

2050M
Tier 2
Crawler Dozer

PIN NCDC25000 and above
PIN NDDC25000 and above
PIN NEDC20000 and above
PIN NFDC20000 and above

OPERATOR'S MANUAL

Part number 47713598

2nd edition English

May 2015

Replaces part number 47616905



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Product identification

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

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

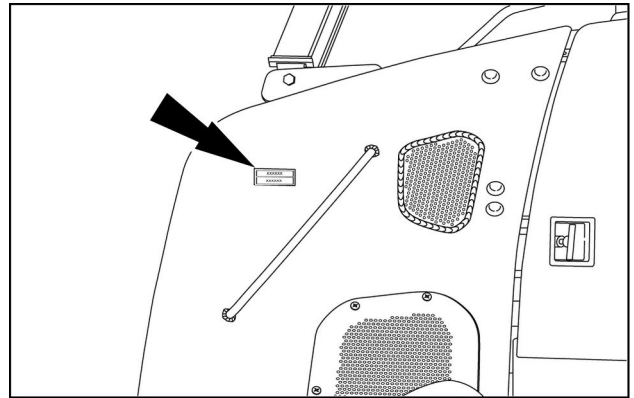
Machine identification

Model name

Product Identification Number (PIN)

Model year

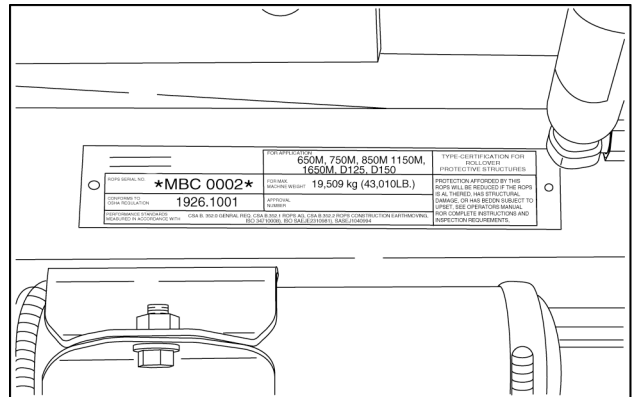
The PIN plate is located on the left-hand side of the machine in front of the engine access door.



RAPH12DOZ0131AA 1

Roll-Over Protective Structure (ROPS)

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

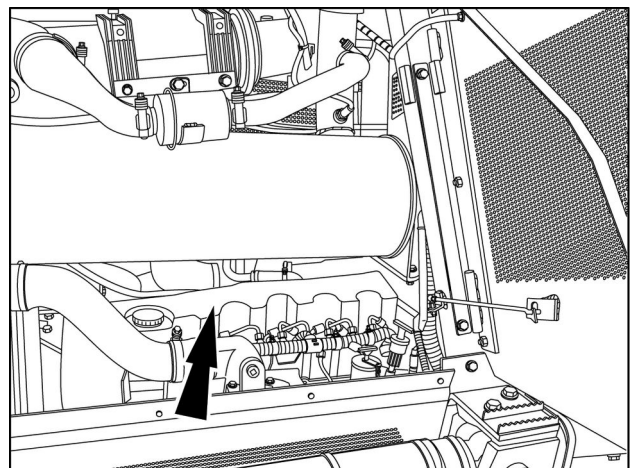


RAIL15DOZ0015AA 2

Engine make and model

Engine serial number

The serial number plate is on the engine valve cover.



RAIL13DOZ1693AA 3

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

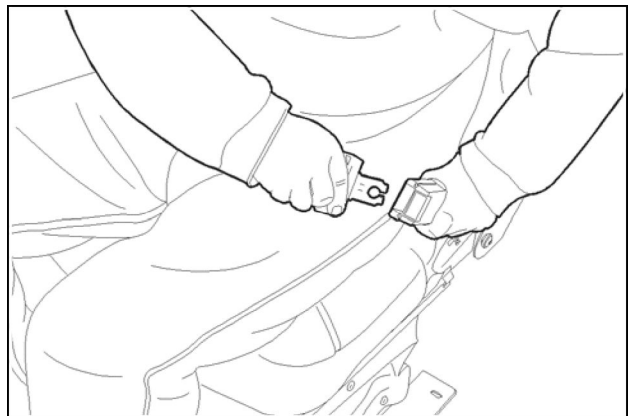
⚠ Seat belts ⚠

Seat belts must be worn at all times.

Seat belt inspection and maintenance:

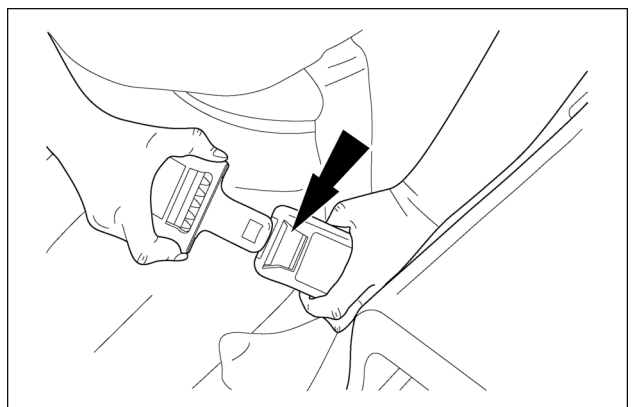
- Keep seat belts in good condition.
- Keep sharp edges and items than can cause damage away from the belts.
- Periodically check belts, buckles, retractors, tethers, slack take-up system, and mounting bolts for damage and wear.
- Replace all parts that have damage or wear.
- Replace belts that have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

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



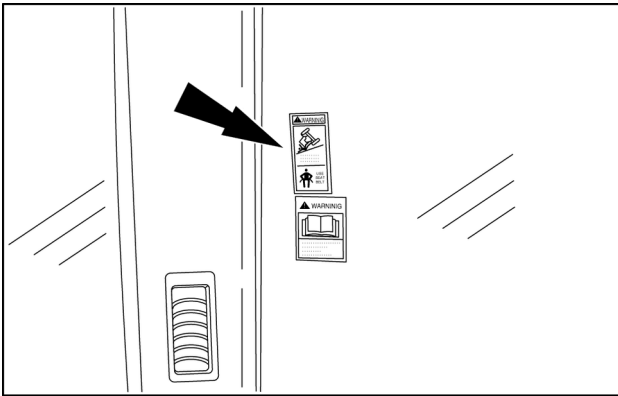
RCIL10CWL037AAL 1

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



RCIL10CWL083FAL 2

WARNING — Use your seat belt



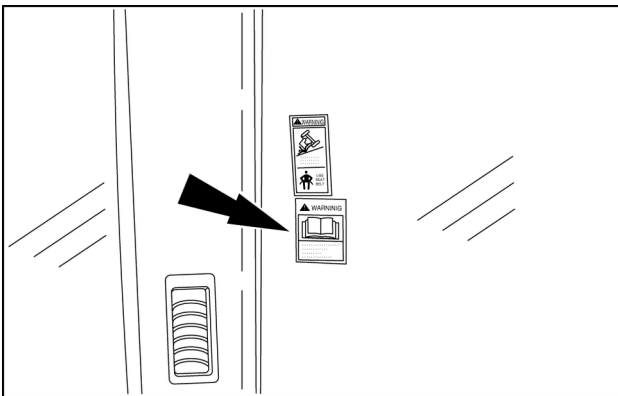
RAPH12DOZ0084AA 1

This WARNING safety sign is located on the support inside the operator's compartment.
WARNING — Avoid crushing. Do not jump if machine tips. Use seat belt. Failure to comply with this warning could result in death or serious injury.
ISO safety sign number: 87706391



