ORIGINAL INSTRUCTIONS

OPERATOR'S MANUAL

L213 L223
L215 L225
L218 L230
L220
Tier 3

200 Series Skid Steer Loader

PIN NHM435463 and above

C227
C232
C238
Tier 3

200 Series Compact Track Loader

PIN NHM435463 and above

Part number 48065346
1st edition English
August 2017

NEW HOLLAND CONSTRUCTION

Contents

ELECTRO HYDRAULIC CONTROLS

CONTROL HANDLES

AUXILIARY HYDRAULICS

INSTRUMENT CLUSTER

MAINTENANCE CHART

INITIAL 10 HOURS

EVERY 10 HOURS OR EACH DAY

INITIAL 50 HOURS

EVERY 50 HOURS

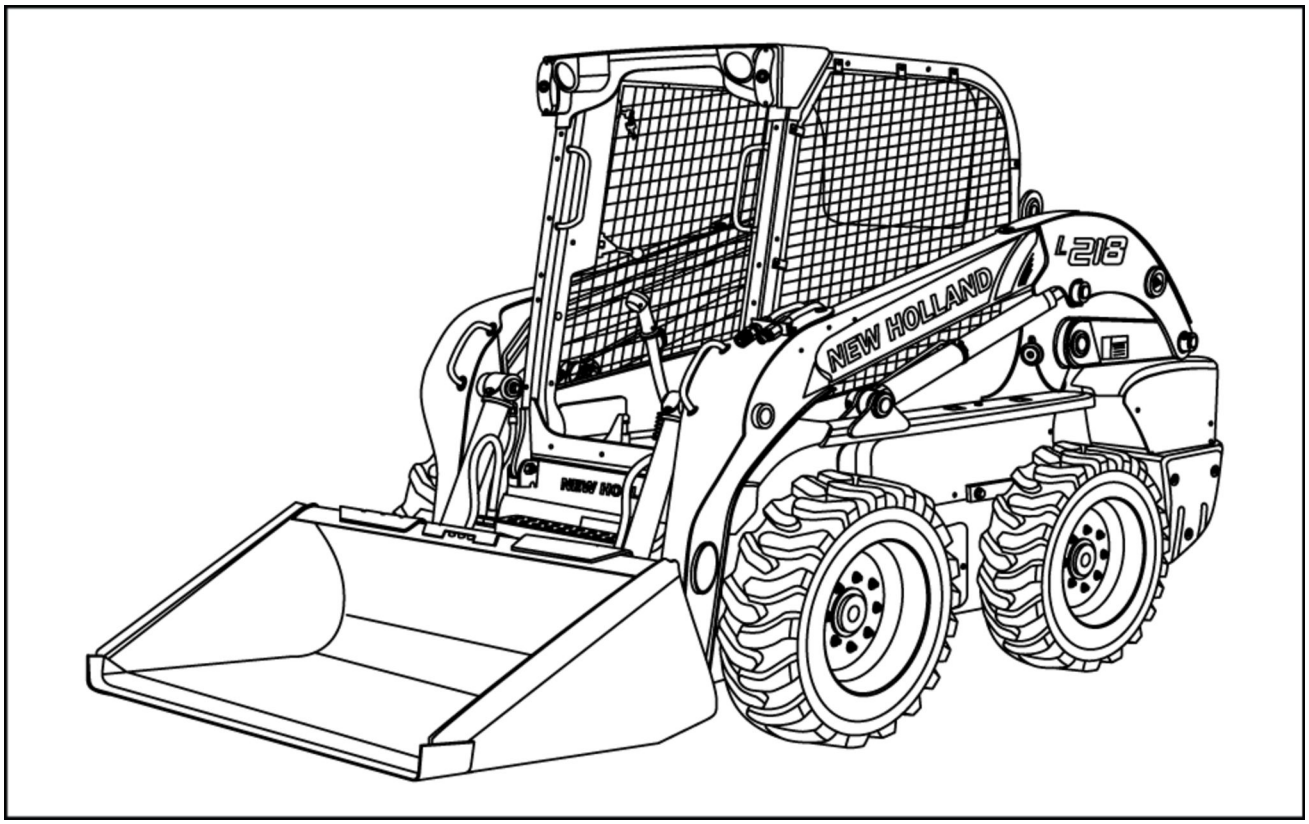
INITIAL 100 HOURS

EVERY 250 HOURS

EVERY 500 HOURS

1 - GENERAL INFORMATION

Note to the owner



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This manual contains important information about the safe operation, adjustment, and maintenance of your machine. Refer to the detailed INDEX at the end of this manual for locating specific items about your machine. Your machine conforms to current safety regulations. Use this manual as a guide. Your machine will remain a reliable working tool as long as it is kept in good working condition and serviced properly.

This machine, with standard equipment and authorized attachments, is intended for above ground material handling. Use only approved accessories and attachments designed for your machine.

CNH Industrial America LLC
P.O. Box 9228
Wichita, Kansas
U.S.A
67277

DEALER'S STAMP OR CARD

This operator's manual is to be stored in the manual compartment equipped on this machine. Make sure this manual is complete and in good condition. Contact your authorized dealer to obtain additional manuals. Contact your authorized dealer for any further information or assistance about your machine. Your authorized dealer has manufacturer approved service parts. Your authorized dealer has technicians with special training that know the best methods or repair and maintenance for your machine. Your authorized dealer is available for any further information. They will also provide any after-sales service you may need, and genuine NEW HOLLAND CONSTRUCTION spare parts, your guarantee of quality and match. NEW HOLLAND CONSTRUCTION customer assistance is also available.

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

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 decals, you will find the signal words DANGER, WARNING, and CAUTION followed by special instructions. These precautions are intended for the personal safety of you and those working with you.

DO NOT operate or permit anyone to operate or service this machine until you or the other persons have read and understand the safety, operation, and maintenance instructions in this manual. Use only trained operators who have demonstrated the ability to operate and service this machine correctly and safely. All persons who will be operating this machine shall possess a valid local vehicle operating permit and/or other applicable local age work permit. The information in this manual is provided on the basis of information that was available at the time that the manual was written. Settings, procedures, part numbers, software, and other items can change. These changes can affect the service that is given to the machine. Ensure that you have complete and most current information from your dealer before you start your machine operation.

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

Use only approved accessories and attachments designed for your machine. Consult your dealer on changes, additions, or modifications that may be required for your machine. Do not make any unauthorized modifications to your machine. Anyone making such unauthorized modifications is responsible for the consequences.

