2050M (BD TIER3)
2050M (PAT TIER3)
Crawler Dozer

OPERATOR'S MANUAL

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CASE CONSTRUCTION

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1 - GENERAL INFORMATION

Note to the owner

Introduction

This manual has been developed as a guide for the safe and proper use of the machine, as well as for its maintenance. Always follow the recommendations in this manual to ensure the best performance, cost-effective operation and long service life of your machine. The manual is in sections. For a list of sections, see the table of contents. Refer to the index at the back of this manual for locating specific items about your machine.

This manual contains all of the information related to daily maintenance, periodic maintenance, correct use and procedures for safe operation and maintenance of the machine. Some maintenance services require technical skills and appropriate tools for execution. Allow only trained technicians to perform such maintenance services on the machine. The recommendations in this manual also allow you to prevent the most common causes of accidents that might occur during work or maintenance operations of the machine. If you are in any doubt, consult your Authorized CASE CONSTRUCTION Dealer.

Read and fully understand all of the instructions and warnings in this manual before you start the engine or operate the machine. Pay special attention to the instructions related to safety, operation and maintenance to avoid unnecessary risks or injuries when you use or perform maintenance operations on the machine. Do not operate this machine or perform maintenance work if you have not had appropriate training. Have all operators read this manual carefully.

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. Make sure that your Authorized CASE CONSTRUCTION Dealer has provided complete and current information before you start to operate any machine.

Do NOT remove this manual from the machine. It should be stored and kept in the appropriate compartment in the cab. Make sure this manual is complete and in good condition. Contact an Authorized CASE CONSTRUCTION Dealer if you need additional manuals or manuals in other languages. Always keep the manual in its compartment.

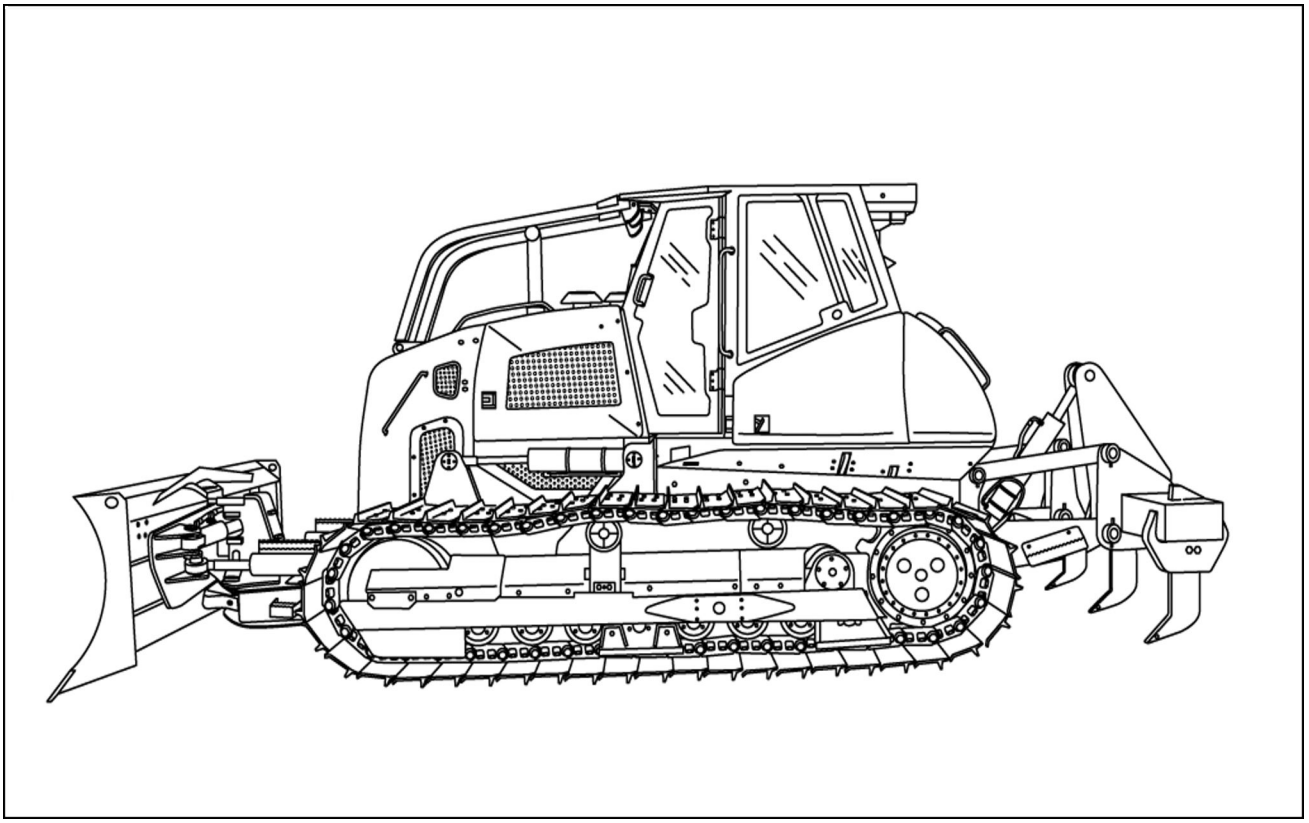
Your machine was designed and manufactured in accordance with the strictest quality standards. It complies with the current safety regulations. Never use the machine for applications that are not included in this manual. Modifications made without authorization could result in serious or fatal accidents. Anyone making such unauthorized modifications shall be accountable for the consequences. The engine and fuel system of the machine are designed and manufactured in accordance with government emissions regulations. Tampering by dealers, customers and operators is strictly prohibited by law. Failure to comply with this recommendation could result in government fines, rework costs, voided warranty, lawsuits, and possible confiscation of the machine until it is returned to its original design. Technical assistance to the engine and repairs must be done by a certified technician only.

Your Authorized CASE CONSTRUCTION Dealer will provide assistance with technicians specially trained and able to use the best methods in carrying out maintenance and repair services on your machine, using genuine CASE CONSTRUCTION-approved parts.

The dealer can also provide additional information, as well as after-sales service that involves the acquisition of genuine parts, quality assurance and total reliability.

For additional information, see your Authorized CASE CONSTRUCTION Dealer.

Basic information



RAIL12DOZ0388FA 1

Your tractor has an electronic engine that gives you more power and less consumption. The tractor travel speed can be adjusted in three different ways: with the speed variation lever, with the two buttons on the travel joystick, or if you activate the joystick forward or backward according to the desired demand. It has a single pedal with two functions (brake or decelerator) that acts on the engine rotation or on the pump flow rate in order to ensure greater accuracy or better braking efficiency.

The hydrostatic transmission system always ensures the delivery of adequate power to the torque required for the work, and thus prevents slipping. The tractor can easily turn with traction on both tracks or even rotate around its central axis without moving (counter-rotation). Because it has fewer components than a standard solution, the maintenance is faster, easier, and cheaper.

The joystick has the exclusive function of (PDC) “Proporcional Dozer Control”, which ensures smooth motion for better leveling work and more comfortable operation. This also has the option of three steering reaction and inversion speeds for greater productivity and comfort.

The hydrostatic drive can operate at a higher rotation. This reduces the total pressure and, consequently, reduces the strain on individual components. This reduction is because the triple final drive adds a planetary reduction to the existing standard double final drive. The two final drives are attached directly to the main chassis for better distribution of the effort, as well as easy disassembly in case of extraordinary maintenance.

The tractor has a monoblock main chassis in which all vital components of the tractor, such as the engine and transmission, are assembled and built into the new chassis. All typical efforts of the tractor are equally distributed. This reduces component wear, guarantees excellent performance for longer time, and results in faster service and inspections.

Intended use

DO NOT use your crawler for operations different from those specified or for operations that are not described in this manual, to prevent serious harm to people or damage to the machine. The manufacturer and your dealer are not responsible for damages caused by improper use. Your crawler, with standard equipment and authorized attachments, was designed for aboveground material handling operations, such as opening and maintenance of roads, cleaning areas, preparation of areas for mining, etc. If you want to use your crawler in an application that requires special implements or equipment, see your Authorized CASE CONSTRUCTION Dealer.

ATTENTION: *This machine is not intended for forestry applications (clearing and stump removal). DO NOT use this machine for any application or purpose other than those described in this manual, the decals, or other product safety information provided with the machine. These materials define the machine's intended use.*

Read the operator's manual

Important information

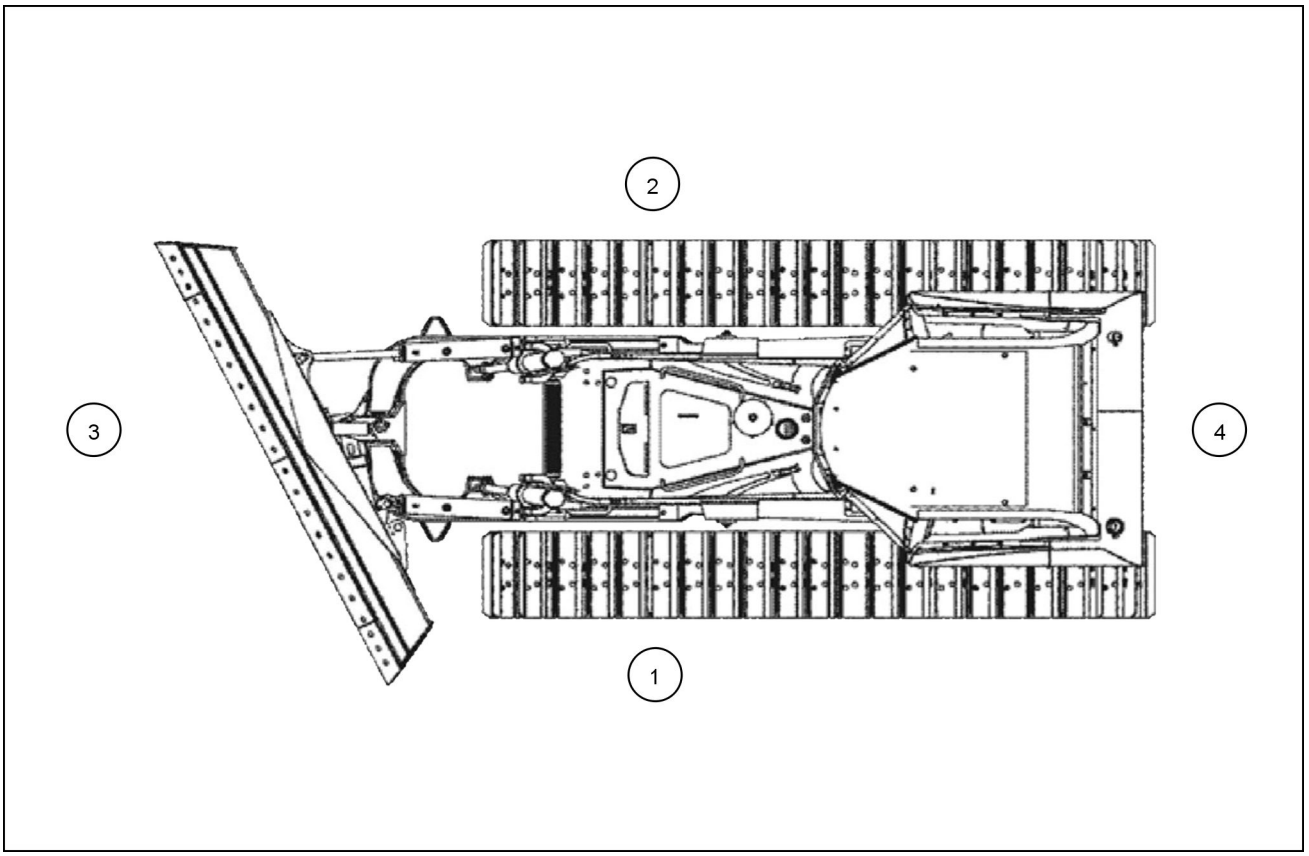
- Each machine is supplied with a copy of this manual.
- This manual has been developed as a guide for the safe and proper use of the machine, as well as for its maintenance. Always follow the recommendations in this manual to ensure the best performance, cost-effective operation and long service life of your machine.
- The manual is in sections. For a list of sections, see the table of contents. Refer to the index at the back of this manual for locating specific items about your machine.
- The "SAFETY INFORMATION" chapter contains important information about safety at the time of maintenance, adjustments and safe operation of the machine, and also contains information about the use of safety messages found throughout this manual.
- The "MAINTENANCE" chapter contains important information about lubrication, cleaning work, maintenance and adjustments of the machine.
- The "SPECIFICATIONS" chapter contains important information about weights, dimensions, torques, and general specifications of the machine.
- The remaining chapters provide operating instructions for the machine, its controls, instruments, and accessories, and information about transport, storage and operation of the machine.
- READ THIS MANUAL COMPLETELY and make sure that you have learned how to operate the machine and its controls correctly and safely. It is your responsibility to read and understand the operator's manual and other provided information before you start to operate the machine. This information includes the speed, brakes, steering, stability and load characteristics of the machine.
- Do not operate this machine or perform maintenance work if you have not had appropriate training. Read and fully understand all the instructions and warnings in this manual. Have all operators read this manual carefully.
- If you follow the basic safety procedures and precautions, you can avoid most accidents that relate to machine inspection and maintenance services.
- Always see the Operator's Manual when you have doubts about any operating procedure of the machine. Read and understand all the safety warnings contained in this manual and all the safety decals on the machine. Correctly follow the maintenance procedures. See your Authorized CASE CONSTRUCTION Dealer if you have any doubts.
- DO NOT remove this manual from the machine. Make sure this manual is complete and in good condition. Contact an Authorized CASE CONSTRUCTION Dealer if you need additional manuals or manuals in other languages. Always keep the manual in its compartment.
- Your machine is compliant with current safety regulations, but the safety information in this manual does not replace safety rules, insurance requirements, and federal, state or local laws. Make sure that your machine has all the appropriate and certified equipment in accordance with these government codes or laws. Consult an Authorized CASE CONSTRUCTION Dealer about changes to your machine.
- CASE CONSTRUCTION reserves the right to improve designs and change specifications at any time, without obligation to install them on previously sold units. The specifications, descriptions, and illustrative materials here correctly reflect the data known on the publication date, but may vary by region and are subject to change without notice. Therefore, all content in this publication is subject to production variations. These variations can affect the maintenance that you perform on the machine. Make sure that your Authorized CASE CONSTRUCTION Dealer has provided complete and current information before you start to operate any machine.
- The illustrations may include optional equipment and accessories, and may not include all standard equipment.
- Dimensions and weights in this manual are only approximate.
- Additional safety messages are used in the text of the manual to show specific safety hazards. Pay attention.

NOTICE: *The safety messages in this manual are intended to illustrate the basic safety procedures of the machine. However, it is impossible for these safety messages to cover all dangerous situations you may encounter. If you have any doubts, consult your direct supervisor prior to operating or performing any maintenance service on the machine.*

Identification Identification of the sides of the machine

Left-hand side, right-hand side, front, and rear

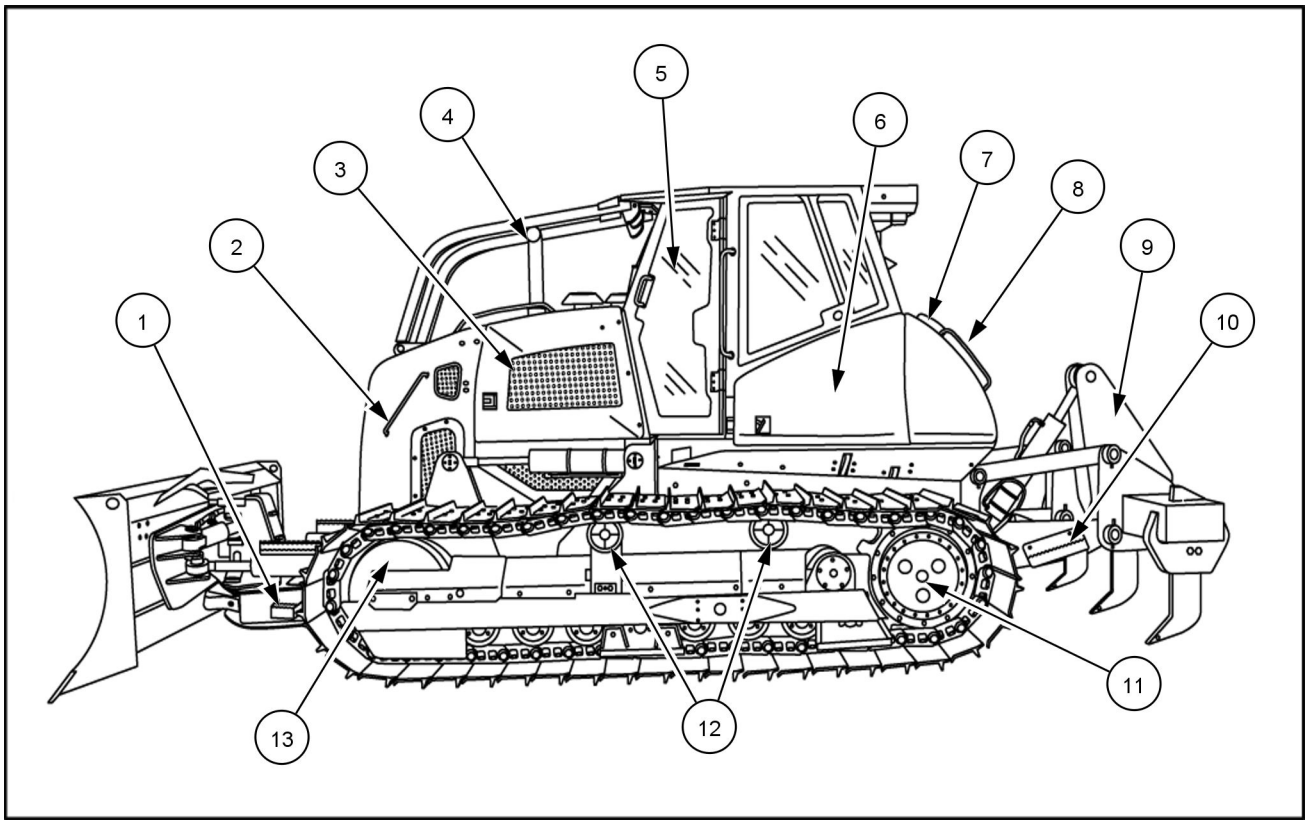
NOTE: *In this manual, the terms "left-hand side" and "right-hand side" indicate the sides of the machine as seen from the operator's seat.*



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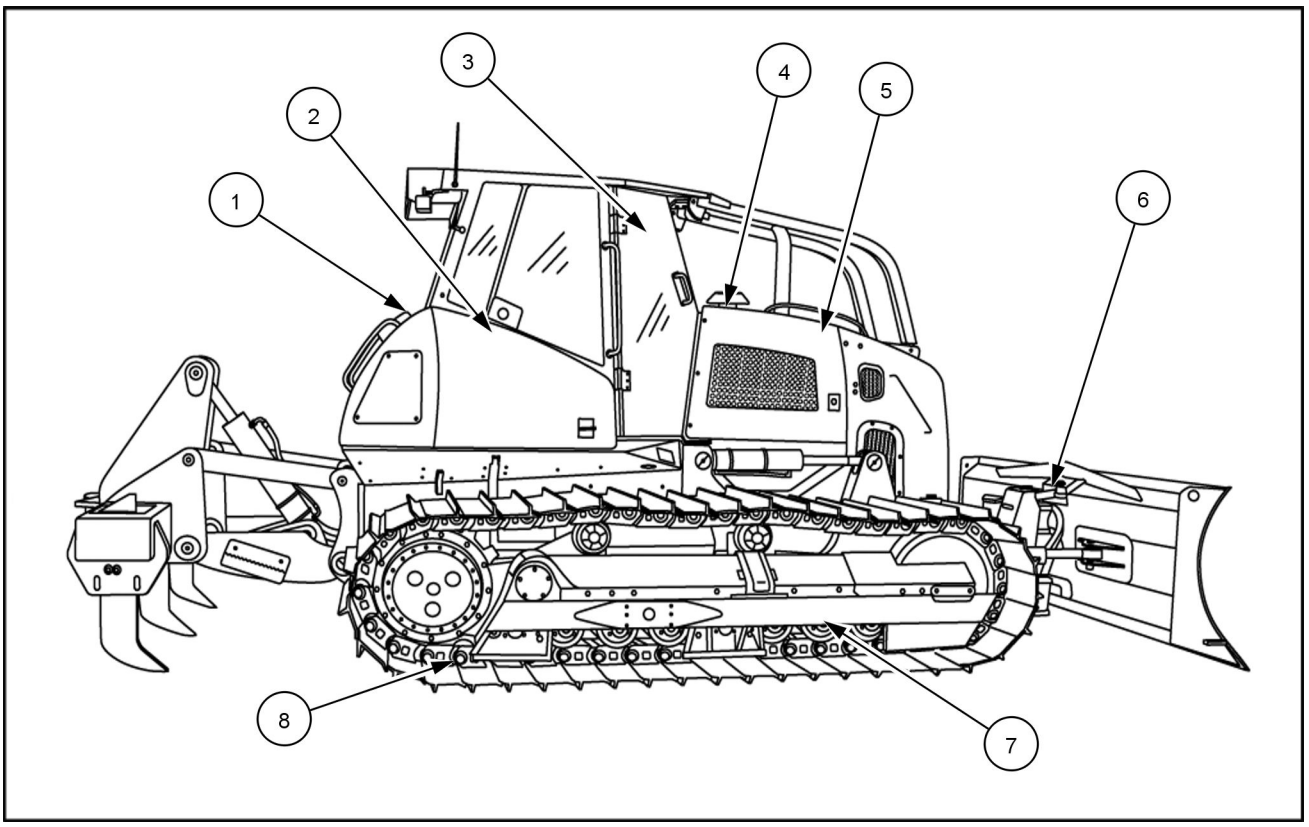
1. Left-hand side
2. Right-hand side
3. Front
4. Rear

Machine components



RAIL12DOZ0388FA 1

1. Front step (if equipped)
2. Front handhold
3. Left front access door
4. Exhaust muffler
5. Left cab door
6. Left rear access door
7. Fuel reservoir
8. Rear handhold
9. Ripper (if equipped)
10. Ripper step (if equipped)
11. Travel reducer
12. Top track roller
13. Track tensioner wheel



RAIL12DOZ0389FA 2

1. Hydraulic Fluid Reservoir
2. Right rear access door
3. Right cab door
4. Telematics system antenna (if equipped)
5. Right front access door
6. Blade tilt link
7. Lower track roller
8. Track links

Identification plates

Model, serial number, and year of manufacture

When you order parts or obtain information or technical assistance, tell your dealer the serial number and type of the machine or implements.

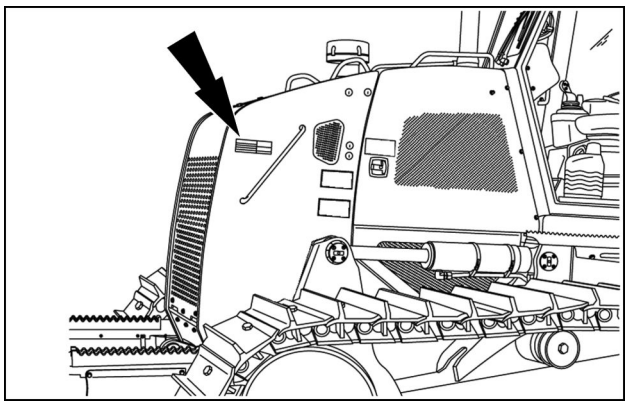
Write the following information in the spaces on the tag: the type, serial number and year of manufacture of your machine, implements, and the serial numbers of the different hydraulic and mechanical components.



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Machine identification

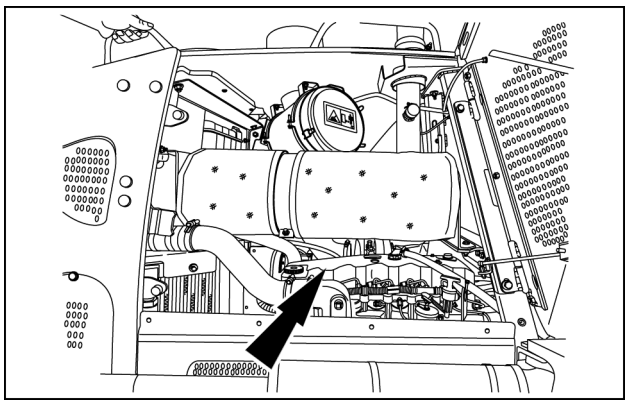
The plate with the machine identification data is located on the left-hand side of the machine, on the engine access door.



COIL14DOZ0115AB 2

Motor

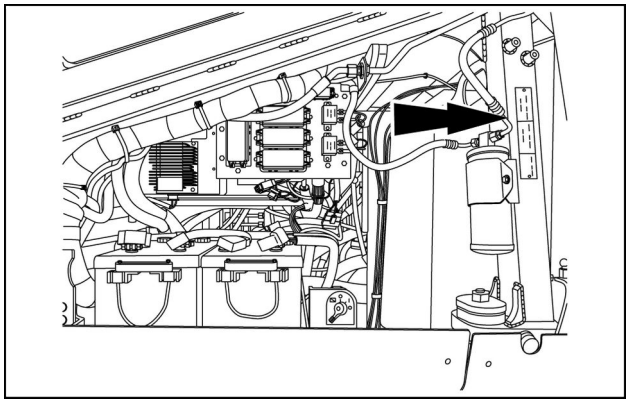
The plate with the engine identification data is located on the engine valves cover.



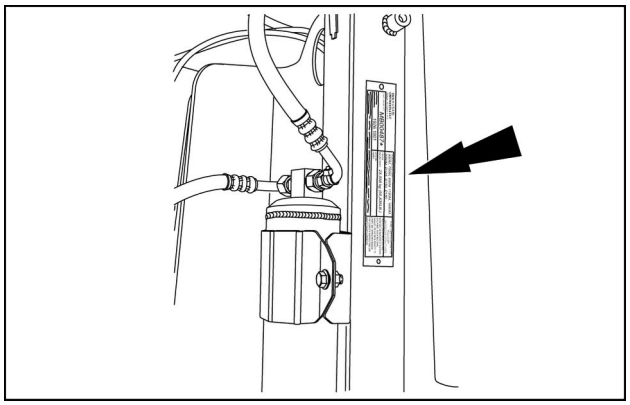
COIL15DOZ0086AA 3

Rollover protective structure (ROPS)

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



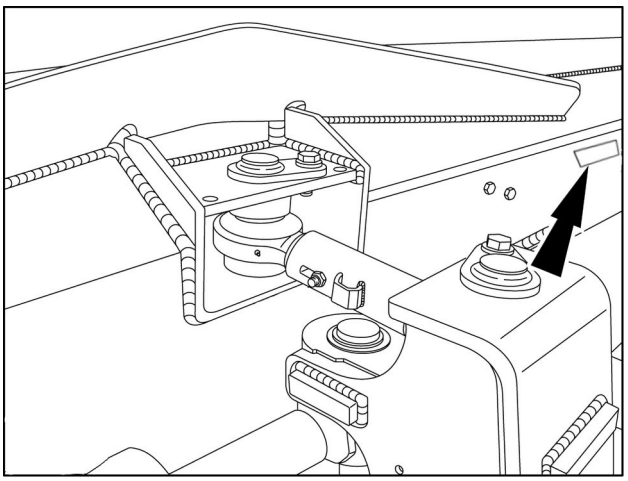
COIL14DOZ0106AA 4



COIL14DOZ0107AA 5

Blade

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



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Ecology and the environment

Ecology and environment

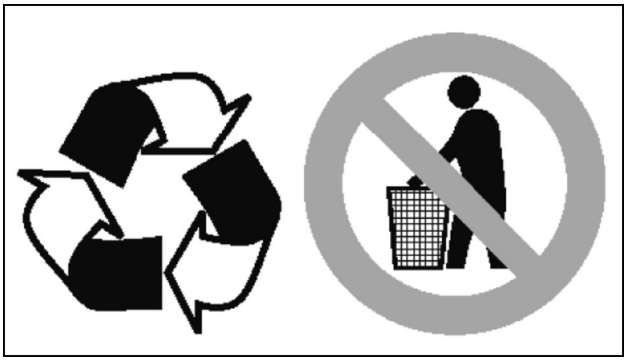
Soil, air and water are vital factors of life in general. Disposing of waste improperly represents a danger for the environment.

NOTE: *Some recommendations must be followed:*

- Obtain information about the correct methods to recycle or dispose of waste from local authorities, collection centers or your dealer.
- Do not dispose of waste onto the ground, into drains, or in water beds.
- Do not fill reservoirs using cans or inappropriate pressurized fluid delivery systems, as they may cause considerable spillage.
- Use sealed containers when draining the fluids. Do not use containers for food or beverages which may induce ingestion.
- The air conditioning system is under pressure, and contains gases that should not be released into the atmosphere. Do not disconnect or remove any component from the pressure line of the air conditioning system. If you need repairs to the air conditioning system, contact a dealer.
- Immediately repair any leaks or defects in the machine's engine cooling and hydraulic systems.
- Generally avoid skin contact with any fuels, oils, fluids, acids, solvents, etc. Most of them contain substances which may be harmful to your health.
- Avoid spills when draining fluid. Store them safely until they can be disposed of properly in compliance with local legislation.
- Protect hoses and pipes during welding works, because the sparks generated during the welding work can damage them, allowing the fluid to leak.

Mandatory recycling

The battery is essentially composed of lead plates and sulfuric acid solution. Because the battery contains heavy metals such as lead, resolution 401 de 2008 of CONAMA orders that all used batteries must be returned to the battery dealer at the time of replacement. Do not dispose of the battery in the garbage. Points of sale are obliged to accept the return of your used battery, and to store it in a suitable place and return it to the manufacturer for recycling.



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Improper disposal of batteries can contaminate the soil, groundwater and waterways. Consumption of contaminated water can cause serious health risks. Contact of the acid solution with the skin or eyes can cause serious injury and blindness. In case of accidental contact with the eyes or skin, immediately wash with running water and seek emergency medical care.

Biodiesel - Biodiesel fuel

Introduction

Fatty acid methyl ester (FAME) fuel, called biodiesel fuel in this section, is a family of fuels derived from vegetable oils treated with methyl esters.

There are two main types: rapeseed methyl ester (RME) and soybean methyl ester (SME). RME is a blend of rapeseed and sunflower methyl ester, and is the preferred type in Europe. SME is the preferred type in the United States.

Diesel engines can be run with pure biodiesel fuel or a blend of standard diesel fuel and biodiesel fuel:

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

NOTE: *Check on the biodiesel decal which blend is suitable for your machine.*

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

- Biodiesel fuel adds lubricity to the fuel, which is beneficial in many circumstances, particularly as sulfur and aromatics are removed from the fuel.
- Biodiesel has a greater cetane number and burns cleaner.
- Biodiesel produces less particulate matter and reduces smoke emissions.
- Biodiesel fuel is fully biodegradable and non-toxic.

Diesel and biodiesel fuel specifications

Diesel fuel specifications are below:

- Brazil: **ASTM D975-10** – standard specification for diesel fuel oils (maximum of 500 ppm sulfur) for TIER 3 engines (MAR-1)
- Argentina: 6537-1:1997 and 6538:2010

Biodiesel blends are covered by:

- The specification for diesel in Brazil ASTM D6751-09A allows up to **7%** of biodiesel. Brazilian fuel suppliers can use up to **7%** of biodiesel fuel (B7) to supply the network.

Before crude oil can be converted into usable biodiesel, it must undergo transesterification to remove glycerides. During the transesterification process, the oil reacts with an alcohol to separate the glycerine 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).

NOTE: *Biodiesel fuels approved for use in CASE CONSTRUCTION equipment must be transesterified and must comply with Brazilian* ***ASTM D6751*** *and Argentine 6515-1:2013 standards.*

NOTICE: *Cold pressed biodiesel, cold pressed oil, straight vegetable oil (SVO), or more generally unrefined vegetable oils used as motor fuel are fuels that are normally made from rapeseed oil or similar high oil content crops. These fuels are not transesterified and do not meet* ***ASTM D6751*** *or 6515-1:2013 requirements. There is no recognized quality standard available for these fuels. Therefore the use of cold pressed biodiesel, cold pressed oil, straight vegetable oil (SVO) or unrefined vegetable oils are NOT APPROVED at any blend in any CASE CONSTRUCTION product.*

NOTICE: *Any engine and fuel injection equipment on a CASE CONSTRUCTION vehicle operated with any blend of NON-APPROVED fuel (fuel that does not meet the specification described in requirement* ***ASTM D6751*** *for Brazil and 6515-1:2013 for Argentina) will no longer be covered by the CASE CONSTRUCTION warranty.*

Fuel usage conditions

You must follow fuel usage conditions. Incorrect use can lead to severe damage to both the engine and the fuel injection equipment.

The main concerns when operating with biodiesel are:

- Filter and injector blockage caused by poor fuel quality.
- Wear and corrosion of internal components from 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 can harm the fuel injection system.

NOTICE: *Problems in the engine fuel injection equipment associated with non-compliance with the following conditions for biodiesel handling and maintenance will not be covered for warranty by CASE CONSTRUCTION.*

Purchase biodiesel fuel from a trusted supplier who understands the product and maintains acceptable fuel quality. 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 website at www.biodiesel.org for more information.

Biodiesel Fuel must be pre-blended by the supplier. Mixing biodiesel fuel blends on-site can result in an incorrect mixture that may damage the engine and/or fuel system.

NOTICE: *CASE CONSTRUCTION may void your warranty if an engine or fuel system problem results from poor fuel quality due to improper blending. You and your fuel supplier are responsible that the right type of fuel and blend is delivered and used.*

Using an additive for Biodiesel

Despite strict standards for the manufacture of biodiesel in Brazil, fuel may present problems after some time in storage, such as the formation of colonies of microorganisms, oxidation and crystallization in the cold. Although the percentage of biodiesel blended with diesel fuel is small, the problems that can occur with the fuel cause major disruptions.

To avoid disruptions and possible damage to equipment, CASE CONSTRUCTION makes the following recommendation:

Use a Biodiesel biocide additive for the purpose of combating the formation of colonies of microorganisms in the machine's fuel system. The additive, as well as having biocidal properties, should also function as a lubricant and antioxidant. Consult your CASE CONSTRUCTION dealer for detailed information on the concentration and frequency of use of the additive.

Electromagnetic compatibility (EMC)

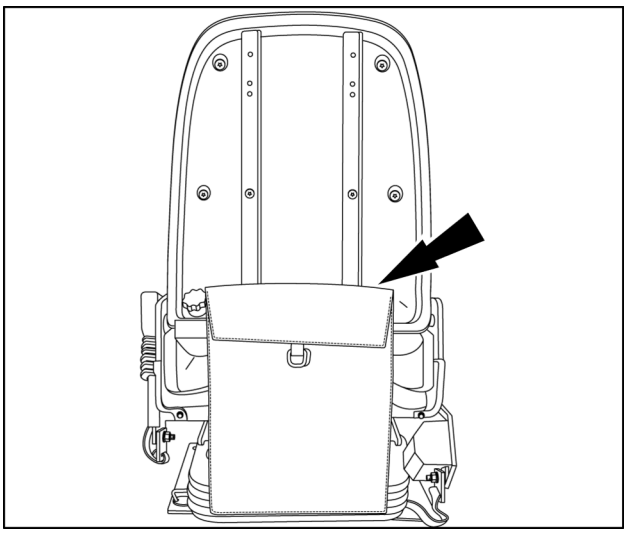
Electromagnetic interferences may occur as a result of the installation of an additional piece of equipment that does not meet the required standards. This interference can result in malfunction of the unit or create situations which compromise safety. You must observe the following:

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

Failure to follow these recommendations will void the CASE CONSTRUCTION warranty.

Operator's manual storage

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



RAIL12DOZ0547AA 1

Read the whole of this manual and ensure that you understand all the controls. All equipment has its limits. Therefore, ensure that you understand the speed, brakes, steering, stability and load characteristics of this machine before you start to operate it.

DO NOT remove this manual from the machine. See a dealer to obtain 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.



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



When you see this symbol, refer to your repair manual.

Service instructions (Availability and access to the parts catalog)

NOTE: *The machine's Parts Catalog is only available in the online version. The catalog can be downloaded or consulted at any time through the CASE CONSTRUCTION website.*

1. Type the link https://www.casece.com into the address bar of your browser.
2. Go to the “Solutions” menu and then the “Parts” submenu.
3. After the page opens, locate and go to the “Visit the CASE Parts Catalog to find parts for your equipment” link.

Access the catalog with user registration

NOTE: *If you are not registered, click “No Thanks, just launch the EPC)”.*

1. If you are registered, click on “Login”.



CNHI17ALL0001AA 1

2. Enter your user name and password and click “Login”.
3. Follow the instructions shown.



CNHI17ALL0008AA 2

4. To register a new user, click “Yes”.



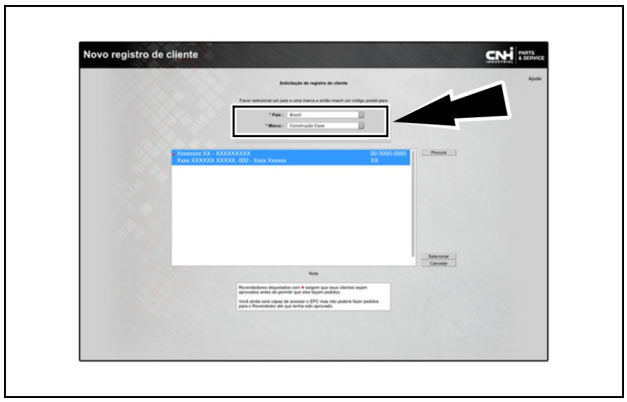
CNHI17ALL0001AA 3

5. Create your user name and click “Check”.



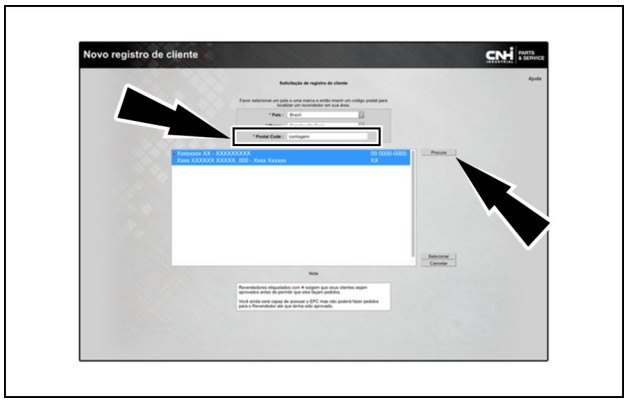
CNHI17ALL0002AA 4

6. Select the country and the brand.



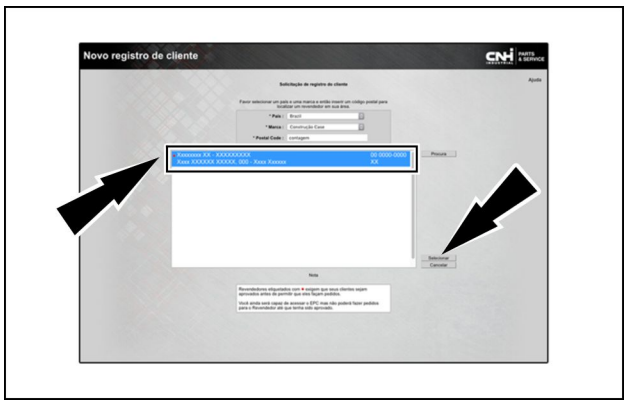
CNHI17ALL0003AA 5

7. In the field “Postal Code”, enter the name of the city and click on the “Search” button.



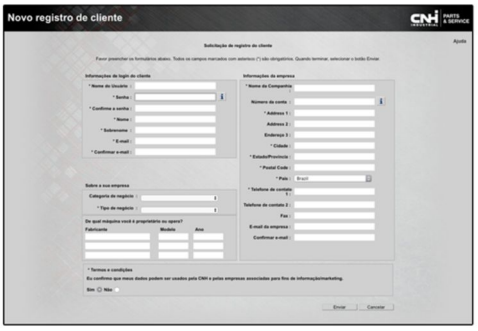
CNHI17ALL0003AA 6

8. Select the corresponding CASE CONSTRUCTION dealer and click “Select”.



CNHI17ALL0003AA 7

9. Fill in the form fields. Pay attention to the required fields, which are identified by an asterisk (*).
10. The local CASE CONSTRUCTION dealer will do the registration, to enable the requesting party to receive part quotes.
11. Follow the instructions shown.



CNHI17ALL0005AA 8

Access to the Parts Catalog without user registration (anonymous user)

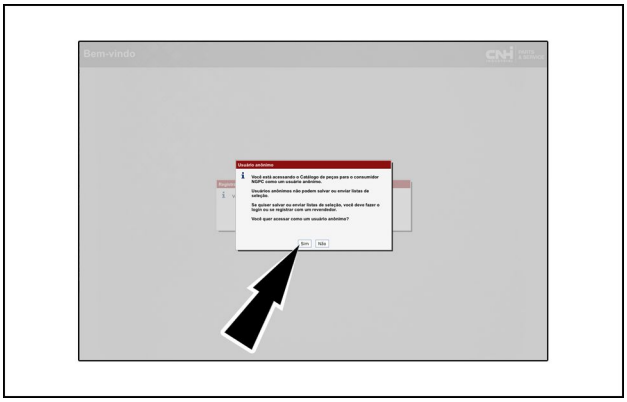
NOTE: *You can consult the catalog without registration, but you will not be able to receive quotes.*

1. If you cannot register, click “No, thanks, just launch the EPC”.



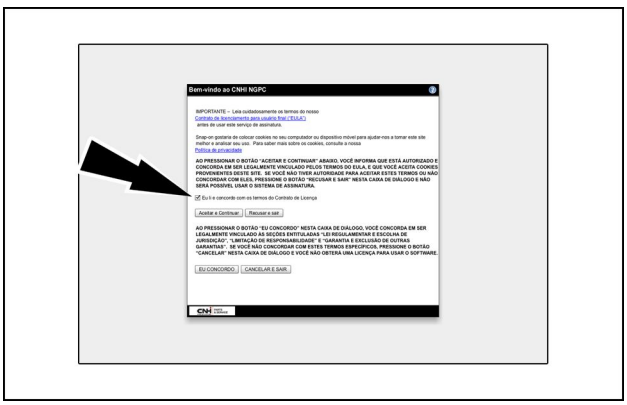
CNHI17ALL0001AA 9

2. Access the Parts Catalog as an anonymous user. Click “Yes”.



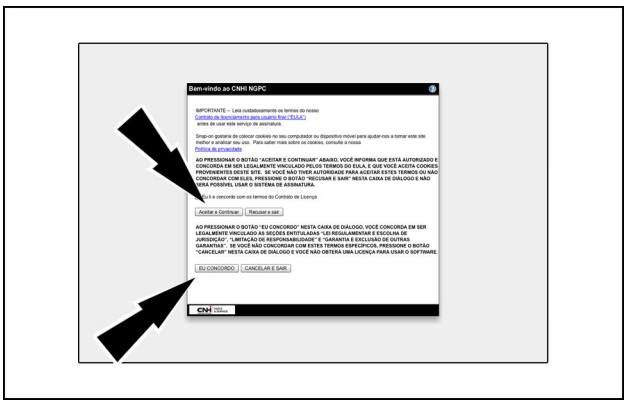
CNHI17ALL0006AA 10

3. Read the terms of the “License Agreement” of the parts catalog.
4. Confirm that you have read and agreed with the terms, by means of the selection box.



CNHI17ALL0007AA 11

5. Click on the “Accept and continue” button and then on the “I Agree” button.
6. Follow the instructions shown.



CNHI17ALL0007AA 12

2 - SAFETY INFORMATION

Safety rules



NOTICE: *This safety alert symbol indicates important safety-related messages in this manual. When you see this symbol, carefully read the message shown and be alert to the possibility of death or serious injury.*

READ THIS MANUAL COMPLETELY and make sure that you have learned how to operate the machine and its controls correctly and safely. It is your responsibility to read and understand the operator's manual and other provided information before you start to operate the machine. This information includes the speed, brakes, steering, stability and load characteristics of the machine.

Do not operate this machine or perform maintenance work if you have not had appropriate training. Read and fully understand all the instructions and warnings in this manual. Have all operators read this manual carefully.

Do not allow unauthorized persons to perform maintenance or repairs on the machine.

If you follow the basic safety procedures and precautions, you can avoid most accidents that relate to machine inspection and maintenance services.

Always see the Operator's Manual when you have doubts about any operating procedure of the machine. Read and understand all the safety warnings contained in this manual and all the safety decals on the machine. Correctly follow the maintenance procedures. See your Authorized CASE CONSTRUCTION Dealer if you have any doubts.

DO NOT remove this manual from the machine. Make sure this manual is complete and in good condition. Contact an Authorized CASE CONSTRUCTION Dealer if you need additional manuals or manuals in other languages. Always keep the manual in the cab, so that you can consult the manual at any time.

Your machine is compliant with current safety regulations, but the safety information in this manual does not replace safety rules, insurance requirements, and federal, state or local laws. Make sure that your machine has all the appropriate and certified equipment in accordance with these government codes or laws. Consult an Authorized CASE CONSTRUCTION Dealer about changes to your machine.

Before beginning the day, walk around the machine and check for oil or fluid leaks. Check the levels of hydraulic fluid, transmission fluid, engine oil, and coolant. Replace any damaged parts or install missing parts. Carry out the required lubrication and maintenance as shown in this manual. Clean any dirt and debris from the machine, especially the engine compartment and the air conditioning condenser.

Before you start the engine, sound the horn. Make sure that everyone is at a safe distance from the machine.

Ensure that the parking brake is applied and that all the controls are in neutral before starting the engine.

You must sound the horn to warn people in the work area.

Before night work, make sure all the lights are turned on.

If your machine is equipped with a cab, make sure that all of the windows are clean and that the windshield wipers work correctly.

NOTICE: *The safety messages in this manual are intended to illustrate the basic safety procedures of the machine. However, it is impossible for these safety messages to cover all dangerous situations you may encounter. If you have any doubts, consult your direct supervisor prior to operating or performing any maintenance service on the machine.*

Safety (Utility lines)

NOTICE: *Safety precautions must be taken when working near buried or overhead utility lines, such as electrical power cables, communication cables (phone, Internet, TV), gas pipes, water pipes, sewer pipes, or others.*

NOTICE: *Before you begin any machine operation, it is your responsibility to be aware of all possible utility lines in the area of your project and to avoid them. Ask local authorities and utility companies for the demarcation and location of their underground lines.*

NOTICE: *Check with local authorities for laws, regulations, and/or strict penalties that require you to locate and avoid existing utility lines. Keep the minimum distance from underground utility lines that is required by law.*

NOTE: *After you locate any buried utility lines, carefully dig a hole to the utility line to verify the location and depth of the line.*

NOTE: *Assess in advance the location in which the machine will be operating. Make sure that the operating site is large enough to move and operate the machine.*

Special precautions with electrical power lines

NOTICE: *Contact with suspended power lines can cause burns or death by electrocution. Make sure that there is enough space between the machine and suspended power lines.*

Before you drive or operate the machine in areas with high-voltage lines and cables, or power stations, check the following procedures:

- Pay attention to overhead high voltage lines and hanging obstacles.
- Retract raised or extended implements, if necessary.
- Remove or lower radio antennas or other accessories.
- Check and make sure to comply with any local regulations that may be applicable.
- Wet ground will expand the area that could cause electrical shock.
- Keep all people and employees away from the work area.
- Serious injury or death can occur if you do not keep the machine or accessories a safe distance from power lines. High voltage lines require a significant distance to ensure safe operation of the machine (see table below).

VOLTAGE (VOLTS)	SAFETY DISTANCE
50000 V or less	**3.0 m** (**10.0 ft**)
50000 – 200000 V	**4.5 m** (**14.8 ft**)
200000 – 350000 V	**5.0 m** (**16.4 ft**)
350000 – 500000 V	**7.5 m** (**24.6 ft**)
500000 – 750000 V	**10.5 m** (**34.4 ft**)
750000 V or more	**13.5 m** (**44.3 ft**)

If any part of the machine touches the high voltage power lines:

- Stop the machine movement immediately.
- Engage the parking brake, stop the engine and remove the key from the ignition switch.
- 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 electrical lines, jump clear of the machine, making sure you do not make contact with the ground and the machine at the same time.
- Do not allow anyone to touch the machine until the electrical power has been shut off to the power lines.

Safety rules (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 your personal safety and for all those involved in the work activity during operation of the machine.

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

DANGER:

Indicates an immediate danger that, if not avoided, will cause death or serious injury. The color associated with Danger is RED.

WARNING:

Indicates a potential danger that, if not avoided, will cause serious injury. The color associated with Warning is ORANGE.

CAUTION:

Indicates a potential danger that, if not avoided, can cause minor or moderate injury. ORANGE also alerts the operator to unsafe practices. 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: *Indicates a situation that, if not avoided, could result in machine 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 or property damage. The word Notice is used to address practices not related to personal safety.

Information

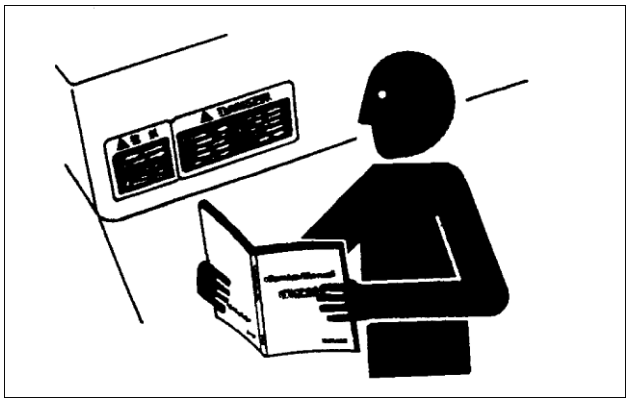
NOTE: *Indicates additional information which clarifies steps, procedures, or other information in this manual.*

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 (Personnel)

Read and understand the safety precautions in the manual

READ THIS MANUAL COMPLETELY and make sure that you have learned how to operate the machine and its controls correctly and safely. It is your responsibility to read and understand the operator's manual and other provided information before you start to operate the machine. This information includes the speed, brakes, steering, stability and load characteristics of the machine.



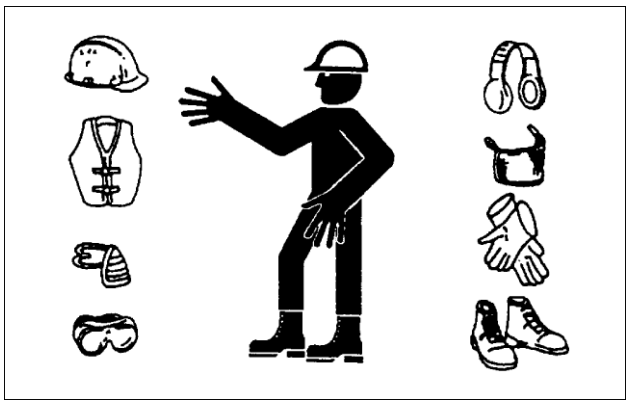
SP0003 1

Do not operate this machine or perform maintenance work if you have not had appropriate training. Read and understand all of the instructions and warnings in this manual. Have all operators read this manual carefully.

Always see the Operator's Manual when you have doubts about any operating procedure of the machine. Read and understand all the safety warnings contained in this manual and all the safety decals on the machine. Correctly follow the maintenance procedures. See your Authorized CASE CONSTRUCTION Dealer if you have any doubts.

Use appropriate protective equipment

Different jobs require different personal protective equipment. Items such as appropriate hard hats, safety goggles, comfortable safety footwear, thick gloves, reflective vests, protective masks, face shields and hearing protection may be necessary. Familiarize yourself with this equipment and know how to use it before starting work.



SP0005 2

Any protective equipment must be replaced or renewed depending on the time of use and wear. Old hard hats may not serve the user's purposes. Faded and stained clothing may not be as visible as new clothing. See the manufacturer‘s recommendations.

Do not wear headphones to listen to the radio while you operate the machine.

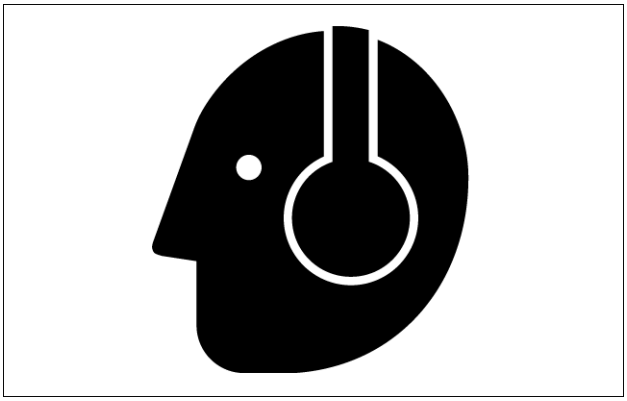
Learn and understand the meanings of the hand signals used in your job. Follow the instructions given by the signaler. See the "Hand Signs" section in this manual for more information.

Familiarize yourself with the regulations, laws and safety equipment required to transport or drive the machine on a road or highway. Beacon warning lights, back-up alarm, "Slow Vehicle" identification plates and other safety equipment are available at Authorized CASE CONSTRUCTION Dealers.

Use hearing protection

Use adequate hearing protection to protect yourself from intense noise during work operation.

NOTE: *Prolonged exposure to loud noises can cause impairment or loss of hearing.*

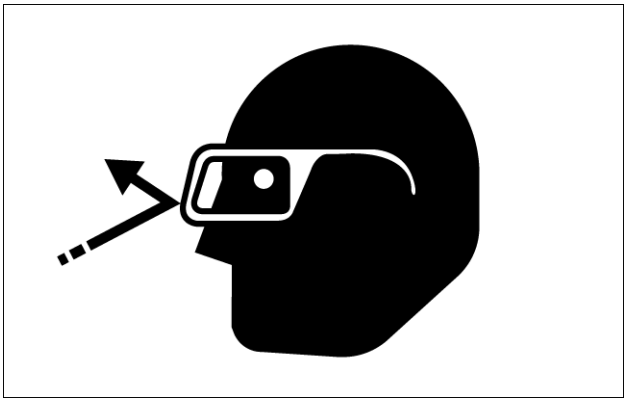


SP0006 3

Use eye or face protection

Use appropriate eye or face shields to protect yourself against injuries caused by parts or debris that may be thrown.

NOTE: *If your face, eyes, or another part of your body is hit by any loose parts or debris, serious injury may occur.*



SP0056 4

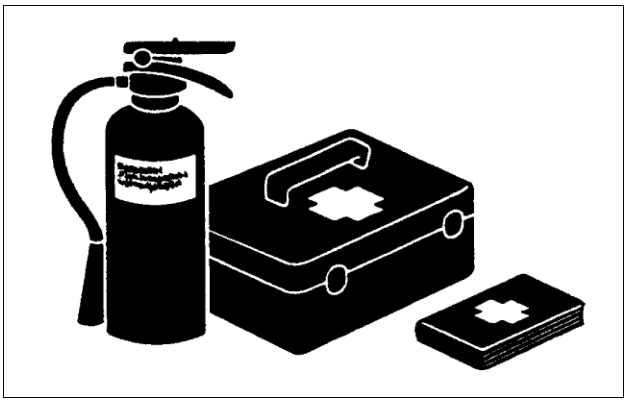
Prepare for emergencies

Be ready to meet emergencies.

Always have a first aid kit and a good fire extinguisher, and know how to use them.

Establish emergency priority procedures to cope with fires or accidents.

Keep emergency telephone numbers for medical rescue, ambulance services, hospital and firefighters in an easy-to-access place.

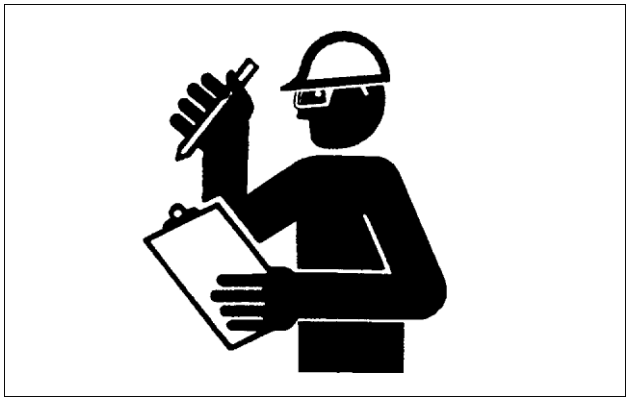


SP0004 5

Inspect the machine

Walk around the machine and perform a visual inspection before you climb into the cab and start operation.

Never start the engine or operate the machine if you notice any failed parts or damaged parts.



SP0007 6

Access the operator's compartment safely

Always approach the machine from the front.

When you enter or exit the machine, always keep contact with three points of support with the steps and handrail.

NOTE: *This will make it safer for you to move your feet and hands, which will help to prevent accidents.*

Keep the steps and handrails clean and clear of debris.

NOTE: *Accidents may result from slippery surfaces.*

Do not use the control levers or hydraulic hoses as a support to enter or exit the machine.

NOTE: *The control levers and hydraulic hoses are movable parts. They do not provide safety as a support. In addition, the control levers could inadvertently move and cause unexpected movement of the machine or implements.*

Never jump to enter or exit the machine.

Never mount or dismount a moving machine.

Do not hurry. Walk, do not run.

Always keep your head, body, limbs, hands and feet inside the operator’s compartment to reduce exposure to external hazards.

Never exit the operator's compartment until the machine has come to a complete stop and the engine is shut down.

Adjust and check

Be sure that all the doors, shields and hoods are correctly installed or closed.

Always keep the windows and rear-view mirrors clean and adjusted so that they provide full visibility.

To avoid getting caught in the machine, do not wear loose clothing, chains, bracelets or other loose personal items, or have your hair long, loose or uncovered.

Remove all loose objects from the operator area and the machine.

NOTE: *Loose objects can jam the controls and cause accidents.*

Operate the controls only when seated in the operator seat.

Adjust the operator seat

The operator seat must be adjusted whenever there is a change of operator.

The operator should be able to fully press the pedals and correctly move the control levers with his/her back resting against the seat back.

NOTE: *An incorrectly adjusted seat can cause risks in relation to operation of the machine and its controls.*

Never operate the machine or its implements from any position other than sitting in the operator seat.



SP0009 7

Adjust and fasten the seat belt

Before operating the machine, carefully examine the condition of the belts, the buckle and the securing components for the seat belt.

If any component is damaged or worn, replace the seat belt or component before you operate the machine.

Never leave the seat belt loose or use it if the strap is twisted or caught in some part of the seat frame.

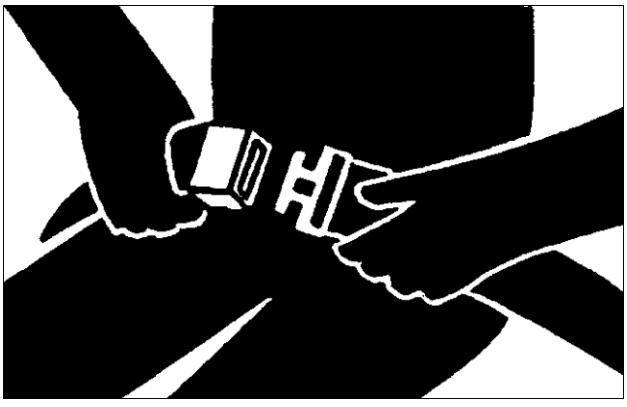
Always fasten the seat belt before you start the engine.

Be sure to remain seated with the seat belt fastened whenever you operate the machine.

Your machine has a rollover protective structure (ROPS) or a falling object protective structure (FOPS) for your safety.

The seat belt can help to protect you if you use it and maintain it correctly.

If an accident occurs, such as a rollover, replace the seat belt and its hardware, even if there was no damage to the seat belt.



SP0011 8

Care during a thunderstorm

Do not operate machine during an electrical storm.

NOTE: *If you are on the ground, move away from machine and look for safe shelter.*

If an electrical storm starts during operation, remain in the cab.

NOTE: *Do not exit the operator's compartment or the cab during an electrical storm. Contact with objects outside of the machine may result in serious injury and even death.*

Roll - over protective structure (ROPS)

DANGER

Pinch hazard!

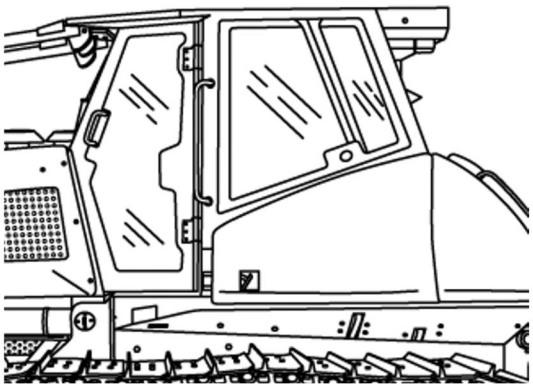
Do not modify the Rollover Protective Structure (ROPS) in any way. Unauthorized modifications, such as welding operations, punctures or cuts, make the ROPS weaker and reduce the level of protection. Go to an authorized dealer to replace the ROPS if it is damaged or if damage occurs. NEVER TRY TO REPAIR THE ROPS.

Failure to comply with these recommendations could result in death or serious injury.

Cab protection

NOTE: *Your machine is equipped with safety systems certified to protect the operator's cab, ROPS or FOPS.*

The ROPS is a rollover protective structure.



RAPH12DOZ0385AA 1

The FOPS is a falling object protective structure. The FOPS may be a cab frame or a two-posted or four-posted frame used for the protection of the operator to minimize the possibility of serious injury.

The protective structure, the mounting supports and the securing elements on the machine are integral parts of the ROPS or FOPS. The protective structures are special safety components of your machine.

Use of the ROPS and FOPS is essential when operating where there is a danger of falling rocks or debris or when there is a danger of frontal impacts with objects that could penetrate the operator's cab. If the machine was not originally equipped with ROPS or FOPS cab protections, you can contact an Authorized CASE CONSTRUCTION Dealer to request installation of the cab protections.

ATTENTION: *Do NOT connect any device to the protective structure for purposes of lifting the cab or towing the machine. DO NOT weld, drill or attempt to straighten or repair protection structures. Any type of modification could influence the structural integrity of the safety system, jeopardizing its effect, with serious consequences for the operator, in case of collision, falling objects or landslides.*

ATTENTION: *After a fire, corrosion or collisions, any possible damage to the cab protective structure must be carefully evaluated by specialized and qualified technicians. In any case, all damaged parts must be replaced by genuine spare parts, so that the original conditions are reinstated. Contact an Authorized CASE CONSTRUCTION Dealer to check the proper function of the cab structure or if you need to replace all or parts of the structure.*

Seatbelt

CAUTION

Roll-over hazard!

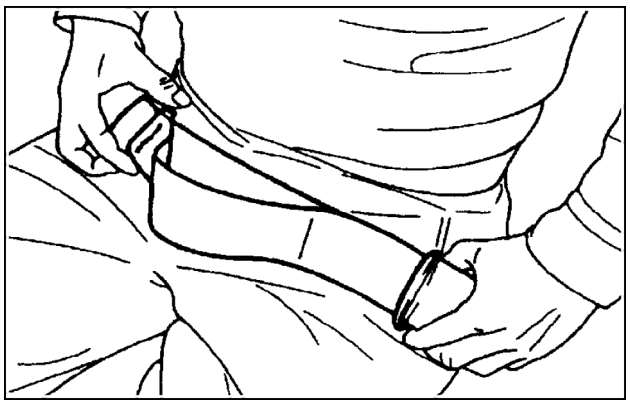
Securely fasten the seat belt. Your machine is equipped with an ROPS cab, an ROPS canopy or an ROPS frame for your protection. The seat belt can help assure your safety if it is properly used and maintained. Never use a seat belt if it is loose or has slack.

Failure to comply with these recommendations could result in death or serious injury.

The seat belt is an integral part of the protection system and must always be used during operation of the machine.

The operator must remain in the operator's seat, inside the cab, in order for the protective system to work correctly.

NOTICE: *To ensure that the operator is suitably protected, seat belts must be used and preserved as recommended.*

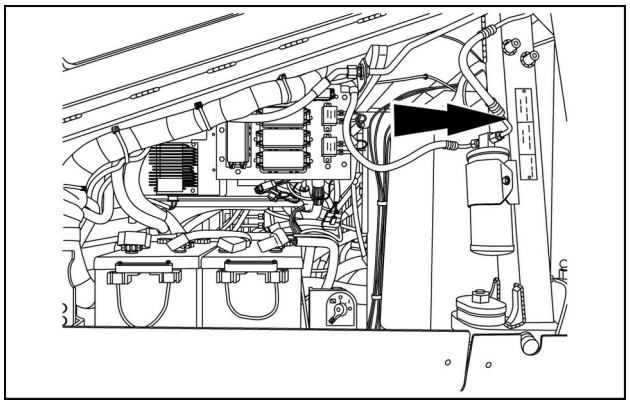


NH0193 2

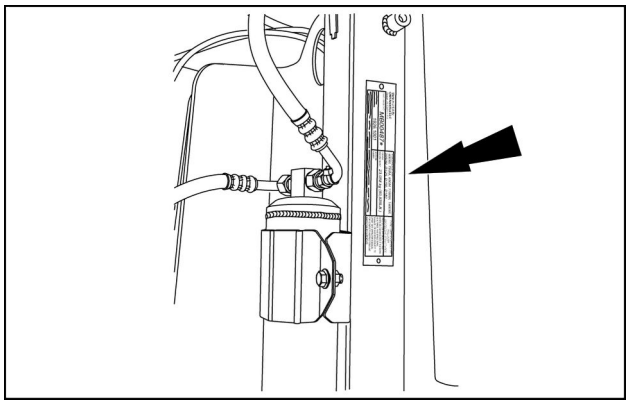
Identification plate

The machine has an ROPS certification plate with its serial number, gross weight, approval numbers, regulation numbers and machine model number.

The plate is located at the rear of the left-hand access compartment.



COIL14DOZ0106AA 3



COIL14DOZ0107AA 4

Seat belt precautions

⚠ WARNING

Avoid injury!
Before starting the engine, securely fasten the seat belt. 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. Never wear the belt if it is twisted or pinched between the seat structures.
Failure to comply could result in death or serious injury.

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Fastening the seat belt

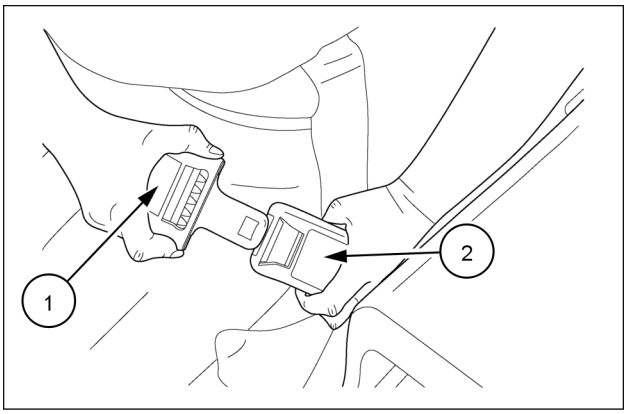
Fasten the seat belt as follows:

- Insert the retaining tang **(1)** into the buckle **(2)**.
- Make sure the belt is fastened and adjust the belt length around your body by pulling on the loose part of the belt on the right-hand side.

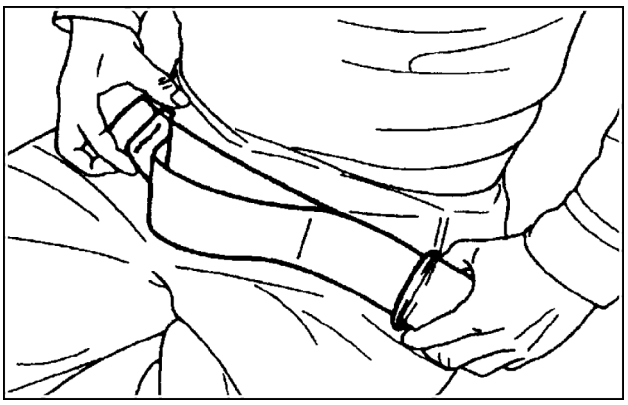
Unfastening the seat belt

Unfasten the seat belt as follows:

- Press the red button on the buckle **(2)** to unlock the tongue from the buckle.
- Slide out the tang **(1)**.



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NH0193 2

Starting and stopping precautions

Starting the machine

Before you start work, proceed as follows:

- Go around the machine and implements to check for possible dangerous conditions, such as people in the machine's operating area.
- Do not start-up until all personnel are clear of the machine.
- Sound the horn before start-up.
-
- Check that the parking brake is engaged.
- Check that the transmission is in neutral.
- Start the engine and operate the machine only from the operator seat.
- Adjust, secure, and latch the operator seat in the position of maximum comfort and with complete access to the controls.
- Fasten the seat belt before you start the engine.
- If you need to use booster batteries for start-up, use the cables as described in this manual.

  NOTE: *Improper use can result in battery explosion or unexpected movement of the machine.*
- Ventilate the battery area before using jumper cables.
- When using jumper cables, make sure the cables do not interfere with or harm the on-board electronic processing or computer devices.
- DO NOT OPERATE the engine for very long in an enclosed area without adequate ventilation.
- Notify those responsible for maintenance of any malfunction in the systems or components, to obtain a proper corrective action.
- Due to the presence of flammable fluids, never check fuel level, refuel, charge the batteries in the presence of materials with smoke, open flames or sparks.
- Adjust all the rear-view mirrors for maximum visibility of the area behind the machine.
- Ensure that engine speed is appropriate for the job to be carried out.
- If any hydraulic control or system responds abnormally or slowly, have the machine checked for air in the system.

  NOTE: *Air in the hydraulic circuits may cause unexpected movements that may result in accidents. Consult this manual for the proper corrective action to be taken.*

Stopping the machine

When the machine needs to stop for any reason, proceed as follows:

- Keep all unauthorized personnel clear of the area.
- Park the machine on a flat, level, firm surface, away from any obstacles, whenever possible.

  NOTE: *In areas with slopes, park the machine with the wheels or tracks (according to the model) securely blocked.*
- Park the machine in an area outside of the work site and without traffic, whenever possible.

  NOTE: *If that is not possible, provide appropriate flags, barriers, lighting and other appropriate signals, as required, to properly warn drivers traveling through the location.*
- Support the implements on the ground.
- Put the control levers in the NEUTRAL position.
- Put all switches in the off position.
- Shut down the engine, placing the ignition key in the OFF position (off).

  NOTE: *Never leave the machine unattended with the engine running.*
- Set the park brake.
- Put the safety lever in the locked position.
- Place a do not operate tag.

Safty Precautions

General safety rules

Exercise caution when you operate the machine on slopes. Full reservoirs and other loads will change the center of gravity of the machine. The machine can tip or roll over when near ditches, 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, drugs, or while otherwise impaired.

Never allow riders on the machine.

When moving ground or using ground-engaging attachments, assess the exact location of gas ducts, water pipes, telephone lines, sewers, overhead and underground electric lines and all other possible obstacles. Such locations should be defined by competent authorities. Contact local utility agencies to determine the locations of services.

Pay attention to overhead high voltage lines and hanging obstacles. High voltage lines may require a significant distance to ensure safe operation of the machine.

Hydraulic fluid 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 wood.
- Turn off the engine, remove the key from the ignition switch and release the pressure from the systems before connecting or disconnecting fluid lines.
- Make sure that all components are in good condition and 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 and prolonged contact with hydraulic fluid may cause skin cancer. Avoid prolonged contact and in case of contact wash your skin with soap and water immediately.
-

Keep clear of moving parts. Do not wear rings, wrist watches, jewellery, loose or hanging garments, such as ties, torn clothing, scarves, unbuttoned or unzipped jackets that can get caught in moving parts.

Wear personal protective equipment when necessary.

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

Make sure that all guards and shields are in good condition and properly installed. Never operate the machine without first installing all the guards and shields. Close the access doors and inspection panels before operating the machine.

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

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

Never operate the engine in enclosed spaces, as exhaust gases harmful to your health may accumulate.

Before starting the engine, make sure that all controls are in the neutral position and the parking brake is engaged.

Start the engine only while seated on the operator's seat. If the safety start switch is not used, the engine can start with the transmission in gear. Do not connect or short across terminals on the starter solenoid. Perform the procedure for starting the engine with a booster battery as described in this manual. Starting the engine with the transmission in gear may cause death or serious injury.

Always keep the windows and rear-view mirrors clean and adjusted, providing full visibility to the operator. All lighting must be operating and the slow-moving vehicle sign (SMV) clean and visible, to provide the best visibility of the machine to others during operation of the machine.

Only operate the controls when in the operator's seat.

General maintenance safety

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

Service the machine on a firm level surface.

Do not attempt repairs unless trained. Refer to the machine manuals and experienced personnel for help.

If you doubt your ability to complete maintenance procedures correctly, contact your authorized dealer.

Follow the proper maintenance intervals and procedures, as well as all safety messages described in the maintenance procedures.

Install all guards and shields after you finish servicing the machine.

Close all access doors and install all inspection 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.

Hydraulic cylinders extended and not supported can lose pressure and drop the implement, causing a crushing hazard. Do not leave the implement in the raised position while parked or during machine maintenance, unless it is securely supported.

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

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

Towing the machine is not recommended. When absolutely necessary to tow, do not exceed the recommended towing speed. Be sure the towing machine has sufficient braking capacity to stop the two machines. Use a tow bar if the brake of the towed machine cannot stop the towed machine. Do not use chains to tow a machine without braking ability.

Turn off the engine, remove the key from the ignition switch and release the pressure from the systems before disconnecting or connecting fluid lines.

Release all pressure before carrying out maintenance work on systems with an accumulator. It is your responsibility to know how many and where the accumulators are on the machine.

Stop the engine and remove the key from the ignition switch before disconnecting or connecting electrical connections.

Avoid possible burns that may be caused by hot water or steam under pressure. Do not remove the radiator cap until the engine is cool. After the engine has cooled, turn the cap slowly to allow all the pressure to be released. After the pressure is released, remove the cap completely. The hydraulic fluid reservoir is under pressure. Be sure to release all pressure from the system before removing the cover of the hydraulic fluid reservoir.

Replace worn or failed components. Remove grease, oil, and accumulated debris.

The engine, transmission, exhaust system components and hydraulic fluid lines heat up during the operation of the machine. Be careful when servicing these components. Allow surfaces to cool before handling or disconnecting hot components. Wear personal protective equipment when necessary.

Disconnect the cable from the negative terminal of the battery before performing any maintenance service on the electrical system or arc-welding on the machine. When performing welding works, follow the instructions in this manual. Wash hands after handling battery components.

General battery safety

Always use eye protection when handling batteries.

Keep sparks, matches and flames away from the batteries.

Leave the battery compartment cover open during a recharging cycle, to improve ventilation. Do not recharge the batteries in enclosed areas.

Disconnect the cable from the negative terminal (-) of the battery first and reconnect it last.

When performing repair works with welding, disconnect the cables from the negative (-) and positive (+) terminals of the battery.

Do not perform welding works, grind components or smoke near the machine.

Correctly follow the procedure for starting the engine with booster batteries. Refer to the procedure in this manual. Do not cause a short-circuit in the terminals of the starter motor solenoid.

Follow manufacturer's instructions when storing and handling batteries.

The battery, its connectors and terminals contain lead and lead compounds. Wash your hands thoroughly after handling the battery or its components.

The sulfuric acid, contained in the battery, is poisonous. It is strong enough to scald the skin, corrode clothes and cause blindness, if it comes into contact with the eyes. In case of contact with the acid:

- Rinse your skin well with water.
- Put sodium bicarbonate or clay on your skin to help the acid neutralization.
- Rinse your eyes with running water for 15 min.
- Immediately see a doctor.
- Drink large quantities of water or milk.
- Do not induce vomiting.

Keep batteries stored in a safe place out of reach of 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 make adjustments to the seat while the machine is in motion.

The operator presence system should never be disconnected or bypassed.

If the operator presence system is inoperable, repair it immediately.

Air-conditioning system

The air conditioning system is under high pressure. Do not try to repair or service the air conditioning system.

Service, repair, or recharging of the air conditioning system should only be carried out by a specialized technician. Contact a CASE CONSTRUCTION dealer.

Reverse alarm

Do not disconnect the reverse alarm system if it is equipped.

Personal protective equipment (PPE)

Use comfortable safety footwear, hard hat and appropriate clothing for the job. Wear protective goggles, protective masks, ear protection and gloves. When necessary, wear reflective vests.

Avoid wearing loose clothing, jewelry, or other items that can catch on control levers or other parts of the machine.

Do not wear headphones to listen to the radio while operating the machine.

Work clothing that has come in contact with fluids could catch fire. Change clothes immediately.

Certain protective equipment should be replaced and renewed due to wear and time of use. Old hard hats may not afford the original, intended protection. Faded and/or soiled vests are no longer as visible as the original intent. See the manufacturer‘s recommendations.

Electrical Storm Safety

Do not operate machine during an electrical storm.

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

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

To get on and off the machine

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

As the tracks are used when mounting and dismounting the machine, always clear debris and dangerous slipping conditions from the tracks before entering or leaving the cab.

Do not jump when entering or leaving the machine.

Make sure steps, handholds and the operator's platform remain clean and clear of debris and foreign substances. Injury may result from slippery surfaces.

Face the machine when mounting and dismounting it.

Always keep three-point contact between the steps and handholds when mounting and dismounting the machine.

Never mount or dismount from a moving machine.

Do not use the controls or hoses as handholds when entering or leaving the cab or the operator's platform.

Working at heights

When the normal use and maintenance of the machine requires working 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 which 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

Do not use a blade or ripper (if equipped) to lift, to transport people or as a work platform.

Know the full area of operation of the machine and attachments. Do not allow anyone to enter the area while the machine is operating.

Do not leave the implement in a raised position while the machine is parked or during service, unless it is securely supported. Hydraulic cylinders must be mechanically locked or supported it they are left in a raised position for maintenance or access to other machine components.

Use of the blade and ripper change the center of gravity of the machine. This can cause the machine to tip on slopes or uneven ground.

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

Transporting loads or objects on the machine can reduce the operator's visibility. Do not operate the machine with reduced visibility.

Precautions specific to this machine

Before operating the machine, walk around the machine to inspect its exterior, implements and attachments. Assess the job site, making sure that there are no obstacles or risks during operation of the machine.

Never exceed the load limit that the machine can push.

Know and understand the job site traffic flow patterns and obey signal personnel, road signs, and flaggers.

Know and understand that job site conditions may change on an hourly basis. It is the operator’s responsibility to monitor the changes and keep the machine, tools and attachments at a safe distance.

Before operating the machine in dark environments, make sure that all work lights are functioning correctly. Do not operate the machine in dark environments without using the work lights.

Remove the key from the ignition switch and/or turn off the master switch (after shutting down the engine) when leaving the machine parked or unattended.

Precautions specific to attachments

Inspect the attachments before operating the machine and make certain they are properly installed.

Improperly installed or locked attachments could come loose and cause serious injury.

Make certain that locking pins and connections are free of dirt or dry mud before attempting to engage and disengage the attachments.

Never stand under a raised attachment or allow others to do so.

Inspect the hoses of the hydraulic system and check for wear or leaks.

Visually inspect welds and make any repairs as necessary.

Check for any loose bolts. Apply proper torque as required.

Do not modify the machine or its attachments. Such modifications can damage and/or affect the integrity, safety and operation of the machine and the attachment. If you are in any doubt, see a CASE CONSTRUCTION dealer.

Check all controls in a clear area and make certain the machine is operating correctly.

Safty Precautions – Fuel handling

⚠ WARNING

Fire hazard!
Do not add gasoline, alcohol, or blended fuels to diesel fuel, except as recommended in this manual.
Fuel combinations may increase fire and explosion hazards.
Failure to comply could result in death or serious injury.

W0401A

When you handle fuels, proceed as follows:

- Do not smoke or permit flames when filling or near fueling operations.
- Never remove the fuel reservoir cap or refuel machines with the engine running or still hot.
- Never allow fuel to spill on hot machine components.
- Avoid spilling fuel on the ground or contaminating the environment.
- Fill the fuel reservoir in an open area.
- Always maintain control of the fuel filter nozzle when filling the tank.

  NOTE: *This will help avoid spilling fuel.*
- Do not completely fill the fuel reservoir. Allow room for expansion.
- Clean up spilled fuel immediately. Correctly dispose of all contaminated material.

  NOTE: *Do not store rags with flammable fluids.*
- Tightened the fuel tank cap securely.
- If the fuel reservoir cap gets lost or damaged, immediately replace the cap with another genuine cap.

  NOTE: *Use of a non-approved cap without proper venting may result in pressurization of the tank.*
- Never use fuel for cleaning purposes.
- Use fuel with adequate rating for the equipment function.
- Do not warm up or drill lines and containers that hold pressurized fluid or other flammable materials.
- Store flammable fluids in a safe location, away from the circulation of people and away from fire hazards.

  NOTE: *Follow the precautions listed in this safety information chapter when handling any service fluid.*

NOTE: *Handle and dispose of the waste in accordance with environmental regulations, laws and government codes.*



SP0057 1

Fire and explosion prevention

⚠ DANGER

Fire hazard!
Always have a fire extinguisher on or near the machine. Keep the fire extinguisher in good condition through routine maintenance and service according to the manufacturer's instructions.
Failure to comply will result in death or serious injury.

D0006A

Safety Procedures

NOTE: *All fuels, most lubricants, and some coolant mixtures are flammable. Explosions or fires may occur if these materials are handled incorrectly, causing serious injury or death.*

- Do not spill fuel or fluids on hot surfaces or electronics.
- Check leaks of fuel and fluids.

  NOTE: *Loose clamps, kinked hoses, or lines or hoses that rub against each other may cause leaks.*
- Do not bend or strike high pressure lines and tubing.
- Do not leave flammable materials spilled or accumulated on the machine.

  NOTE: *Spilled fuel and lubricants, trash, grease, debris, coal dust and other substances may cause fires.*
- Remove all trash and debris from the machine each day, especially trash and debris that is near hot components such as the engine, transmission, exhaust system, battery, etc.
- Remove the build-up of debris that is near moving components such as bearings, pulleys, belts, gears, fans, etc.

  NOTE: *You may need to clean the machine more frequently (shorter periods) when you operate the machine in extreme conditions.*
- Inspect the electrical system to check for the existence of loose connections or worn insulation.

  NOTE: *repair or replace as necessary.*
- Do not store rags with flammable fluids.
- Do not expose the machine to flames, burning brush or explosives.
- Promptly investigate any unusual smells that occur during machine operation or maintenance.
- Always keep a fire extinguisher on or near the machine.



SP0058 1

Precautions with pressurized components

NOTE: *Flammable sprays can be generated by heating near lines containing pressurized fluid, resulting in severe burns to those doing the repair or to bystanders.*

- Do not warm up or cut lines and containers that hold pressurized fluid or other flammable materials.

  NOTE: *Pressurized lines can be accidentally cut when heat goes beyond the area of the flame in case of a welding procedure.*
- Install temporary fire protection on the lines and other components of the machine when you perform a welding procedure.
- Clean the components to be welded or cut with non-flammable solvents before you start the work.



SP0059 2

In case of fire

NOTE: *Always keep a fire extinguisher on or near the machine. Make sure that the fire extinguisher is in good condition. Make sure that you perform maintenance on the fire extinguisher in accordance with the recommendations.*

If a fire occurs on the machine, if possible, proceed as follows:

- Park the machine in a safe location.

  NOTE: *away from other people, machines or structures.*
- Support the implements on the ground.
- Shut down the engine. Place the ignition key in the OFF position.
- Set the park brake.
- Request assistance.
- Exit the operator's compartment safely using the steps and handrails.
- Evaluate the situation, checking the possibility of using a fire extinguisher.

  NOTE: *Use a fire extinguisher if there is time. Otherwise, move away from the machine.*

  NOTE: *Do not try to save objects. Keep calm and preserve life.*



SP0061 3

Safty Precautions (Weld works)

⚠ WARNING

Avoid injury!
When welding, always wear proper protective equipment and welding clothing. All persons in the work area must, at minimum, wear welding goggles. Never look directly at the welding arc without welding eye protection.
Failure to comply could result in death or serious injury.

W1178A

NOTICE: *Repair works with welding must be performed by a qualified and experienced welder. Appropriate safety regulations should be followed by the personnel involved in the work. The time to perform welding operations depends on the quality and precision of the work. Never make modifications on the machine.*

To perform welding operations on the machine (authorized and in accordance with CASE CONSTRUCTION recommendations), proceed as follows:



SP0064 1

- Identify all points of fracture or cracking, and the areas in which welding is required.
- Thoroughly clean the areas involved.
- Remove all paint. Inspect the parts with liquid penetrant or a magnetic tool for particles.
- Shut down the engine. Place the ignition key in the “OFF” position to shut down the engine.

  NOTICE: *After you shut down the machine, wait at least* ***8 min*** *to shut down the battery cables or the master switch (if equipped). This time is necessary so that the engine’s electronic system (if equipped) can store the settings data in the electronic module.*
- Disconnect the batteries and the wires from terminals D+ and B+ of the alternator.
- Disconnect the electrical wiring harnesses from the control modules of the machine.
- Connect the ground cable of the welding machine to the component to be welded.
- Always connect the welding equipment to the frame that is being welded.
- Never connect the welding equipment ground to a component of the hydraulic system.
- Avoid welding at low temperatures, e.g., below **16 °C**. If necessary, warm up the part involved prior to welding.
- Remove the paint from all surfaces before heating or welding. Painted surfaces can generate toxic gases when heated or welded.
- Use appropriate masks or protective goggles.
- Wear appropriate gloves and protective equipment.
- Disconnect the connectors from all control modules of the machine.

Heating lines containing pressurized fluid

NOTICE: *Flammable sprays can be generated by heating near lines containing pressurized fluid, resulting in severe burns to those doing the repair and to bystanders.*

- Do not cause heating by welding, or use open flames near the components containing pressurized fluid or other flammable materials.
- Install temporary fire protection to protect the lines and other components of the machine when you perform a welding procedure.

  NOTE: *Pressurized lines can be accidentally cut when the heat goes beyond the area of the flame.*
- Avoid heating lines containing flammable fluids
- Do not weld or torch cut lines that contain flammable fluids.
- Clean the lines to be welded or cut with non-flammable solvents before welding or cutting them.

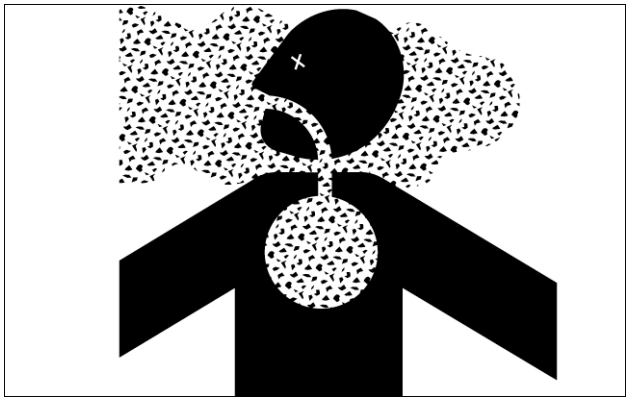


SP0059 2

Remove the paint before welding or heating

NOTICE: *Hazardous fumes can be generated when the paint is heated by the welding arc or torch flame. If inhaled, these fumes may be harmful to your health.*

- Do not breath in potentially toxic fumes and dust.
- Do all such work outside or in a well-ventilated area.
- Handle and dispose of waste from paints or solvents in accordance with environmental regulations, laws, and government codes.
- Remove the paint from the part to be welded before welding or heating operations.
- When sanding or grinding the paint, avoid breathing in the dust.
- Wear an approved respirator.
- If you use solvent or paint stripper, remove the stripper with soap and water before welding operations.
- Remove solvent or paint stripper containers and other flammable material from area.
- Allow the fumes to disperse for at least **15 min** before welding or heating operations.



SP0060 3

Safety Decals

⚠ WARNING

Avoid injury!
Make sure decals are perfectly legible. Clean decals regularly. Replace all damaged, missing, painted over, or illegible decals. See your dealer for replacement decals. When replacing parts bearing decals, be sure to put new decals on each new part.
Failure to comply could result in death or serious injury.

W0229A

The safety decals placed on your machine are a guide for your safety and that of those involved in the work operation of the machine.

Before you start the work operations, walk around the machine. Note the content, the location, and the meaning of all of the safety decals.

Make sure you understand all safety signs indicated on the decals.

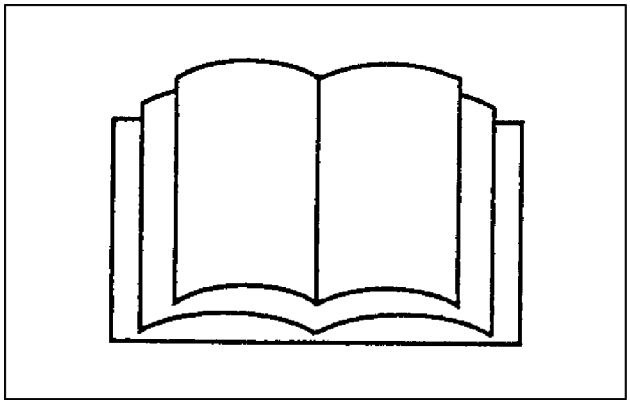
Keep safety decals clean and legible. Clean the safety decals with a soft cloth, water and gentle detergent. Do not use solvents, gasoline, or other chemicals to clean the safety decals. Such products may damage or remove the decals, which compromises their visibility and the safety of everyone involved in the work.

Replace all safety decals that are damaged, illegible or missing. If a safety decal is on a part that is replaced, make sure a new safety decal is installed on the new part. See your Authorized CASE CONSTRUCTION Dealer to obtain new safety decals.

This chapter only covers decals relating to the safety, operation, and maintenance of the machine. For information about all decals for the machine, see an Authorized CASE CONSTRUCTION Dealer or the parts catalog for your machine.

Refer to Operator's Manual

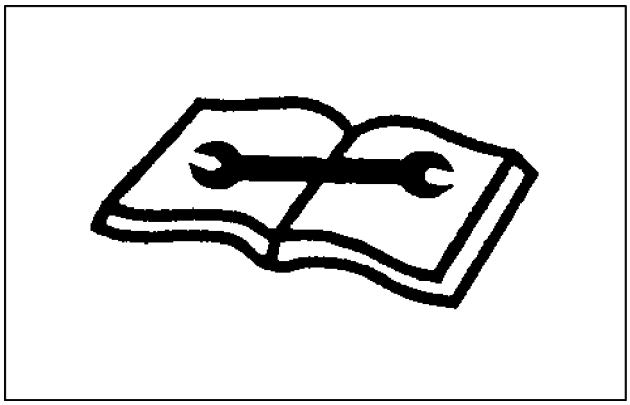
Decals that display the symbol to the side are intended to direct the operator to read the “Operator's Manual” to obtain further information about maintenance, adjustments, and procedures related to specific sectors of the machine.



BRIL12MG0229A0A 1

See the repair manual

Decals that display the symbol to the side are intended to direct the operator to read the “Repair Manual” to obtain further information about maintenance, adjustments, and procedures related to specific sectors of the machine.



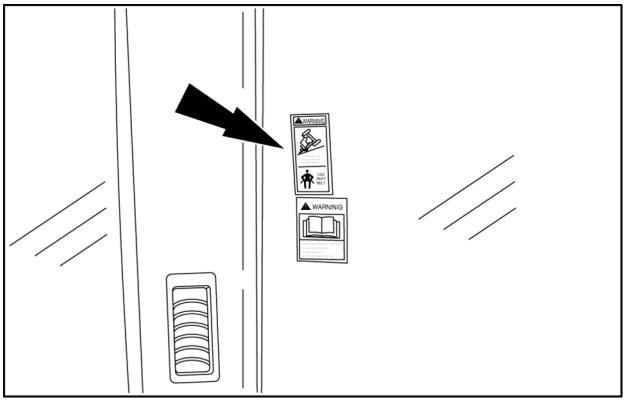
BRIL12MG0230A0A 2

1 – "Use seat belt" decal
Use the seat belt. Avoid crushing. Do not jump if the machine tips. Failure to comply with these recommendations could result in death or serious injury.
Quantity :1
87706391



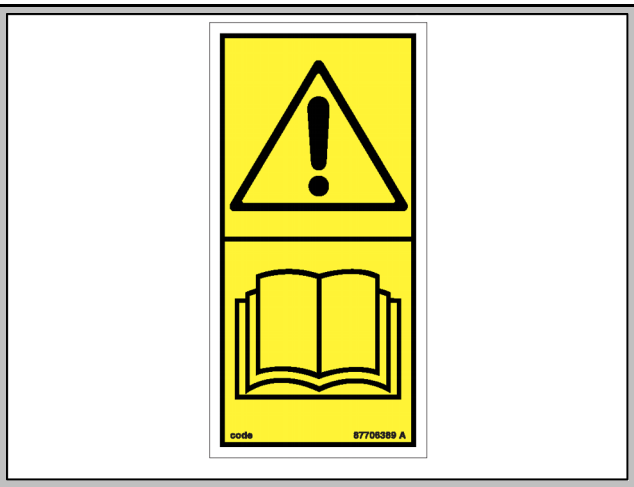
87706391 3

This safety decal is located inside the operator's compartment, on the right-hand side window.



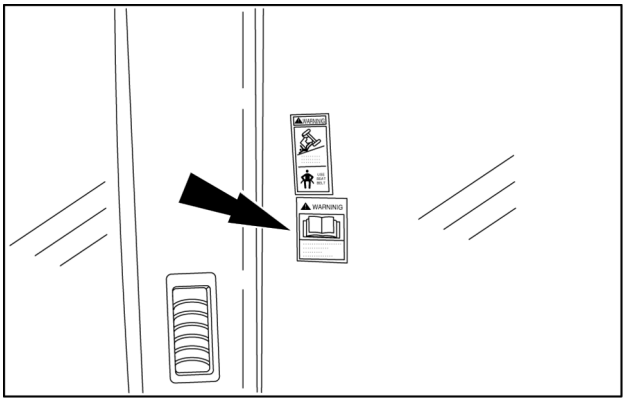
RAPH12DOZ0084AA 4

2 – "Read the operator's manual" decal
Carefully read the operator's manual prior to starting the motor, operating, servicing, refuelling or carrying out any other work on the machine. Failure to comply with these recommendations could result in death or serious injury.
Quantity :1
87706389



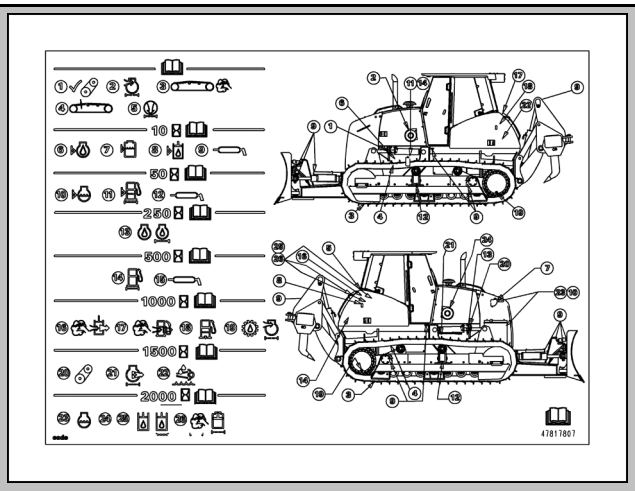
87706389 5

This safety decal is located inside the operator's compartment, on the right-hand side window.



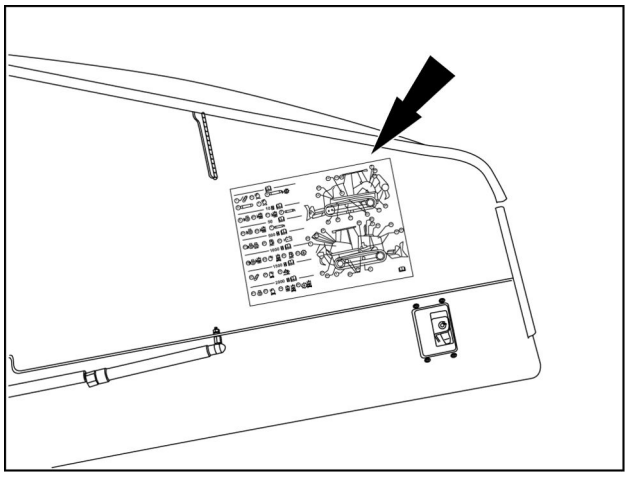
RAPH12DOZ0084AA 6

3 – "Maintenance information" decal
This decal indicates machine maintenance intervals.
Quantity :1
47817807



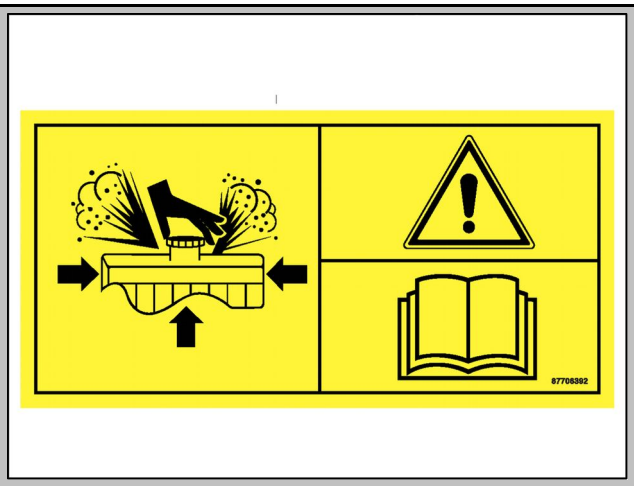
47817807 7

This informational decal is located on the access door of the left-hand rear compartment.



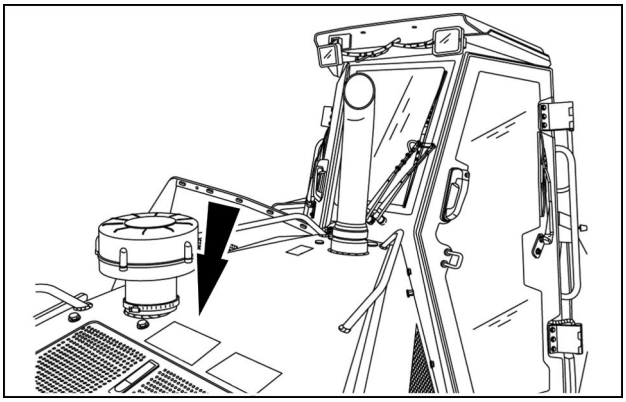
RAPH12DOZ0046AA 8

4 – "Coolant overflow tank pressurized" decal
Liquid under pressure. Wait for the system to cool before removing the cap from the reservoir. At operating temperature, the coolant can cause burns if it comes into contact with the skin. Failure to comply with this recommendation could result in death or serious injury.
Quantity :1
87706392



87706392 9

This safety decal is located on top of the hood, next to the coolant overflow tank access cover.



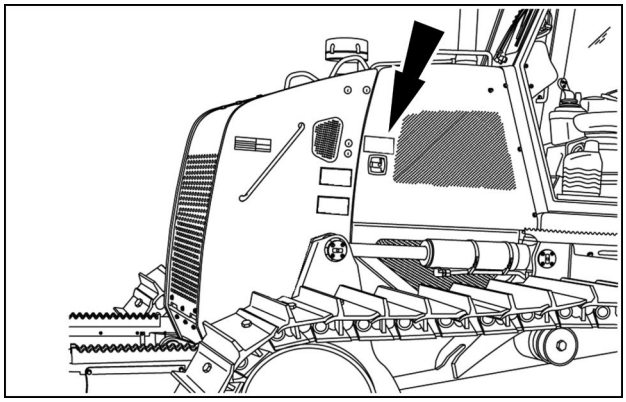
COIL14DOZ0111AB 10

5 – "Burn hazard" decal
Hot components can cause serious burns. Keep away from the machine when the engine is running. Turn off the engine and wait until all of the machine components are cool before performing any maintenance work on the machine. Failure to follow these recommendations may result in serious injury.
Quantity: 3
87415865



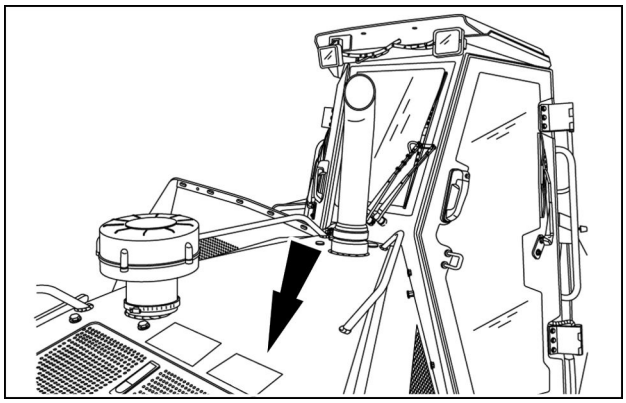
87415865 11

This safety decal is located on the front, left-hand and right-hand engine access doors.



COIL14DOZ0115AB 12

This safety decal is located on top of the hood, next to the coolant overflow tank access cover.



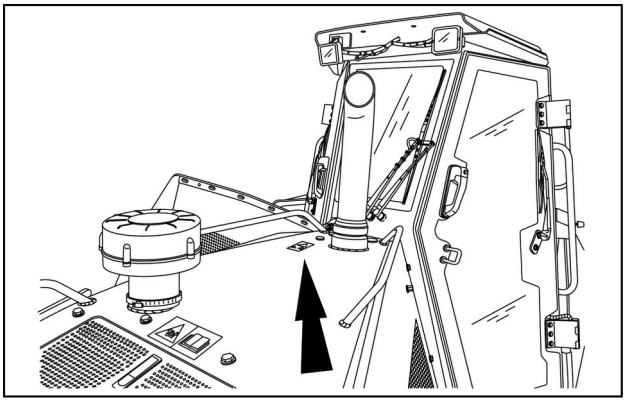
COIL14DOZ0111AB 13

6 – "Explosion hazard" decal
Liquid under pressure. Do not use ether. Failure to comply with this recommendation could result in death or serious injury.
Quantity :1
8603095



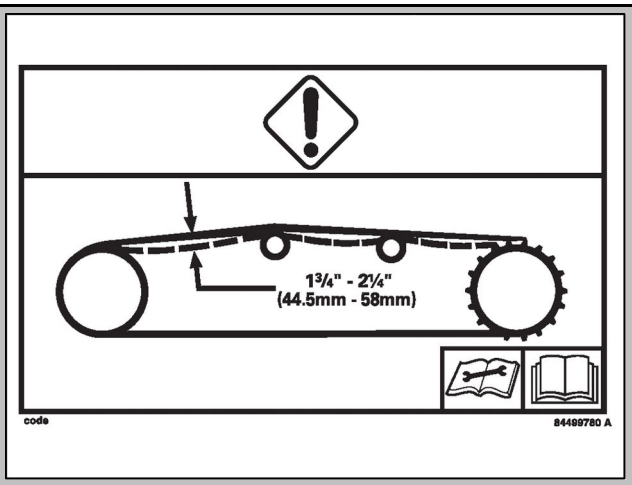
8603095 14

This safety decal is located on top of the hood, near the exhaust tube.



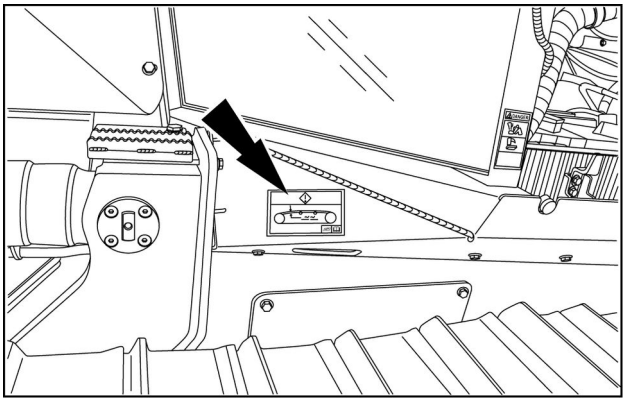
COIL14DOZ0111AA 15

7 – "Correct track tension" decal
This decal indicates the correct operating tension of the tracks.
Quantity :1
84499780



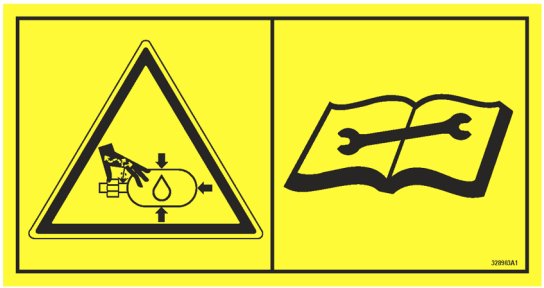
84499780 16

This informational decal is located below the left-hand rear access door.



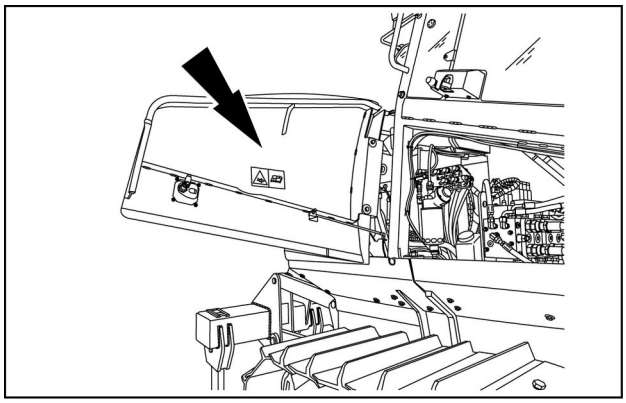
RAPH12DOZ0042AA 17

8 – "Pressurized system" decal
Pressurized system. Release the system's internal pressure before servicing. Only refill the system with nitrogen. Failure to comply with these recommendations could result in death or serious injury.
Quantity :1
328903A1



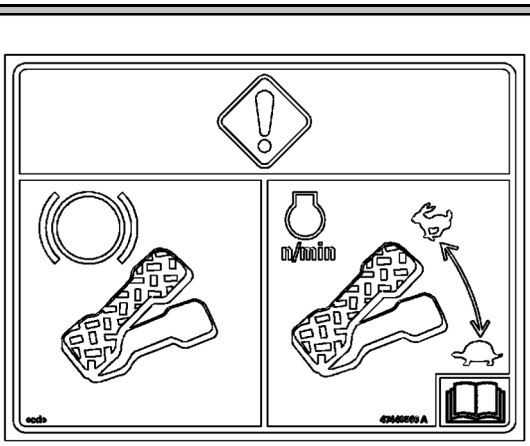
328903A1A 18

This safety decal is located inside the cover of the right-hand rear access compartment.



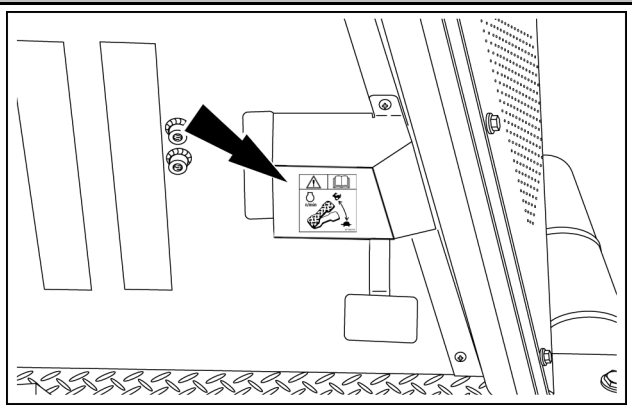
COIL14DOZ0112AA 19

9 – "Deceleration or brake pedal" decal
Read the operator's manual and make sure you understand the operation of the deceleration pedal or engine brake before operating the machine. Failure to comply with this recommendation could result in death or serious injury.
Quantity :1
47449566



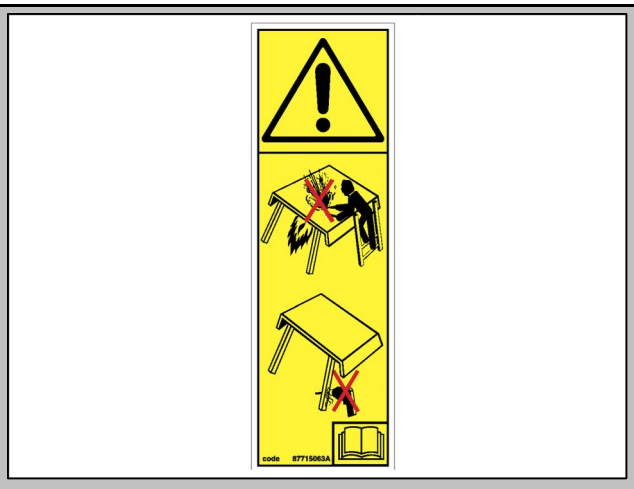
47449566 20

This safety decal is located above the deceleration or brake pedal inside the operator’s compartment.



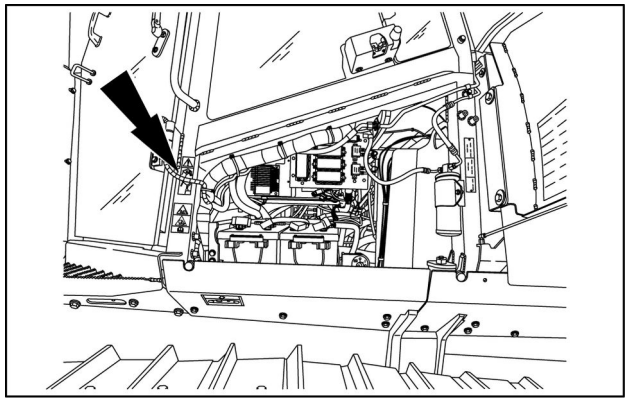
RAIL12DOZ1254AB 21

10 – "Rollover protective structure (ROPS)" decal
Do not modify or repair the ROPS or the FOPS. Any repair work on the ROPS or on the FOPS must be done by qualified dealer technicians. Failure to comply with this recommendation could result in death or serious injury.
Quantity :1
87715063



87715063A 22

This safety decal is located inside the left-hand rear compartment.



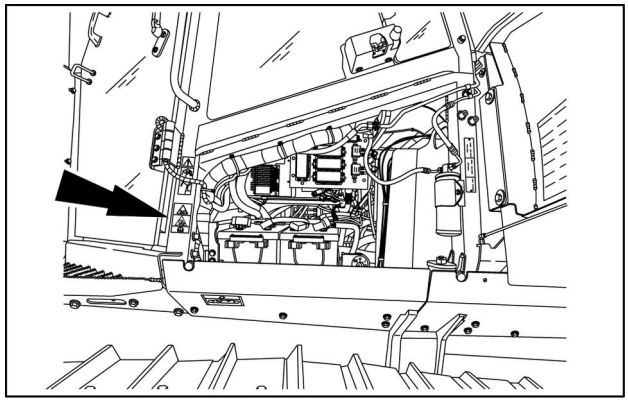
COIL14DOZ0113AA 23

11 – "Risk of explosion and run over" decal
This decal indicates the risk of explosion and run over while starting the engine with booster batteries. Refer to the operator's manual before performing this procedure. Failure to comply with this recommendation could result in death or serious injury.
Quantity :1
87706390



87706390A 24

This safety decal is located inside the left-hand rear compartment.



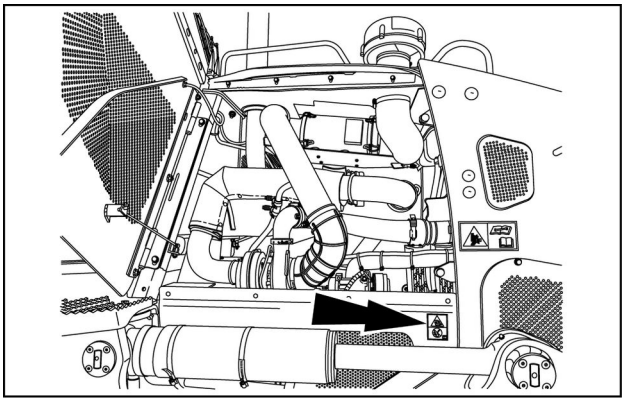
COIL14DOZ0113AA 25

12 – "Risk of unexpected movement" decal
This decal indicates the risk of unexpected movement of the machine while starting the engine if the machine has the transmission engaged. Start the engine only from the operator's seat with the machine controls in the neutral position. Failure to comply with these recommendations could result in death or serious injury.
Quantity :1
87706393



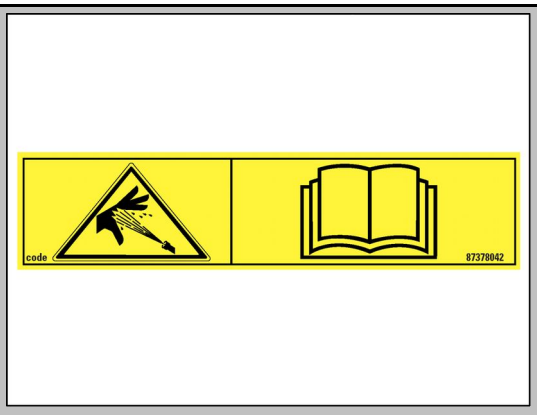
87706393 26

This safety decal is located in the right-hand front engine compartment.