87706391 2

WARNING — Read the operator's manual



RAPH12DOZ0084AA 3

This WARNING safety sign is located inside the operator's compartment.
WARNING — Read the Operator's Manual. Fasten seat belt. No riders. Keep others away. Failure to comply with this warning could result in death or serious injury.
ISO safety sign number: 87706389



87706389 4

3 - CONTROLS AND INSTRUMENTS

ACCESS TO OPERATOR'S PLATFORM

Proper entry and exit

Steps and hand holds

▲ WARNING

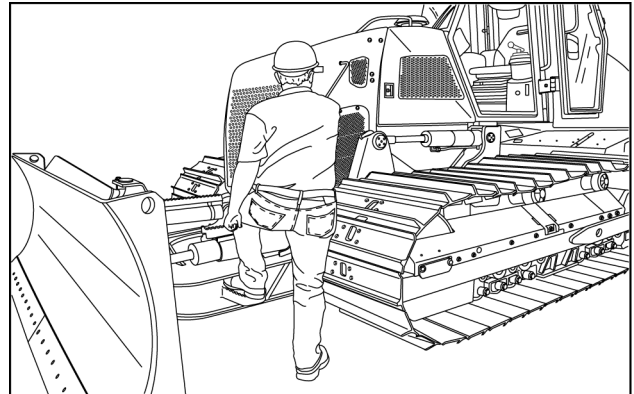
Fall hazard!

Clean the steps and access handles to remove all traces of grease, oil, mud, and ice (in winter).

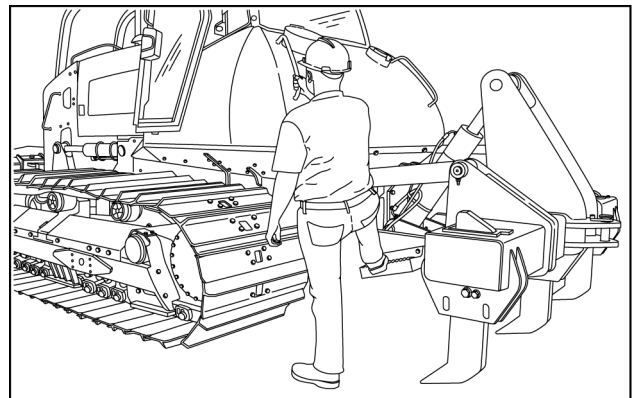
Failure to comply could result in death or serious injury.

W0139A

Use the steps and hand holds when getting on or off the machine. Use at least three points of support when getting on and off the machine. The cab door must be locked into the full open or full closed position before using the door hand hold. The machine can be entered from either the front or rear. The front entry is the recommended entry point.



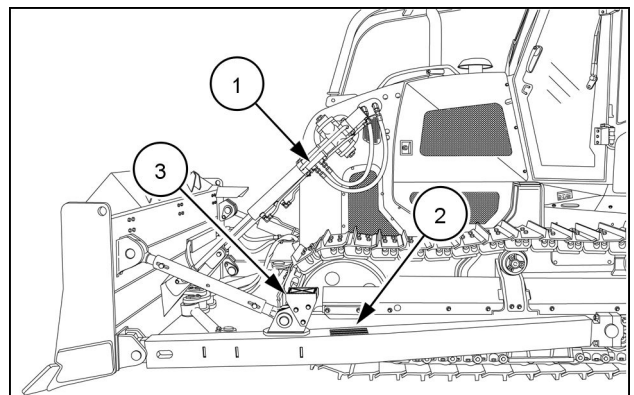
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RAPH12DOZ0118AA 2

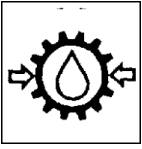
Bulldozer blade entry

Enter the machine with the optional bulldozer blade using the hand hold (1), the foot treads (2) and the step (3) located on the push beam. Obey the DO NOT STEP safety sign.



RAIL13DOZ1599AA 3

4. Charge pressure warning



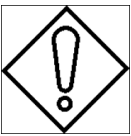
The charge pressure warning lamp will illuminate, and an audible warning will sound if there is no or low oil pressure in the transmission. Do not operate the machine if this warning occurs. Stop the machine immediately. The lamp will also illuminate if the engine is stopped and the key is on.

5. Hydrostatic drive temperature



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

6. Caution master indicator



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

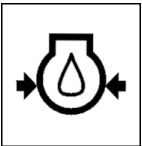
7. Stop master indicator



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

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

8. Oil pressure indicator



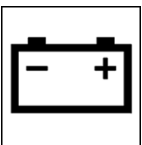
The low engine oil pressure warning lamp illuminates red and an audible warning will occur if there is no or low oil pressure in the engine when the machine is operating. Bring the machine safely to a stop and turn the machine OFF immediately. Do not run the engine if the warning lamp illuminates while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

9. Park brake indicator



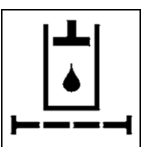
The parking brake lamp illuminates red when the parking brake is ON. Turn the parking brake ON or OFF with the parking brake switch.

10. Voltage



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

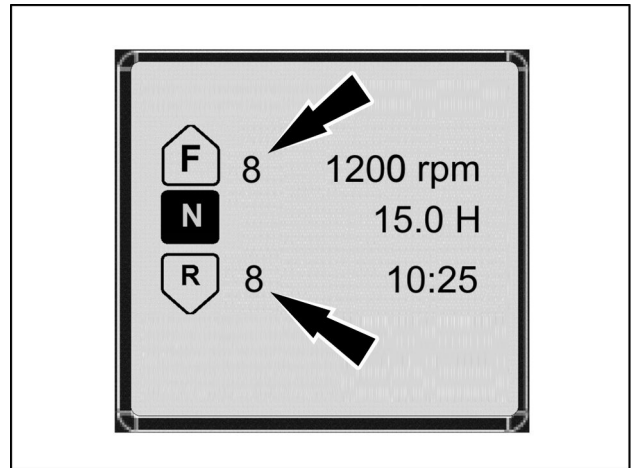
11. Hydraulic filter



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

The machine has 15 increments for speed that are selected from the left hand control. In this example, the speeds are equal both forward and reverse.