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

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

Electro-Magnetic Compatibility (EMC)

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

- The maximum power of emission equipment (radio, telephones, etc.) must not exceed the limits imposed by the national authorities of the country where you use the machine
- The add-on equipment must not interfere with the functioning of the on board electronics

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

Product identification

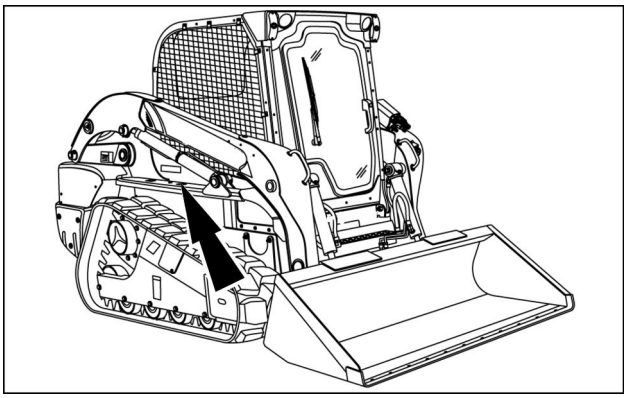
Write your machine model number, Product Identification Number (PIN), and serial numbers on the lines provided below. Always give these numbers and component plate numbers to your dealer when you need parts or information for your machine.

Make a record of the numbers. Keep this record 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
Machine Model and Type
Product Identification Number
Year of Build
Engine Serial Number
Hydrostatic Pump Serial Number
Bucket Part Number

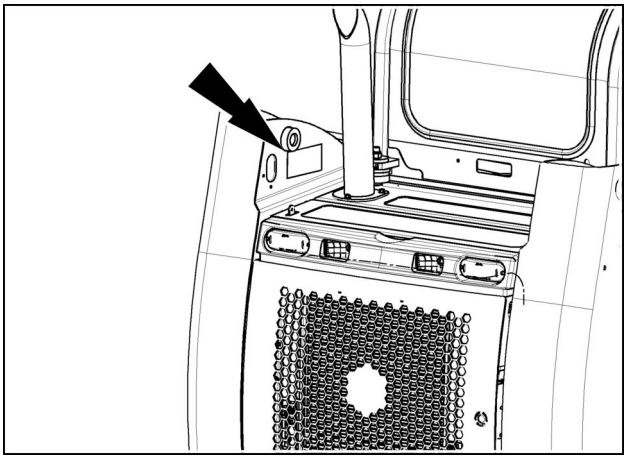
Product Identification Number (PIN).

- Outside right-hand side of chassis - vertical lift.



9310748611 1

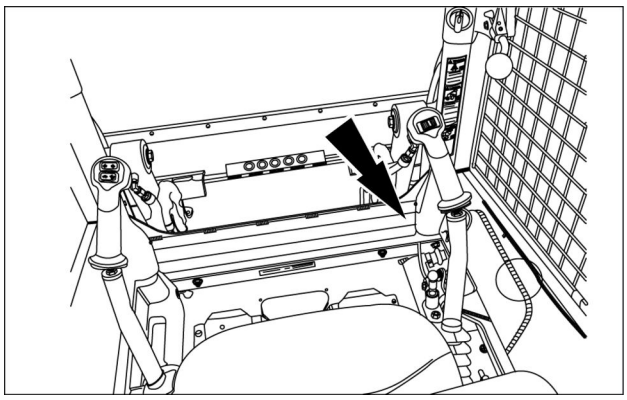
- Inside left-hand side loader arm tower - radial lift.



931002296A 2

Roll Over Protective Structure (ROPS) certification plate.

- Front edge (lower) inside cab.



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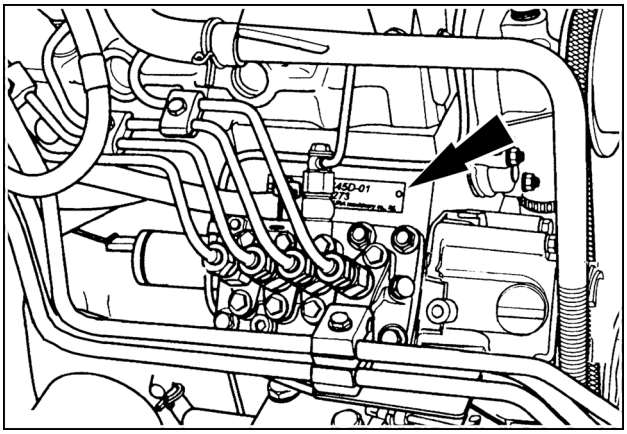
Engine serial number plate

On the fuel injection - ISM engines.	
L213	ISM engine
L215	
L218	
L220	



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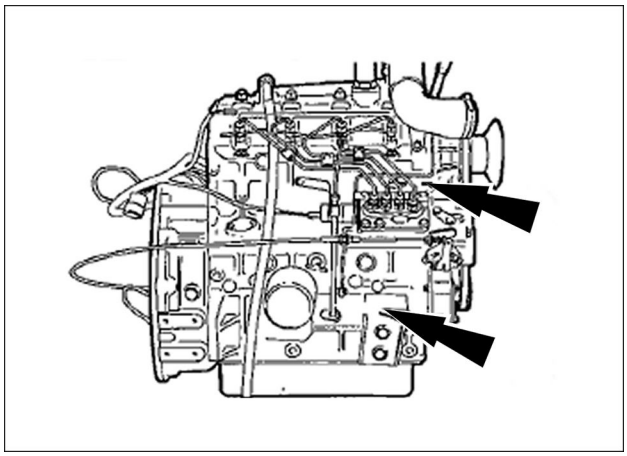
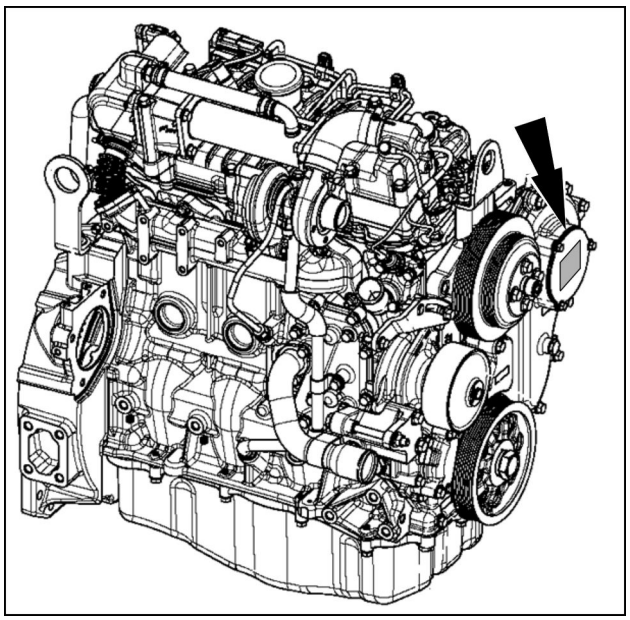
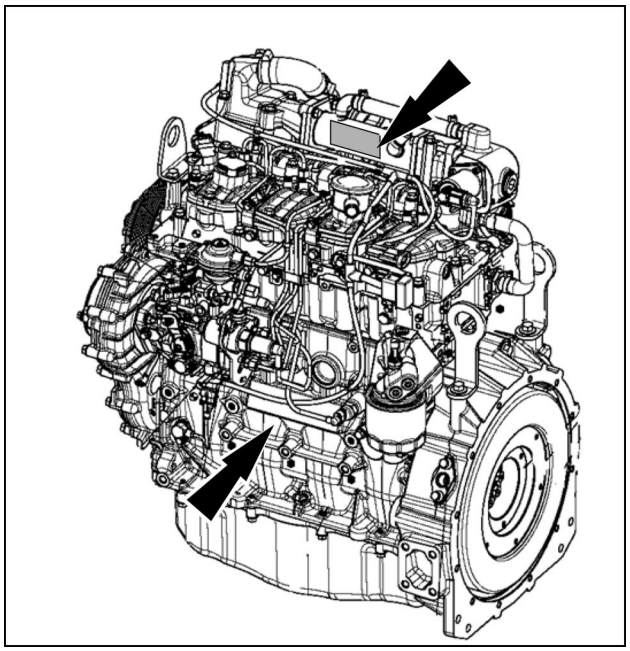


