850M
Tier 4
Crawler Dozer

PIN NDDC83000 and above
PIN NEDC80000 and above
PIN NFDC80000 and above

OPERATOR'S MANUAL

Part number 47713445
2nd edition English
March 2015
Replaces part number 84512874

CASE CONSTRUCTION

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1 - GENERAL INFORMATION

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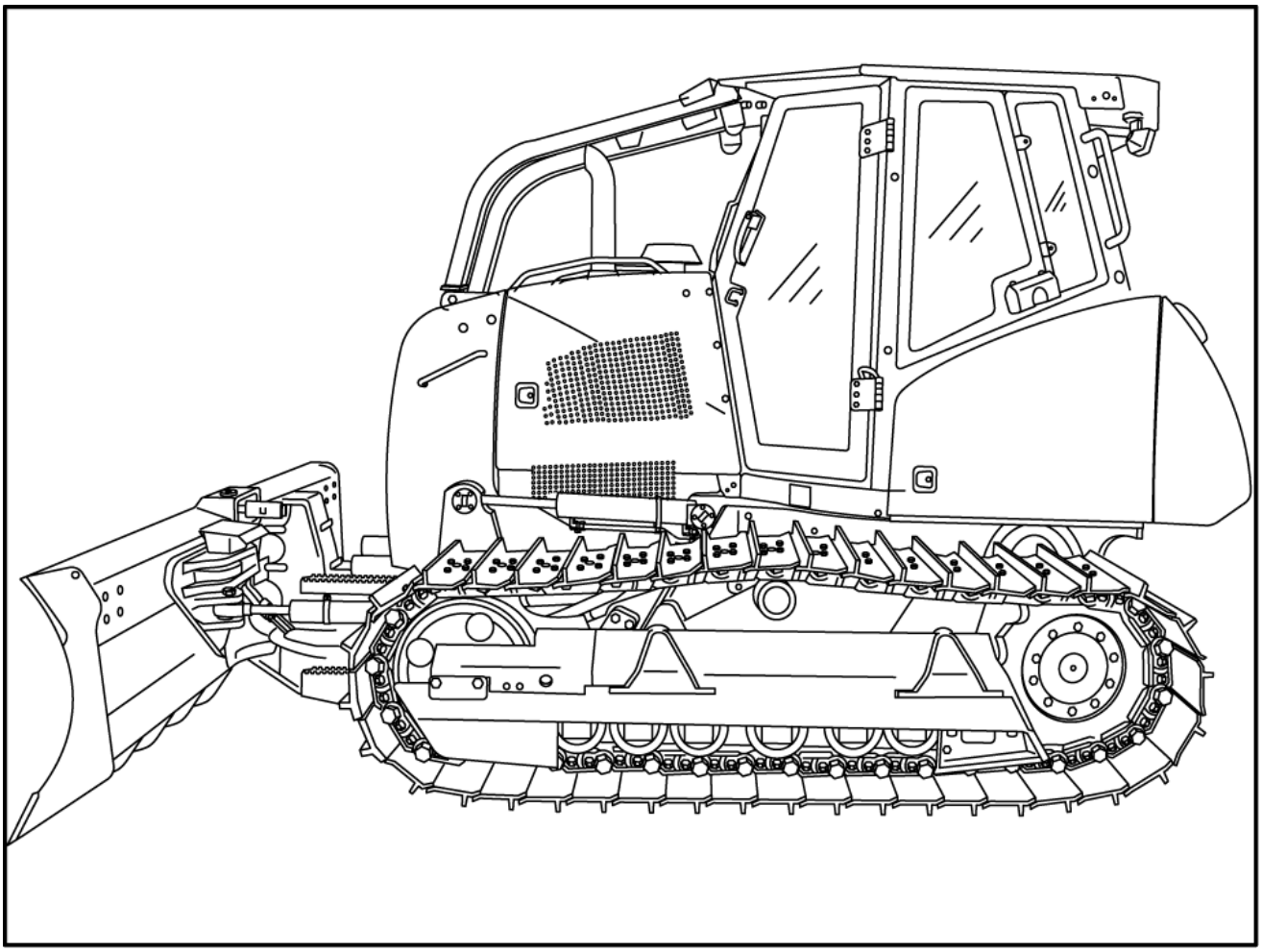


RAIL13DOZ1297GA 1

Read this manual before you start the engine or operate the machine. This manual contains important information about the safe operation and maintenance of your machine. Refer to the index at the back of this manual for locating specific items about your machine. This crawler dozer conforms to current safety regulations.

Consult an authorized dealer or CNH Industrial America LLC on changes, additions, or modifications that can be required for this machine to comply with various country regulations and safety requirements. Unauthorized modifications will cause serious injury or death. Anyone making such unauthorized modifications is responsible for the consequences.

The information in this manual is provided on the basis of information that was available at the time the manual was written. Settings, procedures, part numbers, software, and other items can change. These changes can affect the maintenance performed on the machine. Ensure that you have complete and current information from your dealer before you start any machine operation.

ATTENTION: *The engine and fuel system on your machine is designed and built to government emission standards. Tampering by dealer, customers, operators, and end users is strictly prohibited by law. Failure to comply could result in government fines, rework charges, invalid warranty, legal action, and possible confiscation of the machine until rework to original condition is completed. Engine service and/or repairs must be done by a certified technician only!*

Before you permit a new operator to operate the machine, make sure that:

- The operator reads and understands the instructions in this operator's manual
- The operator understands ALL safety signs on the machine

All persons who will be operating this machine shall possess a valid local vehicle operating permit and/or other applicable local age work permits.

Store this operator's manual in the manual compartment equipped on this machine. Make sure this manual is complete and in good condition. Contact your dealer to obtain additional manuals or manuals in languages other than that of the country of use.

Your CASE CONSTRUCTION dealer is available for any further information. They will also provide any after-sales service you may need, to include genuine CASE CONSTRUCTION spare parts, your guarantee of quality and match. CASE CONSTRUCTION customer assistance is also available. Go to www.casece.com.

This is the safety alert symbol. It is used with and without signal words to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

⚠ WARNING

Illustrations in this manual may show protective shielding open or removed to better illustrate a particular feature or adjustment.
Replace all shields before operating the machine.
Failure to comply could result in death or serious injury.

W0012A

IMPROVEMENTS

CNH Industrial America LLC is continually striving to improve its products. We reserve the right to make improvements or changes when it becomes practical and possible to do so, without incurring any obligation to make changes or additions to the equipment sold previously.

Intended use

DO NOT operate or permit anyone to operate or service this machine until you or the other persons have read and understand the safety, operation, and maintenance instructions in this manual. Use only trained operators who have demonstrated the ability to operate and service this machine correctly and safely.

This crawler, with standard equipment and attachments, is intended to be used for general earth moving purposes such as land leveling and above ground material rehandling.

DO NOT use this machine for any application or purpose other than those described in this manual, on the safety signs, or other product safety information provided with the machine. These materials define the machine's intended use.

If the machine is to be used in an application that involves special attachments or equipment, consult your authorized dealer. Consult an authorized dealer on changes, additions or modifications that can be required for this machine to comply with various country regulations and safety requirements. Unauthorized modifications may cause serious injury or death. Anyone making such unauthorized modifications is responsible for the consequences.

Electro-Magnetic Compatibility (EMC)

Interference may arise as a result of add-on equipment that may not necessarily meet the required standards. As such interference can result in serious malfunction of the unit and/or create unsafe situations, you must observe the following:

- The maximum power of emission equipment (radio, telephones, etc.) must not exceed the limits imposed by the national authorities of the country where you use the machine
- The electro-magnetic field generated by the add-on system should not exceed **24 V/m** at any time and at any location in the proximity of electronic components
- The add-on equipment must not interfere with the functioning of the on board electronics

Failure to comply with these rules will render the CASE CONSTRUCTION warranty null and void.

Product identification

Model, Product Identification Number (PIN), and year of manufacture

Record the machine Product Identification Number (PIN) and additional machine information including the model and the component serial numbers in the spaces below. Always supply this information to your dealer when you order parts, obtain information, or require assistance. Keep a record of these numbers and your Manufacturer's Statement of Origin in a safe place. If the machine is stolen, report the numbers to your local law enforcement agency.

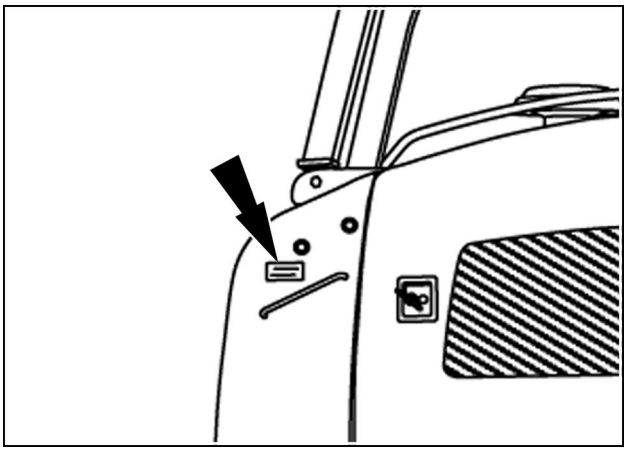
Machine identification

Model name

Product Identification Number (PIN)

Model year

The PIN plate is located on the left-hand side of the machine in front of the engine access door.



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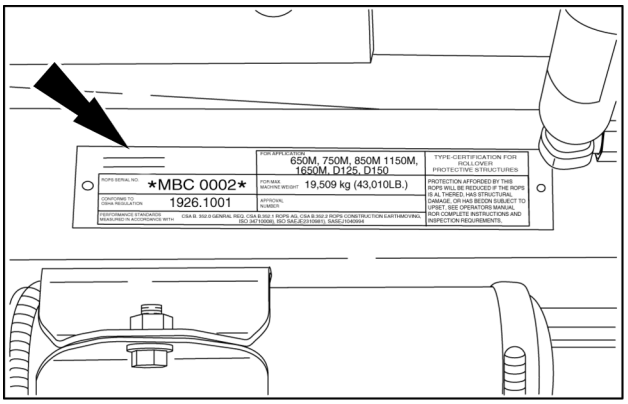
Roll-Over Protective Structure (ROPS)

The ROPS serial number plate is located in the left-hand rear access compartment.

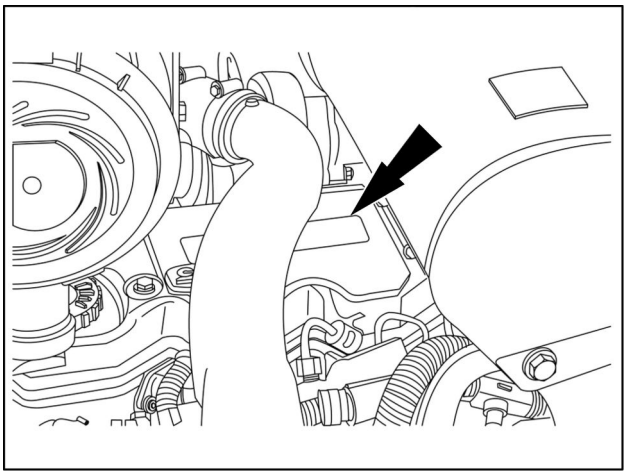


RAIL15DOZ0015AA 2

Engine make and model

Engine serial number

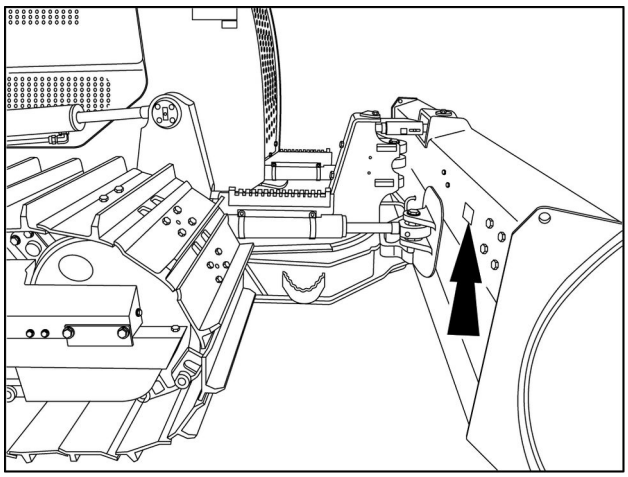
The serial number plate is on the engine valve cover.



RAIL13DOZ0142AA 3

Dozer blade

The serial number plate is on the right-hand side of the dozer blade.



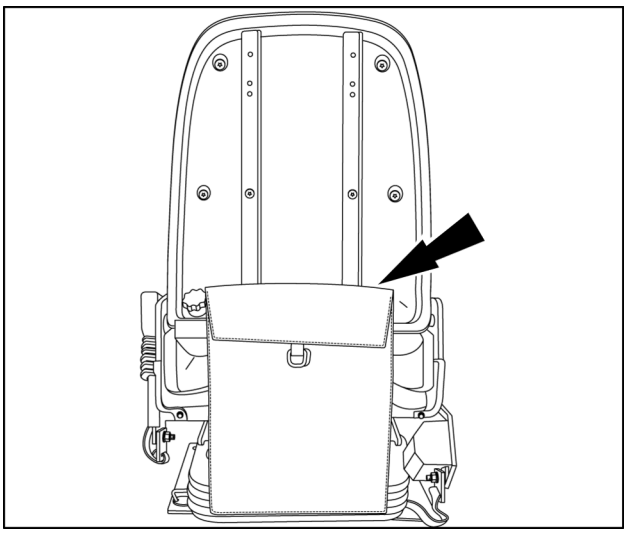
RAIL13DOZ1292AA 4

Operator's manual storage on the machine

The operator’s manual storage compartment is located on the operator’s seat back.

READ THIS MANUAL COMPLETELY and make certain you understand the controls. All equipment has a limit. Make sure you understand the speed, steering, stability, and load characteristics of this machine before you start to operate.

DO NOT remove this manual from the machine. See your dealer for additional manuals. Always keep the operator's manual in the storage compartment provided on the machine. The operator's manual must be available for use by all operators.



RAIL12DOZ0547AA 1

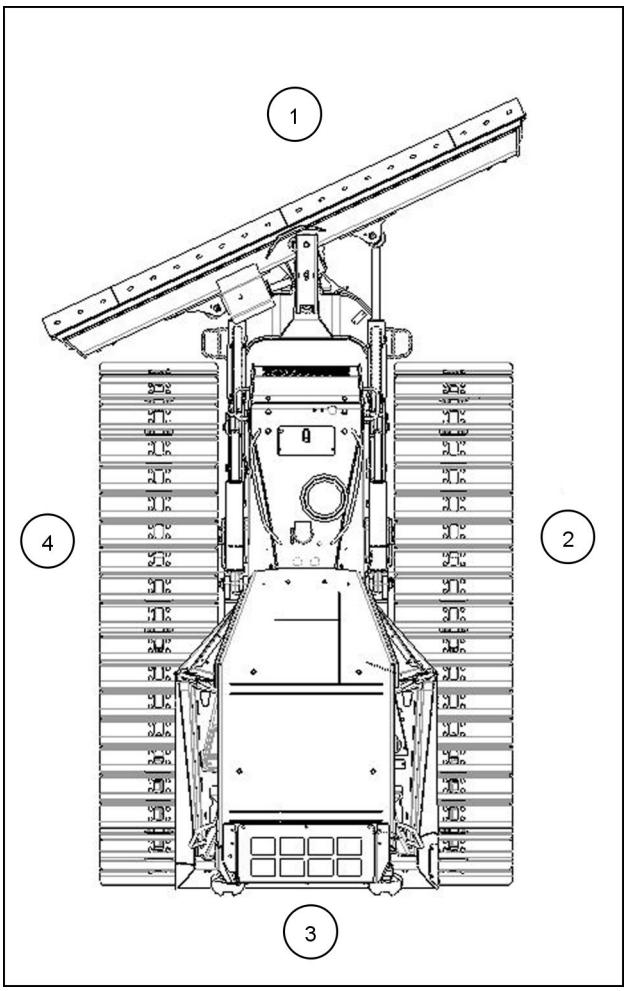
When you see this symbol read your operator's manual.

When you see this symbol refer to your service manual.

Machine orientation

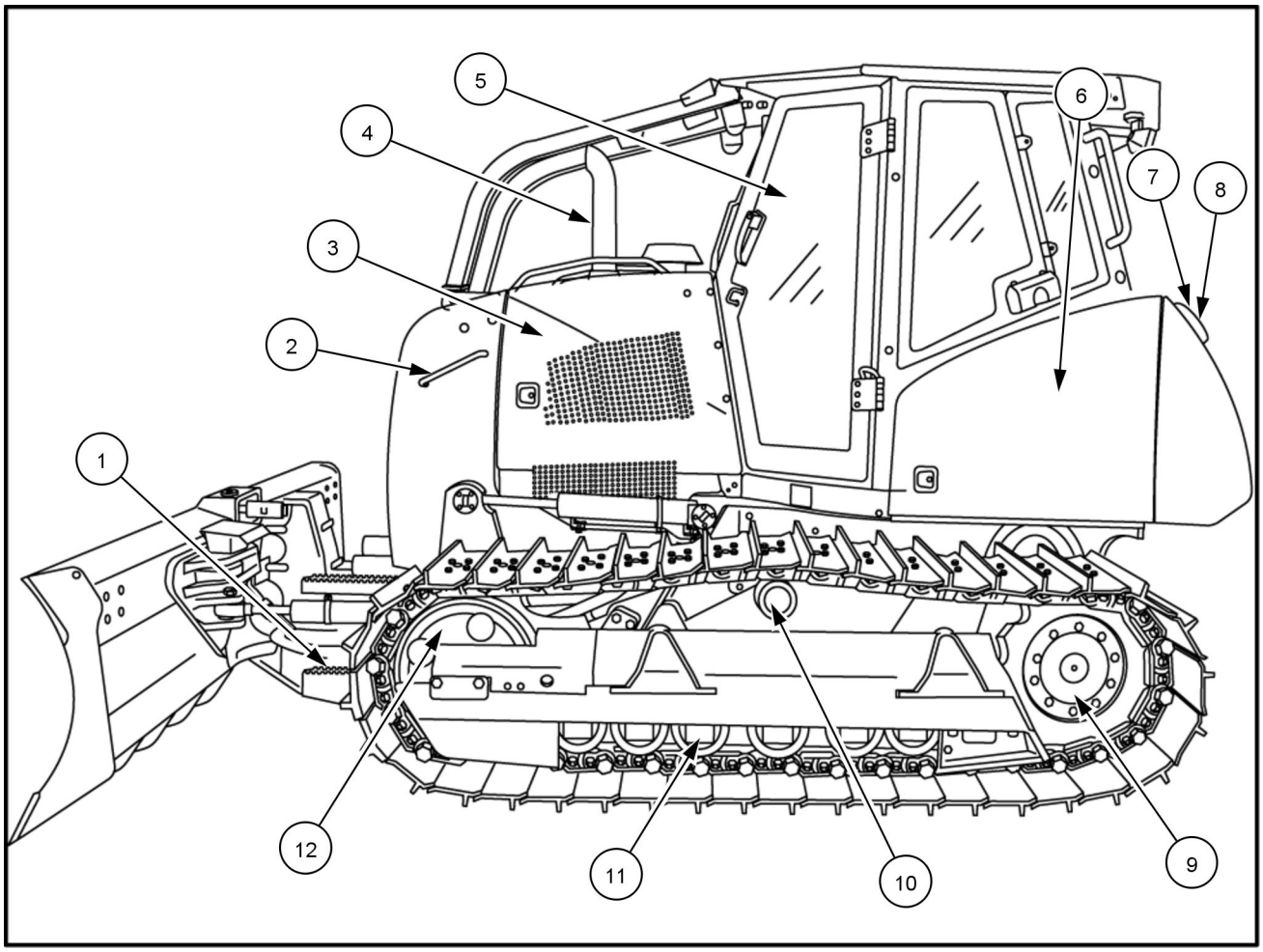
The terms right-hand, left-hand, front, and rear are used in this manual to indicate the sides as they are seen from the operator's seat.

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



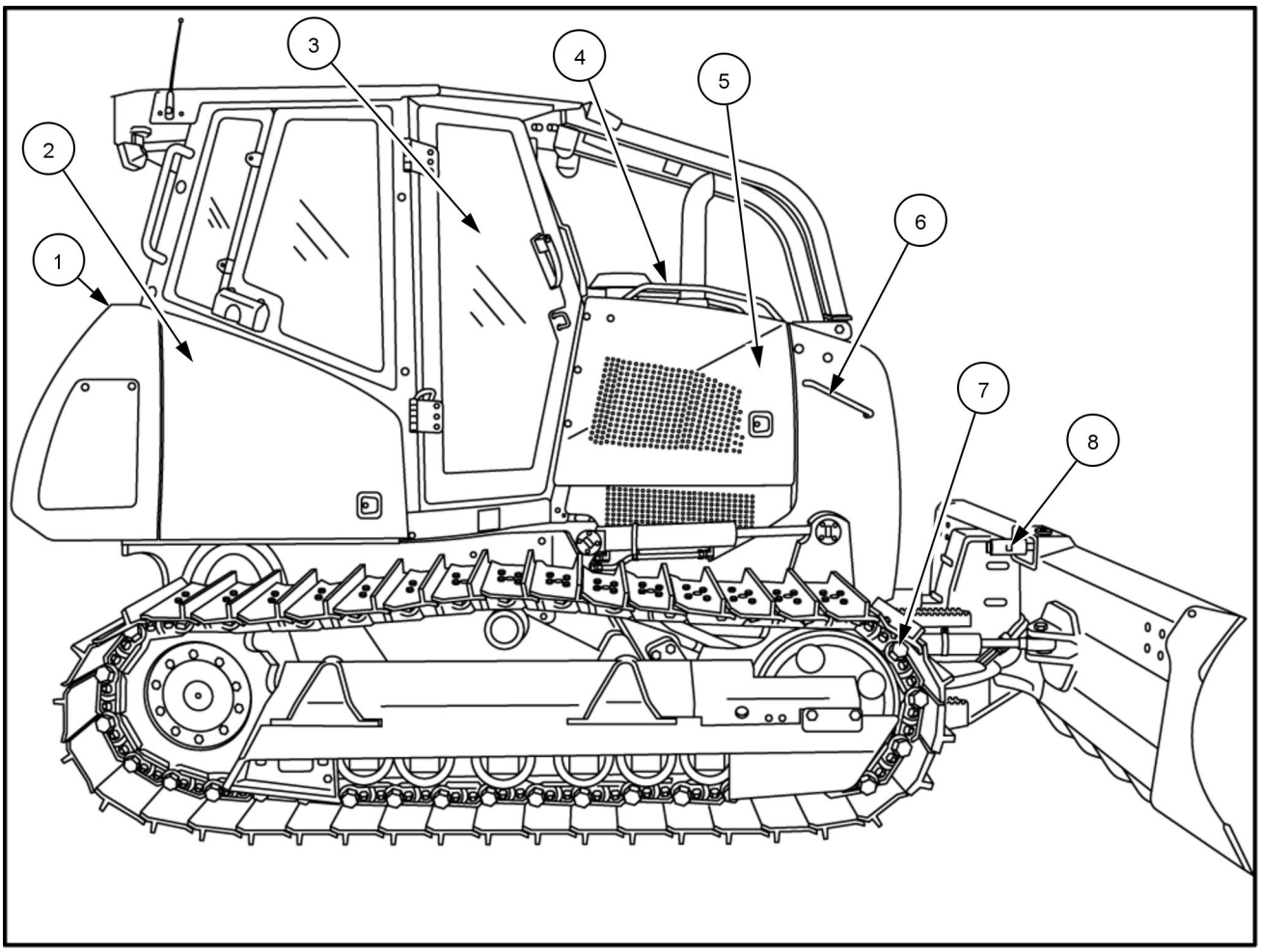
RAPH13DOZ0888CA 1

Machine components



RAIL13DOZ1297GA 1

1. Step
2. Hand hold
3. Left front access door
4. Exhaust
5. Left cab door
6. Left rear access door
7. Fuel fill
8. Diesel exhaust fluid (DEF) fill
9. Final drive planetary
10. Carrier roller
11. Track rollers
12. Idler



RAIL13DOZ1296GA 2

1. Hydraulic oil fill
2. Right rear access door
3. Right cab door
4. Telematics antenna (if equipped)
5. Right front access door
6. Hand hold
7. Track links
8. Blade pitch strut

Selective Catalytic Reduction (SCR) exhaust treatment - Product overview

What is Selective Catalytic Reduction (SCR)?

Your CASE CONSTRUCTION machine is equipped with additional components to comply with national and local exhaust emissions requirements. The main components of the SCR system include the SCR catalyst, the Diesel Exhaust Fluid (DEF)/AdBlue® injection unit, the **DEF/ADBLUE®** tank, and the **DEF/ADBLUE®** dosing control unit.

How does Selective Catalytic Reduction (SCR) work?

During combustion, harmful Nitrogen Oxide (NO_X) molecules are formed in the exhaust. By injecting a **DEF/ADBLUE®** solution into the exhaust prior to a catalyst, the NO_X can be converted to harmless elemental Nitrogen and water. This happens when the NO_X molecules react inside the catalyst with the heat generated by the engine and the ammonia in the **DEF/ADBLUE®** solution.

NOTICE: *Prolonged idling of the machine with no load for more than **6 h** will cause damage to the SCR catalyst.*

During cold engine operation at low engine coolant and ambient air temperatures, water vapor will be visible from the exhaust. This water vapor will resemble steam or light white smoke, and will dissipate as the engine and machine components warm. This water vapor is considered normal.

NOTE: *After engine shutdown, the SCR system will perform a purge cycle, which permits the supply module to continue to run for up to 70 seconds. This is considered normal and requires no action from the operator.*

What is Diesel Exhaust Fluid (DEF)/AdBlue®?

DEF/ADBLUE® is a clear, colorless, non-toxic, aqueous urea solution (**32.5 %**) with a slight ammonia odor. It is used to chemically reduce NO_X emissions from heavy-duty diesel-powered vehicles. **DEF/ADBLUE®** is neither explosive nor harmful to the environment. **DEF/ADBLUE®** is classified under the minimum-risk category of transportable fluids.

International standard **ISO 22241-1** defines **DEF/ADBLUE®** quality. The American Petroleum Institute (API®) has a voluntary certification program for **DEF/ADBLUE®**. To ensure that **DEF/ADBLUE®** satisfies the requirements of ISO 22241, look for the **API® DEF Certification Mark™** whenever you purchase **DEF/ADBLUE®**. API Diesel Exhaust Fluid Certification Mark is a registered trademark of API in the United States and or other countries.

Finding Diesel Exhaust Fluid (DEF)/AdBlue®

Your CASE CONSTRUCTION dealer is fully equipped to accommodate all your **DEF/ADBLUE®** needs.

Case Customer Assistance: 1-866-542-2736
casecustomerassistance.na@cnh.com

Storage, handling, and transport

NOTICE: *Storage temperatures above **30 °C (86 °F)** greatly reduce the shelf life of **DEF/ADBLUE®**.*

DEF/ADBLUE® has a typical shelf life of 6-12 months. Refer to the SHELF LIFE table below. In order for **DEF/ADBLUE®** to remain in a useable condition, storage requirements must be met.

- Store between **-11 °C** (**12 °F**) and **30 °C** (**86 °F**).
- Use only an approved **DEF/ADBLUE®** container. Contact your dealer to obtain proper storage container(s).
- Keep container tightly closed.
- Keep container in a cool, well-ventilated area.
- Keep away from heat and direct sunlight.

If the machine will exceed a four month shut down period:

1. Perform a complete after-run procedure.
2. Drain the **DEF/ADBLUE®** tank.
3. Flush the tank with deionized water.
4. Drain the deionized water

   NOTICE: *Do not disconnect any electrical connections from the **DEF/ADBLUE®** system.*

Machine start-up after extended shutdown:

1. Fill the **DEF/ADBLUE®** tank.
2. Replace the main filter in the supply module.
3. Start the machine.

Thawing

- Your CASE CONSTRUCTION machine is equipped with an internal tank heater to thaw frozen **DEF/ADBLUE®**. Your machine will still function until the **DEF/ADBLUE®** begins to flow. The SCR system will then function normally.

  NOTE: *You may notice a slight reduction in engine torque in high demand situations until the **DEF/ADBLUE®** is fully thawed.*

- Do not heat **DEF/ADBLUE®** for long periods of time at temperatures above **30 °C** (**86 °F**). This causes the solution to decompose, which very slowly decreases the expected shelf life.

NOTICE: *Do not use an anti-gelling or freeze point improver in your **DEF/ADBLUE®**. The **32.5 %** solution is specifically designed to provide the optimum NO_X reduction properties. Any further blending or adjusting of the **DEF/ADBLUE®** mixture will lessen its ability to perform correctly and may cause damage to the SCR components.*

Handling and supply of additives, if any.

- Personal Protective Equipment (PPE) is not required under normal conditions. If splashing is likely, wear eye protection. For prolonged or repeated contact, impervious gloves are recommended. Follow the precautions listed in the SAFETY INFORMATION chapter when handling any service fluid.
- No additives are required.

NOTICE: *Contaminated **DEF/ADBLUE®** can affect the performance of your machine. Follow all instructions in this manual when handling **DEF/ADBLUE®**.*

Shelf life

Constant ambient storage temperature	Minimum shelf life
Less than or equal to **10 °C** (**50 °F**)	36 months
Less than or equal to **25 °C** (**77 °F**) [1]	18 months
Less than or equal to **30 °C** (**86 °F**)	12 months
Less than or equal to **35 °C** (**95 °F**)	6 months
Greater than **35 °C** (**95 °F**)	-[2]
[1] To prevent decomposition of **DEF/ADBLUE®**, prolonged transportation or storage above **25 °C** (**77 °F**) should be avoided.	
[2] Significant loss of shelf life: check every batch before use. See your CASE CONSTRUCTION dealer for more information on testing.	

NOTE: *The main factors taken into account to define the shelf life in the table above are the ambient storage temperature and the initial alkalinity of **DEF/ADBLUE®**. The difference in evaporation between vented and non-vented storage containers is an additional factor.*

NOTE: *The information in this table is for reference only and has been provided by the International Organization for Standardization, Document number **ISO 22241-3** Diesel engines - NO_X reduction agent AUS 32 - Part 3: Handling, transportation and storage.*

***NOTE: DEF/ADBLUE®** that remains in the tank of the machine after the season does not require any special precautions unless storage exceeds the shelf life table above.*

Disposal

- Dispose of **DEF/ADBLUE®** and any filter accumulations in accordance with all applicable Federal, State, and local laws governing waste disposal.

US Environmental Protection Agency (EPA) Warranty Statement

CASE CONSTRUCTION warrants to the ultimate purchaser and each subsequent purchaser that the engine is designed, built and equipped so as to conform with US Environmental Protection Agency (EPA) regulations applicable at the time of manufacture and that it is free from defects in workmanship or material which would cause it not to meet these regulations for a period of:

- 2 years or 1,500 hours of operation, whichever occurs first, for engines less than **19 kW** (**25 Hp**)
- 5 years or 3,000 hours of operation, whichever occurs first, for engines greater than or equal to **19 kW** (**25 Hp**)

NOTE: *This warranty applies to all units operated in the United States or Canada.*

Coverage

The model year, class of diesel engine, and emission application determination for your engine are identified on the Emission Control Information Label. This label is affixed to one of the following areas of the engine: the top of engine's rocker arm cover, the right-hand side of the oil pan, and the right-hand side of the engine front gear cover. The warranty period begins on the date the new equipment is sold to the first retail purchaser. The presence of the emission control label is the indication that the engine conforms to the applicable standards. Any emission control system parts which are proven defective during normal use will be repaired or replaced during the warranty period.

The engine owner has responsibility to perform all the required maintenance listed in the Owner's Manual. CASE CONSTRUCTION will not deny an emission warranty claim solely because no record of maintenance exists; however, a claim may be denied if failure to perform maintenance resulted in the failure of a warranted part

It is recommended that replacement parts used for maintenance or repairs be CASE CONSTRUCTION Service Parts to maintain the quality originally designed into your emission certified engine. The use of non- CASE CONSTRUCTION parts does not invalidate the warranty on other components unless the use of such parts causes damage to warranted parts.

The manufacturer is liable for damages to other engine components caused by the failure of any warranted emission control system part. CASE CONSTRUCTION is not responsible for failures resulting from improper repair or the use of parts that are not genuine CASE CONSTRUCTION or CASE CONSTRUCTION approved parts.

Component coverage

New engines certified for sale and registered will have the following items covered by the emission warranty, depending on the emission level of the engine, if the items were first installed on the new engine as original equipment:

Fuel injection system

- Fuel injection pump
- Fuel injectors
- Fuel injection lines

Air induction system

- Intake manifold
- Turbocharger system (includes exhaust manifold)
- Charge air cooler

Positive Crankcase Ventilation (PCV) system (if applicable)

- PCV valve
- Oil fill cap

Exhaust after treatment Devices (if applicable)

- Diesel Oxidation Catalyst (DOC)
- Diesel Particulate Filter (DPF)
- Selective Catalytic Reduction (SCR)
- Diesel Exhaust Fluid (DEF) tank and dispensing systems

Exhaust Gas Recirculation Systems (EGR)

- EGR valve assembly
- EGR cooler

Cold Start Enrichment Systems

Electronic Control Units, Sensors, Solenoids, and Wiring harnesses used in above systems

Emissions warranty does not cover

- Repairs arising from storage deterioration, failure to maintain the equipment, negligence, alteration, improper use of the equipment, collision or other accident, vandalism, or other casualty, or operation beyond rated capacity or specification.
- Repairs arising from abuse or neglect, including but not limited to: operation without adequate coolant or lubricants, adjustments to the fuel system outside equipment specifications, over-speeding, improper storage, starting, warm-up, or shutdown practices, incorrect fuel or contaminated fuel, oil or other fluids.
- Normal maintenance services, such as engine tune-ups, engine fuel system cleaning, checks, adjustments, shimming, etc.
- Items replaced due to customer demand.
- Labor charges performed by anyone except a dealer authorized by contract to repair the equipment, unless they qualify under special provisions (i.e. outside labor).
- Any and all travel costs for items such as towing, service calls, or transporting a unit to and from the place where the warranty service is performed.
- Normal maintenance costs, including but not limited to: lubricants, coolants, fluids, fuel, filters, and associated labor. Lubricants, filters, and coolants may qualify for warranty reimbursement if they require replacement as a DIRECT RESULT of a defect in material or workmanship.
- Claims involving the inspection or reconditioning of units after storage or prior use.
- Repairs arising from service performed by agents not approved by CASE CONSTRUCTION.
- Repairs arising from any unauthorized modification to the product or the use of non- CASE CONSTRUCTION parts, implements or attachments.
- Removal, replacement, or installation of non- CASE CONSTRUCTION optional equipment, attachments or components.
- Premiums charged for overtime labor costs or out of shop expenses.
- Economic loss including lost profits, crop loss, equipment rental, or other expense.
- Unauthorized modification or updating machines without a warrantable failure.
- Any and all costs of dealer shop supplies incurred with repairs, including but not limited to: solvents, cleaners, anti-seize lubricants, loctite, sealant, adhesive, oil-dry, shop towels, etc.
- Failure of the machine, its implements or attachments caused by improper field application or loading.
- Any and all costs for coolant, fuel, or lube (oil) analysis including supplies and lab recommendations.
- Cost associated with cleaning of machine in preparation for servicing.

California Emission Control Warranty Statement

The California Air Resources Board and FPT Industrial S.p.A. are pleased to explain the emission control system warranty on your 2014 engine. In California, new heavy-duty off-road engines must be designed, built and equipped to meet the State's stringent anti-smog standards. FPT Industrial S.p.A. must warrant the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the fuel injection system and the air induction system. Also included may be hoses, belts, connectors and other emission-related assemblies.

Where a warrantable condition exists, FPT Industrial S.p.A. will repair your heavy-duty off-road engine at no cost to you including diagnosis, parts and labor.

MANUFACTURER'S WARRANTY COVERAGE:

The 2014 and later heavy-duty off-road engines are warranted for 5 years or 3000 hours, whichever comes first. If any emission-related part on your engine is defective, the part will be repaired or replaced by FPT Industrial S.p.A.

OWNER'S WARRANTY RESPONSIBILITIES:

- As the off-road engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual. FPT Industrial S.p.A. recommends that you retain all receipts covering maintenance on your off-road engine, but FPT Industrial S.p.A. cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.
- As the off-road engine owner, you should however be aware that FPT Industrial S.p.A. may deny you warranty coverage if your off-road engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.
- Your engine is designed to operate on (fuel) only. Use of any other fuel may result in your engine no longer operating in compliance with California's emissions requirements.
- You are responsible for initiating the warranty process. The ARB suggests that you present your off-road engine to a FPT Industrial S.p.A. dealer as soon as a problem exists. The warranty repairs should be completed by the dealer as expeditiously as possible.

If you have any questions regarding your warranty rights and responsibilities, you should contact Technical Service at 630-917-0759.

CALIFORNIA EMISSION CONTROL WARRANTY PARTS LIST

Fuel injection system:

- Fuel injection pump
- Fuel injectors
- Fuel injection lines

Air induction system:

- Intake manifold
- Turbocharger system (includes exhaust manifold)
- Charge air cooler

Positive Crankcase Ventilation (PCV) system (if applicable)

- PCV valve
- Oil fill cap

Exhaust after treatment Devices (if applicable)

- Diesel Oxidation Catalyst (DOC)
- Diesel Particulate Filter (DPF)
- Selective Catalytic Reduction (SCR)
- Diesel Exhaust Fluid (DEF) tank and dispensing systems

Exhaust Gas Recirculation Systems (EGR)

- EGR valve assembly
- EGR cooler

Cold Start Enrichment Systems

Electronic Control Units, Sensors, Solenoids, and Wiring harnesses used in above systems

2 - SAFETY INFORMATION

Safety rules and signal word definitions

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 and on machine safety signs, 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. The color associated with DANGER is RED.

⚠ WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury. The color associated with WARNING is ORANGE.

⚠ CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury. The color associated with CAUTION is YELLOW.

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 damage or property damage. The color associated with Notice is BLUE.*

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine damage 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.

Safety rules

⚠ General safety rules ⚠

Use caution when you operate the machine on slopes. Raised equipment, full tanks and other loads will change the center of gravity of the machine. The machine can tip or roll over when near ditches and embankments or uneven surfaces.

Never permit anyone other than the operator to ride on the machine.

Never operate the machine under the influence of alcohol or drugs, or while you are otherwise impaired.

When digging or using ground-engaging attachments, be aware of buried cables. Contact local utilities to determine the locations of services.

Pay attention to overhead power lines and hanging obstacles. High voltage lines may require significant clearance for safety.

Hydraulic oil or diesel fuel leaking under pressure can penetrate the skin, causing serious injury or infection.

- DO NOT use your hand to check for leaks. Use a piece of cardboard or paper.
- Stop the engine, remove the key, and relieve the pressure before you connect or disconnect fluid lines.
- Make sure that all components are in good condition. Tighten all connections before you start the engine or pressurize the system.
- If hydraulic fluid or diesel fuel penetrates the skin, seek medical attention immediately.
- Continuous long term contact with hydraulic fluid may cause skin cancer. Avoid long term contact and wash the skin promptly with soap and water.

Keep clear of moving parts. Loose clothing, jewelry, watches, long hair, and other loose or hanging items can become entangled in moving parts.

Wear protective equipment when appropriate.

DO NOT attempt to remove material from any part of the machine while it is being operated or while components are in motion.

Make sure that all guards and shields are in good condition and properly installed before you operate the machine. Never operate the machine with shields removed. Always close access doors or panels before you operate the machine.

Dirty or slippery steps, ladders, walkways, and platforms can cause falls. Make sure these surfaces remain clean and clear of debris.

A person or pet within the operating area of a machine can be struck or crushed by the machine or its equipment. DO NOT allow anyone to enter the work area.

Raised equipment and/or loads can fall unexpectedly and crush persons underneath. Never allow anyone to enter the area underneath raised equipment during operation.

Never operate the engine in enclosed spaces as harmful exhaust gases may build up.

Before you start the machine, be sure that all controls are in neutral or park lock position.

Start the engine only from the operator's seat. If you bypass the safety start switch, the engine can start with the transmission in gear. Do not connect or short across terminals on the starter solenoid. Attach jumper cables as described in the manual. Starting in gear may cause death or serious injury.

Always keep windows, mirrors, and all lighting clean to provide the best possible visibility while you operate the machine.

Operate controls only when seated in the operator's seat, except for those controls expressly intended for use from other locations.

Before you leave the machine:

1. Park the machine on a firm, level surface.
2. Put all controls in neutral or park lock position.
3. Engage the parking brake. Use wheel chocks if required.
4. Lower all hydraulic equipment — Implements, header, etc.
5. Turn off the engine and remove the key.

When, due to exceptional circumstances, you would decide to keep the engine running after you leave the operator's station, then you must follow these precautions:

1. Bring the engine to low idle speed.
2. Disengage all drive systems.
3. **⚠ WARNING**

   Some components may continue to run down after disengaging drive systems.
   Make sure all drive systems are fully disengaged.
   Failure to comply could result in death or serious injury.

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   Shift the transmission into neutral.
4. Apply the parking brake.

⚠ General maintenance safety ⚠

Keep the area used for servicing the machine clean and dry. Clean up spilled fluids.

Service the machine on a firm, level surface.

Install guards and shields after you service the machine.

Close all access doors and install all panels after servicing the machine.

Do not attempt to clean, lubricate, clear obstructions, or make adjustments to the machine while it is in motion or while the engine is running.

Always make sure that working area is clear of tools, parts, other persons and pets before you start operating the machine.

Unsupported hydraulic cylinders can lose pressure and drop the equipment, causing a crushing hazard. Do not leave equipment in a raised position while parked or during service, unless the equipment is securely supported.

Jack or lift the machine only at jack or lift points indicated in this manual.

Incorrect towing procedures can cause accidents. When you tow a disabled machine follow the procedure in this manual. Use only rigid tow bars.

Stop the engine, remove the key, and relieve pressure before you connect or disconnect fluid lines.

Stop the engine and remove the key before you connect or disconnect electrical connections.

Scalding can result from incorrect removal of coolant caps. Cooling systems operate under pressure. Hot coolant can spray out if you remove a cap while the system is hot. Allow the system to cool before you remove the cap. When you remove the cap, turn it slowly to allow pressure to escape before you completely remove the cap.

Replace damaged or worn tubes, hoses, electrical wiring, etc.

The engine, transmission, exhaust components, and hydraulic lines may become hot during operation. Take care when you service such components. Allow surfaces to cool before you handle or disconnect hot components. Wear protective equipment when appropriate.

When welding, follow the instructions in the manual. Always disconnect the battery before you weld on the machine. Always wash your hands after you handle battery components.

⚠ Fire and explosion prevention ⚠

Fuel or oil that is leaked or spilled on hot surfaces or electrical components can cause a fire.

Crop materials, trash, debris, bird nests, or flammable material can ignite on hot surfaces.

Always have a fire extinguisher on or near the machine.

Make sure that the fire extinguisher(s) is maintained and serviced according to the manufacturer's instructions.

At least once each day and at the end of the day, remove all trash and debris from the machine especially around hot components such as the engine, transmission, exhaust, battery, etc. More frequent cleaning of your machine may be necessary depending on the operating environment and conditions.

At least once each day, remove debris accumulation around moving components such as bearings, pulleys, belts, gears, cleaning fans, etc. More frequent cleaning of your machine may be necessary depending on the operating environment and conditions.

Inspect the electrical system for loose connections and frayed insulation. Repair or replace loose or damaged parts.

Do not store oily rags or other flammable material on the machine.

Do not weld or flame cut any items that contain flammable material. Clean items thoroughly with non-flammable solvents before welding or flame-cutting.

Do not expose the machine to flames, burning brush, or explosives.

Promptly investigate any unusual smells or odors that may occur during operation of the machine.

⚠ General battery safety ⚠

Always wear eye protection when you work with batteries.

Do not create sparks or have open flame near a battery.

Ventilate the area when you charge a battery or use a battery in an enclosed area.

Disconnect the negative (-) terminal first and reconnect the negative (-) terminal last.

When you weld on the machine, disconnect both terminals of the battery.

Do not weld, grind, or smoke near a battery.

When you use auxiliary batteries or connect jumper cables to start the engine, use the procedure shown in the operator's manual. Do not short across terminals.

Follow the manufacturer's instructions when you store and handle batteries.

Battery post, terminals, and related accessories contain lead and lead compounds. Wash hands after handling. This is a California Proposition 65 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.

Keep out of reach of children and other unauthorized persons.

⚠ Operator presence system ⚠

Your machine is equipped with an operator presence system to prevent the use of some features while the operator is not in the operator's seat.

Never disconnect or bypass the operator presence system.

If the operator presence system is inoperable, then it must be repaired.

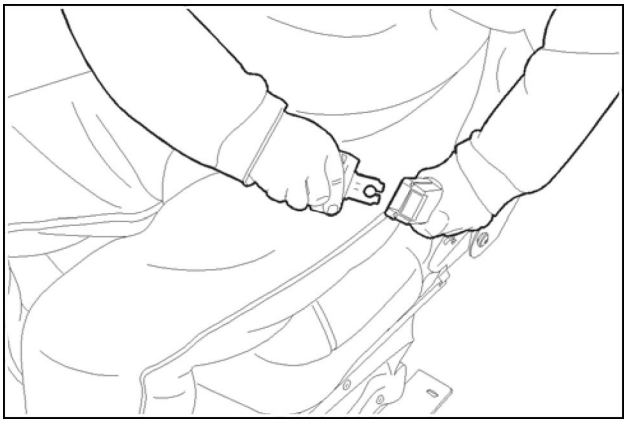
⚠ Seat belts ⚠

Seat belts must be worn at all times.

Seat belt inspection and maintenance:

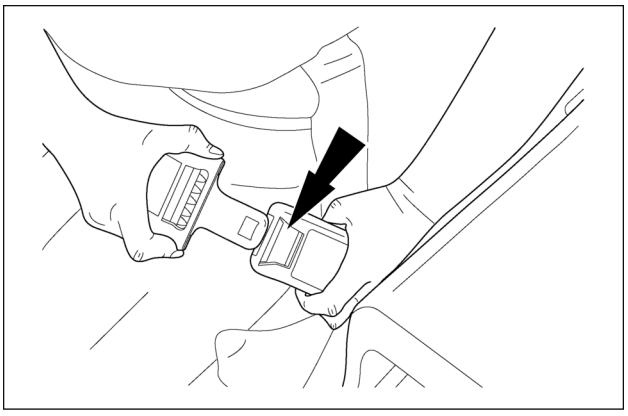
- Keep seat belts in good condition.
- Keep sharp edges and items than can cause damage away from the belts.
- Periodically check belts, buckles, retractors, tethers, slack take-up system, and mounting bolts for damage and wear.
- Replace all parts that have damage or wear.
- Replace belts that have cuts that can make the belt weak.
- Check that bolts are tight on the seat bracket or mounting.
- If the belt is attached to the seat, make sure that the seat or seat brackets are mounted securely.
- Keep seat belts clean and dry.
- Clean belts only with soap solution and warm water.
- Do not use bleach or dye on the belts because this can make the belts weak.

Pull the right-hand belt from the seat belt retractor. Fasten the metal belt end into the left-hand buckle.



RCIL10CWL037AAL 1

Press the red button on the left-hand seat belt mechanism to release the seat belt.



RCIL10CWL083FAL 2

⚠ Operator protective structure ⚠

Your machine is equipped with an operator protective structure, such as: a Roll Over Protective Structure (ROPS), Falling Objects Protective Structure (FOPS), or a cab with a ROPS. A ROPS may be a can frame or a two-posted or four-posted structure used for the protection of the operator to minimize the possibility of serious injury. The mounting structure and fasteners forming the mounting connection with the machine are part of the ROPS.

The protective structure is a special safety component of your machine.

DO NOT attach any device to the protective structure for pulling purposes. DO NOT drill holes to the protective structure.

The protective structure and interconnecting components are a certified system. Any damage, fire, corrosion, or modification will weaken the structure and reduce your protection. If this occurs, THE PROTECTIVE STRUCTURE MUST BE REPLACED so that it will provide the same protection as a new protective structure. Contact your dealer for protective structure inspection and replacement.

After an accident, fire, tip over, or roll over, the following MUST be performed by a qualified technician before returning the machine to field or job-site operations:

- The protective structure MUST BE REPLACED.
- The mounting or suspension for the protective structure, operator's seat and suspension, seat belts and mounting components, and wiring within the operator's protective system MUST be carefully inspected for damage.
- All damaged parts MUST BE REPLACED.

DO NOT WELD, DRILL HOLES, ATTEMPT TO STRAIGHTEN, OR REPAIR THE PROTECTIVE STRUCTURE. MODIFICATION IN ANY WAY CAN REDUCE THE STRUCTURAL INTEGRITY OF THE STRUCTURE, WHICH COULD CAUSE DEATH OR SERIOUS INJURY IN THE EVENT OF FIRE, TIP OVER, ROLL OVER, COLLISION, OR ACCIDENT.

Seat belts are part of your protective system and must be worn at all times. The operator must be held to the seat inside the frame in order for the protective system to work.

⚠ Air-conditioning system ⚠

The air-conditioning system is under high pressure. Do not disconnect any lines. The release of high pressure can cause serious injury.

The air-conditioning system contains gases that are harmful to the environment when released into the atmosphere. Do not attempt to service or repair the system.

Only trained service technicians can service, repair, or recharge the air-conditioning system.

⚠ Backup alarm system ⚠

Do not disconnect backup alarm system if so equipped.

⚠ Personal Protective Equipment (PPE) ⚠

Wear Personal Protective Equipment (PPE) such as hard hat, eye protection, heavy gloves, hearing protection, protective clothing, etc.

⚠ Do Not Operate tag ⚠

Before you start servicing the machine, attach a 'Do Not Operate' warning tag to the machine in an area that will be visible.

⚠ Hazardous chemicals ⚠

If you are exposed to or come in contact with hazardous chemicals you can be seriously injured. The fluids, lubricants, paints, adhesives, coolant, etc. required for the function of your machine can be hazardous. They may be attractive and harmful to domestic animals as well as humans.

Material Safety Data Sheets (MSDS) provide information about the chemical substances within a product, safe handling and storage procedures, first aid measures, and procedures to take in the event of a spill or accidental release. MSDS are available from your dealer.

Before you service your machine check the MSDS for each lubricant, fluid, etc. used in this machine. This information indicates the associated risks and will help you service the machine safely. Follow the information in the MSDS, and on manufacturer containers, as well as the information in this manual, when you service the machine.

Dispose of all fluids, filters, and containers in an environmentally safe manner according to local laws and regulations. Check with local environmental and recycling centers or your dealer for correct disposal information.

Store fluids and filters in accordance with local laws and regulations. Use only appropriate containers for the storage of chemicals or petrochemical substances.

Keep out of reach or children or other unauthorized persons.

Applied chemicals require additional precautions. Obtain complete information from the manufacturer or distributor of the chemicals before you use them.

⚠ Utility safety ⚠

When digging or using ground-engaging equipment, be aware of buried cables and other services. Contact your local utilities or authorities, as appropriate, to determine the locations of services.

Make sure that the machine has sufficient clearance to pass in all directions. Pay special attention to overhead power lines and hanging obstacles. High voltage lines may require significant clearance for safety. Contact local authorities or utilities to obtain safe clearance distances from high voltage power lines.

Retract raised or extended components, if necessary. Remove or lower radio antennas or other accessories. Should a contact between the machine and an electric power source occur, the following precautions must be taken:

- Stop the machine movement immediately.
- Apply the parking brake, stop the engine, and remove the key.
- Check if you can safely leave the cab or your actual position without contact with electrical wires. If not, stay in your position and call for help. If you can leave your position without touching lines, jump clear of the machine to make sure that you do not make contact with the ground and the machine at the same time.
- Do not permit anyone to touch the machine until power has been shut off to the power lines.

⚠ Electrical storm safety ⚠

Do not operate machine during an electrical storm.

If you are on the ground during an electrical storm, stay away from machinery and equipment. Seek shelter in a permanent, protected structure.

If an electrical storm should strike during operation, remain in the cab. Do not leave the cab or operator’s platform. Do not make contact with the ground or objects outside the machine.

⚠ Mounting and dismounting ⚠

Mount and dismount the machine only at designated locations that have handholds, steps, and/or or ladders.

Do not jump off of the machine.

Make sure that steps, ladders, and platforms remain clean and clear of debris and foreign substances. Injury may result from slippery surfaces.

Face the machine when you mount and dismount the machine.

Maintain a three-point contact with steps, ladders, and handholds.

Never mount or dismount from a moving machine.

Do not use the steering wheel or other controls or accessories as handholds when you enter or exit the cab or operator's platform.

⚠ Working at heights ⚠

When the normal use and maintenance of the machine requires you to work at heights:

- Correctly use installed steps, ladders, and railings.
- Never use ladders, steps, or railings while the machine is moving.
- Do not stand on surfaces that are not designated as steps or platforms.

Do not use the machine as a lift, ladder, or platform for working at heights.

⚠ Lifting and overhead loads ⚠

Never use loader buckets, forks, etc. or other lifting, handling, or digging equipment to lift persons.

Do not use raised equipment as a work platform.

Know the full area of movement of the machine and equipment and do not enter or permit anyone to enter the area of movement while the machine is in operation.

Never enter or permit anyone to enter the area underneath raised equipment. Equipment and/or loads can fall unexpectedly and crush persons underneath it.

Do not leave equipment in raised position while parked or during service, unless securely supported. Hydraulic cylinders must be mechanically locked or supported if they are left in a raised position for service or access.

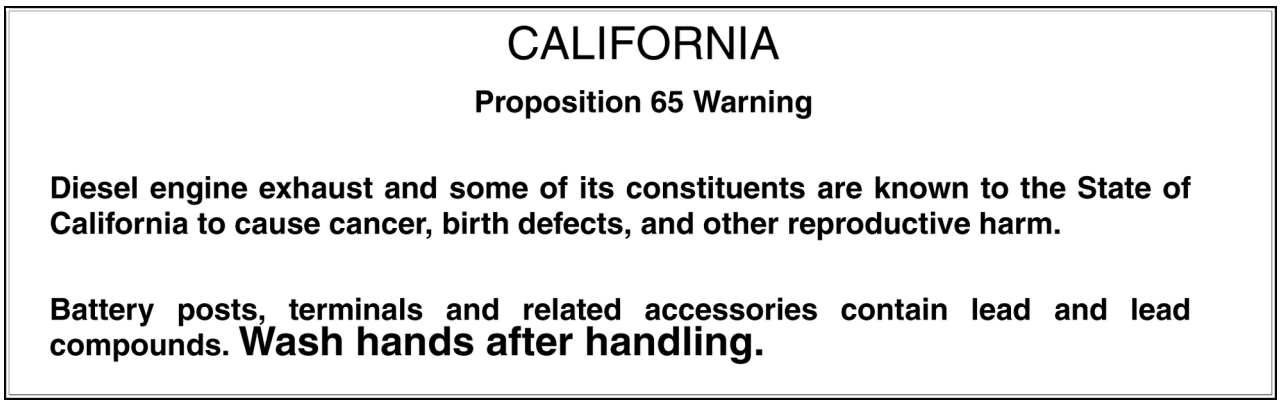
Loader buckets, forks, etc. or other lifting, handling, or digging equipment and its load will change the center of gravity of the machine. This can cause the machine to tip on slopes or uneven ground.

Load items can fall off the loader bucket or lifting equipment and crush the operator. Care must be taken when lifting a load. Use proper lifting equipment.

Do not lift load higher than necessary. Lower loads to transport. Remember to leave appropriate clearance to the ground and other obstacles.

Equipment and associated loads can block visibility and cause an accident. Do not operate with insufficient visibility.

Safety rules — California Proposition 65 Warning



RCIL08CCH001EAA 1

California Proposition 65 Warning

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

Battery posts, terminals and related accessories contain lead and lead compounds. Wash hands after handling.

Operator's seat belt

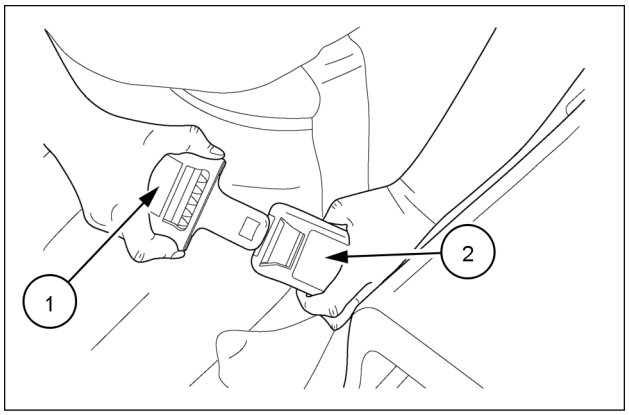
⚠ WARNING

Roll-over hazard!
Securely fasten the seat belt. Your machine is equipped with a Roll-Over Protective Structure (ROPS) cab, ROPS canopy, or ROPS frame for your protection. The seat belt can help ensure your safety if it is properly used and maintained. Never wear a seat belt loosely or with slack in the belt system. Failure to comply could result in death or serious injury.

W0143A

Seat belt

1. Insert the metal end of the right-hand belt strap into the latch mechanism on the left-hand side of the seat.
2. Press on the red button on the left-hand side mechanism to unlatch the seat belt.



RCIL10CWL083FAL 1

1. Right-hand belt strap
2. Latch mechanism

Ecology and the environment

Soil, air, and water quality is important for all industries and life in general. When legislation does not yet rule the treatment of some of the substances that advanced technology requires, sound judgment should govern the use and disposal of products of a chemical and petrochemical nature.

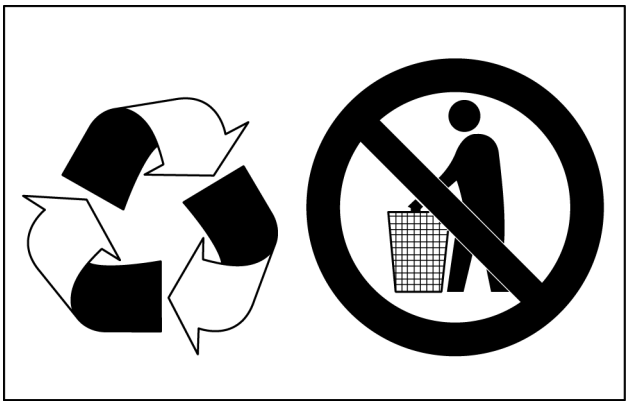
Familiarize yourself with the relative legislation applicable to your country, and make sure that you understand this legislation. Where no legislation exists, obtain information from suppliers of oils, filters, batteries, fuels, anti-freeze, cleaning agents, etc., with regard to the effect of these substances on man and nature and how to safely store, use, and dispose of these substances. Your CASE CONSTRUCTION dealer can also provide assistance.

Helpful hints

- Avoid the use of cans or other inappropriate pressurized fuel delivery systems to fill tanks. Such delivery systems may cause considerable spillage.
- In general, avoid skin contact with all fuels, oils, acids, solvents, etc. Most of these products contain substances that may be harmful to your health.
- Modern oils contain additives. Do not burn contaminated fuels and or waste oils in ordinary heating systems.
- Avoid spillage when you drain fluids such as used engine coolant mixtures, engine oil, hydraulic fluid, brake fluid, etc. Do not mix drained brake fluids or fuels with lubricants. Store all drained fluids safely until you can dispose of the fluids in a proper way that complies with all local legislation and available resources.
- Do not allow coolant mixtures to get into the soil. Collect and dispose of coolant mixtures properly.
- Do not open the air-conditioning system yourself. It contains gases that should not be released into the atmosphere. Your CASE CONSTRUCTION dealer or air-conditioning specialist has a special extractor for this purpose and can recharge the system properly.
- Repair any leaks or defects in the engine cooling system or hydraulic system immediately.
- Do not increase the pressure in a pressurized circuit as this may lead to a component failure.
- Protect hoses during welding. Penetrating weld splatter may burn a hole or weaken hoses, allowing the loss of oils, coolant, etc.

Battery recycling

Batteries and electric accumulators contain several substances that can have a harmful effect on the environment if the batteries are not properly recycled after use. Improper disposal of batteries can contaminate the soil, groundwater, and waterways. CASE CONSTRUCTION strongly recommends that you return all used batteries to a CASE CONSTRUCTION dealer, who will dispose of the used batteries or recycle the used batteries properly. In some countries, this is a legal requirement.



NHIL14GEN0038AA 1

Mandatory battery recycling

NOTE: *The following requirements are mandatory in Brazil.*

Batteries are made of lead plates and a sulfuric acid solution. Because batteries contain heavy metals such as lead, CONAMA Resolution 401/2008 requires you to return all used batteries to the battery dealer when you replace any batteries. Do not dispose of batteries in your household garbage.

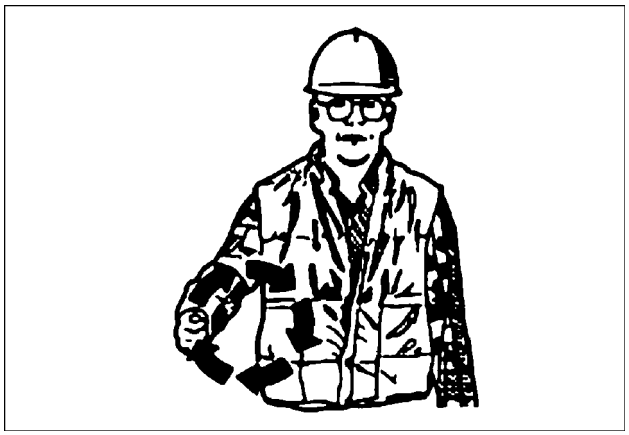
Points of sale are obliged to:

- Accept the return of your used batteries
- Store the returned batteries in a suitable location
- Send the returned batteries to the battery manufacturer for recycling

Hand signals

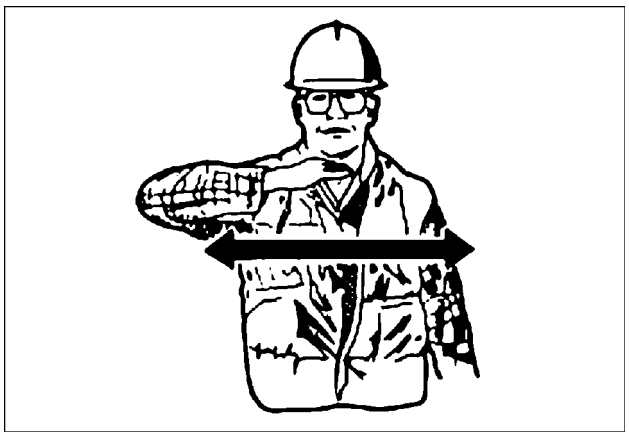
When operating the machine, never attempt to carry out tasks calling for fine control or to work in areas where visibility is poor or impaired without seeking the assistance of a signal person. Make perfectly sure that you and the signal person understand the signals to be used.

Start the engine.



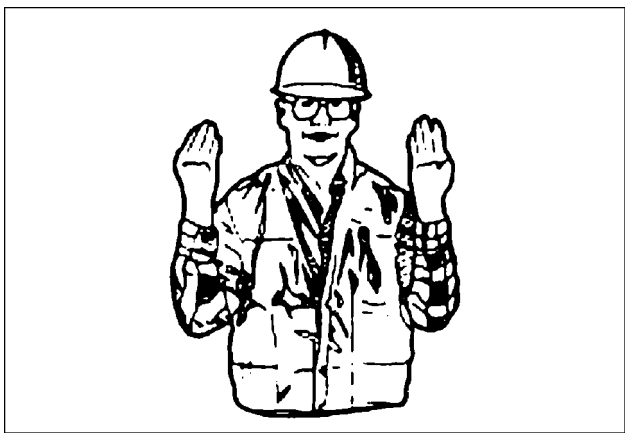
RAIL15DOZ0052AA 1

Stop the engine.



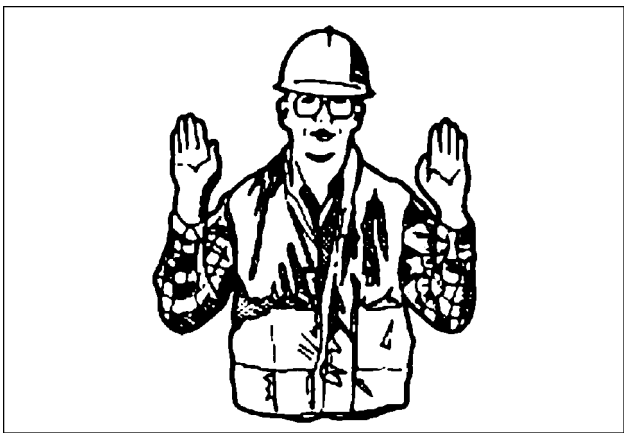
RAIL15DOZ0053AA 2

Come to me.
Wave hands back and forth (palms inward).



RAIL15DOZ0054AA 3

Move away from me.
Wave hands back and forth (palms outward).

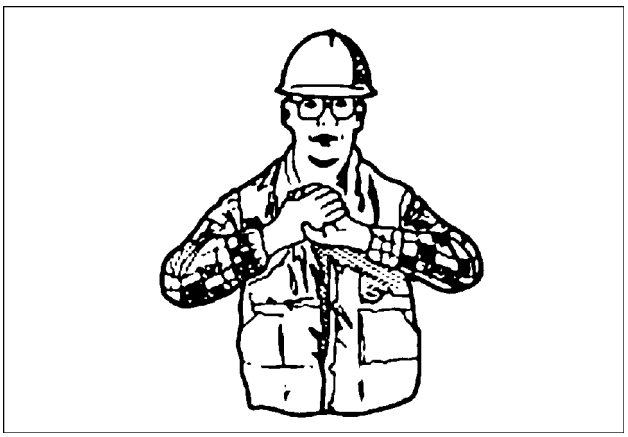


RAIL15DOZ0055AA 4

Go this far.

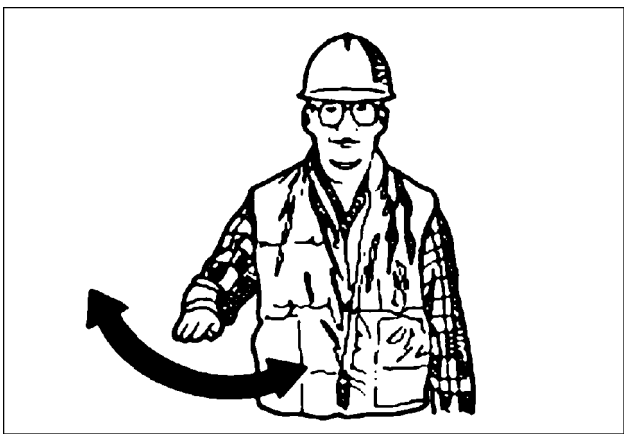
RAIL15DOZ0056AA 5

All stop and hold.



RAIL15DOZ0057AA 6

Stop
Move one hand back and forth.

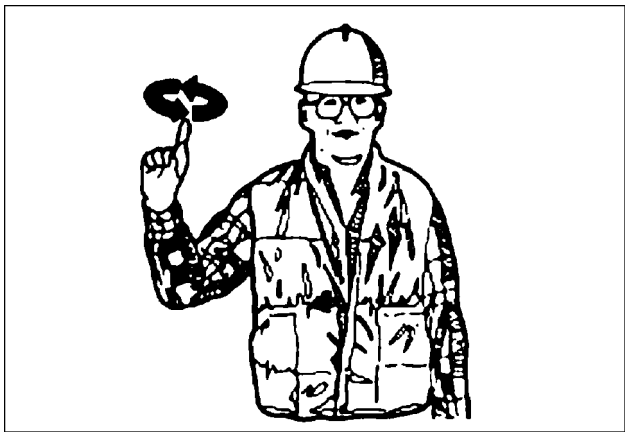


RAIL15DOZ0058AA 7

Emergency stop
Move both hands back and forth.

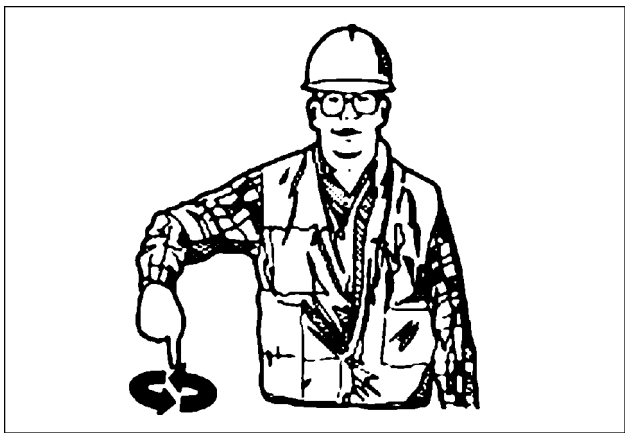
RAIL15DOZ0059AA 8

Raise the tool.



RAIL15DOZ0060AA 9

Lower the tool.



RAIL15DOZ0061AA 10

Safety signs

⚠ WARNING

Avoid injury!
An illegible or missing safety sign can have far-reaching consequences. Inspect safety signs daily. Clean and replace damaged safety signs as necessary.
Failure to comply could result in death or serious injury.

W0167A

The following safety signs are on your machine as a guide for your safety and for the safety of those working with you. Walk around the machine and note the content and the location of all safety signs before you operate your machine.

Keep all safety signs clean and legible. Clean safety signs with a soft cloth, water, and a gentle detergent.

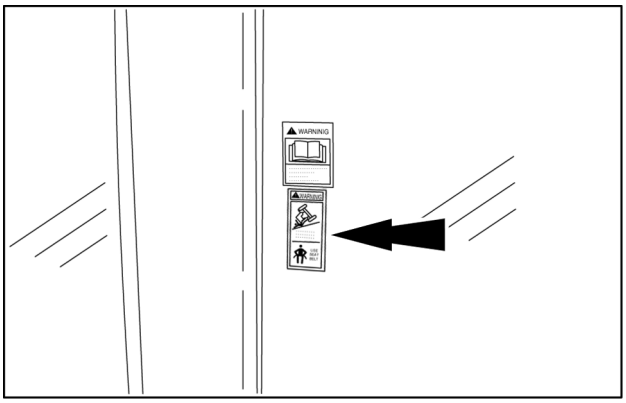
NOTICE: *Do not use solvent, gasoline, or other harsh chemicals. Solvents, gasoline, and other harsh chemicals may damage or remove safety signs.*

Replace all safety signs that are damaged, missing, painted over, or illegible. If a safety sign is on a part you or your dealer replaces, make sure that you our your dealer install the safety sign on the new part. See your dealer for replacement safety signs.

Safety signs that display the “Read operator’s manual” symbol direct you to the operator’s manual for further information regarding maintenance, adjustments, or procedures for particular areas of the machine. When a safety sign displays this symbol, consult the appropriate page of the operator’s manual.

Safety signs that display the “Read service manual” symbol direct you to the service manual. If you doubt your ability to perform service operations, contact your dealer.

WARNING — Use your seat belt

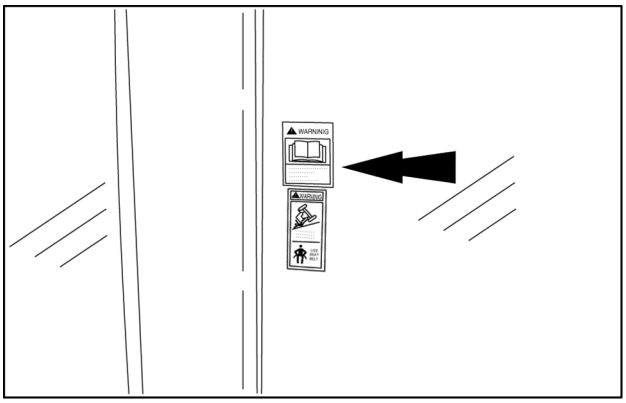


RAPH13DOZ1479AA 1

This WARNING safety sign is located on right hand glass in the operator's compartment.
WARNING — Avoid crushing. Do not jump if machine tips. Use seat belt. Failure to comply with this warning could result in death or serious injury.
English safety sign number: 321-7030
French safety sign number: 87706391
Spanish safety sign number: 87706391

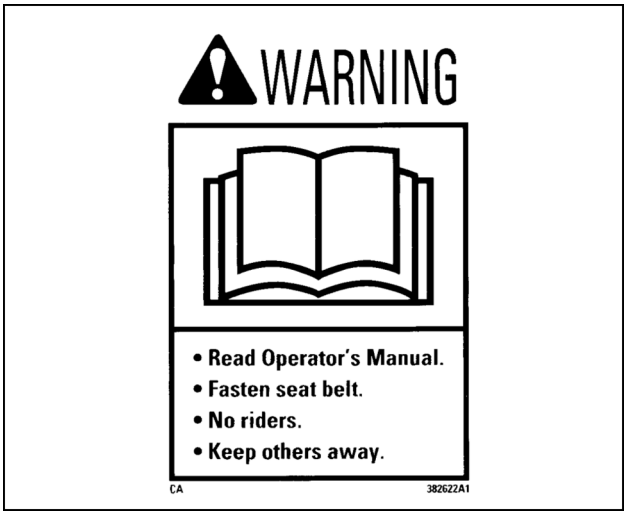
RCIL10WHL008EAL 2

WARNING — Read the operator's manual



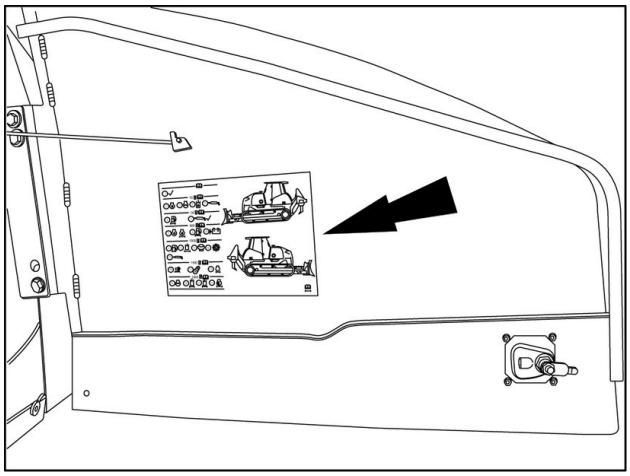
RAPH13DOZ1479AA 3

This WARNING safety sign is located on the right hand glass in the operator's compartment.
WARNING — Read the Operator's Manual. Fasten seat belt. No riders. Keep others away. Failure to comply with this warning could result in death or serious injury.
English safety sign number: 382622A1
French safety sign number: 87706389
Spanish safety sign number: 87706389



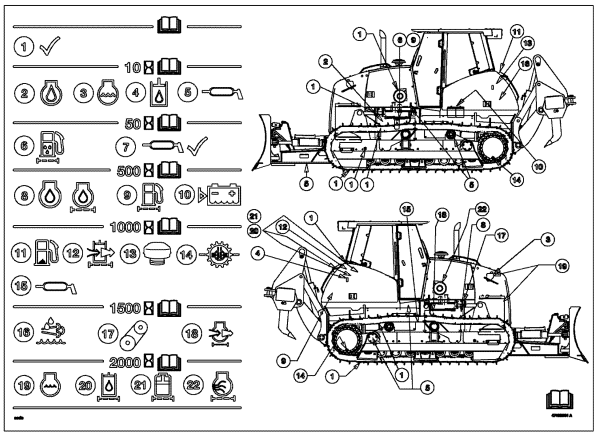
RCPH10WHL043BAH 4

Maintenance information



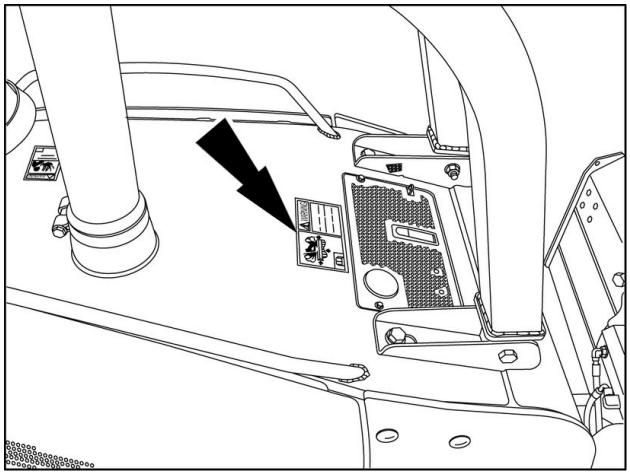
RAIL13DOZ1285AA 5

This informational sign is located on the left rear access compartment door. It indicates machine maintenance intervals.
Informational sign number: 47460564



47460564 6

WARNING — Hot liquid under pressure

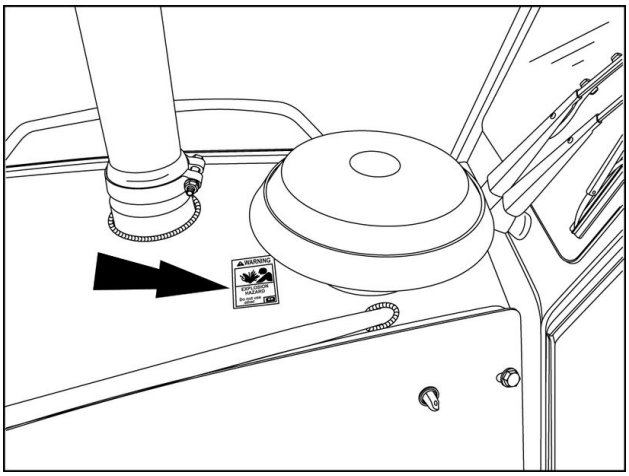


RAIL14DOZ0579AA 7

This WARNING safety sign is located on top of the hood above the coolant fill tank cover.
WARNING — Hot liquid under pressure hazard. Service when cool. Failure to comply with this warning could result in death or serious injury.
English safety sign number: 329044A1
French safety sign number: 87706392
Spanish safety sign number: 87706392

329044A1 8

WARNING — Explosion hazard

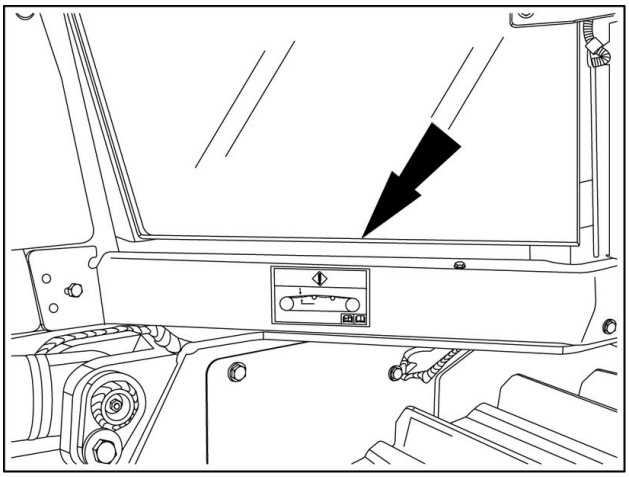


RAIL14DOZ0575AA 9

This WARNING safety sign is located on top of the hood.
WARNING — Explosion hazard. Do not use ether. Failure to comply with this warning could result in death or serious injury.
English safety sign number: 8603092
French safety sign number: 8603095
Spanish safety sign number: 8603095

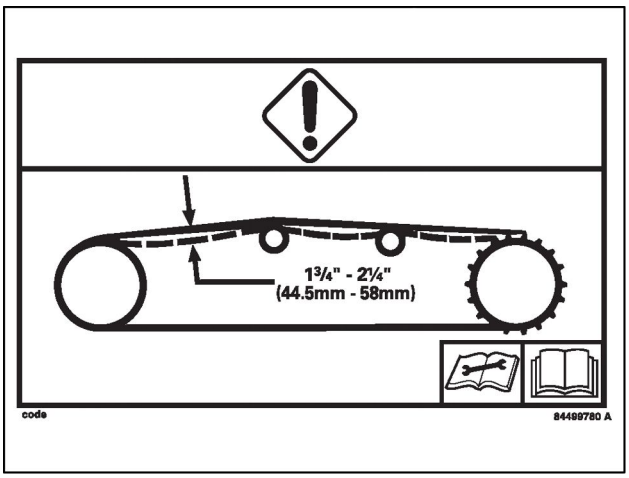
8603092 10

Track tension information



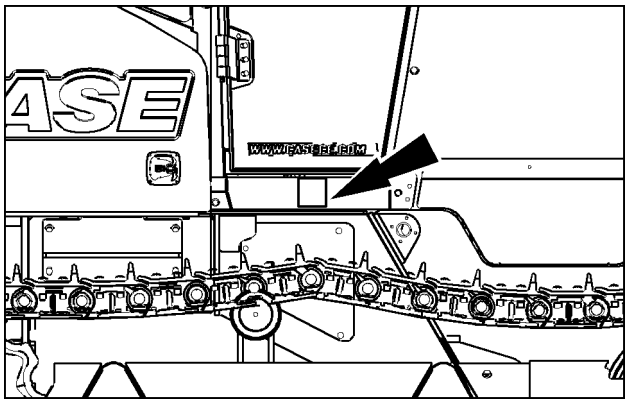
RAIL13DOZ0246AA 11

This informational sign is located on the left-hand side of the machine above the tracks. It indicates the correct tension of the track.
Informational sign number: 84499780



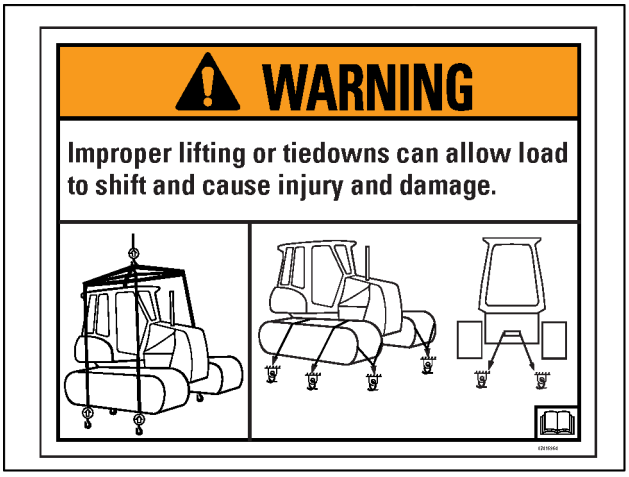
84499780 12

WARNING — Crush hazard



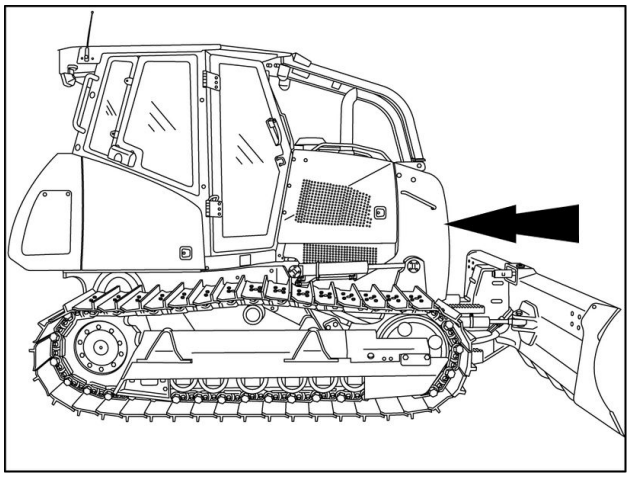
RAPH12DOZ0062AA 13

This WARNING safety sign is located on the right-hand side of the machine above the tracks.
WARNING — Improper lifting or tiedowns can allow load to shift and cause injury or damage. Failure to comply with this warning could result in death or serious injury.
Safety sign number: 87416964



87416964 14

WARNING — Pinch hazard

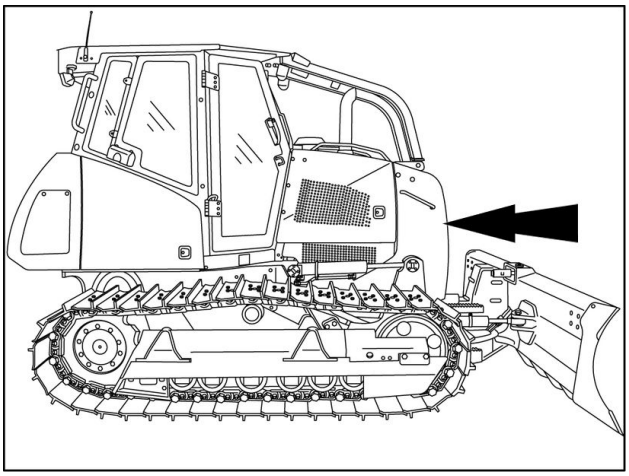


RAIL13DOZ1294AA 15

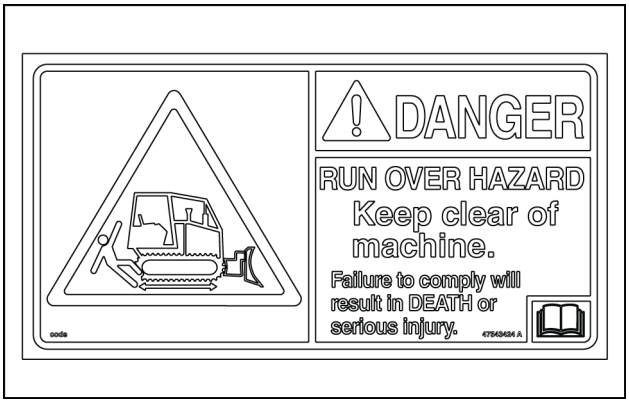
This WARNING safety sign is located on both sides of the machine just in front of the engine access doors.
WARNING — Pinch hazard keep clear. Failure to comply could result in death or serious injury.
English safety sign number: 84394350
French safety sign number: 87741372
Spanish safety sign number: 87741372