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



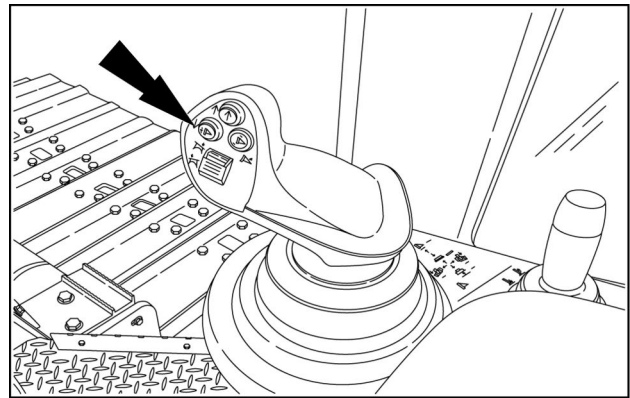
RAIL13DOZ1263AA 4

Grading

Use the grading mode to change the sensitivity of the blade for a special grading response. This allows the blade to move with more precision. Grading mode cannot be used when the leveling system is activated. Choose between aggressive, normal, slow, or grading blade work. Once pressed, the machine will operate in grading mode. Press the button again and the machine will return to the selected blade sensitivity.

The grading icon will display on the multi-display screen. The machine speed will decrease in the precision grading mode. Return to normal operation by turning this function off.

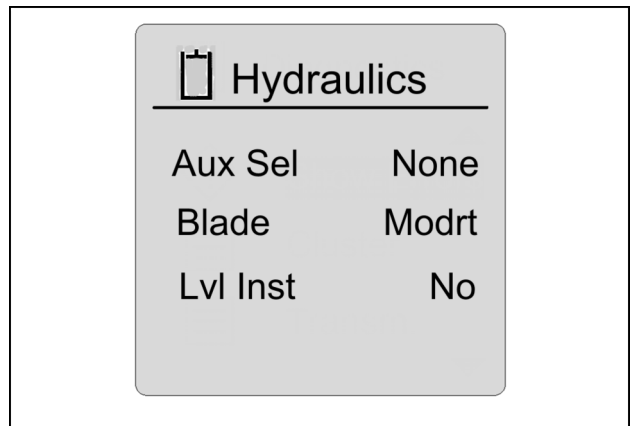
NOTE: The implement must be enabled to use this feature.



RAPH12DOZ0082AA 7

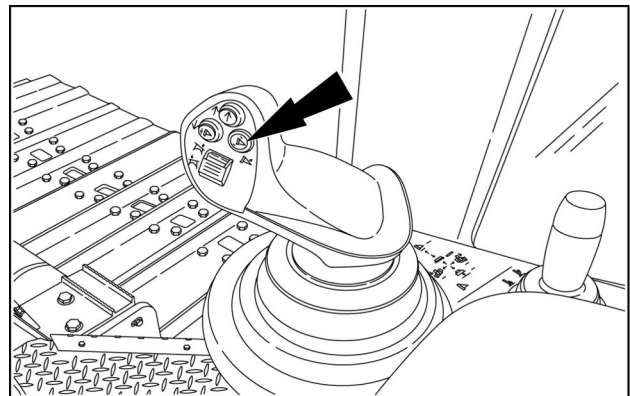
Leveling

The leveling system will produce a desired grade at a pre-set elevation and/or angle. The system must be equipped with an auto blade control system completion kit. The hydraulics selection should be set to "Lvl Inst". At the hydraulics screen, highlight "Lvl Inst" and press enter/confirm. Follow the prompts and change the "Lvl Inst" to Yes. This will allow the leveling functions to work.



RAIL12DOZ0216AA 8

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



RAPH12DOZ0082AA 9

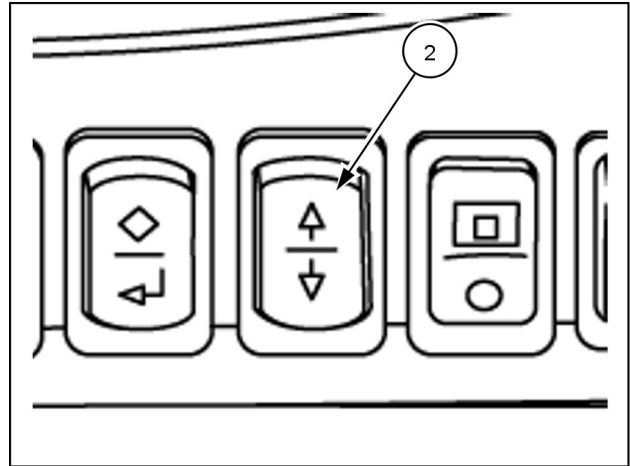
NOTE: In order to use this feature, the implement must be enabled, auto leveling must be engaged, and the blade lift and tilt axis must be in the auto manual function.

Viewing screens

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

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

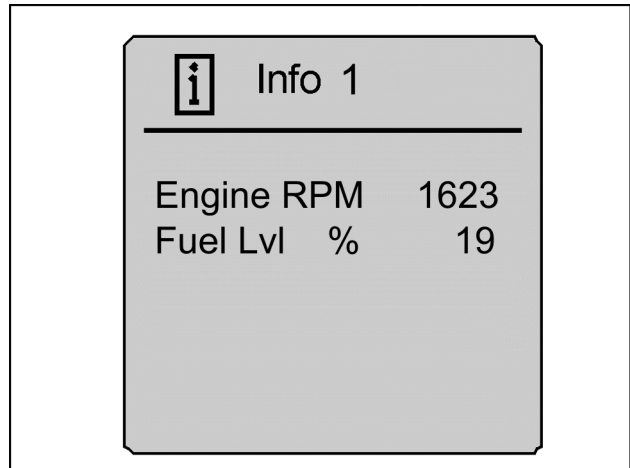
From the driving screen, push the down arrow.



RAIL12DOZ0225AA 4

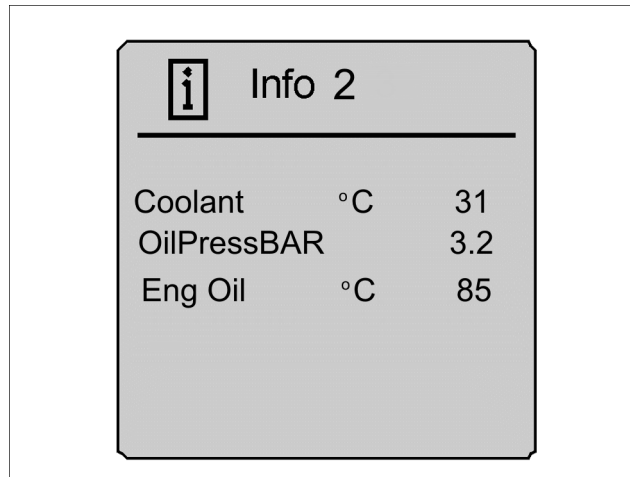
Information screens

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



RAIL13DOZ1262AA 5

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



RAIL12DOZ1027AA 6

4 - OPERATING INSTRUCTIONS

COMMISSIONING THE UNIT

Before starting the engine

▲ WARNING

**IMPROPER OPERATION OF THIS MACHINE CAN CAUSE DEATH OR SERIOUS INJURY.
MAKE SURE THAT EVERY OPERATOR:**

- is instructed in the safe and proper use of this machine.
- reads and understands the operator's manual for this machine.
- reads and understands ALL safety signs on the machine.

Failure to comply could result in death or serious injury.