RCPH11SSL004AAD 5

Located at the end of the engine that is facing rearward	
L223	FPT engines
L225	
L230	
C227	
C232	
C238	



931002236 6



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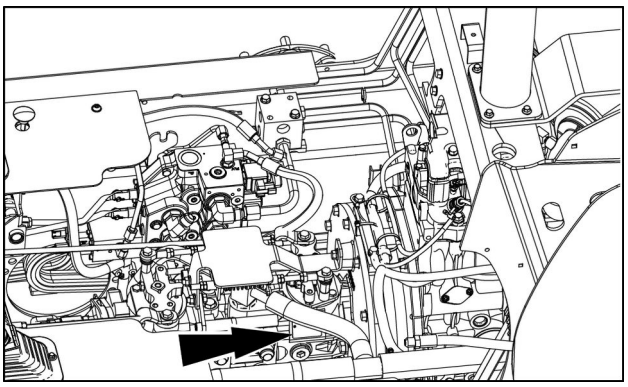
Hydrostatic pump

- Mechanical (Manual) hydrostatic pump

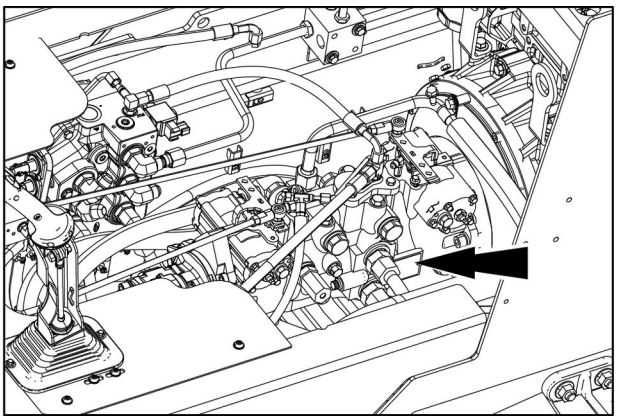
NOTE: *You must tilt the cab forward to view the hydrostatic pump. Some items not shown for clarity.*



RAIL15SSL0134BA 8

- Mechanical (Servo) hydrostatic pump

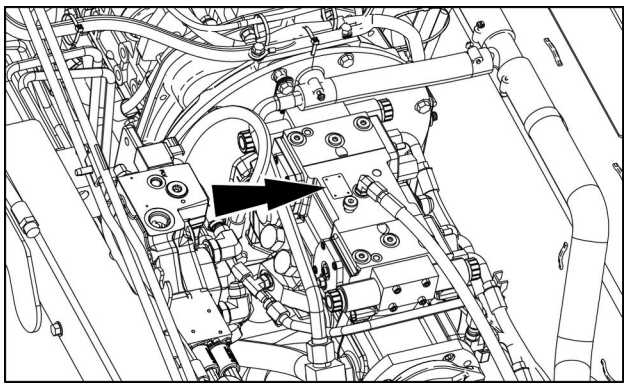
NOTE: *You must tilt the cab forward to view the hydrostatic pump. Some items not shown for clarity.*



RAIL15SSL0133BA 9

- Electro-Hydraulic (EH) hydrostatic pump

NOTE: *You must tilt the cab forward to view the hydrostatic pump. Some items not shown for clarity.*



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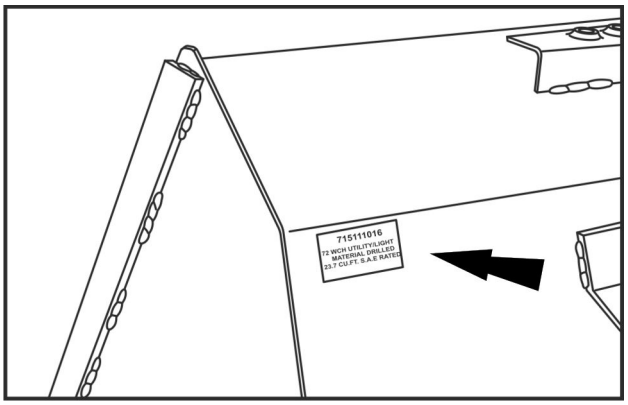
Bucket identification plate (part number and description)



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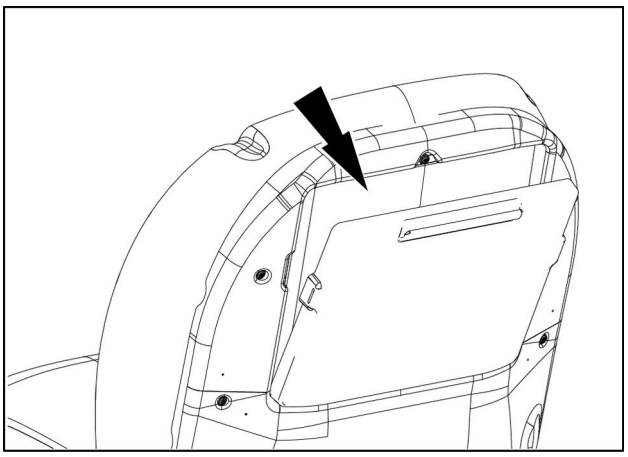
Operator's manual storage on the machine

Keep the Operator's manual in the storage compartment behind the operator’s seat. The Operator's manual must be available for use by all operators.



