OPERATOR'S MANUAL

L213 L220
L216 L221
L218 L228
Tier 4B (final)
200 Series Skid Steer Loader

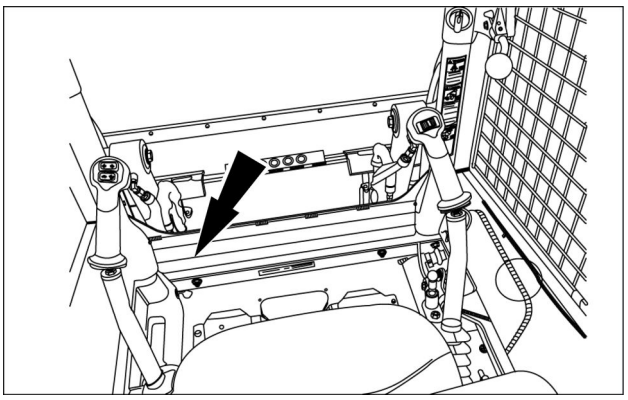
C227
C232
Tier 4B (final)
200 Series Compact Track Loader

Part number 47852728
2nd edition English
April 2015
Replaces part number 47683885

NEW HOLLAND CONSTRUCTION

Roll Over Protective Structure (ROPS) certification plate.

- Front edge (lower) inside cab.



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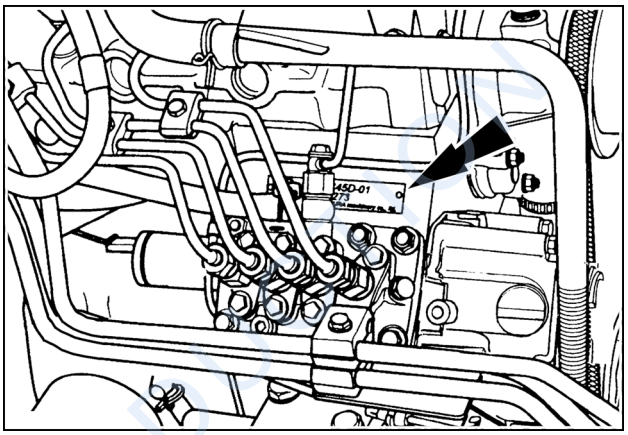
Engine serial number plate location for Models L213 and L216

- On the fuel injection pump.



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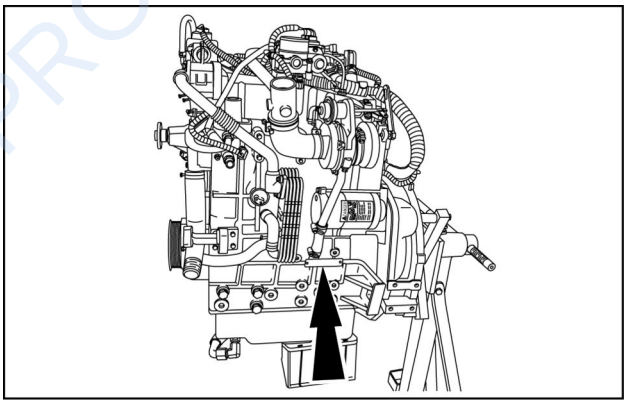
Engine serial number plate location for Models L218 and L220

- On the right-hand side of the engine.



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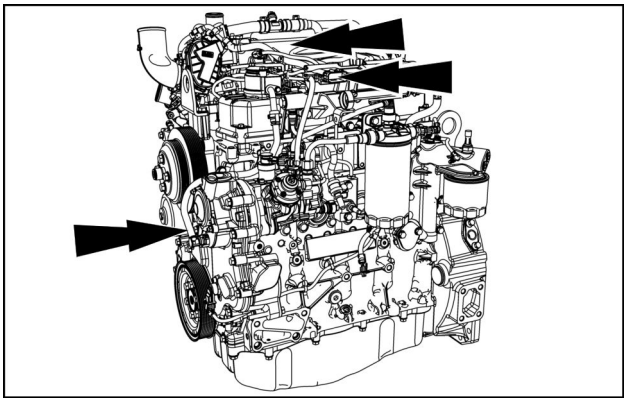
Engine serial number plate location for Models L221, L228, C227, and C232

- On the side of the Exhaust Gas Recirculation (EGR) cooler.
- On top of the valve cover.
- The serial number is also stamped on the engine front cover.



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Any warranted part that is not scheduled for replacement, as required maintenance shall be warranted for the warranty period defined above. If any such part fails during the period of warranty coverage, it will be repaired or replaced under warranty. Any such part repaired or replaced under the warranty shall be warranted for the remaining warranty period.

Any warranted part that is scheduled only for regular inspection in the written instructions shall be warranted for the warranty period defined above. A statement in the written instructions to the effect of "repair or replace as necessary" shall not reduce the period of warranty coverage. Any such part repaired or replaced under warranty shall be warranted for the remaining warranty period.

Any warranted part that is scheduled for replacement, as required maintenance shall be warranted for the period of time prior to the first scheduled replacement point for that part. If the part fails prior to the first scheduled replacement, the part shall be repaired or replaced by the engine manufacturer under warranty. Any such part repaired or replaced under warranty shall be warranted for the remainder of the period prior to the first scheduled replacement point for the part.

Repair or replacement of any warranted part under warranty shall be performed at no charge to the owner at a warranty station.

ISM provides warranty services or repairs at all manufacturer distribution centers (warranty stations) that are franchised to service the subject engines. Please see the Customer Assistance section of this statement for help in locating such service centers.

The owner will not be charged for diagnostic labor that leads to the determination that a warranted part is in fact defective, provided that such diagnostic work is performed at a warranty station.

ISM is liable for damages to other engine components proximately caused by a failure under warranty of any warranted part.

ISM is required by California regulations to maintain a supply of warranted parts sufficient to meet the expected demand for such parts during the warranty period for the engines covered by this warranty.

OWNER'S WARRANTY RESPONSIBILITIES:

This engine is designed to operate on ultra-low sulfur diesel fuel only if rated >19kW, and on low sulfur or ultra-low sulfur diesel fuel only if rated <19kW. Use of any other fuel may result in this engine no longer operating in compliance with California's emissions requirements.

The purchaser is responsible for initiating the warranty process. The California Air Resources Board suggests that the engine be presented to an ISM dealer as soon as a problem exists. The warranty repairs should be completed by the dealer as expeditiously as possible.

Add-on or modified parts, as defined in Section 1900(b)(1) and (b)(10), Title 13, that are not exempted by the Air Resources Board may not be used. The use of any non-exempted add-on or modified parts shall be grounds for disallowing a warranty claim made in accordance with this article. The engine manufacturer shall not be liable under this article to warrant failures of warranted parts caused by the use of a non-exempted add-on or modified part.

The emissions control parts covered by this Emission Control System Warranty are listed under "What is Covered By the Emission Warranty." As the off-road engine owner, you are responsible for the performance of the required maintenance listed in your owner's manual. ISM recommends that you retain all receipts covering maintenance on your off-road engine, but ISM cannot deny warranty solely for the lack of receipts or for your failure to ensure the performance of all scheduled maintenance.

As the off-road engine owner, you should however be aware that ISM may deny you warranty coverage if your off-road engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.

Customer Assistance

In the event that you do not receive the warranty service to which you believe you are entitled under the Emission Control System's Warranty, you should contact ISM at the address below for assistance. If you need additional assistance or information concerning the Emission Control System Warranty, contact:

IHI Shibaura Machinery Corporation

Quality department

Proper entry and exit

⚠ WARNING

Crushing hazard!
Do not enter or exit the operator's compartment while the loader arms are raised or unsupported. Rest the loader arms on the ground or verify that loader arm is being supported by the loader arm strut or loader arm lock pin before entering or exiting the operator's compartment.
Failure to comply could result in death or serious injury.

W1365A

⚠ WARNING

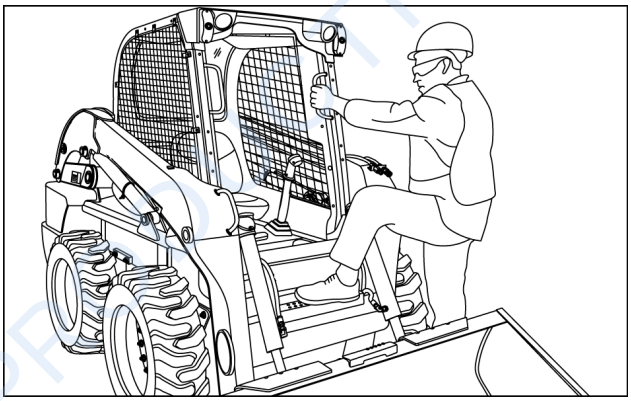
Fall hazard!
Jumping on or off the machine could cause an injury. Always face the machine, use the handrails and steps, and get on or off slowly. Maintain a three-point contact to avoid falling: both hands on the handrails and one foot on the step, or one hand on the handrail and both feet on the steps.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

W0141A

Enter the machine

NOTE: *Always maintain three-points of contact with the machine at all times while entering the operator's compartment.*

1. Face the cab entry point.
2. If applicable, open the cab door.
3. Hand holds are provided on the loader arm, front cab posts, or on the inside of the cab door. Grab the hand holds.
4. Place one foot on the loader arm coupler step or on the bucket step.



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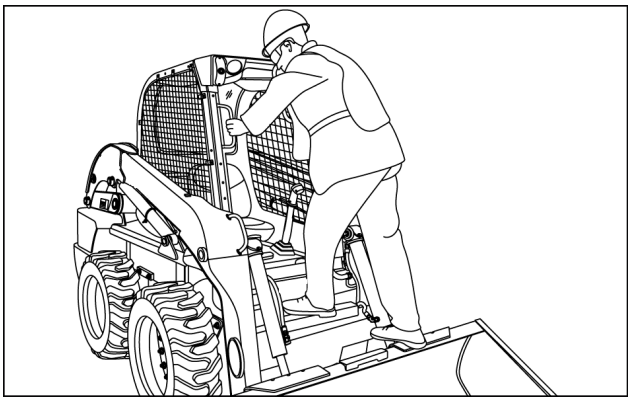
5. Pull your self up, face the machine, and stand on the step(s).
6. Position your hands so that you are comfortable with stepping into the cab.
7. Place one foot into the center area of the cab. A step area is provided between the foot pedals, if equipped.
8. Step into the cab, turn your body, and sit in the operator's seat.