W0188A

▲ WARNING

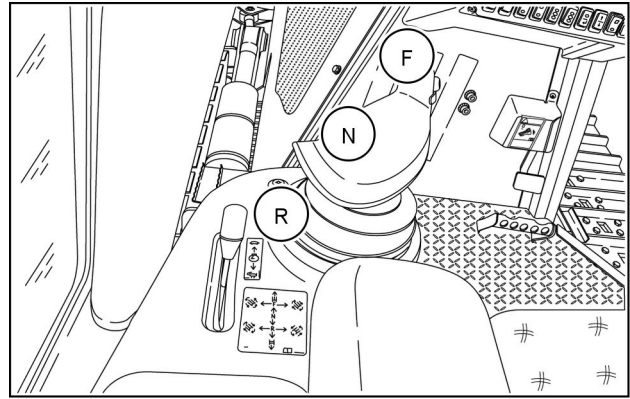
Avoid injury!
Do not operate the machine while under the influence of alcohol or drugs.
Failure to comply could result in death or serious injury.

W0160A

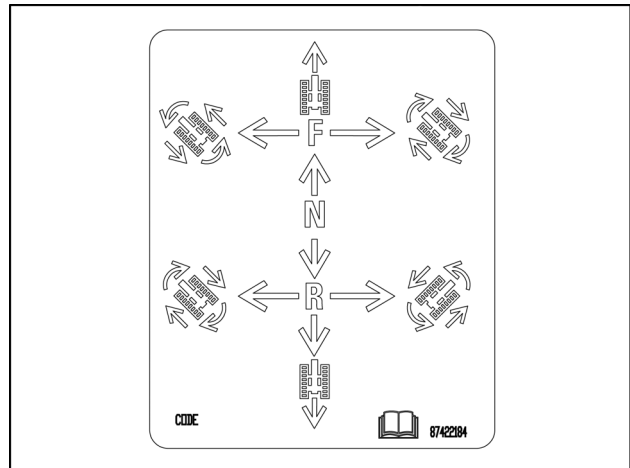
Before starting the engine

1. Perform a daily walk around and visual inspection of the machine.
2. Check for loose connections, faulty hoses, oil leaks, debris or trash buildup, loose bolts, damaged, or missing parts that could affect the normal and safe operation of the machine.
3. Make any necessary corrections before operating the machine.
4. Complete recommended daily maintenance.
5. Check that the machine fuel tank is filled with clean fuel that matches the specifications given in this manual.

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



RAPH12DOZ0080AA 2

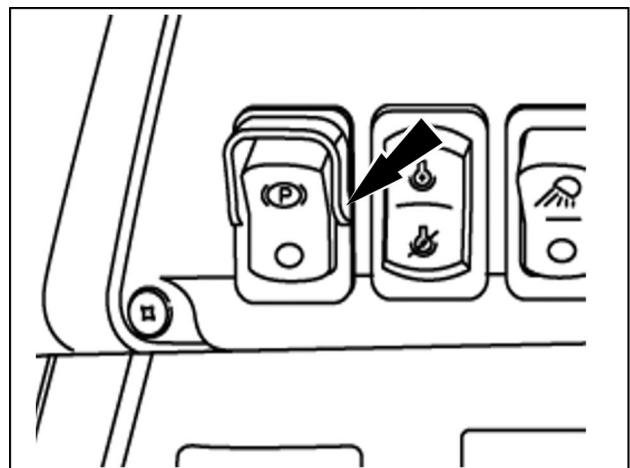


RAPH12DOZ0149AA 3

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

NOTE: The speed will default to the factory preset speed (8) at initial key on.

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



RAPH12DOZ0133AA 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 removing the floor mat and seat bolts.

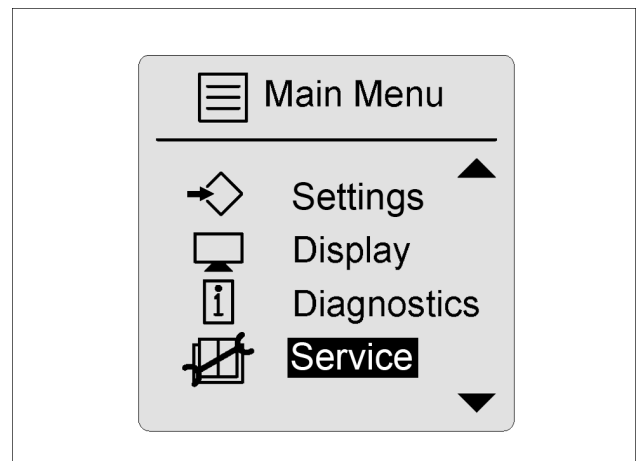
Engine or hydraulic failure

Towing this machine is not recommended. If your machine is disabled, you must make a judgment if the machine can be moved without further damage. If possible, repair the machine at the job location.

If you cannot repair the machine at the job location, you may wish to contact your authorized dealer for assistance. Incorrectly performed towing procedures can severely damage machines with hydrostatic motors.

Keep all unauthorized personnel clear of the area.

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



RAIL15DOZ0018AA 1

Transporting by ship or rail

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

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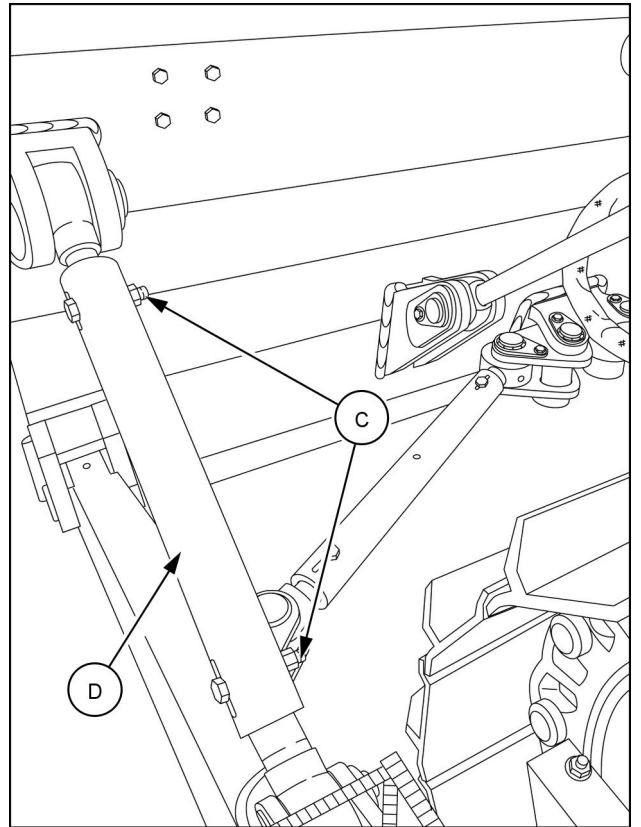
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11. Install the bolts (C) into the left-hand pitch link (D) to secure the adjustment.