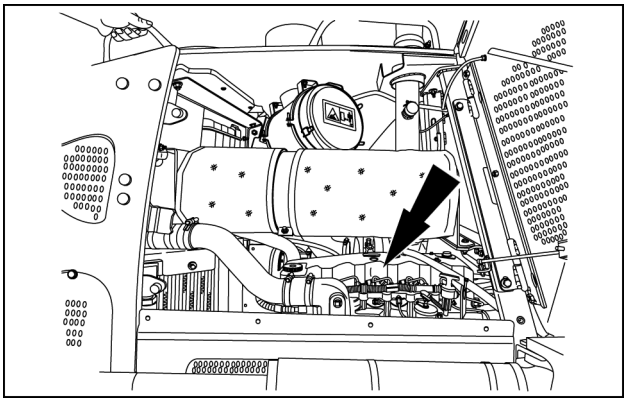
COIL14DOZ0109AA 27

13 – "Pressurized fuel system" decal
Engine operation generates a high pressure in the fuel system. Do not disconnect or attempt to repair any item in the fuel system with the engine running. Wait until the system cools to carry out maintenance work on the system. At operating temperature, the fuel can cause burns if it comes into contact with the skin. Failure to comply with these recommendations could result in death or serious injury.
Quantity :1
87378042



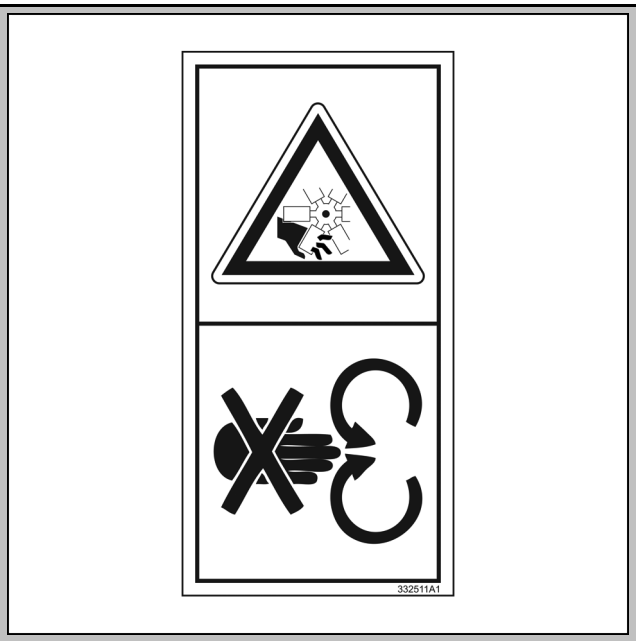
87378042 28

This safety decal is located in the front compartment on the engine valve cover.



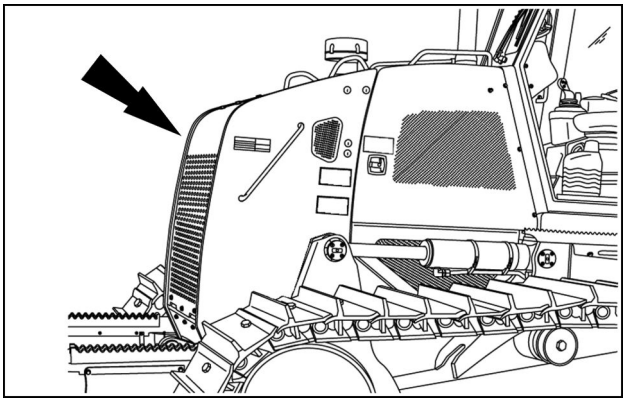
COIL15DOZ0086AA 29

14 – "Rotating parts" decal
Rotating parts can cause serious injuries. Keep clear of rotating parts such as fans, belts and pulleys when the engine is running. Stop the engine before performing any maintenance work on the machine. Failure to comply with these recommendations could result in death or serious injury.
Quantity: 2
332511A1



332511A1 30

This safety decal is located on the engine compartment on the left-hand side and right-hand side, near the engine cooling system fan.



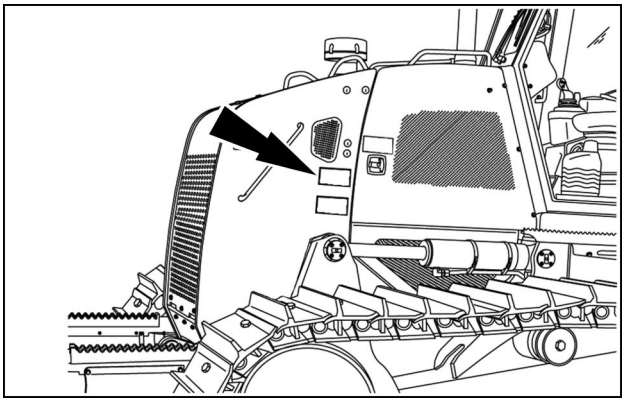
COIL14DOZ0115AB 31

15 – "Crush hazard" decal
This decal highlights the risk of being crushed by the machine. Keep away from the machine. Failure to comply with this recommendation could result in death or serious injury.
Quantity: 2
87741372



87741372 32

This safety decal is located on the front engine frame, just in front of the left-hand and right-hand forward engine access doors.



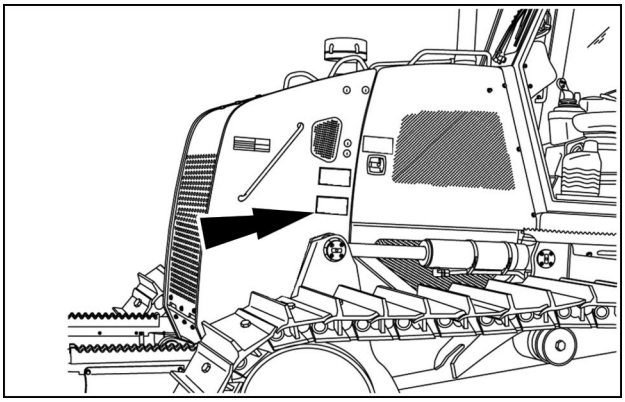
COIL14DOZ0115AB 33

16 – "Run over hazard" decal
This decal highlights the risk of being run over by the machine. Keep away from the machine. Failure to comply with this recommendation could result in death or serious injury.
Quantity: 2
87719507



87719507 34

This safety decal is located on the front engine frame, just in front of the left-hand and right-hand forward engine access doors.



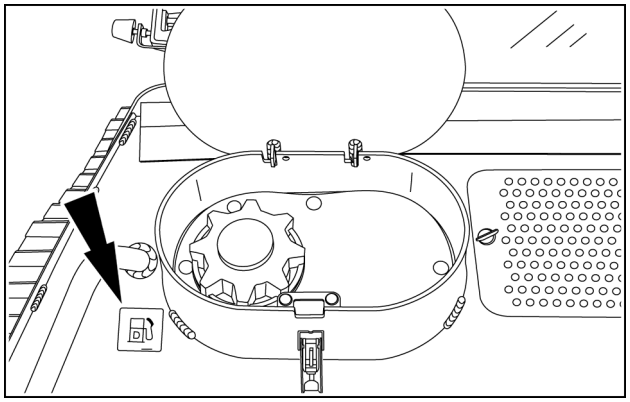
COIL14DOZ0115AB 35

17 – "Fuel tank filling nozzle" decal
This decal indicates the correct location for filling the fuel tank.
Quantity :1
85804338



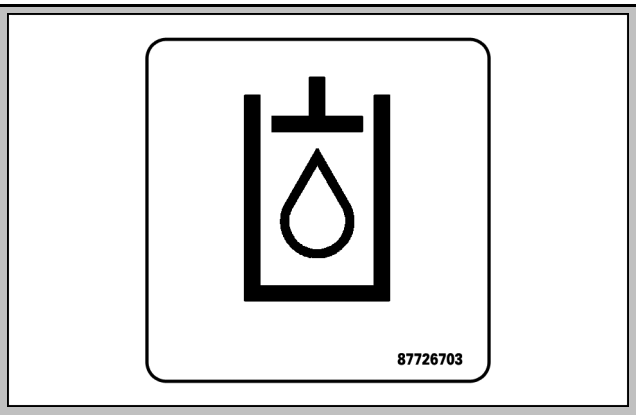
85804338 36

This information decal is located near the access cover for the fuel tank filling nozzle.



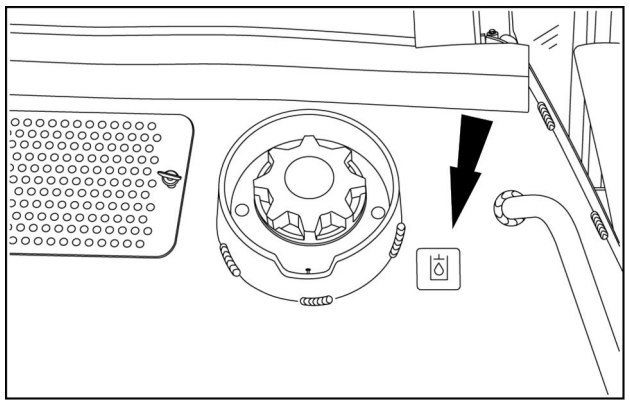
COIL14DOZ0009AA 37

18 – "Hydraulic fluid reservoir filling nozzle" decal
This decal shows the correct location for filling the hydraulic fluid tank.
Quantity :1
87726703



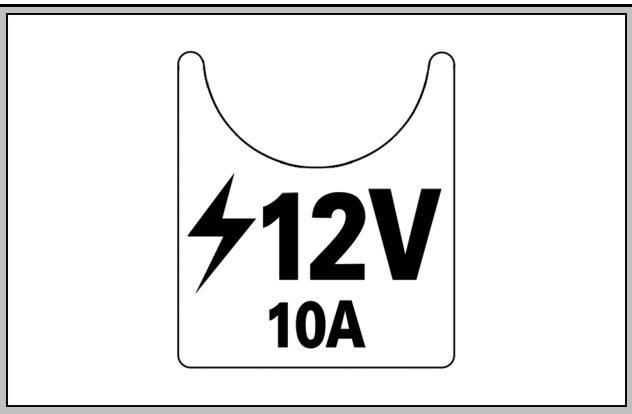
87726703 38

This information decal is located near the access cover for the hydraulic fluid tank filling nozzle.



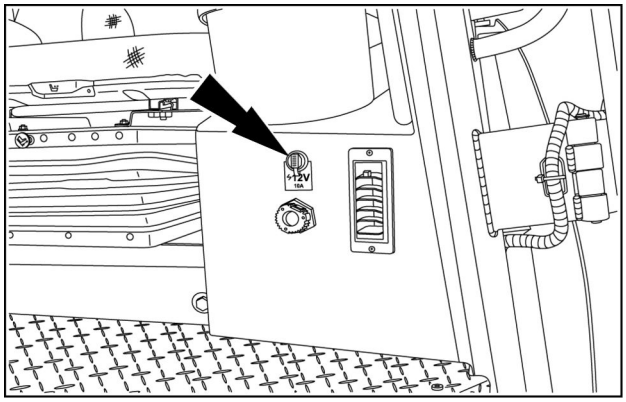
RAPH12DOZ0048AA 39

19 – "12V Voltage" decal
Before connecting electrical devices, make sure that the voltage is 12 volts.
Quantity :1
87601526



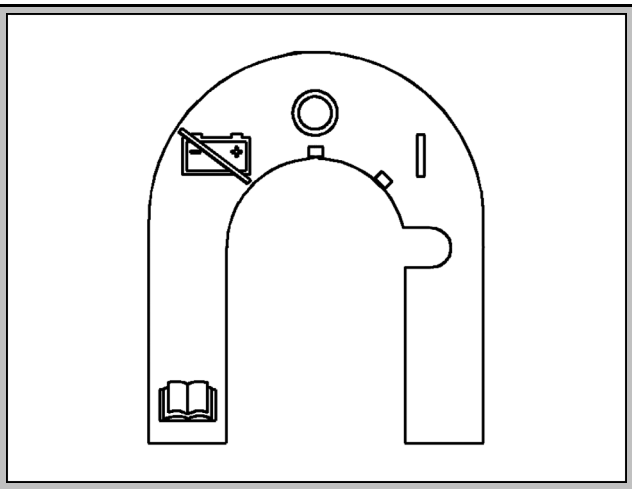
87601526 40

The information decal is located in the lower left-hand corner of the operator’s compartment below the left-hand control console.



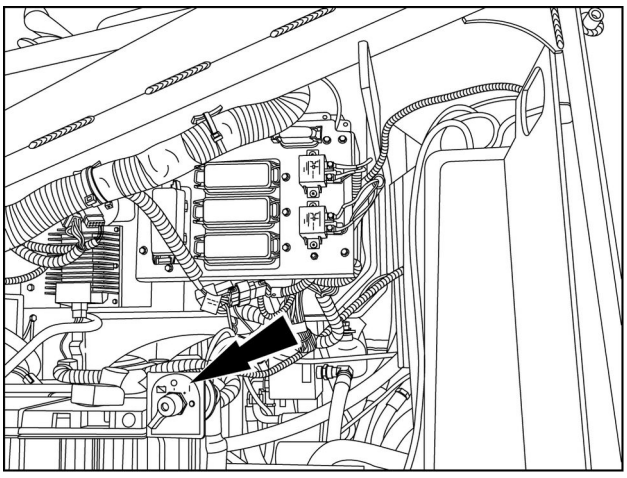
RAPH12DOZ0086AA 41

20 – "Master switch" decal
This decal indicates the location of the master switch of the machine's electrical system.
Quantity :1
47458056



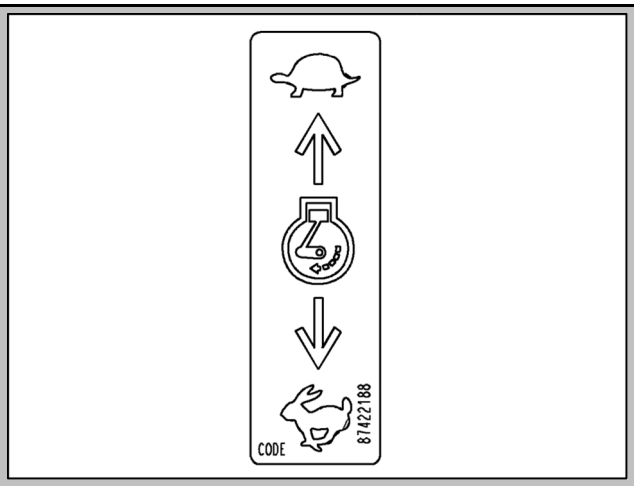
47458056 42

This safety decal is located inside the left-hand rear compartment.



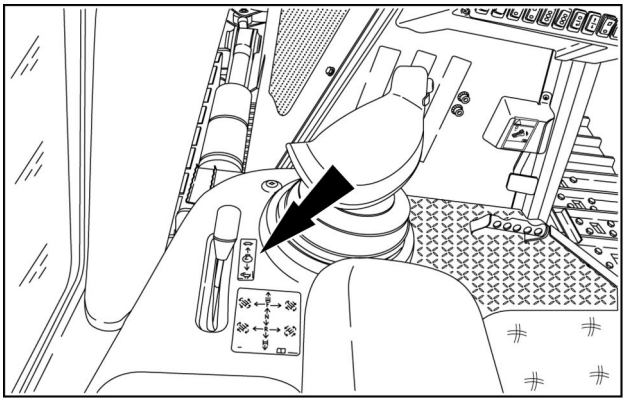
RAIL13DOZ0954AA 43

21 – "Engine speed control" decal
This decal indicates the position of the control lever to increase or decrease the speed of the engine.
Quantity :1
87422188



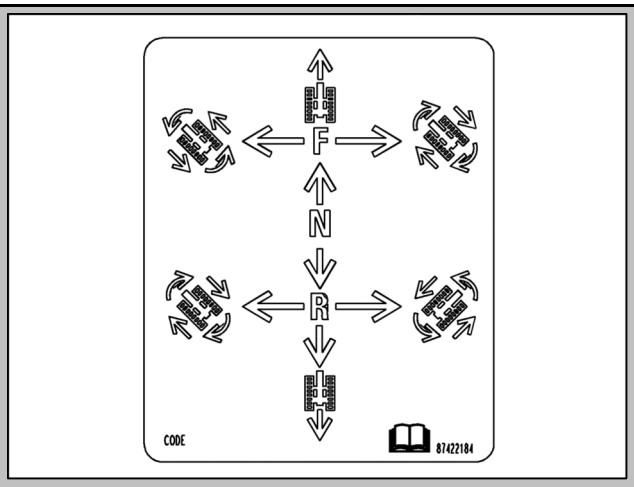
87422188 44

This informational decal is located near the engine acceleration control lever.



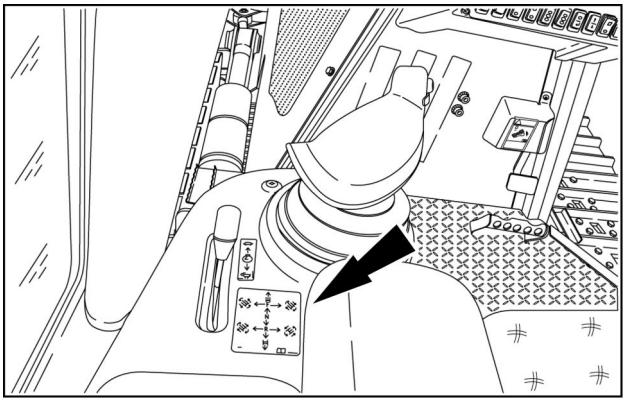
RAPH12DOZ0080AA 45

22 – "Movement and steering control" decal
This decal indicates the positions of the machine movement and steering lever.
Quantity :1
87422184



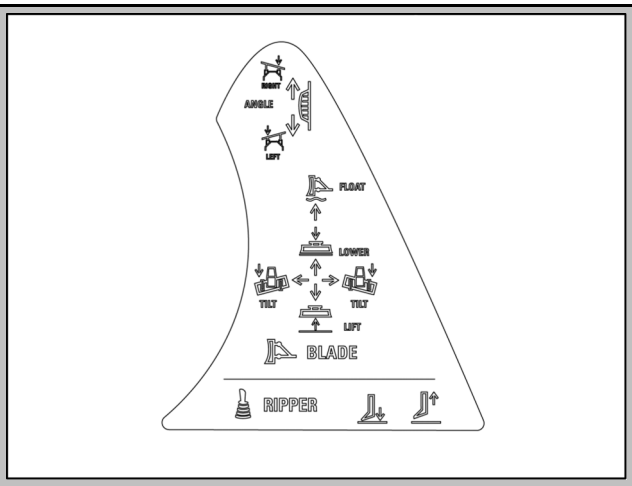
87422184 46

This informational decal is located near the movement and steering control lever.



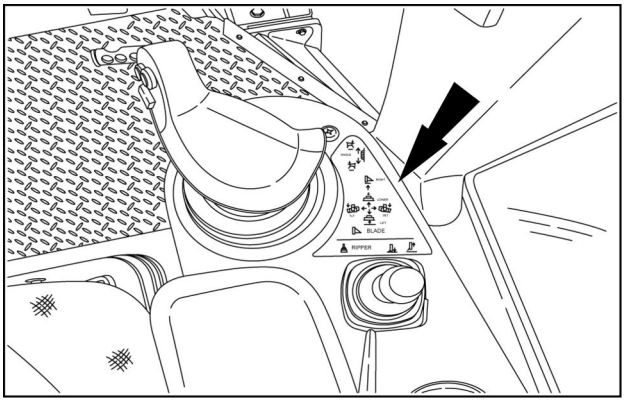
RAPH12DOZ0080AA 47

23 – "Blade control" decal (PAT model)
This decal indicates the positions of the blade control lever.
Quantity :1
84513047



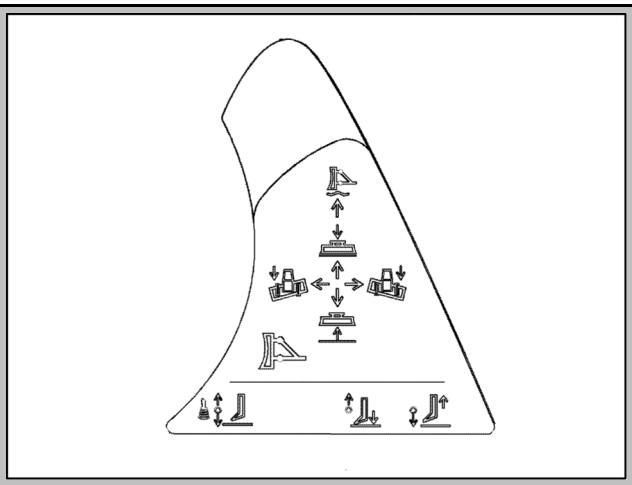
84513047 48

This informational decal is located near the blade control lever.



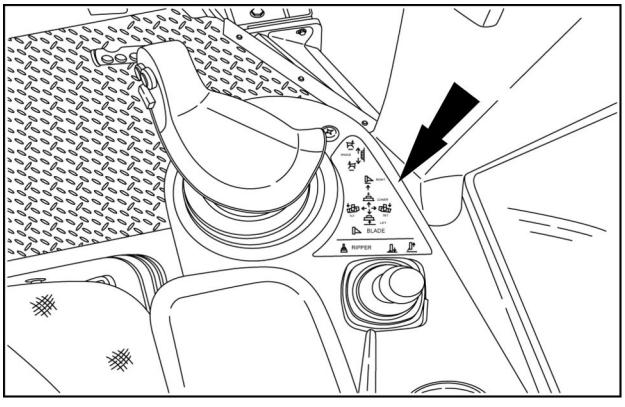
RAPH12DOZ0081AA 49

23 – "Blade control" decal (BD model)
This decal indicates the positions of the blade control lever.
Quantity :1
47492012



47492012 50

This informational decal is located near the blade control lever.



RAPH12DOZ0081AA 51

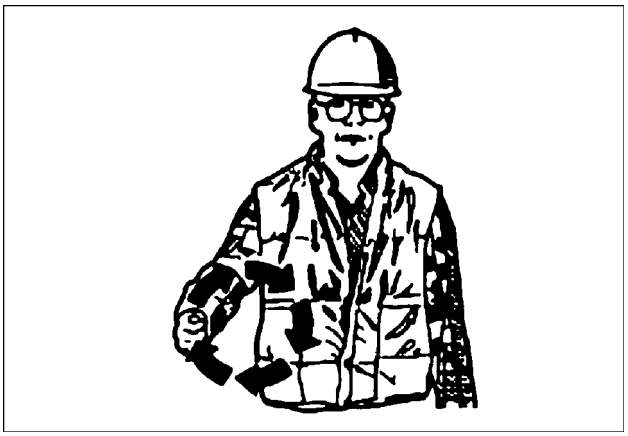
Hand signals

Hand signals

When operating the machine, never attempt to carry out tasks calling for precise control or 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.

Turn the engine on

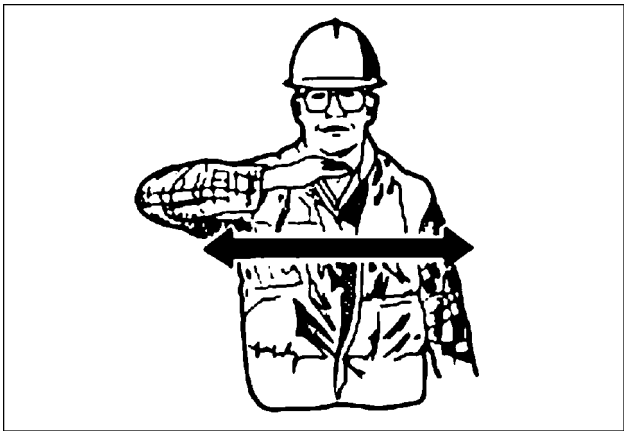
Facing the machine operator, extend your right arm toward the operator, make a fist with right hand and make small circular movements clockwise.



RCPH10WHL017BAD 1

Turn off the engine

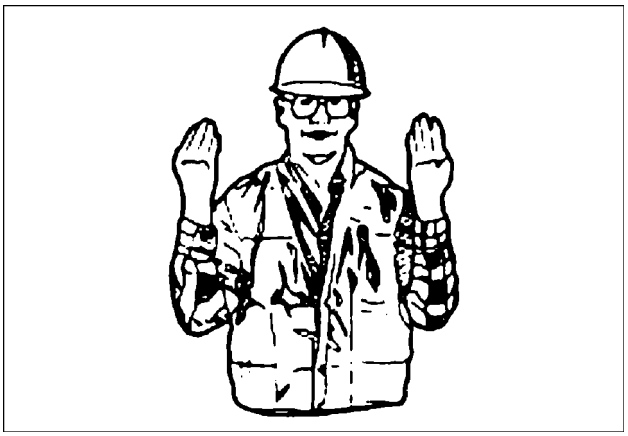
Facing the machine operator, hold your left arm lowered along the side of your body, bring your right hand to the height of your neck and make sideways movements.



RCPH10WHL005BAD 2

Come toward me

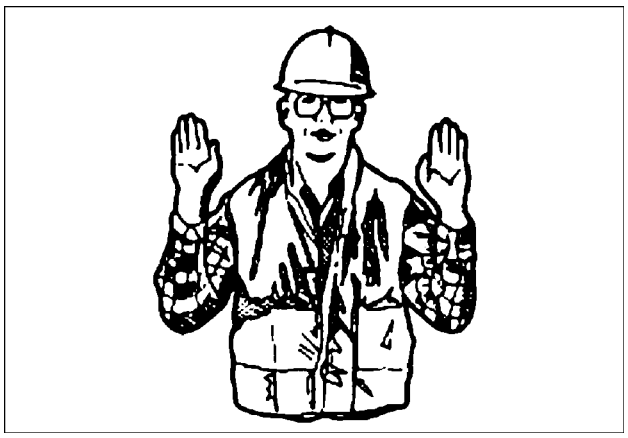
Facing the machine operator, bend both elbows and with the back of your hands facing the operator, move your hands away from the machine operator.



RCPH10WHL018BAD 3

Move away from me

Facing the machine operator, bend both elbows and with the palm of your hands facing the operator, move your hands toward the machine operator.



RCPH10WHL019BAD 4

Move this far

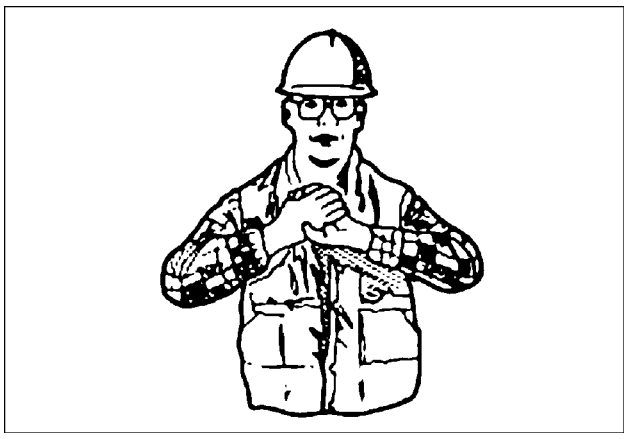
Face the machine operator, raise both forearms, hands open one facing each other, move the hands in inside laterally indicating how far to move.



RCPH10WHL020BAD 5

Stop and remain stopped

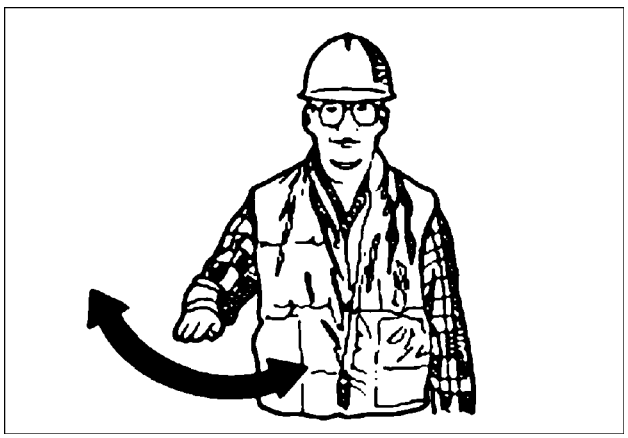
Facing the machine operator, join and keep your hands stopped.



RCPH10WHL002BAD 6

Stop

Facing the machine operator, hold your left arm lowered along the side of your body, lift your right arm forward with your right hand open and facing down, move your right arm back and forth.



RCPH10WHL009BAD 7

Emergency stop

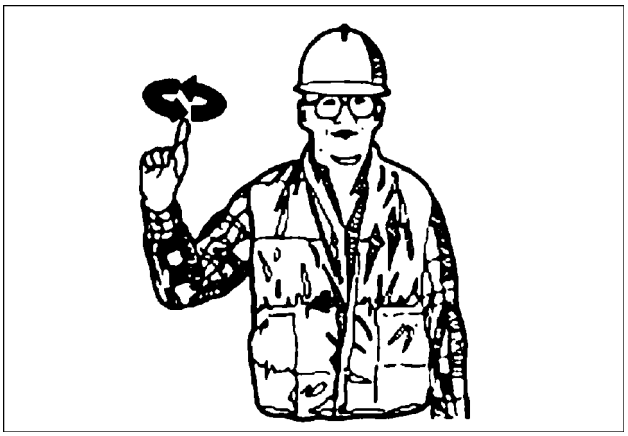
Facing the machine operator, raise both arms laterally and with your hands open and facing down, move your arms back and forth.



RCPH10WHL004BAD 8

Raise the implement

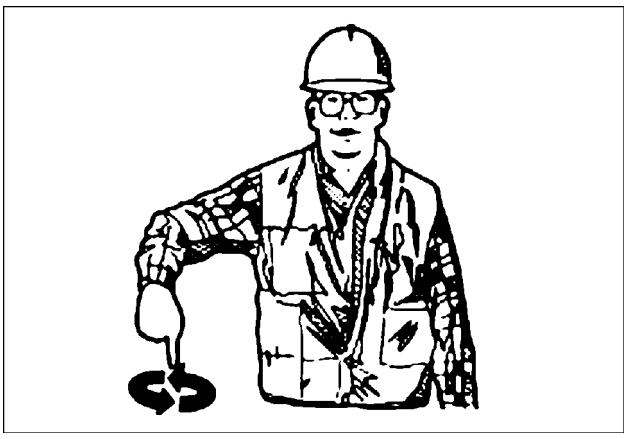
Face the machine operator, raise the right forearm on the vertical, with the index finger pointing up, and move the hand in small circular motions.



RCPH10WHL008BAD 9

Lower the implement

Face machine operator, extend the right arm down, point the index finger down and move the hand in small circular motions.



RCPH10WHL007BAD 10

3 - CONTROLS AND INSTRUMENTS

ACCESS TO OPERATOR'S PLATFORM

Access to operator’s platform

⚠ 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

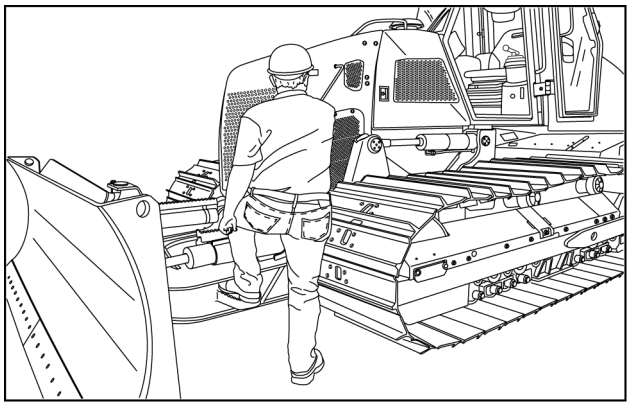
Steps and hand holds

Use the steps and handholds to get 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.

Only enter the machine from the front.



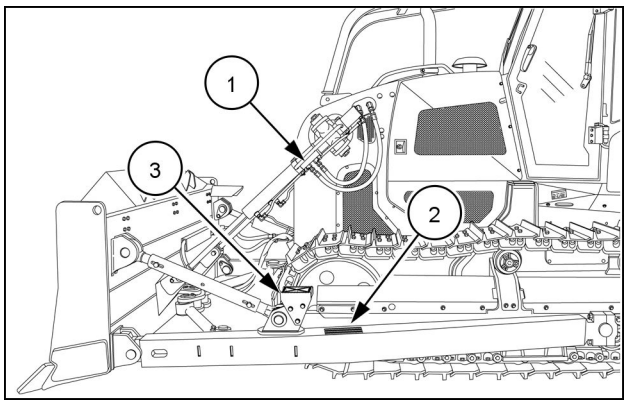
RAPH12DOZ0114AA 1

Entry from the front of the machine

Enter the machine using the blade as one of the support points.

Use the handhold **(1)**, the footrest **(2)** and the step **(3)** located on the push beam.

Obey the DO NOT STEP safety sign.



RAIL13DOZ1599AA 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

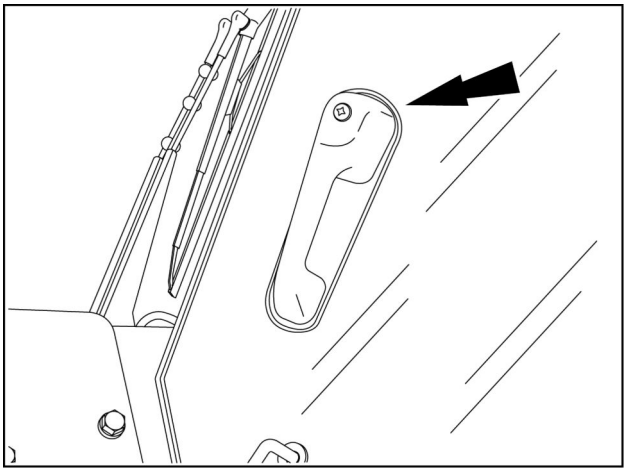
Opening the door from the outside

Use the ignition key to lock or unlock the door from outside the machine.

Use the door handle to open the door from the outside.

Open the door completely until it latches against the cab in the open position.

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

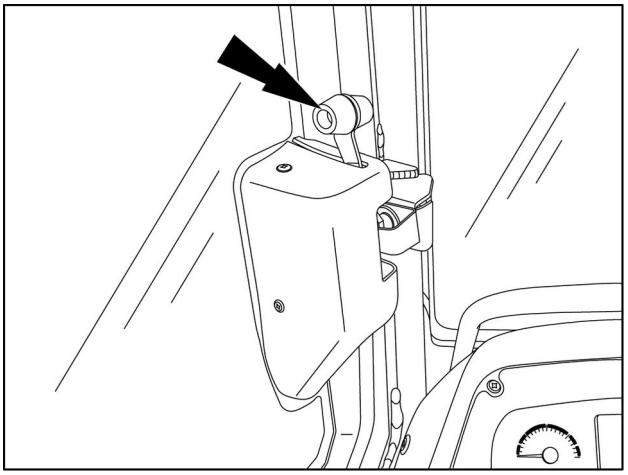


RAIL12DOZ0659AA 3

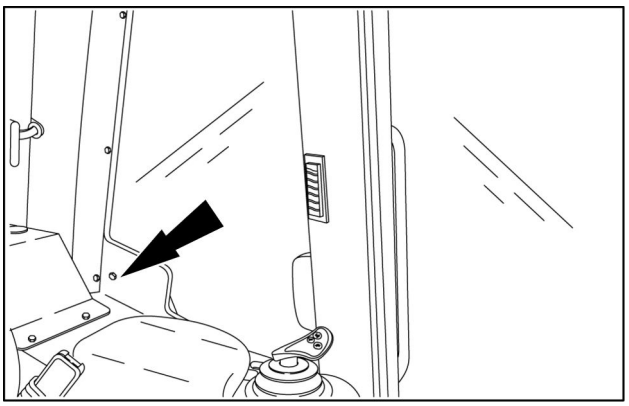
Inside door latch

To open the door from inside the cab, press the door release latch.

To secure the door in the fully open position from inside the cab, push the door back until the door locks against the cab.



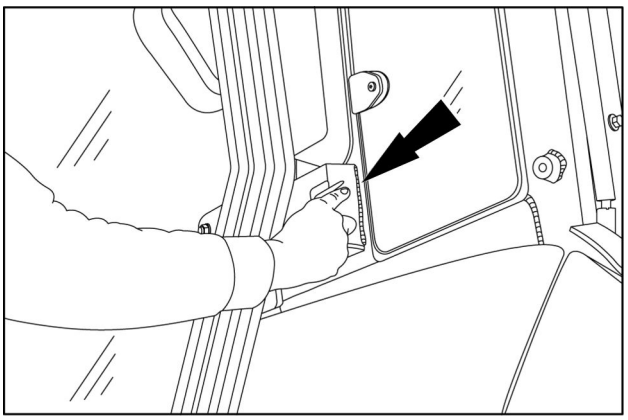
RAIL13DOZ1596AA 4



RAPH12DOZ0087AA 5

Exterior door latch

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



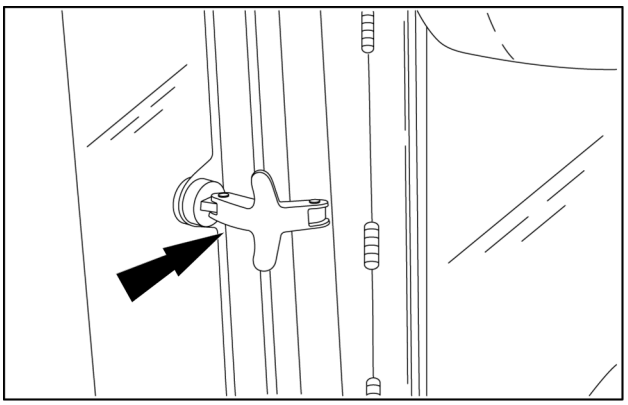
RAIL12DOZ0173AA 6

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

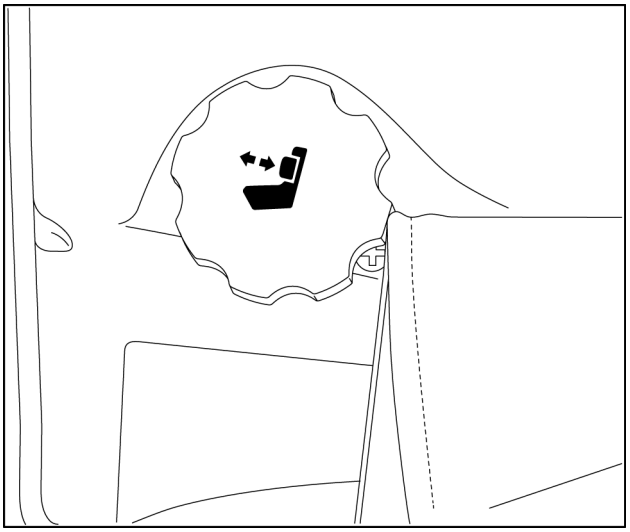
⚠ WARNING

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

Lumbar adjustment

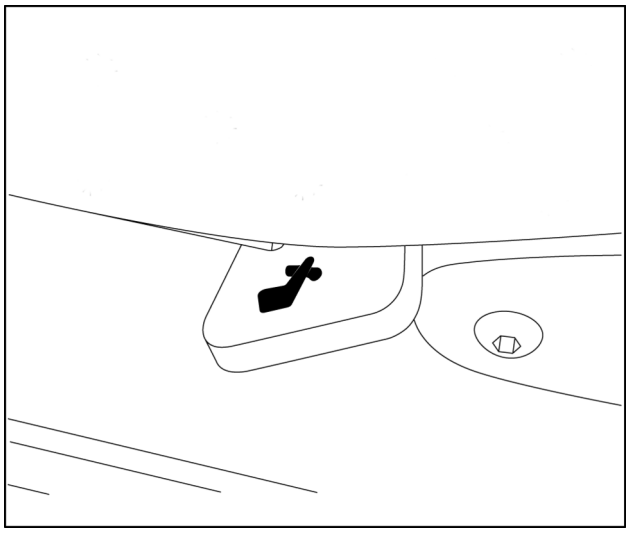
Locate the lumbar adjustment knob on the back of the operator’s seat. Turn the knob clockwise to increase the lumbar support. Turn the knob counterclockwise to decrease the lumbar support.



RAIL12DOZ0548AA 1

Backrest adjustment

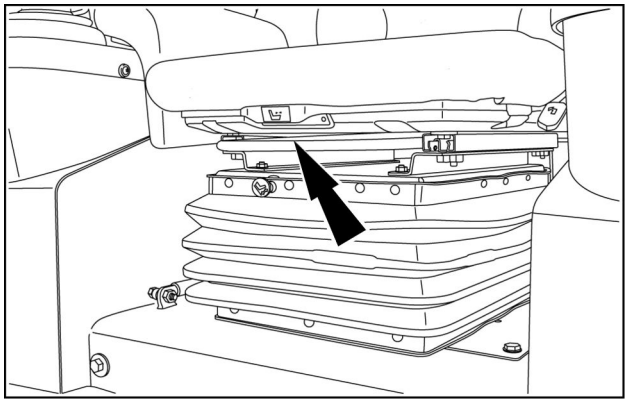
The backrest adjustment is located on the left-hand side of the operator’s seat. Lift up on handle, move the backrest to the desired position, release the handle to lock in position. The seat back can be tilted completely forward to access the cab air filter and manual pocket.



RAIL12DOZ0650AA 2

Slide lever

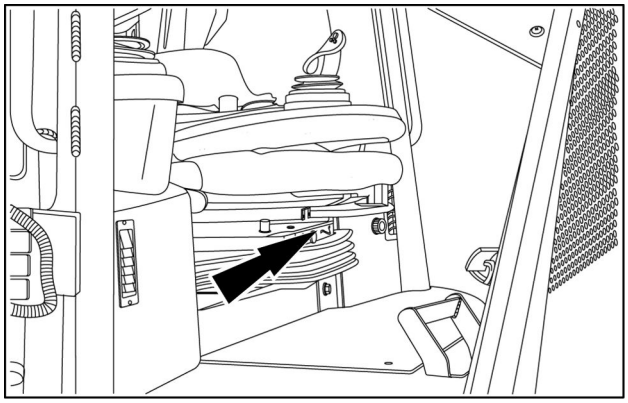
Pull the slide adjustment lever up and adjust the seat forward or backward, as required. Release the lever to lock the seat in position. Always make adjustments from the front center of the adjustment bar.



RAPH12DOZ0075AA 3

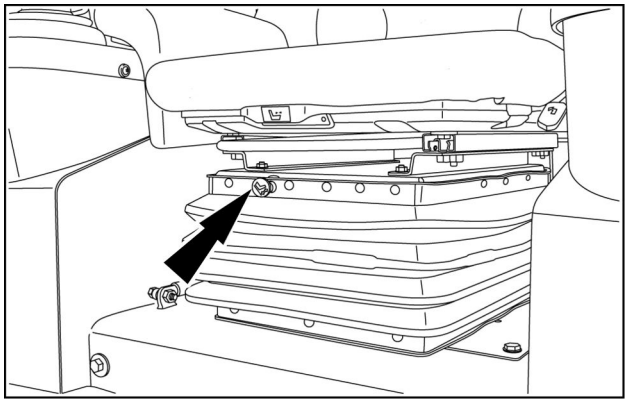
Seat height adjustment

Use the seat height adjustment to raise and/or lower the seat. The seat offers air suspension. When the knob is pulled air is released and the seat lowers.



RAIL12DOZ0651AA 4

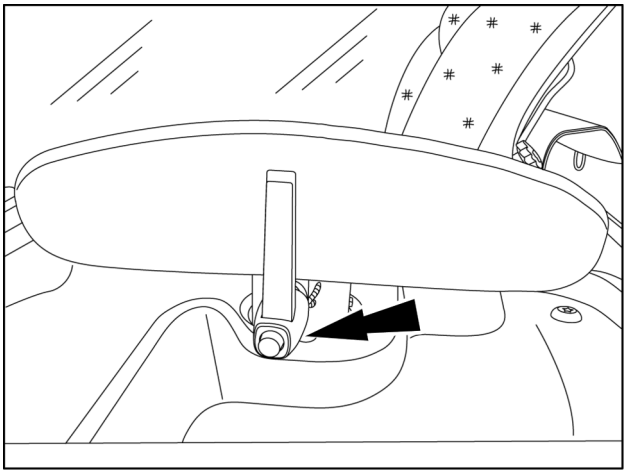
To raise the seat, remove the weight from the seat slightly and allow the air to lift the seat to the desired height. Release the knob at the desired height.



RAPH12DOZ0075AA 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

Shoulder 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

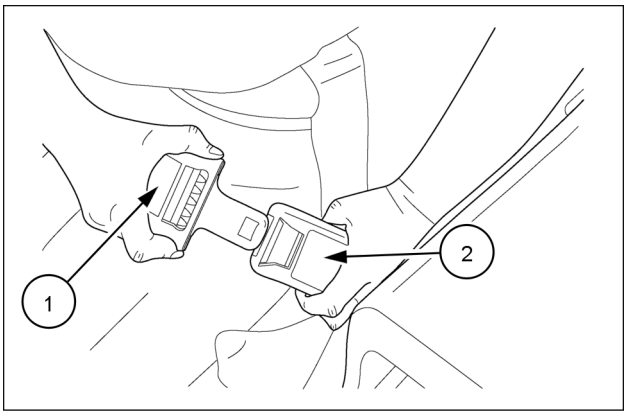
Fasten the seat belt as follows:

- Insert the retaining tang **(1)** into the buckle **(2)**.
- Make sure the belt is fastened and adjust the belt length around your body by pulling on the loose part of the belt on the right-hand side.

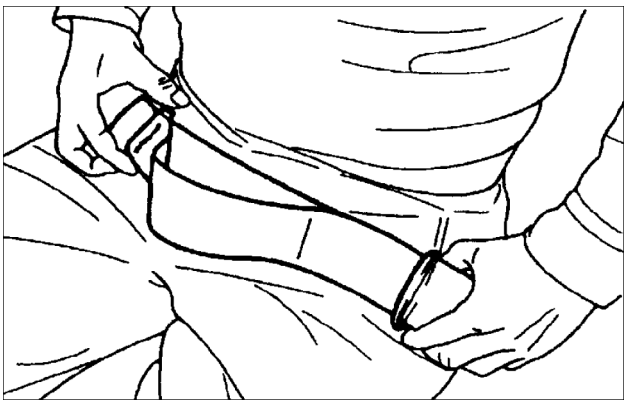
Unfastening the seat belt

Unfasten the seat belt as follows:

- Press the red button on the buckle **(2)** to unlock the tongue from the buckle.
- Slide out the tongue **(1)**.



RCIL10CWL083FAL 1



NH0193 2

FORWARD CONTROLS

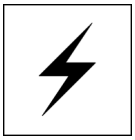
Key start switch

⚠ 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

The ignition switch has four positions:



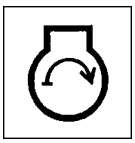
Accessory position: This position powers the power train controller, accessory switches and instrument cluster.



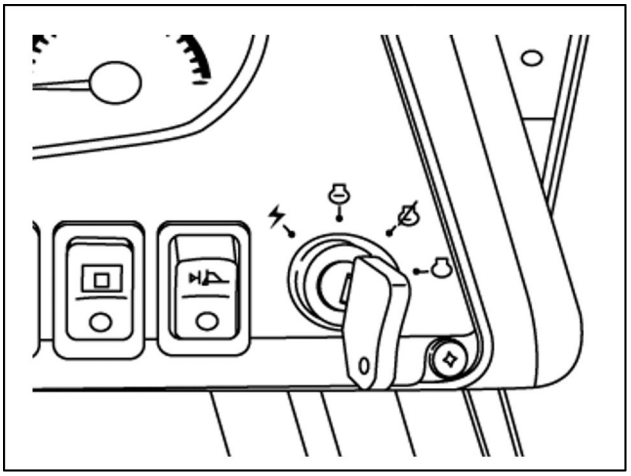
Engine stop (OFF position): Turn the key to the OFF position to stop the engine. After the engine has stopped, remove the key.



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



Engine start-up (START position): Turn the key completely clockwise to the START position to engage 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.



RAPH12DOZ0132AA 1

Foot pedals

Dual function pedal

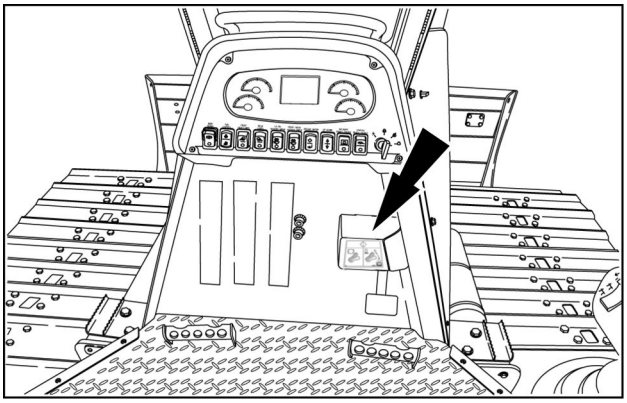
The dual function pedal can operate as a brake pedal or a deceleration pedal. As a deceleration pedal, the engine rotation is reduced as the pedal is depressed. The brake pedal is the default function. These settings are made through the transmission selection on the mult-function display.

NOTE: *See the multi-function display information in chapter 4.*

Foot Brake Pedal

When used as a brake pedal, the dual function pedal brakes the machine by adjusting the transmission, allowing for gradual forward movement.

Pushing the pedal completely down will reduce the volume displaced in the hydraulic travel system and activate the brakes within the planetary reduction gears.

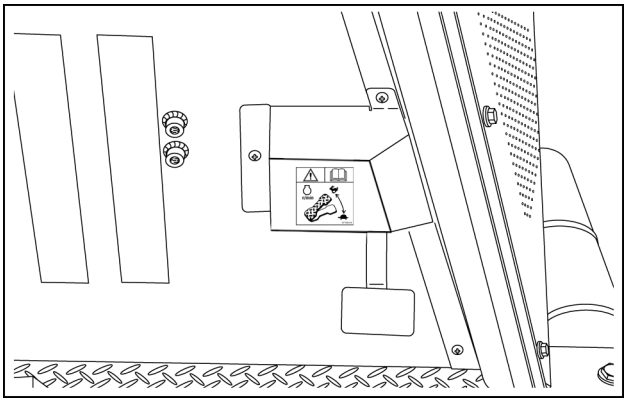


RAIL13DOZ1264AA 1

Decelerator pedal

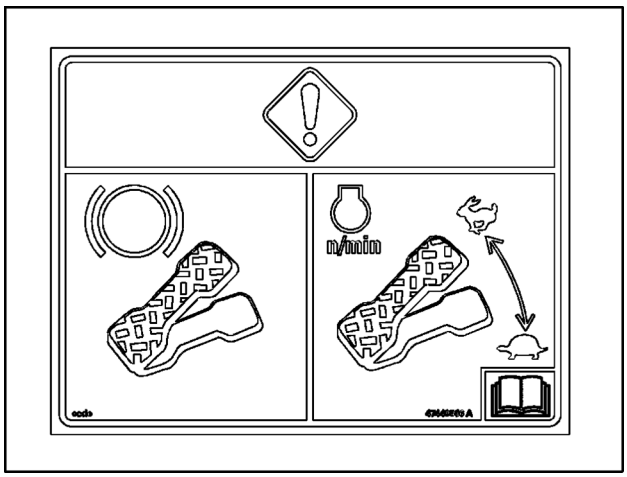
The dual function pedal used as deceleration pedal reduces the engine RPM and slows the machine.

Push down on the decelerator pedal to decelerate (reduce engine speed).



RAIL12DOZ1254AB 2

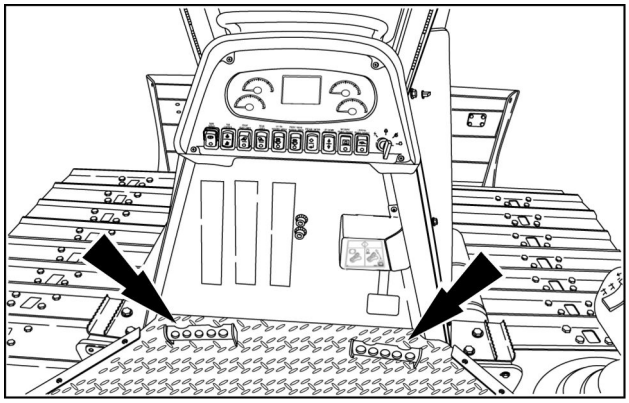
NOTE: *Use the decelerator pedal to control the machine in precision work.*



47449566 3

Footrest

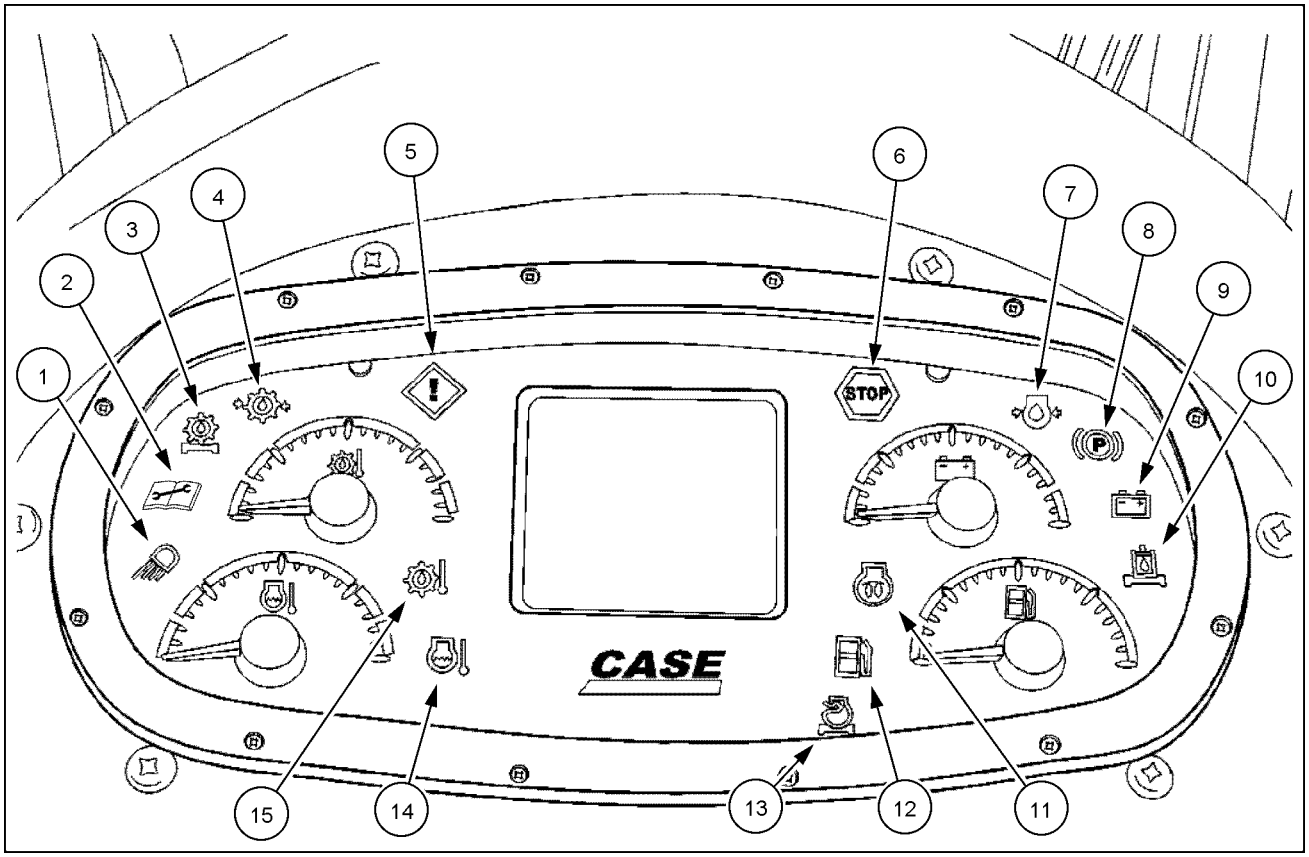
The machine is equipped with footrests, one right-hand and one left-hand.



RAIL13DOZ1264AA 4

Front console

Dashboard



RAPH12DOZ0136FA 1

(1) Work lights
(2) maintenance
(3) Hydrostatic transmission filter
(4) Hydraulic pressure
(5) Warning master indicator
(6) Stop master indicator
(7) Low engine oil pressure
(8) Parking brake
Alternator **(9)**
(10) Hydraulic filter
(11) Engine preheat
(12) Fuel level
(13) Engine air filter
(14) Coolant from the engine
(15) Hydrostatic transmission temperature

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

1. Worklights



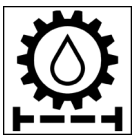
The indicator light will come on when the worklights switch is turned on.

2. Maintenance



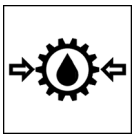
The maintenance indicator light indicates that maintenance is required on the machine. Contact your authorized dealer or read the service and/or operator's manual for information about correct service methods, intervals and fluid specifications.

3. Hydrostatic transmission filter



The warning light for the hydrostatic transmission filter shows the condition of the transmission filter. Stop the engine and replace the filter if the indicator light comes on during normal operation of the machine (hydraulic fluid at operating temperature and engine at maximum speed without load).

4. Hydraulic pressure



The warning light for the transmission hydraulic pressure will come on and an audible signal will sound if the pressure is low or there is no transmission hydraulic fluid pressure. Stop the machine immediately. The warning light will also come on if the engine is stopped and the key is on.

5. Warning master indicator



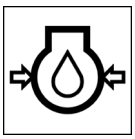
This warning master indicator illuminates in yellow to indicate there is a non-critical warning. When it comes on, a change in the operation mode of the machine is necessary. A scheduled shutdown for maintenance may be required. Contact your authorized dealer if the condition persists.

6. Stop master indicator



When the stop master indicator lights up, you must stop the machine safely and turn off the engine immediately. Failure to follow this instruction may result in injury and/or damage to the machine. The multi-function screen will indicate the critical warning message.

7. Low engine oil pressure



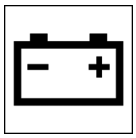
The low engine oil pressure warning light shows red and an audible signal will sound if there is no pressure or if the engine oil pressure is low while you are operating the machine. Bring the machine to a safe stop, and turn the engine OFF immediately. Do not run the engine if the warning light comes on during operation.

8. Parking Brake



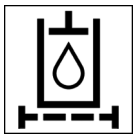
The parking brake indicator light shows red when the parking brake is on. Engage or release the parking brake using the switch located on the panel.

9. Alternator



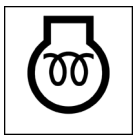
The alternator indicator light will come on when the battery has low voltage. The alternator indicator light comes on with the ignition switch in the ON position and momentarily goes out after a few seconds. If the alternator indicator light remains on, check the alternator voltage gauge.

10. Hydraulic filter



The hydraulic filter restriction warning light comes on if there is any issue, or when it is time to replace the hydraulic filter. If the hydraulic filter warning light comes on during normal operation of the machine, with the hydraulic fluid at operating temperature and the engine at maximum throttle, shut down the engine and replace the hydraulic filter.

11. Engine preheat



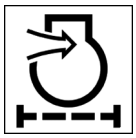
Wait until the engine preheat indicator light turns off before starting the engine. The engine preheating indicator light will come on when the engine intake air needs to be warmed up, under cold weather conditions.

12. Fuel Level



The low fuel level indicator light will come on and an audible signal will sound for a few moments when the tank is low on fuel. Check the fuel level using the fuel gauge on the panel. Do not allow the fuel level to be too low in the reservoir.

13. Engine air filter



The engine air filter warning light will come on if the restriction in the air filter is too high. It will also come on briefly when the ignition switch is turned on. If the warning light remains illuminated, shut down the engine and inspect the engine air filter.

14. Engine Coolant



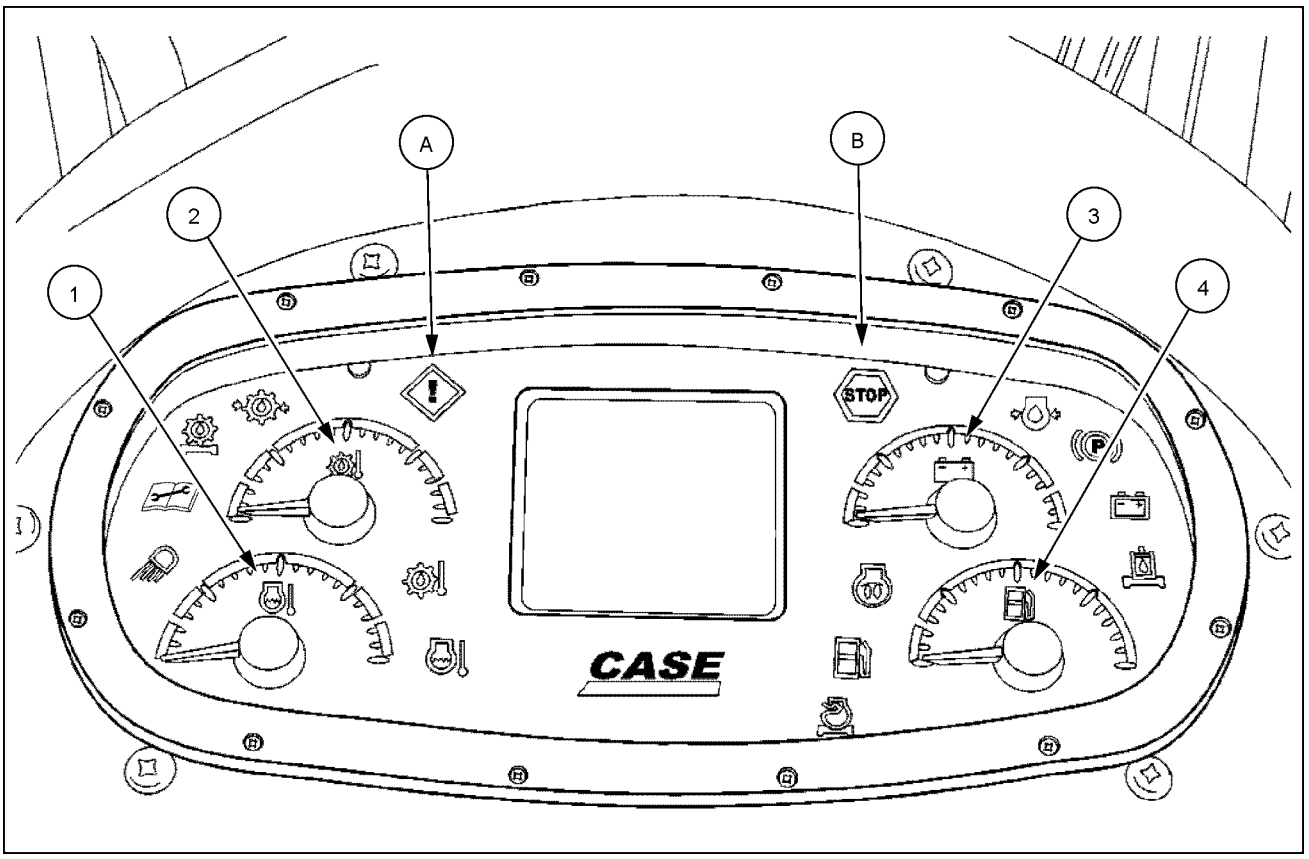
The engine coolant warning lamp will illuminate and the audible buzzer will sound when the engine coolant temperature is too high. Check the coolant temperature using the indicator on the panel. If the engine coolant warning light comes on and the audible warning sounds, run the machine at idle speed. If this does not correct the problem, shut down the engine immediately and check the level of machine coolant.

15. Hydrostatic transmission temperature



The hydrostatic transmission fluid warning light will come on and an audible signal will sound if the transmission operating temperature is too high. Check the transmission operating temperature using the transmission temperature gauge. The transmission operating temperature is normal when the gauge needle is in the green area of the display.

Status and warning icons



RAPH12DOZ0136FA 1

(A) Warning master indicator
(B) Stop master indicator

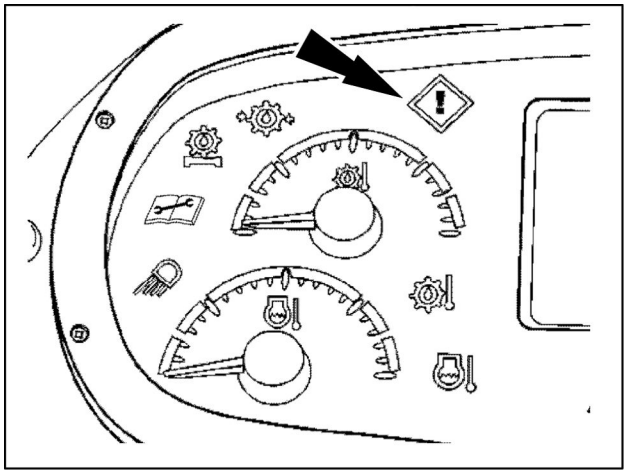
(1) Engine coolant temperature gauge
(2) Hydraulic Fluid Temperature Indicator
(3) Battery voltage indicator
Fuel level gauge **(4)**

A. Warning master indicator (non-critical warnings – yellow)

NOTICE: *When a failure occurs, an audible alarm will sound continuously and the stop master indicator will be YELLOW and will appear in the message area. When this occurs, return the machine to a service area and stop the engine to avoid the risk of costly repairs.*



The warning master indicator is a non-critical warning indicator. If it comes on, change the operating mode and schedule a work interruption for maintenance or, if the condition persists, contact your authorized CASE CONSTRUCTION dealer. The following table lists non-critical warning indications that may be displayed on the instrument cluster and the corrective action required.



RAPH12DOZ0138AA 2

Non-critical warning master indicator

"Display" monitor	Description	Corrective Action
Parking Brake	Parking brake engaged and machine shifted forward or reverse	Release the parking brake.
Coolant temperature	Engine coolant temperature high	1. Idle machine and monitor temperature. 2. Clean radiator or operate fan reverser (If equipped). 3. Check coolant level and add coolant, if necessary.
Hydraulic fluid temperature	Hydraulic fluid temperature high	1. Idle machine and monitor temperature. 2. Clean cooler or operate fan reverser (If equipped). 3. Check hydraulic fluid level.
Engine air filter "Air filter"	Air filter blocked	1. Clean the air filter. 2. Replace the primary and secondary filters.
'Hydraulic system filter	Hydraulic system filter with high restriction	Replace the hydraulic system filter
Voltage	Malfunctioning alternator	1. Check electrical system. 2. Voltages are out of range. 3. Change operating procedure.
Fuel	Fuel level low	Fill the fuel tank (do not allow the tank to fully empty).

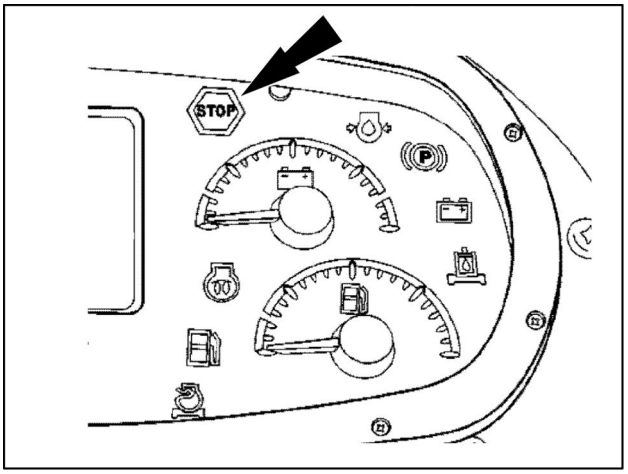
NOTE: *If the conditions persist after the corrective actions, contact your authorized CASE CONSTRUCTION dealer.*

B. Stop master indicator (critical warnings – red)

NOTICE: *When a failure occurs, an audible alarm will sound continuously and the stop master indicator will be RED and will appear in the message area. When this occurs, stop the machine safely and immediately SHUT DOWN the engine. Non-compliance with this instruction may result in injury and damage to the machine.*



The stop master indicator is a critical warning indicator. If it comes on, IMMEDIATELY stop the machine safely and shut down the engine. The following table lists some of the critical warning indications that may be displayed on the instrument cluster and the corrective action required.



RAIL12DOZ0821AA 3

⚠ WARNING

Damaged components can cause an accident with the machine.
If the STOP master indicator illuminates, immediately and safely bring the machine to a stop and turn the engine off.
Failure to comply could result in death or serious injury.

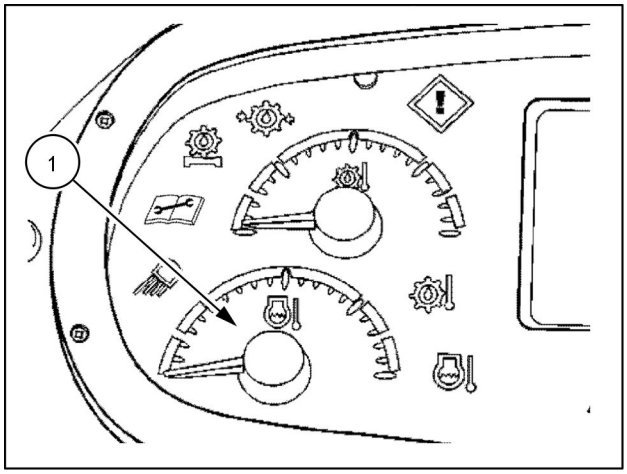
Critical warning master indicator

"Display" monitor	Description	Corrective Action
Engine Oil Pressure	Low eng oil press	Bring the machine to a safe stop, and turn the engine OFF immediately. Contact your dealer.
Brake fluid pressure	Low brake fluid 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 fluid temperature	Hydraulic fluid temperature high	Bring the machine to a safe stop, and turn the engine OFF immediately. Contact your dealer.

1. Engine coolant temperature gauge



The indicator shows the temperature of the engine coolant. Normal operating temperature is in the green area. When the engine coolant temperature increases, the gauge pointer will move into the yellow area and the warning alarm will sound for three seconds. The warning master indicator turns yellow. When the temperature continues increasing, the gauge pointer will move into the red area and the warning alarm sounds continuously. The stop master indicator turns red. The machine SHOULD NOT be operated when the temperature is in the red area.



RAPH12DOZ0138AA 4

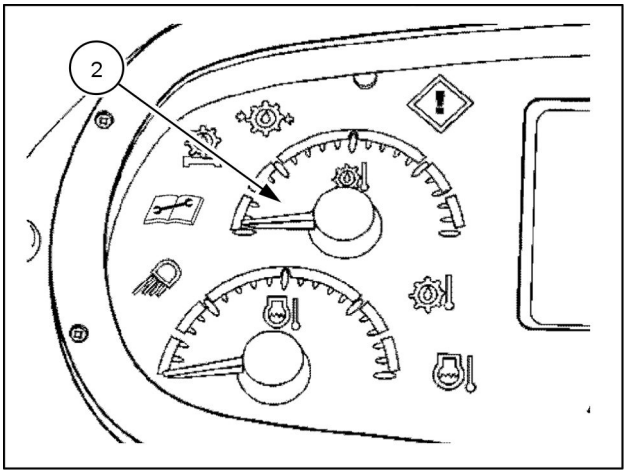
Engine coolant temperature gauge

Indication	Condition	Master Indicator	Indicator Status	Alarm Status
20 – 103 °C (**68 – 217 °F**)	The temperature of the engine coolant is normal	–	–	–
103 – 105 °C (**217 – 221 °F**)	The temperature of the engine coolant is high	Warning (Yellow)	Flashes	3 Seconds
105 °C (**221 °F**) and above	The temperature of the engine coolant is very high	Stop (Red)	Illuminated	Continuously

2. Hydraulic fluid temperature indicator



The indicator shows the hydraulic system fluid temperature. Normal operating temperature is in the green area. When the hydraulic system fluid temperature increases, the gauge pointer will move into the yellow area and the warning alarm will sound for three seconds. The warning master indicator turns yellow. When the temperature continues increasing, the gauge pointer will move into the red area and the warning alarm sounds continuously. The stop master indicator turns red. The machine SHOULD NOT be operated when the temperature is in the red area.



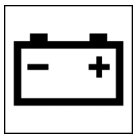
RAPH12DOZ0138AA 5

Hydraulic fluid temperature indicator

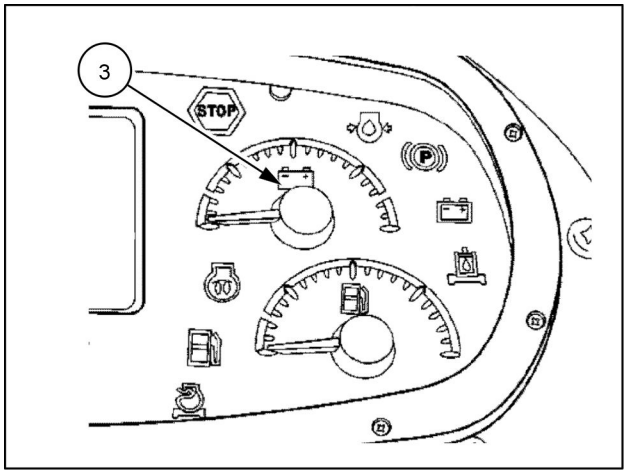
Indication	Condition	Master Indicator	Indicator Status	Alarm Status
37 – 90 °C (**99 – 194 °F**)	The hydraulic fluid temperature is normal	–	–	–
90 – 100 °C (**194 – 212 °F**) (See the note below.)	The hydraulic fluid temperature is high	Warning (Yellow)	Flashes	3 Seconds
100 °C (**212 °F**) and above	The hydraulic fluid temperature is very high	Stop (Red)	Illuminated	Continuously

NOTE: *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 fluid temperature does not return to normal operating temperature, check the hydraulic fluid level. Correct the problem before continuing to operate the machine.*

3. Battery voltage gauge



The gauge shows the battery voltage (if the battery is properly charging). If the gauge pointer is in the green area, the battery is in normal condition. If the gauge pointer is in the yellow area, the engine should be monitored. If the gauge pointer is in the red area, the battery is in a discharge condition. The stop master indicator turns red, stop the machine and correct the issue.



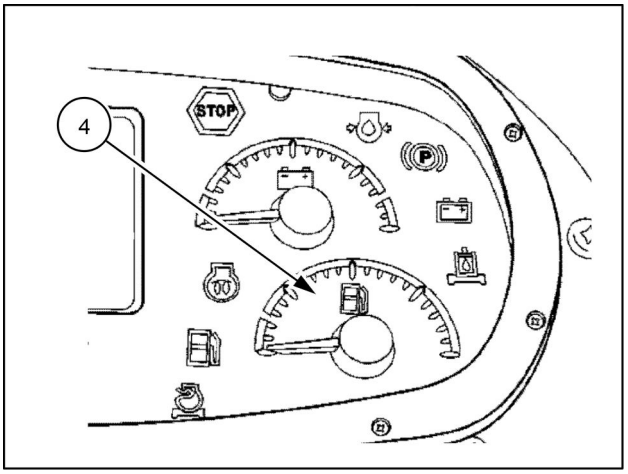
RAIL12DOZ0821AA 6

NOTICE: *Do not operate the machine if the gauge pointer is in the red area and the alarm is sounding continuously. Stop the machine and correct the problem.*

4. Fuel level gauge



The indicator shows the fuel level in the tank. The normal operating range is in the green area. When the tank is almost empty, the gauge pointer will move into the yellow area. The fuel warning indicator light will turn on and the warning alarm will be activated for three seconds.



RAIL12DOZ0821AA 7

Fuel level gauge

Indication	Condition	Master Indicator	Indicator Status	Alarm Status
8% and below	Fuel level low	Warning (Yellow)	Illuminated	3 Seconds
14% and above	Fuel level normal	–	–	–

NOTICE: *Do not operate the machine if the fuel gauge pointer is in the red area and the alarm is sounding continuously. Stop the machine and fill up.*

Operation of the multi-functional LCD display

Multi-function screen

The multi-function Liquid Crystal Display LCD is located at the center of the instrument cluster.

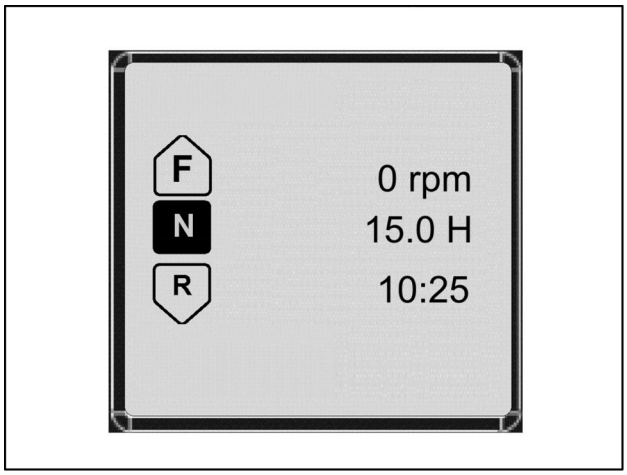
With the ignition key in the ON (ligado) position, the indicator lights on the instrument cluster will momentarily flash.

The multi-function screen will indicate the machine model.

The home screen will then appear.

Once operator preferences are set, the screen will show those selections.

NOTE: *With the ignition key in the ON (ligado) position, the operator can press the ENTER / ESC key 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.*



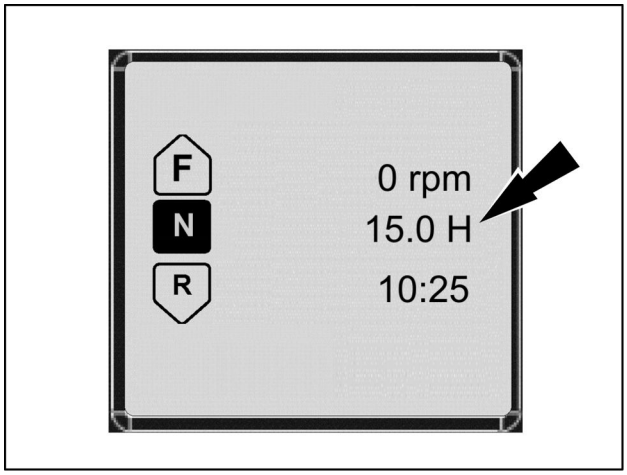
RAIL13DOZ1261AA 1

Information will be displayed on the LCD display as programmed by the operator or automatically by machine factory settings.

The screen offers prompts to assist the operator when programming machine functions and during diagnostics of some machine systems.

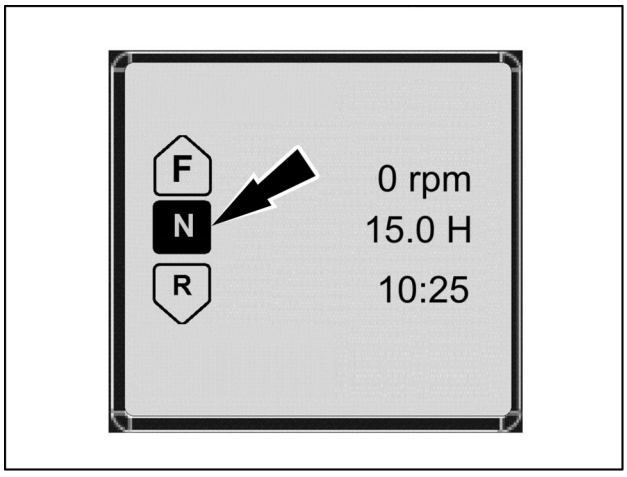
The home screen displays on the right-hand side the engine speed, the machine's number of work hours and the clock.

The display is controlled by the technological system installed on the machine and is configured to meet the operator's preferences.



RAIL13DOZ1261AA 2

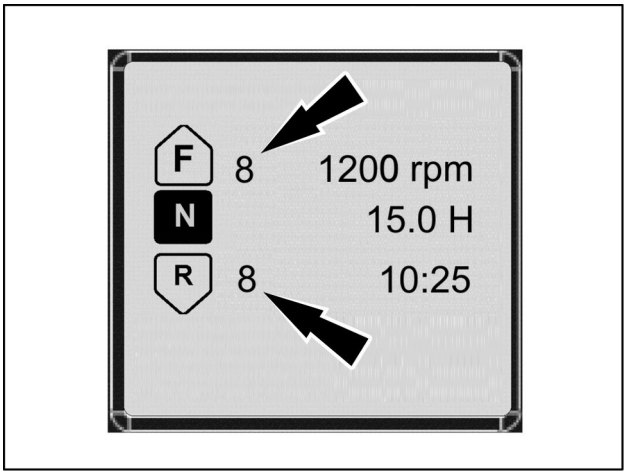
The left-hand side of the screen displays the transmission, Forward (F), Neutral (N) or Reverse (R), as selected by the operator.



RAIL13DOZ1261AA 3

The machine is equipped with 15 travel speed ranges, which can be selected using the upshift and downshift buttons located on the travel and direction control lever.

NOTE: *In this example, the travel speeds are the same for forward movement and reverse movement.*

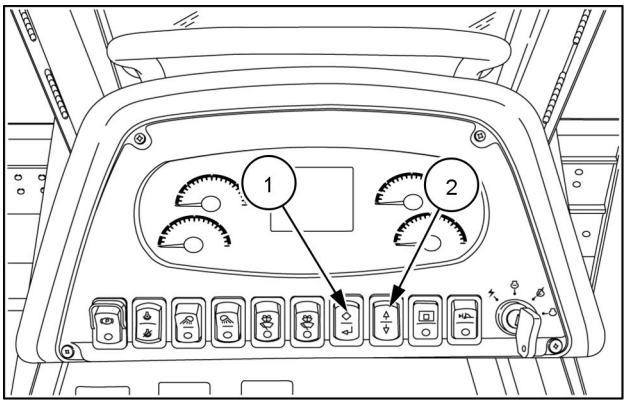


RAIL13DOZ1263AA 4

Navigating the multi-function screen

Navigating through the multi-function liquid crystal display (LCD) screens

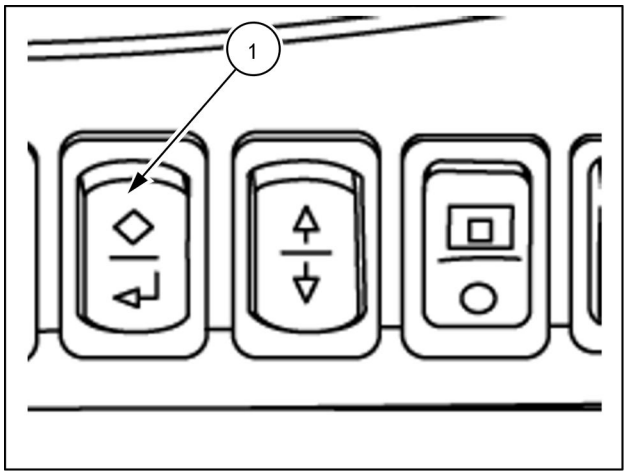
The ENTER / ESC switch **(1)** and the UP or DOWN arrow switch **(2)** are located on the front console and are used to navigate the multi-function screen of the machine.



RAPH12DOZ0076AA 1

Use the ENTER / ESC switch **(1)** to confirm the selected item or to return to the previous screen or to the main menu.
Press the top of the switch to use the ESC function, return to the previous screen or to the main menu, and also to save the set-up preference in the memory.
Press the bottom of the switch to use the ENTER function, confirming the selected item.

The entire selection and confirmation process for configuration of the multi-function screen are essentially programmed in the same manner.

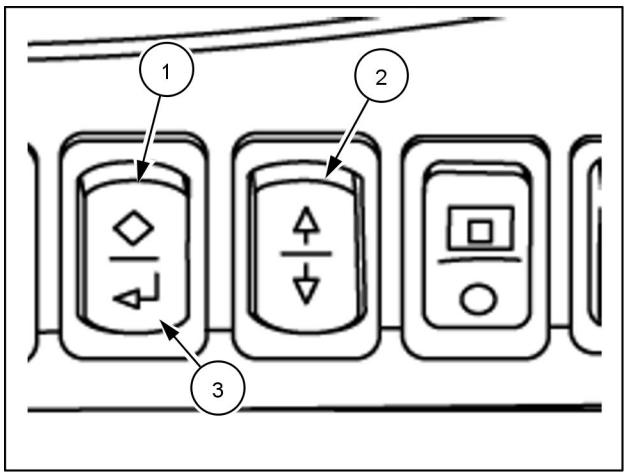


RAIL12DOZ0225AA 2

Use the UP or DOWN arrow switch **(2)** to scroll to the desired selection.
Press the top of the switch to use the scroll UP function.
Press the bottom of the switch to use the scroll DOWN function.

Follow all the prompts displayed on the screen when given and use the UP or DOWN switch **(2)** to select the desired option and then use the ENTER switch **(3)** to confirm the selected option. Press the ESC switch **(1)** to save the selection chosen and return to the main menu.

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



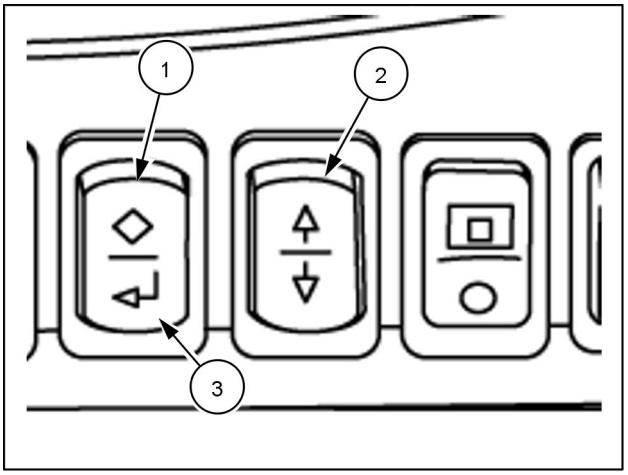
RAIL12DOZ0225AA 3

Viewing screens

The multi-function screen has 3 information screens and 2 trip screens with easy access. At any time with the engine running or with the ignition key in the ON (LIGADO) position, press the UP or DOWN switch **(2)**, from the home screen, to access screens. These screens are in a circular loop and can be accessed by pressing the UP or DOWN switch **(2)**. The following sequence shows access using only the DOWN key **(2)**.

NOTE: *To save the changes made in the multi-function screen settings in the memory, you need to press the ENTER switch **(3)** confirming the change and then press the ESC switch **(1)** to save in the memory.*

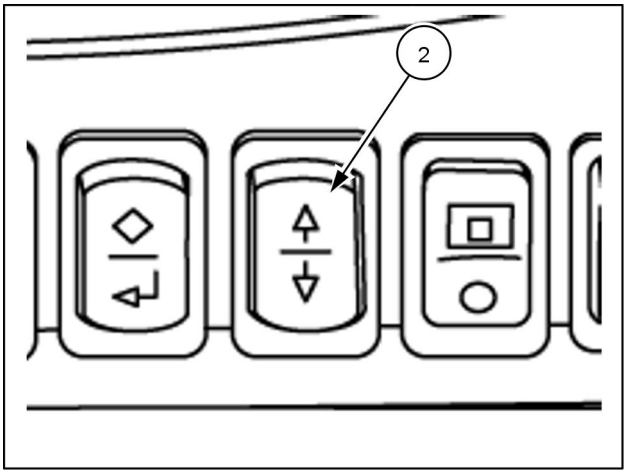
On the home screen, press the bottom of the switch **(2)**.



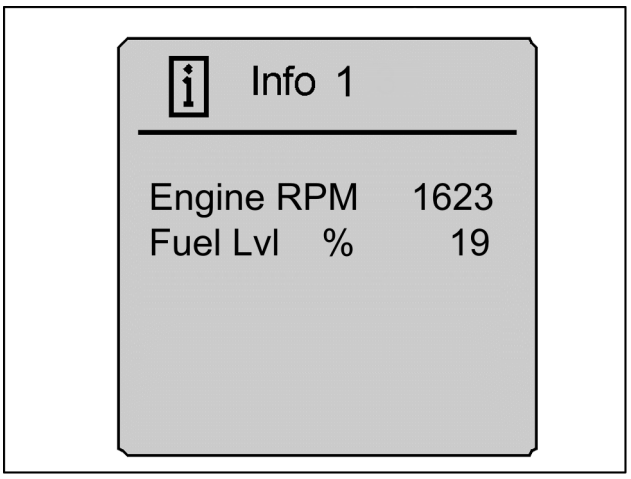
RAIL12DOZ0225AA 4

Information screens

"Info 1" is the first information screen displayed when pressing the bottom of the switch **(2)** from the home screen. This screen displays the following items:
Engine RPM - Engine speed
Fuel Lvl - Level of fuel in the reservoir



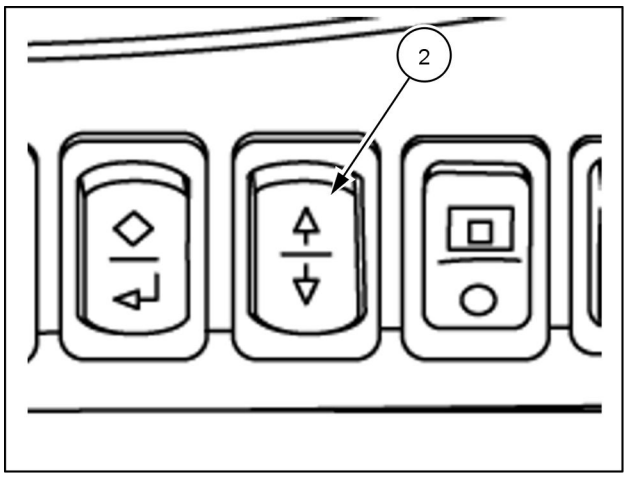
RAIL12DOZ0225AA 5



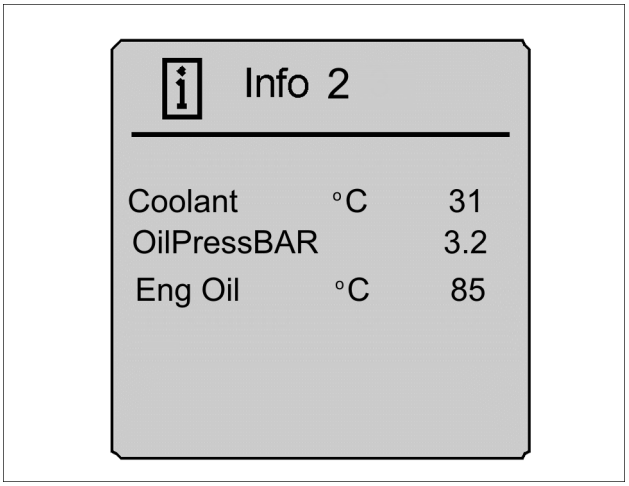
RAIL13DOZ1262AA 6

Press the bottom of the switch **(2)** again to display the "Info 2" screen. This screen displays the following items:
Coolant - Engine coolant temperature
OilPressBAR – Engine oil pressure
Eng Oil - Engine oil temperature

Temperature can be displayed in either Fahrenheit or Celsius.



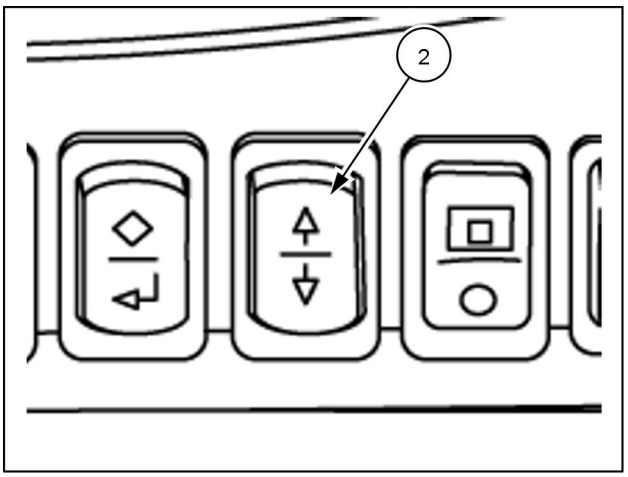
RAIL12DOZ0225AA 7



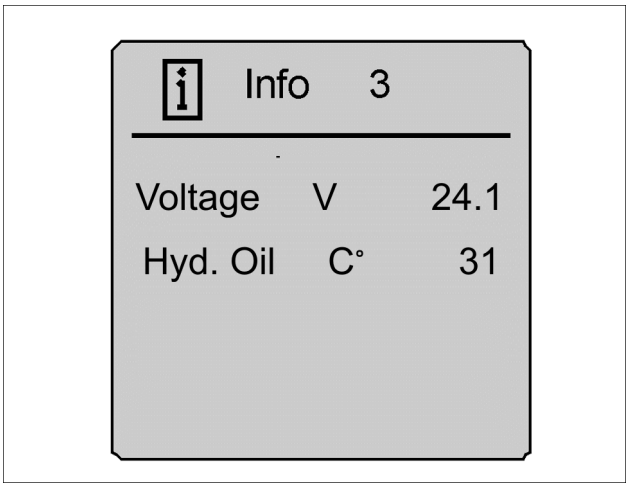
RAIL12DOZ1027AA 8

Press the bottom of the switch **(2)** again to display the "Info 3" screen. This screen displays the following items:
Voltage V – Alternator voltage
Hyd. Oil – Hydraulic fluid temperature

Temperature can be displayed in either Fahrenheit or Celsius.



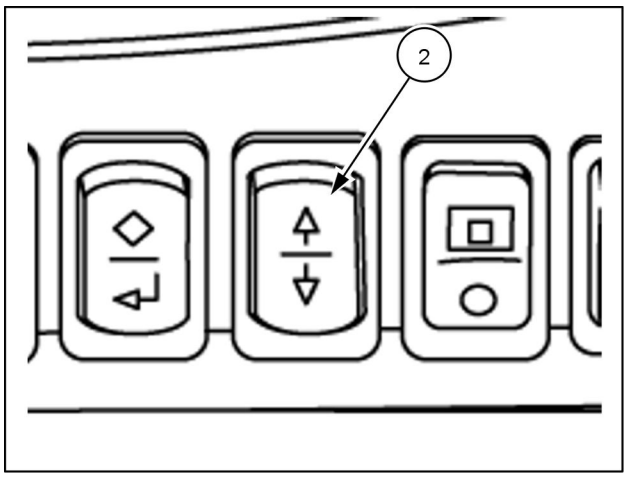
RAIL12DOZ0225AA 9



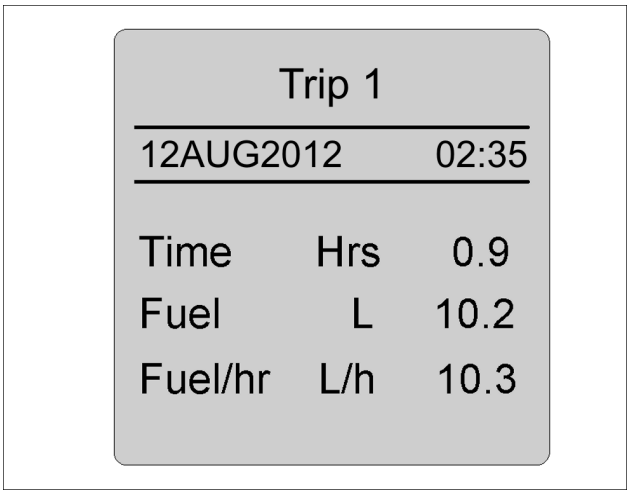
RAIL12DOZ0822AA 10

Trip screens

The trip screens allow the operator to monitor certain information for the machine while working. Press the bottom of the switch **(2)** again to display the "Trip 1" screen. The multi-function screen enables you to use two trip screens, each programmed differently. When selected, the trip screens will display the last programming configured. The following information is displayed on this screen:
Time – Total machine work time, shown in hours
Fuel – Total fuel consumption
Fuel/hr – Average fuel consumption per hour



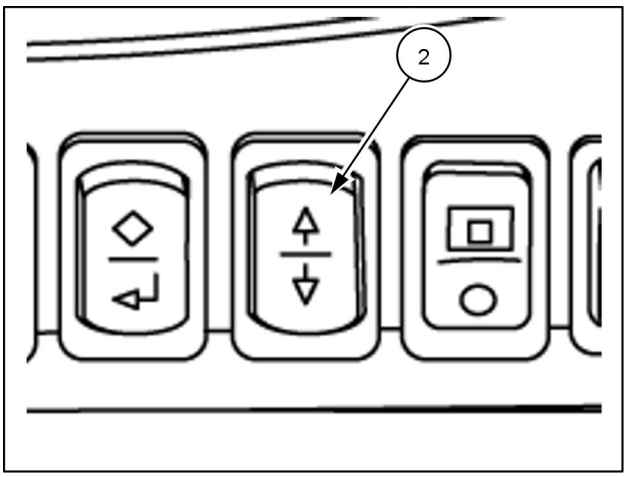
RAIL12DOZ0225AA 11



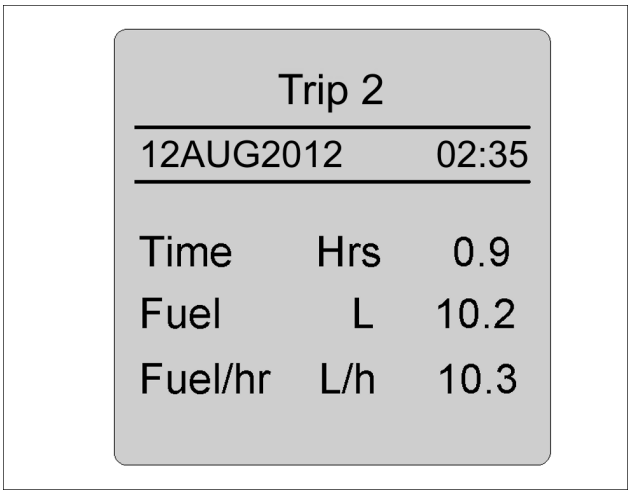
RCPH10WHL353AAH 12

Press the bottom of the switch **(2)** again to display the "Trip 2" screen. Trip 1 and Trip 2 screens can be reset independently.

The previous screens can be accessed by pressing the UP switch **(2)**.



RAIL12DOZ0225AA 13



RCPH10WHL354AAH 14

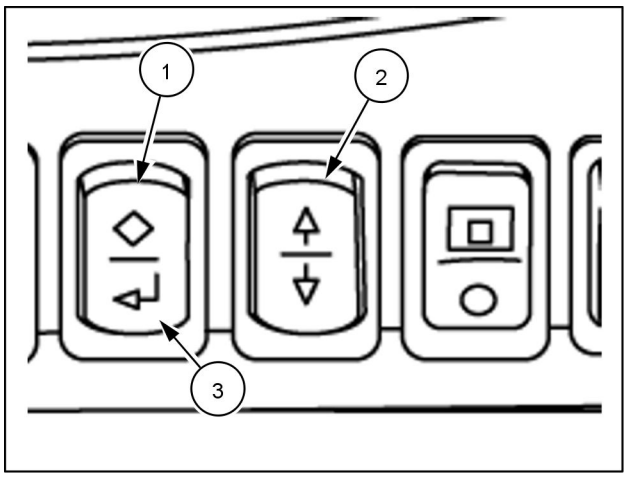
Setting trip screens

To configure the trip screens, select the screen you wish to configure by pressing the UP or DOWN switch **(2)** and confirm the selection by pressing the ENTER switch **(3)**.

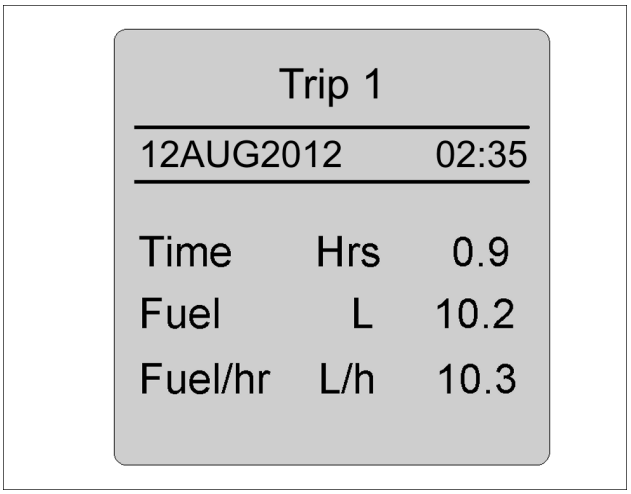
The fuel capacity can be set in United States gallons, Imperial gallons, or metric liters when setting measurement preferences.

The trip screen will indicate a reset message. On this screen, press the ENTER switch **(3)** to clear the numbers previously recorded and reset the trip information. The current date and time will display automatically, and the information for total machine work time, total fuel consumption and average fuel consumption will be reset to zero.

Press the ESC switch **(1)** to return to the home screen and save the settings in the memory. The system will begin to record work time and fuel consumption immediately.



RAIL12DOZ0225AA 15



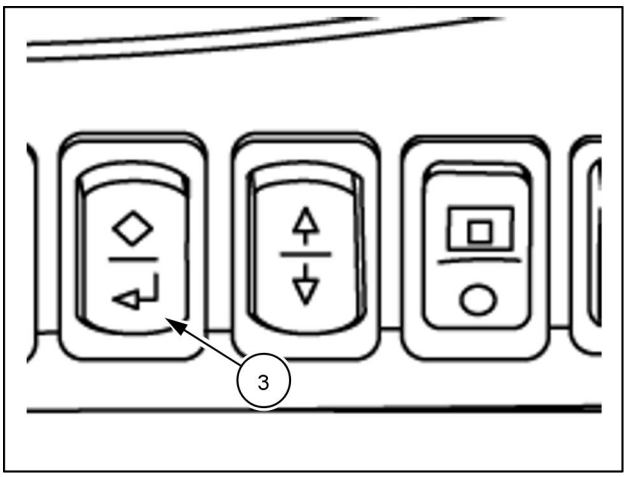
RCPH10WHL353AAH 16

Accessing the service screens

After starting the machine's engine or turning the ignition key to the ON (LIGADO) position, the operator or service technician may adjust the machine settings for the best working conditions, test system components, view indications of failures that may have occurred or select set-up preferences. The language can be set at the beginning of the menu configuration to allow the operator to view the screen in his/her preferred language.

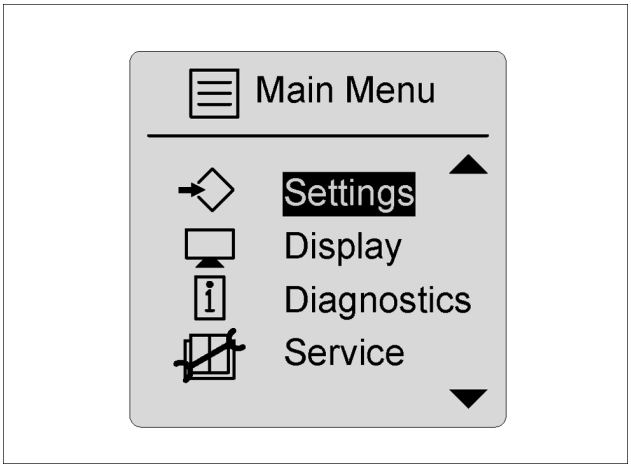
Main Menu

1. Press the ENTER switch **(3)** for 2 segundos to enter the Main Menu screen.

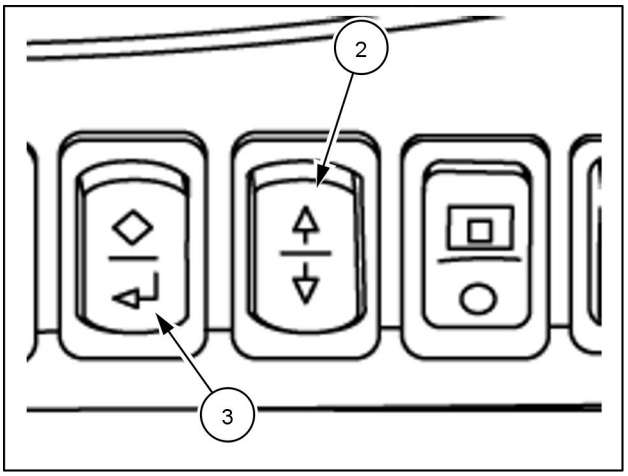


RAIL12DOZ0225AA 17

2. The main menu screen will be displayed, along with the following choices:
   Settings
   Display
   Diagnostics
   Service
3. Use the UP or DOWN switch **(2)** to select the Settings option and press the ENTER switch **(3)**.

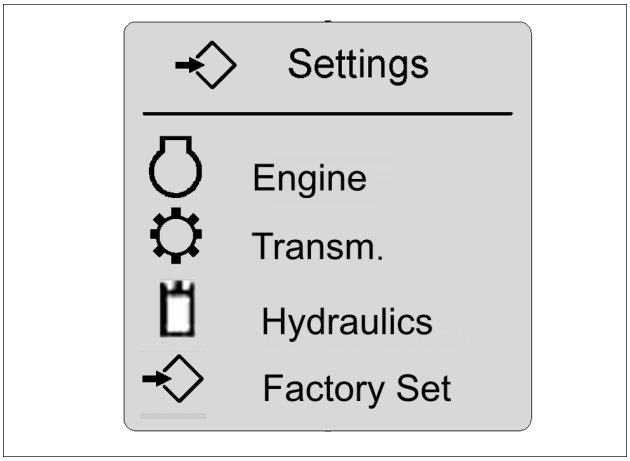


RCPH10WHL355AAH 18

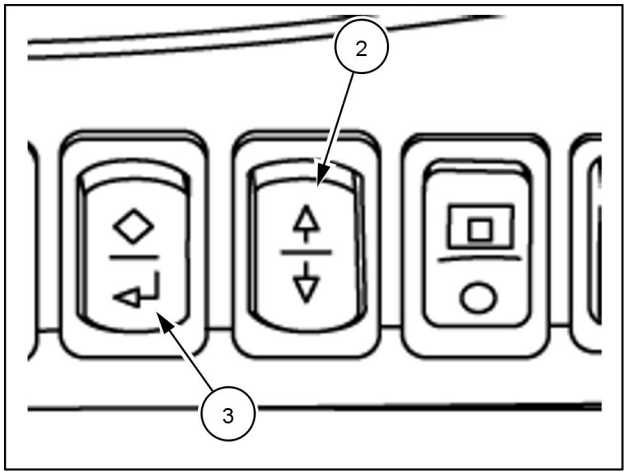


RAIL12DOZ0225AA 19

4. The Settings screen will display along with the following choices:
   Engine
   Transmission
   Hydraulics
   Factory set - Factory settings
5. Use the UP or DOWN switch **(2)** to select the Engine option and press the ENTER switch **(3)**.



RAIL12DOZ1028AA 20

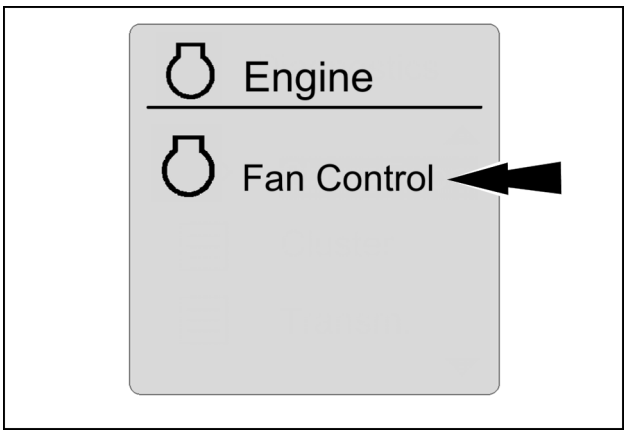


RAIL12DOZ0225AA 21

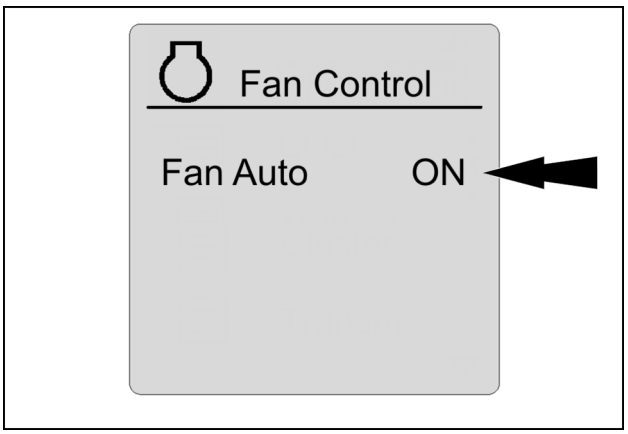
Engine selections

This screen allows the operator to change the settings of the engine cooling fan. The fan may be used in automatic or manual mode. In automatic mode setting, the fan speed and direction (reverse) are controlled automatically by the AIC. The fan functions are determined by the hydraulic oil temperature, engine coolant temperature and intake air. In manual mode, the fan speed is set at its maximum value (**100%**). The machine will default to the automatic fan control setting.

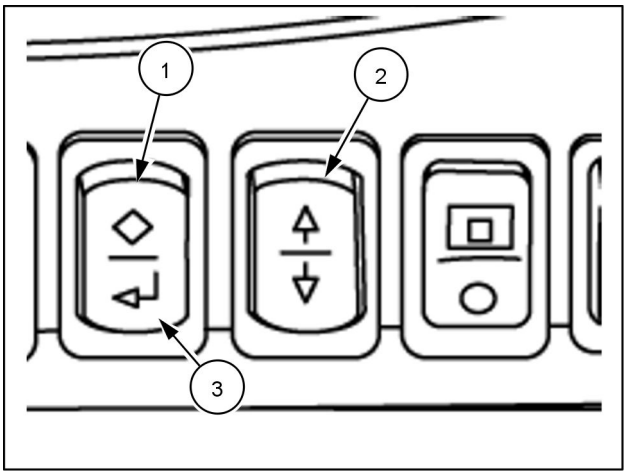
To change the ventilation mode, select using the UP or DOWN switch **(2)**, and press the ENTER switch **(3)** to confirm the change. Press the ESC switch **(1)** to return to the main screen and save the preference in the memory.



RAIL12DOZ0213AA 22



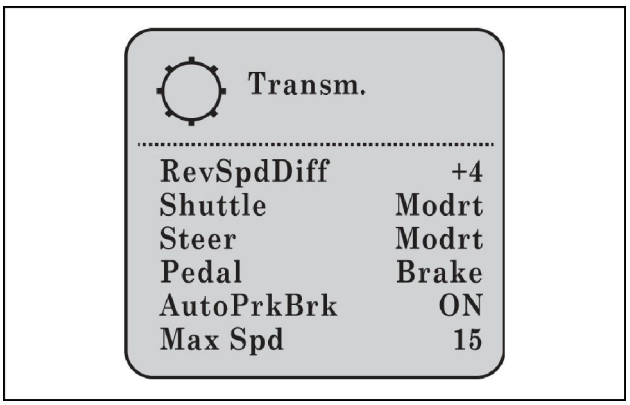
RAIL12DOZ0649AA 23



RAIL12DOZ0225AA 24

Transmission selections

To change the settings in the transmission option, see page **4-23**.

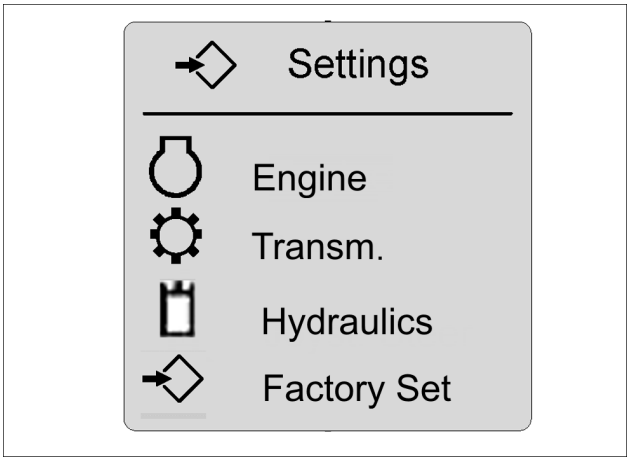


RAIL13DOZ1211AA 25

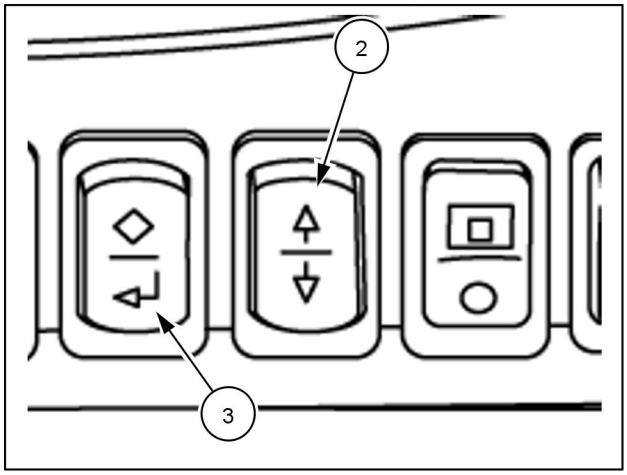
Hydraulic system selections

This screen allows the operator to select between the following options:
Aux Sel – Selection of auxiliary hydraulic system
Blade
Lvl ins – Levelling system installed

1. To change the options in the hydraulic system, follow the same steps in main menu to step 4.
2. Use the UP or DOWN switch **(2)** to select the Hydraulics option and press the ENTER switch **(3)**.



RAIL12DOZ1028AA 26

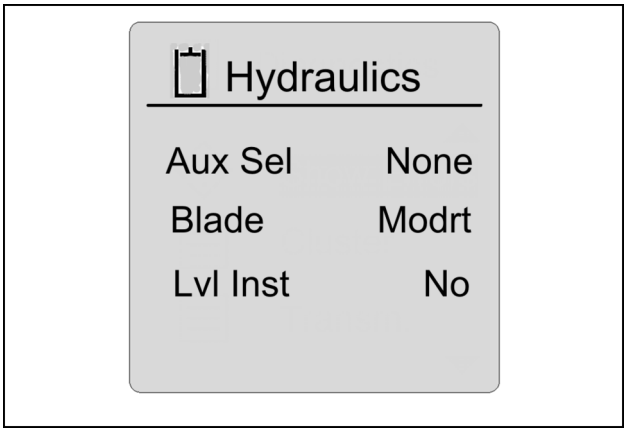


RAIL12DOZ0225AA 27

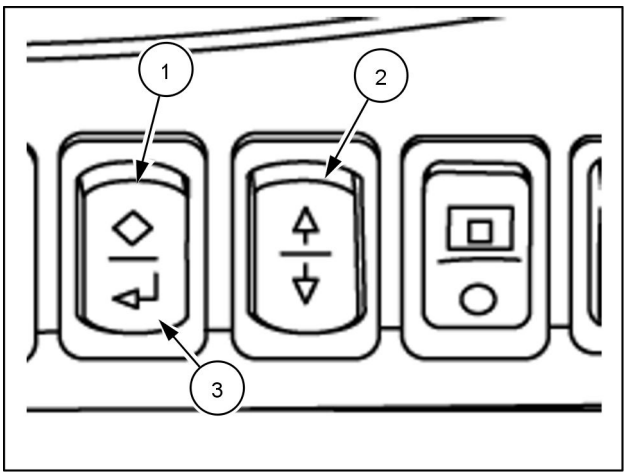
The following options will be displayed:

- Auxiliary hydraulic system selection allows you to select an auxiliary implement installed on the machine, with the following options:
  Ripper
  Winch
  None (factory default)
- Blade allows you to select between three options for use of the blade:
  Smooth
  Moderate (factory default)
  Aggressive
- Levelling system installed, allows you to activate the levelling mode of the blade.
  Yes
  No (factory default)

Use the UP or DOWN switch **(2)** to select the option desired and press the ENTER switch **(3)** to confirm the change. Press the ESC switch **(1)** to return to the main screen and save the preference in the memory.