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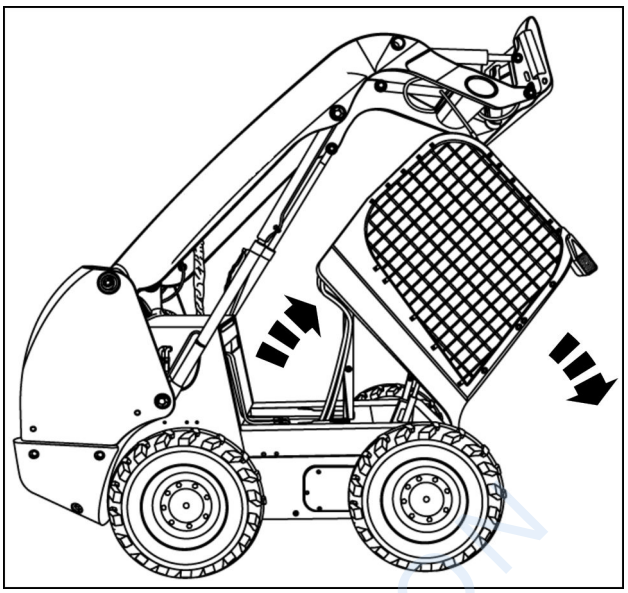
2. Pull on the hand holds at the front of the machine until the cab is completely tilted forward.



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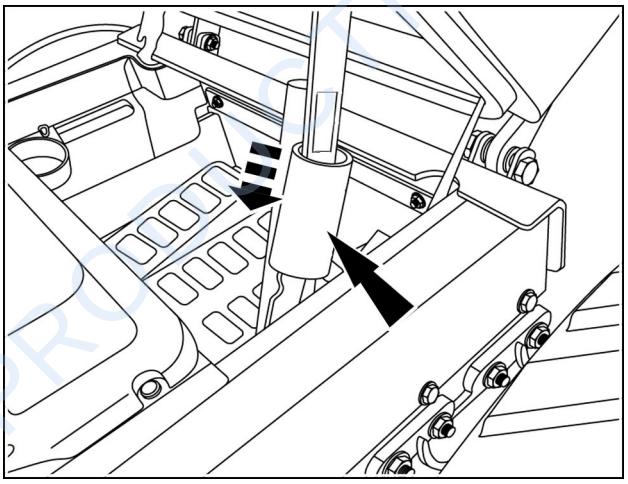
3. Confirm that the red lock tube has lowered over the cab pivot linkage. If it has the cab tilt position is now secure.



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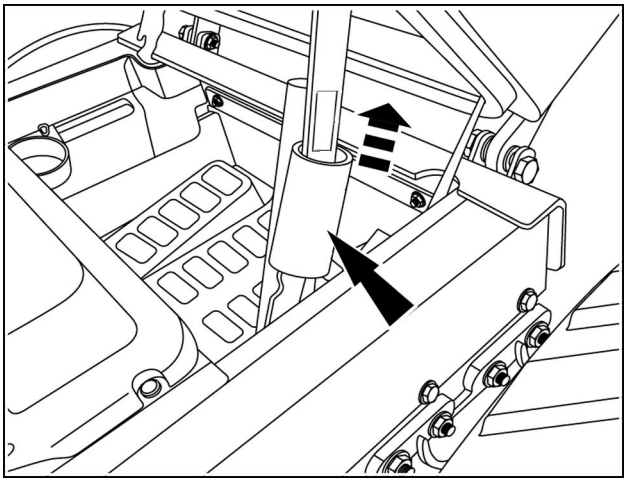
Tilt and secure the cab for machine operation

1. Raise the red lock tube exposing the cab pivot linkage.
2. Push the cab backward into the operation position.



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WARNING
DO NOT use ether. Failure to comply could result in death or serious injury.

Quantity: 1
84535230

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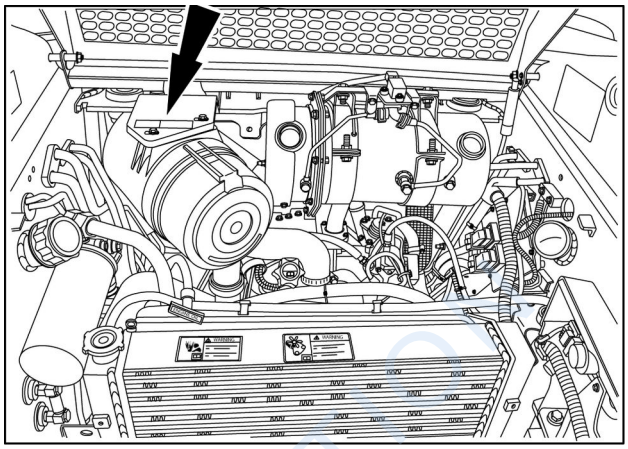
Location:
On top of the air cleaner bracket. Models L213 and L216 only.



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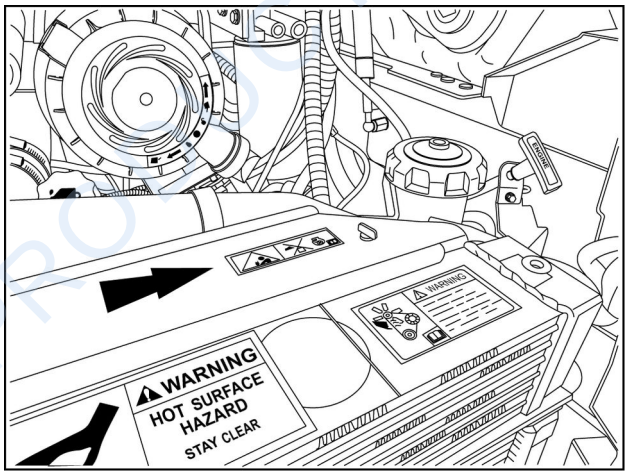
Location:
On the shroud access plate. Models L218, L220, L221, L228, C227, and C232 only.



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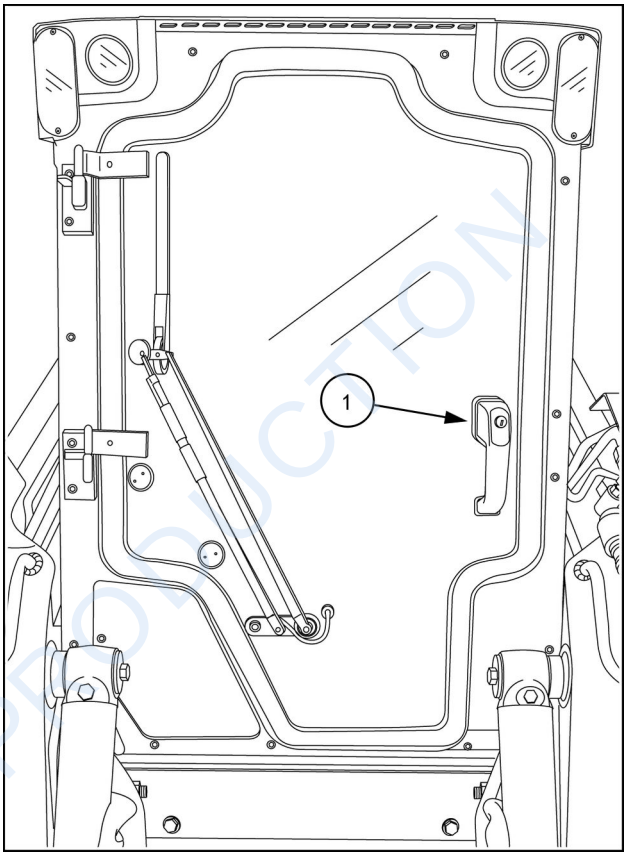
3 - CONTROLS AND INSTRUMENTS

ACCESS TO OPERATOR'S PLATFORM

Door latches, cab

Exterior door latch

Push on the knob **(1)** to release the door for entry. The starter switch key may be used to lock the door.



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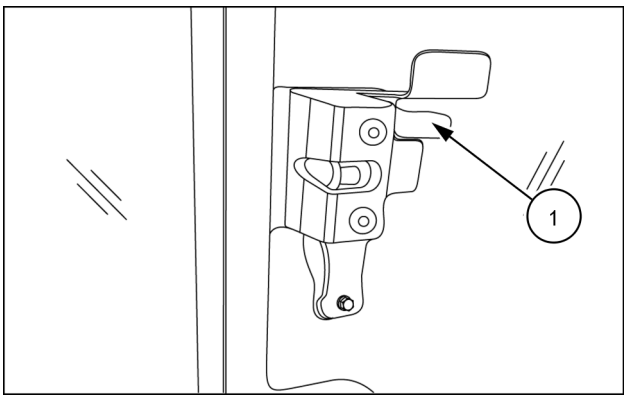
Interior door latch

Push on the lever **(1)** to release the door latch and open door.

NOTICE: *Do not raise or lower loader lift arm until you have confirmed the door is fully closed. Damage may occur to the door assembly.*



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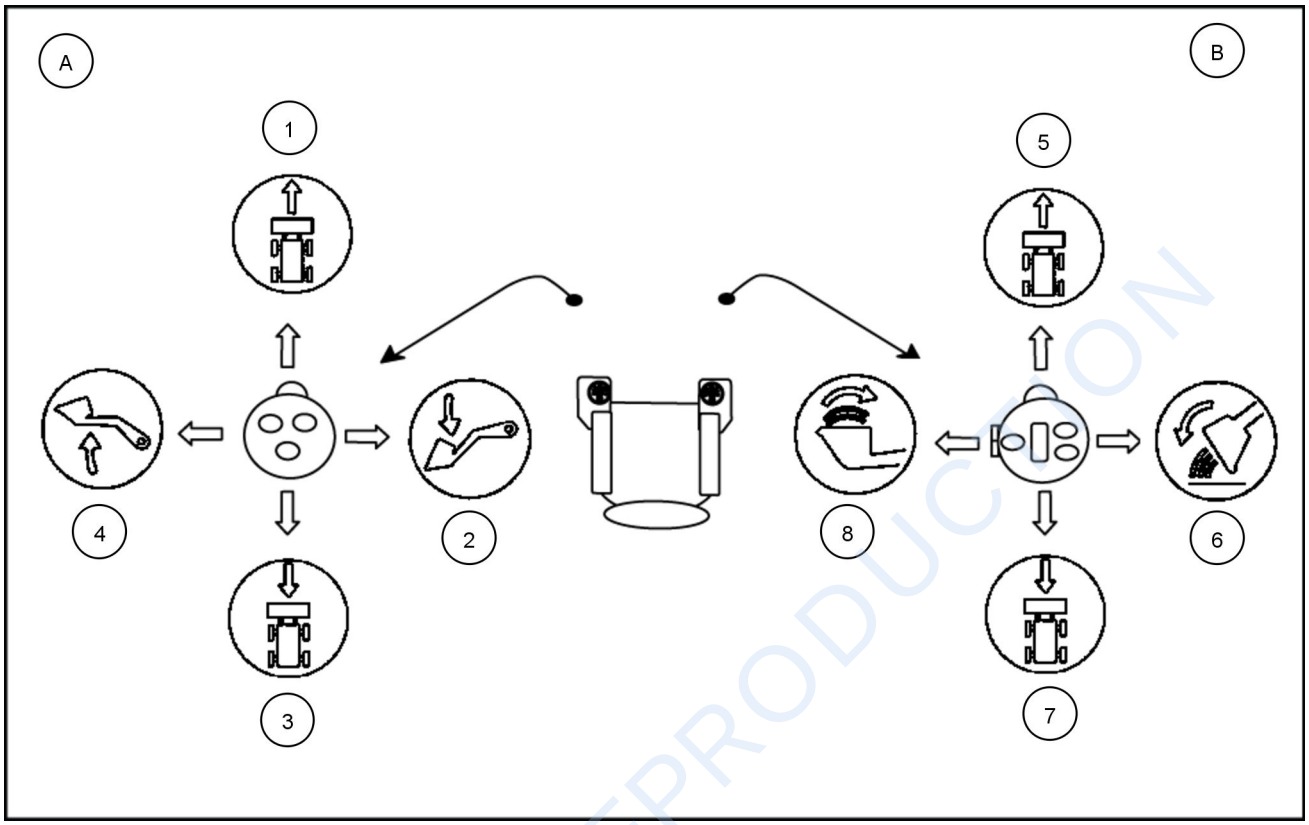
ELECTRO-HYDRAULIC CONTROLS

Control pattern overview

Standard H control pattern



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The chart below will give a description of the control lever functions. The left-hand control lever is represented by the letter (A) and the right-hand control lever by letter (B).