84394350 16

DANGER — Run over hazard



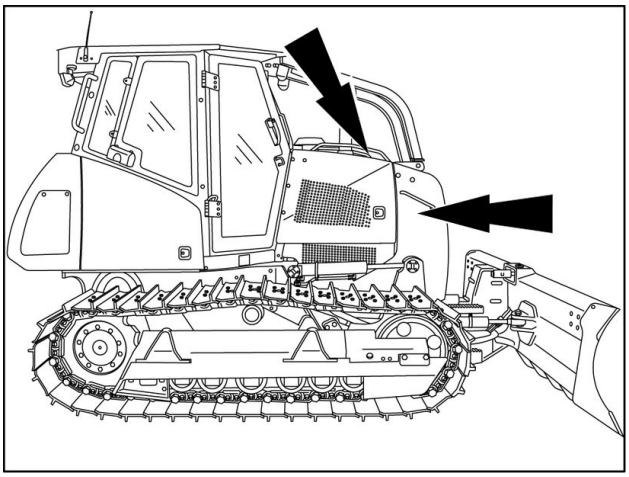
RAIL13DOZ1294AA 17



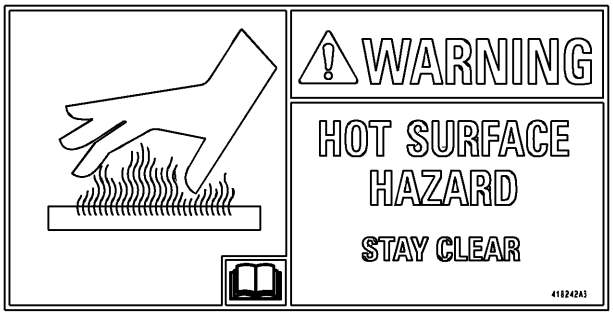
47543424 18

This DANGER safety sign is located on both sides of the machine just in front of the engine access doors.
DANGER — Run over hazard keep clear of machine. Failure to comply will result in death or serious injury.
English safety sign number: 47543424
French safety sign number: 87719507
Spanish safety sign number: 87719507

WARNING — Hot surface hazard



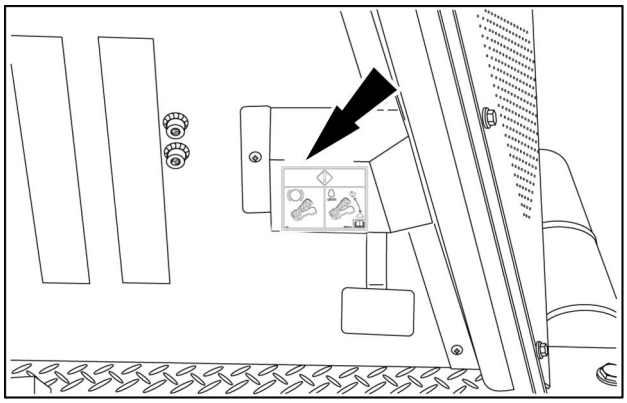
RAIL13DOZ1294AA 19



418242A3 20

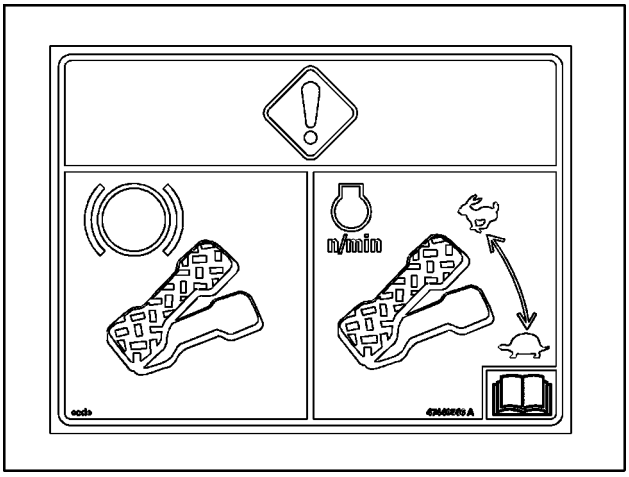
This WARNING safety sign is located on both sides of the machine just in front of the engine access doors, and also on top of the hood.
WARNING — Hot surface hazard stay clear. Failure to comply could result in death or serious injury.
English safety sign number: 418242A3
French safety sign number: 87415865
Spanish safety sign number: 87415865

Deceleration or transmission pedal information



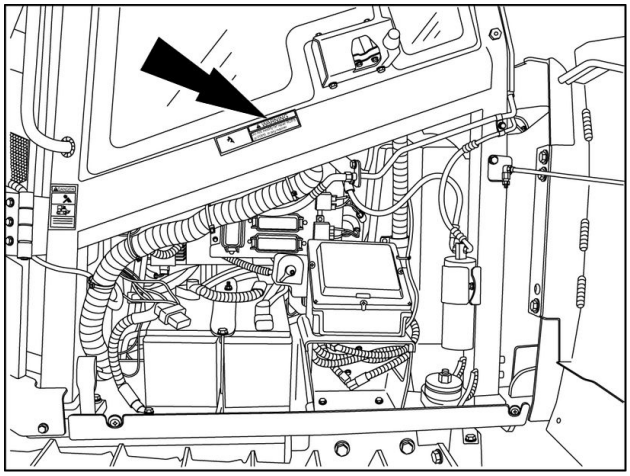
RAIL12DOZ1254AA 21

This informational sign is located above the deceleration or transmission pedal inside the operator's compartment.
The deceleration pedal reduces the engine RPM. The transmission pedal de-strokes the hydraulics. Depress the pedal to slow the machine. Release the pedal to increase the machine speed. Failure to comply with this warning could result in death or serious injury. (This is a dual function pedal-deceleration or transmission).
Informational sign number: 47449566



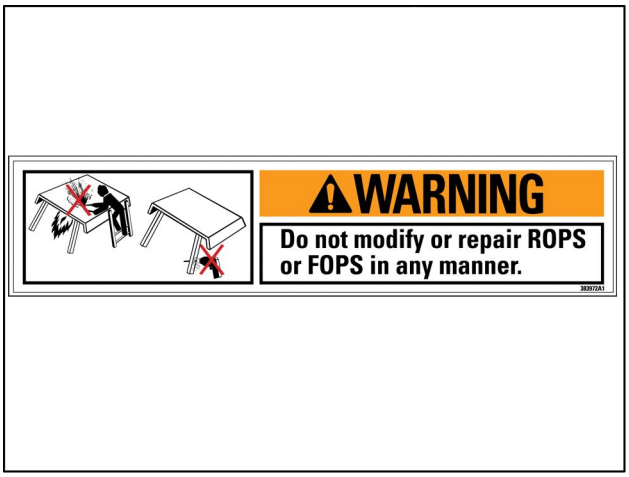
RAIL12DOZ1253AA 22

WARNING — Rollover Protection Structure (ROPS)



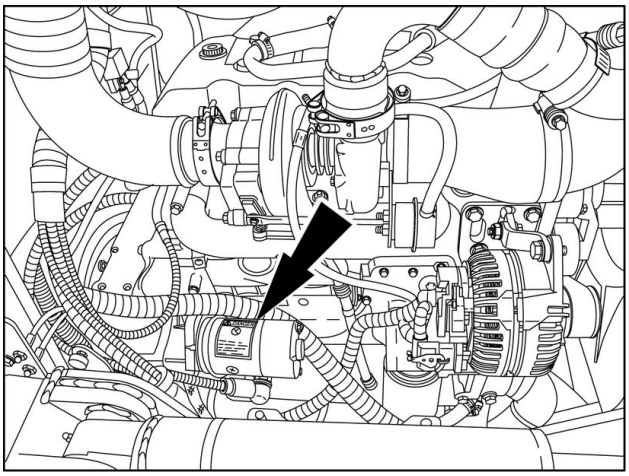
RAIL13DOZ1286AA 23

This WARNING safety sign is located inside the left rear access compartment.
WARNING — Do not modify or repair ROPS or FOPS in any manner. Failure to comply with this warning could result in death or serious injury.
English safety sign number: 383972A1
French safety sign number: 87715063
Spanish safety sign number: 87715063

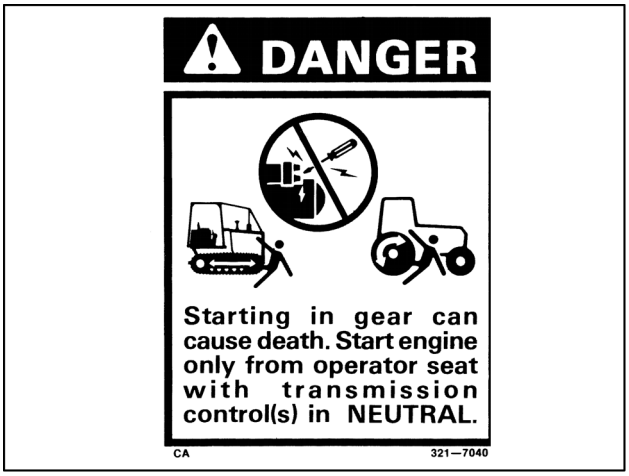


383972A1 24

DANGER — Unexpected movement hazard



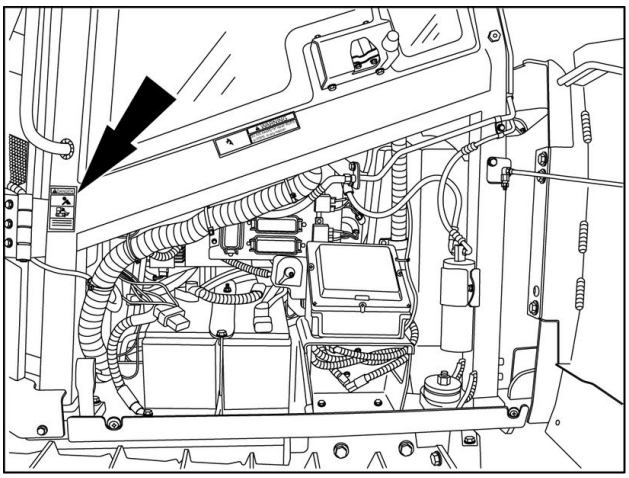
RAIL13DOZ1535AA 25



3217040 26

This DANGER safety sign is located in the right front engine compartment.
DANGER — Starting in gear can cause death. Start engine only from the operator's seat with the transmission control(s) in neutral. Failure to comply with this warning will result in death or serious injury.
English safety sign number: 321–7040
French safety sign number: 87706393
Spanish safety sign number: 87706393

DANGER — Explosion hazard/Run over hazard

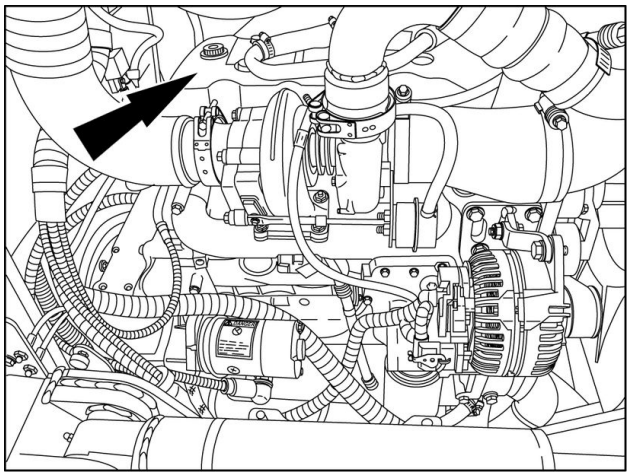


RAIL13DOZ1286AA 27

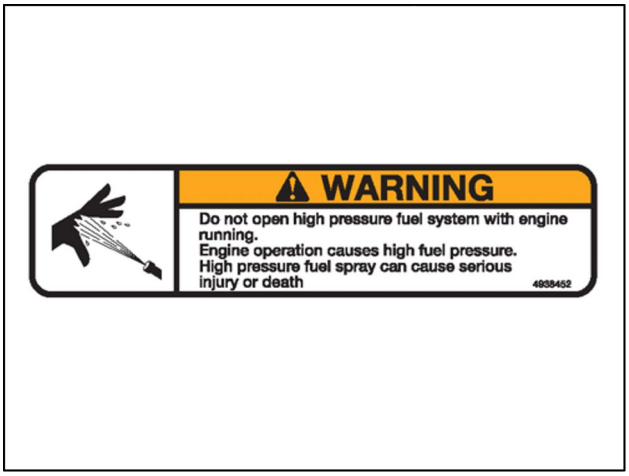
383973A1 28

This DANGER safety sign is located in the left rear access compartment.
DANGER — Explosion hazard/Run over hazard. Read procedure in operator's manual before jump start or service. Failure to comply will result in death or serious injury.
English safety sign number: 383973A1
French safety sign number: 87706390
Spanish safety sign number: 87706390

WARNING — Pressurized fluid hazard



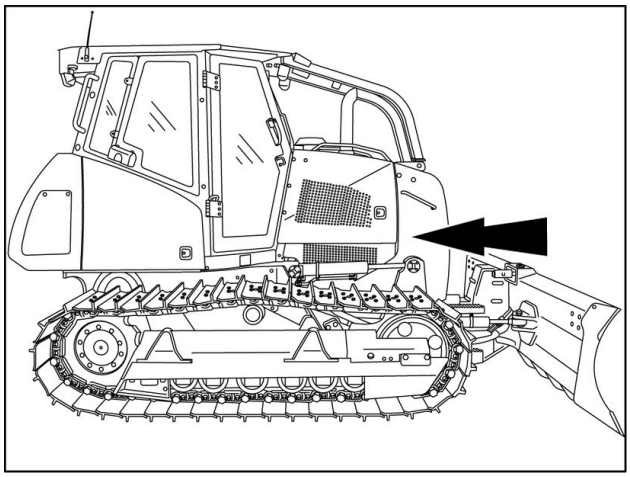
RAIL13DOZ1535AA 29



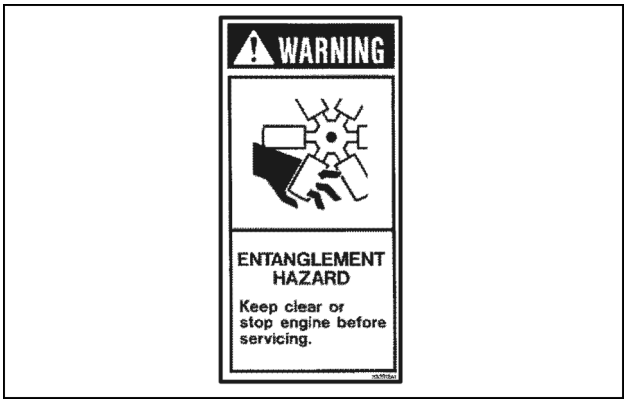
84242780 30

This WARNING safety sign is located in the front access compartment on the engine valve cover.
WARNING — Do not open high pressure fuel system with engine running. Engine operation causes high fuel pressure. High pressure fuel spray can cause serious injury or death. Failure to comply with this warning could result in death or serious injury.
English safety sign number: 84242780
French safety sign number: 87378042
Spanish safety sign number: 87378042

WARNING — Entanglement hazard



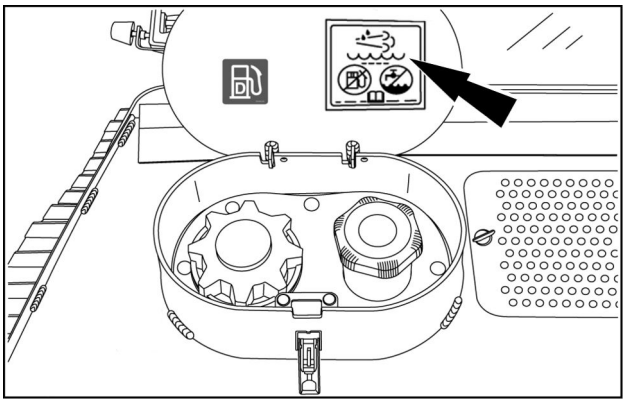
RAIL13DOZ1294AA 31



332512A1 32

This WARNING safety sign is located on both sides of the machine just in front of the engine access doors.
WARNING — Entanglement hazard. Keep clear or stop engine before servicing. Failure to comply with this warning could result in death or serious injury.
English safety sign number: 332512A1
French safety sign number: 332511A1
Spanish safety sign number: 332511A1

Diesel Exhaust Fluid/AdBlue® (DEF) fill location

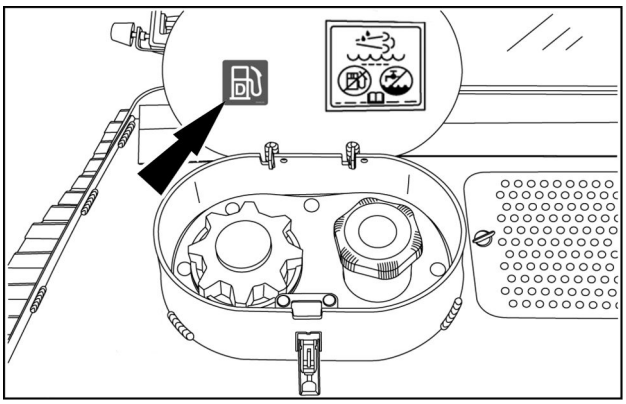


RAPH13DOZ1541AA 33

This informational sign is located under the fuel fill and DEF fill cover. It cautions against filling the DEF tank with fuel or water. Adding fuel or water to the DEF tank will cause engine damage. Read this operator's manual for further information.
Informational sign number: 84284896

84284896A 34

Diesel fuel fill location

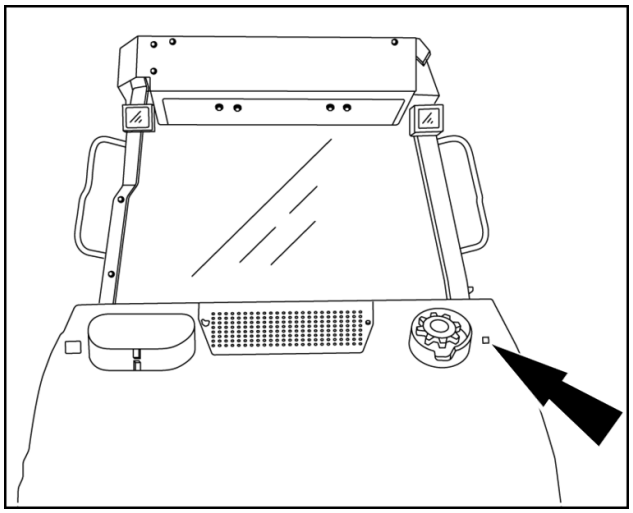


RAPH13DOZ1541AA 35

This informational sign is located under the diesel fuel fill and DEF fill cover. It indicates the correct diesel fuel fill location.
Informational sign number: 85804338

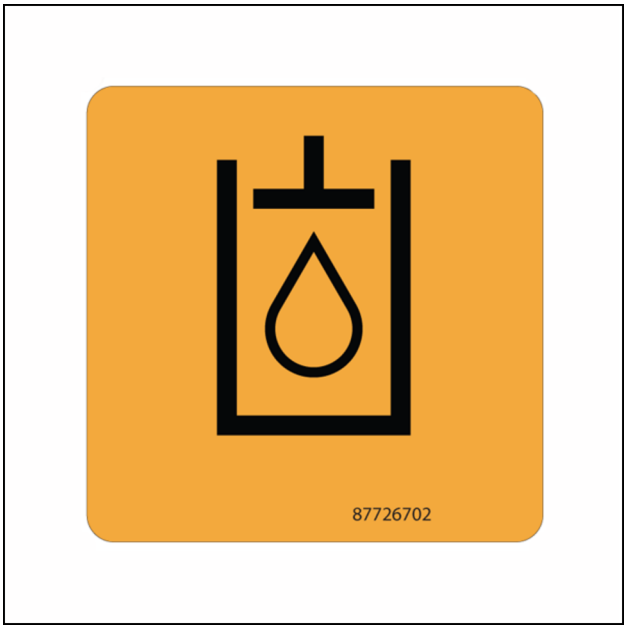
85804338 36

Hydraulic oil fill location



RAIL15DOZ0062AA 37

This informational sign is located next to the hydraulic oil fill. It indicates the correct hydraulic oil fill location.
ISO sign number: 87726702



87726702 38

3 - CONTROLS AND INSTRUMENTS

ACCESS TO OPERATOR'S PLATFORM

Proper entry and exit

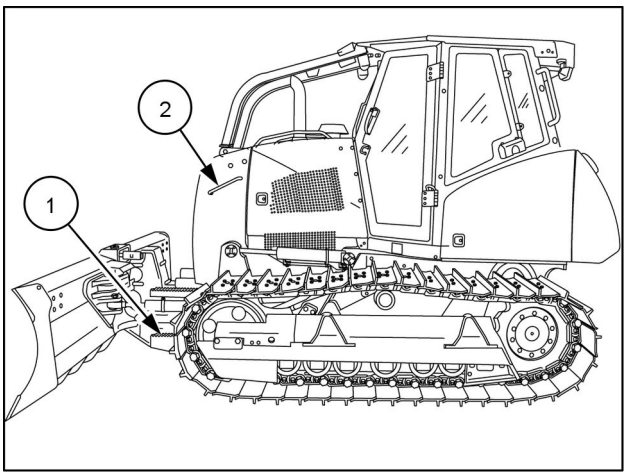
Steps and hand holds

⚠ WARNING

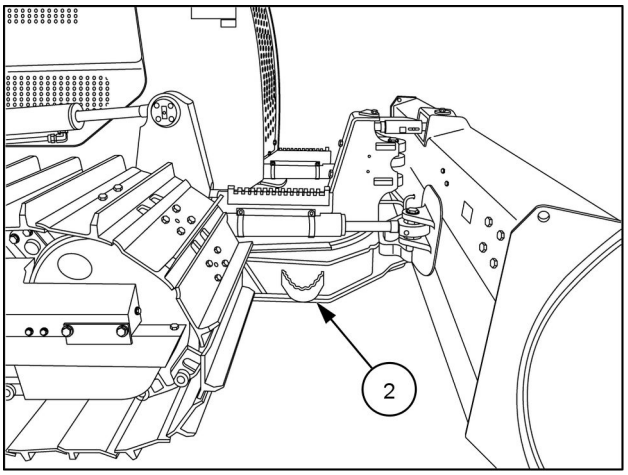
Fall hazard!
Clean the steps and access handles to remove all traces of grease, oil, mud, and ice (in winter).
Failure to comply could result in death or serious injury.

W0139A

Use the steps **(1)** and hand holds **(2)** when getting on or off the machine. Use at least three points of support when getting on and off the machine. The cab door must be locked into the full open or full closed position before using the door hand hold. The front entry is the recommended entry point.



RAIL13DOZ1295AA 1



RAIL13DOZ1292AA 2

Cab door

⚠ WARNING

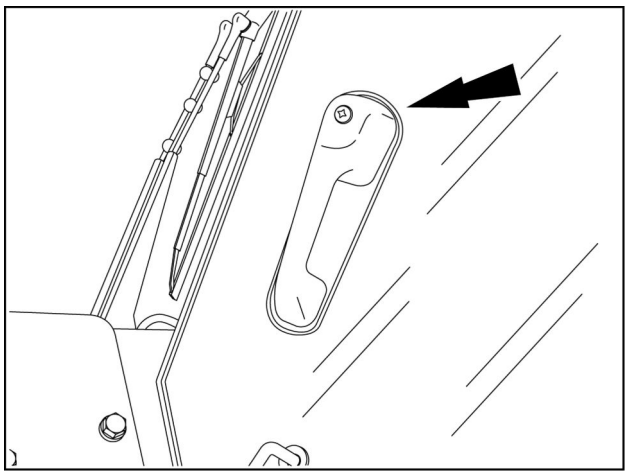
Fall hazard!
Always lock the cab doors in the full open or full closed position before using the handrails on the doors.
Failure to comply could result in death or serious injury.

W0133A

Door handle and door lock - Use the key to lock or unlock door from outside the machine. Use the door handle to open the door from the outside.

Open the door completely until it latches in place against the cab to lock the door in the open position. To close the door, use the door release knob.

NOTE: *The key provided with the machine can be used to lock and unlock the various panels and to activate the engine starter switch functions.*

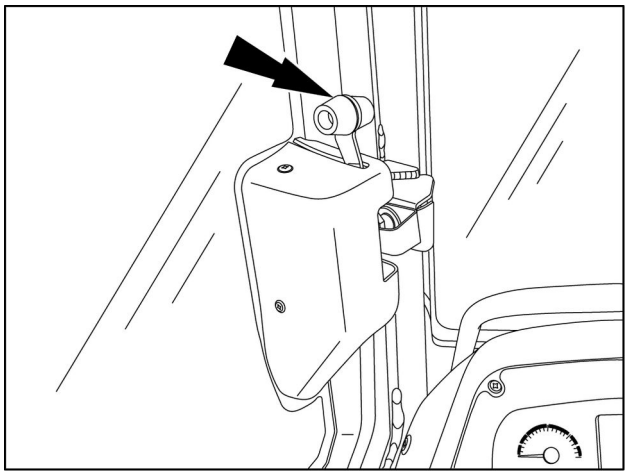


RAIL12DOZ0659AA 3

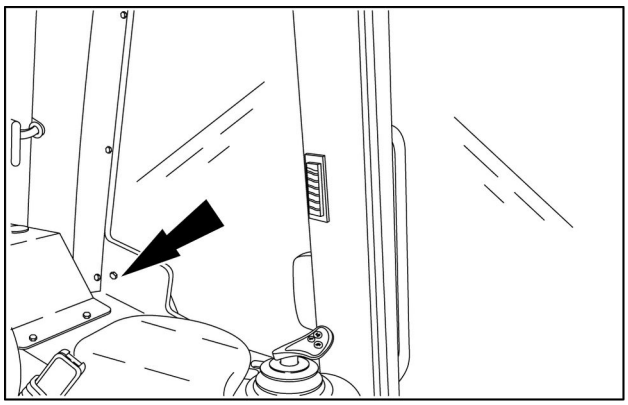
Inside door latch

To secure the door in the open position from inside the cab, push the door back until the door locks on the door catch at the rear of the cab.

Push the latch to open the door from the inside.



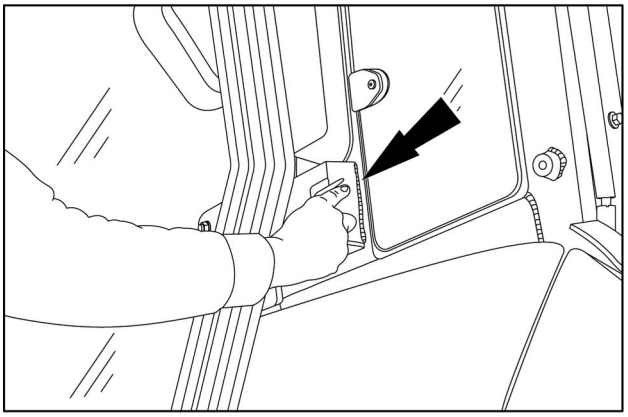
RAIL13DOZ1596AA 4



RAPH12DOZ0087AA 5

Exterior door latch

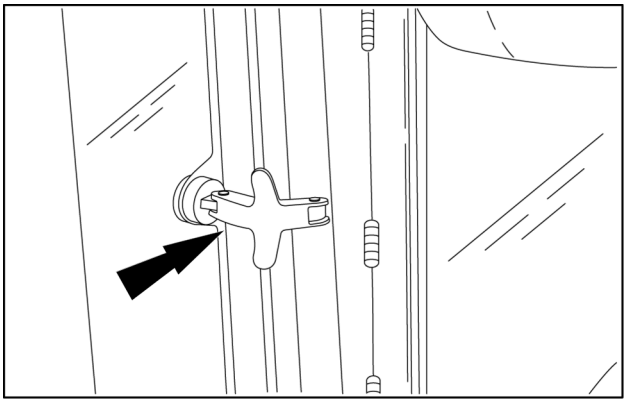
Push the lever down to unlatch the cab door from the open and locked position.



RAIL12DOZ0173AA 6

Window latch

Rear side cab windows can be opened. Use the latch to open windows. Pull the latch towards the window to open.



RAPH12DOZ0107AA 7

OPERATOR'S SEAT

Operator's seat

⚠ WARNING

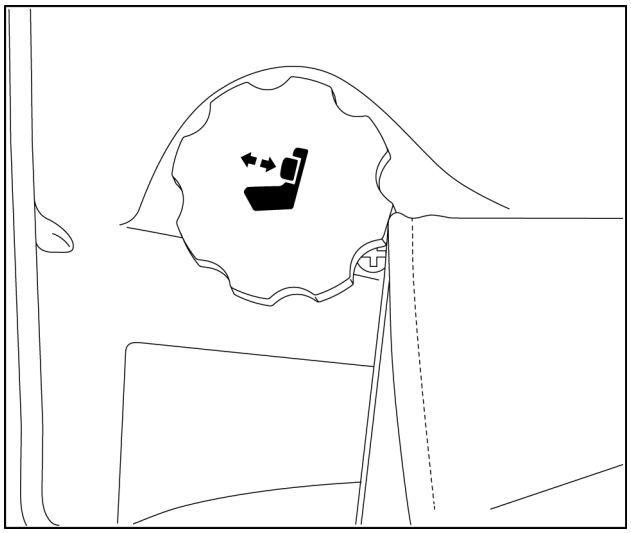
Loss of control hazard!
DO NOT make seat adjustments while the machine is in motion. All seat adjustment should be made with the machine stationary and the parking brake applied.
Failure to comply could result in death or serious injury.

W0293A

Crawler canopy machines are equipped with vinyl mechanical suspension seats. Cab machines are equipped with cloth air suspension seats. Adjust the seat so that you can fully depress the deceleration or transmission pedal when your back is against the seat backrest. Adjustments for all styles of seats are similar.

Lumbar adjustment

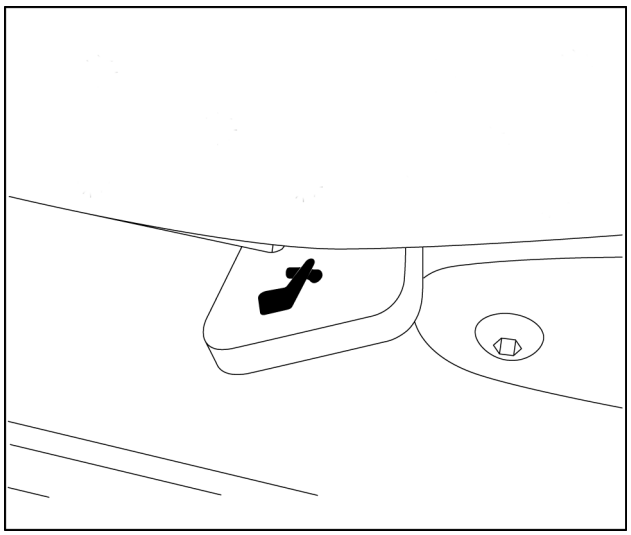
Locate the lumbar adjustment knob on the back of the operator's seat. Turn the knob clockwise to increase the lumbar support. Turn the knob counterclockwise to decrease the lumbar support.



RAIL12DOZ0548AA 1

Backrest adjustment

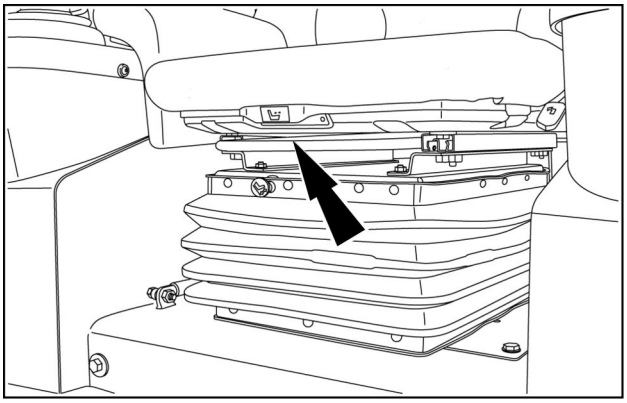
The backrest adjustment is located on the left-hand side of the operator's seat. To adjust the backrest lift up on the handle, move the backrest to the desired position, and release the handle. Tilt the seat back completely forward to access the cab air filter and operator's manual storage pocket.



RAIL12DOZ0650AA 2

Slide adjustment lever

Pull the slide adjustment lever up and adjust the seat forward or backward as required. Release the lever to lock the seat in position. Always make adjustments from the front center of the adjustment bar.



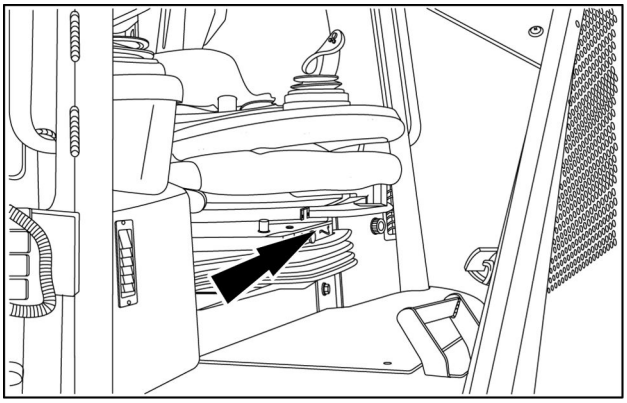
RAPH12DOZ0075AA 3

Seat height adjustment

To raise the seat, push the knob and remove your weight off the seat. Allow the air to build to the desired height. Release the knob at the desired height.

To lower the seat, pull the knob out to release air. Release the knob at the desired height.

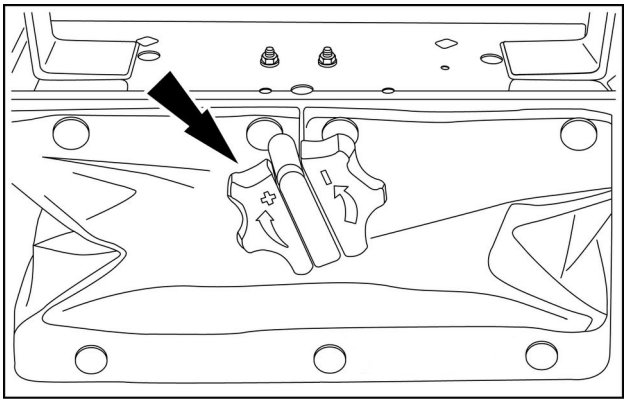
NOTE: *Over time, there will be some air loss. Readjust the seat at the beginning of each work day.*



RAIL12DOZ0651AA 4

Comfort-control mechanical suspension seat

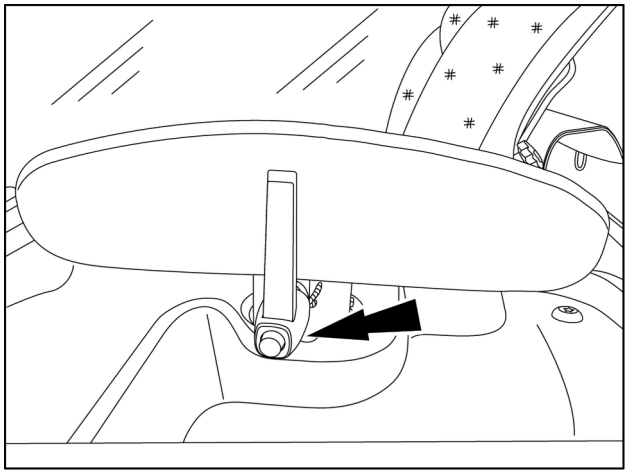
Sit in the seat and use the control knob to adjust the seat for your desired ride.



RAPH13DOZ1162AA 5

Armrest height

Depress the knob on the armrest adjustment lever, and push the lever forward. Both the left and right arm rest height can be adjusted. Return the lever to the back position to lock the desired height in place.



RAIL12DOZ0166AA 6

Seat belt

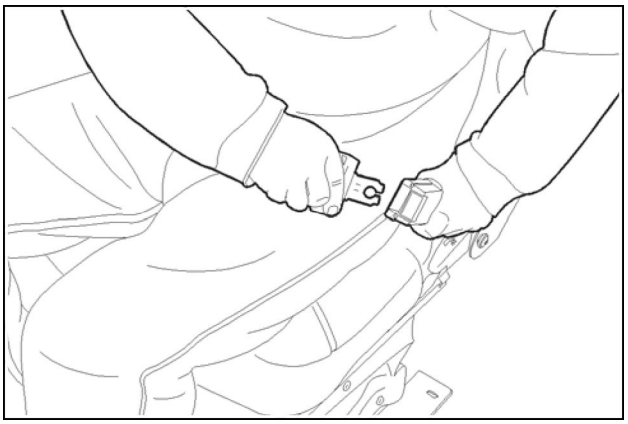
⚠ WARNING

Roll-over hazard!
Securely fasten the seat belt. Your machine is equipped with a Roll-Over Protective Structure (ROPS) cab, ROPS canopy, or ROPS frame for your protection. The seat belt can help ensure your safety if it is properly used and maintained. Never wear a seat belt loosely or with slack in the belt system. Failure to comply could result in death or serious injury.

W0143A

Fastening the seat belt

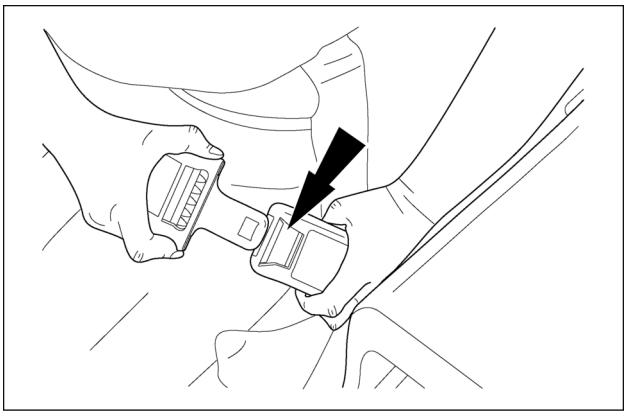
Pull the right-hand belt from the seat belt retractor. Fasten the metal belt end into the left-hand buckle.



RCIL10CWL037AAL 1

Unfastening the seat belt

Press the red button on the left-hand seat belt mechanism to release the seat belt.



RCIL10CWL083FAL 2

FORWARD CONTROLS

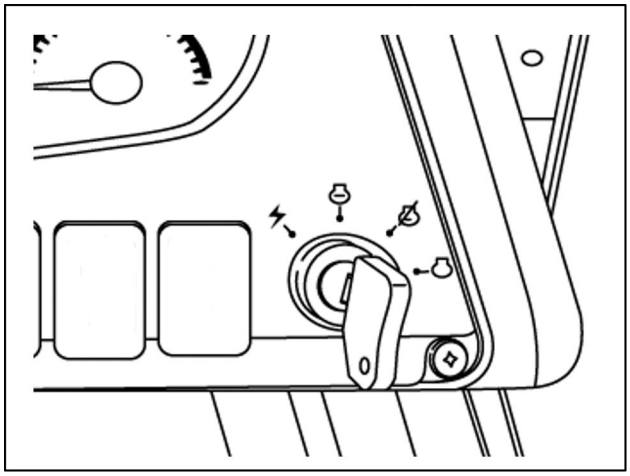
Ignition switch

⚠ WARNING

Hazard to bystanders!
Always sound the horn before starting the machine. Make sure the work area is clear of other persons, domestic animals, tools, etc. before you operate the machine. Never allow anyone in the work area during machine operation.
Failure to comply could result in death or serious injury.

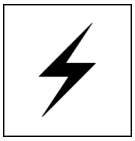
W0304A

Ignition switch



RAPH13DOZ1546AA 1

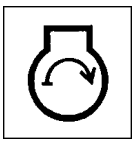
The ignition switch has four positions:



Accessory position: This position energizes the drivetrain controller, accessory switches and instrument cluster.

Engine stop (OFF position): Turn the key to STOP in order to stop the engine. After the engine has stopped, remove the key.

Engine ON (ON position): Turn the key clockwise to ON and check the warning lamps. This is the normal position of the ignition switch when the engine is running.



Engine start (start position): Turn the key completely clockwise to the START position to actuate the starter motor. After the engine starts, release the key. The switch is spring loaded and will return automatically to the ON position when released.

NOTICE: *After engine shutdown, the SCR system will perform a purge cycle which permits the supply module to continue to run. Do NOT shut off the master disconnect for at least* ***90 s*** *after the key is turned to the OFF position.*

Foot controls

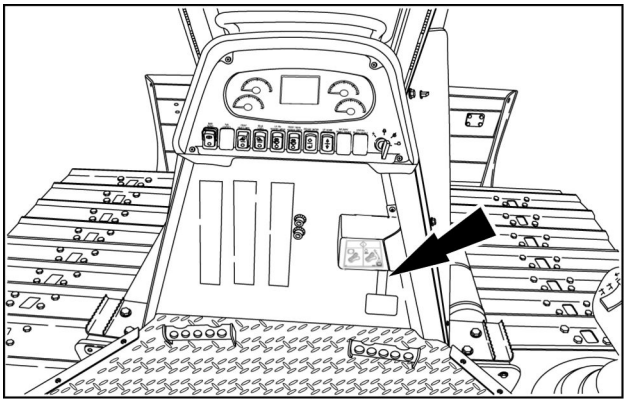
Dual function pedal

The dual function pedal can be switched to operate as a deceleration pedal or a transmission control pedal. As a deceleration pedal, the engine RPM is reduced as the pedal is depressed. As a transmission pedal, the hydraulic system is de-stroked as the pedal is depressed. The transmission pedal is the default function. These settings are made through the transmission selection on the multi-function display.

NOTE: *See machine settings on page* ***4-14*** *for more information.*

Transmission pedal

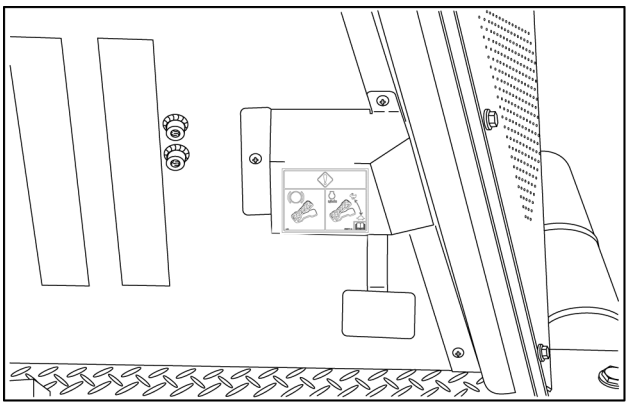
As a transmission pedal, the machine varies the transmission flow (pump/motor displacement) allowing for inching. Pushing the pedal completely down will de-stroke the hydraulics.



RAPH13DOZ1547AA 1

Deceleration pedal

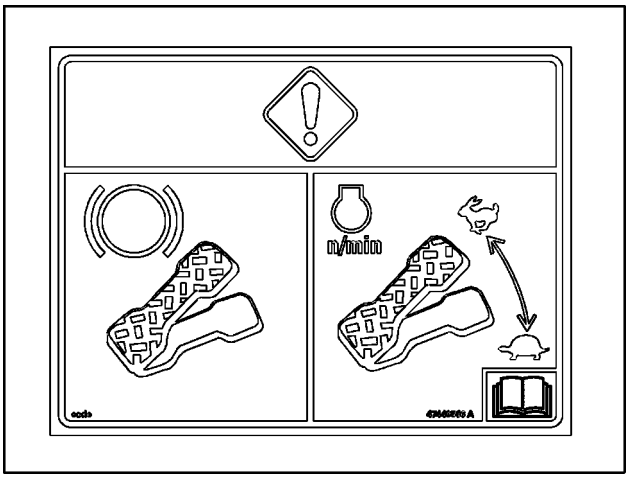
The deceleration pedal reduces the engine RPM and slows the machine. Push the deceleration pedal to slow or stop the machine.



RAIL12DOZ1254AA 2

Use the deceleration pedal to reduce the speed all the way to zero by de-stroking the ground drive along with decreasing the engine RPM.

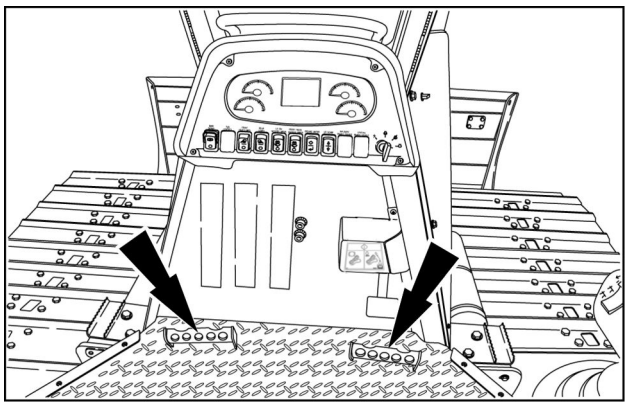
NOTE: *Use the deceleration pedal to control the dozer for precision work.*



47449566 3

Footrest

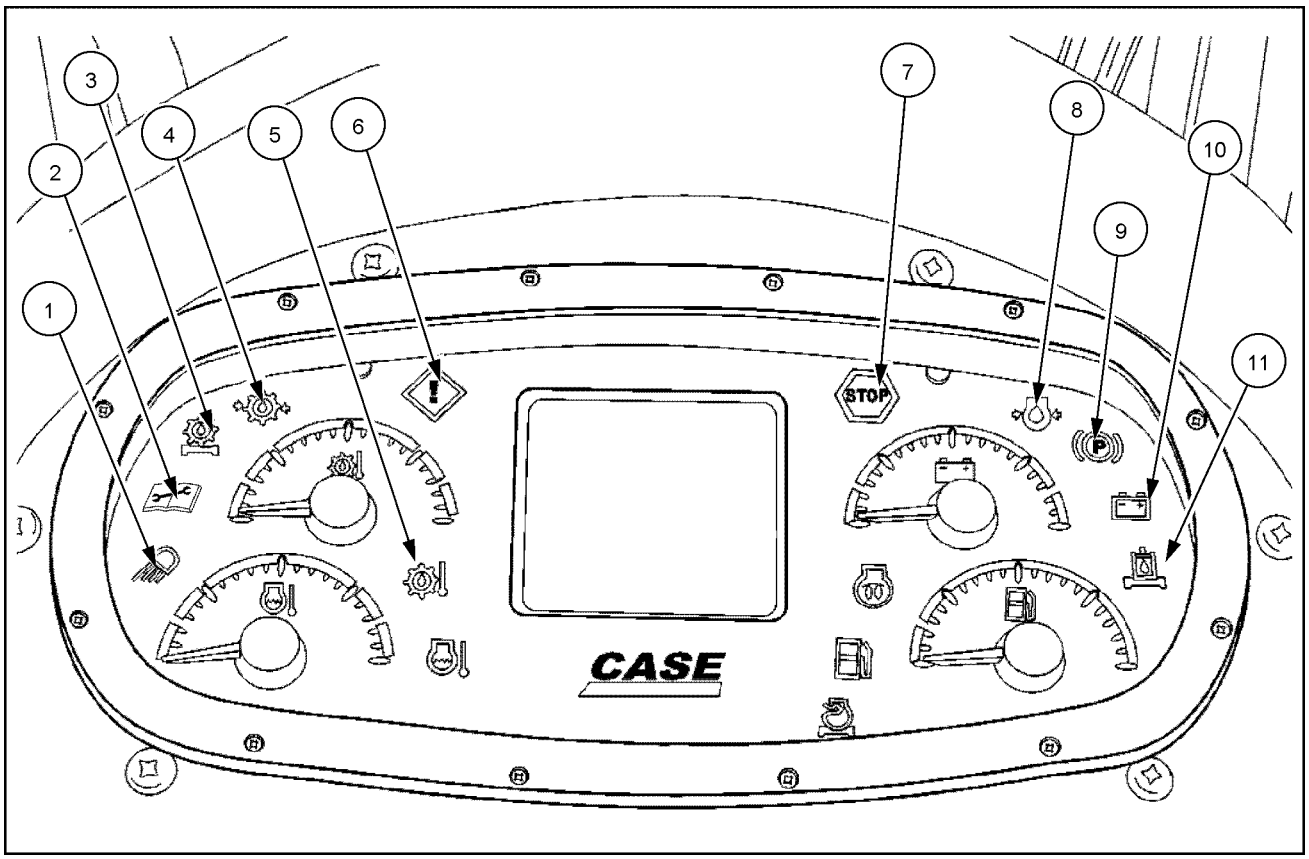
The machine is equipped with a left and right footrest.



RAPH13DOZ1547AA 4

Front console

Instrument panel



RAPH12DOZ0136FA 1

NOTICE: *The warning lights will illuminate momentarily when the ignition switch is turned on. Check and/or replace the fuse if the lamps do not illuminate.*

1. Work light lamp

The work light lamp will illuminate when the machine light switch is turned on.

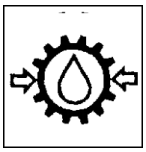
2. Service

The service lamp indicates service is required. Contact your authorized dealer or read your service and/or operator's manual for correct service methods, intervals, and fluid/consumable requirements.

3. Hydrostatic drive filter

The hydrostatic drive filter warning lamp shows the condition of the transmission filter. Stop the engine, and replace the filter if the warning lamp illuminates during normal operation (hydraulic fluid at operating temperature and engine at full throttle).

4. Charge pressure warning



The transmission pressure warning lamp will illuminate, and an audible warning will sound if there is no or low oil pressure in the transmission. Do not operate the machine if this warning occurs. Stop the machine immediately. The lamp will also illuminate if the engine is stopped and the key is on.

5. Hydrostatic drive temperature

The hydrostatic drive oil lamp will illuminate, and an audible warning will sound if the transmission operating temperature is too high. Monitor the transmission operating temperature with the transmission temperature gauge. The transmission operating temperature is normal when the gauge needle is in the green area of the gauge.

6. Caution master indicator

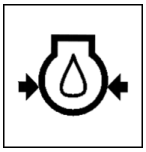
This caution master indicator illuminates yellow to indicate there is a non-critical warning. Change the machine operating method. If the caution master indicator continues to illuminate, a scheduled shutdown for maintenance may be required. Contact your authorized dealer if the condition persists.

7. Stop master indicator

Bring the machine safely to a stop, and turn the machine OFF immediately if the stop master indicator lamp illuminates. This is a critical warning indicator. The multi-function display screen will indicate the critical warning message.

NOTICE: *Failure to do so may result in damage to the machine.*

8. Oil pressure indicator

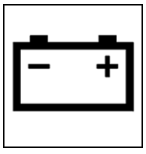


The low engine oil pressure warning lamp illuminates red and an audible warning will occur if there is no or low oil pressure in the engine when the machine is operating. Bring the machine safely to a stop and turn the machine OFF immediately. Do not run the engine if the warning lamp illuminates while operating.

9. Park brake indicator

The parking brake lamp illuminates red when the parking brake is ON. Turn the parking brake ON or OFF with the parking brake switch.

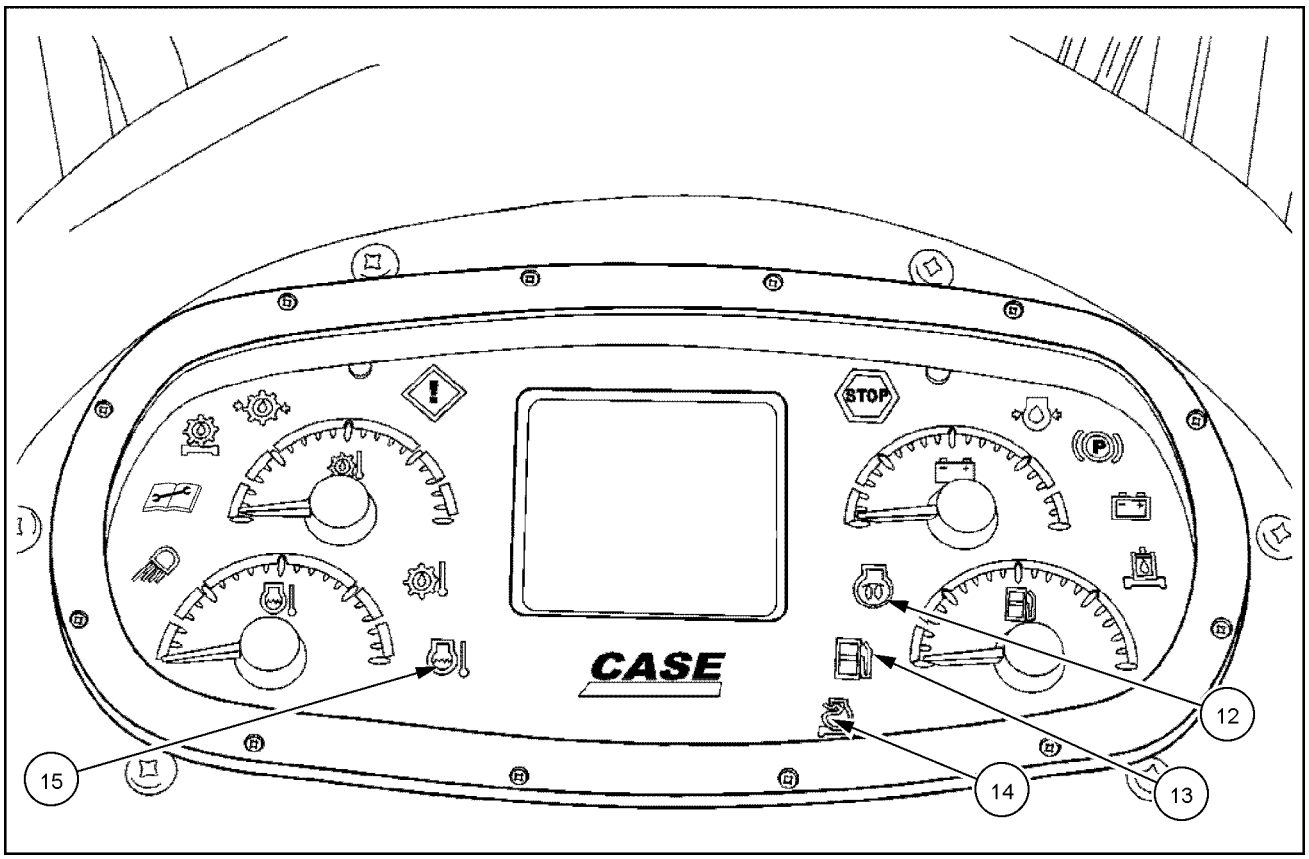
10. Voltage



This lamp will illuminate when the battery has low voltage. The lamp illuminates with the key switch in the ON position momentarily and goes out after a few seconds. If the lamp stays illuminated, check the voltage gauge.

11. Hydraulic filter

The hydraulic filter lamp illuminates if there is a problem with the hydraulic filter. If the hydraulic filter lamp illuminates during normal operation with the hydraulic oil at operating temperature and the engine at full throttle, stop the engine and replace the hydraulic filter.



RAPH12DOZ0136FA 2

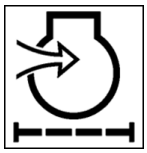
12. Engine preheat

Wait until the engine preheat lamp turns OFF before starting the engine. The engine preheat lamp will illuminate when the incoming air needs to be preheated in cold temperatures.

13. Low fuel

The low fuel warning lamp will illuminate and the audible warning will sound for a few moments when the machine is low on fuel. Monitor the fuel level at the fuel gauge. Do not allow the machine to run out of fuel.

14. Engine air filter

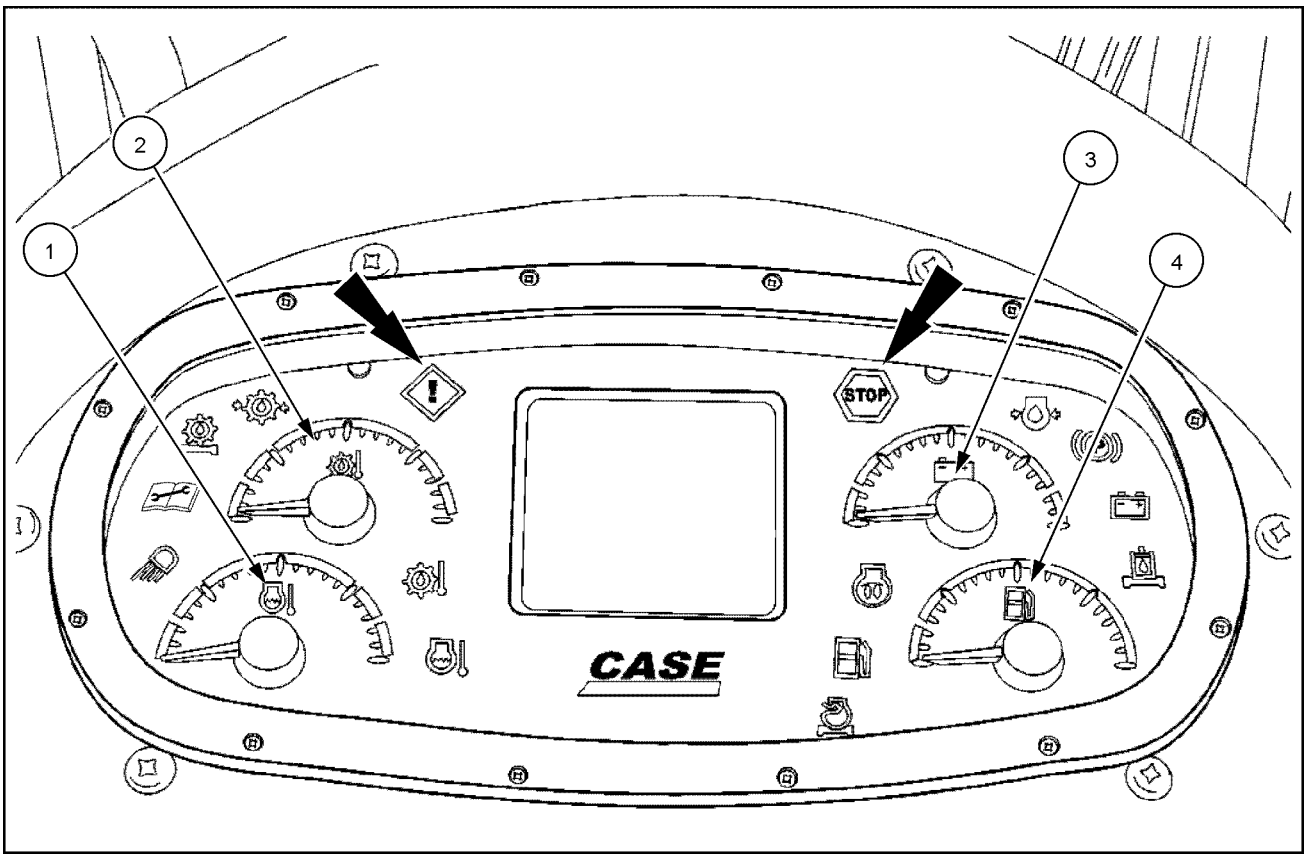


The engine air filter warning lamp will illuminate if there is an air filter restriction. It will illuminate briefly when the ignition switch is turned on. If the engine air filter lamp remains illuminated, stop the engine and check the engine air filter.

15. Engine coolant

The engine coolant warning lamp will illuminate and the audible buzzer will sound when the engine coolant temperature is too high. Monitor the coolant temperature with the coolant temperature gauge. If the engine coolant warning lamp illuminates and the audible warning sounds, run the machine at idle speed. If this does not correct the problem, stop the engine immediately, and check the machine coolant.

Status and warning icons



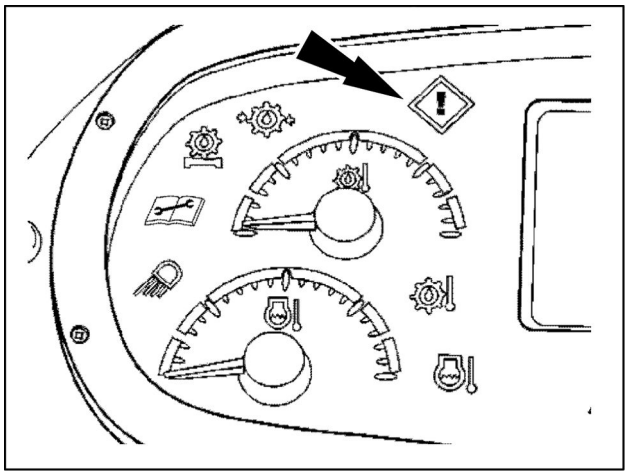
RAPH12DOZ0136FA 1

Non-critical warnings

When a fault occurs, an audible alarm may sound and the caution master indicator will be yellow. The caution message will be displayed in the message area. If this occurs, return the machine to a service position, and turn the engine off. Take corrective action to help avoid expensive repairs.

Caution master indicator (Yellow-Non-critical)

The caution master indicator is a non-critical warning display. See the non-critical warning chart. When the caution master indicator is ON, change the operating method, schedule a shutdown for maintenance, or if the condition persists, contact your dealer. The non-critical warning table lists warning displays that may appear on the instrument cluster and the corrective action required.



RAPH12DOZ0138AA 2

Non-critical warnings

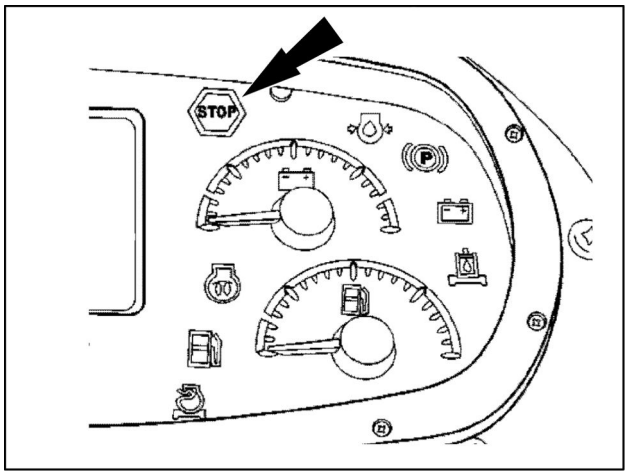
Display	Description	Corrective action
Parking brake	Parking brake engaged and machine shifted forward or reverse	Put the joystick in neutral and release the parking brake.
Coolant temperature	High engine coolant temperature	1. Idle machine and monitor temperature. 2. Clean radiator or operate fan reverser (If equipped). 3. Check coolant level and add coolant, if necessary. 4. If condition persists, contact your dealer.
Hydraulic temperature	High hydraulic temperature	1. Idle machine and monitor temperature. 2. Clean cooler or operate fan reverser (If equipped). 3. Check hydraulic fluid level. 4. If condition persists, contact your dealer.
Air filter	High air filter restriction	1. Clean air filter. 2. Replace primary and secondary filters. 3. If condition persists, contact your dealer.
Hydraulic filter	Hydraulic filter restriction	1. Replace hydraulic filter 2. If condition persists, contact your dealer.
Voltage	Alternator malfunction	1. Check electrical system. 2. Voltages are out of range. 3. Change operating procedure. 4. If condition persists, contact your dealer.
DEF level low	DEF level is less than **15 %** of tank volume. No engine power loss at this level	Fill DEF tank.
DEF level low. Power limited	DEF level is less than **5 %** of tank volume. There will be moderate engine power level loss.	Fill DEF tank.
Poor DEF quality detected	High NOx level detected.	Drain tank. Replace DEF.
DEF injection failed	After engine has run for 3 hours with high NO_X level detected, there will be a torque and speed reduction.	Drain tank. Replace DEF.
Poor DEF quality detected	After engine has run for an extended period of time with high NO_X level detected, the engine may stop.	Drain tank. Replace DEF.
DEF injection failed. Torque limited	Technical failure detected.	Contact your authorized dealer.
DEF injection failed. Power limited	Technical failure detected. Torque reduction may be experienced.	Contact your authorized dealer.
DEF injection failed. Torque limited	Technical failure detected. Torque reduction may be experienced.	Contact your authorized dealer.
Fuel	Low fuel	Fill fuel tank - do not allow tank to totally empty.

Critical warnings

The following table lists critical warning displays that may appear on the instrument cluster and the corrective action required. Should a fault occur, a continuous audible alarm will sound, and the stop master Indicator will be RED. A warning message will be displayed in the message area.

Stop master indicator (Red-critical)

The stop master Indicator is a critical warning display. When the stop master indicator illuminates, IMMEDIATELY bring the machine safely to a stop, and turn the engine OFF.

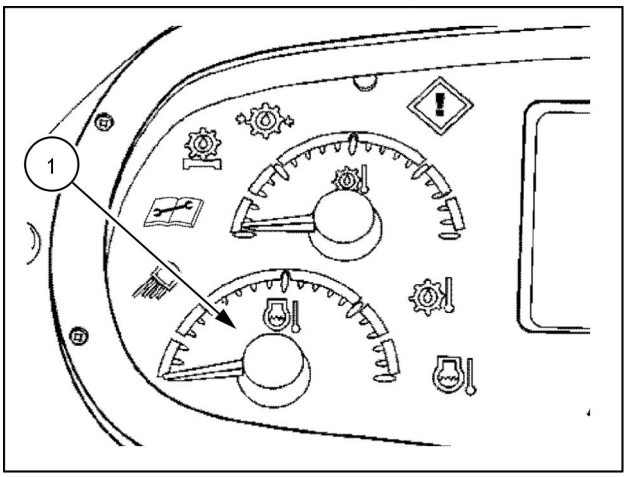


RAIL12DOZ0821AA 3

Display	Description	Corrective Action
Engine oil pressure	Low engine oil pressure	Bring the machine to a safe stop, and turn the engine OFF immediately. Contact your dealer.
Brake pressure	Low brake pressure	Bring the machine to a safe stop, and turn the engine OFF immediately. Contact your dealer.
Coolant temperature	High engine coolant temperature	Bring the machine to a safe stop, and turn the engine OFF immediately. Check the coolant levels after allowing the engine and the coolant to cool. Contact your dealer.
Hydraulic oil temperature	High hydraulic oil temperature	Bring the machine to a safe stop, and turn the engine OFF immediately. Contact your dealer.
DEF tank empty	DEF level below minimum acceptable level	Refill the DEF tank immediately.
DEF injection failed.	Technical failure detected	If machine continues to operate for over 5 hours, the engine may stop. Contact your dealer.
SCR failure	SCR fault/failure detected. Loss of power.	Contact your authorized dealer for repair.

1. Engine coolant temperature gauge

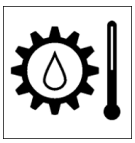
The engine coolant temperature gauge indicates the coolant temperature of the engine. Normal operating temperature is in the green zone. When the engine coolant temperature increases the gauge will move into the yellow zone, and the warning alarm sounds for three seconds. The caution master indicator turns yellow. If the temperature continues to increase, the gauge moves into the red zone, and the audible warning alarm sounds continuously. The stop master indicator turns red. Do not operate the machine when the temperature is in the red zone.



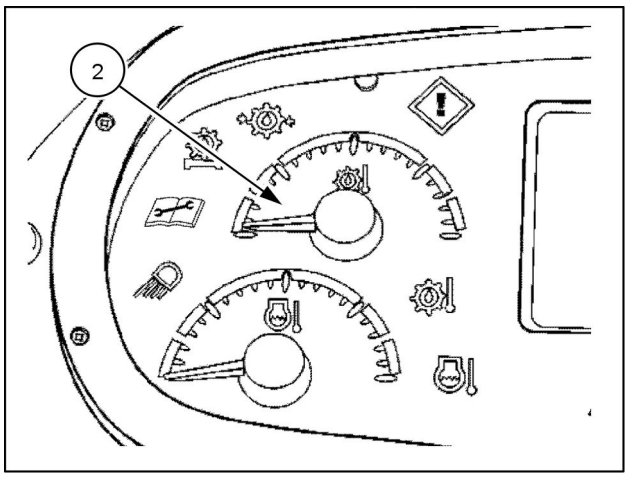
RAPH12DOZ0138AA 4

Engine coolant temperature gauge				
Gauge indication	**Condition**	**Master indicator**	**Gauge status**	**Alarm status**
20 - 103.0 °C (**68 - 217.4 °F**)	Coolant temperature is normal			
103 - 105 °C (**217 - 221.0 °F**)	Coolant temperature is high	Caution (Yellow)	Solid	1 second
110 °C (**230 °F**) and above	Coolant temperature is very high	Stop (Red)	Solid	Continuous

2. Hydraulic oil temperature gauge



The hydraulic oil temperature gauge indicates the oil temperature of the hydraulic system.



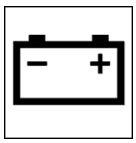
RAPH12DOZ0138AA 5

The normal operating temperature is in the green zone. When the hydraulic oil temperature increases, the gauge will move into the yellow zone, the warning alarm sounds, and the caution master indicator turns yellow. If the temperature continues to increase the gauge moves into the red zone, the audible warning alarm will sound continuously, and the stop master indicator turns red. Do not operate the machine when the temperature is in the red zone.

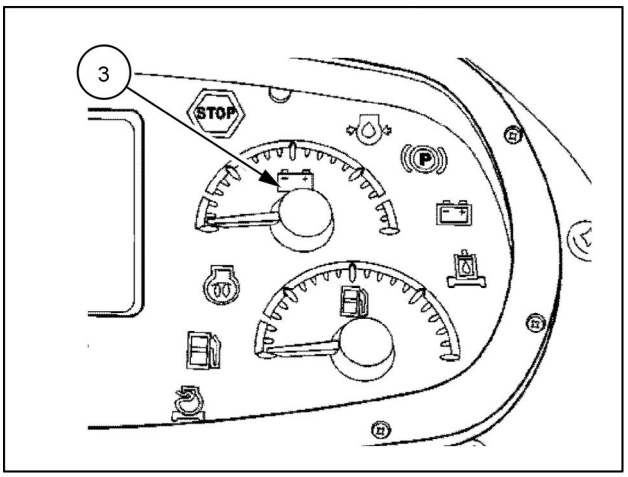
Hydraulic oil temperature gauge				
Gauge indication	**Condition**	**Master indicator**	**Gauge status**	**Alarm status**
37 - 90.0 °C (**98.6 - 194.0 °F**)	Oil temperature is normal			
90.0 - 100.0 °C (**194.0 - 212.0 °F**) (See the notice below.)	Oil temperature is high	Caution (yellow)	Solid	1 second
100.0 °C (**212.0 °F**) and above	Oil temperature is very high	Stop (red)	Solid	Continuous

NOTICE: *To prevent damage to the hydraulic system, stop the machine, shift to neutral, and run the engine at partial throttle, approximately* ***1700 RPM*** *until the system cools. If the hydraulic oil temperature does not return to normal operating temperature, check the hydraulic oil level. Correct the problem before continuing to operate the machine.*

3. Voltage gauge



This gauge indicates the voltage in the operating system. The gauge indicates if the battery is properly charging. If the gauge moves into the yellow zone, the engine should be monitored. If the gauge moves into the red zone the battery is in a discharge condition. If the battery warning light illuminates and the gauge moves into the red zone, stop the machine and correct the problem.



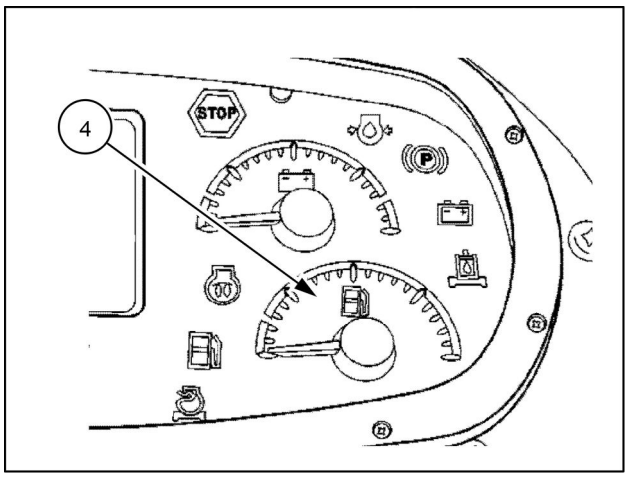
RAIL12DOZ0821AA 6

NOTICE: *Do not operate the machine if the indicator turns red and the alarm sounds continuously. Stop the machine and correct the problem.*

4. Fuel level gauge

The fuel level gauge indicates the fuel level. Normal operating range is in the green zone. When the tank is almost empty the gauge will move into the yellow zone and the fuel indicator will turn on and the warning alarm will sound for a few seconds.

NOTICE: *Do not allow the machine to run completely out of fuel.*



RAIL12DOZ0821AA 7

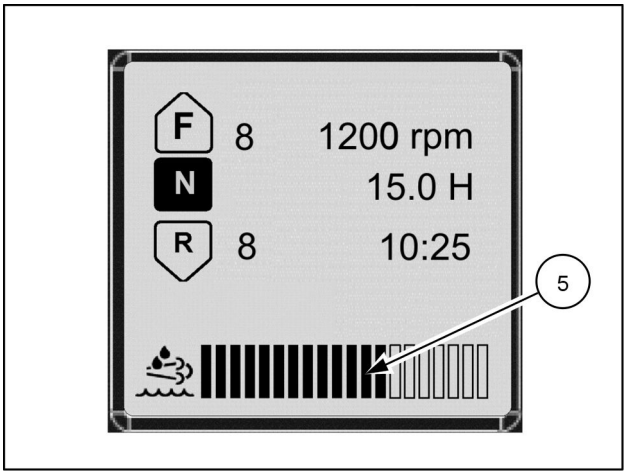
Fuel level gauge				
Gauge indication	**Condition**	**Master indicator**	**Gauge status**	**Alarm status**
8 % and below	Fuel level low	Caution (yellow)	ON	3 Seconds
14 % and above	Fuel level normal			

NOTICE: *Do not operate the machine if the indicator turns red and the alarm sounds continuously. Stop the machine and correct the problem.*

5. Diesel Exhaust Fluid (DEF) level gauge

The monitor screen is located in the center of the console. The DEF level bar gauge indicates the level of diesel exhaust fluid in the DEF tank. When all bars are illuminated, the tank is full. Illuminated bars indicate the level of fluid remaining in the DEF tank. When the tank is at **5–10 %** of tank volume, the warning system will flash and/or will flash and sound an audible alarm dependent upon DEF levels.

NOTICE: *If the DEF system becomes completely empty, the engine will lose significant power.*



RAIL12DOZ0224AA 8

DEF level gauge				
Gauge indication	**Condition**	**Master indicator**	**Gauge status**	**Alarm status**
6–10 %	No engine power loss	Caution (yellow)	Flashes	None
5 % and below	Moderate engine power loss	Caution (yellow)	Flashes for 4 seconds, then steady	Continuous
Empty	Severe engine power loss	Stop (red)	Flashes continuously	Continuous

Selective Catalytic Reduction (SCR) exhaust treatment - Overview

Diesel Exhaust Fluid (DEF)/AdBlue® instrumentation warning

ATTENTION: *The fuel system, exhaust after-treatment system, and engine on your machine are designed and built to government emissions standards. Tampering by dealers, customers, operators, and users is strictly prohibited by law. Failure to comply could result in government fines, rework charges, invalid warranty, legal action, and possible confiscation of the machine until rework to original condition is completed. Engine service and/or repairs must be done by a certified technician only!*

Your CASE CONSTRUCTION machine is equipped with a warning system to inform the operator of the DEF/AdBlue® level, system malfunctions, and engine power loss that may result from the SCR system for reducing exhaust emissions.

Warning symbols

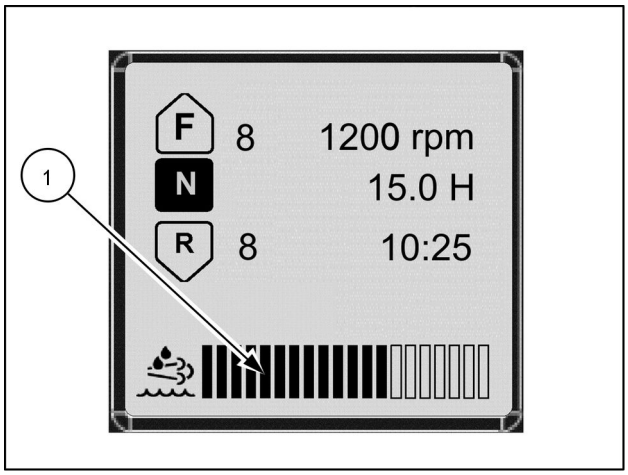
DEF/AdBlue®

Warning/Fault light

Stop engine light

During normal operation of your CASE CONSTRUCTION machine, the instrument cluster displays the DEF/AdBlue® fluid level **(1)** at all times.

Warning lights and indicators will be illuminated with a warning on the visual display. The display changes automatically to allow the operator to view the warning indicator and display message.



RAIL12DOZ0224AA 1

DEF/AdBlue® level faults, failures, and engine power loss levels

Visual display warning	Indicator light	Indicator light status	Audible alarm	Description
"DEF/AdBlue Level LOW"		Active	Active	DEF/AdBlue® level is less than **10 %** of tank volume, refill DEF/AdBlue®. No engine power loss.
"DEF/AdBlue Level Tank EMPTY Power Limited"		Active	Active	DEF/AdBlue® level is less than **5 %** of tank volume (**0 %** will be displayed), refill DEF/AdBlue® immediately. Up to **65 %** torque reduction and **40 %** engine speed reduction within **40 min** of engine running time.
"DEF/AdBlue Level Tank EMPTY Power Limited"		Active	Active	DEF/AdBlue® level is empty. Refill DEF/AdBlue® immediately. Engine speed reduced to low idle within **30 min** of engine running time.
"DEF/AdBlue Level Tank EMPTY Power Limited"		Active	Active	Emergency re-start is active. No engine power loss. Engine will be reduced to low idle after **30 s** of continued operation. Refill DEF/AdBlue® immediately.

DEF/AdBlue® quality faults, failures, and engine power loss levels

Visual display warning	Indicator light	Indicator light status	Audible alarm	Description
"Poor DEF/ AdBlue Quality Detected Torque Limited"		Active	Active	DEF/AdBlue® quality/concentration is questionable. Drain DEF/AdBlue® tank, clean and refill with approved DEF/AdBlue® solution. Contact your local authorized dealer if failure persists. No engine power loss.
"Poor DEF/ AdBlue Quality Detected Power Limited"		Active	Active	DEF/AdBlue® quality/concentration is questionable **60 min** after the initial warning. Drain DEF/AdBlue® tank, clean and completely refill with approved DEF/AdBlue® solution. Contact your local authorized dealer if failure persists. Up to **65 %** torque reduction and **40 %** engine speed reduction within **40 min** of engine running time.
"Poor DEF/ AdBlue Quality Detected Power Limited"		Active	Active	DEF/AdBlue® quality/concentration is questionable **220 min** after the initial warning. Drain DEF/AdBlue® tank, clean and completely refill with approved DEF/AdBlue® solution. Contact your local authorized dealer if failure persists. Engine speed reduced to low idle within **30 min** of engine running time.
"Poor DEF/ AdBlue Quality Detected Power Limited"		Active	Active	Emergency re-start is active. Drain DEF/AdBlue® tank, clean and completely refill with approved DEF/AdBlue® solution. Contact your local authorized dealer if failure persists. No engine power loss. Engine will be reduced to low idle after **30 s** of continued operation. Contact your local authorized dealer for repair.

SCR system technical faults, failures, and engine power loss levels

Visual display warning	Indicator light	Indicator light status	Audible alarm	Description
DEF/AdBlue Injection Failed Torque Limited”		Active	Active	SCR fault/failure detected. Up to **25 %** torque reduction within **25 min** of engine running time. Contact your local authorized dealer for repair.
DEF/AdBlue Injection Failed Power Limited”		Active	Active	SCR fault/failure detected **90 min** after the initial warning Up to **65 %** torque reduction and **40 %** engine speed reduction within **40 min** of engine running time. Contact your local authorized dealer for repair.
DEF/AdBlue Injection Failed Power Limited”		Active	Active	SCR fault/failure detected **240 min** after the initial warning. Engine speed reduced to low idle within **30 min** of engine running time. Contact your local authorized dealer for repair.
DEF/AdBlue Injection Failed Power Limited”		Active	Active	Emergency re-start is active. No engine power loss. Engine will be reduced to low idle after **30 s** of continued operation. Contact your local authorized dealer for repair.

Resetting the Selective Catalytic Reduction (SCR) system

For DEF/AdBlue® storage tank fluid level faults, failures that can cause engine power loss:

- The DEF/AdBlue® tank level must be raised above **15 %** total volume.
- The key switch must be cycled to the Off position or throttle returned to low idle position.

For DEF/AdBlue® quality and SCR system technical faults, failures that can cause engine power loss:

- To fully reset the system, the component/failure causing the fault must be repaired or replaced.
- Switching off the engine will reset the system and the engine will restart at full power.
- If the same failure is re-detected within **40 h** of engine operation, the last active engine power loss level will be activated.
- If the same failure is detected three consecutive times within **40 h** of engine operation, maximum engine power loss will remain active after engine restart until the system is repaired.
- Please contact your authorized CASE CONSTRUCTION dealer for service.

Emergency re-start

NOTE: *Emergency re-starts are only enabled after the engine has been commanded to low idle.*

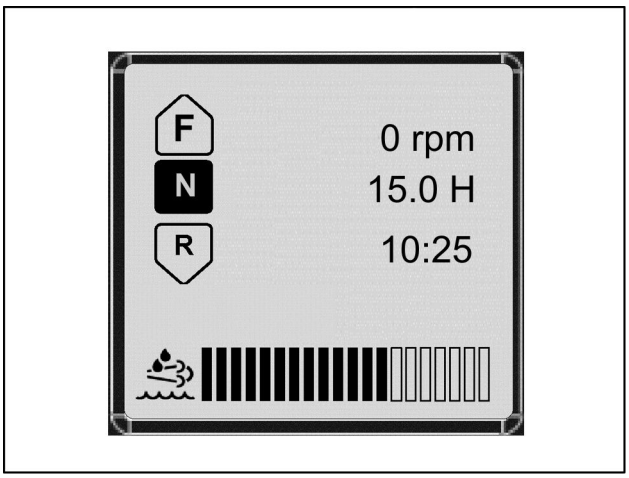
If full power loss is experienced, it may be impossible for the machine to move under its own power. Emergency re-starts are available to provide the capability to move the machine.

- Allows **30 s** of operation without power loss.
- After **30 s**, the engine is automatically reduced to low idle speed.
- There is no limit to the number of emergency re-starts

Multi-function display

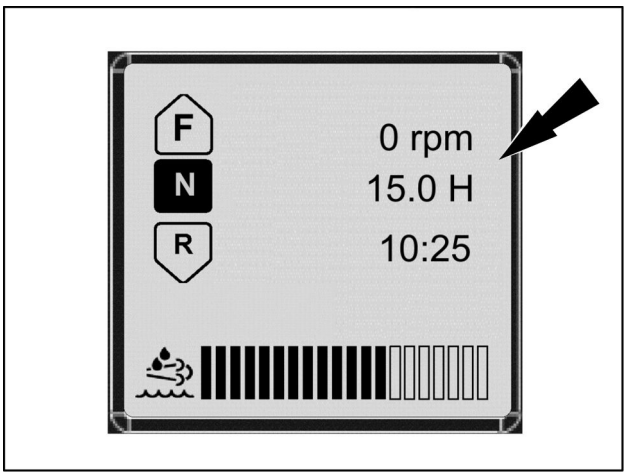
The multi-function Liquid Crystal Display (LCD) is located at the center of the modular dashboard. On start up, the console indicator lamps will momentarily flash. The display will flash the machine model. The initial standard screen will then appear. Once operator preferences are set, the screen will reflect those selections.