RAIL12DOZ0216AA 28

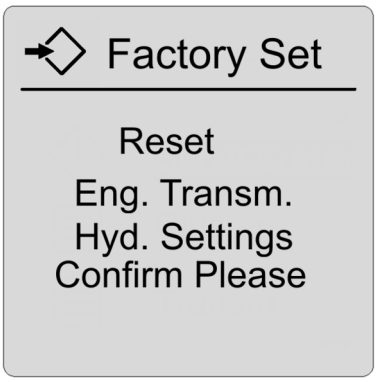


RAIL12DOZ0225AA 29

Factory settings

This screen allows the operator to quickly reset the settings of the engine, transmission and hydraulic system to factory settings.

To reset to factory settings, see page **4-23**.

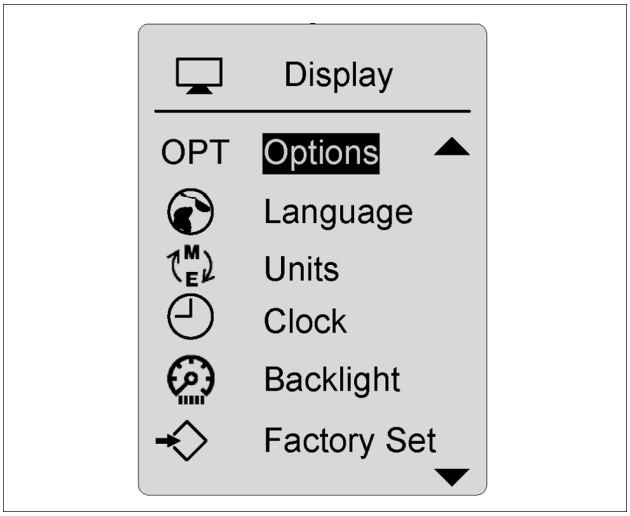


RAIL12DOZ0221AA 30

Display configurations

This screen allows the operator to configure the multi-function screen according to operator preferences.

To change the display settings according to operator preferences, see page **3-40**.



RCPH10WHL358BAH 31

Maintenance

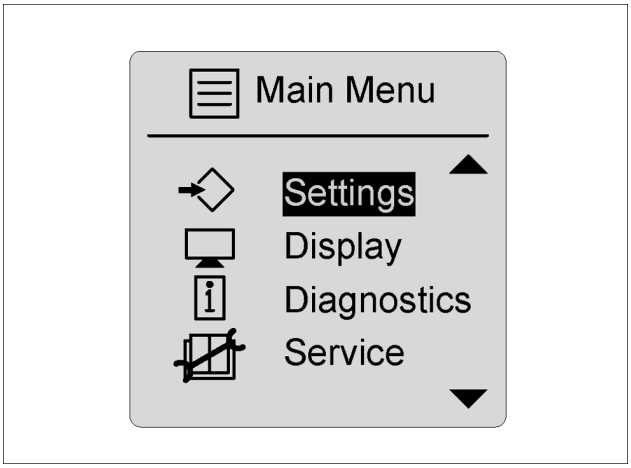
⚠ WARNING

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.

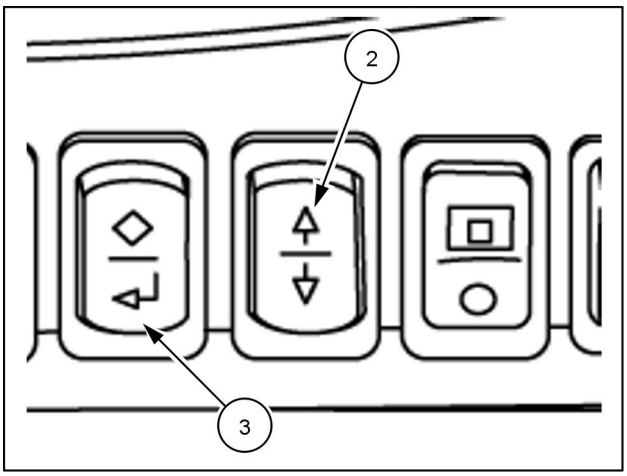
W0300A

This screen allows the operator or service technician to perform some tests on certain components of the machine. These tests must be performed by a qualified operator or technician, as some tests require the engine to be turned on and at high rotation.

1. To change the service menu options, follow the same steps in main menu to step 3.
2. Use the UP or DOWN switch **(2)** to select the Service option and press the ENTER switch **(3)**.

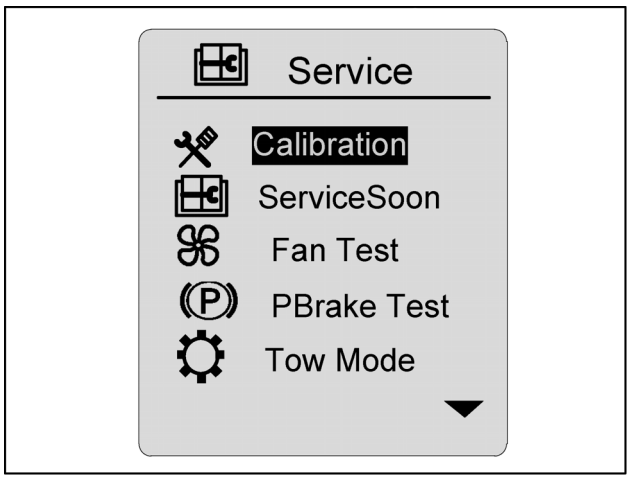


RCPH10WHL355AAH 32

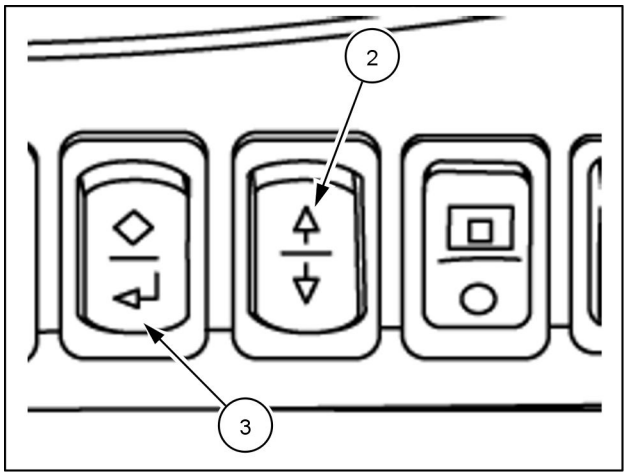


RAIL12DOZ0225AA 33

3. The service screen will be displayed along with the following options:
   Calibration – Calibration of controls
   ServiceSoon – Next maintenance
   Fan Test
   PBrake Test - Parking brake test
   Tow Mode
4. Use the UP or DOWN switch **(2)** to select the Calibration option and press the ENTER switch **(3)**.

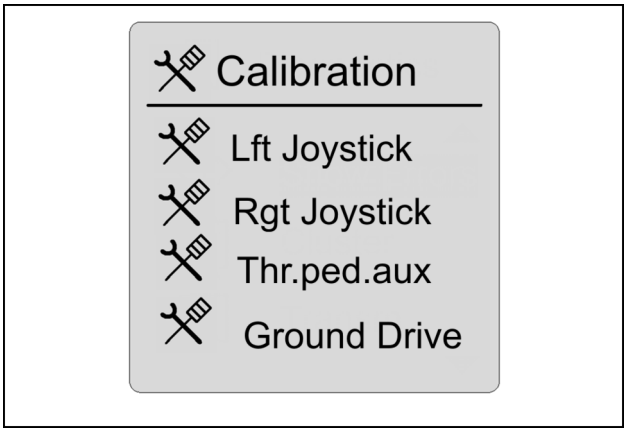


RAIL12DOZ0591AA 34

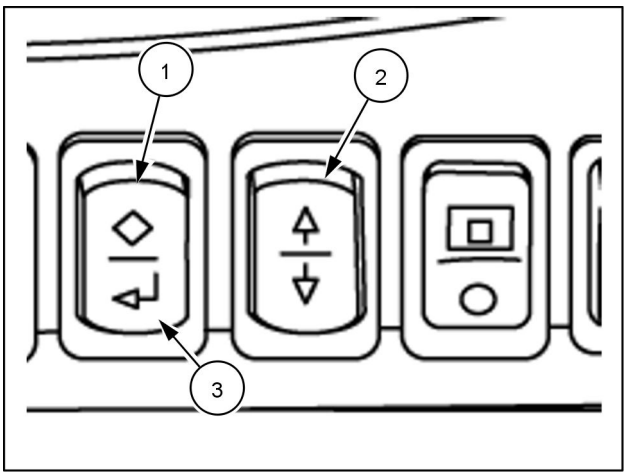


RAIL12DOZ0225AA 35

5. The following calibration options will then be displayed:
   Lft joystick - Left-hand control
   Rgt joystick - Right-hand control
   Thr.ped.aux – Auxiliary throttle pedal
   Ground drive
6. Use the UP or DOWN switch **(2)** to select the option desired and press the ENTER switch **(3)** to confirm. Press the ESC switch **(1)** to return to the main screen and save the preference in the memory.



RAIL12DOZ0223AA 36



RAIL12DOZ0225AA 37

To set the calibration of the control levers, observe the following conditions:

- The ignition key must be in the ON (LIGADO) position and the engine must be OFF
- The implement setting must be DISABLED.
- The operator must be in the seat.
- The parking brake must be ON.
- There should be no fault codes related to the controls.

To configure the calibration of the ground drive option, observe the following conditions:

- The engine must be ON.
- The implement setting must be DISABLED.
- The parking brake must be OFF.
- There should be no fault codes related to the controls.
- There should be no fault codes related to the ground drive.
- The temperature of the hydraulic fluid should be in the range of **40.0 °C** (**104.0 °F**) to **45.0 °C** (**113.0 °F**), and the engine speed at **1800 RPM**.

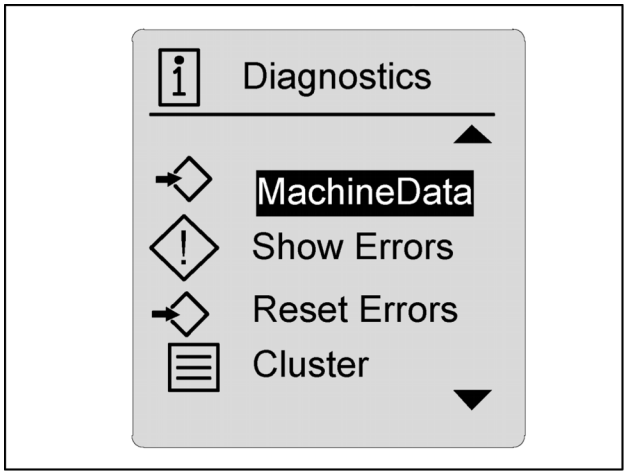
Diagnostics menu

This screen must only be used by a qualified service technician.

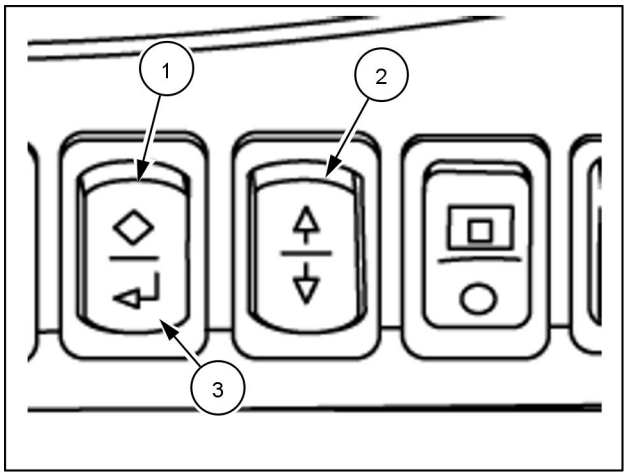
To enter the diagnostics menu, follow the same steps in the main menu to step 3.

Use the UP or DOWN switch **(2)** to select the Diagnostics option and press the ENTER switch **(3)**.

NOTE: *Pressing the ESC switch **(1)** will return the monitor to the main screen. To save the changes made on the multi-function screen, the operator must press the ENTER switch **(3)** confirming the change and then press the ESC switch **(1)** to record the setting in the memory and return to the main screen.*



RAIL12DOZ0586AA 38



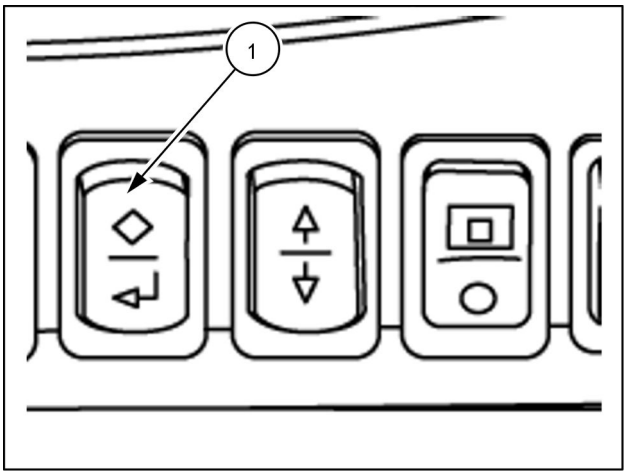
RAIL12DOZ0225AA 39

Multi-function display – Operator preferences

“ESC” switch

When using the computer system on board the machine, you can return to the main menu by pressing the ESC switch **(1)**. If an error message displays when setting desired selections, press the ESC switch **(1)** and begin again.

NOTE: *Selecting options and navigating through the screen menus are the same for all functions. The multi-function screen will tell the operator if errors occur.*



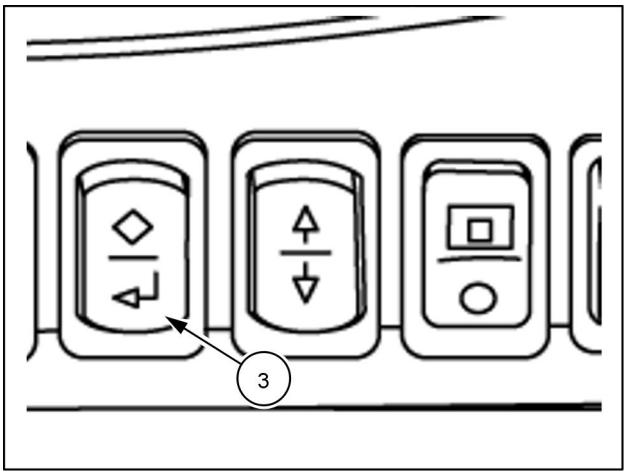
RAIL12DOZ0225AA 1

Display

This screen allows the operator to configure the multi-function screen according to operator preferences.

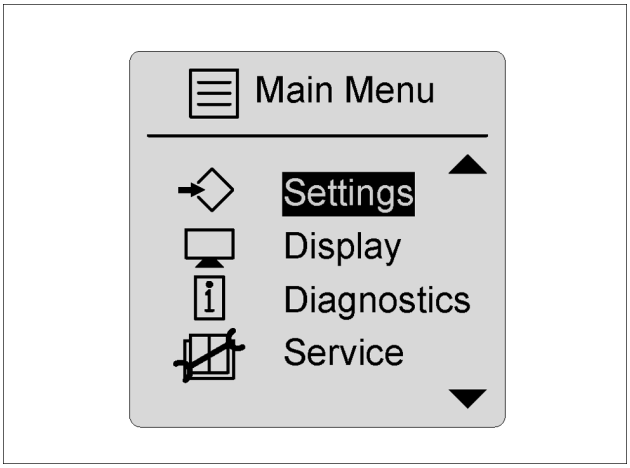
To begin configuring the monitor, follow the following steps:

1. From the home screen, press the ENTER switch **(3)** for 2 segundos to enter the main menu screen.

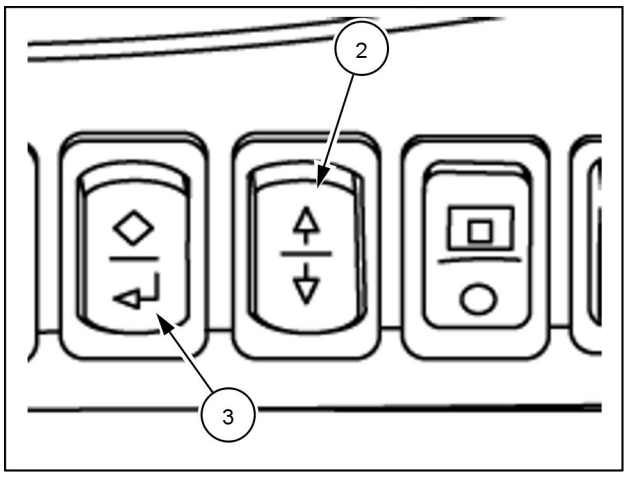


RAIL12DOZ0225AA 2

2. The main menu screen will be displayed, along with the following choices:
   Settings
   Display
   Diagnostics
   Service
3. Use the UP or DOWN switch **(2)** to select the Display option and press the ENTER switch **(3)**.



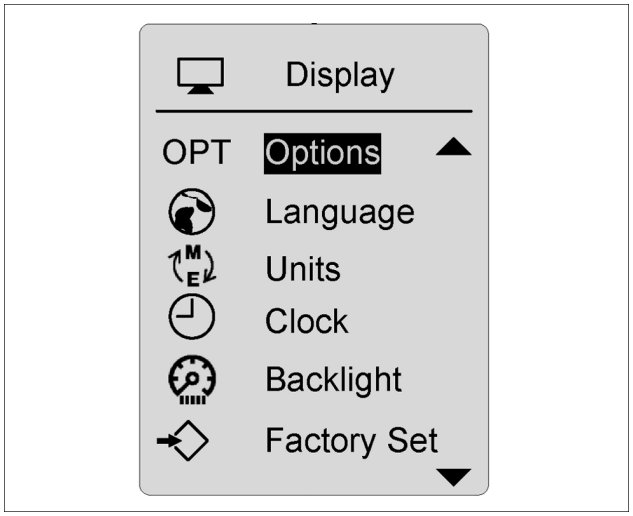
RCPH10WHL355AAH 3



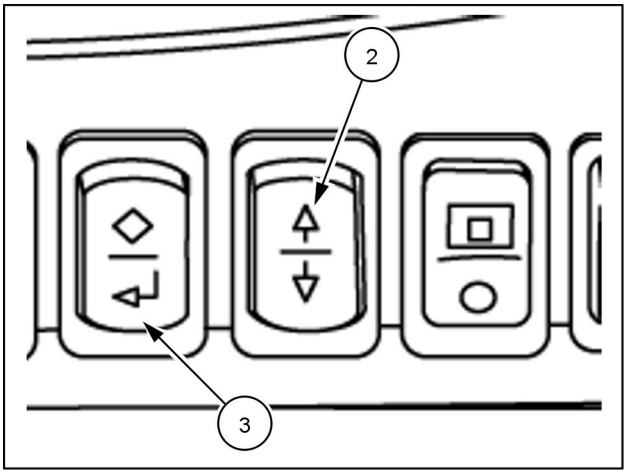
RAIL12DOZ0225AA 4

4. The display screen will display along with the following choices:
   Language
   Units – Units of measure
   Clock
   Backlight – Display backlighting
   Factory Set – Factory settings

5. Use the UP or DOWN switch **(2)** to select the Language option and press the ENTER switch **(3)**.



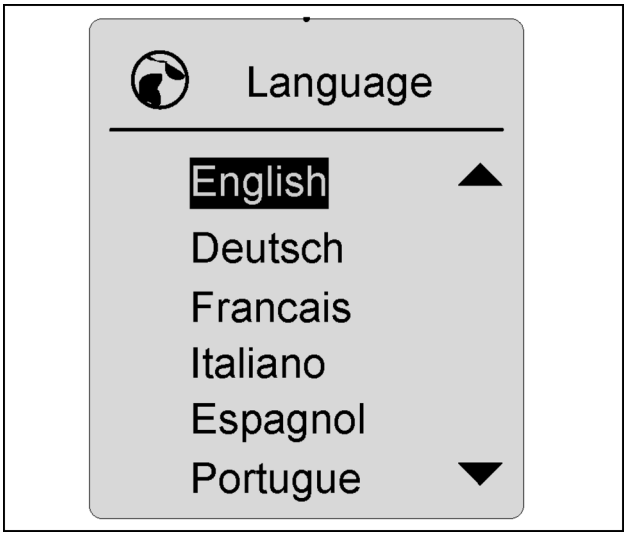
RCPH10WHL358BAH 5



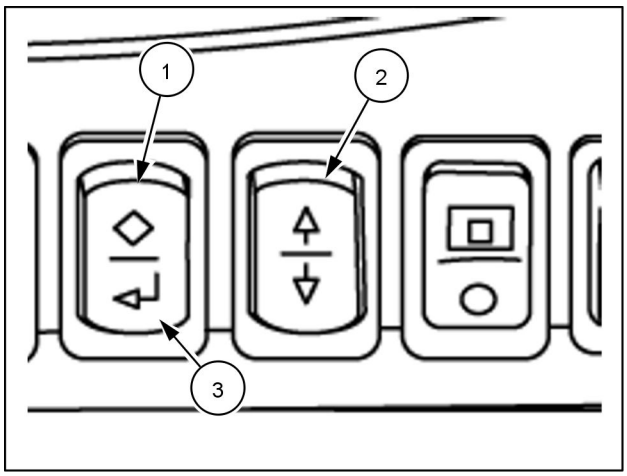
RAIL12DOZ0225AA 6

Language menu

1. The languages option allows you to select between the following languages:
   English
   Deutsch — German
   Francais — French
   Italiano — Italian
   Espagnol — Spanish
   Portugue — Portuguese
2. Use the UP or DOWN switch **(2)** to select the language desired and press the ENTER switch **(3)** to confirm. Press the ESC switch **(1)** to return to the main screen and save the preference in the memory.



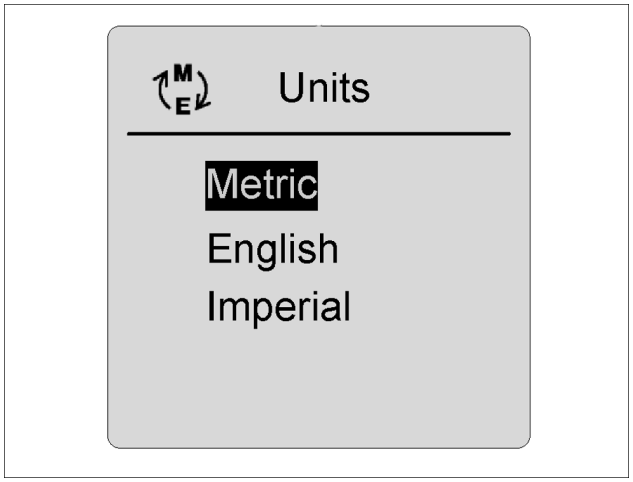
RCPH10WHL361BAH 7



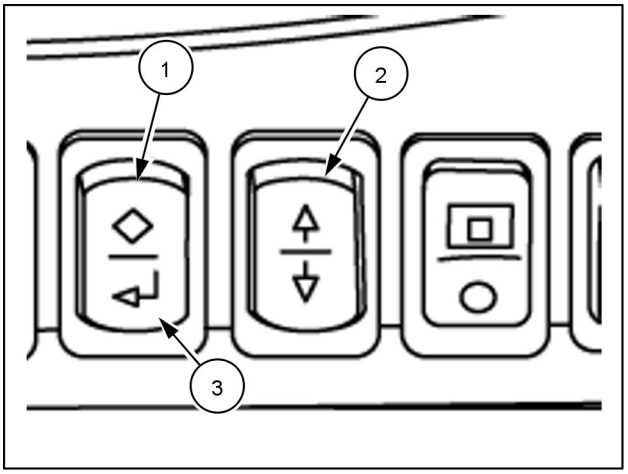
RAIL12DOZ0225AA 8

"Units" Units of measurement menu

1. The measurement units available are:
   Metric
   English
   Imperial
2. Use the UP or DOWN switch **(2)** to select the option desired and press the ENTER switch **(3)** to confirm. Press the ESC switch **(1)** to return to the main screen and save the preference in the memory.



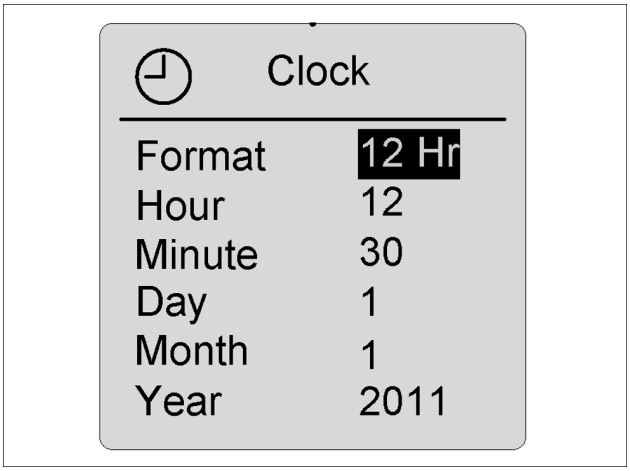
RCPH10WHL362BAH 9



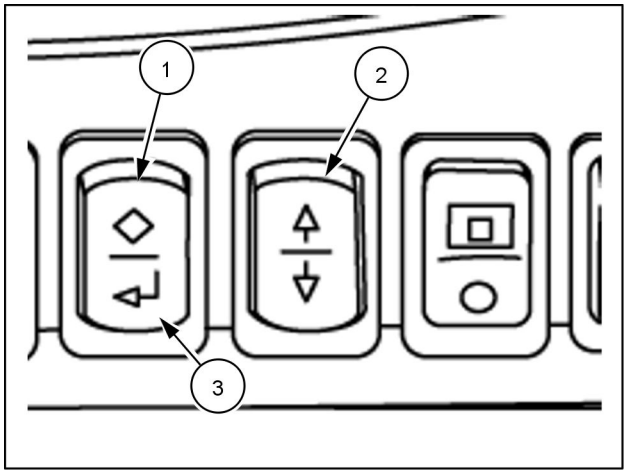
RAIL12DOZ0225AA 10

"Clock" menu

1. The options available are:
   Format
   Hour
   Minute
   Day
   Month
   Year
2. Use the UP or DOWN switch **(2)** to select the option desired and press the ENTER switch **(3)** to change the data.
3. Push the UP or DOWN switch **(2)** to enter the new data, (to increase the numbers, push the UP switch and to decrease the number press the DOWN switch). Press the ENTER switch **(3)** to confirm. Press the ESC switch **(1)** to return to the main screen and save the preference in the memory.



RCPH10WHL363BAH 11



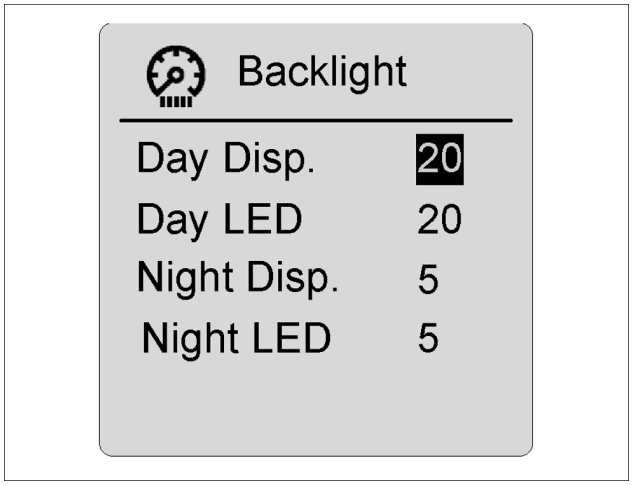
RAIL12DOZ0225AA 12

Multi-function screen backlight menu “Backlight”

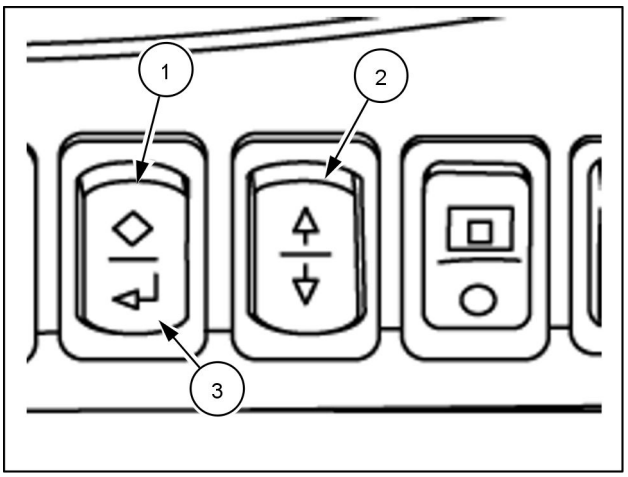
The backlight menu of the multi-function screen can be used to change the background lighting and brightness of the screen.

1. The options available are:
   Day Disp — Day display light
   Day LED — Day display LED
   Night Disp — Night display light
   Night LED — Night display LED
2. Use the UP or DOWN switch **(2)** to select the option desired and press the ENTER switch **(3)** to change the data.
3. Push the UP or DOWN switch **(2)** to enter the new data, (to increase the numbers, push the UP key and to decrease the number press the DOWN key). Press the ENTER switch **(3)** to confirm. Press the ESC switch **(1)** to return to the main screen and save the preference in the memory.

NOTE: *The screen will change to night lighting mode when the headlights are turned on.*



RCPH10WHL364BAH 13

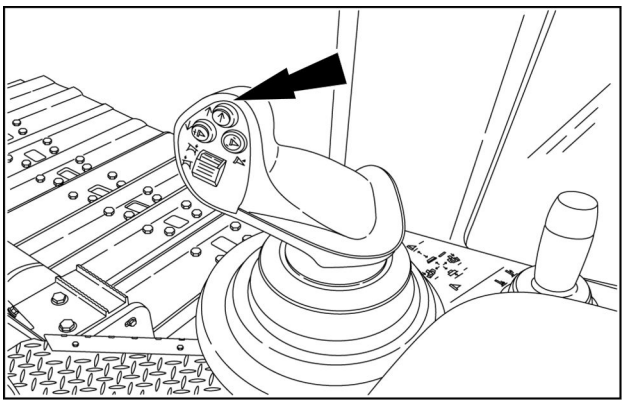


RAIL12DOZ0225AA 14

Right-hand control lever

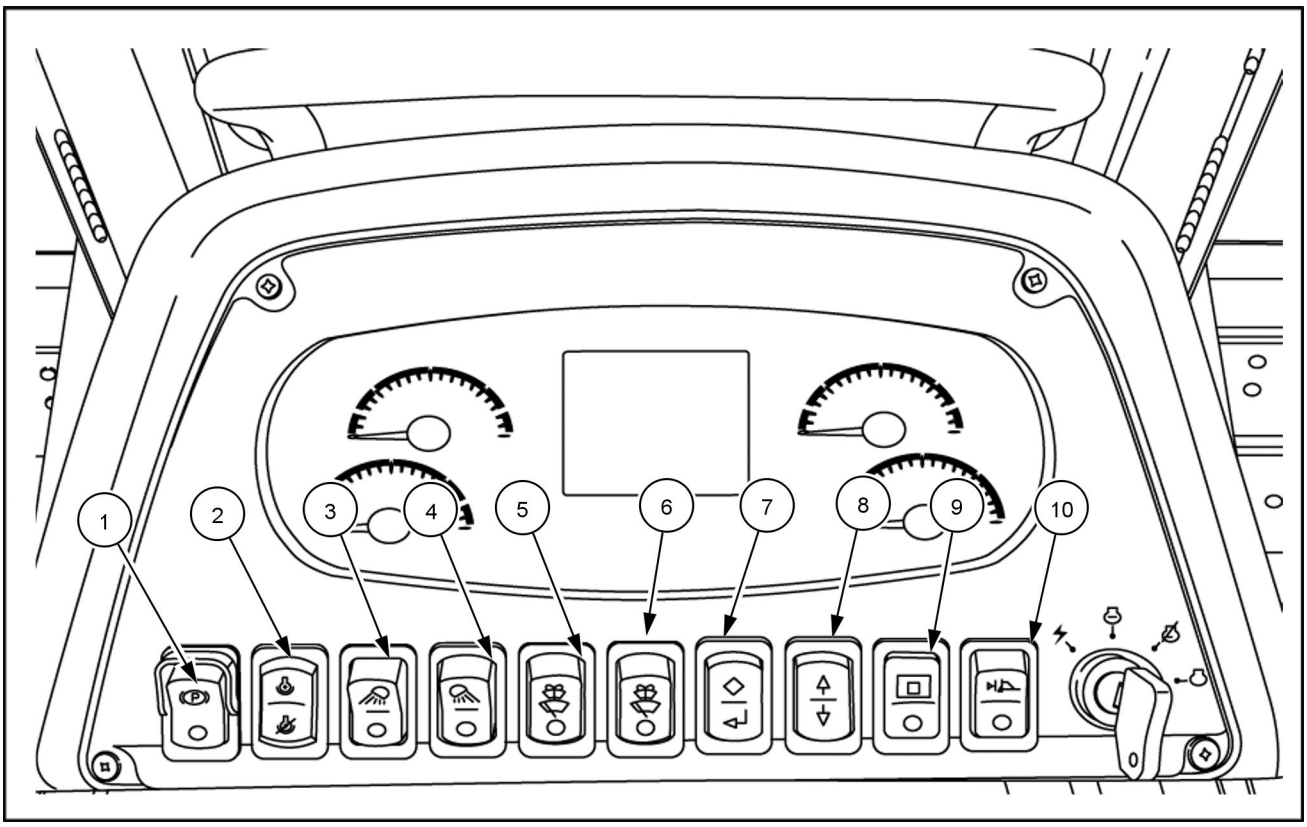
Joystick multi-function screen control

- The multi-function screen can also be accessed through the right-hand joystick. This will allow the operator to access info screens and trip screens without removing his hands from the joysticks.



RAPH12DOZ0082AA 1

Switches



RAPH12DOZ0139FA 1

Park Brake Switch **(1)**
(2) Fan reverse switch
(3) Front work lights switch
(4) Rear work lights switch
(5) Side wipers/washers switch
(6) Central wiper/washer switch
(7) “Enter/Esc” switch
(8) Screen up/screen down switch
(9) Implement enable/disable switch
(10) Levelling enable/disable switch (If equipped)

1. Park Brake Switch



When turning the ignition key on, the parking brake will default to the ON position. The parking brake allows the operator to lock and unlock the transmission control.

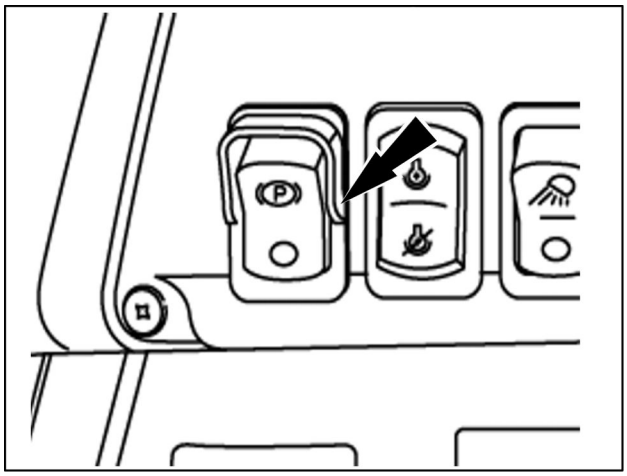
Parking brake activation

Place the machine in neutral and stop the machine. Apply the park brake by pressing on the top of the switch. The parking brake will automatically activate when the machine is shut down.

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

Park Brake Release

Move the joystick to neutral, and press the parking brake switch.



RAPH12DOZ0133AA 2

2. Fan reverse switch



This is a three position switch. To use the fan reverser in manual mode, put the transmission control lever in its "neutral" position and the engine at idle speed. Press the fan reverser switch and accelerate the engine to maximum speed for a minimum of 10 seconds or until debris stops blowing out of the heat exchangers. Return the engine throttle control lever to idle and release the fan reverser switch. Press the upper part of the switch for the manual momentary reversal as described. The center position of the switch is the automatic position, and the lower position disables the automatic fan. Leaving the switch in the central position is recommended in conditions with a lot of debris.

3. Frontal worklights switch



Press the top of the switch to turn on the front worklights, and the bottom of the switch to turn the lights off.

4. Rear worklights switch



Press the top of the switch to turn on the rear worklights, and the bottom of the switch to turn the lights off.

5. Side wipers/washers switch



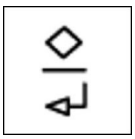
The switch has 3 positions:
A. Press the top of the switch and put it in the central position to turn on the wiper.
B. Press the top of the switch once more and keep it pressed to activate the washer. The switch automatically returns to the central position.
C. Press the bottom of the switch to turn off the wiper.

6. Central wiper/washer switch



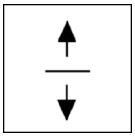
The switch has 3 positions:
A. Press the top of the switch and put it in the central position to turn on the wiper.
B. Press the top of the switch once more and keep it pressed to activate the washer. The switch automatically returns to the central position.
C. Press the bottom of the switch to turn off the wiper.

7. “Enter/Esc” switch



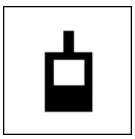
Use this switch to make selections on the multi-function screen.
A. Press the top of the switch (ESC) to exit or return to the previous function.
B. Press the bottom of the (ENTER) switch to confirm it is the desired function.
See page **3-40** for more information about the multi-function screen.

8. Screen up/screen down switch



Use this switch to scroll between selections on the multi-function screen.
A. Press the top of the switch to scroll up to the selections.
B. Press the bottom of the switch to scroll down to the selections.
See page **3-40** for more information about the multi-function screen.

9. Implement enable/disable switch



Press and release the implement activation switch to activate the machine's hydraulic system. The switch is a momentary switch. The machine defaults to hydraulic system off when the key is in the on position. The key must be in the on position while the engine is not cranking to use the implement enable/disable switch. When the function is on, a LED indicator will appear on the console.

10. Leveling enable/disable switch (If equipped)



The levelling system enable/disable switch allows the operator to put the blade into levelling mode. This will activate the auto/manual switch. The enable/disable switch is a momentary switch. The operator can adjust the grade and other levelling system settings by interfacing with the levelling system module. When the function is on, a LED indicator will appear on the console. The machine must be equipped with the levelling system module.

LEFT-HAND SIDE CONTROLS

Control levers

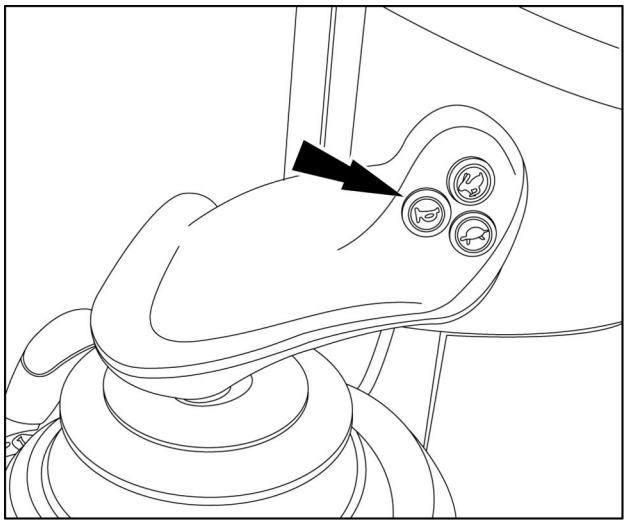
⚠ WARNING

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 horn button is located on the travel and direction control lever. Sound the horn before starting the machine's engine.

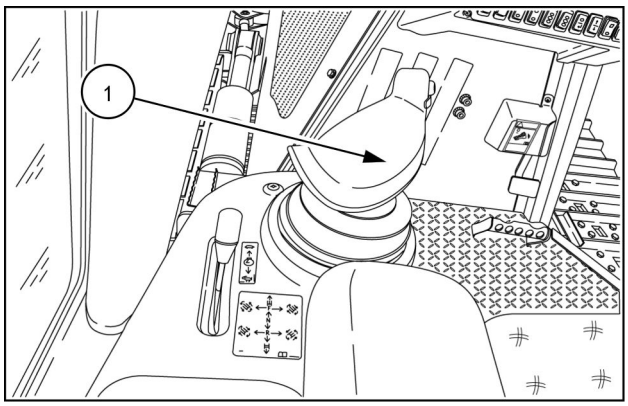


RAIL12DOZ0181AA 1

Travel and direction control lever

The travel and direction control lever **(1)** allows for directional movement of the machine.
Through this lever, the machine can be moved forward, in reverse, turn and pivot.

The travel and direction control lever has a hold point for pivoting to the left and to the right. Use the machine in a clear, unobstructed area until you become familiar with the controls. See page **4-13** for more information about the machine's operation.



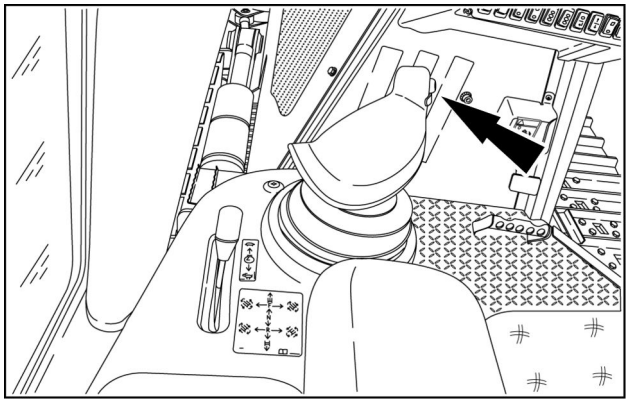
RAPH12DOZ0080AA 2

Hydrostatic drive speed

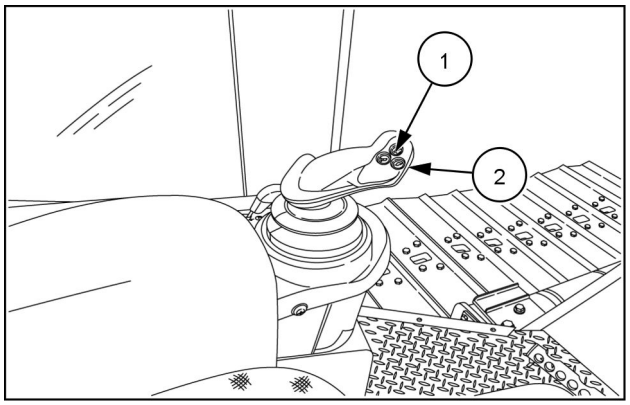
Control the hydrostatic drive speed through the buttons located on the travel and direction control.

Use the upshift and downshift buttons to select the hydrostatic drive speed. The machine has 15 speed ranges configured and you can select a maximum speed through the multi-function screen. See page **4-23** for how to set the maximum hydrostatic drive speed.

The top button **(1)** (hare symbol) allows you to increase a speed range when pressed.
The bottom button **(2)** (tortoise symbol) allows you to decrease a speed range when pressed.
Continuously move between the speed ranges by pressing and holding the speed range upshift (1) or downshift (2) button.



RAPH12DOZ0080AA 3



RAPH12DOZ0079AA 4

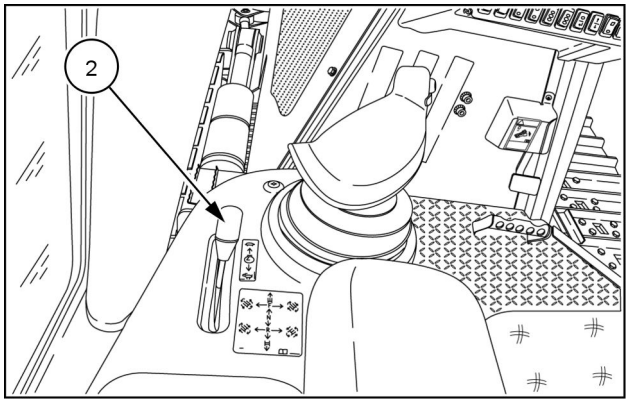
Engine hand throttle

The engine hand throttle controls engine rotation. The hand throttle lever increases or decreases engine rotation. Near the engine throttle lever there is a decal that indicates the direction of activation of the lever to increase or decrease the engine rotation. Choose the engine rotation suitable to operate and complete the job efficiently.

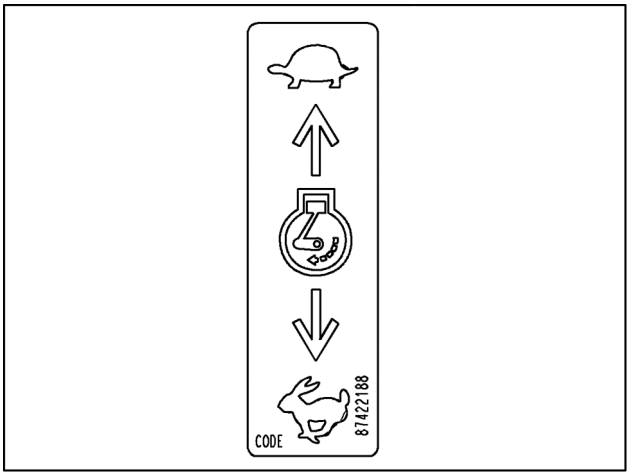
- Pull the engine hand throttle lever **(2)** back (hare symbol) to increase the engine rotation.
- Push the engine hand throttle lever **(2)** forward (tortoise symbol) to decrease the engine rotation.

NOTE: *Before shutting down the engine, let it to run for a few minutes at idle speed to allow for deceleration and stabilization of the turbocharger at a low speed and temperature.*

NOTE: *Stopping the engine while running at high rotation may cause the turbocharger turbine shaft to rotate without proper lubrication, causing damage to the turbocharger.*



RAPH12DOZ0080AA 5



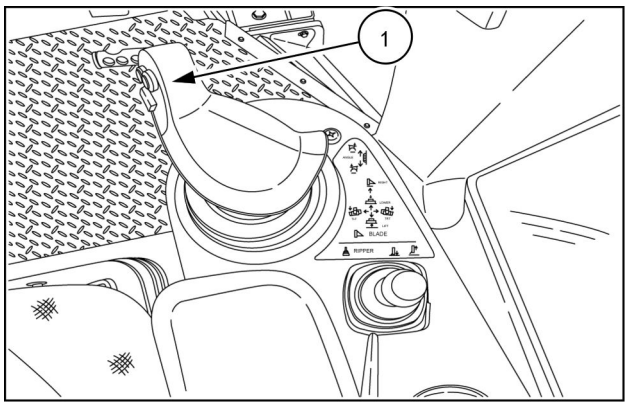
87422188 6

RIGHT-HAND SIDE CONTROLS

Control levers – Blade (PAT model)

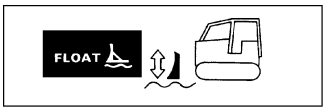
Blade control lever

The 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.

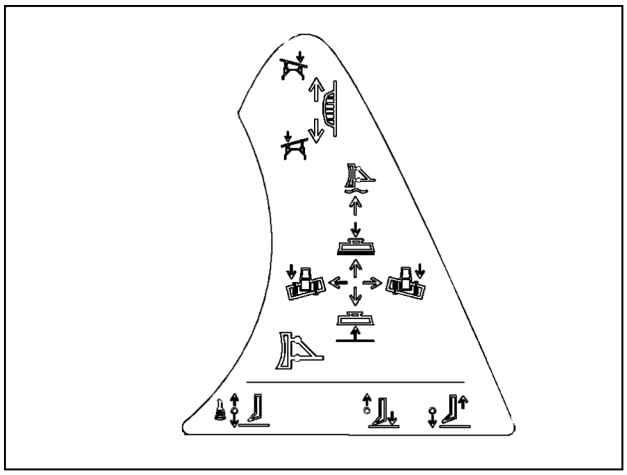


RAPH12DOZ0081AA 1

Float

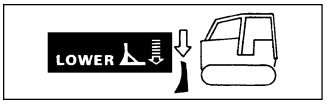


FLOAT **(A)** is a detent position. When in the FLOAT position, the blade can follow the level of the ground without movement of the control lever.



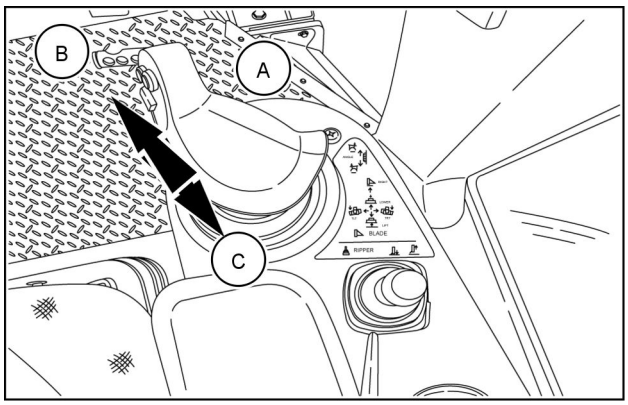
4742656856 2

Lower



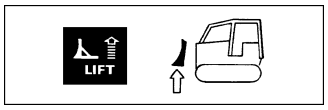
Push the control lever forward **(B)** to LOWER the blade. The control lever must be held in this position in order to lower the blade. When the lever is released, it will return to the hold position.

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 the blade down stoke, before the float detent hold point.*



RAPH12DOZ0081AA 3

Lift



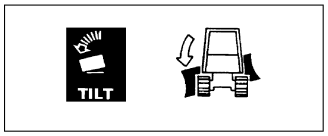
Move the control lever back to the RAISE **(C)** position to lift the blade. When the control lever is released, it will return to the NEUTRAL or HOLD position.

Hold

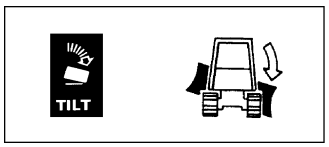
The blade will stop moving in the HOLD position **(C)**. When released, the control lever will return automatically to the HOLD position **(C)**. You must manually move the control lever from the FLOAT position to the HOLD position **(C)**.

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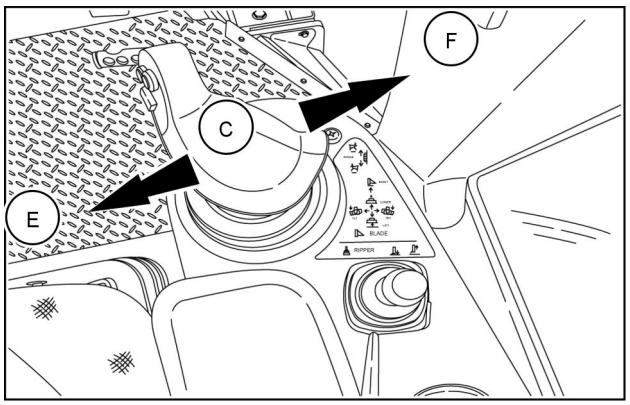
Tilt



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

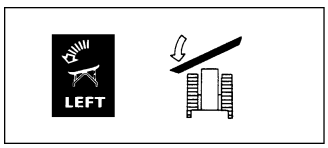


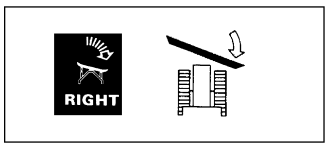
Move the control lever to the right **(F)** to tilt the blade to the right.
The blade will stop moving when the control lever is in the HOLD **(C)** position. When released, the control lever will return automatically to the HOLD position.



RAPH12DOZ0081AA 4

Angling the blade





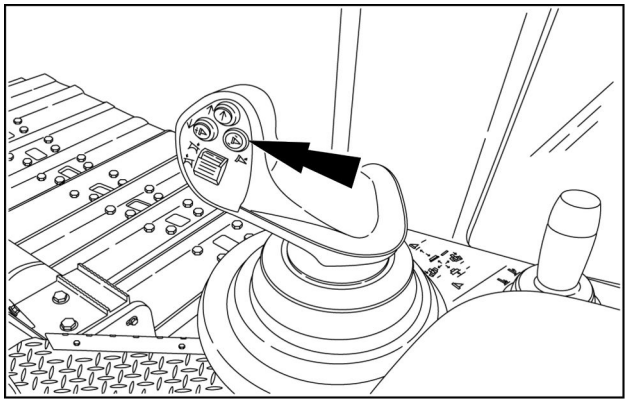
Change the angle of the blade from side to side by moving the thumb wheel located on the face of the joystick.



RAPH12DOZ0082AA 5

Blade shake

A blade shake feature is located on the face of the right hand joystick. When blade shake is activated, the machine will automatically move the tilt of the blade to shake the blade. Press and hold the blade shake momentary button, and the blade will shake at high frequency until released or for approximately 3 seconds. Levelling must be off to activate the blade shake feature.

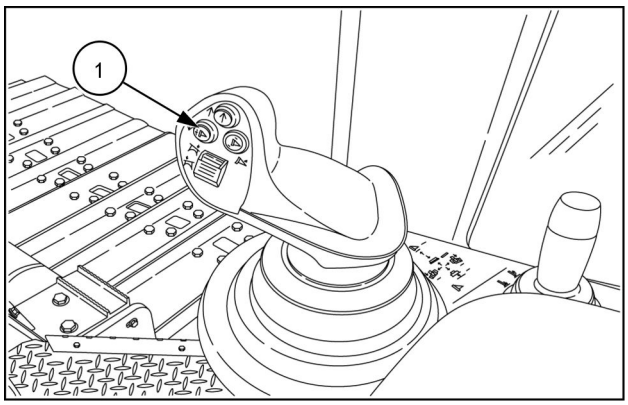


RAPH12DOZ0082AA 6

Level make up

Use the levelling mode **(1)** to change the sensitivity of the blade for a special levelling response. This allows the blade to move with more precision. Levelling mode cannot be used when the self levelling system is activated. To work with the blade, choose one of the possible modes: aggressive, normal, slow or levelling. Once pressed, the machine will operate in levelling mode. Press the button again and the machine will return to the selected blade sensitivity.
The levelling icon will display on the multi-function monitor. The machine speed will decrease in precision levelling mode. Return to normal operation by turning this function off.

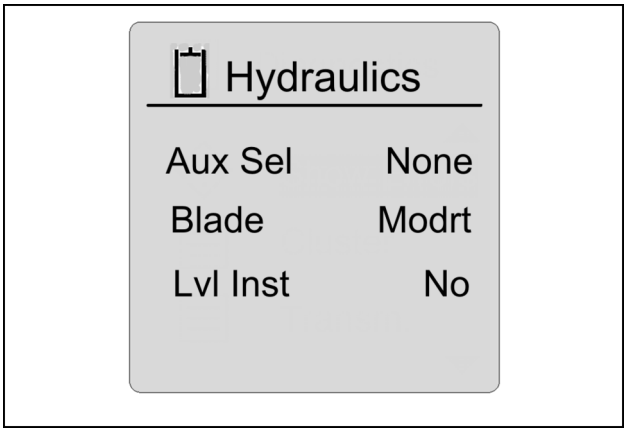
NOTE: *The implement must be enabled to use this feature.*



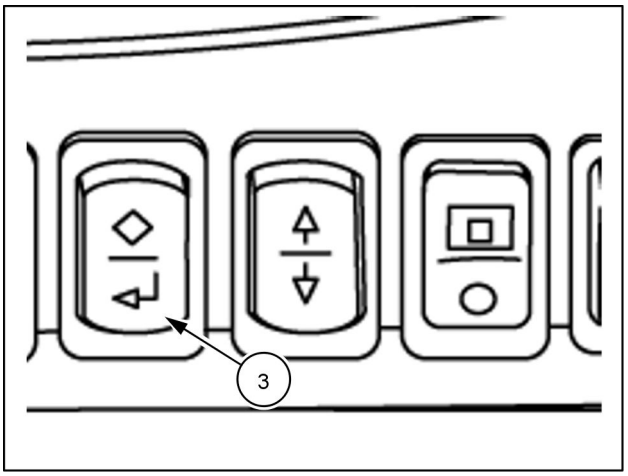
RAPH12DOZ0082AA 7

Self Levelling

The leveling system will produce a desired grade at a preset elevation and/or angle. The system must be equipped with an auto blade control system completion kit. The hydaulics selection should be set to LvlInst. At the hydraulics screen, highlight Lvl Inst and press the ENTER switch **(3)**. Follow the prompts and change the Lvl Inst to Yes. This will allow the leveling functions to work.

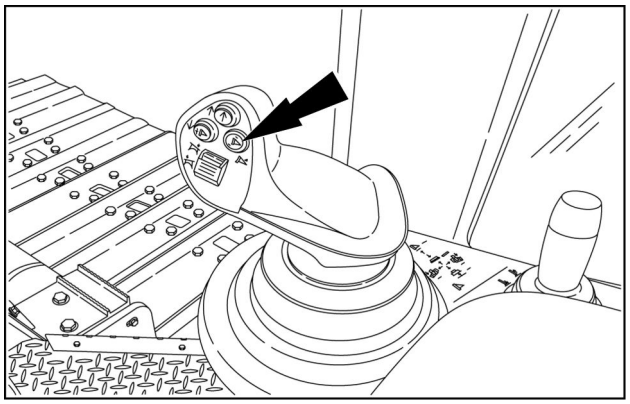


RAIL12DOZ0216AA 8



RAIL12DOZ0225AA 9

This setting controls the blade and shifts the blade up with extreme accuracy. The leveling system settings interface with levelling system module. The levelling system on/off switch is used to put the blade into levelling mode. This enables the Auto/Manual switch. The momentary switch features LED to indicate the leveling feature is activated. The up/down blade offset switch will allow for small adjustments to the preset elevation.



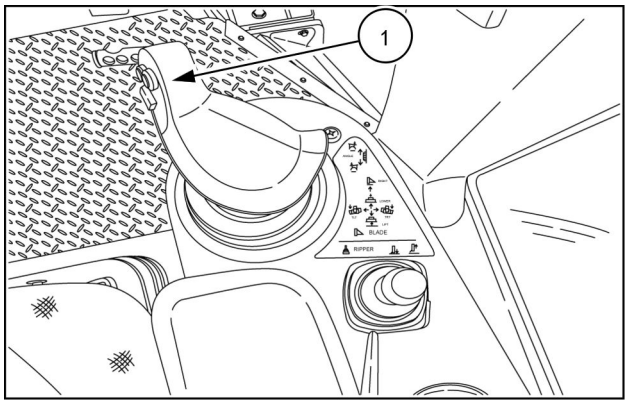
RAPH12DOZ0082AA 10

NOTE: *In order to use this feature, the implement must be activated, self levelling must be activated, and the blade lift and tilt axis must be in the Auto/Manual function.*

Control levers – Blade (BD model)

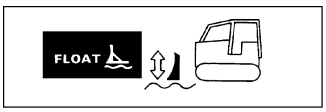
Blade control lever

The 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.



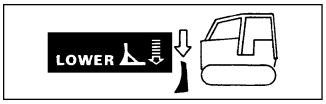
RAPH12DOZ0081AA 1

Float



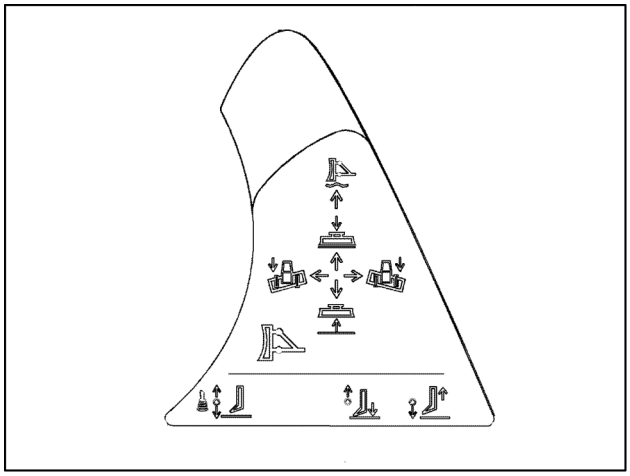
FLOAT **(A)** is a detent position. When in the FLOAT position, the blade can follow the level of the ground without movement of the control lever.

Lower

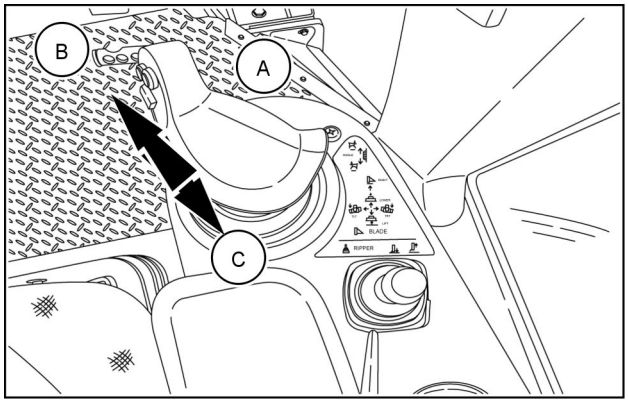


Push the control lever forward **(B)** to LOWER the blade. The control lever must be held in this position in order to lower the blade. When the lever is released, it will return to the hold position.

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 the blade down stoke, before the float detent hold point.*

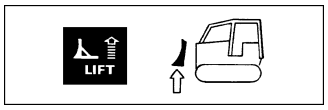


47492012 2



RAPH12DOZ0081AA 3

Lift



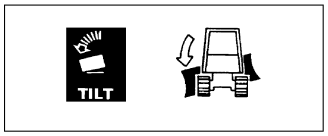
Move the control lever back to the RAISE **(C)** position to lift the blade. When the control lever is released, it will return to the NEUTRAL or HOLD position.

Hold

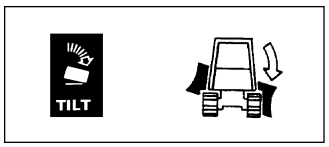
The blade will stop moving in the HOLD position **(C)**. When released, the control lever will return automatically to the HOLD position **(C)**. You must manually move the control lever from the FLOAT position to the HOLD position **(C)**.

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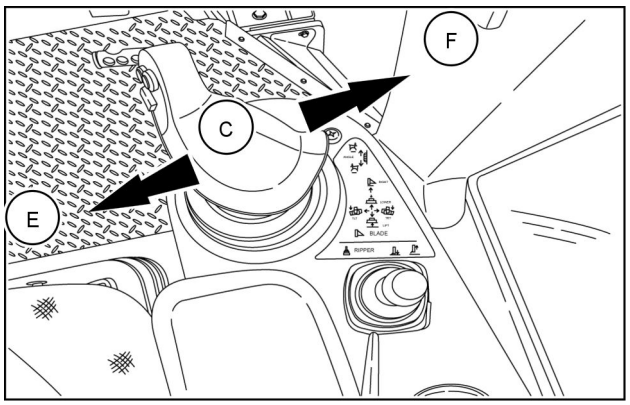
Tilt



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



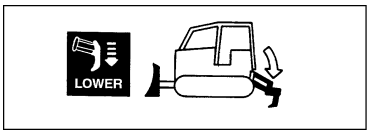
Move the control lever to the right **(F)** to tilt the blade to the right.
The blade will stop moving when the control lever is in the HOLD **(C)** position. When released, the control lever will return automatically to the HOLD position.



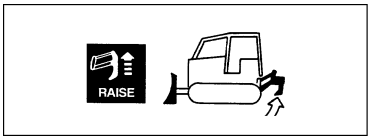
RAPH12DOZ0081AA 4

Control levers – Ripper

Ripper control lever



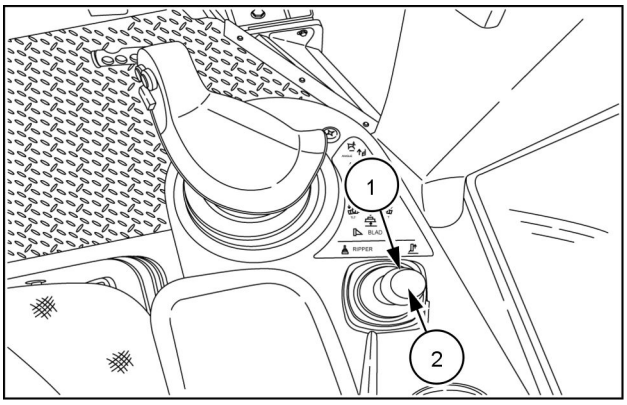
Move the ripper control lever forward right to the **(1)** position to lower the ripper.



Move the ripper control lever to the back left **(2)** 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.

A winch can also be used with this control lever. Select the winch or ripper using the multi-function monitor. Only use an approved winch.



RAPH12DOZ0081AA 1

OVERHEAD CONTROLS

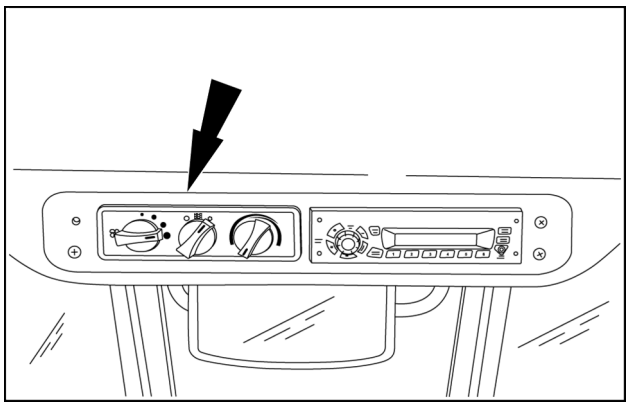
Climate control system

Cab climate control panel

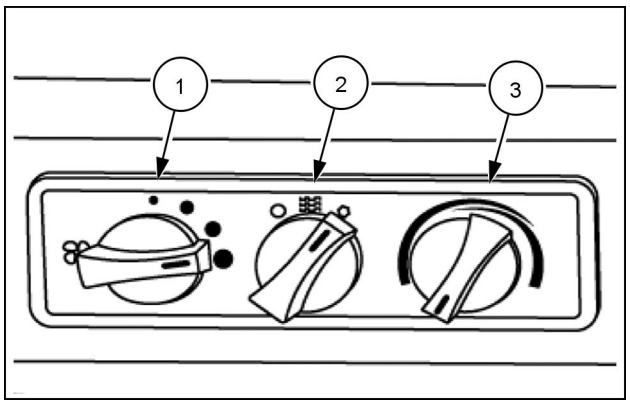
The climate control panel is located at the front of the upper structure of the cab.

1. Fan control selector
   It has 4 positions for adjustment. The first position (fully up), keeps the fan off. Turn the fan control selector clockwise in one-position increments to increase the speed of the fan.
2. Heating and air conditioning control selector
   It has 3 positions for adjustment. The first position (fully to the left), keeps the system off. The second position (fully up), activates the heating. The third position (fully to the right), activates the air conditioning.
3. Temperature control selector
   Use the temperature control to adjust the desired temperature inside the cab. Blue markings indicate cooler temperatures. Red markings indicate warmer temperatures. The heater and air conditioning selector turn these functions on and off.

NOTICE: *If your machine is equipped with a hot water circulation shut-off valve, it should be left OPEN for all temperature control positions.*



RAPH12DOZ0083AA 1



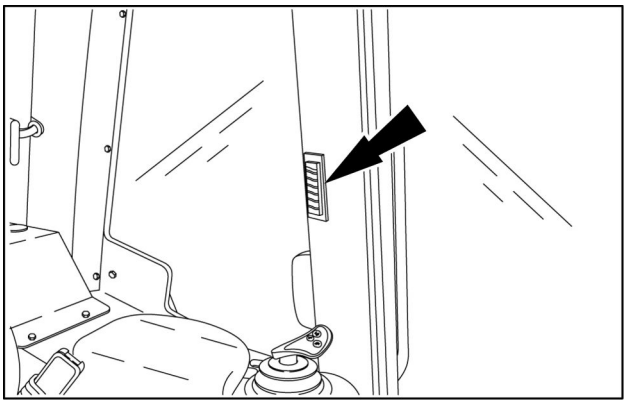
COIL14DOZ0008AA 2

Venting – Cab air vents

Main vents

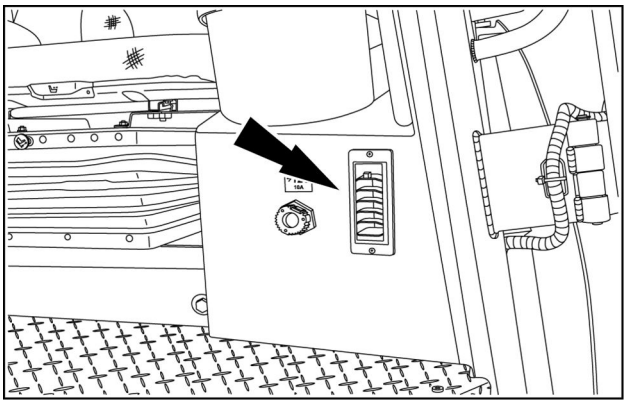
Side column vents
Located on the right- and left-hand cab pillars, they direct air toward the windows or the operator.

NOTE: *Adjust the vents to direct the air flow.*



RAPH12DOZ0087AA 1

Bottom vents
Located on the bottom of the side consoles.



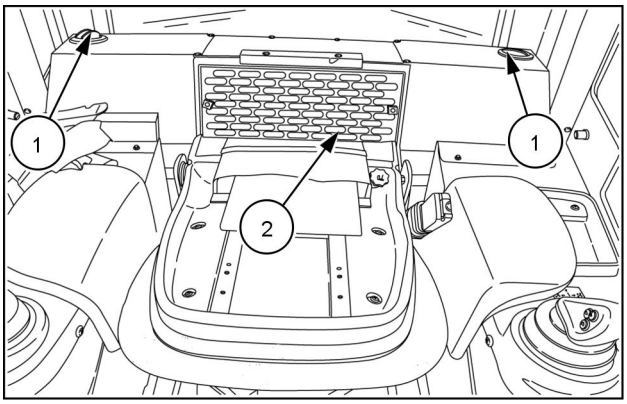
RAPH12DOZ0086AA 2

Rear air recirculation vents

Rear vents **(1)**
Located at the right- and left-hand ends of the rear deck.

NOTE: *When open, air is recirculated in the cab. Always keep the rear air recirculation vents open for maximum cooling with the air conditioning or maximum heat with the heater.*

Cab air filter **(2)**
Located behind the operator's seat next to the cab floor.



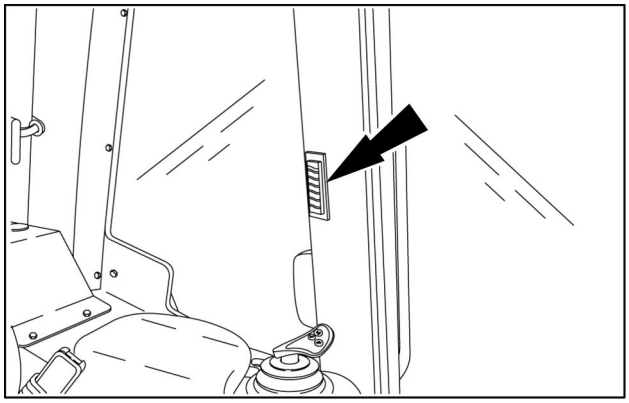
RAPH12DOZ0074AA 3

Defroster vents

The side column vents and the rear vents can be used to defrost the windows and the windshield. Direct the air flow from the vents to defrost the windows.

Turn the fan speed selector to full speed and close all other air vents. This will enable the maximum air flow to the windows.

If a fogging condition occurs, make sure that the air recirculation vents are closed. If the machine is equipped with air conditioning, turn the air conditioning on and turn the heater control selector fully clockwise.

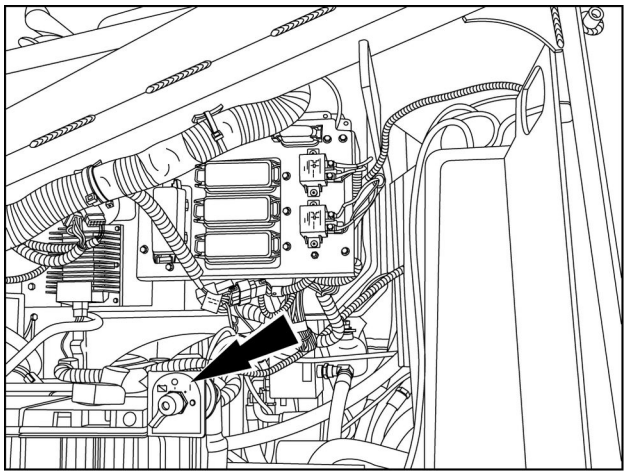


RAPH12DOZ0087AA 4

EXTERIOR CONTROLS

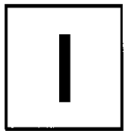
Electrical (Master switch)

The master switch is located on the left-hand side of the machine. The switch has two positions: “ON” and “OFF”.



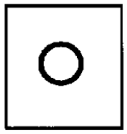
RAIL13DOZ0954AA 1

On position



The key in the ON position powers the entire electrical system.

Off position



The key in the OFF position interrupts all power from the electrical system.

NOTICE: *DO NOT use the master switch to turn the engine off.*

Telematics

Electronic module SiteWatch™

This machine is equipped with a telematics system. This is a monitoring system that combines Internet, cellular, and GPS technologies. A transponder unit is mounted on the equipment that wirelessly communicates with the CASE CONSTRUCTION**SiteWatch™** user interface 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. Refer to the provided guide for operating your telematics system.

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

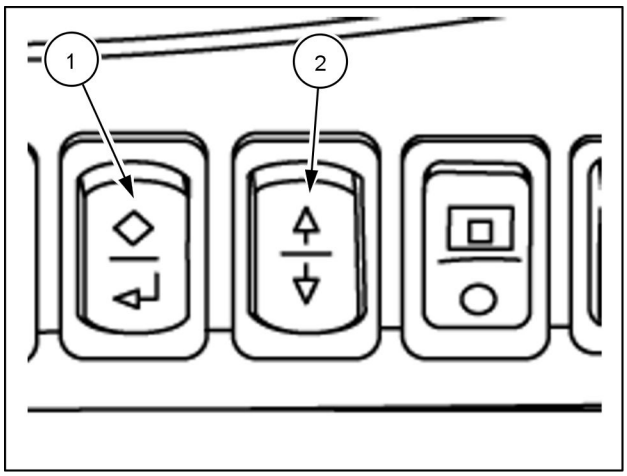
Adjustments and calibration

Joystick (Calibration procedure)

ATTENTION: *With the engine off, the ignition key in the "ON" position and the hydraulic implements disabled, use the multi-function screen of the liquid-crystal display on the instrument cluster to start the calibration.*

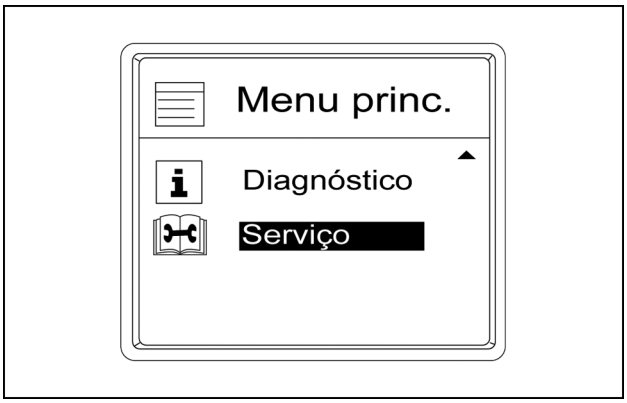
Calibration of the left-hand joystick

1. Go to the main menu by pressing the ENTER switch **(1)**.
   Press the UP or DOWN arrow switch **(2)** to select the service option on the multi-function screen.

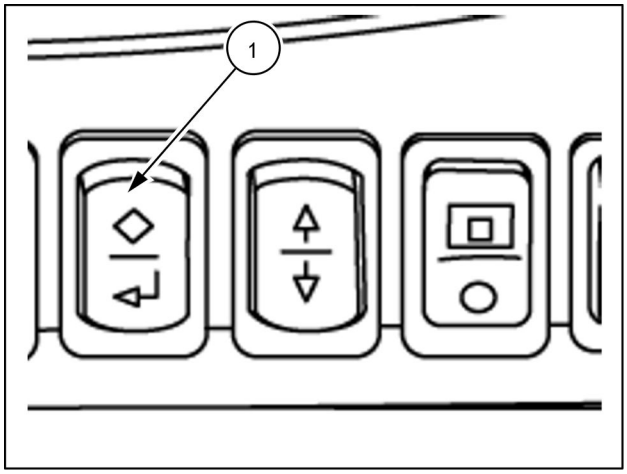


RAIL12DOZ0225AA 1

2. Press the ENTER key **(1)** to confirm the service selection.



COIL15DOZ0109AA 2

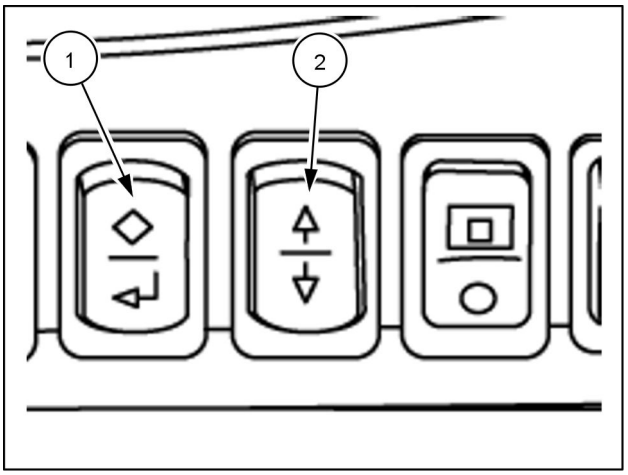


RAIL12DOZ0225AA 3

3. Use the UP or DOWN arrow switch **(2)** to select the "calibration" option
   Press the ENTER switch **(1)** to confirm the calibration selection.

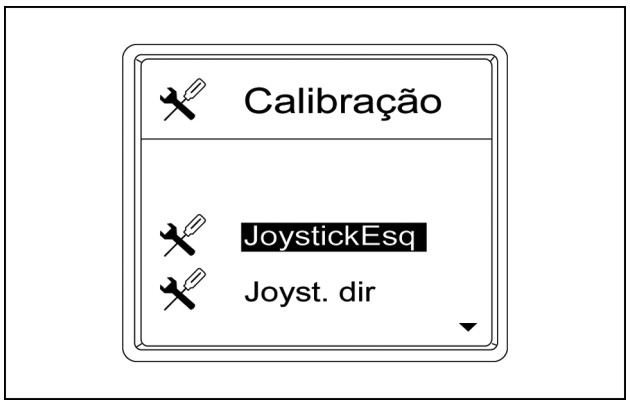


COIL15DOZ0110AA 4

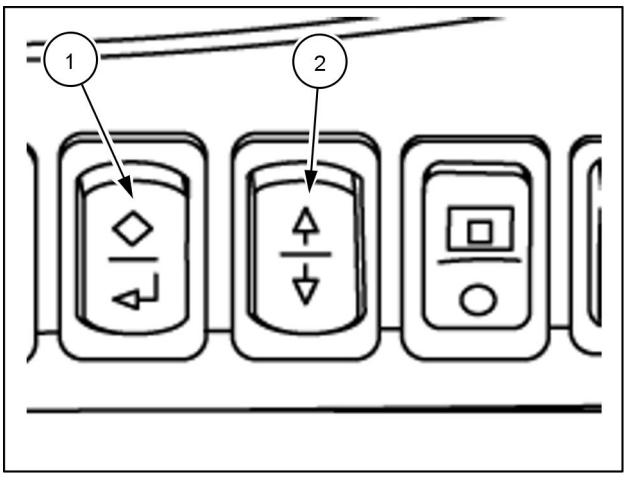


RAIL12DOZ0225AA 5

4. Use the UP or DOWN arrow switch **(2)** to select the "JoystickEsq" option
   Push the ENTER switch **(1)** to confirm the selection of the left-hand joystick.



COIL15DOZ0010AB 6

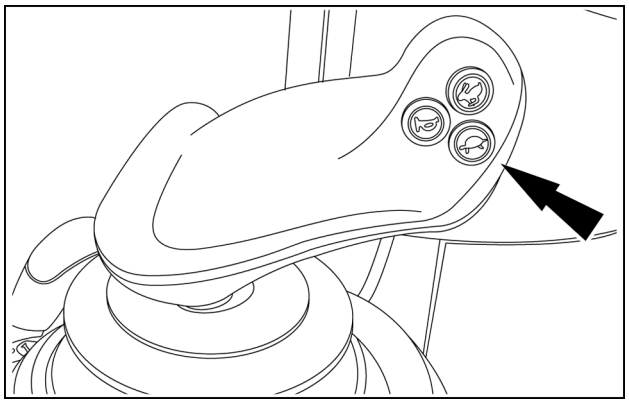


RAIL12DOZ0225AA 7

5. Follow the instructions shown on the multi-function screen.
   Place the left-hand joystick in the central position. Release the joystick in this position.
   Press the bottom button, for deceleration (indicated by the figure of a tortoise).

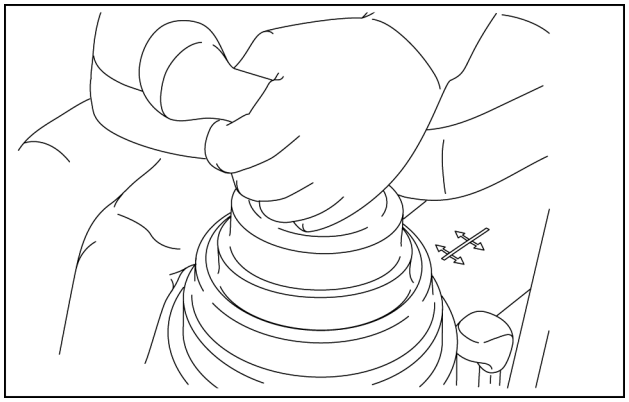


COIL15DOZ0114AB 8



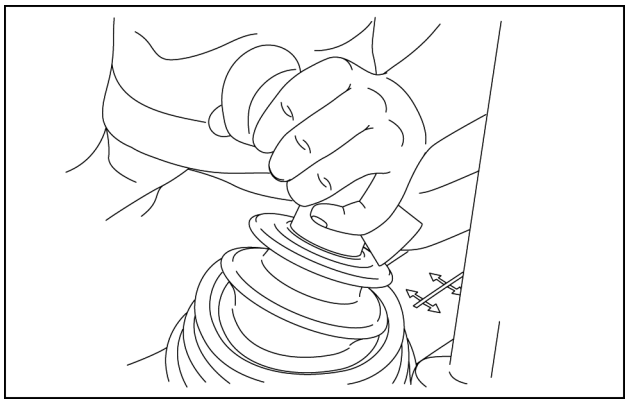
RAIL12DOZ0181AB 9

6. Move the left-hand joystick fully forward. Then move the joystick fully to the right-hand side, to the stop at the end of its stroke.
   Press the bottom button, for deceleration (indicated by the figure of a tortoise).



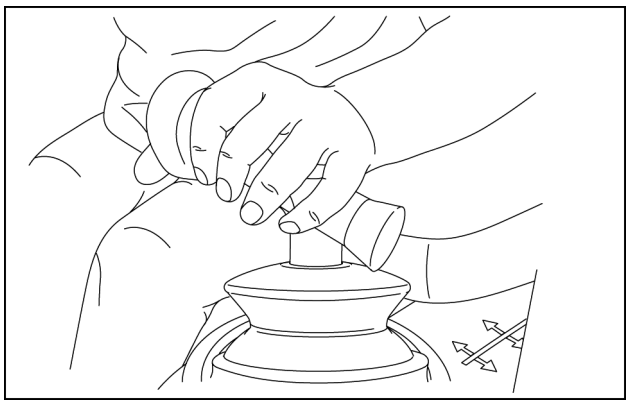
COIL15DOZ0001AA 10

7. Move the left-hand joystick fully backward. Then move the joystick fully to the left-hand side, to the stop at the end of its stroke.
   Press the bottom button, for deceleration (indicated by the figure of a tortoise).



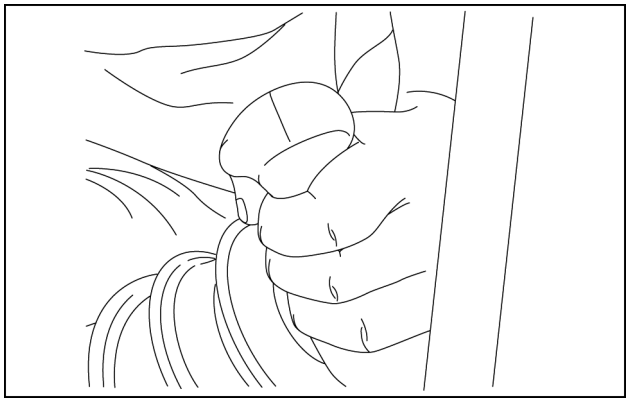
COIL15DOZ0002AA 11

8. Move the left-hand joystick to the right-hand side, to the detent position. Do not exceed the detent position. Press the bottom button, for deceleration (indicated by the figure of a tortoise).



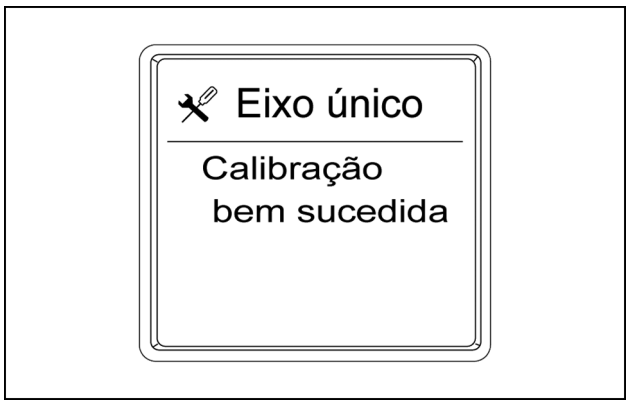
COIL15DOZ0004AA 12

9. Move the left-hand joystick to the left-hand side, to the detent position. Do not exceed the detent position. Press the bottom button, for deceleration (indicated by the figure of a tortoise).



COIL15DOZ0006AA 13

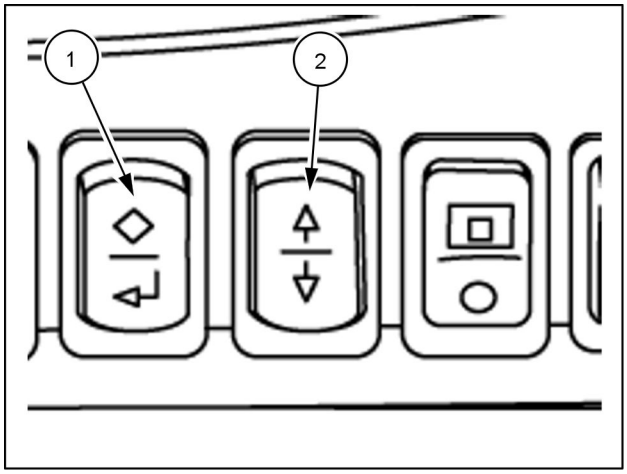
10. After this procedure, make sure that the message "Calibration successful" appeared on the multi-function screen.
    Once this message has appeared, calibration of the left-hand joystick will be completed.
    If a fault occurs during calibration, a message will appear on the screen. The calibration must be repeated.
    If the issue persists, turn the ignition key to the "OFF" position. After a few seconds, turn the ignition key back to the "ON" position. Perform the calibration again.



COIL15DOZ0008AA 14

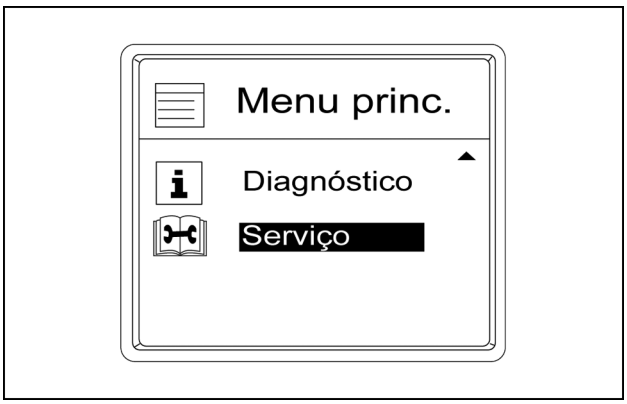
Calibration of the right-hand joystick

1. Go to the main menu by pressing the ENTER switch **(1)**.
   Press the UP or DOWN arrow switch **(2)** to select the service option on the multi-function screen.

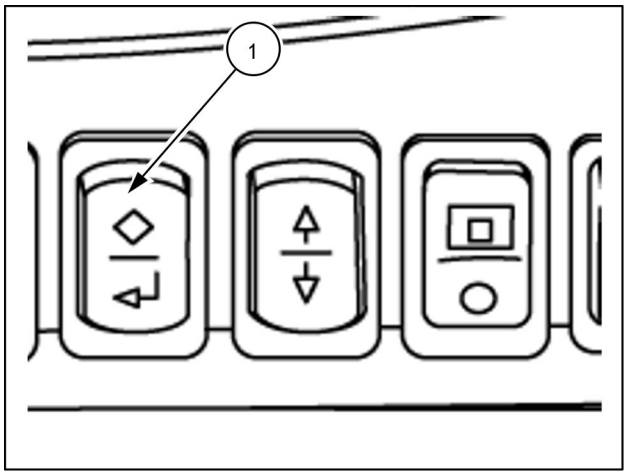


RAIL12DOZ0225AA 15

2. Press the ENTER key **(1)** to confirm the service selection.



COIL15DOZ0109AA 16

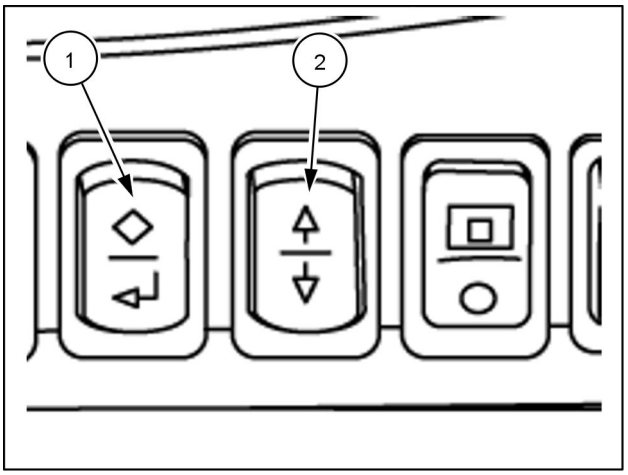


RAIL12DOZ0225AA 17

3. Use the UP or DOWN arrow switch **(2)** to select the "calibration" option
   Press the ENTER switch **(1)** to confirm the calibration selection.

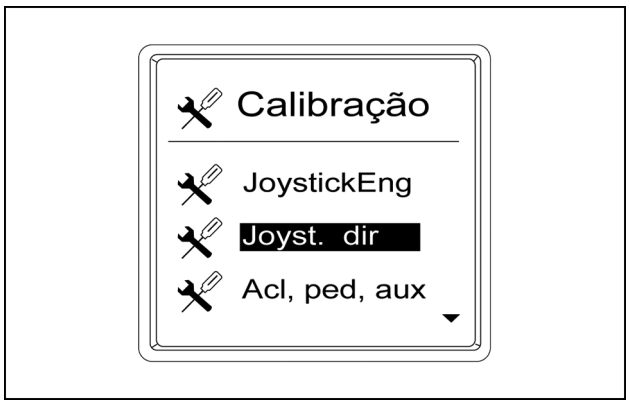


COIL15DOZ0110AA 18

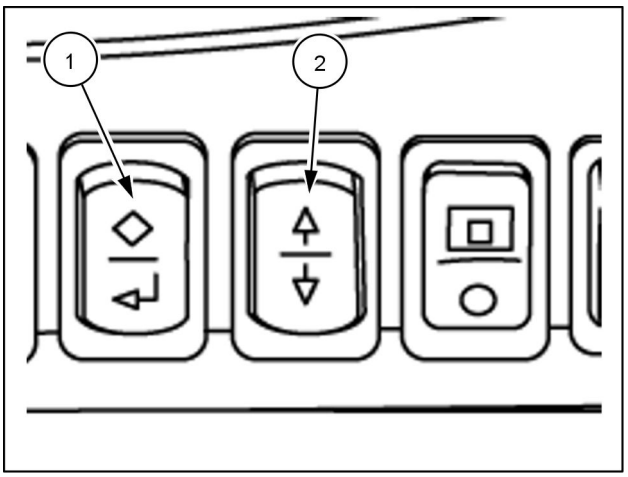


RAIL12DOZ0225AA 19

4. Use the UP or DOWN arrow switch **(2)** to select the "Joyst.Dir" option.
   Push the ENTER switch **(1)** to confirm the selection of the right-hand joystick.

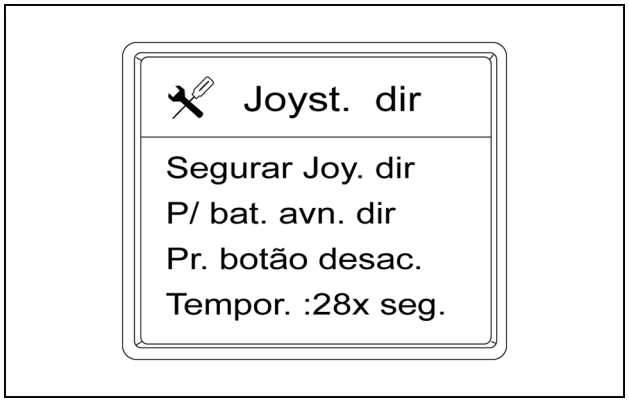


COIL15DOZ0011AA 20

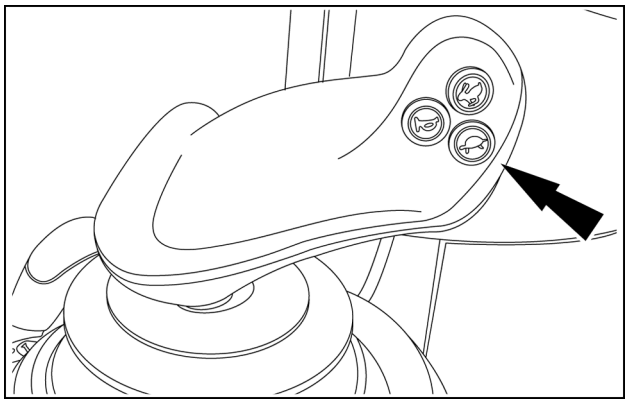


RAIL12DOZ0225AA 21

5. Follow the instructions shown on the multi-function screen.
   Place the right-hand joystick in the central position. Release the joystick in this position.
   Press the bottom button, for deceleration (indicated by the figure of a tortoise).

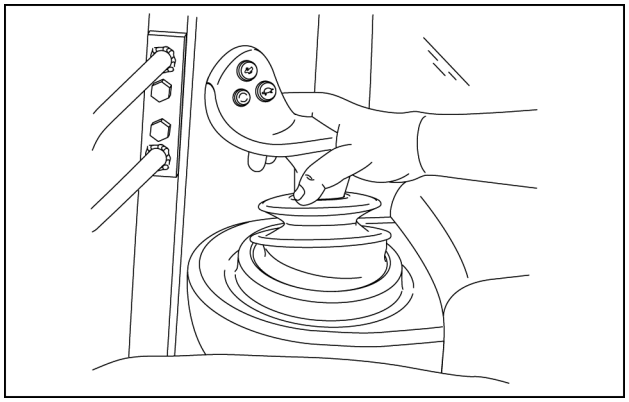


COIL15DOZ0114AC 22



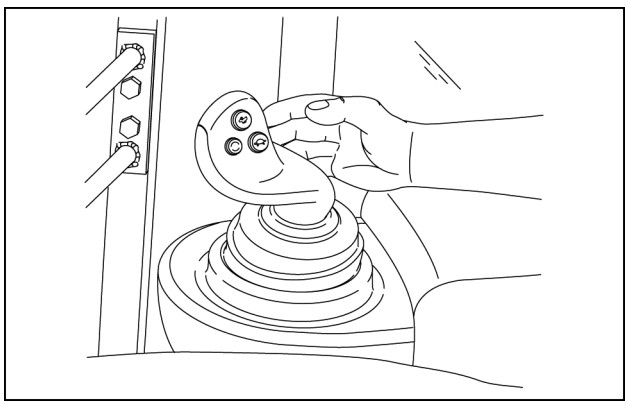
RAIL12DOZ0181AB 23

6. Move the right-hand joystick forward (float). Then move the joystick fully to the right (tilt right).
   Press the bottom button, for deceleration (indicated by the figure of a tortoise).



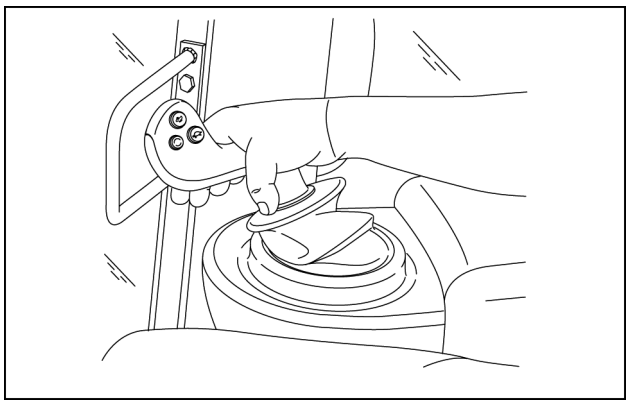
COIL15DOZ0017AA 24

7. Move the right-hand joystick backward (lift). Then move the joystick fully to the left (tilt left).
   Press the bottom button, for deceleration (indicated by the figure of a tortoise).



COIL15DOZ0018AA 25

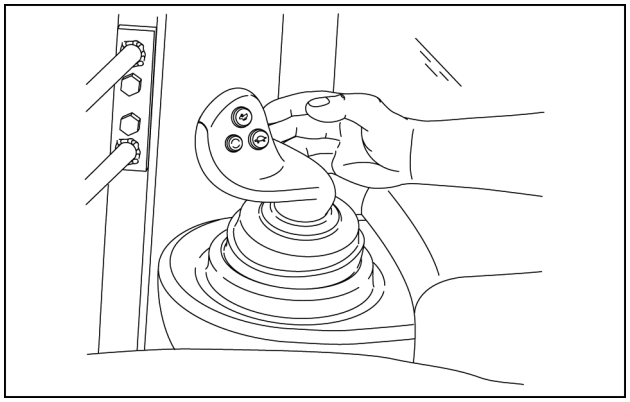
8. Move the right-hand joystick forward (float). Do not enter the detent position.
   Press the bottom button, for deceleration (indicated by the figure of a tortoise).



COIL15DOZ0015AA 26

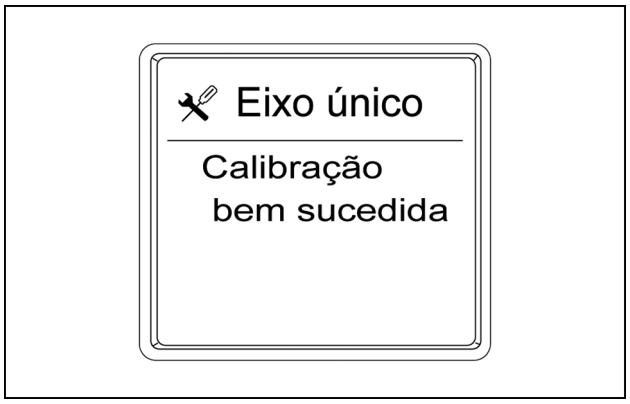
For PAT models only

9. Place the right-hand joystick in the central position. Release the joystick in this position.
   Place the blade angle adjustment wheel in the central position.
   Press the bottom button, for deceleration (indicated by the figure of a tortoise).
   Place the blade angle adjustment wheel at the end of top stroke.
   Press the bottom button, for deceleration (indicated by the figure of a tortoise).
   Place the blade angle adjustment wheel at the end of bottom stroke.
   Press the bottom button, for deceleration (indicated by the figure of a tortoise).



COIL15DOZ0018AA 27

10. After this procedure, make sure that the message "Calibration successful" appeared on the multi-function screen.
    Once this message has appeared, calibration of the right-hand joystick will be completed.
    If a fault occurs during calibration, a message will appear on the screen. The calibration must be repeated.
    If the issue persists, turn the ignition key to the "OFF" position. After a few seconds, turn the ignition key back to the "ON" position. Perform the calibration again.

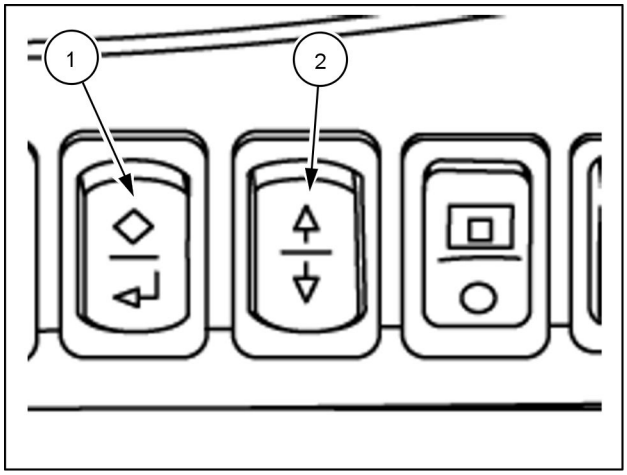


COIL15DOZ0008AA 28

Ripper control lever / Engine hand throttle / Deceleration brake pedal – Calibration procedure

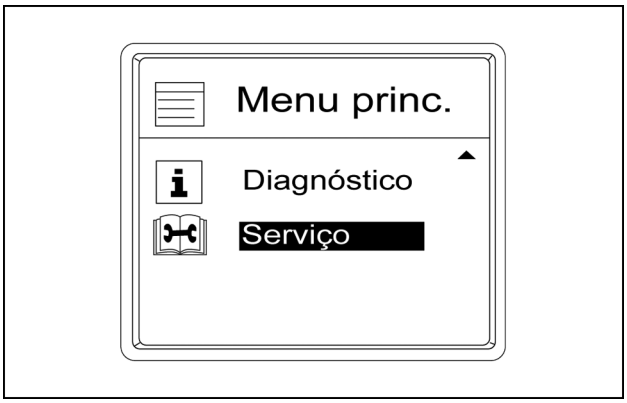
ATTENTION: *With the engine off, the ignition key in the "ON" position and the hydraulic implements disabled, use the multi-function screen of the liquid-crystal display on the instrument cluster to start the calibration.*

1. Go to the main menu by pressing the ENTER switch **(1)**.
   Press the UP or DOWN arrow switch **(2)** to select the service option on the multi-function screen.

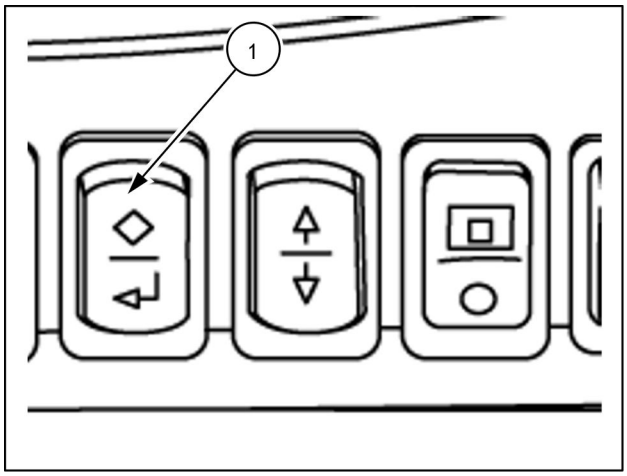


RAIL12DOZ0225AA 1

2. Press the ENTER key **(1)** to confirm the service selection.



COIL15DOZ0109AA 2

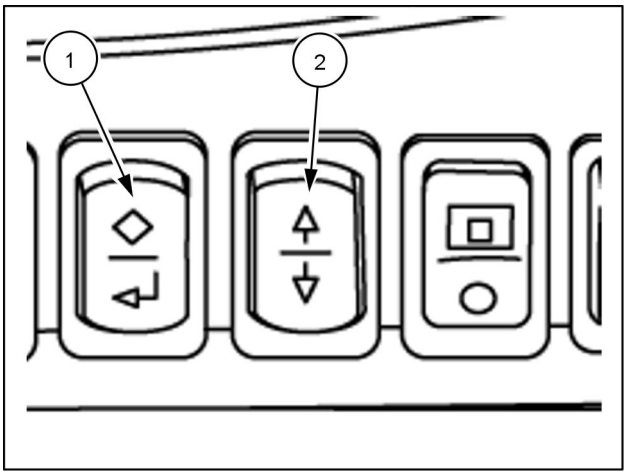


RAIL12DOZ0225AA 3

3. Use the UP or DOWN arrow switch **(2)** to select the "calibration" option
   Press the ENTER switch **(1)** to confirm the calibration selection.

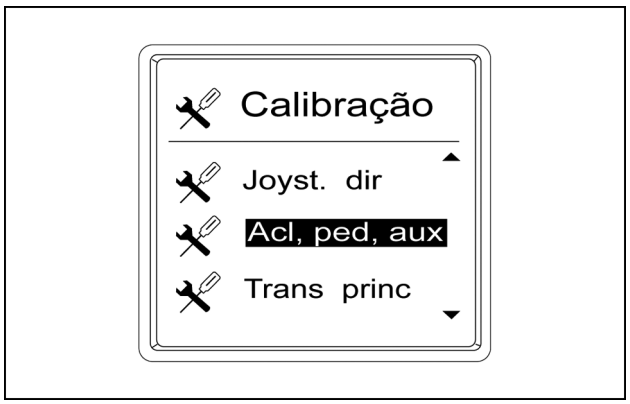


COIL15DOZ0110AA 4

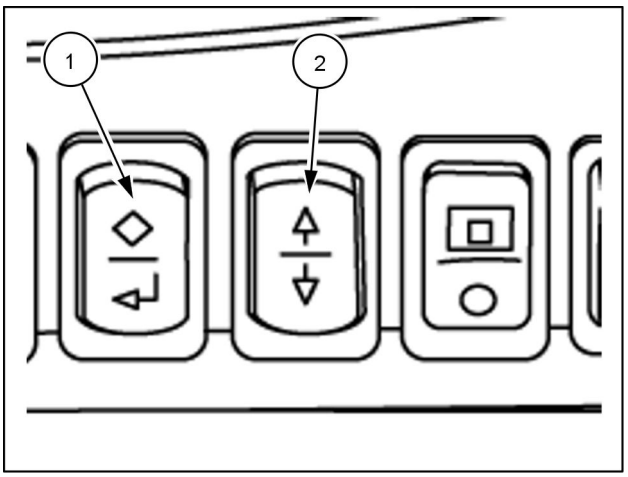


RAIL12DOZ0225AA 5

4. Use the UP or DOWN arrow switch **(2)** to select the "Acl.ped, aux" option
   Push the ENTER switch **(1)** to confirm the selection of the left joystick.
   Follow the steps that will be shown on the multi-function screen.



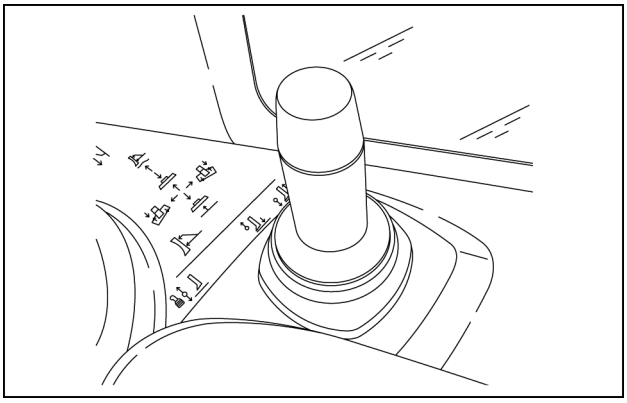
COIL15DOZ0022AA 6



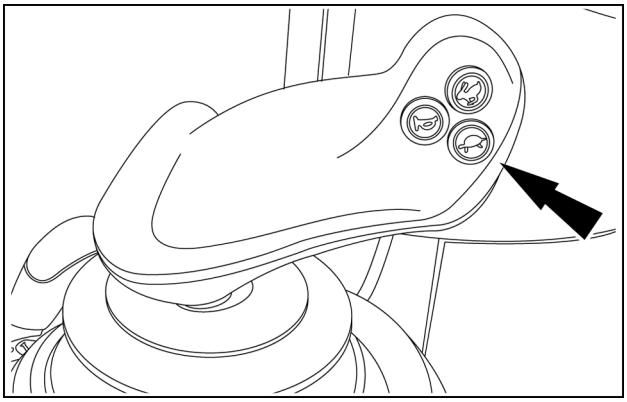
RAIL12DOZ0225AA 7

Calibration of the ripper (if installed)

5. Put the ripper control lever in the central position. Press the bottom button, for deceleration (indicated by the figure of a tortoise).

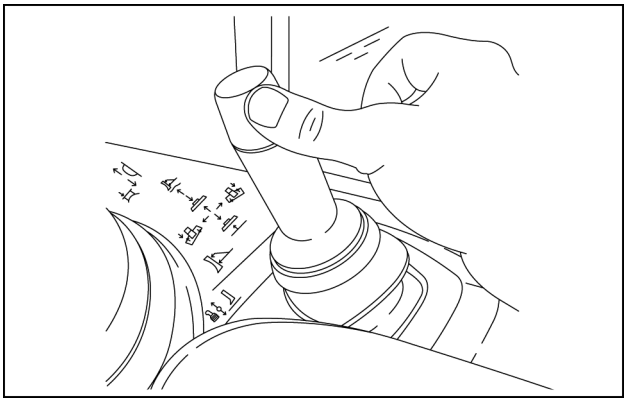


COIL15DOZ0024AA 8



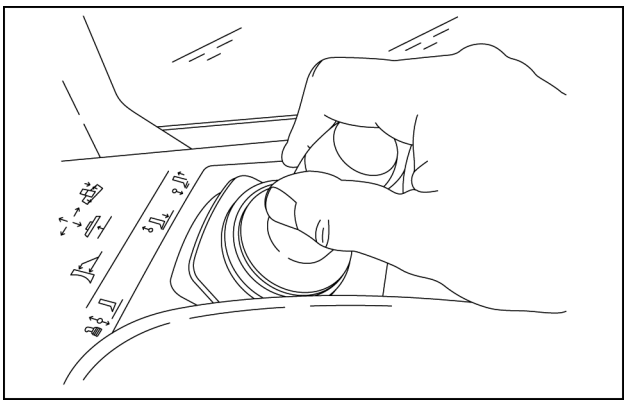
RAIL12DOZ0181AB 9

6. Move the ripper control lever fully forward. Press the bottom button, for deceleration (indicated by the figure of a tortoise).



COIL15DOZ0025AA 10

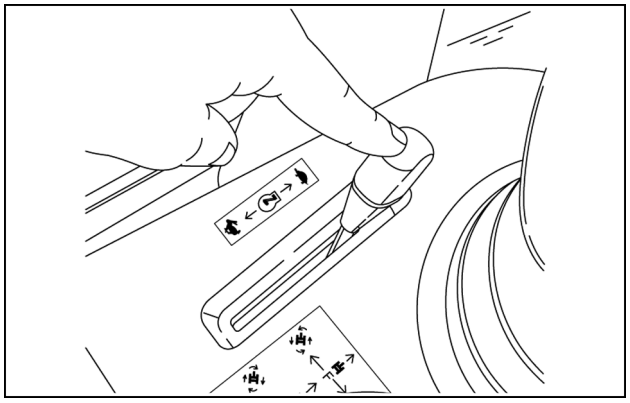
7. Move the ripper control lever fully backward. Press the bottom button, for deceleration (indicated by the figure of a tortoise).



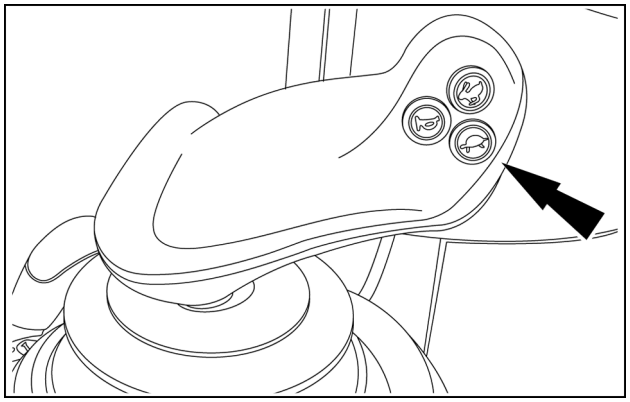
COIL15DOZ0026AB 11

Calibration of the engine hand throttle

8. Move the throttle lever fully forward (idle speed).
   Press the bottom button, for deceleration (indicated by the figure of a tortoise).