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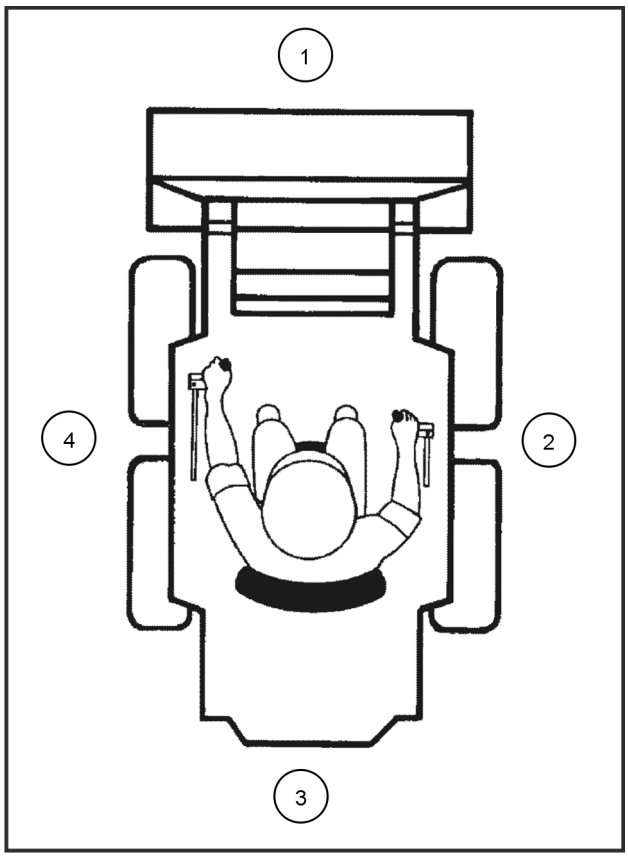
Machine orientation



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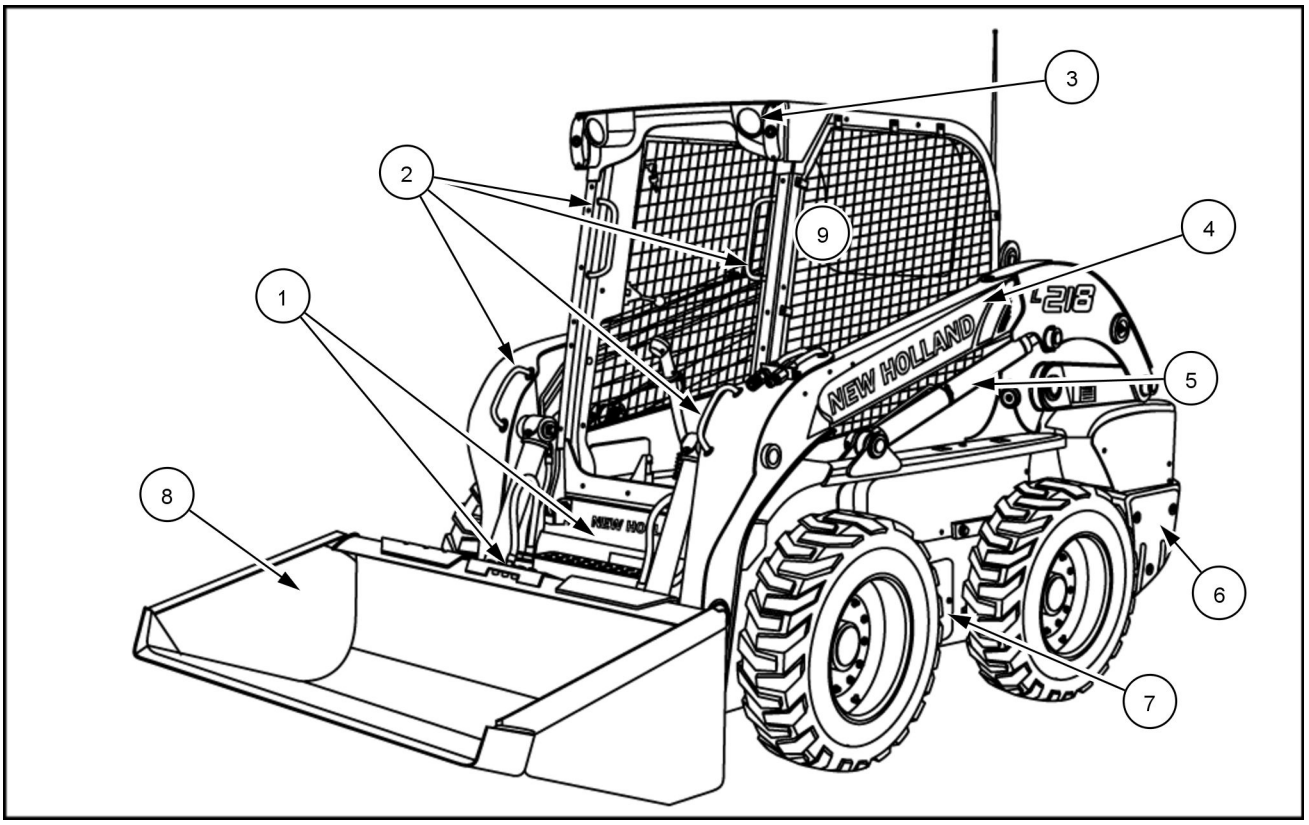
The terms front (1), right-hand side (2), rear (3), and left-hand side (4) are used in this manual to indicate the direction as seen from the operator's seat.

Machine components



93107444 1

(1) Steps
(2) Hand-holds
(3) Front lights
(4) Loader arm
(5) Loader arm cylinder
(6) Service access cover
(7) Chain compartment access
(8) Bucket
(9) Operator's compartment

2 - SAFETY INFORMATION

Safety rules and signal words

Personal safety

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible death or injury.

Throughout this manual you will find the signal words DANGER, WARNING, and CAUTION followed by special instructions. These precautions are intended for the personal safety of you and those working with you.

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

⚠ DANGER indicates a hazardous situation that, if not avoided, will result in death or serious injury.

⚠ WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury.

⚠ CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

FAILURE TO FOLLOW DANGER, WARNING, AND CAUTION MESSAGES COULD RESULT IN DEATH OR SERIOUS INJURY.

Machine safety

NOTICE: *Notice indicates a situation that, if not avoided, could result in machine or property damage.*

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine or property damage. The word Notice is used to address practices not related to personal safety.

Information

NOTE: *Note indicates additional information that clarifies steps, procedures, or other information in this manual.*

Throughout this manual you will find the word Note followed by additional information about a step, procedure, or other information in the manual. The word Note is not intended to address personal safety or property damage.

Safety rules

⚠ General safety rules ⚠

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

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

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

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

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

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

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

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

Wear protective equipment when appropriate.

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

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

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

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

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

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

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

Start the engine only from the operator's seat. Do not connect or short across terminals on the starter solenoid. Attach jumper cables as described in the manual. Starting in gear may cause death or serious injury.

Always keep windows, mirrors, all lighting, and Slow-Moving Vehicle (SMV) emblem clean to provide the best possible visibility while you operate the machine.

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

Before you leave the machine:

1. Park the machine on a firm, level surface.
2. Lower the loader arms and attachments to the ground.
3. Place all controls in the neutral position.
4. Press the Operate button on the instrument panel, this should disable the ground drive and the loader hydraulic controls.
5. Engage the park brake.
6. Check that the interlock system is functioning by moving the controls out of the neutral position. If any movement occurs do not operate the machine. Park the machine, turn off the engine, and contact your authorized dealer for assistance.
7. Turn off the engine and if applicable remove the key.
8. Exit the machine.
9. Use wheel chocks if required.