NOTE: *Upon initial startup, the operator can push the return/escape switch, and the language selection screen will appear immediately. This allows the operator to make a language selection without having to use an unknown language to scroll through to preferences.*



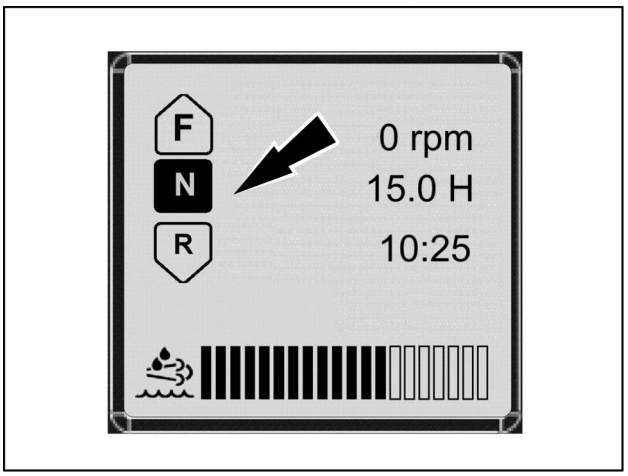
RAIL12DOZ0206AA 1

Information will be displayed on the LCD as directed by the operator or automatically by machine operations. The screen offers prompts to assist the operator when programming machine functions and/or performing diagnostics.
The start-up screen shows the machine hours, RPM, and time. The display is controlled by machine technology and geared toward operator preferences.



RAIL12DOZ0206AA 2

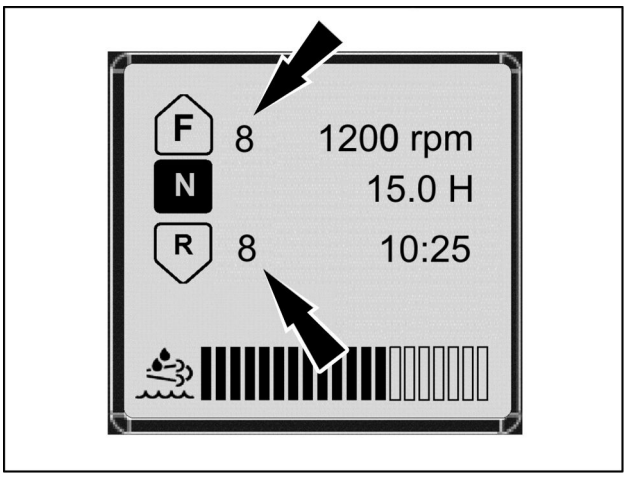
The left side of the screen displays the transmission selection Forward, Neutral, or Reverse as selected by the operator (F-N-R).



RAIL12DOZ0206AA 3

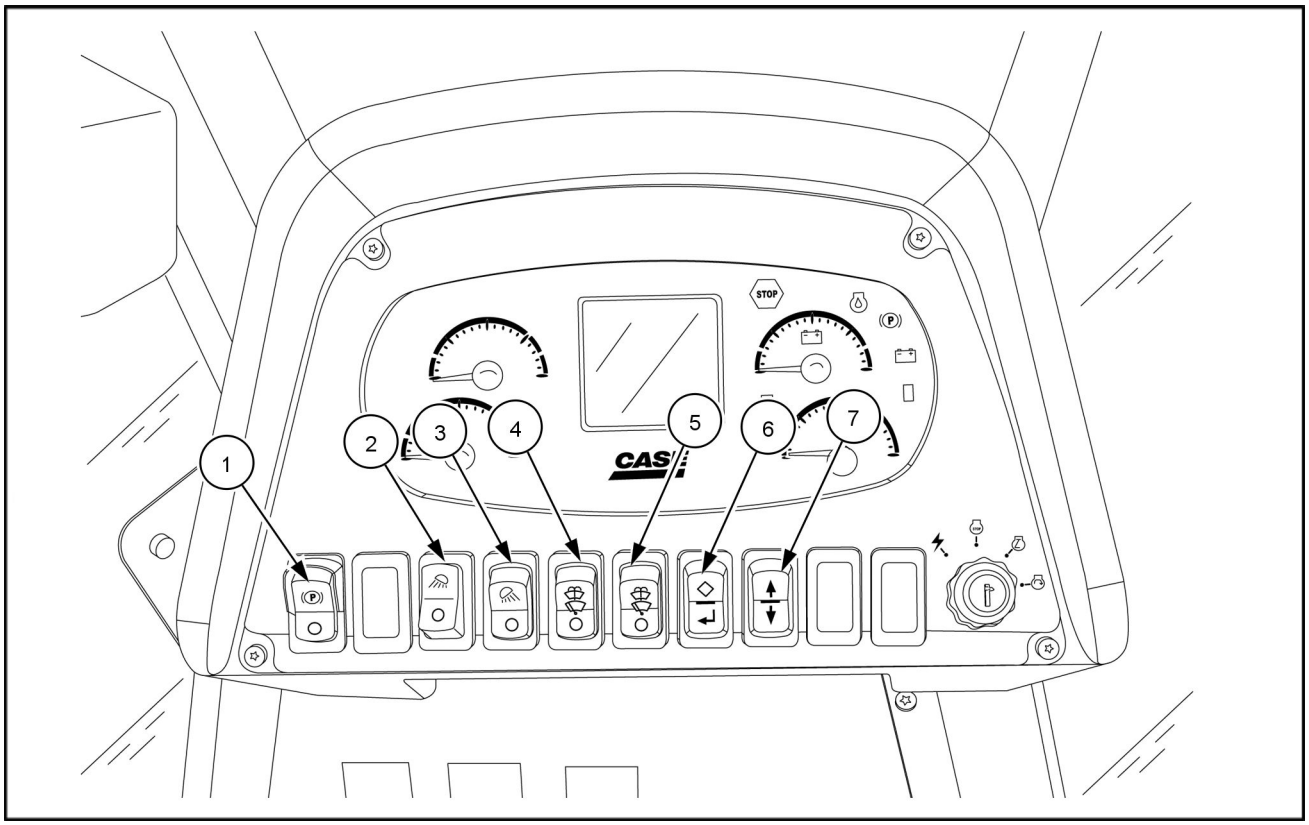
The machine has 15 increments for speed that are selected from the left hand control. In this example, the speeds are equal both forward and reverse.
A DEF fluid gauge is shown at the bottom of the screen. Bars indicate amount of DEF fluid in the tank as the bars are illuminated.

NOTICE: *When the tracks are unsupported off of the ground, do not run the machine at speeds above the step 10 position. This may result in damage to the drivetrain components.*



RAIL12DOZ0224AA 4

Switch overview and operation



RAIL13DOZ0857GA 1

1. Park brake switch

When turning the ignition key on, the park brake will default to the ON position. The park brake allows an operator to lock and unlock ground drive control.

Engaging the park brake

Place the machine in neutral and stop the machine. Engage the park brake by pushing down on the top of the switch. The park brake will automatically engage when the machine is shut off.

Releasing the park brake

Move the joystick to neutral, and press the park brake button.

NOTICE: *A failure in the operating procedure or a failure in the electrical or hydraulic function can result in an abrupt engagement of the park brake. Always wear your seat belt.*

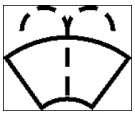
2. Front head lamp switch

Push on the top of the switch for front work lights. Pushing on the bottom of the switch will turn the lights OFF.

3. Rear lamp switch

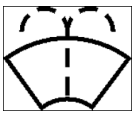
Push on the top of the switch for rear work lights. Pushing on the bottom of the switch will turn the lights OFF.

4. Left-hand/Right-hand wiper/washer switch



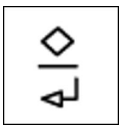
A. Push switch to the center position for ON.
B. Push on the front of switch for washer fluid.

5. Front/Rear wiper/washer switch



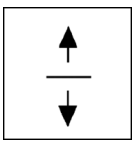
A. Push switch to the center position for ON.
B. Push on the front of switch for washer fluid.

6. Enter/Escape switch



Use this switch to make selections on the monitor multi-function display. See page **3-40** for further information.

7. Up/Down switch



Use this switch to scroll between selections on the monitor multi-function display. Push the top of switch for up. Push the bottom of the switch to scroll down. See page **3-40** for further information.

NOTE: *Blank switches may be used for optional devices.*

LEFT-HAND SIDE CONTROLS

Control levers

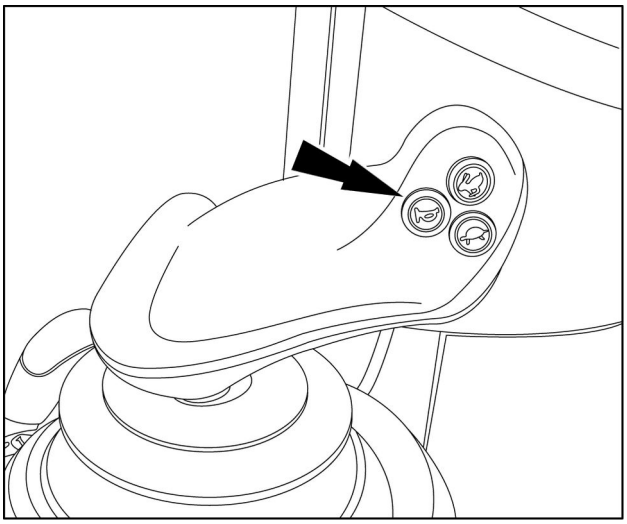
⚠ WARNING

Hazard to bystanders!
Always sound the horn before starting the machine. Make sure the work area is clear of other persons, domestic animals, tools, etc. before you operate the machine. Never allow anyone in the work area during machine operation.
Failure to comply could result in death or serious injury.

W0304A

Horn button

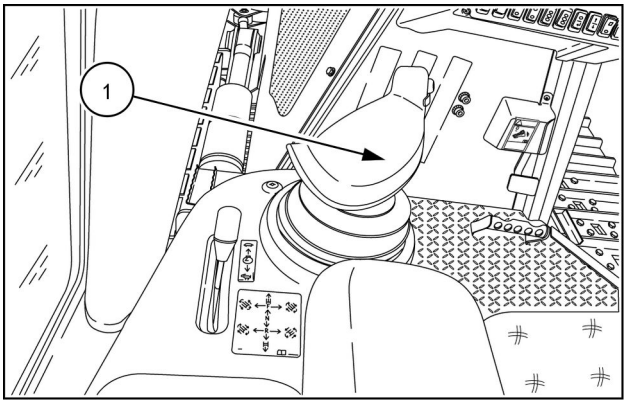
The direction control lever allows for directional movement of the machine. The horn button is also located on the direction control lever. Always sound the horn before starting the machine.



RAIL12DOZ0181AA 1

Direction control lever

The direction control lever **(1)** allows forward, reverse, neutral direction, turning and counter rotation.
The lever has detent positions for neutral, forward, and reverse. The lever remains in the forward or reverse position until it is moved by the operator. Turning is also controlled by the direction control lever. The direction control lever has a feel point for left and right counter rotation. Use the machine in a clear, unobstructed area until you become familiar with the controls. See page **4-9** for additional information on operating the machine.



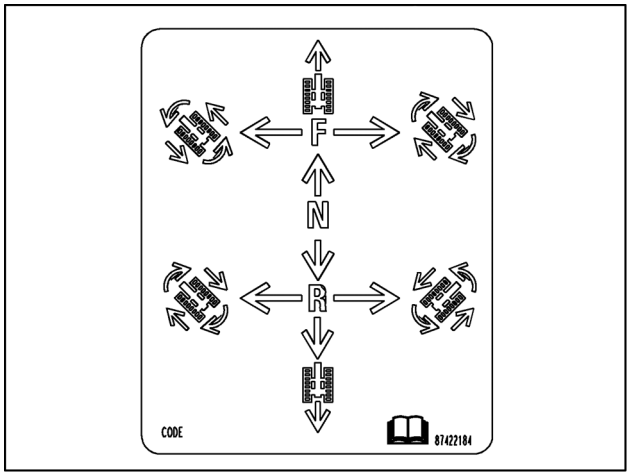
RAPH12DOZ0080AA 2

Turning the machine

1. Keep the machine in neutral for several seconds when starting the machine. Change the gear in order to move the machine in either forward or reverse

   NOTE: *The crawler dozer will not move unless the engine is at approximately* ***1200 RPM*** *or higher.*

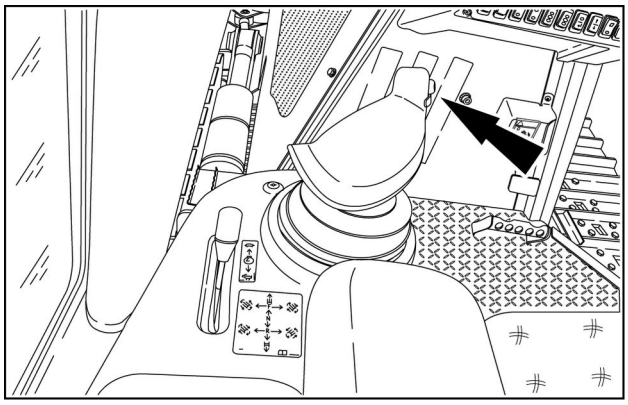
2. Push or pull the lever in the direction desired (right or left) in either forward or reverse.



87422184 3

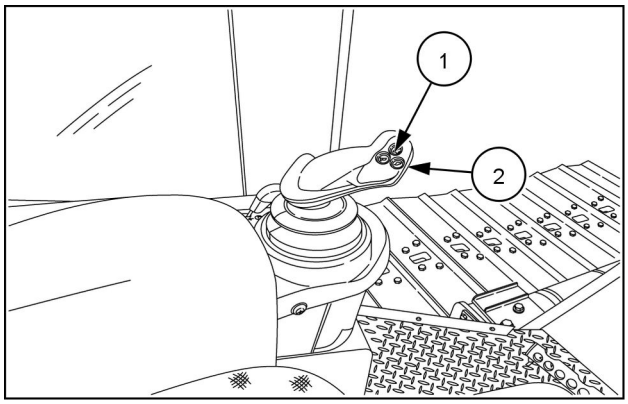
Hydrostatic drive speed

Use the up/down buttons to control the hydrostatic drive speed. The two buttons marked with a hare (to increase speed) and a tortoise (to decrease speed) can change the speed of the machine from low to high.
The machine has 15 speed increments.



RAPH12DOZ0080AA 4

Increase track speed by pushing on the upper button (hare) **(1)**. Holding the button increases the speed in increments.
Reduce track speed with the tortoise **(2)** button.

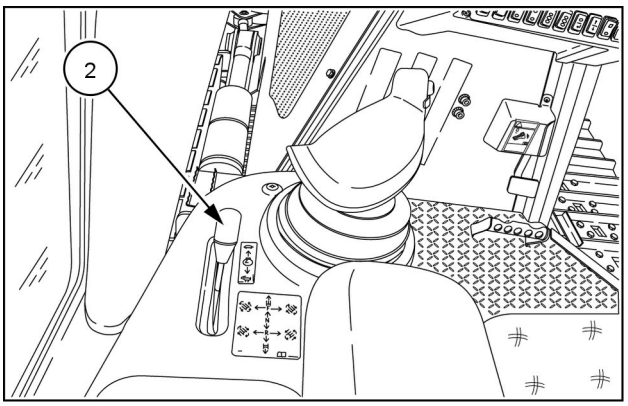


RAPH12DOZ0079AA 5

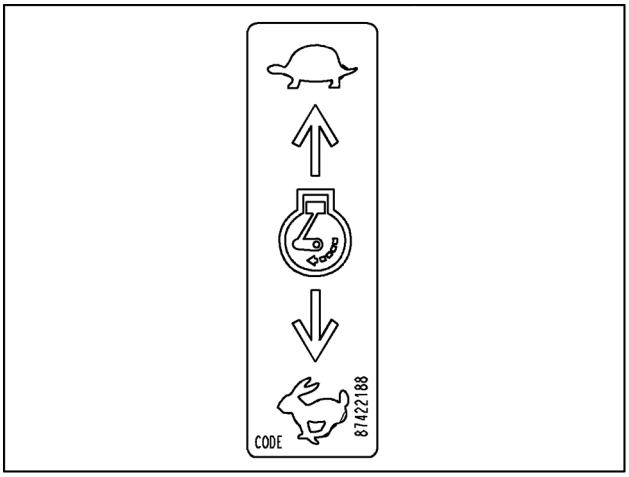
Engine hand throttle

The engine hand throttle controls engine speed. Speeds are designated fast (hare symbol) and slow (tortoise symbol). See the adjacent informational sign. Choose engine speed suitable to operate and complete the job efficiently. Do not shut the engine down from full throttle.

- Pull the engine hand throttle lever **(2)** BACK to increase the engine speed.
- Push the throttle lever FORWARD to decrease the engine speed. See the instructional decal located to the right of the throttle.



RAPH12DOZ0080AA 6

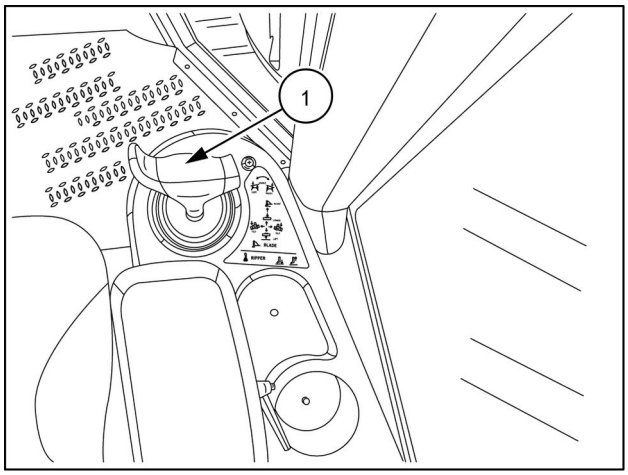


87422188 7

RIGHT-HAND SIDE CONTROLS

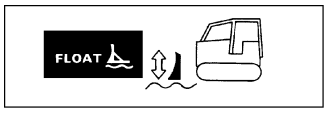
Dozer blade control lever

The dozer blade control lever **(1)** is located on the right hand console. Position **(A)** FLOAT is the only position that the lever will remain in without the operator holding the lever. The blade will stop, and the lever will return to neutral or the HOLD position in any other position when the lever is released.



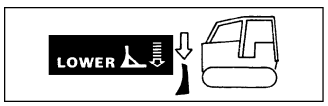
RAIL13DOZ0247AA 1

Float



FLOAT **(A)** is a detent position. When in the FLOAT position, the blade can follow the level of the ground without movement of the control lever.

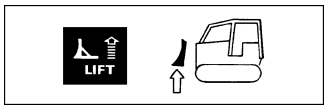
Lower



Push the control lever forward **(B)** to LOWER the blade. The control lever must be held in this position in order to lower the blade. When the lever is released, it will return to the HOLD position.

NOTE: *A quick drop feature allows the blade to lower quickly. The further the joystick is moved forward, the more quickly the blade moves. To activate the quick drop, move the joystick to the end of blade down stoke before the float detent feel point.*

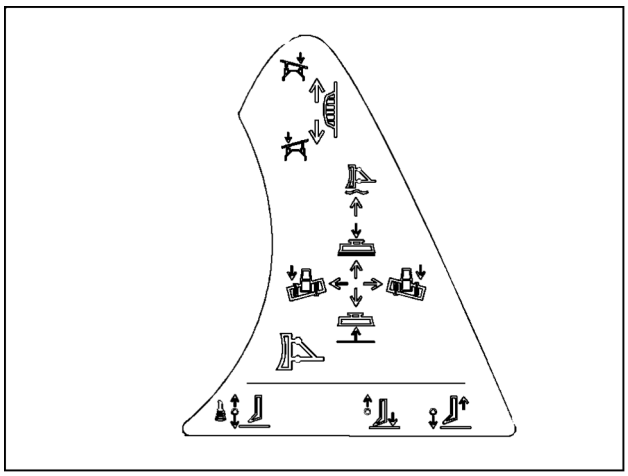
Raise



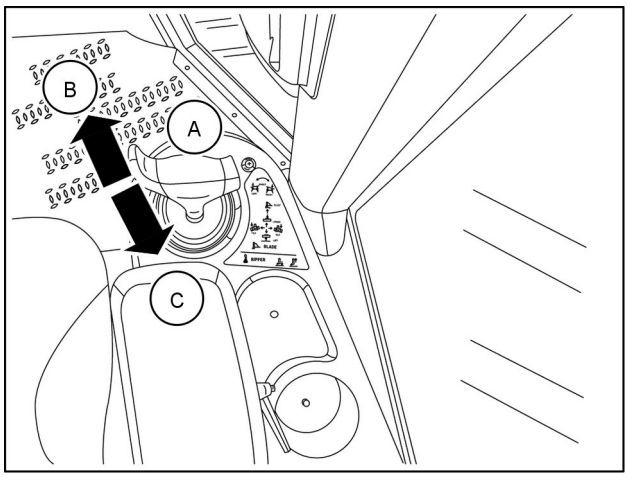
Move the control lever back to the RAISE **(C)** position to lift the blade. When the control lever is released, it will return to the neutral or hold position.

Hold

The blade will stop moving in the HOLD position. When released, the control lever will return automatically to the HOLD position. You must manually move the control lever from the FLOAT position to the HOLD position.

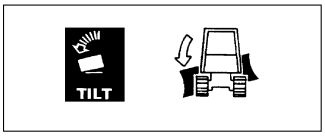


4742656856 2

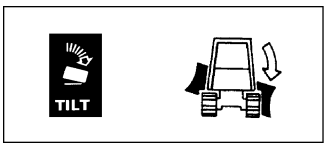


RAIL13DOZ0247AA 3

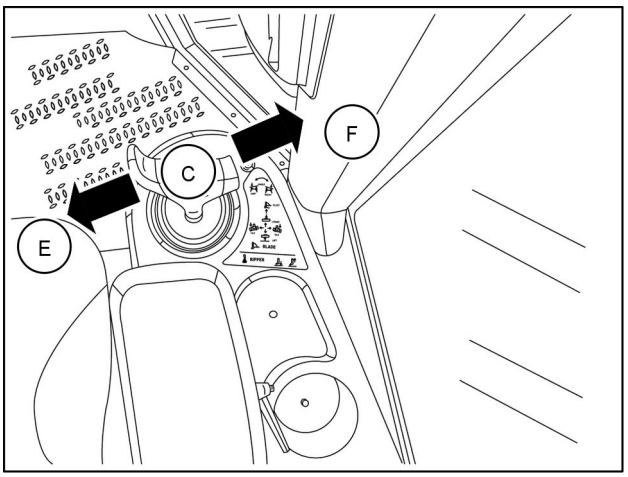
Tilt



Move the control lever to the left **(E)** to tilt the blade to the left.

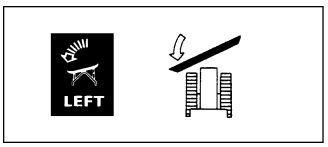


Move the control lever to the right **(F)** to tilt the blade to the right.
The blade will stop moving when the control lever is in the HOLD **(C)** position. When released, the control lever will return automatically to the HOLD position.

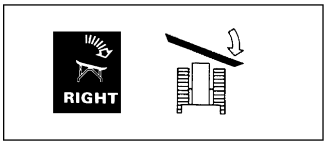


RAIL13DOZ0247AA 4

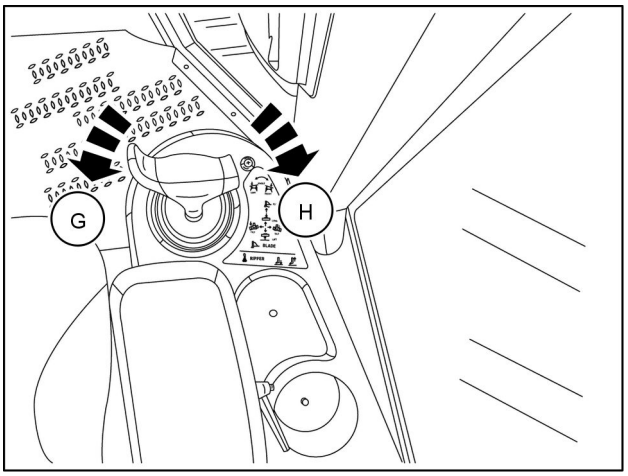
Angling the blade



Rotate the lever counter-clockwise to angle the blade left **(G)**.

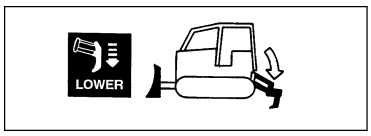


Rotate the lever clockwise to angle the blade right **(H)**.

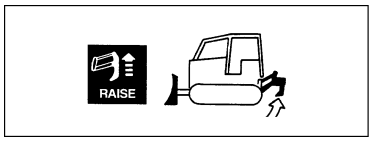


RAIL13DOZ0247AA 5

Ripper control lever

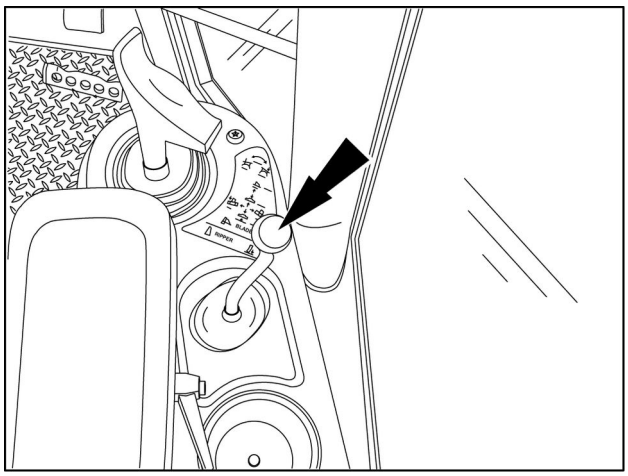


Move the ripper control lever forward right to the position to lower the ripper.



Move the ripper control lever to the back left position to raise the ripper.

The ripper will stop moving when the control lever is in the HOLD position. When released, the control lever will return to the HOLD position automatically.



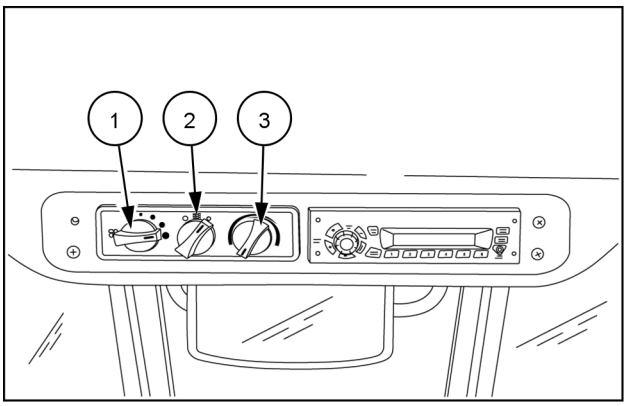
RAIL13DOZ1242AA 1

OVERHEAD CONTROLS

Climate control system

Operating the climate control system

The climate control panel is located on the upper front cab frame above the operator's head.



RAPH12DOZ0083AA 1

- Fan control
  Set the four-speed fan at the desired comfort setting. Turn the fan control knob **(1)** in one step increments clockwise to increase fan speed. Turn the fan control knob **(1)** to the 12 o'clock position for OFF.
- Heat and air conditioning control
  The heat and air-conditioning control knob **(2)** has three positions. OFF is the far left position. Turn the heat and air-conditioning control knob **(2)** clockwise to the next position for heat (straight up). Turn the heat and air-conditioning control knob **(2)** to the far right indicated by the snowflake for air-conditioning.
- Temperature control
  Use the temperature control knob **(3)** to adjust to the desired cab temperature. Blue markings indicate cooler temperatures. Red markings indicate warmer temperatures when using the heater. The heat and air-conditioning knob **(2)** turn these functions on and off.

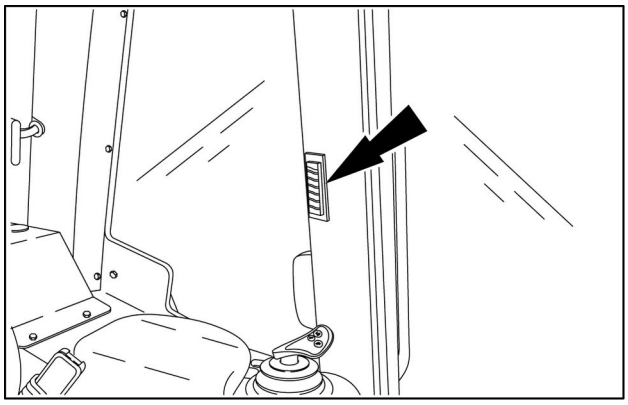
NOTICE: *If your machine is equipped with a water shut-off valve, it should be left ON for all temperature operating conditions.*

Cab air louvers

Main air louvers

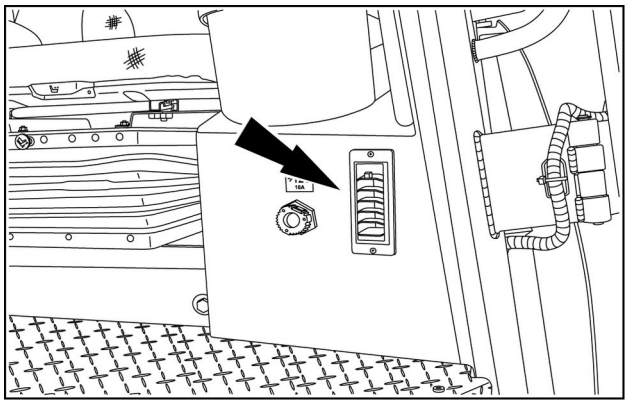
Louvers on the right-hand cab support and left-hand cab support direct air toward the windows or the operator.

Adjustments can be made to direct the air flow of the louvers.



RAPH12DOZ0087AA 1

Other louvers are located on the lower control housing.

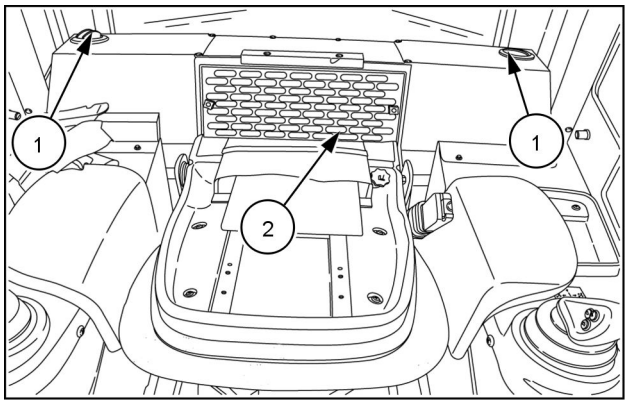


RAPH12DOZ0086AA 2

Recirculation air louver and rear louvers

The rear deck has two climate control louvers **(1)**. The cab air filter **(2)** is located behind the operator's seat next to the floor. When the louvers are open, air recirculates in the cab.

NOTE: *Always have these louvers open for maximum cooling with the air conditioning or maximum heat with the heater.*



RAPH12DOZ0074AA 3

Defrost air louvers

Use the support louvers and rear deck louvers to defrost the windows and windshield. Direct the air flow for defrosting.

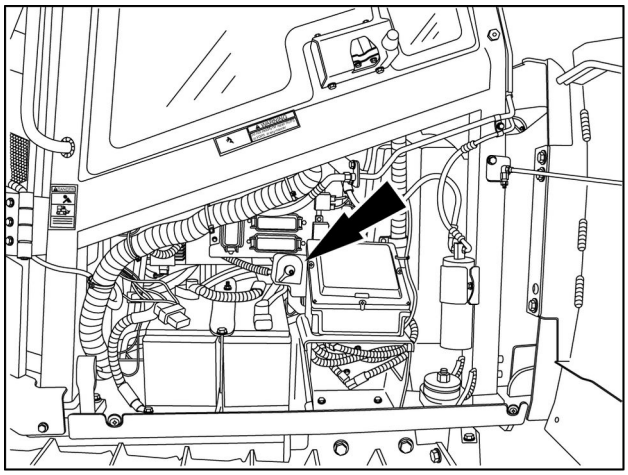
Turn the blower fan to the highest speed and close all other louvers to direct maximum air flow on the windows.

If a fogging condition occurs, make sure that the recirculation air louvers are CLOSED. If equipped with air conditioning, turn the air conditioning ON, and turn the heat control completely clockwise.

EXTERIOR CONTROLS

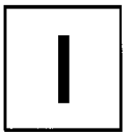
Master disconnect switch

The master electrical disconnect switch is located on the left side of the machine. The switch has two positions: ON and OFF.



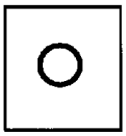
RAIL13DOZ1286AA 1

Master electrical switch ON



The master disconnect switch in the ON position energizes the entire electrical system.

Master electrical switch OFF



All machine power is interrupted in the OFF position.

NOTICE: *DO NOT use the master electrical disconnect switch to stop the engine.*

NOTE: *After engine shutdown, the SCR system will perform a purge cycle which permits the supply module to continue to run. Do not shut off the master disconnect for 90 seconds after key off.*

Telematics

SiteWatch™

This machine is equipped with a telematics system. This is an asset-monitoring system that combines Internet, cellular, and GPS technologies. A transponder unit is mounted on the equipment that wirelessly communicates with the user interface CASE CONSTRUCTION **SiteWatch™** at www.casesitewatch.com. Using cellular technology, the transponder can send equipment data, including location, on/off status, usage and production metrics, diagnostic data, movement alarms, and unauthorized usage to the interface. The system will help cut costs and keep accurate records. See the furnished guide for operating your telematics system.

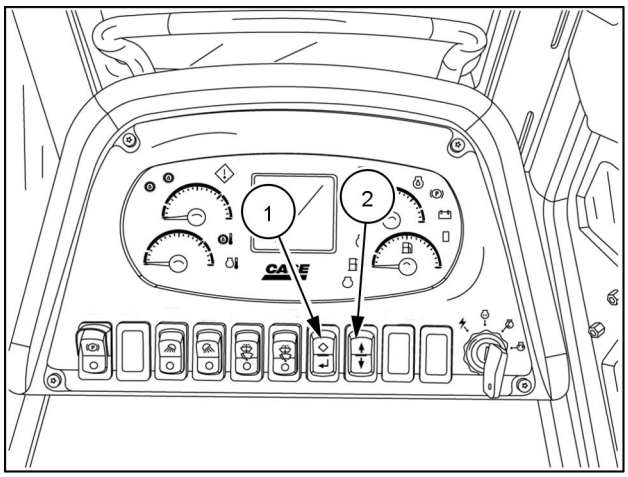
NOTE: *The CASE CONSTRUCTION* ***SiteWatch™*** *website (www.casesitewatch.com) will not be accessible until the CASE CONSTRUCTION* ***SiteWatch™*** *subscription for this machine is registered by an authorized CASE CONSTRUCTION dealer. Contact an authorized CASE CONSTRUCTION dealer for details.*

DISPLAY

Navigating the multi-function display screen

Navigation through the Liquid Crystal Display (LCD) multi-function display screens

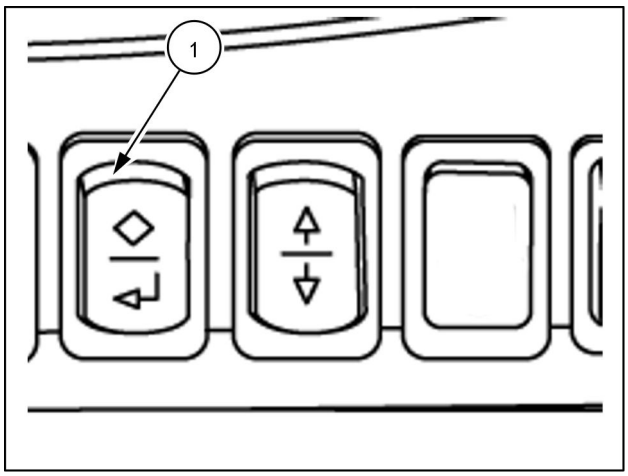
The enter/escape switch **(1)** and the up/down arrow switch **(2)** are located on the front console.
Use these switches to move from one screen to another, choose various selections, monitor the machine functions, and retrieve information.



RAIL13DOZ0230AA 1

Use the enter/escape switch **(1)** to enter selections or return to the previous menu or main screen. Push the top of the switch to escape. Push the bottom of the switch to enter/confirm.

All selections made with the computerized technology are essentially programmed in the same manner.

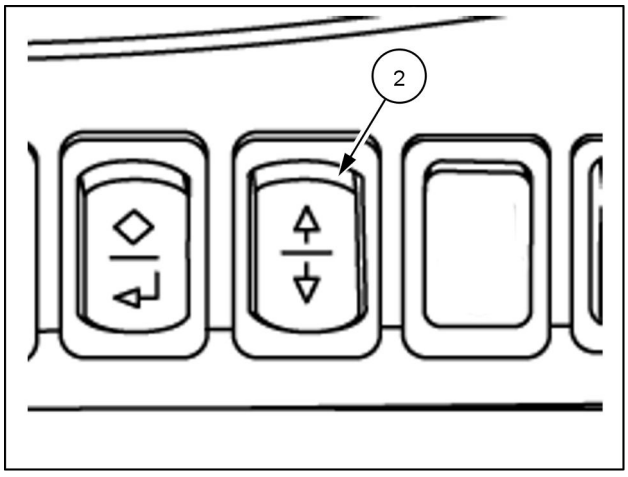


RAIL13DOZ0229AA 2

Use the arrow switch **(2)** to scroll to the desired selection. Press the top of the switch to scroll up. Press the bottom of the switch to scroll down.

Follow any screen prompts when given and use the enter/confirm switch to enter the selection. Use the escape switch to return to the main menu. This will lock the chosen selection into memory.

NOTE: *Arrows on the screen will indicate if selections are up or down from the current selection.*



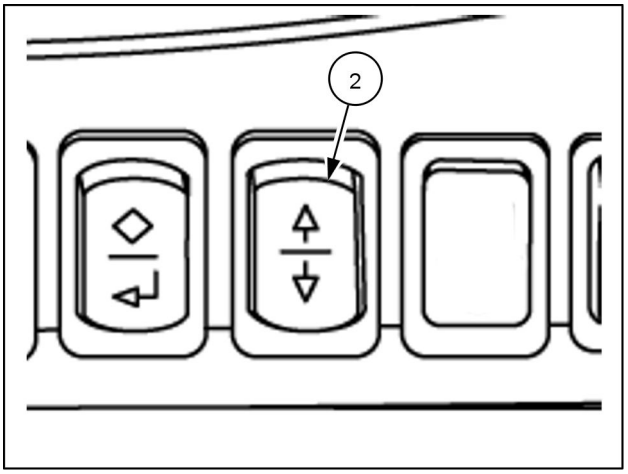
RAIL13DOZ0229AA 3

Viewing screens

At any time during operation or with the key switch ON, the operator may scroll through the information screens and two trip screens by using the arrow switch. These screens are in a circular loop and may be accessed by pressing the up or down switch. The following sequence shown uses the down switch only.

NOTE: *Pressing the escape switch will return the LCD back to the normal driving screen. In order to lock the changes into memory, the operator must press the enter/ confirm switch.*

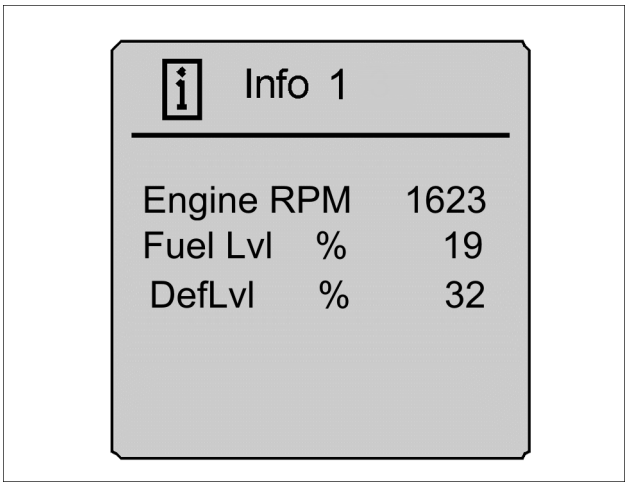
From the driving screen, push the down arrow.



RAIL13DOZ0229AA 4

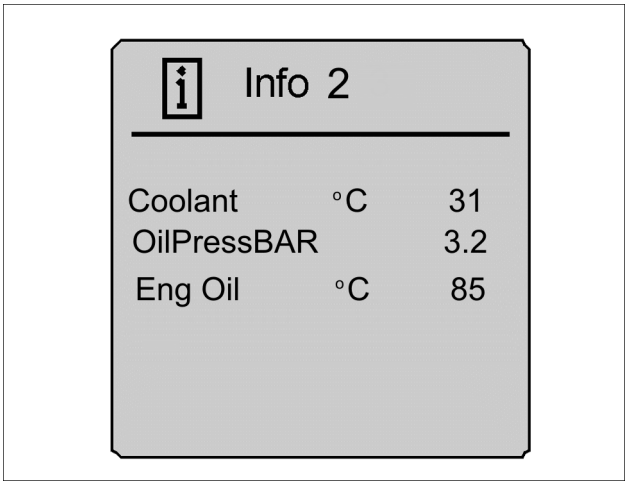
Information screens

Info 1 is the first information screen displayed when using the down arrow from the driving screen. It displays engine RPM, fuel level, and the DEF fluid level.



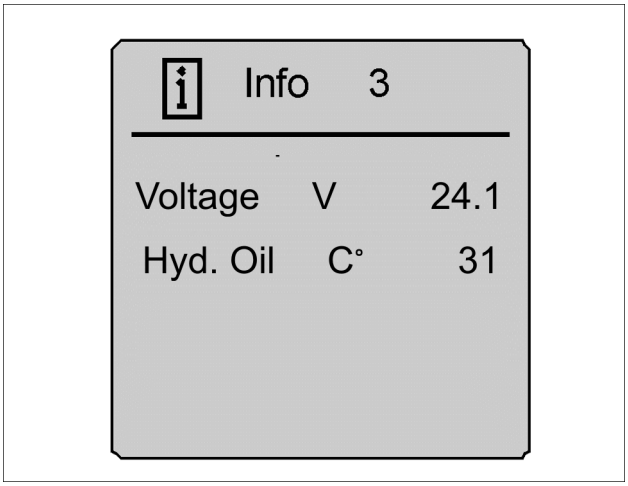
RAIL12DOZ1026AA 5

Press the down switch again to display Info 2 screen. This screen will display coolant temperature, engine oil temperature, and oil pressure. Temperature can be displayed in either Fahrenheit or Celsius.



RAIL12DOZ1027AA 6

Push the down switch again to display the Info 3 screen. This screen displays the voltage and hydraulic oil temperature.

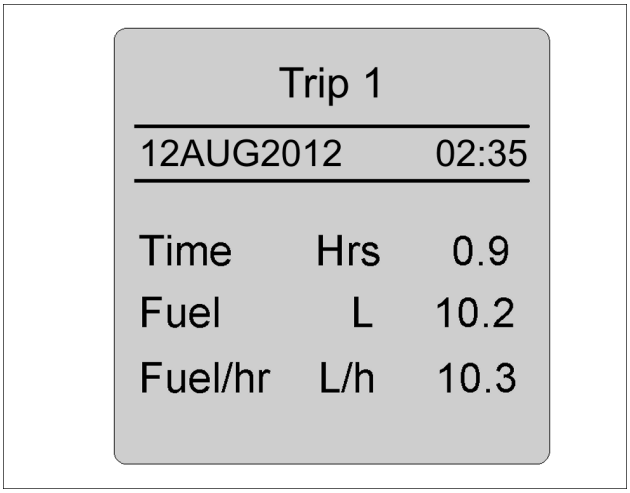


RAIL12DOZ0822AA 7

Trip screens

NOTE: *The Trip screens can only be accessed with the key in the ON position, and the engine OFF.*

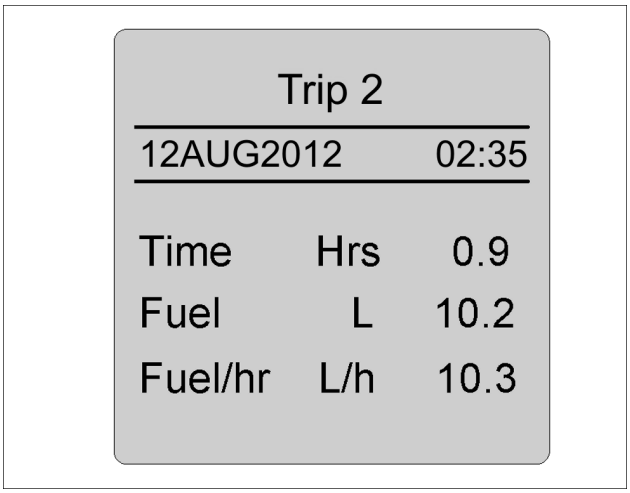
Press the down switch again and the Trip 1 screen will display. The LCD provides two trip computers. The trip screens will display since last reset the total time in hours, the total fuel, and the average fuel consumption per hour.



RCPH10WHL353AAH 8

By continuing to scroll down, the Trip 2 screen will display. Trip 1 and Trip 2 screens can be reset independently.

Previous screens can be accessed by using the up arrow switch.



RCPH10WHL354AAH 9

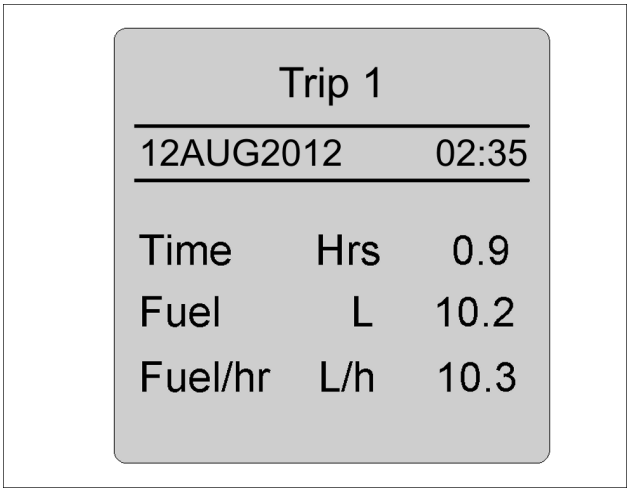
Setting trip screens

Highlight the trip screen you wish to set. (Capacity can be set in United States gallons, Imperial gallons, or metric liters when setting measurement preferences).

Press the enter/confirm switch to reset to the desired trip screen.

The trip screen will indicate a reset message. At this screen, press the enter/confirm switch to clear the numbers and reset the trip information. The current date and time will display automatically. The hours, fuel consumption, and fuel used per hour will reset and revert to zero.

Press the escape switch to return to the main driving screen and lock settings into memory. The screen will begin to record time and fuel usage immediately.



RCPH10WHL353AAH 10

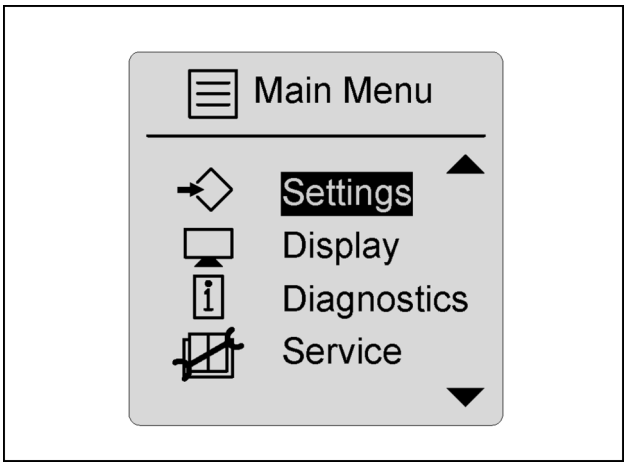
Entering the service screens

After the machine has been started or the key switch has been turned to ON, the operator or service technician may use the main menu to adjust machine configurations to working conditions, to test components, view faults that may have occurred, or to select preferences. Languages can be set at the beginning of the menu configuration to allow the operator to work in the language of choice.

Main menu

Press and hold the enter/confirm switch for two seconds to arrive at the main menu. The arrow switch can be used to scroll through menu selections.

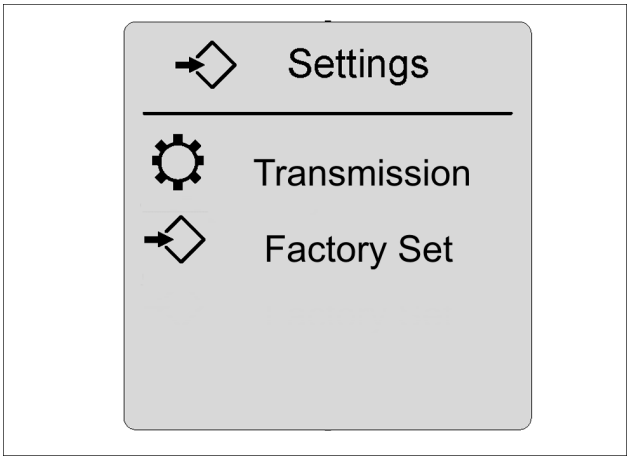
Items and selections in this menu are:
Settings
Display
Diagnostics
Service



RCPH10WHL355AAH 11

Settings

Selections at the setting menu include:
Transmission
Factory Set

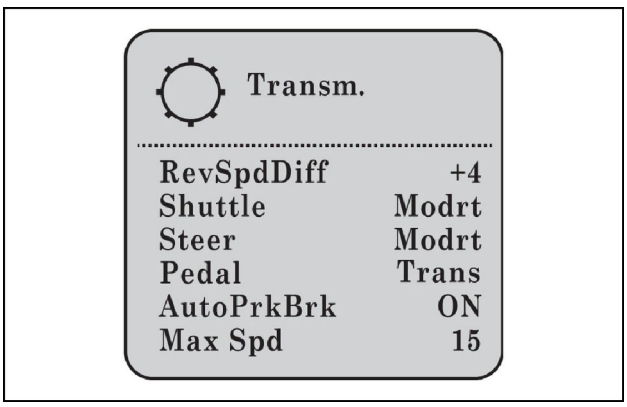


RAIL13WEL0527AA 12

Transmission selections

RevSpdDiff — Indicates speed differential between reverse and forward.
Shuttle — Adjusts ground drive ramps: smooth, moderate, or aggressive.
Steer — Adjusts steering curves: smooth, moderate, or aggressive.
Pedal — Adjusts transmission command (default). Change from transmission pedal to deceleration pedal.
AutoPrkBrk — When the “AutoPrkBrk” function is set to “ON”, the unit is in neutral and the UCM senses movement from the drive motor speed sensors for **30 s**, the park brake will engage.
1. ON (default)
2. OFF

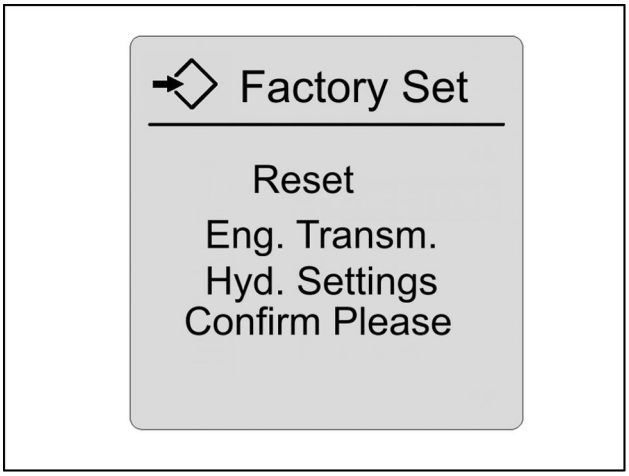
Max Speed — Sets speed in increments: 15, 13, 11, 9.



RAIL14DOZ0583AA 13

Reset factory settings

Engine, transmission and hydraulics settings can be quickly changed back to factory settings with this screen selection.

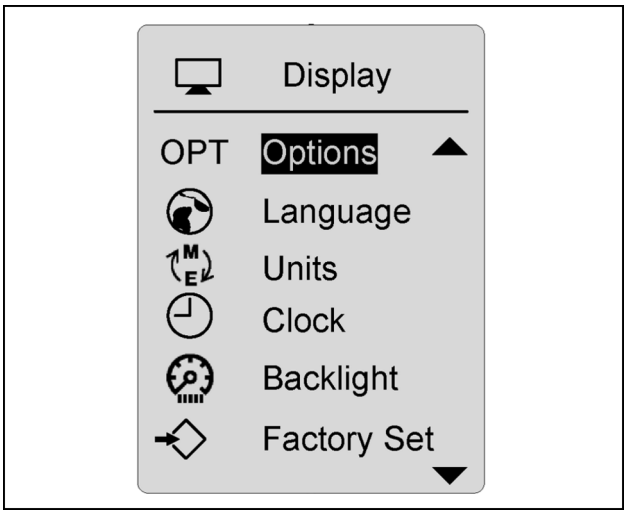


RAIL12DOZ0221AA 14

Display

Highlight the Display selection and press enter/confirm.

Items and selections in this menu are:
Languages (English, German, French, Italian, Spanish, Portuguese)
Units (Metric, English, Imperial)
Clock (Hour, Minute, Month, Day, Year)
Backlight (Day Display, Day LED, Night Display, Night LED)



RCPH10WHL358BAH 15

Service

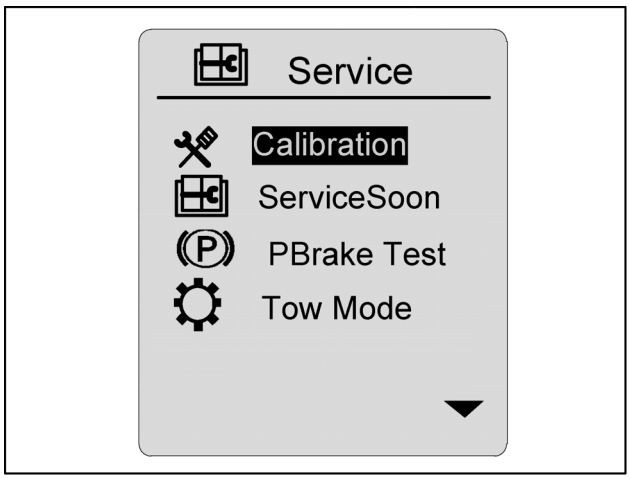
⚠ WARNING

Unexpected machine movement!
The machine could move automatically during calibration. Park on a flat surface, engage the parking brake, and be sure that the area around the machine is clear before starting the calibration process. Failure to comply could result in death or serious injury.

W0300A

Highlight the desired selection, and press enter/confirm. The tests in the configuration menu should be performed only by a qualified operator or technician, as some tests require the engine to be running at high RPM.

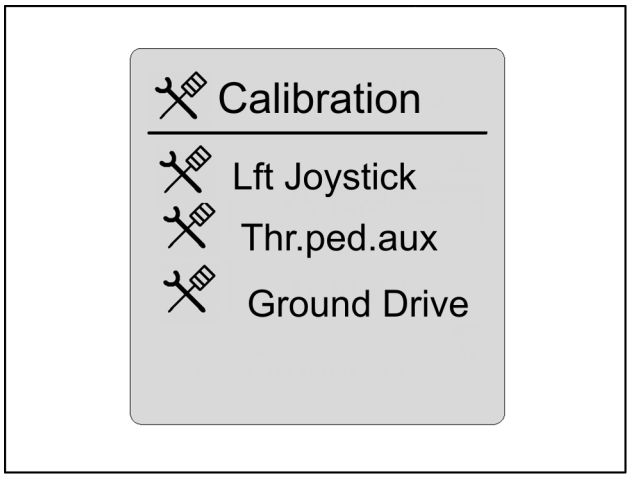
Items and selections in this menu are:
Calibration
Service Soon
PBrake Test
Tow Mode



RAIL12DOZ0648AA 16

Calibration screens

Calibration for the
Lft joystick
Ground Drive
Highlight selection and follow screen prompts. For enabling conditions, the ignition key must be ON, the engine must be OFF, the implement setting must be OFF, the operator is in the seat, the parking brake is ON, and there are no joystick related error codes.
For ground drive calibration, the engine must be ON, no joystick or ground drive error codes, park brake must be OFF, the implement setting disabled, hydraulic oil temperature is in the **40 - 45 °C** (**104.0 - 113.0 °F**) range, and RPM at 1800.

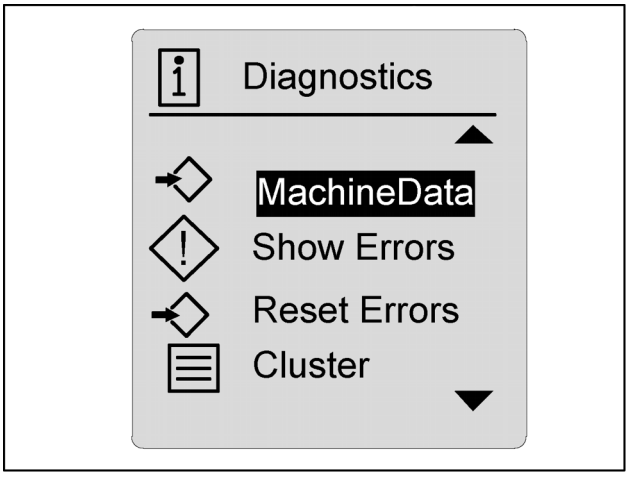


RAIL13DOZ0132AA 17

Diagnostics

Highlight the desired selection and press enter/confirm. The diagnostic area should be used by a trained service technician.

NOTE: *Pressing the escape switch will return the LCD back to the normal driving screen. In order to lock the changes into memory, the operator must press the enter/ confirm switch, then use the escape switch to return to the main screen.*



RAIL12DOZ0586AA 18

Operator preferences

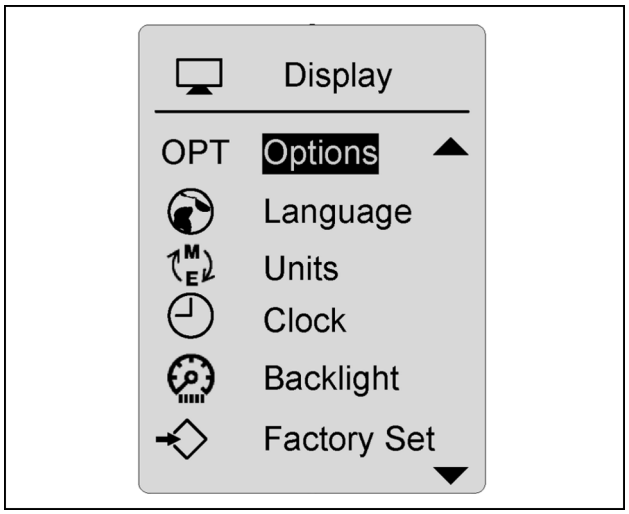
Escaping from errors

When using the machine computer system, you can return to the main menu by pressing the escape switch. When setting desired selections, should an error message display, press the escape switch and begin again.

NOTE: *Selecting options and navigating through the screen menus are the same for all functions. The display will tell the operator if errors have occurred.*

Language screen, measurement units and clock

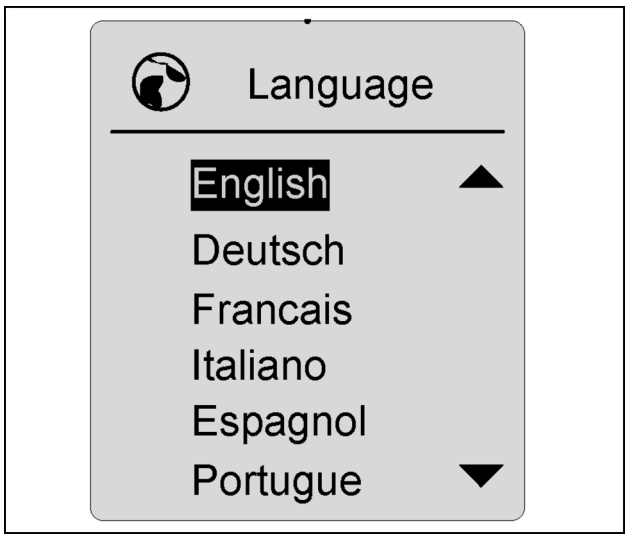
The LCD screen can be set with language, measurements, and/or clock preferences. Use the arrow switch to scroll to the preferences menu. Press the enter/confirm switch on the correct selection. Press the escape switch to return to the main driving screen, and lock the selection into memory.



RCPH10WHL358BAH 1

Languages

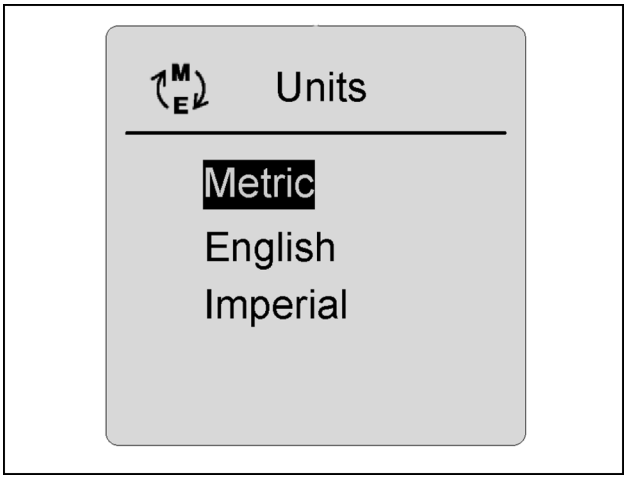
Choose the preferences desired: language in English, Spanish, Portuguese, Italian, German, French; measurement units in metric, English, or Imperial; and clock units in 12 or 24 hour cycles. Highlight the preference you wish to change, and press the enter/confirm switch. The preference will flash and allow you to scroll through the choices. When the correct preference is chosen, press the enter/confirm switch, then use the escape switch to return to the main driving screen in order to lock the preference into memory.



RCPH10WHL361BAH 2

Units

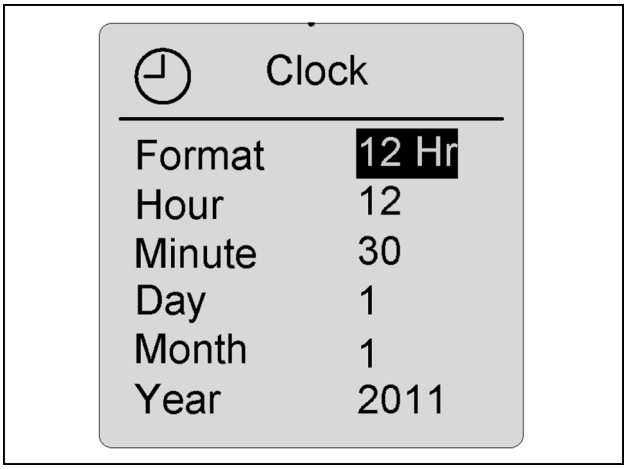
Units can be changed to metric, English, or Imperial units. Highlight the unit preference, and press the enter/confirm switch. Use to escape switch to lock the preference into memory.



RCPH10WHL362BAH 3

Clock

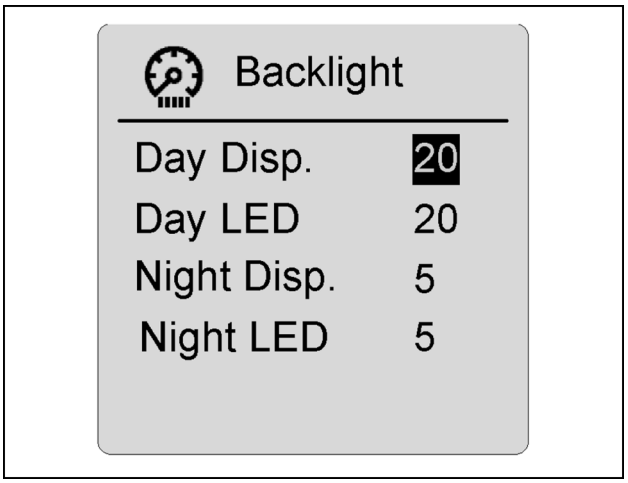
Setting the hour and date - From the select screen, choose the clock designation, and press the enter/confirm switch. Use the arrow switch to show field for time and date by pressing the arrow switch. When the correct time and date have been entered by using the up and down arrow switch (up increases the numbers - down decreases the numbers), press the enter/confirm switch to lock in correct time. Press the escape switch to return to the main driving screen and lock selections into memory.



RCPH10WHL363BAH 4

Display backlight menu

The display menu can be used to change the background and brightness of the screen. Use the arrow switch to make your selection from the display menu, and press the enter/confirm switch until the screen reverts to the main driving screen to lock the selection into memory. The screen display can be changed to suit working conditions. The screen will change to night function illumination when the head lamps are turned ON.



RCPH10WHL364BAH 5

4 - OPERATING INSTRUCTIONS

COMMISSIONING THE UNIT

Before starting the engine

⚠ WARNING

IMPROPER OPERATION OF THIS MACHINE CAN CAUSE DEATH OR SERIOUS INJURY.
MAKE SURE THAT EVERY OPERATOR:
-is instructed in the safe and proper use of this machine.
-reads and understands the operator's manual for this machine.
-reads and understands ALL safety signs on the machine.
Failure to comply could result in death or serious injury.

W0188A

⚠ WARNING

Avoid injury!
Do not operate the machine while under the influence of alcohol or drugs.
Failure to comply could result in death or serious injury.

W0160A

Before starting the engine

1. Perform a daily walk around and visual inspection of the machine.
2. Check for loose connections, faulty hoses, oil leaks, debris or trash buildup, loose bolts, damaged, or missing parts that could affect the normal and safe operation of the machine.
3. Make any necessary corrections before operating the machine.
4. Complete recommended daily maintenance.
5. Check that the machine fuel tank is filled with clean fuel that matches the specifications given in this manual.
6. Check and make certain the DEF tank is properly filled. Low volume in the tank can cause loss of power and torque. The tank will need to be filled after approximately two fuel fills. Do not allow the DEF tank to drop below 10 % volume for the best engine performance.

Run in period of a new machine

Your machine will last longer, give better and more economical performance, if you pay particular attention to the engine during the initial run-in period.

During this period:

- Warm up the engine before using it under load.
- Do not operate the engine at maximum power for prolonged periods of time.
- Do not work the engine hard at stall speeds (tracks stopped and the engine running at full throttle).
- Do not run the engine for a long period at idle speed.
- Frequently check the instruments on the instrument panel.
- Check the oil levels and coolant level frequently.
- During the run-in period, certain checks and servicing operations should be carried out in addition to those specified in the service schedule.

NOTICE: *For turbocharged engines, only shut the engine down from the low idle position to prevent damage to the turbocharger.*

Track shoe bolts

Check the track shoe bolt torque after the first 20 hours of operation when the machine is new or if the track shoes have been removed. Check the track shoe bolt torque every 100 hours of operation thereafter until the track shoe bolts remain tight. Torque to **340 - 380 N·m** (**251 - 280 lb ft**) for the standard link bolts and **340 - 380 N·m** (**251 - 280 lb ft**) for the master link bolts. Do not over tighten the track shoe bolts.

Starting the engine

⚠ WARNING

IMPROPER OPERATION OF THIS MACHINE CAN CAUSE DEATH OR SERIOUS INJURY.
MAKE SURE THAT EVERY OPERATOR:
-is instructed in the safe and proper use of this machine.
-reads and understands the operator's manual for this machine.
-reads and understands ALL safety signs on the machine.
Failure to comply could result in death or serious injury.

W0188A

⚠ WARNING

Equipment failure could cause accident or injury!
Before operating the machine, check for correct operation of steering, brakes, hydraulic controls, instruments, and safety equipment. Make sure the transmission control lever is in the neutral position. Make all adjustments before operating the machine.
Failure to comply could result in death or serious injury.

W0204A

⚠ WARNING

Hazard to bystanders!
Make sure the area surrounding the machine is clear of all persons before starting the engine.
Failure to comply could result in death or serious injury.

W0090A

Before operating the machine

Before operating this machine, complete the following procedures:

1. Make sure that the fluids and lubricants are suitable for prevailing conditions.
2. Check the level of all fluids (engine oil, fuel, hydraulic fluid, Diesel Exhaust Fluid (DEF) and coolant).
3. Carry out the daily maintenance operations listed on page **7-27**.
4. Inspect the machine, look for any signs of possible leakage, and check the hoses. Tighten or replace as necessary.
5. Complete run-in maintenance if the machine is new or has a reconditioned engine.
6. Check track tension, and check for loose, missing, or broken parts.
7. Clean the steps and hand holds. Grease, oil, mud, or ice in winter on the steps and access handles can cause accidents. Make sure the steps and hand holds are kept clean at all times.
8. Clean or replace any safety signs that are illegible. See safety signs in Chapter 2.
9. Make sure that the engine access panels and all doors are properly closed and latched.
10. Secure the cab door in either fully closed or fully opened position.
11. Remove any obstructions that hinder visibility. Clean the windshield, the windows, and the rear view mirrors.
12. Check that no tools or other items have been left on the machine or in the operator's compartment.
13. Make sure no one is on or under the machine. The operator must be alone on the machine.
14. Make sure no one is standing in the machine working area.
15. Find out about current safety measures in use on the work site.
16. Work out a convenient means of escape from the machine. Familiarize yourself with the emergency exits in the event of the cab door being jammed or the machine turning over.
17. Make sure that the lighting and signaling equipment is fully operative before undertaking any travel or work during hours of darkness.
18. Adjust the seat so that you can comfortably reach the foot pedal when your back is against the seat backrest.
19. Fasten and adjust the seat belt.
20. Check the instrument panel for correct indications with the engine running and at operating temperature.

21. Check the controls for correct operation.

Starting the engine

⚠ WARNING

Equipment failure could cause accident or injury!
Before operating the machine, check for correct operation of steering, brakes, hydraulic controls, instruments, and safety equipment. Make sure the transmission control lever is in the neutral position. Make all adjustments before operating the machine.
Failure to comply could result in death or serious injury.

W0204A

1. Turn the master disconnect switch to the ON position.
2. Take up the correct position in the operator's seat with the seat belt correctly fastened. Make sure you can push the foot pedal completely down with your back against the seat cushion.
3. Make sure the parking brake is engaged.
4. Make sure the equipment control levers are in NEUTRAL with the equipment on the ground.

   NOTE: *The direction control lever must be in NEUTRAL or the engine will not crank.*
5. Turn the key switch to the ON position, and check the instrument indicators.
6. Keep all unauthorized personnel clear of the area.
7. Sound the horn to alert others of your intent to start the engine.
8. Turn the key switch to the START position until the engine starts, then release the key.

   NOTICE: *Do not operate the starter motor more than **30 s** at one time. Let the starter motor cool for **3 min** before you engage the starter motor again. While the starter motor is engaged, white or black smoke must be seen at the exhaust pipe. Check the fuel supply if no smoke is seen.*
9. Check the instruments to make sure the indications are correct after the engine starts. Run the engine at low idle with the transmission in neutral until the engine coolant temperature is warm.

   NOTICE: *Operate the machine at reduced loads until all systems reach operating temperature. This is very important during extremely cold weather operation to protect both the engine and hydraulic systems.*

Engine speed

DO NOT OPERATE the engine at idle speed for long periods. This can cause a low operating temperature. A low operating temperature can cause acids and deposits in the engine oil.

Run the engine at low idle for a minute at start up before picking up speed and load.

Always bring the engine to low idle for a few minutes to let all parts cool evenly before shut down.

NOTICE: *Always shut the engine down from the lowest idle to prevent damage to the turbocharger.*

Operating in extreme temperatures

Operating the machine in hot climates

⚠ WARNING

Hazard to bystanders!
Make sure the area surrounding the machine is clear of all persons before starting the engine.
Failure to comply could result in death or serious injury.

W0090A

⚠ WARNING

Equipment failure could cause accident or injury!
Before operating the machine, check for correct operation of steering, brakes, hydraulic controls, instruments, and safety equipment. Make sure the transmission control lever is in the neutral position.
Make all adjustments before operating the machine.
Failure to comply could result in death or serious injury.

W0204A

1. Keep the coolant at the correct level in the coolant reservoir and in the radiator.
2. Use the correct solution of ethylene glycol and water in the cooling system.
3. Clean all dirt and debris from the radiator, cooler, and engine area.
4. Check the condition of the engine accessory drive belt.
5. Use lubricants of the correct viscosity.

NOTICE: *Do not operate the starter motor for more than* ***30 s*** *at one time. Let the starter motor cool for* ***three min*** *before you attempt to restart the machine. When the starter motor is engaged, you must see white or black smoke at the exhaust pipe. If no smoke is seen, check the fuel supply.*

Cold temperature operation

Operating in cold climate conditions

Cold weather conditions require special operating procedures. The machine will require special start up, warm up, and maintenance procedures for the best performance. Proper cold weather maintenance will extend the service life of the machine.

Batteries

Clean the batteries and make sure they are at full charge. In cold conditions, it is important to run the machine long enough to return the charge lost by starting. In most cold conditions, run the machine for about **10 min**. In extreme cold conditions, run the machine for **30 min**.

NOTE: *A fully charged battery at* ***-17 °C*** *(****1.4 °F****) has only* ***40 %*** *of the normal starting power. At* ***-29 °C*** *(****-20.2 °F****) the battery has only* ***18 %****.*

Inspect the battery cables and terminals. Clean the terminals, and apply electrical terminal sealers to prevent corrosion. See your authorized dealer.

If you add water to the batteries and the temperature is below **0 °C** (**32.0 °F**), charge the batteries or run the engine for approximately **2 h**. This will prevent battery freezing.

Lubricants

Follow the recommended oil and filter service for the engine and hydraulic system. Use the correct viscosity oil in each component for the ambient temperature. For extreme cold conditions, contact your authorized dealer for alternative lubricants for the hydraulic and transmission systems.

Fuel

Check with your fuel supplier for the correct cold weather fuel. Wax particles in the fuel filters will reduce engine power. Some cold weather fuel blends result in lower engine power.

Check for water in the fuel system. Cold temperatures can cause condensation to form in the fuel tank. Check and drain the fuel prefilter and fuel tank for water as required.

Diesel Exhaust Fluid (DEF)

During cold weather conditions, it is normal for the DEF to freeze inside the tank. Your machine is equipped with an internal tank heater to thaw frozen DEF. Your machine will still function until the DEF begins to flow. The Selective Catalytic Reduction (SCR) system will return to normal function once the DEF begins to flow. The DEF level gauge may not display an accurate level until the tank thaws completely.

NOTE: *Do not use an anti-gelling or freeze point improver in your DEF. The* ***32.5 %*** *solution is specifically designed to provide the optimum* NO_X *reduction properties. Any further blending or adjusting of the DEF mixture will lessen its ability to perform correctly and may cause damage to the SCR components.*

Cooling system

Check the coolant mixture before operating in cold temperatures. A mixture of **50 %** ethylene glycol or **50 %** OAT coolant and **50 %** water must be used. This mixture is used if the lowest ambient temperature is **-37 °C** (**-34 °F**). If the ambient temperature is lower, adjust the mixture. Use ethylene glycol or OAT coolant and water in the machine during all seasons. Depending on the date of manufacture, the machine could have either coolant type. Machines with OAT coolant will have a decal near the fill location. Never mix conventional coolant with OAT coolant. See page **7-22** for instructions on switching coolant types.

Cold temperature starting aids

⚠ WARNING

Explosion hazard!
DO NOT use ether starting fluid. Serious engine damage, explosion, death, or serious personal injury could occur.
Failure to comply could result in death or serious injury.

W0148A

This machine may be equipped with an engine grid heater. Turn the key switch to ON, and wait for the engine grid heater indicator lamp to go out. This allows for smooth running conditions during cold weather warm up. Contact your authorized dealer for additional cold weather starting aids.

Machine warm up

To properly warm the machine in cold conditions:

1. Set engine speed to **1200 - 1400 RPM**. Operate the ground drive at no greater than speed 8.
2. Cycle the implement system functions by moving each function the full cylinder stroke several times.
3. Repeat Step 2 for **10 min** or until hydraulic oil temperature is at least **10.0 °C** (**50.0 °F**).

NOTE: *Warm oil to above **20.0 °C** (**68.0 °F**) for optimized performance.*

4. Once the engine has started, run the engine at about half throttle (**1650 RPM**) for a minimum of four minutes under no load. This will help stabilize the engine.
5. Operate the machine in a clear safe area. Check the full operation of the machine.

If the machine idles in cold temperatures, the engine will stay warm, but the hydraulic oil and brake oil will cool. The oil and components can become cold, which will affect hydraulic function response time. If this should happen you MUST go through the complete warm up procedure.

Make sure the track system is clean when you park the machine. In cold weather, park the machine on planks. This will prevent the tracks from freezing to the ground.

NOTICE: *If the track freezes to the ground, do not try to drive the machine. This will cause damage to the power train.*

STOPPING THE UNIT

Parking the machine

⚠ WARNING

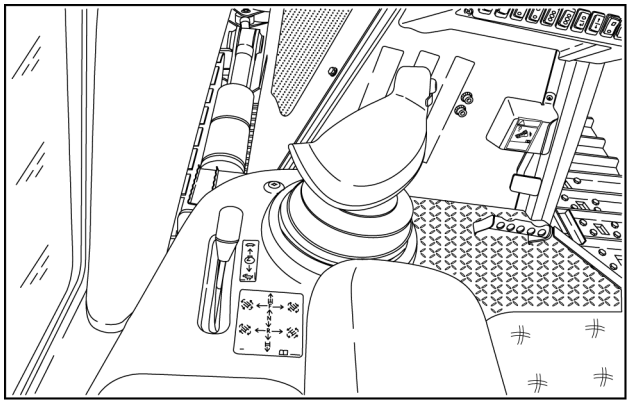
Fall hazard!
Jumping on or off the machine could cause an injury. Always face the machine, use the handrails and steps, and get on or off slowly. Maintain a three-point contact to avoid falling: both hands on the handrails and one foot on the step, or one hand on the handrail and both feet on the steps.
Failure to comply could result in death or serious injury.

W0141A

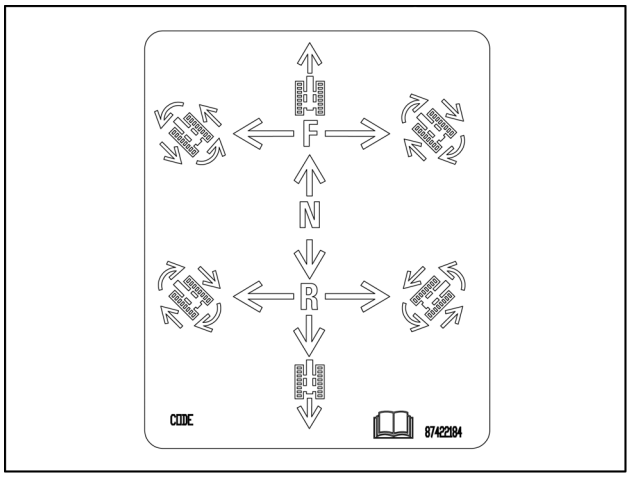
1. Park the machine on firm, level ground, and place the transmission in neutral.

   NOTICE: *If you must temporarily park the machine on a hillside, put the front of the machine toward the bottom of the hill. Make sure the machine is behind an object that will not move.*

2. Lower the dozer blade and ripper (if equipped) to the ground.

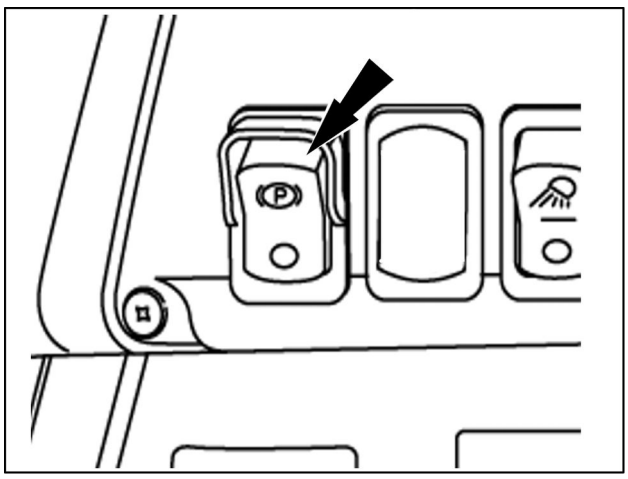


RAPH12DOZ0080AA 1



RAPH12DOZ0149AA 2

3. Press the momentary toggle switch to engage the parking brake. The indicator light on the switch and on the instrument cluster will illuminate when the parking brake is engaged.
4. Run the engine at low idle speed for a few minutes if the engine has been working with a heavy load. This decreases the temperature of the engine parts evenly. The turbocharger may be damaged if the engine is not properly shut down.
5. Make sure the engine is at its lowest idle.
6. Turn the key switch to OFF to stop the engine.
7. When you park the machine, make sure the track system is clean. In cold weather, place the machine on planks. This will prevent the tracks from freezing to the ground.



RAPH12DOZ0404AA 3

MOVING THE UNIT

Operating the machine

Crawler operation

⚠ WARNING

Equipment failure could cause accident or injury!
Before operating the machine, check for correct operation of steering, brakes, hydraulic controls, instruments, and safety equipment. Make sure the transmission control lever is in the neutral position. Make all adjustments before operating the machine.
Failure to comply could result in death or serious injury.

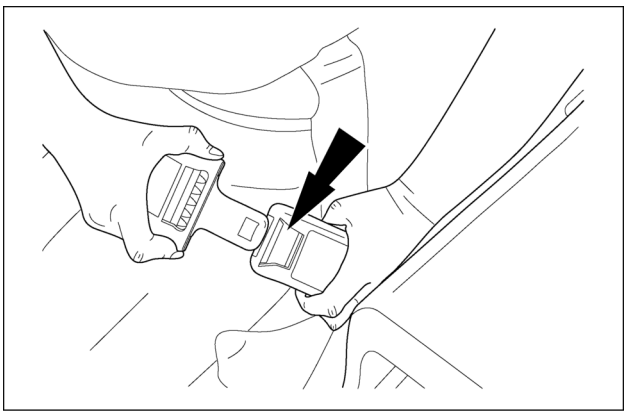
W0204A

⚠ WARNING

IMPROPER OPERATION OF THIS MACHINE CAN CAUSE DEATH OR SERIOUS INJURY.
MAKE SURE THAT EVERY OPERATOR:
-learns and practices the safe use of machine controls in a safe, clear area before operating the machine on a job site.
-clears the work area of all bystanders.
-observes pertinent laws and regulations.
-follows the instructions in this operator's manual.
Failure to comply could result in death or serious injury.

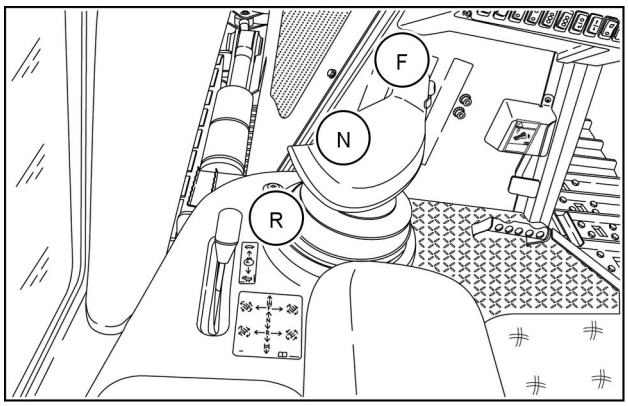
W0189A

1. Adjust the seat, and fasten your seat belt. Make sure that you can fully depress the deceleration or transmission pedal when your back is against the seat backrest.

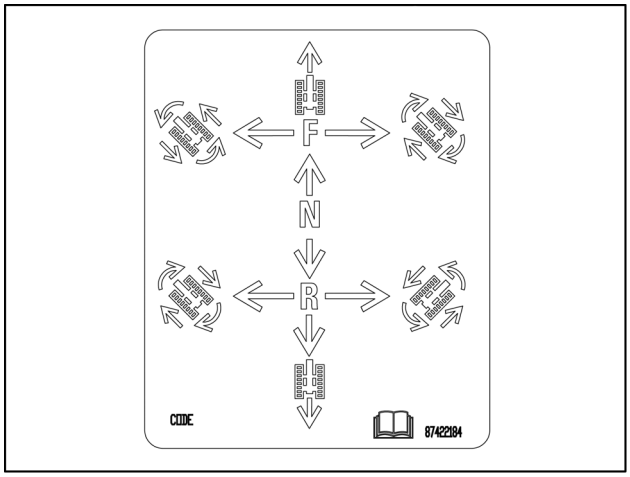


RCIL10CWL083FAL 1

2. Place the machine direction control in neutral.
3. Turn the ignition switch to ON, and monitor the display and gauges. If the engine preheat lamp is illuminated, wait for the preheat process to complete before starting the engine.
4. Press the deceleration or transmission pedal all the way down.