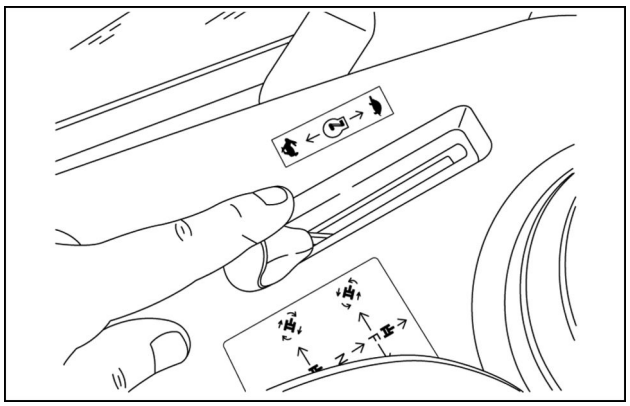


COIL15DOZ0027AA 12



RAIL12DOZ0181AB 13

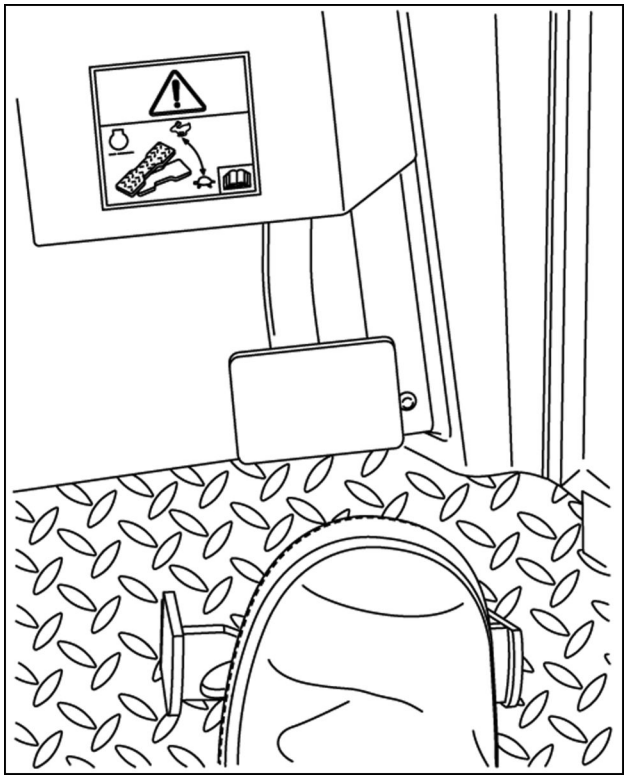
9. Move the throttle lever fully backward (maximum throttle).
   Press the bottom button, for deceleration (indicated by the figure of a tortoise).



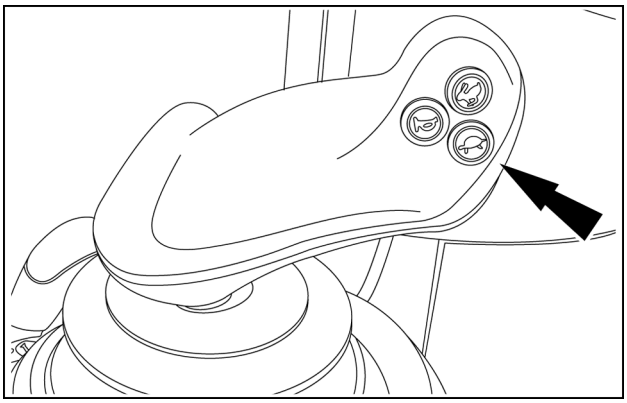
COIL15DOZ0028AA 14

Calibration of the dual function pedal (brake and decelerator)

10. Do not press the dual function pedal.
    Press the bottom button, for deceleration (indicated by the figure of a tortoise).

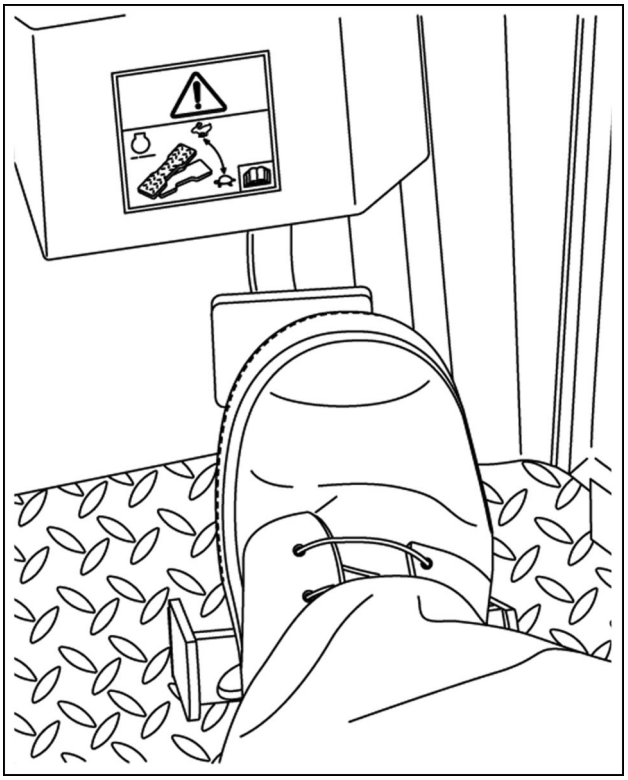


COIL15DOZ0029BA 15



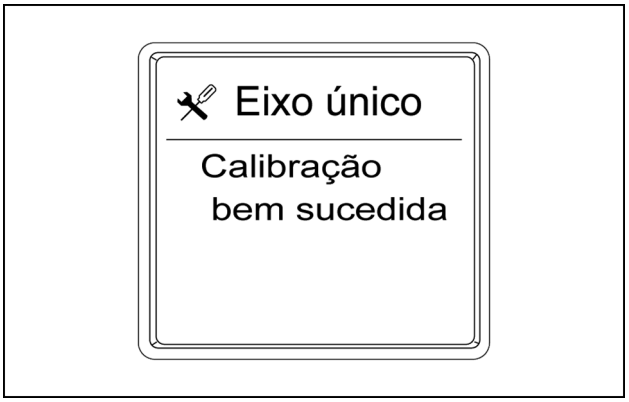
RAIL12DOZ0181AB 16

11. Fully depress the dual function pedal.
    Press the bottom button, for deceleration (indicated by the figure of a tortoise).



COIL15DOZ0030BA 17

12. After this procedure, make sure that the message "Calibration successful" appeared on the multi-function screen.
    Once this message appears, the calibration of the ripper control lever, the engine hand throttle and the brake and deceleration pedal will be completed.
    If a fault occurs during calibration, a message will appear on the screen. The calibration must be repeated.
    If the issue persists, turn the ignition key to the "OFF" position. After a few seconds, turn the ignition key back to the "ON" position. Perform the calibration again.

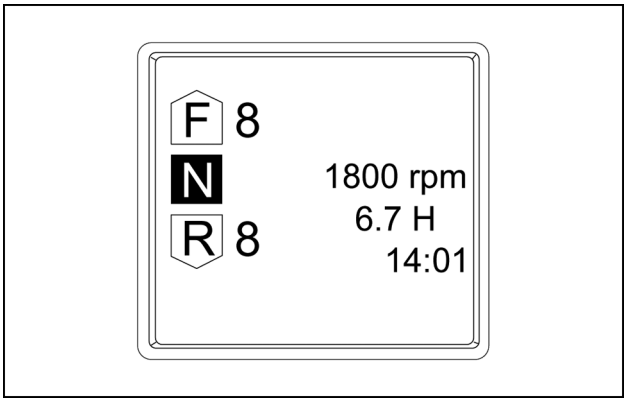


COIL15DOZ0008AA 18

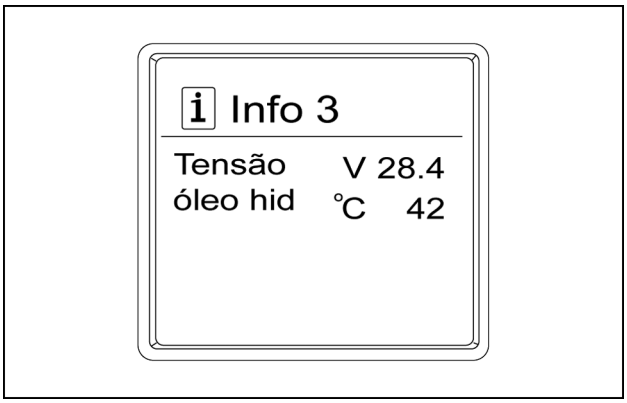
Drive (Pump) – Calibration procedure

ATTENTION: *The operator must adjust the throttle lever to obtain an engine speed of* ***1800 RPM****. The parking brake must be released. The implements must be disabled. The hydraulic fluid should be at a temperature between* ***40 °C*** *and* ***45 °C****.*

1. Before you start the procedure, make sure that the machine is in the pre-determined conditions.

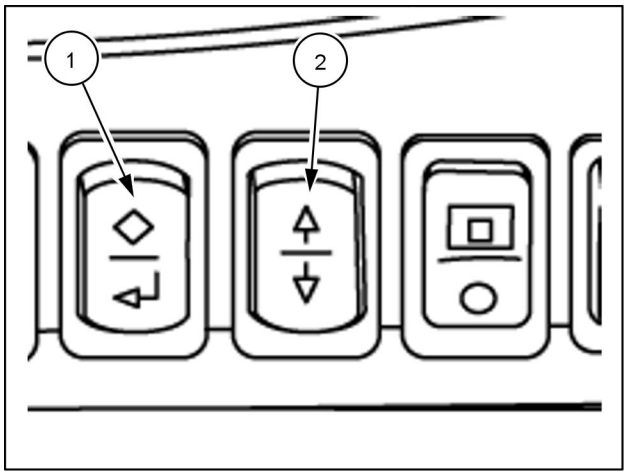


COIL15DOZ0032AA 1



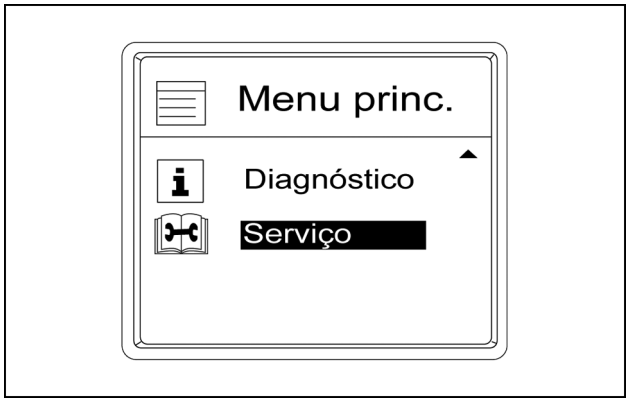
COIL15DOZ0033AA 2

2. Run the engine.
   Go to the main menu by pressing the ENTER switch **(1)**.
   Press the UP or DOWN arrow switch **(2)** to select the service option on the multi-function screen.

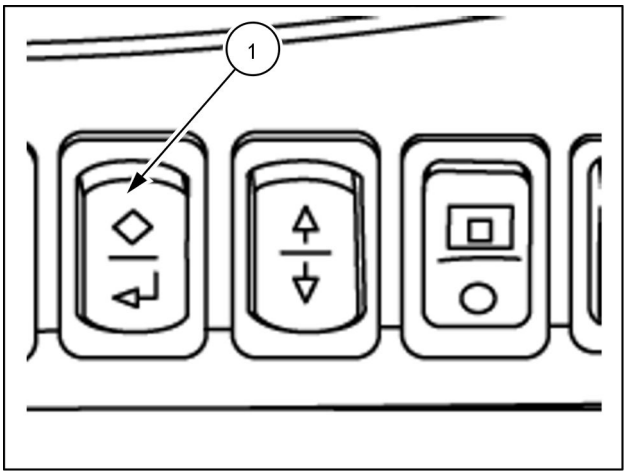


RAIL12DOZ0225AA 3

3. Press the ENTER key **(1)** to confirm the service selection.



COIL15DOZ0109AA 4

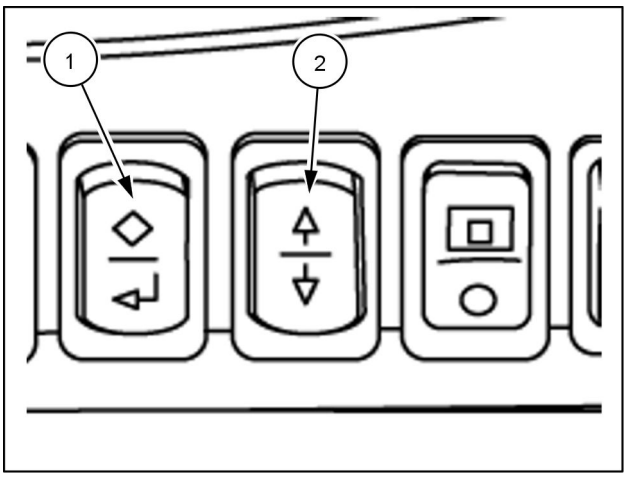


RAIL12DOZ0225AA 5

4. Use the UP or DOWN arrow switch **(2)** to select the "calibration" option
   Press the ENTER switch **(1)** to confirm the calibration selection.

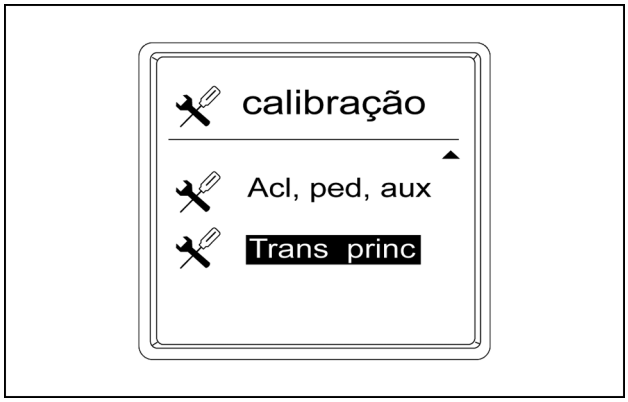


COIL15DOZ0110AA 6

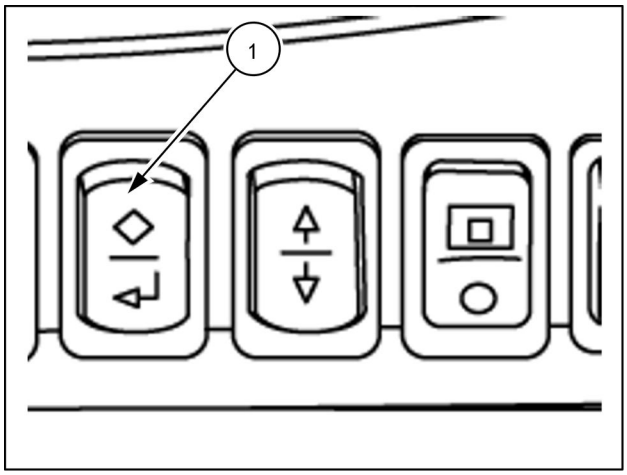


RAIL12DOZ0225AA 7

5. Use the UP or DOWN arrow switch **(2)** to select the "Trans princ” option
   Push the ENTER switch **(1)** to confirm the selection of the left joystick.
   Follow the steps that will be shown on the multi-function screen.
   Drive the machine to an area where the ground is flat and level.



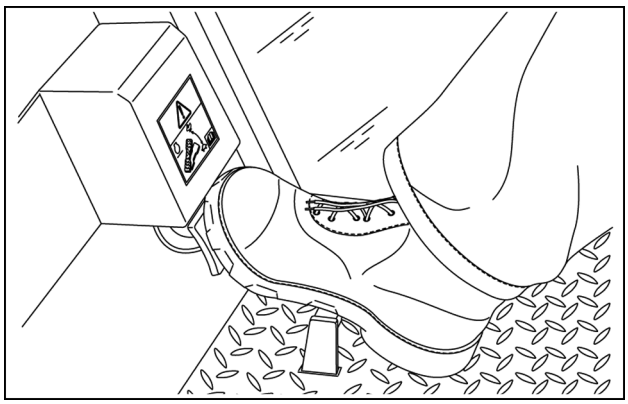
COIL15DOZ0036AA 8



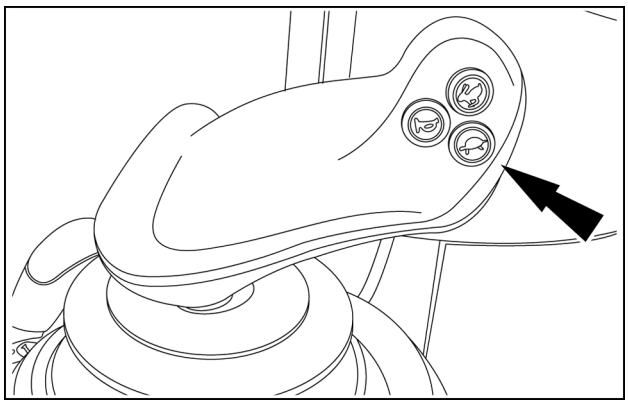
RAIL12DOZ0225AA 9

6. Press and hold down the brake pedal.
   Press the bottom button, for deceleration (indicated by the figure of a tortoise).
   After this procedure, 4 automatic processes will be carried out:
   – Automatic process for right-hand forward pump;
   – Automatic process for right-hand reverse pump;
   – Automatic process for left-hand forward pump;
   – Automatic process for left-hand reverse pump.

   NOTE: *When the message "Pump Calibration" appears on the multi-function screen, the control module tests are being performed. No additional operator intervention will be required to complete the test. Continue to press down the decelerator pedal until the test is completed.*

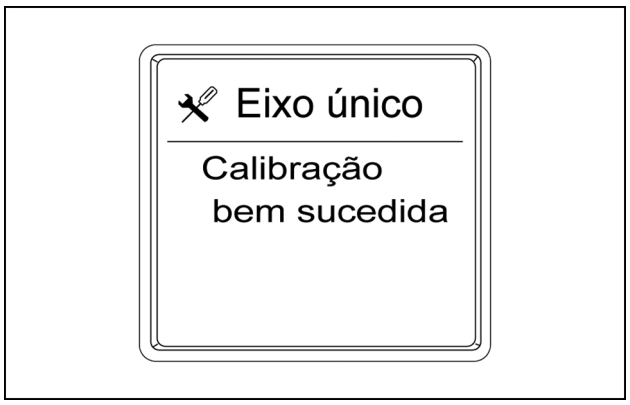


COIL15DOZ0037AA 10



RAIL12DOZ0181AB 11

7. After this procedure, make sure that the message "Calibration successful" appeared on the multi-function screen.
   Once this message has appeared, the calibration of the transmission pumps will be completed.
   If a fault occurs during calibration, a message will appear on the screen. The calibration must be repeated.
   If the issue persists, turn the ignition key to the "OFF" position. After a few seconds, turn the ignition key back to the "ON" position. Perform the calibration again.



COIL15DOZ0008AA 12

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. Inspect the machine carefully every day at the beginning of the work shift. Do a careful visual inspection from the outside of the machine before turning on the engine to prevent damages and personal injuries.
2. Check for loose connections, faulty hoses, fluid leaks, debris or trash build-up, loose bolts, damaged or missing parts that could affect 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 topped up and filled with clean fuel that matches the specifications given in this manual.

Operating applications

- Opening and maintenance of roads.
- Cleaning of areas.
- Preparation of areas for mining.

ATTENTION: *This equipment cannot be used for forestry applications.*

Run in period of a new machine

During the initial run-in period of the machine engine, special care is essential to ensure good performance and a longer service life of the machine.

During this period, follow some recommendations:

- 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 in "stall" conditions (tracks stopped and the engine running at full throttle).
- Do not run the engine for a long period at idle speed.
- Frequently check the gauges on the instrument panel.
- Check the fluid levels and coolant level frequently.

NOTICE: *Run the engine at idle speed for a few minutes before turning the engine off. Always shut the engine down with the throttle in idle position to keep from damaging the turbocharger.*

Track shoe bolts

Check the torque of the track shoe bolts in the first 20 hours of operation when the machine is new or if the track shoes have been replaced. After that, check the torque of the track shoe bolts every 100 hours of operation.

ATTENTION: *For the torque procedures for the track shoe bolts, refer to page* ***7-50***

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

Before starting the machine engine

Before operating the engine, complete the following procedures:

- Check the level of all fluids (engine oil, fuel, hydraulic fluid and coolant) and make sure that the fluids and lubricants are suitable for the prevailing operating conditions.
- Carry out all the daily maintenance operations.
- Look for signs of leaks. Check the condition of the hoses, tubes, and fittings. Tighten or replace as required.
- Complete run-in maintenance if the machine is new or if the engine has been reconditioned.
- Check track tension and check for loose, missing or damaged parts.

  ATTENTION: *For track tension adjustment procedures, refer to page* ***7-30****.*
- Keep the steps, handholds and platform of the operator's cab clean. Grease, oil, mud or ice can cause slipping.
- Clean or replace any safety decals which are illegible. Refer to the safety decals on the page **2-25**.
- Make sure that all doors are correctly closed and latched.
- Latch the cab door in either fully closed or fully open position.
- Remove any obstructions which prevent the full visibility of the operator. Always keep the glass, windows and rear-view mirrors clean.
- Check that no tools or other objects have been left on the machine or in the operator's compartment.
- Make sure no one is on or under the machine. The operator must be alone on the machine.
- Make sure no one is standing in the machine operating area.
- Make sure you know and follow local safety regulations.
- Work out a convenient means of escape from the machine. Familiarize yourself with the emergency exits in the event the cab door does not open or the machine rolls over.
- Make sure that all lighting and signaling equipment is fully operative before undertaking any travel or work during hours of darkness or in poorly lit environments.
- Adjust the operator's seat so you are comfortable and can reach the decelerator or brake pedal with your back supported on the back of the seat.
- Fasten and adjust the seat belt.
- Make sure that all controls are in the neutral position.

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

Starting the engine in normal conditions

1. Make sure that the parking brake is applied.
2. Make sure that all control levers are in the NEUTRO position with the implements on the ground.

   NOTE: *The travel and direction control lever must be in neutral or the engine will not start.*
3. Keep all unauthorized personnel clear of the machine operating area. Sound the horn to alert people of your intent to start the engine.
4. Turn the ignition key to the ON (LIGADO) position, and note the operation of warning icons on the instrument cluster.
5. Turn the ignition key to the START (PARTIDA) position and remove the key.

   NOTICE: *Do not leave the ignition key in the START (PARTIDA) position for more than 30 segundos. If it is not possible to start the engine, turn the ignition key to the OFF (DESLIGADO) position. Wait 3 minutos and attempt to start the engine again.*
6. After starting the engine, check the indicators on the instrument cluster and make sure that all operating conditions are normal. Allow the engine to run at idle speed with the transmission in neutral until the temperature of the engine coolant and the hydraulic system fluid reaches the operating range.

   NOTICE: *Operate the machine at reduced loads until all systems reach operating temperature.*

Engine speed

- DO NOT OPERATE the engine at idle speed for long periods. This will keep the operating temperature of the system low. A low operating temperature can cause acids and deposits in the engine oil.
- Run the engine at idle speed for one minute before starting operation of the machine.
- Before turning off the engine, always place it at idle speed for a few minutes to let all parts cool evenly before shutting it down.

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

Operating in extreme temperatures

Operating the machine in hot weather conditions

⚠ 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

When operating the machine in hot weather, some recommendations must be followed:

- Use an engine oil, hydraulic fluid and diesel fuel specifically for use in hot climates.
- Clean the radiator, oil cooler and cooling system debris screen often to prevent damage or overheating of the engine. Do not allow dirt and debris to accumulate in the radiator fins, oil cooler fins or on the cooling system debris screen.
- Keep the engine accessories drive belt correctly tensioned.
- Make certain that the engine coolant mixture is sufficient to keep the machine operation safe.
- If the engine overheats, place it in idle to help cool it, turn off the engine and check the coolant level. If necessary, top up the system up to the correct level. If, after filling to the proper level, the engine continues to overheat, shut it down, allow it to cool, drain and flush the entire cooling system and refill with the proper mixture of fresh, clean coolant.
- Check the batteries electrolyte (acid) level frequently and top it up as necessary with distilled water.
- Keep a close watch on the instrument cluster for warning icons during operation. Avoid running the engine at low rotation unnecessarily. During periods when the machine is operated infrequently, place the engine throttle in the idle position.

NOTICE: *Do not keep the ignition key at the START (PARTIDA) position for more than 30 segundos. If it is not possible to start the engine, turn the ignition key to the OFF (DESLIGADO) position. Wait 3 minutos and attempt to start the engine again.*

Operating in cold temperatures

Operating the machine in cold weather conditions

Cold weather conditions require special operating procedures. The machine will require special start-up, warm-up and maintenance procedures to have better performance, avoid serious damage and prolong its service life.

When operating the machine in cold weather, some recommendations must be followed:

Batteries

Keep batteries fully charged.

In cold conditions, it is important to run the machine long enough for the battery to recover the charge lost during start-up of the machine. In most cold conditions, this is about **10 min**, but at extremely low temperatures, it can be **30 min**.

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

Keep batteries terminals free of ice and snow. Ice and snow could cause the terminals to short circuit and cause extensive damage to the machine systems. Clean the terminals, and apply electrical terminal sealers to prevent corrosion. Check the batteries electrolyte (acid) level frequently and top it up as necessary with distilled water. If the machine will be left outside overnight, removing the batteries and storing them in a warm area with a higher ambient temperature is recommended.

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

NOTE: *Do not charge the battery in temperatures below* ***16.0 °C*** *(****60.8 °F****), as it could explode. First warm up the battery to* ***16.0 °C*** *(****60.8 °F****).*

Lubricants

Use engine oil and hydraulic fluid specific for use in cold climates. Use the correct viscosity oil and fluid in each component based on the ambient temperature. If in doubt, see your CASE CONSTRUCTION dealer.

Fuel

Check with your fuel supplier for the ideal fuel for use in cold weather. Engine power will be reduced if wax particles are in the fuel filters. Some cold weather fuel blends result in lower engine power.

Low temperatures can cause condensation to form in the fuel tank. Check daily if there is water in the first stage fuel filter and fuel tank and drain as required.

Engine cooling system

Make certain that the quantity of engine coolant is sufficient to maintain safe operation of the machine. Consider cooling factors such as strong winds when calculating the amount of water and ethylene glycol for filling the engine cooling system.

NOTE: *Mix the coolant at a proportion that ensures protection at a temperature* ***5 °C*** *lower than minimum temperature than the machine will experience during operation, storage or transport.*

Keep a close watch on the instrument cluster for warning icons during operation. It may be necessary to use a coolant heater, fuel heater, engine heater jacket and additional battery booster to help start the engine.

Check the concentration of additive in the engine coolant every day, before starting the machine in low ambient temperature conditions. In conditions where the ambient temperature is above **-37.0 °C** (**-34.6 °F**), a mixture of **50%** ethylene glycol and **50%** water must be used in the cooling system. If the ambient temperature is below **-37.0 °C** (**-34.6 °F**), it is advisable to use a mixture of **40%** water and **60%** ethylene glycol. Use ethylene glycol and water in the cooling system during all seasons. If in doubt, see your CASE CONSTRUCTION dealer.

Starting the engine in cold conditions

⚠ 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

Engine preheat

This machine may be equipped with an intake air preheating system (Grid Heater). Wait for the preheat indicator light to go out before starting the engine. The engine preheat indicator light will come on when the ambient temperature is low and the intake air needs to be preheated to start the engine.

To start the engine in low temperature conditions, proceed as follows:

1. Make sure that the parking brake is applied.
2. Make sure that all control levers are in the NEUTRO position with the implements on the ground.

   NOTE: *The travel and direction control lever must be in neutral or the engine will not start.*
3. Turn the ignition key to the ON (LIGADO) position and wait for the intake air preheat indicator light to go out.

   NOTICE: *Before starting the engine, wait until the preheat indicator light goes out.*
4. Turn the ignition key to the START (PARTIDA) position, the preheat indicator light may come on again during start-up and shortly after the engine starts, to complete the warm-up cycle. This provides the ideal conditions for the proper operation of the engine in cold weather conditions.
5. Contact your authorized dealer for additional information about start-up in cold weather.

Warming up of engine

After preheating and starting the engine, adjust the engine speed to **1650 RPM** and let it run for 4 minutos without load, this will cause the engine to warm up.

Machine warm up

To properly warm up the machine and ensure safety when operating the machine at low temperatures, proceed as follows:

1. Perform the procedures previously described in "Engine Preheat" step 1 to 3.
2. Set the engine speed between 1200 and **1400 RPM**.
3. Move the machine without exceeding speed range 8.
4. Operate the blade control lever and ripper control lever (if equipped), activating all functions to the end of the cylinder strokes a few times. Continue with this procedure for **10 min** or until the temperature of the hydraulic fluid reaches at least **10.0 °C** (**50.0 °F**).

   NOTE: *For best performance, warm up the hydraulic fluid to a temperature greater than **20.0 °C** (**68.0 °F**).*
5. Operate the machine in a clear safe area, operate the controls, operate all the functions and make sure that they are functioning correctly.

If it is necessary to leave the engine running at idle speed for long periods when operating the machine in cold weather conditions, the engine will stay warm, but the hydraulic system fluid and brake fluid will cool. With the fluid temperature below the operating temperature, the response time of the hydraulic functions will be affected and may be slow. If this happens, you MUST perform the complete machine warm-up procedure again.

NOTE: *The transmission assembly is equipped with an internal protection system that does not allow selection of gears if the transmission fluid temperature is below **-12.0 °C** (**10.4 °F**). If it is not possible to select gears, let the engine run with the transmission in neutral 2 a 4 minutos and try again.*

Make sure the track system is clean when you park the machine. In low ambient temperature conditions, place the machine on planks. This will prevent the tracks from freezing to the ground.

NOTE: *Do not try to move the machine if the track is frozen to the ground. This will cause damage to the power train.*

STOPPING THE UNIT

Machine parking

⚠ 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. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.

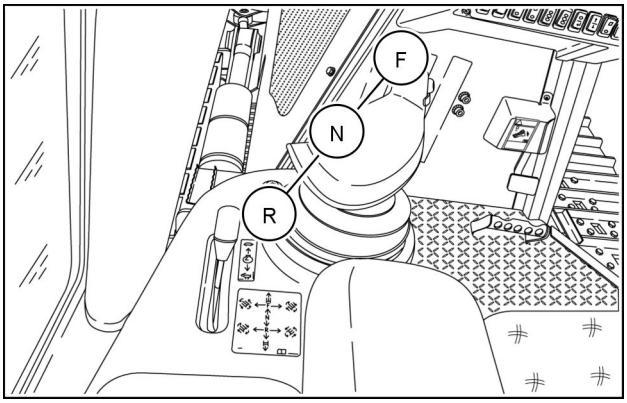
   NOTE: *If it is not possible to park the machine on a level surface, park the machine with the front facing the side of the descent. Make sure that the machine is behind an object that will not move.*
3. Lower the blade and ripper (if equipped) to the ground.
4. Place the travel control level in neutral.
5. Set the parking brake.

   NOTE: *The indicator light located on the switch and on the instrument cluster comes on when the parking brake is engaged.*
6. Let the engine run at idle speed for a few minutes.

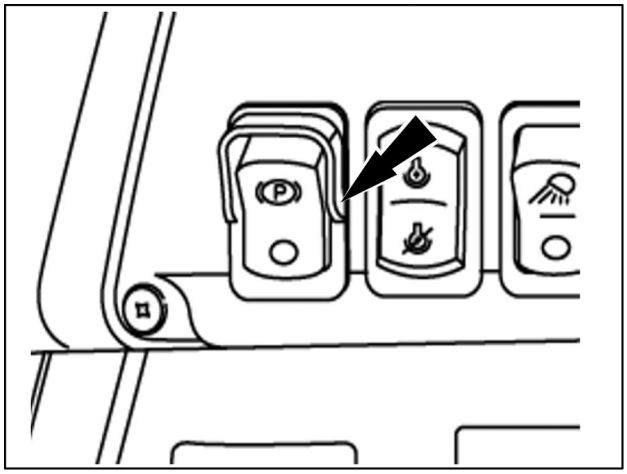
   NOTE: *This decreases the temperature of the engine evenly.*

   NOTE: *The turbocharger may be damaged if the engine is not properly shut down.*
7. Place the ignition key in the "OFF" position to shut down the engine.
8. Remove the key.
9. Close the windows, the cab doors, the compartment access doors, and all panels.
10. Turn the master switch to the OFF position to turn off the electrical system. See page **3-63**.
11. Make sure the entire track system is clean.

    NOTE: *In cold weather conditions, place the machine on planks. This will prevent the tracks from freezing to the ground.*



RAPH12DOZ0080AA 1



RAPH12DOZ0133AA 2

MOVING THE UNIT

Machine 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

NOTE: *Keep all unauthorized personnel clear of the area. Always know the location of all workers in your proximity. Warn them before you start work.*

Before starting machine operation

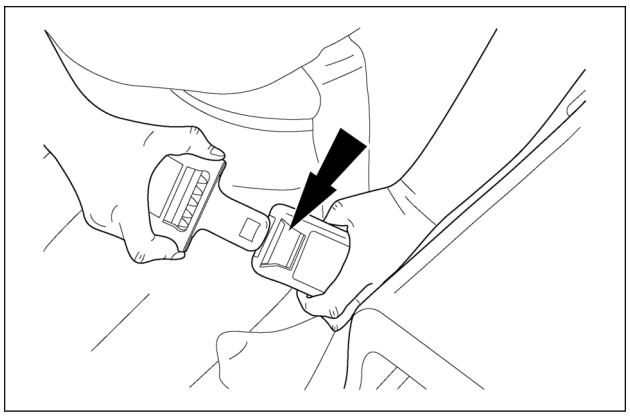
1. Adjust the operator seat.

   NOTE: *Make sure you can fully depress the pedals and move the control levers with your back resting against the seat back.*



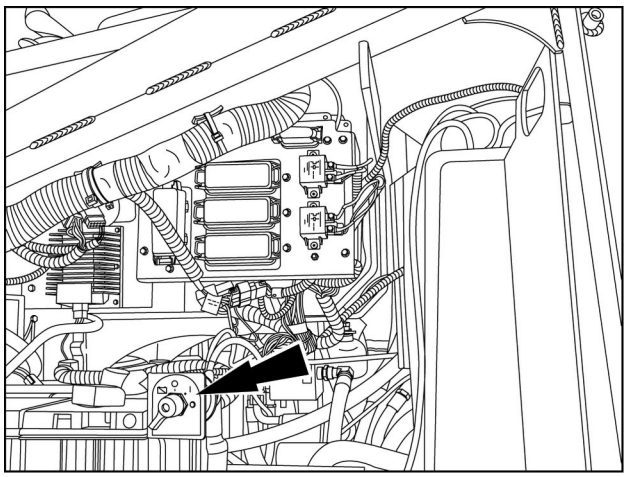
SP0009 1

2. Fasten your seat belt.



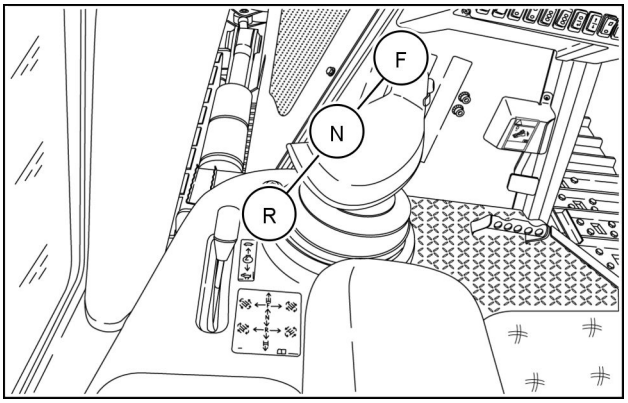
RCIL10CWL083FAL 2

3. Turn the master switch to the ON position to power up the electrical system. See page **3-63**.



RAIL13DOZ0954AA 3

4. Place the travel and direction control lever in neutral **(N)**.



RAPH12DOZ0080AA 4

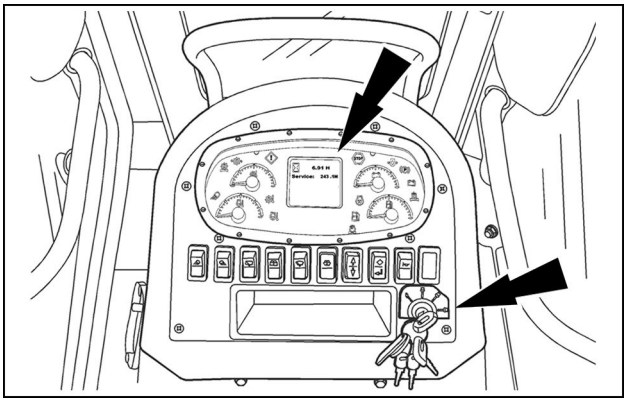
5. Turn the ignition switch to the “ON” position and monitor the gauges on the instrument cluster.

   NOTE: *If the preheat light comes on, wait for the intake air preheating process to finish before starting the engine. The indicator light will go out when the preheating process is completed.*

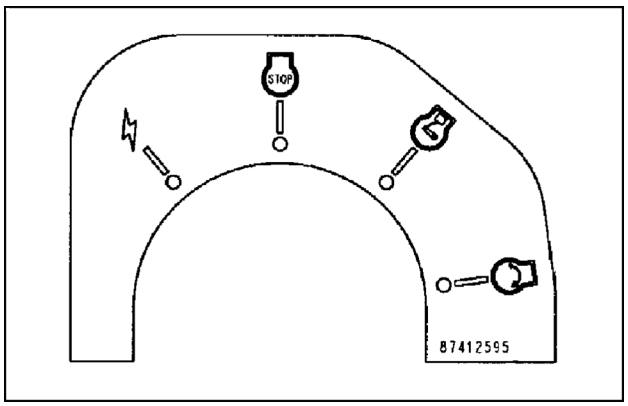
6. Turn the ignition key to the “START” position to power the starter motor and start the engine.

   NOTE: *Once the engine is started, the key should be released and will return automatically to the “ON” position.*

   NOTICE: *Do not keep the ignition key at the “START” position for more than **30 s**. If it is not possible to start the engine, turn the ignition key to the “OFF” position. Wait **3 min** and attempt to start the engine again.*



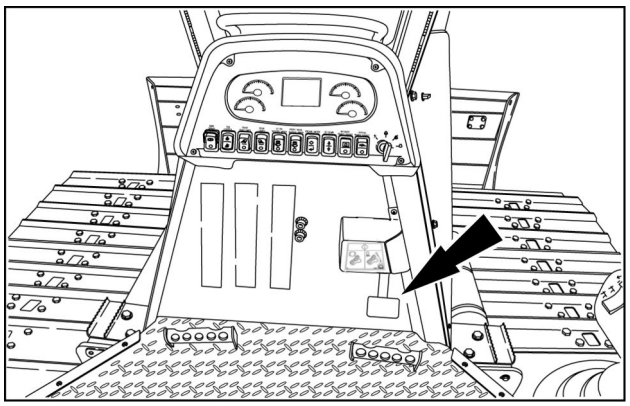
COIL14DOZ0162AA 5



RCIL10CWL003AAL 6

7. Fully depress and hold the decelerator or brake pedal.

NOTICE: *If the brake pedal is pressed all way down, the parking brake will be engaged.*



RAIL13DOZ1264AA 7

8. Press the parking brake switch to release it.

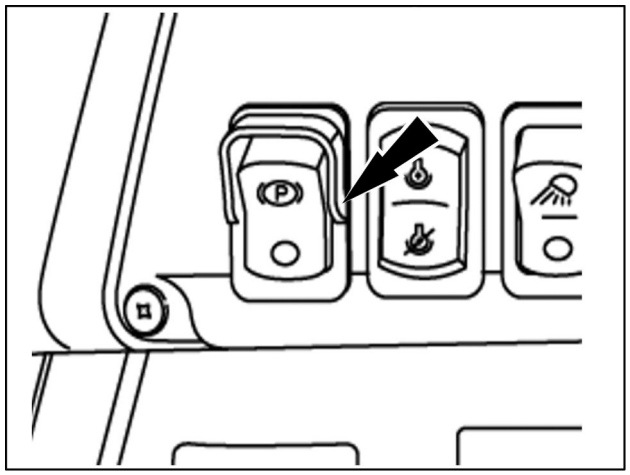
   NOTE: *The indicator light located on the switch and the instrument cluster will go out when the parking brake is released.*

9. Select a low travel speed. Select an appropriate speed from a speed range of 1–15.

   NOTE: *The speed selected will be indicated on the multi-function monitor screen.*

   NOTE: *The travel speed will return to the factory pre-set speed (8) when the engine is turned off.*

10. Raise the blade above the ground, and make sure that the ripper (if equipped) is in the transport position.



RAPH12DOZ0133AA 8

11. Continue to hold the decelerator or brake pedal.
12. Place the direction control lever in **(F)** (forward) and slowly release pressure on the decelerator pedal or brake.

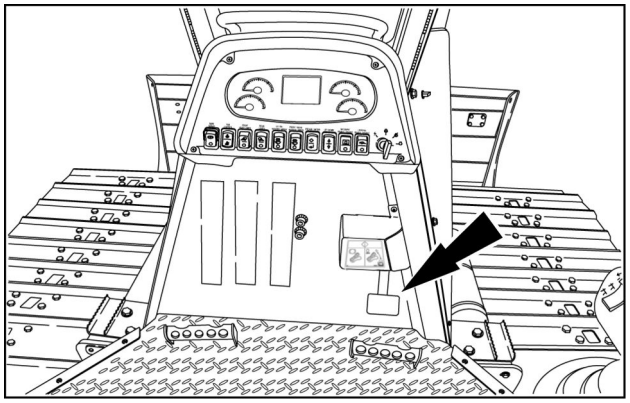
    NOTE: *The machine will not move if the engine is below* ***1200 RPM****.*

13. Slowly release the pressure on the decelerator or brake pedal to test the decelerator or brake pedal.

    NOTE: *This will cause the machine to move forward.*

14. Fully press the decelerator or brake pedal.

    NOTE: *The machine should stop in a straight line.*



RAIL13DOZ1264AA 9

Direction control lever

⚠ WARNING

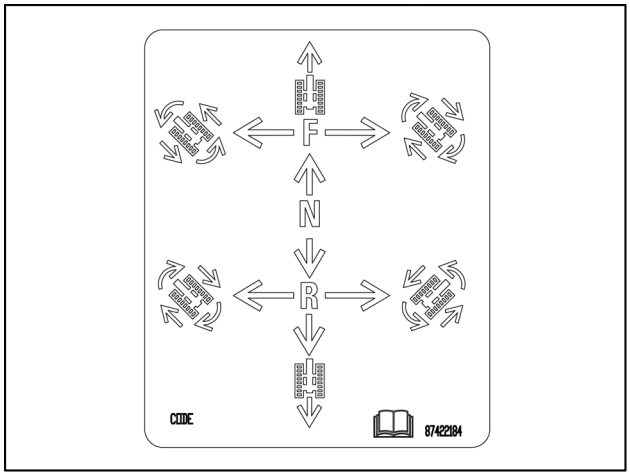
IMPROPER OPERATION OF THIS MACHINE CAN CAUSE DEATH OR SERIOUS INJURY.
MAKE SURE THAT EVERY OPERATOR:
-learns and practices the safe use of machine controls in a safe, clear area before operating the machine on a job site.
-clears the work area of all bystanders.
-observes pertinent laws and regulations.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

W0189A

Travel and direction control lever

The instructions below are to inform the operator about the basic functions of the travel and direction control lever.

Near the travel and direction control lever, there is a decal that illustrates the various movements of the machine based on how the travel and direction control lever is applied. Read and heed the functions associated with the travel and direction control lever listed on this decal prior to operating the machine.



RAPH12DOZ0149AA 1

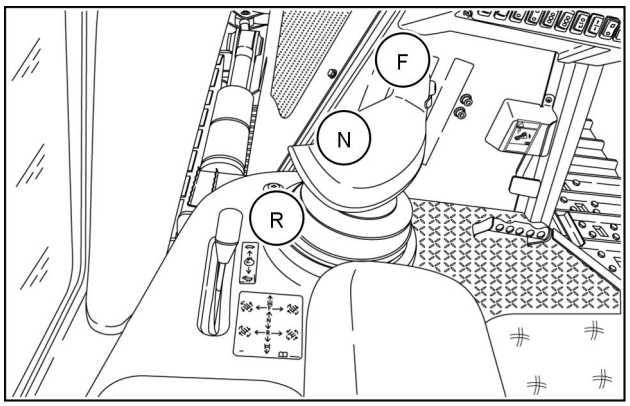
Machine travel

Travel forward or in reverse

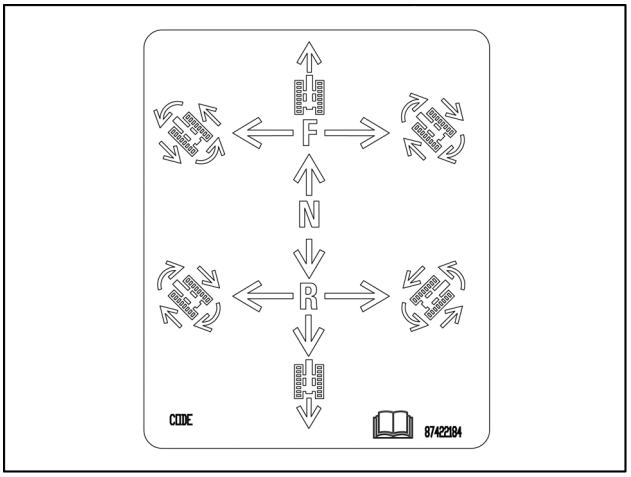
- To move the machine forward, push the travel and direction lever forward towards the front of the machine **(F)**. To move the machine in reverse, pull the travel and direction lever back **(R)**.

Positions **(F)** and **(R)** have a "Detent".

- The travel and direction lever remains in position **(F)** or **(R)** until the operator removes it from the "Detent" position.
- On start-up, the tractor must remain in position **(N)** for a few seconds before the machine moves.
- The travel and direction control lever has a hold point in position **(N)**. When the lever is in this position, it is not necessary to hold it.



RAPH12DOZ0080AA 2

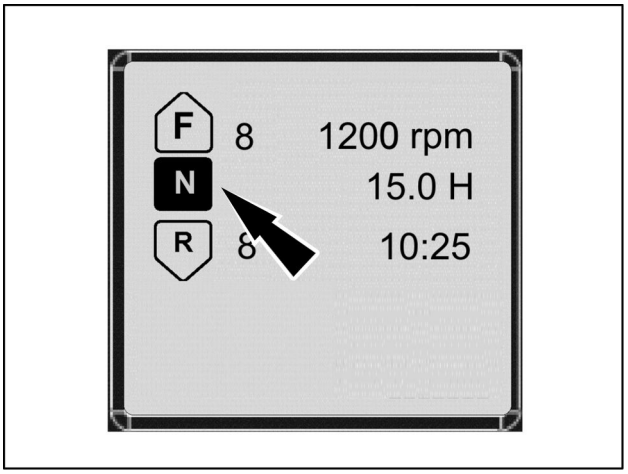


RAPH12DOZ0149AA 3

- Move the travel and direction control lever to the desired position: travel forward **(F)**, neutral **(N)**, travel in reverse **(R)** and check on the multi-function panel. The selected position will be indicated. (Neutral is shown as selected in the figure below).

  NOTE: *The crawler will move only when the engine speed is above* ***1200 RPM****.*

  NOTE: *The sensitivity of the travel and direction control lever can be set to 3 options, see to page* ***4-23****.*



RAIL12DOZ0831AA 4

Making turns

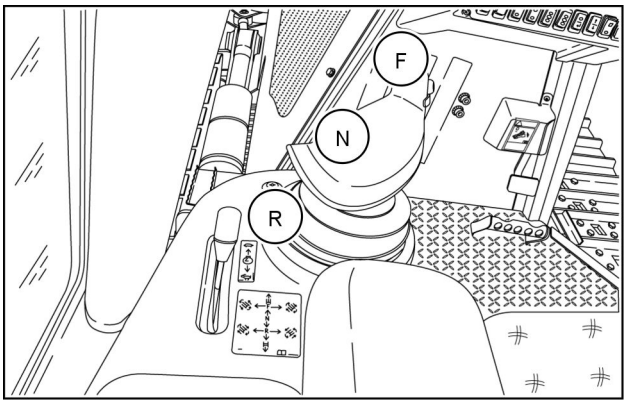
The tractor can only turn when moving forward or backward. Moving the travel and direction control lever to the left-hand side or to the right-hand side without moving it forward or backward will not move the tractor.

Left-hand turn (forward travel)

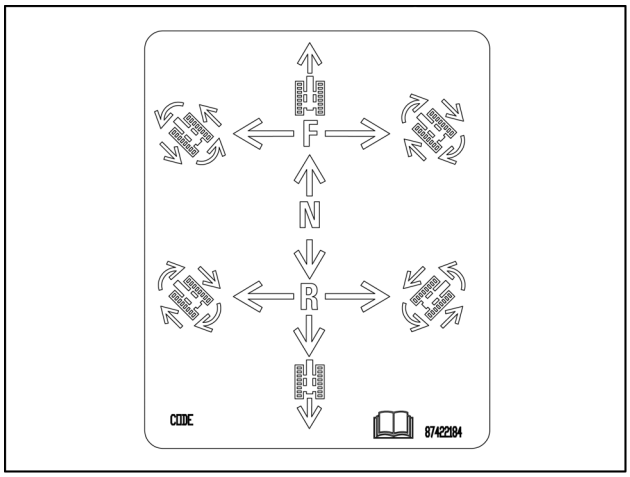
- Push the travel and direction control lever to the position **(F)** and then steer it to the left in 11 horas position. The machine will gradually turn to the left.
- To make a sharper turn to the left, push the travel and direction control lever to the position **(F)** and then steer it to the left in 10 horas position. The machine will turn to the left with the appropriate power for each track.

Right-hand turn (forward travel)

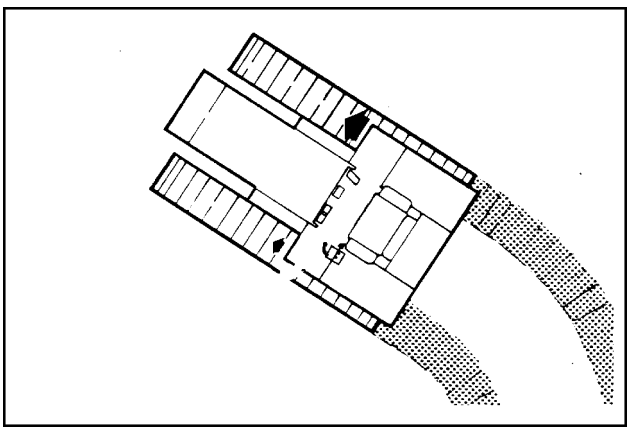
- Push the travel and direction control lever to the position **(F)** and then steer it to the right in 1 hora position. The machine will do a gradual turn to the right.
- To make a sharper turn to the right, push the travel and direction control lever to the position **(F)** and then steer it to the right in 2 horas position. The machine will turn to the right with the appropriate power for each track.



RAPH12DOZ0080AA 5



RAPH12DOZ0149AA 6



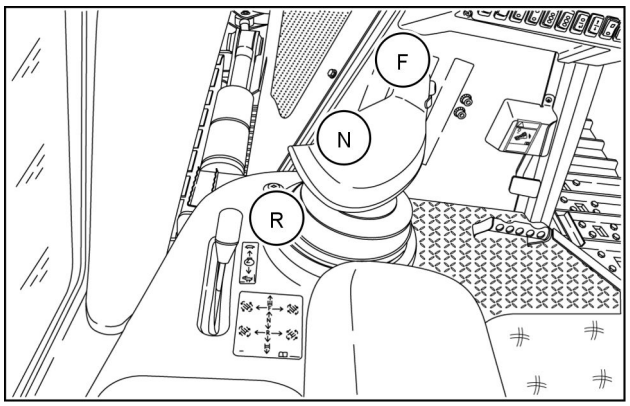
RCIL10CWL016AAL 7

Left-hand turn (reverse travel)

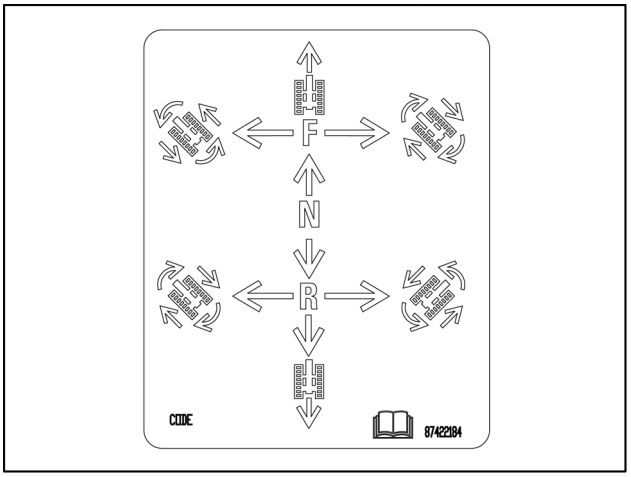
- Pull the travel and direction control lever to the position **(R)** and then steer it to the left in 7 horas position. The machine will do a gradual turn to the left.
- To make a sharper turn to the left, pull the travel and direction control lever to the position **(R)** and then steer it to the left in 8 horas position. The machine will turn to the left with the appropriate power for each track.

Right-hand turn (reverse travel)

- Pull the travel and direction control lever to the position **(R)** and then steer it to the right in 5 horas position. The machine will do a gradual turn to the right.
- To make a sharper turn to the right, pull the travel and direction control lever to the position **(R)** and then steer it to the right in 4 horas position. The machine will turn to the right with the appropriate power for each track.



RAPH12DOZ0080AA 8



RAPH12DOZ0149AA 9

Turn on one of the tracks

Turning to the left-hand side

- Press the brake or decelerator pedal all the way down. Pull the travel and direction control lever to the position **(F)** and then steer it to the left in 9 horas position. Slowly release the brake or decelerator pedal. The machine turns to the left, moving only the right-hand track.

Turning to the right

- Press the brake or decelerator pedal all the way down. Pull the travel and direction control lever to the position **(F)** and then steer it to the right in 3 horas position. Slowly release the brake or decelerator pedal. The machine turns to the right, moving only the left-hand track.

NOTE: *Positions 3 horas and 9 horas have a "Detent". When you place the travel and direction control lever in these positions, you will not need to hold it by hand.*

Pivoting the machine

This maneuver actuates the tracks simultaneously in opposite directions, allowing the machine to turn on its axis.

Pivoting to the left-hand side

- Press the brake or decelerator pedal all the way down. Pull the travel and direction control lever to the position **(F)** and then steer it all the way to the left in 9 horas position. The lever must be held in this position by hand. Slowly release the brake or decelerator pedal. The machine pivots to the left, rotating around its central shaft (pivoting counter-clockwise).

Pivoting to the right-hand side

- Press the brake or decelerator pedal all the way down. Pull the travel and direction control lever to the position **(F)** and then steer it all the way to the right in 3 horas position. The lever must be held in this position by hand. Slowly release the brake or decelerator pedal. The machine pivots to the right, rotating around its central shaft (pivoting clockwise).

Direction control lever

⚠ WARNING

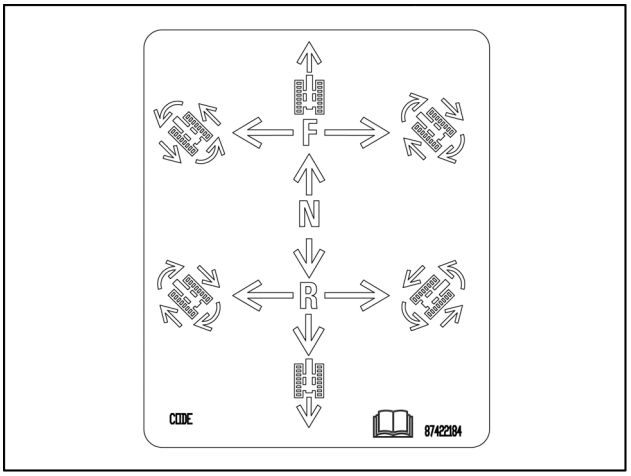
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-clears the work area of all bystanders.
-observes pertinent laws and regulations.
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Failure to comply could result in death or serious injury.

W0189A

Travel and direction control lever

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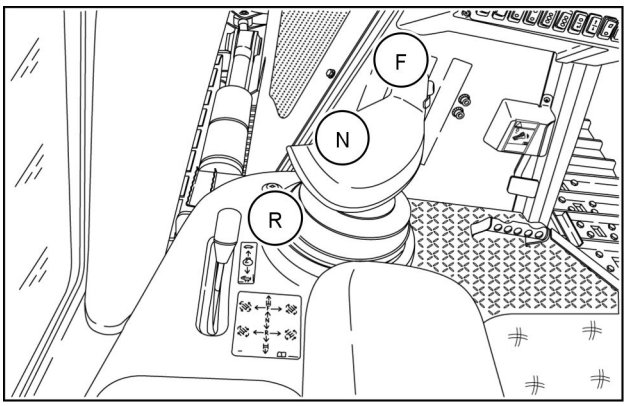


RAPH12DOZ0149AA 1

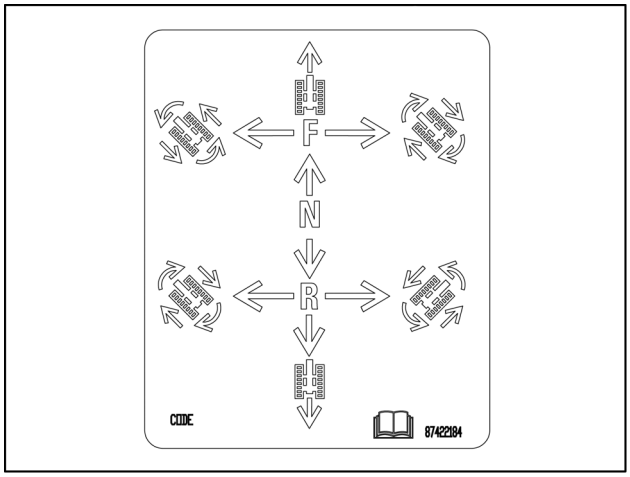
Machine travel

Travel forward or in reverse

- To move the machine forward, push the travel and direction lever forward towards the front of the machine **(F)**. To move the machine in reverse, pull the travel and direction lever back **(R)**.



RAPH12DOZ0080AA 2

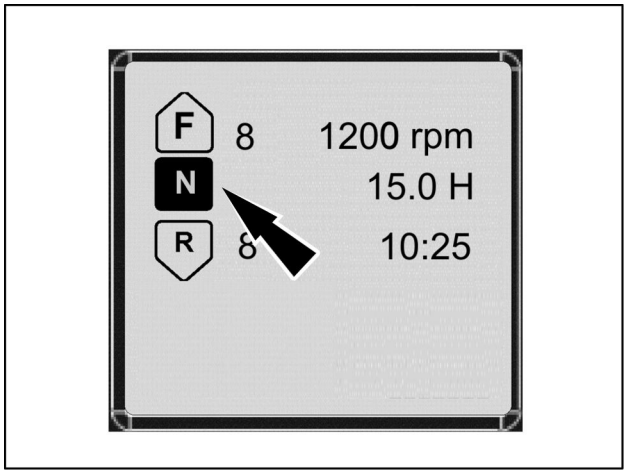


RAPH12DOZ0149AA 3

- Move the travel and direction control lever to the desired position: travel forward **(F)**, neutral **(N)**, travel in reverse **(R)** and check on the multi-function panel. The selected position will be indicated. (Neutral is shown as selected in the figure below).

  NOTE: *The crawler will move only when the engine speed is above* ***1200 RPM****.*

  NOTE: *The sensitivity of the travel and direction control lever can be set to 3 options, see to page* ***4-23****.*



RAIL12DOZ0831AA 4

Making turns

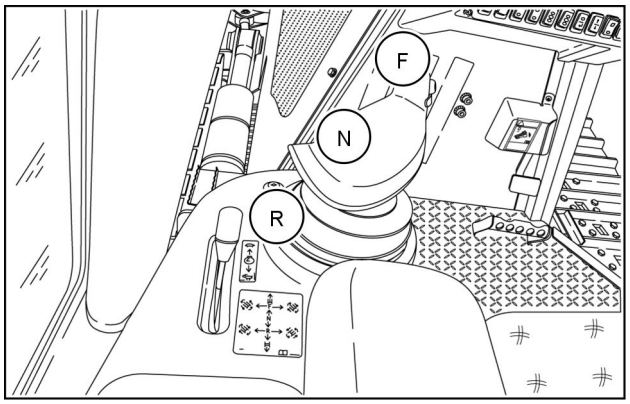
The tractor can only turn when moving forward or backward. Moving the travel and direction control lever to the left-hand side or to the right-hand side without moving it forward or backward will not move the tractor.

Left-hand turn (forward travel)

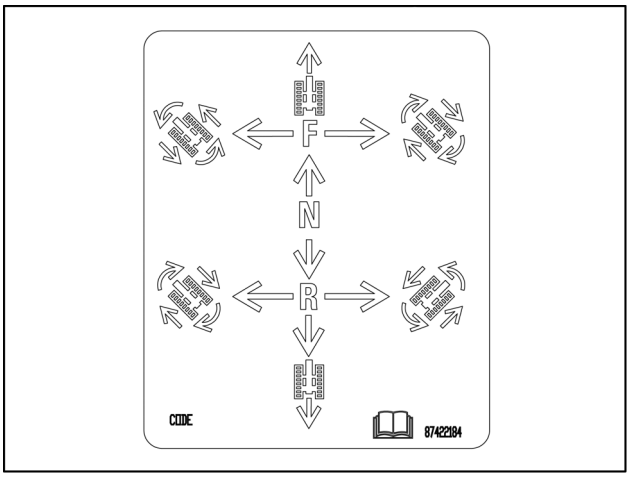
- Push the travel and direction control lever to the position **(F)** and then steer it to the left in 11 horas position. The machine will gradually turn to the left.
- To make a sharper turn to the left, push the travel and direction control lever to the position **(F)** and then steer it to the left in 10 horas position. The machine will turn to the left with the appropriate power for each track.

Right-hand turn (forward travel)

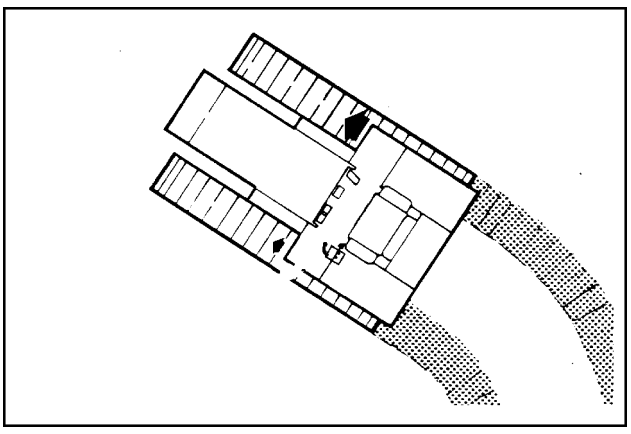
- Push the travel and direction control lever to the position **(F)** and then steer it to the right in 1 hora position. The machine will do a gradual turn to the right.
- To make a sharper turn to the right, push the travel and direction control lever to the position **(F)** and then steer it to the right in 2 horas position. The machine will turn to the right with the appropriate power for each track.



RAPH12DOZ0080AA 5



RAPH12DOZ0149AA 6



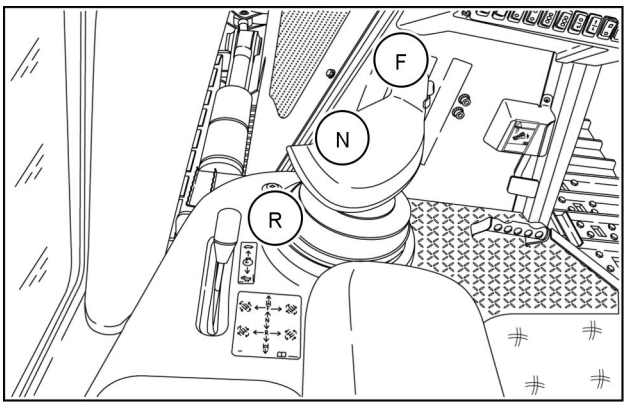
RCIL10CWL016AAL 7

Left-hand turn (reverse travel)

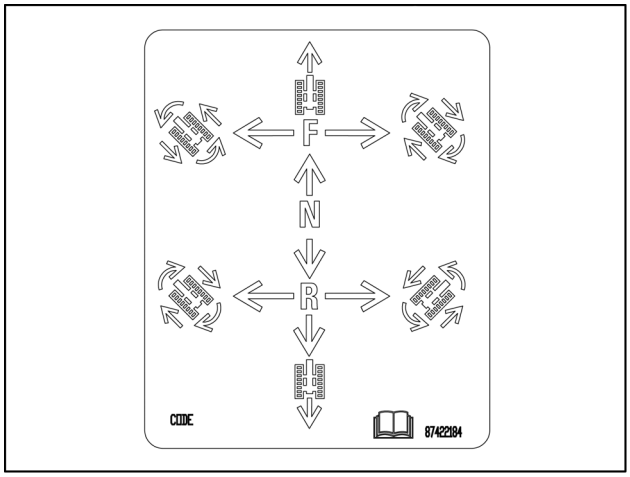
- Pull the travel and direction control lever to the position **(R)** and then steer it to the left in 7 horas position. The machine will do a gradual turn to the left.
- To make a sharper turn to the left, pull the travel and direction control lever to the position **(R)** and then steer it to the left in 8 horas position. The machine will turn to the left with the appropriate power for each track.

Right-hand turn (reverse travel)

- Pull the travel and direction control lever to the position **(R)** and then steer it to the right in 5 horas position. The machine will do a gradual turn to the right.
- To make a sharper turn to the right, pull the travel and direction control lever to the position **(R)** and then steer it to the right in 4 horas position. The machine will turn to the right with the appropriate power for each track.



RAPH12DOZ0080AA 8



RAPH12DOZ0149AA 9

Turn on one of the tracks

Turning to the left-hand side

- Press the brake or decelerator pedal all the way down. Pull the travel and direction control lever to the position **(F)** and then steer it to the left in 9 horas position. Slowly release the brake or decelerator pedal. The machine turns to the left, moving only the right-hand track.

Turning to the right

- Press the brake or decelerator pedal all the way down. Pull the travel and direction control lever to the position **(F)** and then steer it to the right in 3 horas position. Slowly release the brake or decelerator pedal. The machine turns to the right, moving only the left-hand track.

Pivoting the machine

This maneuver actuates the tracks simultaneously in opposite directions, allowing the machine to turn on its axis.

Pivoting to the left-hand side

- Press the brake or decelerator pedal all the way down. Pull the travel and direction control lever to the position **(F)** and then steer it all the way to the left in 9 horas position. The lever must be held in this position by hand. Slowly release the brake or decelerator pedal. The machine pivots to the left, rotating around its central shaft (pivoting counter-clockwise).

Pivoting to the right-hand side

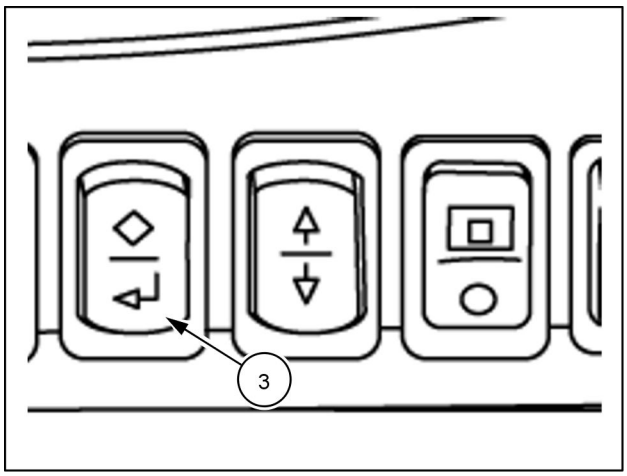
- Press the brake or decelerator pedal all the way down. Pull the travel and direction control lever to the position **(F)** and then steer it all the way to the right in 3 horas position. The lever must be held in this position by hand. Slowly release the brake or decelerator pedal. The machine pivots to the right, rotating around its central shaft (pivoting clockwise).

Machine settings

Adjusting the sensitivity of the travel and direction control lever

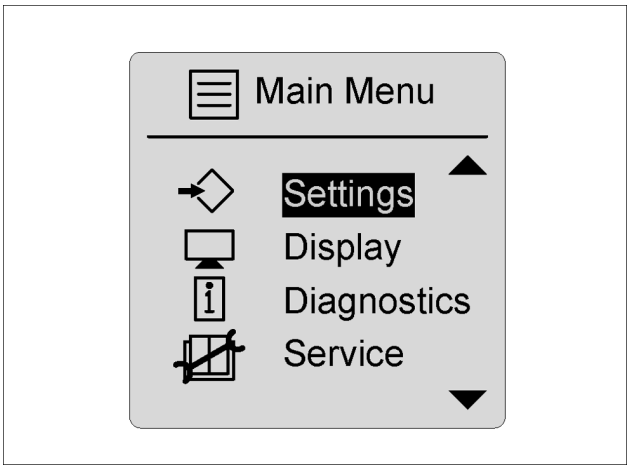
The travel and direction control lever has three options for sensitivity setting (Soft, Moderate and Aggressive). This setting allows the operator to adjust the sensitivity of the lever according to needs of the operator for displacement of the machine. To change the sensitivity of the travel control lever, proceed as follows:

1. Press the ENTER switch **(3)** for 2 segundos to enter the Main Menu screen.

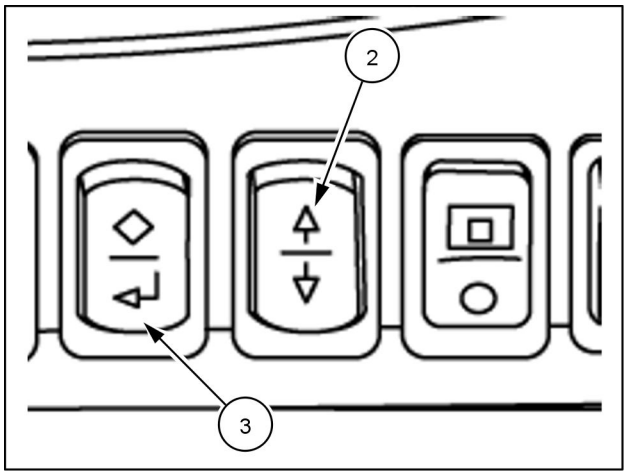


RAIL12DOZ0225AA 1

2. The main menu screen will be displayed, along with the following choices:
   Settings
   Display
   Diagnostics
   Service
3. Use the UP or DOWN switch **(2)** to select the Settings option and press the ENTER switch **(3)**.

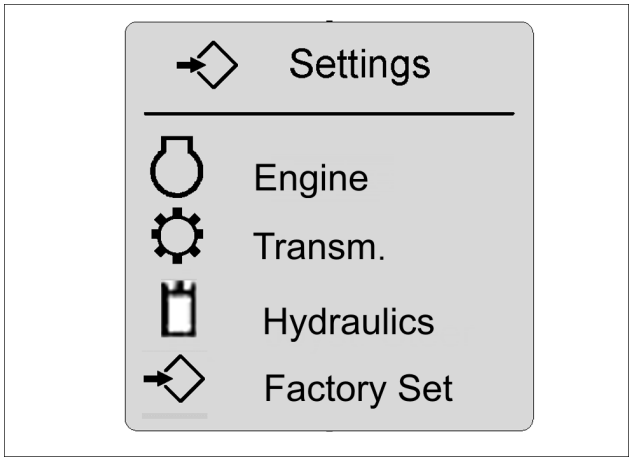


RCPH10WHL355AAH 2

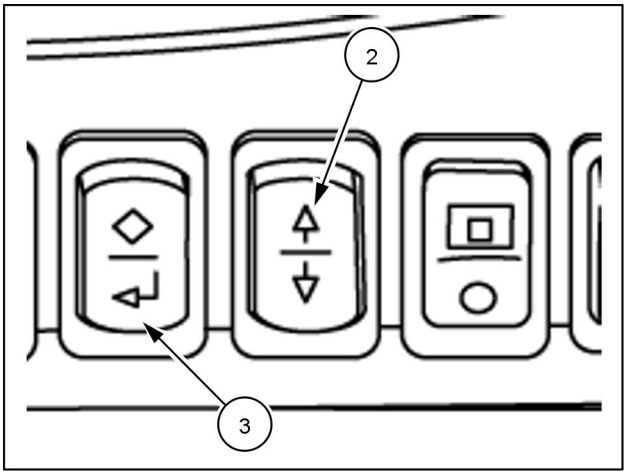


RAIL12DOZ0225AA 3

4. The Settings screen will display along with the following choices:
   Engine
   Transmission
   Hydraulics
   Factory set - Factory settings
5. Use the UP or DOWN switch **(2)** to select the Transmission option and press the ENTER switch **(3)**.

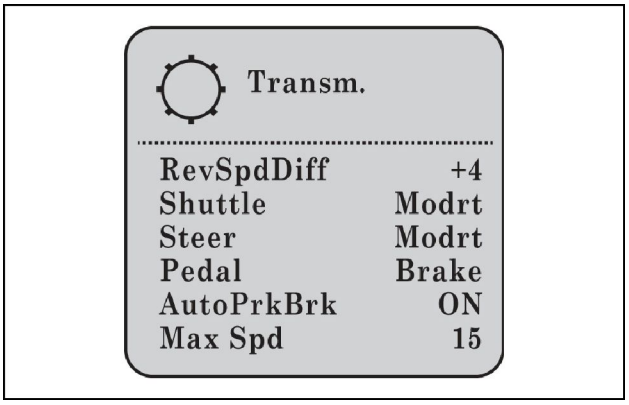


RAIL12DOZ1028AA 4

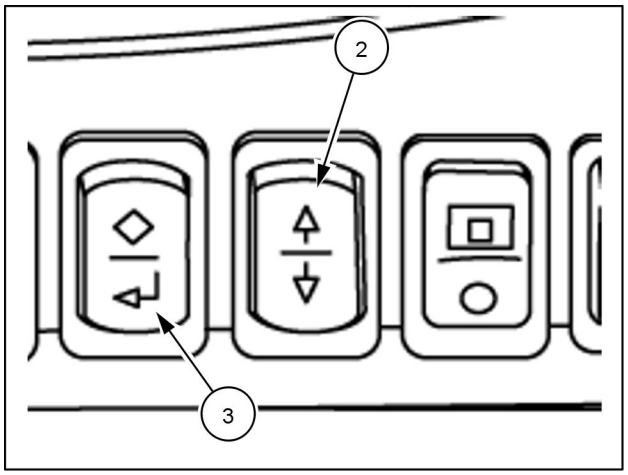


RAIL12DOZ0225AA 5

6. The transmission screen will appear, along with the following choices:
   RevSpdDiff - To select a different speed range between forward and reverse travel
   Shuttle - To select reverser operation mode
   Steer - To select a sensitivity option for the travel and direction control lever
   Pedal - To select between brake or deceleration pedal
   AutoPrkBrk - To select automatic operation of the parking brake
   Max Spd - To select a maximum hydrostatic drive speed
7. Use the UP or DOWN switch **(2)** to select the Steer option and press the ENTER switch **(3)**.



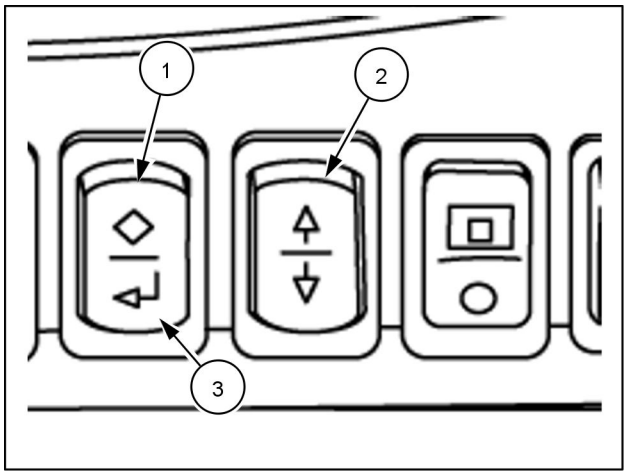
RAIL13DOZ1211AA 6



RAIL12DOZ0225AA 7

8. In the steer option, it is possible to select between:
   Smth – Soft
   Modrt – Moderate
   Agrsv – Aggressive

   NOTE: *Moderate (Modrt) is the factory setting.*
9. Use the UP or DOWN switch **(2)** to select the option desired and press the ENTER switch **(3)** to confirm. Press the ESC switch **(1)** to return to the main screen and save the preference in the memory.

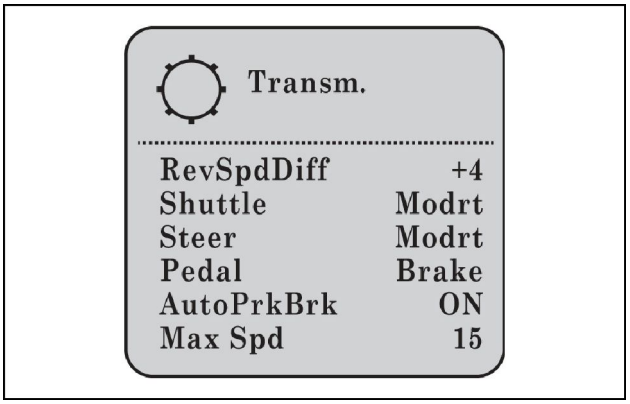


RAIL12DOZ0225AA 8

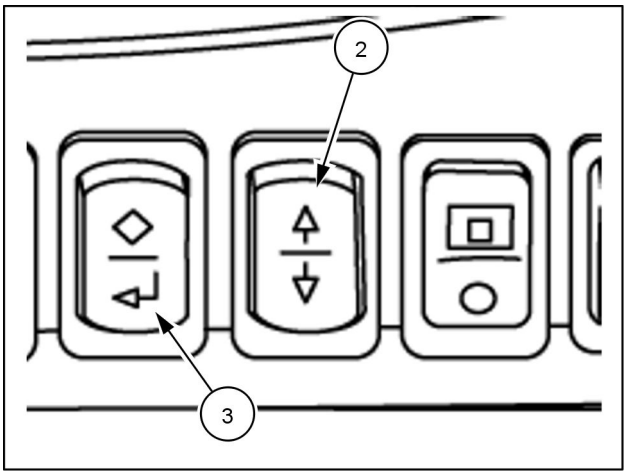
Maximum hydrostatic drive speed

This option allows the operator to select one of 4 ranges for maximum speed of forward or reverse travel.

1. To set the maximum hydrostatic drive speed, follow the same steps as when adjusting the sensitivity of the travel and direction lever up to step 6.
2. Use the UP or DOWN switch **(2)** to select the Maximum Speed (Max Spd) option and press the ENTER switch **(3)**.



RAIL13DOZ1211AA 9

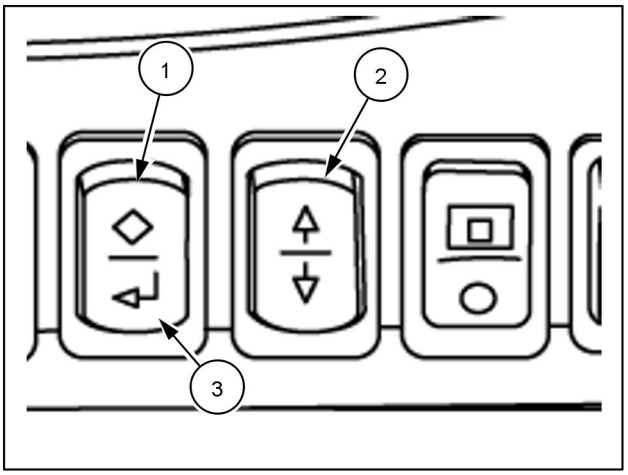


RAIL12DOZ0225AA 10

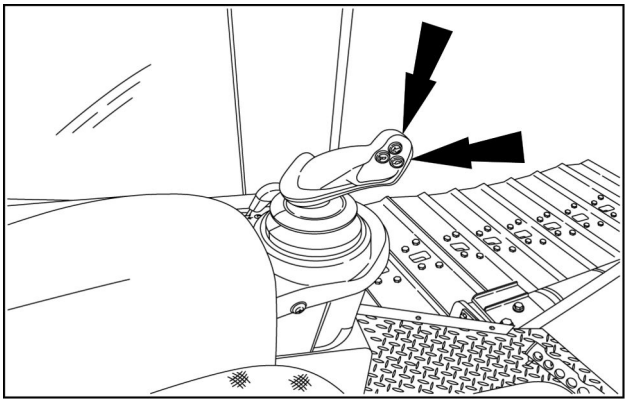
3. In the maximum speed option, it is possible to select between the following speed ranges:
   9
   11
   13
   15
4. Use the UP or DOWN switch **(2)** to select the option desired and press the ENTER switch **(3)** to confirm. Press the ESC switch **(1)** to return to the main screen and save the preference in the memory.

   NOTE: *The factory default drive speed is 15.*

   NOTE: *The speed can be increased or decreased by activating the speed buttons located on the travel and direction control lever.*



RAIL12DOZ0225AA 11

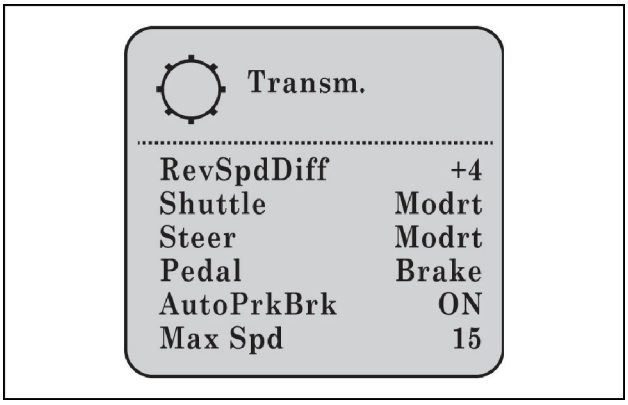


RAPH12DOZ0079AA 12

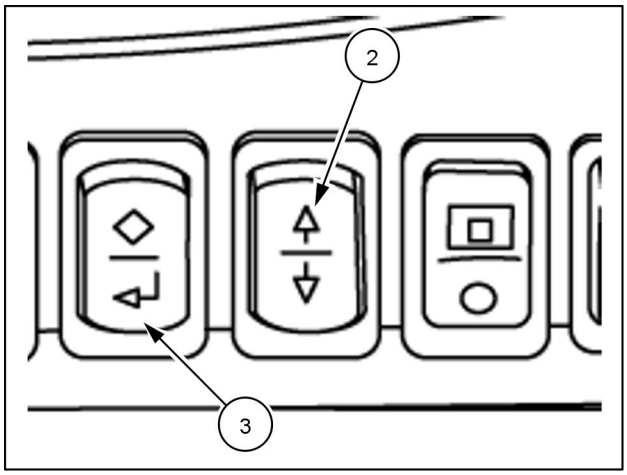
Configuration of the difference of maximum speeds between forward and reverse travel

This function allows the operator to select a speed option for reverse travel greater or lower than the speed for forward travel.

1. To set the difference of speeds between forward and reverse travel, follow the same steps as when adjusting the sensitivity of the travel and direction lever up to step 6.
2. Use the UP or DOWN switch **(2)** to select the Different Reverse Travel Speeds (RevSpdDiff) option and press the ENTER switch **(3)**.



RAIL13DOZ1211AA 13

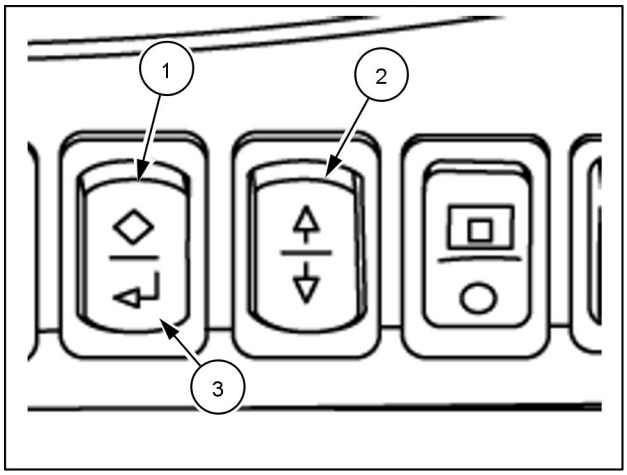


RAIL12DOZ0225AA 14

3. In the difference in speed ranges option, it is possible to choose from the following ranges:

-2	0	+2
-1	+1	+3

4. Use the UP or DOWN switch **(2)** to select the option desired and press the ENTER switch **(3)** to confirm. Press the ESC switch **(1)** to return to the main screen and save the preference in the memory.



RAIL12DOZ0225AA 15

This speed difference will be calculated in relation to the maximum hydrostatic drive speed.

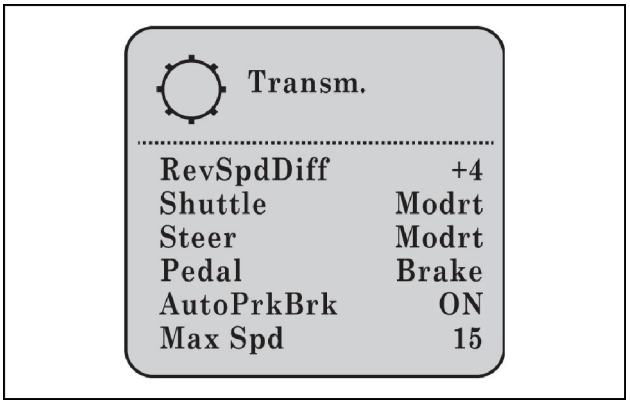
For example, if the speed difference selected is (–2) and the maximum hydrostatic drive speed is 11, the maximum reverse travel speed will be 2 points lower than the maximum forward travel speed, i.e., the maximum reverse travel speed will be 9, and the maximum forward travel speed will be 11. In another example, if the maximum hydrostatic drive speed is 13 and the speed difference is 2, the maximum reverse travel speed will be 2 points higher than the maximum forward travel speed, i.e., the maximum reverse travel speed will be 15, and the maximum forward travel speed will be 13. If the speed difference selected is 0, the travel speeds for forward and reverse travel will be the same.

NOTE: *The reverse travel speed cannot be less than 1 and no greater than the maximum hydrostatic drive speed.*

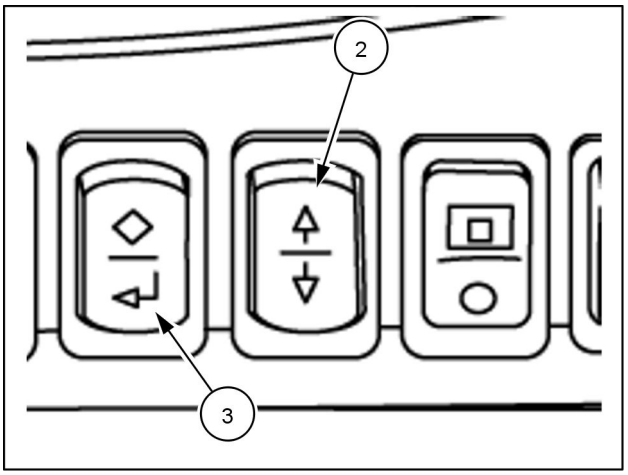
"Brake or decelerator" pedal type set-up

This function allows the operator to select which type of pedal is used on the machine.

1. To select the type of pedal to be used, follow the same steps as for the adjusting the sensitivity of the travel and direction lever up to step 6.
2. Use the UP or DOWN switch **(2)** to select the Pedal option and press the ENTER switch **(3)**.



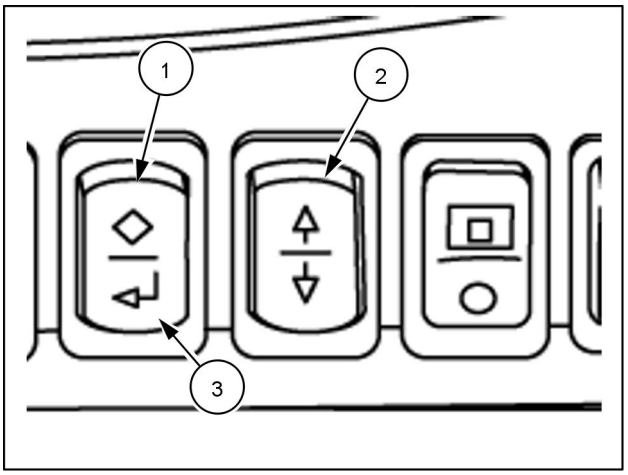
RAIL13DOZ1211AA 16



RAIL12DOZ0225AA 17

3. In the pedal option, it is possible to select between:
   Deceleration
   Brake

   NOTE: *Brake is the factory default.*
4. Use the UP or DOWN switch **(2)** to select the option desired and press the ENTER switch **(3)** to confirm. Press the ESC switch **(1)** to return to the main screen and save the preference in the memory.

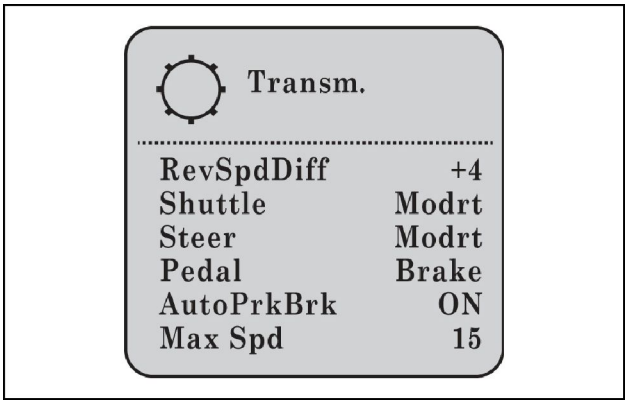


RAIL12DOZ0225AA 18

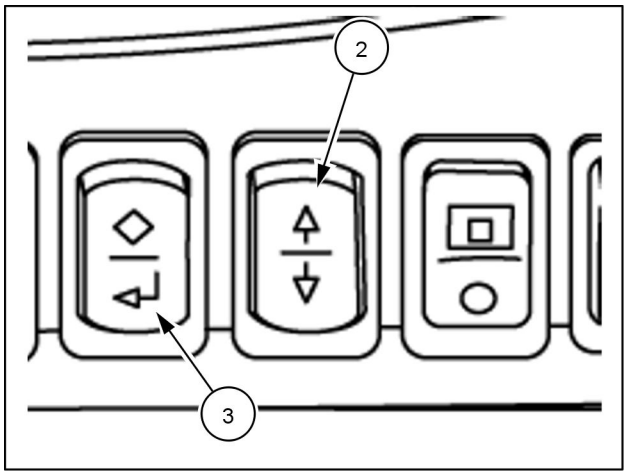
Adjusting the shuttle settings

This function allows the operator to select the shuttle operation mode.

1. To select the operation mode to be used, follow the same steps as for the adjusting the sensitivity of the travel and direction lever up to step 6.
2. Use the UP or DOWN switch **(2)** to select the Shuttle option and press the ENTER switch **(3)**.



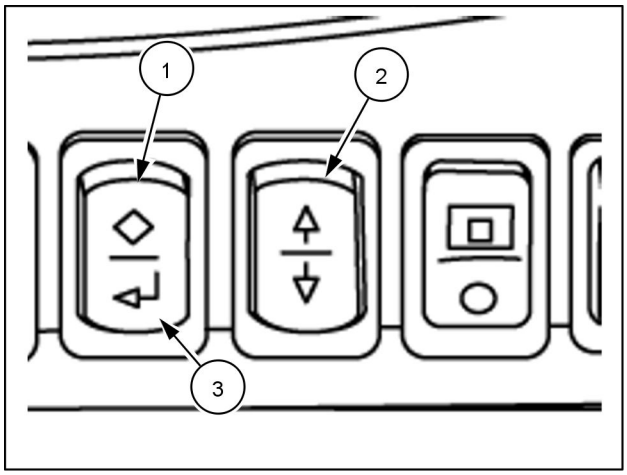
RAIL13DOZ1211AA 19



RAIL12DOZ0225AA 20

3. In the shuttle option, it is possible to select between:
   Smth – Soft
   Modrt – Moderate
   Agrsv – Aggressive

   NOTE: *Moderate - Modrt is the factory default.*
4. Use the UP or DOWN switch **(2)** to select the option desired and press the ENTER switch **(3)** to confirm. Press the ESC switch **(1)** to return to the main screen and save the preference in the memory.

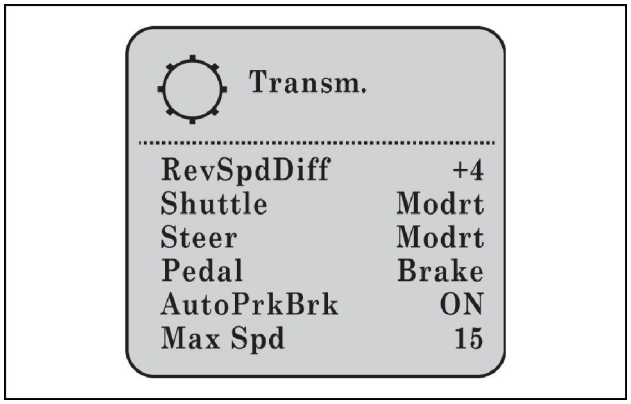


RAIL12DOZ0225AA 21

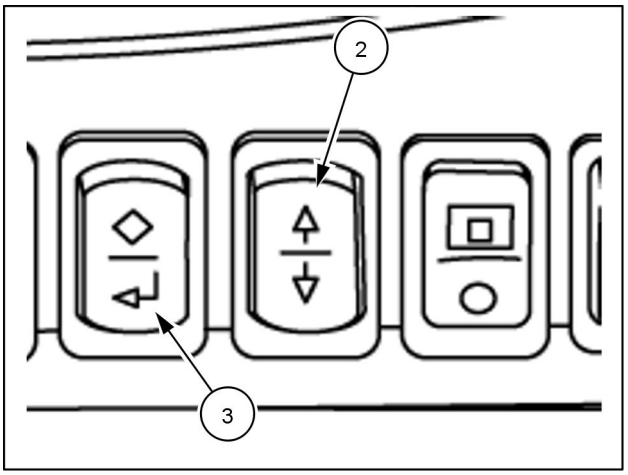
Automatic activation of the parking brake

This function allows the operator to activate or deactivate the system that automatically applies the parking brake when you operate the machine on a slope.

1. To configure this function, follow the same steps as for the adjusting the sensitivity of the travel and direction lever up to step 6.
2. Use the UP or DOWN switch **(2)** to select the Automatic Parking Brake (AutoPrkBrk) option and press the ENTER switch **(3)**.



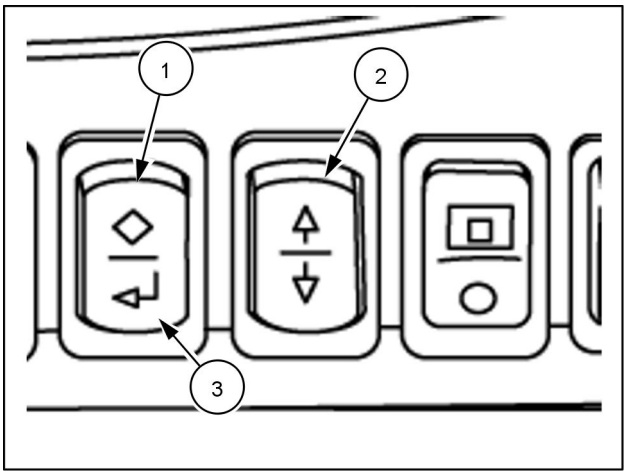
RAIL13DOZ1211AA 22



RAIL12DOZ0225AA 23

3. In the automatic parking brake option, it is possible to select between:
   ON – Activated
   OFF – Deactivated

   NOTE: *Activated is the factory default.*
4. Use the UP or DOWN switch **(2)** to select the option desired and press the ENTER switch **(3)** to confirm. Press the ESC switch **(1)** to return to the main screen and save the preference in the memory.

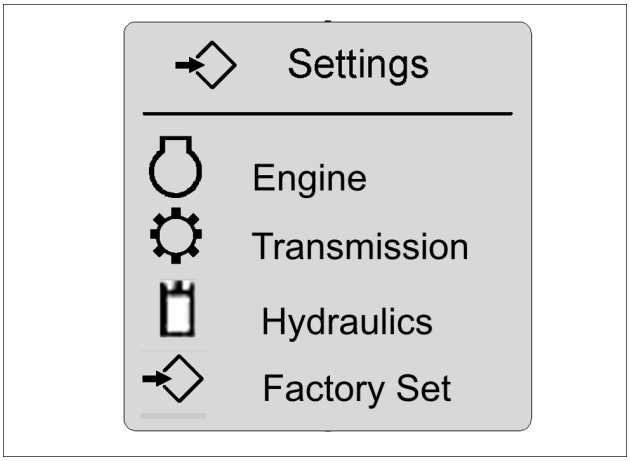


RAIL12DOZ0225AA 24

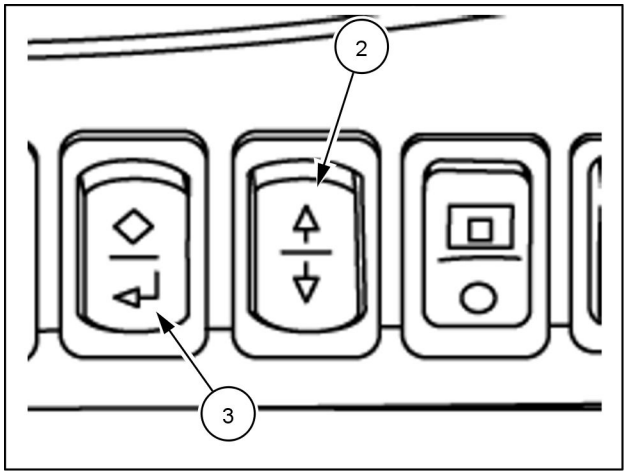
Factory settings

This function allows the operator to reset the factory settings on the machine for the engine, transmission and hydraulic system.

1. To reset the settings, follow the same steps as when adjusting the sensitivity of the travel and direction lever up to step 4.
2. Use the UP or DOWN switch **(2)** to select the Factory Settings (Factory Set) option and press the ENTER switch **(3)**.



RAIL12DOZ0212AA 25

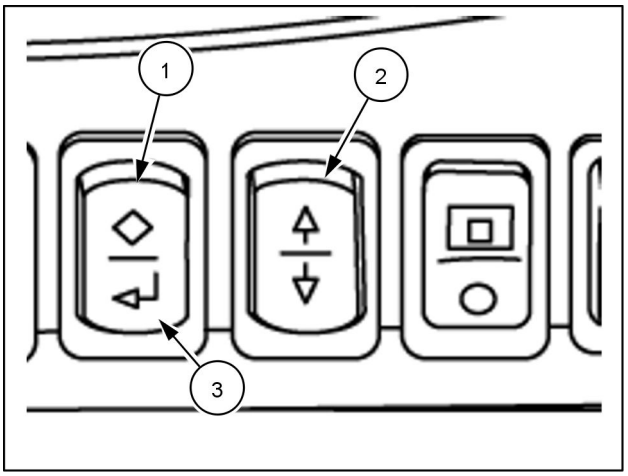


RAIL12DOZ0225AA 26

3. The factory settings screen will display.
4. Use the UP or DOWN switch **(2)** to select the Confirm (Confirm Please) option and press the ENTER switch **(3)** to confirm. Press the ESC switch **(1)** to return to the main screen and save the preference in the memory.



RAIL12DOZ0217AA 27



RAIL12DOZ0225AA 28

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.

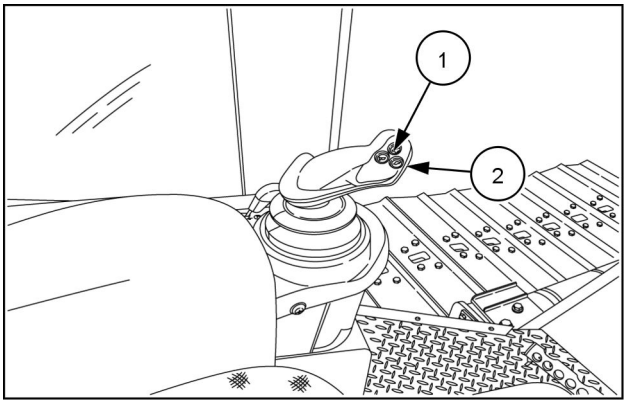
W0304A

The crawler is equipped with a system that allows the operator to select variable travel speeds, and also select a maximum travel speed. This system allows you to move the machine in 15 speed ranges and select a maximum speed from 4 options. To select a maximum travel speed through the multi-function screen, refer to page **4-23**.
On the travel and direction control lever, there are two buttons for selecting the desired travel speed. The top button (hare symbol) allows you to increase a speed range when pressed. The bottom button (tortoise symbol) allows you to decrease a speed range when pressed. Continuously move between the speed ranges by pressing and holding the speed range upshift **(1)** or downshift **(2)** button.

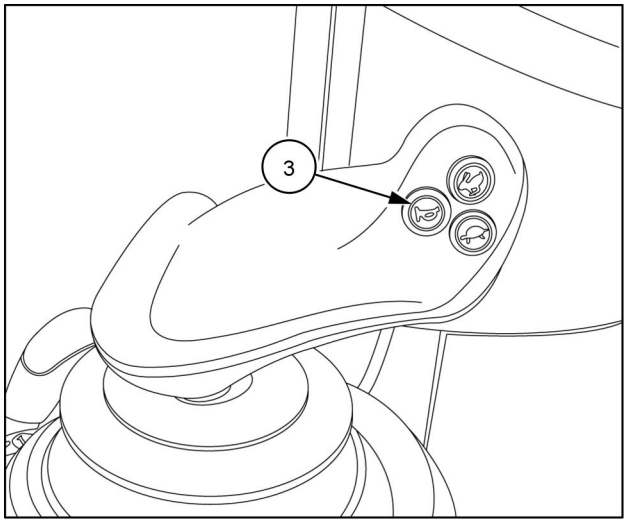
NOTE: *The travel speed can only be increased to the maximum speed configured for the machine. The maximum drive speed allowed is 15.*

NOTE: *The standard drive speed is 8.*

NOTE: *The horn button **(3)** is also located on the travel and direction control lever. Always sound the horn before starting the engine.*



RAPH12DOZ0079AA 1

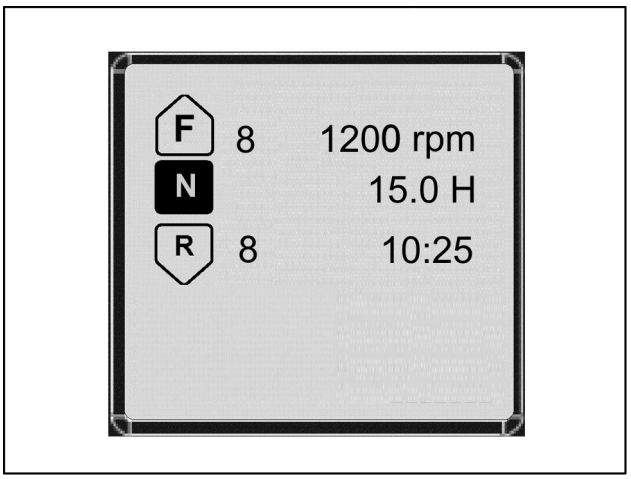


RAIL12DOZ0181AA 2

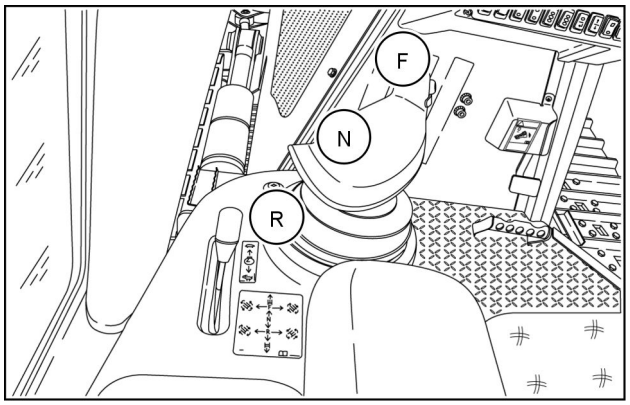
The selected drive speed is displayed on the multi-function screen.

NOTE: *When the engine is shut off, the hydrostatic drive speed returns to 8 (factory default).*

On the multi-function screen, the position of the travel is displayed as: F (forward travel), N (neutral) and R (reverse travel). Before starting the engine, make sure that the travel lever is in N (neutral). If F or R is selected, the indicator light will flash and the travel lever should be put in N (neutral) before starting the engine. After its operation, wait a few seconds for the machine to move.



RAIL12DOZ0831AA 3



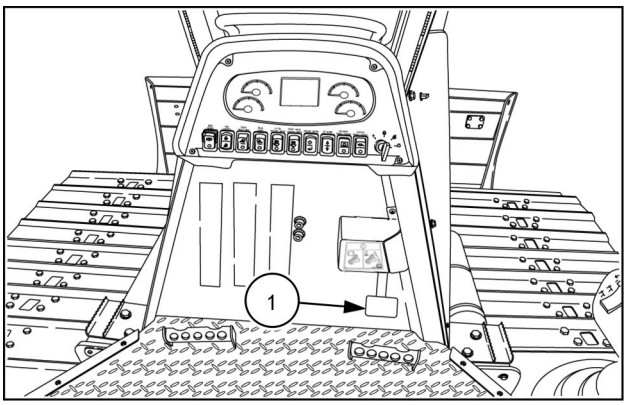
RAPH12DOZ0080AA 4

Pedals

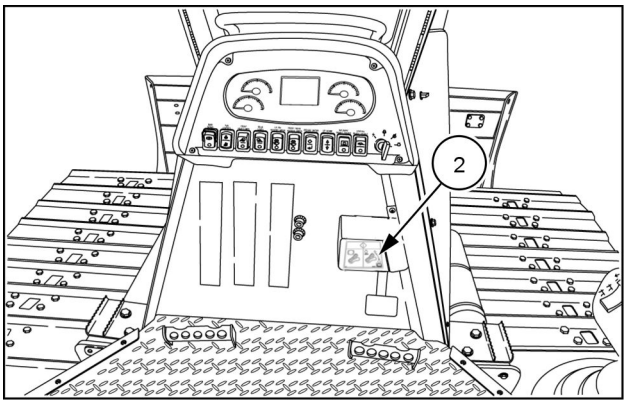
The machine has a dual function pedal **(1)**, brake or decelerator function. As the brake pedal is the default function, it lowers the travel speed or stops the machine, depending on how far down it is pressed. Use the decelerator pedal to decelerate (reducing engine speed) or stop the machine, depending on how far down it is pressed. Just like the pedal in brake function, the decelerator function also works in any direction. The pedal's mode of use can be changed on the multi-function screen. Refer to page **4-23**.

NOTE: *In precision grading, using the pedal in decelerator mode is recommended.*

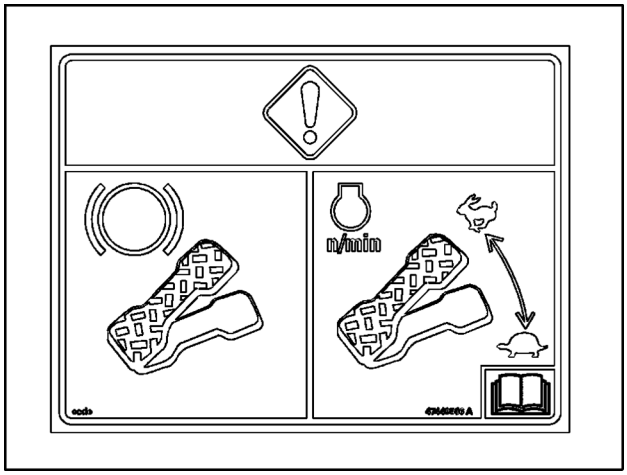
NOTICE: *Above the pedal, there is a safety decal* ***(2)*** *with information about the use of the pedal. If in doubt, refer to page* ***2-25****.*



RAIL13DOZ1264AA 1



RAIL13DOZ1264AA 2



47449566 3

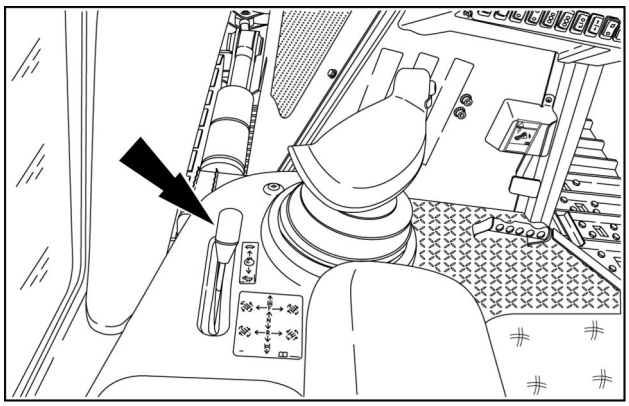
Engine hand throttle

The engine hand throttle controls engine rotation. The hand throttle lever increases or decreases engine rotation.

- Pull the Throttle Lever back to increase the engine speed.
- Push the throttle lever forward to decrease the engine speed.

NOTE: *Before shutting down the engine, let it to run for a few minutes at idle speed to allow for deceleration and stabilization of the turbocharger at a low speed and temperature.*

NOTE: *Stopping the engine while running at high rotation may cause the turbocharger turbine shaft to rotate without proper lubrication, causing damage to the turbocharger.*



RAPH12DOZ0080AA 4

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 removal of the cab floor mat, the cab floor panel and the seat bolts.*

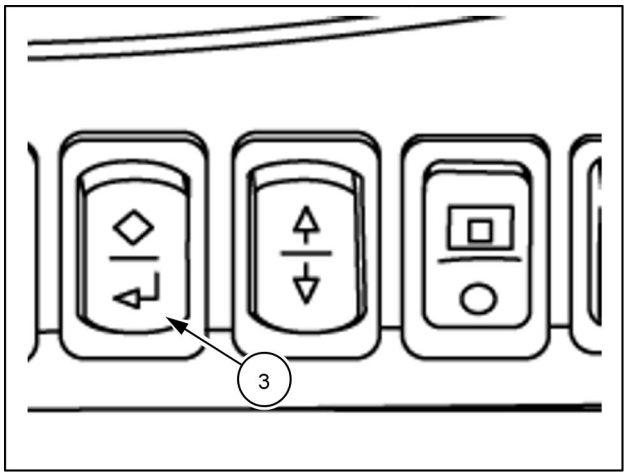
Engine or hydraulic failure

Towing the machine is not recommended. If your machine stops for some reason and cannot be operated due to issues in the engine or hydraulic system, attempt to repair the machine on site.
If the repair is not possible on site, assess whether the machine can be towed without causing further damage. Some important steps must be taken before starting the machine towing operation.
Keep all unauthorized personnel clear of the machine towing area.

NOTE: *Machines with hydro motors can be severely damaged if towing procedures are not performed correctly.*

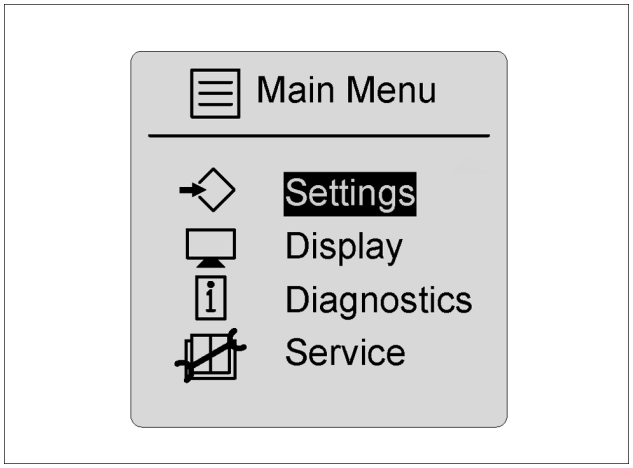
Tow mode set-up

1. Press the ENTER switch **(3)** for 2 segundos to enter the Main Menu screen.

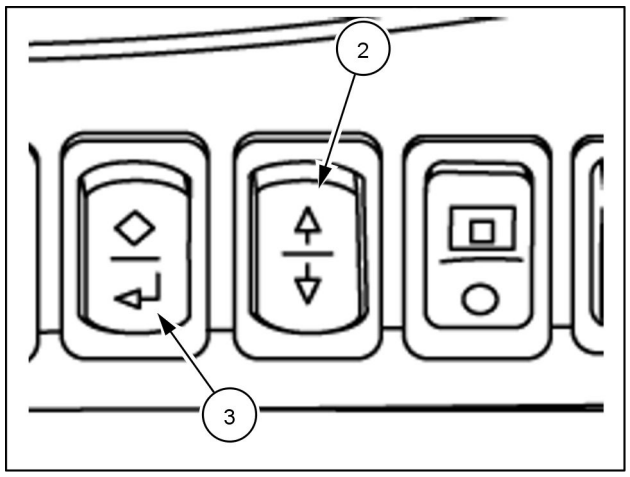


RAIL12DOZ0225AA 1

2. The main menu screen will be displayed, along with the following choices:
   Settings
   Display
   Diagnostics
   Service
3. Use the UP or DOWN switch **(2)** to select the Service option and press the ENTER switch **(3)**.