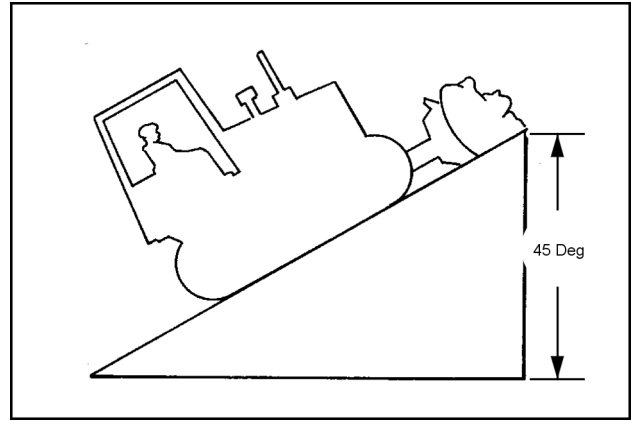


RAIL14DOZ0529AA 8

Terrain

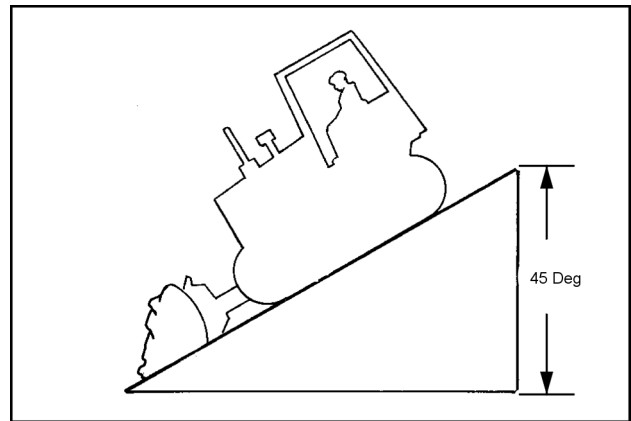
Changes in the terrain shifts the machine center of gravity and increases the weight of the machine on different parts of the undercarriage.

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



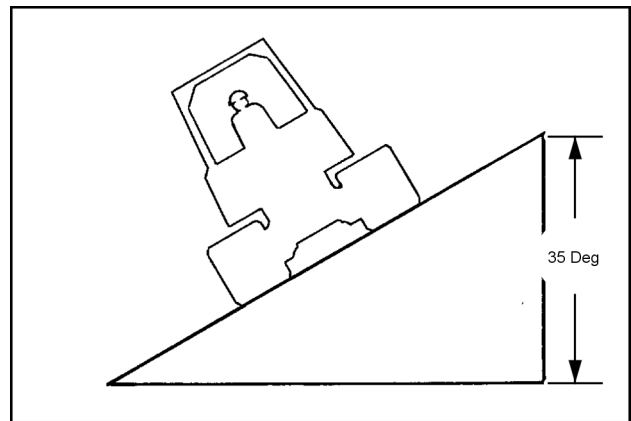
RCIL10CWL004AAL 1

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



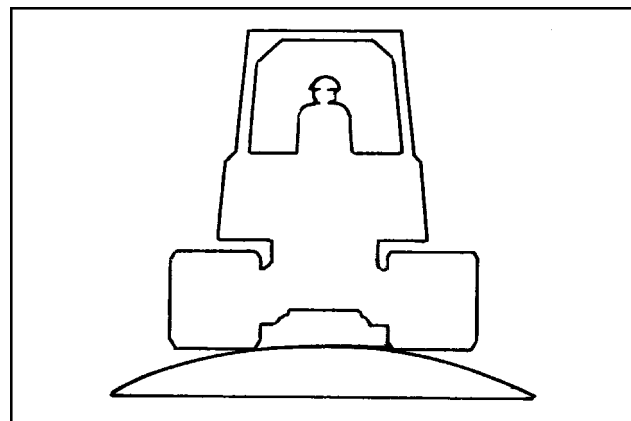
RCIL10CWL005AAL 2

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



RCIL10CWL006AAL 3

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



RCIL10CWL007AAL 4

Torque data for O-ring face seal fittings

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

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

Fluids and lubricants

Engine crankcase	
Capacity with filter change	16.4 L (17.3 US qt)
Capacity without filter change	15.6 L (16.5 US qt)
Specifications	CASE AKCELA UNITEK NO. 1™ SBL CJ-4 SAE 10W-40
Fuel tank	
Capacity	405 L (107 US gal)
Cooling system	
Capacity	30.3 L (8.0 US gal)
Specifications	50 % Water and 50 % CNH XHD HEAVY DUTY COOLANT / ANTI-FREEZE or CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT. Depending on the date of manufacture, the machine could have either coolant type. Machines with OAT coolant will have a decal near the fill location. Never mix conventional coolant with OAT coolant. See 7-20 for instructions on switching coolant types.
Hydraulic reservoir/Transmission refill	
Capacity	210.0 L (55.5 US gal)
Specifications	TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30
Final drives	
Capacity - Each Side	25.0 L (26.4 US qt)
Specifications	CASE AKCELA GEAR 135 H EP 85W-140
Grease fittings	
Quantity	As Required
Specifications	TUTELA MOLY GREASE GR-75

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

Engine coolant

⚠ WARNING

Burn hazard!

Hot coolant can spray and scald if you remove the radiator or deaeration tank cap while the system is hot. To remove the cap: allow the system to cool, turn the cap to the first notch, and wait for all pressure to release. Remove the cap only after all pressure has released.

Failure to comply could result in death or serious injury.

W0367A

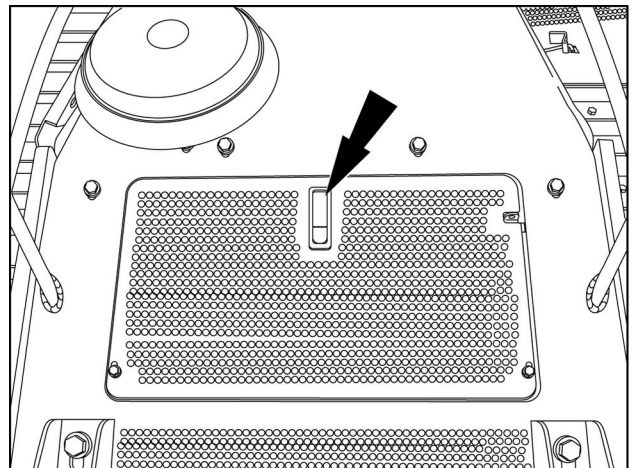
Check the coolant reservoir level every 10 hours of operation or each day.

Prior operation:

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

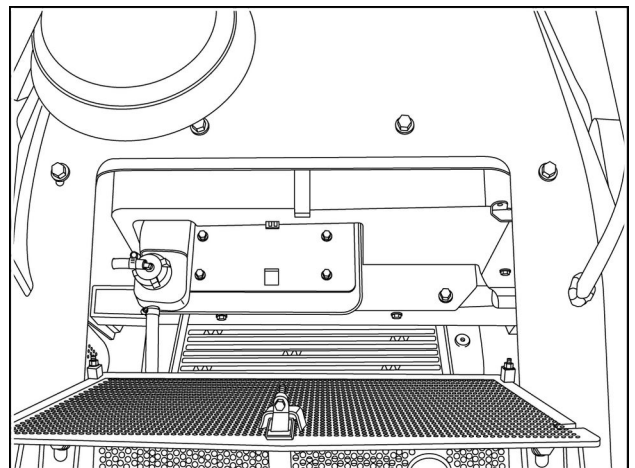
Service specifications —	
Type of coolant	50 % Water and 50 % CNH XHD HEAVY DUTY COOLANT / ANTI-FREEZE or CASE AKCELA ACTIFULL™ OT EXTENDED LIFE COOLANT. Depending on the date of manufacture, the machine could have either coolant type. Machines with OAT coolant will have a decal near the fill location. Never mix conventional coolant with OAT coolant. See page 7-20 for instructions on switching coolant types.
Coolant capacity	30.3 l (32.0 US qt)

1. Check the coolant reservoir tank located under the access panel on top of the engine hood. Open the access panel door.