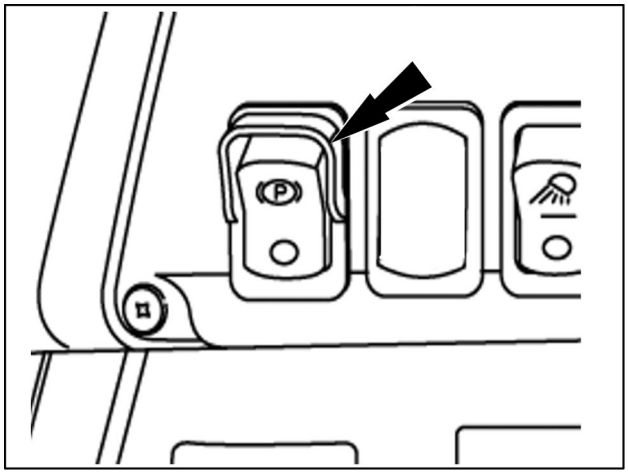
RAPH12DOZ0080AA 2



RAPH12DOZ0149AA 3

5. Press the momentary toggle switch to release the parking brake. The indicator light on the switch and on the instrument cluster will go out when the parking brake is disengaged.
6. Shift down to a low speed. Select an appropriate speed from a speed range of 1–15. The monitor display will reflect the speed selected.

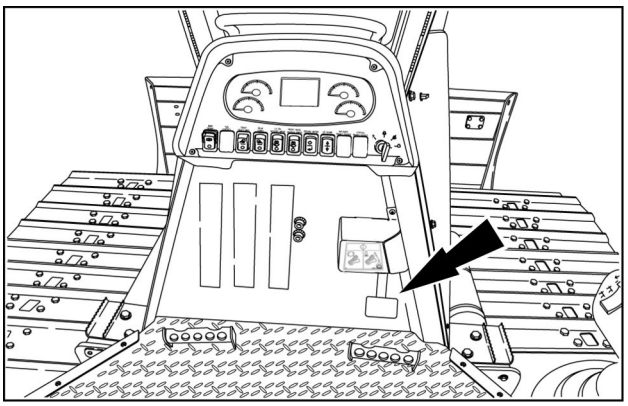
   NOTE: *The speed will default to the factory preset speed (8) at initial key on.*
7. Raise the blade above the ground, and make sure that the ripper, if equipped, is in the transport position.



RAPH12DOZ0404AA 4

8. Continue to hold the deceleration or transmission pedal down.
9. Place the direction control lever in F (Forward), and slowly release pressure on the deceleration or transmission pedal.

   NOTE: *The crawler will not move if the engine is below approximately* ***1200 RPM****.*
10. Test the deceleration or transmission pedal by driving the crawler forward and pushing the pedal. The crawler must stop in a straight line.



RAPH13DOZ1547AA 5

Direction control lever

⚠ WARNING

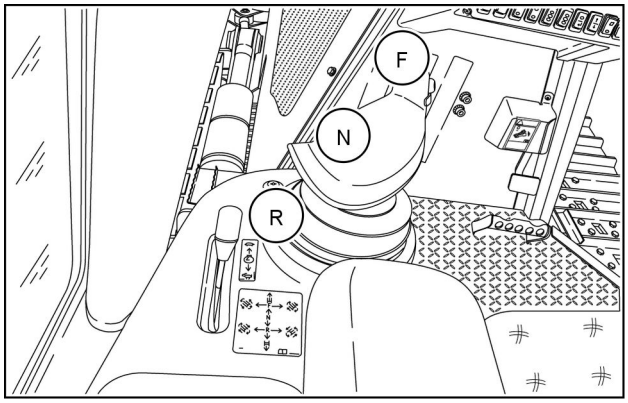
IMPROPER OPERATION OF THIS MACHINE CAN CAUSE DEATH OR SERIOUS INJURY.
MAKE SURE THAT EVERY OPERATOR:
-learns and practices the safe use of machine controls in a safe, clear area before operating the machine on a job site.
-clears the work area of all bystanders.
-observes pertinent laws and regulations.
-follows the instructions in this operator's manual.
Failure to comply could result in death or serious injury.

W0189A

Control the drive and steering with the direction control lever. The direction control lever sends an electronic signal to the controller.

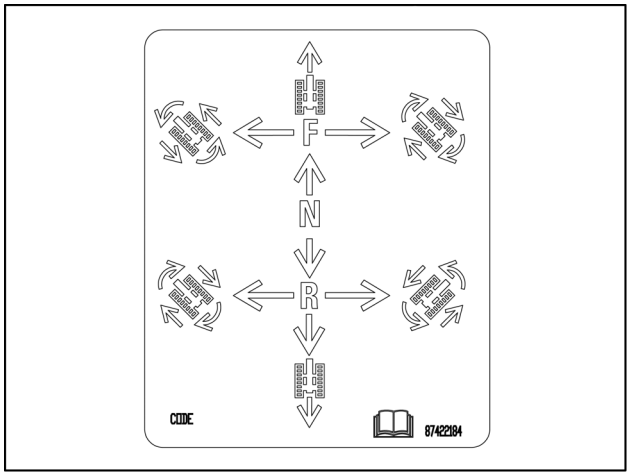
The directional control lever has a detent in the forward and reverse positions. The lever will stay in the forward or reverse position until you remove it from either detent. At start up, the crawler must be in the neutral position for several seconds before the machine will move.
The directional control lever position will be displayed on the instrument gauge.

The sensitivity or feel of the direction control lever can be adjusted to moderate, smooth, or aggressive.



RAPH12DOZ0080AA 1

Direction control lever

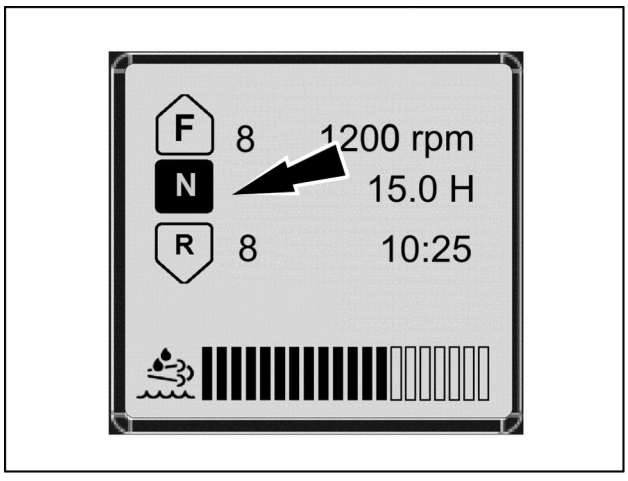


RAPH12DOZ0149AA 2

Move the direction control lever to the position desired (forward-neutral-reverse) and verify the selection on the multi-function display (neutral shown).

NOTE: *The crawler will not move unless engine is above approximately* ***1200 RPM****.*

Turn the crawler by moving the direction control lever in the direction desired. Turning is accomplished through forward or reverse only. Moving the control lever left or right without being in forward or reverse will not move the crawler.



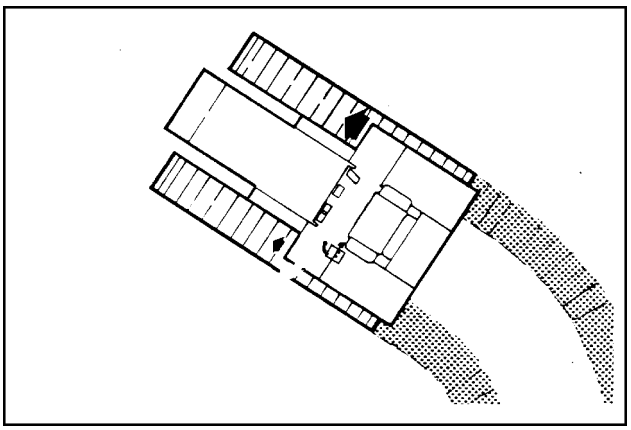
RAIL12DOZ0224AA 3

Turning

Turns are performed in conjunction with forward or reverse motion of the crawler.

Steering a gradual turn

1. Move the direction control lever forward and to the left to the eleven o'clock position. The crawler will gradually turn to the left.
2. Move the direction control lever forward and to the right to the one o'clock position. The crawler will gradually turn to the right.



RCIL10CWL016AAL 4

Power turn

1. Move the direction control lever toward the ten o'clock position, and the crawler will turn sharper to the left with appropriate power to each track.
2. Move the direction control lever toward the two o'clock position, and the crawler will turn sharper to the right with appropriate power to each track.

Counter rotation

1. Left counter rotation
   Push the decelerator pedal all the way down. Move the direction control lever forward and then straight left to the nine o'clock position. Slowly release the decelerator pedal.
2. Right counter rotation
   Push the decelerator pedal all the way down. Move the direction control lever forward and then straight right to the three o'clock position. Slowly release the decelerator pedal.

Machine settings

Multi-function display

Adjusting steering sensitivity

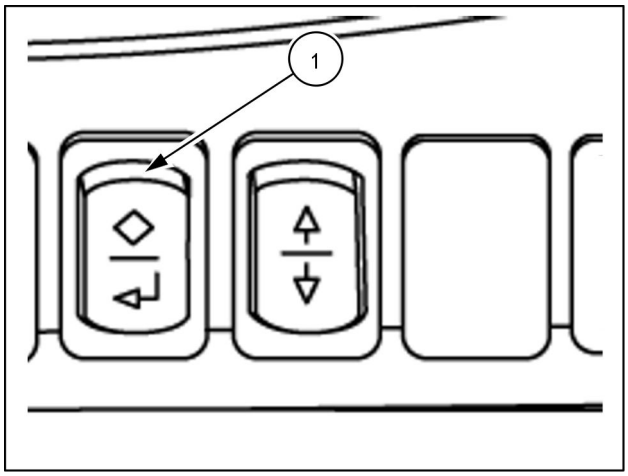
The direction control lever has three sensitivity settings:

- Smooth
- Moderate
- Aggressive

Change the sensitivity to suit job site, operations, and operator experience. Practice with the steering in the normal sensitivity mode.

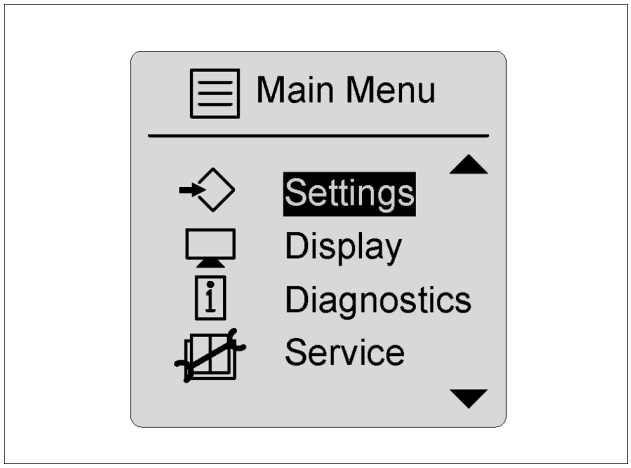
To change the steering sensitivity:

1. Press and hold the enter switch **(1)** for two or three seconds until the menu screen appears.



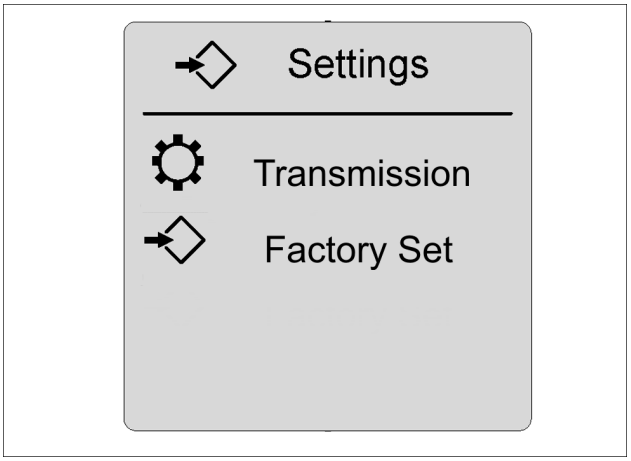
RAPH12DOZ0409AA 1

2. Highlight “Settings”, and press the enter switch.



RCPH10WHL355AAH 2

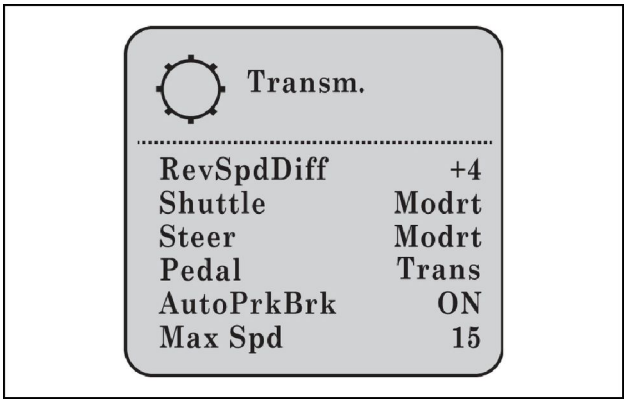
3. The Settings screen will display along with the following choices:
   Transmission
   Factory Set
4. Select “Transmission”, and press the enter switch.



RAIL13WEL0527AA 3

5. Use the down arrow to highlight “Steer”.

   NOTE: *Moderate is preset from the factory.*
6. Push the enter switch to confirm the selection.
7. Choose and highlight the setting desired: “Smooth”, “Moderate”, or “Aggressive”. Push the enter switch to confirm the selection.
8. Press the escape switch to store the choice.



RAIL14DOZ0583AA 4

Adjusting maximum hydrostatic drive speed parameter

To adjust the maximum drive speed, follow the same steps as for steering sensitivity, then highlight “Max Spd”.

The max drive speed choices are: 9, 11, 13, 15 as selected by the operator, with default set to 15.

The speed can be raised or lowered with the speed buttons located on the left joystick.

Adjusting reverse speed ratio differential setting

To adjust the reverse speed ratio differential, follow the same steps as for steering sensitivity, then highlight “RevSpdDiff”.

The RevSpdDiff choices are: -2, -1, 0, +1, +2, +3, and +4.

After selecting and highlighting the desired value, press the enter to confirm the selection. Press the escape switch to store the choice.

This will produce a reverse speed calculated from the forward speed. For example, if “+4” is selected, this will produce a reverse speed 4 speeds higher than the forward speed. If “-2” is selected, this will produce a reverse speed 2 speeds slower than the forward speed. If “0” is selected, the reverse and forward speeds will be the same.

The reverse speed cannot be below 1 and above the “Max Spd” setting.

Adjusting shuttle parameter

To adjust the shuttle parameter, follow the same steps, highlighting “Shuttle”.

The shuttle choices are:

- Smooth
- Moderate (preset from the factory)
- Aggressive

After selecting and highlighting the desired value, press the enter to confirm the selection. Press the escape switch to store the choice.

Dual function deceleration or transmission pedal

The deceleration or transmission pedal can be changed at the transmission selection. Highlight “Pedal”, and follow the same steps as for steering sensitivity.

Choose between:

- Decel
- Trans - (factory default)

Auto park brake setting

To adjust the auto park brake setting, follow the same steps as for steering sensitivity, then highlight “AutoPrk-Brk”.

The AutoPrkBrk choices are:

- On (default)
- Off

After selecting and highlighting the desired value, press the enter switch to confirm the selection. Press the escape switch to store the choice.

When the “AutoPrkBrk” function is set to “ON”, the unit is in neutral and the UCM senses movement from the drive motor speed sensors for **30 s**, the park brake will engage.

Factory Set

This setting allows the reset of functions to factory default. Follow the prompts, and press the enter switch to confirm the selection.

RAIL12DOZ0217AA 5

Hydrostatic drive speed controls

⚠ WARNING

Hazard to bystanders!
Always sound the horn before starting the machine. Make sure the work area is clear of other persons, domestic animals, tools, etc. before you operate the machine. Never allow anyone in the work area during machine operation.
Failure to comply could result in death or serious injury.

W0304A

The crawler has variable speed selections in either forward and reverse. Select a maximum speed in a range of 15 increments. Press the UP **(1)** or DOWN **(2)** button to move from one speed to another. This allows the operator to increase speed one increment at a time by each touch of the button. Move continuously through the drive speeds by holding the button in.

NOTE: *The speed can only be increased to the maximum drive speed setting. The maximum drive speed setting can be adjusted. The highest speed from the factory is preset at 15.*

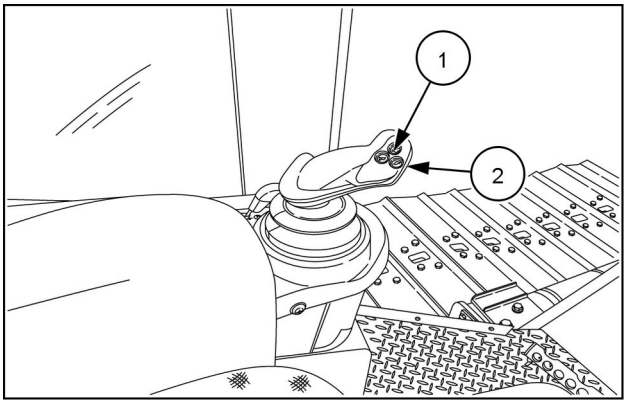
NOTE: *The transmission speed will default to 8 when the crawler engine is shut off.*

NOTE: *The horn button is also located on the joystick. Always sound the horn before starting the machine.*

The drive speed on the multi-function display shows the speed selected. When the crawler engine is shut off, the drive speed will default to 8.

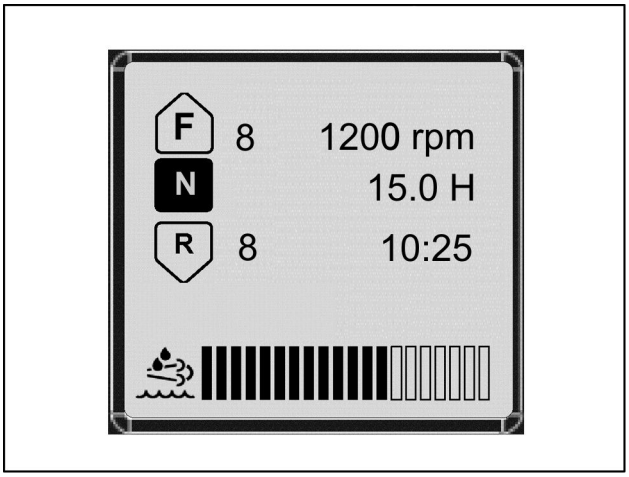
The multi-function display also shows the position of the direction control lever as Forward (F), Neutral (N), or Reverse (R). If the F or R flashes, the directional control lever must be returned to neutral before the crawler will move.

NOTE: *The crawler will not move unless the engine is above* ***1200 RPM****.*



RAPH12DOZ0079AA 1

1. Hydrostatic drive increase speed (Hare)
2. Hydrostatic drive decrease speed (Tortoise)

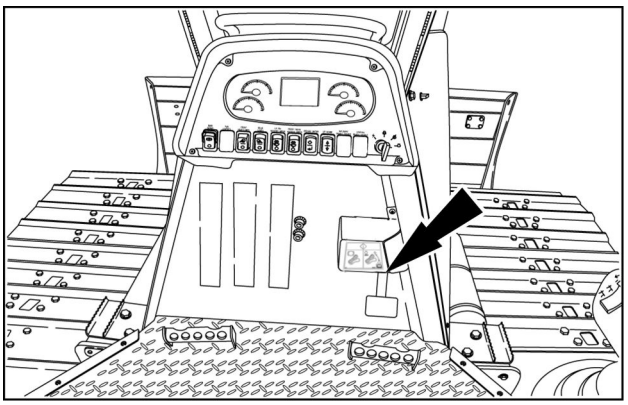


RAIL12DOZ0224AA 2

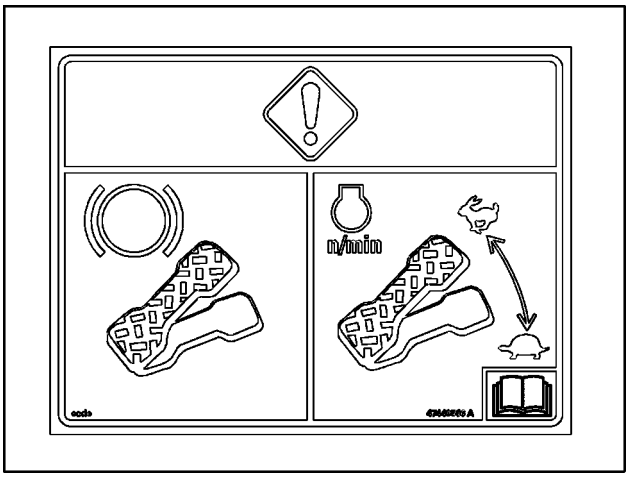
Deceleration or transmission pedal

The machine features a dual function deceleration or transmission pedal. The transmission (Trans) pedal is the default feature. Use the deceleration pedal to slow or stop the vehicle for precision grading. The deceleration pedal reduces the throttle setting as it is depressed. The deceleration pedal works in any direction. The function of the pedal can be changed through the multi-function display. See complete multi-function display instructions and changing the pedal functions in this chapter on page **4-14**.

NOTICE: *See the deceleration or transmission safety sign located above the pedal and in the safety section in this manual.*



RAPH13DOZ1547AA 1

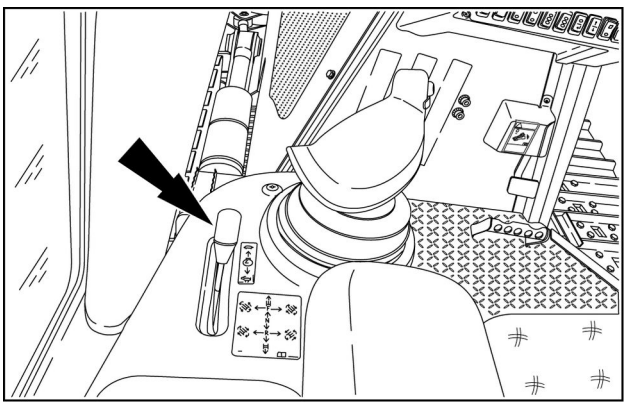


47449566 2

Throttle speed lever

1. Pull the throttle speed lever back to increase the engine speed.
2. Push the throttle speed lever forward to decrease the engine speed.

NOTICE: *Run the engine at low idle for a few minutes before turning the engine off. Always shut the engine down with the throttle at its lowest setting to keep from damaging the turbocharger.*



RAPH12DOZ0080AA 3

5 - TRANSPORT OPERATIONS

ROAD TRANSPORT

Tow procedure

⚠ WARNING

Misuse hazard!
Towing is a delicate maneuver that is always carried out at the risk of the user. The manufacturer's warranty does not apply to incidents or accidents that occur during towing. Where possible, carry out the repairs at the site.
Failure to comply could result in death or serious injury.

W0286A

⚠ WARNING

Transport hazard!
Make sure that the weight of a trailed vehicle that is not equipped with brakes NEVER EXCEEDS the weight of the machine that is towing the vehicle. Stopping distance increases with increasing speed as the weight of the towed load increases, especially on hills and slopes.
Failure to comply could result in death or serious injury.

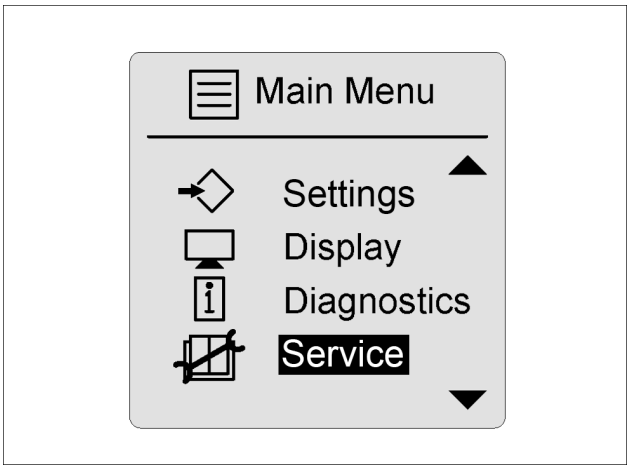
W1138A

NOTICE: *If you doubt your ability to perform this procedure, contact your authorized dealer. This procedure will require removing the floor mat, the floor panel and seat bolts.*

Engine or hydraulic failure

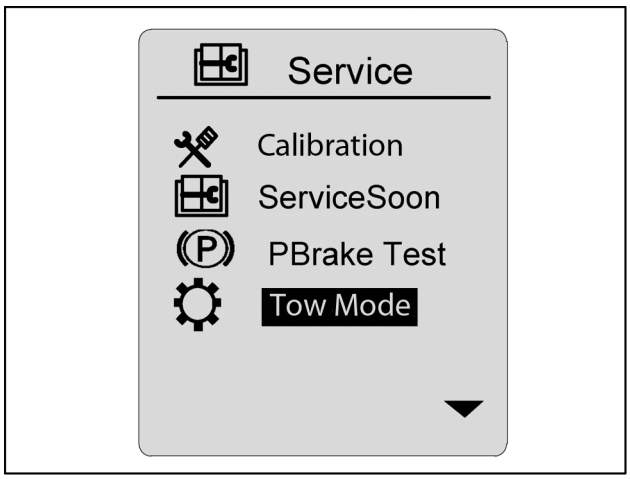
Towing this machine is not recommended. If your machine is disabled, you must make a judgment if the machine can be moved without further damage. If possible, repair the machine at the job location.
If you cannot repair the machine at the job location, you may wish to contact your authorized dealer for assistance. Incorrectly performed towing procedures can severely damage machines with hydrostatic motors.
Keep all unauthorized personnel clear of the area.

1. Use the multi-function display screen to select the towing mode. From the main menu, scroll down and select “Service”. Press the enter switch.



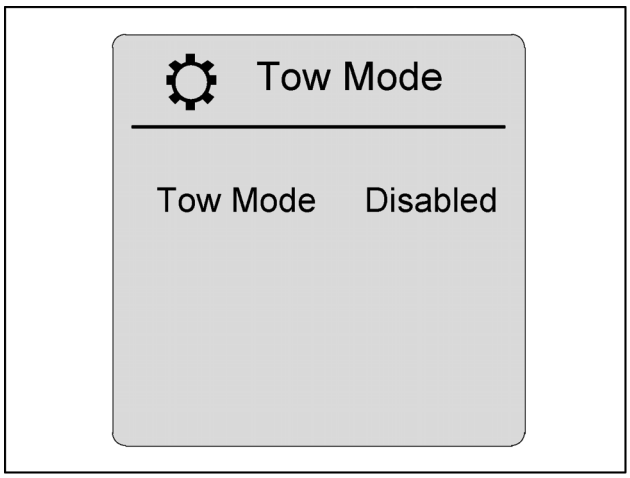
RAIL15DOZ0018AA 1

2. Scroll down, and highlight the “Tow Mode” selection. Press the enter switch.

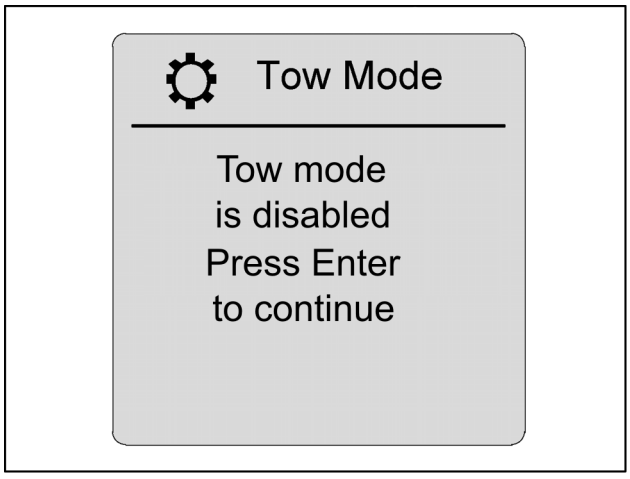


RAIL12DOZ0648AA 2

3. Change the Tow Mode from “Disabled” to “Enabled” by highlighting and pressing the enter switch.

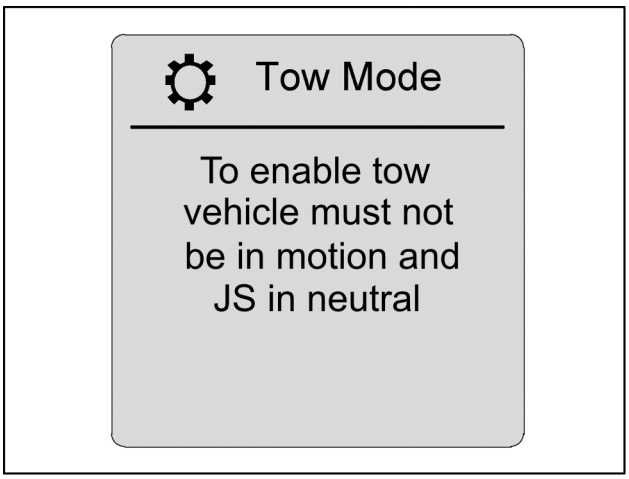


RAIL12DOZ0592AA 3



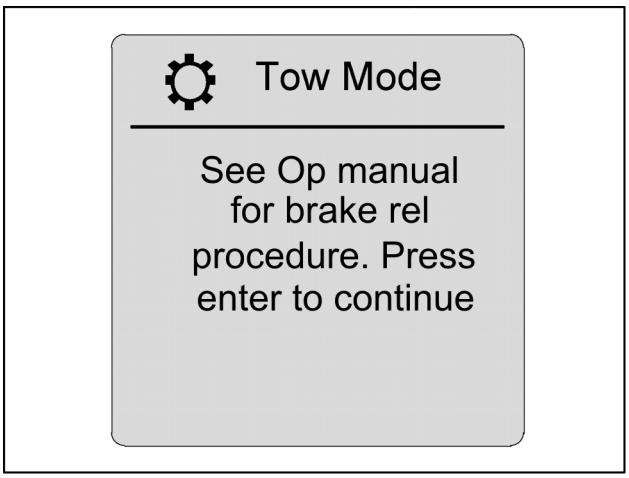
RAIL12DOZ0823AA 4

4. Continue to follow the screen prompts.



RAIL12DOZ0824AA 5

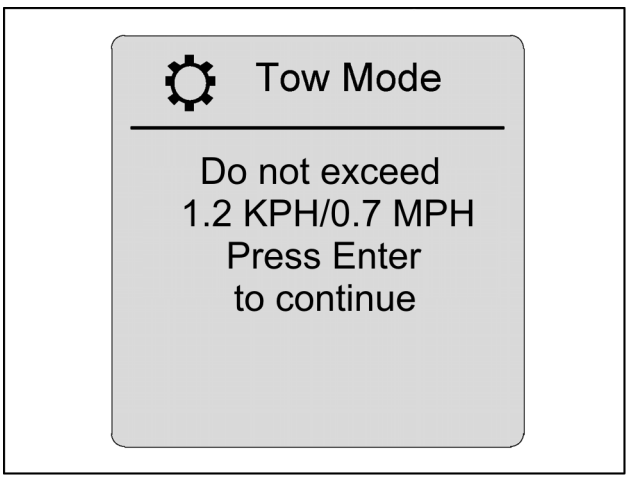
5. Read the procedure for releasing brakes on page **5-5**.



RAIL12DOZ0825AA 6

6. Press the enter switch to continue to the next screen.

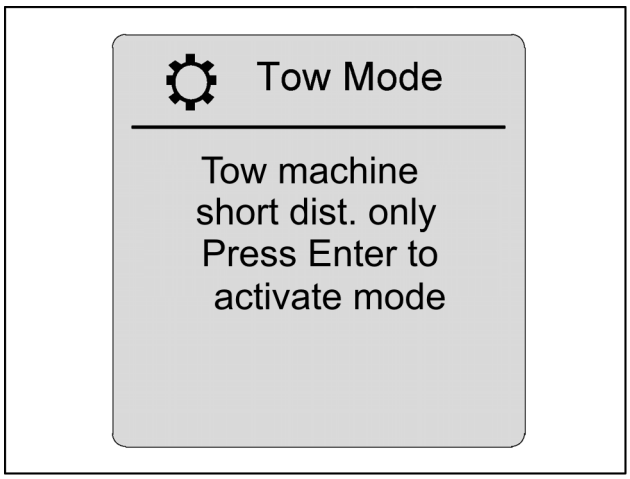
NOTICE: *Do not tow the machine over* ***1.2 km/h*** *(****0.7 mph****).*



RAIL12DOZ0826AA 7

7. Press the enter switch to continue to the next screen.

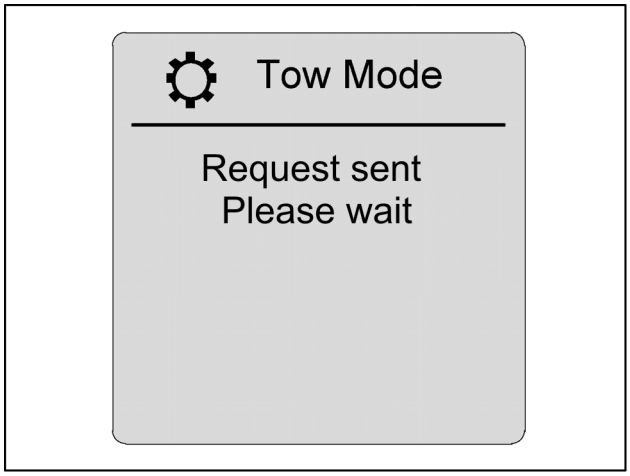
NOTICE: *Tow the machine the shortest possible distance.*



RAIL12DOZ0827AA 8

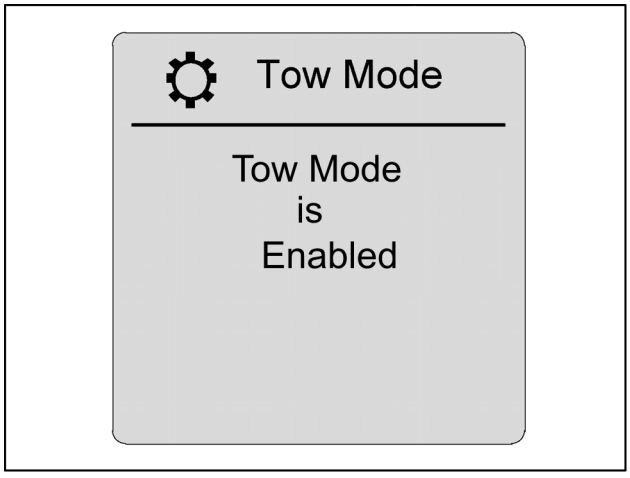
8. The tow mode will be enabled. Wait for the next screen prompt before towing.

NOTICE: *Before you proceed to Step 9 in this instruction, follow the procedures on page* ***5-5*** *before you tow the machine.*



RAIL12DOZ0828AA 9

9. When the tow mode is enabled, tow the machine at a slow rate of speed following all safe towing procedures. Change the tow mode screen back to the ”Disabled” mode when tow is complete.



RAIL12DOZ0829AA 10

NOTICE: *Higher towing speeds and longer towing distances will result in high heat generation and insufficient lubrication. This will cause machine damage.*

Moving a disabled machine

⚠ WARNING

Misuse hazard!
Towing is a delicate maneuver that is always carried out at the risk of the user. The manufacturer's warranty does not apply to incidents or accidents that occur during towing. Where possible, carry out the repairs at the site.
Failure to comply could result in death or serious injury.

W0286A

⚠ WARNING

Transport hazard!
Make sure that the weight of a trailed vehicle that is not equipped with brakes NEVER EXCEEDS the weight of the machine that is towing the vehicle. Stopping distance increases with increasing speed as the weight of the towed load increases, especially on hills and slopes.
Failure to comply could result in death or serious injury.

W1138A

NOTICE: *The tow option bypasses high-pressure relief valves. Catastrophic hydrostatic motor damage can occur if the hydraulic circuit empties or overheats.*

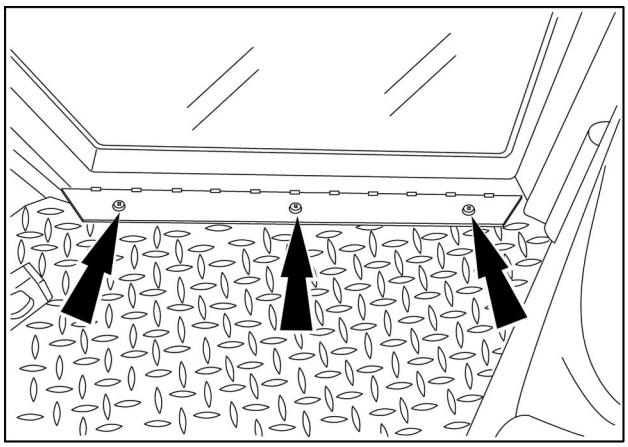
If your machine is disabled, you must make a judgment if the machine can be moved without more damage. If possible, repair the machine at the job site.
If you cannot repair the machine at the job location, and if you have a transport trailer, park the trailer as close as possible to the machine. Use a rigid tow bar to tow the machine.
Keep all unauthorized personnel clear of the area.

Make certain that the machine used for moving the disabled machine has the braking capacity, weight, and power to control both machines.
The towing machine must be equipped with a rear shield to protect the operator if the cable or tow bar disengages.
Do not use chains to tow this machine.
If necessary, you can attach a second machine behind the disabled machine to assist with additional control or braking.

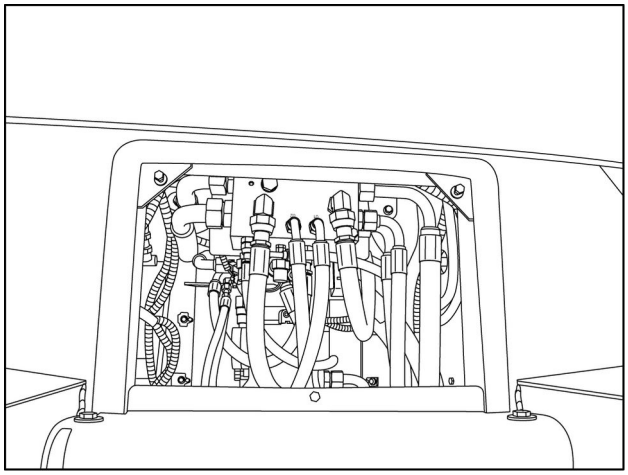
You must open the pressure relief valves in order to bypass the hydrostatic pumps. There are two upper valves for forward movement and two lower valves for rearward movement.

NOTE: *You must remove the floor mat, the floor panel, and tilt the back of the operator's seat in order to perform this procedure.*

1. Access the pressure relief valve by removing the floor mat and tilting the operator seat back. The valves are located on the hydrostatic pumps beneath the cab floor.

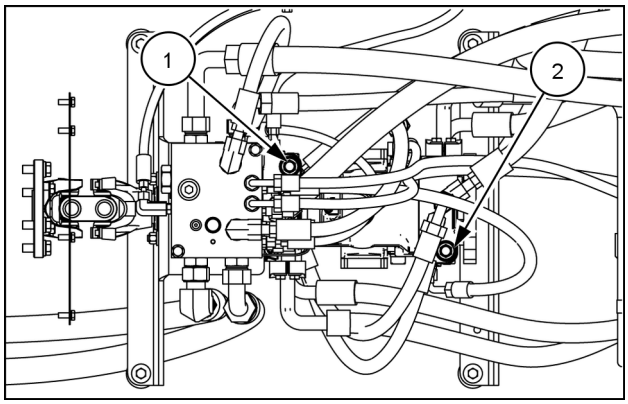


RAIL12DOZ0232AA 1



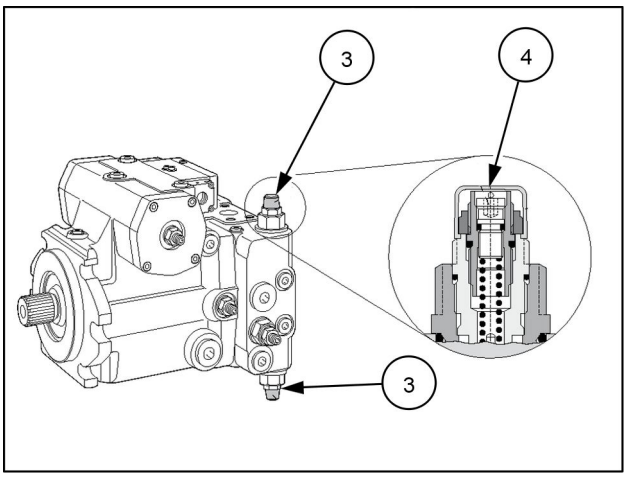
RAIL13DOZ1261AA 2

2. Open the pressure relief valves to bypass the hydrostatic pumps. (two right side valves **(1)** and two left side valves **(2)**). The pumps are tandem mounted and valves can be found on each side of the pump.



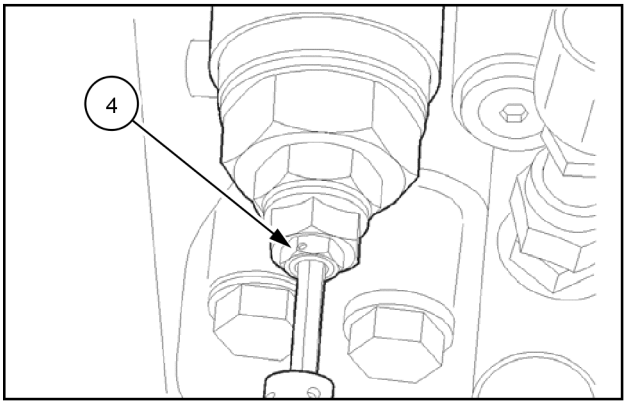
RAIL13DOZ1265AA 3

3. Remove the relief valve plastic caps **(3)**. The plastic caps will be unusable after removal.



RAIL12DOZ0644AA 4

4. Use an Allen wrench, and turn the engagement screw **(4)** counterclockwise two turns on each relief valve.



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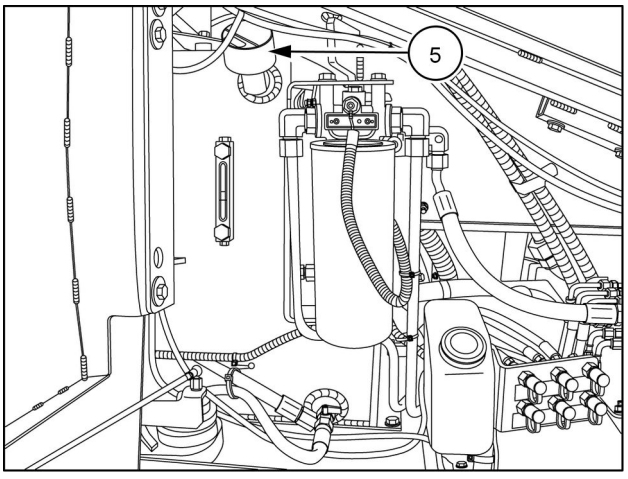
Releasing the brakes

This machine is equipped with SAHR (spring applied hydraulically released) parking brakes. Hydraulic pressure must release the brakes. If the engine will not run, you MUST use a hand pump to release the brakes.

1. Remove the hydraulic reservoir breather **(5)**.



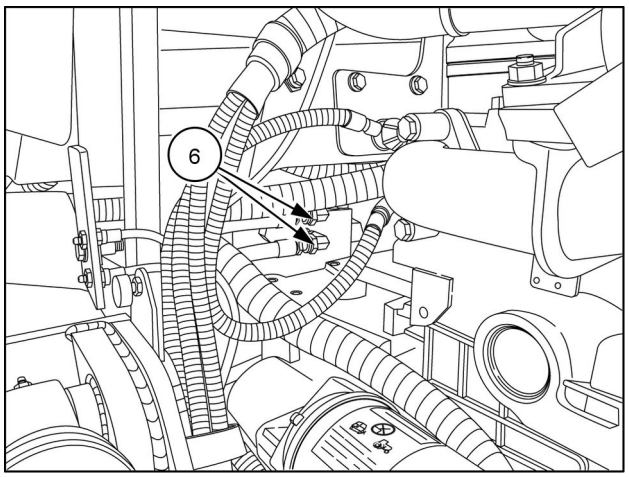
RAIL13DOZ1281AA 6

2. Connect a vacuum pump at the hydraulic reservoir breather, and hold a vacuum to keep from losing fluid.

3. Locate the fittings **(6)** on the front of the hydraulic manifold mounted above the pumps.

   NOTE: *The fittings are accessible under the cab through the right side front engine compartment access door.*

4. Disconnect the fittings **(6)** at the brake lines and cap the fittings. There are two brake lines. A T-fitting will be required for the two lines in order to connect to the hand pump. If a T-fitting is not available, two pumps must be used.



RAIL13DOZ1536AA 7

5. Connect a hand pump with the capacity to reach and maintain **2275 kPa** (**330.0 psi**) **22.7 bar** (**329.2 psi**).
6. Operate the pump until the correct pressure is reached, and the brakes are released.
7. Check and maintain **2275 kPa** (**330.0 psi**) **22.7 bar** (**329.2 psi**) maximum in the brake line when moving the machine. Damage to the brake system can result if the pressure is reduced.
8. Move the machine following safety guidelines for moving a disabled machine.
9. Disconnect the hand pump.
10. Remove the plug, and reconnect the lines to the brake solenoid.
11. Remove the vacuum pump, if used.
12. Tighten the relief valve engagement screws back in carefully, and replace protective cap with a new cap.

NOTICE: *The protective cap prevents damage or inadvertent movement of the engagement screw.*

Transporting by truck or trailer

⚠ WARNING

Driving hazard!
Know all rules, regulations, laws, and required safety equipment for transporting or operating this machine on a road or highway. See your dealer to obtain a rotating beacon, backup alarm, Slow Moving Vehicle (SMV) emblem, and other safety equipment.
Failure to comply could result in death or serious injury.

W0154A

⚠ WARNING

Transport hazard!
The machine can slip or fall from a ramp or trailer. Make sure the ramp and trailer are not slippery. Remove all oil, grease, ice, etc. Move the machine on or off the trailer with machine centered on the trailer or ramp.
Failure to comply could result in death or serious injury.

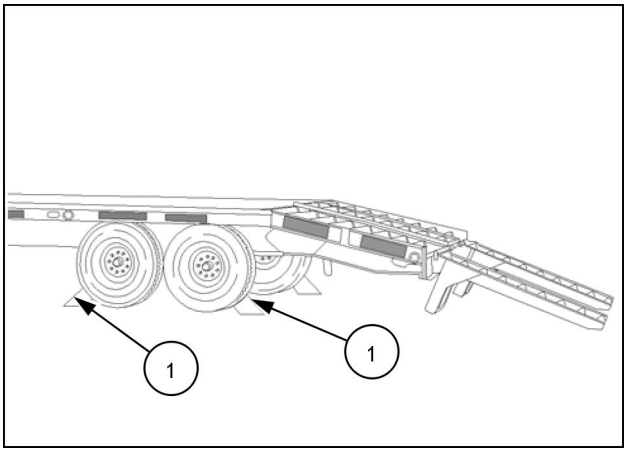
W0152A

Transporting the machine by truck or trailer

NOTICE: *Make certain the truck and trailer are adequate for the machine. The truck, trailer, and machine must be equipped with the correct safety equipment for transport. Wide load escorts may be required for some machines. Remove all dirt, mud, snow, ice, oil, or grease from the trailer and ramp before loading or unloading the machine.*

Make sure you know the safety rules and regulations before transporting the machine. You must know the rules or laws for transportation and safety that are used in each area that you will be in. Make sure that the truck and machine are equipped with the correct safety equipment. Use care when loading a machine.

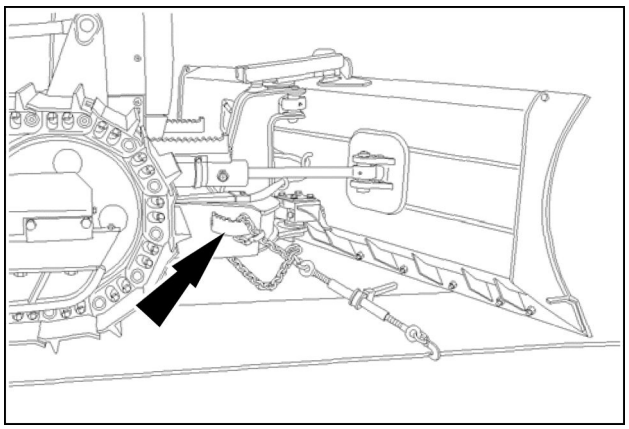
1. Put a block on both sides of the trailer wheels.
2. Move the crawler slowly onto the trailer. Place the direction control lever in the neutral position.
3. Lower the blade and ripper, if equipped, to the trailer.
4. Engage the parking brake.
5. Stop the engine, remove the key, and lock all access doors.



RCIL10CWL015AAL 1

NOTE: *Do not attach chains to the tracks of the machine.*

6. Use chains to fasten the crawler to the trailer at both the front and rear of the machine.
7. Put blocks at both ends of the tracks.
8. Remove the blocks from the trailer wheels.
9. When moving the crawler off of the trailer, always select a slower drive speed.
10. Keep attachments as low as possible.
11. Drive slowly, and keep the machine centered on the trailer and ramp.



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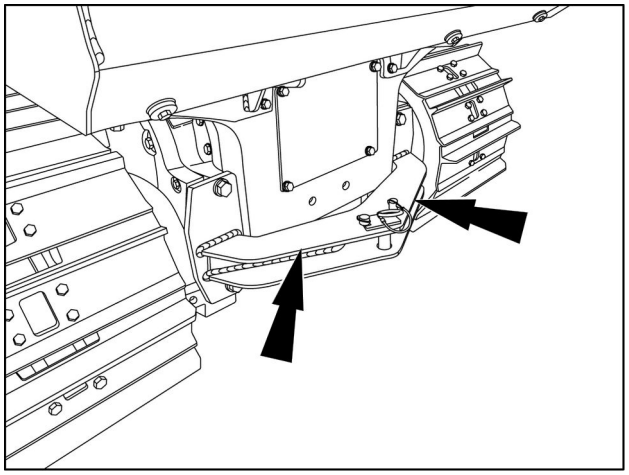

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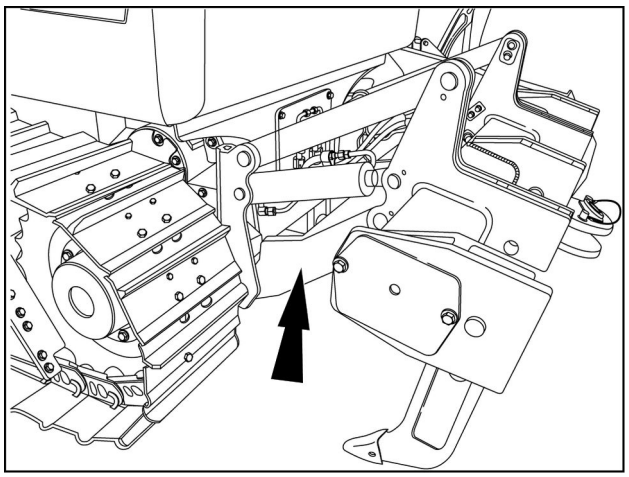


RAIL13DOZ1249AA 4

Transporting by ship or rail

Transport by rail or ship is subject to specific regulation. Consult an approved organization.

PREPARING FOR ROAD TRANSPORT

Lifting the machine

⚠ WARNING

Crushing hazard!
Always remove the attachment before lifting the machine.
Failure to comply could result in death or serious injury.

W1195A

⚠ DANGER

Avoid injury!
The machine can tilt forward or backward. Leave the lifting straps attached in order to secure the machine.
Failure to comply will result in death or serious injury.

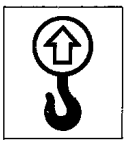
D0110A

⚠ WARNING

Crushing hazard!
The lifting systems must be operated by qualified personnel who are aware of the correct procedures to follow. Make sure all lifting equipment is in good condition, and all hooks are equipped with safety latches.
Failure to comply could result in death or serious injury.

W0256A

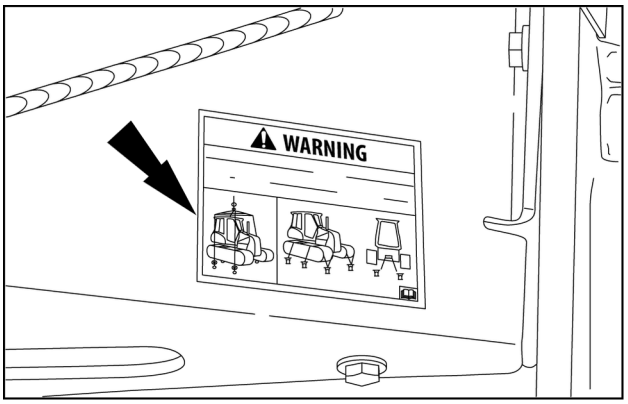
Lifting hooks



Lift the machine using the lifting attachment points identified on the machine by the lift hook symbol.

NOTE: *See the Lift Safety Signs located on the right-hand side of the machine.*

1. Keep all unauthorized personnel clear of the area. Do not allow anyone on the machine while it is being lifted.
2. Remove any loose items, tools, etc. and lock all doors.
3. Use lifting equipment of sufficient weight lifting capacity for this machine. Shield the machine with cloth or pads to protect finish.
4. Position the machine so the center of gravity balances the machine.
5. Lift the machine slightly, and allow it to balance and stabilize before continuing lift.



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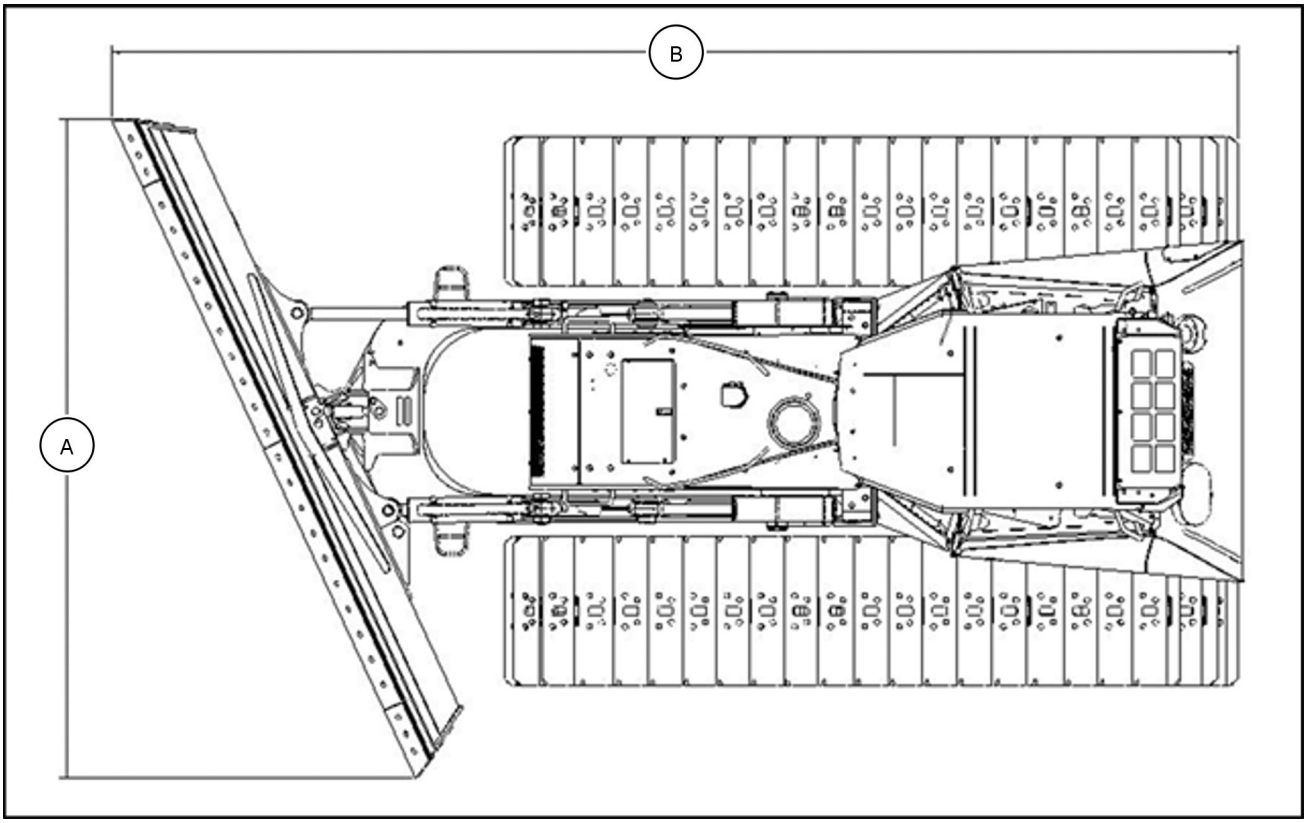
Transport dimensions

Transport length and width with blade fully angled at 25 °



RAIL13DOZ1259FA 1

Blade width	Transport width A	Transport length without drawbar B
2438.4 mm (96 in)	**2209 mm (87.0 in)**	**4758 mm (187.3 in)**
2642 mm (104 in)	**2384 mm (93.8 in)**	**4782 mm (188.3 in)**
2845 mm (112 in)	**2587 mm (101.9 in)**	**4814 mm (189.5 in)**
3048 mm (120 in)	**2764 mm (108.8 in)**	**4868 mm (191.7 in)**
3150 mm (124 in)	**2855 mm (112.4 in)**	**4889 mm (192.5 in)**

NOTE: *Add **63 mm (2.5 in)** for drawbar. Add **886 mm (34.9 in)** for ripper.*

6 - WORKING OPERATIONS

GENERAL INFORMATION

Dozer blade

⚠ WARNING

Hazard to bystanders!
Always know the location of all workers in your area. Warn them before you start working on the machine. Always keep all unauthorized bystanders clear of the area.
Failure to comply could result in death or serious injury.

W0176A

⚠ WARNING

Avoid injury!
Do not operate the machine while under the influence of alcohol or drugs.
Failure to comply could result in death or serious injury.

W0160A

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Raised equipment or machine movement without an operator can cause serious injury. Always do the following before performing any maintenance:
Park the machine on flat, level ground.
Lower the attachment to the ground.
Shut down the engine and remove the starter switch key.
Lock the tracks.
Failure to comply could result in death or serious injury.

W0269A

⚠ WARNING

IMPROPER OPERATION OF THIS MACHINE CAN CAUSE DEATH OR SERIOUS INJURY.
MAKE SURE THAT EVERY OPERATOR:
-learns and practices the safe use of machine controls in a safe, clear area before operating the machine on a job site.
-clears the work area of all bystanders.
-observes pertinent laws and regulations.
-follows the instructions in this operator's manual.
Failure to comply could result in death or serious injury.

W0189A

⚠ WARNING

Driving hazard!
Hillside operations can be dangerous. Rain, snow, ice, loose gravel, or soft ground, etc. can change the ground conditions. You must make a judgment if it is safe to operate your machine on any hillside or ramp.
Failure to comply could result in death or serious injury.

W0144A

⚠ WARNING

Hazard to bystanders!
Always sound the horn before starting the machine. Make sure the work area is clear of other persons, domestic animals, tools, etc. before you operate the machine. Never allow anyone in the work area during machine operation.
Failure to comply could result in death or serious injury.

W0304A

Operating tips

The operating tips given in this section do not include all possible conditions. This is basic information that can help you move more material in less time.
If you are a new operator, always operate the machine in an open area at decreased speed until you know the function of each control.

Engine speed

Run the engine at full throttle when safe. The ground condition and type of job will control the track speed and range position that you use.

Blade pitch

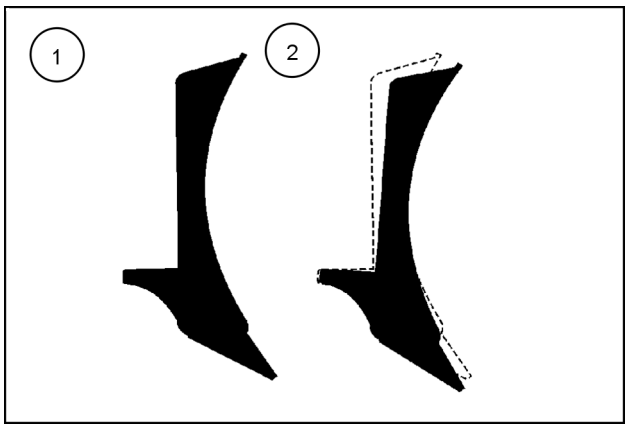
Rearward position advantages

1. Blade is able to push larger load.
2. Blade will stay on top in soft ground.
3. Blade will not dig into ground.
4. Blade best used for fine grading.

Forward position advantages

1. Load slides off the blade as the crawler travels in reverse.
2. Blade will dig into hard ground.
3. Less load spillage over top of blade.

NOTE: *See page **6-3** for adjustment procedure.*



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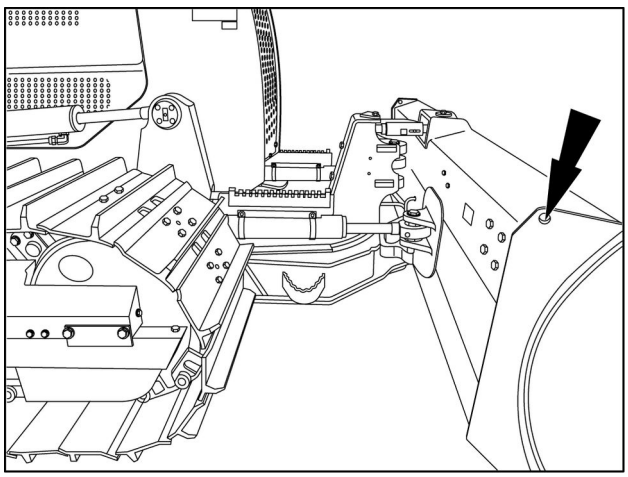
1. Rearward position (50 degree pitch)
2. Forward pitch (60 degree pitch)

Blade lift eye

Do not pull, tow, or lift the machine using the blade lift eye.

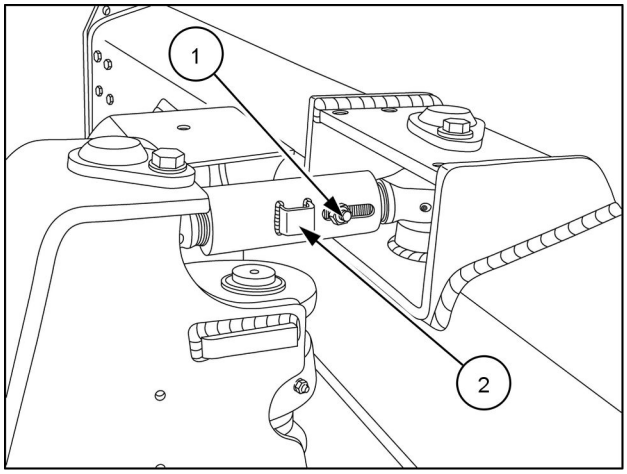


RAIL13DOZ1292AA 2

Dozer blade pitch adjustment (if equipped)

Dozer blade pitch adjustment

1. Raise the dozer blade **100 mm** (**3.9 in**).
2. Release the dozer blade control lever, and set the parking brake.
3. Shut the engine off, and remove the ignition key.
4. Loosen the retaining bolt **(1)** from the slotted keyway on the strut.
5. Use a bar inserted into the slot **(2)** to adjust the strut clockwise or counter-clockwise until the desired pitch angle is reached, stopping at 1/2–turn increments.
6. Replace the retaining bolt into the slotted keyway.



RAIL13DOZ1287AA 1

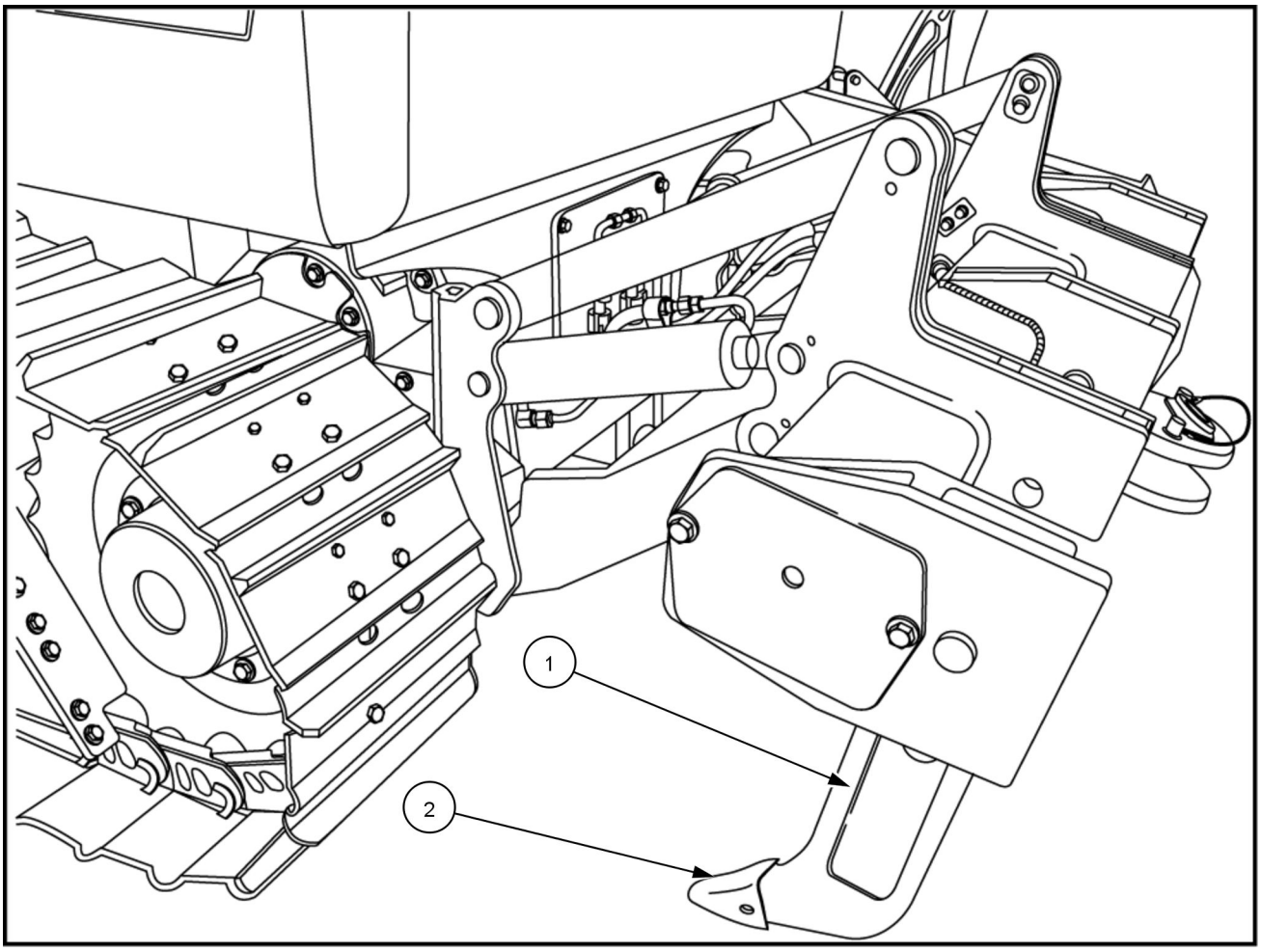
Rearward position blade pitched rearward

When the top of the dozer blade pitch is set to the rearward position, the blade will be able to push a larger load. The blade will stay on top in soft ground. The blade will not dig into the ground. Use the rearward pitch position for fine grading.

Forward position blade pitched forward

When the top of the dozer blade pitch is set to the forward position, the load slides off of blade as crawler travels in reverse. The blade will dig into hard ground. There will be less load spillage over the top of the blade.

Ripper

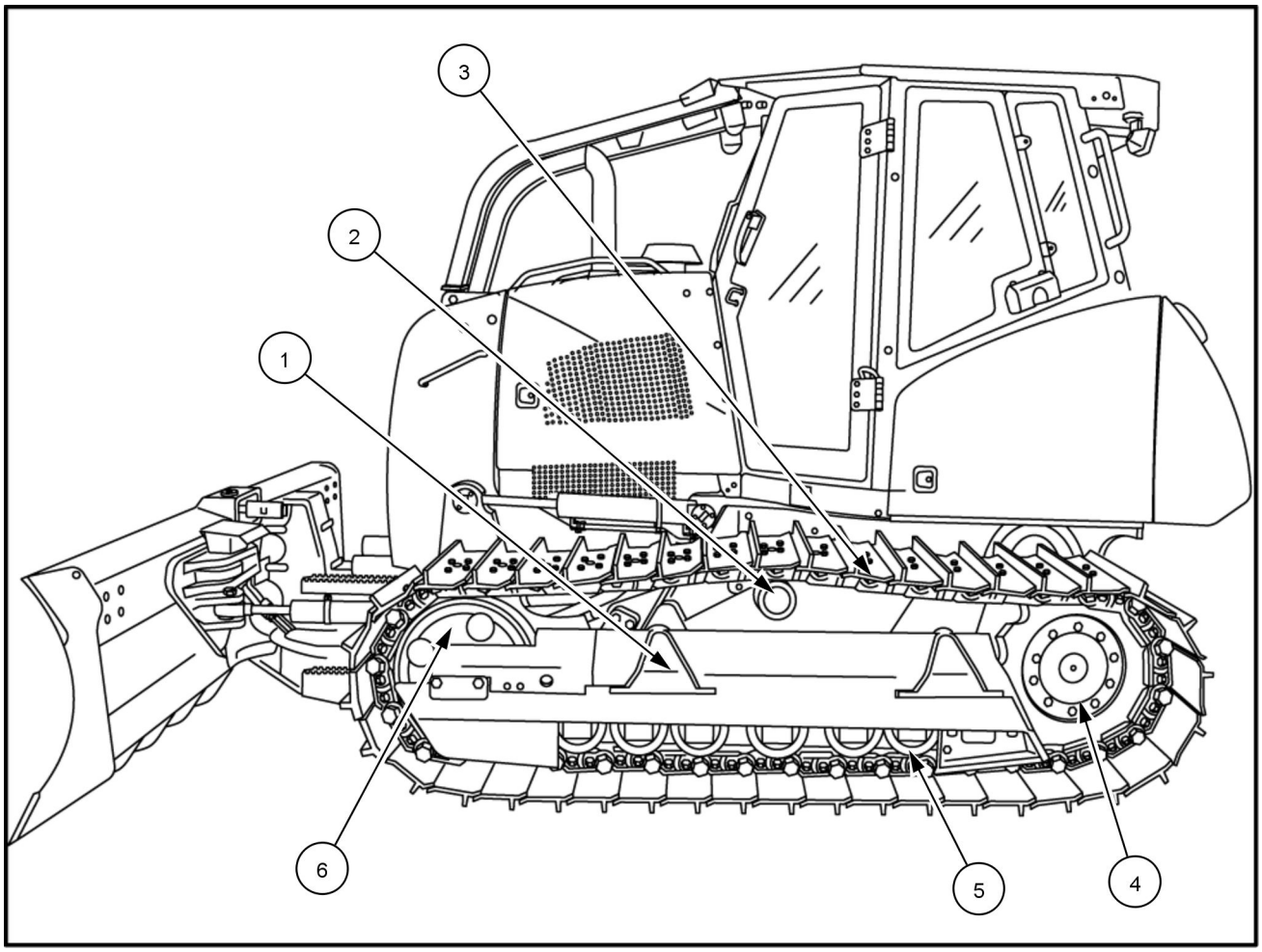


RAIL13DOZ1249AA 1

1. Ripper Shank
2. Ripper tooth

The rear ripper depth can be adjusted. Use the appropriate depth for the working conditions.

Track systems



RAIL13DOZ1297GA 1

Track frame

The track frames **(1)** attach to the machine chassis on each side. All the track components except the drive sprockets attach to the track frames.

Carrier rollers

The carrier rollers **(2)** mount on the top of the track frames. The carrier roller supports the track chain between the drive sprocket and idler. The carrier roller helps maintain alignment of the chain between the idler and drive sprocket.

Track chain

The track chains **(3)** include a number of link assemblies connected together to form a complete chain. Shoes bolt to the track chain to provide traction for the machine.

Drive sprocket

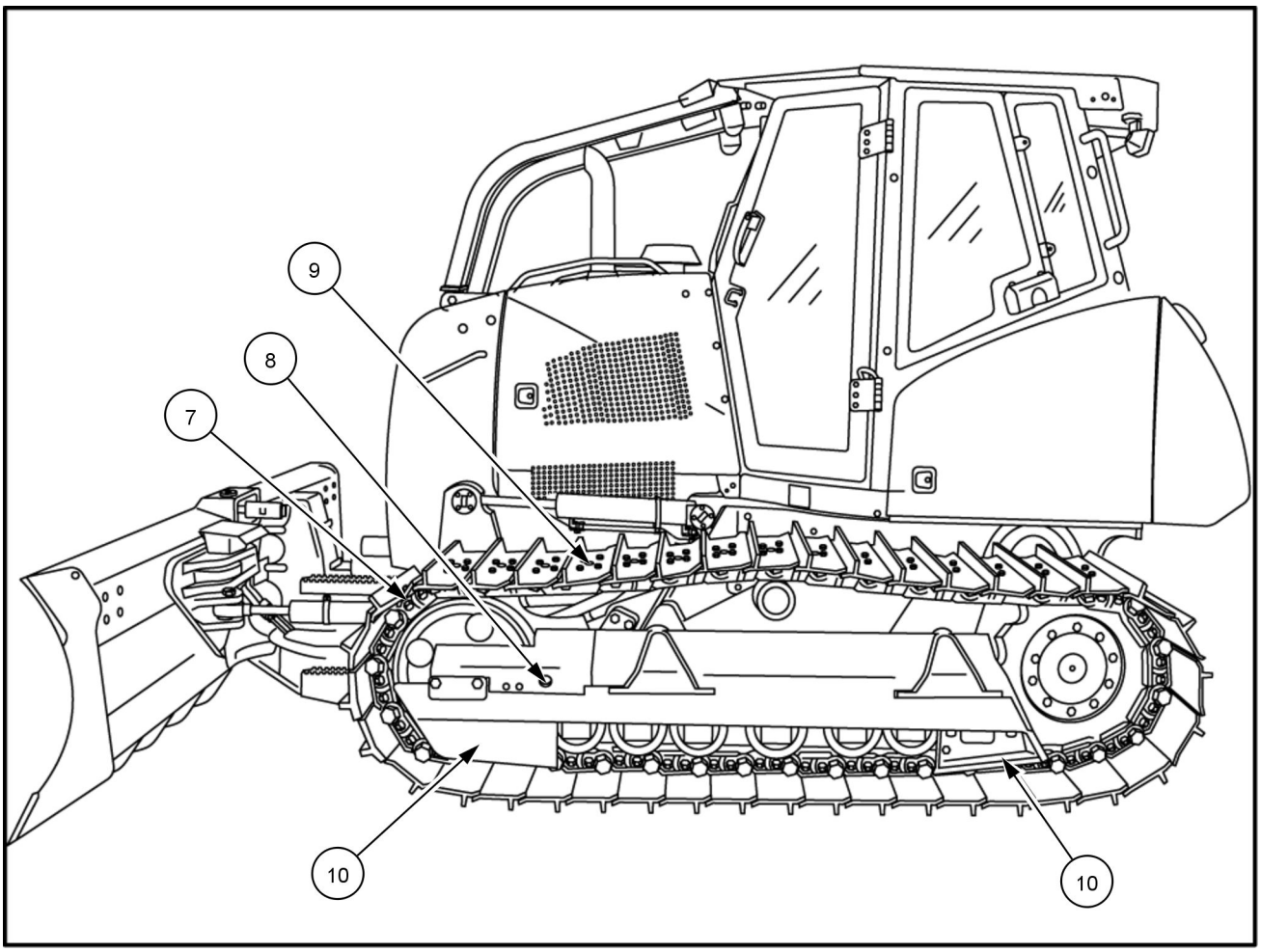
The drive sprockets **(4)** transmit engine power to the tracks. The drive sprockets rotate the track chain around the undercarriage assembly. The drive sprockets do not support the weight of the machine.

Track rollers

The track rollers **(5)** mount to the bottom of the track frames. These rollers carry the weight of the machine on the track chains.

Idler

The idler **(6)** carries the track chain around the front of the track frame. This assembly can slide forward or back on the track frame against the recoil spring to absorb any shock loads. These shock loads can be from changes in the terrain or temporary material buildup on the tracks.



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Track links

A number of track links **(7)** make up the track chain assembly. Each link assembly consists of a right-hand and a left-hand link. The track pin is hollow with Case Lubricated Track (CLT) chains, bushings, and seals. Each link assembly is bored at both ends to hold the pins and the bushing that connect the two links. The bushing is a pressed fit into each link. A pin is inserted through the bushing. The next set of links is pressed onto the pin.

Track adjuster grease fitting

The track adjuster **(8)** is a grease-filled hydraulic cylinder used to maintain or adjust track tension. Add grease or remove grease from the track adjuster to change track tension.

Track shoes

The track shoes **(9)** provide traction and flotation for the machine.

Track guides

The track guides **(10)** correctly align the chain to the idler and sprocket. The guides also prevent the chain from deviating off the idler and sprocket. The full rock guide option helps prevent rocks and debris from entering between the front roller and the idler, and between the rear roller and the sprocket.

Undercarriage wear

Factors controlling undercarriage wear

You can prolong undercarriage life by understanding factors that contribute to wear.

Soil conditions are a major factor in determining undercarriage wear. Nonabrasive soils, such as silt and clay cause the least amount of wear. Wet, sandy soils are the most abrasive and cause the most wear.

Working in rocky conditions and other surfaces where the grouser bars do not penetrate causes high impact and twisting loads on the track chains.

Follow the operating and maintenance tips to help you get the most life from your machine's undercarriage.

Wear factors you can control

Minimize the effects of packing by checking track tension frequently when working in mud, snow and wet sand. Packing can cause track jumping and banging.

- Severe packing of materials between undercarriage components causes wear by increasing track tension.

NOTICE: *Running tracks that are too tight greatly reduces the life of the bushing and sprocket. Operate the tracks at the recommended tension. This will increase the bushing and sprocket life by 2.5 to 3 times.*

- Operating techniques and maintenance also greatly affect undercarriage life.
- Avoid spinning the tracks as much as possible, especially in abrasive soil conditions.
- Avoid long runs at high speed, and limit the amount of reverse travel.
- Avoid frequent reverse operation. Keep travel speed to a minimum when working in reverse.
- Speed impact, turning, and direction of operation greatly affect wear.
- Work up and down a slope instead of across it. This decreases wear on roller flanges and link side rails.
- Check track tension, and clean the undercarriage more frequently when working in high packing conditions.
- Constantly turning the crawler in the same direction will cause uneven wear.
- Use the smallest track shoes possible to minimize track chain twisting. Limit the use of wide track shoes to flotation applications.
- Park the machine on level ground to prevent seal distortion.
- Clean the undercarriage more often when operating in freezing conditions
- Park the machine on planks. This is particularly important in cold weather to prevent the tracks from freezing to the ground.

How to extend the life of sealed track and lubricated track

NOTE: *Turn the bushings at the 100 percent limit.*

Letting the pins and bushings run to destruction results in accelerated wear of other components. The pins and bushings should be flipped, end to end, with the lube hole remaining DOWN for proper lubrication. Contact your authorized dealer or see the Service Manual for this machine.

Extended Life Track

The Extended Life Track chain incorporates a bushing that is free to rotate on the standard lubricated track bushing. Wear is distributed over the entire circumference of the bushing. The bushing is free to rotate without creating the scrubbing action between the sprocket and the bushing as in conventional crawler track chain design.

A major reduction in wear on the Extended Life Track chain is the external bushing wear caused by the sprocket contact. The Extended Life Track bushing rotates with the sprocket. The wear point is primarily between the outer and inner bushing. As the chain wears it may become more "noisy" under certain transporting conditions due to the wear between the inner and outer bushings. This is normal.

Recommended application

Extended Life Track is recommended in high abrasive/low impact applications where bushing wear is severe. The narrowest possible track shoe that will give adequate flotation should be used to obtain maximum life from the sealed and lubricated standard pin and bushing joint. Field testing in abrasive conditions has proven the Extended Life Track bushing will obtain up to twice the wear life as the conventional lubricated track bushings.

NOTE: *If the machine has been parked for an extended period of time or is working in corrosive environmental applications, check the bushings before operating the machine. Loosen the bushings if they will not rotate.*
This may be necessary on new chains where the clearance between bushings is minimal.

Uncontrolled wear factors

Normal undercarriage wear is a normal part of machine operation. Soil and underfoot conditions cannot be controlled. These include abrasive soils, impact, packing and moisture.

Abrasive soils

Ground surfaces have different levels of abrasiveness. The higher the abrasiveness, the higher the undercarriage wear rate.

Moisture plays a major role in the abrasiveness of soils. A sand slurry will be less abrasive than a damp sand. Wet abrasives create grinding compound like conditions.

Low abrasiveness

Silts and clays are low abrasive soils. When wet, this type soil feels slick and can be easily molded.

Moderate abrasiveness

Silts or clays that contain a low amount of rounded sand particles and enough moisture to stick together are moderately abrasive.

High abrasiveness

High abrasive soils contain a high amount of sharp, irregular shaped sand particles.

Impact

Impact is best described as the amount of grouser penetration in the ground. The effect of high impact loads can be reduced by reducing the machine speed and by using the smallest track shoes possible.

Low Impact

Track shoe grousers will completely penetrate the ground surface with little or no rock or other irregularities.

High Impact

Track shoe grousers will not penetrate the ground surface. Large rock or large irregularities cause high impact on the undercarriage system. Rocky terrain causes bending, breaking, and chipping of the components. Reduce the machine speed, and use the smallest track shoes possible.

Packing

Packing materials are materials that stick to or pack around the moving components. Tracks must be adjusted as often as required when working in this type of soil condition.

Packing materials cause a mismatch between components, particularly between the chain and sprocket. The packing materials tighten the chain causing increased stress and strain on links, pins, bushings, and the contact surfaces between mating parts. As mismatch occurs due to packing in the sprocket root, each track bushing rides higher in the sprocket. This condition causes rapid and severe forward and reverse wear, and a chain to sprocket “jumping” that is indicated by a loud “banging” and/or “popping” noise. This results in high impact loads that cause additional wear and cracking.

Packing conditions can also stop rollers from turning. When this happens, the track chain slides over that spot on the roller causing a flat spot. Packing materials increase the abrasive effect of most material by not allowing the material to escape. Wear will be accelerated.

When a packing problem continues, install relieved track sprockets.

Intermittent packing can also occur between some of the sprocket teeth. Intermittent packing can cause the track to tightened and release rapidly. This will cause the recoil spring to compress and release. A loud “banging” noise will result.

Extreme reverse loading

Extreme reverse loading occurs when the machine backs uphill. The top of both track chains become tight, compressing the recoil springs. When the machine is driven forward, a loud “banging” noise may occur as one or both recoil springs release.

Track Shoes

The shoes must provide adequate traction and flotation, but should be no wider than necessary. Flotation is the ability to stay on the surface of soft ground or mud. Correct flotation occurs when the grousers penetrate fully into the ground without letting the track shoes go below the surface.

Track shoes that are too wide can have a damaging effect on many of the undercarriage components. The middle of the track shoe is fastened to the track links, and the links act as a fulcrum and must absorb or transmit any leverage or twisting forces that occur as the machine moves over uneven or rocky terrain. All of the other components (sprockets, track rollers and idlers) resist and restrict the twisting forces of the links. This results in wear and damage caused by the twisting action. The twisting action can also damage the links, pins, bushings, and track plate mounting hardware.

Wide track shoes effects:

1. Resistance to turning - results in wear on the shoe corners and twists the track chain.
2. Bending, cracking or breaking the track shoes, shoe hardware and links.
3. Constant problems with loose shoe hardware that makes the bolt holes larger.
4. Increased wear on links, roller flanges and idler flanges caused by a constant twisting of the track chain.
5. Decreased pin and bushing life or decreased link life due to elongated pin and bushing bores. This is a result of the twisted links.
6. Possible loss of lubricant in the Lubricated Track pins. This will result in early pin and bushing wear.

Partially controlled wear factors

Speed

Unnecessary speed can cause a higher wear rate on pins, bushings and sprockets. The faster the speed, the faster the wear rate. High reverse speed accelerates bushing and sprocket wear. Reverse speeds are faster than forward speeds. Wear rate is a function of speed and distance traveled not just hours worked.

Impact

High speed will increase impact loading when there is low grouser penetration on hard surfaces or when working in rock.

Impact can cause structural problems such as bending, cracking or breakage of components. This can also affect pin and bushing retention and bushing cracking. Fractures can be caused by a worn chain.

Turning

Wear rate increases with increased turning. Turning increases interference loads between moving components. Turning in reverse accelerates bushing and sprocket wear due to increased loads transferred from the rotation of the bushings against the sprocket in reverse.

Track slip

Wear rate on all components increases when tracks slip. Track shoe grousers are affected due to increased sliding between the grouser and the ground.