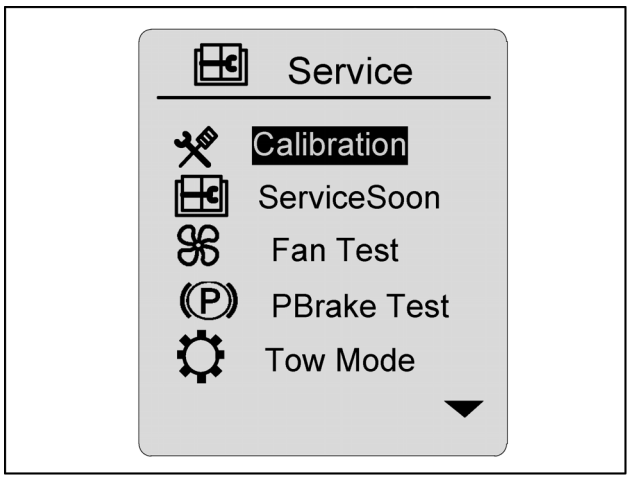


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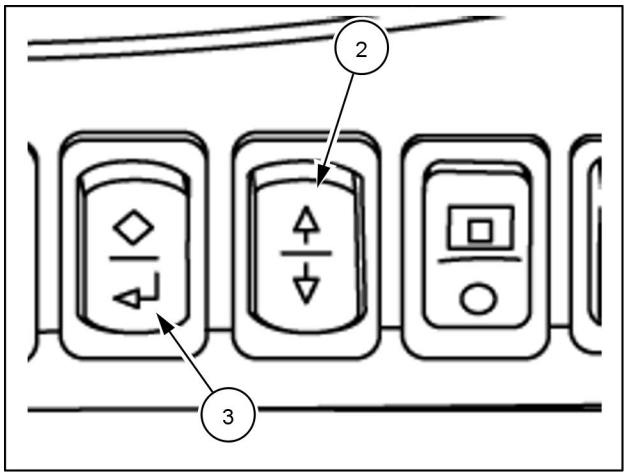


RAIL12DOZ0225AA 3

4. The service screen will be displayed along with the following options:
   Calibration – Calibration of Controls
   ServiceSoon
   Fan Test
   PBrake Test - Parking Brake Test
   Tow Mode
5. Use the UP or DOWN switch **(2)** to select the Tow Mode option and press the ENTER switch **(3)**.

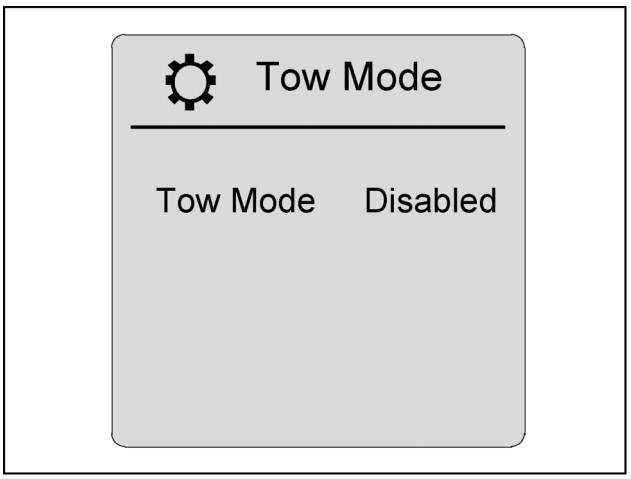


RAIL12DOZ0591AA 4

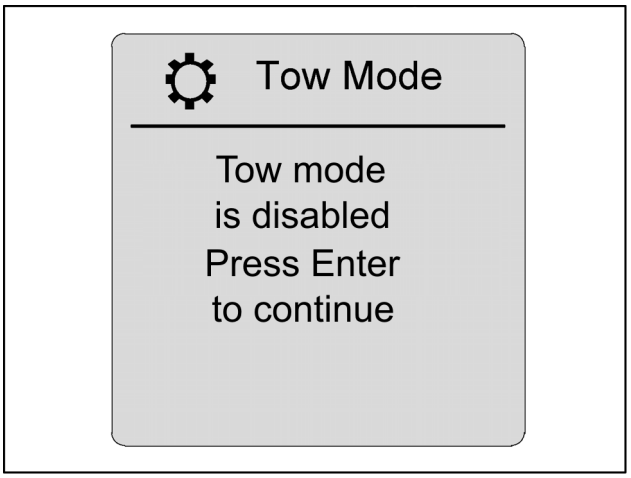


RAIL12DOZ0225AA 5

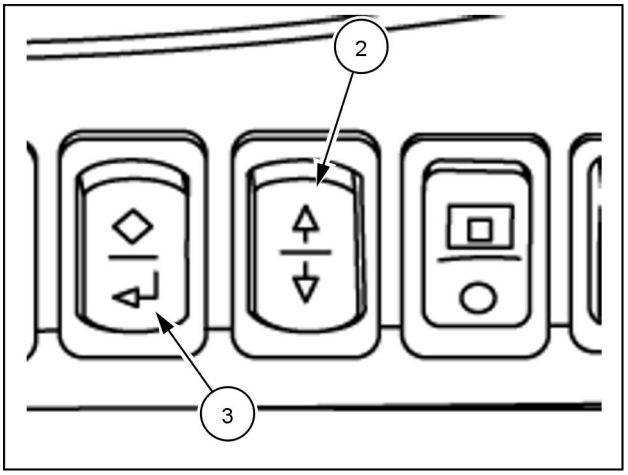
6. The tow mode screen will be displayed, along with the following choices:
   Disabled
   Enabled
7. Use the UP or DOWN switch **(2)** to select the Enabled option and press the ENTER switch **(3)**.



RAIL12DOZ0592AA 6

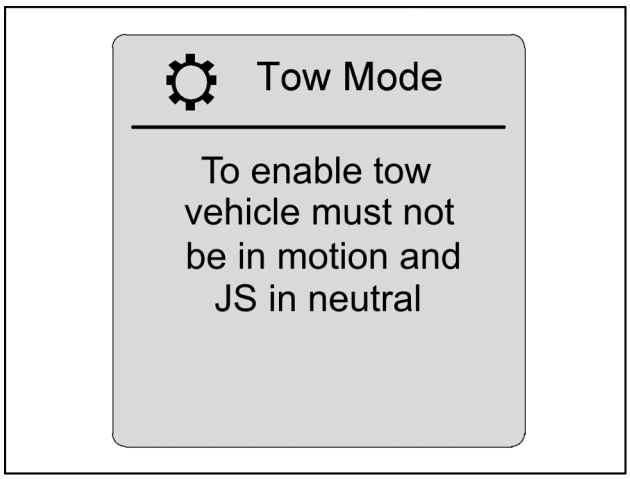


RAIL12DOZ0823AA 7



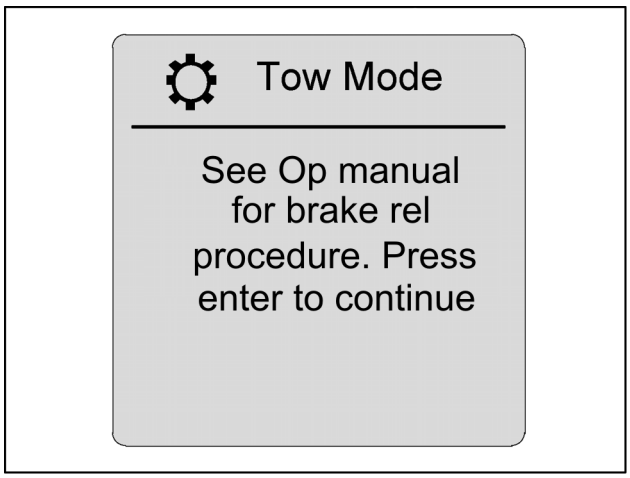
RAIL12DOZ0225AA 8

8. Continue to follow the screen prompts.
   The machine should not be towed and the travel lever must be in neutral.

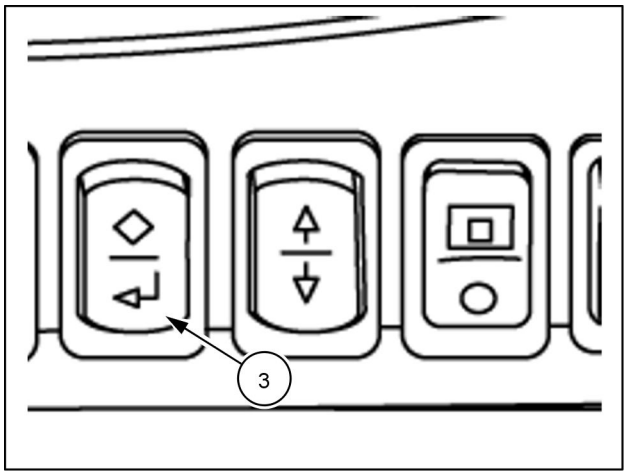


RAIL12DOZ0824AA 9

9. Read the following procedures and press the ENTER switch **(3)** to confirm activation of tow mode.
   Read the "Brake release" section of the operator's manual.
   Press the ENTER switch **(3)**.

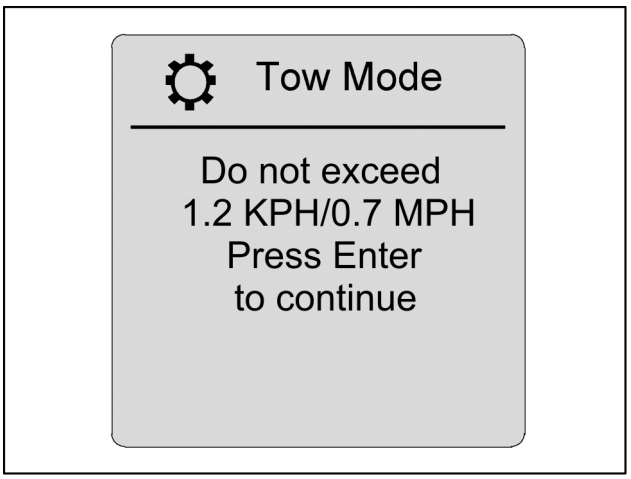


RAIL12DOZ0825AA 10

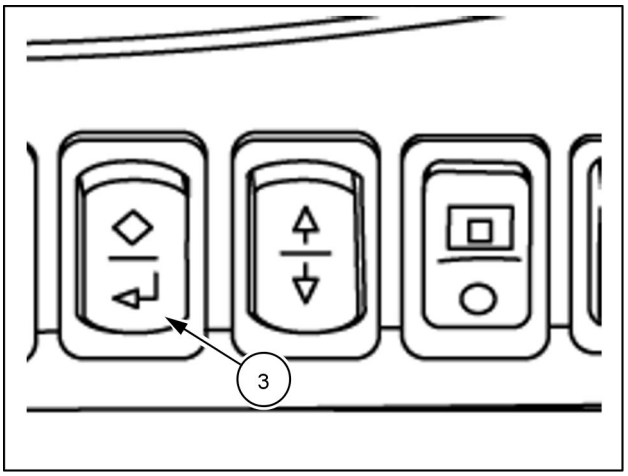


RAIL12DOZ0225AA 11

10. Do not tow the machine at a speed above **1.2 km/h** (**0.7 mph**). Press the ENTER switch **(3)**.

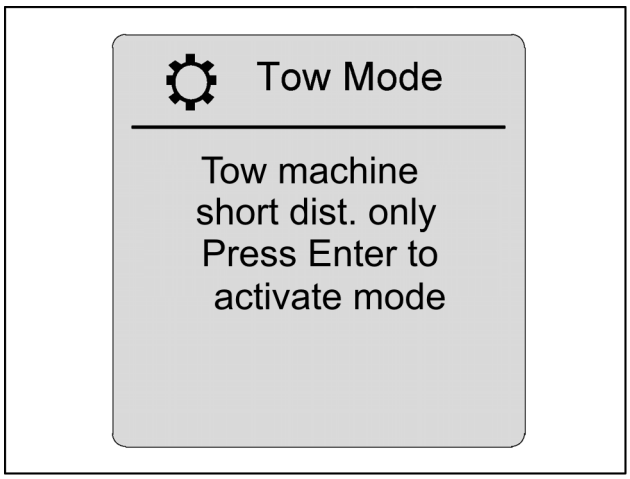


RAIL12DOZ0826AA 12

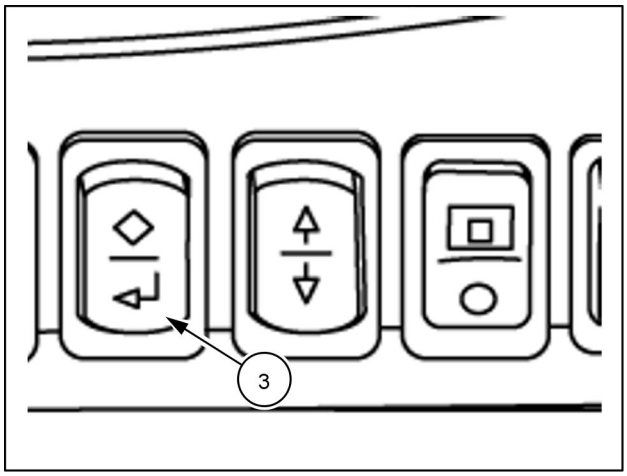


RAIL12DOZ0225AA 13

11. Tow the machine the shortest possible distance. Press the ENTER switch **(3)**.



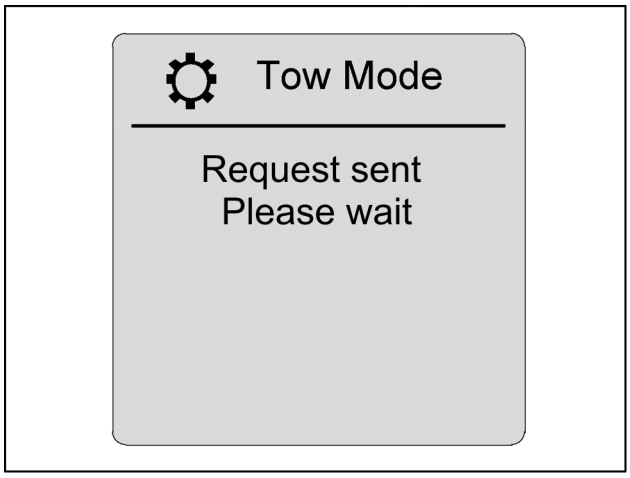
RAIL12DOZ0827AA 14



RAIL12DOZ0225AA 15

12. The tow mode will be enabled. Wait for the next screen prompt before starting the tow operation.

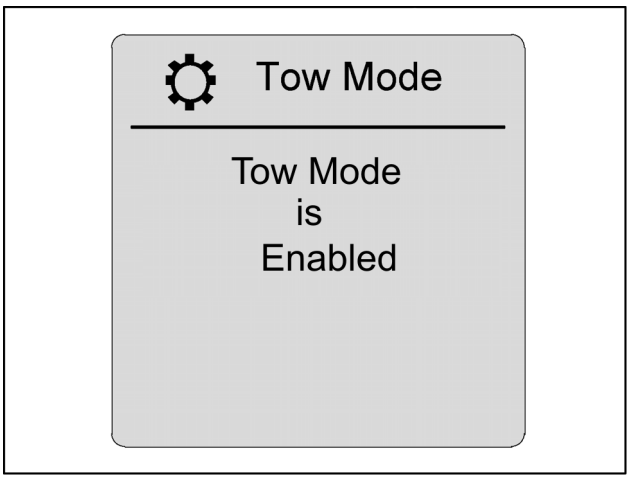
    NOTICE: *Before starting the tow operation, perform the procedures described in "How to move a disabled machine" on page* ***5-9****.*



RAIL12DOZ0828AA 16

13. When tow mode is enabled, tow the machine at a low speed, not exceeding the speed limit previously described, and follow all safe towing procedures. Change the tow mode screen back to the disabled mode after completing the towing operation.

    NOTICE: *Towing the machine at speeds above those permitted and for long distances will result in high heat generation and insufficient lubrication in machine systems. This will cause serious damage to the machine.*



RAIL12DOZ0829AA 17

Moving a disable 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 the oil flow of the high pressure relief valves. Serious damage to hydrostatic motors can occur if the hydraulic circuit empties or overheats.*

NOTE: *If your machine is disabled, you must decide whether the machine can be moved without additional damage. If possible, repair the machine at the job site. If necessary, contact your CASE CONSTRUCTION dealer. If you cannot repair the machine at the job site, and if you have a trailer for transport nearby and available, use a rigid tow bar to tow the machine. Keep all unauthorized personnel clear of the area.*

Opening the hydraulic pressure relief valves

This instruction is for moving the machine a few feet and no faster than 1.6 km/hr (1 mph).

1. Make certain that the machine used for moving the disabled machine has the braking capacity, weight and power to control both machines.

   NOTE: *Park the towing machine as close as possible to the disabled machine.*

2. The towing machine must be equipped with a rear shield to protect the operator if the cable or tow bar disengages.

   NOTE: *Do not use chain to tow this machine.*

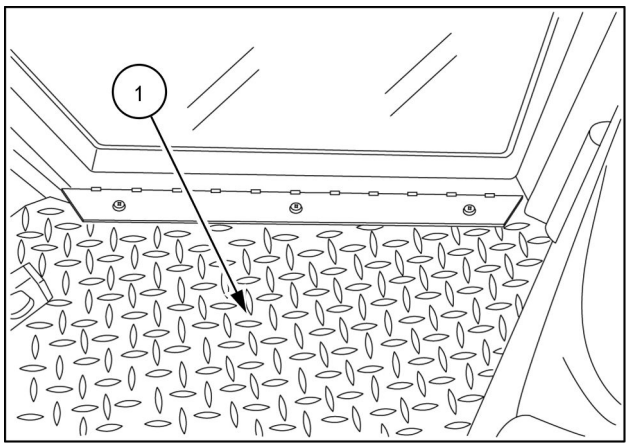
3. If required, a second machine can be attached behind the disabled machine to assist with additional control or braking.
4. Attach a rigid drawbar or cable to the disabled machine.
5. The pressure relief valves must be opened to bypass the flow of oil from the valves to the hydrostatic pumps.

   NOTE: *There are two valves located on each hydrostatic pump.*

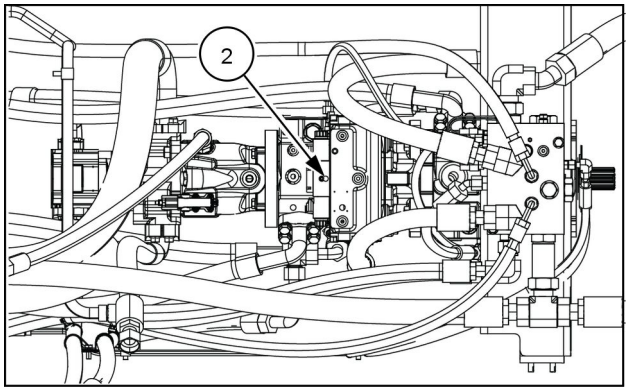
6. Remove the center belly pan covers and floor mat. Then tilt back the operator's seat to access the relief valves.

7. Access the upper pressure relief valve **(2)** by removing the floor mat **(1)** and the cab floor access panel, and then tilting the operator's seat back.

   NOTE: *The upper pressure relief valve is located on the rear hydrostatic pump.*



RAIL12DOZ0232AA 1

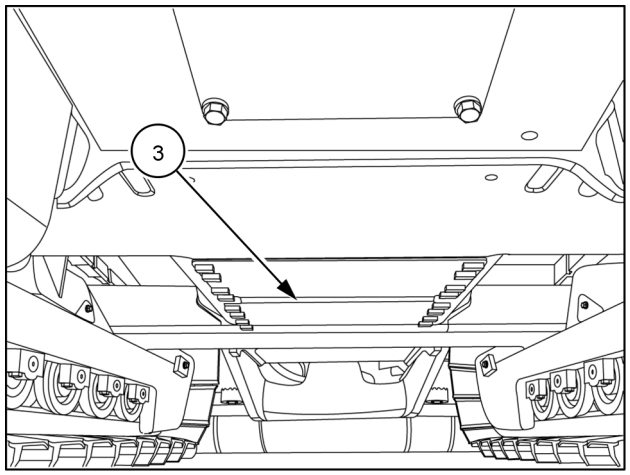


RAIL13DOZ1709AA 2

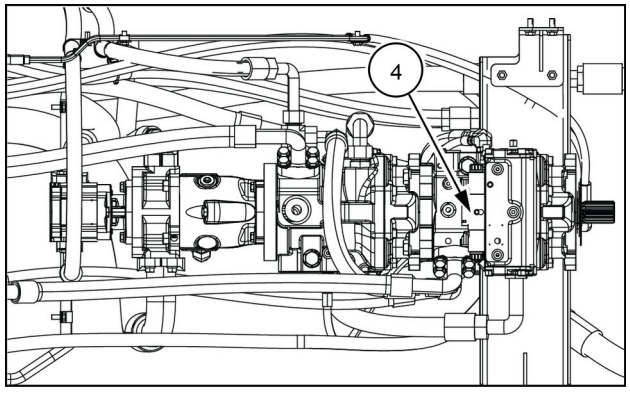
8. Access the lower pressure relief valve **(4)** by removing the center belly pan cover **(3)** underneath the machine.

   NOTE: *The lower pressure relief valve is located on the front hydrostatic pump.*

   ATTENTION: *The center belly pan cover **(3)** is very heavy. Be careful not to drop it when installing, removing or handling. Failure to comply could result in minor or moderate injury.*



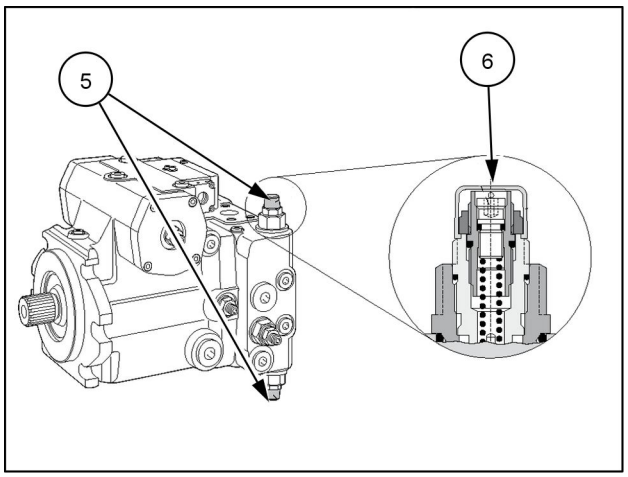
RAIL13DOZ0274AA 3



RAIL13DOZ1710AA 4

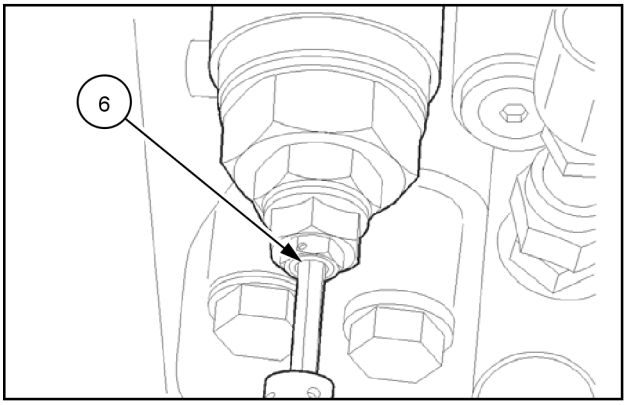
9. Remove the relief valve plastic caps **(5)** to access the drive screws **(6)**.

   NOTE: *The plastic caps will be unusable after removal and should be replaced.*



RAIL12DOZ0644AA 5

10. Use an Allen wrench, and turn the drive screw **(6)** counter-clockwise two turns on each relief valve.

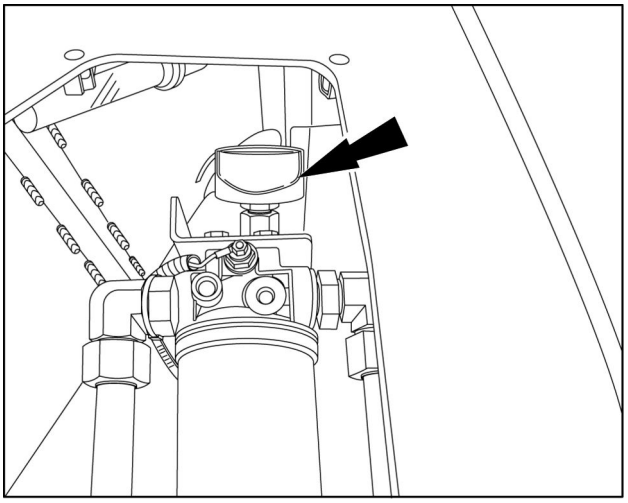


RCIL10CWL116AAL 6

Releasing the brakes for towing

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



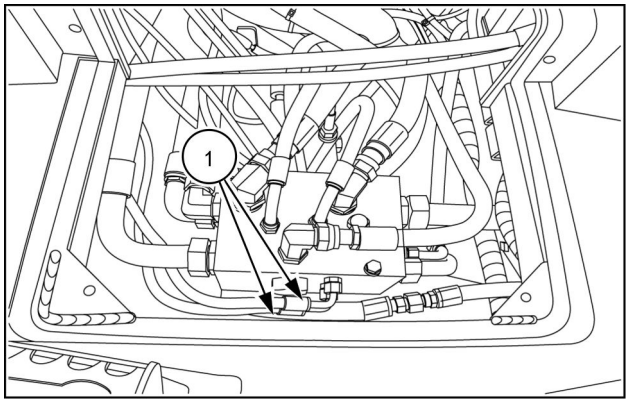
RAIL12DOZ0372AA 7

3. Disconnect the fittings **(1)** at the brake solenoid and cap them.

   NOTE: *There are two brake lines.*

4. A T connection will be required to connect the two lines to the hand pump.

   NOTE: *If a T connection in is not available, two pumps must be used.*



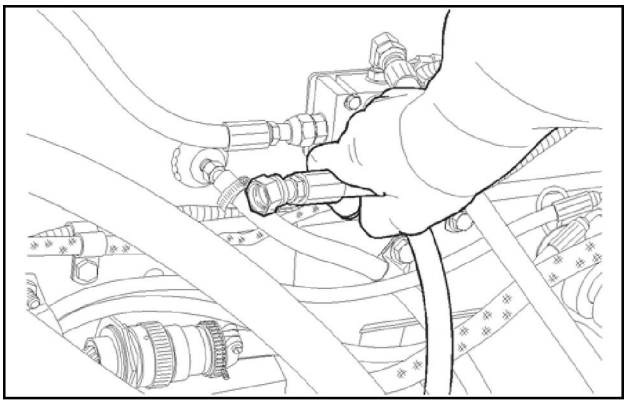
RAPH12DOZ0094AA 8

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.

   NOTE: *Damage to the brake system can result if the pressure is reduced.*

8. The machine is now ready to be moved.
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. Re-tighten the relief valve attachment screws very carefully, until the end of the stroke. Replace the protective caps with new caps.

    NOTICE: *The protective caps prevent damage or inadvertent movement of the drive screws.*



RCIL10CWL146AAL 9

Transporting on a 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

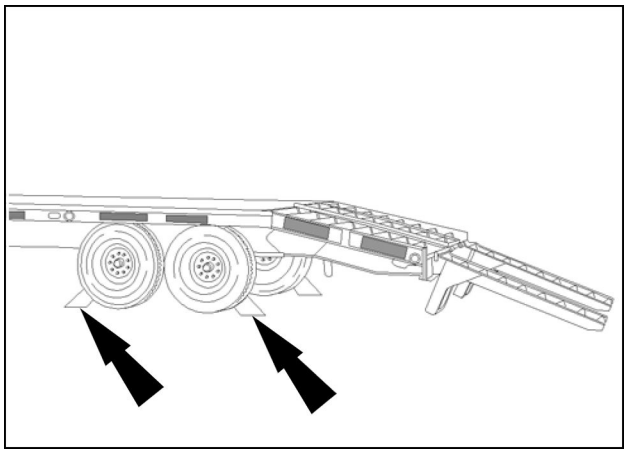
ATTENTION: *Make sure that the trailer is suitable for the machine. The trailer and machine must be equipped with the correct safety equipment for transport. Clean the trailer before loading or unloading the machine. Make sure you know the regulations, laws and governmental codes related to road transport before transporting the machine. Make sure that the trailer and the machine are equipped with the correct safety equipment. Use care when loading a machine.*

Loading the machine on a trailer

To load and position the machine on a trailer, proceed as follows:

1. Chock the trailer wheels to prevent movement during loading.
2. The width of the ramps must be sufficient to suit the trailer and the machine, or even wider.
3. The slope of the access ramp should not be greater than a **15°** angle.
4. Make sure that the machine is aligned to the ramps before ascending.
5. Because the machine tends to be unstable when travelling over the rear wheels of the trailer, travel slowly and carefully, to the required position, paying special attention to the attachment so as not to touch the bed of trailer.
6. Lower the blade and ripper, if equipped, to the trailer.
7. Shut down the engine, placing the ignition key in the off position.
8. Set the park brake.
9. Get out of the machine and lock all access doors.
10. Make sure that all residual pressure is relieved from the hydraulic circuits.

    ATTENTION: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****.*



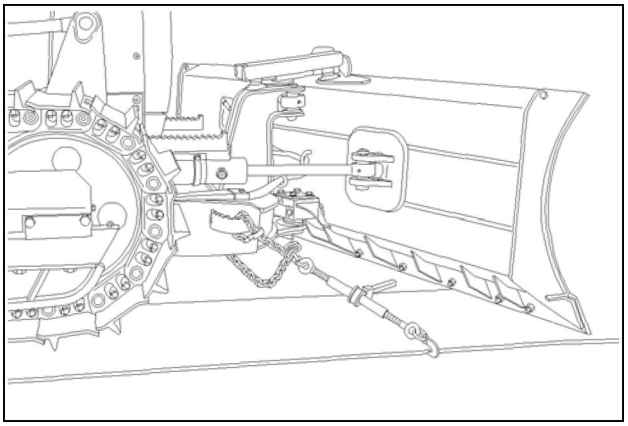
RCIL10CWL015AAL 1

Securing the machine

After loading and positioning the machine, secure it as described below:

1. Use cables, straps or chains at the front and the rear of the machine, to secure it correctly to the trailer.
2. Place chocks at the ends of the tracks, to prevent the machine from moving during transport.

NOTE: *Consult regulations, laws, and governmental codes related to road transport.*



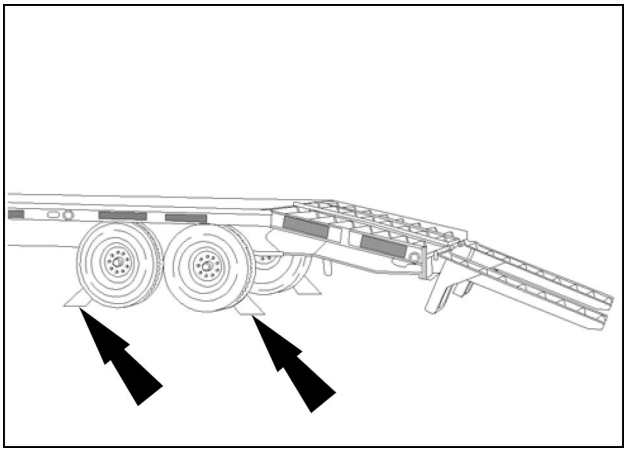
RCIL10CWL033AAL 2

Unloading the machine

To unload the machine, proceed as follows:

1. Chock the trailer wheels to prevent movement during unloading of the machine.
2. Remove the cables, straps or chains used to secure the machine.
3. Remove the chocks from the ends of the tracks.
4. Start the machine engine.
5. Keep attachments as low as possible.
6. Travel at low speed.
7. Be prepared for a sudden change in the position of the machine during travel up or down the ramp.

   NOTE: *The machine may rock forward or backward as the center of gravity passes the upper point of the ramp.*
8. Unload the machine on firm ground.



RCIL10CWL015AAL 3

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

⚠ WARNING

Pinch hazard!

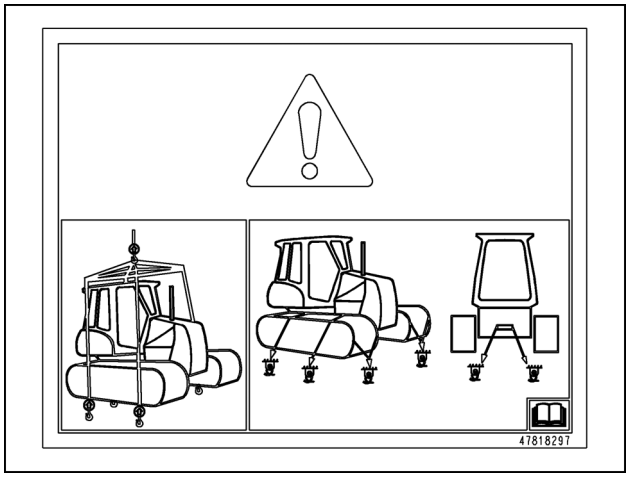
- Cables, straps or chains used to suspend the machine must have sufficient lifting capacity for the machine.
- Improper lifting methods and procedures or inadequate chains, straps and cables can cause unexpected movement or allow the machine to slide when raised, resulting in severe damage to the machine, and even death.
- When suspending the machine, operate the controls slowly and smoothly, avoiding sudden or fast movements, for the safety of the personnel involved, the machine and the hoist.
- When suspending the machine with the aid of one or more assistants, communication signals should be understood by all those involved, in order to avoid personal injury or death.
- During the lifting procedure, keep the area clear of all people, especially the area under the machine.

Lifting procedures

To start the procedures for lifting the machine, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Shut down the engine, placing the ignition key in the off position.
3. Get out of the machine, and do not allow anyone to be in it during the lifting process.
4. Check on the operator's seat and in the cab area for loose objects that may fall or cause an accident or damage during the lifting procedure

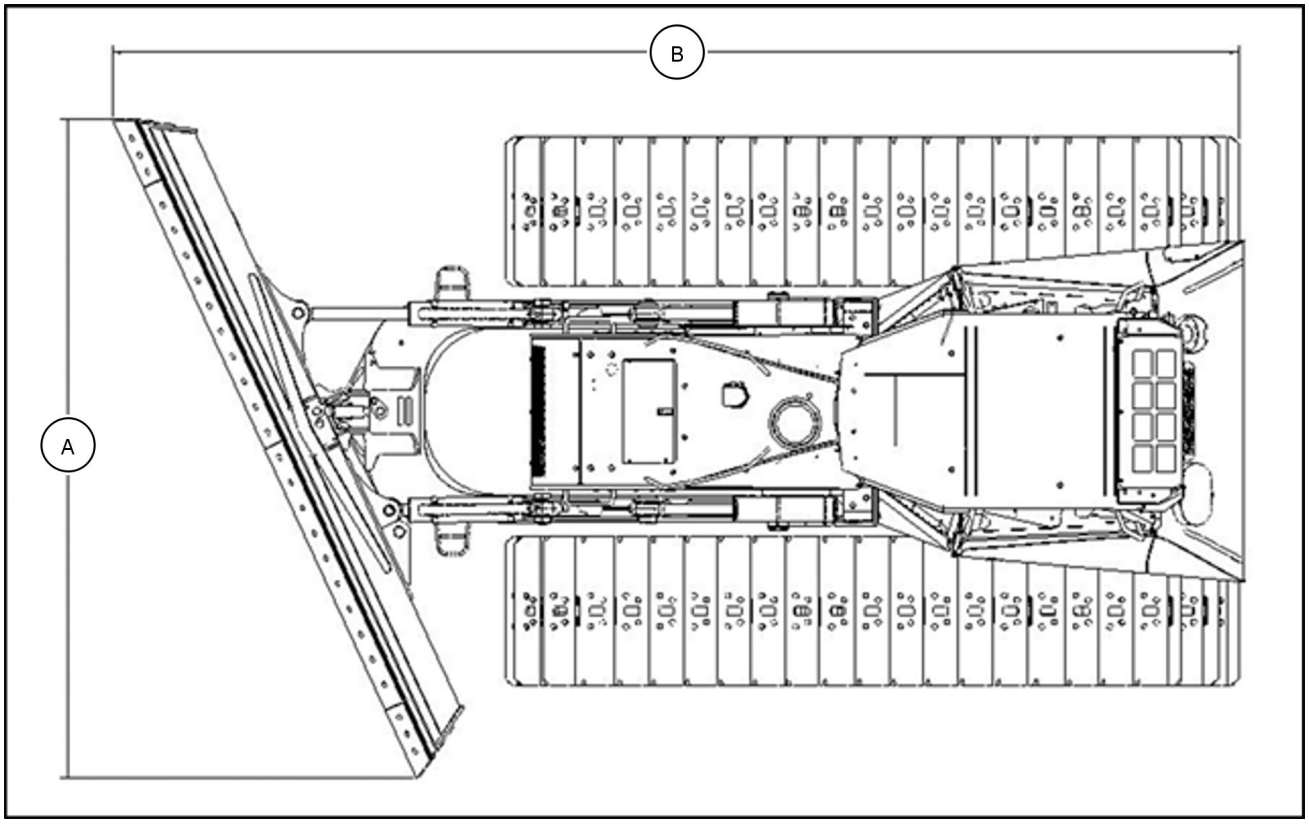
   NOTE: *If there is, remove them or secure them safely.*
5. Only use lifting equipment with appropriate capacities for this machine.
6. Protect the machine from damage during lifting and transport, using linings.
7. Position the machine so the center of gravity balances the machine.
8. Suspend the machine slowly and let it stabilize before continuing lifting.



47818297 1

Transport dimensions

Transport length and width with blade fully angled at 25°



RAIL13DOZ1259FA 1

XLT model

Blade Width	Transport width	Transport length without drawbar
XLT PAT blade	**3287 mm** (**129.4 in**)	**6021 mm** (**237.0 in**)
LT/XLT BD blade	**3423 mm** (**134.8 in**)	**5410 mm** (**213.0 in**)

NOTE: *Add **262 mm** (**10.3 in**) for machine equipped with drawbar.*
*Add **1227 mm** (**48.3 in**) for machine equipped with ripper.*

NOTE: *The folding blade is straight when in transport and both ends are folded. The dimension shown is only the blade width.*

6 - WORKING OPERATIONS

GENERAL INFORMATION

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.

Angling the blade

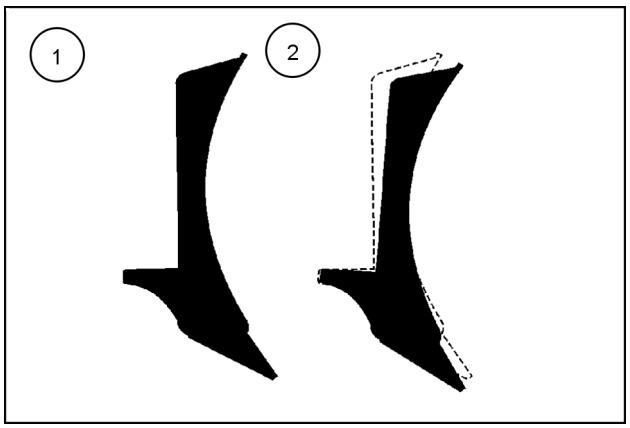
Advantages of the backward-angled blade position

- Blade can push a larger load.
- Blade will stay on top in soft ground.
- .Blade will not dig into the ground.
-

Advantages of the forward-angled blade position

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

NOTE: *See Blade Pitch Adjustment in this manual for adjustment procedure.*

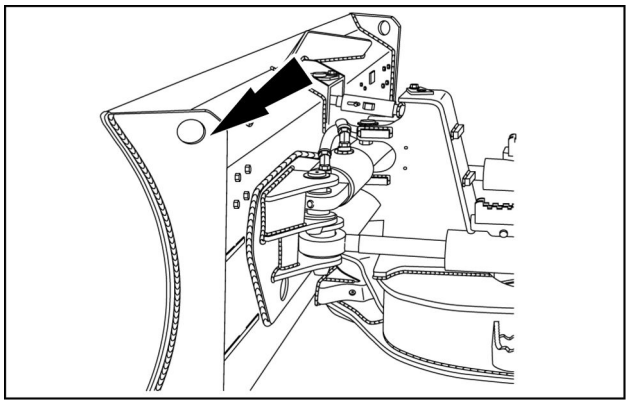


RCIL10CWL018AAL 1

(1) Backward-angled (angle of **50°**)
(2) Forward-angled (angle of **60°**)

Blade lift eye

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

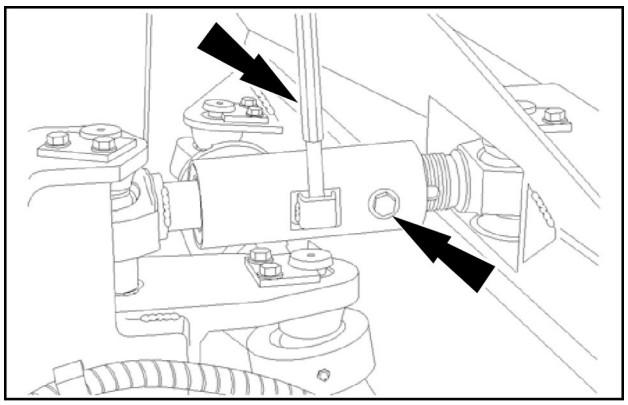


RAPH12DOZ0113AA 2

Blade – Adjusting the tilt angle (PAT models)

Adjusting the blade tilt angle

1. Raise the blade to **100 mm** (**3.9 in**).
2. Release the blade control lever and shut down the engine.
3. Remove the ignition key, and set the parking brakes.
4. Loosen the retaining bolt from the slotted keyway on the tilt link.
5. Use a bar to adjust the tilt link clockwise or counterclockwise until the desired tilt angle is reached, stopping at 1/2 turn increments.
6. Replace the retaining bolt at the slotted keyway.



RCIL10CWL149AAL 1

Position of the blade with backward tilt angle

When dozer blade has a backward tilt angle, the blade will be able to push a larger load. Blade will stay on top in soft ground.

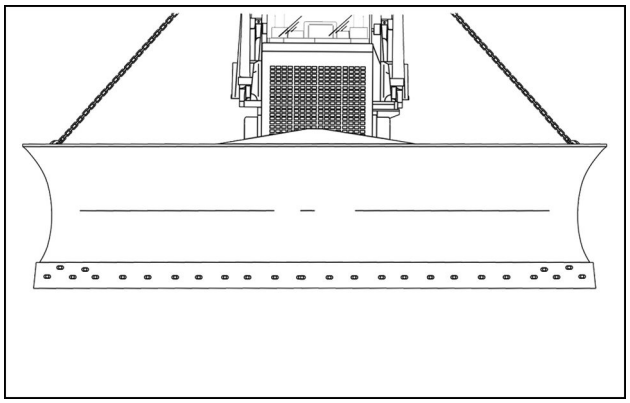
Position of the blade with forward tilt angle

When dozer blade has a forward tilt angle, the load slides off the blade as the crawler travels in reverse. Blade will dig into hard ground.

Blade (PAT models) – Assembly and Installation

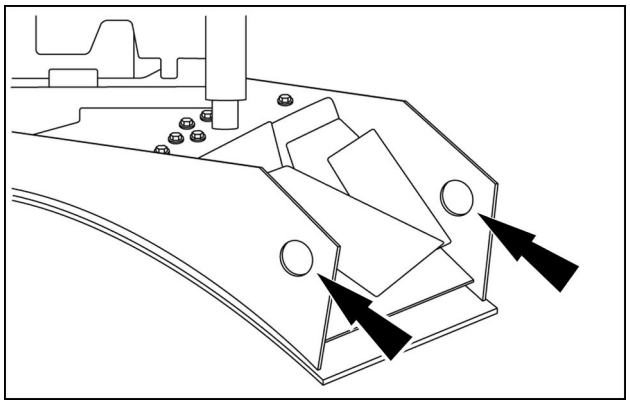
1. Clean all of the dirt and debris from the ball joints and eye bolts before you install them on the machine.

ATTENTION: *The blade weighs approximately* ***1500 kg****. Use proper lifting equipment to prevent accidents or property damage.*



COIL15DOZ0045AB 1

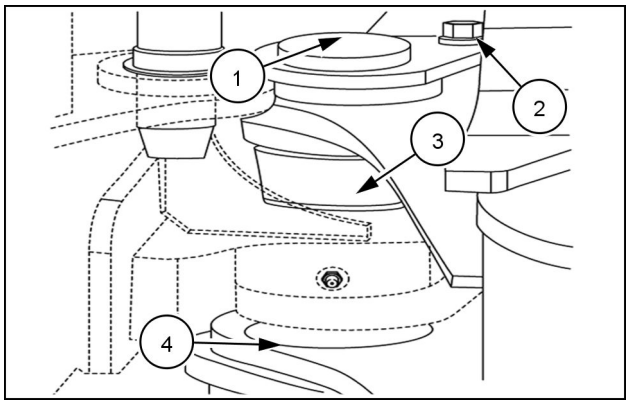
2. Handle the blade with an adequate lifting device.
3. Hold the blade in the vertical position through the side eye bolts, as shown.



COIL15DOZ0040AA 2

Installation of the central blade pin

4. Lubricate the central blade pin **(1)**. Install the smaller conical spacer **(4)** on the bottom and the larger conical spacer **(3)** on top. Pass the pin between the power arc and the blade. Torque the bolt **(2)**.



COIL15DOZ0070AA 3

Installation of the cylinder pins

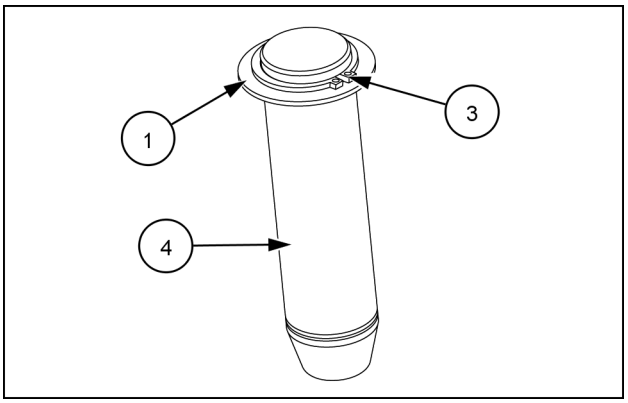
5. Position the washers **(1)** and the snap rings **(3)** onto the pins **(4)** as shown.

   Component description:

   (1) Washer

   (3) Snap ring

   (4) Pin



COIL15DOZ0041AA 4

6. Position and lock the pins in the cylinders as shown. Follow the assembly sequence:
   1st snap ring,
   2nd washer,
   3rd spacer.

   Component description:

   (1) Washer

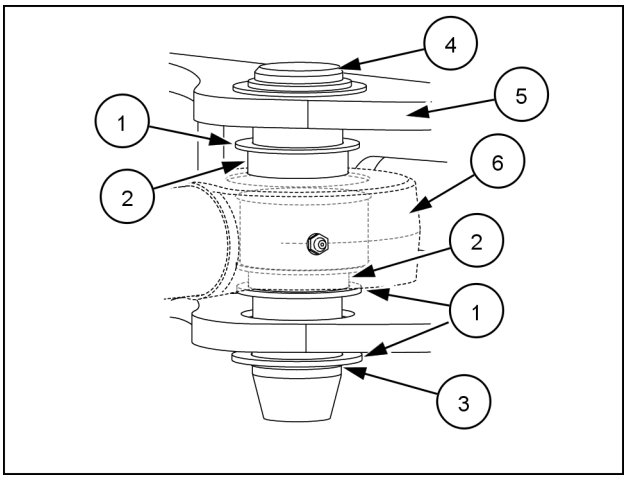
   (2) Spacer

   (3) Snap ring

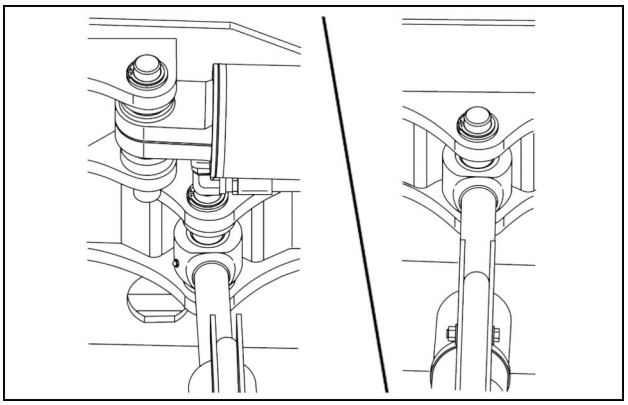
   (4) Pin

   (5) Blade

   (6) Tilt cylinder



COIL15DOZ0042BA 5



COIL15DOZ0043AA 6

Installation of the tilt tie rod

7. Position the blade tilt cylinder **(7)**. Position the shims **(7)** with the allowed clearance of up to **1 mm**. Install the pins **(4)**. Torque the bolts **(8)**.

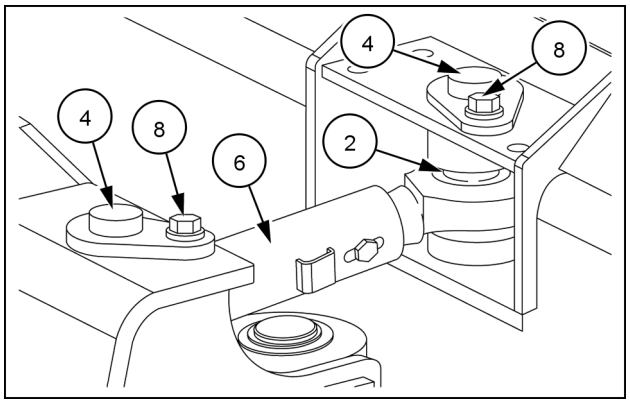
   Component description:

   (2) Spacer

   (4) Pin

   (6) Tilt cylinder

   (8) Bolt



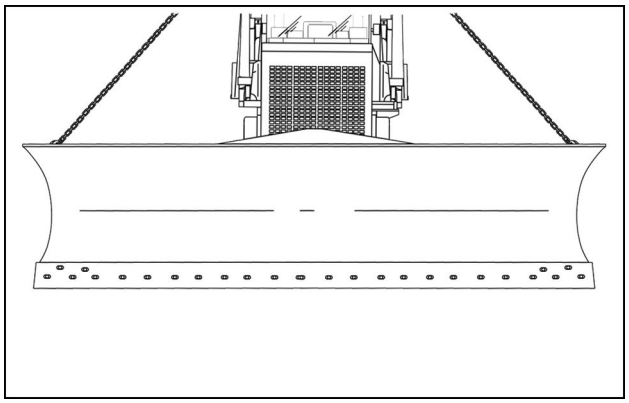
COIL15DOZ0044AA 7

8. Check that all of the snap rings are positioned correctly and properly locked. Also check that all of the bolts have the correct torque of **350 N·m**.
9. Test the movements of the blade. Retighten the bolts if needed.
10. Check that the snap rings are positioned correctly.
11. Lubricate all of the points as indicated on page **7-42**.

Blade (BD models) – Assembly and Installation

1. Clean all of the dirt and debris from the ball joints and eye bolts before you install them on the machine.

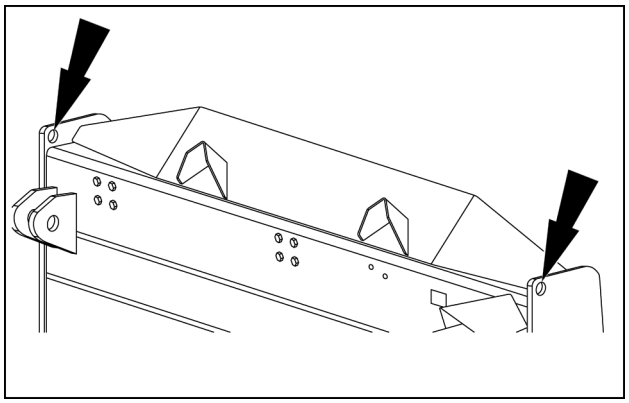
ATTENTION: *The blade weighs approximately* ***1500 kg****. Each arm (push beam) weighs approximately* ***380 kg****. Use proper lifting equipment to prevent accidents or property damage.*



COIL15DOZ0045AB 1

2. Handle the blade and the arms with an adequate lifting device.
3. Hold the blade in the vertical position through the side eye bolts, as shown.
4. Position the blade in front of the machine.

NOTE: *Use the lift points.*



COIL15DOZ0046AA 2

Installation of the arms on the blade

5. Position the blade arm **(1)** on the blade eye bolt **(3)**.
6. Pass the pin **(2)** between the blade and the arm.

NOTE: *Before you pass the pin* ***(2)*** *make sure that the ball joint and the holes of the blade eye bolt* ***(3)*** *are correctly aligned. This will greatly assist the passage of the pin.*

7. Fit the bolt **(4)** and the washer **(5)**.
8. Repeat the operation for the other side.

   Component description:

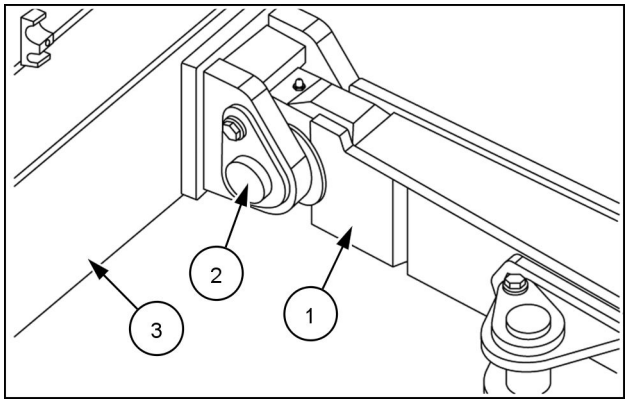
   (1) Blade arm

   (2) Pin

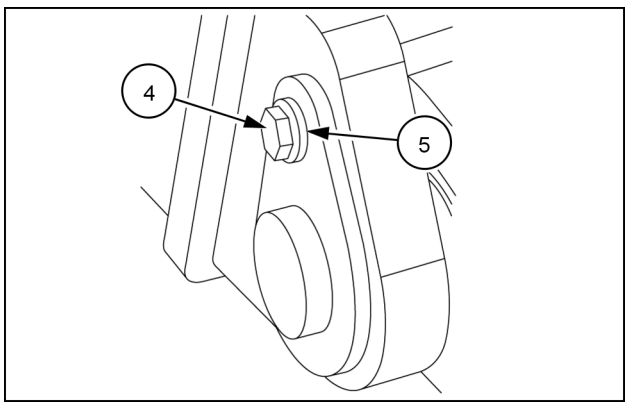
   (3) Blade eye bolt

   (4) Bolt

   (5) Washer



COIL15DOZ0047AA 3



COIL15DOZ0048AA 4

Installation of the blade arms on the track chassis

9. Place the blade arm journal **(2)** on the track chassis side bracket **(6)**.
10. Install the journal cover **(1)**. Follow the assembly sequence:
    1st spacer,
    2nd journal cover,
    3rd bolt and nuts.
11. Repeat the operation for the other side.

Component description:

(1) Journal cover

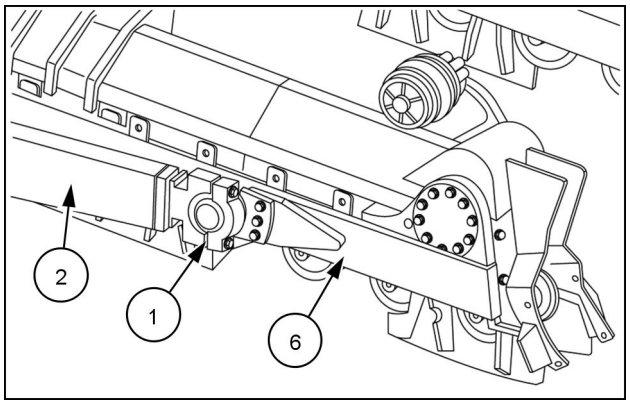
(2) Blade arm journal

(3) Spacer

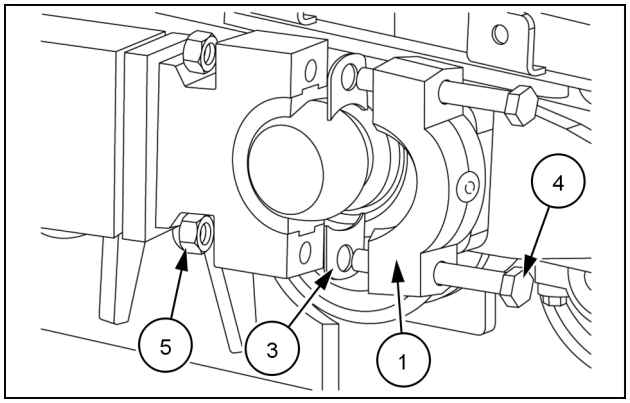
(4) Bolt

(5) Nuts

(6) Track chassis side bracket



COIL15DOZ0049AA 5



COIL15DOZ0050AA 6

12. Position the tie rod **(7)** on the blade arm.
13. Pass the pin **(8)**. Lock with the bolt. Follow the assembly sequence:
    1st spacer,
    2nd washer,
    3rd bolt.
14. Repeat the operation for the other side.

Component description:

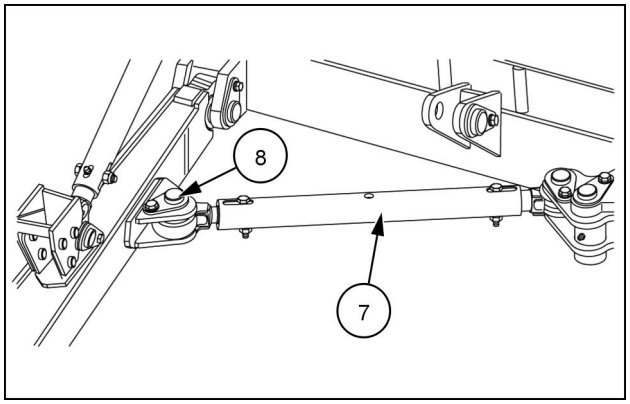
(7) Tie rod

(8) Pin

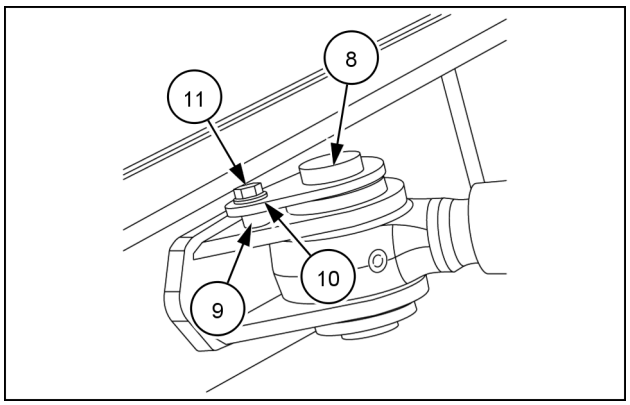
(9) Spacer

(10) Washer

(11) Bolt



COIL15DOZ0051AA 7



COIL15DOZ0052AA 8

Installation of the upper tie rod

15. Position the blade tilt tie rod **(1)**.
16. Pass the pin **(2)**. Keep the shims **(3)** between the sides of the tie rod.
17. Lock the pin with the bolt **(6)**. Follow the assembly sequence:
    1st spacer,
    2nd washer,
    3rd bolt.

Component description:

(1) Blade tilt tie rod

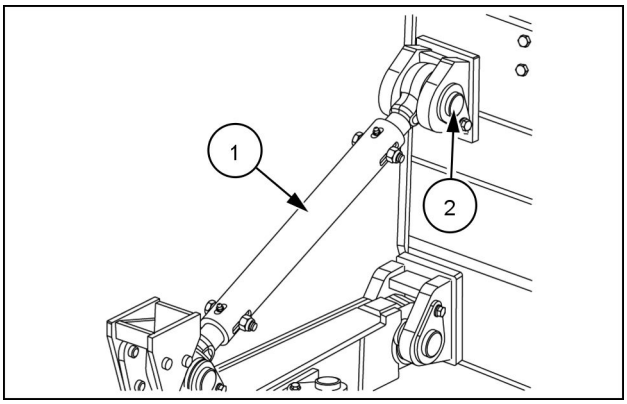
(2) Pin

(3) Shims

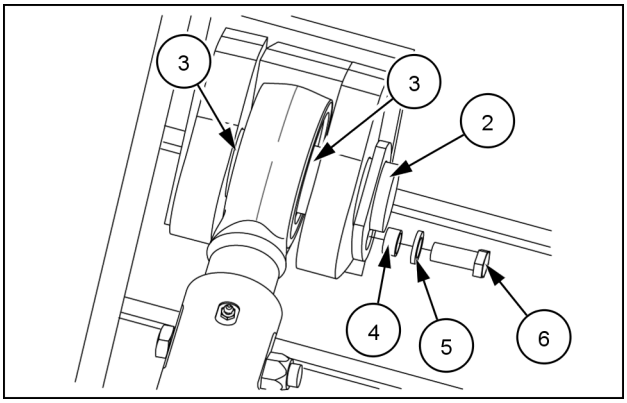
(4) Spacer

(5) Washer

(6) Bolt



COIL15DOZ0053AA 9

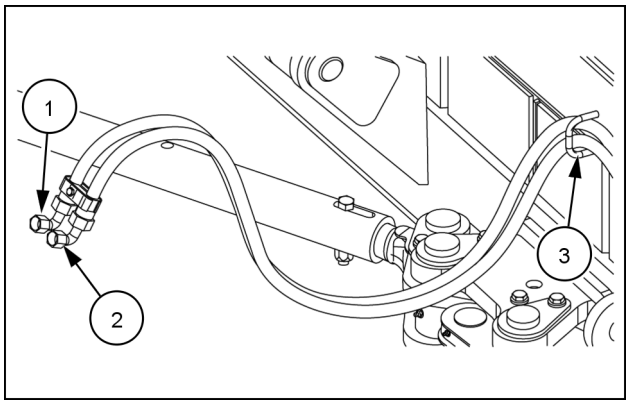


COIL15DOZ0054AA 10

Installation of the tilt cylinder

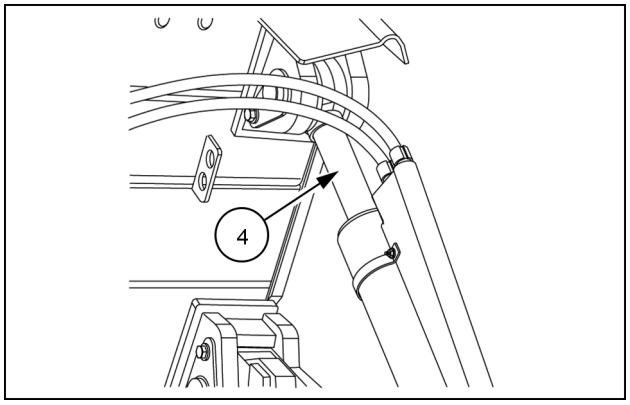
18. Install the cylinder hoses **(1)** and **(2)** on the chassis ports. Then apply a torque of **25 N·m** to the fittings.

NOTE: *The hoses must be routed through the conduit on the blade **(3)**.*



COIL15DOZ0055AA 11

19. Position the cylinder **(4)** in the blade eye bolt.

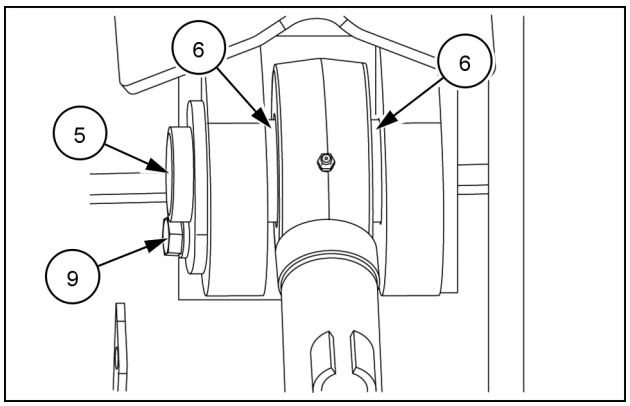


COIL15DOZ0056AA 12

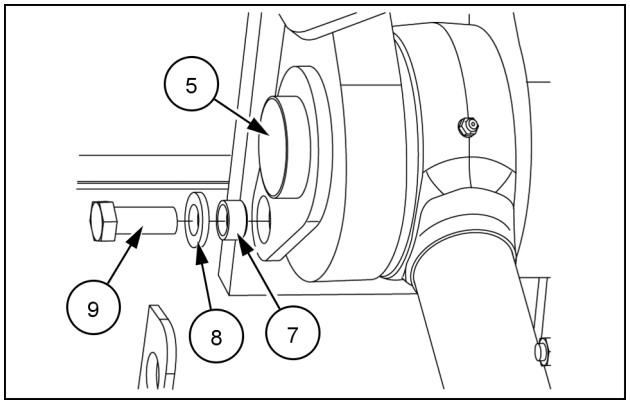
20. Pass the pin **(5)**. Keep the one spacer **(6)** on each side of the cylinder between the cylinder and the blade. Secure the pin with the bolt **(9)**. Follow the assembly sequence:
1st spacer,
2nd washer,
3rd bolt.

Component description:

- **(1)** Hose
- **(2)** Hose
- **(3)** Conduit
- **(4)** Cylinder
- **(5)** Pin
- **(6)** Spacers
- **(7)** Spacer
- **(8)** Washer
- **(9)** Bolt



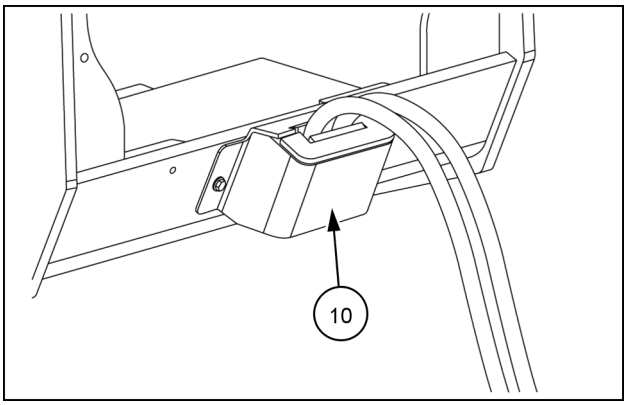
COIL15DOZ0057AA 13



COIL15DOZ0058AA 14

21. Install the hose protection **(10)** on the chassis.

NOTE: *You may need to open the front grate.*



COIL15DOZ0059AA 15

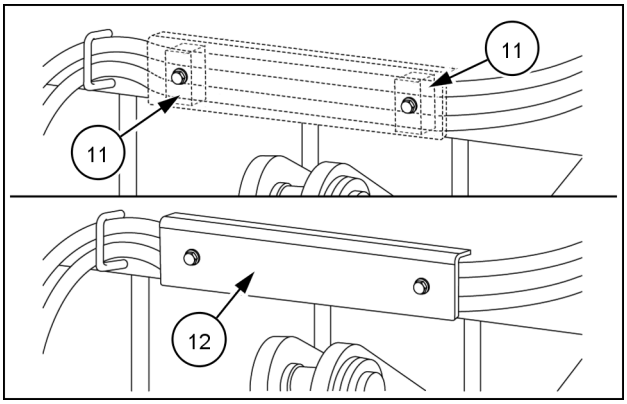
22. Pass the cylinder hoses through the spacers **(11)** on the blade.
23. Install the hose protection **(12)** on the blade.

Component description:

(10) Hose protection

(11) Spacers

(12) Hose protection



COIL15DOZ0060AB 16

Install the lift cylinder

24. Position the cylinders **(1)** and **(2)** in the blade eye bolts.

25. Pass the pin **(3)**. Always keep one internal spacer **(4)** on each side of the cylinder (between the wall of the eye bolt and the cylinder). Secure the pin with the bolt **(7)**. Follow the assembly sequence:
    1st spacer,
    2nd washer,
    3rd bolt.

    Component description:

    (1) Cylinder

    (2) Cylinder

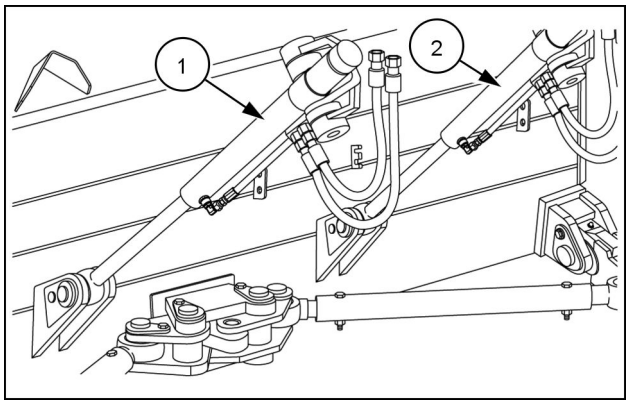
    (3) Pin

    (4) Internal spacers

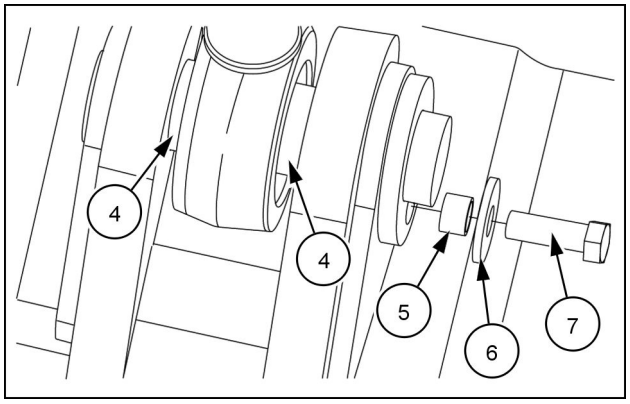
    (5) Spacer

    (6) Washer

    (7) Bolt



COIL15DOZ0061AA 17



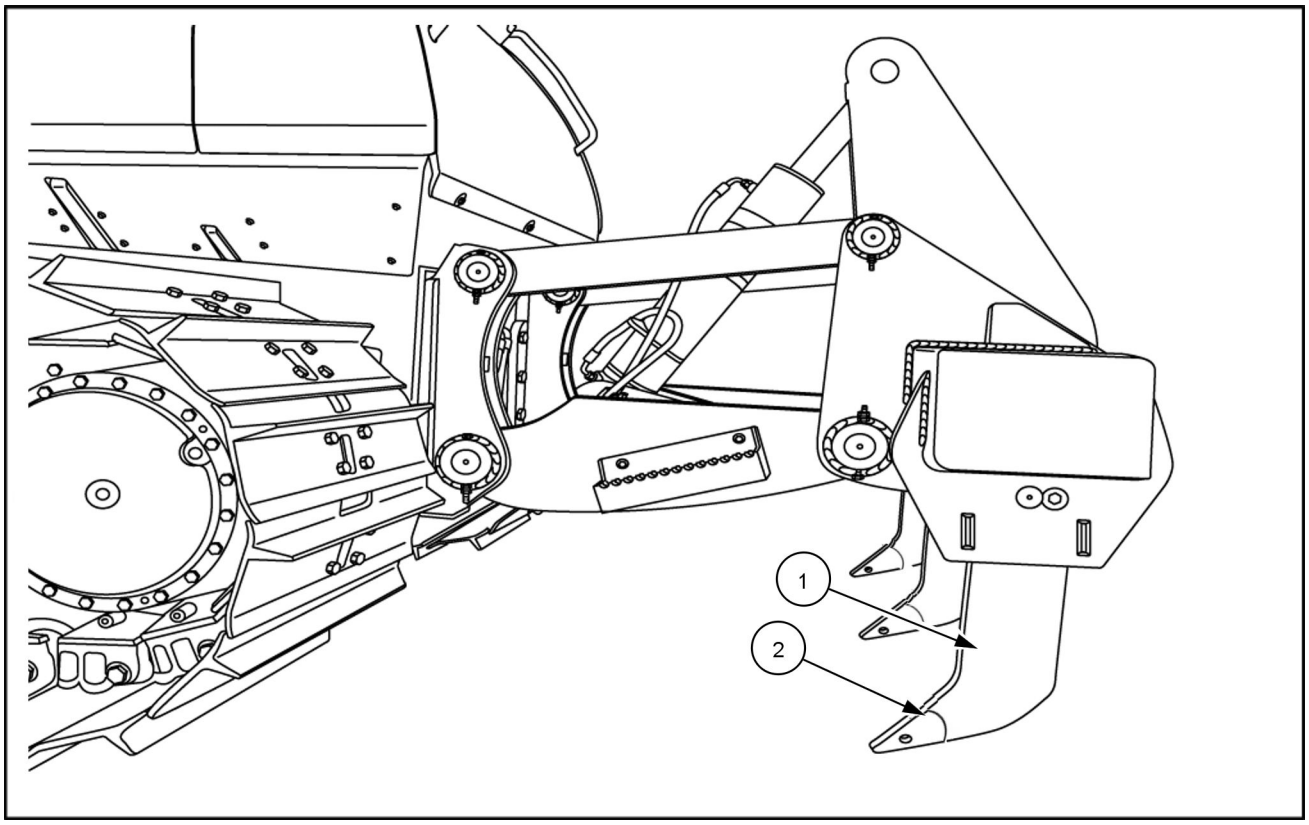
COIL15DOZ0062AA 18

26. Test the movements of the blade. Make sure that the blades are operating correctly and freely (there should not be any locked movement and tensioned hoses) and that the blade is aligned in the horizontal position when in the rest position.

27. Torque all bolts and connections to:
    Pin fastening bolts **350 N·m**;
    Other bolts **80 N·m**;
    Connections **25 N·m**.

28. Lubricate all of the points as indicated on page **7-46**.

Ripper



RAIL13DOZ1265FA 1

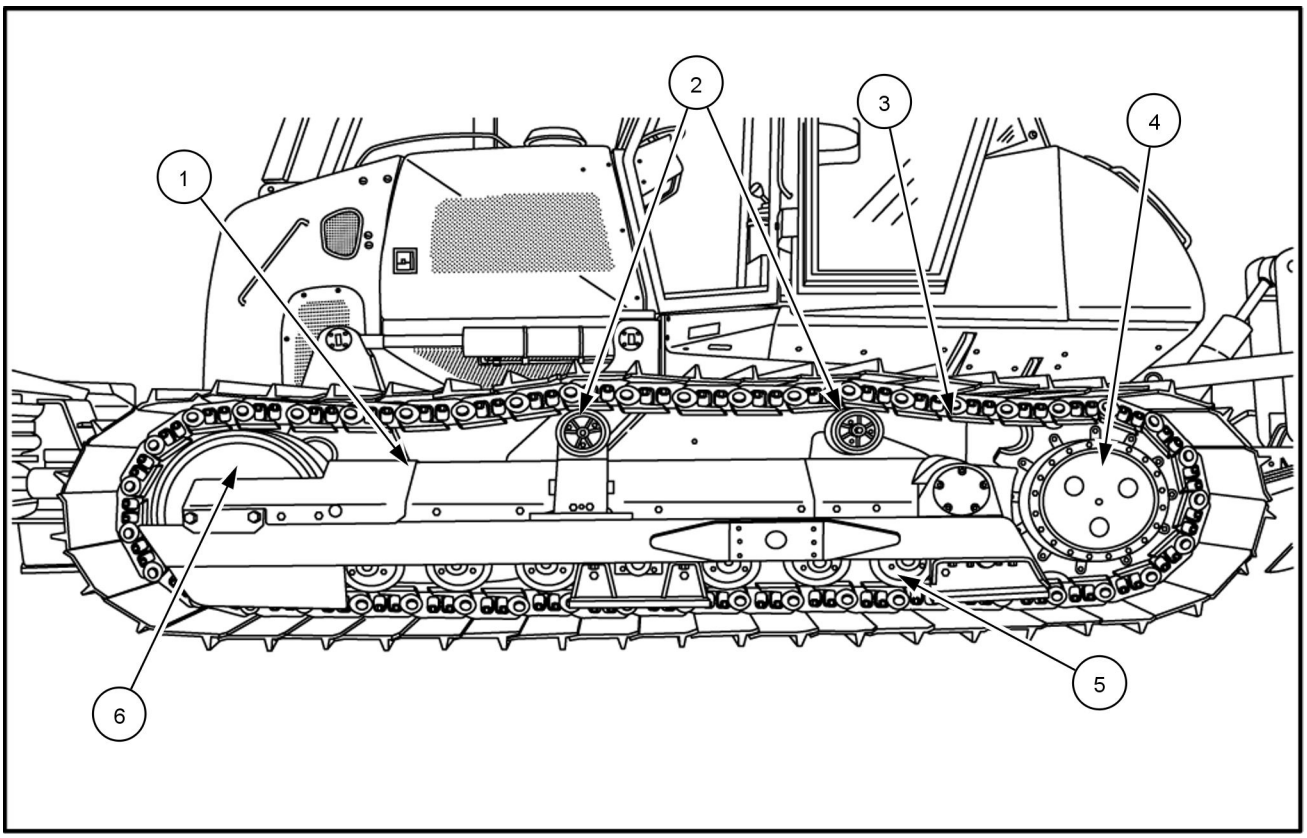
(1) Ripper shank support
Ripper Shank (2)

The rear ripper depth can be adjusted.

Use the appropriate depth for the working conditions.

Tracks – Frame and drive wheels

Track systems



RAIL12DOZ0228FA 1

1. Track frame

The track frames are attached to the machine chassis on each side. All the track components, except the drive sprockets, are connected to the track frames.

2. Upper rollers

The upper roller is mounted on the top of the track frame to support the track chain between the drive sprocket and tensioner wheel. The top roller helps maintain alignment of the chain between the tensioner wheel and the drive sprocket.

3. Track chain

The track chain includes a number of link assemblies connected together, to form a complete chain. Shoes are bolted to the track chain to provide traction for the machine.

4. Drive sprockets

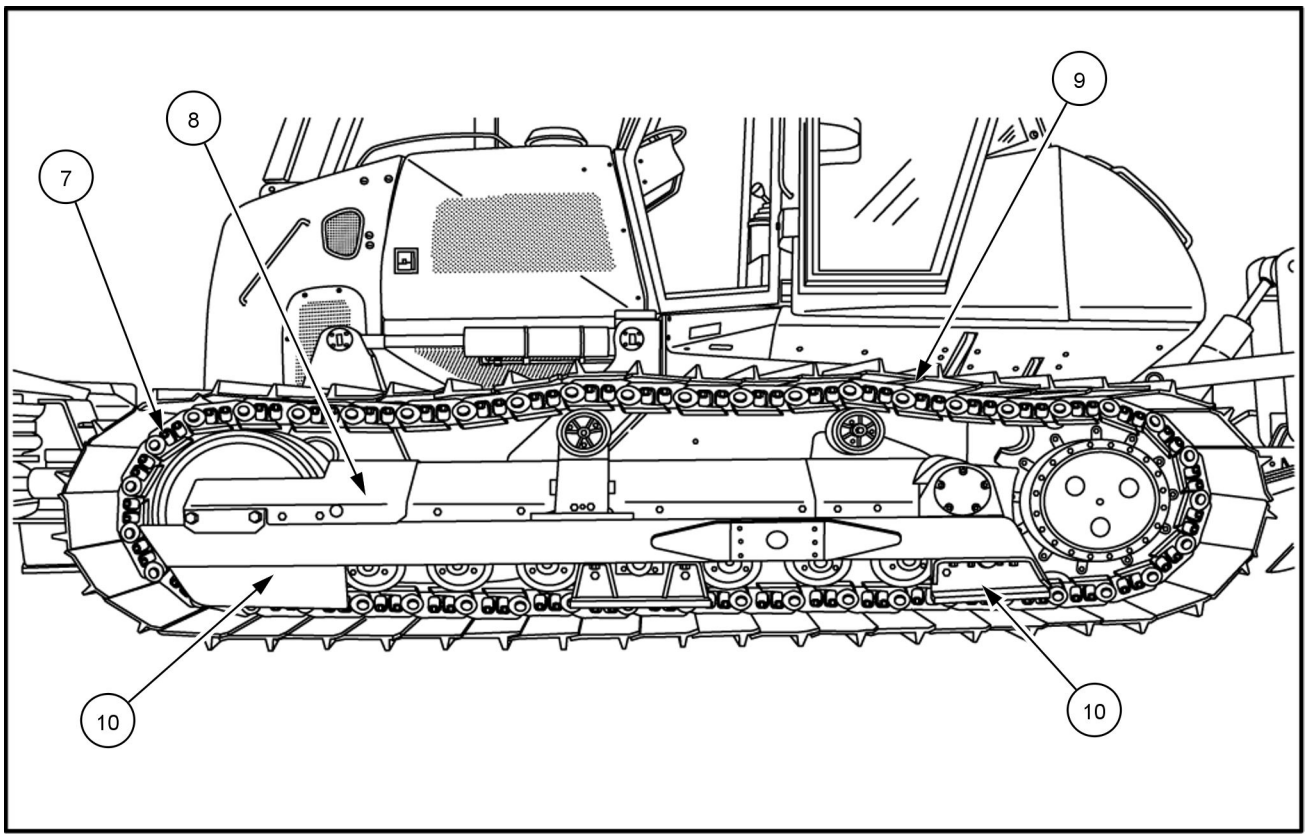
The drive sprockets transmit engine power to the tracks. The drive sprocket rotates the track chain around the lower frame assembly. The drive sprockets do not support the weight of the machine.

5. Lower rollers

The lower rollers are mounted on the bottom of the track frame. These rollers carry the weight of the machine on the track chain.

6. Tensioner wheel

The tensioner wheel 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.



RAIL12DOZ0228FA 2

7. Track links

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

8. Track adjuster grease fitting

The track adjuster 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.

9. Track Shoes

The track shoes are installed on the track chain to give traction and flotation to the machine.

10. Track guides

The track guides correctly align the chain to the tensioner wheel and to the sprocket. The guides also prevent the chain from deviating off the tensioner wheel and sprocket. The rock guide option helps prevent rocks and debris from entering between the front roller, tensioner wheel, rear roller and sprocket.

Tracks – Lower frame wear

Factors that determine lower frame wear

NOTICE: *You can prolong the service life of the lower frame if you properly understand the factors that contribute to its wear.*

- Terrain and soil conditions are a fundamental factor in determining the life of the lower frame.
- Non-abrasive soils such as sludge and mud cause less wear.
- Wet, sandy terrain or soil containing oil cause more wear.
- Working in rocky terrains where the teeth do not penetrate may cause high impact and twisting loads on the tracks.
- Correctly follow the operation and maintenance procedures to obtain maximum service life of the lower frame.

Operating and maintenance techniques

NOTICE: *The following operating and maintenance techniques will help you achieve a longer service life for the lower frame of your machine.*

- Avoid rotating movements on the tracks, especially on abrasives terrains.
- Avoid frequently operating in reverse.

  NOTE: *When using reverse gear, keep the lowest speed possible.*
- Speed, impacts, turns and direction of operation greatly affect wear.
- When working on sloping terrain, operate the machine perpendicular to the slope, avoiding working diagonally across the slope.

  NOTE: *This reduces the wear on the support roller flanges.*
- Frequently check the tension of the tracks and clean the lower frame more frequently (shorter periods) when operating the machine in extreme conditions with increased accumulation of materials on the frame.

  NOTE: *Tracks that are too tight (with high tension) reduce power and cause wear of the bushings and sprocket.*
- Always making turns to the same side will cause the two sides of the machine to wear unevenly.
- Use the lowest shoe possible to minimize twisting of the tracks.
- Use the wider shoes only in applications that require them (greater float).
- Park the machine on level ground to prevent deformation of the seals.
- In very low temperatures, clean the lower frame more frequently, and park the machine on an appropriate site, so that freezing does not occur.

Lubricated chain track

NOTICE: *The lubricated chain track CLT is a track with sealed and lubricated junction that contains an oil reservoir on each pin. Each knuckle is sealed to prevent contamination and to lubricate internally. Wear of the pin and the inside of the bushing is eliminated by constant lubrication from the oil reservoir on each pin. The increased outer diameter and the deeper tempering of the bushing box allow external wear to be reduced, increasing service life. Sealed and lubricated pins and bushings greatly reduce the friction between components of the track, increasing service life. They also allow increase the machine's power, making operation more productive.*

- Rotate pins and bushings when you reach the 100% wear limit.

  NOTE: *Operating the machine after the 100% wear limit can cause cracks on the bushings and completely wear them on the pins.*

- The pins and bushings should be flipped, end to end, with the lube hole remaining DOWN for proper lubrication.

  NOTE: *Using the pins and bushings until they are completely worn out results in accelerated wear of other components.*

Extended life chain track

NOTICE: *The extended life chain track CELT is a sealed and lubricated track with an oil reservoir on each pin. Each knuckle is sealed to prevent penetration of contaminants and to provide internal lubrication. It incorporates larger diameter rotating bushings that turn over standard bushings. This allows wear to be distributed over the entire circumference of the bushing, and since it turns freely, it does not create friction wear between the sprocket and the bushing as occurs with conventional tracks. This system with larger diameter rotating bushings allows you to reduce the wear of standard bushings, increasing your service life. Sealed and lubricated pins and bushings greatly reduce the friction between components of the track, increasing service life. They also allow increase the machine's power, making operation more productive.*

- The extended life chain 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 that the extended life chain track bushing provides up to twice the working life of 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.*

Lower frame wear factors that can be controlled

NOTICE: *Operating and maintenance techniques affect the service life of the lower frame. Correct operation and maintenance of the machine contribute to the control of lower frame wear.*

Accumulated materials

- Minimize the effects of material build-up by frequently checking the clearance of the tracks when working on land with mud, snow and wet sand.
- The build-up of material on the lower frame can cause the track to slip from the guide and frame.
- The build-up of material between the components of the lower frame causes wear because it increases track tension.

  NOTE: *Using tracks with the tension too high will reduce the life of the bushings, journals and sprocket by up to three times.*

Track Tension

- Check the track tension frequently during operation.
- When working in mud, snow and some sandy conditions, check the track tension more often.

  NOTE: *The material will build up on parts of the lower frame and the tracks will become too tight.*
- Always maintain the correct track tension and always clean the lower frame at the end of the work shift.

Track Shoes

- The shoes must provide adequate traction and flotation, but must not be wider than absolutely necessary.

  NOTE: *Flotation is the ability to stay on the surface of soft terrain or mud.*
- Correct flotation occurs when the grousers fully penetrate into the ground without letting the track shoes go below the surface
- Track shoes that are too wide can damage many components of the lower frame.
- The center of the track shoe is fastened to the track links. 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 tensioner wheels) resist and restrict the twisting forces of the links.

  NOTE: *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.*

Effects of wide track shoes

- Resistance to steering movement results in wear on the shoe corners and twists the track chain.
- Bending, cracking or breaking the track shoes, shoe hardware and links.
- Constant problems with loose shoe hardware that makes the bolt holes larger.
- Increased wear on links, roller flanges and wheel tensioner flanges, caused by the constant twisting of the track chain.
- Decreased pin and bushing life or decreased link life due to elongated pin and bushing bores.

  NOTE: *This is a result of the twisted links.*
- Possible loss of lubricant in the lubricated track pins.

  NOTE: *This will result in early pin and bushing wear.*

Wear factors that cannot be controlled

NOTE: *Soil and path conditions cannot be controlled. These conditions include abrasive soils, soil moisture, impact on the bottom frame and material accumulated.*

Abrasive soils

- Each type of soil on which a machine works has a different level of abrasiveness. Generally, the more abrasive, the greater the rate of wear.
- Moisture plays important role in abrasive soils. A sandy paste will be less abrasive than damp sand, especially if the sand builds up at the base of the sprocket and around the bushings. Wet abrasives have a grinding effect.

Low abrasiveness

- Fine sand and clay belong to this category. When wet, this type of ground is soft and can be easily molded.

Moderate abrasiveness

- Fine sand or clay that contains a small amount of rounded sand particles and enough moisture to stick to gaskets belong to this category.

High abrasiveness

- These 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 rocks or large irregularities cause high impact on the lower frame system. Rocky terrain causes bending, breaking, and chipping of the components. Reduce the machine speed and use the smallest track shoes possible.

Wear factors that cannot be controlled (continued)

Accumulated materials

- These are any materials that adhere to or build-up around moving components.

  NOTE: *To maintain correct track tension, the tracks must be adjusted whenever required when working in this type of terrain.*

- These materials cause imbalance between components, particularly between the chain and the sprocket. The materials tighten the chain, causing excessive tension and fatigue on the knuckles, pins, bushings and the contact surfaces between joint parts. The greater the imbalance due to the build-up of materials at the base of the sprocket, the higher each track bushing is suspended in the sprocket.

  NOTE: *This condition causes faster and serious forward and reverse wear, and "jumping" of the chain off the sprocket, indicated by a high loud "banging" noise. This results in high impact loads that cause additional wear and cracking. This build-up can also prevent the rollers from turning. When this happens, the track chain slips over that point of the roller. This causes a crushing over the roller.*

- These materials also increase the "adhesive effect", not allowing the materials to escape and accelerating wear. Open center jaws or special sprockets can help mitigate this problem. 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.

Excessive load in reverse

- Occurs when the machine is moving up a ramp in reverse and the upper part of the track chains are tensioned, compressing the recoil damper spring. When the machine is driven forward, a loud “banging” noise may occur as one or both recoil damper springs releases.

Partially controlled wear factors

Revolution

- Overspeed 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 also a function of speed and distance travelled, 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.

  NOTE: *This may also result in gripping and breakage of pins and bushings.*
- A worn chain can cause breakages.

Change of direction (right-hand and left-hand turns)

- 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 slipping

- Wear rate on all components increases when tracks slip.
- Track shoe grousers are affected due to increased spilling between the grousers 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.
- Also, more build-up and slipping will occur on the favored side, which will result in an increased wear rate.

Operation in reverse

- Avoid excessive use of operations in reverse.
- This is not only an unproductive use of the machine, but it also accelerates the wear of the bushings and the sprocket.
- In most cases, the reverse gear speed is greater than the forward travel speed.

Levelling

- Levelling shifts the machine weight to the front, causing a faster wear rate on the front rollers and tensioner wheels.

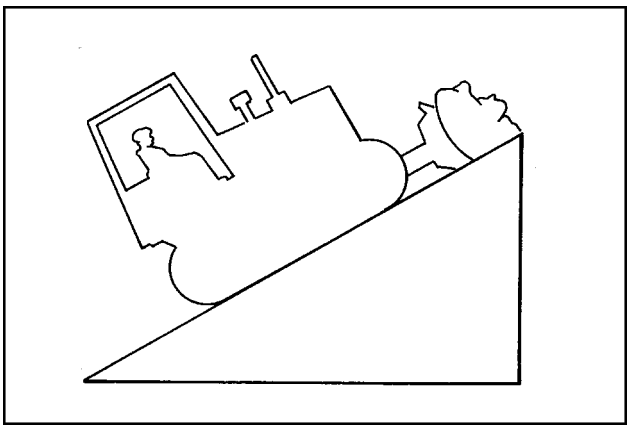
Ripping

- 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 change the attitude of the machine. This condition shifts the center of gravity and increases the weight of the machine on different parts of the lower frame.

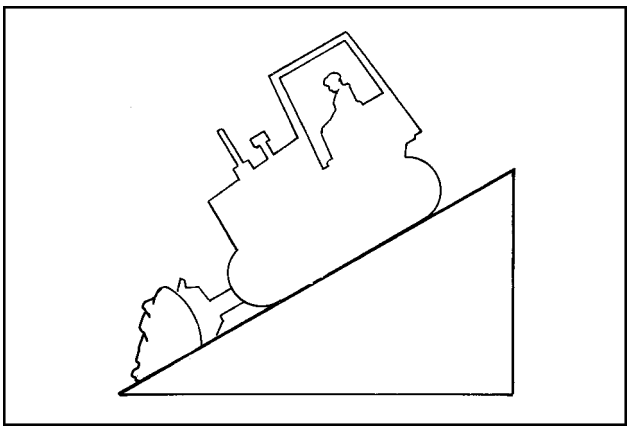
1. Working uphill – This condition moves the weight of the machine rearward, causing increased wear of the rear rollers and wear from forward travel of the sprockets and bushings.



RCIL10CWL004AAL 1

2. Working downhill – The machine weight is moved forward, increasing wear of the front rollers.

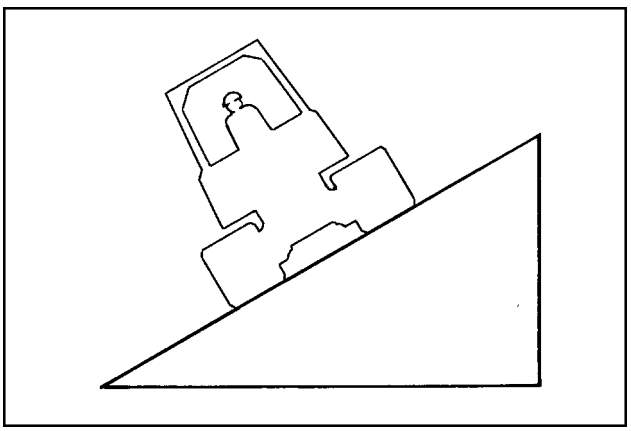
   NOTE: *However, due to the design of the track system, working downhill reduces the wear of the sprockets and bushings.*



RCIL10CWL005AAL 2

3. Working on a side slope – This shifts the weight of the machine toward the slope side of the machine.

   NOTE: *Wear is increased on the sides of the frame rail, the rollers and flanges of the tensioner wheel, the ends of the bushings, and the ends of the track shoes that are on the slope side of the machine.*

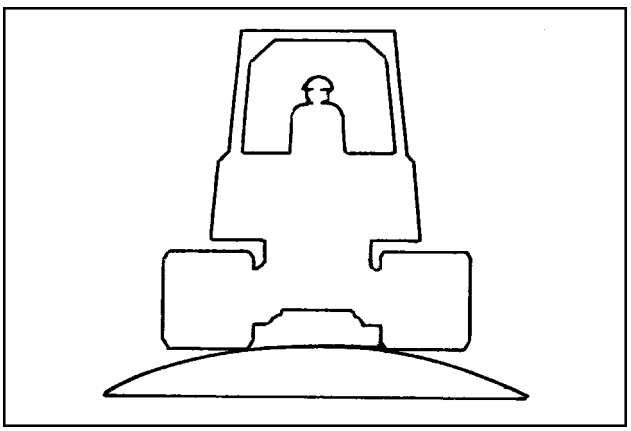


RCIL10CWL006AAL 3

4. Working on elevated ground – The internal components support the heaviest load.

   NOTE: *Wear is increased on the inner knuckles, on the surface of the roller bearing, on the surface of the tensioner wheel, and on the ends of the track plate.*

5. In extreme situations, there is too much external wear of the sprocket/bushing.

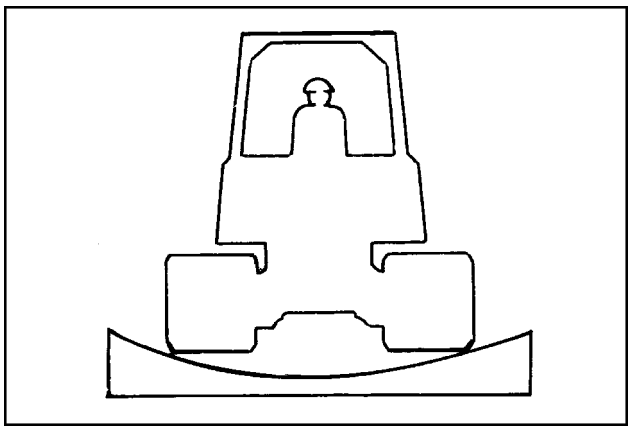


RCIL10CWL007AAL 4

6. Working on ground depression – The external components support the heaviest load.

   NOTE: *Wear is increased on the outer knuckles, on the surface of the roller bearing, on the surface of the tensioner wheel and on the ends of the track plate.*

7. In extreme situations, there is too much external wear of the sprocket/bushing.



RCIL10CWL008AAL 5

Clean tracks

Always clean the lower frame 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.

Engine starting aids

Starting the engine

⚠ DANGER

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

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1. Carry out all of the necessary procedures before starting the engine. See page **4-3** for detailed information.
2. Turn the ignition switch to ON (ON) and watch the instrument cluster.

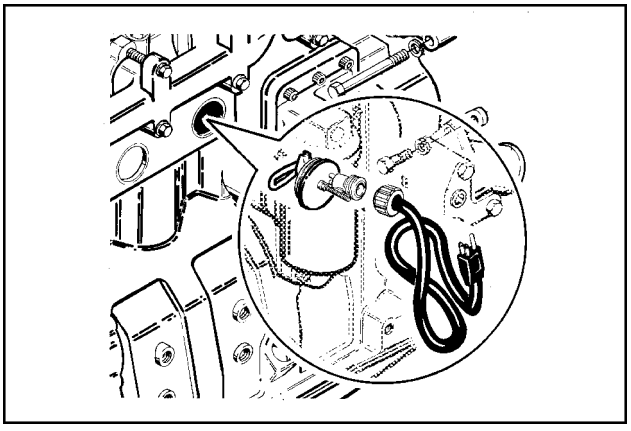
   NOTE: *The engine preheat warning light will illuminate if the temperature is low and engine preheating is required.*
3. Wait for the preheat warning light to go out before starting the engine (START).
4. Place the hand throttle in the middle position between fast (hare symbol) and slow (tortoise symbol) and keep it in this position until starting the engine.

NOTE: *For additional instructions to help start the engine, consult an authorized CASE CONSTRUCTION dealer.*

Engine coolant heater (if equipped)

1. Your machine allows installation of an engine coolant heater.

   NOTE: *Check the orifice on the right-hand side of the engine cylinders block.*
2. Consult an authorized CASE CONSTRUCTION dealer for information about purchase and installation of this option.
3. Follow the heater manufacturer's instructions for installation and operation.



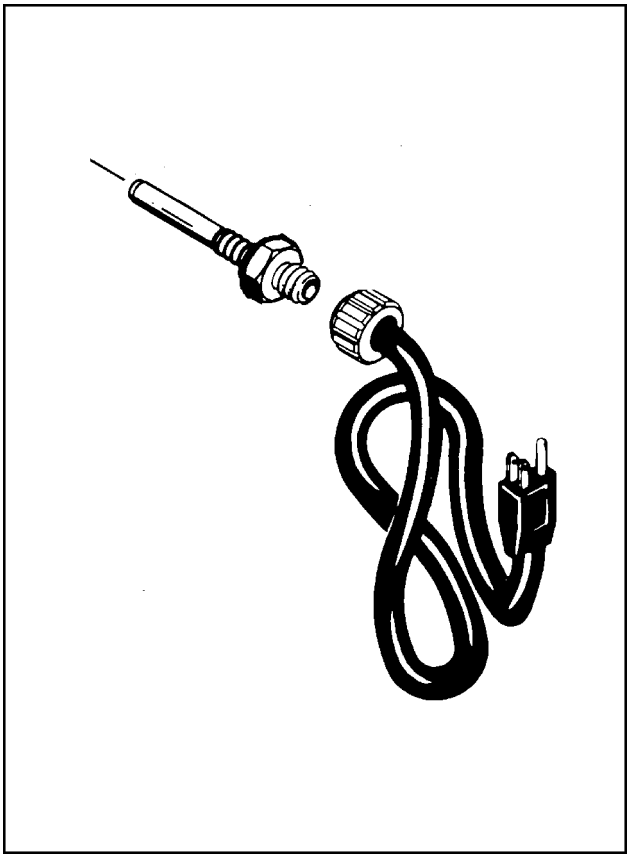
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Engine oil heater (if equipped)

1. Your machine allows installation of an engine oil heater.

   NOTE: *Check the orifice on the right-hand side of the engine oil reservoir.*

2. Consult an authorized CASE CONSTRUCTION dealer for information about purchase and installation of this option.
3. Follow the heater manufacturer's instructions for installation and operation.



RCIL10CWL002BAL 2

7 - MAINTENANCE

GENERAL INFORMATION

Maintenance and adjustments

⚠ 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

- Only use original parts and recommended fluids and lubricants. See the **8-1** page.

  NOTE: *Using fuel, lubricants, fluids or spare parts other than those recommended will immediately void the warranty.*
- Never change the fuel injection pump governor setting or the hydraulic system safety valve setting. Lead seals should be removed only by authorized personnel. Otherwise, the manufacturer rejects any responsibility in regard to the warranty.
- Always keep electrical components protected from water and humidity.
- Never remove electrical components such as the main electronic central unit, sensors, etc. as they may be irreversibly damaged.
- 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.
- Any modification to this machine without prior authorization could cause serious injury. Do not make any modifications without authorization. Consult your authorized dealer CASE CONSTRUCTION.
- Take particular care to replace all filters regularly. Clean filters mean longer engine running life.
- Handle and dispose of the waste in accordance with environmental regulations, laws, and government codes.

NOTICE: *When it is necessary to wash the machine, do NOT direct pressurized water or steam directly onto electrical or electronic components. Protect the following components:*

- Solenoid valves
- CPU, panels, and electronics
- Alternator and starter motor
- Electrical connectors and wiring harnesses
- Fuses and relays
- etc,

Preparing the machine for maintenance

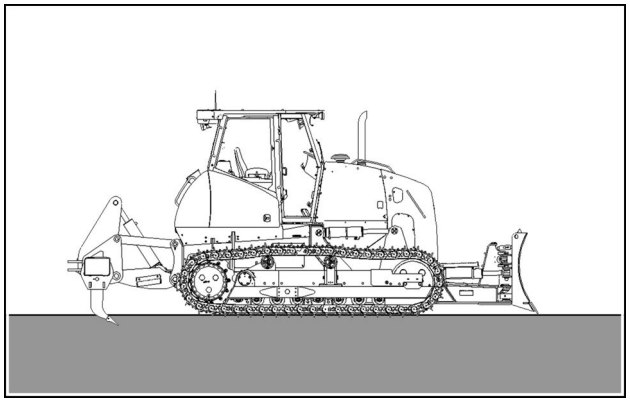
NOTICE: *Do not allow unauthorized persons to perform maintenance or repairs on the machine. Read this Manual carefully before starting, operating, filling or servicing the machine.*

Unless otherwise specified, all maintenance operations should be carried out as follows:

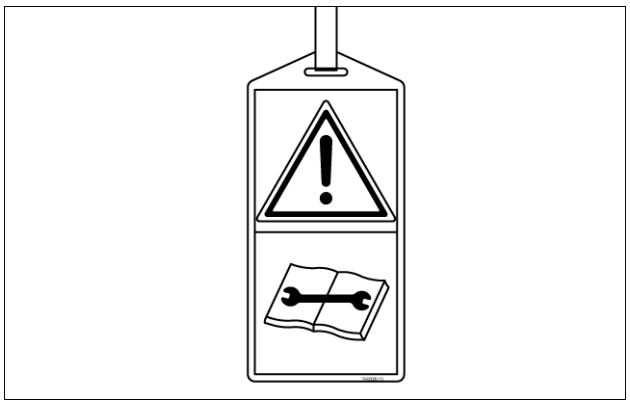
1. Park the machine on a flat, level, firm surface, away from any obstacles.
2. Keep all unauthorized personnel clear of the area.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Remove the key from the ignition switch.
7. Place chocks blocking the tracks.
8. Wait until all circuits are cool before you start servicing or repairing the machine.
9. Relieve all hydraulic pressure from the circuits.
10. Relieve all accumulator pressure for the appropriate circuit.
11. Attach a "DO NOT OPERATE" tag on the ignition switch or cab door, to inform that the machine is down for inspection or maintenance services.

    NOTE: *This tag will prevent accidental start-up of the machine.*

    NOTE: *Additional tags may be requested from an authorized CASE CONSTRUCTION dealer.*



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SP0043 2

Hour meter

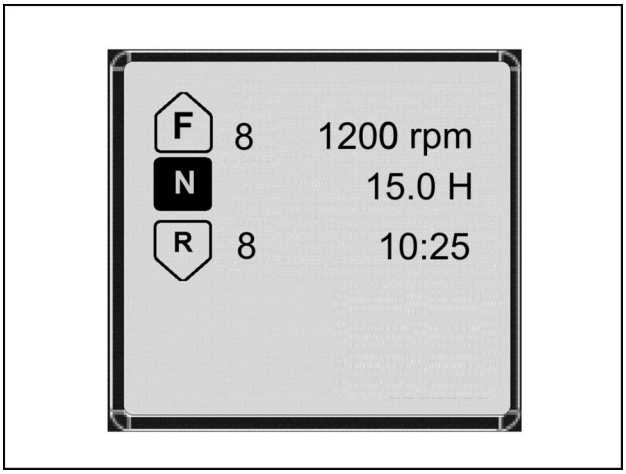
The hourmeter enables you to schedule the maintenance and lubrication operations of the machine. Its hourly indications are the same as those of a clock when the engine is running.

The maintenance intervals are carefully calculated to guarantee safe and efficient machine operation. Take a reading of the machine's hours worked and determine, based on the lubrication and maintenance table when and what type of maintenance is required.

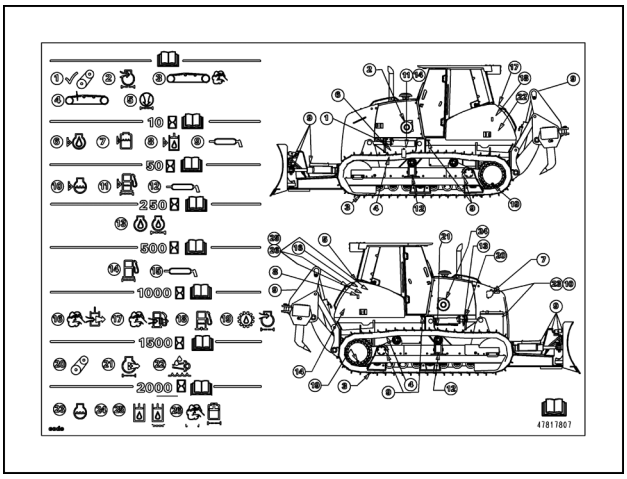
Service intervals indicated in the table refer to a machine working under normal operating conditions.

During the first hours of operation of the machine, or in severe conditions or in environments with a high concentration of dust, water, or mud, the intervals for maintenance must be reduced.

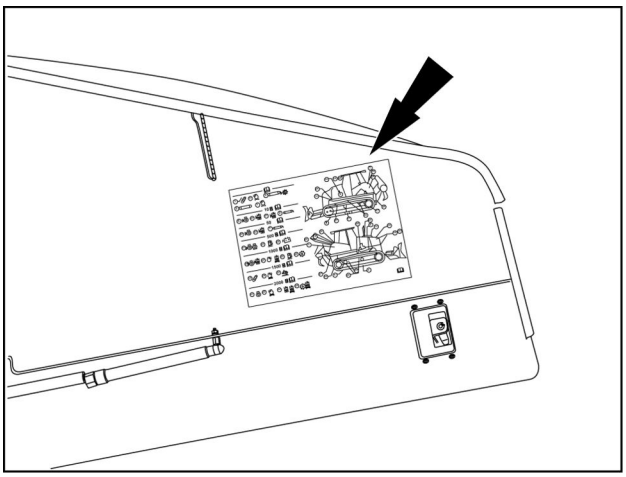
NOTICE: *Be sure to carry out all the servicing operations properly as defined in this manual.*



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Maintenance

NOTICE: *Most accidents involving machine inspection and maintenance services can be avoided by following basic safety procedures and precautions. Read and understand all the safety warnings contained in this manual and all the safety decals on the machine. Correctly follow the maintenance procedures.*

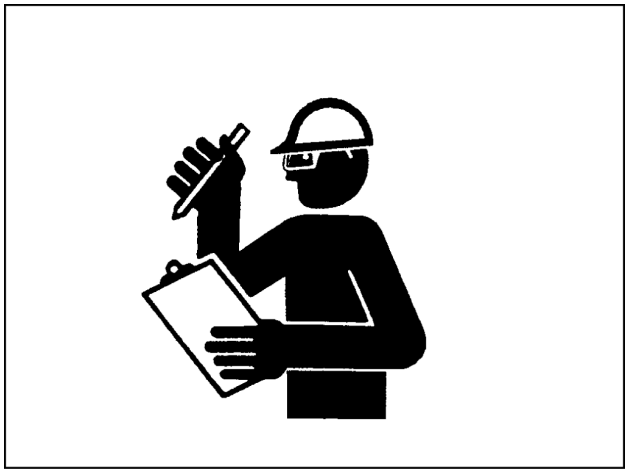
- Never service the machine (lubrication, repairs, adjustments) with the engine running, unless it is recommended.
- When removing or installing a machine component, make sure that the supports and lifting devices are appropriate for the load to be supported. Always remember that the fixing point that you choose on the machine for lifting must be suitable for the planned load and that the area for supporting the machine on the ground must be stable.
- Be well aware of the capacity of service jacks and other lifting equipment, as well as how to use them.
- Any load lifted with a service jack or with other lifting equipment is dangerous. Before starting work on the machine, transfer the weight from the jacks to another more secure means of support.
- Before performing inspection or maintenance services on the machine or on any component that may fall, make sure this component is securely locked, chocked, supported or blocked. Protect sharp objects and edges when carrying out service on the machine.
- Do not work around knuckles or other components of the machine which are not adequately supported and blocked.
- Never perform repairs on mechanical or pressurized components or components with fluid or gas before relieving the pressure according to the specifications of each component.
- Never use gasoline, diesel, petroleum jelly or other flammable products for cleaning operations. Only use authorized commercial solvents that are non-flammable and non-toxic.
- Never use your hand or any other body part to identify hydraulic leaks. The hydraulic system operates under high pressure and any leak, no matter how small, can penetrate the skin, causing serious injuries. Use a piece of cardboard or wood to locate the leak. Relieve the hydraulic pressure before shutting down the circuits, and when redoing the connections, make sure they are tight.
- Prior to performing maintenance operations that involve handling lubricant fluids, grease or coolant liquids, make sure to use certified protective equipment, such as protective clothing, rubber gloves and safety goggles to prevent contact with the eyes and skin. Prolonged contact of the skin with these substances could cause irritation and other problems on the skin. In the event an accidental contact occurs, wash with plenty of water and seek medical attention, if required.
- Following the presence of flammable fluids, do not use matches, cigar lighters or torches as lighting means when servicing the machine.
- Keep your hands and face away from loose connections during pressure tests on the injectors and injection systems. Also, wear protective glasses with side shields.
- When maintenance operations require access to any component or areas that cannot be reached from the ground, use a ladder or platform. If you do not have this equipment, use the means of access available on the machine, such as handrails and steps. Perform these operations with care.
- Make sure that all auxiliary electrical equipment (heaters, battery chargers, pumps and others) are properly grounded.
- Prior to starting the engine, warn all persons performing operations or working around the machine. Sound the horn.
- Always lock engine hood before servicing any component inside the engine compartment.
- Keep everyone away from the implements. Avoid accidents.
- Always use suitable tools to align the holes. Do not use hands or fingers.

Safety checks

NOTICE: *To operate the machine correctly means to prolong its working life. Follow the instructions contained in this manual before performing any maintenance on the machine.*

Check the machine every day before commencing the work:

1. Check controls and instruments.
2. Check the levels of fluid, oils, fuel, and coolant with the machine parked on firm, level ground, and the engine cold.
3. Check the hydraulic lines for leaks, kinking, wear or damages.
4. Visually inspect the machine outside, considering its condition. If there is any change, immediately repair or contact a dealer.
5. If the machine exhibits any fault, repair before starting or contact your dealer.



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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.
- Always check the level of fluids, and drain or fill the various compartments, with the machine on level ground and the engine shut down.
- The intervals specified in this manual refer to normal operating conditions. During the initial period of use (running in) and specific operating conditions, service intervals may be reduced.
- The following maintenance should be performed on regular schedules, but often need special attention when conditions require.

Radiator

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

Engine Air Filter

- Replace the primary element if the air filter restriction indicator lights up.
- Inspect the filter for damage.
- Wipe off the filter seal. Clean all of the dust from the air filter housing.
- For complete information see the maintenance chart and air filter replacement in this section.

Fuel Prefilter

- Check for water in the fuel system.
- Low temperatures can cause water to collect in the fuel reservoir.
- Check the first stage fuel filter for water.
- Drain any sediment and/or water that collects in the fuel system.

NOTE: *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.*

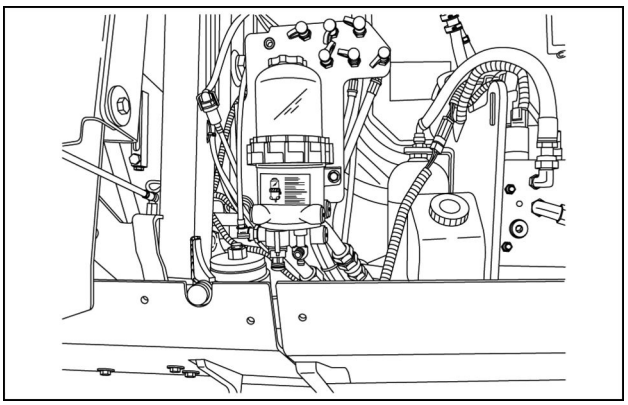
Track

- Clean the tracks and lower frame 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 low, 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 lower frame, the tracks may become too tensioned.
- Correct track adjustment is the most important factor that helps to control lower frame wear.