(A) Left-hand control lever	
(1)	Left side drive forward.
(2)	Loader arm lower.
(3)	Left side drive reverse.
(4)	Loader arm raise.

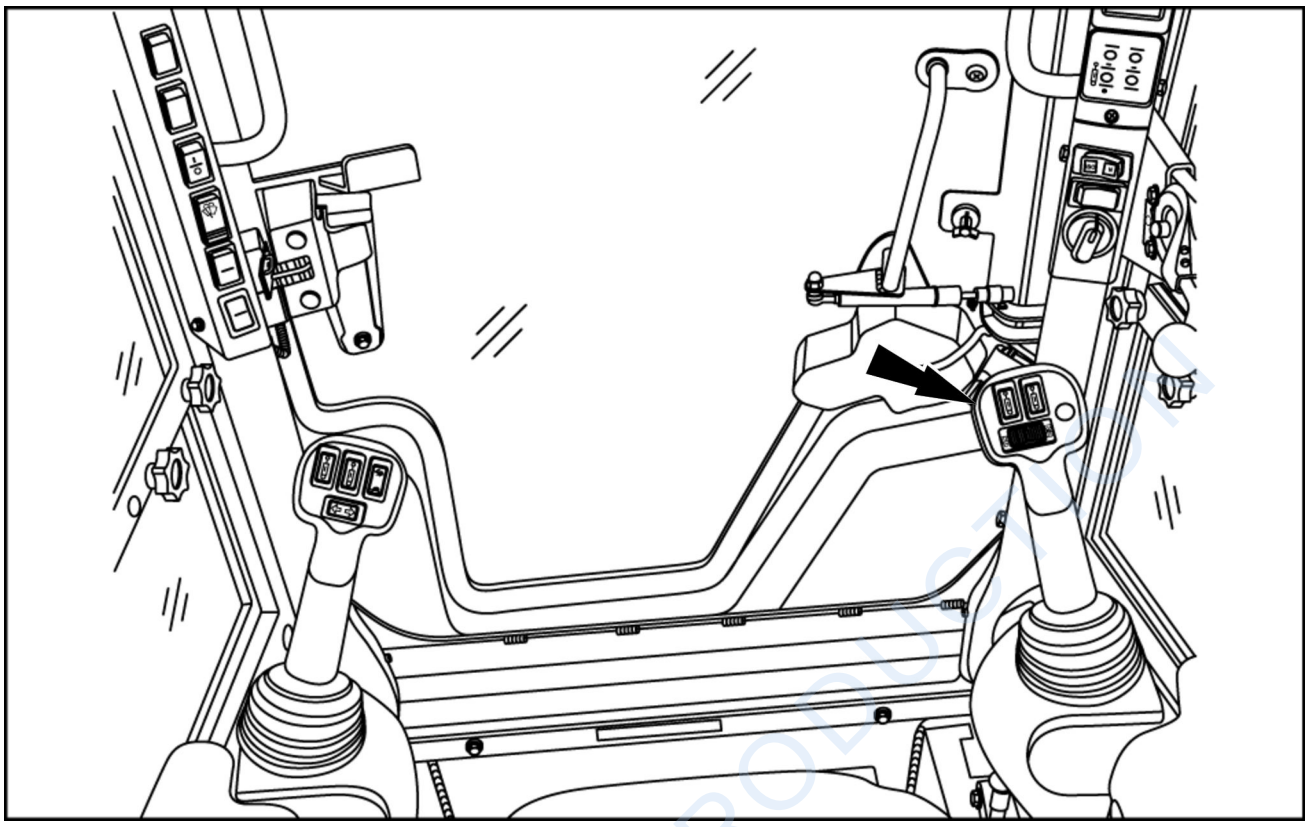
(B) Right-hand control lever	
(5)	Right side drive forward.
(6)	Bucket dump.
(7)	Right side drive reverse.
(8)	Bucket rollback (curl).

NOTE: *The standard H control pattern uses both left-hand and right-hand control levers for ground drive functions.*

NOTICE: *Do not operate the unit until the hydraulic oil is at sufficient operating temperature.*

ISO control pattern lift arm and bucket controls

Lift arm and bucket controls



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The right-hand control lever operates the lift arm and bucket.

Lift arm raise and lower control.

- Pull back on the right-hand control lever to raise (up) the lift arm.
- Push the right-hand control lever forward to lower (down) the lift arm.
- The lift arm spool is equipped with a detent FLOAT circuit. In this detent position the lift arm will float over changing ground contour and the lever will remain in this position until pulled back toward the up stroke slightly.

Engage the float feature:

Press the float button on the right-hand control lever and push the lever partially forward. If the operator has the right-hand control lever already partially in the down stroke position and then presses the float button, the float feature will engage.

Disengage the float feature:

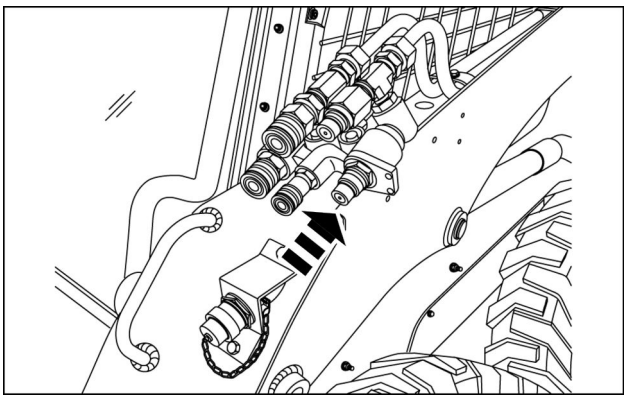
Pull back on the right-hand control lever out of the detent position.

Bucket dump and curl control.

- Pivot the right-hand control lever inward (down) and the bucket will roll back (curl).
- Pivot the right-hand control lever outward (up) and the bucket will dump.

NOTE: *There is no detent or float position on the bucket dump and curl circuit.*

Relieve pressure before disconnecting attachment hoses



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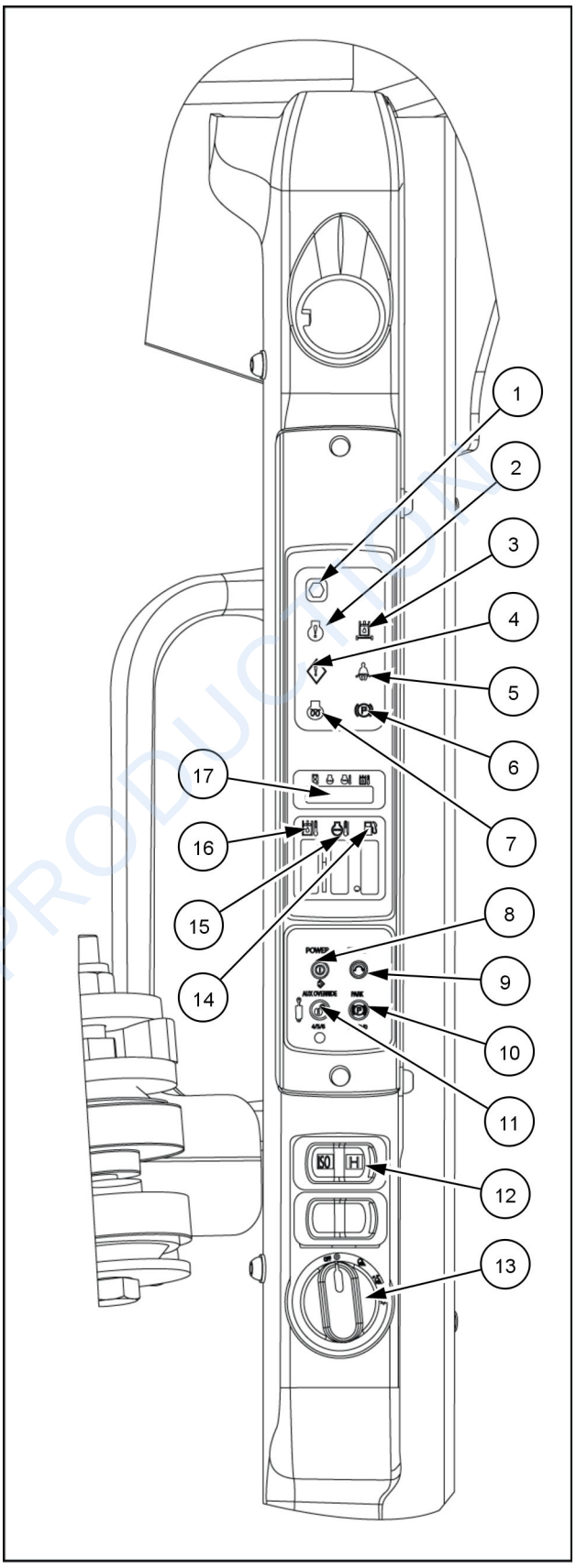
1. Lower the loader arm all the way down and ensure that the loader arm or attachment is not supporting the weight of the machine with the front wheels off the ground.
2. Place all controls in the neutral position.
3. Press the Operate button to deactivate the hydraulic system and ground drive system.
4. Stop the engine.
5. Move the controls to ensure that the hydraulic interlock is engaged and the loader arm and bucket cylinders do not move.
6. Unbuckle the seat belt and safely exit the machine.
7. Prior to disconnecting the 5/8 inch high flow attachment hoses, with the palm of your hand push one of the lower, 1/2 inch quick disconnect couplings towards the Connect-Under-Pressure (CUP) valve. When done properly, the coupling will move about **6 mm** (**0.25 in**), relieving any stored pressure in that circuit.
8. Repeat Step 7 on the other 1/2 inch coupling.
9. Disconnect the 5/8 inch high flow attachment hydraulic hoses from the quick disconnects.
10. Install the coupler covers, if equipped.