Favored side operation

Wear rates will increase on all components when only one side of the machine is favored. Wear increases as more power is applied to the favored side. More packing and slippage will occur on the favored side that will result in an increased wear rate.

Reverse Operation

Avoid excessive use of reverse operation. This is nonproductive use of the machine that accelerates bushing and sprocket wear. Most speeds are faster in reverse than forward.

Dozing

Dozing shifts the machine weight to the front causing a faster wear rate on the front rollers and idlers.

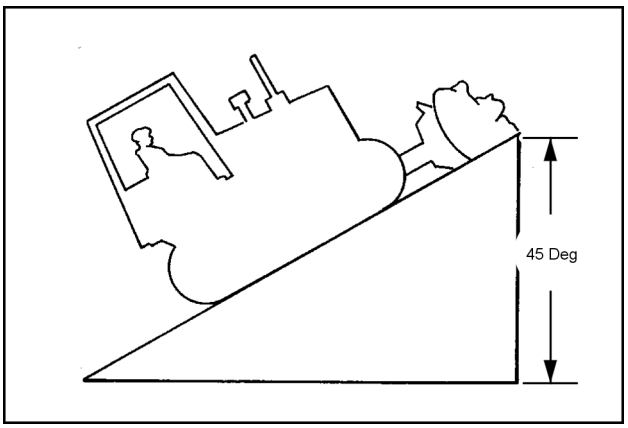
Ripping

Ripping will shift the machine weight toward the rear causing a faster wear rate on the rear rollers. During severe applications, the sprockets and track bushings wear much faster.

Terrain

Changes in the terrain shifts the machine center of gravity and increases the weight of the machine on different parts of the undercarriage.

1. Working uphill moves the weight of the machine backward causing increased wear of the rear rollers and increases forward drive wear of the sprockets and bushings.
   Uphill limit: **45 °**



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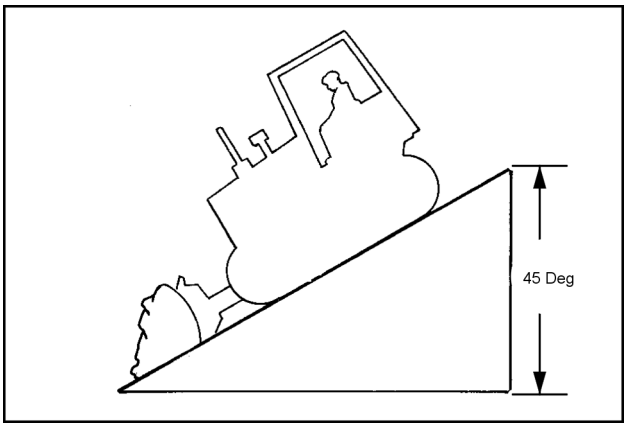
2. Working downhill moves the machine weight forward causing increased wear of the front rollers. Due to the design of the track system, working downhill does reduce the wear of the sprockets and bushings.
   Downhill limit: **45 °**



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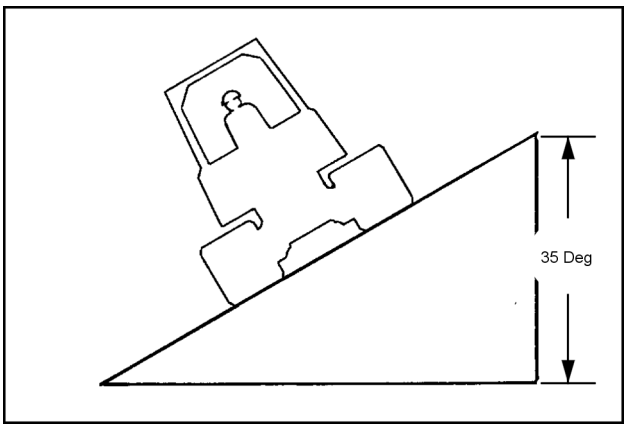
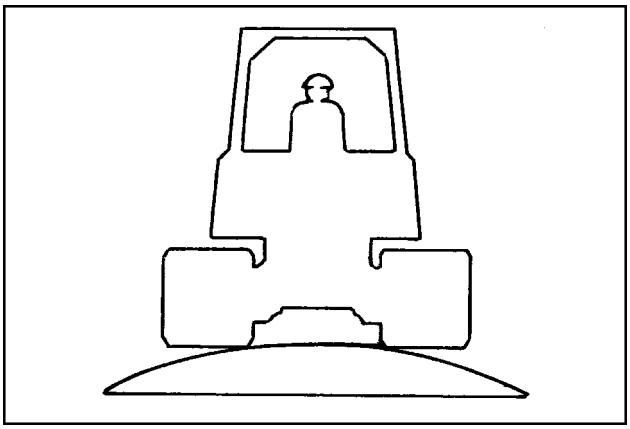
3. Working on the side of a hill moves the weight of the machine toward the downhill side of the machine. Wear is increased on the rail sides, roller and idler flanges, bushing ends and track shoe ends that are on the downside of the hill.
   Side hill limit: **35 °**



RCIL10CWL006AAL 3

4. Working on a crown will cause the inner components to carry the heaviest load. The wear is increased on the inner links, roller treads, idler treads and track plate ends. In extreme situations, the inner sprocket/bushing wear is greatly increased.



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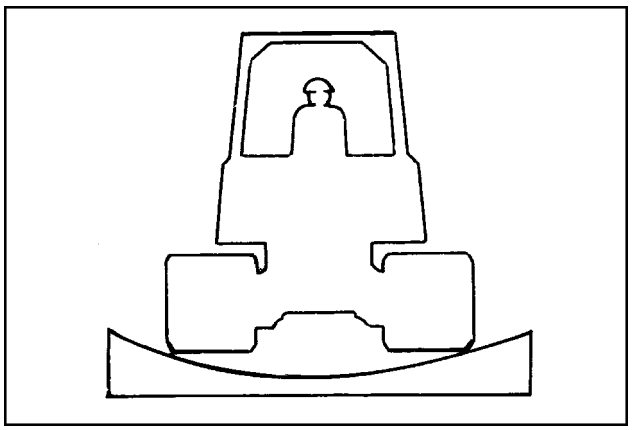
5. Working in a depression causes the outer components to carry the heaviest load. The wear is increased on the outer links, roller treads, idler treads, and track plate ends. In extreme situations, the outer sprocket/ bushing wear is greatly increased.



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Clean tracks

Always clean the undercarriage at the end of the day or shift. Park the machine on a level surface to prevent distortion of the track seals (Lubricated Track). If the temperature is cold, park the machine on a surface that will not freeze to the track shoes.

NOTICE: *When the tracks are unsupported off of the ground, do not run the machine at speeds above the step 10 position. This may result in damage to the drivetrain components.*

Engine starting aids

Starting the engine

⚠ WARNING

Explosion hazard!
DO NOT use ether starting fluid. Serious engine damage, explosion, death, or serious personal injury could occur.
Failure to comply could result in death or serious injury.

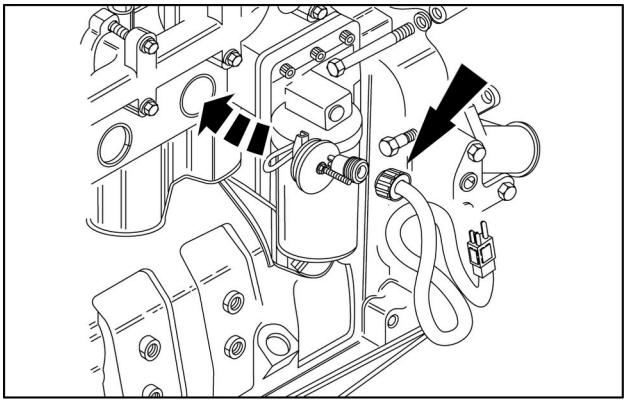
W0148A

1. Make all seat adjustments before starting the engine. Fasten the seat belt.
2. Turn the key switch to ON, and watch the instrument cluster. The engine preheat lamp will illuminate If the temperature is low and engine preheating is required. Wait until the preheat lamp goes out before starting the engine.
3. Place the hand throttle at the 1/2 throttle position and hold until the engine starts.
4. Actuate the starter motor.

Additional starting aids may be available on your machine. For additional information on these items, contact your authorized dealer.

Engine coolant heater (if equipped)

The right side of the engine cylinder block is provided with a passage for installing a coolant heater. See your authorized dealer for this option. Follow the heater manufacturer's instructions for installation and operation.



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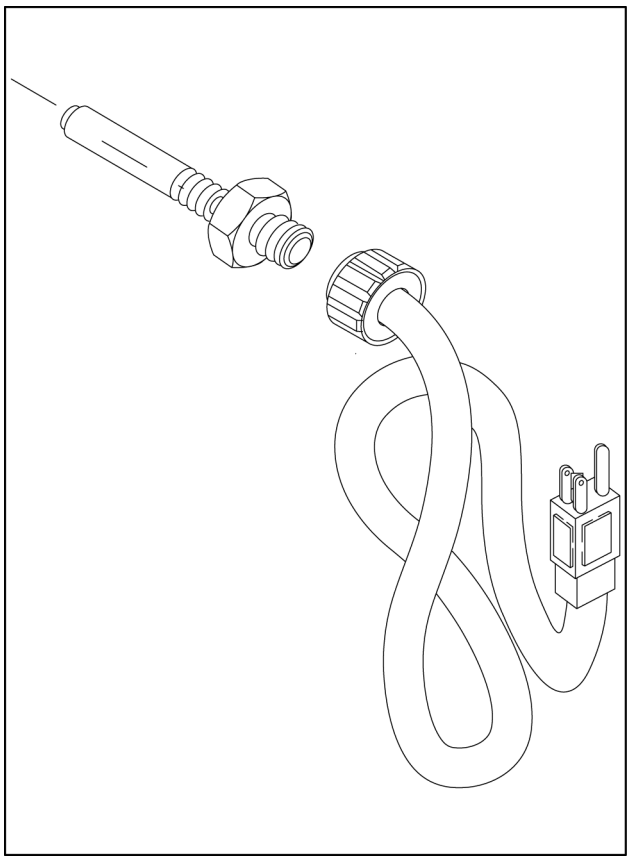
Engine oil heater (if equipped)

The engine oil heater is installed on the right side of the engine oil pan. See your authorized dealer for this option. Follow the heater manufacturer's instructions for installation and operation.



RAIL14DOZ0568BA 2

7 - MAINTENANCE

GENERAL INFORMATION

Advice

Servicing your machine

NOTICE: *While any company can perform necessary maintenance or repairs on your equipment, CASE CONSTRUCTION strongly recommends that you use only authorized CASE CONSTRUCTION dealers and products that meet given specifications. Improperly or incorrectly performed maintenance and repair voids the equipment warranty and may affect service intervals.*

Environment

Before you service the machine and before you dispose of the old fluids, lubricants and filters, always remember the environment

- Do not pour oil or fluids on the ground, down drains or into containers that can leak.
- Dispose of all old fluids, lubricants and filters in accordance with local regulations.
- Check with your local environmental recycling center or your local dealer for correct information.

Plastic and resin parts

- Do not use gasoline, paraffin, paint thinner, etc., when cleaning plastic, e.g.; console, instrument cluster, monitors and gauges, etc. Using gasoline, paraffin, paint thinner, etc., will cause color fading, cracking or deformation of the parts being cleaned.
- Use only water, mild soap and a soft cloth when you clean these parts.

Torque charts - Minimum tightening torques for normal assembly

Metric non-flanged hardware

Nominal size	Class 8.8 bolt and Class 8 nut		Class 10.9 bolt and Class 10 nut		Locknut CL .8 W/CL8.8 bolt	Locknut CL.10 W/CL10.9 bolt
	Unplated	Plated W/ZnCr	Unplated	Plated W/ZnCr		
M4	**2.2 N·m (19 lb in)**	**2.9 N·m (26 lb in)**	**3.2 N·m (28 lb in)**	**4.2 N·m (37 lb in)**	**2 N·m (18 lb in)**	**2.9 N·m (26 lb in)**
M5	**4.5 N·m (40 lb in)**	**5.9 N·m (52 lb in)**	**6.4 N·m (57 lb in)**	**8.5 N·m (75 lb in)**	**4 N·m (36 lb in)**	**5.8 N·m (51 lb in)**
M6	**7.5 N·m (66 lb in)**	**10 N·m (89 lb in)**	**11 N·m (96 lb in)**	**15 N·m (128 lb in)**	**6.8 N·m (60 lb in)**	**10 N·m (89 lb in)**
M8	**18 N·m (163 lb in)**	**25 N·m (217 lb in)**	**26 N·m (234 lb in)**	**35 N·m (311 lb in)**	**17 N·m (151 lb in)**	**24 N·m (212 lb in)**
M10	**37 N·m (27 lb ft)**	**49 N·m (36 lb ft)**	**52 N·m (38 lb ft)**	**70 N·m (51 lb ft)**	**33 N·m (25 lb ft)**	**48 N·m (35 lb ft)**
M12	**64 N·m (47 lb ft)**	**85 N·m (63 lb ft)**	**91 N·m (67 lb ft)**	**121 N·m (90 lb ft)**	**58 N·m (43 lb ft)**	**83 N·m (61 lb ft)**
M16	**158 N·m (116 lb ft)**	**210 N·m (155 lb ft)**	**225 N·m (166 lb ft)**	**301 N·m (222 lb ft)**	**143 N·m (106 lb ft)**	**205 N·m (151 lb ft)**
M20	**319 N·m (235 lb ft)**	**425 N·m (313 lb ft)**	**440 N·m (325 lb ft)**	**587 N·m (433 lb ft)**	**290 N·m (214 lb ft)**	**400 N·m (295 lb ft)**
M24	**551 N·m (410 lb ft)**	**735 N·m (500 lb ft)**	**762 N·m (560 lb ft)**	**1016 N·m (750 lb ft)**	**501 N·m (370 lb ft)**	**693 N·m (510 lb ft)**

NOTE: *M4 through M8 hardware torque specifications are shown in pound-inches. M10 through M24 hardware torque specifications are shown in pound-feet.*

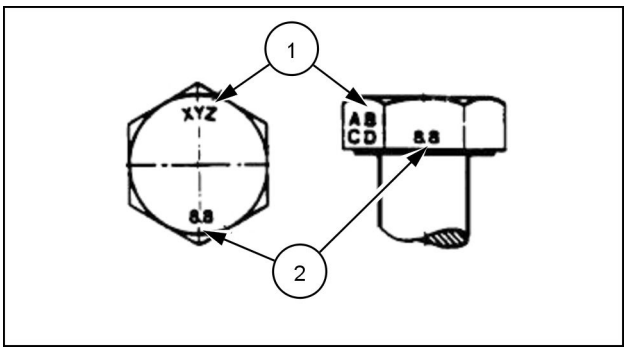
Metric flanged hardware

Nominal size	Class 8.8 bolt and Class 8 nut		Class 10.9 bolt and Class 10 nut		Locknut CL.8 W/CL8.8 bolt	Locknut CL.10 W/CL10.9 bolt
	Unplated	Plated W/ZnCr	Unplated	Plated W/ZnCr		
M4	**2.4 N·m (21 lb in)**	**3.2 N·m (28 lb in)**	**3.5 N·m (31 lb in)**	**4.6 N·m (41 lb in)**	**2.2 N·m (19 lb in)**	**3.1 N·m (27 lb in)**
M5	**4.9 N·m (43 lb in)**	**6.5 N·m (58 lb in)**	**7.0 N·m (62 lb in)**	**9.4 N·m (83 lb in)**	**4.4 N·m (39 lb in)**	**6.4 N·m (57 lb in)**
M6	**8.3 N·m (73 lb in)**	**11 N·m (96 lb in)**	**12 N·m (105 lb in)**	**16 N·m (141 lb in)**	**7.5 N·m (66 lb in)**	**11 N·m (96 lb in)**
M8	**20 N·m (179 lb in)**	**27 N·m (240 lb in)**	**29 N·m (257 lb in)**	**39 N·m (343 lb in)**	**18 N·m (163 lb in)**	**27 N·m (240 lb in)**
M10	**40 N·m (30 lb ft)**	**54 N·m (40 lb ft)**	**57 N·m (42 lb ft)**	**77 N·m (56 lb ft)**	**37 N·m (27 lb ft)**	**53 N·m (39 lb ft)**
M12	**70 N·m (52 lb ft)**	**93 N·m (69 lb ft)**	**100 N·m (74 lb ft)**	**134 N·m (98 lb ft)**	**63 N·m (47 lb ft)**	**91 N·m (67 lb ft)**
M16	**174 N·m (128 lb ft)**	**231 N·m (171 lb ft)**	**248 N·m (183 lb ft)**	**331 N·m (244 lb ft)**	**158 N·m (116 lb ft)**	**226 N·m (167 lb ft)**
M20	**350 N·m (259 lb ft)**	**467 N·m (345 lb ft)**	**484 N·m (357 lb ft)**	**645 N·m (476 lb ft)**	**318 N·m (235 lb ft)**	**440 N·m (325 lb ft)**
M24	**607 N·m (447 lb ft)**	**809 N·m (597 lb ft)**	**838 N·m (618 lb ft)**	**1118 N·m (824 lb ft)**	**552 N·m (407 lb ft)**	

Identification

Metric hex head and carriage bolts, classes 5.6 and up

1. Manufacturer’s identification
2. Property class



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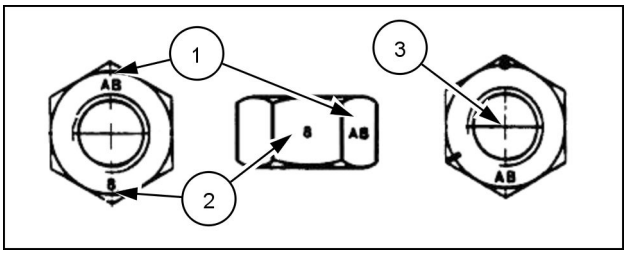
Metric hex nuts and locknuts, classes 05 and up

1. Manufacturer’s identification
2. Property class
3. Clock marking of property class and manufacturer’s identification (optional), i.e. marks **60 °** apart indicate Class 10 properties and marks **120 °** apart indicate Class 8.



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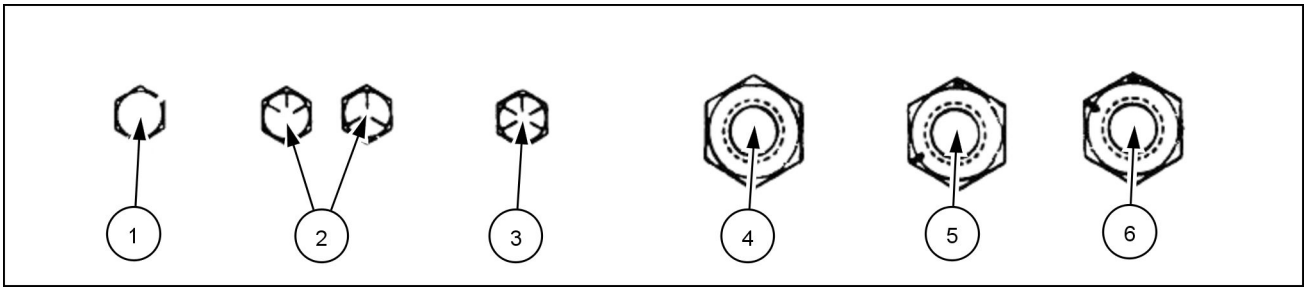
Inch non-flanged hardware

Nominal size	SAE grade 5 bolt and nut		SAE grade 8 bolt and nut		Locknut GrB W/ Gr5 bolt	Locknut GrC W/ Gr8 bolt
	Unplated or silver plated	Plated W/ZnCr gold	Unplated or Plated silver	Plated W/ZnCr gold		
1/4	**8 N·m (71 lb in)**	**11 N·m (97 lb in)**	**12 N·m (106 lb in)**	**16 N·m (142 lb in)**	**8.5 N·m (75 lb in)**	**12.2 N·m (109 lb in)**
5/16	**17 N·m (150 lb in)**	**23 N·m (204 lb in)**	**24 N·m (212 lb in)**	**32 N·m (283 lb in)**	**17.5 N·m (155 lb in)**	**25 N·m (220 lb in)**
3/8	**30 N·m (22 lb ft)**	**40 N·m (30 lb ft)**	**43 N·m (31 lb ft)**	**57 N·m (42 lb ft)**	**31 N·m (23 lb ft)**	**44 N·m (33 lb ft)**
7/16	**48 N·m (36 lb ft)**	**65 N·m (48 lb ft)**	**68 N·m (50 lb ft)**	**91 N·m (67 lb ft)**	**50 N·m (37 lb ft)**	**71 N·m (53 lb ft)**
1/2	**74 N·m (54 lb ft)**	**98 N·m (73 lb ft)**	**104 N·m (77 lb ft)**	**139 N·m (103 lb ft)**	**76 N·m (56 lb ft)**	**108 N·m (80 lb ft)**
9/16	**107 N·m (79 lb ft)**	**142 N·m (105 lb ft)**	**150 N·m (111 lb ft)**	**201 N·m (148 lb ft)**	**111 N·m (82 lb ft)**	**156 N·m (115 lb ft)**
5/8	**147 N·m (108 lb ft)**	**196 N·m (145 lb ft)**	**208 N·m (153 lb ft)**	**277 N·m (204 lb ft)**	**153 N·m (113 lb ft)**	**215 N·m (159 lb ft)**
3/4	**261 N·m (193 lb ft)**	**348 N·m (257 lb ft)**	**369 N·m (272 lb ft)**	**491 N·m (362 lb ft)**	**271 N·m (200 lb ft)**	**383 N·m (282 lb ft)**
7/8	**420 N·m (310 lb ft)**	**561 N·m (413 lb ft)**	**594 N·m (438 lb ft)**	**791 N·m (584 lb ft)**	**437 N·m (323 lb ft)**	**617 N·m (455 lb ft)**
1	**630 N·m (465 lb ft)**	**841 N·m (620 lb ft)**	**890 N·m (656 lb ft)**	**1187 N·m (875 lb ft)**	**654 N·m (483 lb ft)**	**924 N·m (681 lb ft)**

Identification

Inch bolts and free-spinning nuts



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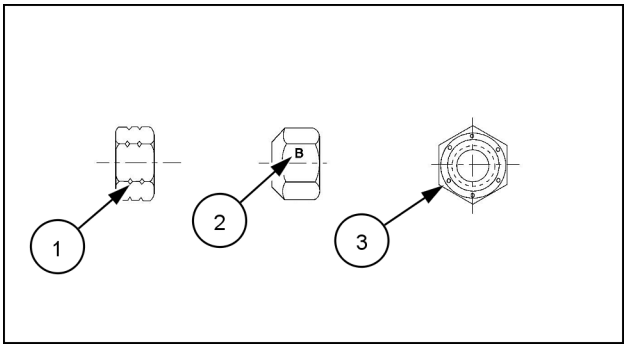
Grade marking examples

SAE Grade Identification			
1	Grade 2 - No Marks	4	Grade 2 Nut - No Marks
2	Grade 5 - Three Marks	5	Grade 5 Nut - Marks **120 °** Apart
3	Grade 8 - Five Marks	6	Grade 8 Nut - Marks **60 °** Apart

Inch locknuts, all metal (three optional methods)

Grade Identification

Grade	Corner Marking Method (1)	Flats Marking Method (2)	Clock Marking Method (3)
Grade A	No Notches	No Mark	No Marks
Grade B	One Circumferential Notch	Letter B	Three Marks
Grade C	Two Circumferential Notches	Letter C	Six Marks



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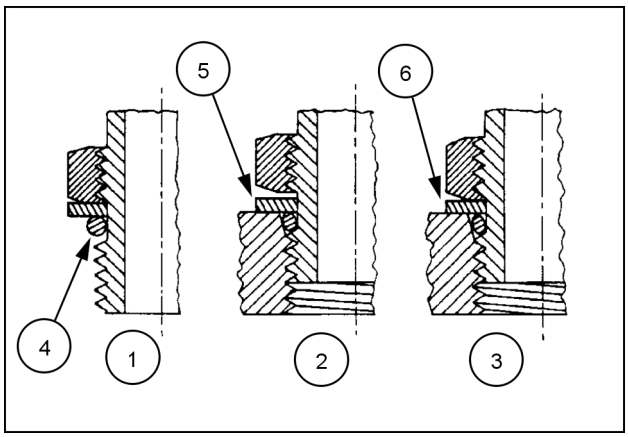
Torque - Hydraulic tubes and fittings - Standard torque data for hydraulics

Installation of adjustable fittings in straight thread O-ring bosses



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1. Lubricate the O-ring by coating it with a light oil or petroleum. Install the O-ring in the groove adjacent to the metal backup washer which is assembled at the extreme end of the groove **(4)**.
2. Install the fitting into the SAE straight thread boss until the metal backup washer contacts the face of the boss **(5)**.

   NOTE: *Do not over tighten and distort the metal backup washer.*
3. Position the fitting by turning out (counterclockwise) up to a maximum of one turn. Holding the pad of the fitting with a wrench, tighten the locknut and washer against the face of the boss **(6)**.

Standard torque data for hydraulic tubes and fittings

Standard torque data for hydraulic tubes and fittings

			37 ° flare female swivel	Straight thread O-ring boss
Dash Size	**Tubing OD**	**Thread size**	**Torque**	**Torque**
-4	**6.4 mm** (**1/4 in**)	7/16-20	**15 - 16 N·m** (**11 - 12 lb ft**)	**18 - 26 N·m** (**13 - 19 lb ft**)
-5	**7.9 mm** (**5/16 in**)	1/2-20	**19 - 21 N·m** (**14 - 15 lb ft**)	**23 - 26 N·m** (**17 - 19 lb ft**)
-6	**9.5 mm** (**3/8 in**)	9/16-18	**24 - 28 N·m** (**18 - 21 lb ft**)	**29 - 40 N·m** (**21 - 30 lb ft**)
-8	**12.7 mm** (**1/2 in**)	3/4-16	**49 - 53 N·m** (**36 - 39 lb ft**)	**49 - 57 N·m** (**36 - 42 lb ft**)
-10	**15.9 mm** (**5/8 in**)	7/8-14	**77 - 85 N·m** (**57 - 63 lb ft**)	**59 - 90 N·m** (**44 - 66 lb ft**)
-12	**19.1 mm** (**3/4 in**)	1-1/16-12	**107 - 119 N·m** (**79 - 88 lb ft**)	**93 - 128 N·m** (**69 - 94 lb ft**)
-14	**22.2 mm** (**7/8 in**)	1-3/16-12	**127 - 140 N·m** (**94 - 103 lb ft**)	**122 - 134 N·m** (**90 - 99 lb ft**)
-16	**25.4 mm** (**1 in**)	1-5/16-12	**147 - 154 N·m** (**108 - 114 lb ft**)	**151 - 174 N·m** (**111 - 128 lb ft**)
-20	**31.8 mm** (**1-1/4 in**)	1-5/8-12	**172 - 181 N·m** (**127 - 133 lb ft**)	**198 - 218 N·m** (**146 - 161 lb ft**)
-24	**38.1 mm** (**1-1/2 in**)	1-7/8-12	**215 - 226 N·m** (**159 - 167 lb ft**)	**209 - 235 N·m** (**154 - 173 lb ft**)

These torques are not recommended for tubes of **12.7 mm** (**1/2 in**) OD and larger with wall thickness of **0.889 mm** (**0.035 in**) or less. The torque is specified for **0.889 mm** (**0.035 in**) wall tubes on each application individually.

Before installing and torquing **37 °** flared fittings, clean the face of the flare and threads with a clean solvent or Loctite cleaner and apply hydraulic sealant **LOCTITE® 569™** to the **37 °** flare and the threads.

Install fitting and torque to specified torque, loosen fitting and retorque to specifications.

Torque data for O-ring face seal fittings

Nominal SAE dash size	Nominal tube OD	O-ring Face Seal (ORFS)	
		Thread size	Torque values
-4	**6.350 mm** (**0.250 in**)	9/16-18	**23 - 26 N·m** (**17 - 19 lb ft**)
-6	**9.520 mm** (**0.375 in**)	11/16-16	**34 - 40 N·m** (**25 - 30 lb ft**)
-8	**12.700 mm** (**0.500 in**)	13/16-16	**52 - 57 N·m** (**38 - 42 lb ft**)
-10	**15.880 mm** (**0.625 in**)	1-14	**81 - 90 N·m** (**60 - 66 lb ft**)
-12	**19.050 mm** (**0.750 in**)	1-3/16-12	**117 - 128 N·m** (**86 - 94 lb ft**)
-16	**25.400 mm** (**1.000 in**)	1-7/16-12	**152 - 174 N·m** (**112 - 128 lb ft**)
-20	**31.750 mm** (**1.250 in**)	1-11/16-12	**179 - 201 N·m** (**132 - 148 lb ft**)
-24	**38.100 mm** (**1.500 in**)	2-12	**213 - 235 N·m** (**157 - 173 lb ft**)

The values shown for O-ring boss ends are intended for steel fittings (with or without washers) with a cadmium and chromate or a zinc and a chromate coating, assembled into a steel or grey iron housing.

Pipe thread fitting torque

Before installing and tightening pipe fittings, clean the threads with a clean solvent or Loctite cleaner and apply sealant **LOCTITE® 567™ PST PIPE SEALANT** for all fittings including stainless steel or **LOCTITE® 565™ PST** for most metal fittings. For high filtration/zero contamination systems use **LOCTITE® 545™**.

Pipe thread fitting	
Thread Size	**Torque (Maximum)**
1/8-27	**13 N·m (10 lb ft)**
1/4-18	**16 N·m (12 lb ft)**
3/8-18	**22 N·m (16 lb ft)**
1/2-14	**41 N·m (30 lb ft)**
3/4-14	**54 N·m (40 lb ft)**

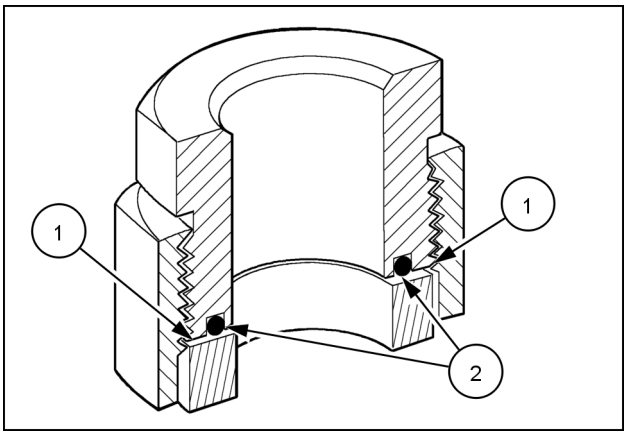
Installation of ORFS (O-ring flat faced) fittings

When installing ORFS fittings thoroughly clean both flat surfaces of the fittings **(1)** and lubricate the O-ring **(2)** with light oil. Make sure both surfaces are aligned properly. Torque the fitting to specified torque listed throughout the repair manual.

NOTICE: *If the fitting surfaces are not properly cleaned, the O-ring will not seal properly. If the fitting surfaces are not properly aligned, the fittings may be damaged and will not seal properly.*

NOTICE: *Always use genuine factory replacement oils and filters to ensure proper lubrication and filtration of engine and hydraulic system oils.*

The use of proper oils, grease, and keeping the hydraulic system clean will extend machine and component life.



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Servicing

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Read and understand the SAFETY INFORMATION Section before you perform any maintenance, service, or repairs. Read and understand the specific service procedures for the components you plan to work with before you start servicing the machine.
Failure to comply could result in death or serious injury.

W0138A

⚠ WARNING

Personal Protective Equipment (PPE) required.
When assembling, operating, or servicing the machine, wear protective clothing and PPE necessary for the particular procedure. Some PPE that may be necessary includes protective shoes, eye and/or face protection, hard hat, heavy gloves, filter mask, and hearing protection.
Failure to comply could result in death or serious injury.

W0353A

Follow the maintenance intervals by checking the hour meter every day. Before starting maintenance, park the machine on flat, firm ground, away from any obstacles, with the attachments on the ground. Keep all unauthorized personnel clear of the area. Unless otherwise specified, all maintenance operations should be carried out with:

- the engine stopped
- the machine parked on a firm, level surface
- the parking brake engaged
- the key removed from the key switch
- a "DO NOT OPERATE" tag on the key switch
- wheel chocks blocking the tracks
- all circuits cooled down prior to starting work
- all hydraulic pressure released
- any accumulator pressure released for the appropriate circuit

Clean the grease fittings before lubrication. Clean around plugs and filler holes before adding fluid. No dust or dirt must enter the components or the circuits. Wear suitable clothing, and use the necessary safety equipment.

Place a Do Not Operate tag on the instrument panel or key switch when performing service work on the machine. Turn off engine, and remove the key before leaving operator's compartment.

Any modification to this machine without prior authorization could cause serious injury. Do not make any modifications without authorization. Consult your authorized dealer.

The service intervals in this chapter refer to normal operating conditions. During the first operation period of a new machine or rebuilt component and under particularly severe conditions, the service intervals should be carried out more frequently.

Take particular care to replace all filters regularly. Clean filters mean longer engine running life.

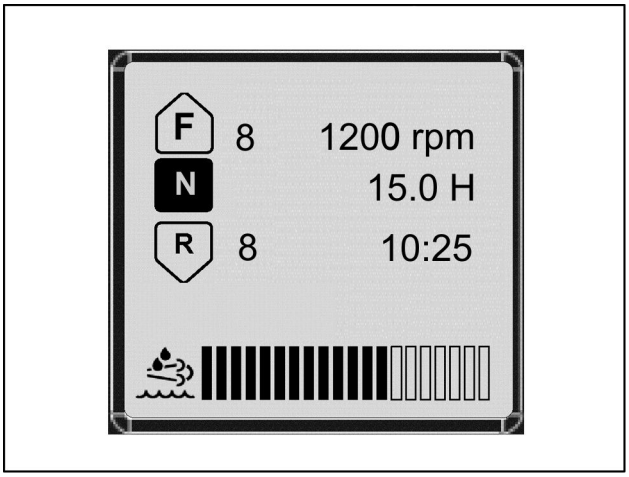
Oils and fluids must be disposed of properly.

Hour meter

The hour meter enables service operations to be scheduled. Its hourly indications are the same as those of a clock when the engine is running.

Servicing intervals are carefully calculated to guarantee safe and efficient machine operation.

Be sure to carry out all the servicing operations properly as defined in this manual.



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Variable periodic maintenance

Some working environments require that maintenance be performed more frequently. Dust, dirt, moisture, extreme hot or cold, and many other factors should be taken into consideration when servicing the machine. Certain equipment or auxiliary tools may cause more stress on hydraulics, drivetrain, engines, or filters. The following maintenance should be performed on regular schedules, but often need special attention when conditions require.

Engine air filter

Replace the primary element if the air filter indicator lamp illuminates.

Inspect the filter for damage. Wipe off the filter seal, and clean all dust from air cleaner housing. Never use water to clean the primary filter. For complete information see the maintenance chart on page **7-25** and air filter replacement on page **7-88** in this chapter.

Track

Clean the tracks and undercarriage as required or at the end of the work shift. Park the machine on a level surface to prevent distortion of the track seals. If the temperature is cold, park the machine on a surface that will not freeze to the track shoes. Check the track tension frequently when you operate. Check the track tension more often when working in extreme conditions. When material packs and collects on the undercarriage, the tracks may become too tight. Correct track adjustment is the most important factor that helps to control undercarriage wear.

Radiator

Check the machine for debris, especially around the engine area and radiator. Make sure these areas are clean. Check the level of the coolant tank.

Fuel prefilter

Check for water in the fuel system. Cold temperatures can cause water to collect in the fuel tank. Check the first stage fuel filter for water. Drain any sediment and/or water that collects in the fuel system. This should be a periodic maintenance procedure dependent upon climate and use conditions.

Fuses

If a fuse is defective, an indicator light will illuminate. Always replace fuses with a fuse of the correct amperage.

NOTE: *If a fuse blows, replace it at once. Locate the problem and if it reoccurs, have it checked by a service technician.*

Releasing pressure in the hydraulic system

⚠ WARNING

Pressurized hydraulic fluid can penetrate the skin and cause severe injuries.
Hydraulic fluid is under extreme pressure. Rest the bucket or attachment on the ground. Shut the engine off, turn the key on, and move the hydraulic control lever through all movements several times to relieve residual pressure in the system.
Failure to comply could result in death or serious injury.

W0161A

⚠ WARNING

Escaping fluid!
Hydraulic fluid or diesel fuel leaking under pressure can penetrate the skin and cause infection or other injury. To prevent personal injury: Relieve all pressure before disconnecting fluid lines or performing work on the hydraulic system. Before applying pressure, make sure all connections are tight and all components are in good condition. Never use your hand to check for suspected leaks under pressure. Use a piece of cardboard or wood for this purpose. If injured by leaking fluid, see your doctor immediately.
Failure to comply could result in death or serious injury.

W0178A

⚠ WARNING

Escaping fluid!
Do not disconnect hydraulic quick coupler under pressurized conditions. Make sure all hydraulic pressure is removed from the system before disconnecting hydraulic quick coupler.
Failure to comply could result in death or serious injury.

W0095A

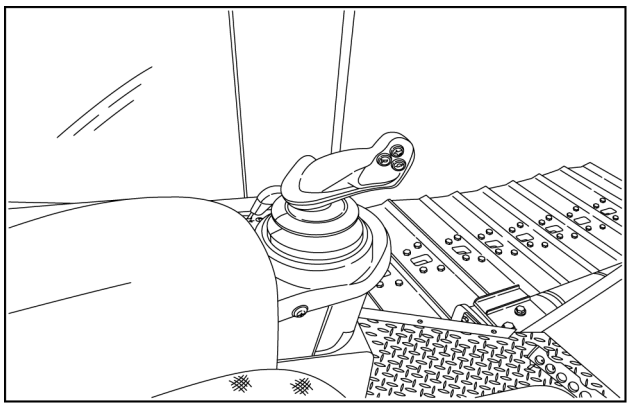
⚠ WARNING

Burn hazard!
Before performing any service on the hydraulic system, you must allow it to cool. Hydraulic fluid temperature should not exceed 40 °C (104 °F).
Failure to comply could result in death or serious injury.

W0241A

Releasing pressure in the hydraulic system

1. Park the machine on firm, level ground, lower the attachments to the ground, and stop the engine. Set the park brake.
2. Keep all unauthorized personnel clear of the machine. Turn the ignition switch key to the ON position. Do not start the engine.
3. Operate the control levers from right to left and front to rear approximately a dozen times. Turn the ignition key to the OFF position.



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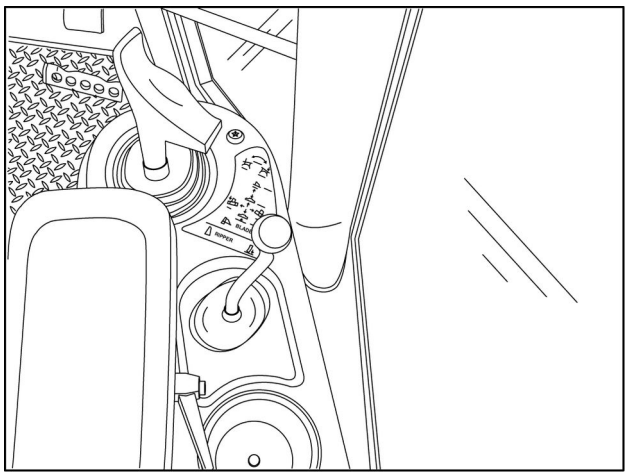

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Hydraulic and hydrostatic drive fluid

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 are slow. The machine does not have enough 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. Laboratory testing can detect microscopic contamination. In addition, if you experience any of the following problems, microscopic contamination could be the cause.

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 you can find 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

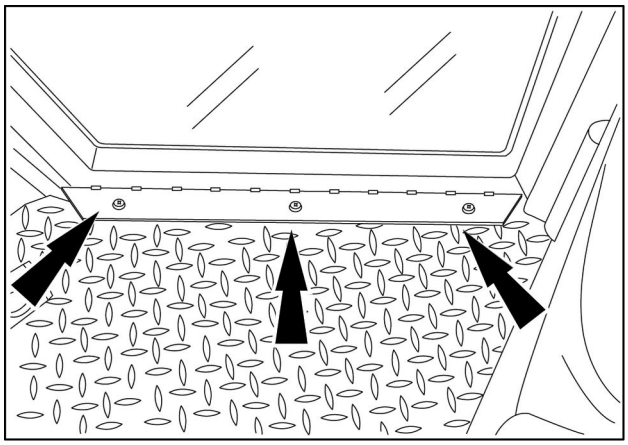
If you find contamination, use a portable filter to clean the hydraulic system.

Cab floor and seat access

Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

Hoses and components that do not require routine operator maintenance are located beneath the cab floor and seat. If necessary, you can access these components as follows:

1. Remove the screws from the floor mat along both door thresholds.
2. Lift the mat over the foot pedals and remove the mat from the cab.



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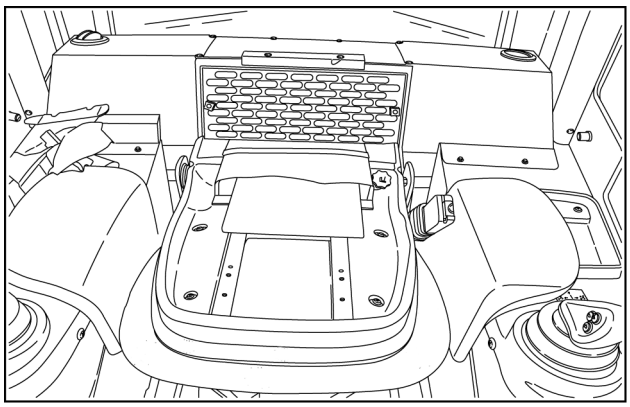
3. Slide the operator's seat all the way forward.
4. Tilt the operator seat back down.
5. Remove the armrests to prevent obstruction.



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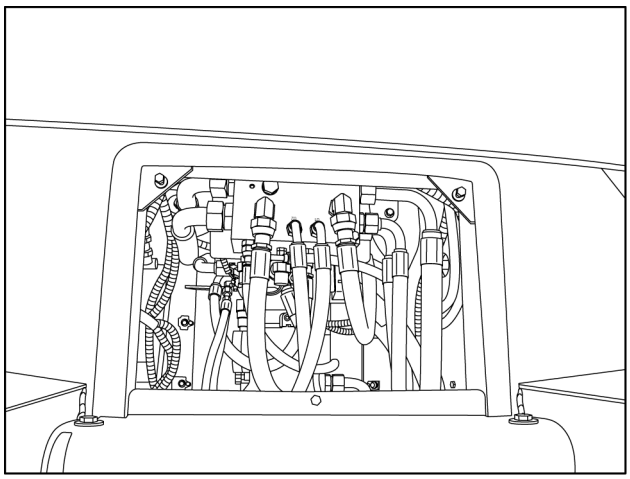
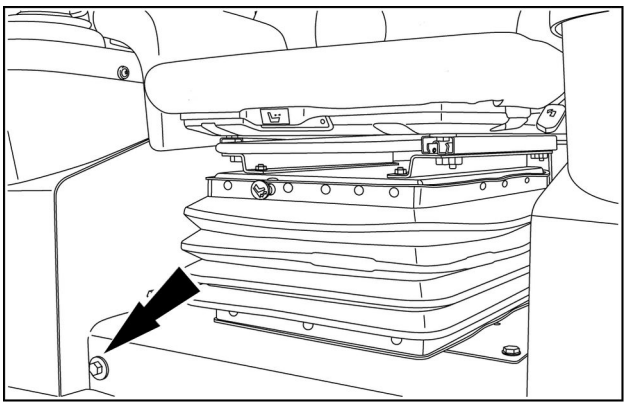
6. Remove the bolts from the floor cover plate, and remove the cover plate. This will allow access to valves and hoses beneath the cab.



RAIL13DOZ1261AA 3

NOTE: *The seat will automatically spring upward and towards the back of the cab.*

7. While holding the seat down, remove the bolts from each side of the lower front seat frame (one per side).



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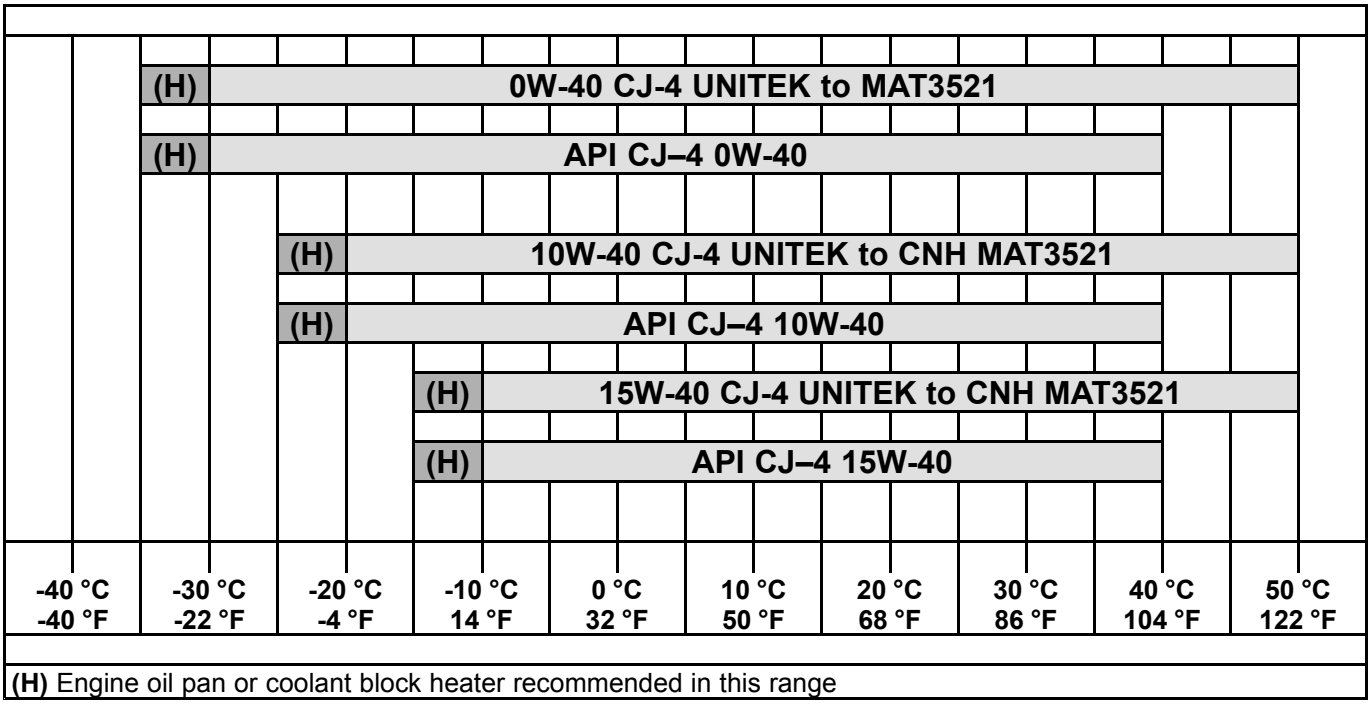
Recommended engine oil for operating temperature ranges

CJ-4 Oils



(H) Engine oil pan or coolant block heater recommended in this range

Fluids and lubricants

Engine crankcase	
Capacity with filter change	**12.3 l** (**13.0 US qt**)
Capacity without filter change	**11.5 l** (**12.2 US qt**)
Specifications	**CASE AKCELA UNITEK NO. 1™ SBL CJ-4 SAE 10W-40**
Fuel tank	
Capacity	**189 l** (**50.0 US gal**)
Selective Catalytic Reduction System — **DEF/ADBLUE®**	
Capacity	**36.7 L** (**9.7 US gal**)
Cooling system	
Capacity	**21.8 l** (**5.75 US gal**)
Specifications	**50 %** Water and **50 % CNH XHD HEAVY DUTY COOLANT / ANTI-FREEZE** or **CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT**. Depending on the date of manufacture, the machine could have either coolant type. Machines with OAT coolant will have a decal near the fill location. Never mix conventional coolant with OAT coolant. See page **7-22** for instructions on switching coolant types.
Hydraulic reservoir/Transmission refill	
Capacity	**90 l** (**23.8 US gal**)
Specifications	**TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30**
Final drives	
Capacity - Each Side	**14.2 l** (**15.0 US qt**)
Specifications	**CASE AKCELA HY-TRAN® ULTRACTION**
Grease fittings	
Quantity	As Required
Specifications	**TUTELA MOLY GREASE GR-75**

NOTE: *If the ambient temperature is lower than* ***-37 °C (-34.6 °F)****, adjust the mixture according to the coolant manufacturer specifications.*

Coolant solution

Use only **CNH XHD HEAVY DUTY COOLANT / ANTI-FREEZE** or **CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT** solution in the cooling system with no additives to prevent leakage. Do not use non-approved anti-rust additives.

NOTICE: *Anti-rust additives and ethylene-glycol can mix and work against each other, reducing anti-corrosion protection, forming deposits in the cooling system, and causing damage to the cooling system and radiator. Contact your dealer for a suitable coolant solution.*

Anti-freeze/Anti-corrosion

Use anti-freeze in all seasons to protect the cooling system from corrosion and risk of freezing. For areas where the ambient temperature is over **-36 °C** (**-32.8 °F**), use a blend of **50 %** ethylene-glycol based anti-freeze.

For areas where the temperature is below **-36 °C** (**-32.8 °F**), it is advisable to use a blend of **40 %** water and **60 %** anti-freeze.

Fuel

Use diesel fuel suitable for the ambient temperature conditions.

Use fuel which is to American Society for Testing and Materials **ASTM D975** standard.

Use grade No. 2 fuel. The use of other types of fuel can result in a loss of power of the engine and may cause high fuel consumption.

In very low ambient temperatures, use a mixture of fuels No. 1 and No. 2 as necessary. Consult your fuel supplier for appropriate fuel supply.

If the temperature falls below the fuel cloud point (point at which wax begins to form), the wax crystals will cause power loss or will prevent the engine from starting.

In cold weather, fill the fuel tank at the end of the day's work in order to prevent the formation of condensation.

Fuel storage

Prolonged storage of fuel can lead to the accumulation of impurities and condensation in the fuel. Engine problems can often be traced to the presence of water in the fuel.

The storage tank must be placed outside, and the temperature of the fuel should be kept as low as possible. Drain off water and impurities regularly.

Engine oil

CASE AKCELA UNITEK NO. 1™ SBL CJ-4 SAE 10W-40 is recommended for your engine. This oil insures correct lubrication of your engine in all working conditions. See the chart on page **7-16** to choose the correct oil for climate/ temperatures.
If **CASE AKCELA UNITEK NO. 1™ SBL CJ-4 SAE 10W-40** cannot be obtained, use only oil of the API SERVICE CJ-4 category.

NOTE: *Do not put any performance additive or other additive in the sump. Oil change intervals shown in this manual are based on tests carried out utilizing CNH lubricants.*

Hydraulic fluid

TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30 is specifically designed for high pressure applications and for this machine’s hydraulic system.

Final drive oil

Use **CASE AKCELA HY-TRAN® ULTRACTION** when replacing or adding fluid to the final drive for this machine.

Grease

The type of grease to use depends on ambient temperature such as **TUTELA MOLY GREASE GR-75**.

Environment

Before you service this machine and dispose of oil, fluids, and lubricants, obey environmental regulations. Do not drain oil or fluids on to the ground or into containers that leak. Check with your local environmental recycling center or your dealer for correct disposal information.

General specification - Diesel fuel

Only use diesel fuel that conforms to North American standard **ASTM D975** Grade No. 2-D S15 or equivalent in your engine. Do not use any other low grade diesel fuel.

NOTICE: *Use of other low grade diesel fuels will result in loss of engine power, high fuel consumption, and damage to the exhaust aftertreatment system (if equipped).*

NOTE: *When operating the machine in very cold climates, the use of winter blended fuel is permitted for a short period of time. See your fuel supplier for winter fuel requirements in your area.*

Fuel conditioner

Diesel fuel conditioner is available from your CASE CONSTRUCTION dealer. Instructions for the use of the fuel conditioner is on the container.

The use of diesel fuel conditioner will:

- Clean fuel injectors, valves, and manifolds for increased service life
- Disperse insoluble gummy deposits that form in the fuel system
- Separate moisture from the fuel
- Stabilize fuel in storage

NOTICE: *Use only CASE CONSTRUCTION approved biocide additives to prevent damage to the exhaust aftertreatment system (if equipped).*

General specification - Biodiesel fuels

Biodiesel fuel usage in CASE CONSTRUCTION products

Introduction to biodiesel fuel

Fatty Acid Methyl Ester (FAME) biodiesel fuel, called biodiesel fuel in the following paragraphs, consists of a family of fuels derived from vegetable oils that producers treat with methyl esters.

There are two main biodiesel fuel types: Rapeseed Methyl Ester (RME) and Soybean Methyl Ester (SME). RME is a blend of rapeseed and sunflower methyl ester. RME is the preferred crop in Europe. SME is the preferred crop in the United States.

Biodiesel fuel is a renewable alternative fuel source. Its use and development is promoted worldwide, especially in Europe and in the United States.

NOTICE: *It is imperative that you check with your CASE CONSTRUCTION dealer to learn which biodiesel fuel blend CASE CONSTRUCTION approves for use in your engine. Be aware that the use of biodiesel fuel blends that do not comply with* ***ASTM D6751*** *could cause severe damage to the engine and fuel system of your machine. The use of non-approved biodiesel fuel blends may void CASE CONSTRUCTION Warranty coverage.*

Biodiesel fuel blends use the following labels to indicate the percentage of biodiesel fuel in the blend:

- B5: indicates the blend of **5 %** biodiesel fuel and **95 %** diesel fuel.
- B7: indicates the blend of **7 %** biodiesel fuel and **93 %** diesel fuel.
- B20: indicates the blend of **20 %** biodiesel fuel and **80 %** diesel fuel.
- B100: indicates **100 %** biodiesel fuel.

Biodiesel fuel has several positive features in comparison with diesel fuel:

- Biodiesel fuel adds lubricity to the fuel. Additional lubricity is beneficial in many circumstances, particularly as fuels contain less sulfur and aromatics.
- Biodiesel fuel has a greater cetane number and burns more cleanly.
- Biodiesel fuel produces less particulate matter and reduces smoke emissions.
- Biodiesel fuel is fully biodegradable and non-toxic.

Specifications for diesel fuel and biodiesel fuel

The following standards apply to diesel fuel specifications:

- **ASTM D975**, Standard Specification for Diesel Fuel Oils. (**15 ppm** sulfur maximum.)

The following standards apply to biodiesel fuel blends:

- United States Diesel Fuel Specification **ASTM D6751** allows up to **5 %** biodiesel since 2009. United States fuel suppliers are allowed to use up to **5 %** biodiesel fuel (B5) to supply the network.
- United States Biodiesel Fuel Specification **ASTM D7467** provides specifications for diesel and biodiesel blends from B5 to B20.

The following standards apply to pure biodiesel fuel (B100):

- **ASTM D6751** - Standard specification for biodiesel fuel blend stock (B100) for middle distillate fuels.

  NOTE: *ASTM updated* ***ASTM D6751*** *to improve the quality of biodiesel in the market place.*

Before producers can convert raw oil into usable biodiesel fuel, it must undergo transesterification to remove glycerides. During the transesterification process, the oil reacts with an alcohol to separate the glycerin from the fat or vegetable oil. This process leaves behind two products: methyl ester (the chemical name for biodiesel) and glycerin (a byproduct usually sold for use in soaps or other products).

NOTICE: *CASE CONSTRUCTION only approves transesterified biodiesel fuel blends that comply with* ***ASTM D6751****.*

NOTICE: *Non-transesterified fuels made from rapeseed oil or similar high oil content crops include cold-pressed biodiesel, cold-pressed oil, Straight Vegetable Oil (SVO), or more generally unrefined vegetable oils used as motor fuel. Because these types of fuel are not transesterified, they do not fulfil the requirements of* ***ASTM D6751****. There is no recognized quality standard available for these types of fuel; therefore, CASE CONSTRUCTION DOES NOT APPROVE the use of cold-pressed biodiesel, cold-pressed oil, Straight Vegetable Oil (SVO), or more generally unrefined vegetable oils as motor fuel at any blend in any CASE CONSTRUCTION product.*

NOTICE: *CASE CONSTRUCTION will discontinue Warranty coverage of any engine equipment and fuel injection equipment you fit to a CASE CONSTRUCTION machine that is found to have run with blend of NON-APPROVED fuel (fuel that does not fulfill the requirements of* ***ASTM D6751****).*

Biodiesel fuel usage conditions

You must stringently follow the biodiesel fuel usage conditions. Incorrect application of the biodiesel fuel usage conditions could lead to severe damage to the engine and fuel injection equipment and aftertreatment system.

The main concerns about operation of equipment with biodiesel fuels are:

- Filter and injector blockage caused by poor fuel quality
- Wear and corrosion of internal components due to water content, which affects lubricity
- Deterioration of some rubber sealing compounds in the fuel system
- Biodiesel oxidation, which can lead to the formation of deposits that may harm the fuel injection system

NOTICE: *CASE CONSTRUCTION Warranty will not cover any problem in the engine fuel injection equipment that results from non-compliance with the following conditions for biodiesel fuel handling and biodiesel fuel maintenance.*

Purchase biodiesel fuel from a trusted supplier who understands the product and maintains acceptable fuel quality. It is highly recommended that you use biodiesel from BQ 9000 accredited suppliers to maintain the quality and consistency of the fuel. The BQ 9000 Quality Management Program is accredited by the National Biodiesel Board for producers and marketers of biodiesel fuel. See the National Biodiesel Board website at www.biodiesel.org for more information.

The supplier must pre-blend biodiesel fuel. Mixing biodiesel fuel blends on-site can result in an incorrect mixture that may damage the engine and/or fuel system.

For machines using Tier 4A (interim) and Stage IIIA engines with an exhaust aftertreatment system, the use of biodiesel blends above B5 through B20 will not void the CASE CONSTRUCTION warranty as long as you stringently follow these conditions for biodiesel fuel handling and maintenance:

1. If you use a biodiesel blend stock to **ASTM D6751**, you must take special precautions. Ensure that the biodiesel blend stock fully complies with the following special requirements:
   - Group I Metals content (sodium and potassium) must be less than or equal to **5 mg/kg** per **EN14538**.
   - Group II Metals content (calcium and magnesium) must be less than or equal to **5 mg/kg** per **EN14538**.
   - Phosphorus content lower than **4 mg/kg** is a mandatory requirement (per **ASTM D4951**).
2. The resulting greater than B5 through B20 blend must not exceed **1 mg/kg** for Group I Metals (sodium and potassium) and for Group II Metals (calcium and magnesium).

NOTICE: For machines using Tier 4A (interim) and Stage IIIA engines with an exhaust aftertreatment system in regions where the biodiesel fuel blend stock is supplied to the ASTM D6751 standards, it is essential that evidence of compliance to the special limits for Group I Metals, Group II Metals and the reduced phosphorus content specified above be obtained on every delivery of fuel from the fuel supplier. Failure to comply with this requirement can result in damage to the catalyst of the aftertreatment system that will not be covered under warranty.

NOTICE: *CASE CONSTRUCTION may void your warranty if the problem is associated with poor fuel quality due to improper blending. It is the responsibility of the fuel supplier and/or yourself to ensure the right type of fuel and blend is delivered and used.*

Maintenance intervals

For machines using the all-electronic engines with a high-pressure common rail fuel system, the use of biodiesel blends up to B20 reduces the engine oil and filter change interval to **250 h**. For all engines, see the operator's manual for specific maintenance intervals.

Check all hoses, connections and gaskets to ensure integrity and cleanliness every 3 months or 150 hours of operation, whichever comes first.

Regular oil sampling is highly recommended to monitor for oil deterioration and engine deterioration.

NOTE: *Oil sampling kits are available from your authorized CASE CONSTRUCTION dealer.*

When switching back from biodiesel to regular #2 diesel, you should change all fuel filters, oil and oil filter even if the changeover falls between routine service intervals.

Storage

You should not store the machine for more than three months with biodiesel fuel in the fuel system. For longer storage time, CASE CONSTRUCTION strongly suggests that you use only regular #2 diesel fuel.

NOTE: *If you must store a machine for longer than 3 months, you must run the engine on regular #2 diesel fuel for a minimum of **20 h** prior to storage. This will flush the biodiesel fuel out of the fuel system.*

Biodiesel fuel is highly hygroscopic and tends to collect water more than diesel fuel. Water collection increases the risk of algae and bacteria growth that can cause severe damage to the fuel injection system. Keep the machine fuel tanks and on-site storage tanks as full as possible to limit the amount of air and water vapor inside. Drain water from the tanks at least once a week.

NOTICE: *Use only CASE CONSTRUCTION approved biocide additives.*

Engine cooling system - Basic instructions

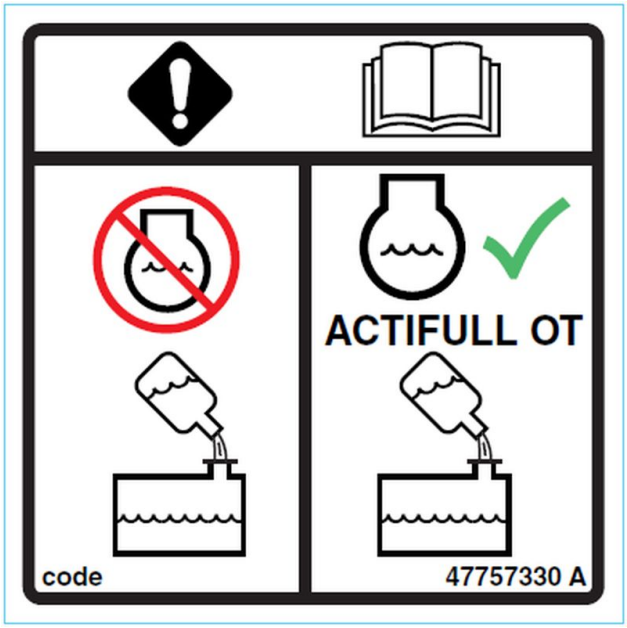
Depending on the date of manufacture, your cooling system may be equipped with conventional ethylene glycol coolant such as **CNH XHD HEAVY DUTY COOLANT / ANTI-FREEZE** or an Organic Acid Technology (OAT) coolant solution such as **CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT**. You can easily identify **CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT** by its yellow color. You should never mix the coolant types.

The coolant solution used must meet the following CNH Industrial material specifications for either coolant type:

- **MAT3624** for OAT coolant
- **MAT3620** for conventional coolant

The decal shown is located near the fill point of the cooling system whenever the factory fill is **CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT**. This decal is available in three different sizes. See the table below for the associated part numbers.

CNH Industrial part number	Size
47757330	**50 mm** x **50 mm**
47757331	**75 mm** x **75 mm**
47757332	**100 mm** x **100 mm**



47757330 1

NOTICE: *NEVER mix OAT coolant with conventional coolant. Under no circumstances should you top off a cooling system with only water. You can use a refractometer to check the concentration level. You should not use Supplemental Coolant Additives (SCA) when using* ***CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT****. Change the coolant solution at the recommended change interval.*

If you need to change a machine from conventional coolant to OAT coolant or vice versa, you should follow the “Changing coolant types” procedure below to attain the full benefit of the coolant.

Changing coolant types

To change coolant from OAT coolant to conventional coolant (or vice versa):

1. Empty the engine cooling system by draining the coolant into a suitable container.
2. Fill the system with clean water.
3. Start the engine and run the engine for at least **30 min**.

   NOTE: *Make sure that you activate the heating system (if equipped) to circulate fluid through the heater core.*
4. Repeat Steps 1 to 3 for a total of two washes.
5. Fill the system with conventional coolant (or OAT coolant).
6. Operate the engine until it is warm. Inspect the machine for leaks.
7. If you are changing to OAT coolant, then attach the decal (CNH Industrial part number 47757330) to indicate the use of OAT coolant in the cooling system.

You may notice the older version of the OAT decal (CNH Industrial part number 47488993) on some applications.

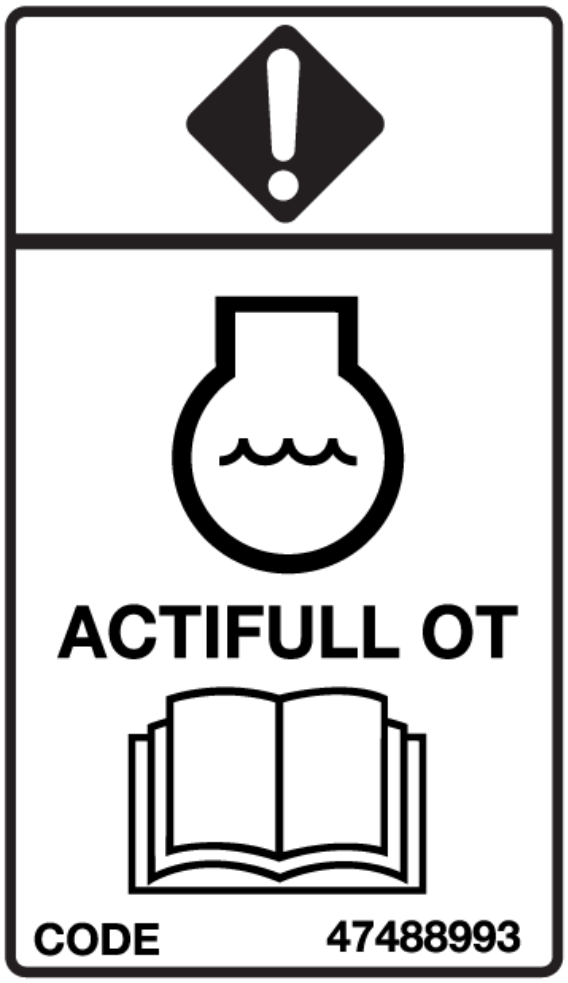
Definitions

Conventional coolant:

A coolant that relies on inorganic inhibitors such as silicates, nitrites, and phosphates for corrosion and cavitation protection.

Organic Acid Technology (OAT) coolant:

A coolant that relies on inhibitors such as organic acid salts for corrosion and cavitation protection.



47488993 2

Selective Catalytic Reduction (SCR) system

Requirements

The operator must maintain appropriate DEF/AdBlue® levels at all times.

NOTICE: *Prolonged idling of the machine with no load for more than **6 h** will cause damage to the SCR catalyst.*

NOTE: *See your CASE CONSTRUCTION dealer for replacement components and cleaning agents.*

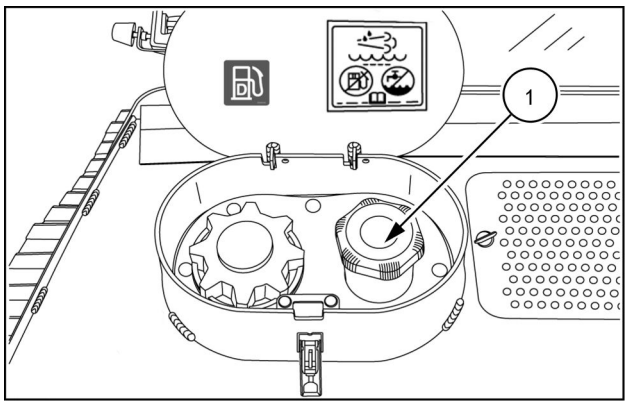
CASE CONSTRUCTION recommends using **CASE AKCELA UNITEK NO. 1™ SBL CJ-4** . See page **7-16** for other recommended engine oils, and their operating temperature ranges. Your SCR system is compatible with up to **20 %** biodiesel fuel.

Diesel Exhaust Fluid (DEF)/AdBlue® refilling

The DEF/AdBlue® tank is located on the left-hand side of the machine, next to the diesel filling port.

The DEF/AdBlue® tank cap **(1)** can be identified by the “blue” color of the cap. A fitting under the cap prevents the insertion of a diesel fill nozzle.

NOTICE: *If any DEF/AdBlue® spills or contacts any surface other than the storage tanks, immediately clean the affected surface with clear water. DEF/AdBlue® will cause corrosion on painted and unpainted metallic surfaces, and may distort some plastic and rubber components.*



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It is recommended that DEF/AdBlue® filling equipment should be used having a fill nozzle/pump with the correct length and diameter, triggered by the magnet in the tank filler neck and with overfill flow cut out.

This will ensure that:

- The screen in the filler neck will not be damaged.
- Impurities are not entering the DEF/AdBlue® tank. The standardized DEF/AdBlue® nozzle matches the filler neck diameter.
- The DEF/AdBlue® tank is not overfilled, as the DEF/AdBlue® pump will stop when the DEF/AdBlue® tank is full.
- DEF/AdBlue® is not pumped in the fuel tank, as the DEF/AdBlue® nozzle cannot pump when the magnet is not sensed.

NOTICE: *If a warning light has been triggered for low or empty DEF/AdBlue®, the system must be reset by cycling the key switch OFF then ON after refilling the DEF/AdBlue® tank.*

NOTICE: *Refilling with a funnel is not recommended as this may lead to damage of the screen in the filler neck.*

NOTE: *The information above has been provided by the International Organization for Standardization (ISO), Document number ISO 22241-4 Diesel engines - NOx reduction agent AUS 32 - Part 4: Refilling interface.*

Diesel Exhaust Fluid (DEF)/AdBlue® consumption

NOTE: *DEF/AdBlue® consumption is highly dependent on engine loads, humidity levels, DEF/AdBlue® fluid concentration, and engine speed. The “typical” consumption is only a guideline to verify proper function of the SCR system. CNH recommends filling he DEF/AdBlue® tanks at every fuel refilling interval.*

MAINTENANCE CHART

Maintenance chart

Maintenance action	Cleaning	Grease	Check	Change fluid	Replace	Drain fluid	Page no.
Daily inspection							
General			x				**7-27**
Every 10 hours							
Engine oil			x				**7-32**
Engine coolant			x				**7-33**
Hydraulic oil			x				**7-35**
Grease points		x					**7-37**
Initial 20 hours							
Track shoe bolt torque			x				**7-41**
Every 50 hours							
Fuel pre-filter - Drain condensation		x					**7-42**
Initial 100 hours							
Change engine oil and filter (Initial)				x			**7-44**
Replace hydraulic oil filters (Initial)					x		**7-47**
Fuel filter (Initial)		x					**7-49**
Clean in-line Diesel Exhaust Fluid (DEF) supply filter (Initial)		x					**7-51**
Track tension (Initial)	x						**7-53**
Final drive oil (initial)						x	**7-55**
Every 500 hours							
Change engine oil and filter				x			**7-59**
Fuel filters					x		**7-62**
Battery electrolyte level	x						**7-64**
Every 1000 hours							
Fuel tank cap		x					**7-65**
Fuel tank sediment						x	**7-66**
Hydraulic reservoir breather		x					**7-69**
Final drive oil						x	**7-71**
Drive shaft slip spline		x					**7-75**
Every 1500 hours							
Drive belt					x		**7-76**
Clean in-line Diesel Exhaust Fluid (DEF) supply filter	x						**7-78**
Engine breather filter and valve clearance					x		**7-80**
Every 2000 hours							
Engine coolant				x			**7-81**
Hydraulic and hydrostatic drive filter and fluid					x		**7-84**
Reservoir suction screen		x					**7-87**
Engine air filters					x		**7-88**
As required							
Track tension	x						**7-91**
Roll Over Protective Structure (ROPS)	x						**7-93**
Cab air filter - Recirculation filter					x		**7-96**
Selective Catalytic Reduction (SCR) system - Replace supply module filter					x		**7-98**
Selective Catalytic Reduction System (SCR) tank filter		x					**7-101**
Engine air filters					x		**7-102**
Doors and windows		x					**7-105**
Ripper shanks and teeth					x		**7-106**
Battery service		x					**7-108**

Maintenance action	Cleaning	Grease	Check	Change fluid	Replace	Drain fluid	Page no.
Auxiliary battery connections			x				**7-111**
Battery removal and installation					x		**7-112**
Work lights					x		**7-114**
ELECTRICAL SYSTEM							
Fuses and relays					x		**7-115**

Daily inspection

General

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Read and understand the SAFETY INFORMATION Section before you perform any maintenance, service, or repairs. Read and understand the specific service procedures for the components you plan to work with before you start servicing the machine.
Failure to comply could result in death or serious injury.

W0138A

Inspect the machine and service certain of its components every day, before starting work.

General

- Check for water or oil leaks.
- Check that all screws and nuts are correctly tightened.
- Wipe off any dust and clean off any accumulated debris (engine, operator's compartment, etc.).
- Check track for tension and pack.
- Check for damage.

Engine

- Turn engine off and remove ignition key.
- Remove and debris from around engine, hot components, or rotating equipment.
- Check the oil level, and change the oil, if necessary.
- Check the coolant level at overflow tank.
- Check for clogging or damage to the radiator.
- Check the engine accessory drive belt condition.
- Check that air filter restriction warning is not illuminated on console cluster.
- Check for water or oil leaks on the components.
- Check the condition of all lines.
- Check the fuel tank level.

Other

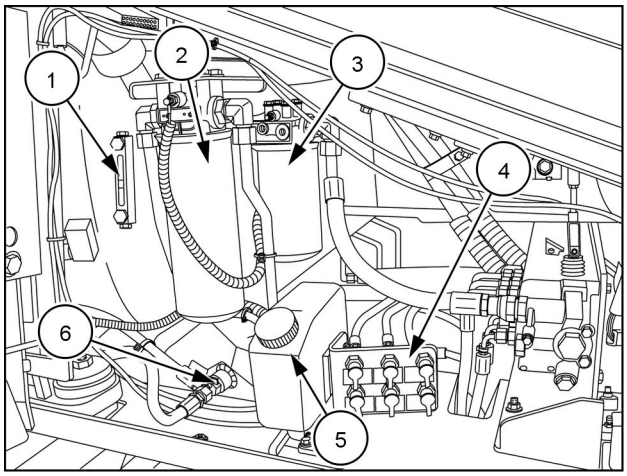
- Check the hydraulic reservoir level.
- Check that the hydraulic oil is clean.
- Check the condition of all lines.
- Check electrical conductors, harnesses and cables for signs of mechanical damage or wear.
- Check that all battery connections are properly tightened.
- Adjust the rear view mirrors.
- Check for oil leaks on the cylinders.
- Check the condition of the blade and ripper (if equipped).

After starting the engine

- Did the engine start correctly? Are the exhaust fumes normal? Any unusual noises?
- Check for abnormal noise on the hydraulic components.
- Check for water, fuel, or oil leaks on the components.
- Check the audible alarm devices, working lights and windshield wipers.
- Check that all hydraulic circuits are functioning correctly.

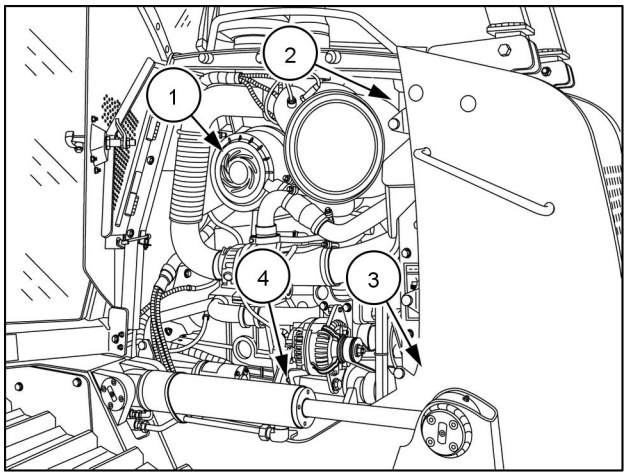
Access doors and fill locations

1. Access door, rear right-hand side of the machine.
   Hydraulic sight gauge **(1)**
   Hydrostatic drive filter **(2)**
   Hydraulic oil filter **(3)**
   Hydraulic test ports **(4)**
   Windshield wiper fluid reservoir **(5)**(if equipped)
   Hydraulic reservoir drain **(6)**



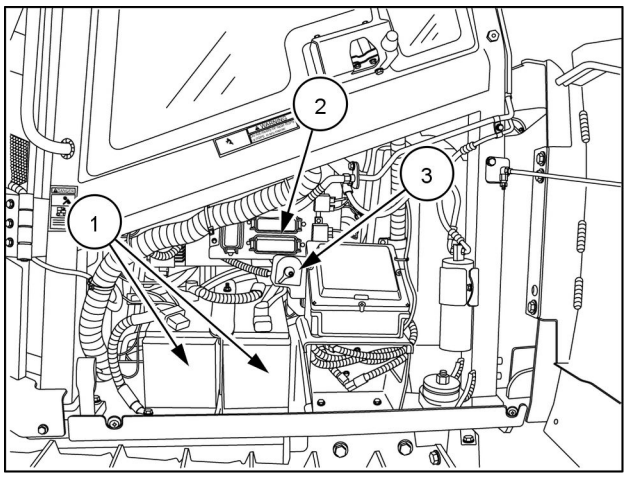
RAIL13DOZ1280AA 1

2. Engine hood, front right-hand side of the machine.
   Engine air cleaner **(1)**
   Engine coolant check **(2)**
   Engine oil environmental drain **(3)** (if equipped)
   Engine coolant environmental drain **(3)** (if equipped)
   Engine oil filter **(4)**



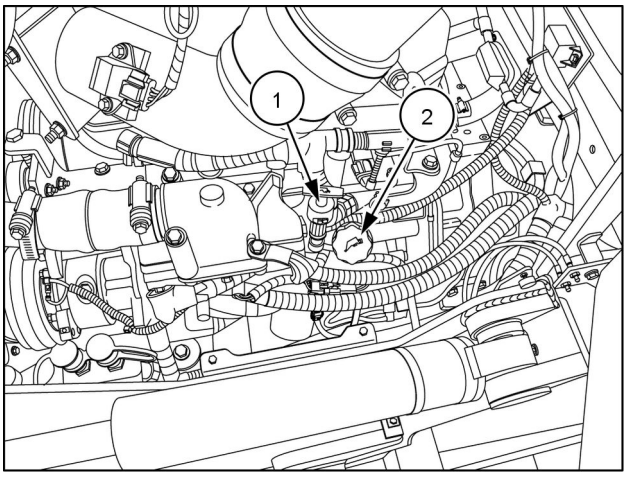
RAIL13DOZ1534AA 2

3. Access door, rear left-hand side of the machine.
   Batteries **(1)**
   Fuses **(2)**
   Electronic disconnect **(3)**



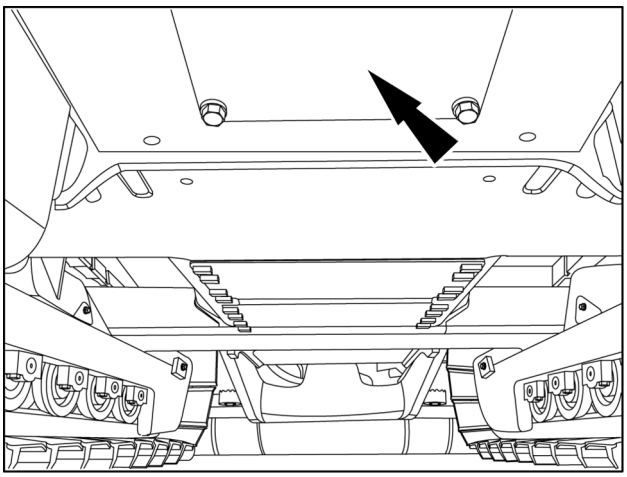
RAIL13DOZ1286AA 3

4. Engine hood, front left-hand side of the machine.
   Oil dipstick **(1)**
   Oil fill **(2)**



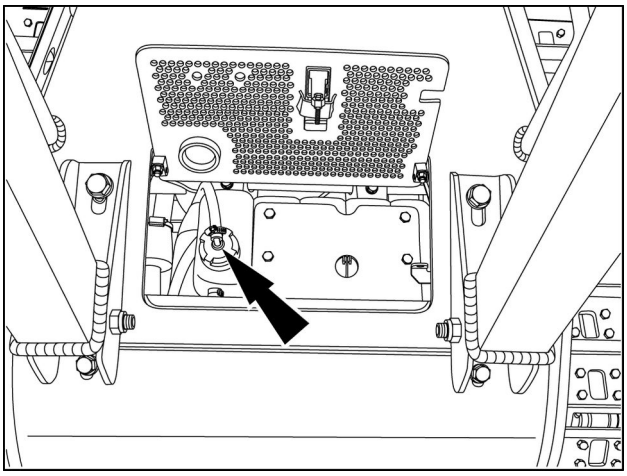
RAIL13DOZ0892AA 4

5. Undercarriage panels
   Engine coolant drain
   Engine oil drain



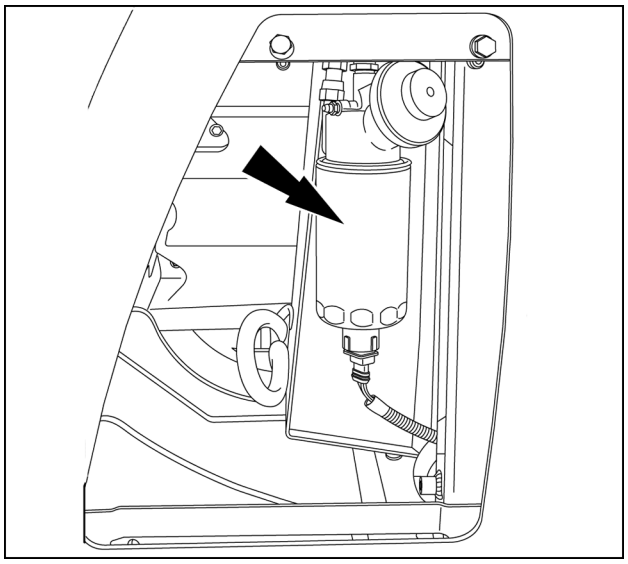
RAIL13DOZ0274AA 5

6. Hood top panel
   Engine coolant fill and check



RAIL14DOZ0573AA 6

7. Access panel, right-hand side rear of the machine.
   Fuel filter



RAIL13DOZ1548AA 7

Every 10 hours

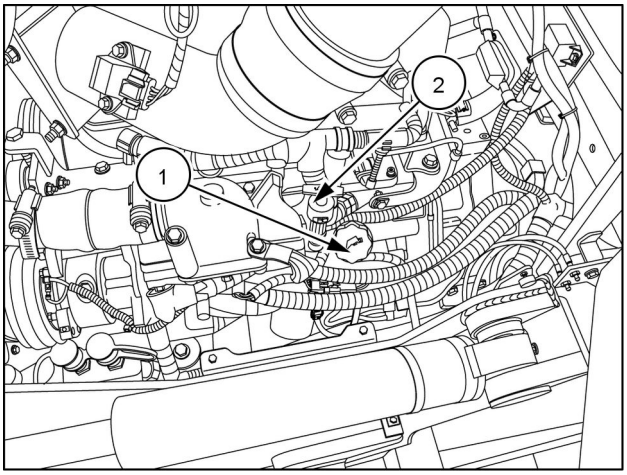
Engine oil

The engine oil level should be checked every 10 hours of operation or each day.

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

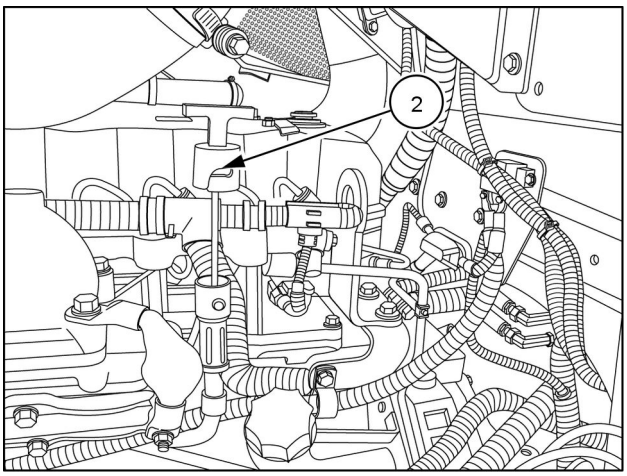
Service specifications	
Type of oil	**CASE AKCELA UNITEK NO. 1™ SBL CJ-4 SAE 10W-40**
Capacity (with filter change)	**12.3 l** (**13 US qt**)

The engine oil fill **(1)** and the oil dip stick **(2)** are located on the left side of the machine in the front engine compartment.



RAIL13DOZ0892AA 1

1. Remove the dipstick **(2)** to check the engine oil level.
2. Wipe the dipstick clean and reinsert. The oil level should register at the full mark.
3. Add oil, if necessary. Do not over fill engine oil.