Access doors and filling locations

Engine hood (rear right-hand side)

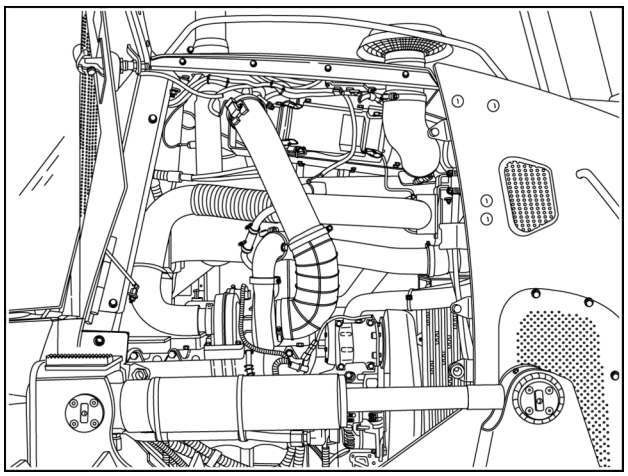
- Fuel filter
- Hydraulic filters
- Test points
- Hydraulic fluid sight gauge
- Windshield washer fluid reservoir



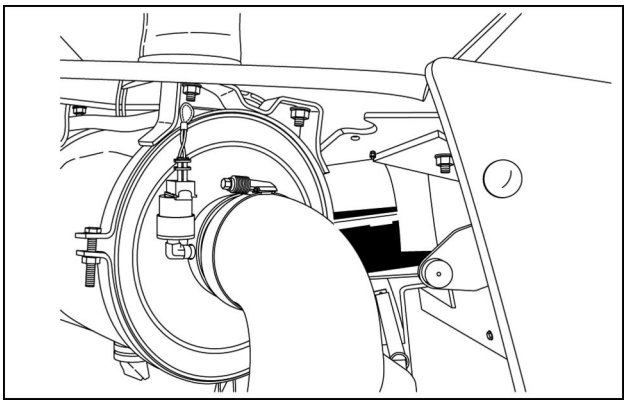
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Engine hood (front right-hand side)

- Oil Filter
- Crankcase breather
- Checking the engine coolant level



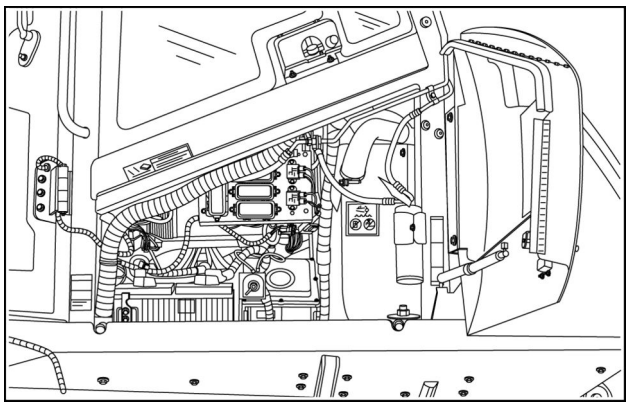
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Engine hood (rear left-hand side)

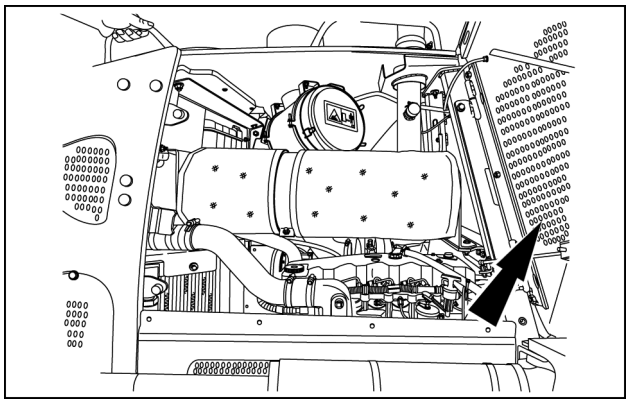
- Batteries
- Electronic disconnect
- Fuses



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Engine hood (front left-hand side)

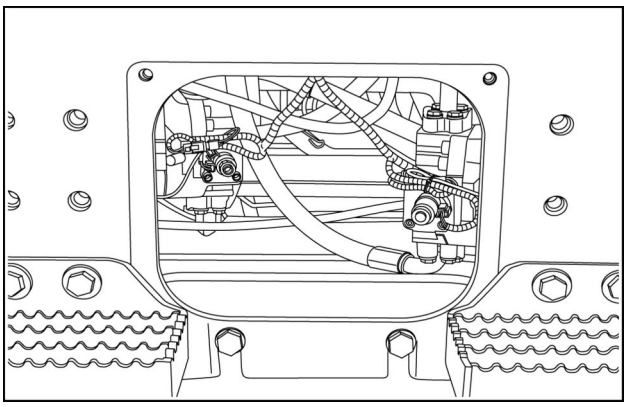
- Engine Air Filters
- Oil dipstick and engine oil fill
- Engine oil environmental drain (if equipped)
- Engine coolant environmental drain (if equipped)



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Rear access panel

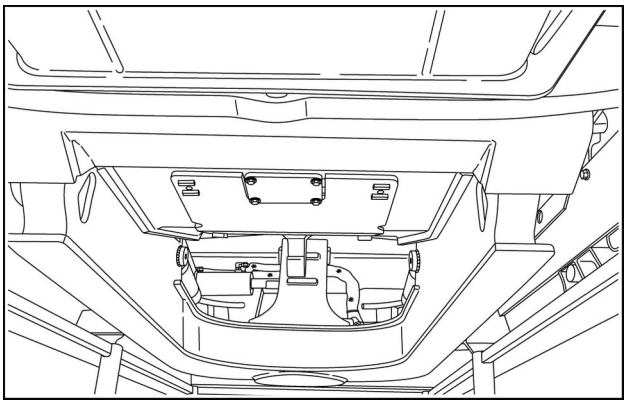
- Hydraulic fluid drain



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Lower frame panels

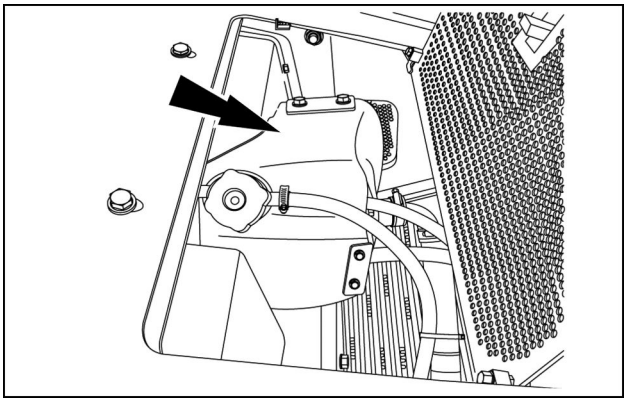
- Coolant Drain
- Draining the engine oil



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Hood top panel

- Coolant Filling



COIL16DOZ0015AA 8

Daily inspection

⚠ 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.

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Every day, before starting work, it is necessary to inspect the machine and service certain of its components.

Overall

- 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 the track tension and wear.
- Check for damage.

Engine

- Check the oil level, and change the oil, if necessary.
- Check the coolant level in the expansion tank.
- Check for clogging or damage to the radiator.
- Check the engine accessory drive belt condition.
- Check that the air filter restriction warning light is not illuminated on the console panel.
- Check for water or oil leaks on the components.
- Check the condition of all fuel lines.
- Check the fuel level in the reservoir.

Other

- Check the hydraulic reservoir level.
- Check that the hydraulic fluid is clean.
- Check the condition of all hydraulic lines.
- Check for electrical short-circuits.
- Check that all battery connections are properly tightened.
- Adjust the rear view mirrors.
- Check for fluid leaks in the cylinders.
- Check the condition of the blade and ripper (if equipped).

After Starting the Engine

- Did the engine start correctly? Is the exhaust smoke 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.

Releasing pressure in the hydraulic system

NOTICE: *Pressurized system!*
Hydraulic fluid leaking under pressure can penetrate the skin and cause serious injuries. To prevent personal injury, relieve all pressure before disconnecting the fluid lines or before starting maintenance services on the hydraulic system. Before applying pressure, make sure all connections are tight and all components are in good condition. Never use your hands 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 with these recommendations could result in death or serious injury.

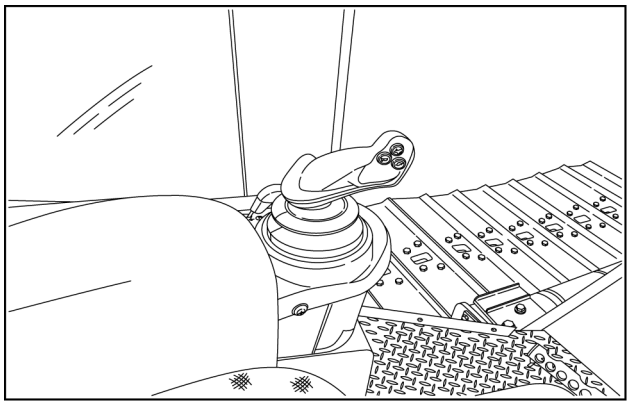
Releasing pressure from the hydraulic system

To release hydraulic system pressure, proceed as follows:

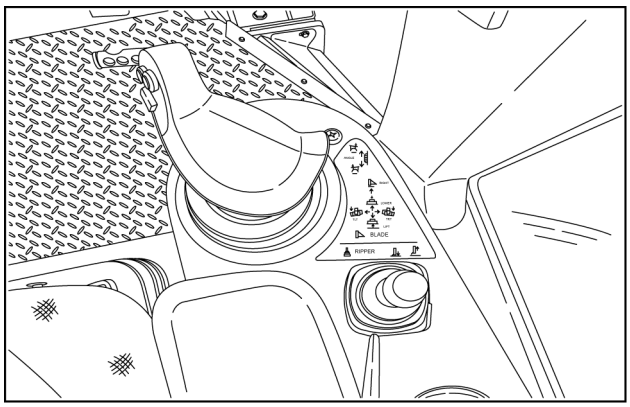
1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Turn the ignition key to the on position.

   NOTE: *Do not start the engine.*
7. Press and release the implement enable / disable switch to enable the machine hydraulics.

   NOTE: *When the function is on, a LED indicator will appear on the console.*
8. Operate the control levers from right to left and front to rear a dozen times approximately.
9. Shut down the engine, placing the ignition key in the off position.



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RAPH12DOZ0081AA 2

Hydraulic contamination

ATTENTION: *Contamination in the hydraulic system is a major cause of the malfunction of hydraulic components. Contamination is any foreign material in the hydraulic fluid.*

Contamination of the hydraulic system

- When you drain the fluid 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

Issues resulting from hydraulic contamination

NOTE: *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.*

- Cylinder rod seals that leak
- Control valve spools that do not return to neutral
- Movement of control valve spools is difficult
- Hydraulic fluid is 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.

ATTENTION: *If your machine has any of these issues, check the hydraulic fluid for contamination. There are two types of contamination: microscopic and visible.*

Microscopic contamination of the hydraulic system

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

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

Visible contamination of the hydraulic system

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

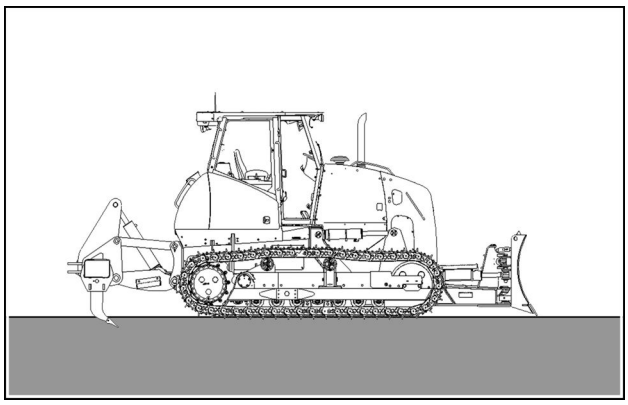
- Particles of metal or dirt in the fluid
- Air in the fluid
- Dark or thick fluid
- Fluid that smells burned
- Water in the fluid

ATTENTION: *If you find contamination, use a Portable Filter to clean the hydraulic system.*

Cab floor / Access to the operator's seat

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

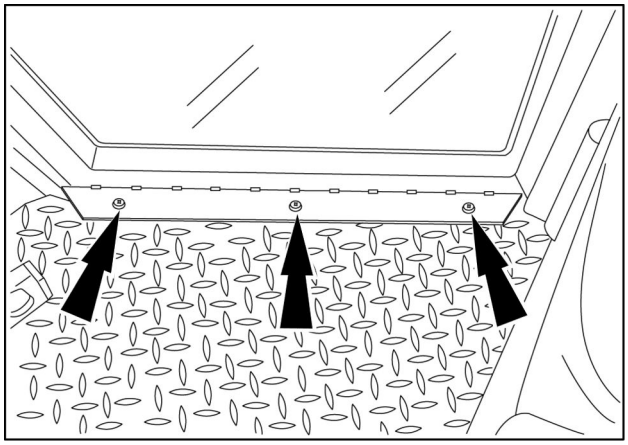
   ATTENTION: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****.*



COIL14DOZ0001AA 1

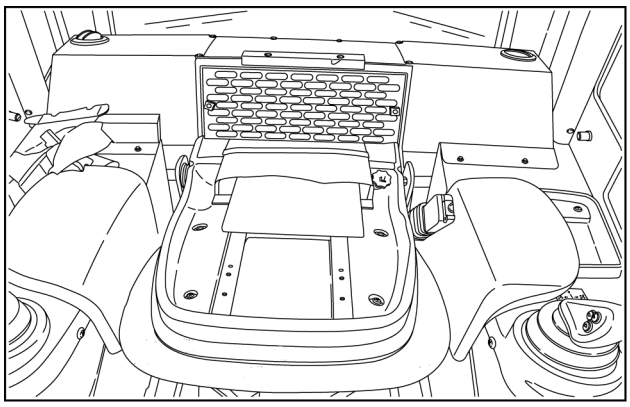
NOTE: *A number of hoses and components are located beneath the cab floor and seat that do not require routine operator maintenance. Should it be necessary, the components can be accessed by removing the cab floor mat and tilting the operator's seat back.*

7. Remove the screws from the floor mat along the threshold of both doors.
8. Lift the mat over the foot pedals and remove from the cab.



RAIL12DOZ0232AA 2

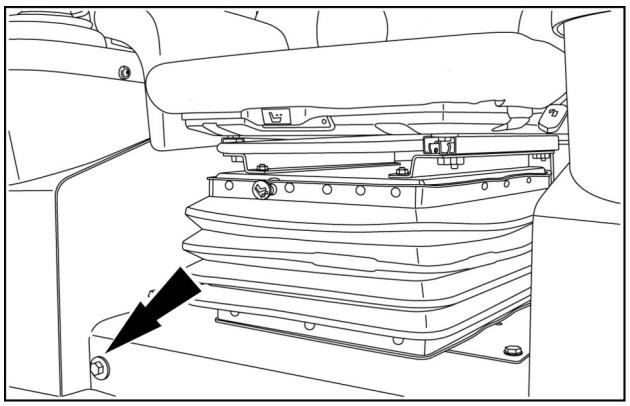
9. Tilt the operator seat back to a compact forward position to prevent obstruction.



RAPH12DOZ0074AA 3

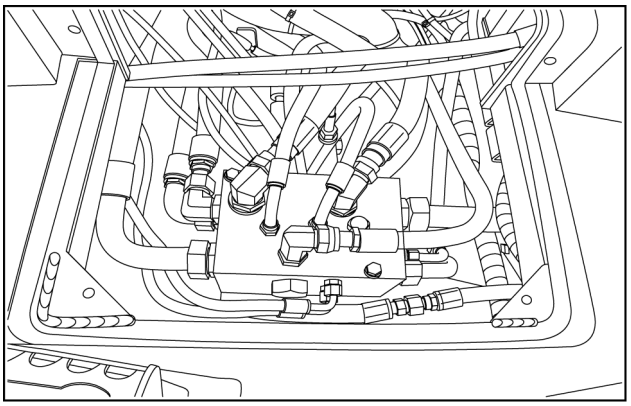
10. Remove the bolts from each side of the lower front seat frame (one each side).

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



RAPH12DOZ0075AA 4

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



RAPH12DOZ0094AA 5

MAINTENANCE CHART

Maintenance chart

Maintenance action	Replace	Check	Grease	Cleanout	Change fluid	Drain fluid	Page No.
As required							
Engine air filters (Replacement)	x						**7-17**
Cab air recirculation filter / Cab air filter	x						**7-19**
Drive belt (Alternator and air-conditioning compressor) (Replacement)	x						**7-23**
Cab protection (ROPS and FOPS)		x					**7-27**
Seat belt / Operator's seat		x					**7-28**
Doors and windows			x				**7-29**
Tracks		x					**7-30**
Ripper / Ripper teeth	x						**7-33**
When the warning lamp lights							
Warning light on		x					**7-36**
EVERY 10 HOURS							
Engine oil level		x					**7-37**
Engine coolant (Level check)		x					**7-39**
Hydraulic reservoir fluid level		x					**7-41**
Lubrication points – Blade (PAT models)			x				**7-42**
Lubrication points – Blade (BD models)			x				**7-46**
INITIAL 20 HOURS							
Tracks		x					**7-50**
EVERY 50 HOURS							
Fuel filter (Drain)					x		**7-51**
INITIAL 100 HOURS							
Fuel filter (Replacement in initial period)	x						**7-52**
Hydrostatic filter/hydraulic filter (Replacement in initial period)	x						**7-53**
Tracks		x					**7-30**
Changing the final drive oil / Planetary reducer oil					x		**7-60**
EVERY 250 HOURS							
Engine air filter restriction sensor (Verification)		x					**7-62**
Drive belt (Alternator and air-conditioning compressor) (Check)		x					**7-64**
Air-conditioning condenser (Fan cleaning)						x	**7-67**
EVERY 500 HOURS							
Fuel filter (Replacement)	x						**7-69**
Engine oil and filter (Replacement)	x						**7-71**
Engine crankcase breather filter (Replacement)	x						**7-74**
Air intake lines (Checking the hoses and clamps)		x					**7-76**
EVERY 1000 HOURS							
Fuel tank					x		**7-78**
Fuel tank cap						x	**7-80**
Hydraulic reservoir breather filter replacement	x						**7-82**
Changing the final drive oil / Planetary reducer oil					x		**7-84**
EVERY 1200 HOURS							
Engine crankcase breather filter (Replacement)	x						**7-74**
EVERY 1500 HOURS							
Engine crankcase breather filter	x						**7-87**
Engine valve clearance - Check and adjust		x					**7-88**
EVERY 2000 HOURS							

Maintenance action	Replace	Check	Grease			Drain fluid	Change fluid	Cleanout	Page No.
Engine coolant (Change) (For 2050M models up to serial number HBZN2050HJAC00953)						x			**7-89**
Hydrostatic fluid and filter/hydraulic fluid and filter (Replacement)	x								**7-91**
Hydraulic suction filter (Cleaning) (For 2050M models up to serial number HBZN2050HJAC00953)								x	**7-95**
EVERY 4000 HOURS									
Engine coolant (Change) (For 2050M models from serial number HBZN2050HJAC00954)						x			**7-97**
Hydraulic suction filter (Cleaning) (For 2050M models from serial number HBZN2050HJAC00954)								x	**7-99**
ELECTRICAL SYSTEM									
Battery service								x	**7-101**
Starting with auxiliary batteries		x							**7-104**
Battery replacement	x								**7-105**
Fuses and relays (Replace)	x								**7-107**
Work lights	x								**7-111**

As required

Engine air filters (Replacement)

⚠ 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

NOTICE: *Replace the primary and secondary engine air filter elements IMMEDIATELY when the engine air filter warning light comes on.*

NOTE: *Under normal sensor operating conditions, a warning light on the instrument cluster should briefly illuminate on start-up and then should go out.*

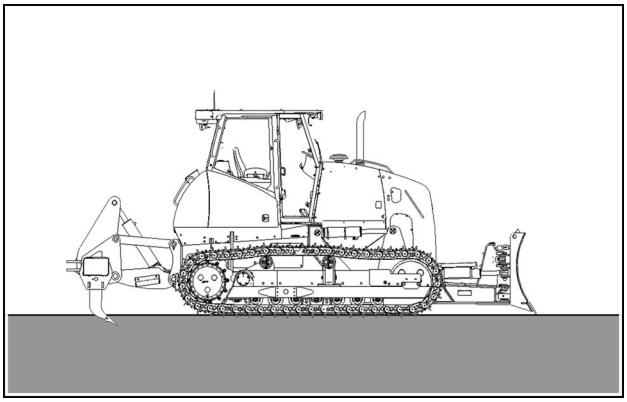
NOTE: *Check the operation of the engine air filter restriction sensor every 250 hours of operation or more frequently (shorter periods) when you operate the machine in extreme conditions. See page* ***7-62*** *for more information.*

NOTE: *Handle and dispose of the waste in accordance with environmental regulations, laws and government codes.*

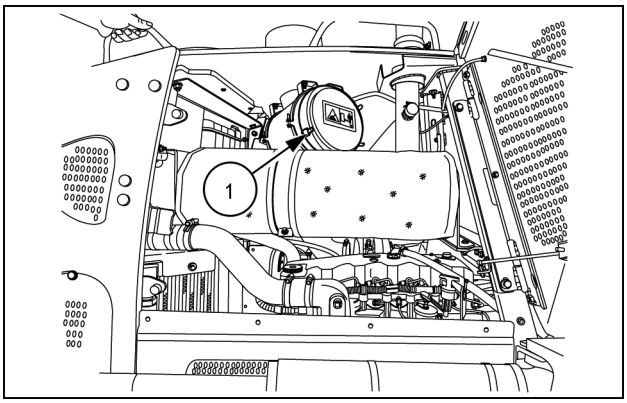
Replacement of the engine air filter elements

To replace the engine air filter elements, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Place the ignition key in the "OFF" position to shut down the engine.
5. Set the parking brake.
6. Make sure that all residual pressure of the hydraulic system is relieved from the circuits before you begin the verification and maintenance procedures. See page **7-11**.
7. Open the left-hand side engine compartment (which gives you access to air filters). Lock the compartment in the open position.
8. Loosen the fastening clips **(1)** and remove the filters cover.

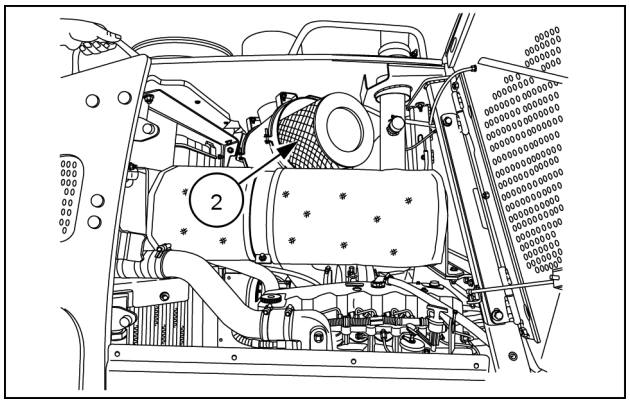


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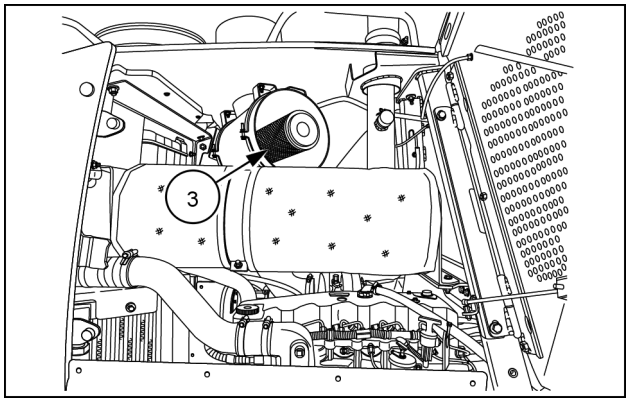


COIL15DOZ0086AA 2

9. Extract the primary air filter element **(2)** and the secondary air filter element **(3)**.
10. Clean the inside of the filter housing with a clean cloth.
11. Install a new secondary air filter element and a new primary air filter element. Make sure that the elements are correctly seated.
12. Reinstall the filters cover. Secure with the fastening clips **(1)**.
13. Close the cover to the engine compartment.



COIL15DOZ0087AA 3



COIL15DOZ0088AA 4

Cab air recirculation filter / Cab air filter

⚠ CAUTION

Eye injury hazard!
Wear protective goggles when using compressed air.
Failure to comply could result in minor or moderate injury.

C0035A

Replacing the cab air recirculation filter

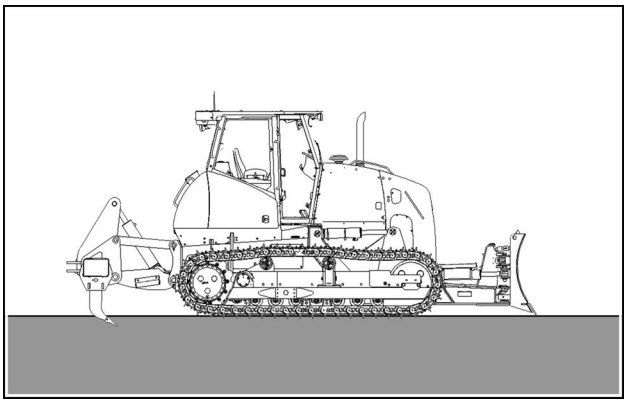
NOTICE: *The cab air recirculation filter should be replaced when needed. Inspect the cab air recirculation filter more frequently (shorter periods) when operating the machine in severe conditions or in environments with a high concentration of dust.*

To replace the cab air recirculation filter, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

   ATTENTION: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****.*

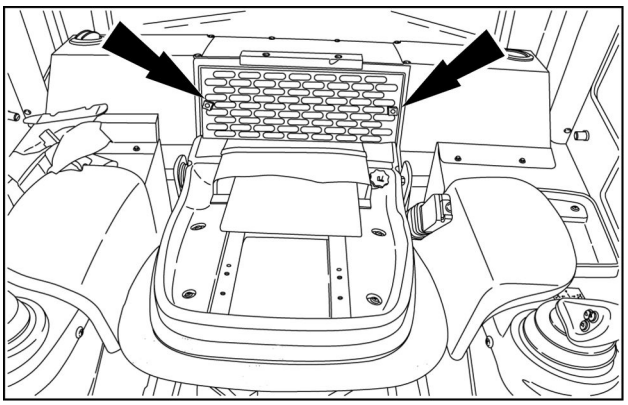
   NOTE: *The cab air recirculation filter is located behind the operator's seat.*



COIL14DOZ0001AA 1

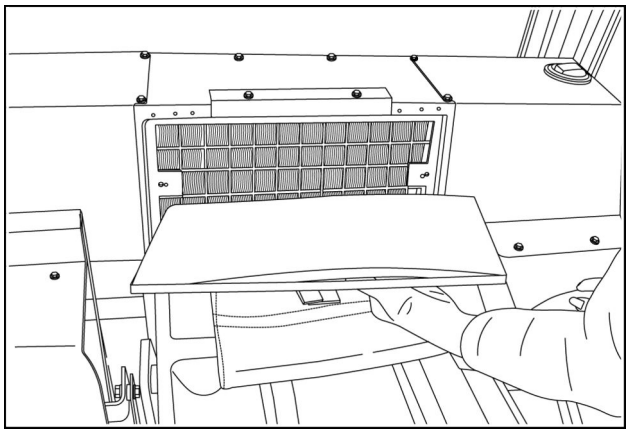
7. Move the operator's seat fully forward and lower the backrest .
8. Remove the retaining screw that holds the recirculation filter cover.
9. Remove the filter and dispose of it properly.
10. Wipe the housing clean.

    NOTE: *Clean the housing of the cab air recirculation filter with compressed air.*



RAPH12DOZ0074AA 2

11. Install a new cab air recirculation filter.
12. Install the recirculation filter cover and tighten the screws securely.
13. Reposition the operator's seat.



RAIL12DOZ0164AA 3

Replace of the cab air filter

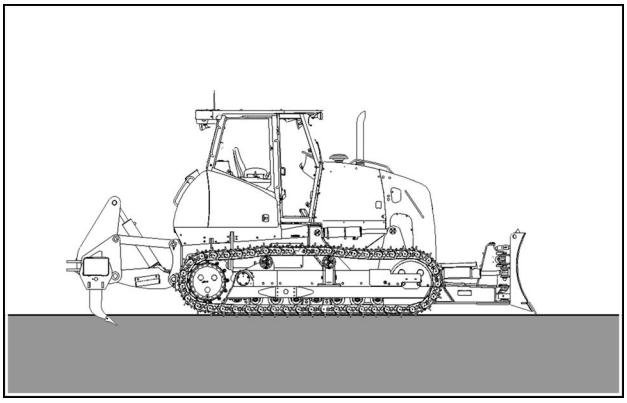
NOTICE: *The cab air filter should be replaced when needed. Inspect the cab air filter more frequently (shorter periods) when operating the machine in severe conditions or in environments with a high concentration of dust.*

To replace the cab air filter, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

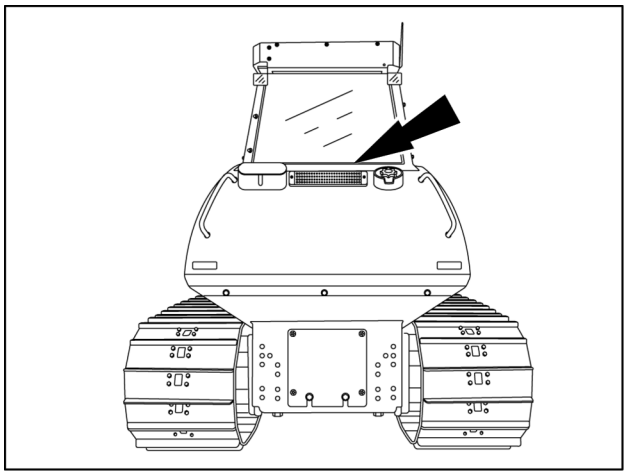
   ATTENTION: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****.*

   NOTE: *The cab air filter is located behind the operator compartment.*



COIL14DOZ0001AA 4

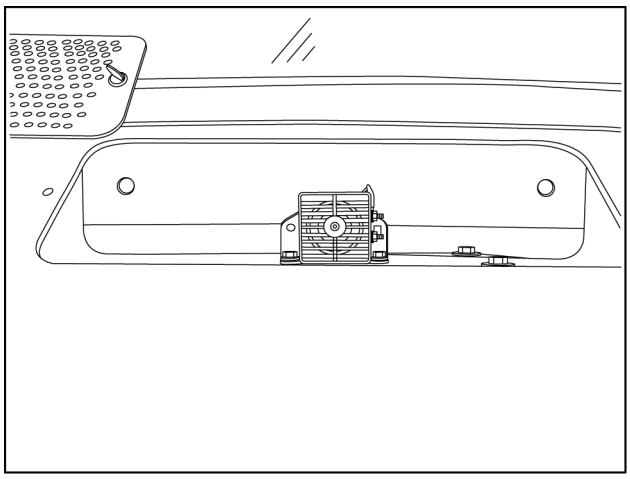
7. Remove the screws from the outer cover of the cab air filter, and remove the cover.



RAIL12DOZ0396AA 5

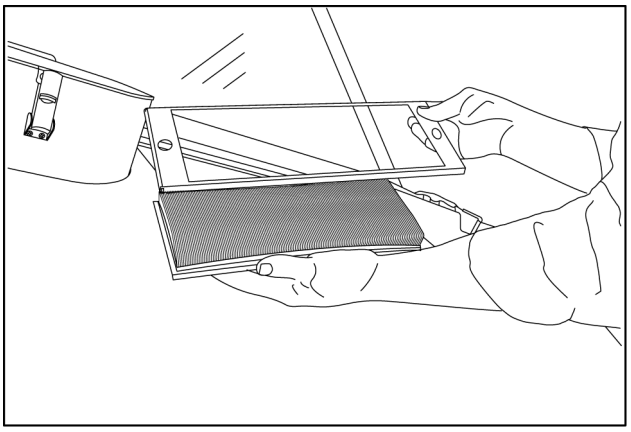
8. Remove the inner cover of the cab air filter.
9. Remove the filter and the mounting bracket.
10. Dispose of the used filter properly.
11. Wipe the housing clean.

    NOTE: *Clean the housing of the cab air recirculation filter with compressed air.*



RAIL12DOZ0187AA 6

12. Install a new filter with the mounting bracket on the filter housing.
13. Install the inner cover of the cab air filter and tighten the screws securely.
14. Install the outer cover of the cab air filter and tighten the screws.



RAIL12DOZ0186AA 7

Drive belt – (Alternator and air-conditioning compressor) (Replace)

⚠ 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.

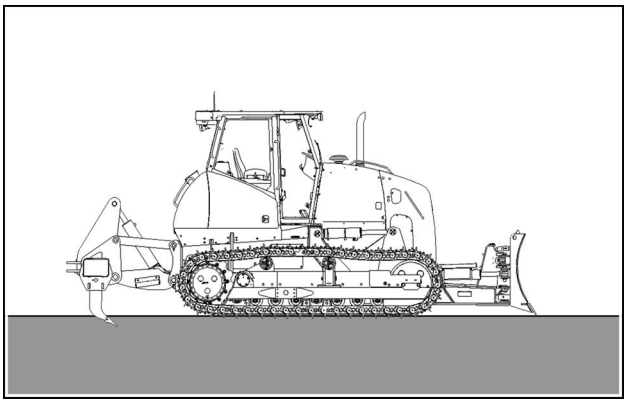
W0097A

NOTICE: *The drive belt of the alternator and air-conditioning compressor must be checked every 250 hours of operation and replaced as necessary.*

NOTE: *Visually check the belt for the correct tension, wear, and damage. Incorrect belt tension may cause battery charge failure, engine overheating, or premature wear.*

Replacement of the drive belt of the alternator and air-conditioning compressor

To replace the drive belt of the alternator and air-conditioning compressor, proceed as follows:

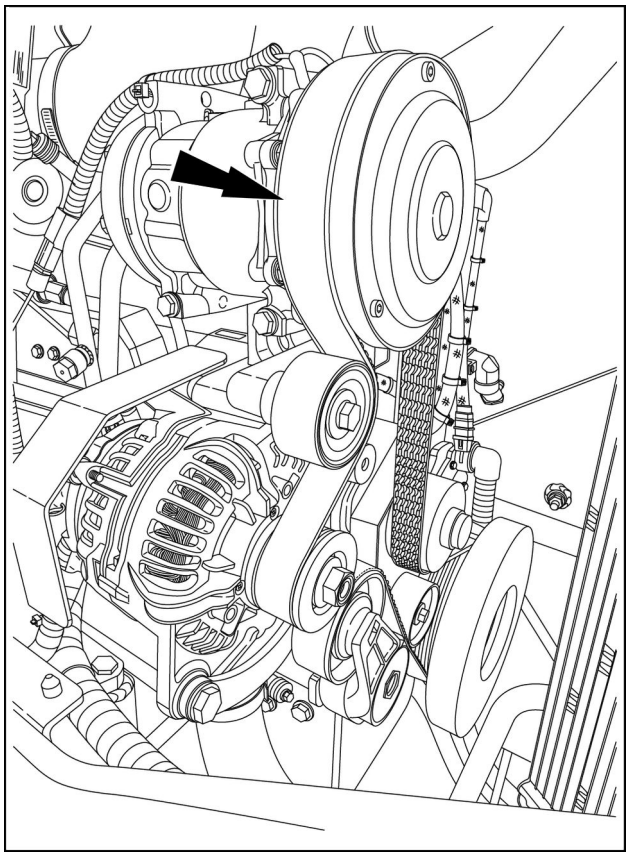


COIL14DOZ0001AA 1

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Place the ignition key in the "OFF" position to shut down the engine.
5. Set the parking brake.
6. Make sure that all residual pressure of the hydraulic system is relieved from the circuits before you begin the verification and maintenance procedures. See page **7-11**.
7. Turn off the master switch. See page **3-63**.
8. Open the engine compartment side covers to access the engine accessory drive belt.

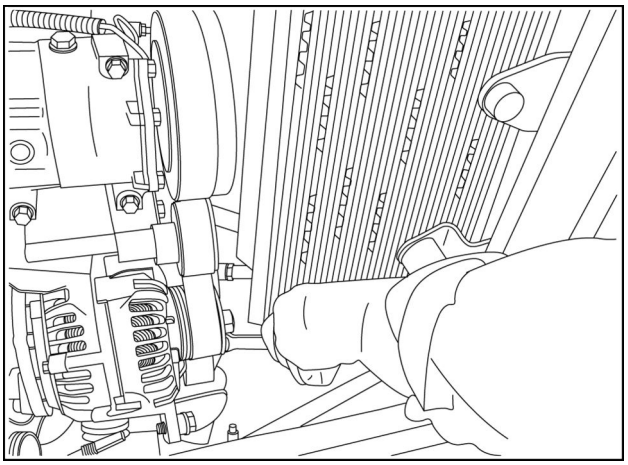
Belt removal

1. Locate the drive belt.



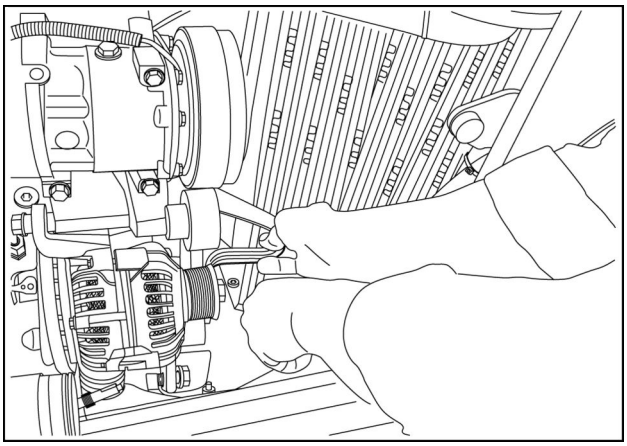
COIL19DOZ0030BA 2

2. Use a power cable and a **1/2 in** socket and work on the tensioner fitting to compress the tensioner spring enough to remove the drive belt.



RAIL12DOZ033AA 3

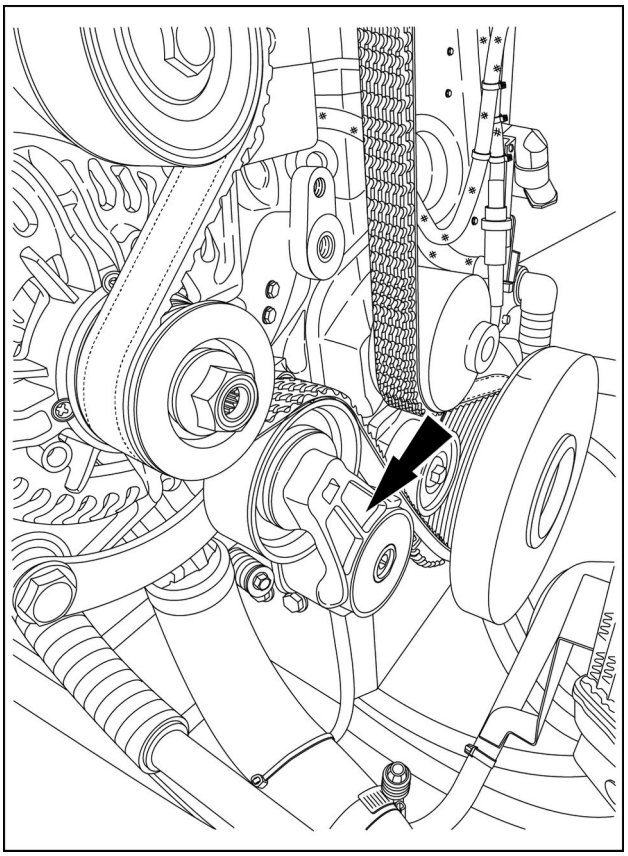
3. Remove the drive belt from pulleys. Start with the water pump pulley.



RAIL12DOZ032AA 4

Belt installation

1. Use a power cable and the **1/2 in** socket and work on the tensioner fitting to fully compress the tensioner spring. Fit the belt over all the pulleys. Leave the water pump pulley for last.
2. Install the belt. Carefully note whether the “Poly-V” grooves fit perfectly with the existing channels on the pulleys.
3. Release the tensioner arm.
4. Check belt tension.



COIL19DOZ0028BA 5

Checking the belt tension

NOTE: *The drive belt is tensioned by an automatic tensioner. If the tensioner arm reaches its end of stroke, the belt should be replaced immediately.*

NOTE: *If the engine runs with the drive belt loose, the drive belt can slip. This may cause premature wear, the engine to overheat or the battery to receive insufficient charge. In addition, the air-conditioning system may not work properly.*

Cab protection (ROPS and FOPS)

NOTE: *Your machine is equipped with safety systems certified to protect the operator's cab, ROPS or FOPS.*

The ROPS is a rollover protective structure and the FOPS is a falling object protective structure. A FOPS may be a cab frame or a two-posted or four-posted frame used for the protection of the operator to minimize the possibility of serious injury.

The protective structure, the mounting supports and the securing elements on the machine are integral parts of the ROPS or FOPS. The protective structures are special safety components of your machine.

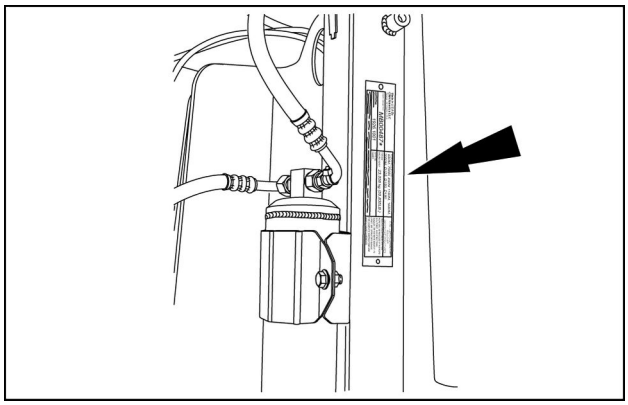
Use of the ROPS and FOPS is essential when operating where there is a danger of falling rocks or debris or when there is a danger of frontal impacts with objects that could penetrate the operator's cab. If the machine was not originally equipped with ROPS or FOPS cab protections, you can contact a dealer to request installation of the cab protections.

ATTENTION: *Do NOT connect any device to the protective structure for purposes of lifting the cab or towing the machine. DO NOT weld, drill or attempt to straighten or repair protection structures. Any type of modification could influence the structural integrity of the safety system, jeopardizing its effect, with serious consequences for the operator, in case of collision, falling objects or landslides.*

ATTENTION: *After a fire, corrosion or collisions, any possible damage to the cab protective structure must be carefully evaluated by specialized and qualified technicians. In any case, all damaged parts must be replaced by genuine spare parts, so that the original conditions are reinstated. Contact an authorized CASE CONSTRUCTION dealer to check that the cab structure is functioning properly or whether the entire structure or parts of it need to be replaced.*

ROPS identification plate

1. The machine has an ROPS plate showing the ROPS certification, gross weight, approval, regulation and model number of the machine.
2. Check and inspect the ROPS structure and the seat belt system as required.
3. The ROPS certification plate is located inside the left-hand rear access compartment.



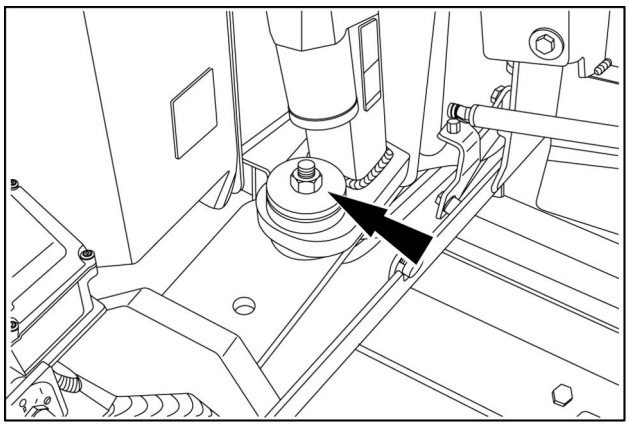
COIL14DOZ0107AA 1

Tightening torques of the ROPS mounting bolts

1. Make sure that all the ROPS mounting bolts are secure and tight.
2. If necessary, tighten all ROPS mounting bolts (both sides) to:
   773 – 854 N·m (**570.1 – 629.9 lb ft**)Series tractors.

NOTE: *Torque specifications are for clean, dry threads.*

3. Check for cracks, rust or holes in the ROPS and in its parts. Age, weather and accidents can damage the ROPS and its parts. If you have any doubt about the integrity of the ROPS system, see your authorized CASE CONSTRUCTION dealer.



RAIL12DOZ0175AA 2

Shoulder belt / Operator’s seat

Seat belt mounting bolts

⚠ 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

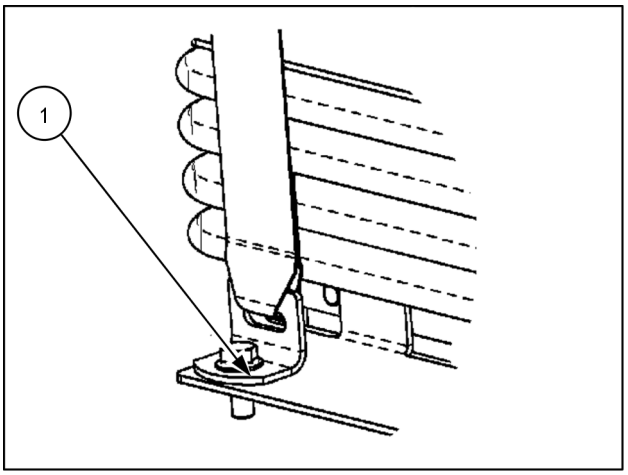
NOTE: *Before operating this machine, always make sure the ROPS and operator’s seat belt are correctly installed. The seat belt is an important part of the ROPS. You must wear the seat belt at all times when you operate the machine.*

1. Make sure that all the seat belt mounting bolts **(1)** are secure and tight.
2. If necessary, tighten all the seat belt mounting points to:
   73 – 87 N·m (**53.8 – 64.2 lb ft**) .
3. Visually inspect the seat belt.

NOTE: *If the seat belt is torn, frayed, or the mechanism is damaged, replace the seat belt.*

4. Keep the seat belts clean, washing them only with soap and water.

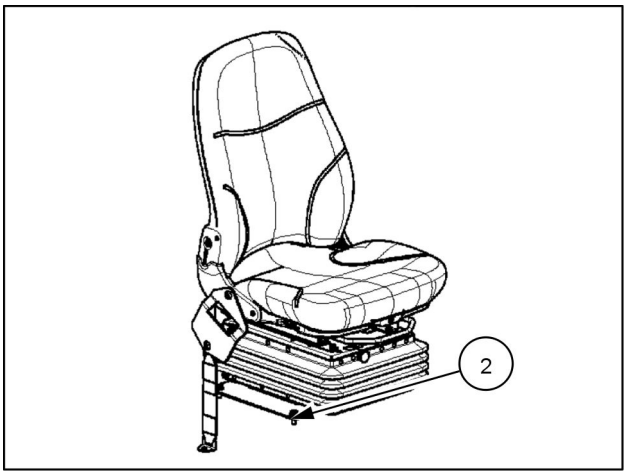
NOTE: *Do not use bleach or dye on the seat belts. This will weaken their composition.*



RAPH12DOZ0389AA 1

Operator's seat mounting bolts

1. Make sure that all of the mounting bolts **(2)** that hold the operator's seat to the cab are properly torqued (two on each side).
2. If necessary, tighten all the operator's seat mounting points to:
   54 N·m (**39.8 lb ft**)Series tractors.



RAPH12DOZ0388AA 2

Doors and windows

⚠ 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

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.

Lubricate door and window hinges

NOTICE: *The door and window hinges should be lubricated every 2000 hours of operation or more frequently (shorter periods) when operating the machine in extreme conditions.*

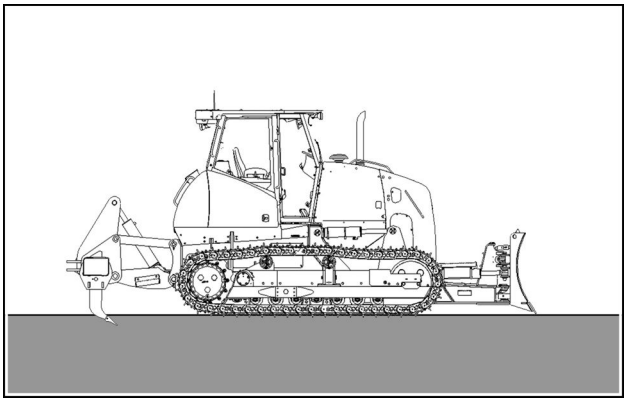
To lubricate the door and window hinges, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

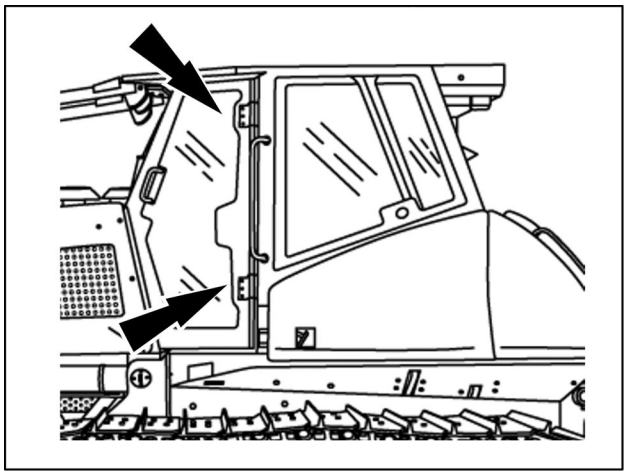
   ATTENTION: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****,*

7. Lubricate the door and window hinges as indicated in figure **2**, using graphite.

   ATTENTION: *Do not use grease to lubricate the hinges.*



COIL14DOZ0001AA 1



RAPH12DOZ0385AA 2

Tracks

⚠ 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

Checking the track tension

NOTICE: *Track tension should be checked in the first 100 hours of operation during the initial break-in period, or more frequently (shorter periods) when operating the machine in extreme conditions such as on terrain with gravel, mud or sharp stones, or even if the tracks are replaced.*

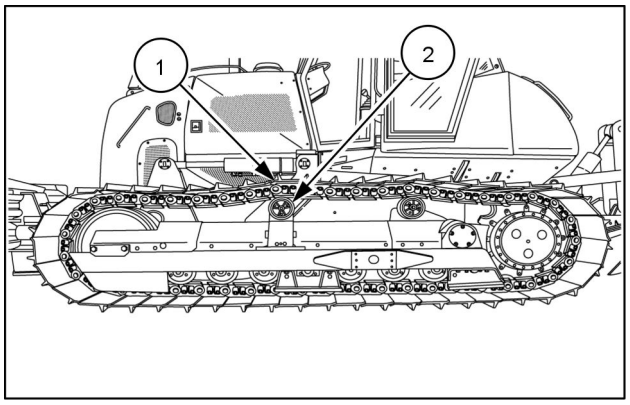
NOTICE: *Clean the tracks and undercarriage as required or at the end of the work shift. When material packs and collects on the undercarriage parts the tracks may become too tight. Correct track adjustment will help control undercarriage wear. Maintain correct track tension.*

To check the tension of the tracks, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Move the machine backward the length of the track, and then forward the length of the track.

   NOTE: *This will make the bottom of the track tight.*
3. Slowly park the machine on a flat, level, firm surface, away from any obstacles.
4. Do not use the brakes to stop.
5. Stop the machine so that one of the pins **(1)** in the track chain is aligned over the front upper roller **(2)** (the roller nearest the tensioner wheel).
6. Support the implements on the ground.
7. Shut down the engine and remove the key.
8. Set the park brake.
9. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

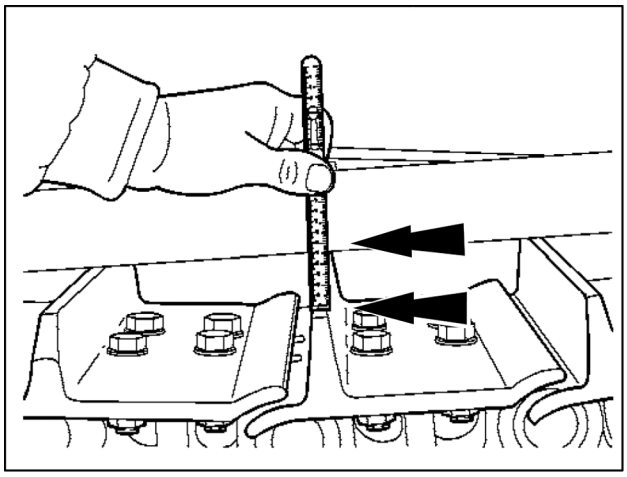
   ATTENTION: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****,*
10. Stand to the side of the tracks between the front and rear upper rollers, and then between the tensioner wheel and the front upper roller.



RAPH12DOZ0110AA 1

11. Measure the distance from the center of the track, between the upper roller and the tensioner wheel, as indicated in figure **2**.
12. Then measure the distance from the center of the track, between the two upper rollers.

    NOTE: *Average the two measurements and adjust the track to average between* ***44.50 – 58.00 mm*** *(****1.75 – 2.25 in****).*



RAIL12DOZ0384AA 2

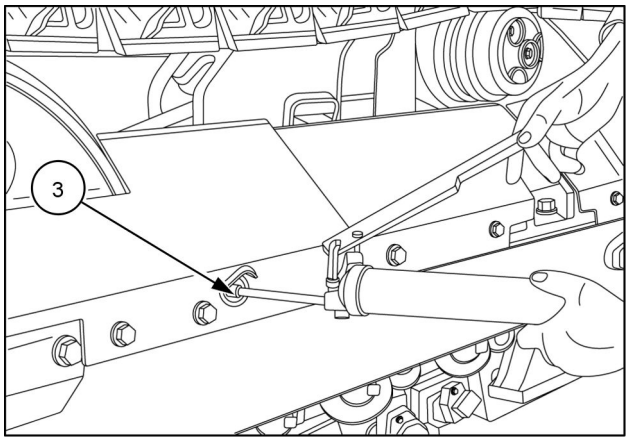
Increasing the track tension

To increase track tension, proceed as follows:

1. Use the track adjuster grease fitting to adjust its tension.

   NOTE: *Adding grease will reduce deflection and increase the track tension.*
2. Pump grease into the fitting **(3)** until deflection is correct.
3. Move the machine backward the length of the track, and then forward the length of the track.

   NOTE: *This will make the bottom of the track tight.*
4. Bring the macine slowly to a stop.
5. Do not use the brakes to stop.
6. Check the deflection of the track again and adjust, if necessary.
7. Repeat the procedure for the other track.



RAIL12DOZ0374AA 3

Reducing the track tension

To reduce the tension of the tracks, proceed as follows:

1. Decrease the track tension with an adjustment to the grease seal fitting.

   ATTENTION: *The grease is UNDER EXTREME PRESSURE. Be careful and loosen the grease seal connection SLOWLY. Wear full coverage face protection before proceeding.*

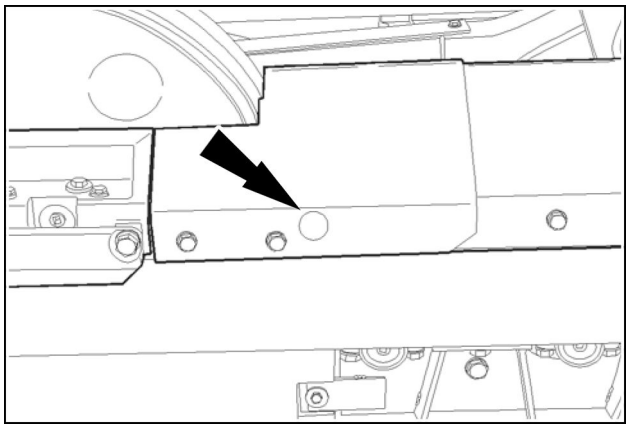
2. Use a **3/4 in** long socket and loosen the grease seal fitting SLOWLY, about two turns.

   ATTENTION: *DO NOT REMOVE the connector! Allow the grease to be removed until the track deflection is within the proper range.*

3. When complete, re-torque the grease seal fitting to **59.7 – 74.6 N·m** (**44 – 55 lb ft**).
4. Move the machine backward the length of the track, and then forward the length of the track.

   NOTE: *This will make the bottom of the track tight.*

5. Bring the macine slowly to a stop.
6. Do not use the brakes to stop.
7. Recheck the track tension.
8. Repeat the procedure for the other track.



RCIL10CWL080AAL 4

Ripper / Ripper teeth

⚠ 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

Replacement of the ripper teeth or shanks

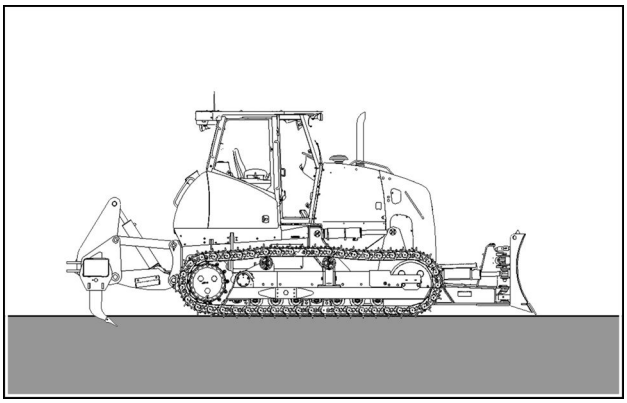
NOTICE: *The ripper teeth or shanks may require periodic replacement. Check the condition of the ripper teeth or shanks more frequently (shorter periods) when operating the machine in extreme conditions. Use care when lifting heavy objects. Always use adequate lifting equipment.*

To replace the ripper teeth or shanks, proceed as follows:

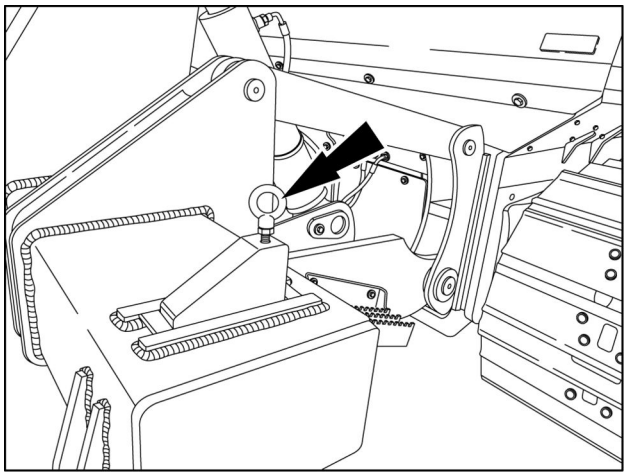
1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

   ATTENTION: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****,*

7. The ripper shanks have a threaded orifice for lifting.
8. Insert an appropriately sized I bolt when replacing the ripper shanks.

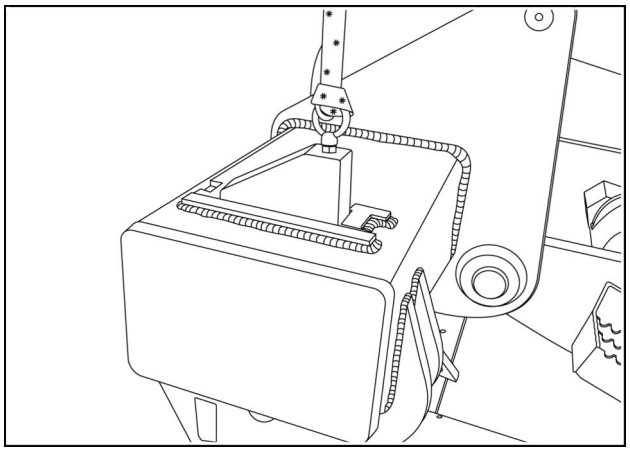


COIL14DOZ0001AA 1



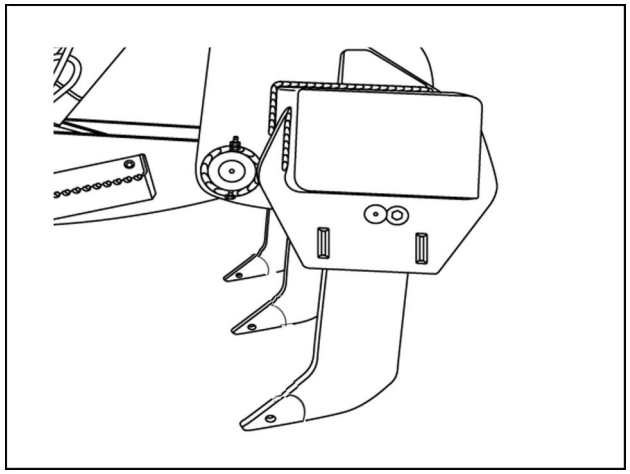
RAIL12DOZ0371AA 2

9. Use appropriate lifting equipment to lift the ripper shanks.



RAIL12DOZ0370AA 3

10. Remove the bolt from the ripper shank cover and turn the cover from the detent position. Remove the spring and punch out the bolt.

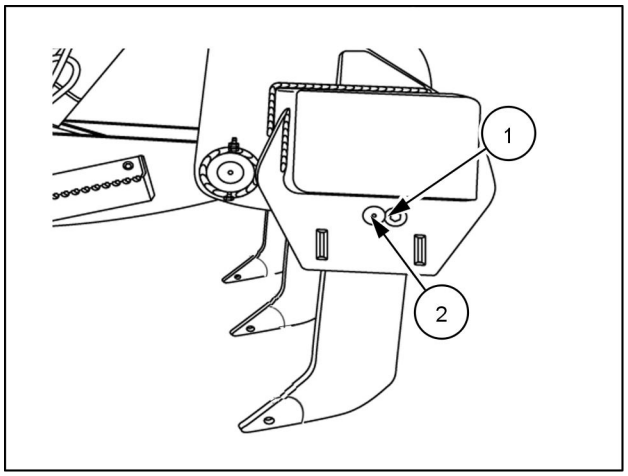


RAIL13DOZ1268AA 4

Adjusting the ripper shanks

1. Remove the bolt. The plate beneath the bolt has a detent to hold the pin in place **(1)**.
2. Remove the pin **(2)** and adjust the shank to the position desired.

   NOTE: *The ripper shanks have a threaded orifice to insert an I bolt to aid in lifting. Ripper shanks are heavy. Use appropriate lifting equipment.*
3. Replace the pin and retaining clip.



RAIL13DOZ1268AA 5

Ripper teeth

1. Damaged ripper teeth can be replaced without removing the shanks.
2. Position the ripper teeth slightly above the ground. Remove cap and punch out bolt.
3. Clean mating surfaces and replace the ripper tooth with a new one. Replace bolt.

Tightening torque

- Securing the teeth
  310.0 – 410.0 N·m (**228.6 – 302.4 lb ft**)

When the warning lamp lights

Warning light on

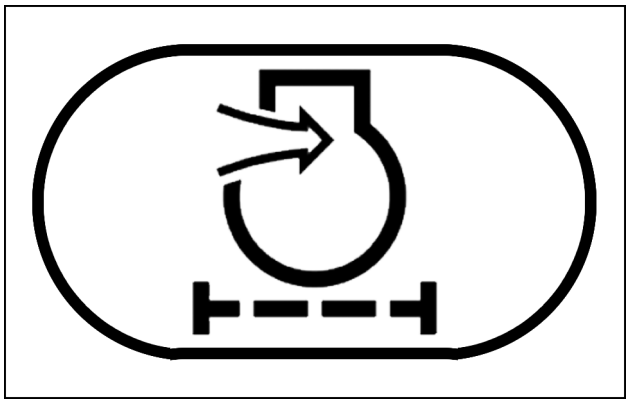
Engine air filter restriction indicator light

The air filter restriction indicator light comes on if air filter is clogged.

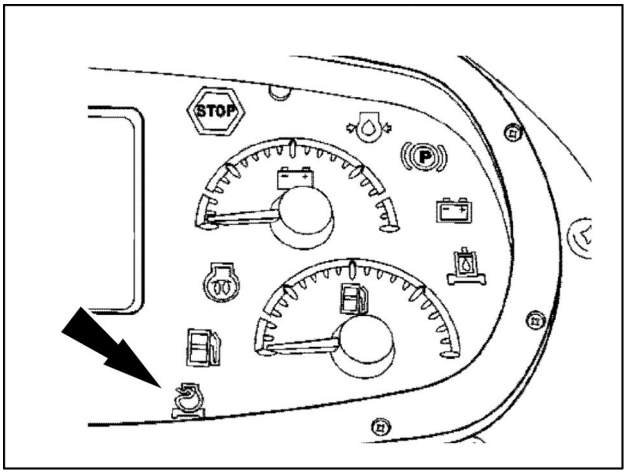
NOTE: *It will illuminate briefly when the ignition switch is turned on.*

If the light stays on, immediately stop the machine and clean the filter. Refer to page **Intake and exhaust manifolds and muffler - Replace** for additional information.

NOTE: *If the engine air filter restriction indicator remains illuminated, shut down the engine and check the engine air filter.*



COILCEX0961AA 1



RAIL12DOZ0821AA 2

EVERY 10 HOURS

Engine oil level

⚠ 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

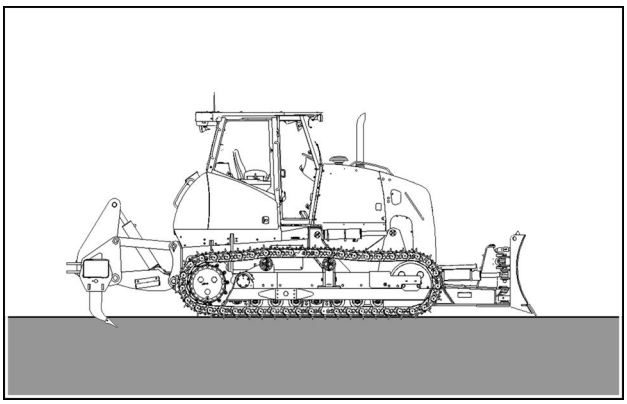
Checking the engine oil level

NOTICE: *The engine oil level should be checked every 10 hours of operation or each day, whichever occurs first. For lubricant specifications, refer to page* ***8-1****.*

To check the engine oil level, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

   ATTENTION: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****.*



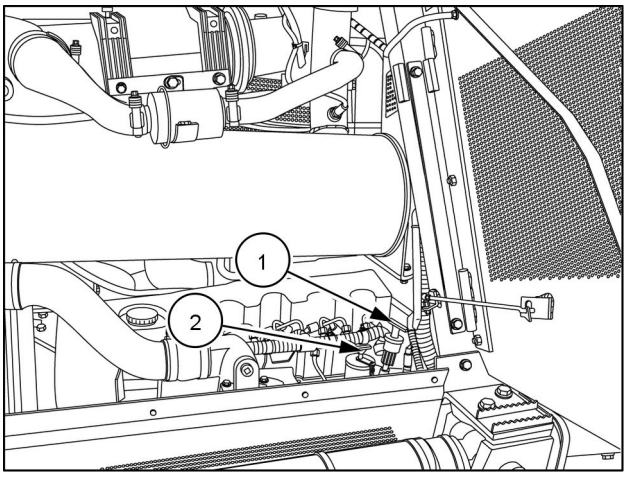
COIL14DOZ0001AA 1

7. Remove the dipstick **(1)** to check the engine oil level.
8. Wipe the dipstick clean and reinsert it. The oil level should register at the full mark.
9. Add oil, if necessary. Do not over fill engine oil.

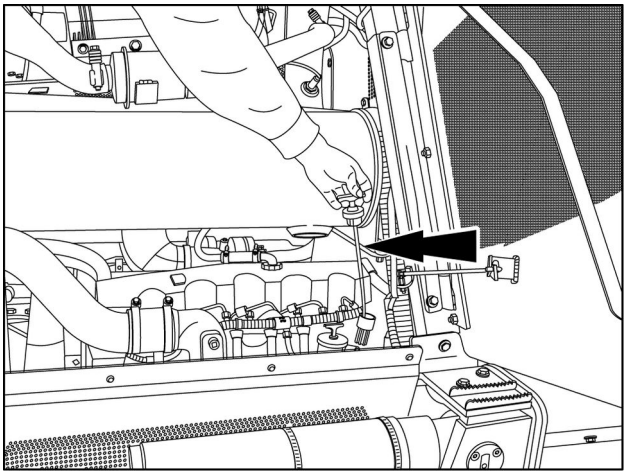
NOTE: *The engine oil dipstick* ***(1)*** *and oil filler neck* ***(2)*** *are located on the left-hand side of the machine, in the front engine compartment.*

NOTE: *This procedure is best performed at the beginning of a work day when the engine is cool and all the oil is accumulated in the crankcase.*

NOTE: *Handle and dispose of the waste in accordance with environmental regulations, laws and government codes.*



RAIL13DOZ1693AA 2



RAIL13DOZ1694AA 3

Engine coolant (Checking the level)

⚠ 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

NOTICE: *The engine coolant level should be checked every 10 hours of operation or each day, whichever occurs first. For engine coolant specifications, see page* ***8-1****.*

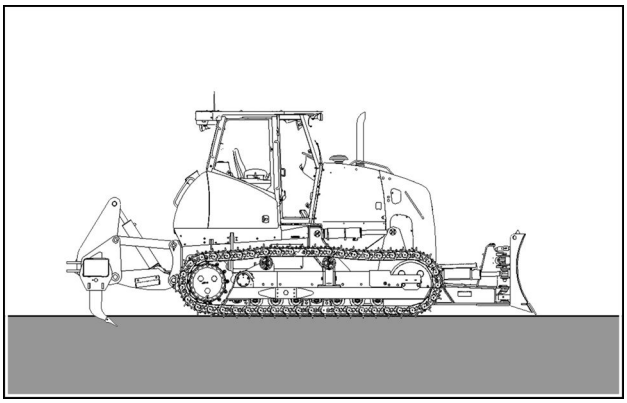
NOTE: *Check for any fluid leaks from the machine every 10 hours of operation or daily before you start the engine.*

NOTE: *Handle and dispose of the waste in accordance with environmental regulations, laws and government codes.*

Checking the engine coolant level

To check the engine coolant level, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Place the ignition key in the "OFF" position to shut down the engine.
5. Set the parking brake.
6. Wait for the engine to cool.

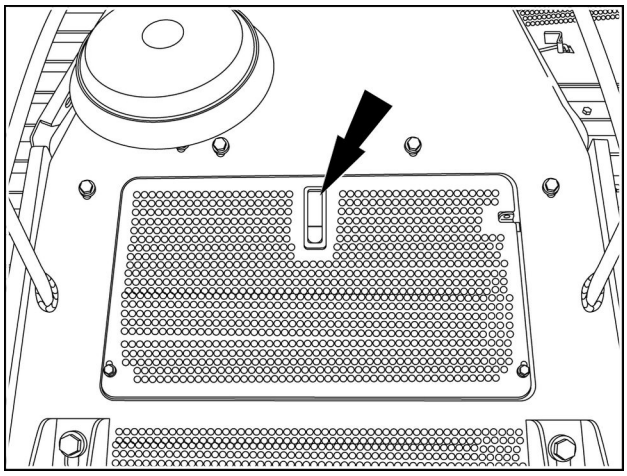


COIL14DOZ0001AA 1

7. Check the engine coolant overflow tank located under the access cover on top of the engine hood.

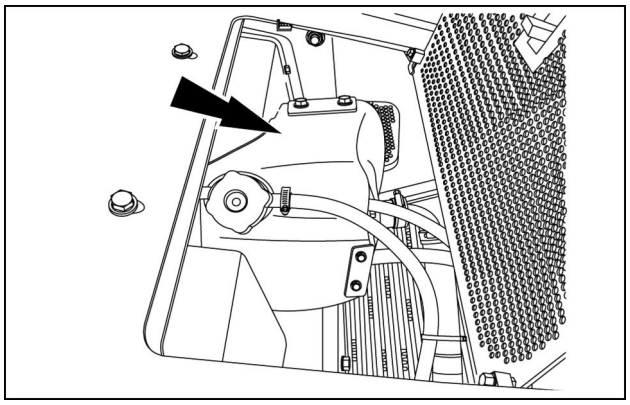
NOTICE: *The cooling system is pressurized. Check the coolant level in the expansion tank only when the coolant is cold and the engine is shut down. Coolant can blow out and cause burns.*

8. Open the access cover.



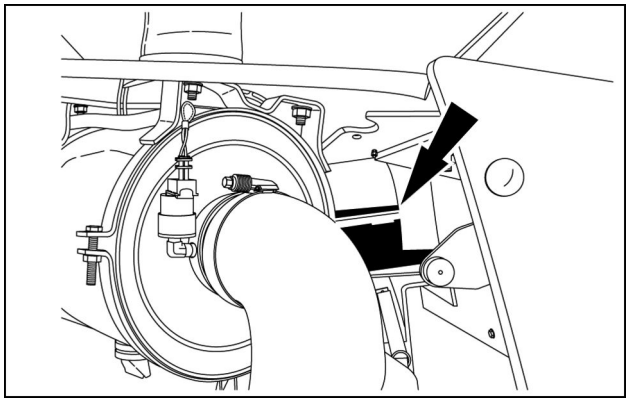
RAIL13DOZ1691AA 2

9. Do not remove the expansion tank cap during this check.



COIL16DOZ0015AA 3

10. Check the level marks and fill marks on the side of the reservoir, through the right-hand side cover of the engine compartment.
11. If required, add coolant through top cover of the engine compartment.
12. Use the correct ratio of water and antifreeze or coolant if the system coolant level is low.
13. Do not exceed the fill limit.
14. Close and latch the access door.



COIL16DOZ0013AA 4

Hydraulic reservoir fluid level

NOTICE: *Pressurized system!*
Hydraulic fluid leaking under pressure can penetrate the skin and cause serious injuries. To prevent personal injury, relieve all pressure before disconnecting the fluid lines or before starting maintenance services on the hydraulic system. Before applying pressure, make sure all connections are tight and all components are in good condition. Never use your hands 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 with these recommendations could result in death or serious injury.

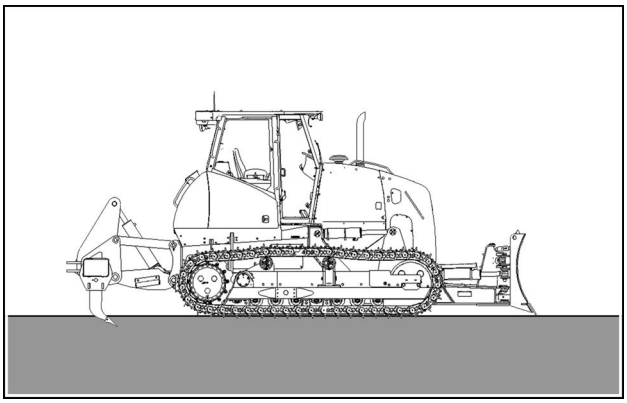
Checking the hydraulic fluid level

NOTICE: *The hydraulic fluid level should be checked every 10 hours of operation or each day, whichever occurs first. For lubricant specifications, see page* ***8-1****.*

To check the hydraulic fluid level, proceed as follows:

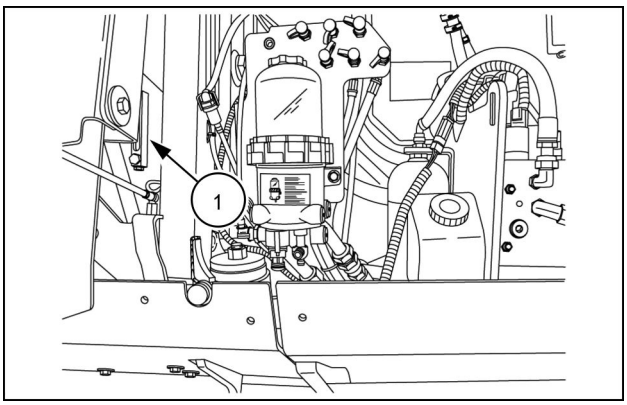
1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

   NOTE: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****,*



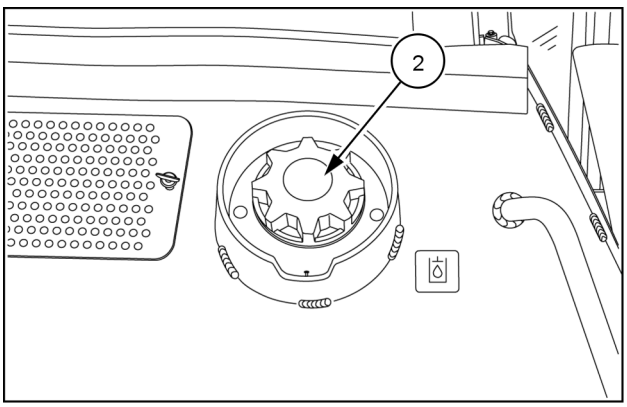
COIL14DOZ0001AA 1

7. Before starting the engine, check the hydraulic fluid level in the sight gauge.
8. If the hydraulic fluid is cold, the level is correct when the top of the fluid is aligned with the indicator mark on the sight gauge **(1)**.



COIL16DOZ0009AA 2

9. If you need to add fluid, make sure that all pressure is relieved in the system.
10. Slowly loosen the tank cap **(2)** and fill until the correct fluid level is reached.



RAPH12DOZ0048AA 3

Lubrication points – Blade (PAT models)

⚠ 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

Lubrication of the machine and implements

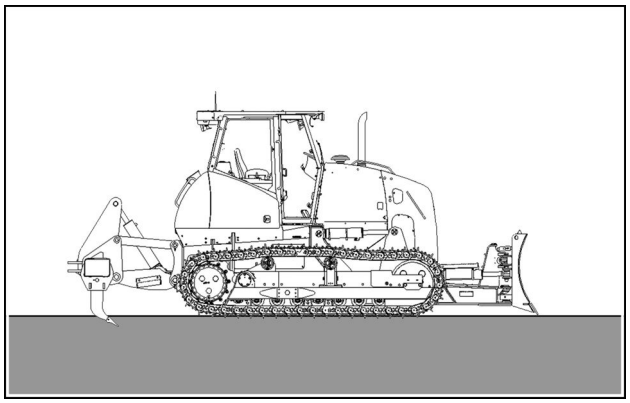
NOTICE: *The machine and implements must be lubricated every 10 hours of operation or more frequently (shorter periods) when operating the machine in extreme conditions such as water or mud. For grease specifications, refer to page* ***8-1****.*

To lubricate the machine or implements, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

   ATTENTION: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****.*

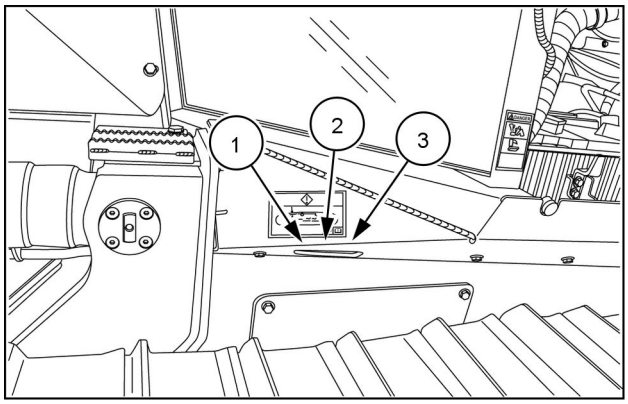
   NOTE: *Clean around the area to be lubricated before service.*
7. Inject grease at the lubrication points indicated in the following illustrations.



COIL14DOZ0001AA 1

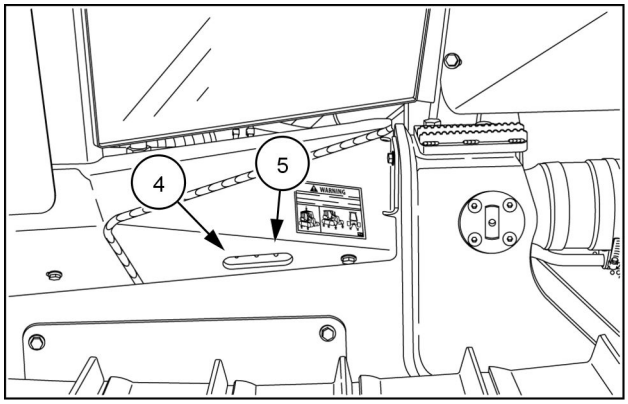
Remote grease zerks

Left-hand
(1) Left lift cylinder
(2) C
frame **(3)** Equalizer beam



RAPH12DOZ0042AA 2

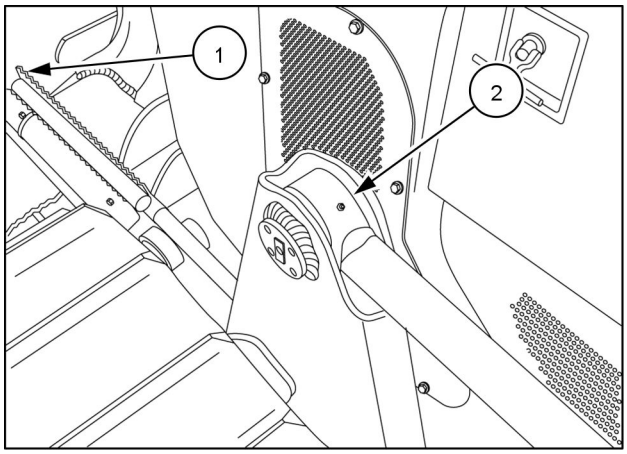
Right side
(4) C-frame
(5) Right lift cylinder



RAPH12DOZ0061AA 3

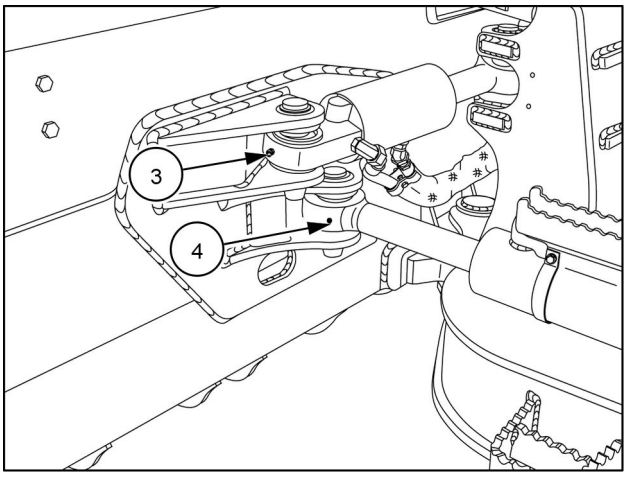
Grease fittings

(1) Angle cylinder base end (one each side).
(2) Lift cylinder rod end (one each side).



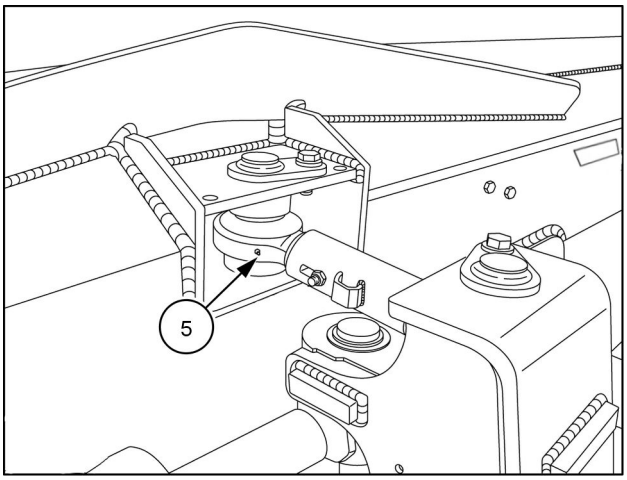
RAIL12DOZ0360AA 4

(3) Tilt cylinder (both ends).
(4) Angle cylinder rod end (one each side).



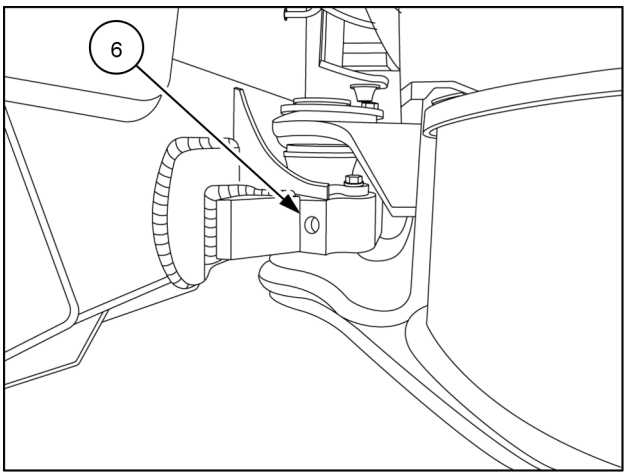
RAIL13DOZ1696AA 5

(5) Blade tilt link (both ends)



RAIL13DOZ1609AA 6

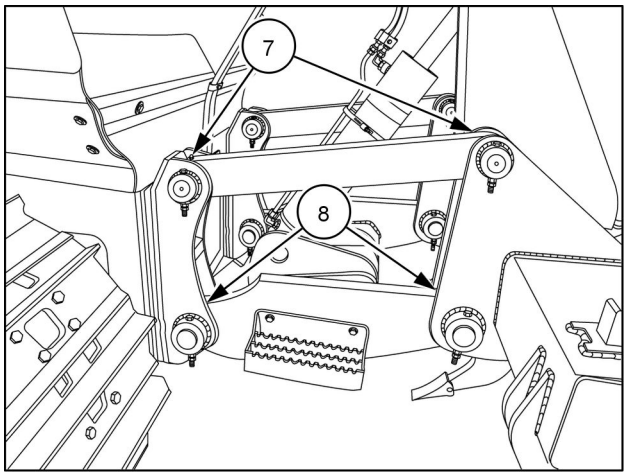
(6) Blade pivot.



RAIL12DOZ0363AA 7

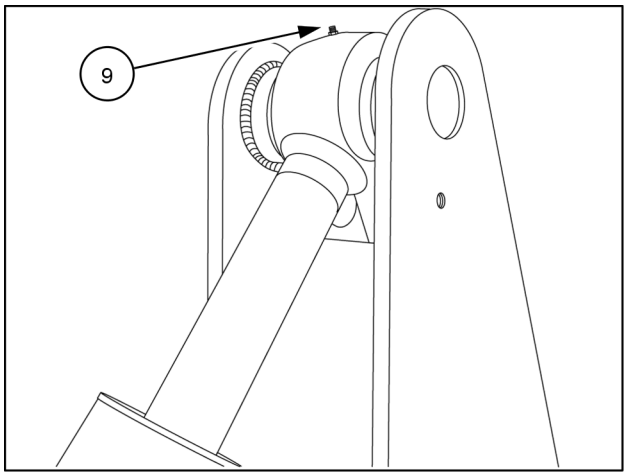
Ripper

(7) Tilt pivot (one each side).
(8) Tilt pivot (one each side).



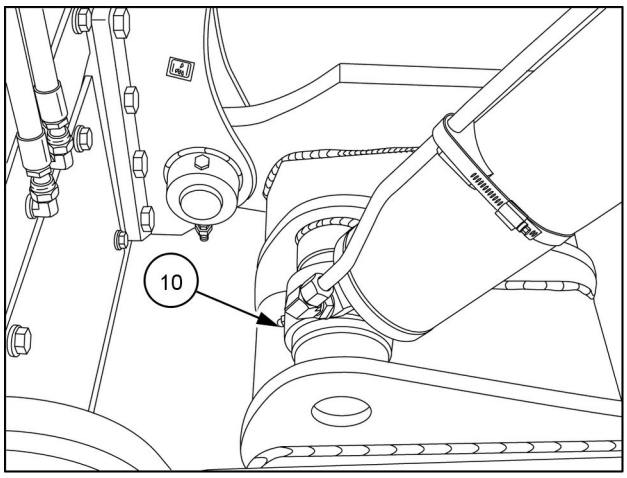
RAIL13DOZ1697AA 8

(9) Ripper lift cylinder upper end.



RAIL12DOZ0369AA 9

(10) Ripper lift cylinder lower end.



RAIL13DOZ1698AA 10

Grease points – Blade (BD model)

⚠ 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

Lubrication of the blade pivot points

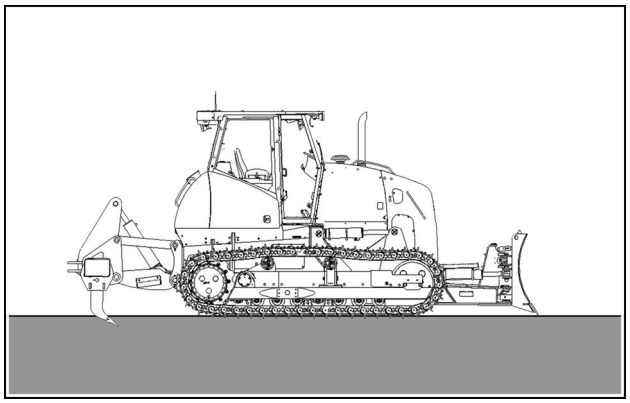
NOTICE: *The machine and implements must be lubricated every 10 hours of operation or more frequently (shorter periods) when operating the machine in extreme conditions such as water or mud. For grease specifications, refer to page* ***8-1****.*

To lubricate the machine or implements, proceed as follows:

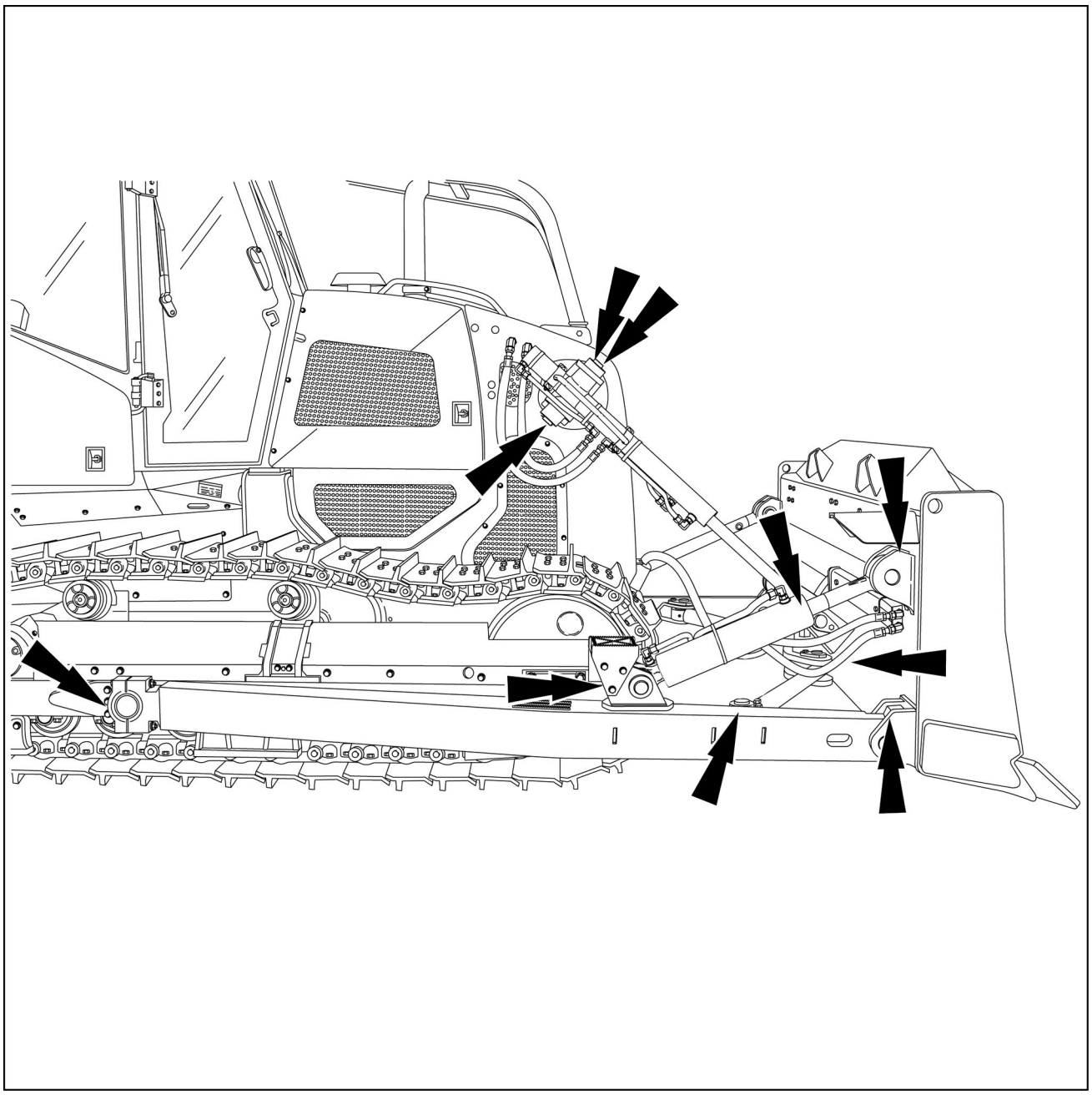
1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

   ATTENTION: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****.*

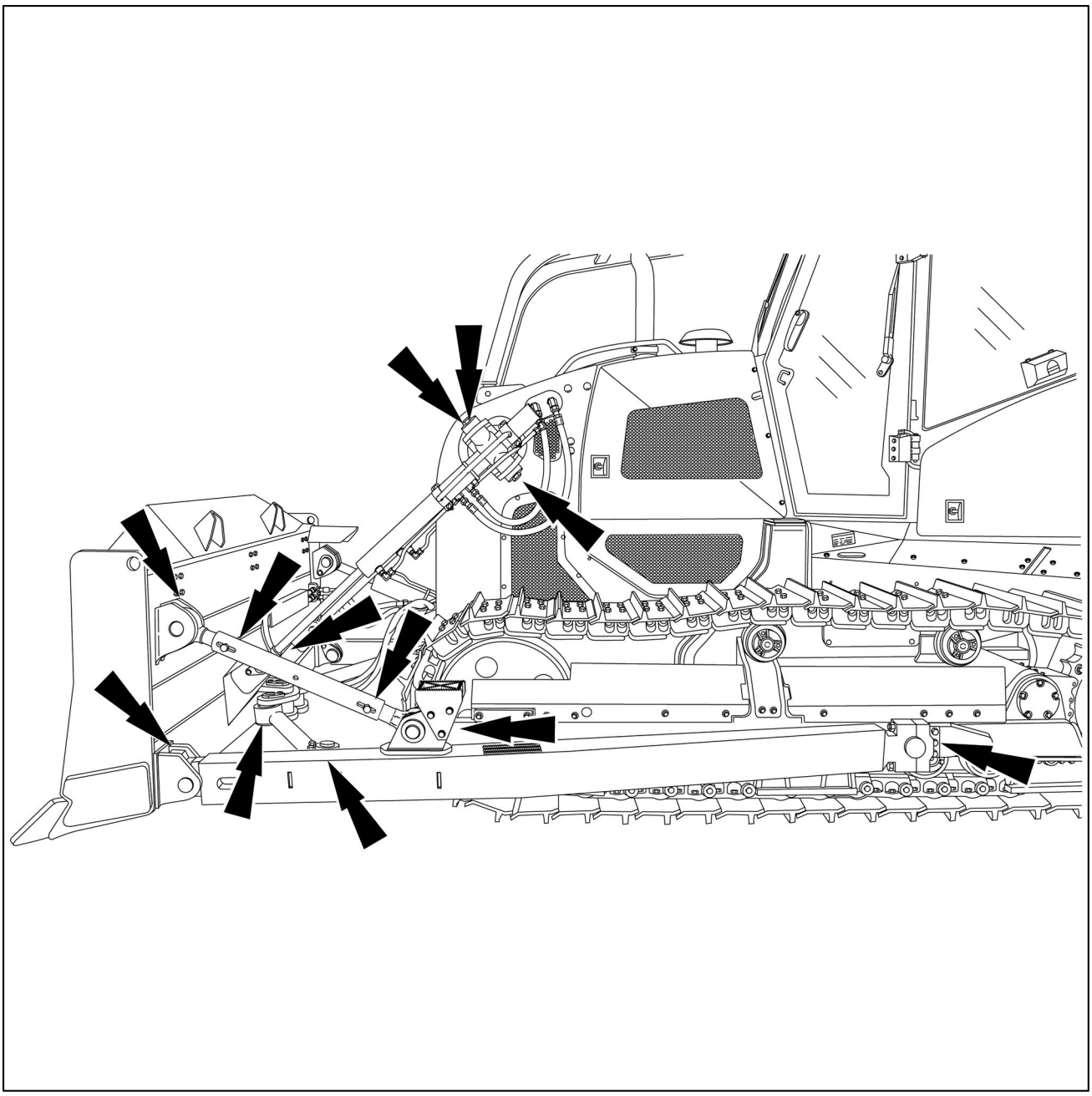
   NOTE: *Clean around the area to be lubricated before service.*
7. Inject grease at the lubrication points indicated in the following illustrations.



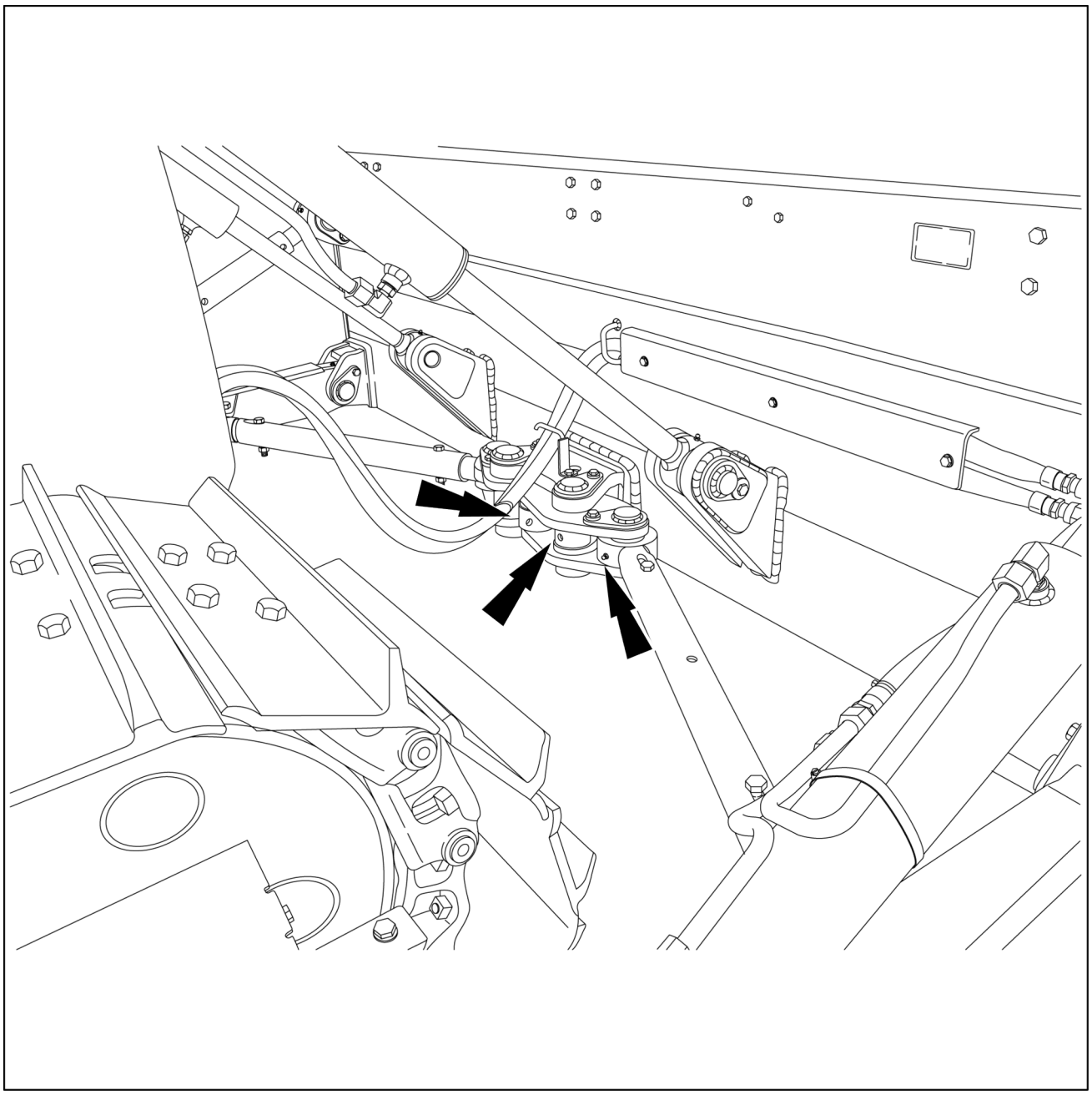
COIL14DOZ0001AA 1



RAIL13DOZ1597GA 2



RAIL13DOZ1598GA 3



RAIL13DOZ0003GA 4

INITIAL 20 HOURS

Tracks

⚠ 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

Checking and adjusting the torque of the track shoe bolts

NOTICE: *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.*

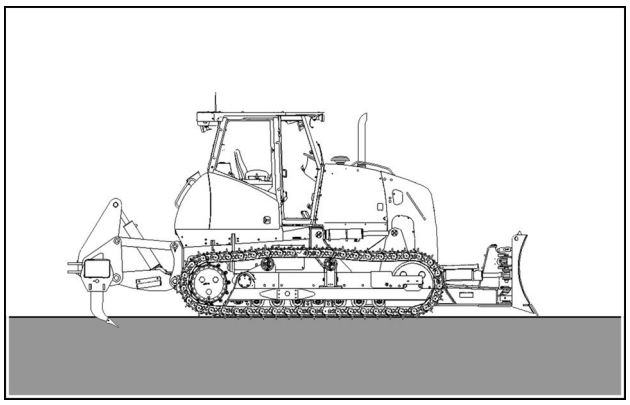
To check and adjust the torque of the track shoe bolts, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

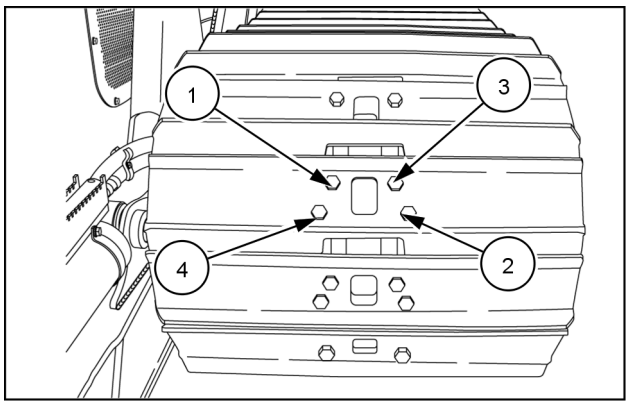
   ATTENTION: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****,*

7. Tighten the bolts in the sequence indicated in figure **2** for the standard track shoe.
8. For the standard link bolts, torque to **715 – 785 N·m** (**527.4 – 579.0 lb ft**)Series tractors.
9. For the master link bolts, torque to **610.0 – 670.0 N·m** (**449.9 – 494.2 lb ft**) .

NOTE: *Do not over tighten the track shoe bolts.*



COIL14DOZ0001AA 1



RAPH12DOZ0115AA 2

EVERY 50 HOURS

Fuel filter (Draining)

NOTICE: *Risk of explosion!*
Fuel vapors are explosive and flammable.
Do not smoke while handling fuel. Keep fuel away from flames or sparks. Stop the engine and remove the key before performing maintenance service. Always work in a well-ventilated area. Wipe up spilled fuel immediately.
Failure to comply with these recommendations could result in death or serious injury.

Draining fuel filter condensation

NOTICE: *Drain the water and sediments from the fuel filter after every 50 hours of operation. Alternatively, drain the water and sediments from the fuel filter more frequently (shorter periods) when you operate the machine in extreme conditions.*

NOTE: *Handle and dispose of the waste in accordance with environmental regulations, laws and government codes.*

To drain the water and sediment from the fuel filter, proceed as follows:

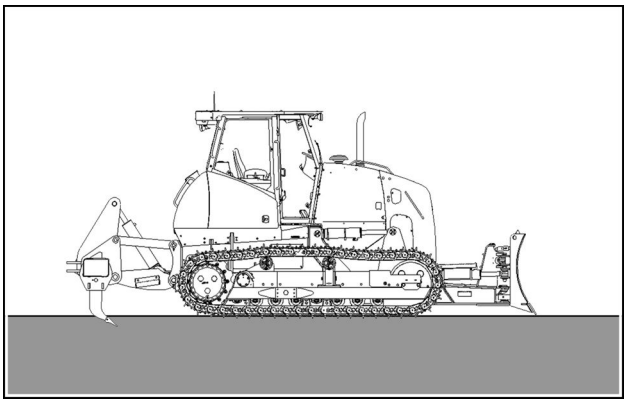
1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

   NOTE: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****,*

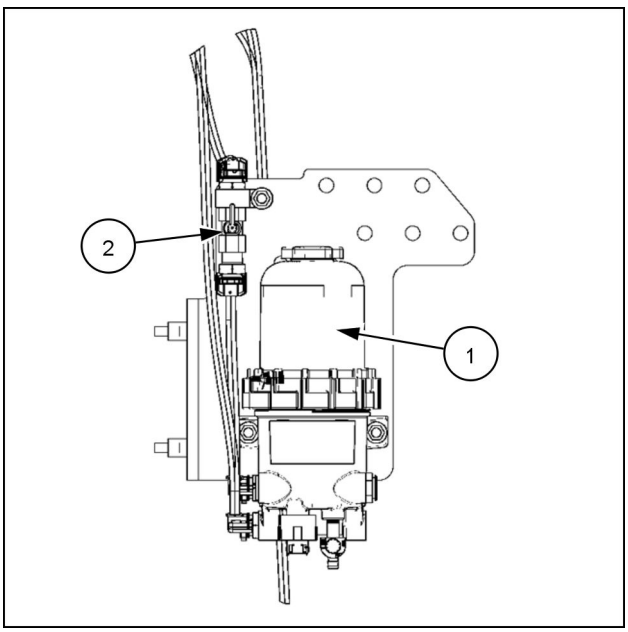
7. Locate the fuel filter **(1)** in the compartment on the right-hand side of the machine.
8. Turn the yellow fuel drain valve **(2)**, on the bottom of the fuel filter, counter-clockwise to open the drain valve.
9. Drain the water and/or contaminants from the fuel filter **(1)** into a suitable container until clean fuel flows.

   NOTE: *Do not allow fuel to spill on engine or ground.*

10. Close the yellow fuel drain valve **(2)**.
11. Check for leaks.



COIL14DOZ0001AA 1



COIL15DOZ9000BA 2

INITIAL 100 HOURS

Fuel filter (Replacement in initial period)

NOTICE: *The fluid filter must be replaced in the first 100 hours of operation during the initial break-in period, and then every 500 hours of operation or more frequently (shorter periods) when operating the machine in extreme conditions.*

For information about fuel filter replacement, see page **7-69**.

Hydraulic filter – Hydrostatic (Replacement in initial period)

NOTICE: *Pressurized system!*
Hydraulic fluid leaking under pressure can penetrate the skin and cause serious injuries. To prevent personal injury, relieve all pressure before disconnecting the fluid lines or before starting maintenance services on the hydraulic system. Before applying pressure, make sure all connections are tight and all components are in good condition. Never use your hands 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 with these recommendations could result in death or serious injury.

NOTICE: *The hydraulic fluid filter and hydrostatic filter must be replaced in the first 100 hours of operation during the initial break-in period, and then every 2000 hours of operation or more frequently (shorter periods) when operating the machine in extreme conditions. For lubricant specifications, see page* ***8-1****.*

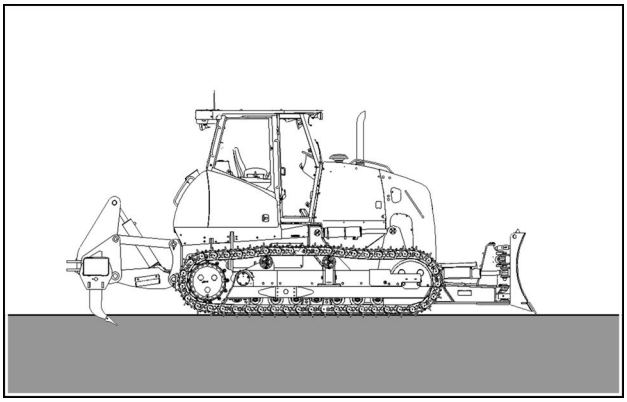
Replacing the hydraulic fluid filter

To replace the hydraulic fluid filter, proceed as follows:

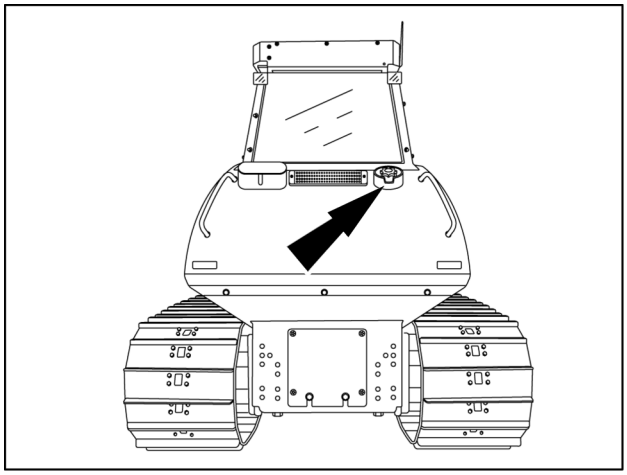
1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

   NOTE: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****,*

7. The hydraulic fluid fill cap is located on the rear of the machine.
8. Make sure the accumulators on the machine are completely discharged.
9. Clean the area around the hydraulic fluid filler cap and slowly loosen the cap to release any remaining pressure.



COIL14DOZ0001AA 1



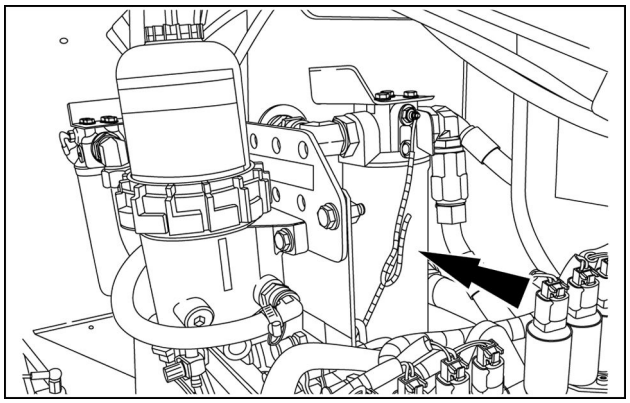
RAIL12DOZ0396AA 2

10. Open the right-hand side cover to access the hydraulic filter.
11. Remove and replace the hydraulic fluid filter.
12. Turn the filter counterclockwise to remove.
13. Clean the mating surface on the filter poppet.

    NOTE: *Make sure that all dirt and gasket material has been removed.*

14. Apply a thin coat of clean fluid on the gasket and threads.
15. Install and firmly hand-tighten the new filter cartridge on the poppet.

    NOTE: *Never use a filter wrench to install a new filter.*

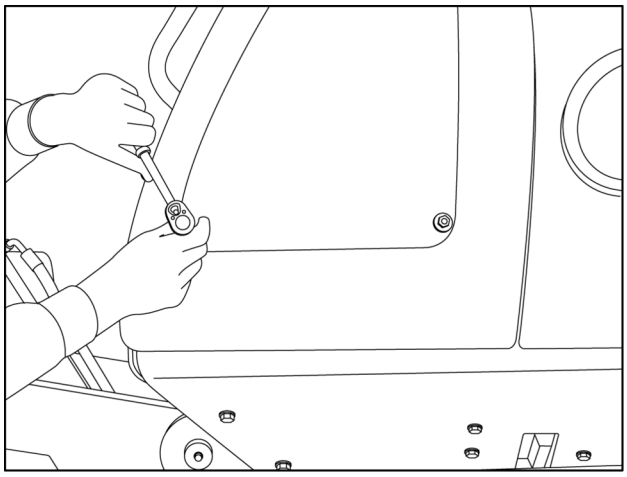


COIL16DOZ0020AA 3

Hydrostatic filter replacement

To replace the hydrostatic filter, proceed as follows:

1. Remove the bolts and the cover from the right rear access panel.

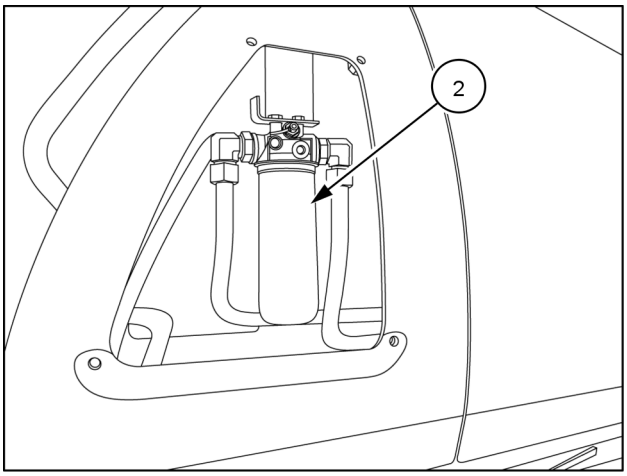


RAIL12DOZ0177AA 4

2. Remove the hydrostatic filter **(2)**.
3. Turn the filter counterclockwise to remove.
4. Clean the mating surface on the filter poppet.

   NOTE: *Make sure that all dirt and gasket material has been removed.*

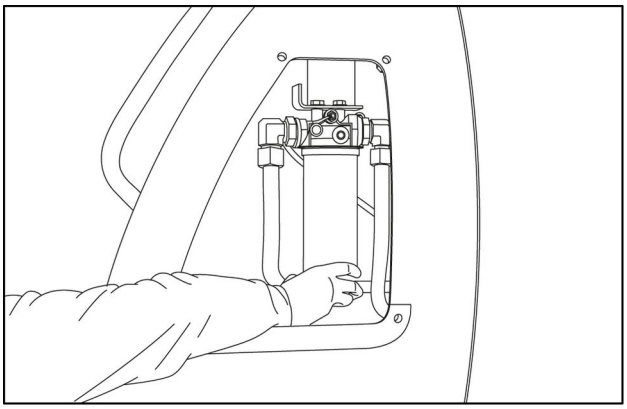
5. Apply a thin coat of clean fluid on the gasket and threads.