(1)	STOP
	Severe warning requiring immediate shut down, RED lamp will flash and audible alarm will sound.

(2)	ENGINE MALFUNCTION
	Yellow Lamp will flash when an engine fault is detected. Use the fault code that appeared in text display and reference it in the troubleshooting section of this manual.

(3)	HYDRAULIC SYSTEM MALFUNCTION
	Yellow Lamp will flash when a Hydraulic fault is detected. Use the fault code that appeared in text display and reference it in the troubleshooting section of this manual.

(4)	ELECTRONIC SYSTEM MALFUNCTION
	This yellow lamp will flash and the alarm will sound. Use the fault code that appeared in text display and reference it in the troubleshooting section of this manual.



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Setting controllability with Easy Electro-Hydraulic (EZ-EH)

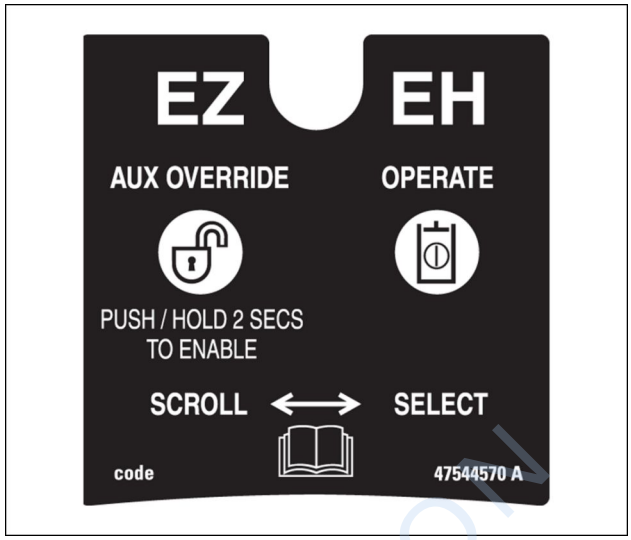
The Easy Electro-Hydraulic (EZ-EH) machines have the EZ-EH information sign located at the top of the instrument cluster on the right-hand column. The following instructions are for the shortcut to the Electro-Hydraulic (EH) setup. Use these settings to set the speed of the drive, lift, and tilt. Also the drive and loader arm settings.

All changes must be made with the hydraulics disabled and the operator in the operator's seat.

1. Press and hold the AUX OVERRIDE button **(1)** for two seconds to enter the EH shortcut menu.
2. SPEEd will display on the display **(2)**. Press the AUX OVERRIDE button **(1)** to select a different menu item (DRIVE, EXIT, HOUR, HOILT, COOLT, RPM, or CYCLE).
3. Press the OPERATE button **(3)** to enter the SPEEd menu. The current setting will be displayed.
4. Press the AUX OVERRIDE button **(1)** to change the SPEEd setting.
5. Press the OPERATE button **(3)** to save a new setting. If EXIT is selected, you will exit back to the top menu level.

   NOTE: *If a new setting is saved, SAVEd will be displayed and you will exit to the top level shortcut menu.*

The CTRL menu works the same as the above SPEEd menu.



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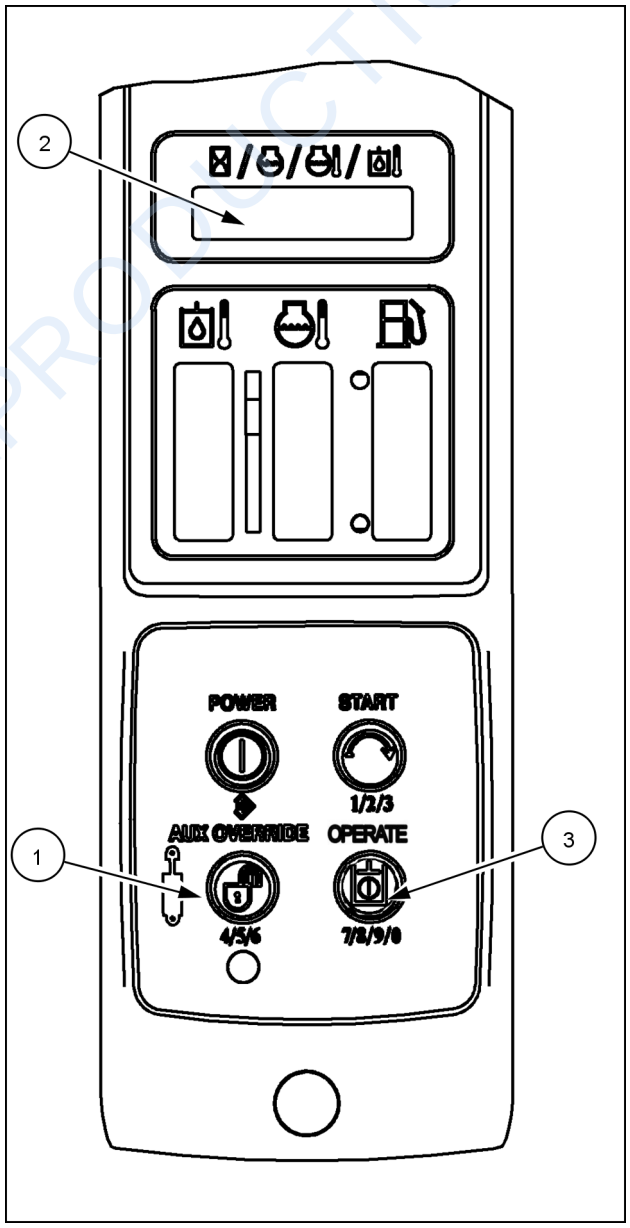


931002267 7

Creating codes

The panel cannot be locked until a code is created. The instrument panel has one owner code and up to ten user codes. The owner code will always unlock the panel. The owner code will be required to create or change user codes and to modify the owner code.

Owner code:

Once in the SETUP menu, press the START button to move to the LOCK menu. Press the POWER button to enter the LOCK menu.

To create an owner code:

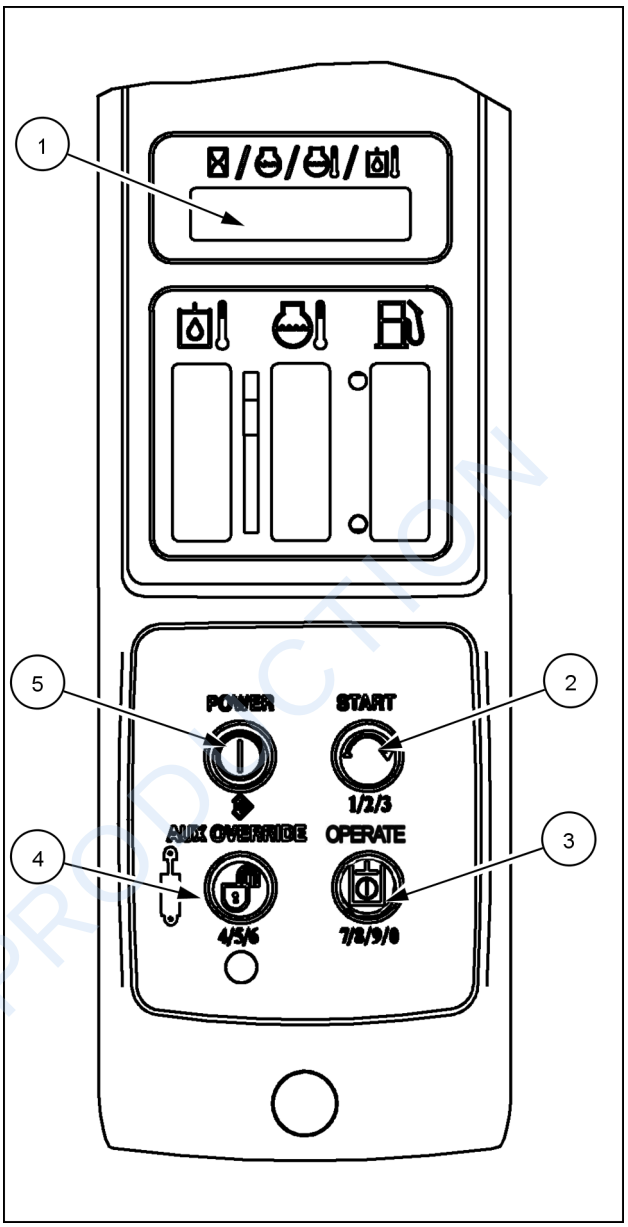
If no owner code exists, the display will show the word OWNCR (Owner Create), followed by 00000 . Write down the planned 5 digit code or use a code you already know.

NOTICE: *Once the code is created, the panel cannot be unlocked without the code. If the panel cannot be unlocked, contact your Dealer.*

1. Enter code by using multiple presses of the START button **(2)**, AUX OVERRIDE button **(4)**, and OPERATE button **(3)**. Press the POWER button **(5)** to save each digit and move to the next.

   NOTE: *For numbers 1, 2, 3 use the START button. For numbers 4, 5, 6 use the AUX OVERRIDE button. For numbers 7, 8, 9, 0 use the OPERATE button.*

2. Press the POWER button **(5)** after the fifth digit to enter the code. The engine preheat lamp will illuminate and the display will begin the thirty second countdown.
3. Press the START button **(2)** to move to the exit menu, and press the POWER button **(5)** to exit the “Setup” menu. The panel is not locked at this point.



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STARTING THE UNIT

Engine operation

⚠ DANGER

Improper operation or service of this machine can result in an accident.
Do not operate this machine or perform any lubrication, maintenance, or repair on it until you have read and understood the operation, lubrication, maintenance, and repair information.
Failure to comply will result in death or serious injury.

D0010A

⚠ WARNING

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

W0148B

⚠ 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

Walk-around inspection

Each day before you start the engine:

- Check for leaks under the machine.
- Check tire condition and pressure or track condition.
- Check the machine, equipment and attachments for wear, damaged, or missing parts.
- Check the machine for debris, especially around the radiator and engine area. Make sure these areas are clean.
- Clean or replace any safety or instructional signs that can not be read.
- Clean the steps, hand rails, and operator compartment. Remove any loose items in the operator's compartment.
- See the maintenance chart in this manual and do all the items under **10 h**.