RAIL13DOZ0899AA 2

NOTE: *This procedure is best performed at the beginning of the work day with the engine cool and all oil drained to the pan.*

Engine coolant

⚠ WARNING

Burn hazard!
Hot coolant can spray and scald if you remove the radiator or deaeration tank cap while the system is hot. To remove the cap: allow the system to cool, turn the cap to the first notch, and wait for all pressure to release. Remove the cap only after all pressure has released.
Failure to comply could result in death or serious injury.

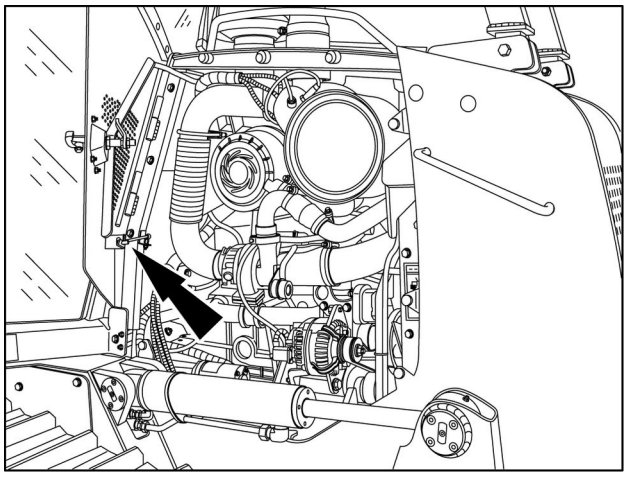
W0367A

Check the coolant reservoir level every 10 hours of operation or each day.

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

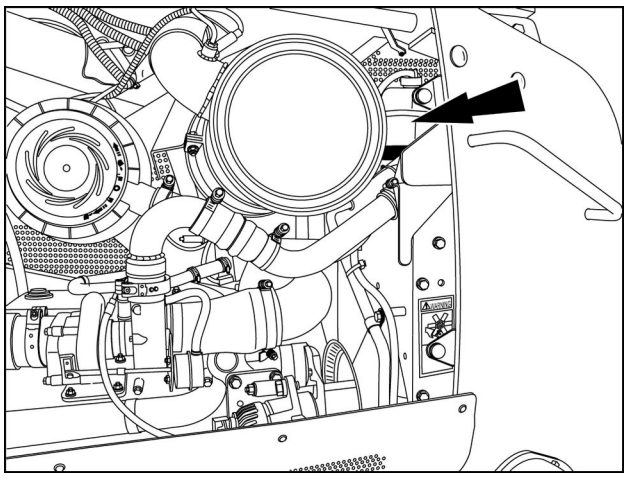
Service specifications	
Type of coolant	**50 %** Water and **50 % CNH XHD HEAVY DUTY COOLANT / ANTI-FREEZE** or **CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT**. Depending on the date of manufacture, the machine could have either coolant type. Machines with OAT coolant will have a decal near the fill location. Never mix conventional coolant with OAT coolant. See page **7-22** for instructions on switching coolant types.
Coolant capacity	**21.8 L** (**5.8 US gal**)

1. Open the right-hand side engine access door. Secure the engine access door open with the support rod.



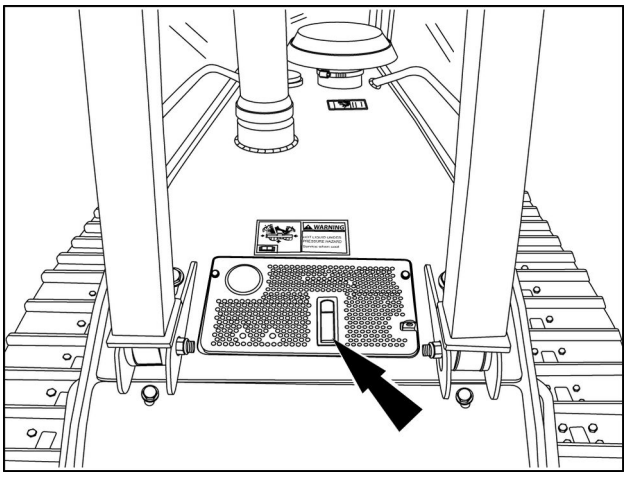
RAIL13DOZ1534AA 1

2. Check the full/fill marks on the side of the coolant reservoir.



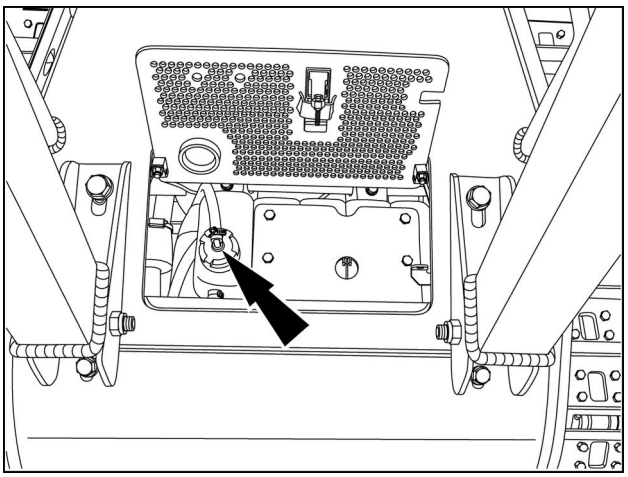
RAIL14DOZ0564AA 2

3. Open the hood top panel.



RAIL14DOZ0572AA 3

4. Open the coolant reservoir, and add coolant if the coolant level is low. Use the proper ratio of water and antifreeze/coolant. Do not overfill.



RAIL14DOZ0573AA 4

Hydraulic oil

⚠ WARNING

Pressurized hydraulic fluid can penetrate the skin and cause severe injuries.
Hydraulic fluid is under extreme pressure. Rest the bucket or attachment on the ground. Shut the engine off, turn the key on, and move the hydraulic control lever through all movements several times to relieve residual pressure in the system.
Failure to comply could result in death or serious injury.

W0161A

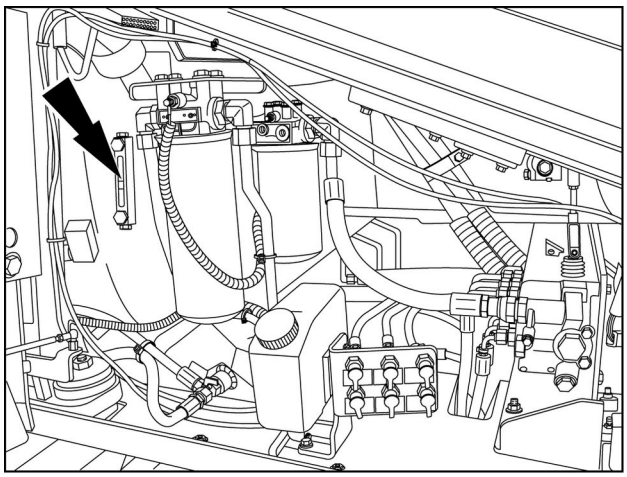
Check the level of the hydraulic oil tank every 10 hours of operation, or each day.

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

Service specifications	
Type of oil	**TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30**
Total system capacity	**90.0 L** (**23.8 US gal**)

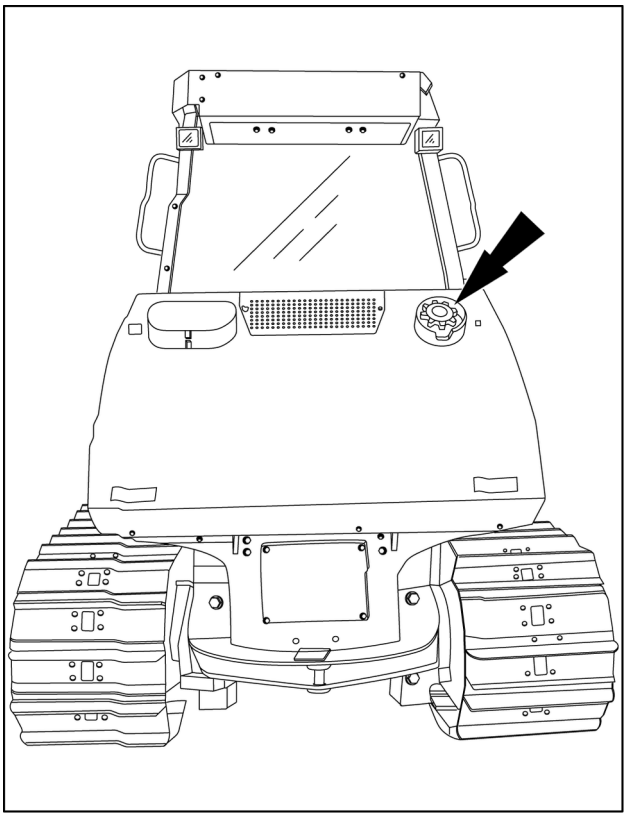
Fluid level check

1. Before you start the engine, check the oil level in the sight gauge. If the oil is cold, the level is correct when the top of the oil is aligned with the indicator mark.
2. If oil is required, make certain that all pressure is relieved in the system.



RAIL13DOZ1280AA 1

3. Slowly loosen the tank cap and top off until the proper oil level is reached.



RAIL13DOZ0848BA 2

Grease points

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Read and understand the SAFETY INFORMATION Section before you perform any maintenance, service, or repairs. Read and understand the specific service procedures for the components you plan to work with before you start servicing the machine.
Failure to comply could result in death or serious injury.

W0138A

⚠ WARNING

Avoid injury! Always do the following before lubricating, maintaining, or servicing the machine.
1. **Disengage all drives.**
2. **Engage parking brake.**
3. **Lower all attachments to the ground, or raise and engage all safety locks.**
4. **Shut off engine.**
5. **Remove key from key switch.**
6. **Switch off battery key, if installed.**
7. **Wait for all machine movement to stop.**

Failure to comply could result in death or serious injury.

W0047A

Lubricate the machine and attachments with **TUTELA MOLY GREASE GR-75** when the hour meter registers 10 hours of operation and every 10 hours thereafter. Lubricate more frequently if conditions so require.

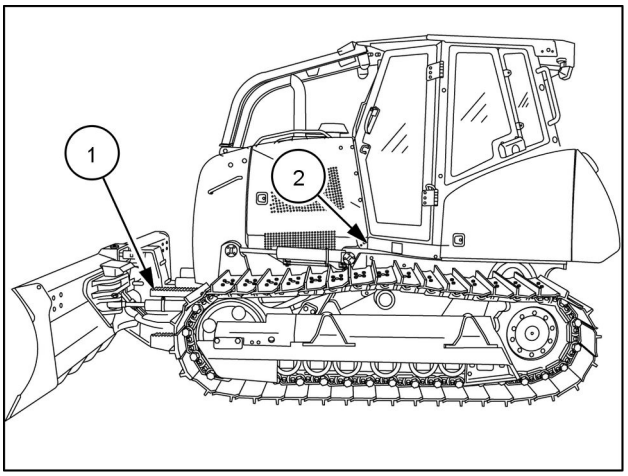
Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

Clean around the area to be greased before service.

NOTE: *In severe conditions, such as immersion in water, it may be necessary to grease more frequently.*

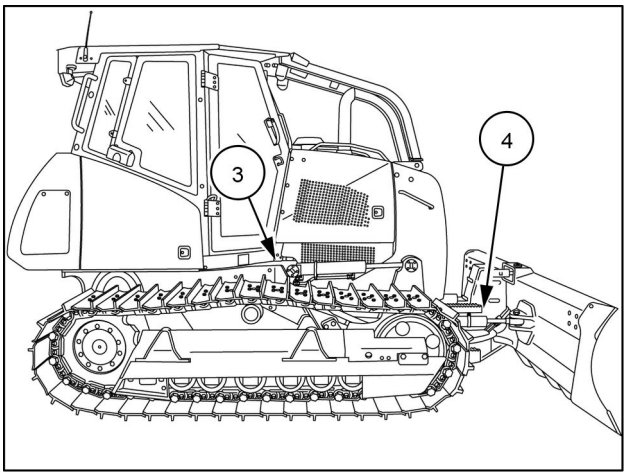
Remote grease zerks

Left side
(1) Blade angle cylinder base end
(2) C-frame



RAIL13DOZ1295AA 1

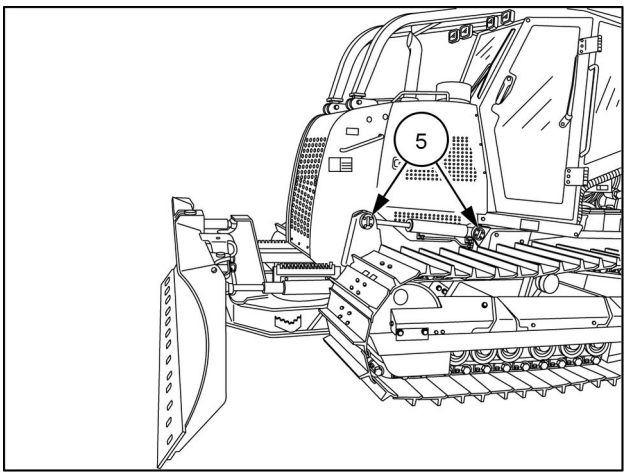
Right side
(3) C-frame
(4) Blade angle cylinder base end



RAIL13DOZ1294AA 2

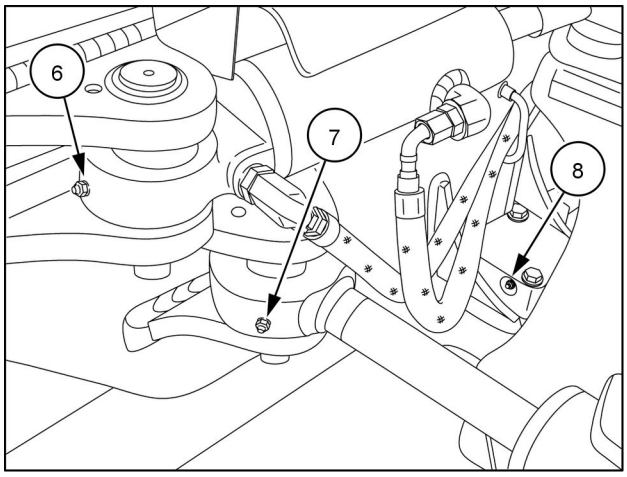
Grease zerks

(5) Blade lift cylinder (both ends) — one cylinder on each side of the machine



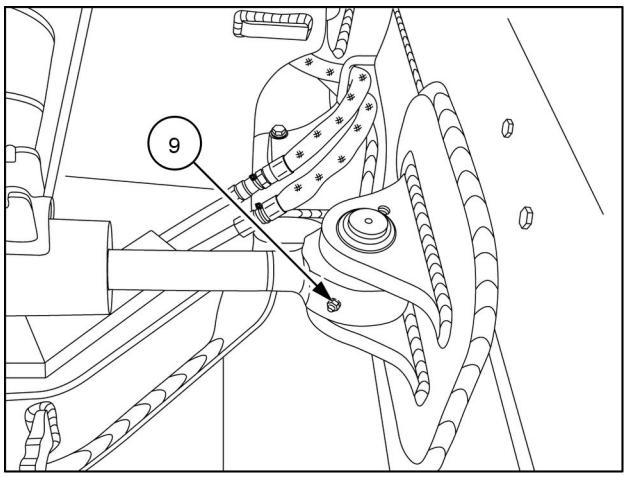
RAIL13DOZ1293AA 3

(6) Blade tilt cylinder base end
(7) Blade angle cylinder rod end (left side of the machine)
(8) Blade pivot



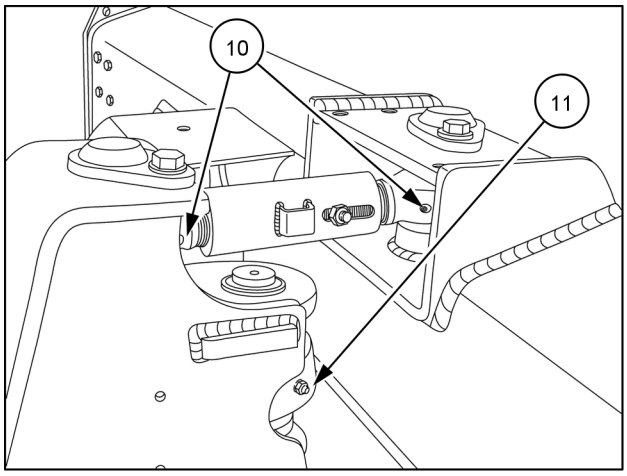
RAIL13DOZ1289AA 4

(9) Blade angle cylinder rod end (right side of the machine)



RAIL13DOZ1288AA 5

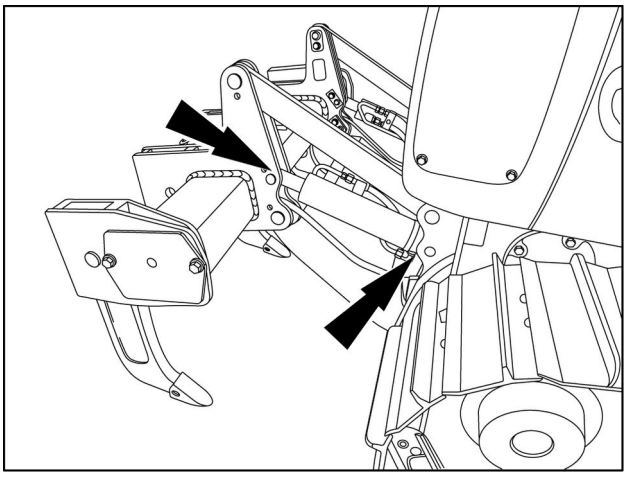
(10) Blade pitch link (both ends)
(11) Blade tilt cylinder rod end



RAIL13DOZ1287AA 6

Ripper (if the machine is so equipped)

Ripper lift cylinders (and tilt pivot points if applicable)



RAIL13DOZ1248AA 7

NOTICE: *In severe conditions, such as immersion in water, it may be necessary to grease more frequently.*

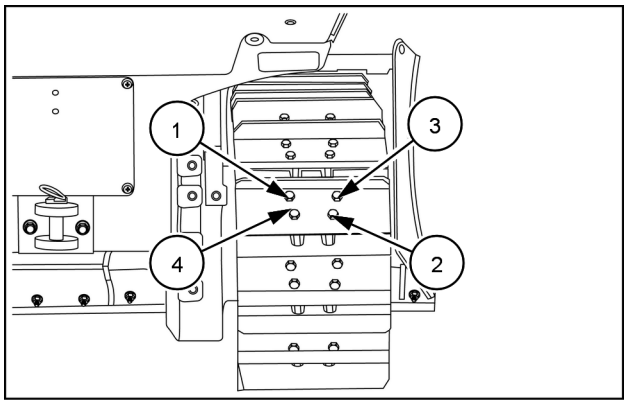
Initial 20 hours

Track shoe bolt torque

Check the torque of the track shoe bolts after the first 20 hours of operation with a new machine or if the shoes have been removed.

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

1. Tighten the bolts in the sequence shown for the standard track shoe.
2. Torque the standard link bolts **340 - 380 N·m** (**251 - 280 lb ft**).
   Torque master link bolts **340 - 380 N·m** (**251 - 280 lb ft**).
   Do not over tighten.



RAPH13DOZ0638AA 1

Every 50 hours

Fuel pre-filter - Drain condensation

⚠ WARNING

Fuel vapors are explosive and flammable.
Do not smoke while handling fuel. Keep fuel away from flames or sparks. Shut off engine and remove key before servicing. Always work in a well-ventilated area. Clean up spilled fuel immediately. Failure to comply could result in death or serious injury.

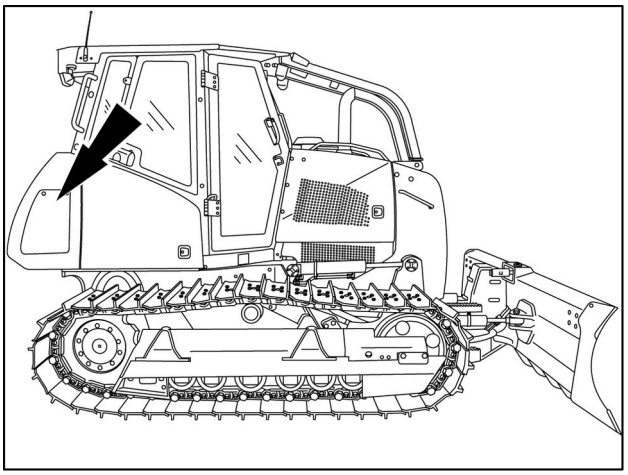
W0904A

Drain water and sediment from the fuel filter every 50 hours and every 50 thereafter or more often if conditions so require or if fuel quality is poor.

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

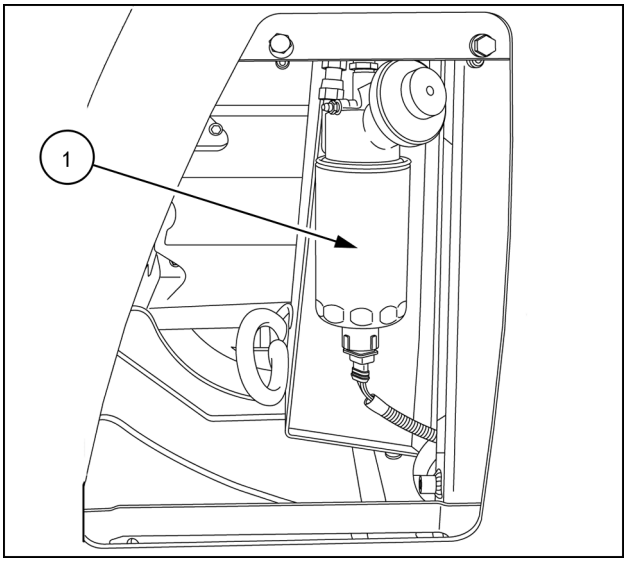
Drain fuel filter condensation

1. Locate the fuel prefilter behind the bolt-on access panel on the right-hand side of the machine.



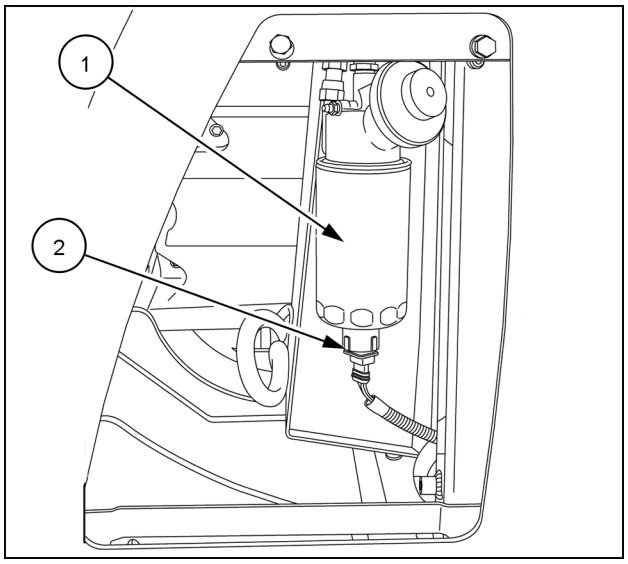
RAIL13DOZ1294AA 1

2. Remove the bolts and panel to access the fuel prefilter **(1)**.



RAIL13DOZ1548AA 2

3. Open the drain valve **(2)**. Turn the drain valve on the bottom of the fuel prefilter **(1)** by turning the valve counterclockwise two or three turns.
4. Drain the water and/or contaminants from the fuel prefilter **(1)** into a suitable container until clean fuel flows. Do not allow fuel to spill on the machine or on the ground.
5. Tighten the drain valve **(2)** only finger tight, turning clockwise.
6. Check for leaks.
7. Replace the access panel, tightening bolts securely.



RAIL13DOZ1548AA 3

Initial 100 hours

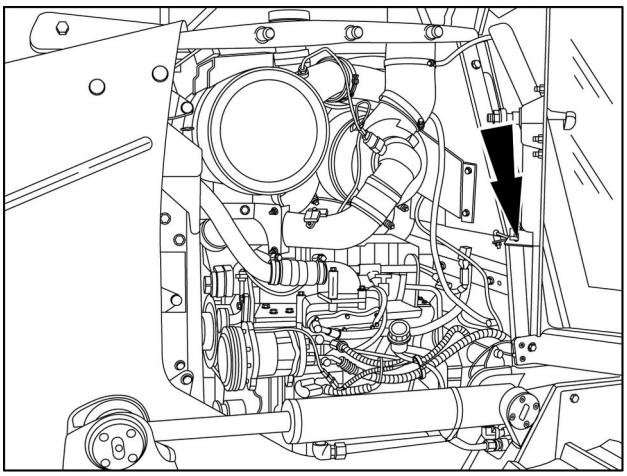
Change engine oil and filter (Initial)

Change the engine oil and filter when the hour meter registers 100 hours for a new machine during the initial run-in period. Change the engine oil and filter every 500 hours thereafter or more frequently when the engine operating conditions are severe.

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

Service specifications	
Type of oil	**CASE AKCELA UNITEK NO. 1™ SBL CJ-4 SAE 10W-40**
Capacity (with filter change)	**12.3 L (13.0 US qt)**

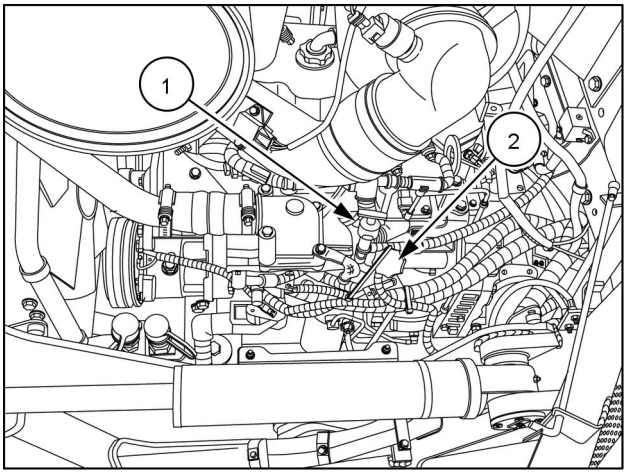
1. Open the left-hand front access door. Secure the access door with the door strut.
2. Remove the lower engine access panel.



RAIL13DOZ1538AA 1

3. Remove the oil dipstick **(1)** and the oil fill cap **(2)**.

NOTE: *Oil drains faster when the oil is warm (but not hot) and the oil dipstick and oil fill cap are removed.*



RAIL13DOZ1537AA 2

NOTE: *If the machine is so equipped, and the special draining equipment is available, use the engine oil environmental drain located in the right side engine access door.*

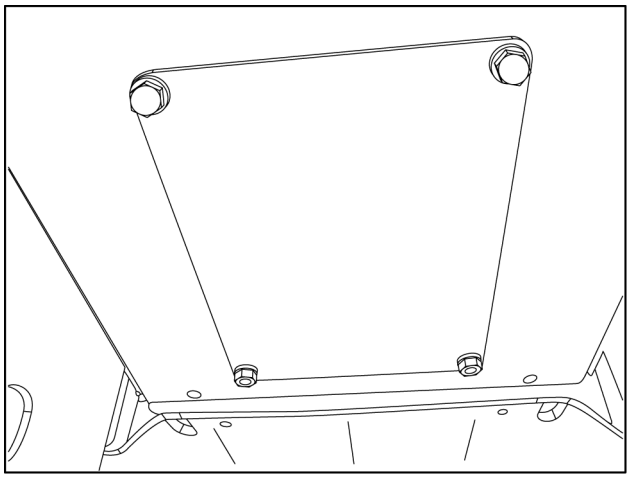
4. **⚠ CAUTION**

   Heavy object!
   The component is heavy. Use care not to drop the component when installing, removing, or handling.
   Failure to comply could result in minor or moderate injury.

   C0095A

   Remove the bolts and the engine access plate under the engine. Locate the oil drain plug.

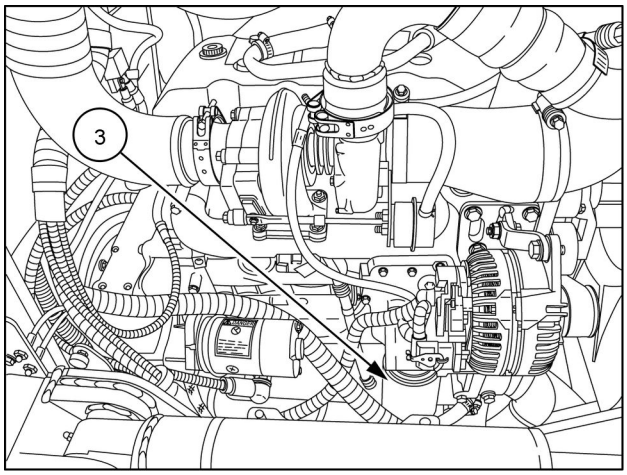
5. Remove the oil drain plug and drain the oil.
6. Use a suitable container to collect the drained oil.



RAIL13DOZ0279AA 3

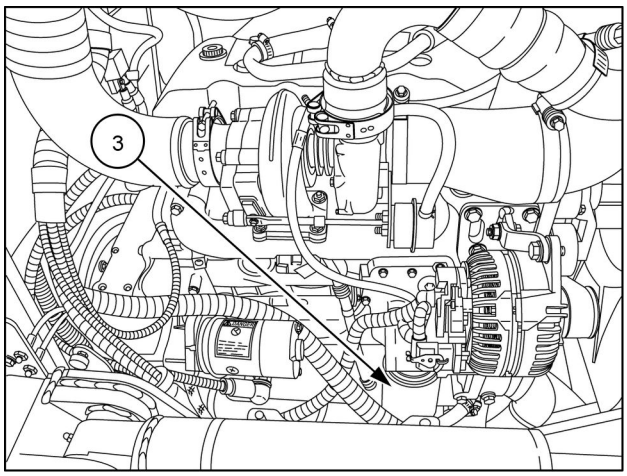
Replace oil filter

7. Locate the oil filter **(3)** in the right front engine compartment. Clean the area around the filter of dirt and debris.



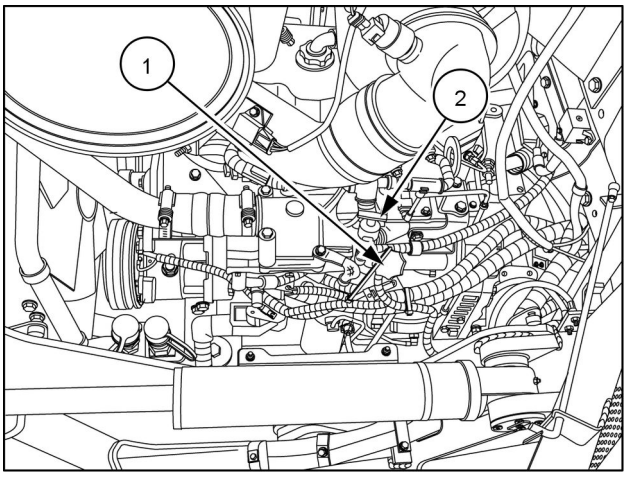
RAIL13DOZ1535AA 4

8. Turn the oil filter **(3)** counterclockwise to remove. Remove and discard the filter following local environmental and waste regulations.
9. Apply a thin layer of clean oil to the new filter gasket.
10. Turn the new oil filter onto the base until the gasket makes contact with the base, and then turn by hand an additional 3/4 turn. Never use a filter wrench to install a new filter.
11. Install the oil drain plug.



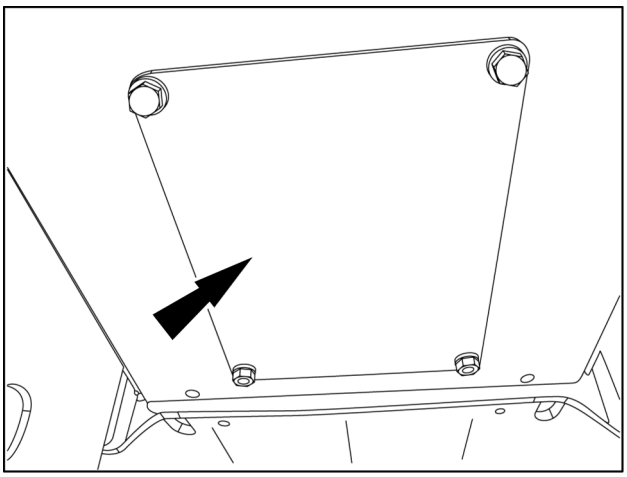
RAIL13DOZ1535AA 5

12. Fill the engine with the proper amount of oil through the fill port **(1)**.
13. Start the engine and run at idle speed. Check the engine oil filter and remote drain for leaks.
14. After **2 min** stop the engine.
15. Wait for the engine oil to drain down for an accurate reading on the dipstick **(2)**.
16. Check the dipstick **(2)**and add additional oil, if necessary.
17. Check for leaks around the filter and drain.



RAIL13DOZ1537AA 6

18. Install the engine oil access panel. Secure the panel with the existing hardware.



RAIL13DOZ0279AA 7

19. Secure the left-hand side lower engine access plate.
20. Close the front access door.

Replace hydraulic oil filters (Initial)

⚠ WARNING

Pressurized hydraulic fluid can penetrate the skin and cause severe injuries.
Hydraulic fluid is under extreme pressure. Rest the bucket or attachment on the ground. Shut the engine off, turn the key on, and move the hydraulic control lever through all movements several times to relieve residual pressure in the system.
Failure to comply could result in death or serious injury.

W0161A

⚠ WARNING

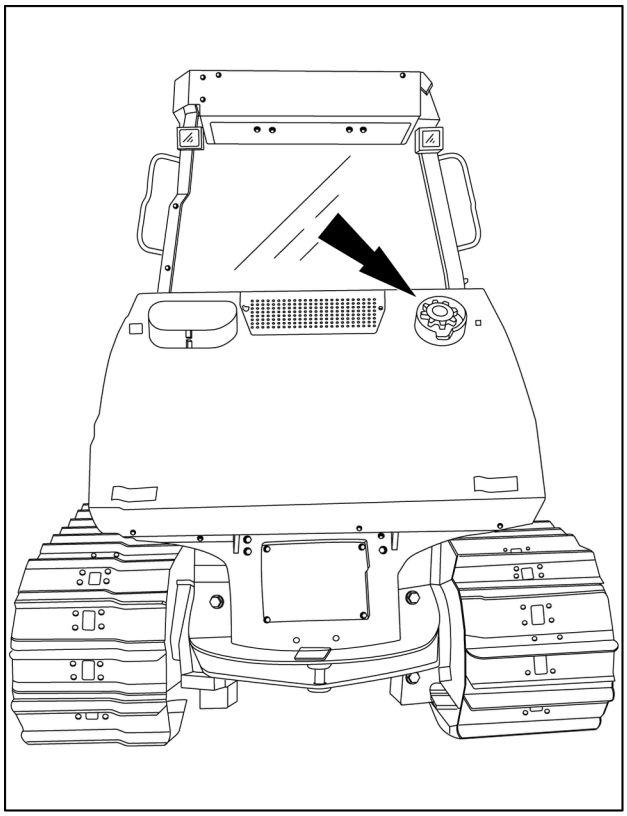
Pressurized fluid can penetrate the skin and cause severe injuries.
Keep hands and body away from any pressurized leak. DO NOT use your hand to check for leaks. Use a piece of cardboard or paper. If fluid penetrates the skin, seek medical attention immediately.
Failure to comply could result in death or serious injury.

W0158A

Replace the hydraulic oil filter when the hour meter registers 100 hours for a new machine during the initial run-in period. The filters should be changed every 2000 hours thereafter or more frequently when operating conditions are severe.

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

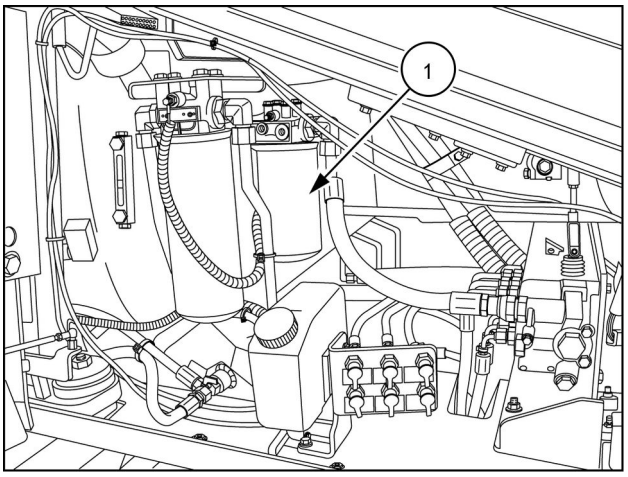
1. Stop the engine. Put a Do Not Operate tag on the key switch.
2. Locate the hydraulic oil fill cap on the rear of the machine.
3. Clean the area around the hydraulic oil fill cap, and slowly loosen the cap to release any remaining pressure.



RAIL13DOZ0848BA 1

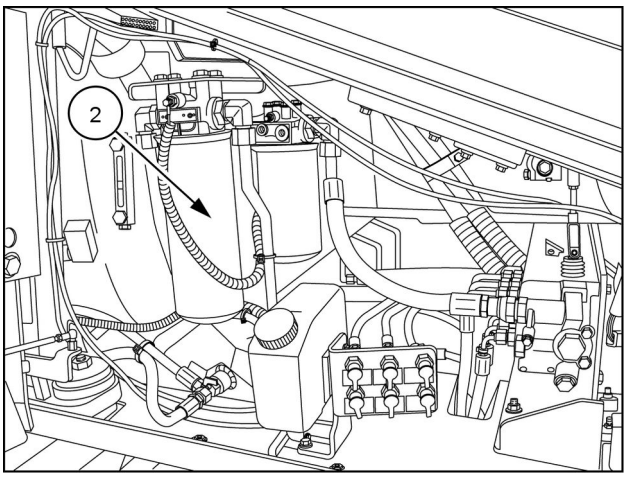
4. Open the right-hand side access door. Secure the access door open with the support rod.

5. Remove the hydraulic oil filter **(1)**. Turn the filter counter clockwise to remove.
6. Clean the contact surface on the filter head. Make sure that all dirt and gasket material has been removed.
7. Apply a thin coat of clean oil to the hydraulic oil gasket and threads.
8. Install and tighten the new filter cartridge firmly to the filter head by hand. Do not use a filter wrench to tighten the filter.



RAIL13DOZ1280AA 2

9. Remove the hydrostatic drive filter **(2)**. Turn the filter counter clockwise to remove.
10. Clean the contact surface on the filter head. Make sure that all dirt and gasket material has been removed.
11. Apply a thin coat of clean oil to the hydrostatic oil gasket and threads.
12. Install and tighten the hydrostatic filter firmly to the filter head by hand. Do not use a filter wrench to tighten the filters.
13. Install the reservoir fill cap.
14. Start the engine and run at **1000 RPM**. Check for leakage around the filters.
15. Operate the controls several times to remove any air in the lines.
16. Place the attachments on the ground and stop the engine.
17. Check the hydraulic oil level.
18. If it is necessary to top off with more oil make certain all pressure is relieved in the system. Remove the fill cap slowly to release pressure in the reservoir, and add **TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30**.
19. Replace all panels and close all access doors securely.



RAIL13DOZ1280AA 3

NOTICE: *Check filters for metal filings or other foreign particles or have oil checked by your authorized dealer through the Systemguard Lubricant Analysis program.*

Fuel filter (Initial)

⚠ WARNING

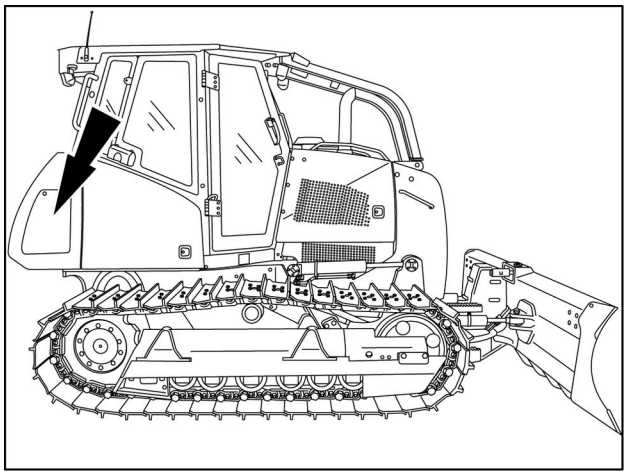
Fire hazard!
When handling diesel fuel, observe the following precautions:
1. Do not smoke.
2. Never fill the tank when the engine is running.
3. Wipe up spilled fuel immediately.
Failure to comply could result in death or serious injury.

W0099A

Change the fuel filter when the hour meter registers 100 hours for a new machine during the initial run-in period. Fuel filters should be changed every 500 hours thereafter or more frequently when operating conditions are severe.

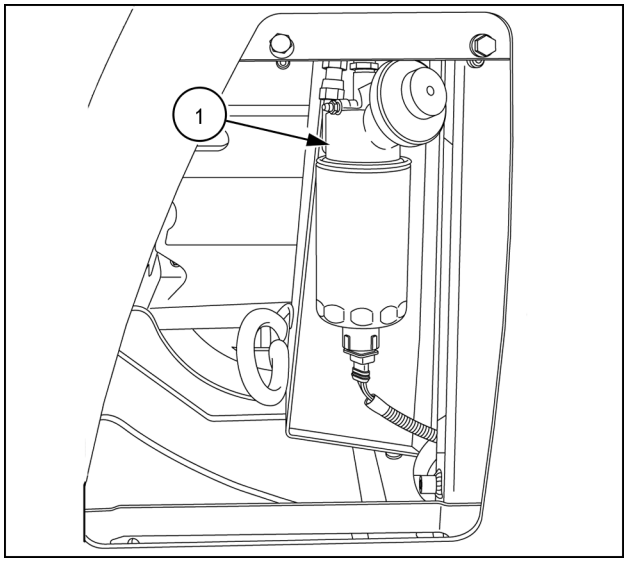
Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

1. Remove the bolts from the rear access panel to service the fuel prefilter.



RAIL13DOZ1294AA 1

2. Close the fuel shut off to prevent fuel leakage.
3. Clean the fuel prefilter head **(1)** and the outside of the prefilter.
4. Remove any dirt and debris around the area that might contaminate the system.
5. Disconnect the wire harness, and turn the fuel prefilter counterclockwise and remove. Capture any fuel remaining in the lines or the fuel prefilter, and discard properly.
6. Apply a thin layer of clean oil to the gasket on the new fuel prefilter.
7. Install the new prefilter. Use your hands to tighten the filter 1/2 to 3/4 turn after the filter makes contact with the prefilter head.
8. Check for leaks.

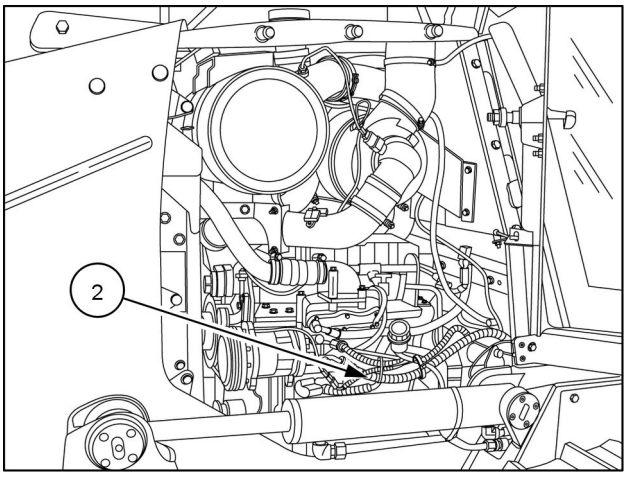


RAIL13DOZ1548AA 2

9. Reconnect the wire harness.

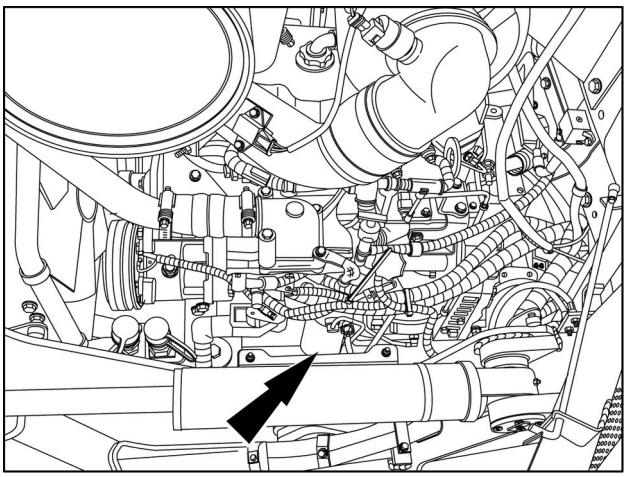
NOTICE: *Never use a filter wrench to tighten a new fuel filter on install.*

10. Locate the fuel filter **(2)** in the left front access compartment.



RAIL13DOZ1538AA 3

11. Clean the fuel filter head, the outside of the fuel filter, and remove any dirt and debris around the area that might contaminate the system.
12. Turn the fuel filter counterclockwise and remove. Capture any fuel remaining in the lines or the fuel filter, and discard properly.
13. Apply a thin layer of clean oil to the gasket on the new fuel filter.
14. Install the filter. Use your hands to tighten the fuel filter 1/2 to 3/4 turn after the fuel filter makes contact with the filter head.
15. Check for leaks.

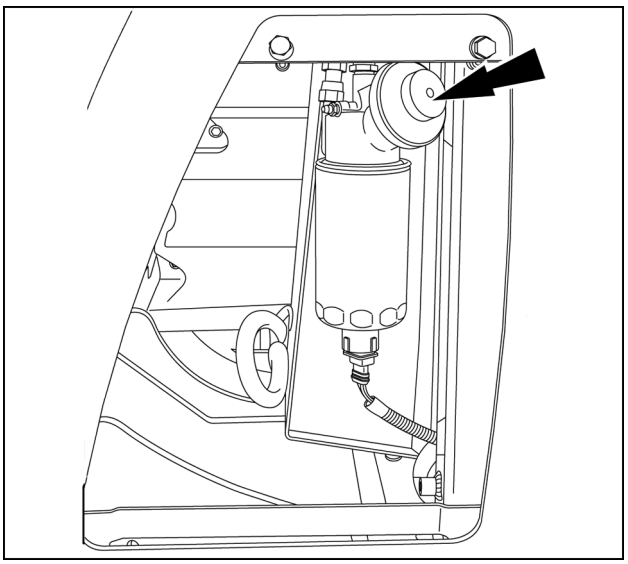


RAIL13DOZ1537AA 4

NOTICE: *Never use a filter wrench to tighten a new fuel filter on install.*

Removing air from the fuel system

1. Remove air from the fuel system after changing the fuel filter. Removing air from the fuel system may also be necessary if the machine runs out of fuel, if the fuel system has been serviced, or if the machine has been in storage.
2. Make certain that the fuel tank shutoff is in the ON position.
3. Loosen the air bleed screw one or two turns.
4. Operate the hand primer until no air bubbles flow from around the air bleed screw.
5. Tighten the air bleed screw.
6. Start the engine, and check for leaks.



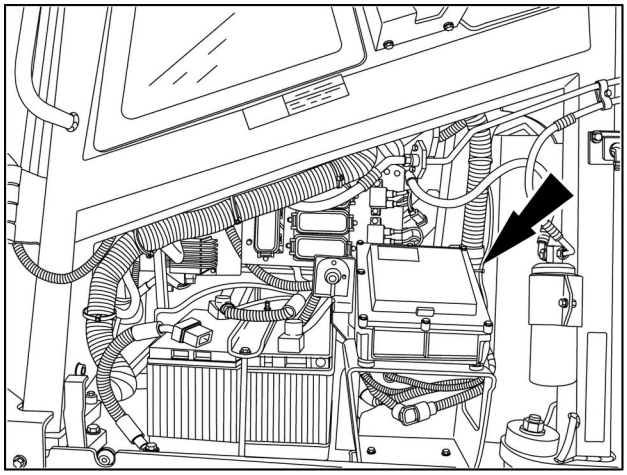
RAIL13DOZ1548AA 5

Clean in-line Diesel Exhaust Fluid (DEF) supply filter (Initial)

Clean the in-line supply filter when the machine is new and the hour meter registers 100 hours. Clean every 1500 hours thereafter or more often if conditions so require. The supply line has a small mesh filter within the line.

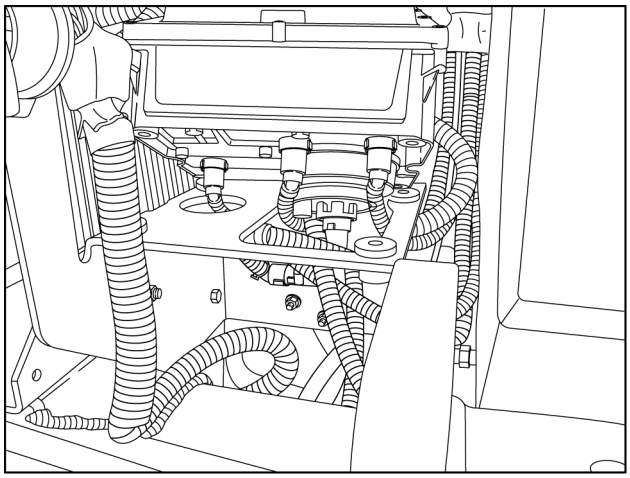
Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance. Turn the electronic disconnect to the OFF position.

1. Open the rear left hand access compartment, and locate the DEF supply module.



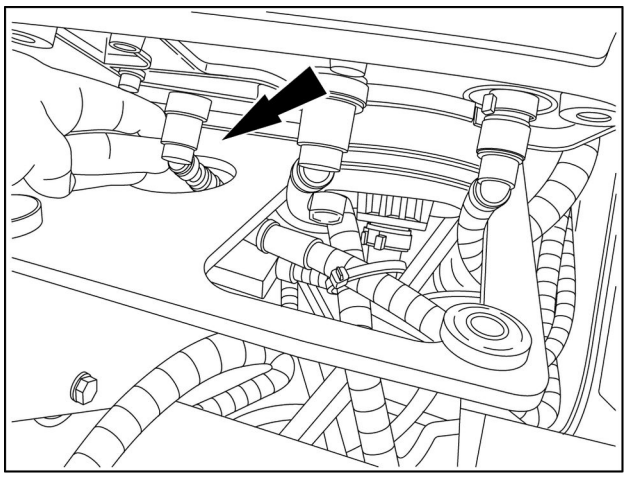
RAIL13DOZ0846AA 1

2. Remove the bolts holding the supply module in place, and tilt the module up.



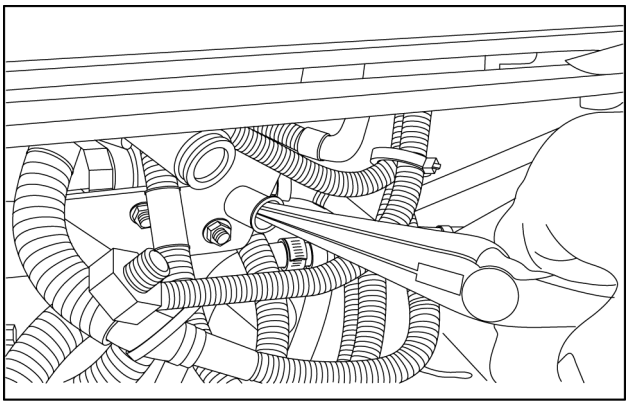
RAIL12DOZ0189AA 2

3. Locate the DEF supply line filter directly below the supply module.
4. Use a suitable container to catch any DEF fluid that is discharged during line and filter disassembly. Clean the area before disassembly.
5. Disconnect the DEF supply line by squeezing the tabs on the connection and separate the lines.



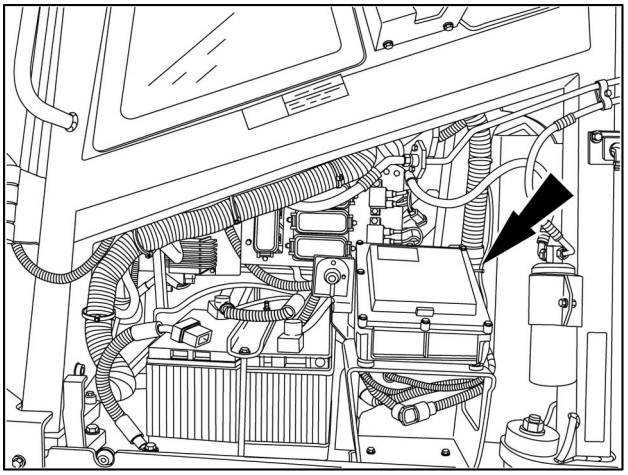
RAIL12DOZ0191AA 3

6. Using needle nose pliers, remove the DEF supply filter using care not to damage or bend the DEF supply filter.
7. Inspect the DEF supply filter housing, and rinse with water. Replace the DEF supply filter if damaged.
8. Reinstall the DEF supply filter into the DEF supply line, and reconnect the DEF supply lines.



RAPH12DOZ0323AA 4

9. Secure the DEF supply module to the mounting bracket.
10. Start the engine and run at idle speed.



RAIL13DOZ0846AA 5

11. Check for leaks around all connections.

Track tension (Initial)

⚠ WARNING

Pressurized fluid can penetrate the skin and cause severe injuries.
The grease in the track tensioning mechanism is under high pressure. Keep face and body away from grease nipple. Never loosen the grease nipple more than one complete turn.
Failure to comply could result in death or serious injury.

W0959A

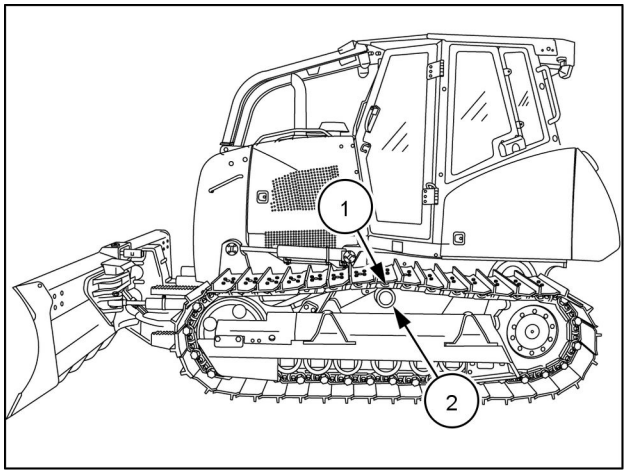
Clean the tracks and undercarriage as required or at the end of the work shift. Park the machine on a level surface to prevent distortion of the track seals. If the temperature is cold, park the machine on a surface that will not freeze to the track shoes.

Check the track tension at 100 hours when the machine is new during the initial run-in period or if the track has been replaced. Check the track tension frequently when you operate. Check the track tension more often when working in extreme conditions. When material packs and collects on the undercarriage parts the tracks may become too tight.

Correct track adjustment will help control undercarriage wear. Maintain correct track tension.

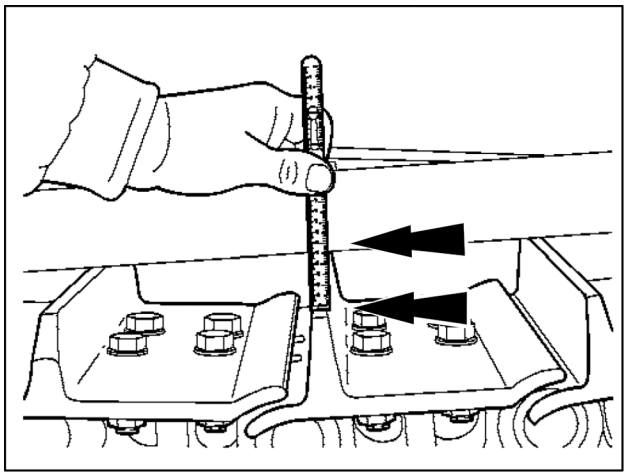
Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

1. In a straight path, move the machine backward the length of the track and then forward the length of the track. This will ensure the bottom of the track is tight. Bring the machine slowly to a stop. Do not use the brakes to stop the machine.
2. Slowly stop the machine so that a pin **(1)** in the track chain is over the carrier roller **(2)**.
3. Park the machine on level ground, in neutral with the parking brake applied.
4. Lower the attachment to the ground.
5. Turn off the engine, and remove the key.



RAIL13DOZ1295AA 1

6. Stand on the tracks between the top roller and the idler wheel.
7. Place a straightedge over the track, and measure the track deflection midway between the top roller and the idler wheel. The correct adjustment is between **44.45 - 57.15 mm** (**1.75 - 2.25 in**).

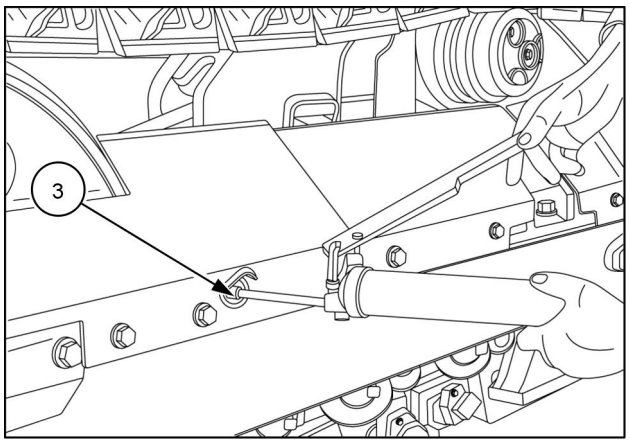


RAIL12DOZ0384AA 2

Increase the track tension

Use the track adjuster grease fitting to adjust track tension. Adding grease will increase and tighten the track deflection.

1. Pump **TUTELA MOLY GREASE GR-75** into the fitting **(3)** until deflection is correct.
2. In a straight path, move the machine backward the length of the track and then forward the length of the track. This will ensure the bottom of the track is tight. Do not use the brakes to stop the machine.
3. Bring the machine slowly to a stop. Do not use the brakes to stop the machine.
4. Check the deflection of the track again and adjust, if necessary.
5. Repeat the procedure for the other track.



RAIL12DOZ0374AA 3

Decrease the track tension

⚠ WARNING

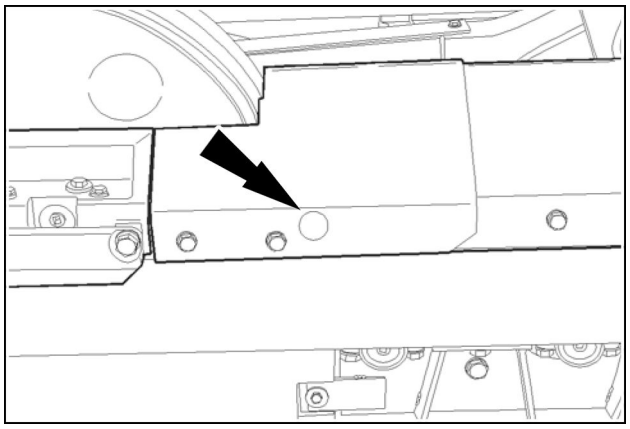
Flying object!
Always wear eye or full face protection when performing this procedure.
Failure to comply could result in death or serious injury.

W0313A

Decrease the track tension with an adjustment to the ball check fitting.

The grease is UNDER EXTREME PRESSURE. Be careful to back the ball check adjustment off SLOWLY. Wear full coverage face protection before proceeding.

1. Use a **3/4 in** deep socket, and loosen the ball check fitting SLOWLY about two turns. DO NOT remove the adapter. Allow the grease to evacuate until the track deflection is within the proper range.
2. When complete, re-torque the ball check to **59.7 - 74.6 N·m** (**44 - 55 lb ft**).
3. In a straight path, move the machine backward the length of the track and then forward the length of the track. This will ensure the bottom of the track is tight. Do not use the brakes to stop the machine.
4. Bring the machine slowly to a stop. Do not use the brakes to stop the machine.
5. Recheck the track tension.
6. Repeat the procedure for the other track.



RCIL10CWL080AAL 4

Final drive oil (initial)

⚠ CAUTION

Burn hazard!
Wait for all components to cool before performing any operation.
Failure to comply could result in minor or moderate injury.

C0053A

⚠ WARNING

Chemical hazard!
When handling fuel, lubricants, and other service chemicals, follow the manufacturer's instructions. Wear Personal Protective Equipment (PPE) as instructed. Do not smoke or use open flame. Collect fluids in proper containers. Obey all local and environmental regulations when disposing of chemicals.
Failure to comply could result in death or serious injury.

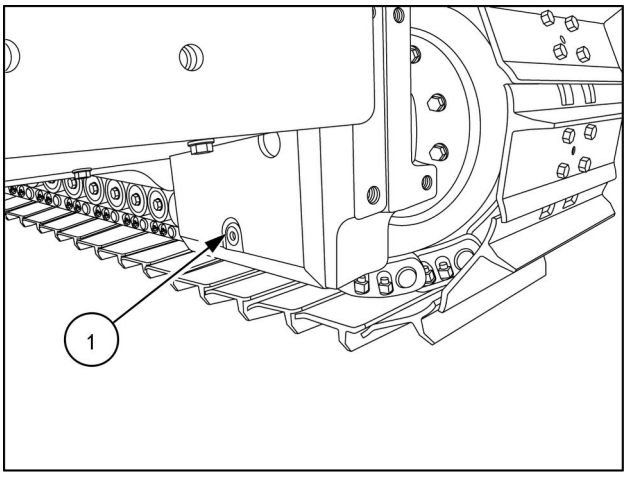
W0371A

Change the oil in the final drive and the planetary drive when the hour meter registers 100 hours when the machine is new during the initial run-in period. Change the oil every 1000 hours thereafter or more often if conditions so require.

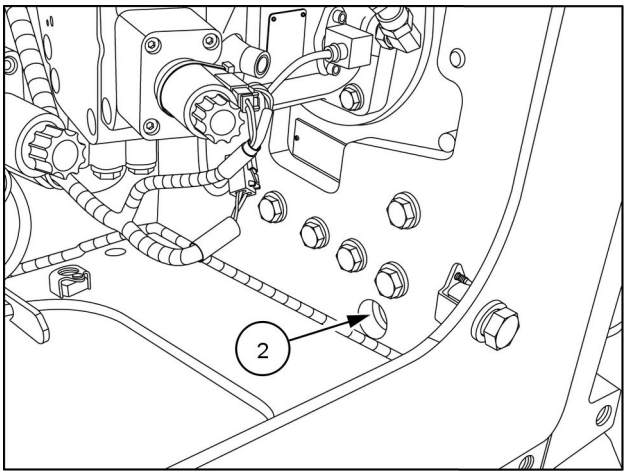
Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance. The machine should be parked to make the drains correctly accessible (see the illustrations).

Service specifications	
Type of oil	**CASE AKCELA HY-TRAN® ULTRACTION**
Capacity (each side)	**14.2 l** (**15 US qt**)

1. Clean the area around the final drive drain plug **(1)** and the area around the check plug **(2)**.

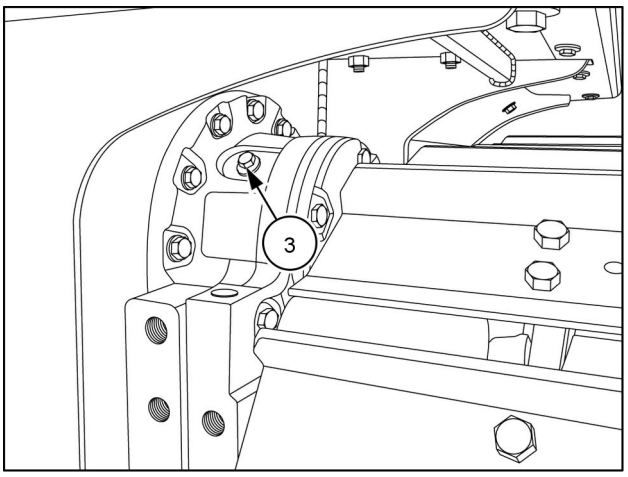


RAIL13DOZ1212AA 1



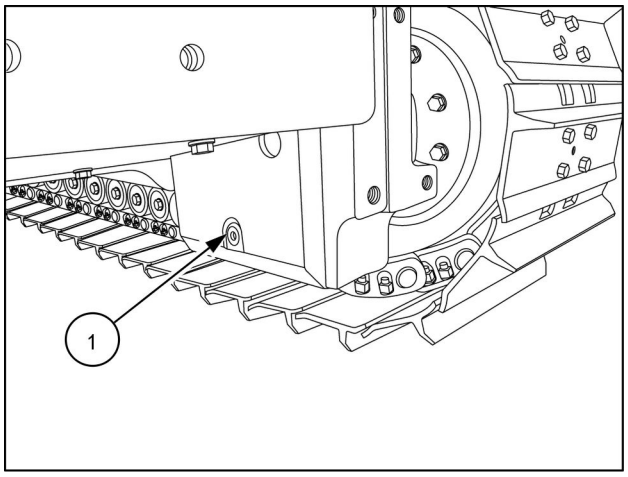
RAIL13DOZ1198AA 2

2. Clean the area around the fill plug **(3)**, then remove the fill plug **(3)**.



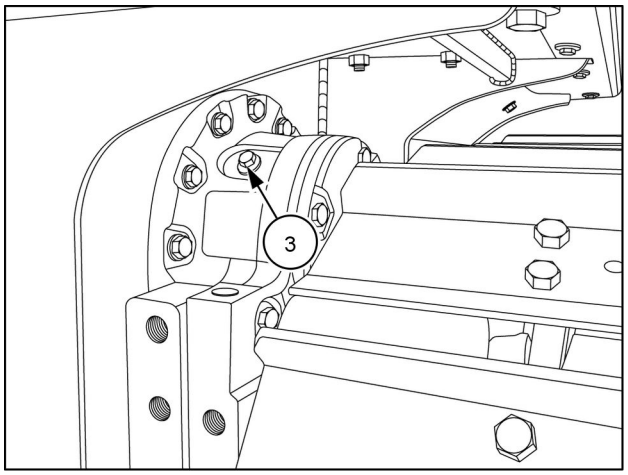
RAIL13DOZ1196AA 3

3. Have a suitable container ready. Slowly remove the final drive drain plug **(1)** and allow the oil to drain into the suitable container.
4. After the oil has drained completely, install the final drive drain plug **(1)**.
5. Check the drained oil for foreign objects, metal shavings, etc.



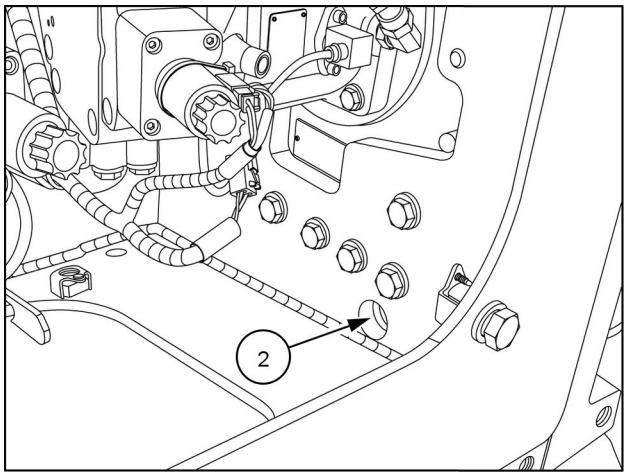
RAIL13DOZ1212AA 4

6. Fill with the specified amount of oil through the fill plug **(3)**.



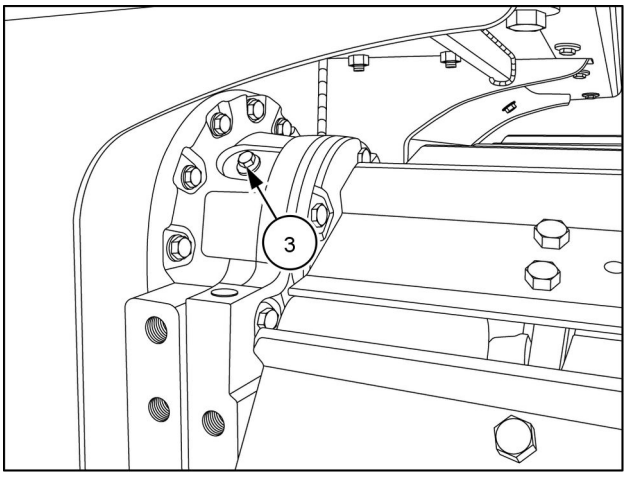
RAIL13DOZ1196AA 5

7. Remove the check plug **(2)** to check the oil level. Oil may begin to seep through the check plug **(2)** when the final drive is completely full.

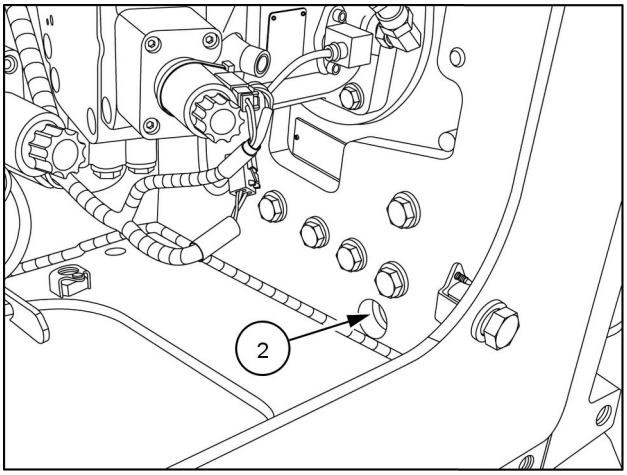


RAIL13DOZ1198AA 6

8. Install the fill plug **(3)** and the check plug **(2)**. Repeat this process on the final drive on the other side of the machine.



RAIL13DOZ1196AA 7



RAIL13DOZ1198AA 8

Every 500 hours

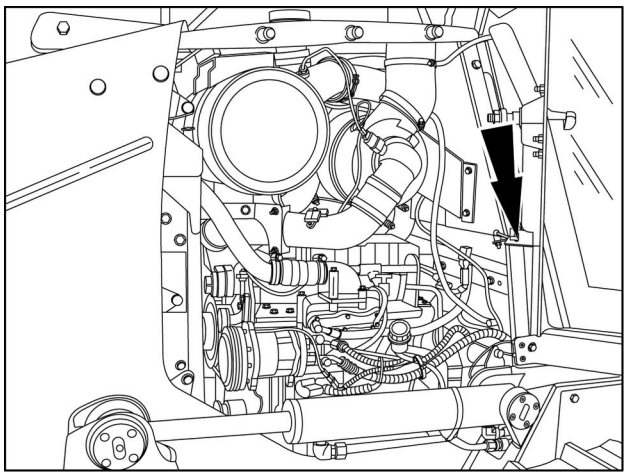
Change engine oil and filter

Change the engine oil and filter when the hour meter registers 500 hours. Change the engine oil and filter every 500 hours thereafter or more frequently when the engine operating conditions are severe.

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

Service specifications	
Type of oil	**CASE AKCELA UNITEK NO. 1™ SBL CJ-4 SAE 10W-40**
Capacity (with filter change)	**12.3 L** (**13.0 US qt**)

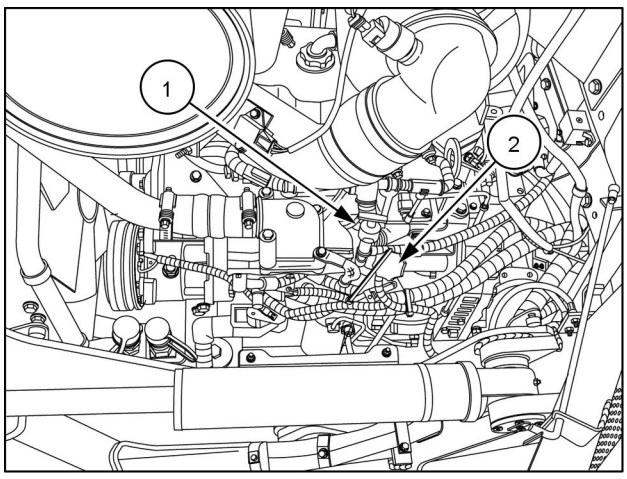
1. Open the left-hand front access door. Secure the access door with the door strut.
2. Remove the lower engine access panel.



RAIL13DOZ1538AA 1

3. Remove the oil dipstick **(1)** and the oil fill cap **(2)**.

NOTE: *Oil drains faster when the oil is warm (but not hot) and the oil dipstick and oil fill cap are removed.*



RAIL13DOZ1537AA 2

NOTE: *If the machine is so equipped, and the special draining equipment is available, use the engine oil environmental drain located in the right side engine access door.*

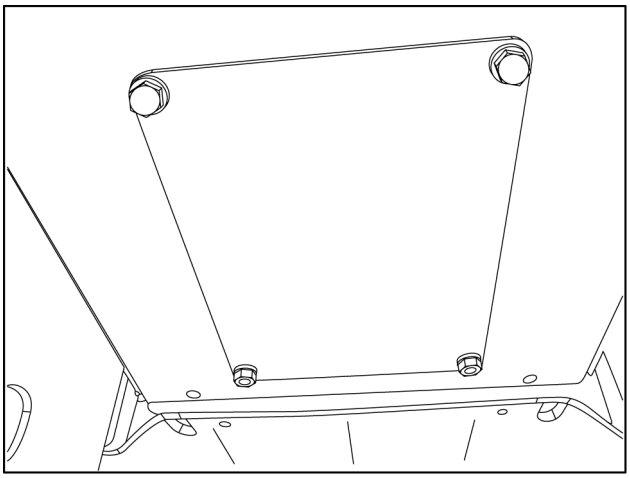
4. **⚠ CAUTION**

   Heavy object!
   The component is heavy. Use care not to drop the component when installing, removing, or handling.
   Failure to comply could result in minor or moderate injury.

   C0095A

   Remove the bolts and the engine access plate under the engine. Locate the oil drain plug.

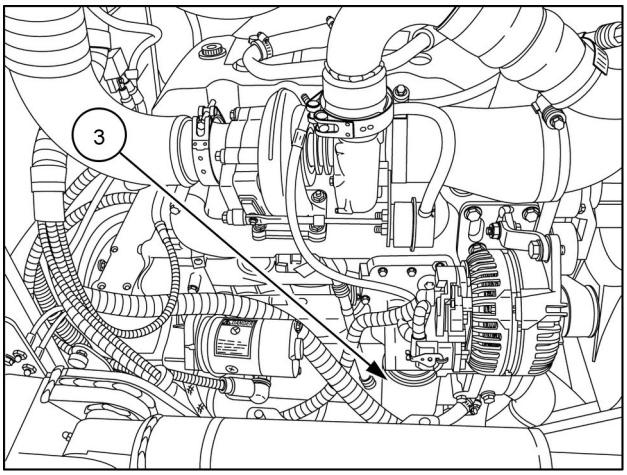
5. Remove the oil drain plug and drain the oil.
6. Use a suitable container to collect the drained oil.



RAIL13DOZ0279AA 3

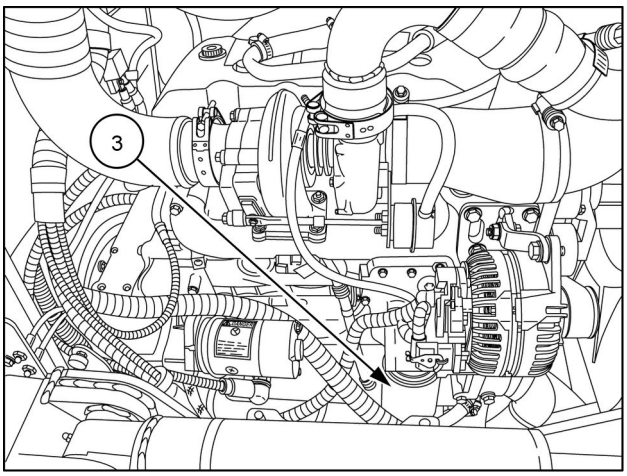
Replace oil filter

7. Locate the oil filter **(3)** in the right front engine compartment. Clean the area around the filter of dirt and debris.



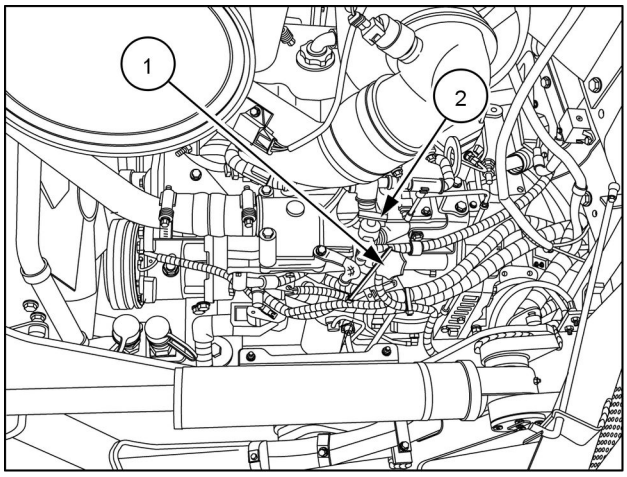
RAIL13DOZ1535AA 4

8. Turn the oil filter **(3)** counterclockwise to remove. Remove and discard the filter following local environmental and waste regulations.
9. Apply a thin layer of clean oil to the new filter gasket.
10. Turn the new oil filter onto the base until the gasket makes contact with the base, and then turn by hand an additional 3/4 turn. Never use a filter wrench to install a new filter.
11. Install the oil drain plug.



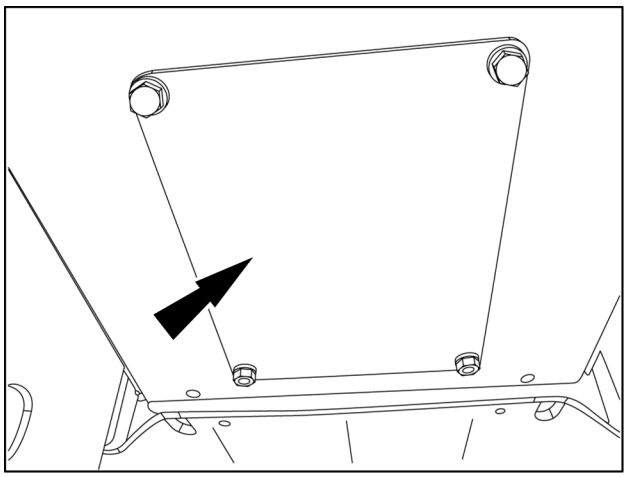
RAIL13DOZ1535AA 5

12. Fill the engine with the proper amount of oil through the fill port **(1)**.
13. Start the engine and run at idle speed. Check the engine oil filter and remote drain for leaks.
14. After **2 min** stop the engine.
15. Wait for the engine oil to drain down for an accurate reading on the dipstick **(2)**.
16. Check the dipstick **(2)** and add additional oil, if necessary.
17. Check for leaks around the filter and drain.



RAIL13DOZ1537AA 6

18. Install the engine oil access panel. Secure the panel with the existing hardware.



RAIL13DOZ0279AA 7

19. Secure the left-hand side lower engine access plate.
20. Close the front access door.

Fuel filters

⚠ WARNING

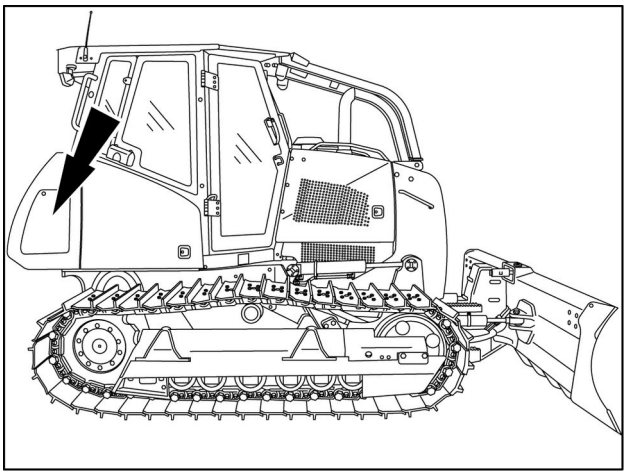
Fire hazard!
When handling diesel fuel, observe the following precautions:
1. Do not smoke.
2. Never fill the tank when the engine is running.
3. Wipe up spilled fuel immediately.
Failure to comply could result in death or serious injury.

W0099A

Replace the pre-fuel filter and the fuel filter when the hour meter registers 500 hours. Fuel filters should be replaced every 500 hours thereafter or more frequently when operating conditions are severe.

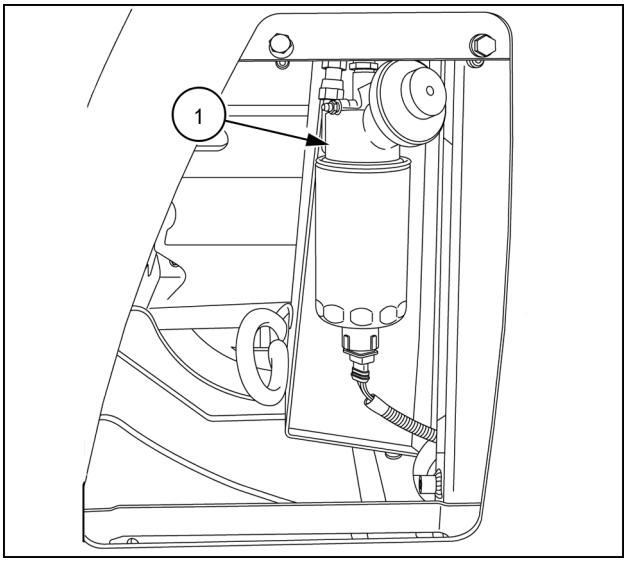
Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

1. Remove the bolts from the rear access panel to service the fuel prefilter.



RAIL13DOZ1294AA 1

2. Close the fuel shut off to prevent fuel leakage.
3. Clean the fuel prefilter head **(1)** and the outside of the prefilter.
4. Remove any dirt and debris around the area that might contaminate the system.
5. Disconnect the wire harness, and turn the fuel prefilter counterclockwise and remove. Capture any fuel remaining in the lines or the fuel prefilter, and discard properly.
6. Apply a thin layer of clean oil to the gasket on the new fuel prefilter.
7. Install the new prefilter. Use your hands to tighten the filter 1/2 to 3/4 turn after the filter makes contact with the prefilter head.
8. Check for leaks.

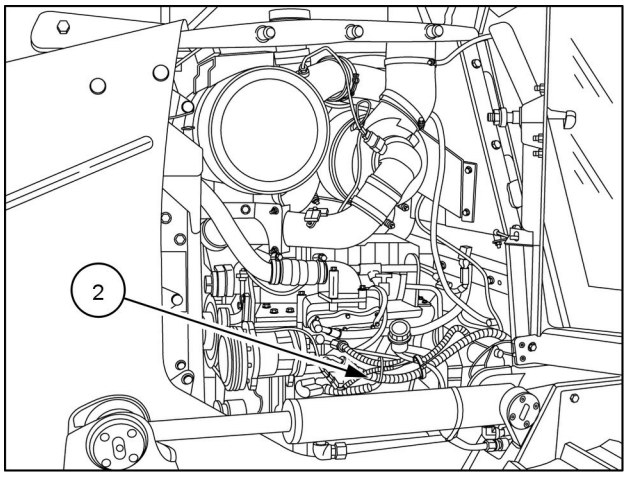


RAIL13DOZ1548AA 2

9. Reconnect the wire harness.

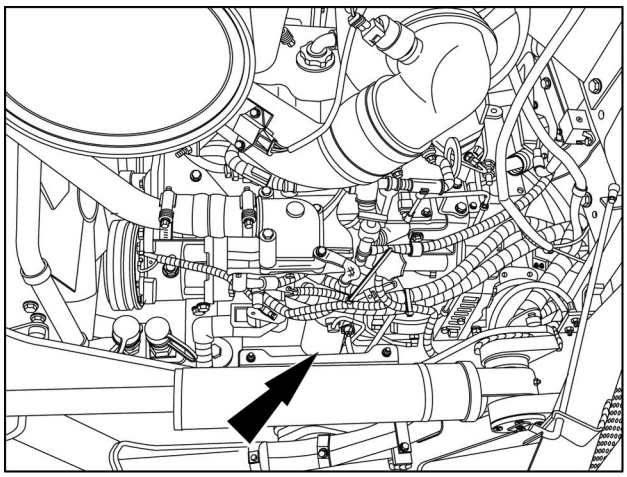
NOTICE: *Never use a filter wrench to tighten a new fuel filter on install.*

10. Locate the fuel filter **(2)** in the left front access compartment.



RAIL13DOZ1538AA 3

11. Clean the fuel filter head, the outside of the fuel filter, and remove any dirt and debris around the area that might contaminate the system.
12. Turn the fuel filter counterclockwise and remove. Capture any fuel remaining in the lines or the fuel filter, and discard properly.
13. Apply a thin layer of clean oil to the gasket on the new fuel filter.
14. Install the filter. Use your hands to tighten the fuel filter 1/2 to 3/4 turn after the fuel filter makes contact with the filter head.
15. Check for leaks.