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

1. Bring the engine to low idle speed.
2. Lower the loader arms and attachments to the ground.
3. Place all controls in their neutral position.
4. Press the Operate button on the instrument panel, this should disable the ground drive and the loader hydraulic controls.
5. Engage the park brake.
6. Check that the interlock system is functioning by moving the controls out of the neutral position. If any movement occurs do not operate the machine. Park the machine, turn off the engine, and contact your authorized dealer for assistance.
7. Exit the machine.

⚠ General maintenance safety ⚠

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

Service the machine on a firm, level surface.

Install guards and shields after you service the machine.

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

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

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

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

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

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

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

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

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

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

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

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

⚠ Wheels and tires ⚠

Make sure that tires are correctly inflated. Do not exceed any recommended load or pressure. Follow the instructions in the manual for proper tire inflation.

Tires are heavy. Handling tires without proper equipment could cause death or serious injury.

Always have a qualified tire technician service the tires and wheels. If a tire has lost all pressure, take the tire and wheel to a tire shop or your dealer for service. Explosive separation of the tire can cause serious injury.

DO NOT weld to a wheel or rim until the tire is completely removed. Inflated tires can generate a gas mixture with the air that can be ignited by high temperatures from welding procedures performed on the wheel or rim. Removing the air or loosening the tire on the rim (breaking the bead) will NOT eliminate the hazard. This condition can exist whether tires are inflated or deflated. The tire MUST be completely removed from the wheel or rim prior to welding the wheel or rim.

⚠ Driving on public roads and general transportation safety ⚠

Comply with local laws and regulations.

Use appropriate lighting to meet local regulations.

Make sure that the SMV emblem is visible.

Lift implements and attachments high enough above ground to prevent accidental contact with road.

When you transport equipment or a machine on a transport trailer, make sure that it is properly secured. Be sure the SMV on the equipment or machine is covered while being transported on a trailer.

Be aware of overhead structures or power lines and make sure that the machine and/or attachments can pass safely under.

Travel speed should be such that you maintain complete control and machine stability at all times.

Slow down and signal before turning.

Pull over to allow faster traffic to pass.

⚠ Fire and explosion prevention ⚠

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

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

Always have a fire extinguisher on or near the machine.

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

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

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

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

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

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

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

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

⚠ General battery safety ⚠

Always wear eye protection when you work with batteries.

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

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

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

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

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

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

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

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

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

Keep out of reach of children and other unauthorized persons.

⚠ Operator presence system ⚠

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

Never disconnect or bypass the operator presence system.

If the operator presence system is inoperable, then it must be repaired. Follow the test procedure (**7-37**).

⚠ Reflectors and warning lights ⚠

You must use flashing amber warning lights when you operate equipment on public roads.

⚠ Air-conditioning system ⚠

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

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

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

⚠ Personal Protective Equipment (PPE) ⚠

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

⚠ Do Not Operate tag ⚠

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

⚠ Operator protective structure ⚠

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

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

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

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

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

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

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

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

⚠ Hazardous chemicals ⚠

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

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

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

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

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

Keep out of reach or children or other unauthorized persons.

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

⚠ Electrical storm safety ⚠

Do not operate machine during an electrical storm.

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

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

⚠ Lifting and overhead loads ⚠

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

Do not use raised equipment as a work platform.

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

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

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

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

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

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

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

Utility safety

YOU MUST FOLLOW safety precautions when you work near buried utility lines.

During operation it is likely that you will be working around or near buried utility lines that may include, but are not limited to:

- Electrical power line
- Gas line
- Water line
- Communication line - telephone or cable television
- Sewer line

NOTICE: *Before construction work begins it is your responsibility to be aware of all utility lines in the area of your project and to avoid them.*

ALWAYS have all local utility companies mark the location of their lines.

NOTICE: *Check with local authorities for laws, regulations, and/or strict penalties requiring you to locate and avoid existing utilities.*

Call all utility companies before you perform any machine operation

After you locate any buried utility lines, carefully dig a hole to the utility line by hand and/or with automatic vacuum equipment. Verify the location and depth of the line.

Where applicable, know the utility color code.

Electric	Red
Gas, Oil, or Petroleum	Yellow
Communication, Telephone, Television	Orange
Water	Blue
Sewer	Green or Brown
Proposed Excavation	White
Surveying	Pink
Reclaimed Water and Slurry	Purple

Coordinate all excavation activity with the proper authorities and professionals before beginning.

Proper entry and exit

⚠ DANGER

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 will result in death or serious injury.

D0168A

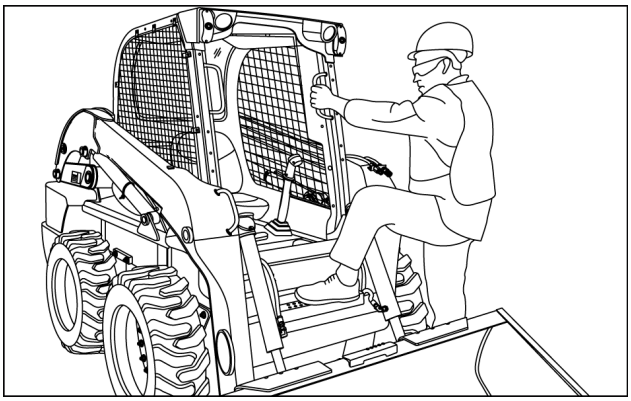
⚠ WARNING

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

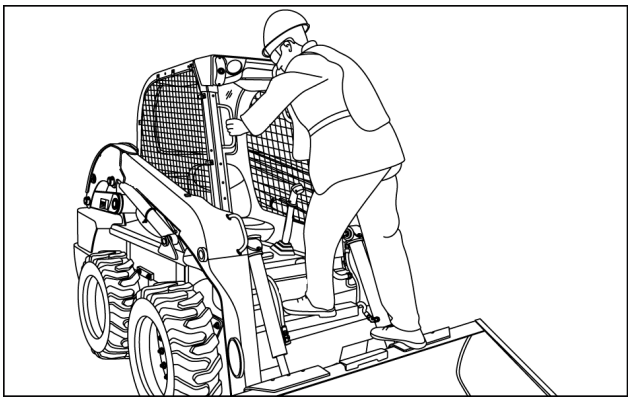
Enter the machine

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.



931002286 1

5. Pull yourself 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.



931002285 2

⚠ DANGER

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 will result in death or serious injury.