Engine speed

NOTICE: *Prevent damage to the turbocharger. If the engine stalls during normal operation, immediately return the throttle to idle before restarting.*

NOTE: *This machine is not intended to be driven on public roads or highways. Contact your local and regional authorities before operating this machine on public roads or highways.*

NOTICE: *DO NOT run the engine at idle speed for more than **3 h**. This can cause a low operating temperature, which can cause acids and deposits in the engine oil, and in the Diesel Particulate Filter (DPF). It is recommended that you run the engine at full throttle when operating conditions permit and when safe.*

Lifting the machine with a four-point lifting device

⚠ WARNING

Heavy objects!
Lift and handle all heavy components using lifting equipment with adequate capacity. Always support units or parts with suitable slings or hooks. Make sure the work area is clear of all bystanders. Failure to comply could result in death or serious injury.

W0398A

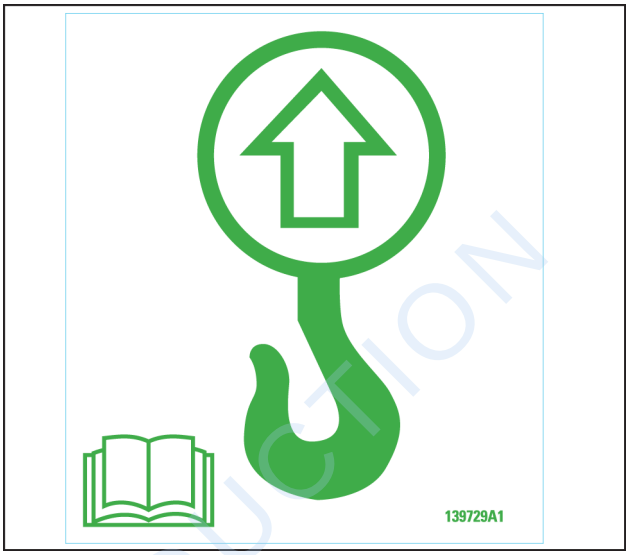
NOTICE: *Only personnel with heavy machine lifting experience should attempt lifting the machine. Contact your dealer for assistance.*

These machines are designed for a four-point lifting device. Use only lifting equipment with a rated capacity to handle the weight of the machine model being lifted. The lifting equipment weight must be added.

1. Remove any and all attachments before lifting the machine.
2. Use the two front lift points and the two rear lift points (one on each side).

NOTICE: *To prevent damage to the cab, synthetic slings must be used for the front lift points.*

Use the correct sling lengths to ensure the proper lift hook point above the cab is maintained for a level machine lift.



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The following precautions must be followed when craning (lifting or lowering) a machine.

- Only attach suitable lifting equipment to the machine at the designated lift points identified with the decal shown.
- Never allow personnel on the machine while craning.
- Secure suitable lifting equipment to the designated lift points using hooks or shackles with the proper capacity rating.
- Remove attachments before craning.
- Use only properly rated lifting devices.
- The weight of the lifting equipment must be added to the machine weight for the proper lift capacity requirement.
- Always inspect the lifting equipment to confirm safe condition. DO NOT use if worn or damaged.
- Do not attach lifting devices to the loader arms or attachments on the machine.
- Make sure that the loader arms are in the lowest position.
- Make sure that the engine is off and parking brake is engaged before craning.
- Keep bystanders a safe distance away from the machine while craning.

RECOVERY TRANSPORT

Moving a disabled machine

⚠ WARNING

Loss of control!
Only tow at safe speeds. Use caution when making corners or meeting traffic.
Failure to comply could result in death or serious injury.

W0126A

NOTICE: *Towing the machine is not recommended. If your machine is disabled, you must make a judgment if the machine can be moved without more damage. If possible, repair the machine at the job site. This machine may be severely damaged if towing or moving is attempted incorrectly. Contact your dealer if the machine is disabled.*

Digging

⚠ WARNING

Loss of control hazard!
Travel speed should be such that complete control and machine stability is maintained at all times. Where possible, avoid operating near ditches, embankments and holes. Reduce speed when turning, crossing slopes, and on rough, slick, or muddy surfaces.
Failure to comply could result in death or serious injury.

W0233A

⚠ WARNING

Tip-over hazard!
Raising an overloaded bucket could cause an accident. If this situation should occur, and the machine should start to tip forward, IMMEDIATELY lower the lift arms.
Failure to comply could result in death or serious injury.

W0255A

⚠ WARNING

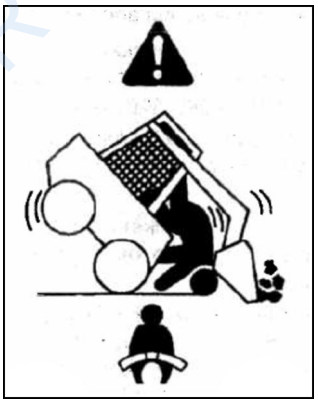
Loss of control hazard!
A full bucket in the raised position may cause the machine to slide when operating over rough ground. Keep the bucket as low as possible during operation for better stability and visibility. Always operate the machine at slow speeds over rough ground.
Failure to comply could result in death or serious injury.

W0271A

⚠ WARNING

Collision hazard!
Always make sure the area behind the machine is clear of all persons, animals, and obstructions BEFORE backing up.
Failure to comply could result in death or serious injury.

W0232A



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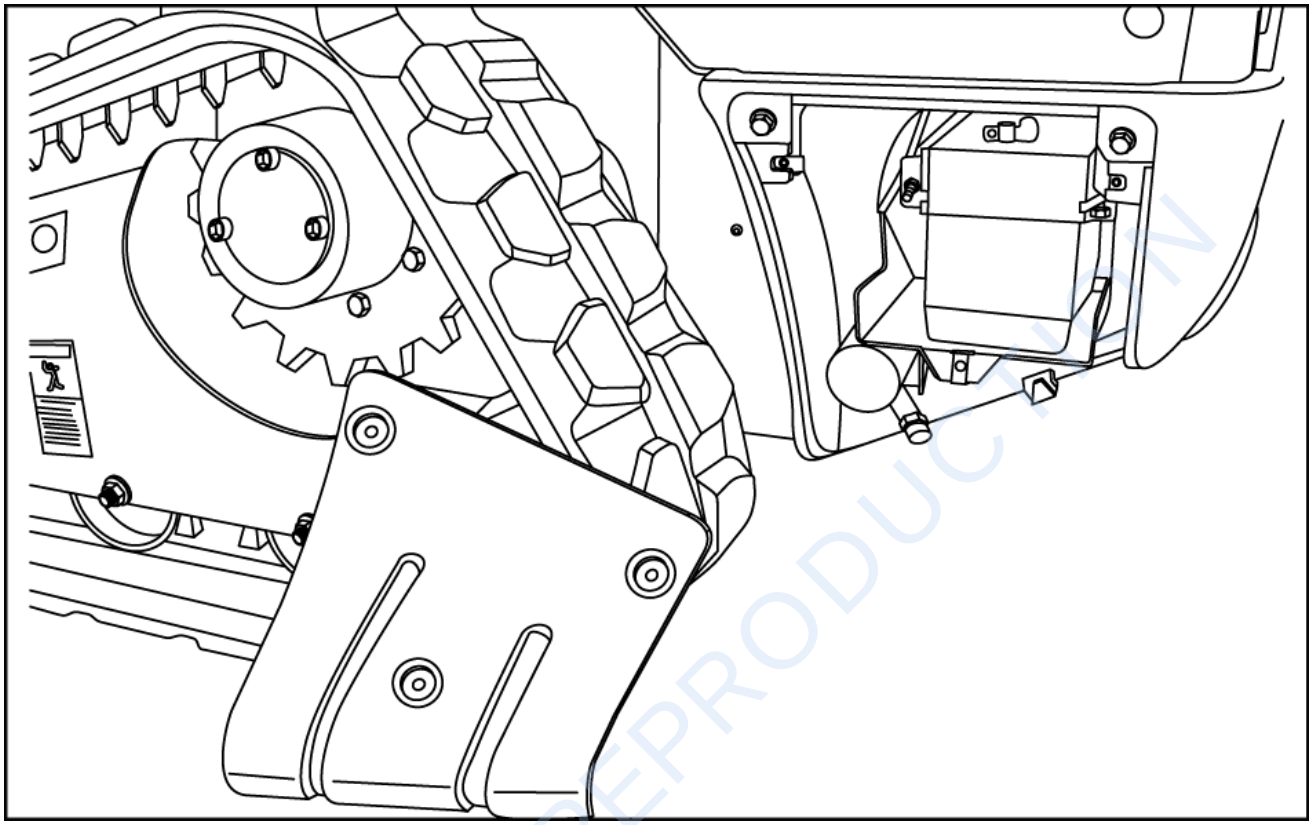
When digging with the machine, remove a thin layer with each pass. This method is efficient and minimizes wheel slippage. When encountering firmly packed materials, flutter the bucket control valve to assist penetration.

NOTE: *If the engine pulls down as the machine is engaging a load, the directional controls are being held to far in the direction of travel. Maximum torque is obtained at minimum ground speed in low range for all machines.*

⚠ 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



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Check the battery as required, for dirt corrosion and damage. Dirt mixed with electrolyte or moisture on the top of the battery can cause a discharged condition in the battery. Clean the battery by using baking soda or ammonia and flush the outside of the battery with water. Spray the battery terminals with battery terminal protector. DO NOT use grease.

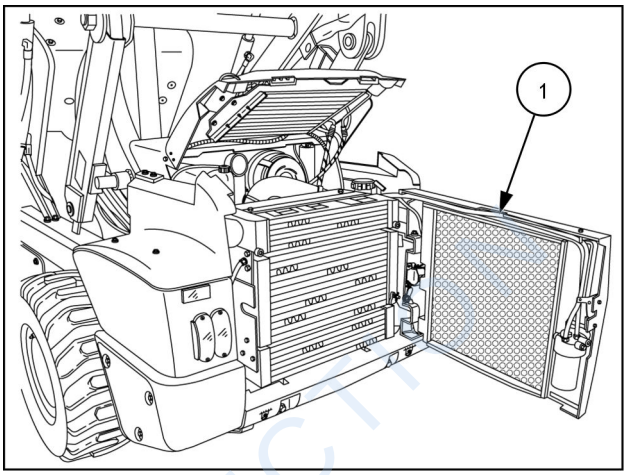
Lubrication and maintenance access

1. Open the engine compartment hood by pivoting upward.
2. Lift up on the latch tab to open the rear service door.

NOTE: *This style hood may be locked with a padlock.*

The open engine hood and rear access door **(1)** will allow the operator or technician to:

- Check the engine oil.
- Access engine oil fill.
- Add fuel.
- Check radiator and hydraulic oil coolers (fill, drain and clean debris).
- Check and clean the coolant reservoir.
- Service both fuel filters (in-line and spin on element water separator) drain water from spin on filter element canister
- Service the hydraulic filter.
- Service the air filters.
- Access hydraulic oil fill.
- The drive belts.
- The alternator.