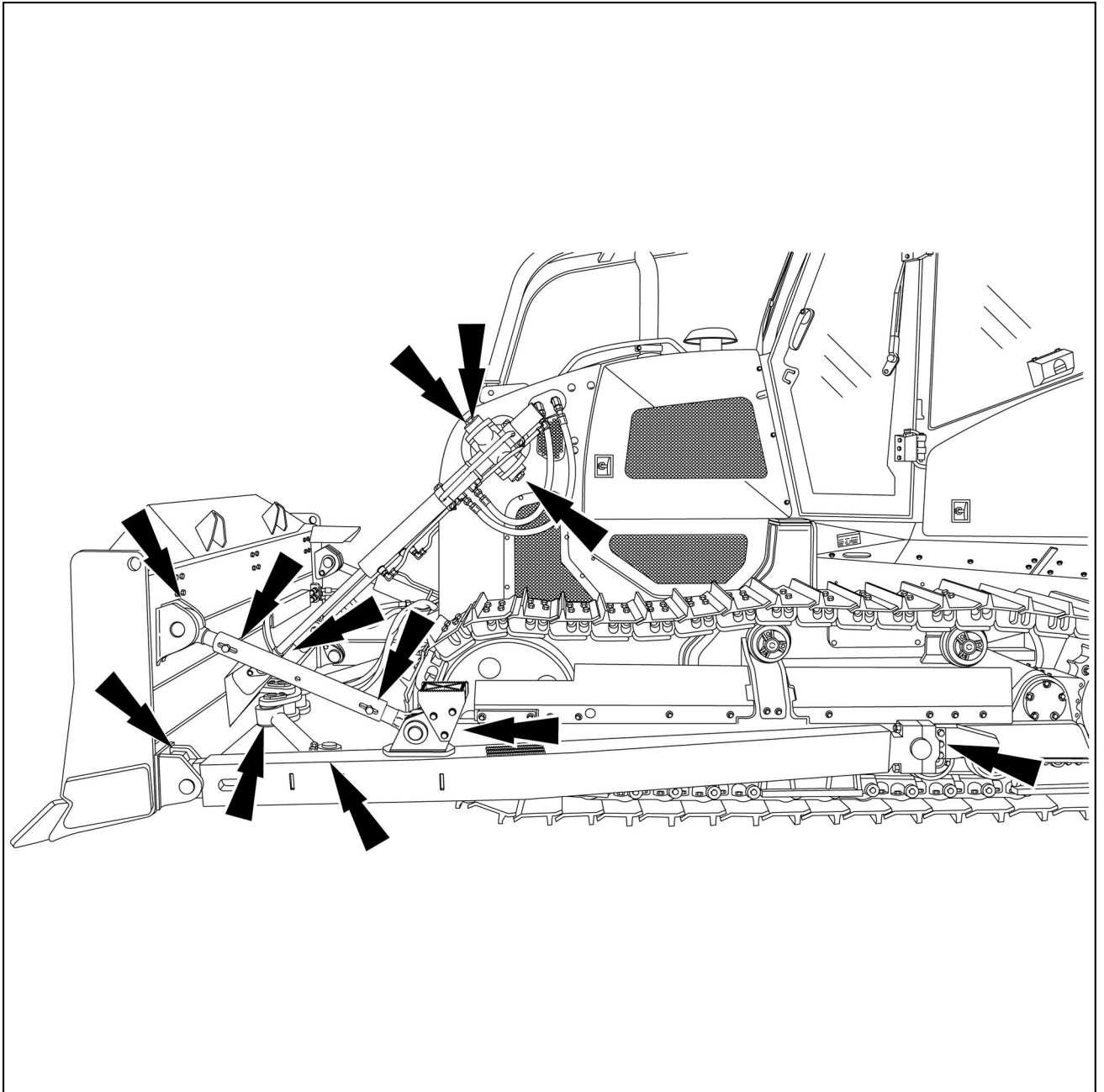


RAIL13DOZ1691AA 1

2. Do not remove the radiator cap during this check.



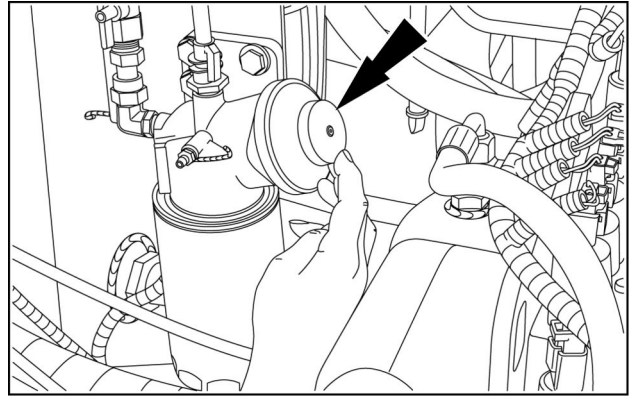
RAIL13DOZ1690AA 2



RAIL13DOZ1598GA 2

Removing air from the fuel system

1. Remove air from the fuel system after changing the fuel filter. Removing air from the fuel system may also be necessary if the machine runs out of fuel, if the fuel system has been serviced, or if the machine has been in storage.
2. Make certain that the fuel tank shutoff is in the ON position.
3. Loosen the air bleed screw one or two turns.
4. Operate the hand primer until no air bubbles flow from around the air bleed screw.
5. Tighten the air bleed screw.
6. Start the engine and check for leaks.



RAPH12DOZ0056AA 3

Battery electrolyte level

⚠ WARNING

Hazardous chemicals!

Battery electrolyte contains sulfuric acid. Contact with skin and eyes could result in severe irritation and burns. Always wear splash-proof goggles and protective clothing (gloves and aprons). Wash hands after handling.

Failure to comply could result in death or serious injury.

W0006A

⚠ WARNING

Battery acid causes burns. Batteries contain sulfuric acid.

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

Failure to comply could result in death or serious injury.

W0111A

⚠ WARNING

Chemical hazard!

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

Failure to comply could result in death or serious injury.