D0168A

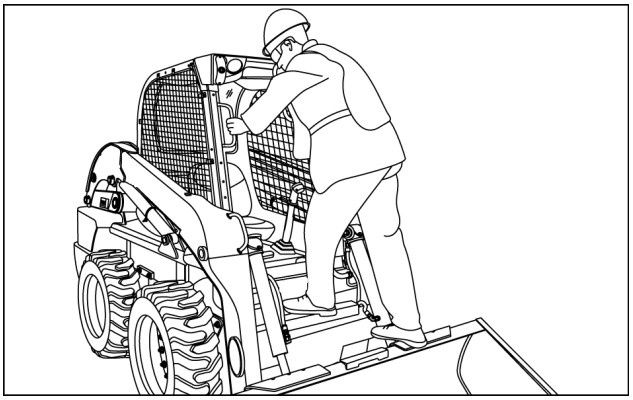
⚠ WARNING

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

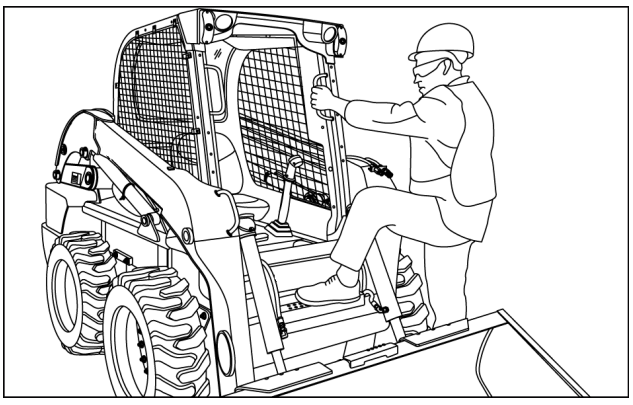
Exit the machine

1. Lower the loader arm and or attachments to the ground.
2. Stop the engine. The parking brake is automatically set.
3. Remove the seat belt. If equipped, raise the restraint bar.
4. If applicable, open the cab door.
5. Grab the hand holds.
6. Pull yourself up and place one foot on the loader arm coupler step or on the bucket step.
7. Position your hands on the hand holds so that you are comfortable with stepping out of the cab.
8. Step out of the machine and turn your body so that you face the machine.



931002285 3

9. Look and make sure that the ground area is clear to step off of the machine.
10. Position your hands so that you are comfortable with stepping off of the machine.
11. Place one foot on the ground.
12. Place the other foot on the ground and safely move away from the machine.



931002286 4

Starting and stopping precautions

- Walk around the machine and attachments to warn all personnel who may be servicing the machine or are in the machine path prior to starting. Do not start until all personnel are clearly away from the machine. Sound the horn, if equipped, before starting.
- Walk around the machine and attachment. Ensure that all safety precautions / warnings are upheld and all safety devices are working as the attachment manufacture states in their safety information.
- Check that the parking device is applied, place all controls in neutral or park as specified by the manufacturer, before starting the machine.
- Adjust, secure, and latch the seat belt. If equipped, lower the restraint bar before starting the machine.
- To avoid potential serious injury by contact with the machine's moving attachment, DO NOT rewire to bypass the seat, seat belt switches, or restraint bar switches (if equipped).
- Start and operate the machine only from the operator's seat.
- Use jumper cables only in the recommended manner. Improper use can result in battery explosion or unexpected machine motion. Ventilate the battery area before using jumper cables. Make sure that using jumper cables will not interfere or harm electronic devices.
- DO NOT operate the engine in an enclosed area without adequate ventilation.
- Park the machine on level ground whenever possible and apply the parking brake. On grades/slope, park the machine with the wheels or track securely blocked.
- Before leaving the operator station, lower the equipment to the ground and shut off the engine.
- Remove the starter key or lock the instrument panel, or turn the master disconnect switch (if equipped) to the OFF position when leaving the machine parked or unattended.

Seat belt precautions

⚠ 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.

⚠ WARNING

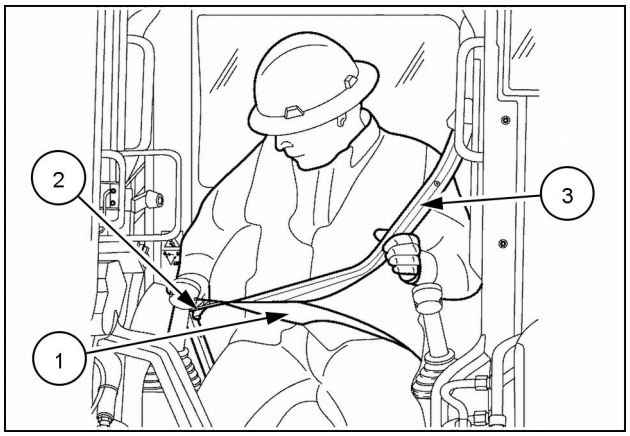
Avoid injury!
Before starting the engine, securely fasten the seat belt. The seat belt can help ensure your safety if it is properly used and maintained. Never wear a seat belt loosely or with slack in the belt system. Never wear the belt if it is twisted or pinched between the seat structures.
Failure to comply could result in death or serious injury.

W0142A

1. Pull the seat belt retractable half **(1)** across and buckle securely with the buckle half **(2)**.
2. A shoulder belt **(3)** is available from your dealer. Some machine configurations are equipped with a shoulder belt.

   NOTE: *State or Local regulations may require a* ***7.6 cm*** *(****3 in****) webbing seat belt available through Dealer Service Parts. This belt may be necessary in some industrial applications. Check your local codes.*

- Check that bolts are tight on the seat bracket or mounting.
- If belt is attached to seat, make sure 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.



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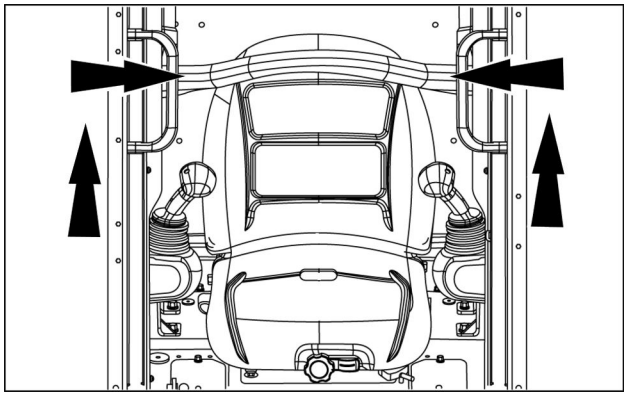
Seat restraint bar (if equipped)

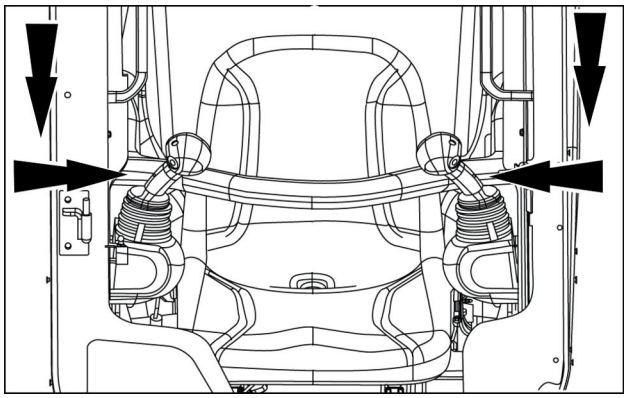
The restraint bar must be down in the operating position before starting.

Seat restraint bar in the raised position.



93109333 2

Seat restraint bar in the operating position.



93109307 3

Specific precautions to this machine

⚠ DANGER

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 will result in death or serious injury.