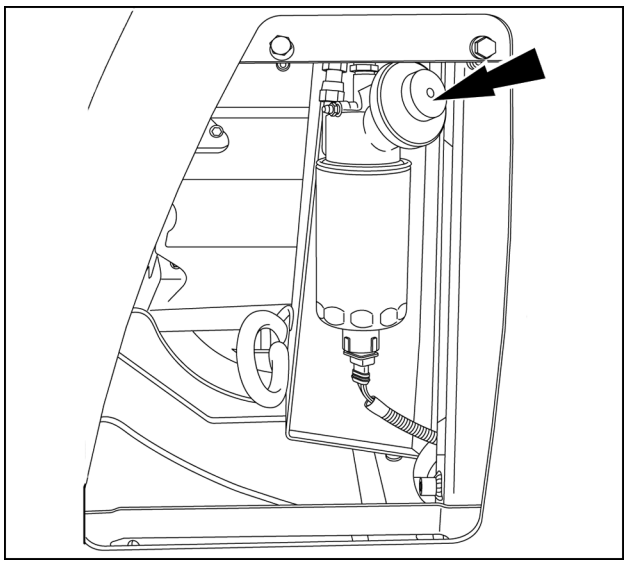


RAIL13DOZ1537AA 4

NOTICE: *Never use a filter wrench to tighten a new fuel filter on install.*

Removing air from the fuel system

1. Remove air from the fuel system after changing the fuel filter. Removing air from the fuel system may also be necessary if the machine runs out of fuel, if the fuel system has been serviced, or if the machine has been in storage.
2. Make certain that the fuel tank shutoff is in the ON position.
3. Loosen the air bleed screw one or two turns.
4. Operate the hand primer until no air bubbles flow from around the air bleed screw.
5. Tighten the air bleed screw.
6. Start the engine, and check for leaks.



RAIL13DOZ1548AA 5

Battery electrolyte level

⚠ WARNING

Hazardous chemicals!
Battery electrolyte contains sulfuric acid. Contact with skin and eyes could result in severe irritation and burns. Always wear splash-proof goggles and protective clothing (gloves and aprons). Wash hands after handling.
Failure to comply could result in death or serious injury.

W0006A

⚠ 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

⚠ WARNING

Chemical hazard!
Battery posts, terminals, and related accessories contain lead and lead compounds. Wash hands after handling.
Failure to comply could result in death or serious injury.

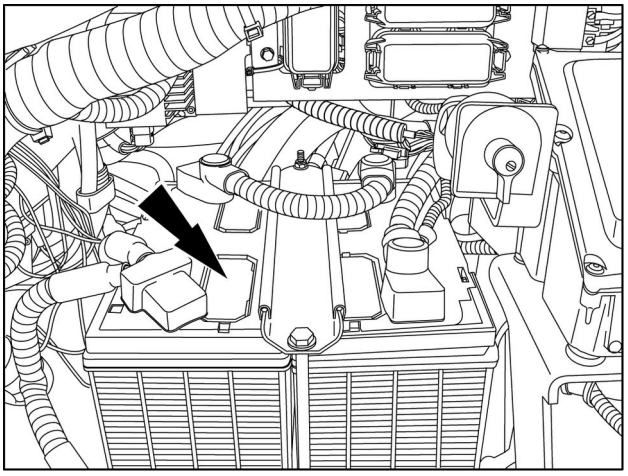
W0349A

Check the battery fluid level every 500 hours of operation or more often if conditions are severe. The battery fluid can decrease with high temperatures.

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance. Turn the master disconnect switch OFF.

Check battery fluid level and specific gravity

1. Wipe the top of the battery or use compressed air to remove dust. Use care when removing caps and do not allow dirt or contaminants to enter the battery cells.
2. Insert a flat blade screwdriver into slots at the top of battery caps. Remove the cell caps, and check the fluid level in each battery cell. The level should be no less than **4.8 mm** (**0.2 in**) from the bottom of the cell.
3. Add distilled water, if necessary, then install the cell caps. Continuous use of the battery with low fluid will lower the battery performance.
4. If the terminals are dirty, wash with warm water. Reinstall the terminals, apply grease or spray rust preventive solution to create good connections. If the terminal is oxidized, polish it with a wire brush or emery paper.



RAIL14DOZ0578AA 1

NOTE: *Measure the specific gravity of battery fluid with a gravimeter. The measured value will vary depending on the ambient temperature.*

Every 1000 hours

Fuel tank cap

⚠ WARNING

Hot liquid under pressure!
Fuel in the high pressure fuel line is still under pressure immediately after you shut down the engine. Before performing any maintenance or inspection, wait for 2 minutes after engine shutdown to allow the pressure to drop.
Failure to comply could result in death or serious injury.

W0249A

⚠ WARNING

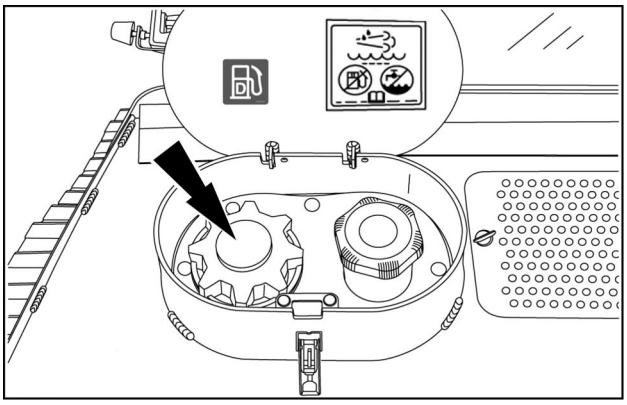
Fuel vapors are explosive and flammable.
Do not smoke while handling fuel. Keep fuel away from flames or sparks. Shut off engine and remove key before servicing. Always work in a well-ventilated area. Clean up spilled fuel immediately.
Failure to comply could result in death or serious injury.

W0904A

Clean the fuel cap breather when the hour meter registers 1000 hours and every 1000 hours thereafter. Clean more frequently, if conditions so require. The cap allows air to be drawn in to create pressure in the fuel tank. Air displaces the used fuel.

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

1. Remove the fuel cap slowly. The fuel cap is located at the rear of the machine.
2. Clean the cap, and dry with compressed air.
3. Reinstall cap, tightening firmly in place.



RAPH13DOZ1541AA 1

NOTICE: *Always replace fuel cap with an genuine authorized fuel cap if replacement is necessary. An approved, factory fuel cap replacement is necessary for correct fuel tank pressure.*

Fuel tank sediment

⚠ WARNING

Hot liquid under pressure!
Fuel in the high pressure fuel line is still under pressure immediately after you shut down the engine. Before performing any maintenance or inspection, wait for 2 minutes after engine shutdown to allow the pressure to drop.
Failure to comply could result in death or serious injury.

W0249A

⚠ WARNING

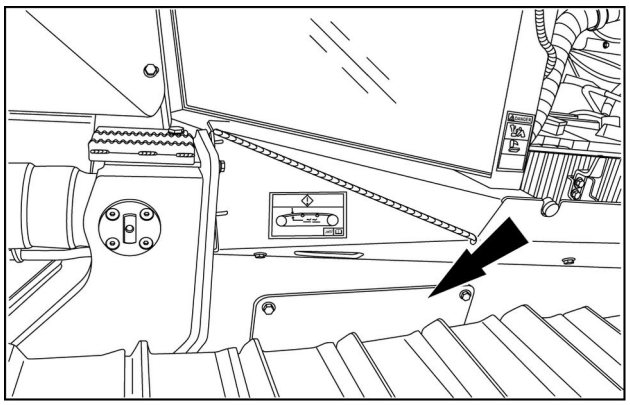
Chemical hazard!
When handling fuel, lubricants, and other service chemicals, follow the manufacturer's instructions. Wear Personal Protective Equipment (PPE) as instructed. Do not smoke or use open flame. Collect fluids in proper containers. Obey all local and environmental regulations when disposing of chemicals.
Failure to comply could result in death or serious injury.

W0371A

Drain condensation from the fuel tank when the hour meter registers 1000 hours of operation and every 1000 hours thereafter. Drain more frequently if conditions so require. The fuel tank drain is located on the left side of the machine.

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

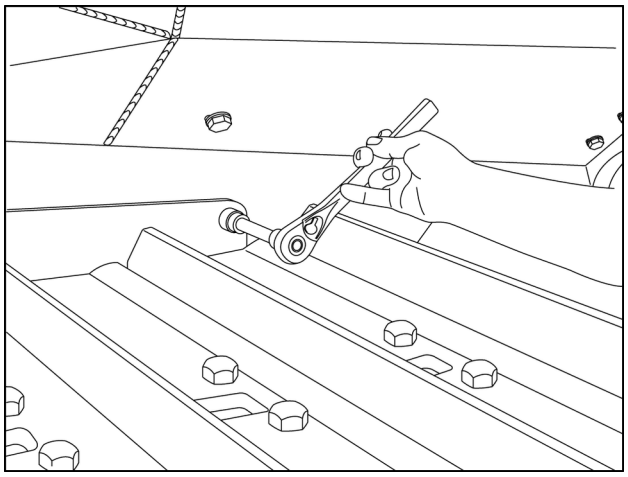
Machines with the environmental drain option include a fuel tank drain hose. Locate the fuel tank drain hose behind a bolt-on service panel on the left-hand side of the machine.



RAPH12DOZ0042AA 1

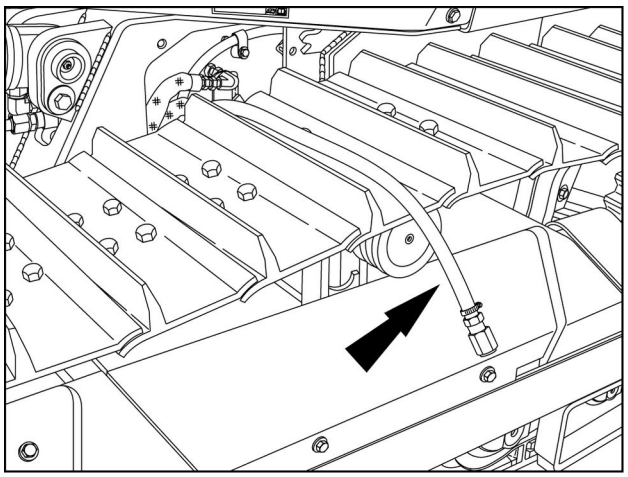
NOTE: *On machines without the environmental drain option, connect a drain hose to the fuel tank drain valve. Access the drain valve through the right rear access panel. You can also access the drain valve through the cab floor. Remove the cab floor access panel and tilt the back of the operator's seat to access the drain valve.*

1. Remove the bolts and remove the service panel.



RAIL12DOZ0410AA 2

2. Pull the drain hose forward. Remove the fitting.

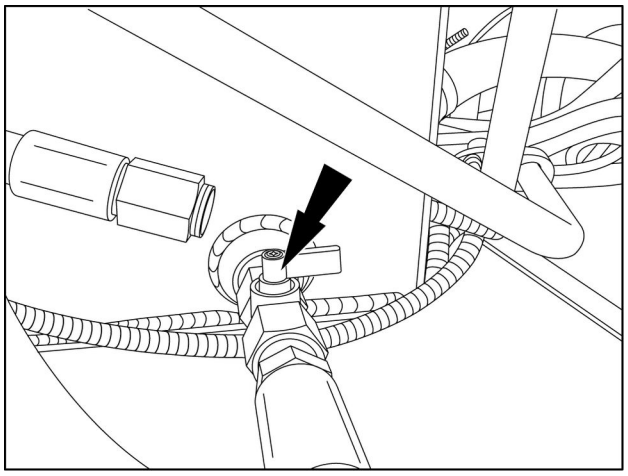


RAIL13DOZ1207AA 3

3. Have a suitable container ready to collect the condensation and the fuel. Open the drain valve on the fuel tank.

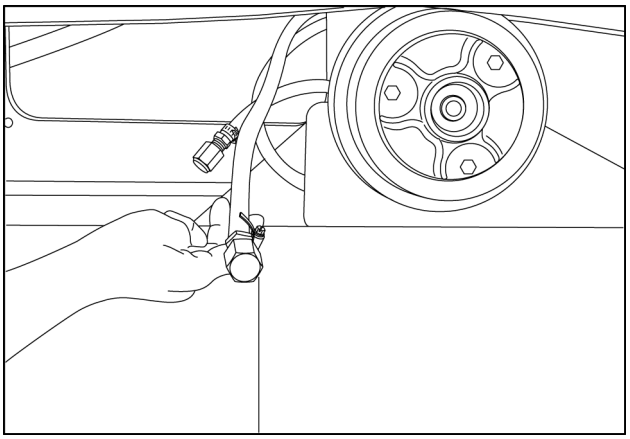
NOTE: *Access the fuel tank shut off valve through the right rear access panel. You can also access the fuel tank shut off valve through the cab floor. Remove the cab floor access panel and tilt the back of the operator's seat to access the fuel tank shut off valve.*

4. Turn the fuel shut off valve to the closed position.
5. Only after clean fuel discharges, replace the fitting on the hose.



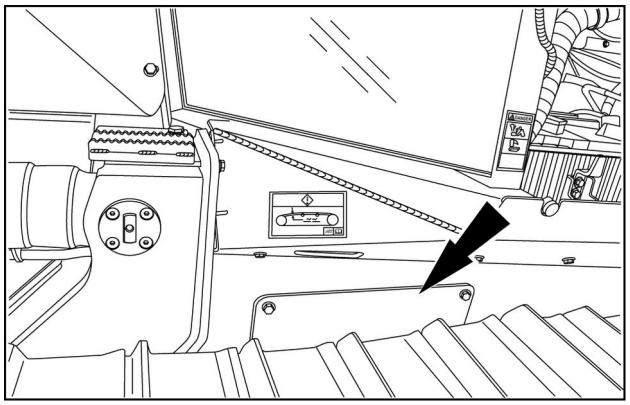
RAIL14DOZ0530BA 4

6. Return the hose within the panel. If necessary, wire tie the hose.
7. Inspect for leaks.



RAIL12DOZ0412AA 5

8. Install service panel with the bolts.



RAPH12DOZ0042AA 6

Hydraulic reservoir breather

⚠ WARNING

Pressurized hydraulic fluid can penetrate the skin and cause severe injuries.
Hydraulic fluid is under extreme pressure. Rest the bucket or attachment on the ground. Shut the engine off, turn the key on, and move the hydraulic control lever through all movements several times to relieve residual pressure in the system.
Failure to comply could result in death or serious injury.

W0161A

⚠ WARNING

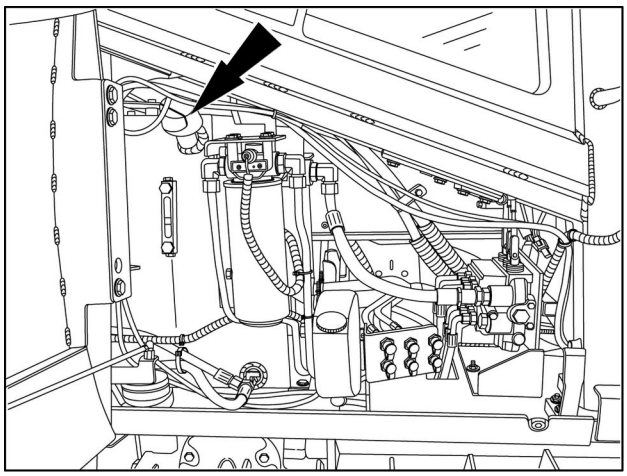
Pressurized fluid can penetrate the skin and cause severe injuries.
Keep hands and body away from any pressurized leak. DO NOT use your hand to check for leaks. Use a piece of cardboard or paper. If fluid penetrates the skin, seek medical attention immediately.
Failure to comply could result in death or serious injury.

W0158A

Replace the hydraulic reservoir breather when the hour meter registers 1000 hours. The hydraulic reservoir breather should be replaced every 1000 hours thereafter or more frequently when operating conditions are severe.

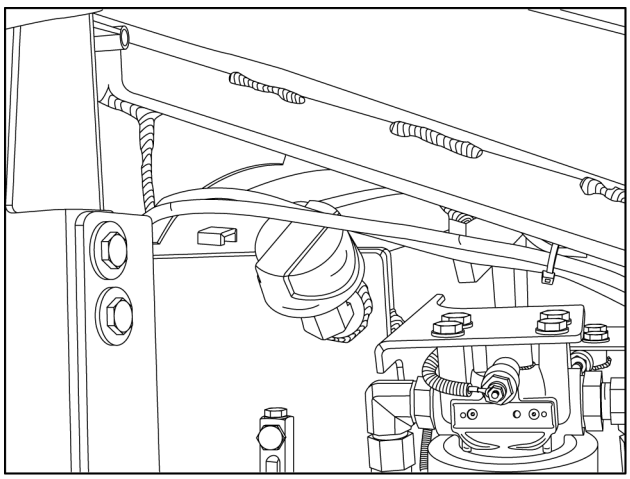
Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

1. Locate the hydraulic reservoir breather in the right rear access compartment.



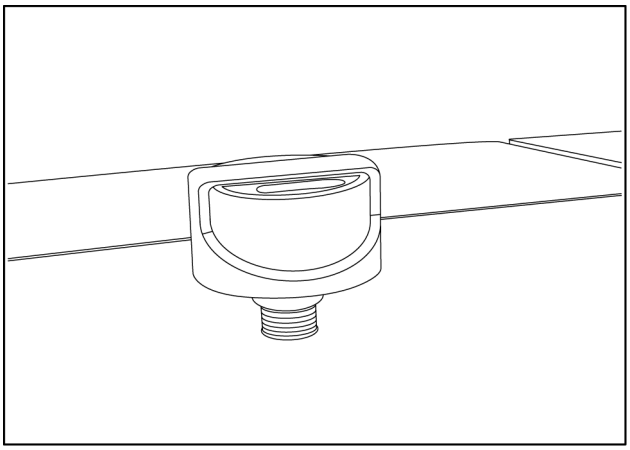
RAIL13DOZ1279AA 1

2. Clean the area around the breather.



RAIL13DOZ0280AA 2

3. Turn the breather counterclockwise, and remove the breather.
4. Replace with a new breather.
5. Close and secure the access door.



RAIL12DOZ0373AA 3

Final drive oil

⚠ CAUTION

Burn hazard!
Wait for all components to cool before performing any operation.
Failure to comply could result in minor or moderate injury.

C0053A

⚠ WARNING

Chemical hazard!
When handling fuel, lubricants, and other service chemicals, follow the manufacturer's instructions. Wear Personal Protective Equipment (PPE) as instructed. Do not smoke or use open flame. Collect fluids in proper containers. Obey all local and environmental regulations when disposing of chemicals.
Failure to comply could result in death or serious injury.

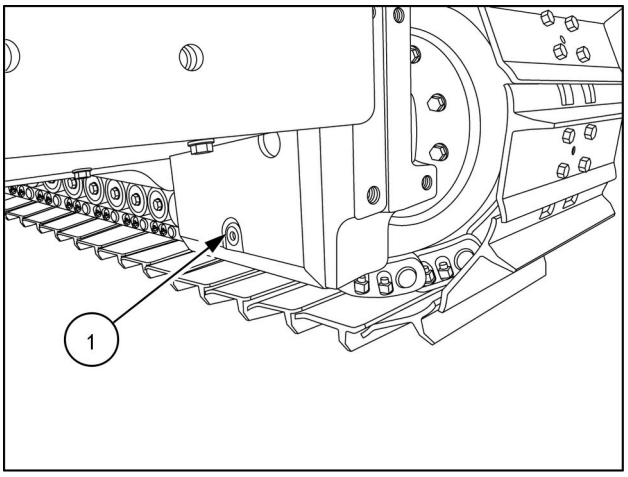
W0371A

Change the oil in the final drive and the planetary drive when the hour meter registers 1000 hours of operation. Change the oil every 1000 hours thereafter or more often if conditions so require.

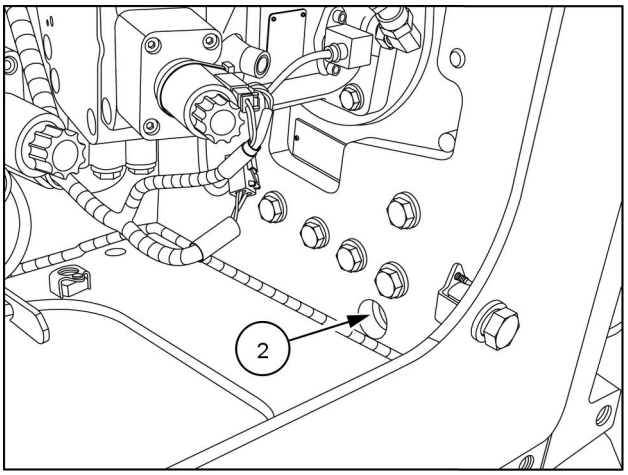
Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance. The machine should be parked to make the drains correctly accessible (see the illustrations).

Service specifications	
Type of oil	**CASE AKCELA HY-TRAN® ULTRACTION**
Capacity (each side)	**14.2 l** (**15 US qt**)

1. Clean the area around the final drive drain plug **(1)** and the area around the check plug **(2)**.

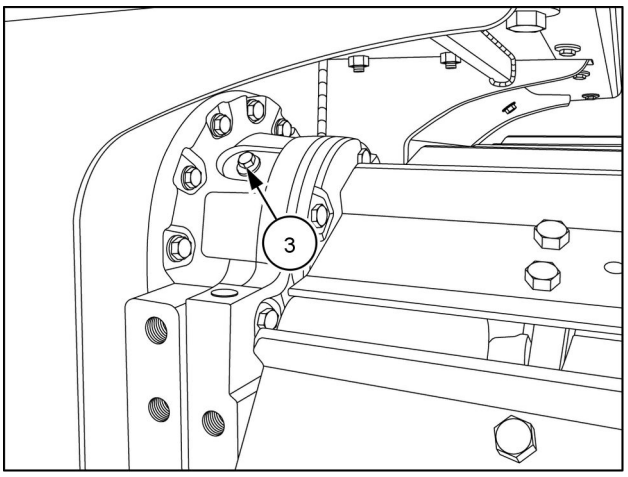


RAIL13DOZ1212AA 1



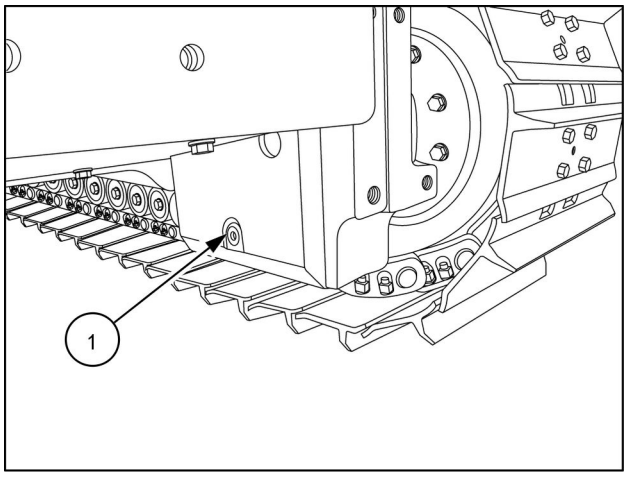
RAIL13DOZ1198AA 2

2. Clean the area around the fill plug **(3)**, then remove the fill plug **(3)**.



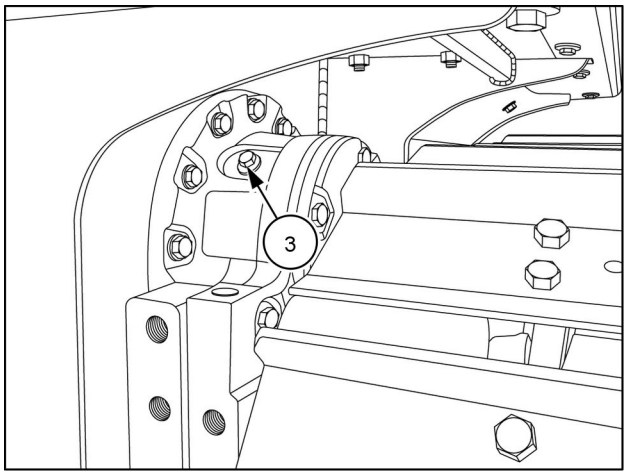
RAIL13DOZ1196AA 3

3. Have a suitable container ready. Slowly remove the final drive drain plug **(1)** and allow the oil to drain into the suitable container.
4. After the oil has drained completely, install the final drive drain plug **(1)**.
5. Check the drained oil for foreign objects, metal shavings, etc.



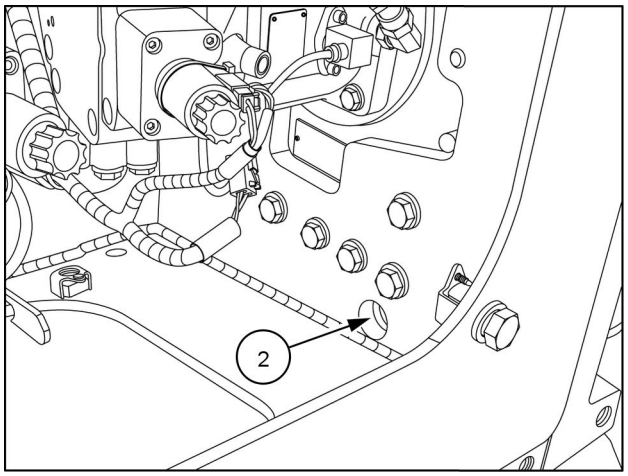
RAIL13DOZ1212AA 4

6. Fill with the specified amount of oil through the fill plug **(3)**.



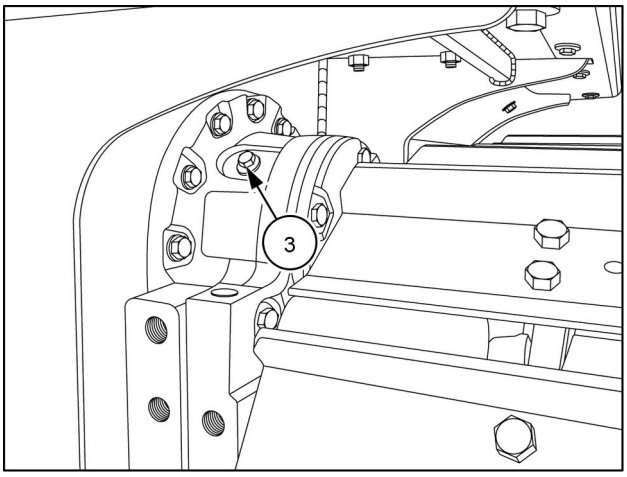
RAIL13DOZ1196AA 5

7. Remove the check plug **(2)** to check the oil level. Oil may begin to seep through the check plug **(2)** when the final drive is completely full.

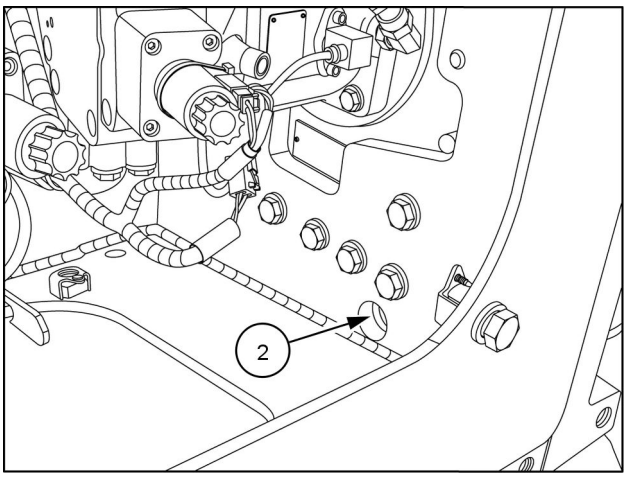


RAIL13DOZ1198AA 6

8. Install the fill plug **(3)** and the check plug **(2)**. Repeat this process on the final drive on the other side of the machine.



RAIL13DOZ1196AA 7



RAIL13DOZ1198AA 8

Drive shaft slip spline

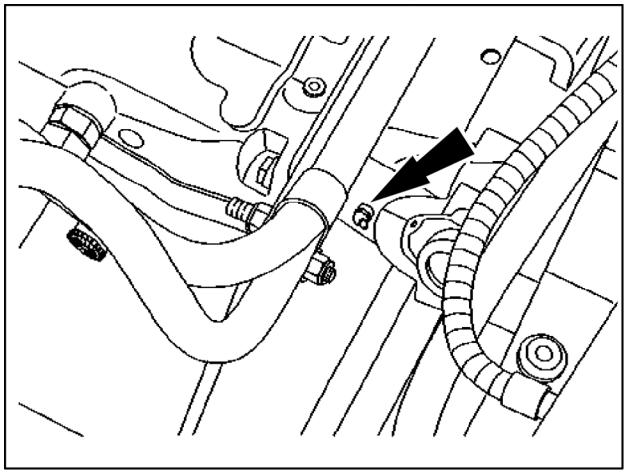
Grease the drive shaft slip spline every 1000 hours of operation. Remove the cab floor to access this component.

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

Specification	**TUTELA MOLY GREASE GR-75**

Apply grease at drive shaft slip spline fitting.

NOTE: *Universal joints do not require lubrication.*



RAIL12DOZ1030AA 1

Every 1500 hours

Drive belt

⚠ WARNING

Entanglement hazard!
Always stop the engine and engage the parking brake, unless otherwise instructed in this manual, before checking and/or adjusting any drive belt or chain.
Failure to comply could result in death or serious injury.

W0097A

⚠ WARNING

Moving parts!
Install all covers, panels, and guards after servicing or cleaning the machine. Never operate the machine with covers, panels, or guards removed.
Failure to comply could result in death or serious injury.

W0135A

Replace the drive belt when the hour meter registers 1500 hours. Check the belt visually each day at the daily walk around for correct tension, wear, and damage. Wrong belt tension may cause battery charge failure, engine overheating, or drive belt wear.

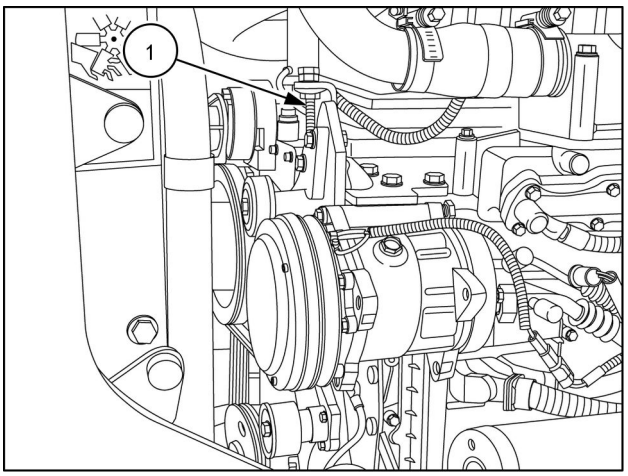
Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

Maintenance specifications	
Visual check	Every 10 hours or every day
Replace belts	Every 1500 hours

NOTICE: *If the engine runs with the drive belt loose, the drive belt can slip and cause the engine to overheat or the battery to receive insufficient charge or an ineffective air conditioning system.*

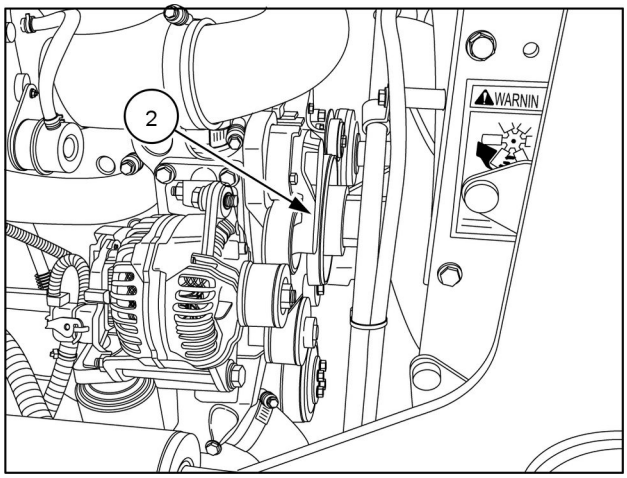
Replacing the drive belt

1. Turn the master disconnect OFF.
2. Locate the drive belts on the front of the engine.
3. Locate the air conditioning compressor drive belt tensioner **(1)** inside the left front engine access door.
4. Loosen the tensioner and remove the air conditioning belt from the air conditioning compressor.



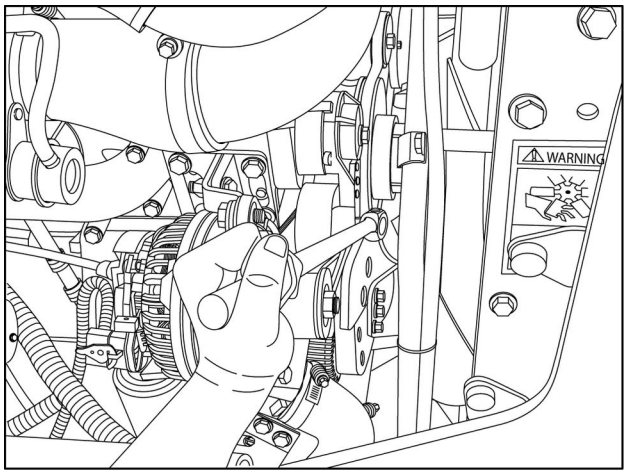
RAIL13DOZ1545AA 1

5. Locate the serpentine drive belt tensioner **(2)** inside the right front engine access door.



RAIL13DOZ1543AA 2

6. Insert the tool and pull up on the tensioner. Loosen the belt tension just enough to remove the drive belt from the pulleys. Work the belt up over and around the fan for final removal.



RAIL13DOZ1544AA 3

7. To install the new belt, fit the belt over and around the fan, the ,water pump, idler and crankshaft pulleys. Turn the pulleys while lifting the tensioner as necessary to install the belt.
8. Check the belt for proper tension.
9. Reinstall the air conditioning compressor drive belt and adjust tension.
10. Check the belt for proper tension.

Serpentine belt tension

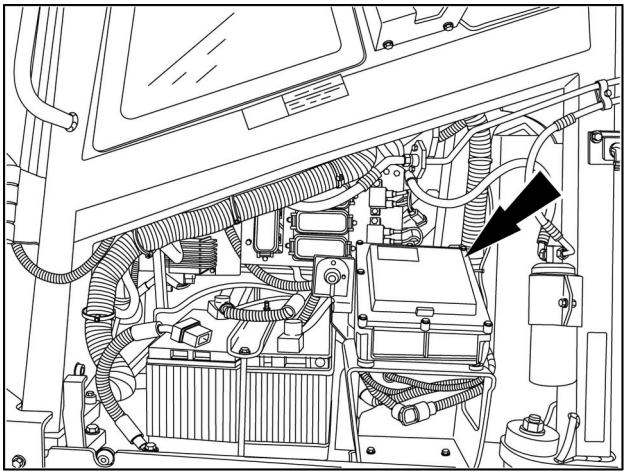
The correct tension for a new drive belt is:
623 - 712 N·m (**459.5 - 525.1 lb ft**).
Tension for a used drive belt is:
400 - 534 N·m (**295.0 - 393.9 lb ft**) tension.

Clean in-line Diesel Exhaust Fluid (DEF) supply filter

Clean the in-line supply filter when the machine hour meter registers 1500 hours and every 1500 hours thereafter or more often if conditions so require. The supply line has a small mesh filter within the line.

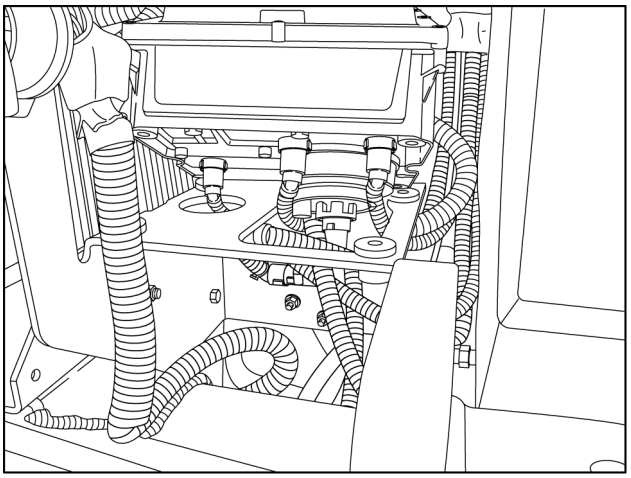
Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

1. Open the rear left hand access compartment, and locate the DEF supply module.



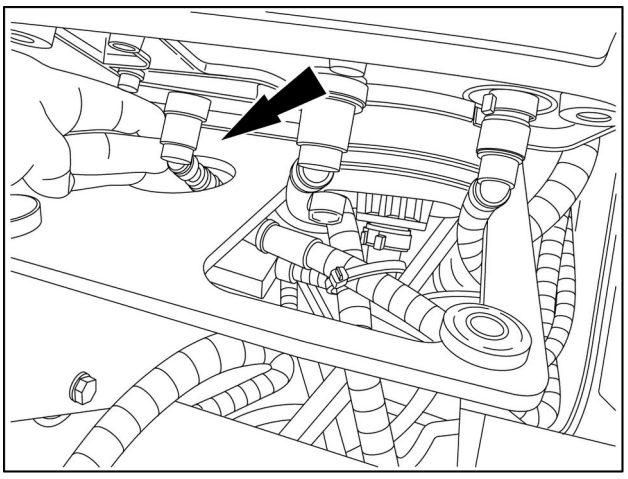
RAIL13DOZ0846AA 1

2. Remove the bolts holding the supply module in place, and tilt the module up.



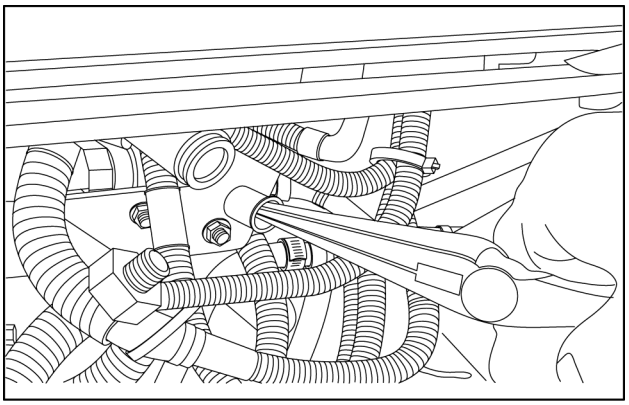
RAIL12DOZ0189AA 2

3. Locate the DEF supply line filter directly below the supply module.
4. Use a suitable container to catch any DEF fluid that is discharged during line and filter disassembly. Clean the area before disassembly.
5. Disconnect the DEF supply line by squeezing the tabs on the connection and separate the lines.



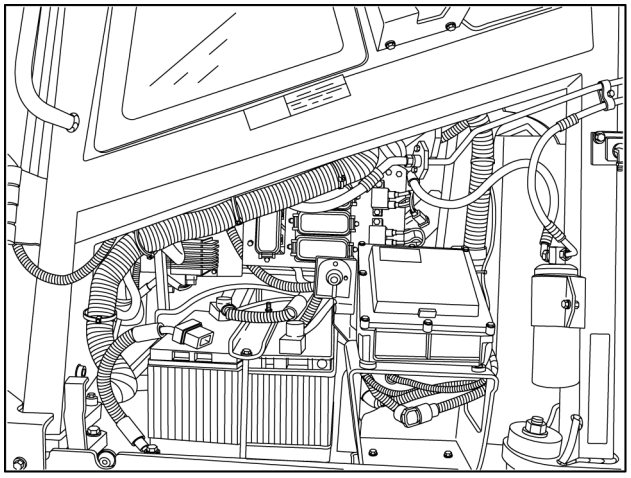
RAIL12DOZ0191AA 3

6. Using needle nose pliers, remove the DEF supply filter using care not to damage or bend the DEF supply filter.
7. Inspect the DEF supply filter housing, and rinse with water. Replace the DEF supply filter if damaged.
8. Reinstall the DEF supply filter into the DEF supply line, and reconnect the DEF supply lines.



RAPH12DOZ0323AA 4

9. Secure the DEF supply module to the mounting bracket.
10. Start the engine and run at idle speed.
11. Check for leaks around all connections.



RAIL13DOZ0846AA 5

Engine breather filter and valve clearance

The crankcase breather filter should be replaced when the hour meter registers 1500 hours. The engine breather filter should be changed every 1500 hours thereafter or more frequently when operating conditions are severe. Check engine valve clearance at 1500 hours and every 1500 hours thereafter. See your authorized dealer for these procedures or refer to the Service Manual for this machine.

Every 2000 hours

Engine coolant

⚠ WARNING

Burn hazard!
Hot coolant can spray and scald if you remove the radiator or deaeration tank cap while the system is hot. To remove the cap: allow the system to cool, turn the cap to the first notch, and wait for all pressure to release. Remove the cap only after all pressure has released.
Failure to comply could result in death or serious injury.

W0367A

⚠ WARNING

Hazardous chemicals!
Coolant can be toxic. Avoid contact with skin, eyes, and clothing. Antidotes:
EXTERNAL - Rinse thoroughly with water. Remove soiled clothing.
INTERNAL - Rinse the mouth with water. DO NOT induce vomiting. Seek immediate medical attention.
EYES - Flush with water. Seek immediate medical attention.
Failure to comply could result in death or serious injury.

W0282A

⚠ WARNING

Rotating parts!
The engine is running. Keep clear of rotating fans and belts.
Failure to comply could result in death or serious injury.

W0275A

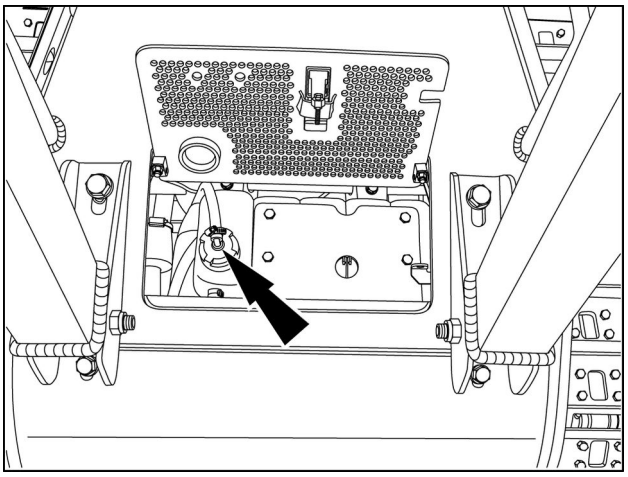
Drain, flush and replace the engine coolant every 2000 hours of operation or each year, whichever occurs first. Clean the system, and replace the coolant.

A mixture of **50 %** water and **50 % CNH XHD HEAVY DUTY COOLANT / ANTI-FREEZE** or **CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT** must be used in this machine. Depending on the date of manufacture, the machine could have either coolant type. Machines with OAT coolant will have a decal near the fill location. Never mix conventional coolant with OAT coolant. See page **7-22** for instructions on switching coolant types.
This mixture is used if the lowest ambient temperature is above **-37 °C** (**-34.6 °F**). If the ambient temperature is lower, adjust the mixture to attain a lower freeze point using the freeze point-concentration chart on the label of your antifreeze concentrate. Never use a coolant solution containing more than **60 %** glycol. It is recommended that ethylene glycol and water be used in your machine all year.

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

Service specifications	
Type of coolant	**50 %** Water and **50 % CNH XHD HEAVY DUTY COOLANT / ANTI-FREEZE** or **CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT** Depending on the date of manufacture, the machine could have either coolant type. Machines with OAT coolant will have a decal near the fill location. Never mix conventional coolant with OAT coolant. See page **7-22** for instructions on switching coolant types.
Coolant capacity	**21.8 L** (**5.8 US gal**)

1. After the temperature of the engine and the coolant has reached a safe level, open the hood top panel and remove the deaeration tank cap.

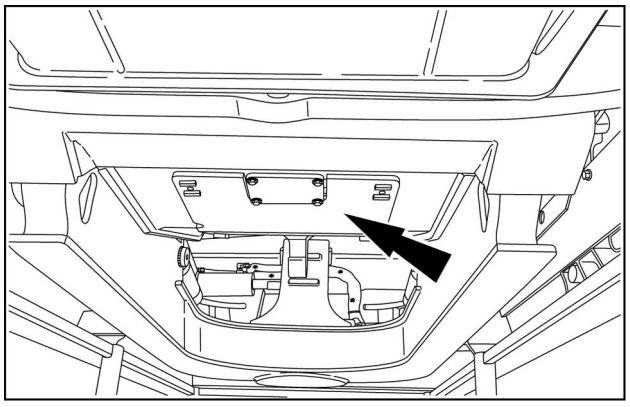


RAIL14DOZ0573AA 1

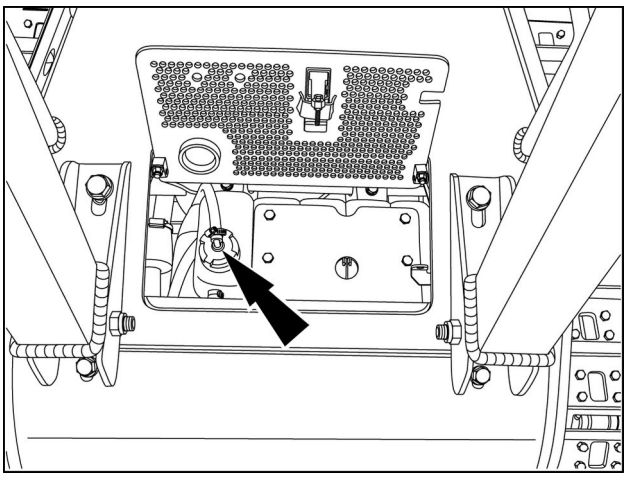
NOTE: *If the machine is so equipped, and the special draining equipment is available, use the engine coolant environmental drain located in the right side front engine access door.*

NOTE: *Panel is heavy, use care during removal.*

2. The coolant drain is located beneath the machine under the front panel.
3. Remove the bolts from the access panel, and remove the panel.
4. Place a suitable container of the proper capacity under the drain.
5. Open the drain cap, and drain the coolant from the system.
6. Secure the drain cap after all the coolant is drained.
7. Use a system cleaning product to clean and flush the system. Contact your authorized dealer for system cleaning products.
8. Follow the cleaning product instructions. After the system has been cleaned and flushed, close and secure the drain.
9. Fill with the proper mix and amount of antifreeze/coolant and water for the system and for the prevailing weather conditions.
10. Start the engine, and let it run at low idle until the engine reaches operating temperature.

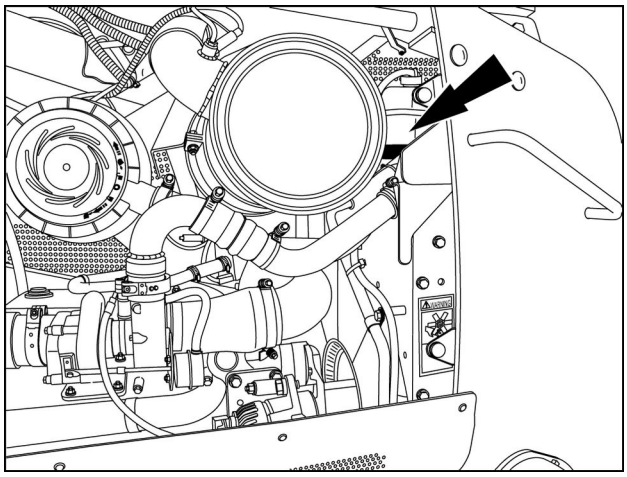


RAPH12DOZ0095AA 2



RAIL14DOZ0573AA 3

11. Allow the system to cool. Check the coolant level at the coolant reservoir.



RAIL14DOZ0564AA 4

Hydraulic and hydrostatic drive filter and fluid

⚠ WARNING

Pressurized hydraulic fluid can penetrate the skin and cause severe injuries.
Hydraulic fluid is under extreme pressure. Rest the bucket or attachment on the ground. Shut the engine off, turn the key on, and move the hydraulic control lever through all movements several times to relieve residual pressure in the system.
Failure to comply could result in death or serious injury.

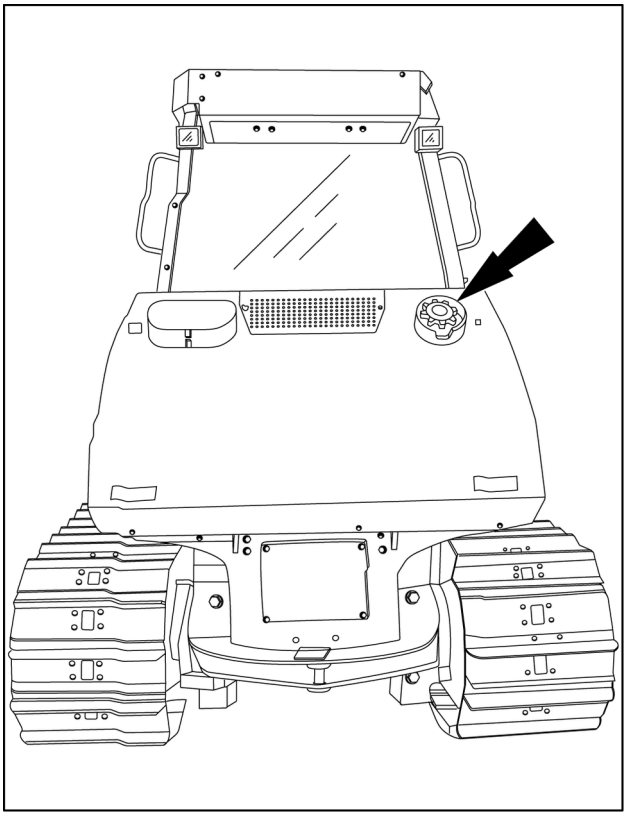
W0161A

Change the hydraulic/hydrostatic drive system oil and filters when the hour meter registers 2000 hours, and every 2000 hours thereafter. Change the oil more frequently when operating conditions are severe.

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

Service specifications	
Type of oil	**TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30**
Total system capacity	**90 l** (**23.75 US gal**)

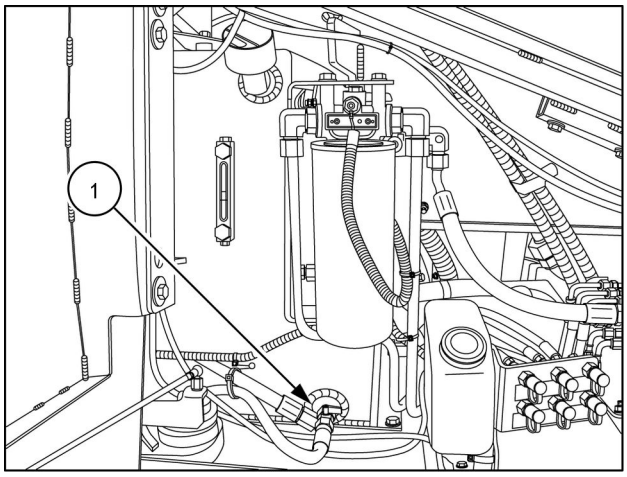
1. Stop the engine. Put a Do Not Operate tag on the key switch.
2. Relieve pressure from the hydraulic system.
3. Clean the area around the hydraulic oil filler cap, and slowly loosen the cap.



RAIL13DOZ0848BA 1

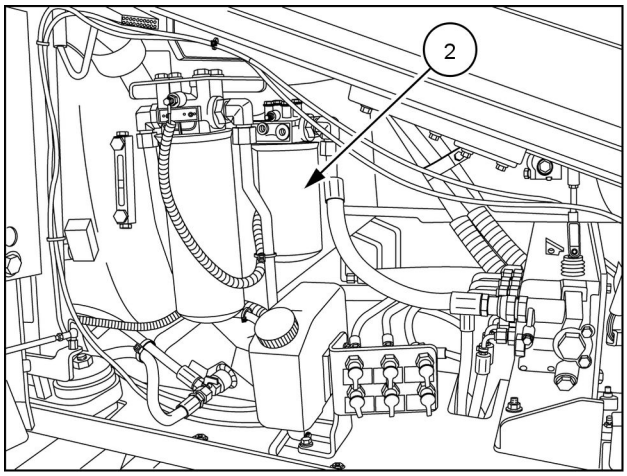
NOTE: *A drain hose is included on machines equipped with the environmental drain option.*

4. Locate the hydraulic reservoir drain **(1)** inside the right rear access door.
5. Attach a drain hose to the hydraulic reservoir drain.
6. Open the hydraulic reservoir drain valve, and drain the oil into a suitable container.
7. After the oil has completely drained, close the drain valve, and remove the drain hose.



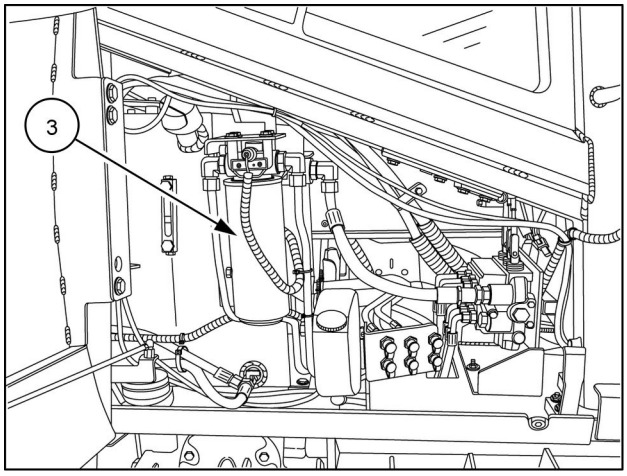
RAIL13DOZ1281AA 2

8. Remove and replace the hydraulic oil filter **(2)**. Turn the filter counterclockwise to remove.
9. Clean the contact surface on the filter head. Make sure that all dirt and gasket material has been removed.
10. Apply a thin coat of clean oil to the hydraulic filter gasket and threads.
11. Install and tighten the filter firmly to the filter head by hand. Do not use a filter wrench to tighten the filter.



RAIL13DOZ1280AA 3

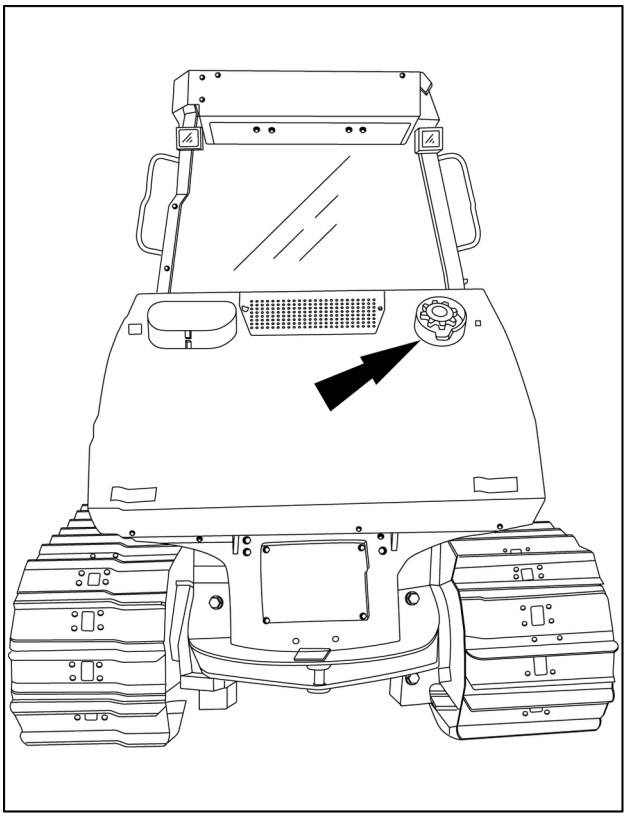
12. Remove the hydrostatic drive filter **(3)**. Turn the filter counterclockwise to remove.
13. Clean the contact surface on the filter head. Make sure that all dirt and gasket material has been removed.
14. Apply a thin coat of clean oil to the hydrostatic filter gasket and threads.
15. Install and tighten the hydrostatic filter firmly to the filter head by hand. Do not use a filter wrench to tighten the filters.



RAIL13DOZ1279AA 4

NOTICE: *Clean the reservoir suction screens in conjunction with this procedure.*

16. Fill the reservoir with new hydraulic oil.
17. Install the reservoir filler cap.
18. Start the engine and run at approximately **1000 RPM**. Check for leakage around the filter and drain.
19. Replace all panels, and close all access doors securely.
20. Operate the controls several times to remove any air in the lines.
21. Place the attachments on the ground, and stop the engine. Check the hydraulic oil level.
22. If it is necessary to top off with more oil, make certain all pressure is removed in the system, and remove the fill cap slowly to release pressure in the reservoir.



RAIL13DOZ0848BA 5

NOTICE: *Check drained oil for metal filings or other foreign particles or have oil checked by your authorized dealer through the Systemguard Lubricant Analysis program.*

Reservoir suction screen

⚠ WARNING

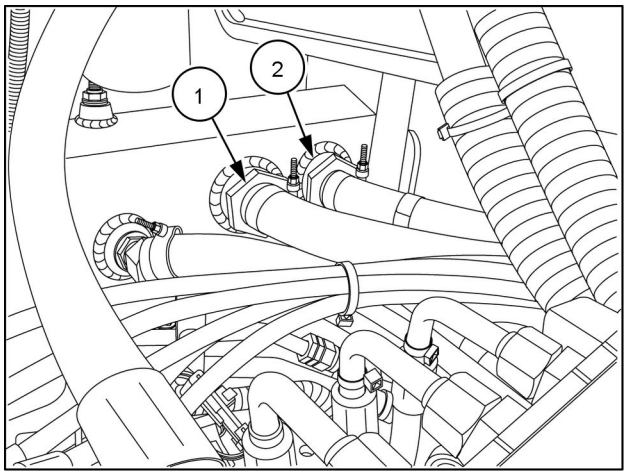
Burn hazard!
Before performing any service on the hydraulic system, you must allow it to cool. Hydraulic fluid temperature should not exceed 40 °C (104 °F).
Failure to comply could result in death or serious injury.

W0241A

Clean the reservoir suction screens when the hour meter registers 2000 hours and every 2000 hours thereafter. Clean more often if conditions so require. Clean the reservoir suction screens in conjunction with replacing the hydraulic/hydrostatic drive oil and filters.

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

1. Locate the suction screens on the bottom of the hydraulic oil tank.
2. After draining the oil from the hydraulic reservoir, loosen the T-Bolt hose clamps and separate the hydraulic hoses from the suction screen assembly hose barbs.
3. Remove the fittings and the rear hydrostatic charge suction screen **(1)**, and the equipment hydraulic suction screen **(2)**.
4. Clean the screens in solvent or replace, if necessary.
5. Install cleaned or new screens, and replace the fittings. Torque the suction screen assemblies to **178 - 195 N·m** (**131 - 144 lb ft**).
6. Slide hoses back on the hose barbs and secure in place with the T-Bolt hose clamps. Orient the threads upward and torque clamp nut **6.6 - 7.7 N·m** (**58.4 - 68.2 lb in**).



RAIL13DOZ1533AA 1

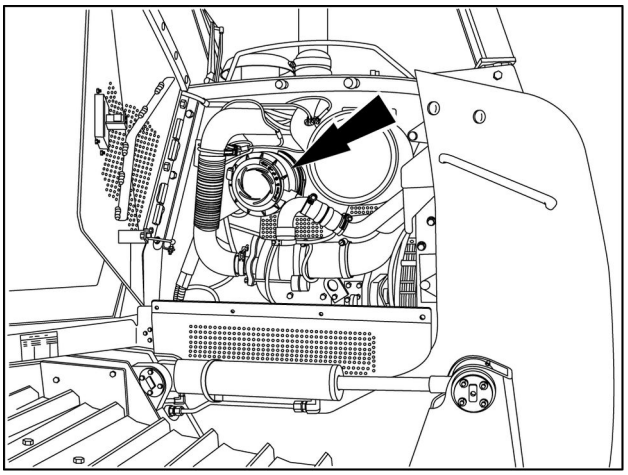
Engine air filters

Check the engine air filter periodically for dirt and debris build up. Replace the engine primary and secondary air filter every 2000 hours or each year, whichever occurs first.

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

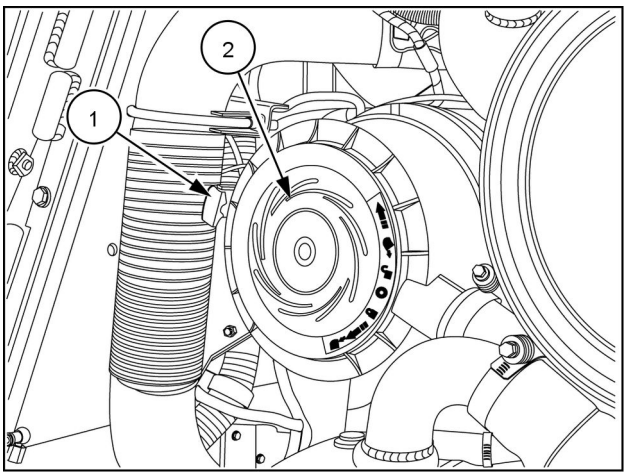
NOTICE: *Replace the primary element if the filter warning lamp on the instrument cluster illuminates or the audible alarm sounds. If the caution warnings continue after replacing the primary filter, replace the secondary filter. Under normal conditions, you should replace the secondary filter after three primary filter replacements. Replace filters more often if conditions so warrant. DO NOT clean the secondary filter. You must replace the secondary filter.*

1. Locate the engine air filter in the right-hand main engine compartment.



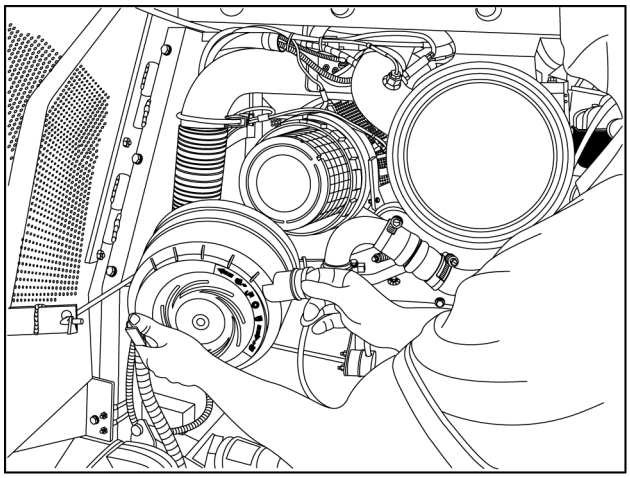
RAIL13DOZ0718AA 1

2. Release the locks **(1)** on the cover **(2)**.



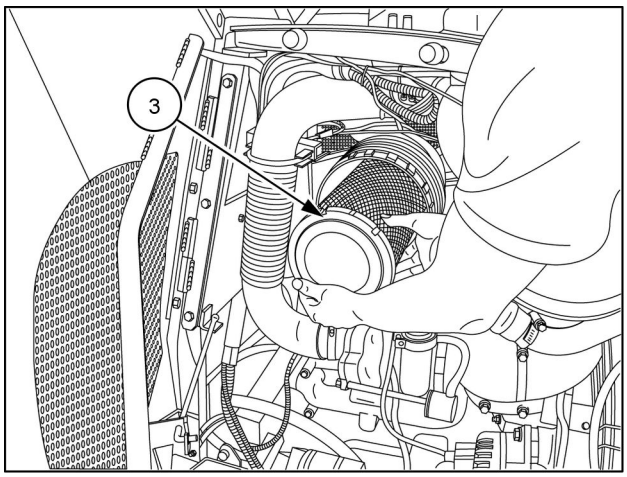
RAIL13DOZ0720AA 2

3. Remove the air cleaner housing cover.



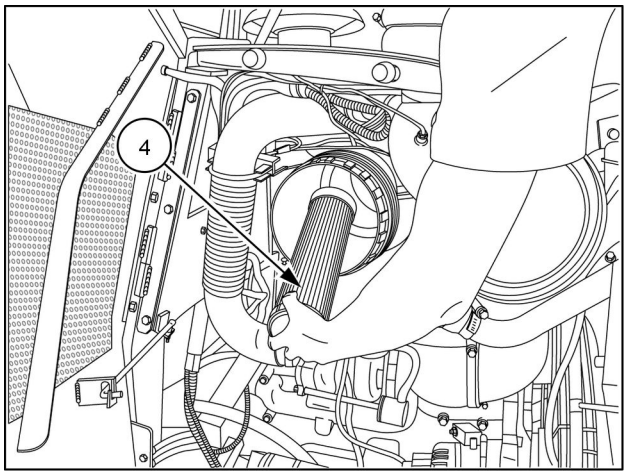
RAIL13DOZ0722AA 3

4. Remove the primary air filter **(3)**.



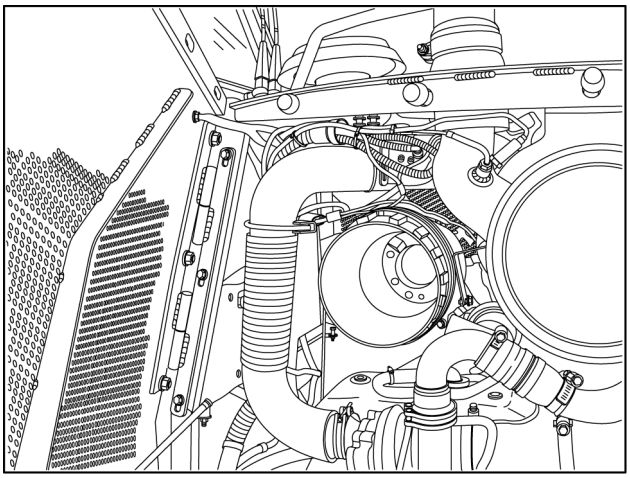
RAIL13DOZ0723AA 4

5. Remove the secondary filter **(4)**.



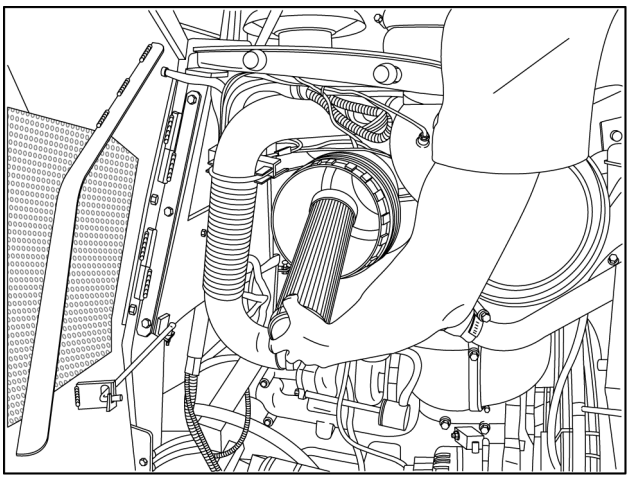
RAIL13DOZ0724AA 5

6. Wipe the inside of the air filter housing to clean any dirt and debris away before installing the new filters.



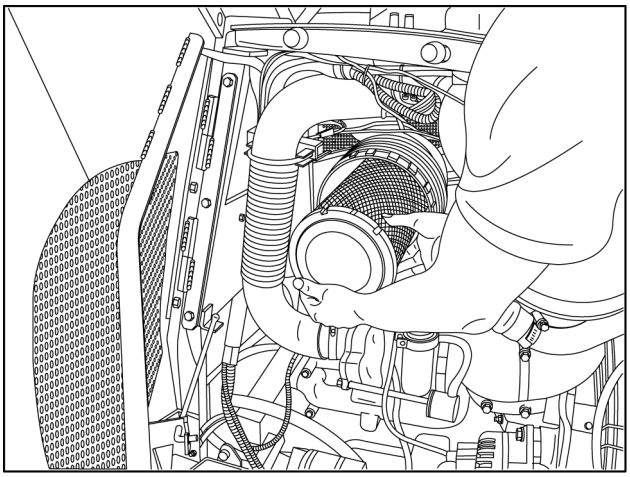
RAIL13DOZ0725AA 6

7. Install the new secondary air filter. DO NOT clean the secondary air filter. You must replace the secondary air filter.



RAIL13DOZ0724AA 7

8. Install the new primary air filter, making certain it seats properly.
9. Install the air filter cover, fastening the locks in place.
10. Push on the end of dust valve to drain dust and debris from the air filter housing.
11. Close and lock the access door.



RAIL13DOZ0723AA 8

As required

Track tension

⚠ WARNING

Pressurized fluid can penetrate the skin and cause severe injuries.
The grease in the track tensioning mechanism is under high pressure. Keep face and body away from grease nipple. Never loosen the grease nipple more than one complete turn.
Failure to comply could result in death or serious injury.

W0959A

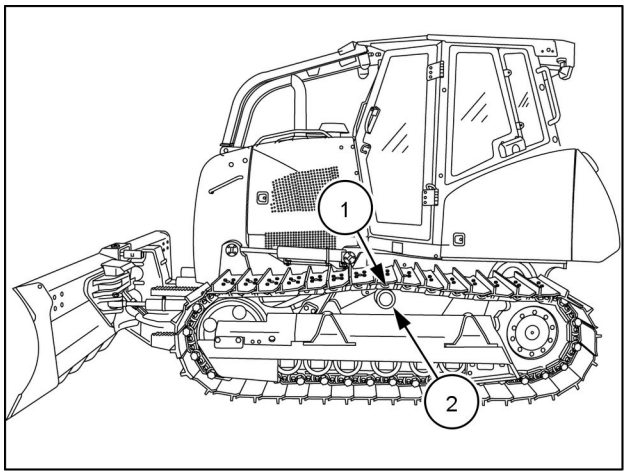
Clean the tracks and undercarriage as required or at the end of the work shift. Park the machine on a level surface to prevent distortion of the track seals. If the temperature is cold, park the machine on a surface that will not freeze to the track shoes.

Check the track tension at 100 hours when the machine is new during the initial run-in period or if the track has been replaced. Check the track tension frequently when you operate. Check the track tension more often when working in extreme conditions. When material packs and collects on the undercarriage parts the tracks may become too tight.

Correct track adjustment will help control undercarriage wear. Maintain correct track tension.

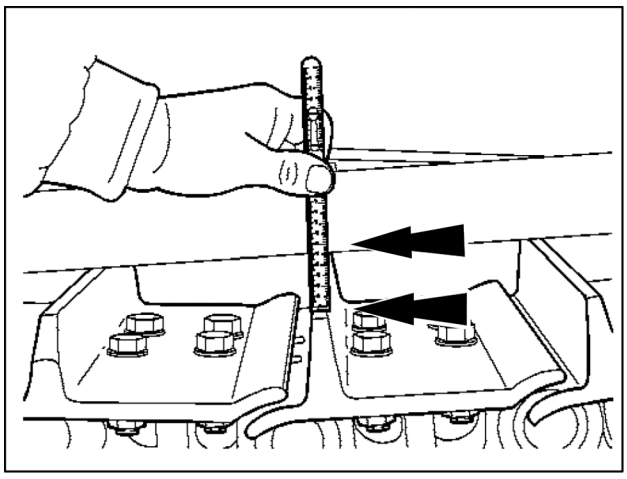
Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

1. In a straight path, move the machine backward the length of the track and then forward the length of the track. This will ensure the bottom of the track is tight. Bring the machine slowly to a stop. Do not use the brakes to stop the machine.
2. Slowly stop the machine so that a pin **(1)** in the track chain is over the carrier roller **(2)**. Do not use the brakes to stop the machine.
3. Park the machine on level ground, in neutral with the parking brake applied.
4. Lower the attachment to the ground.
5. Turn off the engine, and remove the key.



RAIL13DOZ1295AA 1

6. Stand on the tracks between the top roller and the idler wheel.
7. Place a straightedge over the track, and measure the track deflection midway between the top roller and the idler wheel. The correct adjustment is between **44.45 - 57.15 mm** (**1.75 - 2.25 in**).

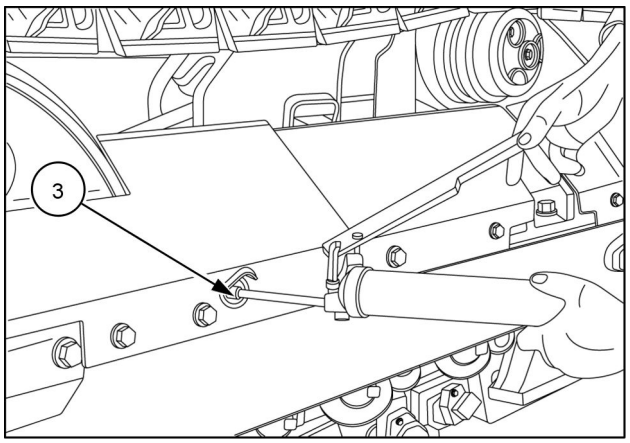


RAIL12DOZ0384AA 2

Increase the track tension

Use the track adjuster grease fitting to adjust track tension. Adding grease will increase and tighten the track deflection.

1. Pump **TUTELA MOLY GREASE GR-75** into the fitting **(3)** until deflection is correct.
2. In a straight path, move the machine backward the length of the track and then forward the length of the track. This will ensure the bottom of the track is tight. Do not use the brakes to stop the machine.
3. Bring the machine slowly to a stop. Do not use the brakes to stop the machine.
4. Check the deflection of the track again and adjust, if necessary.
5. Repeat the procedure for the other track.



RAIL12DOZ0374AA 3

Decrease the track tension

⚠ WARNING

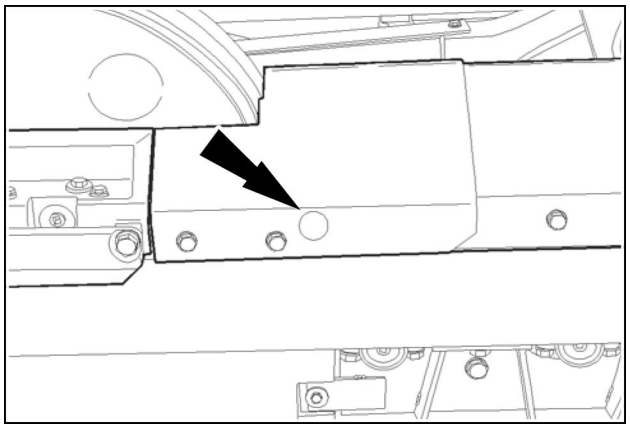
Flying object!
Always wear eye or full face protection when performing this procedure.
Failure to comply could result in death or serious injury.

W0313A

Decrease the track tension with an adjustment to the ball check fitting.

The grease is UNDER EXTREME PRESSURE. Be careful to back the ball check adjustment off SLOWLY. Wear full coverage face protection before proceeding.

1. Use a **3/4 in** deep socket, and loosen the ball check fitting SLOWLY about two turns. DO NOT remove the adapter. Allow the grease to evacuate until the track deflection is within the proper range.
2. When complete, re-torque the ball check to **59.7 - 74.6 N·m** (**44 - 55 lb ft**).
3. In a straight path, move the machine backward the length of the track and then forward the length of the track. This will ensure the bottom of the track is tight.
4. Bring the machine slowly to a stop. Do not use the brakes to stop the machine.
5. Recheck the track tension.
6. Repeat the procedure for the other track.



RCIL10CWL080AAL 4

Roll Over Protective Structure (ROPS)

⚠ WARNING

Roll-over hazard!
After an accident, fire, tip over, or roll over, a qualified technician MUST replace the Roll-Over Protective Structure (ROPS) before returning the machine to the field or job site operation.
Failure to comply could result in death or serious injury.

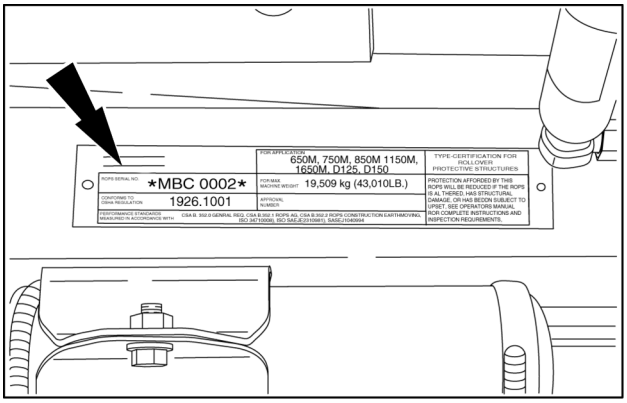
W0134A

⚠ WARNING

Misuse hazard!
Your machine is equipped with an operator protective structure. DO NOT weld, drill holes, attempt to straighten, or repair the protective structure. Modification in any way can reduce the structural integrity of the structure.
Failure to comply could result in death or serious injury.

W0001B

Your machine is equipped with an operator protective structure, such as: Roll Over Protective Structure (ROPS) or Falling Object Protective Structure (FOPS). A ROPS may be a cab frame or a two-posted or four-posted structure used for the protection of the operator to minimize the possibility of serious injury. The mounting structure and fasteners forming the mounting connection with the machine are part of the ROPS. The Protective Structure is a special safety component of your machine. DO NOT attach any device to the protective structure for pulling purposes. DO NOT drill holes into the protective structure. The protective structure and interconnecting components are a certified system. Any damage, fire, corrosion or modification will weaken the structure and reduce your protection. If this occurs, the protective structure MUST be replaced so that it will provide the same protection as a new protective structure. Contact your authorized dealer for protective structure inspection and replacement. The protective structure MUST be replaced. The mounting or suspension for the protective structure, operator seat and suspension, seat belts and mounting components and wiring within the operator's protective system MUST be carefully inspected for damage. All damaged parts MUST be replaced.



RAIL15DOZ0015AA 1

ROPS certification plate

The machine has a ROPS plate showing the certification of the ROPS, gross weight, approval, regulation, and model number of the machine.

Check and inspect the ROPS structure and the seat restraint system as required.

The ROPS certification plate is located in the left rear access compartment.

Seat belt

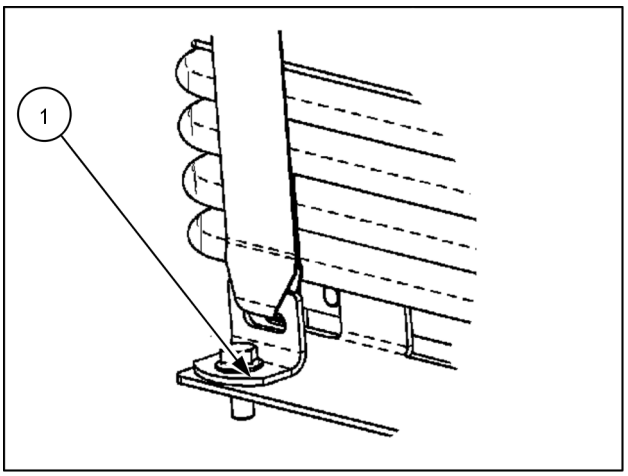
⚠ WARNING

Equipment failure could cause accident or injury!
Always fasten the seat belt securely before you operate the machine. Inspect seat belt parts for wear and damage. Replace any and all worn or damaged parts of the seat belt prior to operation.
Failure to comply could result in death or serious injury.

W0046C

Before you operate this machine, always make sure the ROPS and operator's seat belt **(1)** is correctly installed. The seat belt is an important part of the ROPS. You must wear the seat belt at all times when you operate the machine.

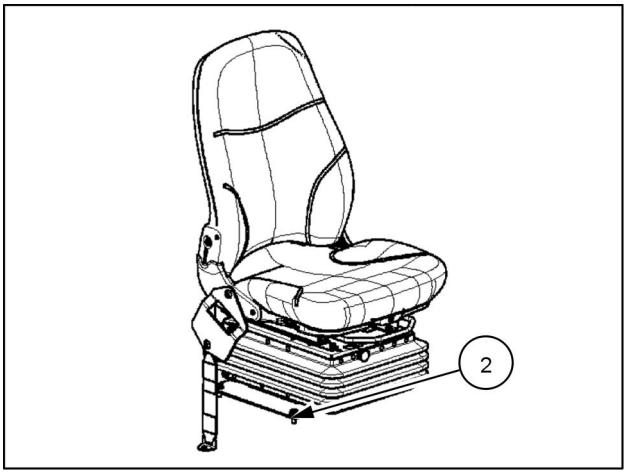
1. Make sure all that seat belt hardware is secure and torqued.
2. Visually inspect the seat belt. If the seat belt is torn, frayed, or the mechanism is damaged, replace the seat belt.
3. Keep the seat belts clean. Wash the seat belts only in soap and water. Do not use bleach or dye on the seat belts. This will weaken the seat belt composition.
4. Torque seat belt hardware and seat mounting hardware to: **48.7 - 65.9 N·m** (**35.9 - 48.6 lb ft**).



RAPH12DOZ0389AA 2

Seat and mounting hardware

Make sure that all hardware that secures the seat **(2)** to the cab is properly torqued (two each side). The seat can be cleaned with a suitable upholstery cleaner. Torque to: **48.7 - 65.9 N·m** (**35.9 - 48.6 lb ft**).



RAPH12DOZ0388AA 3

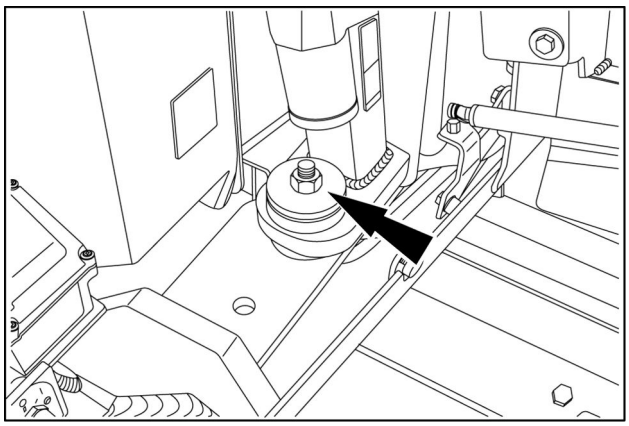
ROPS cab torque specifications

⚠ WARNING

Tip-over hazard!
Adding additional weight (buckets, attachments, etc.) to the machine can create a tipping hazard. Do not exceed the gross weight indicated by the machine specifications.
Failure to comply could result in death or serious injury.

W0153A

1. Check the torque of the ROPS mounting bolts. If necessary, tighten the bolts to the correct torque.
2. Check for cracks, rust, or holes in the ROPS and ROPS components. Age, weather, and accidents can cause damage to the ROPS and ROPS parts. If you have any doubt about the integrity of the ROPS system, see your authorized dealer.



RAIL12DOZ0175AA 4

Torque specifications	
ROPS cab mounting bolts (both sides)	Torque to: **773 - 854 N·m** (**570.1 - 629.9 lb ft**)

NOTE: *Torque specifications are for clean, dry threads.*

Cab air filter - Recirculation filter

⚠ WARNING

Eye injury hazard!
Wear full coverage safety glasses with side panels when using compressed air. Limit air pressure to 200 kPa (29 psi).
Failure to comply could result in death or serious injury.

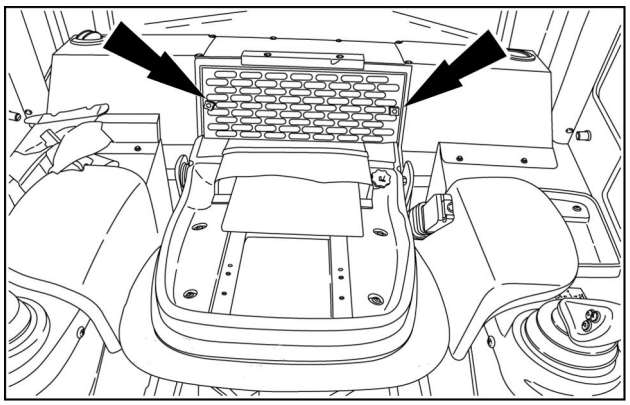
W0162A

The cab recirculation air filter is located behind the operator's seat. Replace the cab air filters when required. The cab air filter is located behind the operator compartment near the exhaust fan.

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

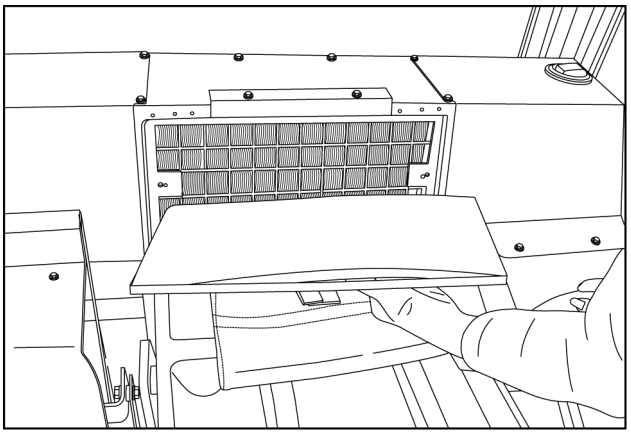
Recirculation filter

1. Remove the retaining screws that holds the recirculation filter cover in place, and remove the recirculation filter.
2. Wipe the housing clean.