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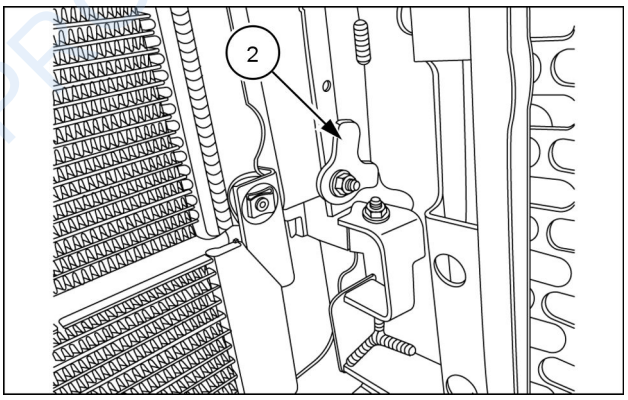
Always lock the rear access door open when servicing or monitoring components, pivot latch **(2)** down to lock.



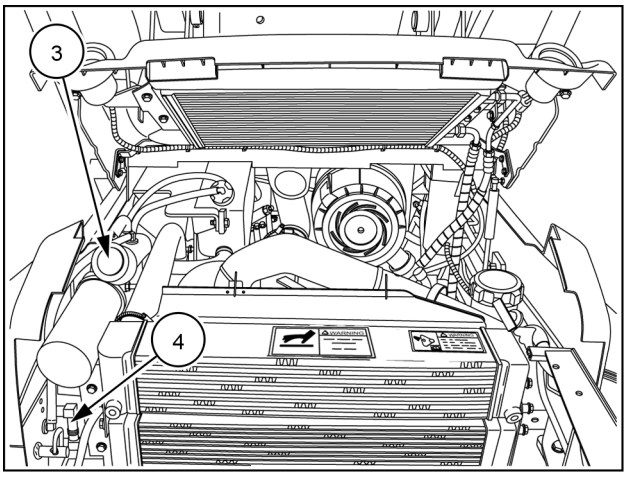
93106878 2

Open the rear service door. The following may be accessed:

- Hydraulic oil fill **(3)**.

NOTE: *If the hydraulic oil fill cap is to be removed, wipe clean before removing to prevent hydraulic system contamination.*

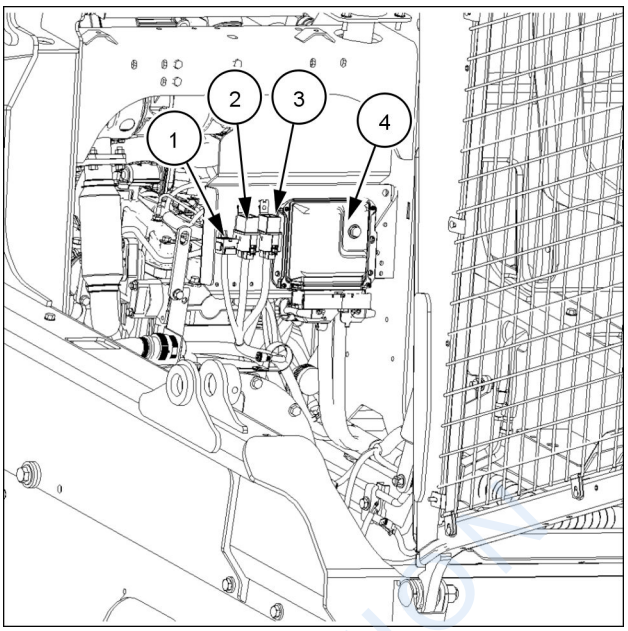
Hydraulic oil level indicator sight glass **(4)**.



RAPH12SSL0024BA 3

L218 and L220 Engine Control Unit (ECU) and relay identification

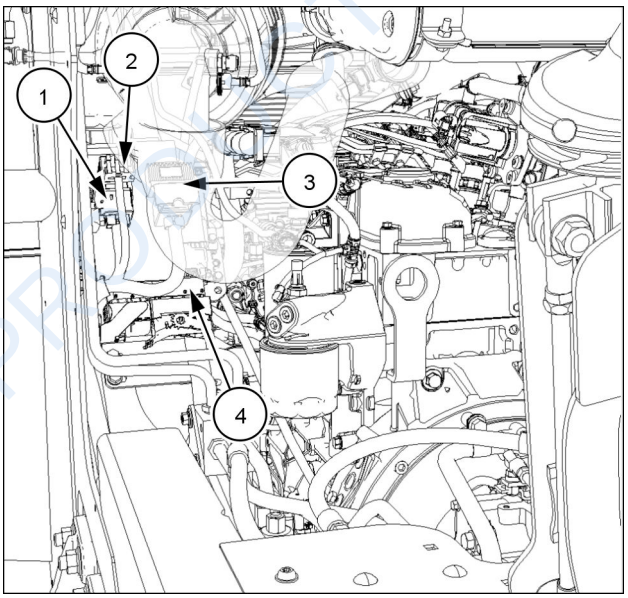
- Flasher relay **(1)** (if equipped with a turn signals)
- Engine Control Unit (ECU) relay **(2)**
- Glow-plug Control Unit (GCU) **(3)**
- Engine Control Unit (ECU) **(4)**



RAIL15SSL0102BA 14

L221 and C227 Engine Control Unit (ECU) and relay identification

- Engine Control Unit (ECU) relay **(1)**
- Flasher relay **(2)** (if equipped with a turn signals)
- Glow-plug Control Unit (GCU) **(3)**
- Engine Control Unit (ECU) **(4)**



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Hydraulic oil level

Check the hydraulic reservoir oil level daily, before beginning operation or every 10 hours of operation. Check the level with the lift arms down on the ground and hydraulic oil cold.

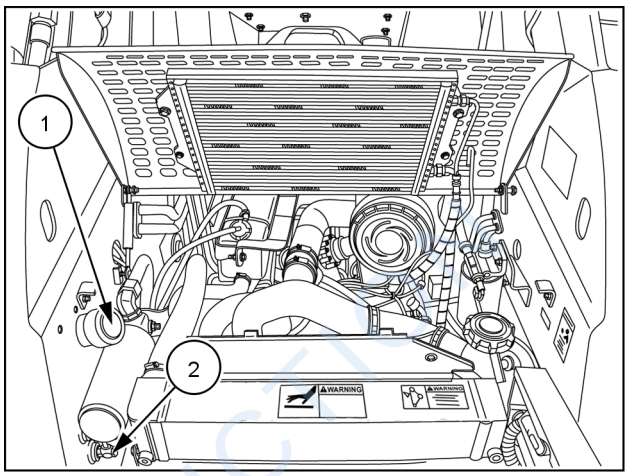
Hydraulic reservoir oil check

NOTICE: *When servicing the reservoir it is important to prevent contamination. Clean the components and all areas around the components to help reduce the risk of contamination.*

1. Park the machine on a firm, level surface with safe access all around.
2. Lower the lift arms down on the ground.
3. Lift engine compartment hood and open the rear access door, and engage lock. Locate the hydraulic oil fill cap **(1)** and the hydraulic oil level **(2)**. See Figure 1 for radial machines and Figure 2 for vertical machines.
4. Check the fluid level. The oil level should be within the middle one third of the sight glass **(2)**.
5. If oil needs to be added:
   A. Clean the filler cap and the area around the cap to reduce the risk of contamination.
   B. Slowly turn the filler cap counterclockwise but DO NOT remove the cap until pressure is relieved.
   C. Remove the filler cap and add oil as required.
   D. Watch the site glass for proper level.
   E. Replace the cap.

NOTE: *Always remove the filler cap slowly.*

NOTICE: *Use the proper hydraulic oil when topping off or changing oil. Refer to the chart, Figure 3, for oil recommendations.*



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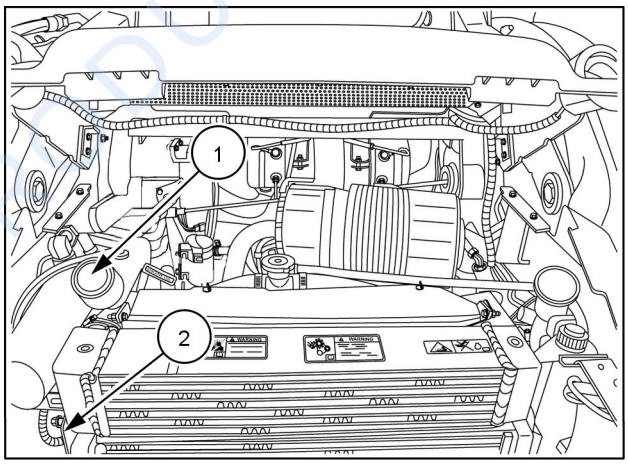

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NOTE: *Top image is applicable to L213, L216, L218, and L220 machines. The lower image is applicable to L221, L228, C227, and C232 machines.*

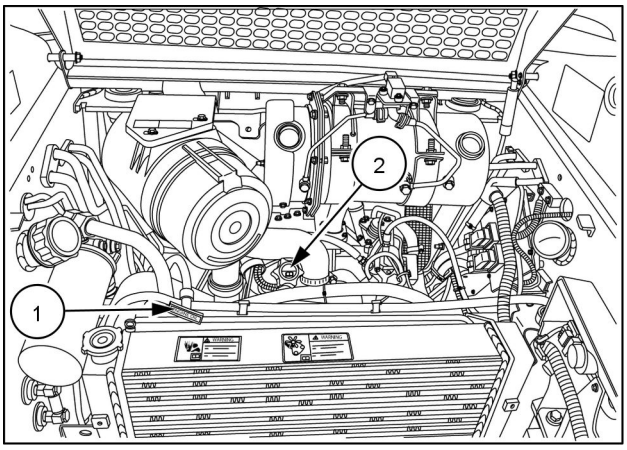
11. Remove the engine oil dipstick **(1)** to provide crankcase ventilation.

NOTICE: *Slowly fill to avoid flooding the valve cover with oil.*

12. Use an oil spout that is smaller than the engine oil fill neck **(2)**, allowing air to pass around the oil fill neck. Slowly add the correct type and quantity of oil, see the oil table below.

NOTE: *Keep the oil fill spout in the upper half of the oil fill neck.*

13. Install the engine oil fill cap.
14. Install the engine oil dipstick.
15. Start the engine and run at idle speed. Check the engine oil filter and drain plug for leaks. After **2 min**, stop the engine, wait for **2 - 3 min** and check the engine oil level.
16. Install access cover and secure with bolts
17. Close rear access door and engine hood.
18. Dispose of the oil in accordance with the local regulations. DO NOT drain onto the ground or into a drain. BE RESPONSIBLE TO THE ENVIRONMENT.