D0168A

- All machines are equipped with safety support features when service or maintenance of the machine is required. You may secure the loader arm in a raised position and secure the cab in a tilt position. These features allow greater access to the internal components of the machine. Read and understand the “Loader arm lock and cab tilt procedure - radial lift machines” page **2-18** or “Loader arm lock and cab tilt procedure - vertical lift machines” page **2-22** in this manual.
- Place all controls in neutral before leaving the cab and be careful not to engage them accidently when entering or exiting the cab.
- Before leaving the operators compartment check the interlock system so movement of controls do not result in machine movement. Follow the “Loader arm and bucket hydraulic interlock” procedure on page **7-37**.
- Keep the load or tool as low as possible while moving the machine around the job site.
- Confirm that the coupler lock pins are engaged with the bucket or attachment retaining tabs.
- Do not over fill the bucket. Dirt, rocks and debris can enter the operator area.

Fire extinguisher

It is recommended that you have a fire extinguisher on your machine. Contact your dealer for the type and location of a fire extinguisher on this machine.

Roll Over Protective Structure (ROPS)

⚠ DANGER

Crushing hazard!
DO NOT operate the machine with the Roll-Over Protective Structure (ROPS) removed. Remove the ROPS only for service or replacement.
Failure to comply will result in death or serious injury.

D0032A

⚠ DANGER

Crushing hazard!
Do not change the Roll Over Protective Structure (ROPS) in any way. Unauthorized changes such as welding, drilling, or cutting will weaken the ROPS and decrease your protection. Have an authorized dealer replace the ROPS if damage of any kind occurs. DO NOT TRY TO REPAIR THE ROPS.
Failure to comply will result in death or serious injury.

D0037A

⚠ 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

⚠ WARNING

Tip-over hazard!
Adding additional weight (buckets, attachments, etc.) to the machine can create a tipping hazard. Do not exceed the gross weight indicated by the machine specifications.
Failure to comply could result in death or serious injury.

W0153A

Your machine has a Roll-Over Protective Structure (ROPS). The ROPS or Cab Structural Frame (CSF) is a special safety component of your machine.

DO NOT attach any device to the ROPS or CSF for pulling purposes.

The ROPS or CSF is a certified structural support and any damage, fire, corrosion or modification will weaken the structure and reduce your protection. If this occurs, the ROPS or CSF must be replaced so that it will provide the same protection as a new ROPS or CSF.

After an accident, fire or rollover, the following MUST be performed before returning the machine to the field or job site:

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

Maintenance and inspection of the Roll Over Protective Structure (ROPS)

1. Check the torque of the ROPS mounting bolts. If necessary, tighten the bolts to the correct torque, for the front tighten them down to **42 N·m** (**31.0 lb ft**) and the rear bolts to **170 N·m** (**125.4 lb ft**). Or see ROPS torque specifications in this manual.
2. Check for cracks, rust, or holes in the ROPS and ROPS parts. Age, weather, and accidents can cause damage to the ROPS and ROPS parts. If you have any doubts about the ROPS system, see your dealer.
3. Check the operator’s seat and the mounting parts for the seat belt. Tighten the bolts to the correct torque. Replace the parts that have wear or damage.

Seatbelt

The seat belt is an important part of your ROPS. You must wear the seat belt at all times when you operate the machine.

Before you operate this machine, always make sure that the ROPS and operator's seat belt are correctly installed.

Welding on the machine

⚠ DANGER

Improper operation or service of this machine can result in an accident.
Any unauthorized modifications made to this machine can have serious consequences. Consult an authorized dealer on changes, additions, or modifications that may be required for this machine. Do not make any unauthorized modifications.
Failure to comply will result in death or serious injury.

D0030A

When you carry out a welding operation on the machine as authorized by the manufacturer and in accordance with the manufacturer's instructions

- Disconnect the batteries
- Disconnect the Engine Control Unit (ECU)
- If your machine is equipped with the Electro-Hydraulic controls option, disconnect the Universal Control Module (UCM)
- Disconnect the alternator B+ and D+ terminal wires
- Connect the ground cable from the welding apparatus to the component on which you will perform the welding operation.

Always connect the welding apparatus to the same structure that is being welded.

Never connect the welding apparatus ground to a component of the hydraulic system.

Loader arm lock and cab tilt procedure - radial lift machines

⚠ DANGER

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 will result in death or serious injury.

D0168A

⚠ DANGER

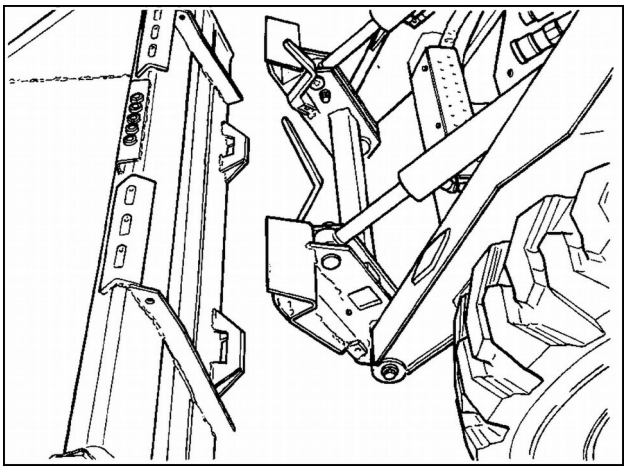
Crushing hazard!
The loader arm is unsupported during support strut removal. Do not enter or exit the operator's compartment with an unsupported loader arm. Two persons are required during storage. One person should remove and store the support strut while the operator remains in the operator's compartment.
Failure to comply will result in death or serious injury.

D0021B

Raise and lock the loader arm for machine service

NOTE: *An instructional decal on the inside of the right-hand loader arm, just above the support strut is also available. Understand the loader arm lock procedure before continuing.*

1. Sit in the operator's seat, fasten the seat belt, pull the restraint bar down (if equipped), and start the engine.
2. Press the OPERATE button to enable the hydraulics.
3. Remove the bucket or attachment from the mounting plate.
4. Park the machine on firm and level surface.
5. If an assistant is not available, turn off the engine and exit the machine.