W0349A

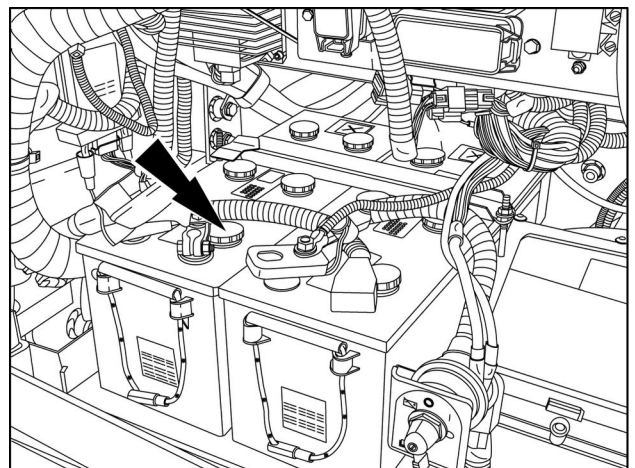
Check the battery fluid level every 500 hours of operation or more often if conditions are severe. The battery fluid can decrease with high temperatures.

Prior operation:

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

Check battery fluid level and specific gravity

1. Wipe the top of the battery or use compressed air to remove dust. Use care when removing caps and do not allow dirt or contaminants to enter the battery cells.
2. Insert a flat blade screwdriver into slots at the top of battery caps. Remove the cell caps, and check the fluid level in each battery cell. The level should be no less than **4.8 mm (0.2 in)** from the bottom of the cell.
3. Add distilled water, if necessary, then install the cell caps. Continuous use of the battery with low fluid will lower the battery performance.
4. If the terminals are dirty, wash with warm water. Reinstall the terminals, apply grease or spray rust preventive solution to create good connections. If the terminal is oxidized, polish it with a wire brush or emery paper.



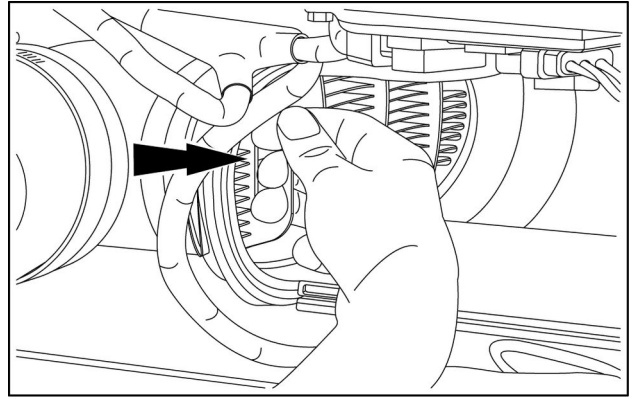
RAIL13DOZ1700AA 1

NOTE: Measure the specific gravity of battery fluid with a gravimeter. The measured value will vary depending on the ambient temperature.

Engine breather filter and valve clearance

The crankcase breather filter should be replaced when the hour meter registers 1500 hours. The engine breather filter should be changed every 1500 hours thereafter or more frequently when operating conditions are severe. Check engine valve clearance at 1500 hours and every 1500 hours thereafter. See your authorized dealer for these procedures or refer to the Service Manual for this machine.

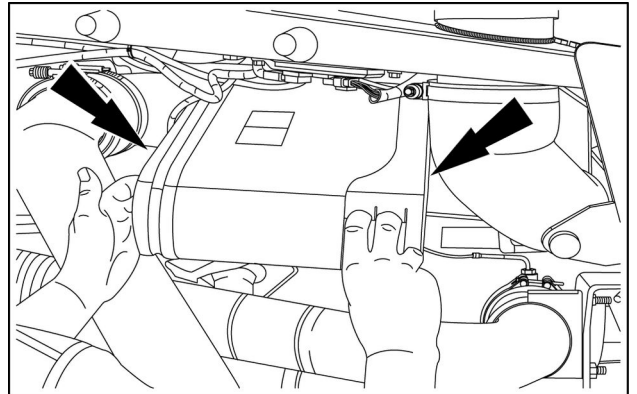
8. Snap the filter element in place with the handle facing toward the front of the machine.



RAIL13DOZ0784AA 8

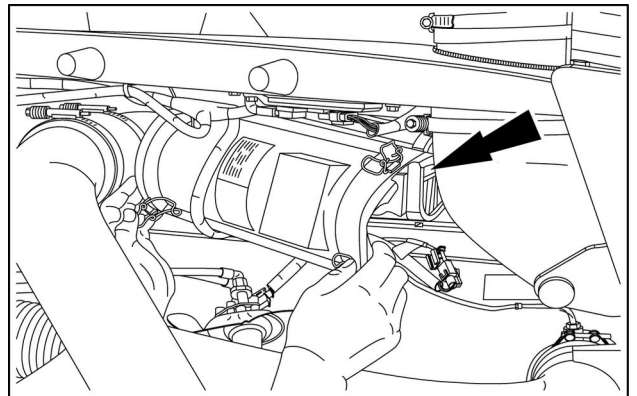
NOTE: Make sure the filter is sealed flush.

9. Fit the larger filter element inside the air cleaner housing. Slide the filter element in until it snaps into place.



RAIL13DOZ0782AA 9

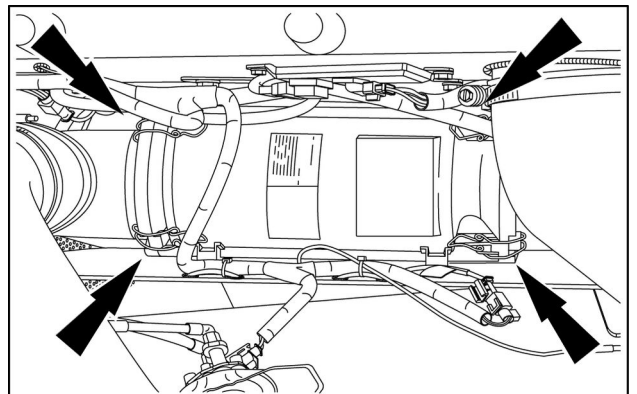
10. Place the air cleaner housing side cover over the pegs of the main housing.



RAIL13DOZ0780AA 10

NOTE: Do not force the U-clips to close. If the U-clips are difficult to close, check the housing cover for proper alignment.

11. Engage the U-clips to secure the housing cover.



RAIL13DOZ0778AA 11

Ripper shanks and teeth

⚠ WARNING

Flying object!
Always wear eye or full face protection when performing this procedure.
Failure to comply could result in death or serious injury.

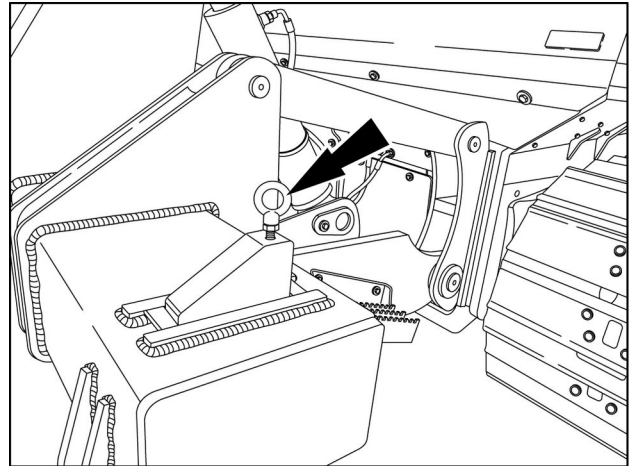
W0313A

Ripper shanks or ripper teeth may require periodic replacement. Use care when lifting heavy objects. Always use adequate lifting equipment.