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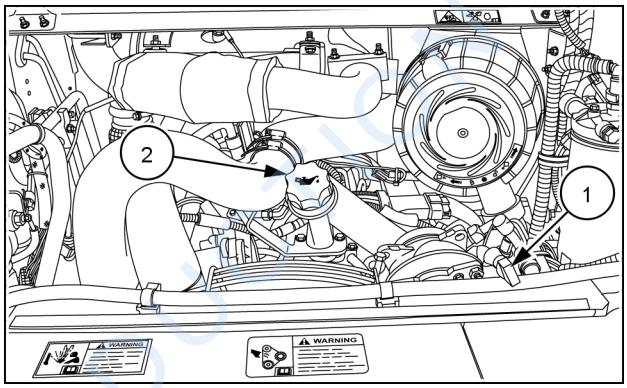

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Engine crank case oil

Capacity - with filter change	
L213, L216, L218, L220	**7 L (7.5 US qt)**
L221, L228, C227, C232	**8.5 L (9.0 US qt)**
Specifications	**NEW HOLLAND AMBRA UNITEK MASTERGOLD SBL CJ-4**

NOTE: *See the engine oil viscosity tables on page **7-12** for the recommended viscosity at ambient temperature ranges.*

Hardware - loose or damaged

Check the entire machine for hardware that is loose or damaged. Replace damaged hardware and use the proper torque values.

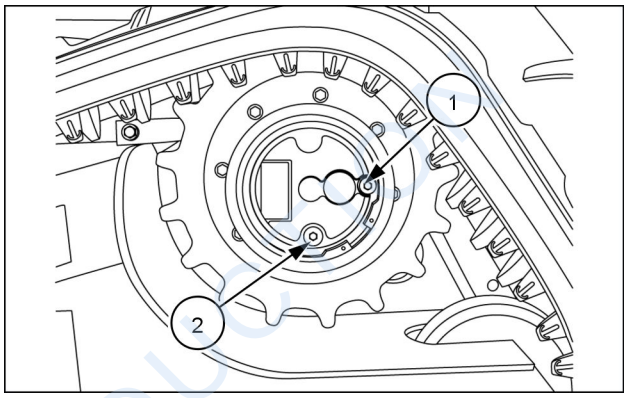
Final drive oil (track models)

The final track drive gear oil should be the initial **50 h**of operation and then every **500 h** of operation.

Final track drive gear oil specification – **TUTELA HYPOIDE EP GEAR LUBE SAE 80W-90**

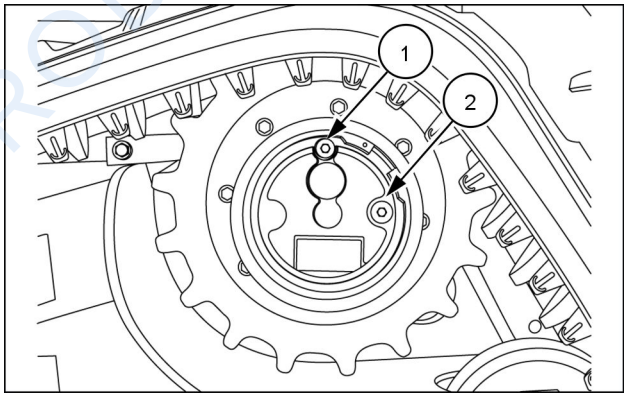
To change oil

1. Position the final drive hub so that one of the drain plugs **(2)** is in the 6:00 position as shown.
2. Remove drain plug **(2)** and let oil drain completely before replacing the drain plug.



931002652 1

3. Rotate the hub so one drain plug **(1)** is at the 12:00 position and the other plug **(2)** is at 3:00 or 9:00 position as shown.
4. Using a funnel, fill the track drive hub until oil starts to flow from **(2)** that is at 3:00 or 9:00 position.
5. Insert both plugs **(1)** and **(2)** and wipe any excess or spilled oil and repeat this procedure on the other side of the machine.

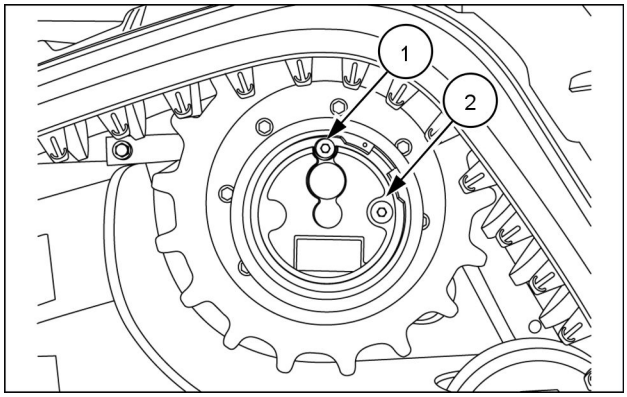


931002651 2

Capacity - each side	**1.0 L** (**1.06 US qt**) +/- **0.1 L** (**0.1 US qt**)
Specifications	**TUTELA HYPOIDE EP GEAR LUBE SAE 80W-90**

To check oil level

1. To check the final drive oil level, rotate the hub so one drain plug **(1)** is at the 12:00 position and the other plug **(2)** is at 3:00 or 9:00 position as shown.
2. Remove the drain plug **(2)**. If the oil level is at the proper level, the oil should be even with the bottom of the drain plug.
3. If the oil is low, remove the top plug **(1)** and add oil until it starts to flow out of **(2)**.



931002651 3

EVERY 2000 HOURS

Engine cooling system - Change fluid – L213, L216, L218, and L220 only

⚠ WARNING

Burn hazard!
Do not handle engine coolant, engine oil, or hydraulic oil at temperatures that exceed 49 °C (120 °F).
Allow fluids to cool before proceeding.
Failure to comply could result in death or serious injury.

W0330A

⚠ WARNING

Hot surface possible!
Wait for all components to cool before performing any operation.
Failure to comply could result in death or serious injury.

W0251A

⚠ 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.

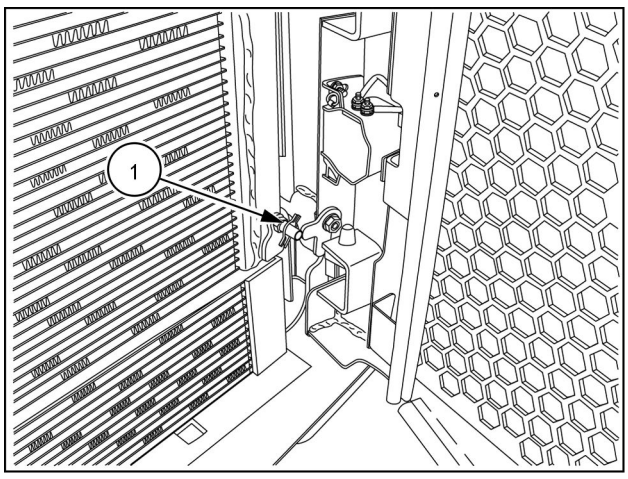
C0043A

NOTICE: *NEVER mix OAT coolant with conventional coolant. Under no circumstances should you top off a cooling system with only water. You can use a refractometer to check the concentration level. Supplemental Coolant Additives (SCA) should not be used when using* ***NEW HOLLAND AMBRA ACTIFULL™ OT EXTENDED LIFE COOLANT****.*

Drain and flush the cooling system every 2000 hours of operation or every two years. Clean the system and replace the coolant if the coolant becomes dirty or has the color of rust.

Coolant specifications – **NEW HOLLAND AMBRA ACTIFULL™ OT EXTENDED LIFE COOLANT**

1. Remove coolant reservoir cap.
2. Attach a hose to the radiator drain valve **(1)** and run to a suitable container that will hold at least **18.9 l** (**5.0 US gal**).
3. Open the radiator drain valve and drain.



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4. After all coolant has drained, close radiator drain valve.
5. Add a cleaning solution to the cooling system and fill the system with clean water. Follow the directions included with the cleaning solution.

NOTE: *Contact your local NEW HOLLAND CONSTRUCTION dealer for the proper cleaning solution.*

6. After draining the solution, flush with clean water.

Storage removal

1. If machine is blocked, lower it to the ground.
2. Change the fuel filters and fill the fuel tank if needed.
3. Tighten the cooling system drain valves.
4. Fill engine coolant system.
5. Check engine oil level.
6. Check the condition of the engine fan belt. Replace it if required.
7. Check the hydraulic fluid level.
8. Lubricate the machine grease fittings.
9. Use a petroleum base solvent and remove the rust and corrosion preventive from the hydraulic cylinder rods and spools, etc.
10. Install a fully charged battery.

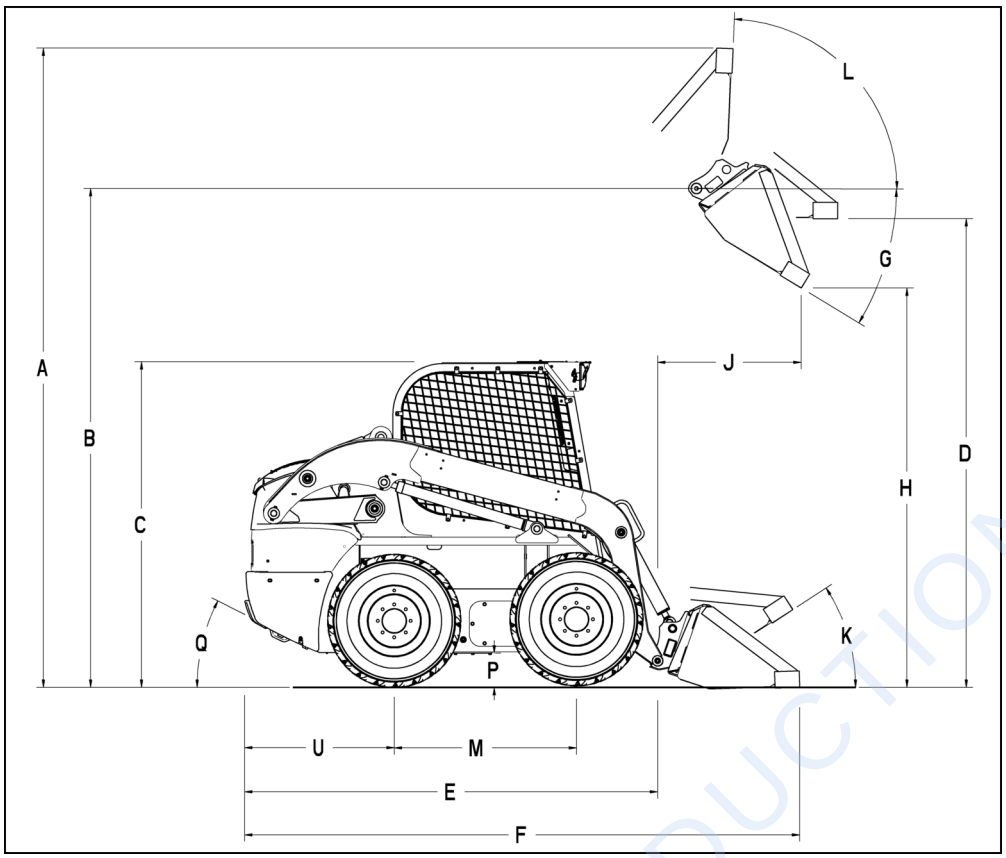
NOTE: *Check the battery periodically for the correct electrolyte level. Wear face protection and test the electrolyte with a hydrometer. When the hydrometer reading is near 1.215, charge the battery.*

11. Remove air from the engine fuel lines.
12. Prime the turbocharger oil lines with oil using the following procedure:
    - Disconnect the electrical connector to the injection pump solenoid. This will prevent the engine from starting.
    - Make sure all persons are clear of the machine. Turn key to START and actuate the starter for about 10 to 15 seconds.
    - Reconnect the wires to the injection pump solenoid.