RAIL12DOZ0178AA 5

6. Install and firmly hand-tighten the hydrostatic filter on the filter poppet.

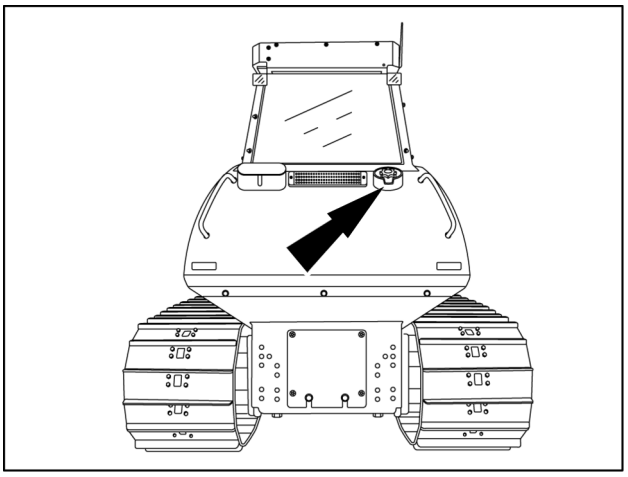
   NOTE: *Never use a filter wrench to install a new filter.*



RAIL12DOZ0179AA 6

7. Install the reservoir filler cap.
8. Start the engine and run at approximately **1000 RPM**.

   NOTE: *Check for leakage around the filter and drain.*
9. Close all access covers.
10. Operate the controls several times to remove any air in the lines.
11. Place the attachments on the ground, and stop the engine.
12. Check the hydraulic fluid level.
13. If you need to add more fluid, make sure all pressure is removed in the system, and remove the filler cap slowly to release pressure in the reservoir.



RAIL12DOZ0396AA 7

NOTICE: *Check for metal filings or other foreign particles in the filters, or allow your authorized CASE CONSTRUCTION dealer to check your machine's hydraulic fluid through the lubricant analysis program.*

NOTE: *Handle and dispose of the waste in accordance with environmental regulations, laws and government codes.*

Tracks

⚠ 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

Checking the track tension

NOTICE: *Track tension should be checked in the first 100 hours of operation during the initial break-in period, or more frequently (shorter periods) when operating the machine in extreme conditions such as on terrain with gravel, mud or sharp stones, or even if the tracks are replaced.*

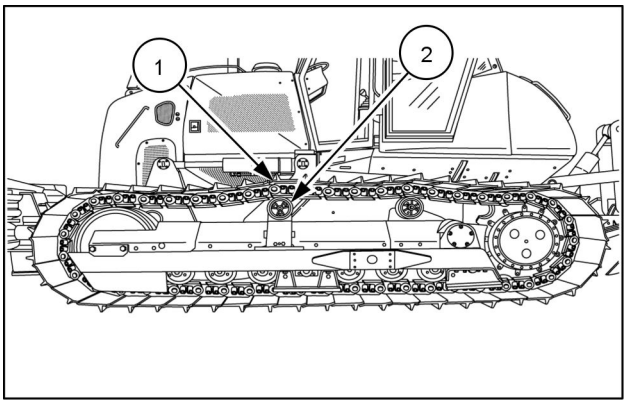
NOTICE: *Clean the tracks and undercarriage as required or at the end of the work shift. When material packs and collects on the undercarriage parts the tracks may become too tight. Correct track adjustment will help control undercarriage wear. Maintain correct track tension.*

To check the tension of the tracks, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Move the machine backward the length of the track, and then forward the length of the track.

   NOTE: *This will make the bottom of the track tight.*
3. Slowly park the machine on a flat, level, firm surface, away from any obstacles.
4. Do not use the brakes to stop.
5. Stop the machine so that one of the pins **(1)** in the track chain is aligned over the front upper roller **(2)** (the roller nearest the tensioner wheel).
6. Support the implements on the ground.
7. Shut down the engine and remove the key.
8. Set the park brake.
9. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

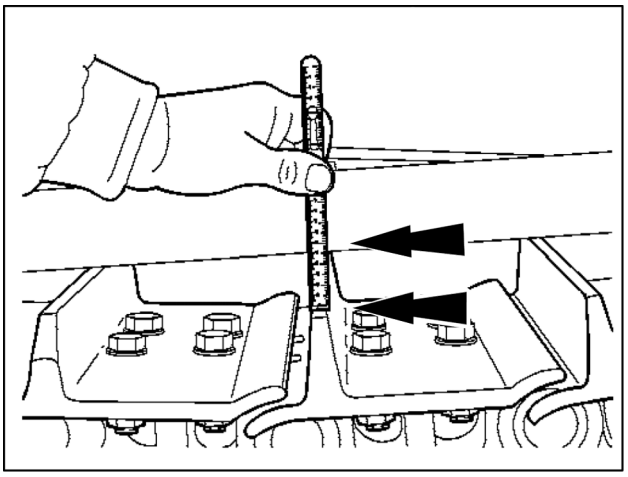
   ATTENTION: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****,*
10. Stand to the side of the tracks between the front and rear upper rollers, and then between the tensioner wheel and the front upper roller.



RAPH12DOZ0110AA 1

11. Measure the distance from the center of the track, between the upper roller and the tensioner wheel, as indicated in figure **2**.
12. Then measure the distance from the center of the track, between the two upper rollers.

    NOTE: *Average the two measurements and adjust the track to average between* ***44.50 – 58.00 mm*** *(****1.75 – 2.25 in****).*



RAIL12DOZ0384AA 2

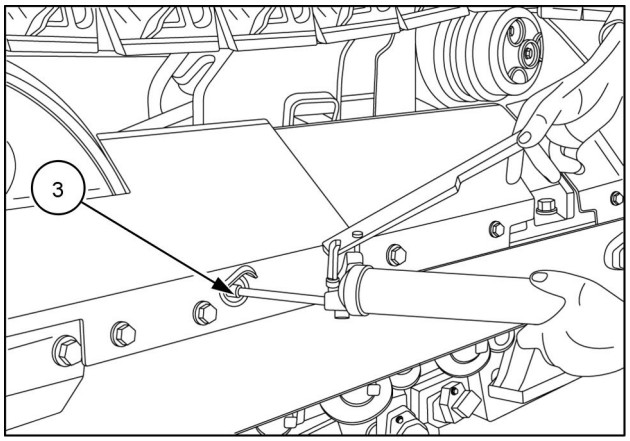
Increasing the track tension

To increase track tension, proceed as follows:

1. Use the track adjuster grease fitting to adjust its tension.

   NOTE: *Adding grease will reduce deflection and increase the track tension.*
2. Pump grease into the fitting **(3)** until deflection is correct.
3. Move the machine backward the length of the track, and then forward the length of the track.

   NOTE: *This will make the bottom of the track tight.*
4. Bring the macine slowly to a stop.
5. Do not use the brakes to stop.
6. Check the deflection of the track again and adjust, if necessary.
7. Repeat the procedure for the other track.



RAIL12DOZ0374AA 3

Reducing the track tension

To reduce the tension of the tracks, proceed as follows:

1. Decrease the track tension with an adjustment to the grease seal fitting.

   ATTENTION: *The grease is UNDER EXTREME PRESSURE. Be careful and loosen the grease seal connection SLOWLY. Wear full coverage face protection before proceeding.*

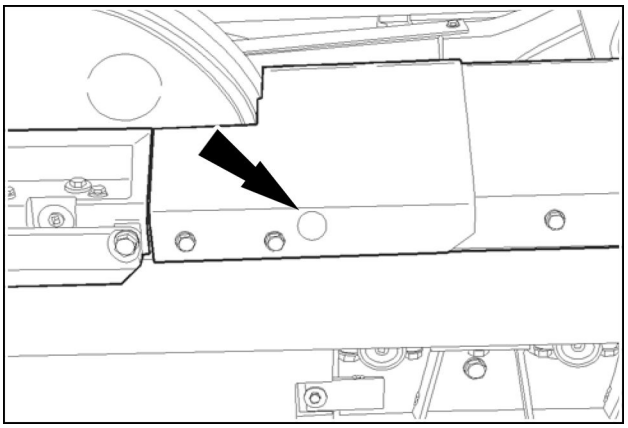
2. Use a **3/4 in** long socket and loosen the grease seal fitting SLOWLY, about two turns.

   ATTENTION: *DO NOT REMOVE the connector! Allow the grease to be removed until the track deflection is within the proper range.*

3. When complete, re-torque the grease seal fitting to **59.7 – 74.6 N·m** (**44 – 55 lb ft**).
4. Move the machine backward the length of the track, and then forward the length of the track.

   NOTE: *This will make the bottom of the track tight.*

5. Bring the macine slowly to a stop.
6. Do not use the brakes to stop.
7. Recheck the track tension.
8. Repeat the procedure for the other track.



RCIL10CWL080AAL 4

Change the final drive oil / Planetary reducer oil

⚠ WARNING
Burn hazard!
The oil of the travel reducers is under pressure. Protect the face and body using appropriate protective goggles and protective clothing. Never service a hot machine. Allow the machine to cool down before starting any maintenance. Heat increases the travel reducer oil pressure. Slowly loosen the filler, drain and level plugs to slowly relieve the pressure inside the reducers. When checking the oil level, stay to the side of the travel reducers. The procedure for alignment of the plugs must be carried out with the help of an assistant on the ground, and this assistant should be away from the operating area of the machine.
Failure to comply with these recommendations could result in death or serious injury.

Replacing the final drive oil / planetary reducer oil

NOTICE: *The final drive oil / planetary reducer oil must be replaced in the first 100 hours of operation during the initial break-in period, and then every 1000 hours of operation or more frequently (shorter periods) when operating the machine in extreme conditions. For lubricant specifications, refer to page* ***8-1****.*

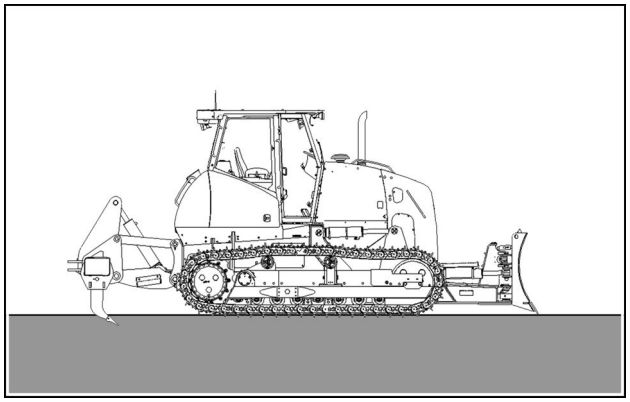
To replace the final drive oil / planetary reducer oil, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. The planetary reducer fill and drain plugs must be aligned vertically, as shown in figure **3**.

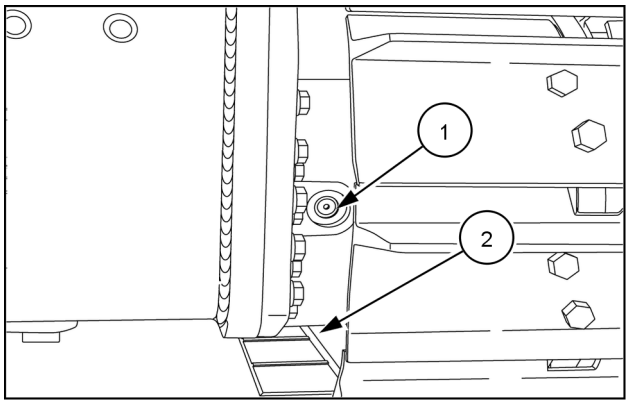
   NOTE: *Observance of this position is essential to proper servicing.*
5. Shut down the engine, placing the ignition key in the off position.
6. Set the park brake.
7. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

   ATTENTION: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****,*
8. To replace the final drive oil, clean the area around the check/fill plug **(1)** and the drain plug **(2)**.

   NOTE: *The drain plugs are located on the bottom of the housing.*

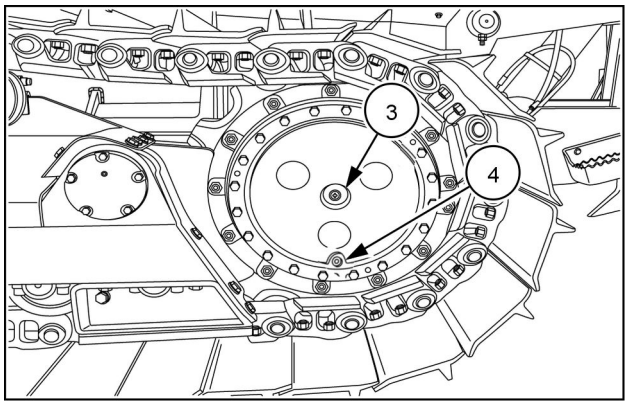


COIL14DOZ0001AA 1



RAIL13DOZ1269AA 2

9. To replace the planetary reducer oil, clean the area around the check/fill plug **(3)** and the drain plug **(4)**.



RAPH12DOZ0383AA 3

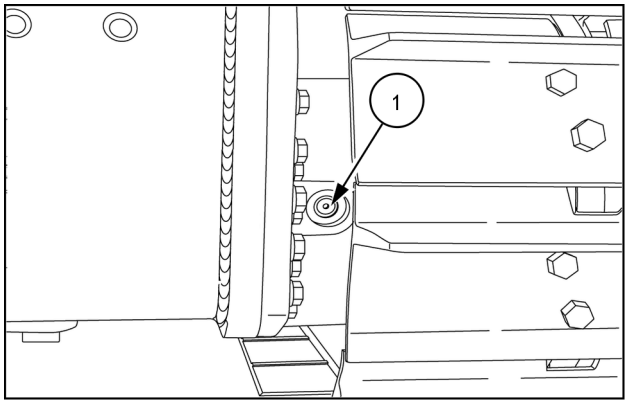
10. Slowly remove the final drive fill/check plug **(1)**.
11. Have a suitable container available and slowly remove the drain plug **(2)** from the final drive reducer.
12. Slowly remove the planetary reducer fill/check plug **(3)**.
13. Have a suitable container available and slowly remove the drain plug **(4)** from the planetary reducer.
14. Allow all the oil to drain.

    NOTE: *The final drive and planetary reducer share the same oil. Complete the draining process for both the final drive and planetary reducer simultaneously.*

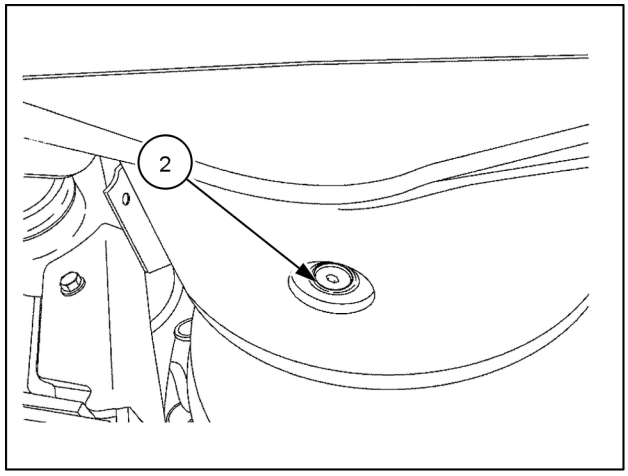
15. Reinstall the final drive drain plug **(2)** and the planetary reducer drain plug **(4)**.
16. Top up with new oil through the fill/check orifice **(1)** and **(3)**.

    NOTE: *Stop the filling process as soon as oil begins to drain from the fill/check orifice.*

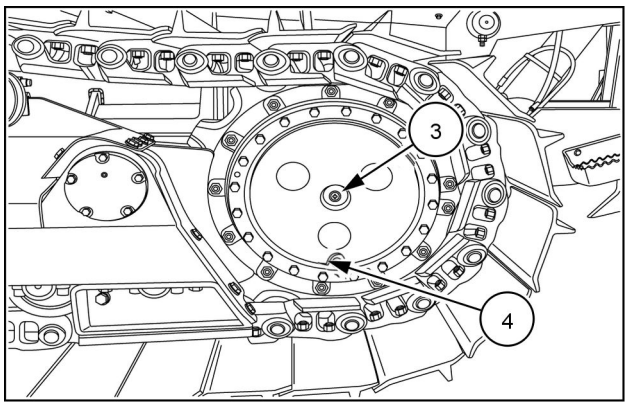
17. Install the fill/check plugs **(1)** and **(3)** and repeat the procedure on the other side.
18. Check for leaks.



RAIL13DOZ1269AA 4



RAPH12DOZ0384AA 5



RAPH12DOZ0383AA 6

EVERY 250 HOURS

Engine air filter restriction sensor (Checking)

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Read and understand the SAFETY INFORMATION chapter 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.

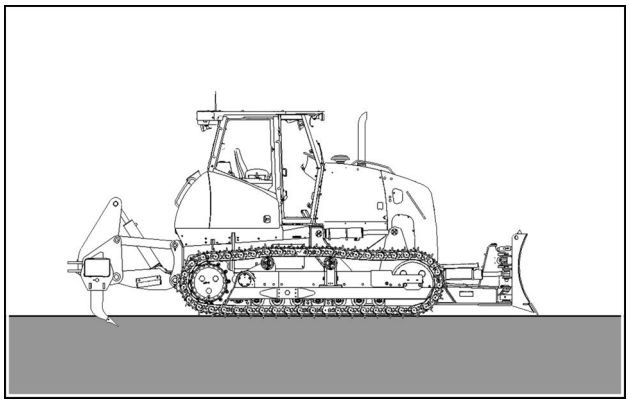
W0138B

NOTE: *As the engine air filters are replaced only when the master warning indicator light (yellow, non-critical) lights up on the instrument cluster, the air filter restriction sensor should be tested every 250 hours of operation of the machine.*

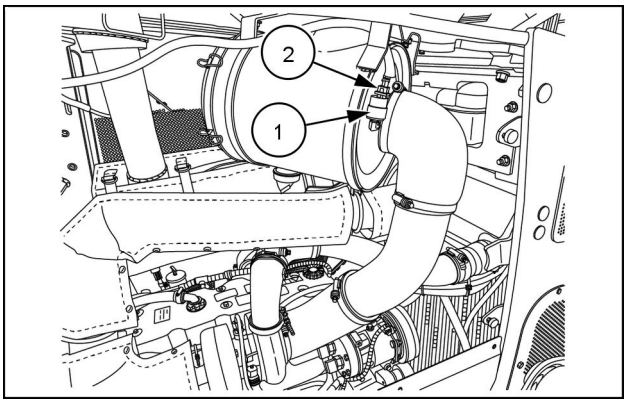
Verification of the operation of the air filter restriction sensor

To test the air filter restriction sensor, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Place the ignition key in the "OFF" position to shut down the engine.
5. Set the parking brake.
6. Make sure that all residual pressure of the hydraulic system is relieved from the circuits before you begin the verification and maintenance procedures. See page **7-11**.
7. Turn off the master switch. See page **3-63**.
8. Open the right-hand side cover of the engine compartment to access the air filter.
9. Locate the air filter restriction sensor **(1)** at the outlet of the filter housing near the fastening clamp of the inlet hose on the inlet line on the turbo charger.
10. Remove the electrical connector **(2)** from the sensor. Check for corrosion or oxidation. Correct if necessary.
11. Re-install the connector. Make sure to fit the connector properly
12. Check the electrical wiring of the sensor. Make sure the sensor is in good condition.

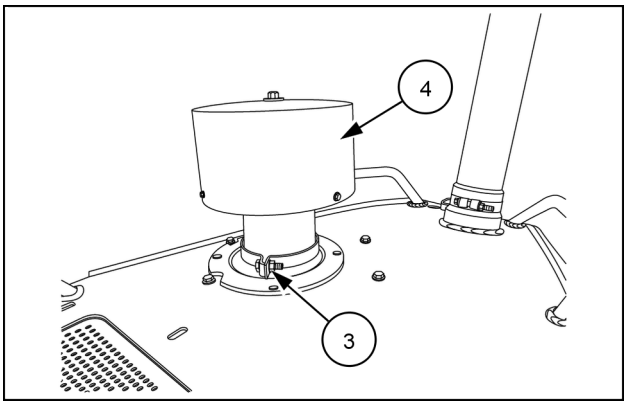


COIL14DOZ0001AA 1



COIL19DOZ0033AA 2

13. Loosen the bolt **(3)** on the clamp that secures the air pre-filter **(4)**.
14. Remove the air pre-filter assembly to access the air inlet nozzle on the filter housing.
15. Start the engine. Keep the engine running at idle speed to do the sensor test.
16. Use a thick piece of cardboard or a flat metal sheet to gradually cover the inlet of the air inlet.

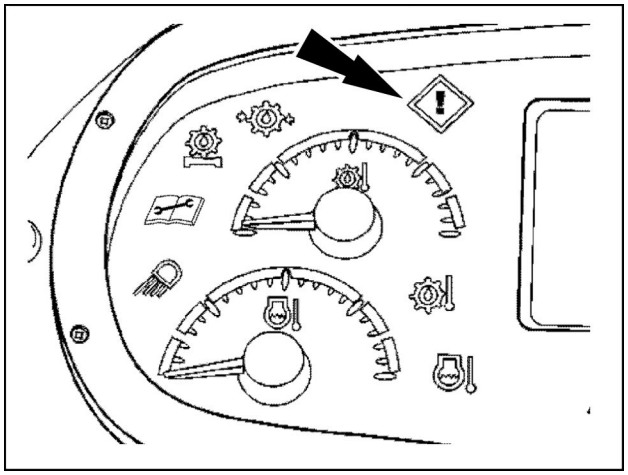


COIL19DOZ0038AA 3

17. Check whether the master warning indicator light (yellow, non-critical) lights up on the panel, to indicate high air filter restriction.
18. Run the engine until the indicator light illuminates on the instrument cluster, indicating high air filter restriction.
19. Shut down the engine.

NOTE: *If the master warning indicator light (yellow, non-critical) lights up on the panel, the restriction indicator works correctly. If this light does not light up, the issue may be the sensor, the connector, or the wiring, or even dirt in the sensor's installation channel.*

20. If the master warning indicator light does not light up on the panel, check the wiring, or if there is dirt in the sensor's installation channel. Correct as required.
21. Perform the test again.
22. If the master warning indicator light still does not light up, the issue must be the sensor **(1)**.
23. Replace the sensor with a new one.
24. Re-install the air pre-filter.
25. Tighten the bolt **(3)** of the clamp that secures the pre-filter **(4)**.
26. Close the hand side access cover to the engine compartment.



RAPH12DOZ0138AA 4

Drive belt – (Alternator and air-conditioning compressor) (Check)

⚠ WARNING

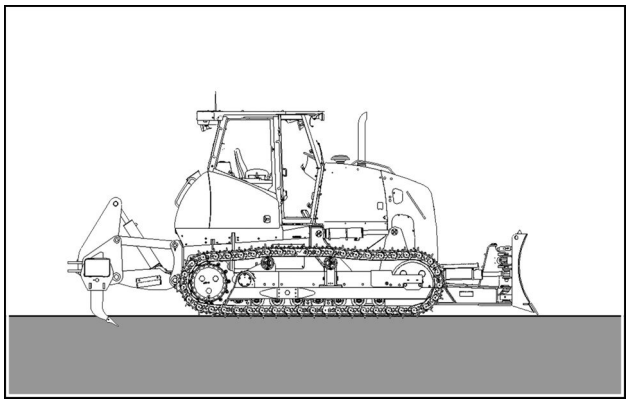
Entanglement hazard!
Always stop the engine and engage the parking brake, unless otherwise instructed in this manual, before checking and/or adjusting any drive belt or chain.
Failure to comply could result in death or serious injury.

W0097A

NOTICE: *The drive belt of the alternator and air-conditioning compressor must be checked every 250 hours of operation and replaced as necessary. Visually check the belt for the correct tension, wear, and damage. Incorrect belt tension may cause battery charge failure, engine overheating, or premature wear.*

Check of the drive belt of the alternator and air-conditioning compressor

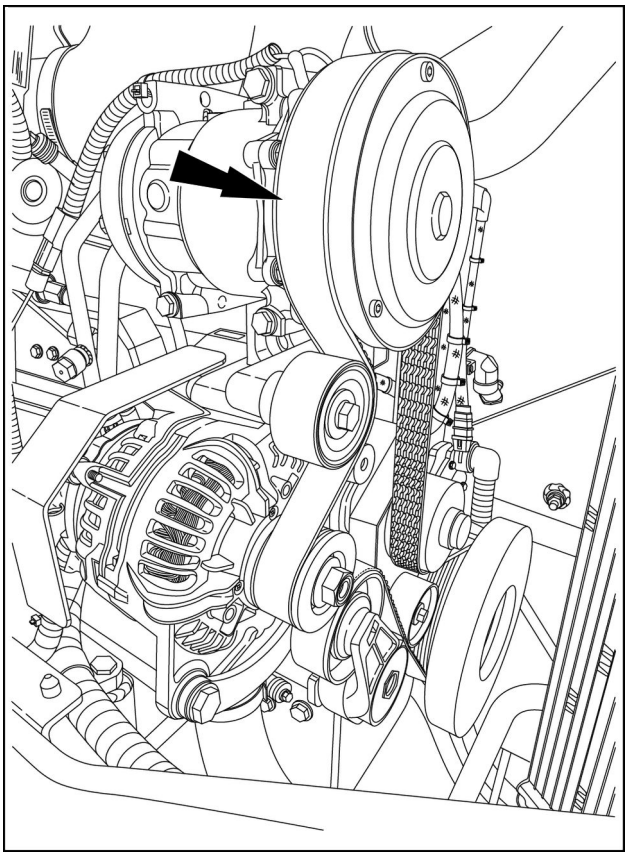
To check the drive belt of the alternator and air-conditioning compressor, proceed as follows:



COIL14DOZ0001AA 1

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Place the ignition key in the "OFF" position to shut down the engine.
5. Set the parking brake.
6. Make sure that all residual pressure of the hydraulic system is relieved from the circuits before you begin the verification and maintenance procedures. See page **7-11**.
7. Turn off the master switch. See page **3-63**.
8. Open the engine compartment side covers to access the engine accessory drive belt.

9. Locate the drive belt.
10. Perform a visual inspection of the belt.
11. Visually check the installation. Make sure that the belt is correctly seated on each of the pulleys.



COIL19DOZ0030BA 2

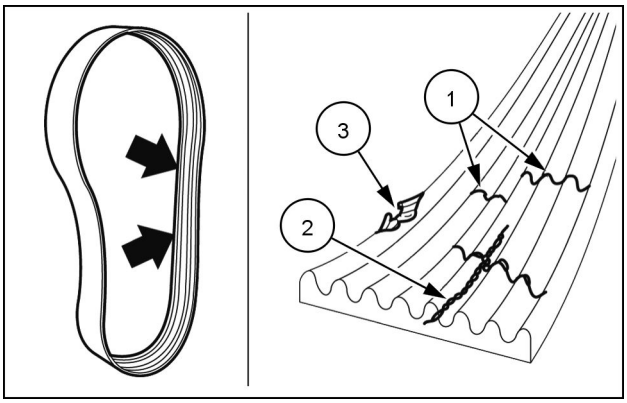
12. Check the condition of the contact surface of the belt on the pulleys.

NOTE: *Small transverse cracks* ***(1)*** *(widthwise) are allowed.*

13. Check for longitudinal cracks **(2)** (lengthwise).

NOTE: *Longitudinal cracks can cause belt failure.*

14. If the belt has longitudinal cracks **(2)**, worn edges, or material loss **(3)**, the belt should be replaced.
15. If the belt has shiny surfaces or points with wear, the belt is probably loose and slipping on the pulleys.
16. Replace the belt if necessary.

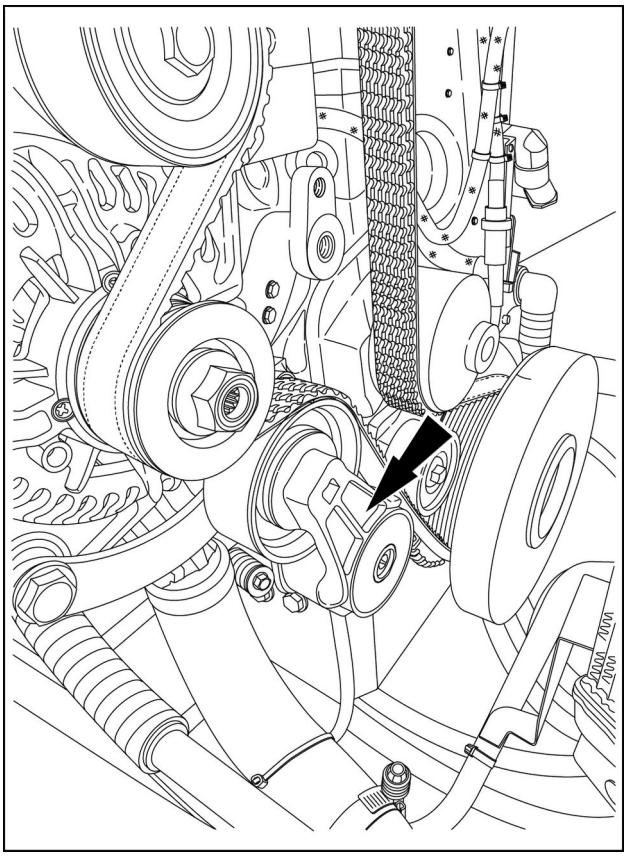


DZ1319DOZ0002AA 3

Checking the belt tension

NOTE: *The drive belt is tensioned by an automatic tensioner. If the tensioner arm reaches its end of stroke, the belt should be replaced immediately.*

NOTE: *If the engine runs with the drive belt loose, the drive belt can slip, causing the engine to overheat or the battery to receive insufficient charge.*



COIL19DOZ0028BA 4

Air conditioning condenser (Cleaning the fans)

⚠ 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

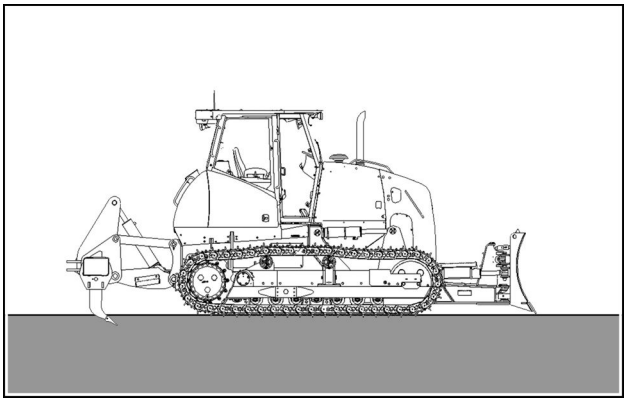
NOTICE: *Clean the air conditioning compressor fans every 250 hours of operation, or more frequently (shorter periods) when you operate the machine in extreme conditions.*

Cleaning the air conditioning condenser fans

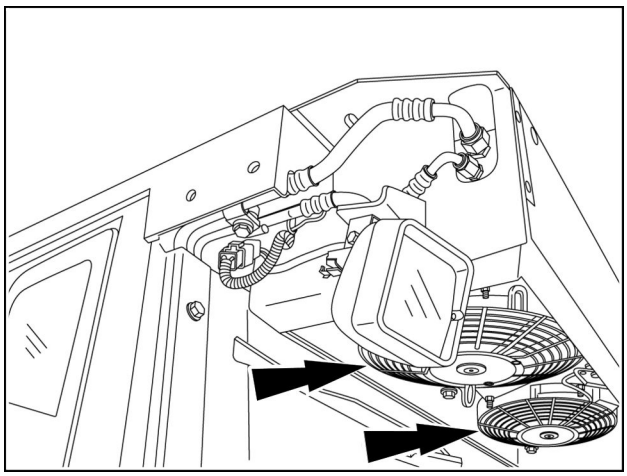
To clean the air conditioning fans, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Place the ignition key in the "OFF" position to shut down the engine.
5. Set the parking brake.
6. Make sure that all residual pressure of the hydraulic system is relieved from the circuits before you begin the verification and maintenance procedures. See page **7-11**.
7. Inspect the air conditioning condenser fans for:
   - Accumulation of dust
   - Accumulation of dry mud
   - Leaf debris
   - Accumulation of small branches
8. Replace the fans when they show any signs of damage, such as:
   - Chipped blades
   - Missing blades

NOTE: *Replace the fan helices whenever necessary.*

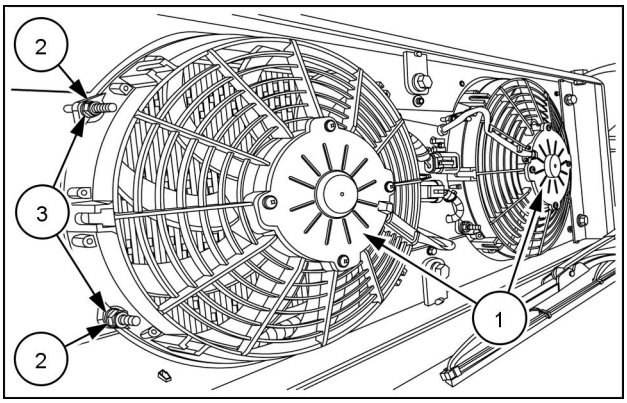


COIL14DOZ0001AA 1



RAIL12DOZ0931BA 2

9. Remove the protective grills **(1)** to access the fan blades and the condenser
10. Remove the eight nuts **(2)** and fastening washers **(3)** around both protective grills.
11. Remove the grills.



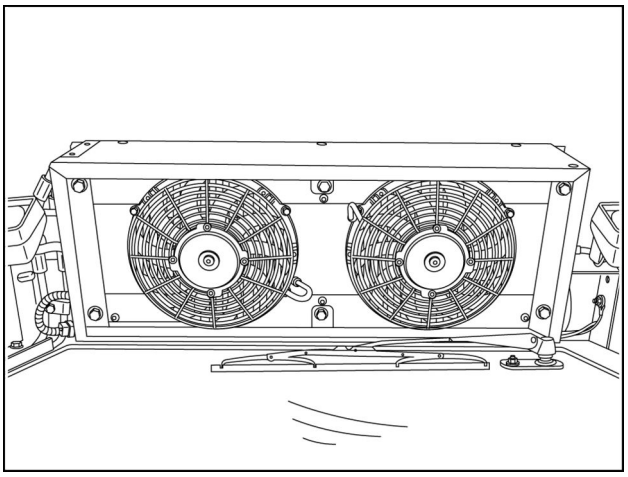
BAIL18DOZ0011AA 3

12. Use a soft brush and compressed air, with the pressure limited to **200 kPa**, to clean the condenser fans and fins.

NOTE: *Be careful not to damage or deform the condenser fins or other components when you use compressed air.*

13. Install the protective grills.

14. Install the eight nuts and fastening washers onto the studs. Torque the nuts to **8.3 N·m** (**73.5 lb in**).



RAIL12DOZ0932BA 4

EVERY 500 HOURS

Fuel filter (Replacement)

⚠ 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

NOTICE: *The fuel filter must be replaced every 500 hours of operation or more frequently (shorter periods) when operating the machine in extreme conditions.*

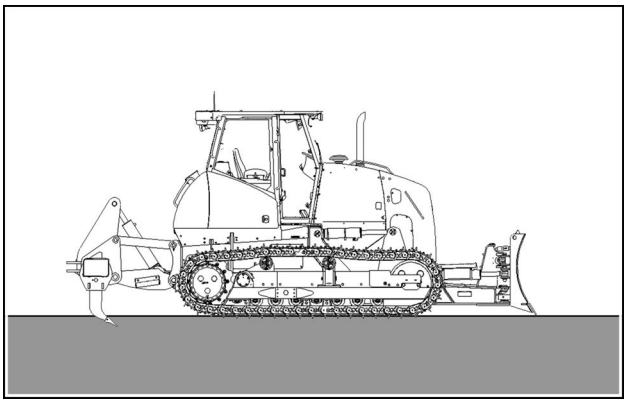
Replace Fuel Filter

To replace the fuel filter, proceed as follows:

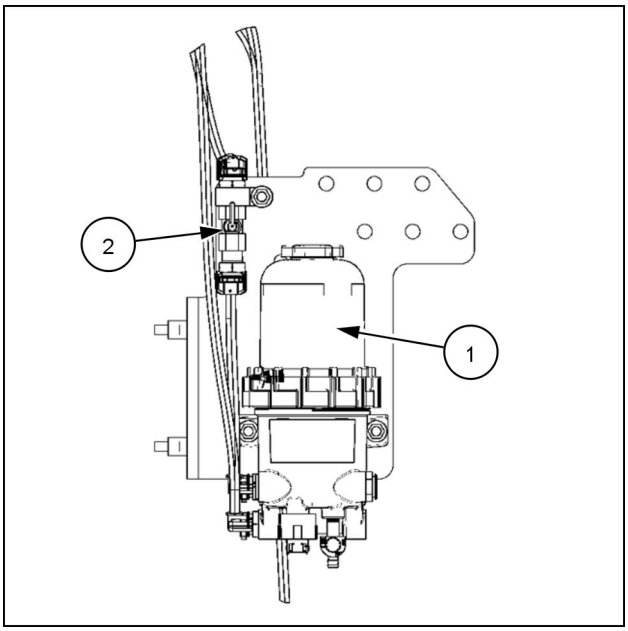
1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

   NOTE: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****.*

7. Locate the fuel filter **(1)** in the compartment on the right-hand side of the machine.
8. Close the fuel cut-off valve **(2)**, on the supply line, to the side of the fuel filter.



COIL14DOZ0001AA 1



COIL15DOZ9000BA 2

9. Clean the upper region of the filter around the cover **(3)**.
10. Turn the cover **(3)** counter-clockwise to fully open the cover.

    NOTE: *After you remove the cover, thoroughly clean the cover.*
11. Turn the yellow fuel drain valve **(4)**, on the bottom of the fuel filter, counter-clockwise to open the drain valve.
12. Drain the water and/or contaminants from the fuel filter into a suitable container.

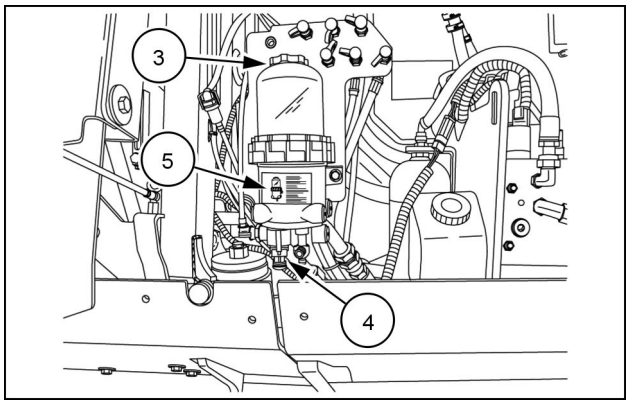
    NOTE: *Do not allow fuel to spill on engine or ground.*
13. Capture any fuel remaining in the lines or the fuel filter, and discard properly.
14. Close the yellow fuel drain valve **(4)**.
15. Use special tool **84238065** to loosen the fixing nut of the filter housing **(5)**.
16. Remove the nut, the filter housing and the filter element.

    NOTE: *Make sure that the O-ring is in good condition.*
17. Install a new filter element.

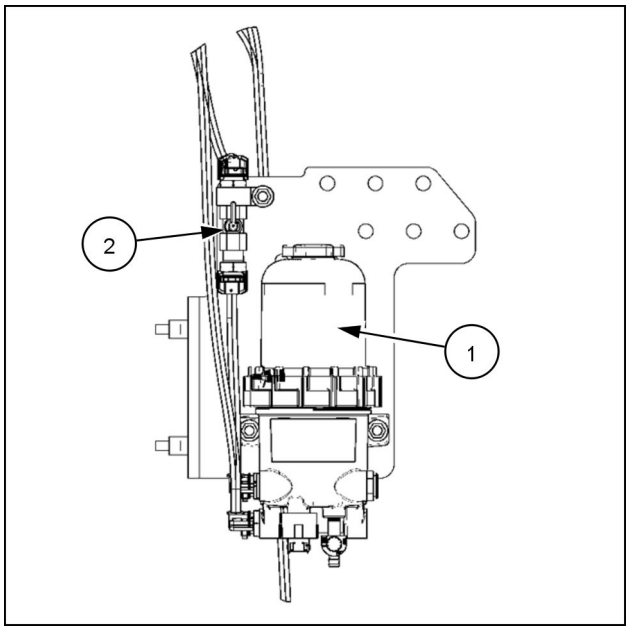
    NOTE: *Make sure that the filter element and the O-ring are installed correctly.*
18. Fit the filter housing onto the filter mounting cradle.
19. Use tool **84238065** to tighten the nut that secures the housing.

    NOTICE: *Be careful to not overtighten because the housing can crack.*
20. Add clean fuel through the cover **(3)** at the top of the filter until the filter element area is completely filled.
21. Firmly tighten the cover **(3)** by hand to close the cover.
22. Open the fuel cut-off valve **(2)** next to the filter **(1)**.
23. Check for leaks.

NOTE: *Handle and dispose of the waste in accordance with environmental regulations, laws and government codes.*



COIL16DOZ0009AA 3



COIL15DOZ9000BA 4

Engine oil and filter (Replacement)

⚠ 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

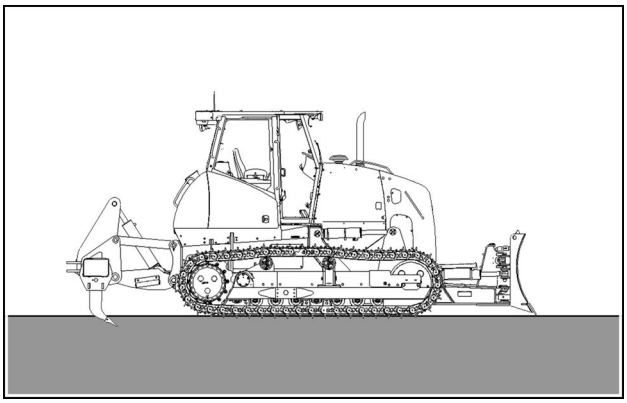
NOTICE: *The engine oil and engine oil filter must be replaced every 500 hours of operation or more frequently (shorter periods) when operating the machine in extreme conditions. For lubricant specifications, see page* ***8-1****.*

Replacing engine oil

To change the engine oil, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

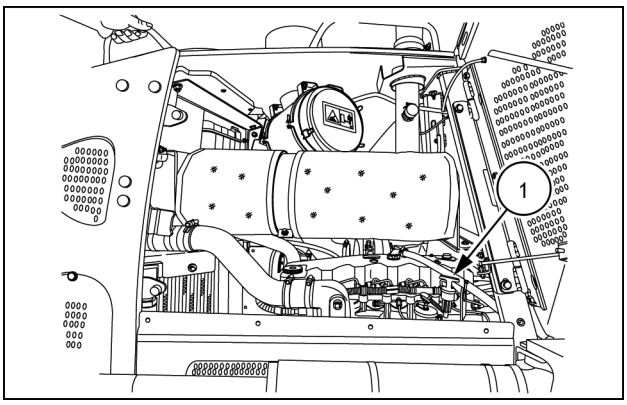
   NOTE: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****,*



COIL14DOZ0001AA 1

7. Open the left-hand front and right-hand rear access doors and latch them in open position.
8. Remove the dipstick **(1)** and check if the oil is warm (not hot).

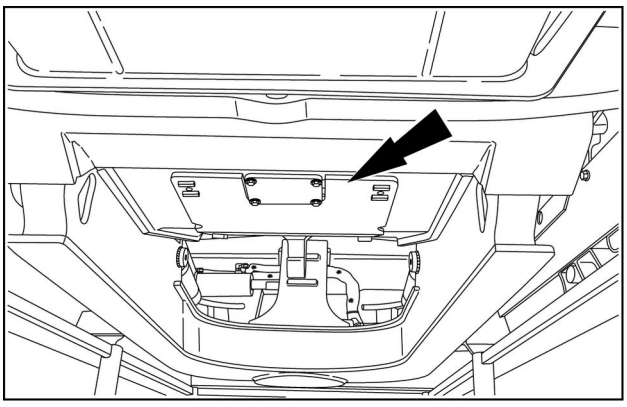
   NOTE: *These two operations provide a faster draining of the oil.*



COIL15DOZ0086AA 2

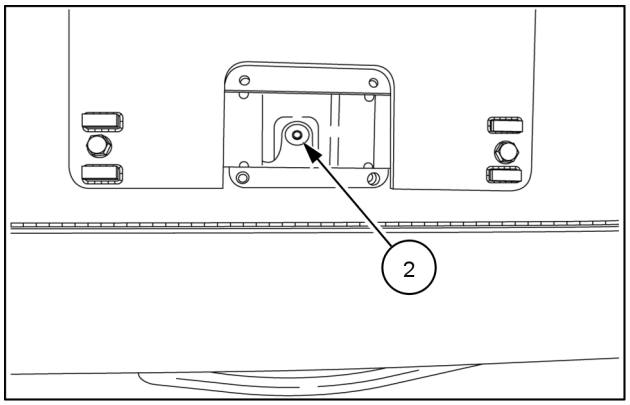
9. Use a suitable container to collect the drained oil.
10. Remove the access cover to the engine oil drain plug (located under the engine) by loosening its mounting bolts, using an appropriate wrench.

    NOTE: *If the machine is equipped with special draining equipment, use the engine environmental drain located in the left-hand engine access door.*



RAPH12DOZ0095AA 3

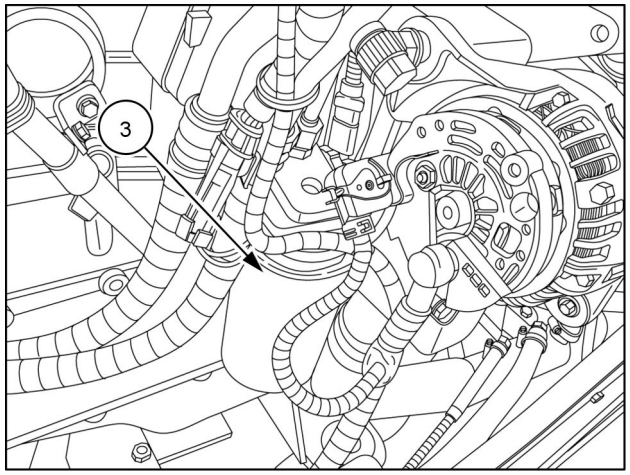
11. Remove the engine oil drain plug **(2)** and drain the oil into a suitable container.



RAPH12DOZ0096AA 4

12. Locate the oil filter **(3)** in the right-hand front engine compartment.
13. Clean the area around the filter.

NOTE: *Handle and dispose of the waste in accordance with environmental regulations, laws and government codes.*



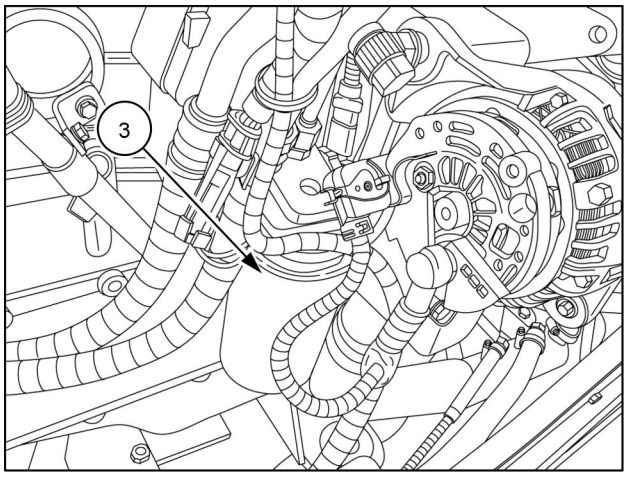
RAIL12DOZ0192AA 5

Replacement of the engine oil filter

To replace the engine oil filter, proceed as follows:

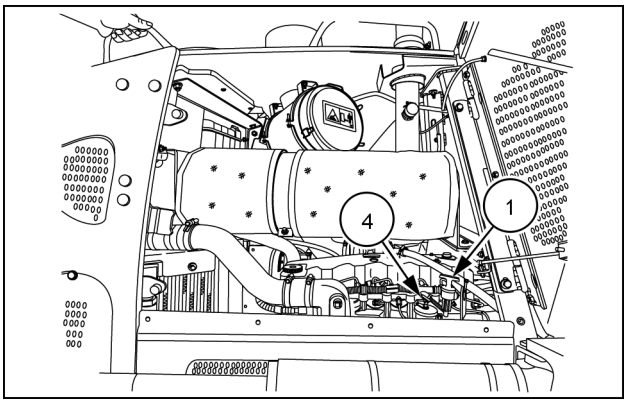
1. Turn the oil filter **(3)** housing counterclockwise to remove.
2. Lubricate the gasket of the new filter with new engine oil.
3. Hand tighten the new filter until the gasket makes contact with the base, and then tighten the new filter another 3/4 turn using only your hands.

   NOTE: *Never use a filter wrench to install a new filter.*
4. Reinstall and tighten the engine oil drain plug.



RAIL12DOZ0192AA 6

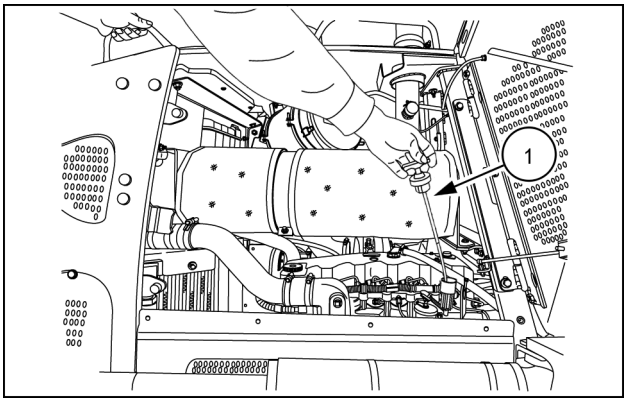
5. Pour oil into the engine through the filler neck **(4)** until the maximum level indicated on dipstick **(1)** is reached, then close the filler neck cap **(4)** and insert the dipstick **(1)**.
6. Start the engine. Let the engine run for a few minutes at idle speed.
7. Check the engine oil filter and remote drain for leaks.
8. After two minutes stop the engine.



COIL15DOZ0086AA 7

9. Wait for the engine oil to circulate to obtain an accurate reading on the dipstick **(1)** and top up if it has changed compared to the previous check.
10. Check again for leaks around the filter and drain.
11. Install the access cover to the engine oil drain plug.

NOTE: *Handle and dispose of the waste in accordance with environmental regulations, laws and government codes.*



COIL15DOZ0086AB 8

Crankcase ventilation filter (Replacement)

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Read and understand the SAFETY INFORMATION chapter 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.

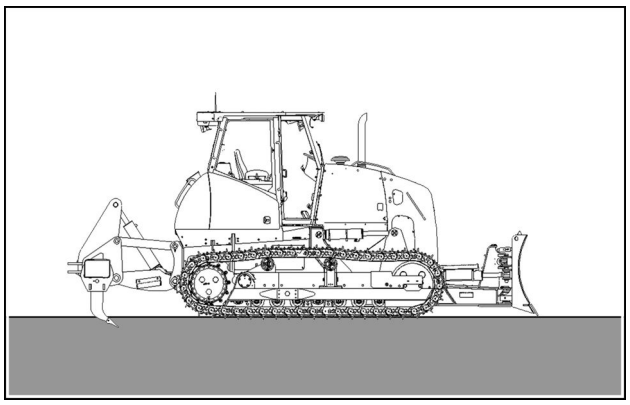
W0138B

NOTICE: *The "blow-by" filter should be replaced every 1200 hours of operation.*

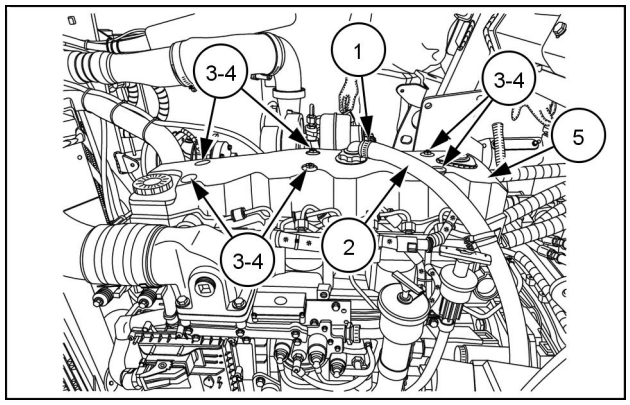
Replacing the crankcase breather filter

To replace the crankcase breather filter, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Place the ignition key in the "OFF" position to shut down the engine.
5. Set the parking brake.
6. Make sure that all residual pressure of the hydraulic system is relieved from the circuits before you begin the verification and maintenance procedures. See page **7-11**.
7. Loosen the clamp **(1)** of the breather hose **(2)**. Remove the hose from the fitting of the cover.
8. Loosen the six fixing nuts **(3)** of the valve cover.
9. Remove the six nuts and the six retainers **(4)** of the valve cover **(5)**.
10. Remove the valve cover **(5)** .

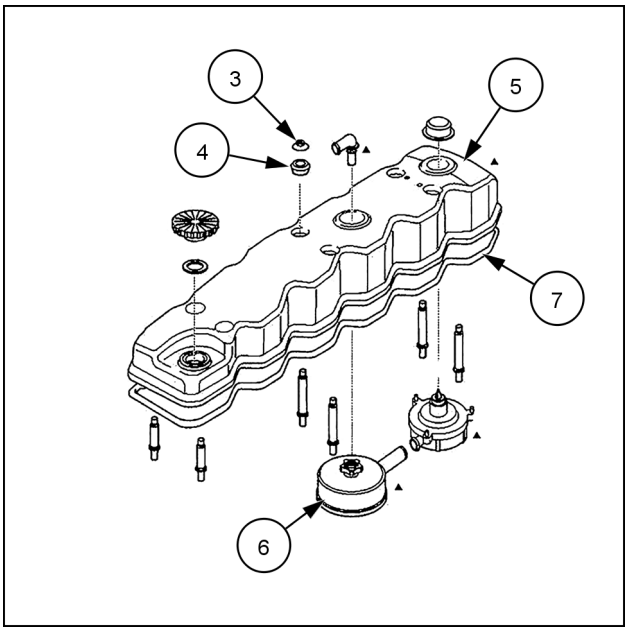


COIL14DOZ0001AA 1



COIL19DOZ0034AA 2

11. Remove the “blow-by” filter. **(6)**
12. Install the new “blow-by” filter **(6)**.
13. Whenever you disassemble the valve cover, replace the cover gasket with the poppet **(7)**.
14. Install the valve cover **(5)**.
15. Install the six retainers of the valve cover **(4)**.
16. Tighten the six nuts **(3)** of the valve cover. Start with the two center nuts and then the nuts of the ends, with a torque of **24 N·m**.
17. Fit the breather hose **(2)**. Tighten the fixing clamp **(1)**.



CCM019DOZ0002BA 3

Air intake lines – (Checking the hoses and clamps)

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Read and understand the SAFETY INFORMATION chapter 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.

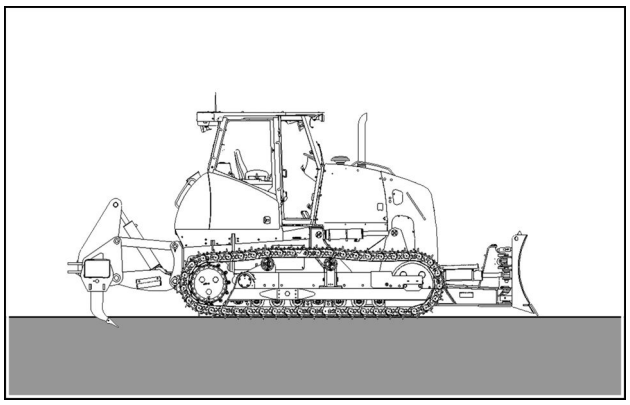
W0138B

NOTICE: *The hoses and clamps of the engine air intake system should be checked every 500 hours of operation.*

Checking the hoses and clamps of the intake system

To check the hoses and clamps of the engine air intake system, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Place the ignition key in the "OFF" position to shut down the engine.
5. Set the parking brake.
6. Make sure that all residual pressure of the hydraulic system is relieved from the circuits before you begin the verification and maintenance procedures. See page **7-11**.
7. Turn off the master switch. See page **3-63**.
8. Open the side covers of the engine compartment to access to the hoses of the air intake system lines.



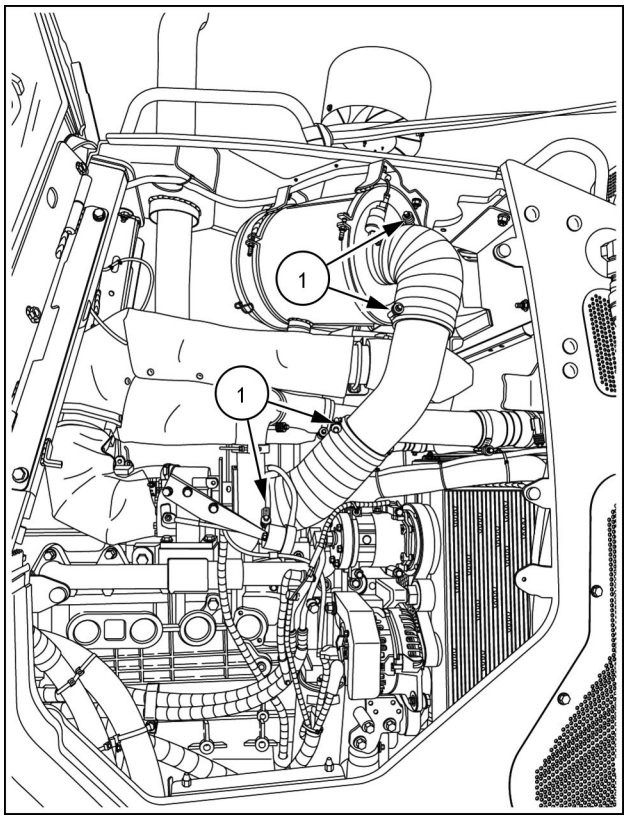
COIL14DOZ0001AA 1

9. Check the condition of all hoses of the air intake system to make sure they are air tight and are not dried out, cracked, or broken.
10. Check the condition and tightness of all hose clamps in the following positions.
    - Air filter outlet and turbocharger inlet **(1)**.
    - Turbocharger outlet **(2)**.
    - Inlet in the intake air cooler **(3)**.
    - Outlet of the intake air cooler **(4)**.
    - Inlet lines on the intake manifold **(5)**.
11. The torque of the clamps that secure the hoses is **5 – 6 N·m**.

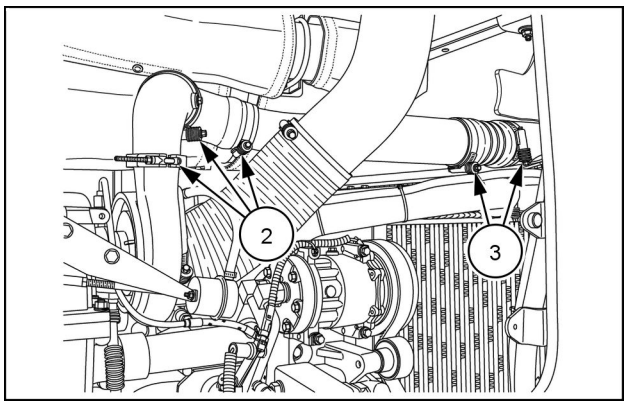
NOTE: *If there are issues in any hoses or clamps, replace the damaged component with a new one.*

12. Once you have completed the checks, close the engine compartment side access covers.

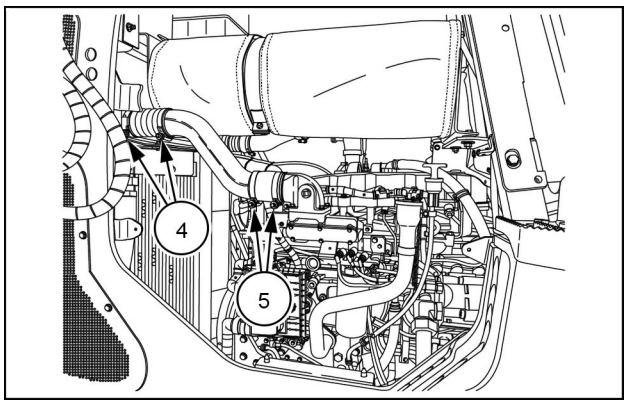
NOTE: *Never let the machine operate with leaks in the intake system. This may cause loss of power, increased fuel consumption, and a reduction in engine life.*



COIL19DOZ0029BA 2



COIL19DOZ0042AA 3



COIL19DOZ0039AA 4

EVERY 1000 HOURS

Fuel tank

⚠ WARNING
Risk of explosion!
Fuel vapors are explosive and flammable.
Do not smoke while handling fuel. Keep fuel away from flames or sparks. Stop the engine and remove the key before performing maintenance service. Always work in a well-ventilated area. Wipe up spilled fuel immediately.
Failure to comply with these recommendations could result in death or serious injury.

Drain fuel tank condensation

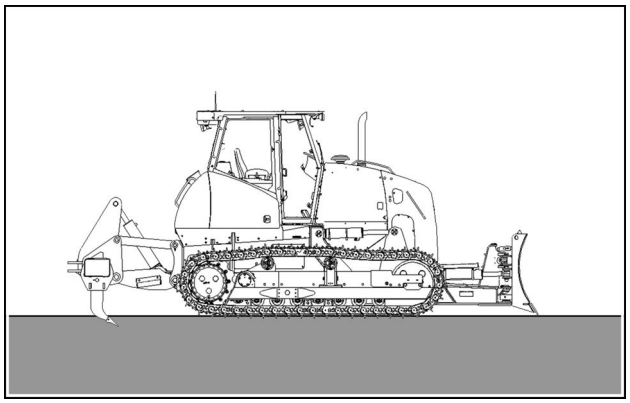
NOTICE: *Drain fuel tank condensation every 1000 hours of operation or more frequently (shorter periods) when operating the machine in extreme conditions. The fuel tank drain is located on the left-hand side of the machine.*

To drain the water and sediment from the fuel filter, proceed as follows:

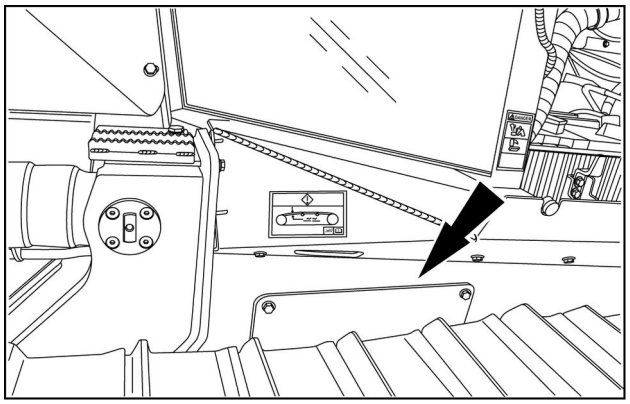
1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

   ATTENTION: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****,*

7. On machines with the environmental drain option, a fuel tank drain hose is supplied, located behind a bolted-on cover on the left-hand side of the machine.
8. Have a suitable container ready to collect the condensation and fuel.



COIL14DOZ0001AA 1

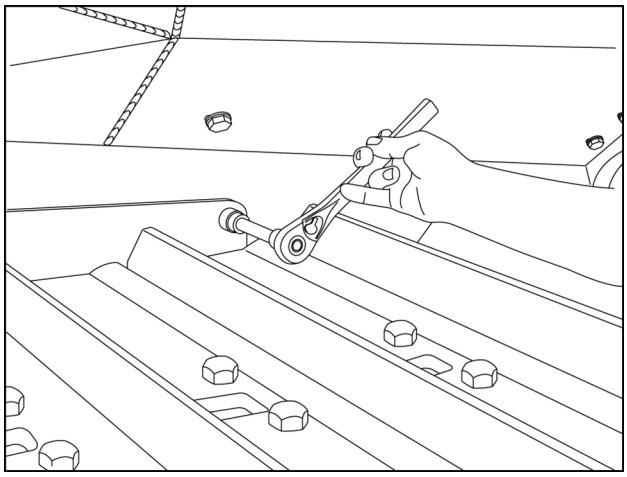


RAPH12DOZ0042AA 2

9. On machines that are not equipped with the environmental drain option, connect a drain hose to the fuel tank drain valve.

   NOTE: *The drain valve is accessible through the right-hand rear access cover or by removing the cab floor access cover.*

10. Loosen the bolts and remove the cover.
11. Position the fuel tank drain hose forward and remove the fitting.

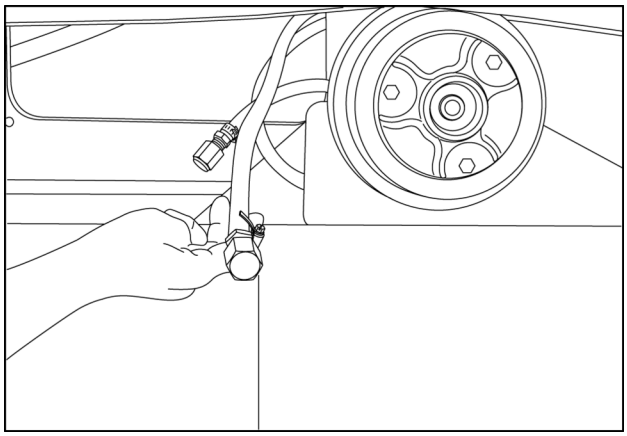


RAIL12DOZ0410AA 3

12. Open the fuel shutoff valve located on the fuel tank, and drain the water and sediment into a suitable container.

    NOTE: *The drain valve is accessible through the right-hand rear access cover or by removing the cab floor access cover.*

13. Turn the shut off valve to the closed position after only clean fuel is discharged.
14. Reinstall the hose connection.
15. Reinstall the hoses on the cover and fasten, if necessary.
16. Check for leaks.
17. Reinstall the cover and the bolts.



RAIL12DOZ0412AA 4

NOTE: *Handle and dispose of the waste in accordance with environmental regulations, laws, and government codes.*

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

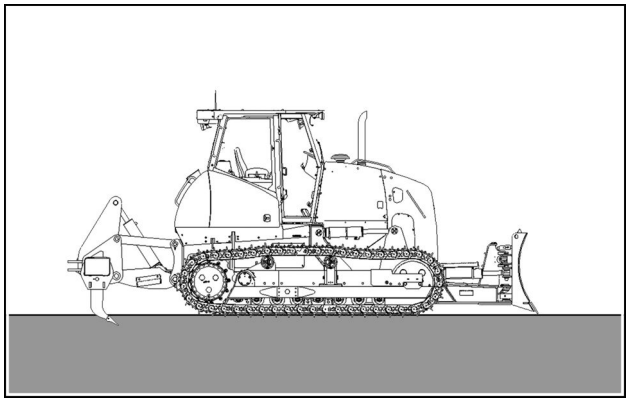
Cleaning the fuel tank cap breather

NOTICE: *The fuel tank cap breather must be cleaned every 1000 hours of operation or more frequently (shorter periods) when operating the machine in extreme conditions. The cover breather allows air to enter the fuel tank.*

To clean the fuel tank cap breather, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

   ATTENTION: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****,*



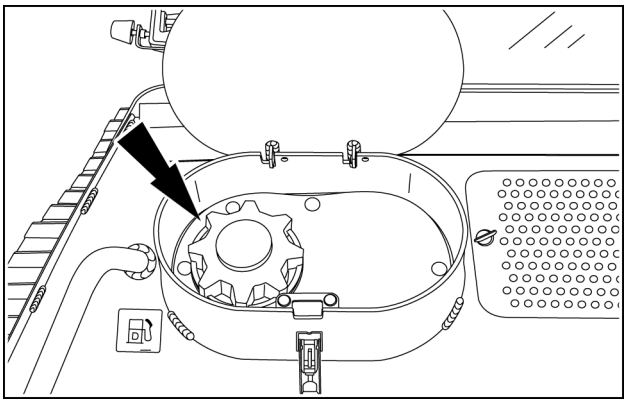
COIL14DOZ0001AA 1

7. Slowly remove the fuel tank cap.

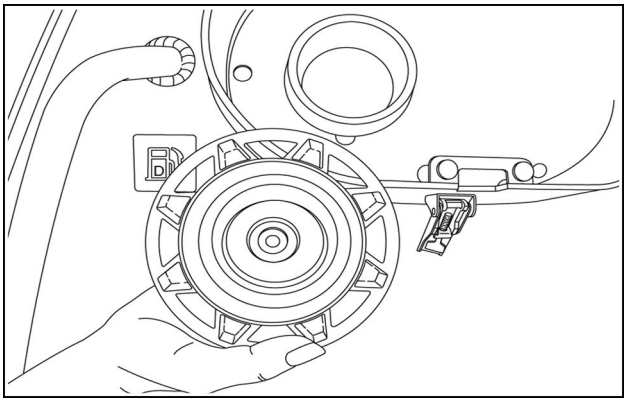
   NOTE: *The fuel tank cap is located at the rear of the machine.*

8. Clean the cap, and dry with compressed air.
9. Reinstall cap, tightening firmly in place.

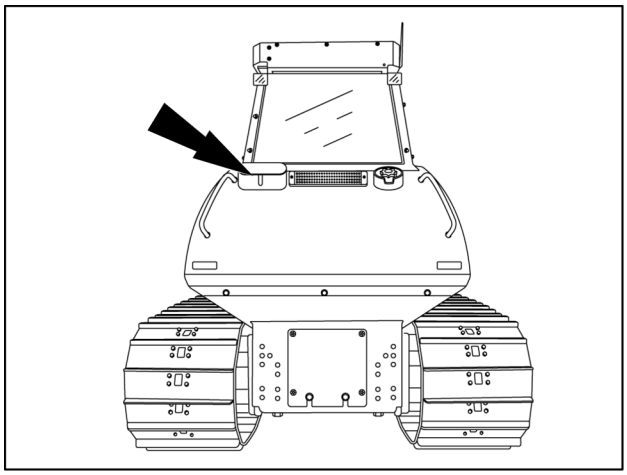
   NOTICE: *If necessary, replace the fuel tank cap with an original cap. The cap must be replaced with a genuine cap to obtain the correct fuel tank pressure.*



COIL14DOZ0009AA 2



COIL14DOZ0010AA 3



RAIL12DOZ0396AA 4

Replacing the hydraulic reservoir breather filter

NOTICE: *Pressurized system!*
Hydraulic fluid leaking under pressure can penetrate the skin and cause serious injuries. To prevent personal injury, relieve all pressure before disconnecting the fluid lines or before starting maintenance services on the hydraulic system. Before applying pressure, make sure all connections are tight and all components are in good condition. Never use your hands 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 with these recommendations could result in death or serious injury.

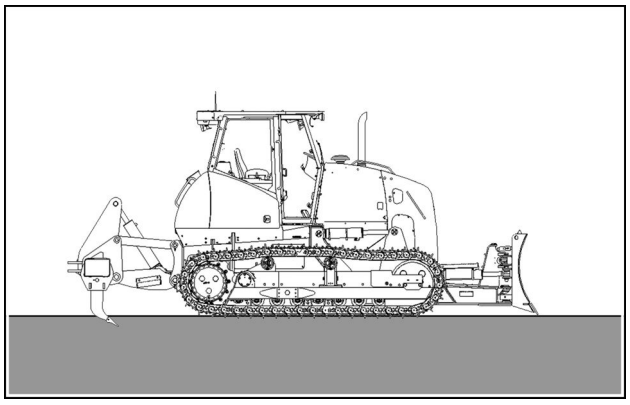
Replacement of the hydraulic fluid reservoir breather

NOTICE: *The hydraulic fluid reservoir breather must be replaced every 1000 hours of operation or more frequently (shorter periods) when operating the machine in extreme conditions.*

To replace the hydraulic fluid reservoir breather, proceed as follows:

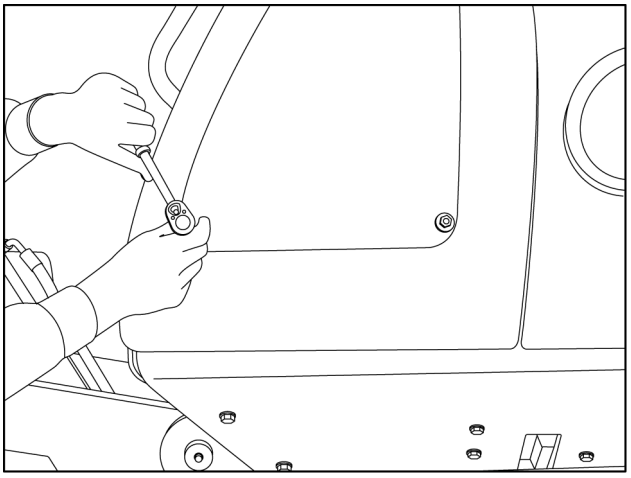
1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

   NOTE: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****,*



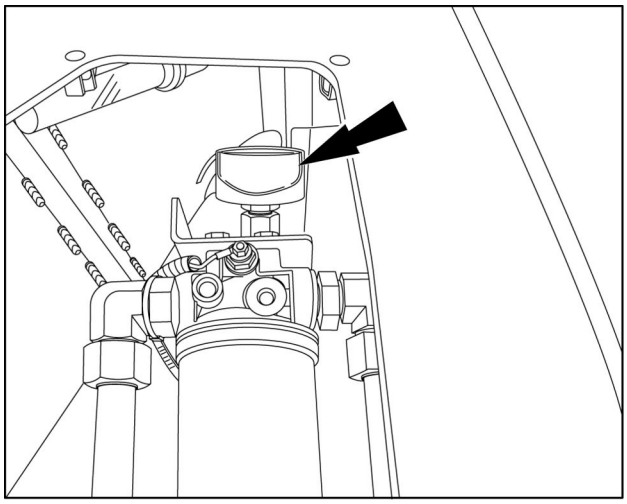
COIL14DOZ0001AA 1

7. Remove the bolts from the access cover to the hydraulic fluid reservoir breather, at the right-hand rear of the machine.



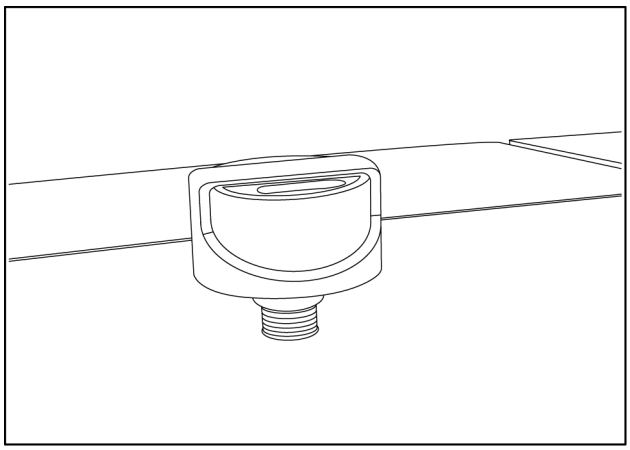
RAIL12DOZ0177AA 2

8. Clean the area around the breather.



RAIL12DOZ0372AA 3

9. Turn the breather counter-clockwise and remove it.
10. Replace it with a new one.
11. Replace the cover and bolts.



RAIL12DOZ0373AA 4

Change the final drive oil / Planetary reducer oil

⚠ WARNING
Burn hazard!
The oil of the travel reducers is under pressure. Protect the face and body using appropriate protective goggles and protective clothing. Never service a hot machine. Allow the machine to cool down before starting any maintenance. Heat increases the travel reducer oil pressure. Slowly loosen the filler, drain and level plugs to slowly relieve the pressure inside the reducers. When checking the oil level, stay to the side of the travel reducers. The procedure for alignment of the plugs must be carried out with the help of an assistant on the ground, and this assistant should be away from the operating area of the machine.
Failure to comply with these recommendations could result in death or serious injury.

Replacing the final drive oil / planetary reducer oil

NOTICE: *The final drive oil / planetary reducer oil must be replaced every 1000 hours of operation or more frequently (shorter periods) when operating the machine in extreme conditions. For lubricant specifications, refer to page* ***8-1****.*

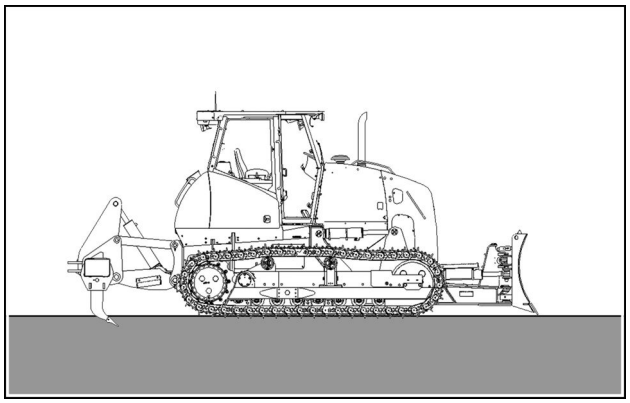
To replace the final drive oil / planetary reducer oil, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. The planetary reducer fill and drain plugs must be aligned vertically, as shown in figure **3**.

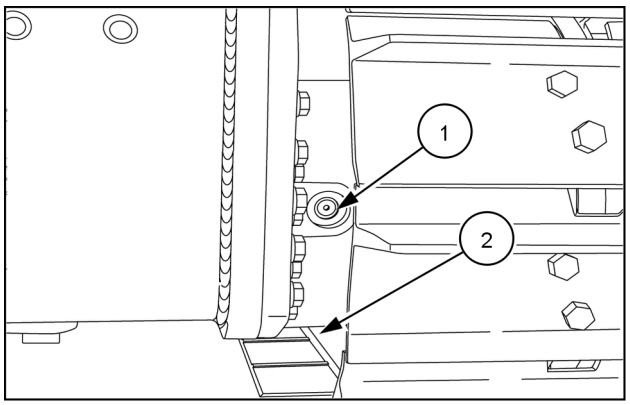
   NOTE: *Observance of this position is essential to proper servicing.*
5. Shut down the engine, placing the ignition key in the off position.
6. Set the park brake.
7. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

   ATTENTION: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****,*
8. To replace the final drive oil, clean the area around the check/fill plug **(1)** and the drain plug **(2)**.

   NOTE: *The drain plugs are located on the bottom of the housing.*

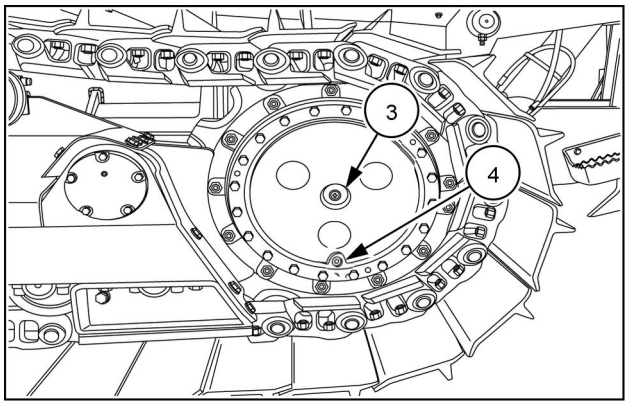


COIL14DOZ0001AA 1



RAIL13DOZ1269AA 2

9. To replace the planetary reducer oil, clean the area around the check/fill plug **(3)** and the drain plug **(4)**.



RAPH12DOZ0383AA 3

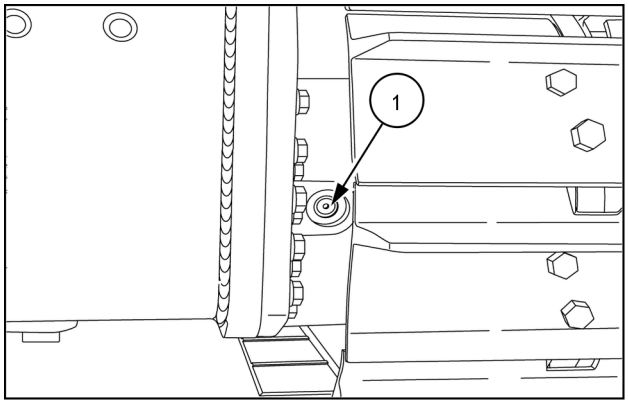
10. Slowly remove the final drive fill/check plug **(1)**.
11. Have a suitable container available and slowly remove the drain plug **(2)** from the final drive reducer.
12. Slowly remove the planetary reducer fill/check plug **(3)**.
13. Have a suitable container available and slowly remove the drain plug **(4)** from the planetary reducer.
14. Allow all the oil to drain.

    NOTE: *The final drive and planetary reducer share the same oil. Complete the draining process for both the final drive and planetary reducer simultaneously.*

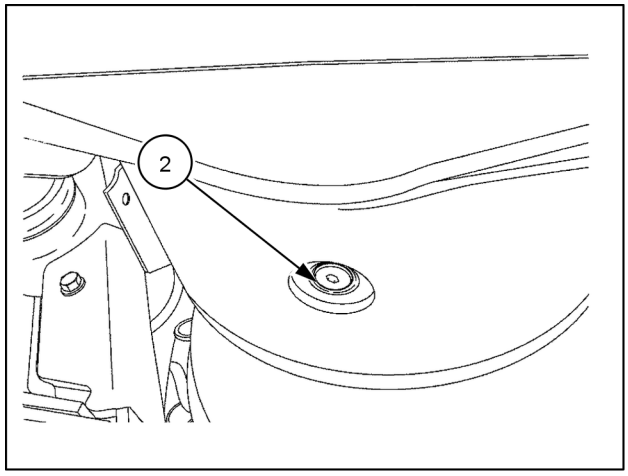
15. Reinstall the final drive drain plug **(2)** and the planetary reducer drain plug **(4)**.
16. Top up with new oil through the fill/check orifice **(1)** and **(3)**.

    NOTE: *Stop the filling process as soon as oil begins to drain from the fill/check orifice.*

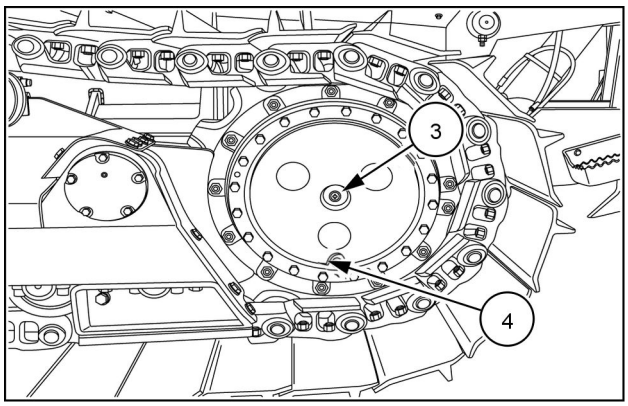
17. Install the fill/check plugs **(1)** and **(3)** and repeat the procedure on the other side.
18. Check for leaks.



RAIL13DOZ1269AA 4



RAPH12DOZ0384AA 5



RAPH12DOZ0383AA 6

EVERY 1200 HOURS

Engine crankcase breather filter (Replacement)

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Read and understand the SAFETY INFORMATION chapter 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.

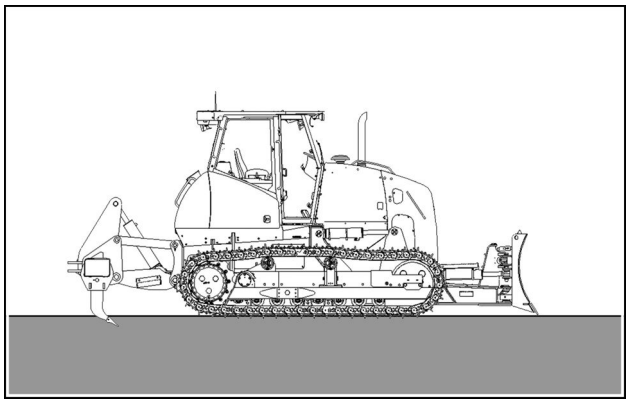
W0138B

NOTICE: *The "blow-by" filter should be replaced every 1200 hours of operation.*

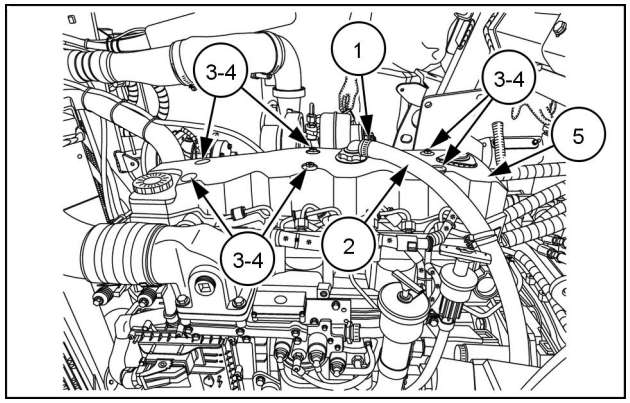
Replacing the crankcase breather filter

To replace the crankcase breather filter, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Place the ignition key in the "OFF" position to shut down the engine.
5. Set the parking brake.
6. Make sure that all residual pressure of the hydraulic system is relieved from the circuits before you begin the verification and maintenance procedures. See page **7-11**.
7. Loosen the clamp **(1)** of the breather hose **(2)**. Remove the hose from the fitting of the cover.
8. Loosen the six fixing nuts **(3)** of the valve cover.
9. Remove the six nuts and the six retainers **(4)** of the valve cover **(5)**.
10. Remove the valve cover **(5)** .

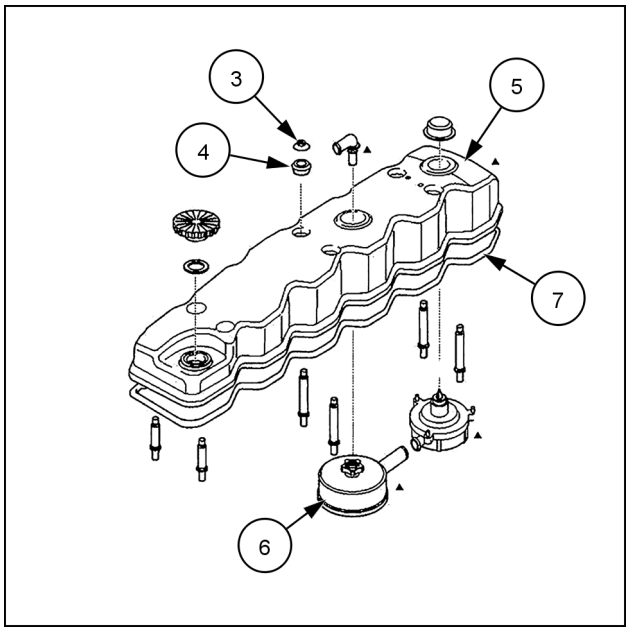


COIL14DOZ0001AA 1



COIL19DOZ0034AA 2

11. Remove the “blow-by” filter. **(6)**
12. Install the new “blow-by” filter **(6)**.
13. Whenever you disassemble the valve cover, replace the cover gasket with the poppet **(7)**.
14. Install the valve cover **(5)**.
15. Install the six retainers of the valve cover **(4)**.
16. Tighten the six nuts **(3)** of the valve cover. Start with the two center nuts and then the nuts of the ends, with a torque of **24 N·m**.
17. Fit the breather hose **(2)**. Tighten the fixing clamp **(1)**.



CCM019DOZ0002BA 3

EVERY 1500 HOURS

Engine crankcase breather filter

⚠ WARNING
Danger of burns!
Remember that during normal operation the engine can reach high temperatures and that is extremely important allow the machine to cool down before performing this operation.
Failure to follow these recommendations may result in serious injury.

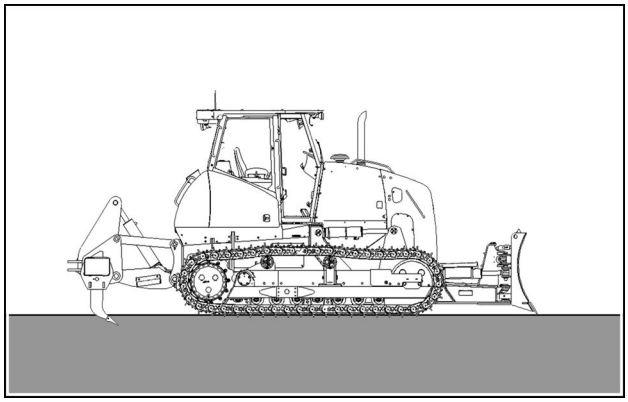
Replacing the engine breather filter

NOTICE: *The engine breather filter must be replaced every 1500 hours of operation or more frequently (shorter periods) when operating the machine in extreme conditions.*

To replace the engine breather filter, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

   ATTENTION: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****,*



COIL14DOZ0001AA 1

Engine valve clearance - Check and adjust

⚠ WARNING
Danger of burns!
Remember that during normal operation the engine can reach high temperatures and that is extremely important allow the machine to cool down before performing this operation.
Failure to follow these recommendations may result in serious injury.

Checking and adjusting the engine valves

ATTENTION: *To perform this operation, see your CASE CONSTRUCTION Dealer.*

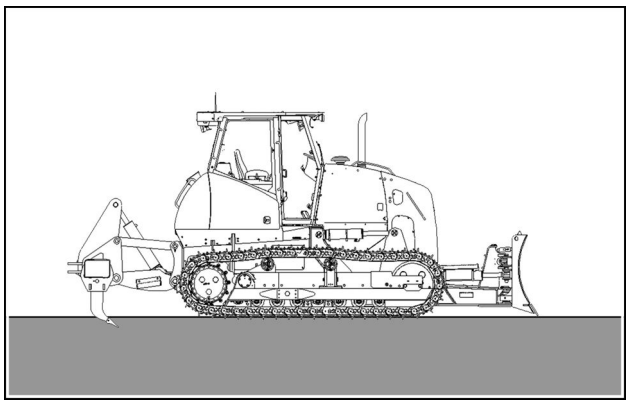
NOTICE: *The engine valve clearance must be checked every 1500 hours of operation or more frequently (shorter periods) when operating the machine in extreme conditions.*

To check and adjust the engine valves, proceed as follows:

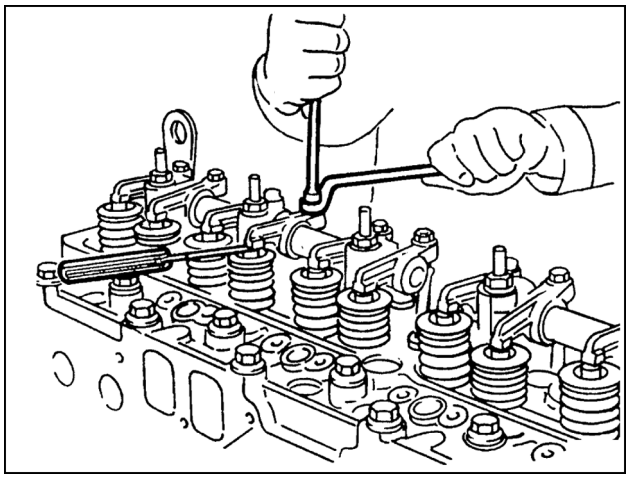
1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

   ATTENTION: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****,*
7. Wait until the machine cools down.
8. Open the engine access covers, latching them in the open position.
9. Remove the access cover to the valves on the engine head.
10. Check that the valve clearance is as follows:
    - Intake: 0.25 ± 0.05 mm
    - Exhaust: 0.50 ± 0.05 mm

NOTE: *To check the clearance of the valves, refer to the Engine Service Manual.*



COIL14DOZ0001AA 1



COILCEX0960AA 2

EVERY 2000 HOURS

Engine coolant – (Change) (For 2050M models up to serial number HBZN2050HJAC00953)

⚠ CAUTION

Burn hazard!
Hot coolant can spray out if you remove the filler cap while the system is hot. After the system has cooled, turn the filler cap to the first notch and wait for all pressure to release before proceeding. Failure to comply could result in minor or moderate injury.

C0043A

NOTICE: *Drain and flush the tank and replace the engine coolant after every 2000 hours of operation. Alternatively, drain and flush the tank and replace the engine coolant more frequently (shorter periods) when you operate the machine in extreme conditions. For engine coolant specifications, see page* ***8-1****.*

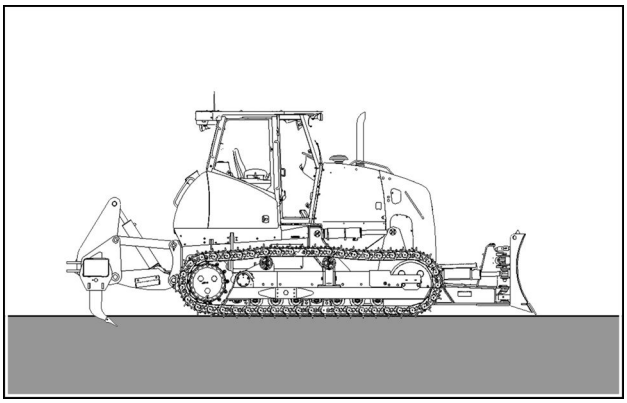
NOTICE: *Never mix organic coolants with inorganic coolants. This mixture damages the cooling system. See page* ***8-1*** *for the specifications of the coolant additives.*

NOTE: *Handle and dispose of the waste in accordance with environmental regulations, laws and government codes.*

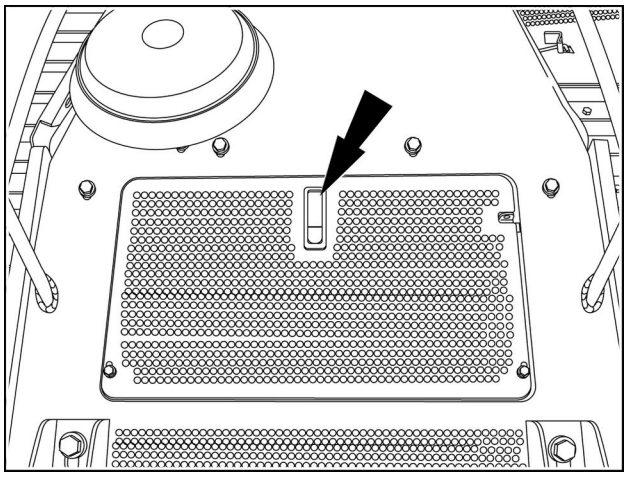
How to drain and clean the radiator and change the engine coolant

To drain and flush the tank and replace the engine coolant, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the parking brake.
6. Make sure that all residual pressure of the hydraulic system is relieved from the circuits before you begin the verification and maintenance procedures. See page **7-11**.
7. Wait for the engine to cool.
8. After the engine has cooled and the temperature of the coolant has reached a safe temperature, remove the access cover.

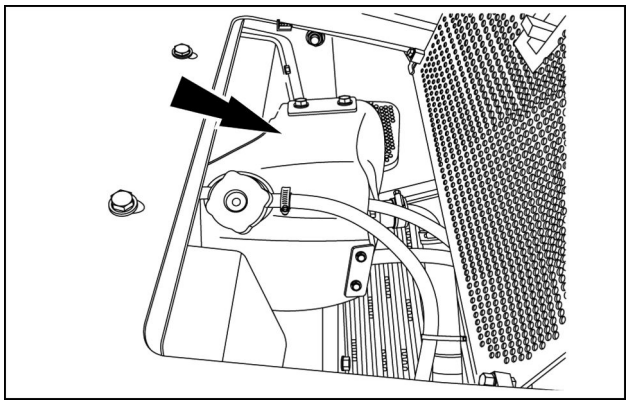


COIL14DOZ0001AA 1



RAIL13DOZ1691AA 2

9. Then remove the cap from the expansion tank.



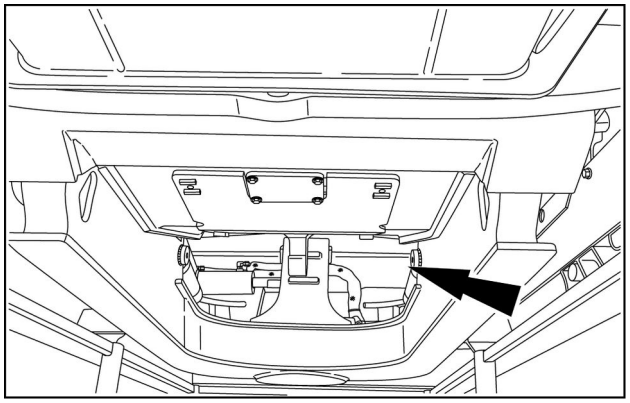
COIL16DOZ0015AA 3

10. The coolant drain plug is located beneath the machine under the front cover.

NOTE: *If the machine is equipped, use the engine coolant environmental drain.*

11. Remove the bolts from the access panel, and remove the panel.

NOTE: *The cover is heavy; use care during removal.*

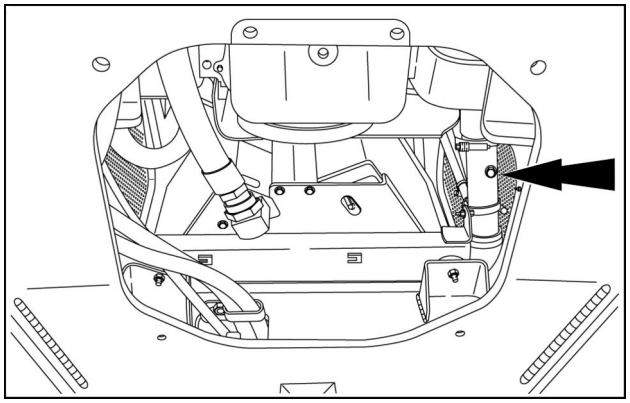


RAPH12DOZ0095AA 4

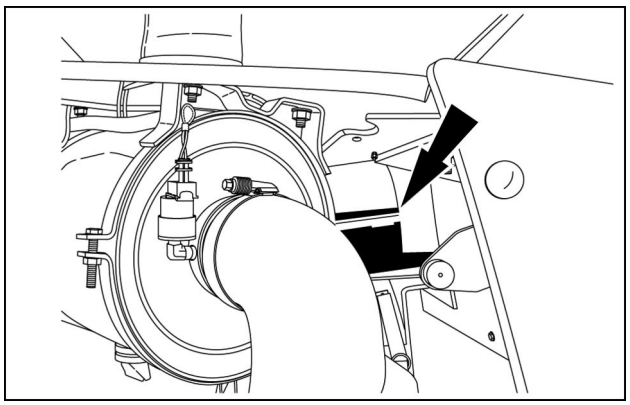
12. Place a suitable container under the drain plug.
13. Remove the drain plug and drain the coolant from the system.
14. Install the drain plug and tighten it correctly after all the coolant has drained.
15. Use an appropriate cleaning product to clean and flush the coolant system.

NOTICE: *Contact your authorized CASE CONSTRUCTION dealer to obtain the cleaning products recommended for your machine's cooling system.*

16. Follow the instructions on the cleaning product bottle.
17. After the system has been cleaned and flushed, install and tighten the drain plug.
18. Make sure that the drain plug is closed and fill the cooling system, using the correct quantity and ratio of antifreeze/coolant and water for the system and weather conditions, through the tank filler neck.
19. Start the engine and let it run at idle speed until the temperature of the liquid coolant matches the operating temperature.
20. Let the system cool.
21. Check the level marks and fill marks on the side of the reservoir, through the right-hand side cover of the engine compartment.



RAPH12DOZ0097AA 5



COIL16DOZ0013AA 6

NOTE: *Add coolant, if required*

Hydraulic fluid and filter – Hydrostatic (Replacement)

NOTICE: *Pressurized system!*
Hydraulic fluid leaking under pressure can penetrate the skin and cause serious injuries. To prevent personal injury, relieve all pressure before disconnecting the fluid lines or before starting maintenance services on the hydraulic system. Before applying pressure, make sure all connections are tight and all components are in good condition. Never use your hands 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 with these recommendations could result in death or serious injury.

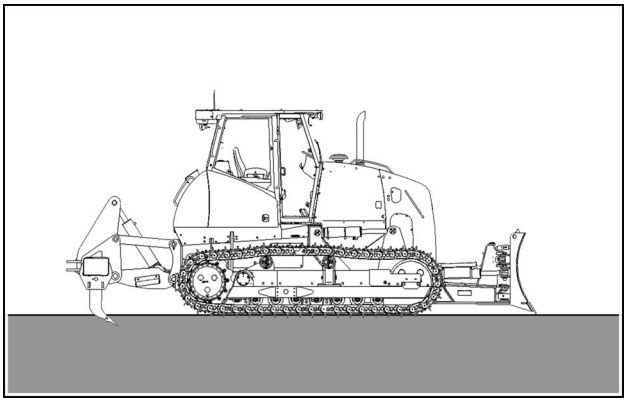
NOTICE: *The fluid and filter of the hydraulic system and the hydrostatic drive filter should be replaced every 2000 hours of operation or more frequently (shorter periods) when operating the machine in extreme conditions. For lubricant specifications, see page* ***8-1****.*

Replacing the hydraulic fluid filter and fluid

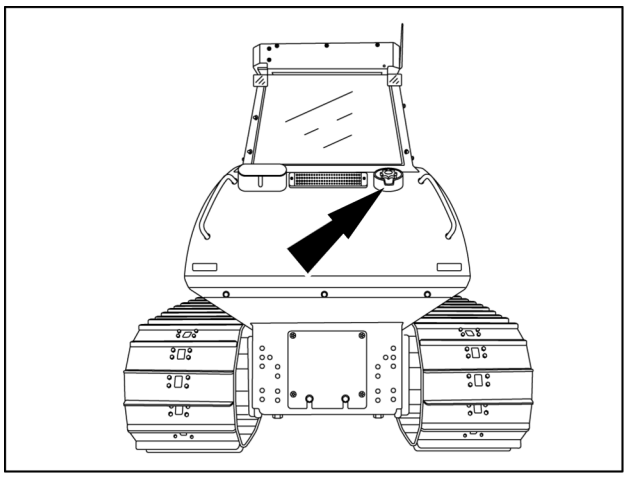
To replace the hydraulic fluid filter and fluid, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Place the DO NOT OPERATE tag on the ignition key.
6. Set the park brake.
7. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

   NOTE: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****,*
8. The hydraulic fluid fill cap is located on the rear of the machine.
9. Make sure the accumulators on the machine are completely discharged.
10. Clean the area around the hydraulic fluid filler cap and slowly loosen the cap to release any remaining pressure.

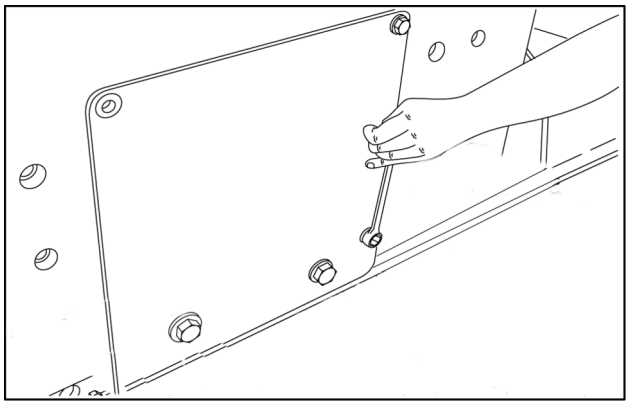


COIL14DOZ0001AA 1



RAIL12DOZ0396AA 2

11. Remove the bolts and the reservoir drain access cover.

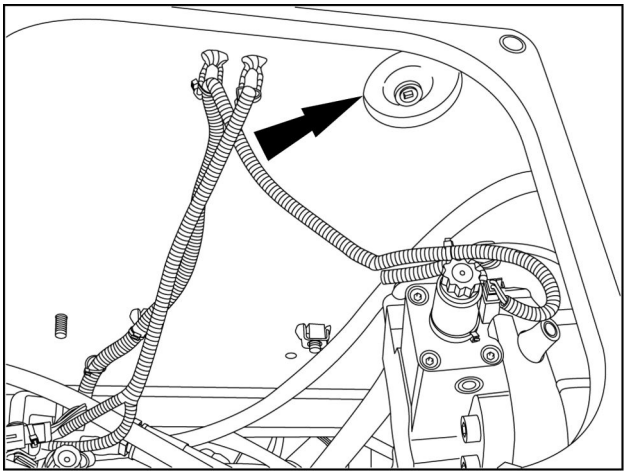


RAIL13DOZ1266AA 3

12. The hydraulic reservoir drain is located in the upper right hand side of the access compartment.

    NOTE: *A drain hose is included on machines equippedwith the environmental drain option.*

13. Open the hydraulic reservoir drain, and drain the oil into a suitable container.
14. After oil has completely drained, close the drain, and replace the access cover.



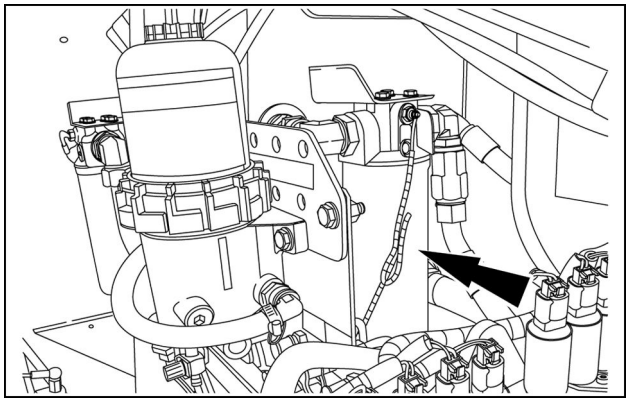
RAIL12DOZ0378AA 4

15. Remove and replace the hydraulic fluid filter.
16. Turn the filter counterclockwise to remove.
17. Clean the mating surface on the filter poppet.

    NOTE: *Make sure that all dirt and gasket material has been removed.*

18. Apply a thin coat of clean fluid on the gasket and threads.
19. Install and firmly hand-tighten the new filter on the poppet.

    NOTE: *Never use a filter wrench to install a new filter.*

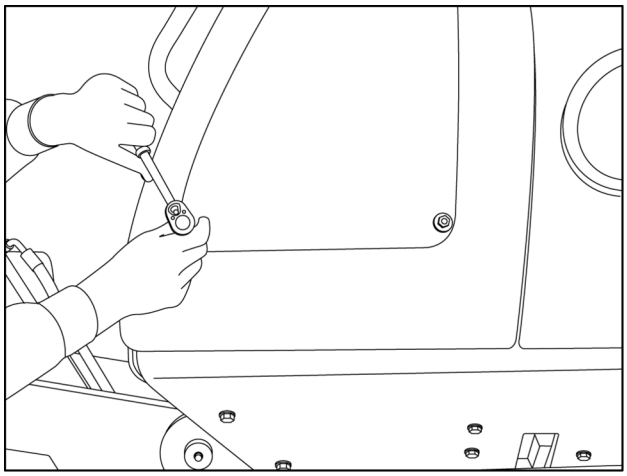


COIL16DOZ0020AA 5

Hydrostatic filter replacement

To replace the hydrostatic filter, proceed as follows:

1. Remove the bolts and the cover from the right rear access panel.

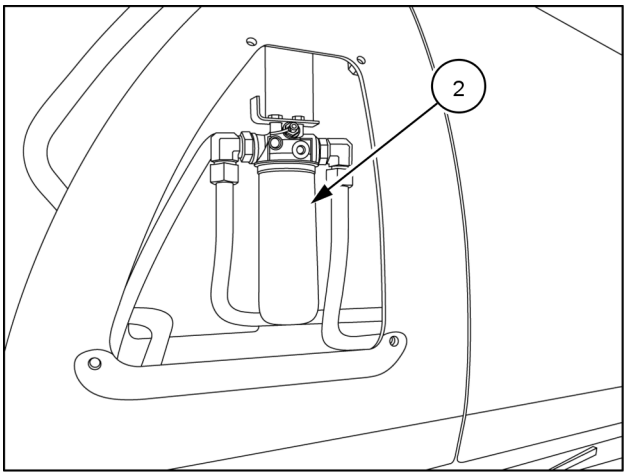


RAIL12DOZ0177AA 6

2. Remove the hydrostatic filter **(2)**.
3. Turn the filter counterclockwise to remove.
4. Clean the mating surface on the filter poppet.

   NOTE: *Make sure that all dirt and gasket material has been removed.*

5. Apply a thin coat of clean fluid on the gasket and threads.

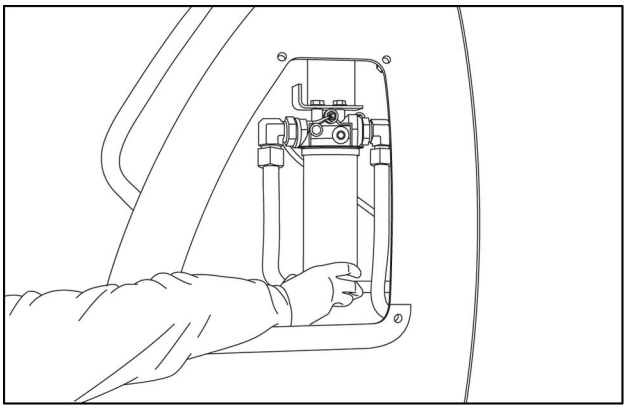


RAIL12DOZ0178AA 7

6. Install and firmly hand-tighten the hydrostatic filter on the filter poppet.

   NOTE: *Never use a filter wrench to install a new filter.*

   NOTICE: *Clean the hydraulic reservoir suction screens in conjunction with this procedure. See page* ***Hydraulic suction filter - (Cleaning) (For D180C models from serial number HBZN180CE-JAC00960)*** *for further information.*



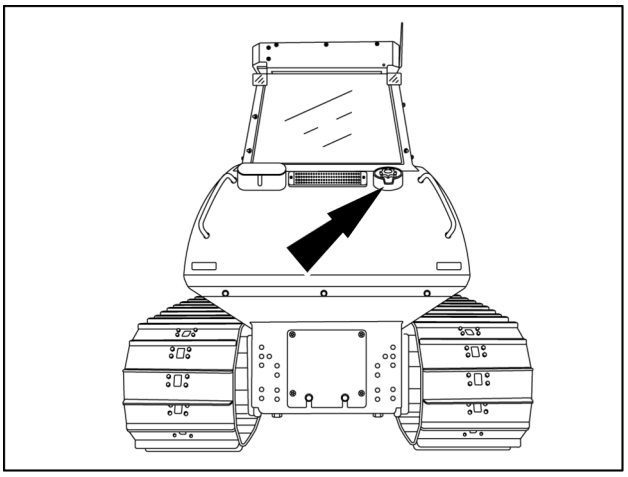
RAIL12DOZ0179AA 8

7. Fill the reservoir with new hydraulic fluid.
8. Install the reservoir filler cap.
9. Start the engine and run at approximately **1000 RPM**.

   NOTE: *Check for leakage around the filter and drain.*
10. Close all access covers.
11. Operate the controls several times to remove any air in the lines.
12. Place the attachments on the ground, and stop the engine.
13. Check the hydraulic fluid level.
14. If you need to add more fluid, make sure all pressure is removed in the system, and remove the filler cap slowly to release pressure in the reservoir.

NOTICE: *Check for metal filings or other foreign particles in the filters, or allow your authorized CASE CONSTRUCTION dealer to check your machine's hydraulic fluid through the lubricant analysis program.*

NOTE: *Handle and dispose of the waste in accordance with environmental regulations, laws and government codes.*



RAIL12DOZ0396AA 9

Hydraulic suction filter – (Cleaning) (For 2050M models up to serial number HBZN2050HJAC00953)

⚠ 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.

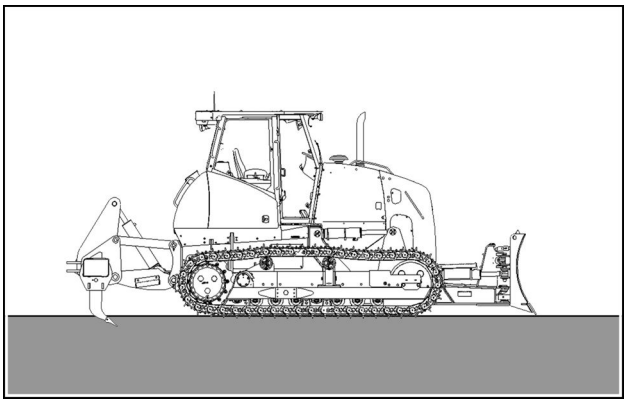
W0241A

NOTICE: *The hydraulic reservoir suction screens must be cleaned every 2000 hours of operation or every 2 years, whichever comes first, or more frequently (shorter periods) when you operate the machine in extreme conditions. Clean the hydraulic reservoir suction screens in conjunction with the procedure for replacement of the filters and change of the hydraulic/hydrostatic drive fluid. See page* ***7-91*** *for further information.*

NOTE: *Handle and dispose of the waste in accordance with environmental regulations, laws and government codes.*

Cleaning the hydraulic reservoir suction screens

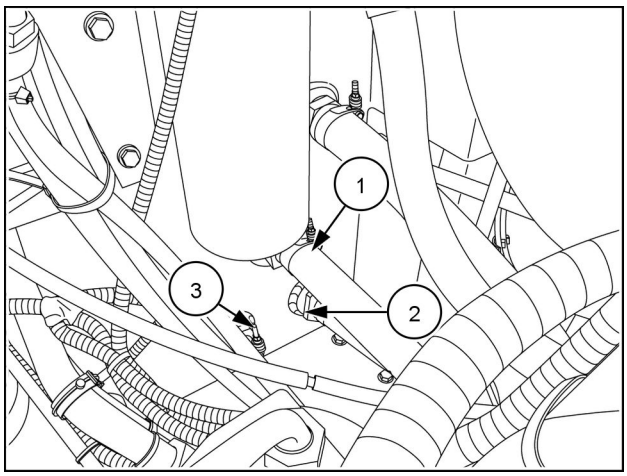
To clean the hydraulic reservoir suction screens, proceed as follows:



COIL14DOZ0001AA 1

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the parking brake.
6. Make sure that all residual pressure of the hydraulic system is relieved from the circuits before you begin the verification and maintenance procedures. See page **7-11**.
7. Locate the suction screens on the front of the hydraulic fluid tank by opening the rear access door.
8. After you drain the fluid from the hydraulic reservoir (see page **7-91**), loosen the T-bolt hose clamps and separate the hydraulic hoses from the suction screen assembly barbs.
9. Remove the charge pump suction screen **(1)**, the equipment pump suction screen **(2)** and the fan pump suction screen **(3)**.
10. Clean the screens with solvent.