Prior operation:

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

1. The ripper shanks have a threaded orifice for lifting. Insert an I-bolt of adequate size when changing ripper shanks.



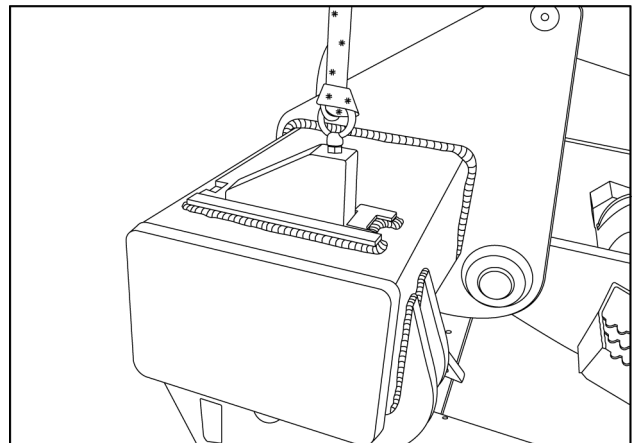
RAIL12DOZ0371AA 1

2. ⚠ CAUTION

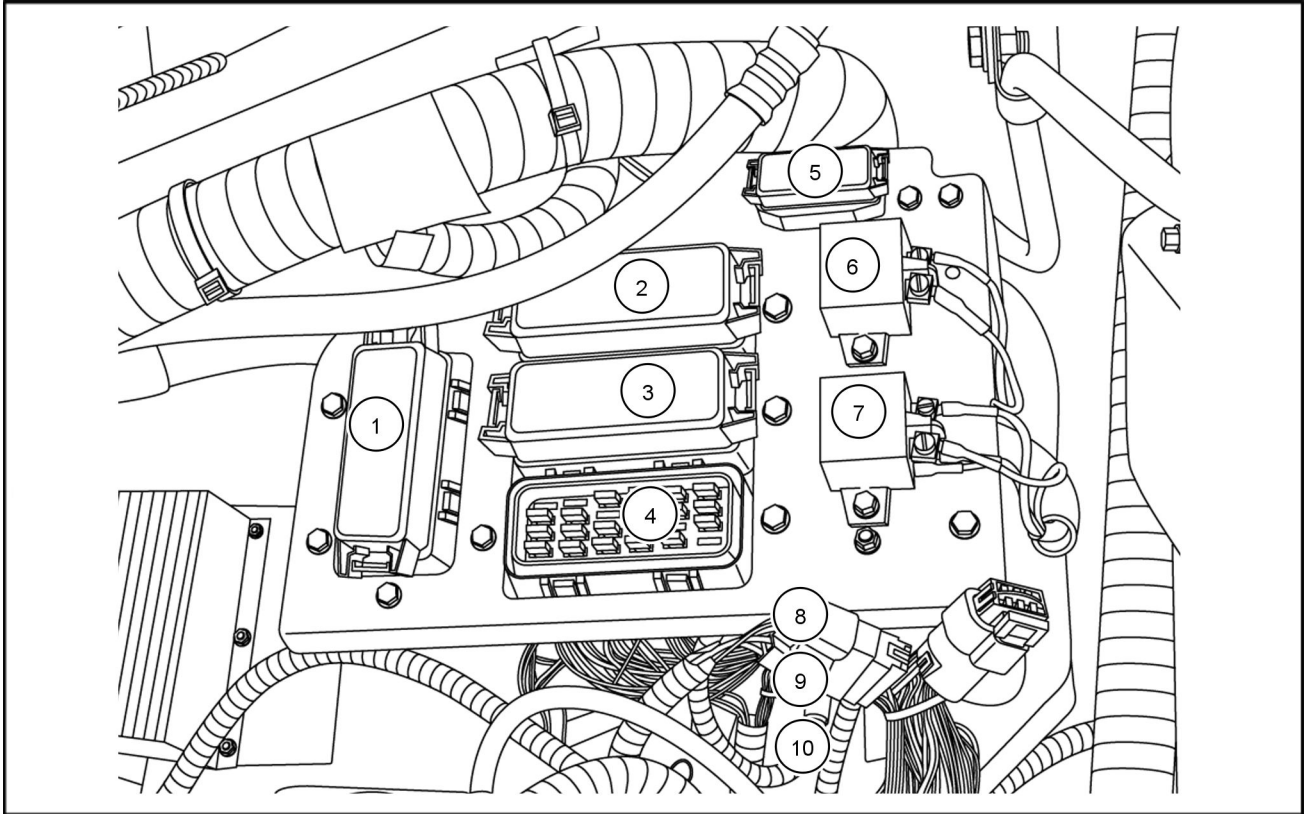
Heavy object!
The component is heavy. Use care not to drop the component when installing, removing, or handling.
Failure to comply could result in minor or moderate injury.

C0095A

Use proper and adequate lifting equipment and lift the ripper shanks.



RAIL12DOZ0370AA 2



RAIL12DOZ1024FA 2

General specifications

NOTE: All specifications are given according to SAE standards or recommended practices where the specification applies.

Engine	
Make and Model	F4HFA613N*E002
Firing order	1-5-3-6-2-4
Bore and stroke	104 mm x 132 mm (4.09 in x 5.20 in)
Displacement	6.7 l (409 in³)
Compression ratio	17:1
Horsepower, Max, Rated Gross @ 2200 RPM	173 kW (231.9 Hp)
Torque, Max, Peak gross @ 1500 RPM	1082 N·m (798 lb ft)
Engine speeds	
High idle	2200 RPM +/- 50 RPM
Rated speed	2200 RPM
Low idle	800 RPM +/- 25 RPM
Engine gradeability	Fore and aft: 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)
Speed reverse	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 - make	Rexthroth
Transmission - type	Dual path hydrostatic
Pumps - model	A4VG145
Pumps - type	Variable axle piston
Pumps displacement	145 cm³
Motors - model	A6VM280, series 71
Motors - type	Variable bent axis
Motors - displacement	280 cm³
Transmission - filter type	4 micron at beta 75 replaceable with 100 mesh suction screen
Brakes	
Steering brakes	Hydrostatic
Parking brakes	Spring applied pressure released
Final drive	
Final drives	2 helical gear reduction with planetary output reduction
Final drive ratio	48.75:1
Fuel System	
Fuel injection system	Electronic
Primary fuel filter rating	10 micron replaceable cartridge
Secondary fuel filter rating	30 micron replaceable cartridge
Electrical system 24 Volt	
Batteries	Two 12 V batteries standard/in series
Capacity	1200 A (90 second diesel rating) 90 second AMPS at -17.8 °C (0.0 °F) to 1.0 V
Alternator	Attached regulator 24 V / 120 A
Starter motor	7.5 kW solenoid

NOTE: Travel Speed and Track Pull are with CLT chain. If the machine is equipped with CELT, chain speed will increase by 4 % and track pull will be reduce by 4 %. Actual track pull may differ from the calculated value because of relief valve tolerances and drive line efficiencies.

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