NOTE: *Before starting the engine, make sure there are no leaks, missing or broken parts.*

13. Start the engine and run at idle speed for 2 minutes. Check for leaks around the filters and drain plugs.
14. Stop the engine and check the fluid levels of the engine cooling system and final drive chain compartments. See the engine coolant level on page **7-37** and the final drive chain tank oil level on page **7-54** for the procedures on checking the fluid levels.

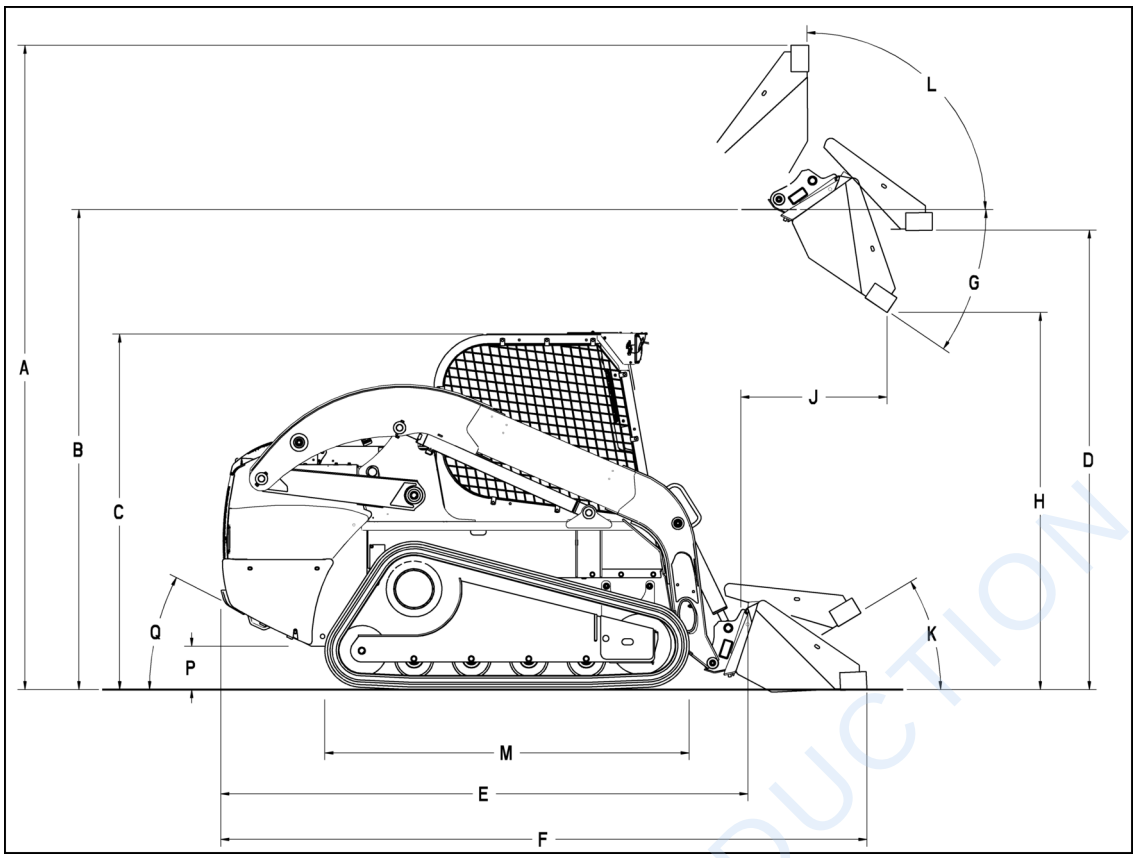
FAULT CODE	ENGINE TYPE	DETECTED BY	FAULT DESCRIPTION
3738	F5H	ENGINE	EDC - Analog Digital Converter (ADC): Diagnostic fault check to report multiple error while checking the complete ROM
3739	F5H	ENGINE	EDC - Power stages, Injector: Loss of synchronization sending bytes to the MM from CPU.
3740	F5H	ENGINE	EDC - Power stages, Injector: DFC to set a torque limitation once an error is detected before MoCSOP's error reaction is set
3741	F5H	ENGINE	EDC - Power stages, Injector: Wrong set response time
3742	F5H	ENGINE	EDC - Power stages, Injector: Too many SPI errors during MoCSOP execution.
3743	F5H	ENGINE	EDC - Power stages, Injector: Diagnostic fault check to report the error in under voltage monitoring
3744	F5H	ENGINE	EDC - Power stages, Injector: Diagnostic fault check to report the error in over voltage monitoring
3745	F5H	ENGINE	EDC - Power stages, Injector: Diagnostic fault check to report that WDA is not working correct
3746	F5H	ENGINE	EDC - Power stages, Injector: OS timed out in the shut off path test. Failure setting the alarm task period.
3747	F5H	ENGINE	EDC - Power stages, Injector: Diagnostic fault check to report that the positive test failed
3748	F5H	ENGINE	EDC - Power stages, Injector: Diagnostic fault check to report the timed out in the shut off path test
3750	F5H	ENGINE	Injection Control: Error in the plausibility of the injection energizing time
3751	F5H	ENGINE	Injection Control: Error in the plausibility of the start of energizing angles
3752	F5H	ENGINE	EDC - Zero Fuel Calibration: Error in the plausibility of the energizing times of the zero fuel quantity calibration
3753	F5H	ENGINE	EDC - Level 2 Monitoring: Diagnostic fault check to report the error due to injection quantity correction
3754	F5H	ENGINE	EDC - Level 2 Monitoring: Diagnostic fault check to report the plausibility error in rail pressure monitoring
3755	F5H	ENGINE	EDC - Level 2 Monitoring: Diagnostic fault check to report the error due to torque comparison
3756	F5H	ENGINE	EDC - Level 2 Monitoring: Diagnosis fault check to report the demand for normal mode due to an error in the PoI2 quantity
3757	F5H	ENGINE	EDC - Level 2 Monitoring: Diagnosis fault check to report the error to demand for an ICO due to an error in the PoI2 shut-off
3758	F5H	ENGINE	EDC - Level 2 Monitoring: Diagnosis fault check to report the error to demand for an ICO due to an error in the PoI3 efficiency factor
3759	F5H	ENGINE	EDC - Level 2 Monitoring: Diagnosis of current path limitation forced by ECU monitoring
3760	F5H	ENGINE	EDC - Level 2 Monitoring: Diagnosis air path limitation due to a functional control unit monitoring forced by ECU monitoring
3761	F5H	ENGINE	EDC - Level 2 Monitoring: Diagnosis quantity path limitation due to a functional control unit monitoring
3762	F5H	ENGINE	EDC - Level 2 Monitoring: Reported Over Voltage of Supply
3763	F5H	ENGINE	EDC - Level 2 Monitoring: Reported Under Voltage of Supply
3764	ISM-DI	ENGINE	Main relay diagnostics: Main relay stuck closed
3764	F5H	ENGINE	EDC Power Relay - Main Relay: Early opening defect of main relay
3766	F5H	ENGINE	Diesel Particulate Filter (DPF) Pressure Sensor: Fault check for the pressure sensor plausibility
3767	F5H	ENGINE	EDC - ECU internal: Diagnostic fault check to report 'WDA active' due to errors in query/response communication
3768	F5H	ENGINE	EDC - ECU internal: Diagnostic fault check to report 'ABE active' due to under voltage detection
3769	F5H	ENGINE	EDC - ECU internal: Diagnostic fault check to report 'ABE active' due to over voltage detection



631002257 3

MEDIUM VERTICAL FRAME (L218)

LOCATION	COMPONENT	MEASUREMENT
A	Overall Operating Height (Fully Raised)	**3820 mm** (**150.4 in**)
B	Height to bucket hinge pin (Fully Raised)	**3048 mm** (**120 in**)
C	Top of Roll Over Protective Structure (ROPS)	**1974 mm** (**77.7 in**)
D	Highest Level Bucket Height	**2877 mm** (**113.3 in**)
E	Overall Length (No Attachment)	**2685 mm** (**105.7 in**)
F	Overall Length (With standard Bucket)	**3352 mm** (**132.0 in**)
G	Dump Angle (Fully Raised)	**51.9 °**
H	Dump Height (Maximum Reach) at full dump angle	**2380.0 mm** (**93.7 in**)
J	Dump Reach (Fully Raised) at full dump angle	**783 mm** (**30.8 in**)
K	Maximum Rollback at Ground	**35 °**
L	Maximum Rollback (Fully Raised)	**87.6 °**
M	Wheel Base	**1128 mm** (**44.4 in**)
P	Ground Clearance (Belly Pan)	**178 mm** (**7 in**)
Q	Angle of Departure	**23 °**
U	Rear Axle to Bumper	**924 mm** (**36.4 in**)
NOTE: *Measurements are based on machines with 10 x 16.5 tires and a* ***1676.4 mm*** *(**66.0 in**) Dirt & Foundry (DF) bucket.*		



631002263 13

LARGE VERTICAL FRAME (C232)

LOCATION	COMPONENT	MEASUREMENT
A	Overall Operating Height (Fully Raised)	**4199.0 mm** (**165.3 in**)
B	Height to Hinge Pin (Fully Raised)	**3330.0 mm** (**131.1 in**)
C	Cab Height	**2043.0 mm** (**80.4 in**)
D	Highest Level Bucket Height	**3155.0 mm** (**124.2 in**)
E	Overall Length (No Attachment)	**2993.0 mm** (**117.8 in**)
F	Overall Length (With standard Bucket)	**3734.0 mm** (**147.0 in**)
G	Dump Angle (Fully Raised)	**54.7 °**
H	Dump Height (Maximum Reach)	**2581.0 mm** (**101.6 in**)
J	Dump Reach (Fully Raised)	**946.0 mm** (**37.2 in**)
K	Maximum Rollback @ Ground	**32.8 °**
L	Maximum Rollback (Fully Raised)	**84.8 °**
M	Track length on ground	**1639.0 mm** (**64.5 in**)
P	Ground Clearance (Belly Pan)	**243.0 mm** (**9.6 in**)
Q	Angle of Departure	**32 °**
NOTE: *All measurements are based on machines with a* ***1981.2 mm*** *(****78.0 in****) Heavy Dirt (HD) bucket.*		