NOTE: *Replace if required.*

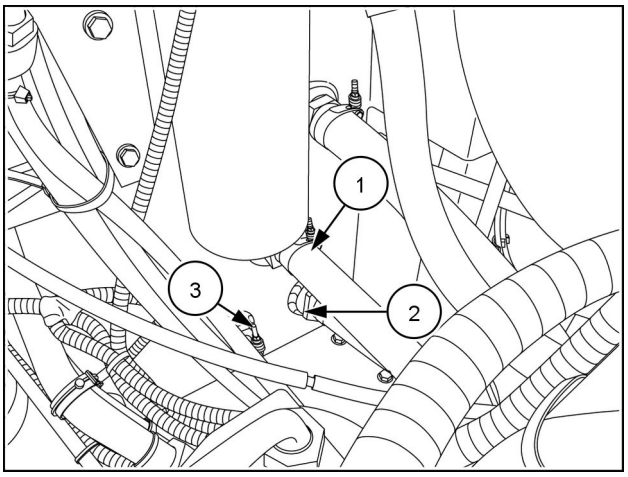


RAIL13DOZ1687AA 2

11. Install cleaned or new screens.
12. Install the hoses to the fittings and secure in place with the clamps (T-bolt type).
13. Position the threads upward and tighten the clamp nut.

Torques

- Charge pump suction screen assemblies **(1)** **202 – 222 N·m** (**149 – 164 lb ft**)
- Equipment pump suction screen **(2)** **236 – 260 N·m** (**174 – 192 lb ft**).
- Fan pump suction screen assembly **(3)** **178 – 195 N·m** (**131 – 144 lb ft**)
- Clamp nut **6.6 – 7.7 N·m** (**58.4 – 68.2 lb in**)



RAIL13DOZ1687AA 3

EVERY 4000 HOURS

Engine coolant – (Change) (For 2050M models from serial number HBZN2050HJAC00954)

⚠ CAUTION

Burn hazard!
Hot coolant can spray out if you remove the filler cap while the system is hot. After the system has cooled, turn the filler cap to the first notch and wait for all pressure to release before proceeding. Failure to comply could result in minor or moderate injury.

C0043A

NOTICE: *Drain and flush the tank and replace the engine coolant after every 2000 hours of operation. Alternatively, drain and flush the tank and replace the engine coolant more frequently (shorter periods) when you operate the machine in extreme conditions. For engine coolant specifications, see page* ***8-1****.*

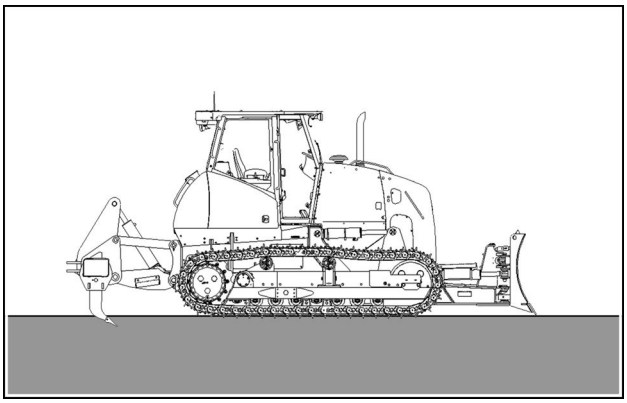
NOTICE: *Never mix organic coolants with inorganic coolants. This mixture damages the cooling system. See page* ***8-1*** *for the specifications of the coolant additives.*

NOTE: *Handle and dispose of the waste in accordance with environmental regulations, laws and government codes.*

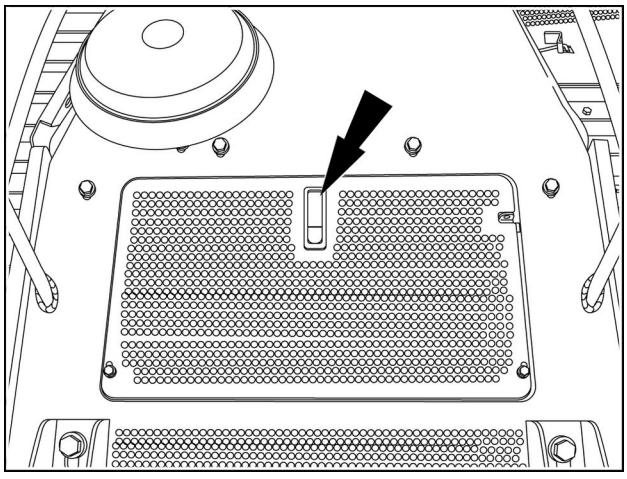
How to drain and clean the radiator and change the engine coolant

To drain and flush the tank and replace the engine coolant, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the parking brake.
6. Make sure that all residual pressure of the hydraulic system is relieved from the circuits before you begin the verification and maintenance procedures. See page **7-11**.
7. Wait for the engine to cool.
8. After the engine has cooled and the temperature of the coolant has reached a safe temperature, remove the access cover.

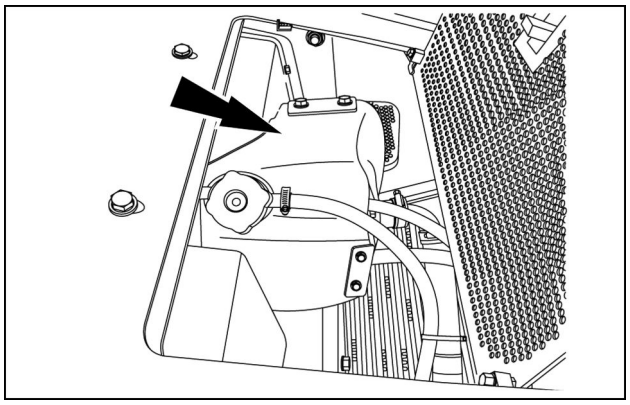


COIL14DOZ0001AA 1



RAIL13DOZ1691AA 2

9. Then remove the cap from the expansion tank.



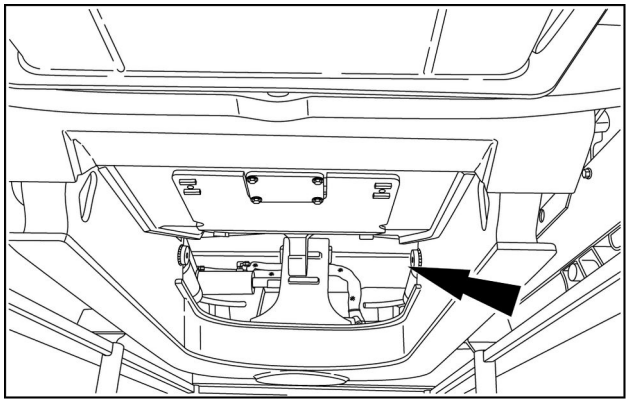
COIL16DOZ0015AA 3

10. The coolant drain plug is located beneath the machine under the front cover.

NOTE: *If the machine is equipped, use the engine coolant environmental drain.*

11. Remove the bolts from the access panel, and remove the panel.

NOTE: *The cover is heavy; use care during removal.*

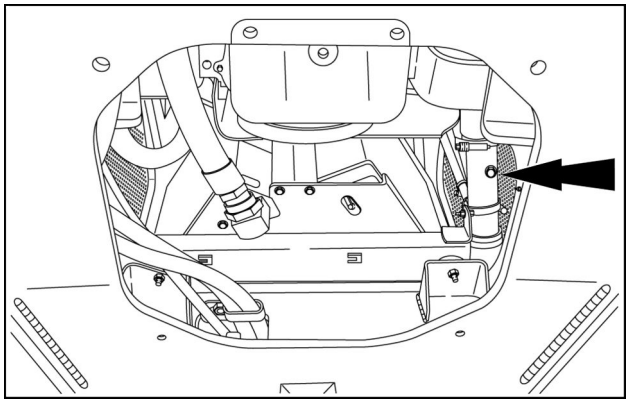


RAPH12DOZ0095AA 4

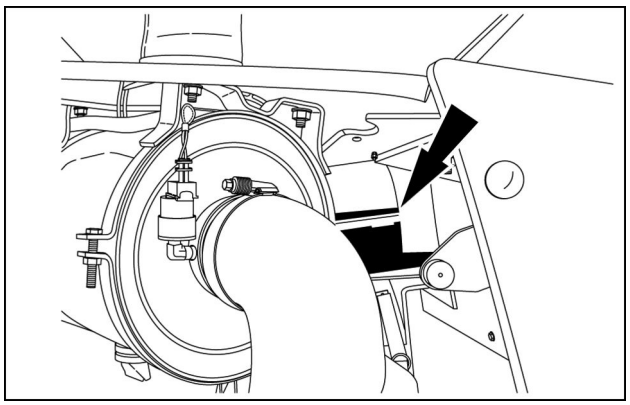
12. Place a suitable container under the drain plug.
13. Remove the drain plug and drain the coolant from the system.
14. Install the drain plug and tighten it correctly after all the coolant has drained.
15. Use an appropriate cleaning product to clean and flush the coolant system.

NOTICE: *Contact your authorized CASE CONSTRUCTION dealer to obtain the cleaning products recommended for your machine's cooling system.*

16. Follow the instructions on the cleaning product bottle.
17. After the system has been cleaned and flushed, install and tighten the drain plug.
18. Make sure that the drain plug is closed and fill the cooling system, using the correct quantity and ratio of antifreeze/coolant and water for the system and weather conditions, through the tank filler neck.
19. Start the engine and let it run at idle speed until the temperature of the liquid coolant matches the operating temperature.
20. Let the system cool.
21. Check the level marks and fill marks on the side of the reservoir, through the right-hand side cover of the engine compartment.



RAPH12DOZ0097AA 5



COIL16DOZ0013AA 6

NOTE: *Add coolant, if required*

Hydraulic suction filter – (Clean) (For 2050M models from serial number HBZN2050HJAC00954)

⚠ 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.

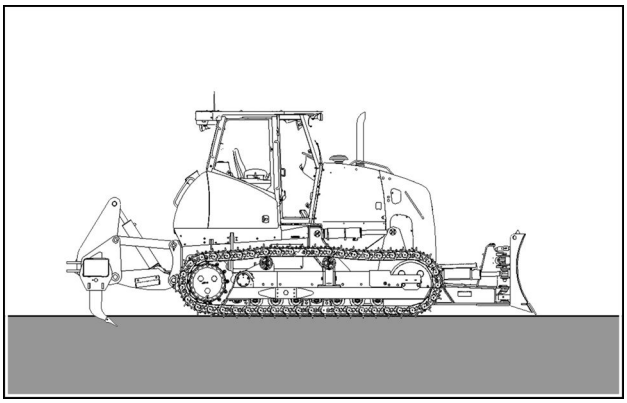
W0241A

NOTICE: *The hydraulic reservoir suction screens must be cleaned every 4000 hours of operation or every 4 years, whichever comes first, or more frequently (shorter periods) when you operate the machine in extreme conditions. Clean the hydraulic reservoir suction screens in conjunction with the procedure for replacement of the filters and change of the hydraulic/hydrostatic drive fluid. See page* ***7-91*** *for further information.*

NOTE: *Handle and dispose of the waste in accordance with environmental regulations, laws and government codes.*

Cleaning the hydraulic reservoir suction screens

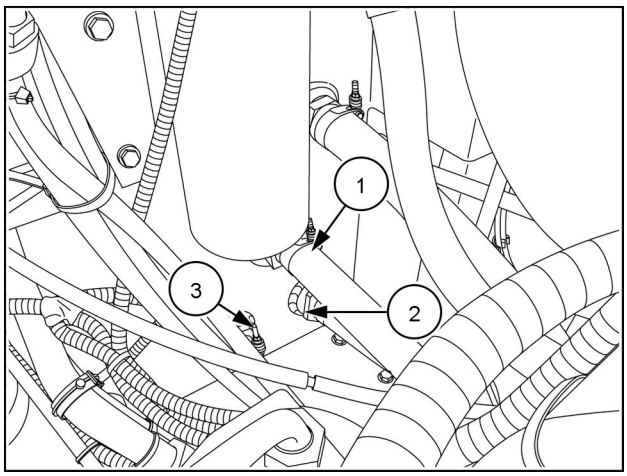
To clean the hydraulic reservoir suction screens, proceed as follows:



COIL14DOZ0001AA 1

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the parking brake.
6. Make sure that all residual pressure of the hydraulic system is relieved from the circuits before you begin the verification and maintenance procedures. See page **7-11**.
7. Locate the suction screens on the front of the hydraulic fluid tank by opening the rear access door.
8. After you drain the fluid from the hydraulic reservoir (see page **7-91**), loosen the T-bolt hose clamps and separate the hydraulic hoses from the suction screen assembly barbs.
9. Remove the charge pump suction screen **(1)**, the equipment pump suction screen **(2)** and the fan pump suction screen **(3)**.
10. Clean the screens with solvent.

NOTE: *Replace if required.*

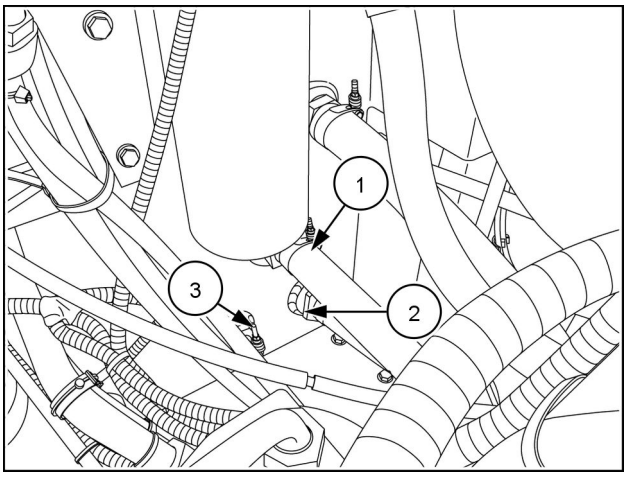


RAIL13DOZ1687AA 2

11. Install cleaned or new screens.
12. Install the hoses to the fittings and secure in place with the clamps (T-bolt type).
13. Position the threads upward and tighten the clamp nut.

Torques

- Charge pump suction screen assemblies **(1)** **202 – 222 N·m** (**149 – 164 lb ft**)
- Equipment pump suction screen **(2)** **236 – 260 N·m** (**174 – 192 lb ft**).
- Fan pump suction screen assembly **(3)** **178 – 195 N·m** (**131 – 144 lb ft**)
- Clamp nut **6.6 – 7.7 N·m** (**58.4 – 68.2 lb in**)



RAIL13DOZ1687AA 3

ELECTRICAL SYSTEM

Battery service

⚠ 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

Explosion hazard!
If battery electrolyte is frozen, attempting to charge the battery or jump-start the engine can cause the battery to explode. Always keep batteries at full charge to prevent frozen battery electrolyte. Never charge a frozen battery.
Failure to comply could result in death or serious injury.

W0203A

⚠ 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.

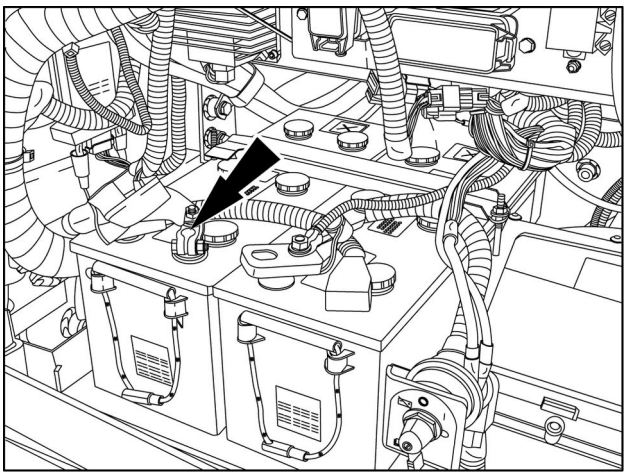
W0253A

ATTENTION: *Before you service components of the electrical system, always disconnect the NEGATIVE (-) battery cable.*

NOTE: *The two batteries are located in the left rear compartment.*

Battery service

Disconnect the alternator wires if you must run the engine with the battery wires disconnected.
Do not use a steam cleaner or cleaning solvent to clean the alternator.
Whenever you perform a welding operation on the machine, as authorized by the manufacturer and in accordance with its instructions, disconnect the batteries, the wires from the terminal D+ and B+ of the alternator, the combined instruments, and turn the master switch to the OFF position. Connect the welding equipment, ground cable, to the component on which the welding operation will be performed. Always connect the welding equipment to the same structure that is being welded. Disconnect the electrical connectors from the transmission control module. Never connect the welding equipment ground to a component of the hydraulic system.



RAIL13DOZ1700AA 1

ATTENTION: *Any unauthorized modification to this machine can cause serious injury or death. Do not make any modifications to the machine without first consulting your dealer.*

NOTICE: *This is a **24 V** electrical system. The master switch is in the positive cable circuit. Shutting down this switch does not disconnect the negative ground network.*

Battery vents

Keep the battery vents clean. Make sure that the vents are not clogged.

Cleaning the batteries

Check regularly for dirt, corrosion, and damage to the batteries and the battery housing. Dirt mixed with electrolyte or moisture on the top of the batteries can cause a discharged condition in the batteries.
Use bicarbonate of soda or ammonia and clean the outer part of the batteries with water to prevent corrosion on the terminals.
Battery contains sulfuric acid. Protect your eyes when working near batteries to avoid splashes of acid solution. In case of contact with the skin, eyes or clothing, wash immediately with running water for at least 15 minutes. Seek medical attention immediately.

Alternator and starter motor

Ask your CASE CONSTRUCTION authorized dealer to check the alternator and starter motor every 1000 hours of operation.

Do not use steam cleaning equipment or a cleaning solvent to clean these components.

Starting with auxiliary batteries

⚠ WARNING

Improper operation or service of this machine can result in an accident.
An error connecting auxiliary starting cables or short-circuiting battery terminals can cause an accident. Connect auxiliary starting cables as instructed in this manual.
Failure to comply could result in death or serious injury.

W0263A

⚠ WARNING

Explosion hazard!
Booster batteries or jumper cables must be connected properly to prevent battery explosion and/or damage to the electrical system. Connect positive to positive and negative to negative.
Failure to comply could result in death or serious injury.

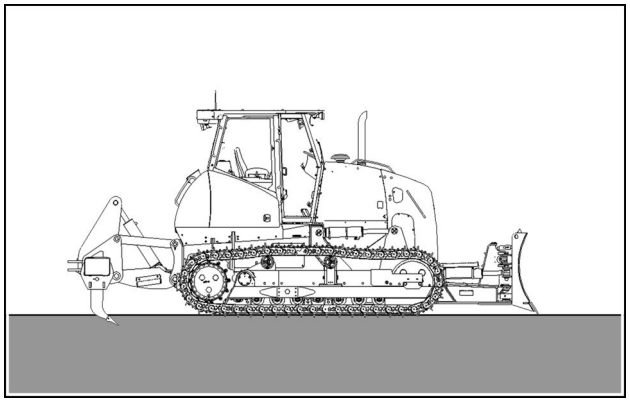
W0343A

Starting with auxiliary batteries

NOTICE: *Make sure that the voltage of the booster batteries is the same as that of the machine's system* ***24 V****.*

To start with booster batteries, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Shut down all machine accessories.



COIL14DOZ0001AA 1

7. Remove the battery terminal cover.
8. Connect one end of the positive (+) cable to the positive (+) terminal on the booster battery.
9. Connect the other end of the positive (+) cable to the positive (+) terminal of the discharged battery.
10. Connect one end of the negative (-) cable to the negative (-) terminal on the booster battery.
11. Connect the other end of the negative (-) cable to the engine block or frame of the machine with the discharged battery.

    NOTE: *Do not connect the negative (-) cable to sheet metal or any rotating part, as damage can result.*

    NOTE: *Do not connect to the negative (-) terminal of the discharged battery.*
12. Start the engine.
13. Always remove the booster battery negative (-) cable from the machine first and then from the booster battery.
14. Remove the positive (+) cable from the machine and then from the booster battery.
15. Install the battery terminal caps.

Replacing the battery

⚠ 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

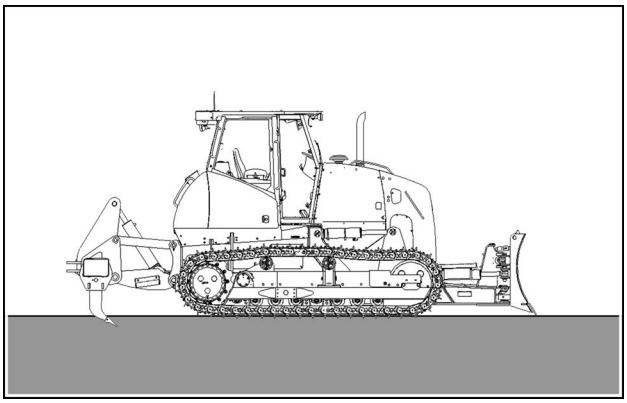
Replacing the batteries

To replace the batteries, proceed as follows:

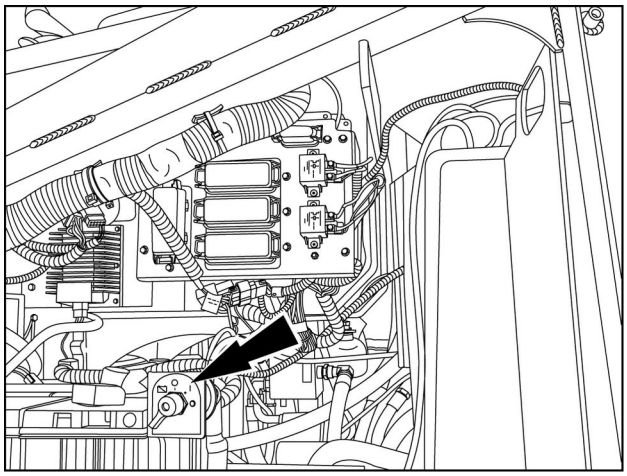
1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

   ATTENTION: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****,*

7. Turn the master disconnect switch OFF.



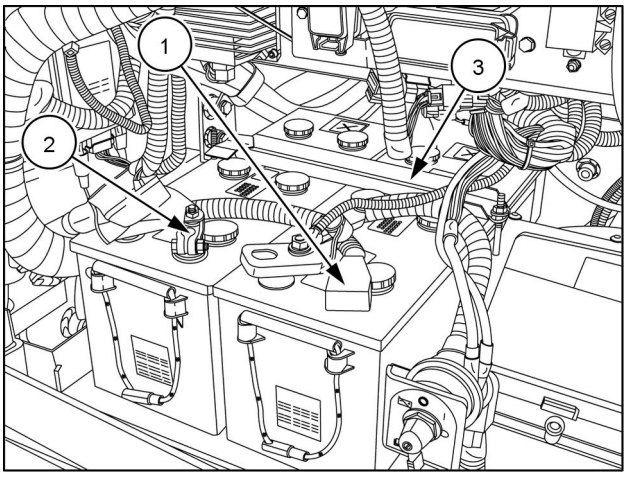
COIL14DOZ0001AA 1



RAIL13DOZ0954AA 2

8. Remove the terminal protection caps **(1)** from the battery.
9. Disconnect the cables **(2)** from the negative terminal, then disconnect the cables from the positive terminal.
10. Remove the screws, washers and mounting bracket **(3)** from the battery.
11. Install a new battery of the correct voltage.

    NOTE: *Make sure the mounting bracket, washers and screws are tightened securely.*
12. Clean the cables.
13. Coat new battery terminals with grease or anti-sulfide spray.
14. First, reconnect the end of the positive cable to the positive terminal and then reconnect the end of the negative cable to the negative terminal.
15. Install the terminal protection caps.
16. Turn on the master switch.



RAIL13DOZ1700AA 3

Fuses and relays (Replacement)

⚠ WARNING

Improper operation or service of this machine can result in an accident.
Read and understand the SAFETY INFORMATION chapter 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.

W0138B

NOTE: *Fuses protect electrical circuits from excessive current.*

NOTE: *If the electrical power does not reach the component when the ignition key is in the on position, the cause may be a blown fuse. Replace a blown fuse with another of the same amperage.*

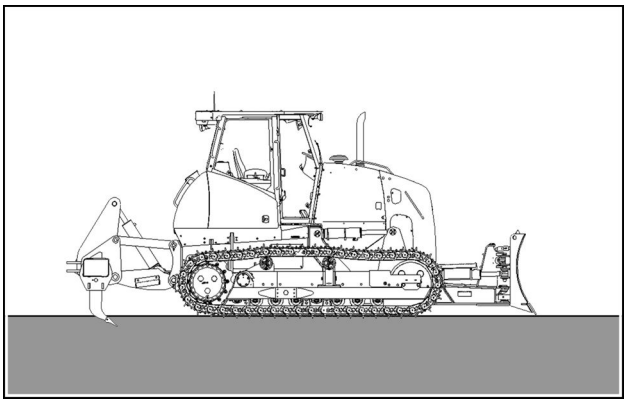
NOTE: *Check the function and location of the fuse in the fuse table or on the instructional decal on the machine.*

Replacement of fuses

To replace the fuses, proceed as follows:

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Set the park brake.
5. Place the ignition key in the "OFF" position to shut down the engine.
6. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

   NOTE: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****,*

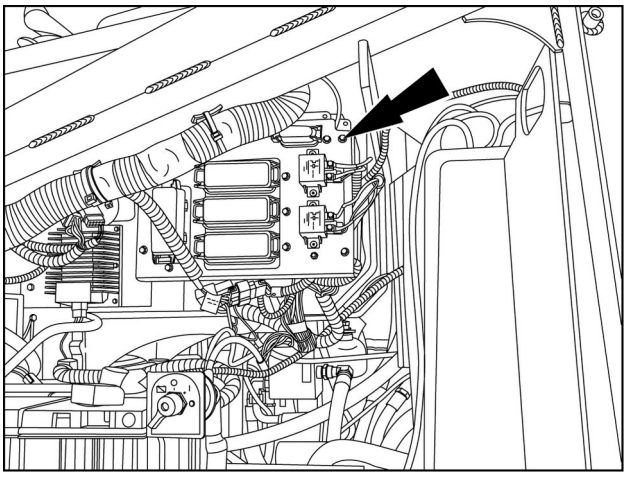


COIL14DOZ0001AA 1

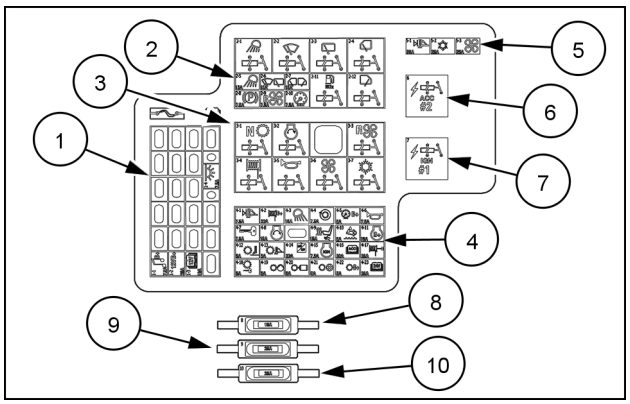
Fuse and relay compartment

The fuse and relay compartment is located in the left-hand side compartment of the cab.

NOTE: *Access through the battery compartment cover*



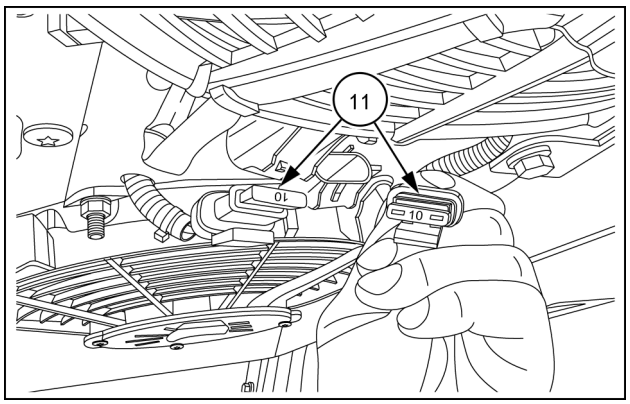
RAIL13DOZ0954AA 2



RAIL13DOZ1526AA 3

Cab fan fuses

The fuses are located on the side of the housing of each fan, at the top of the cab.



COIL17DOZ0052AB 4

Component description

Position	Fuse function	Amperage
1-1	Radio	**7,5 A**
1-2	Power take-off	**15 A**
1-3	optional customer **12 V**, always active	**10 A**
1-4	Cab dome light	**7,5 A**
2-1	Front lights relay	**24 V – 35 A**
2-2	Front wiper relay	**24 V – 35 A**
2-3	Rear wiper relay	**24 V – 35 A**
2-4	Left wiper relay	**24 V – 35 A**
2-5	Front headlights	**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 Reversal	**7,5 A**
2-10	Implement enable/Up - Down/Enter - Escape/Instrument cluster	**7,5 A**
2-11	Not applicable	**24 V – 35 A**
2–12	Right wiper relay	**24 V – 35 A**
3-1	Machine safety relay	**24 V – 35 A**
3-2	Starter Relay	**24 V – 35 A**
3-3	Fan Reverse Relay	**24 V – 35 A**
3-4	Winch control relay (optional)	**24 V – 35 A**
3-5	Horn relay	**24 V – 35 A**
3-6	A/C relay (optional)	**24 V – 35 A**
3-7	Condenser relay	**24 V – 35 A**
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	Instrument Cluster	**5 A**
4-6	Horn	**7,5 A**
4-7	Ingnition switch	**7,5 A**
4-8	Power up	**15 A**
4-9	Pneumatic seat /ROPS heater	**15 A**
4-10	Not applicable	**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	optional customer **24 V**, 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	Active controller unit	**5 A**
4-23	optional customer **24 V**, always active	**20 A**
5-1	Laser leveling	**30 A**
5-2	Air conditioning condenser	**25 A**
5-3	Air conditioning fan	**25 A**
6	Accessory	**24 V – 50 A**
7	Glow	**24 V – 50 A**
8	Telematics	**10 A**
9	Controller unit	**20 A**
10	Not applicable	**20 A**

Position	Fuse function	Amperage
11	Cab fans	**10 A**

Work lights

⚠ 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.

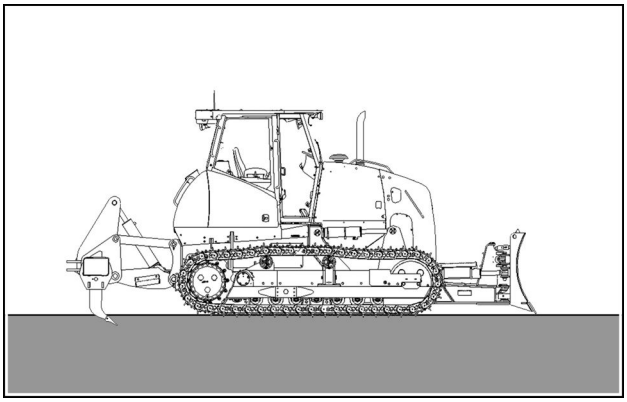
W0138A

Replacing the work light bulbs

To replace the work light bulbs, proceed as follows:

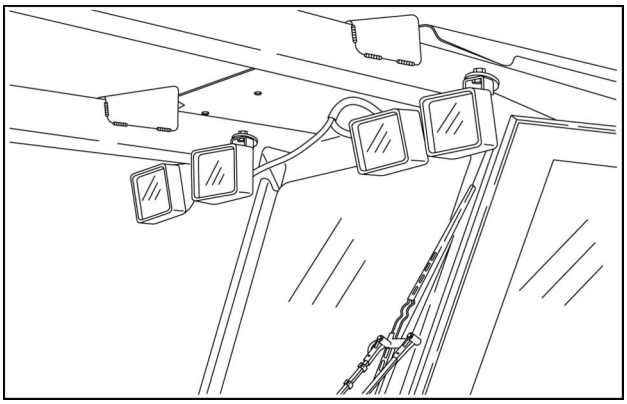
1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Set the park brake.
6. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

   ATTENTION: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****,*



COIL14DOZ0001AA 1

7. Remove the bolts from the front of the lights frame, using a Phillips wrench.

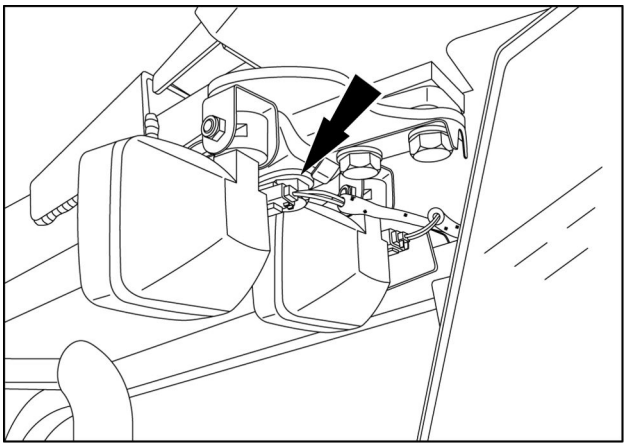


RAPH12DOZ0104AA 2

1. Loosen the pressure connectors.
2. Remove the light assembly.
3. Secure the connectors.

   NOTE: *Make sure the fittings are firmly in place.*

4. Bolt the work light structure, using a Phillips wrench.



RAIL12DOZ0196AA 3

STORAGE

Preparation for storage

⚠ WARNING

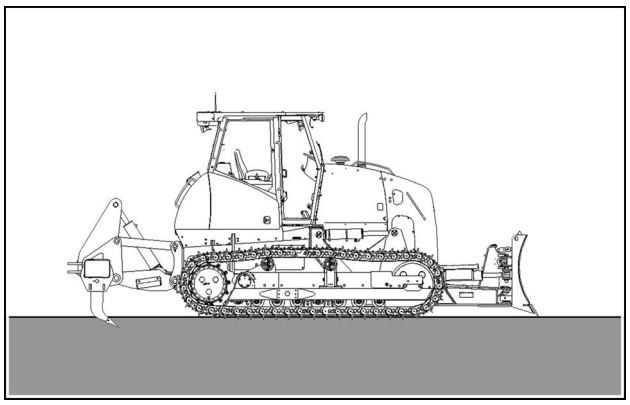
Improper operation or service of this machine can result in an accident.
Read and understand the SAFETY INFORMATION Section before you perform any maintenance, service, or repairs. Read and understand the specific service procedures for the components you plan to work with before you start servicing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

W0138A

ATTENTION: *When storing the machine, park on a flat, level, firm surface away from any obstacles and in a closed site. If that is not possible, cover it with a waterproof tarp. If stored outside in freezing temperatures, park the machine on planks to prevent the tracks from freezing to the ground.*

Before storing the machine

To store the machine for a period equal to or greater than one month, proceed as follows:



COIL14DOZ0001AA 1

1. Keep all unauthorized personnel clear of the area.
2. Park the machine on a flat, level, firm surface, away from any obstacles.
3. Support the implements on the ground.
4. Shut down the engine, placing the ignition key in the off position.
5. Place a DO NOT OPERATE tag on the right-hand control arm.
6. Set the park brake.
7. Make sure that all residual pressure is relieved from circuits before beginning verification and maintenance procedures.

   ATTENTION: *For the procedures to release pressure in the hydraulic system, refer to page* ***7-11****,*
8. Clean the machine.
9. Grease the machine thoroughly. The exposed surfaces of the cylinder rods must be covered with a thin layer of grease for protection. Consult your authorized dealer CASE CONSTRUCTION.

   NOTE: *When the machine resumes service, the grease will disappear automatically*
10. Drain the fuel tank, and fill with a mixture of **90%** diesel fuel and **10%** anti-corrosive oil.
11. Run the engine at idle speed for 5 minutes to allow the anti-corrosion oil to reach the filters, pump, supply lines and injectors.

12. With the engine warm, drain the oil sump, fill with anti-corrosive oil and replace the engine oil filter.
13. When the engine is cold, clean the exposed engine components.
14. Clean or replace the air filter element.
15. Drain the cooling system.

    NOTE: *Leave the drain valves open, and do not tighten the radiator cap.*

16. Remove the batteries.
17. Clean the battery housing.
18. Make certain that no traces of battery acid remain.
19. Store the batteries safely in a cool and dry location where the temperature will be higher than **0 °C** (**32.0 °F**).
20. Paint any areas of the paint that shows signs of deterioration.
21. Unplug the air filter inlet and the exhaust pipe outlet.
22. Lock the engine compartment access doors.

Periodic checks

Every month, check:

1. The battery charge and electrolyte level. Recharge the batteries if required.
2. The grease on the cylinder rods and/or perform attachment functions monthly.
3. The level of fuel in the tank and the level of anti-corrosive oil in the engine. Add more fuel or oil, 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 of tractor from storage

Starting up after storage

⚠ 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

1. Close the drain valves and fill the coolant overflow tank.
2. Drain the fuel reservoir and top up with suitable fuel.
3. Drain the engine oil sump, top up with clean engine oil and check the oil level.
4. Replace fuel filters.
5. Install the batteries.
6. Grease the machine thoroughly.
7. Check the condition of the engine accessory drive belt, and replace the belt, if necessary.
8. Check the condition of the air conditioning drive belt and replace belt, if necessary.
9. Check the hydraulic fluid level, and add more fluid, if necessary.
10. Clean the cylinder rods.
11. Open the air filter inlet and the exhaust pipe.
12. Remove the DO NOT OPERATE tag, and start the engine following the starting up procedure.
13. Keep non-authorized personnel clear of the machine.
14. Carefully monitor all of the gauges and warning lights of the instrument cluster.

8 - SPECIFICATIONS

Lubrication, Filters and Fluids

Capacities and specifications

Engine oil

Oil specification	**AKCELA NO. 1™ ENGINE OIL CI-4 SAE 15W-40** API CI-4/CH-4
Capacity with filter change	**15.4 L** (**16.3 US qt**)
Capacity without filter change	**14.5 L** (**15.3 US qt**)

Fuel system

Fuel specification	Diesel fuel No. 2
System capacity	**405 L** (**107 US gal**)

Cooling system

Additive specification (For models up to serial number HBZN2050HJAC00953)	**50%** of water +**50% AKCELA PREMIUM ANTI-FREEZE**
Additive specification (For models from serial number HBZN2050HJAC00954)	**50%** of water +**50% AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT**
System capacity	**30.28 L** (**8.0 US gal**)
NOTE: *This mix has anticorrosive, antiscaling, and antifoaming properties. It does not freeze until* ***-38.0 °C (-36.4 °F)****. If the ambient temperature is lower than* ***-37 °C (-34.6 °F****), adjust the mixture according to the coolant additive manufacturer's specifications.* ***NOTICE:*** *The fluids* ***AKCELA PREMIUM ANTI-FREEZE*** *and* ***AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT*** *can never be mixed.*	

Hydraulic system and transmission

Fluid specification	**AKCELA AUTO SUPREME 10W-30**
Total system capacity	**210 L** (**55 US gal**)

Final reducers

Fluid specification	**AKCELA GEAR LUBE 135 H EP 85W-140** SAE 85W-140
Capacity	
Primary reducer (each)	**12.5 L** (**13.2 US qt**)
Planetary reducer (each)	**12.5 L** (**13.2 US qt**)

Lower rollers

Oil Specification	**AKCELA GEAR LUBE 135 H EP 80W-90** SAE 80W-90
Capacity (each)	**0.275 L** (**0.29 US qt**)

Tensioner wheel

Oil Specification	**AKCELA GEAR LUBE 135 H EP 80W-90** SAE 80W-90
Capacity (each)	**0.225 L** (**0.238 US qt**)

Upper rollers

Oil Specification	**AKCELA GEAR LUBE 135 H EP 80W-90** SAE 80W-90
Capacity (each)	**0.334 L** (**0.353 US qt**)

Grease fittings

Grease specification	**AKCELA MOLY GREASE**
Quantity	As required

CLT and CELT tracks

Oil Specification	**AKCELA GEAR LUBE 135 H EP 80W-90** SAE 80W-90
Capacity (each pin)	**29.0 ml** (**1.0 US fl oz**)

Air conditioning

Compressor lubricant specifications	Synthetic polyolester (POE) lubricant for **HFC R134A** of required viscosity ISO VG 68
Compressor lubricant capacity	**200 ml**
Air conditioning gas specifications	Environmentally-friendly hydro fluoro carbon gas **HFC R134A**
Air conditioning gas capacity	**1400 g**

General specifications

NOTE: *All specifications are given according to SAE standards or recommended practices where the specification applies.*

Motor	
Make & Model	F4HE96848*J101
Firing order	1-5-3-6-2-4
Bore and stroke	**104 mm** x **132 mm** (**4.09 in** x **5.20 in**)
Volumetric displacement	**6.7 l** (**409 in³**)
Compression ratio	17,5 : 1
Max nominal gross power @ **2200 RPM**	**173 kW** (**231.9 Hp**)
Max gross torque @ **1500 RPM**	**1082 N·m** (**798 lb ft**)
Engine speeds	
Maximum RPM without load	**2200 +/- RPM 50 RPM**
Maximum nominal speed	**2200 RPM**
Idle speed	**800 +/- RPM 25 RPM**
Gradeability (without losing the engine lubrication capacity)	Longitudinal: **35°** Sideways: **45°** maximum
Hydraulic system	
Pump capacity	**40.4 US gpm** @ **3626 psi** @ **2200 RPM** engine
Travel speeds	
Speed forward	Infinitely variable from **0 – 9.33 km/h** (**0.0 – 5.8 mph**)
Reverse speed	Infinitely variable from **0 – 9.33 km/h** (**0.0 – 5.8 mph**)
Track pull (Maximum both tracks)	**360212 N** (**80979 lb**)
Power train	
Transmission – manufacturer	Rexthroth
Transmission – type	Dual drive hydrostatic
Pumps – model	A4VG145
Pumps – type	Variable volume pistons
Pumps displacement	**145 cm³**
Motors – model	A6VM280,series 71
Motors – type	Variable tilt shaft
Motors – travel	**280 cm³**
Transmission – filter type	4 µm @ ß 75 replaceable with 100-mesh suction screen
Foot brakes	
Steering brakes	Hydrostatic
Parking brakes	Spring-activated, pressure-released
Final drive	
Final drives	Primary reduction by helical gears and secondary by planetary reducer
Total reduction	48.75:1
Fuel system	
Fuel injection system	"Common Rail" electronic
Primary fuel filter rating	10 µm replaceable cartridge
Secondary fuel filter rating	30 µm replaceable cartridge
Electrical system 24 Volt	
Batteries	Two **12 V** batteries in series
(CCA) cold start current	**1200 A** @ **-17.8 °C** (**0.0 °F**) for 90 seconds, without letting the voltage fall below **1,0 V**
Alternator	Bosch **24 V**, **120 A**, with voltage regulator
Starter motor	Nippon Denso **7.5 kW**, relay-activated

NOTE: *Travel speed and track pull with CLT lubricated chain. If the machine is equipped with track with CELT extended life chain, track speed will increase by* ***4%*** *and track pull will be reduced by* ***4%****. Actual track pull may differ from the calculated value because of relief valve tolerances and final drive line efficiencies.*

Tracks

General specification

Adjusting track tension	Hydraulic
Track frame suspension	Pivot shaft and oscillating equalizer beam
Track link pitch	**203.2 mm** (**8.0 in**)
Height of track shoe grouser	**71.5 mm** (**2.8 in**)
Track pin diameter	**44.53 mm** (**1.753 in**)
Track bushing diameter	* **72.7 mm** (**2.862 in**) or ** **93.2 mm** (**3.67 in**)
Number of sprocket teeth	* 25 (5 segments of 5 teeth) or ** 26 (13 segments of 2 teeth)
Sprocket pitch	* **814.97 mm** (**32.09 in**) or ** **846.42 mm** (**33.324 in**)
Track frame	Reinforced box sections with replaceable sloped canopies
Track with CLT lubricated chain	Standard
Track with CELT extended life chain	Optional

NOTE: *If the machine is equipped with track with optional CELT extended life chain, ground pressure will be* ***0.7 kPa*** *(****0.1 psi****) greater.*

Machines equipped with XLT extra-long chassis track	
Number of track shoes per side	45
Number of upper rollers per side	2
Number of lower rollers per side	8
Roller flange configuration from sprocket	SF, DF, SF, DF, SF, SF, DF, SF
Upper roller diameter	**187.5 mm** (**7.38 in**)
Lower roller diameter	**210 mm** (**8.27 in**)
Tensioner wheel diameter	**678 mm** (**26.69 in**)
Length of track on ground (track with standard CLT lubricated chain)	**3277 mm** (**129 in**)
Length of track on ground (track with optional CELT extended life track	**3251 mm** (**128 in**)
Tread	**1941 mm** (**76 in**)
Track shoe width	**610 mm** (**24 in**)
610 mm (**24 in**) **1 bar** (***) track shoe	**39979 cm²** (**6197 in²**)
Ground pressure [**76 in** tread / PAT power arc / BD power arc / **610 mm** (**24 in**) track shoe] (****)	**50.5 kPa** (**7.32 psi**)

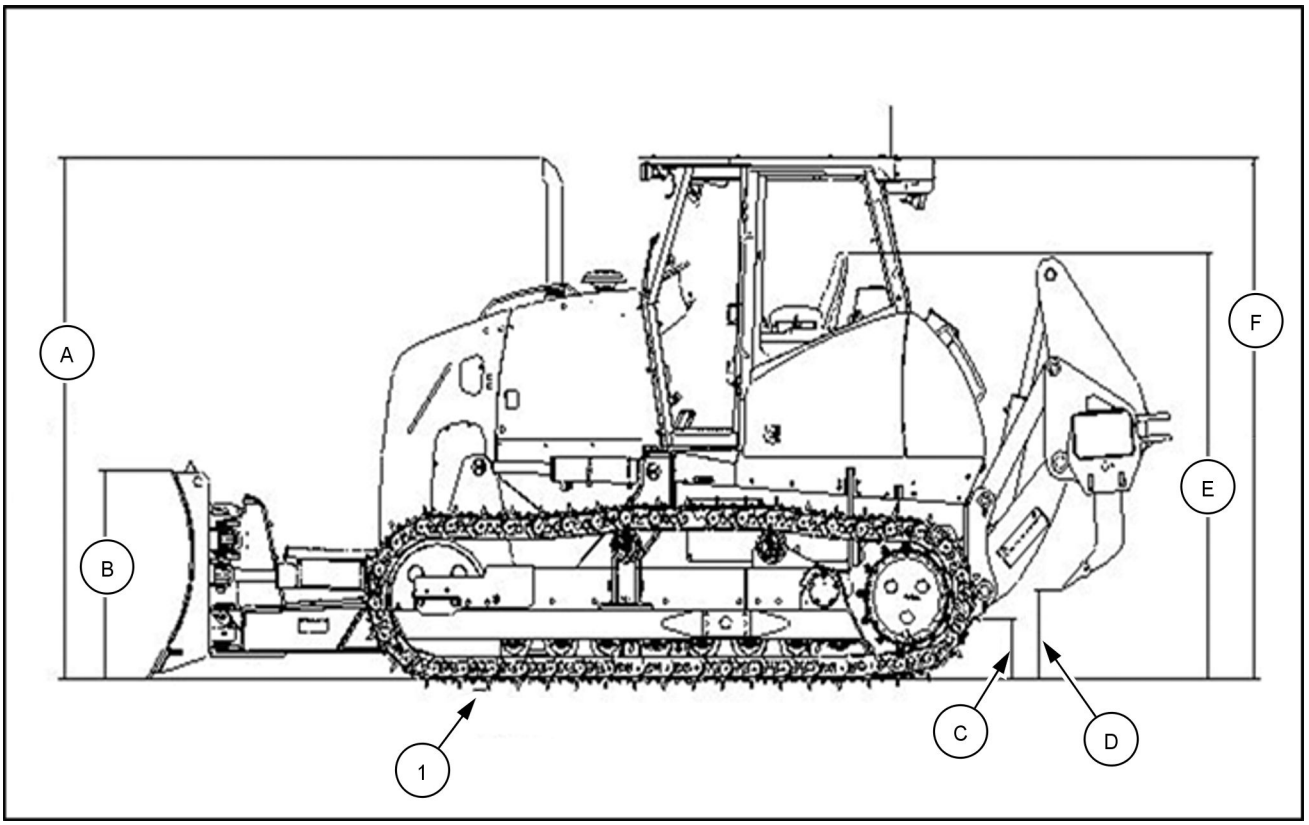
* Values for track with standard CLT chain..

** Values for track with optional CELT chain..

*** Area of track-on-ground, values for track with standard CLT chain (if the unit is equipped with track with optional CELT chain, the on ground area is **8%** less).

**** On-ground pressure values for track with standard CLT chain (if the unit is equipped with track with optional CELT chain, the on-ground pressure is **1 psi** less).

Machine specifications and dimensions



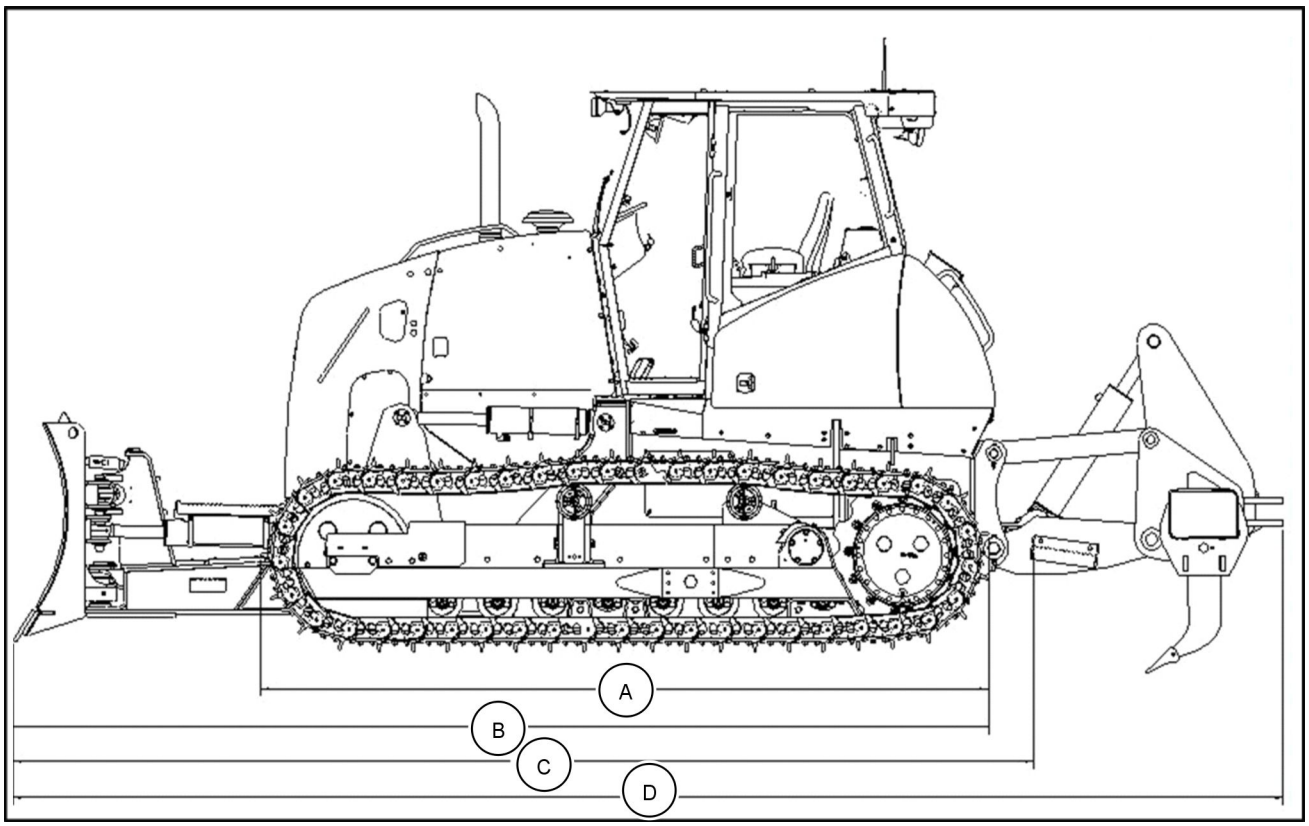
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Height and ground clearance dimensions

Machines equipped with XLT extra-long chassis track		
	PAT power arc	**BD power arc**
(A) Top of exhaust stack	**2876.6 mm (113.3 in)**	**2876.6 mm (113.3 in)**
(B) Blade height	**1369 mm (53.9 in)**	**1108 mm (43.6 in)**
(C1) Clearance at belly pans (lowest)	**325 mm (12.8 in)**	**325 mm (12.8 in)**
(C2) Drawbar clearance	**525.2 mm (20.7 in)**	**525.2 mm (20.7 in)**
(C3) Clearance at center line of drawbar opening	**601.1 mm (23.7 in)**	**601.1 mm (23.7 in)**
(D) Shank height (transport position) **(**)**	**556.6 mm (21.9 in)**	**556.6 mm (21.9 in)**
(E) Top of seat headrest	**2553.7 mm (100.5 in)**	**2553.7 mm (100.5 in)**
(F1) Height of cab with air conditioning	**3103.4 mm (122.2 in)**	**3103.4 mm (122.2 in)**

NOTE: (1) *Clearance and overall height dimensions are with the grouser fully penetrated. Add* ***55.5 mm*** *(****2.2 in****) if the machine is on a rigid surface.*

NOTE: (**) *Ripper transport with shank in the intermediate position.*



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Length dimensions with blade straight

Machines equipped with XLT extra-long chassis track		
	PAT power arc	**BD power arc**
(A) Overall length: No blade, no rear equipment, track with standard CLT chain)	**4345.7 mm** (**171.1 in**)	**3840.5 mm** (**151.2 in**)
(B) Overall length: Straight blade, no rear equipment	**5738.6 mm** (**225.9 in**)	**5200.1 mm** (**204.7 in**)
(C) Overall length: Blade straight, with drawbar	**5902 mm** (**232.4 in**)	**5387.0 mm** (**212.1 in**)
(D) Overall length: Blade straight, with ripper	**7383.8 mm** (**290.7 in**)	**6869.7 mm** (**270.5 in**)

NOTE: *The values apply to machines equipped with standard CLTchain.*

NOTE: *Overall length with blade tilt angle at **55%**.*

Ripper specifications

Ripper operating data and dimension

	PAT power arc	BD power arc
Overall length in transport position	**6580.4 mm** (**259.1 in**)	**6475.9 mm** (**255 in**)
Overall length with ripper shank resting on the ground line	**6956.5 mm** (**273.9 in**)	**6852 mm** (**269.8 in**)
Ripper shanks in top position	Lifting **486 mm** (**19.1 in**)	Dig **507 mm** (**20 in**)
Ripper shank in mid position	Lifting **570 mm** (**22.4 in**)	Dig **422 mm** (**16.6 in**)
Ripper shank in bottom position	Lifting **655 mm** (**25.8 in**)	Dig **337 mm** (**13.3 in**)

Control type	Hydraulic cylinders (dual action)
Overall width (Maximum)	**1953.3 mm** (**76.9 in**)
Width of cut (Maximum)	**1889.8 mm** (**74.4 in**)
Number of teeth (Standard)	3
Number of teeth (Maximum)	3
Width of shank	**50.8 mm** (**2.0 in**)
Tooth width	**66.0 mm** (**2.6 in**)

NOTE: *Lift and dig dimensions are with the grouser fully penetrated. Add* ***52.6 mm*** *(****2.07 in****) if unit is on rigid surface.*

Machine weights

Machines equipped with XLT extra-long chassis track/ **76 in** indicator / PAT power arc / BD power arc / **610 mm** (**24 in**) track shoe	
Operating weight	**20599 kg** (**45413 lb**)
Transport weight	**20230 kg** (**44600 lb**)
Equipment	Add:
Retrieval hitch	**23 kg** (**51 lb**)
Drawbar	**66 kg** (**146 lb**)
PAT model blade	**1353 kg** (**2983 lb**)
BD model blade	**1625 kg** (**3583 lb**)
Ripper (5 shank) with 4 spool valve	**1355 kg** (**2987 lb**)
Track with CLT chain with **24 in** closed shoe	**3492 kg** (**7699 lb**)
Track with CELT chain with **24 in** open shoe	**3578 kg** (**7888 lb**)
Track with CLT chain with **28 in** closed shoe	**3842 kg** (**8470 lb**)
Track with CELT chain with **28 in** open shoe	**3928 kg** (**8660 lb**)

Operating weight includes ROPS, full fuel and hydraulic tanks, **77 kg** (**170 lb**) operator, track with CLT chain, front pull hook, rear lift system, track guides, backup alarm, horn, lights, track shoes, C frame and blade (width as shown).

Transport weight includes base machine weight, **56.8 l** (**15 US gal**) fuel, full hydraulic system, front pull hook, frame and blade as indicated. Add for rear-mounted equipment, drive sprocket and tracks, ROPS canopy or cab and any optional equipment.

Standard torque data

Non-flanged metric fasteners

Nominal size	Bolt 8.8 Class and nut class 8		Bolt 10.9 Class and nut class 10		Jam nut CL 0.8 with bolt CL 8.8	Jam nut CL 0.10 with bolt CL 10.9
	Unplated	Zinc- and chrome-plated	Unplated	Zinc- and chrome-plated		
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: *The torque specifications in English units for M4 to M8 fastening elements are shown in pounds-inches. The torque specifications in English units for M10 to M24 fastening elements are shown in pounds-feet.*

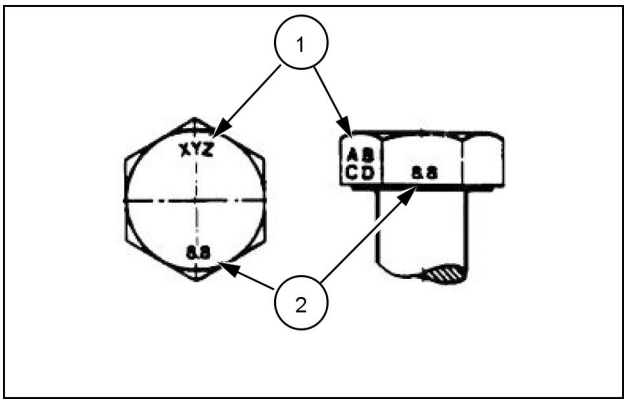
Flanged metric fasteners

Nominal size	Bolt 8.8 Class and nut class 8		Bolt 10.9 Class and nut class 10		Jam nut CL 0.8 with bolt CL 8.8	Jam nut CL 0.10 with bolt CL 10.9
	Unplated	Zinc- and chrome-plated	Unplated	Zinc- and chrome-plated		
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)**	

Metric hexagonal bolts, classes 5.6 and higher

(1) Manufacturer's Identification

(2) Property Class



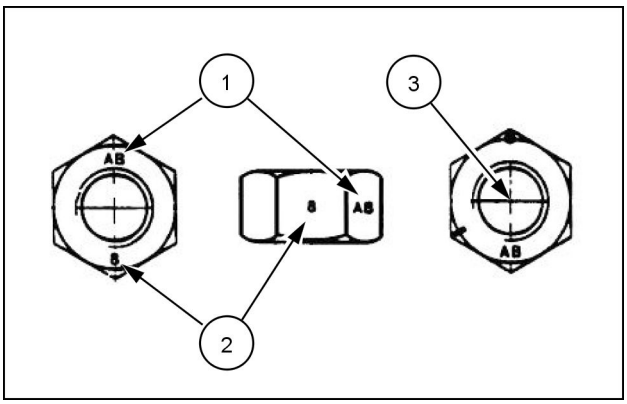
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Metric hexagonal nuts and jam nuts, classes 05 and up

(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.

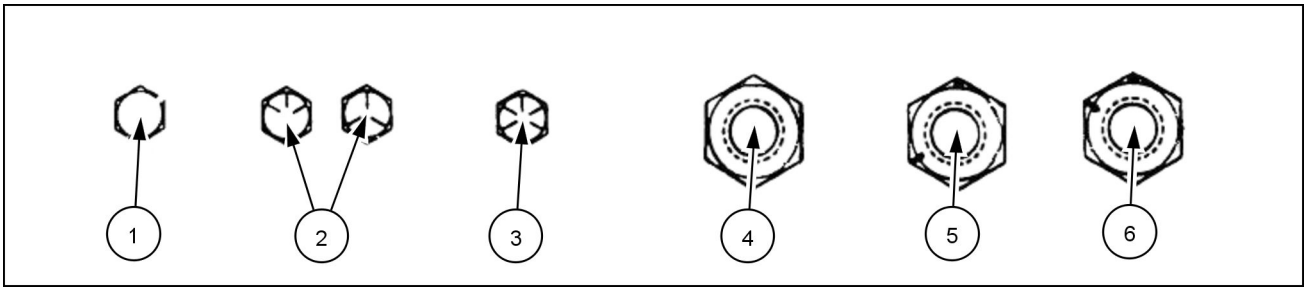


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Non-flanged fasteners in inches

Nominal size	Bolt and nut class SAE 5		Bolt and nut class SAE 8		Jam nut GrB with bolt Gr5	Jam nut GrC with bolt Gr8
	Unplated or silver-plated	Gold-, Zinc- and Chrome-plated	Unplated or silver-plated	Gold-, Zinc- and Chrome-plated		
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)**

Bolts in inches and self-locking nuts (Class SAE)



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(1) Class 2 bolt - No Marks

(2) Class 5 bolt - Three marks

(3) Class 8 bolt - Five marks

(4) Class 2 nut - No Marks

(5) Class 5 Nut - Marks **120°** apart

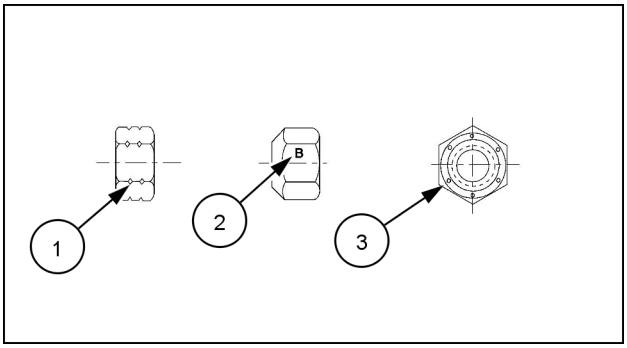
(6) Class 8 Nut - Marks **60°** apart

Self-locking nuts in inches, all-metal (three optional methods)

Grade A
(1) Corner marking method: No notches
(2) Flats marking method: No marks
(3) Clock marking method: No marks

Grade B
(1) Corner marking method: One circumferential notch
(2) Flats marking method: Letter B
(3) Clock marking method: Three marks

Grade C
(1) Corner marking method: Two circumferential notches
(2) Flats marking method: Letter C
(3) Clock marking method: Six marks



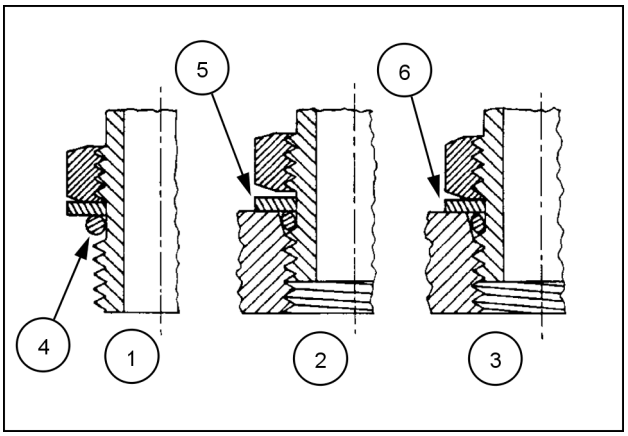
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Standard torque data for hydraulic tubes and fittings

Installation of adjustable fittings in orifices with cylindrical threads and O-rings.

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 adjustable fitting into the straight threaded orifice SAE until the metal backup washer contacts the face of the orifice **(5)** .

   NOTE: *Do not over tighten and distort the metal backup washer.*
3. Loosen the adjustable fitting (counter-clockwise) up to a maximum of one turn to position it. Holding the pad of the fitting with a wrench, tighten the locknut and washer against the face of the orifice **(6)**.



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Standard torque for lines and fittings

Number Dash	Outer diameter of lines	Thread size	Adjustable female fitting with 37° conical seal	Fitting with cylindrical threads and O-ring.
			Torque	Torque
-4	**6.4 mm** (**1/4 in**)	7/16-20	**15 – 16 N·m** (**11 – 12 lb ft**)	**18 – 20 N·m** (**13 – 15 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 – 33 N·m** (**21 – 24 lb ft**)
-8	**12.7 mm** (**1/2 in**)	3/4-16	**49 – 53 N·m** (**36 – 39 lb ft**)	**49 – 53 N·m** (**36 – 39 lb ft**)
-10	**15.9 mm** (**5/8 in**)	7/8-14	**77 – 85 N·m** (**57 – 63 lb ft**)	**59 – 64 N·m** (**44 – 47 lb ft**)
-12	**19.1 mm** (**3/4 in**)	1-1/16-12	**107 – 119 N·m** (**79 – 88 lb ft**)	**93 – 102 N·m** (**69 – 75 lb ft**)
-14	**22.2 mm** (**7/8 in**)	1-3/16-12	**127 – 147 N·m** (**94 – 108 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 – 166 N·m** (**111 – 122 lb ft**)
-20	**31.8 mm** (**1-1/4 in**)	1-5/8-12	**172 – 181 N·m** (**127 – 133 lb ft**)	**198 – 216 N·m** (**146 – 159 lb ft**)
-24	**38.1 mm** (**1-1/2 in**)	1-7/8-12	**215 – 226 N·m** (**159 – 167 lb ft**)	**209 – 231 N·m** (**154 – 170 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 tightening the fittings with a **37°** conical seal, clean the conical face and threads with solvent or Loctite cleaning agent. After cleaning, apply **LOCTITE® 569™** sealant to the **37°** sealing surface and the threads.

Install adjustable fitting and torque to specified torque, loosen the adjustable fitting and re-torque to specifications.

Torque data for fittings with O-ring face seal

Nominal SAE dash size	Nominal tube O.D.	O-ring face seal end	
		Thread size	Tube nut torque
-4	**6.350 mm** (**0.250 in**)	9/16-18	**14 – 16 N·m** (**10 – 12 lb ft**)
-6	**9.520 mm** (**0.375 in**)	11/16-16	**24 – 27 N·m** (**18 – 20 lb ft**)
-8	**12.700 mm** (**0.500 in**)	13/16-16	**43 – 47 N·m** (**32 – 35 lb ft**)
-10	**15.880 mm** (**0.625 in**)	1-14	**60 – 68 N·m** (**44 – 50 lb ft**)
-12	**19.050 mm** (**0.750 in**)	1-3/16-12	**90 – 95 N·m** (**66 – 70 lb ft**)
-14	**22.220 mm** (**0.875 in**)	1-3/16-12	**90 – 95 N·m** (**66 – 70 lb ft**)
-16	**25.400 mm** (**1.000 in**)	1-7/16-12	**125 – 135 N·m** (**92 – 100 lb ft**)
-20	**31.750 mm** (**1.250 in**)	1-11/16-12	**170 – 190 N·m** (**125 – 140 lb ft**)
-24	**38.100 mm** (**1.500 in**)	2-12	**200 – 225 N·m** (**148 – 166 lb ft**)

The values shown for the seal end are intended for steel fittings (with or without washers) with galvanized chrome or zinc-plated chrome surface treatment, mounted in grey cast iron or steel housings.

Tightening torque of threaded fittings for lines

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

Threaded fittings for lines	
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**)

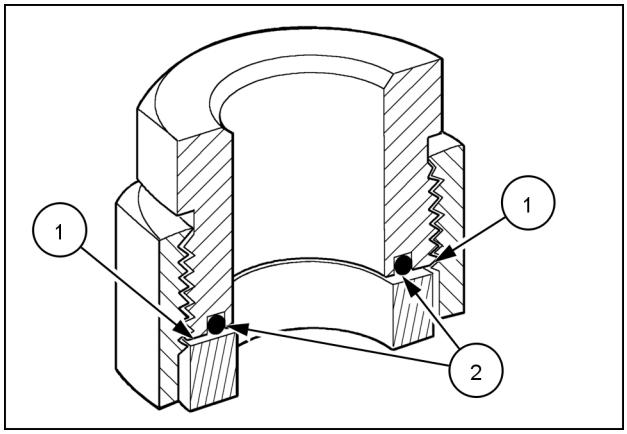
Installation of O-ring and flat seal (ORFS) fittings

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

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

NOTICE: *Always use genuine replacement fluid and filters, and ensure proper lubrication and filtration of engine oil and hydraulic system fluid.*

The use of proper fluids and greases, as well as keeping the hydraulic system clean, will extend service life of the machine and components.

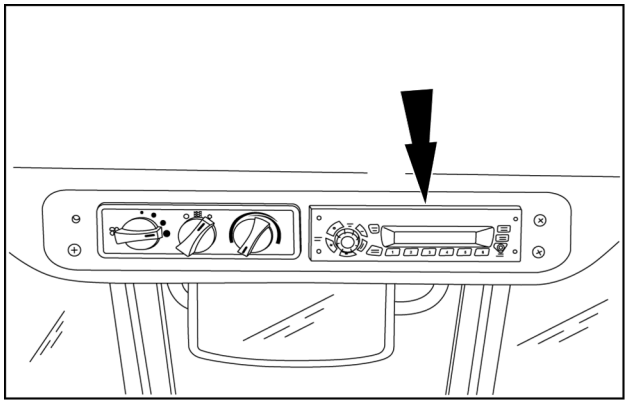


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9 - ACCESSORIES

Radio (option)

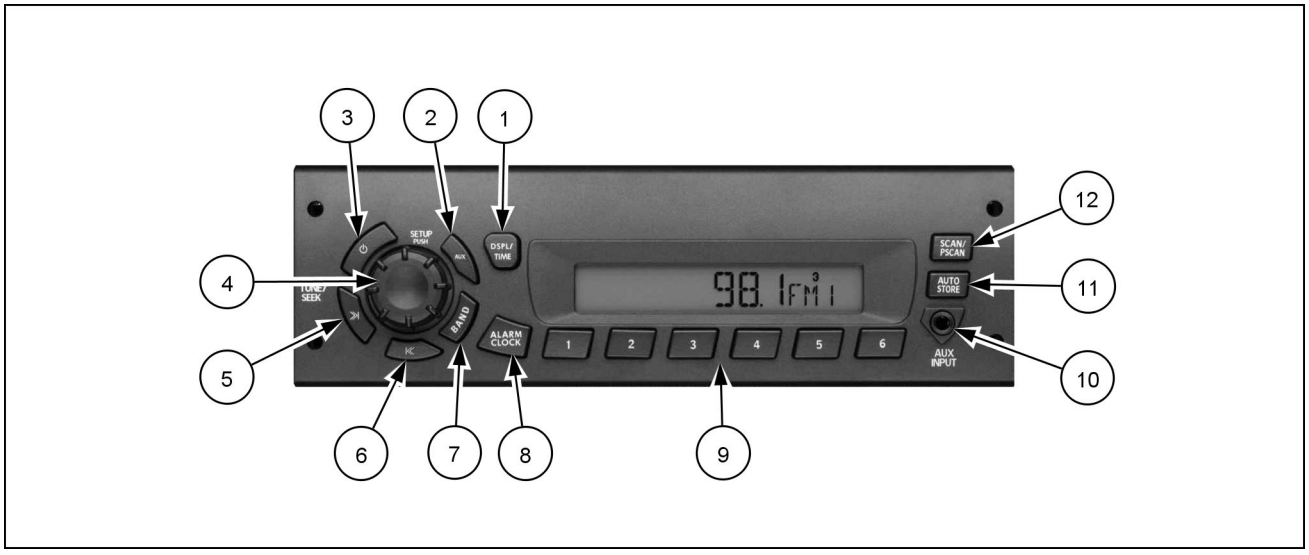
At your CASE CONSTRUCTION authorized dealer, there is a radio model available for your machine, if it does not yet have one.



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Introduction

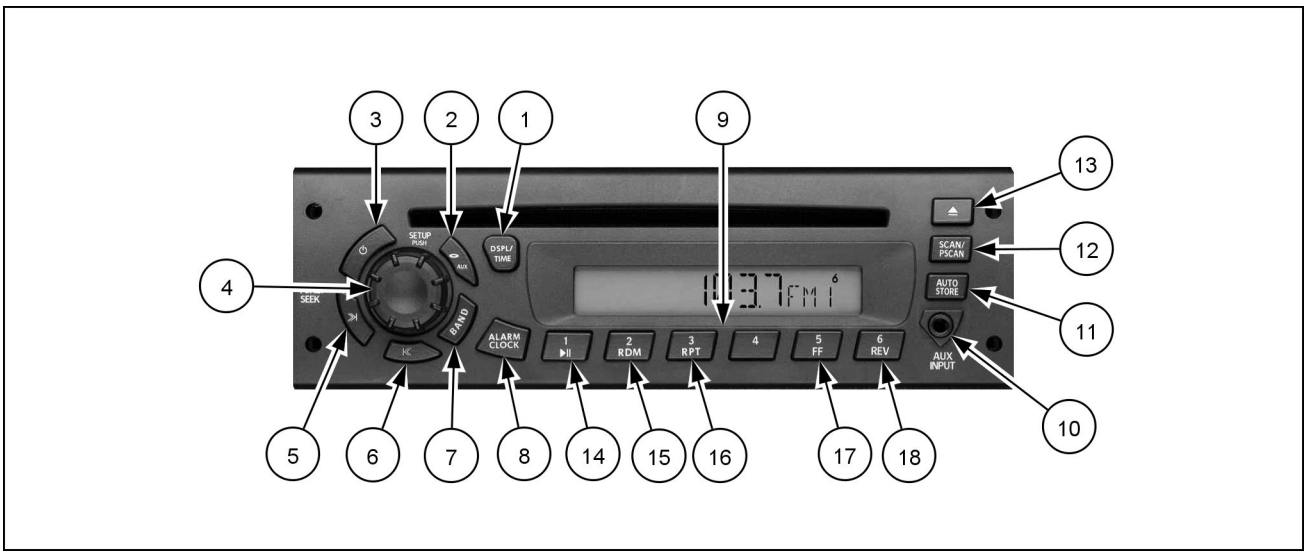
Your radio was designed for easy operation and to provide years of listening pleasure. To obtain maximum of satisfaction from your radio, read the instructions below and familiarize yourself with the device before you use it. Find out what it can do and how to operate all of its controls. In doing so, you will get the most from the advanced technology that has been designed into it.



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Stereo radio

1. DSPL/TIME - Switches to the set time mode/switches the readout
2. AUX - Switches to auxiliary input mode
3. ⏻ POWER – Turns the device on/off
4. SETUP - Turns on the radio/controls the volume/adjusts bass, treble, balance, fade, seek sensitivity and speakers
5. ⏭ TUNE/SEEK – Switches to the next radio station
6. ⏮ TUNE/SEEK – Switches to the previous radio station
7. BAND – Switches between bands
8. ALARM CLOCK - Switches to set alarm mode
9. BUTTONS 1 TO 6 – Presets radio stations
10. AUX INPUT – Auxiliary input for external audio devices
11. AUTO STORE - Stores the strongest stations (frequencies) in the presets
12. SCAN/PSCAN – Search stations/presets on the current band



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CD Receiver

1. DSPL/TIME - Switches to the set time mode / switches the readout
2. ⏀ AUX - Switches to CD / Auxiliary input mode
3. ⏻ POWER – Turns the device on/off
4. SETUP - Turns on the radio / controls the volume / adjusts bass, treble, balance, fade, seek sensitivity and speakers
5. ⏭ TUNE/SEEK – Switches to the next radio station / next CD track
6. ⏮ TUNE/SEEK – Switches to the previous radio station / previous CD track
7. BAND – Switches between AM, FM1, FM2, FM3 and Weather (WX) (Weather) bands
8. ALARM CLOCK - Switches to set alarm mode
9. BUTTONS 1 TO 6 – Presets radio stations
10. AUX INPUT – Auxiliary input for external audio devices
11. AUTO STORE - Stores the strongest stations (frequencies) in the presets
12. SCAN/PSCAN – Searches stations, CD track presets
13. ⏏ Ejects CDs
14. ⏯ Performs and pause CDs or auxiliary audio inputs
15. RDM – Executes random CD track
16. Repeats the same CD track until you cancel
17. FF – CD track fast-forward
18. REV – CD track fast-reverse

Radio operating instructions

To learn how to obtain the most from your device, read all the following instructions.

ATTENTION: *When operating the machine, always keep your eyes on the job to be performed and your hands on the controls, paying very close attention to the normal operating tasks. As always, the operator is responsible for the safe operation of the machine. Not keeping your eyes on the job to be performed and your hands on the controls when operating the machine may result in injury to you and others.*

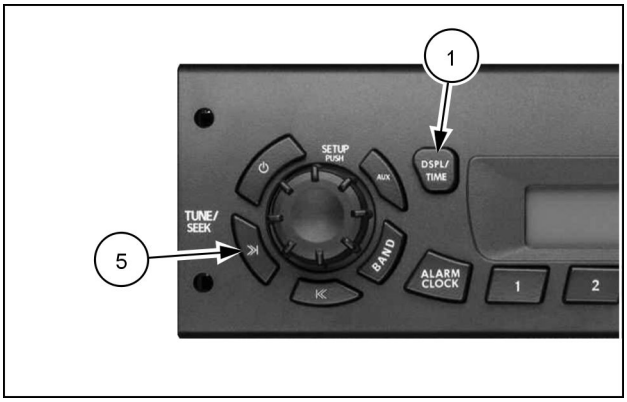
Clock

Using the clock

Your clock can function in 12-hour or 24-hour mode. The 12-hour mode distinguishes between AM and PM. The 24-hour mode operates military time. To change from 12-hour to 24-hour mode:

1. Turn on the ignition key
2. Press and hold the button **(1)** DSPL/TIME until the hours and minutes digits flash and you hear an audible signal. This indicates that you are in set time mode.
3. Press and release the button **(5)** to switch between 12-hour and 24-hour modes.

NOTE: *After 5 seconds of inactivity, the display will return to the default display, and the current mode is set.*



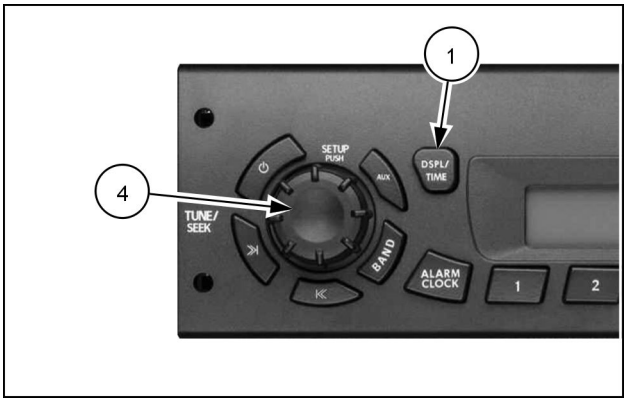
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Setting the clock

1. Turn "ON" the starter key.
2. Press and hold the button **(1)** DSPL/TIME until the hours and minutes digits flash and you hear an audible signal. This indicates that you are in set time mode.
3. Press the DSPL/TIME button **(1)** again until the hours digits flash.
4. Turn the knob **(4)** SETUP to change the hours. Turn it to the right to increase the digits, or to the left to decrease the digits.
5. Press the button **(1)** DSPL/TIME again to make the minute digits blink. Turn the knob **(4)** SETUP to change the minutes. Turn it to the right to increase the digits or to the left to decrease the digits.
6. Press the button **(1)** DSPL/TIME again to complete the time setting procedure. The display will return to the default display.

NOTE: *At any time during the time setting process, not pressing a button or turning the adjustment knob for 5 seconds will cancel set time mode, returning the radio to normal operation and keeping any changes that you have already made.*

ATTENTION: *Only set the clock when you are not operating the machine. Setting the clock during operation could cause injury to you or others. As always, the operator is responsible for the safe operation of the machine.*

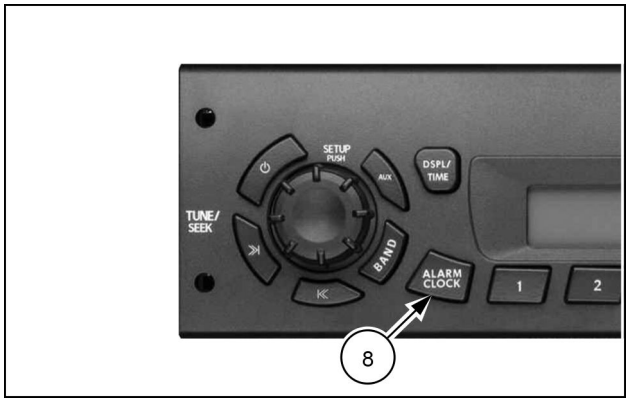


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Alarm

Using the alarm

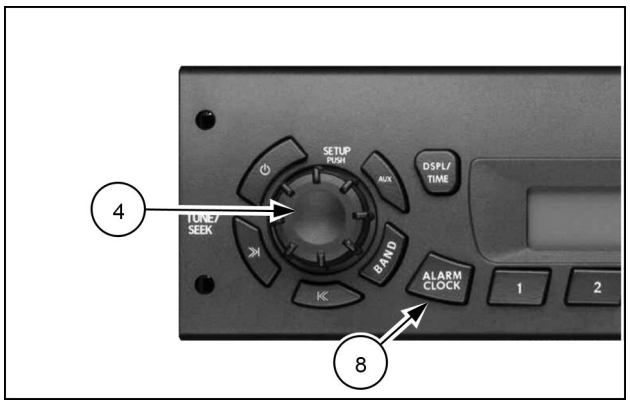
The alarm activates the radio at a certain time. Momentarily pressing the ALARM CLOCK button **(8)** makes the set alarm time appear on the display.



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Setting the alarm

1. With the radio on, press and hold the button **(8)** ALARM CLOCK to view the “ALARM” and SET icon. You will be in set alarm mode. The hour digits for the alarm time will start to flash.
2. Turn the knob **(4)** SETUP until the desired hour appears on the display. Turn the knob to the right to increase the hour or to the left to decrease the hour.
3. Press the ALARM CLOCK button **(8)** again until the digits for minutes begin to flash.
4. Turn the SETUP knob **(4)** to change the minute.
5. Press the ALARM CLOCK button **(8)** again until SET TONE appears on the display.
6. Press the button **(8)** ALARM CLOCK again, until VOL appears on the display. Press the button again and you will hear an audible signal. To increase the alarm volume, turn the button **(4)** SETUP to the right. To decrease the alarm volume, turn the SETUP button **(4)** to the left.
7. Press the button **(8)** ALARM CLOCK again to complete and return the display to normal operation. The icon will appear on the display to indicate that the alarm is active.



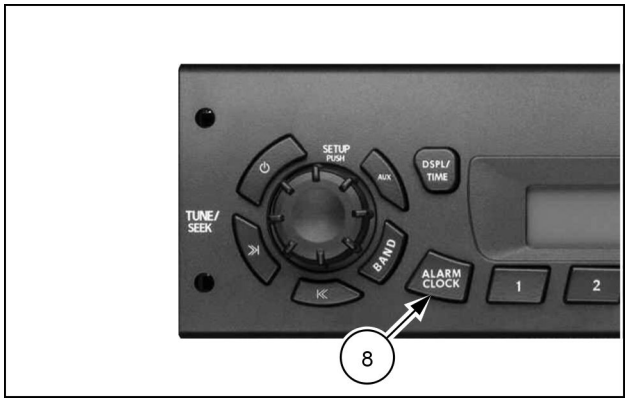
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NOTE: *If you fail to press any button or turn the adjustment knob for 5 seconds during the alarm setting process, the alarm setting will be cancelled and the radio will return to normal operation, keeping any changes that have been made.*

ATTENTION: *Only set the alarm when you are not operating the machine. Setting the alarm during operation of the machine could cause injury to you or others. As always, the operator is responsible for the safe operation of the machine.*

Turning off the alarm

Press and hold the ALARM CLOCK button **(8)** until you hear an audible signal and the icon disappears from the display.



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Activating the snooze function

To use SNOOZE, press any button when the alarm is sounding. The alarm will sound again in 9 minutes.

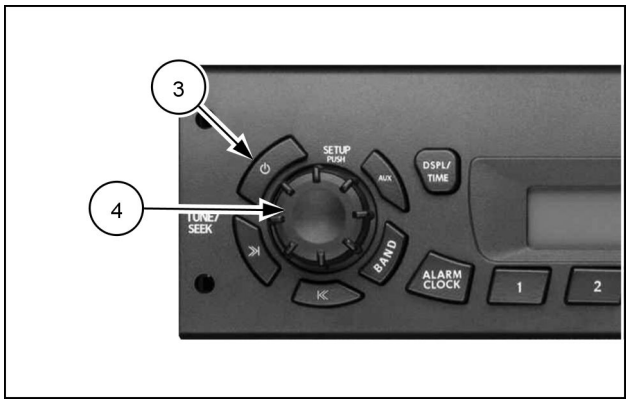
General radio functions

Your radio is equipped with:

- One AM band with 6 AM station presets
- Three FM bands with a total of 18 FM station presets
- One weather band with 6 WX presets

Turning on the power

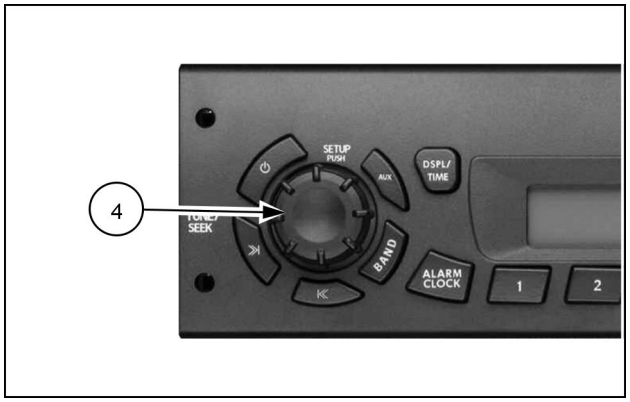
With the ignition key turned on, the device can be turned on and off by pressing the button **(3)**⏻. Pressing the SETUP button **(4)** will also turn on the device.



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Adjusting the volume

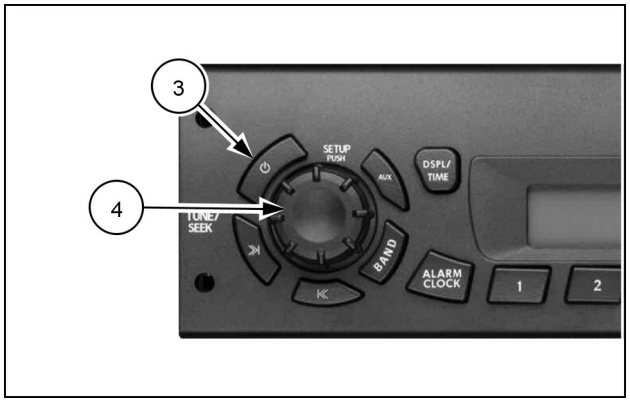
To increase the volume, turn the knob **(4)** SETUP to the right. To decrease the volume, turn the knob to the left.



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One-hour timer

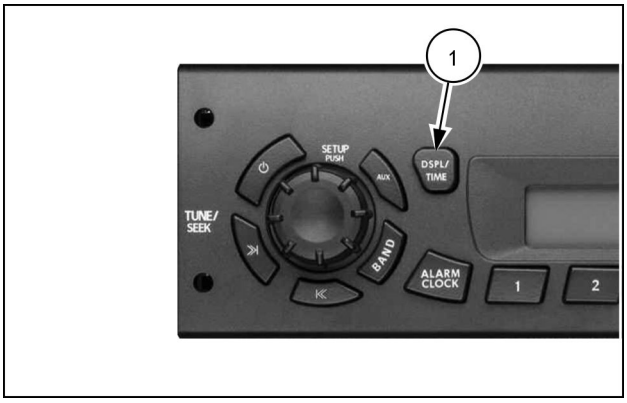
With the ignition key off, pressing the button **(3)**⏻ or the button **(4)** SETUP will turn on the device and activate the one-hour time. The device will be turned off after one hour. Pressing the button **(3)**⏻ or the SETUP button **(4)** again will reactivate the one-hour timer.



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Display

Your device's default display shows the time. It can also display additional information that changes depending on the mode it is in. By pressing the DSPL/TIME button **(1)** when the device is on, you can switch between available displays.



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Radio mode displays

When using the radio, press the DSPL/TIME button **(1)** to switch between two display modes:

- Display 1: Clock
- Display 2: Frequency

CD mode displays

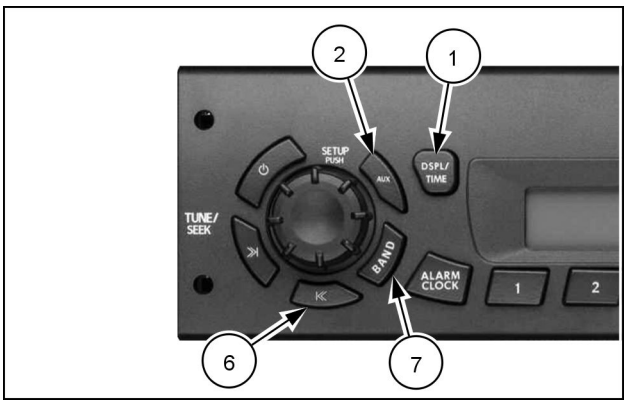
When using the CD player, press the DSPL/TIME button **(1)** to switch between two display modes:

- Display 1: Clock
- Display 2: Track number and elapsed time

Setting a default display

To change the default display:

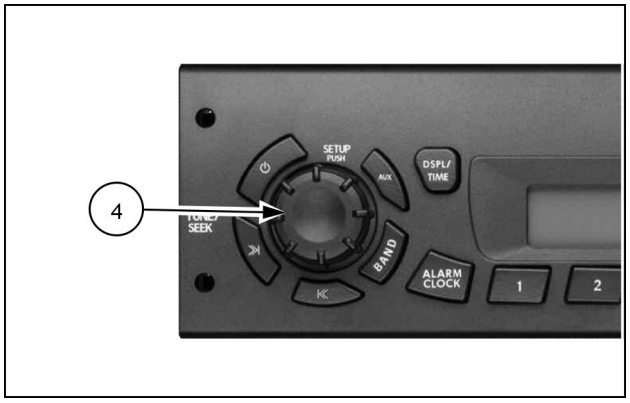
1. Turn on the radio.
2. To change the default display from radio or CD mode, you need to be in the mode to which you want to make the change.
   - Press the BAND button **(7)** to enter Radio mode.
   - Press the ⌔ button **(2)** to enter CD mode.
3. Press and hold the DSPL/TIME button **(1)** for 2 seconds until the hours and minutes digits begin to flash.
4. While the digits are flashing, press button **(6)** until the display that you want to be the default appears.



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Adjusting the display brightness

If the panel light control does not control the brightness of the radio display or if it is operating in one-hour timer mode, press the button **(4)** SETUP until DIM and the brightness level will be shown on the display. Turn the SETUP knob **(4)** to the right to increase the brightness or to the left to decrease it.



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Auxiliary mode

In auxiliary mode, you can activate an external device, such as your iPOD or a MP3 device, that is connected via the auxiliary input at the front of the radio.

To use an external device:

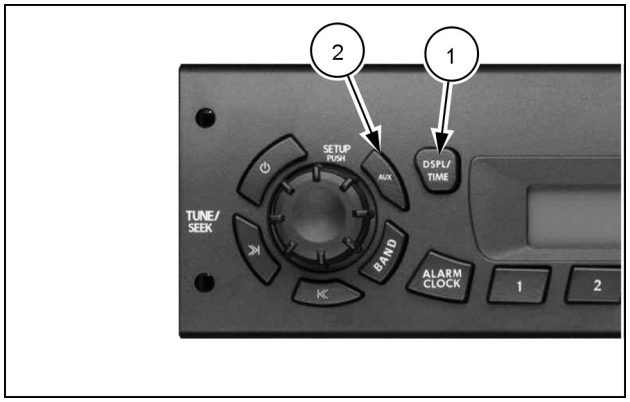
1. Connect the device via the auxiliary input jack.
2. Press the ⚭ / AUX button **(2)** until AUX IN appears on the display.

When an external device is connected and turned on, you will be able to hear it. If the ⚭ / AUX button **(2)** is pressed and there is no device connected, the radio display will show NO AUX.

To put the auxiliary mode in “MUTE” (mute), press the button **(1)**. Press it again to resume hearing the external device that you connected.

To turn off auxiliary mode:

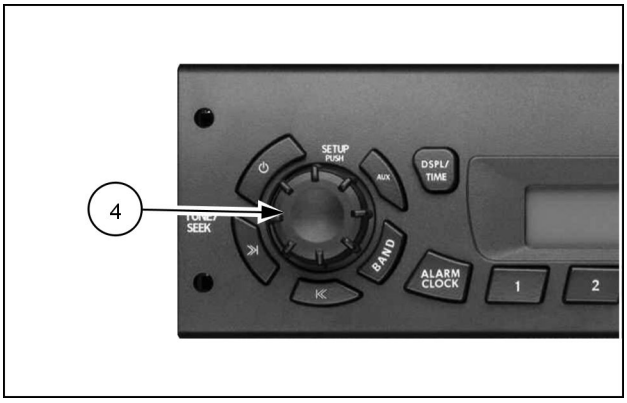
1. Press the ⚭ / AUX **(2)** or BAND **(7)** button until the radio switches to the mode you want to use.
2. Shut down the auxiliary line of the AUX IN jack.



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Adjusting the radio settings

To adjust the volume, bass, treble, balance, fade, seek sensitivity and speakers, press and release the button **(4)** SETUP. Every time you press the rotating knob, you will advance to next setting and VOL (volume), BASS (bass), FADE (fade), SEEK SENSITIVITY (seek sensitivity), DIM (dim) or SPEAKERS (speakers) will appear on the display.



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VOLUME: Turn the knob **(4)** SETUP to the right to increase the volume and to the left to decrease the volume. The display will show VOL and the volume level.

BASS: Press the button **(4)** SETUP until BASS and the current setting appear on the display. Turn the rotating knob to the right to increase the bass or to the left to decrease.

TREBLE: Press the button **(4)** SETUP until TREBLE and the current setting appear on the display. Turn the rotating knob to the right to increase the bass or to the left to decrease.

BALANCE: Press the button **(4)** SETUP until BALANCE and the current setting appear on the display. Turn the rotating knob to the right to move the sound to the right speakers, or to the left to move the sound to the left speakers.

FADE: Press the button **(4)** SETUP until FADE and the current setting appear on the display. Turn the rotating knob to the right to move the sound to the front speakers, or to the left to move the sound to the rear speakers.

SEARCH SENSITIVITY: Press the button **(4)** SETUP until SEEK and the current sensitivity level appear on the display. Turn the rotating knob to the right to increase the seek sensitivity or to the left to decrease the seek sensitivity. Increasing the sensitivity will help you find more stations, including those that are slightly weaker. Reducing the sensitivity will cause you to find fewer stations, but the strongest.

DIM: Press the button **(4)** SETUP until DIM appears on the display. Turn the SETUP knob **(4)** to the right to increase the brightness of the display or to the left to decrease the brightness.

SPEAKERS: Press the button **(4)** SETUP until SPEAKER4 or SPEAKER2 appears on the display. Turn the knob to toggle the functionality from 2 speakers to 4 speakers.

Using the radio

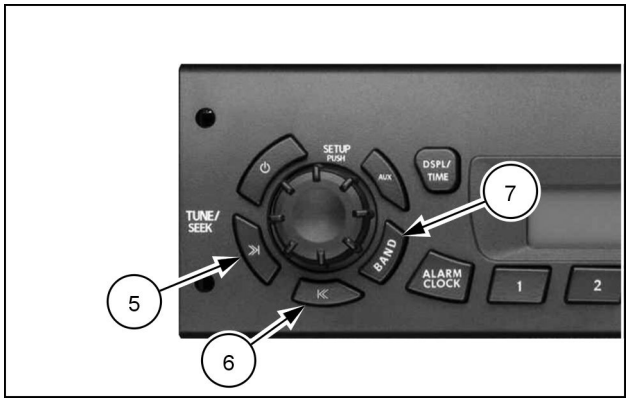
Finding a station

BAND: Press this button **(7)** to toggle between FM1, FM2, FM3, AM and WX. Your selection will appear on the display.



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TUNE/SEEK: Press and hold the buttons **(5)**⏭ and **(7)** BAND for 2 seconds to toggle between manual tuning and seek mode. The display will show TUNE or SEEK. The device will be in the mode that is displayed.



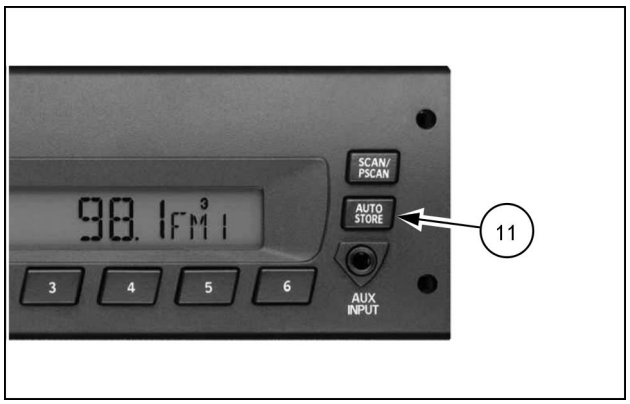
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Manual TUNE:

1. Press and hold down the ⏭ **(5)** and BAND **(7)** buttons until TUNE appears on the display.
2. To increase the radio frequency, press the ⏭ button **(5)** to go on to the next station up.
3. To increase the frequency, press the ⏮ button **(6)** to go on to the next station down.

SEEK: Pressing the buttons **(5)**⏭ or **(6)**⏮ for more than half a second activates SEEK mode and the display will show SEEK. SEEK mode ends when you reach a tunable station and that station begins to play.
If the SEEK function does not find a tunable station, after searching the band twice, the SEEK function ends and the display will show NOT FOUND for 5 seconds. After 5 seconds, the default display appears and the radio continues to play the station that was playing before the SEEK function was activated.
To cancel SEEK, press the ⏭ **(5)** or ⏮ **(6)** button again.

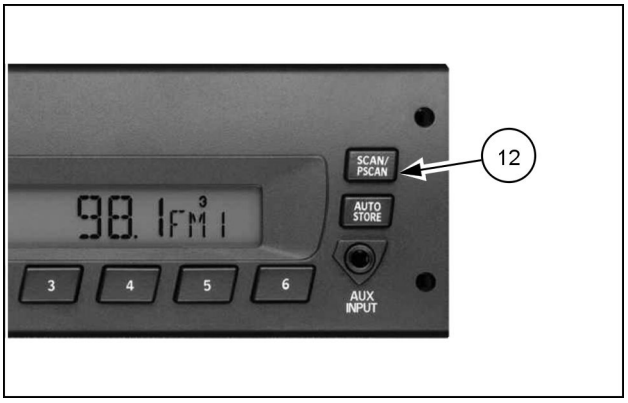
AUTO STORE: This function stores the 6 strongest stations on buttons 1 to 6. Press and hold the button **(11)** AUTO STORE until AUTO and the AS icon appear on the display. The AUTO STORE function will affect only the band that you are listening to. For example: If you press **(11)** AUTO STORE while listening to FM1, the presets in AM, FM2, FM3 and WX will not change. Pressing and holding AUTO STORE **(11)** for more than 2 seconds cancels the AUTO STORE function and the original defaults are restored.



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SCAN: Press the button **(12)** SCAN/PSCAN to scan all the stations on the band you are using. When a station with a strong enough frequency is found, the radio will play it for 5 seconds and then continue to scan until you press **(12)** SCAN/PSCAN again. The display will show SCAN and the frequency of the scan.

PSCAN (presets scan): Press **(12)** SCAN/PSCAN for more than 2 seconds to scan the presets on the band being used. (FM will scan on FM1, FM2, and FM3). When a strong enough frequency is found, the radio will play that station for 5 seconds and will continue the scan. The display will show PSCAN, the frequency, the preset number and the current band. The presets scan will continue until you press SCAN/PSCAN **(12)** again.



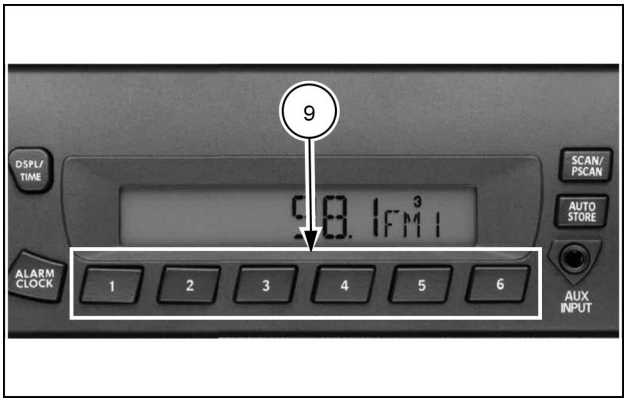
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Setting the presets

The six numbered buttons allow you to preset 6 of your favorite stations, by band, and easily return to them with the push of a button. To set them:

1. Turn on the radio.
2. Select the band.
3. Tune the desired station.
4. Press and hold one of the 6 numbered buttons **(9)** for more than 2 seconds to store the station selected. When the station is assigned to the preset number you have chosen, you will hear an audible signal and the preset number will be visible.
5. Repeat steps 1 to 4 for each button.

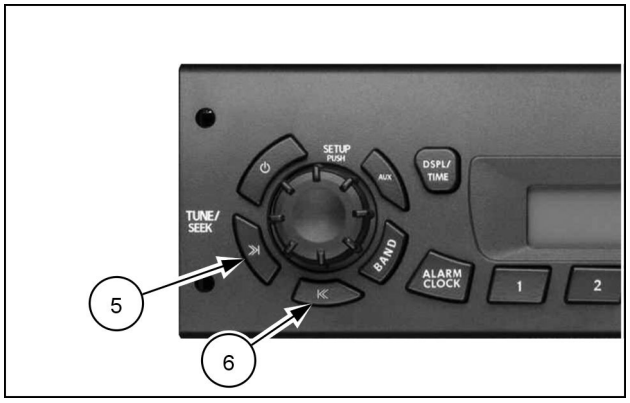
   NOTE: *Pressing each respective button will then tune the radio to the station you have set for the band you are listening to.*



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Using the weather band (available only in some countries)

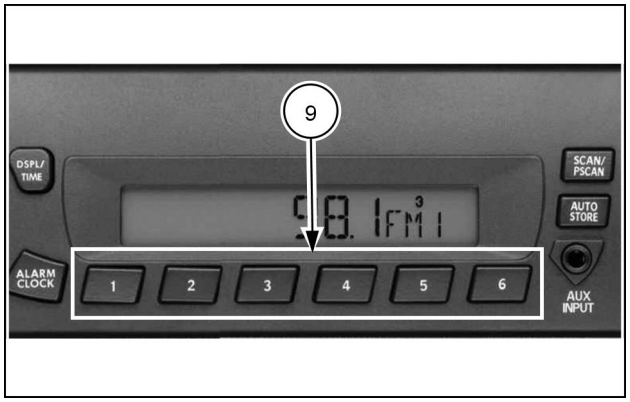
NOAA Weather Radio is a service of the National Weather Service. It provides continuous transmissions about the latest weather information, directly from the National Weather Service. Messages about the weather are repeated every four to six minutes and reviewed every one to three hours, or more frequently, if necessary. Most stations operate 24 hours a day.
The weather for the area where you are can be found on one of the 7 stations. When in Weatherband mode, the display will show WEATHER, WX and the channel number. The channel can be changed using the ⩙ **(5)** or ⩘ **(6)** buttons and can also be preset on the buttons numbered 1 to 6 **(9)**.



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The frequencies associated with weatherband channels are as follows:

1. **162.400 MHz**
2. **162.425 MHz**
3. **162.450 MHz**
4. **162.475 MHz**
5. **162.500 MHz**
6. **162.525 MHz**
7. **162.550 MHz**



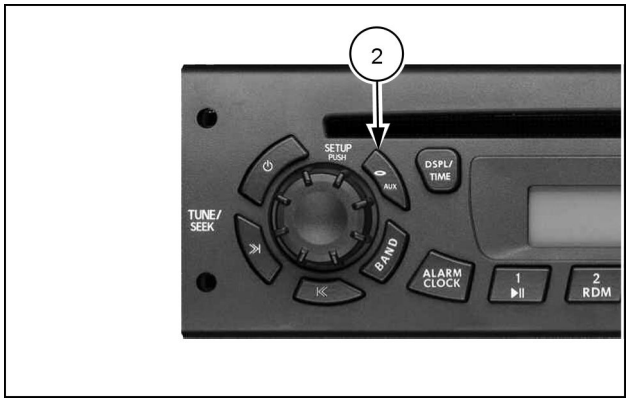
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The National Weather Service operates approximately 372 stations. About **90%** of the population of the nation is within the listening range of NOAA Weather Radio transmission.

Using the CD player (if equipped)

Your CD player plays full-size compact discs.

NOTICE: *Never insert any other object, other than a CD, into your device. This may damage the device, resulting in unnecessary repairs and/or void the warranty of the unit.*

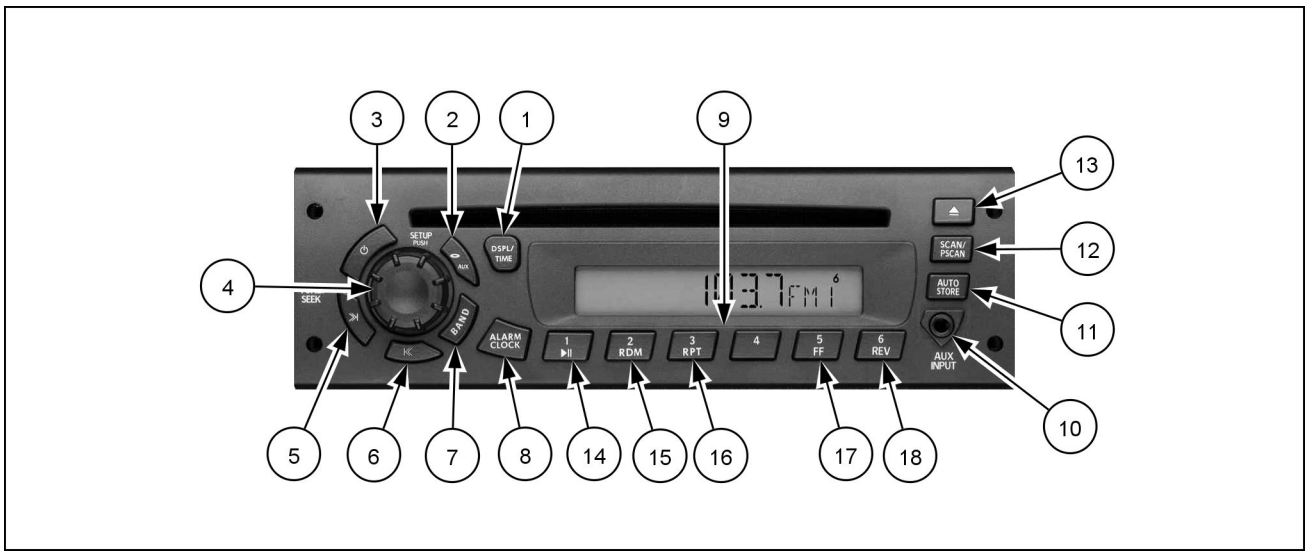


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Playing a CD

1. Turn on the ignition key and the device.
2. Insert a disc partially into the opening, with the label facing up. The device will automatically pull the disc when it is partially inserted. The CD and LOADING icon will appear on the display, followed by the track number and time elapsed. Then, the disc will begin to play.
3. If you are listening to the AM / FM / WX radio, press the ⚭ /AUX button to play a CD that has been loaded into the device. If no CD has been loaded, the display will show “NO CD” for five seconds and return to the default display. If a CD has been loaded, the track number and time elapsed will be displayed.

If a CD is ejected and not removed within 16 seconds, the CD will be reloaded, but not played until the ⚭ /AUX button is pressed.



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Button Functions:

DSPL/TIME: Press **(1)** DSPL/TIME to toggle between the track number/elapsed time and the time. To switch the display, refer to the "Display" section.

TUNE/SEEK⏭: Press **(5)**⏭ to advance to the next track. The track number and time elapsed will be displayed.

TUNE/SEEK ⏮: Press **(6)**⏮ to go to the beginning of the track that is being played. Press this button within the first 8 seconds of the track to go to the beginning of the previous track. The track number and time elapsed will be displayed.

PLAY/PAUSE⏯: Press the button **(14)**⏯ to pause a CD. PAU will appear on the display and the audio will be cut off. Press the button again to resume playback of the CD.

RDM: Press the button **(15)** RDM to activate random track selection. RDM will appear on the display and the tracks on the loaded disc will be played in random order. Press the RDM button **(15)** to deactivate random playback.

RPT: Press the button **(16)** RPT to repeat the track that is being played. RPT will appear on the display and the track that is being played will be repeated until you press the RPT button **(16)** again.

FF: Press and hold the button **(17)** FF to fast-forward the track. When you release the button **(17)** FF, playback will return to its normal speed. The track number and elapsed time display for 5 seconds before the default display reappears.

REV: Press and hold the button **(18)** REV to fast-reverse the track. When you release the button **(18)** REV, playback will return to its normal speed. The track number and elapsed time display for 5 seconds before the default display reappears.

TRACK SCAN: Press **(12)** SCAN/PSCAN to scan all the tracks of the CD. After playing 10 seconds of the current track, the device will automatically go to the next track. To finish the scan, press SCAN/PSCAN **(12)** again.

EJECT⏏: Press the ⏏ button **(13)** to eject a CD.

Troubleshooting

The following error messages can appear during playback of a CD:

NO CD:	No CD was loaded in the device.
FOCUS:	The lens cannot focus on the disc. Possible reasons include: • The disc was inserted upside down – Eject and reinsert the disc. • The disc is dirty, scratched or wet – Attempt to clean the disc. • The lens is dirty – Clean the disc lens with a lens cleaner. • Too much moisture – Wait one hour and try again.
TRACKING:	Loss of tracking control. Possible reasons include: • The disc is dirty or scratched – Attempt to clean the disc. • The lens is dirty – Clean the disc lens with a lens cleaner. • The disc is stuck and will not turn – Contact the dealer.
LOAD:	Issue in the loading/unloading motor – Contact the dealer.

NOTE: *The sound quality, skips, difficulty finding tracks and/or difficulty loading or ejecting a CD-R may be affected by the quality of the CD-R, by the recording method, by the quality of the music that was recorded or how the CD-R was handled. If these issues occur, try playing a CD you know is good to see if the error corrects itself. If an error occurs repeatedly or if an error cannot be corrected, contact the dealer. If the radio displays an error message, write it down and provide it to the dealer when you report the issue.*

ATTENTION: *The laser beam used in the CD device is dangerous to the eyes. Do not try to disassemble the CD unit. This can be dangerous to you and/or others and may void the warranty of the unit.*

Operating tips

Tips about your audio system

ATTENTION: *Hearing damage from high noise is almost imperceptible until it is too late. Your hearing can adapt to high sound volumes. The sound that appears normal may be high and be dangerous for your hearing. Take the precautions to adjust the volume of your device to a safe level, before your hearing adapts to it.*

To help prevent hearing loss:

- Adjust the volume control to the lowest level.
- Increase the volume slowly until you hear comfortably and clearly.

Understanding radio reception

FM STEREO: FM stereo offers you better sound than AM, but FM signals have a reach of only **16 – 65 km**. Tall buildings or mountains may interfere with FM signals, causing intermittent sound.

AM: The range of most AM stations is higher than for FM, especially at night. The longer range, however, could cause stations to interfere with each other. AM may pick up sounds from things such as storms and power lines. Try to reduce the treble to reduce this noise, if it exists.

Taking care of your CDs

Handle the discs with care. Keep them in their original packaging or other protective packaging and always away from the sun and dust. If the disc surface is dirty, use a soft cloth soaked in a mild detergent solution to clean it. Clean the disc from the center to the edge.

Never touch the signal surface when handling the disc. Hold the disc by the outer edge, or by the inside edge (the hole) and the outer edge.

Do not put a label or tape or write on the surface of the disc. This may damage your CD and/or your device.

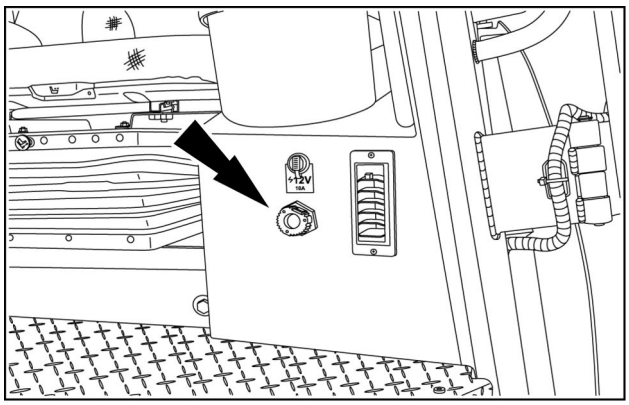
NOTICE: *Before adding any audio equipment on your machine – such as a CB radio, mobile telephone or two-way radio – make sure that this is possible. If it is possible, proper installation is very important. Added audio equipment may interfere with the operation of your machine's engine, radio and other systems, and even damage them. Your machine's systems can interfere with the operation of audio equipment that may have been installed improperly. Before adding audio equipment, check with your dealer and make sure to check federal laws on radio and mobile telephone units.*

NOTICE: *Only an authorized installer should install this device. Installation by unauthorized installers will void the unit's warranty.*

Auxiliary electrical outlet

The **12 V** auxiliary power socket can be used to connect a lighting device to help with service and maintenance procedures.

NOTE: *The auxiliary power socket is located in the lower left-hand corner of the operator's compartment below the left-hand control console.*



RAPH12DOZ0086AA 1

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