RAPH12DOZ0074AA 1

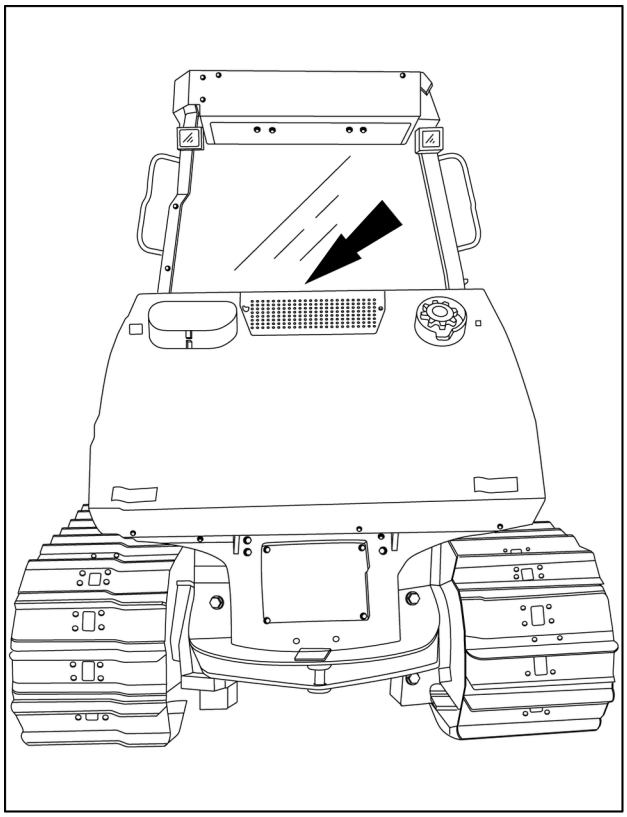
3. Replace the recirculation filter with a new one.
4. Reinstall the new recirculation filter, and secure the access filter cover.



RAIL12DOZ0164AA 2

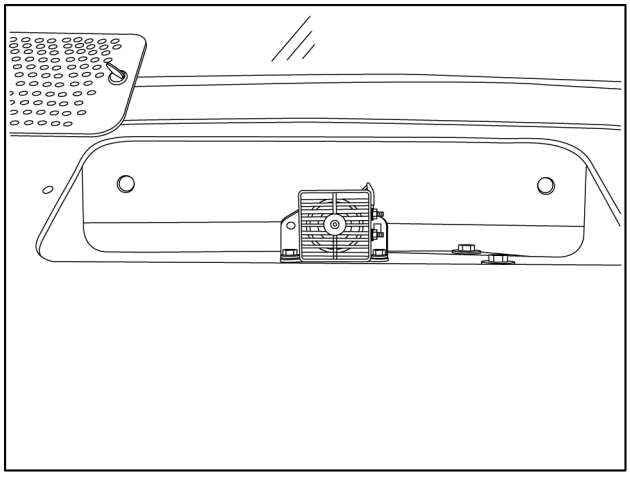
Cab air filter

1. Locate the cab air filter behind the operator's compartment.
2. Remove the screws from the cab air filter cover, and remove the cab air filter cover.



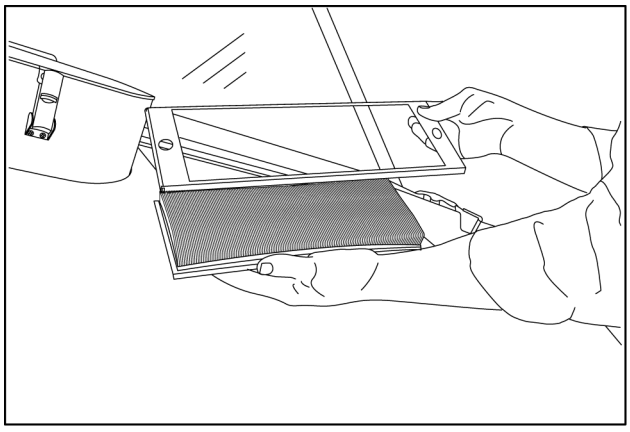
RAIL13DOZ0848BA 3

3. Remove the inner cover.
4. Remove the old filter and filter mounting bracket.
5. Wipe the inside of the cab air filter housing.



RAIL12DOZ0187AA 4

6. Replace the cab air filter with a new one, installing the filter into the cab air filter mounting bracket.
7. Replace inner air filter cover, tightening bolts securely.
8. Replace the outer metal cover and tighten screws.



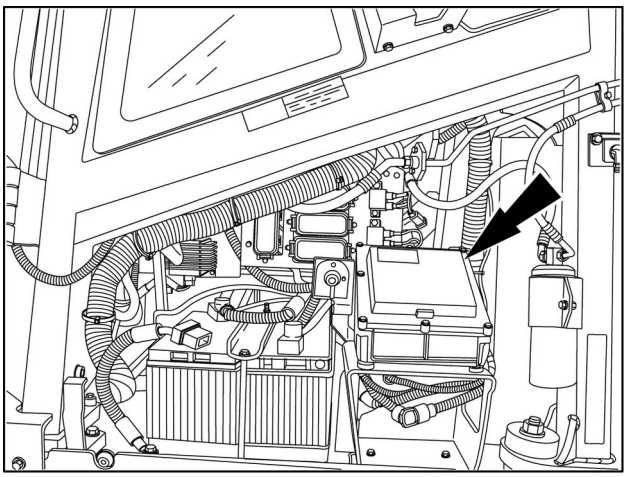
RAIL12DOZ0186AA 5

Selective Catalytic Reduction (SCR) system - Replace supply module filter

Clean the in-line supply filter when the machine is new and the hour meter registers 100 hours. Clean every 1500 hours thereafter or more often if conditions so require. The supply line has a small mesh filter within the line. Replace the main filter at approximately 3000 hours.

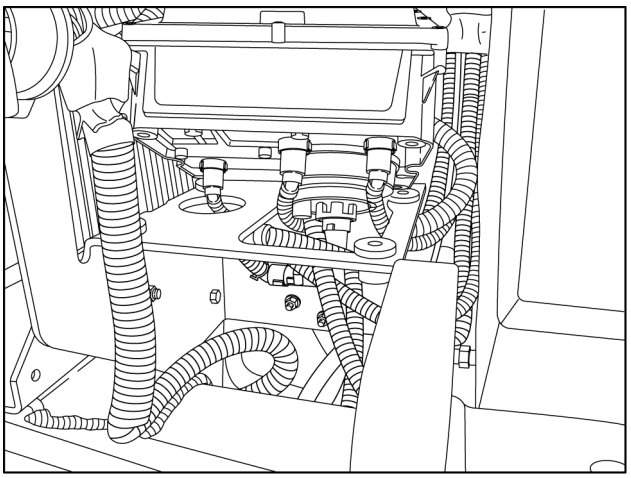
Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

1. Open the rear left hand access compartment, and locate the DEF supply module.



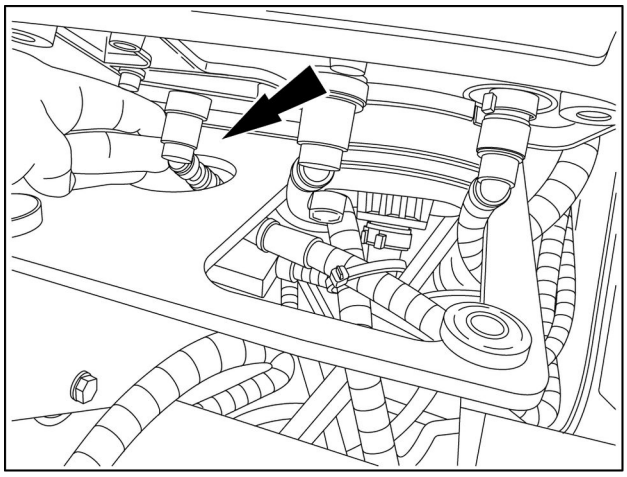
RAIL13DOZ0846AA 1

2. Remove the bolts holding the supply module in place, and tilt the module up.



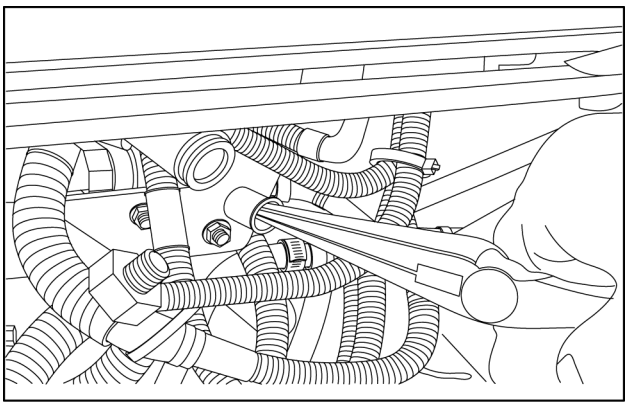
RAIL12DOZ0189AA 2

3. Locate the DEF supply line filter directly below the supply module.
4. Use a suitable container to catch any DEF fluid that is discharged during line and filter disassembly. Clean the area before disassembly.
5. Disconnect the DEF supply line by squeezing the tabs on the connection and separate the lines.



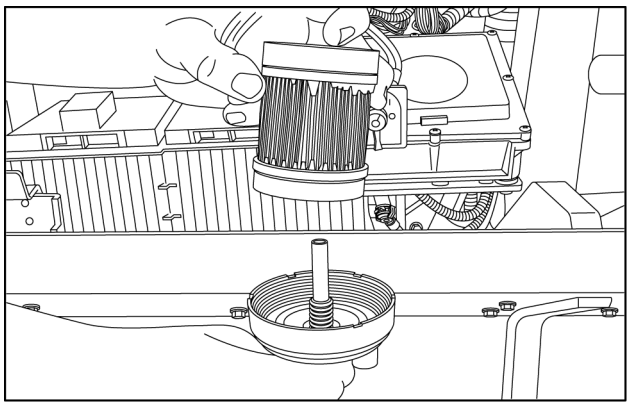
RAIL12DOZ0191AA 3

6. Using needle nose pliers, remove the DEF supply filter using care not to damage or bend the DEF supply filter.
7. Inspect the DEF supply filter housing, and rinse with water. Replace the DEF supply filter if damaged.



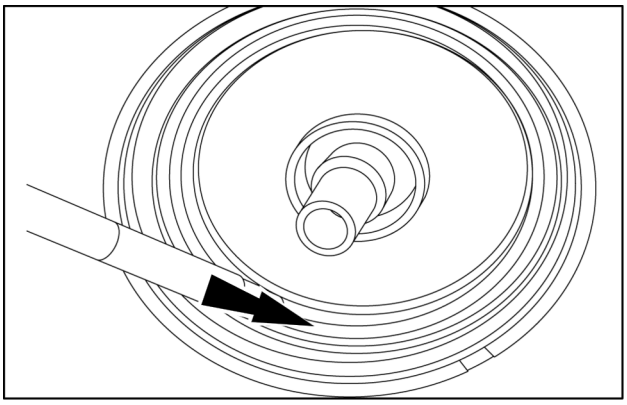
RAPH12DOZ0323AA 4

8. Once the fitting is disconnected, remove the DEF filter.
9. Turn the spin-on DEF filter counterclockwise to remove. Remove and discard the filter following local environmental and waste regulations



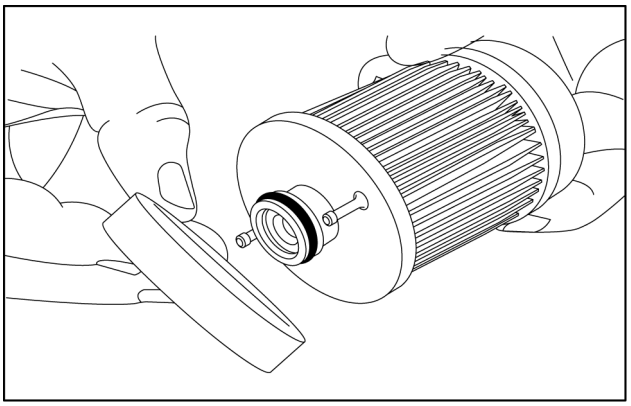
RAPH12DOZ0316AA 5

10. Lubricate the O-ring at the filter base.



RAPH12DOZ0319AA 6

11. Remove the foam pads from both ends of the replacement filter, and lubricate the filter ends.
12. Replace pads, and reinstall the new DEF supply filter into the housing. Install into the supply module by turning clockwise. Do not overtighten.
13. Secure the DEF supply module to the mounting bracket.
14. Start the engine and run at idle speed. Check for leaks.



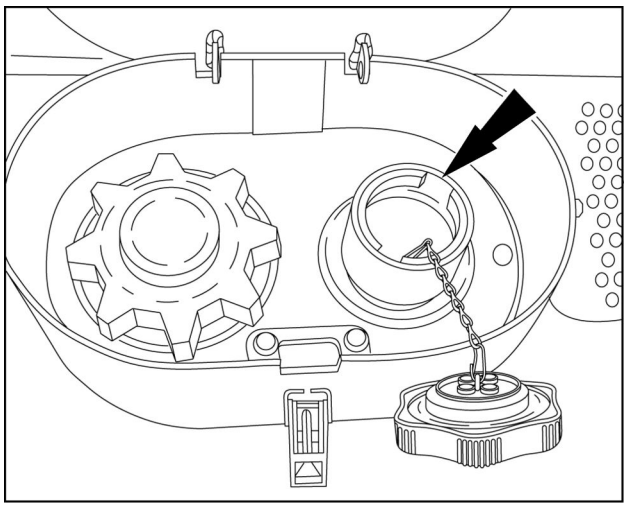
RAPH12DOZ0318AA 7

Selective Catalytic Reduction System (SCR) tank filter

Clean the SCR tank filter as required.

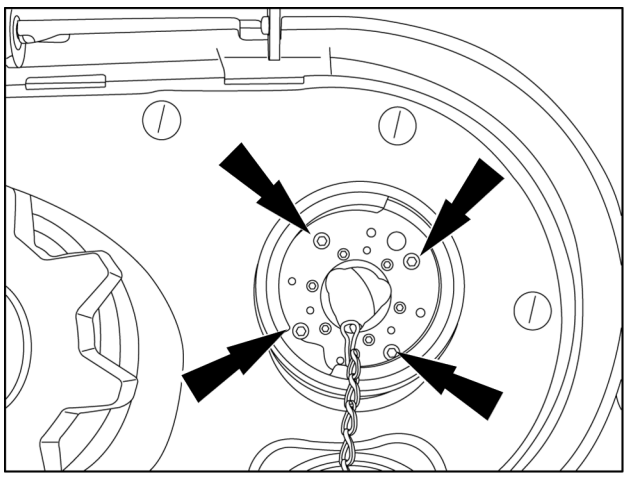
Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

1. The DEF tank mesh filter is located within the neck of the DEF fill tube. Open the DEF fill compartment. Clean the area to be serviced in order to prevent DEF tank contamination.



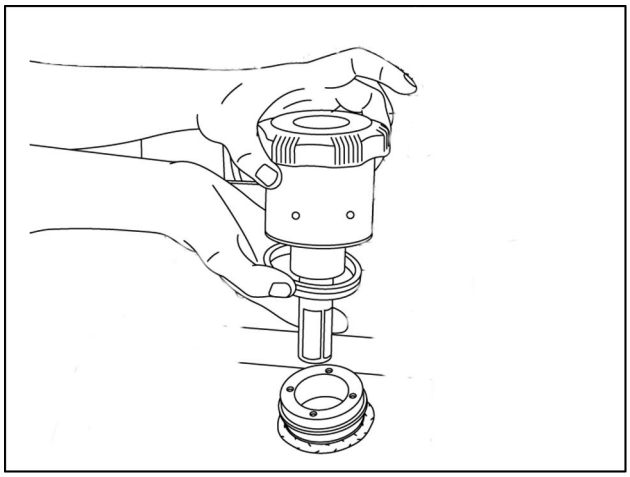
RAIL12DOZ0362AA 1

2. Remove the DEF cap. Remove the hex screws with an Allen wrench.



RAIL12DOZ0905BA 2

3. Remove the tank filter assembly and the O-ring from the DEF tank neck. Rinse the tank filter with water
4. Reinstall the O-ring on the DEF tank neck with the radius surface facing up.
5. Reinstall the tank filter assembly securing it with the hex screws.
6. If the tank filter has been damaged, replace the tank filter. To replace, separate the tank filter and fit a new tank filter to the assembly.
7. Insert assembly into orifice. Attach the assembly using with the hex screws.



RAIL12DOZ0387AA 3

Engine air filters

⚠ WARNING

Eye injury hazard!
Wear full coverage safety glasses with side panels when using compressed air. Limit air pressure to 200 kPa (29 psi).
Failure to comply could result in death or serious injury.

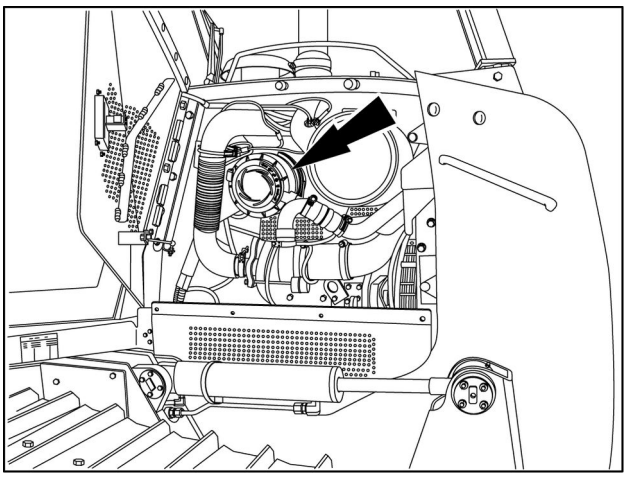
W0162A

Check the engine air filter periodically for dirt and debris build up. The primary air filter can be cleaned using compressed air. Do not attempt to clean the secondary filter. It must always be replaced. Replace the engine primary and secondary air filter every 2000 hours or each year, whichever occurs first.

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

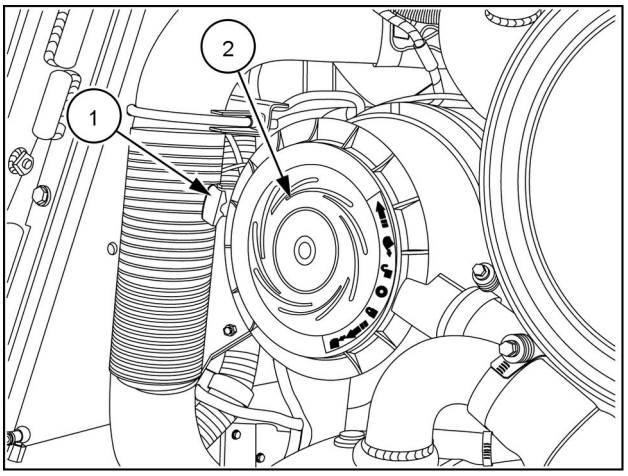
NOTICE: *Replace the primary element if the filter warning lamp on the instrument cluster illuminates or the audible alarm sounds. If the caution warnings continue after replacing the primary filter, replace the secondary filter. Under normal conditions, you should replace the secondary filter after three primary filter replacements. Replace filters more often if conditions so warrant. DO NOT clean the secondary filter. You must replace the secondary filter.*

1. Locate the engine air filter in the right-hand main engine compartment.



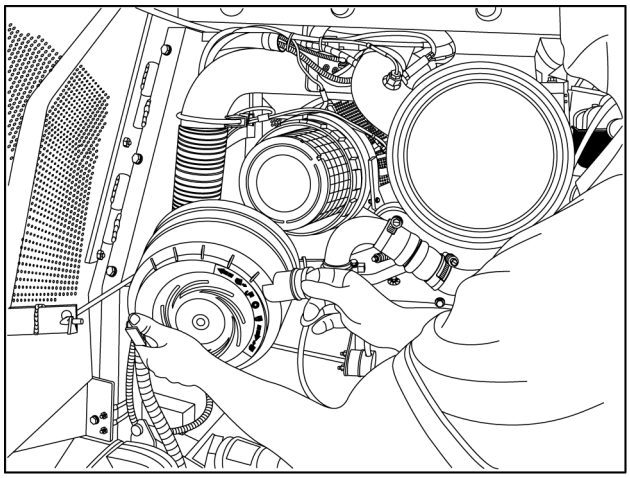
RAIL13DOZ0718AA 1

2. Release the locks **(1)** on the cover **(2)**.



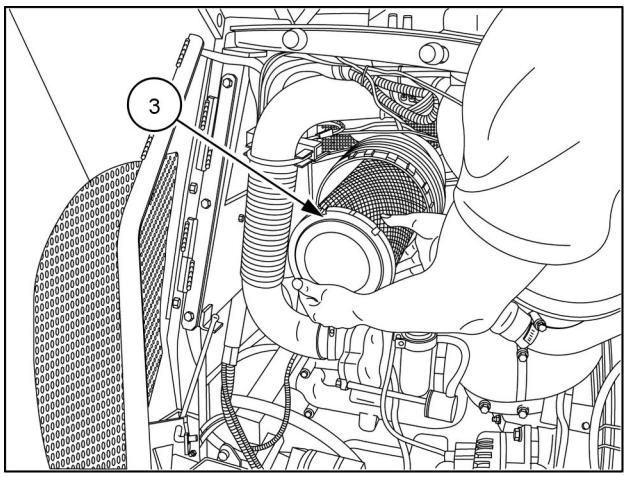
RAIL13DOZ0720AA 2

3. Remove the air cleaner housing cover.



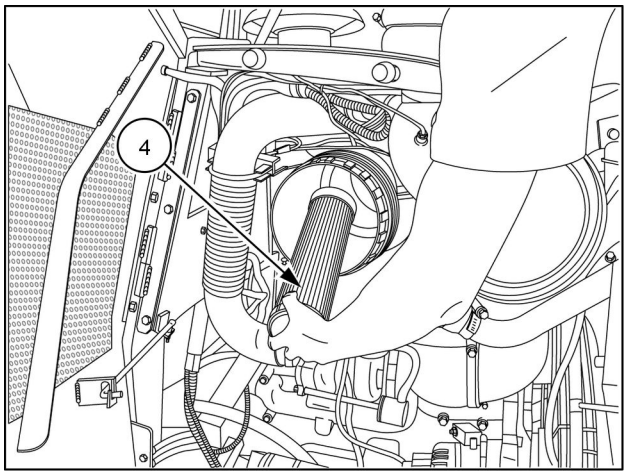
RAIL13DOZ0722AA 3

4. Remove the primary air filter **(3)**. Clean the primary air filter with compressed air if the primary filter is not being replaced. The primary filter should be replaced after three cleanings.



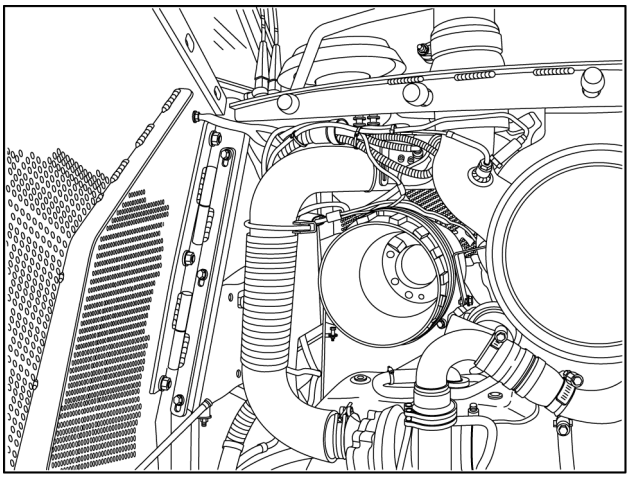
RAIL13DOZ0723AA 4

5. Remove the secondary filter **(4)**.



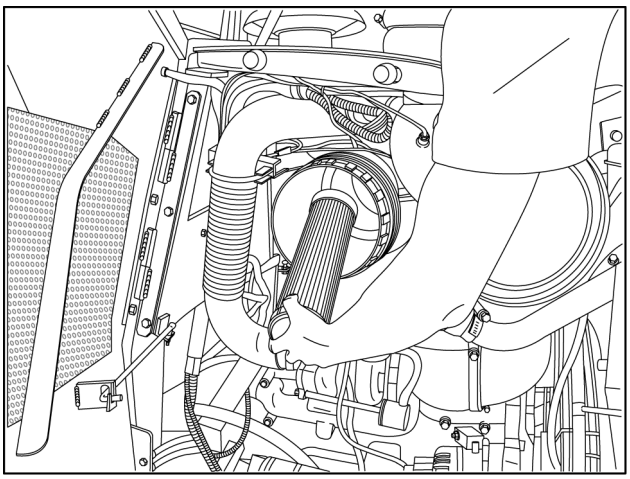
RAIL13DOZ0724AA 5

6. Wipe the inside of the air filter housing to clean any dirt and debris away before installing the new filters.



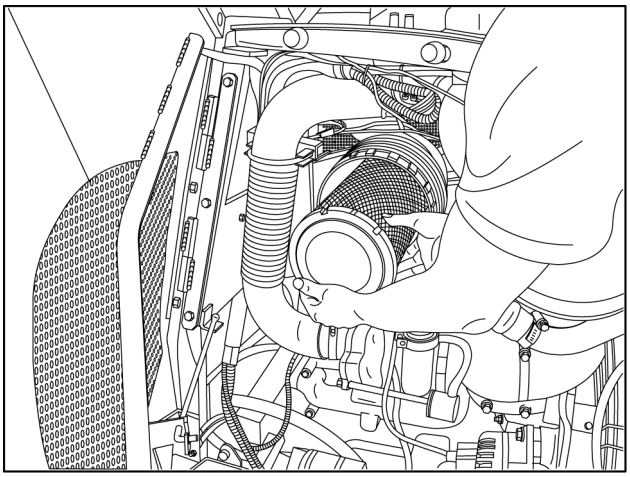
RAIL13DOZ0725AA 6

7. Install the new secondary air filter. DO NOT clean the secondary air filter. You must replace the secondary air filter.



RAIL13DOZ0724AA 7

8. Install the new primary air filter, making certain it seats properly.
9. Install the air filter cover, fastening the locks in place.
10. Push on the end of dust valve to drain dust and debris from the air filter housing.
11. Close and lock the access door.



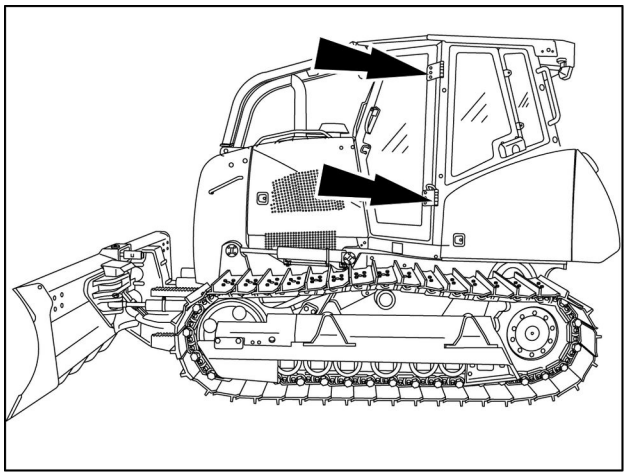
RAIL13DOZ0723AA 8

Doors and windows

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

Lubricate door and window hinges

1. Lubricate the door and window hinges when the hour meter registers 2000 hours or more frequently if conditions so require.
2. Use **CNH IRON GARD GRAPHITE LUBRICANT NON-STICK** to lubricate the hinges. Do not use grease.



RAIL13DOZ1295AA 1

Ripper shanks and teeth

⚠ WARNING

Flying object!
Always wear eye or full face protection when performing this procedure.
Failure to comply could result in death or serious injury.

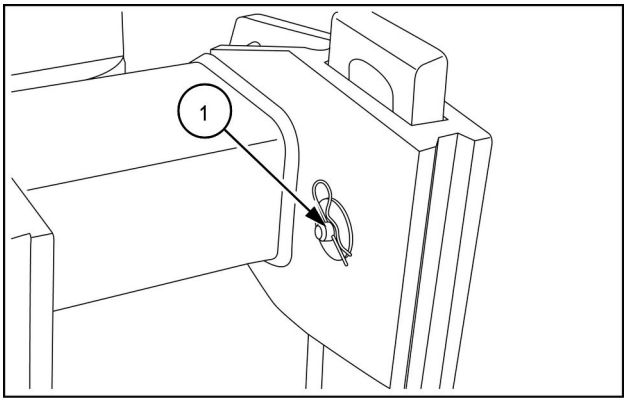
W0313A

Ripper shanks or ripper teeth may require periodic replacement. Use care when lifting heavy objects. Always use adequate lifting equipment.

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

Replacing the ripper shanks

1. Remove the retaining clip, and drive the pin **(1)** out of the ripper.



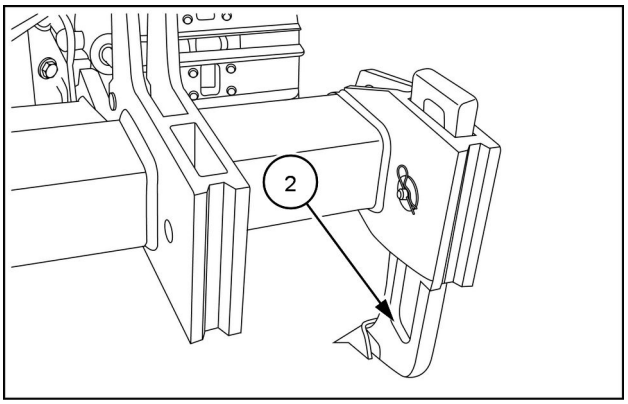
RAPH13DOZ0560AA 1

2. **⚠ CAUTION**

   Heavy object!
   The component is heavy. Use care not to drop the component when installing, removing, or handling.
   Failure to comply could result in minor or moderate injury.

   C0095A

   Remove the ripper shank.

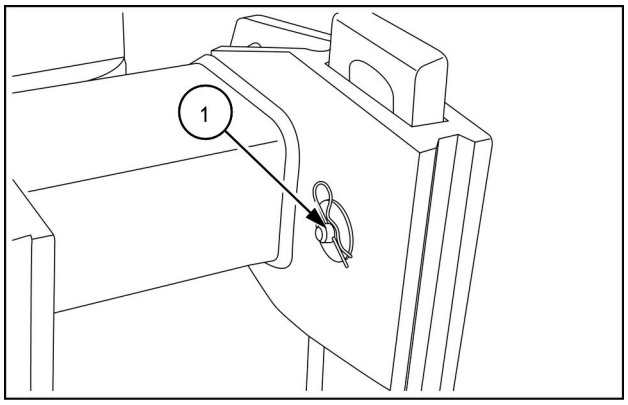


RAPH13DOZ0561AA 2

3. Reinstall the shank and replace the pin and clip.

Adjusting the ripper shanks

4. Remove the retaining clip, and drive the pin **(1)** out of the ripper.



RAPH13DOZ0560AA 3

5. **⚠ CAUTION**

   Heavy object!
   The component is heavy. Use care not to drop the component when installing, removing, or handling.
   Failure to comply could result in minor or moderate injury.

   C0095A

   Adjust the shank to the position desired.

6. Replace the pin and retaining clip.

Ripper teeth

1. Damaged ripper teeth can be replaced without removing the ripper shank.
2. Position the ripper teeth slightly above the ground. Remove cap and punch out bolt.
3. Clean mating surfaces and replace ripper tooth with a new component. Replace bolt.

Rear attachment torque values

Ripper
705 - 1165 N·m (**520.0 - 859.3 lb ft**)

Drawbar
705 - 1165 N·m (**520.0 - 859.3 lb ft**)

Hitch
430 - 485 N·m (**317.2 - 357.7 lb ft**)

Battery service

⚠ DANGER

Explosion hazard and/or run over hazard!
Read the procedure in the operator's manual before jump-start or service to avoid injury.
Failure to comply will result in death or serious injury.

D0149A

⚠ WARNING

Electrical shock hazard!
Do not reverse battery terminals. Connect positive cable ends to positive terminals (+) and negative cable ends to negative terminals (-).
Failure to comply could result in death or serious injury.

W0262A

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Before working on any component(s) of the electrical circuit, put the starter switch key in the off (shut down) position. When disconnecting batteries, always disconnect the negative (-) cable first. When reconnecting batteries, always connect the negative (-) cable last.
Failure to comply could result in death or serious injury.

W0264A

⚠ WARNING

Hazardous chemicals!
Battery electrolyte contains sulfuric acid. Contact with skin and eyes could result in severe irritation and burns. Always wear splash-proof goggles and protective clothing (gloves and aprons). Wash hands after handling.
Failure to comply could result in death or serious injury.

W0006A

⚠ 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

⚠ WARNING

Electrical shock hazard!
Before working on any part of the electrical system, disconnect the battery ground cable. Complete all electrical work before connecting the cable.
Failure to comply could result in death or serious injury.

W0129A

⚠ WARNING

Chemical hazard!
Battery posts, terminals, and related accessories contain lead and lead compounds. Wash hands after handling.
Failure to comply could result in death or serious injury.

W0349A

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Welding sparks can cause battery gases to explode. When welding on the machine, always disconnect the B+ and D+ wires from the alternator. Check the wire markings before reconnecting to ensure a correct connection.
Failure to comply could result in death or serious injury.

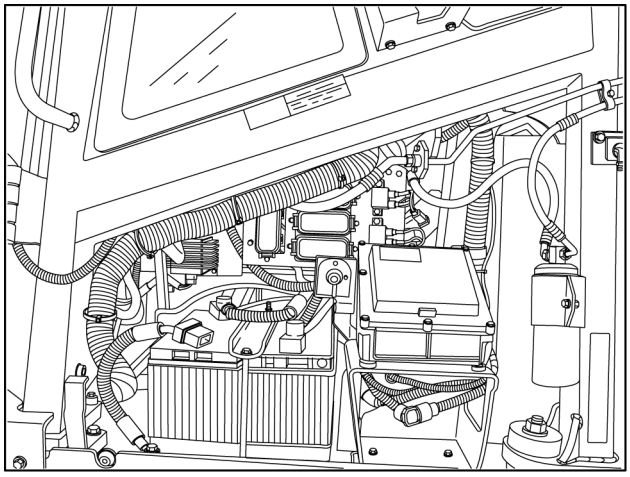
W0253A

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance. Turn the master electrical disconnect off.

The two batteries are located in the left rear compartment.

Battery service

Always disconnect the NEGATIVE (-) battery cable before you service ANY component of the electrical system.
Dirt, moisture, and corrosion on the battery will discharge the battery. Clean the battery with CASE CONSTRUCTION Battery Saver. Follow the instructions on the container.
Disconnect the alternator wires if you must run the engine with the battery wires disconnected.
Disconnect the alternator wires, the instrument cluster, and turn the master disconnect switch to OFF before you use an electric welder.
Do not use a steam cleaner or cleaning solvent to clean the alternator.



RAIL13DOZ0846AA 1

NOTICE: *This is a 24 volt electrical system. The master disconnect switch is in the positive cable circuit. Turning this switch to the off position does not disconnect the negative ground network.*

Battery vents

Keep the battery vents clean. Make sure the vents are not restricted.

Cleaning the batteries

Check the batteries and battery compartment regularly for dirt, corrosion and damage. Dirt mixed with electrolyte or moisture on the top of the batteries can cause a discharged condition in the batteries. Use one of the following methods to clean the batteries.

- Use CASE CONSTRUCTION Battery Saver. Follow the instructions on the container. This cleaner does not need water.

If CASE CONSTRUCTION Battery Saver is unavailable, use other special cleaners to prevent corrosion on the battery terminals.

Alternator and starter motor

Have your authorized dealer check the alternator and starter motor.

Do not use steam cleaning equipment or a cleaning solvent to clean these components.

Alternator

Service specification	
Check	Every 1000 hours

Starter motor

Service specification	
Check	Every 1000 hours

Auxiliary battery connections

⚠ DANGER

Explosion hazard and/or run over hazard!
Read the procedure in the operator's manual before jump-start or service to avoid injury.
Failure to comply will result in death or serious injury.

D0149A

⚠ DANGER

Explosion hazard!
When jump-starting the machine, connect and disconnect the jumper cables as instructed in this manual. Make sure no persons are near the connecting points before starting the engine. Start the engine from the operator's seat.
Failure to comply will result in death or serious injury.

D0128B

Prior operation:
Keep all unauthorized personnel clear of the area. Shift the machine to neutral with the parking brake applied, and the attachment lowered to the ground.

Make sure that the voltage of the booster batteries is the same as that of the machine system (24 volts).

1. Turn off the ignition and all accessories on the machine(s).
2. Remove the battery terminal cover.
3. Connect one end of the positive (+) cable to the positive (+) terminal on the booster battery. Connect the other end of the positive (+) cable to the positive (+) terminal of the discharged battery.
4. Connect the negative (-) cable to the negative (-) terminal on the booster battery.
5. Connect the other end of the negative cable to the engine block or frame of the machine with the discharged battery. Do not connect the negative cable to sheet metal or any rotating part, as damage can result. Do not connect to the negative terminal on the battery.
6. Start the engine.
7. Always remove the booster battery negative (-) cable from the machine first, then from the booster battery. Remove the positive (+) cable from the machine and then from the booster battery.

NOTICE: *Do not connect booster battery cables to sheet metal or any rotating part, as damage can result.*

8. Install the terminal covers.

Battery removal and installation

⚠ CAUTION

Heavy parts!
Machine batteries are extremely heavy. Make sure the battery is supported safely during the removal process.
Failure to comply could result in minor or moderate injury.

C0050A

⚠ WARNING

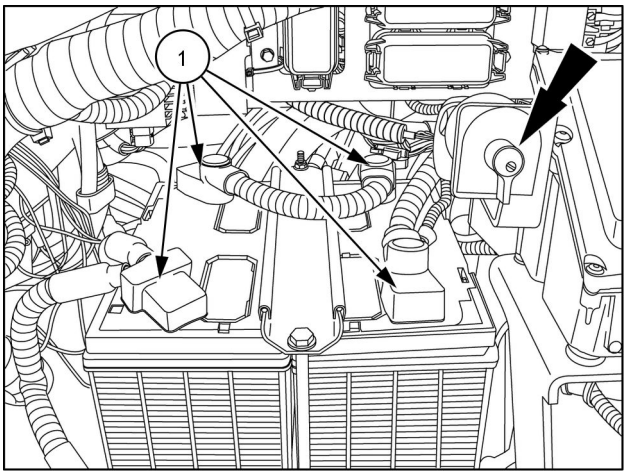
Chemical hazard!
When lifting a plastic-cased battery, excessive pressure on the end walls could cause acid to spill through the vent caps. Lift a plastic-cased battery with a battery carrier or with your hands positioned on opposite corners of the battery. Always wash your hands after handling.
Failure to comply could result in death or serious injury.

W0385A

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

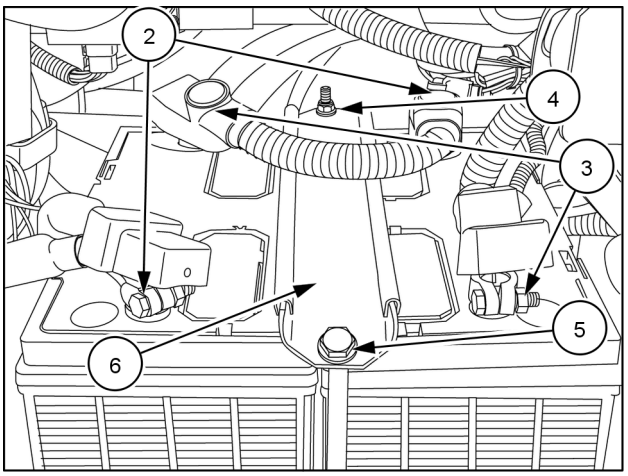
Replacing the battery

1. Turn the electronic disconnect switch to the OFF position.
2. Remove the terminal protection caps **(1)** from the battery terminals.



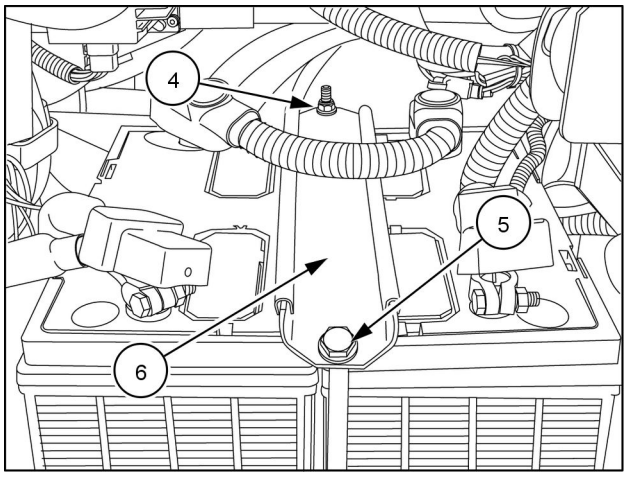
RAIL14DOZ0578AA 1

3. Disconnect the cables from the negative terminals **(2)**, then disconnect the cables from the positive terminals **(3)**.
4. Loosen the nut **(4)** and remove the bolt **(5)**. Then remove the battery retainer bracket **(6)** from the batteries.
5. Remove the batteries.



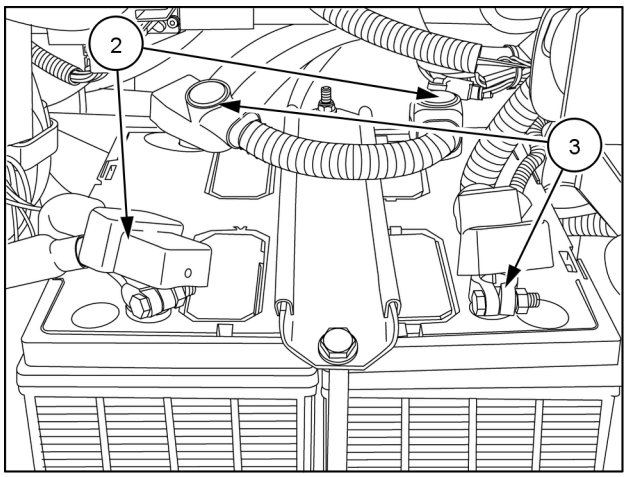
RAIL14DOZ0576AA 2

6. Install new batteries of the correct voltage. Center the bracket **(6)** evenly on both batteries. Torque the battery retainer bracket fasteners **(4)** and **(5)** to **3.4 - 5.4 N·m** (**2.5 - 4.0 lb ft**).



RAIL14DOZ0576AA 3

7. Clean the cables, and coat new battery terminals with grease or anti-sulfide spray.
8. Reconnect the positive cable ends to the positive terminals **(3)** first, then reconnect the negative cable ends to the negative terminals **(2)** .
9. Torque the battery terminal nuts **(2)** and **(3)** to **21.5 - 24.0 N·m** (**15.9 - 17.7 lb ft**).



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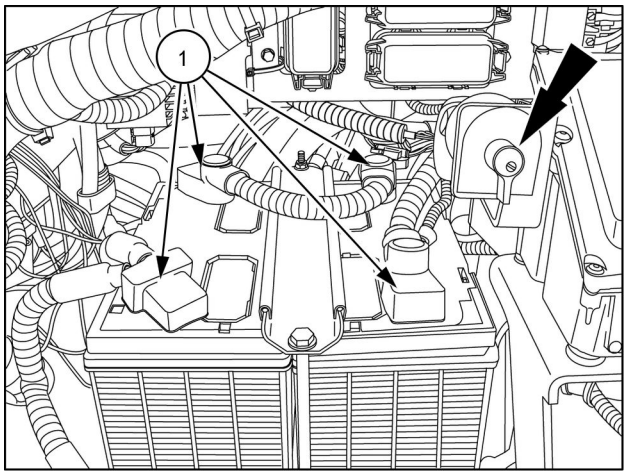
10. Install the terminal protection caps **(1)**.
11. Turn electronic disconnect to the ON position.

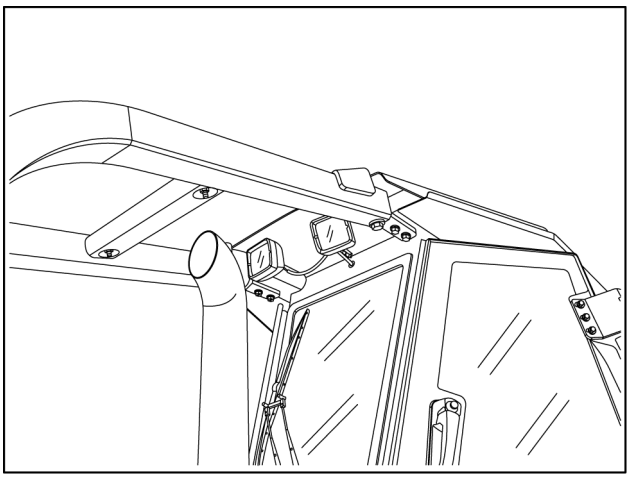


RAIL14DOZ0578AA 5

Work lights

Prior operation:
Keep all unauthorized personnel clear of the area. Park the machine on level ground, in neutral with the parking brake applied, and the attachment lowered to the ground, turn off the engine, remove the key, and verify that engine components have cooled or avoid contact. Make sure that all residual pressure is relieved from circuits before beginning maintenance.

1. To replace work lights, remove the Phillips screws from the front of the light.



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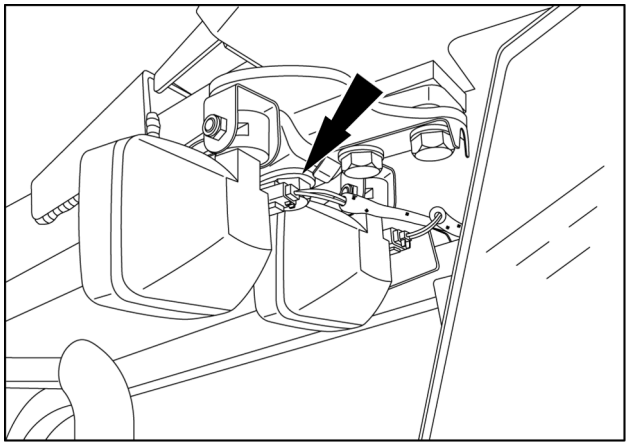
2. Disconnect push on connectors, and replace the lamp assembly. Push the connectors on, making certain connections are firmly in place.
3. Replace the lamp assembly, and secure the frame with the Phillips screws.

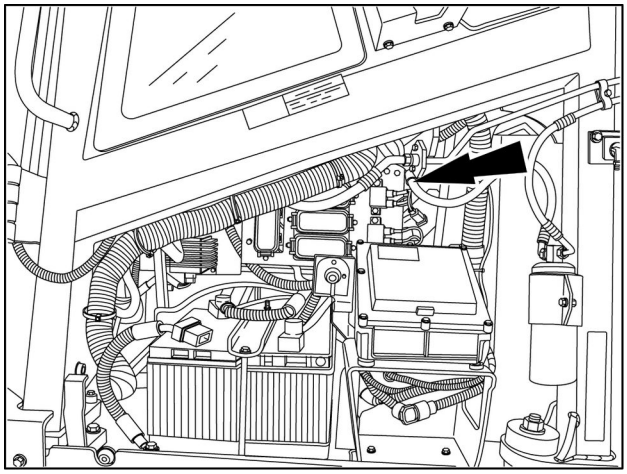


RAIL12DOZ0196AA 2

ELECTRICAL SYSTEM

Fuses and relays

Fuses and relays can be found inside the access door on the left-hand side of the machine.
If power does not come on when the key switch is turned to the ON position, check the appropriate fuse.
Before changing fuses or relays, turn the ignition key switch to the OFF position.
Check fuse function and location against fuse chart or informational sign on machine.



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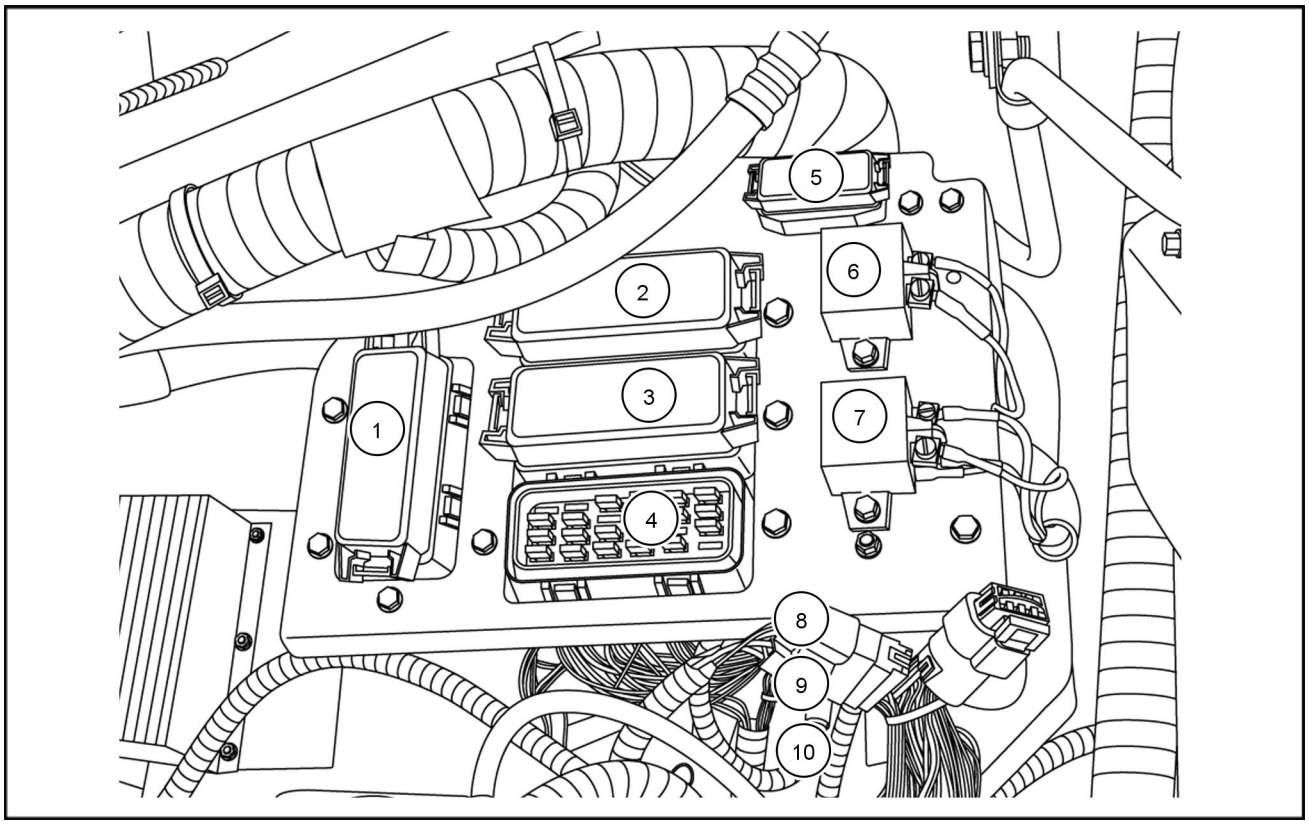

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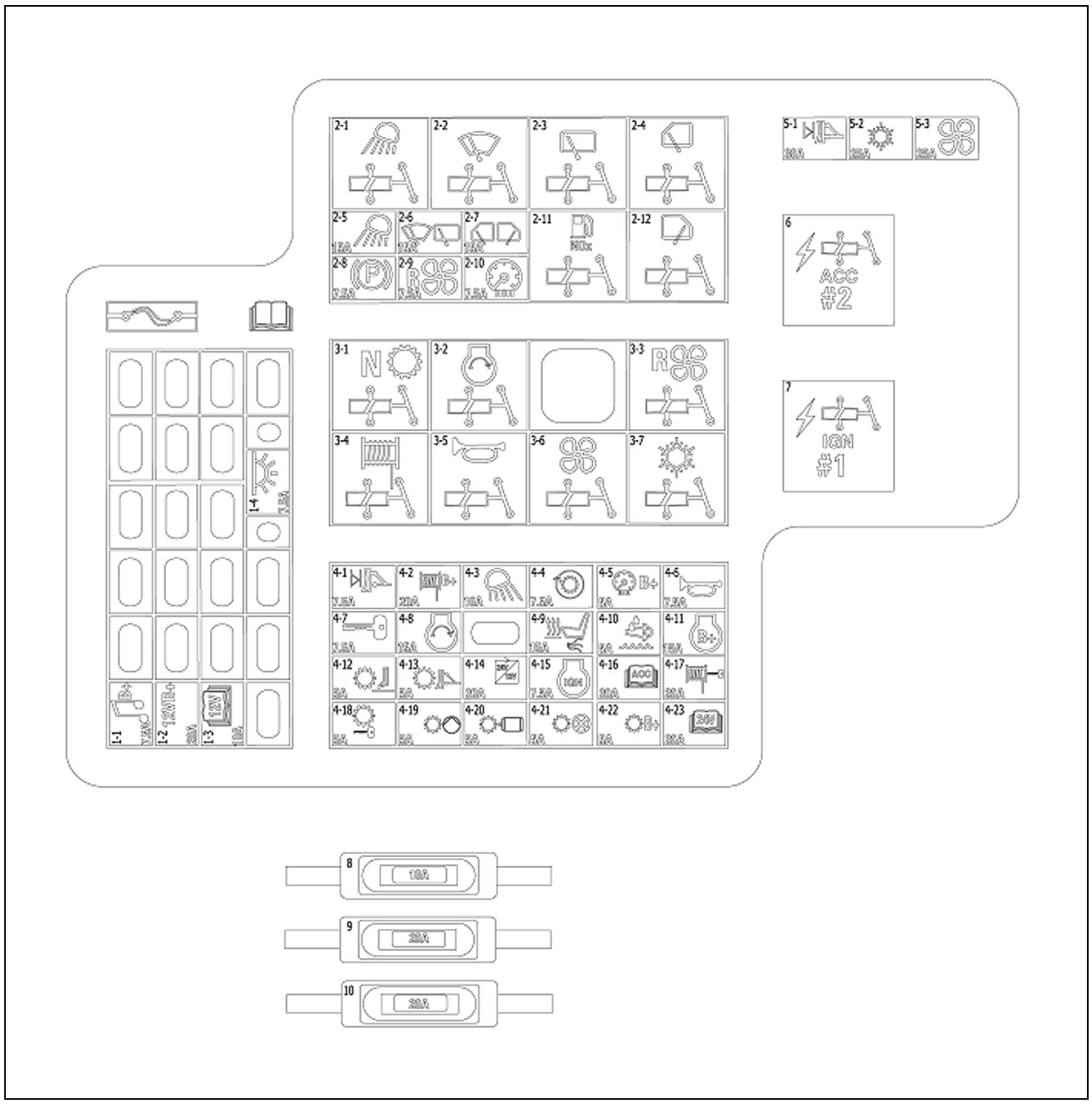


RAIL13DOZ1526GA 3

Key	Fuse function	Amperage
1-1	Radio	7.5 A
1-2	Power outlet	20 A
1-3	Customer option 12V, always active	10 A
1-4	Dome Light	7.5 A
2-1	Front lights relay	24V - 15A/10A
2-2	Front wiper relay	24V - 15A/10A
2-3	Rear wiper relay	24V - 15A/10A
2-4	Left wiper relay	24V - 15A/10A
2-5	Front lights	15 A
2-6	Front / Rear wiper	15 A
2-7	Left /Right wiper	15 A
2-8	Park brake	7.5 A
2-9	Fan reverse	7.5 A
2-10	Implement enable / Up - Down / Enter - Escape / Cluster	7.5 A
2-11	Nox sensor relay	24V - 35A
2-12	Right wiper relay	24V - 15A/10A
3-1	Vehicle safety relay	24V - 15A/10A
3-2	Starter motor relay	24V -15A/10A
3-3	Fan reverse relay	24V -15A/10A
3-4	Winch control relay (optional)	24V - 15A/10A
3-5	Horn relay	24V - 15A/10A
3-6	A/C relay (optional)	24V - 15A/10A
3-7	Condenser relay	24V - 15A/10A
4-1	Leveling (optional)	7.5 A
4-2	Winch (optional)	20 A
4-3	Rear lights	10 A
4-4	Speed sensor	7.5 A
4-5	Cluster	5 A
4-6	Horn	7.5 A
4-7	Key switch	7.5 A
4-8	Start	15 A
4-9	Air seat /ROPS heat	15A
4-10	Urea	5 A
4-11	ECU 1	15 A
4-12	VF/2	5 A
4-13	VF/4	5 A
4-14	Converter	20 A
4-15	ECU 2	7.5 A
4-16	Customer option 24V, ACC	20 A
4-17	Winch IGN (optional)	20 A
4-18	UCM key on	5 A
4-19	VF/3	5 A
4–20	VF/6	5 A
4-21	LED	5 A
4-22	UCM live	5 A
4-23	Customer option 24V, always active	20 A
5-1	Laser leveling	30 A
5-2	A/C condenser	25 A
5-3	A/C fan	25 A
6	Accessory	24V - 50 A

Key	Fuse function	Amperage
7	Ignition	24V - 50 A
8	Telematics	10 A
9	UCM	20 A
10	SCR	20 A

STORAGE

Preparation for storage

The following procedure applies when the machine is to be stored for a month or more. Store the machine on firm, level ground, inside a building or, if not possible, outside and covered with a tarpaulin. If stored outside in freezing temperatures, park the machine on planks to prevent the tracks from freezing to the ground. Before storing the machine:

1. Clean the machine.
2. Retract the arm cylinder rod as far as possible, and lower the attachment to the ground.
3. Grease the machine thoroughly. The exposed surfaces of the cylinder rods should be greased or covered with a protective film. See your authorized dealer.

NOTE: *When the machine resumes service, the film will disappear automatically*

4. Drain the fuel tank, and fill with a mixture of 90% diesel fuel and 10% anti-corrosive oil. Run the engine at idle speed for five minutes to allow the anti-corrosive oil to reach the lines, filters, pump and injectors.
5. While the engine is still warm, drain the oil sump, fill with anti-corrosive oil, and replace the engine oil filter.
6. When the engine is cold, clean the exposed engine components.
7. Clean or replace the air filter element.
8. Drain the cooling system. Leave the drain valves open, and do not tighten the radiator cap.
9. Drain the **DEF/ADBLUE®** tank.
10. Remove the batteries. Clean the battery housing. Make certain that no traces of battery acid remain. Store the batteries safely in a cool and dry location where the temperature will be higher than **0 °C** (**32.0 °F**).
11. Paint any areas of the paint that shows signs of deterioration.
12. Plug the air filter inlet and the exhaust pipe.
13. Remove the starter switch key, and place a DO NOT OPERATE label on the right-hand control arm.
14. Lock the hoods and the cab door.

Periodic checks

Every month, check:

1. The battery charge and battery electrolyte level. Recharge the batteries if required.
2. The grease on the cylinder rods and/or perform attachment functions monthly.
3. The fuel level in the fuel tank and the anti-corrosive oil level in the engine. Add more fluids, if necessary.
4. The condition of all lines, connectors and clamps (rust). Grease, if necessary.
5. The condition of the paint work. Apply a coat of anti-rust treatment where necessary.

Removal from storage

Starting up after storage

⚠ WARNING

Inhalation hazard! Risk to operators and bystanders.
Avoid running the engine in confined areas. Make sure there is adequate ventilation at all times.
Failure to comply could result in death or serious injury.

W0156A

1. Close the drain valves, and fill the cooling system.
2. If the **DEF/ADBLUE®** tank was drained for long term storage (90 days or more), refill the tank with fresh fluid.
3. Drain the fuel reservoir and top up with suitable fuel.
4. Drain the engine sump, fill with clean engine oil, and check the oil level.
5. Replace the filtering element of the fuel filters.
6. Install the batteries.
7. Grease the machine thoroughly.
8. Check the condition of the engine accessory drive belt, and replace the belt, if necessary.
9. Check the condition of the air conditioning drive belt and replace belt, if necessary.
10. Check the hydraulic fluid level, and add more fluid, if necessary.
11. Clean the cylinder rods.
12. Unplug the air filter inlet and the exhaust pipe.
13. Remove the DO NOT OPERATE tag, and start the engine following the starting up procedure. Keep non-authorized personnel clear of the machine.
14. Keep a careful watch on all systems display panel lamps and indicators.

8 - SPECIFICATIONS

General specifications

NOTE: *All specifications are given according to* ***SAE*** *standards or recommended practices where the specification applies.*

Engine	
Make and Model	F4HFE413P*A001
Firing order	1-3-4-2
Bore and stroke	**104.00 mm** (**4.09 in**) X **132.00 mm** (**5.20 in**)
Displacement	**4.5 l** (**274.6 in³**)
Compression ratio	17.5:1
Horsepower, Max, Rated Gross @ **2000 RPM**	**90 kW** (**120 Hp**)
Torque, Max, Peak gross @ **1500 RPM**	**500 N·m** (**369 lb ft**)
Engine speeds	
High idle	**2150 - 2250 RPM**
Rated speed	**2200 RPM**
Low idle	**1075 - 1125 RPM**
Engine gradeability — fore and aft	**45 °** maximum
Engine gradeability — side to side	**35 °** maximum
Travel speeds	
Speed forward	Infinitely variable from **0 - 9.3 km/h** (**0.0 - 5.8 mph**)
Speed reverse	Infinitely variable from **0 - 9.3 km/h** (**0.0 - 5.8 mph**)
Track pull (Maximum both tracks)	**190,442 N** (**42,813 lb**)
Power train	
Transmission - make	Rexroth
Transmission - type	Dual path hydrostatic
Pumps - model	AA4VTG
Pumps - type	Variable axle piston
Pumps displacement	**71 cm³**
Motors - model	AA6VM
Motors - type	Variable bent axis
Motors - displacement	**80 cm³**
Transmission - filter type	4 micron replaceable with 100 mesh suction screen
Brakes	
Steering brakes	Hydrostatic
Parking brakes	Spring applied hydraulically released
Final drive	
Final drives	2 helical gear reduction with planetary output reduction
Final drive ratio	62:4:1
Fuel System	
Fuel injection system	Electronic
Primary fuel filter rating	10 micron replaceable cartridge
Secondary fuel filter rating	30 micron replaceable cartridge
Electrical system 24 Volt	
Batteries	Two 12V batteries standard in series
Capacity	925 Cold Cranking Amps (CCA) at **-20.0 °C** (**-4.0 °F**) and 180 minute RC rating
Alternator	Attached regulator 24 V—120 AMPS
Starter motor	7.5 KW solenoid

NOTE: *Travel Speed and Track Pull are with CLT chain. If machine is equipped with CELT chain speed will increase 4% and track pull will reduce 4%. Actual track pull may differ from the calculated value because of relief valve tolerances and drive line efficiencies.*

Fluids and lubricants

Engine crankcase	
Capacity with filter change	**12.3 l** (**13.0 US qt**)
Capacity without filter change	**11.5 l** (**12.2 US qt**)
Specifications	**CASE AKCELA UNITEK NO. 1™ SBL CJ-4 SAE 10W-40**
Fuel tank	
Capacity	**189 l** (**50.0 US gal**)
Selective Catalytic Reduction System — **DEF/ADBLUE®**	
Capacity	**36.7 L** (**9.7 US gal**)
Cooling system	
Capacity	**21.8 l** (**5.75 US gal**)
Specifications	**50 %** Water and **50 % CNH XHD HEAVY DUTY COOLANT / ANTI-FREEZE** or **CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT**. Depending on the date of manufacture, the machine could have either coolant type. Machines with OAT coolant will have a decal near the fill location. Never mix conventional coolant with OAT coolant. See page **7-22** for instructions on switching coolant types.
Hydraulic reservoir/Transmission refill	
Capacity	**90 l** (**23.8 US gal**)
Specifications	**TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30**
Final drives	
Capacity - Each Side	**14.2 l** (**15.0 US qt**)
Specifications	**CASE AKCELA HY-TRAN® ULTRACTION**
Grease fittings	
Quantity	As Required
Specifications	**TUTELA MOLY GREASE GR-75**

NOTE: *If the ambient temperature is lower than* ***-37 °C*** *(****-34.6 °F****), adjust the mixture according to the coolant manufacturer specifications.*

Tracks - General specification

Track adjustment	Hydraulic
Track frame suspension	Rigid
Height of track shoe grouser	**52.3 mm** (**2.06 in**)
Track gauge	
LT	**1575 mm** (**62.0 in**)
WT/LGP	**1778 mm** (**70.0 in**)
Length of track on ground model with standard CASE Lubricated Track (CLT)	**2352 mm** (**92.6 in**)
Length of track on ground model with optional CASE Extended Life Track (CELT)	**2373 mm** (**93.4 in**)
Number of track shoe per side	40
Number of carrier rollers per side all models	1
Track rollers per side	7
CASE lubricated track (CLT)	Standard
CASE extended life track (CELT)	Optional

NOTE: *If machine is equipped with optional CELT chain ground pressure will be* ***0.7 kPa*** *(****0.1 psi****) greater.*

LT = Long Track

WT = Wide Track

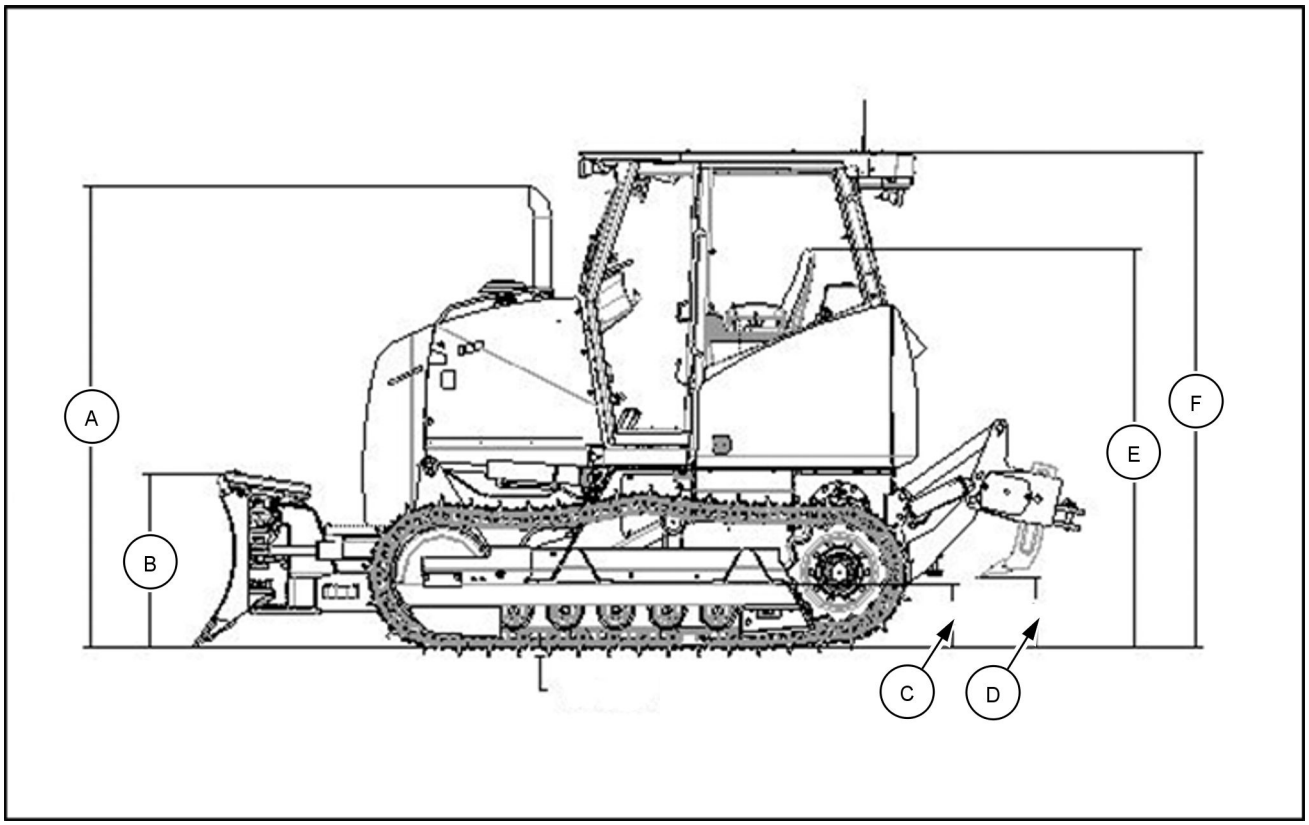
LGP = Low Ground Pressure

TRACTOR MODELS		
	LT	WT / LGP
NUMBER OF TRACK SHOES PER SIDE	40	40
NUMBER OF CARRIER ROLLERS PER SIDE	1	1
NUMBER OF TRACK ROLLERS PER SIDE	7	7
Track Frame	Reinforced boxed sections with replaceable sloped track covers	
All Models	MM	IN
CARRIER ROLLER RAIL DIAMETER	140	5.51
TRACK ROLLER RAIL DIAMETER	190	7.48
	MM	IN
LENGTH OF TRACK ON GROUND	CLT 2352	CLT 92.6
	ELT 2373	ELT 93.4
TRACK GAUGE	LT – 1575 WT/LGP — 1778	LT —62 WT/LGP — 70
TRACK SHOE WIDTH OPTIONS	LT 457	LT 18
	LT/WT 508	LT/WT 20
	WT 610	WT 24
	LGP 711	LGP 28

TRACTOR MODELS						
	LT		WT		LGP	
*** AREA OF TRACK ON GROUND (W/ CLT CHAIN):	CM^2	IN^2	CM^2	IN^2	CM^2	IN^2
457 MM (18 INCH) 1 BAR TRACK SHOE	21507	3334				
508 MM (20 INCH) 1 BAR TRACK SHOE	23896	3704	23896	3704		
610 MM (24 INCH) 1 BAR TRACK SHOE			28694	4448		
711 MM (28 INCH) 1 BAR TRACK SHOE					33445	5184

GROUND PRESSURE:		SHOE WIDTH			
		457.2 mm (18 in)	**508.0 mm (20 in)**	**609.6 mm (24 in)**	**711.2 mm (28 in)**
LT 62" GAUGE / PAT **2641.6 mm** (**104 in**) BLADE	KPA (PSI)	40.1 5.82	36.5 5.30		
WT 70" GAUGE / PAT **3048.0 mm** (**120 in**) BLADE	KPA (PSI)			31.3 4.54	
LGP 70" GAUGE / PAT **3149.6 mm** (**124 in**) BLADE	KPA (PSI)				27.6 4.00
* Values are for standard CLT (Case Lubricated Track)					
** Values are for optional CELT (Case Extended Life Track)					
*** Area of track on ground values for CLT — if unit is equipped with CELT, are on ground is 8% less.					
**** Ground pressure values for CLT — if unit is equipped with CELT, ground pressure is 1PSI greater.					

Machine specifications and dimensions



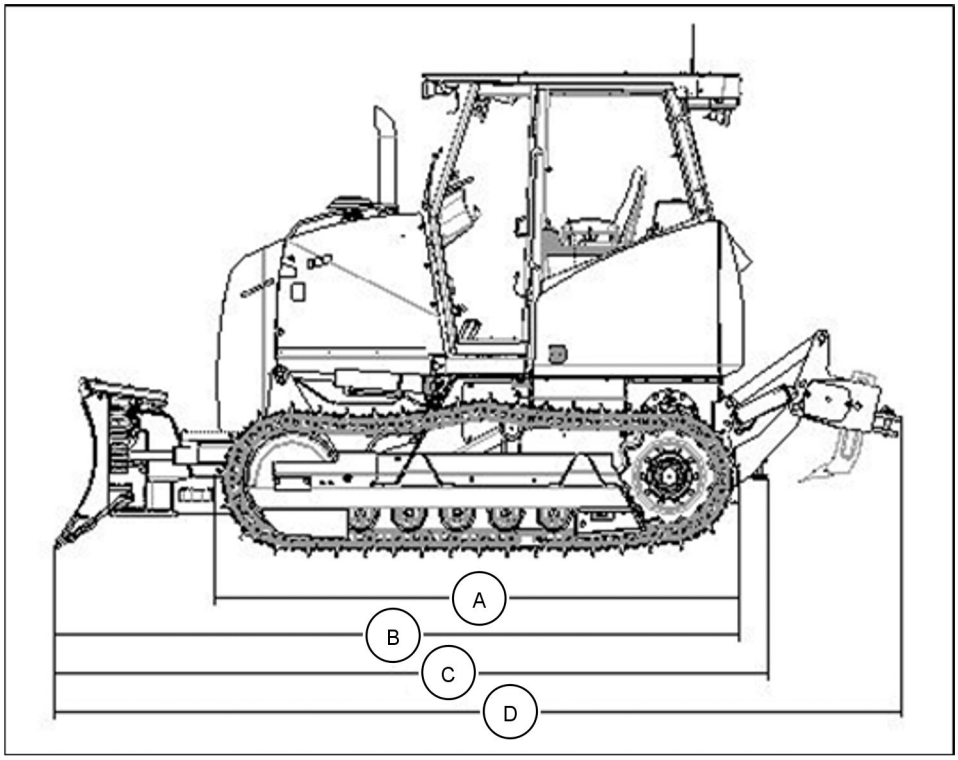
RAPH13DOZ1549GA 1

Height and ground clearance dimensions

	Model		
A	Top of exhaust stack	**2674 mm** (**105.3 in**)	
B	Blade height	**918 mm** (**36.1 in**)	
C	Ground clearance at belly pans	**366 mm** (**14.4 in**)	
C2	Ground clearance at drawbar	**450 mm** (**17.7 in**)	
C3	At center line of drawbar opening	**506 mm** (**19.9 in**)	
D	Shank height (Transport position)	**440 mm** (**17.3 in**)	
E		CLT Chain	CELT Chain
	Top of seat head rest	**2229 mm** (**87.8 in**)	**2245 mm** (**88.4 in**)
F	Height of cab with air conditioning	**2773 mm** (**109.2 in**)	**2789 mm** (**109.8 in**)
	Height of ROPS canopy	**2788 mm** (**109.8 in**)	**2804 mm** (**110.4 in**)

NOTE: *Ground clearance and overall height dimensions are with the grouser fully penetrated per* ***ISO 6746-1****. Add* ***52.3 mm*** *(****2.059 in****) if machine is on solid surface.*

** Ripper transport with shank in midrange position.



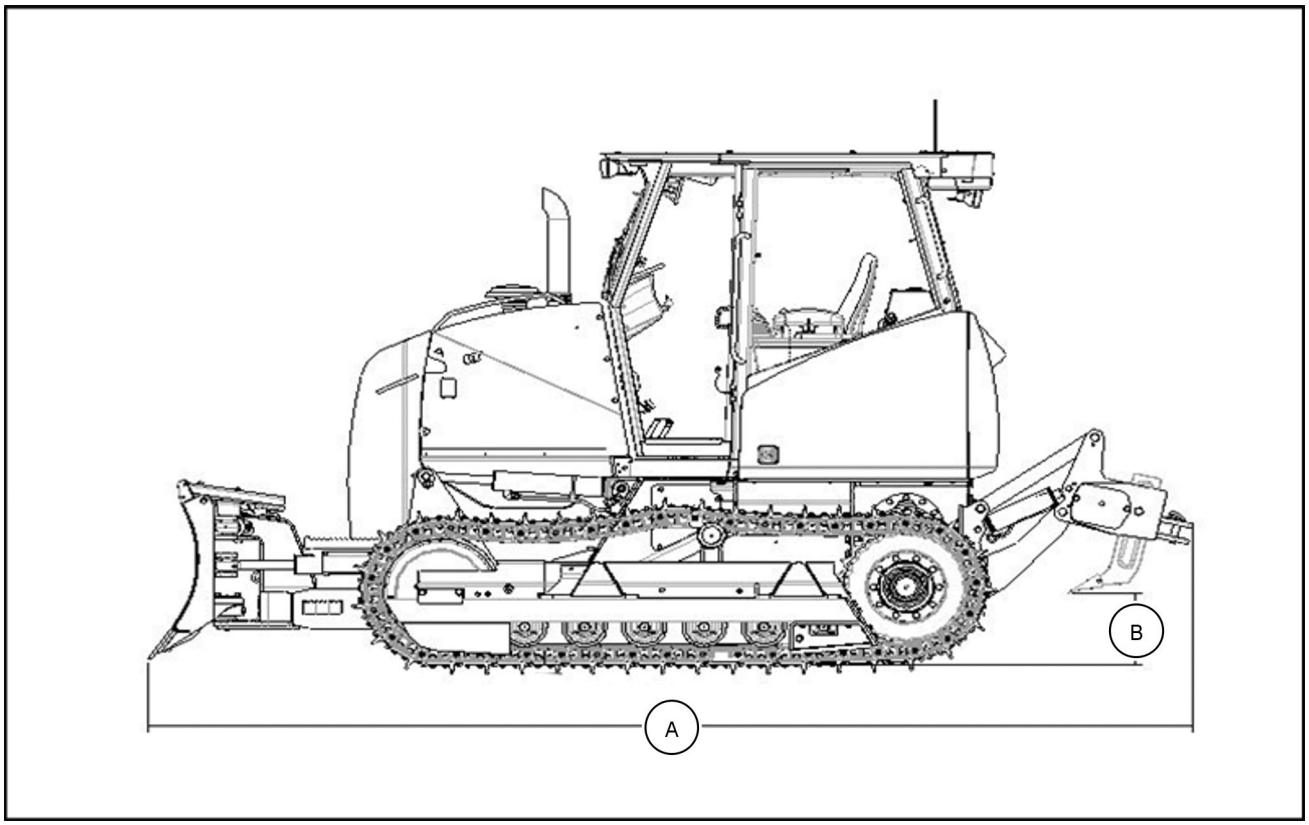
RAPH13DOZ1550GA 2

Length dimensions with blade straight

		CLT chain
A	Overall length without blade, without rear equipment	**3261 mm** (**128.4 in**)
B	Overall length blade straight , without rear equipment	**4258 mm** (**167.6 in**)
C	Overall length, blade straight, with drawbar	**4408 mm** (**173.5 in**)
D	Overall length, blade straight, with ripper	**5233 mm** (**206.0 in**)

NOTE: *Overall length is with blade pitch at* ***55 °****.*

Ripper specifications



RAIL13DOZ416GA 1

Operating data and dimension - Ripper Long Track (LT) - Wide Track (WT) - Low Ground Pressure (LGP)

Overall length in transport position	**5086 mm** (**200.2 in**)
Overall length with ripper shank resting on the ground line	**5264 mm** (**207.2 in**)
Ripper shanks in top position	
Lift **442 mm** (**17.4 in**)	Dig **241 mm** (**9.5 in**)
Ripper shank in mid position	
Lift **384 mm** (**15.1 in**)	Dig **301 mm** (**11.9 in**)
Ripper shank in bottom position	
Lift **325 mm** (**12.8 in**)	Dig **361 mm** (**14.2 in**)

Type of control	Hydraulic cylinders — double acting
Overall width (Maximum)	**1805.9 mm** (**71.1 in**)
Width of cut (Maximum)	**1765.3 mm** (**69.5 in**)
Number of teeth (Standard)	3
Number of teeth (Maximum)	3
Shank width **38.1 mm** (**1.5 in**)	Tooth width **52.32 mm** (**2.06 in**)
Type of control: Two hydraulic cylinders (double acting) **9.9 cm** (**3.9 in**) DIA X **21.3 cm** (**8.4 in**) Stroke x **4.4 cm** (**1.8 in**) rod Lift force taken at drawbar with shanks on ground line	

NOTE: *Lift and dig dimensions are with the grouser fully penetrated per* ***ISO 6746-1****. Add* ***52.6 mm*** *(****2.07 in****) if unit is on solid surface.*

Machine weights

Operating weight

Unit equipped with cab, full fuel and hydraulic tank, **77 kg** (**170 lb**) operator, CLT chain, front pull hook, rear retrieval hitch, track guides, backup alarm, horn, lights, track shoe, C-frame, and blade width as noted.

LT	WT	LGP
(62 in Gauge) **2438.4 mm** (**96 in**) Pat Blade **457.2 mm** (**18 in**) Shoe	(70 in Gauge) **2844.8 mm** (**112 in**) Pat Blade **609.6 mm** (**24 in**) Shoe	(70 in Gauge) **3048.0 mm** (**120 in**) Pat Blade **711.2 mm** (**28 in**) Shoe
9970 kg (**21980 lb**)	**10320 kg** (**22752 lb**)	**10547 kg** (**23252 lb**)

Shipping weight

Shipping weight includes base unit weight, **56.8 l** (**15 US gal**) fuel, full hydraulic system, front pull hook, frame and blade as noted. Add for rear mounted equipment, track chain and sprocket, ROPS canopy or cab and any optional equipment.

LT	WT	LGP
(62 in Gauge) **2438.4 mm** (**96 in**) Pat Blade **457.2 mm** (**18 in**) Shoe	(70 in Gauge) **2844.8 mm** (**112 in**) Pat Blade **609.6 mm** (**24 in**) Shoe	(70 in Gauge) **3048.0 mm** (**120 in**) Pat Blade **711.2 mm** (**28 in**) Shoe
9779 kg (**21560 lb**)	**10129 kg** (**22331 lb**)	**10355 kg** (**22830 lb**)

Add for rear equipment

Ripper	**635 kg** (**1399.9 lb**)
Drawbar	**38 kg** (**83.8 lb**)
Pull hook	**13 kg** (**29 lb**)

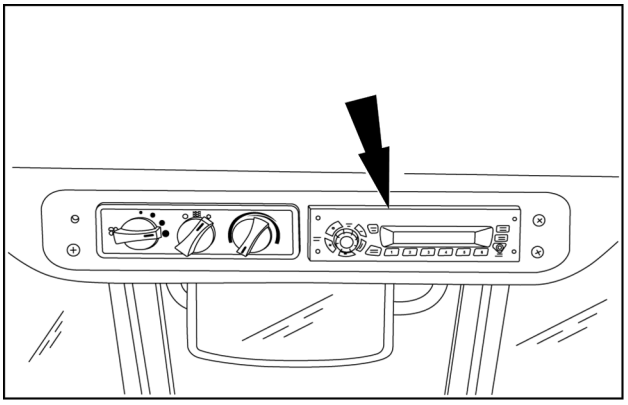
Add for track shoes, chains, & sprockets

	LT	WT	LGP
CLT with **457.2 mm** (**18 in**) Closed Shoe	**1448 kg** (**3192.3 lb**)	**1448 kg** (**3192.3 lb**)	
CELT with **457.2 mm** (**18 in**) Open Shoe	**1512 kg** (**3334 lb**)	**1512 kg** (**3334 lb**)	
CLT with **508.0 mm** (**20 in**) Closed Shoe	**1556 kg** (**3431 lb**)	**1556 kg** (**3431 lb**)	
CELT with **508.0 mm** (**20 in**) Open Shoe	**1614 kg** (**3558 lb**)	**1614 kg** (**3558 lb**)	
CLT with **609.6 mm** (**24 in**) Closed Shoe		**1736 kg** (**3828 lb**)	
CELT with **609.6 mm** (**24 in**) Open Shoe		**1800 kg** (**3969 lb**)	
CLT with **711.2 mm** (**28 in**) Closed Shoe			**1924 kg** (**4242 lb**)
CELT with **711.2 mm** (**28 in**) Open Shoe			**1988 kg** (**4384 lb**)

9 - ACCESSORIES

Radio (if equipped)

A radio (if equipped) is available for this machine from your authorized dealer. Refer to the radio manufacturer's instructions for correct operation.



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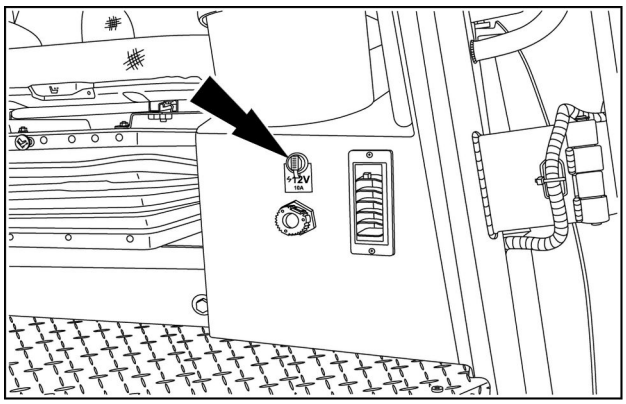
Auxiliary power outlet

The auxiliary power outlet socket (**12 V**) is located in the lower left corner of the operator's compartment below the left control console.



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Dealer's stamp

CNH Industrial America LLC reserves the right to make improvements in design and changes in specifications at any time without notice and without incurring any obligation to install them on units previously sold. Specifications, descriptions, and illustrative material herein are as accurate as known at time of publication, but are subject to change without notice.

Availability of some models and equipment builds varies according to the country in which the equipment is being used. For exact information about any particular product, please consult your Case dealer.

CASE CONSTRUCTION