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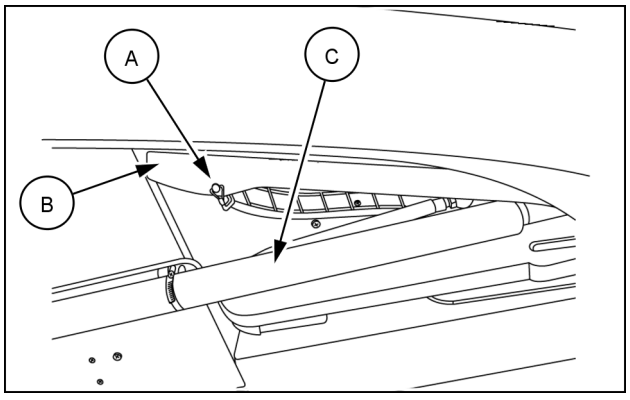
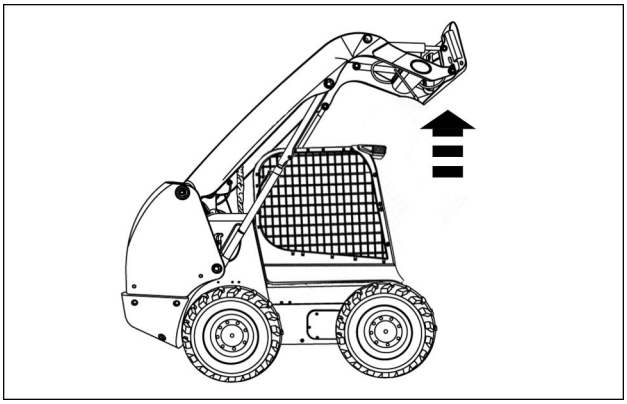
6. Remove the support strut pin **(A)** and let the support strut **(B)** rest on the lift cylinder barrel **(C)**.



93106848A 2

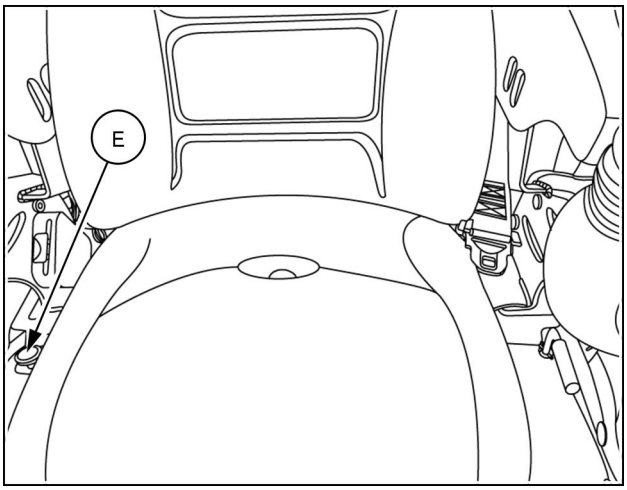
7. Slowly raise the loader arm until the support strut **(B)** falls onto the cylinder rod **(D)**.
8. Stop the engine.



RAIL14SSL0418AA 3

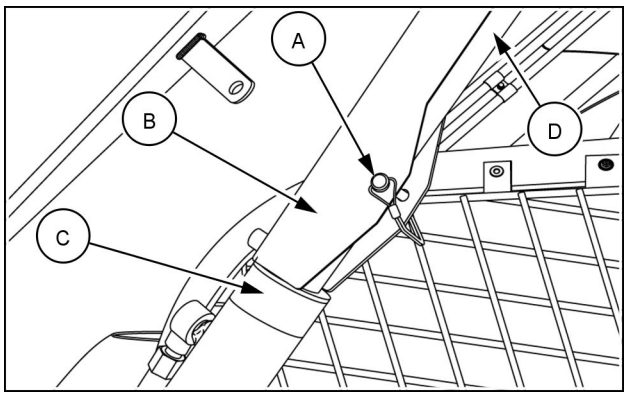
9. Pull up on the override control knob **(E)** (red control knob near the right-hand side of the operator's seat). The support strut **(B)** will brace against the top of the cylinder barrel **(C)** supporting the weight of the loader arm.

NOTICE: *Only use the override control knob to lower the loader arm in emergency situations when engine power is not available or to lower the loader arm onto the support strut for servicing the machine.*



93107465A 4

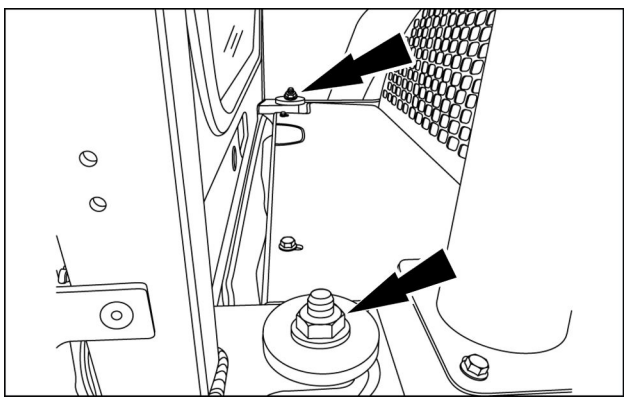
10. Ask an assistant to insert the pin **(A)** into the support strut **(B)**. If an assistant is not available visually confirm that the support strut is braced against the top of the cylinder barrel before exiting the machine.



93106854A 5

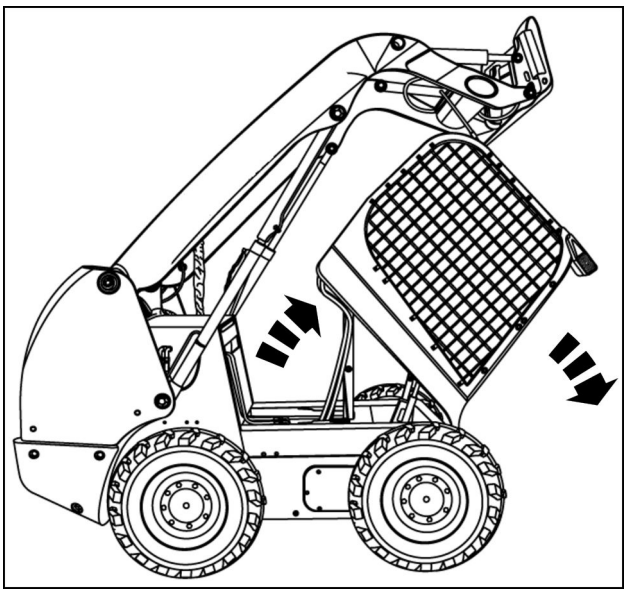
Tilt and lock the cab forward for machine service

1. Remove the two, rear retaining nuts, located at the rear of the cab.



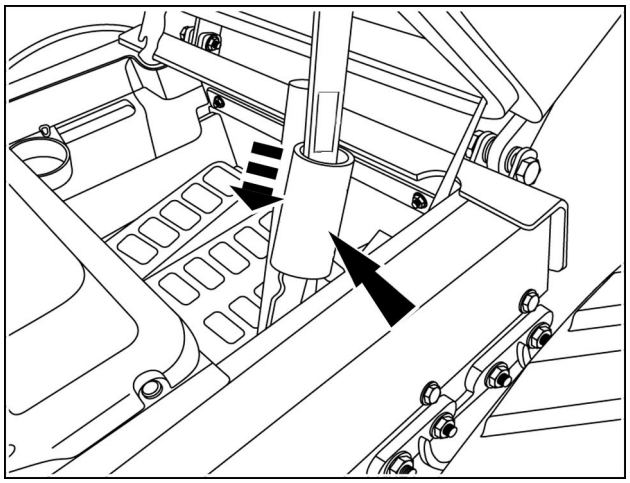
931001633 6

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



93107498 7

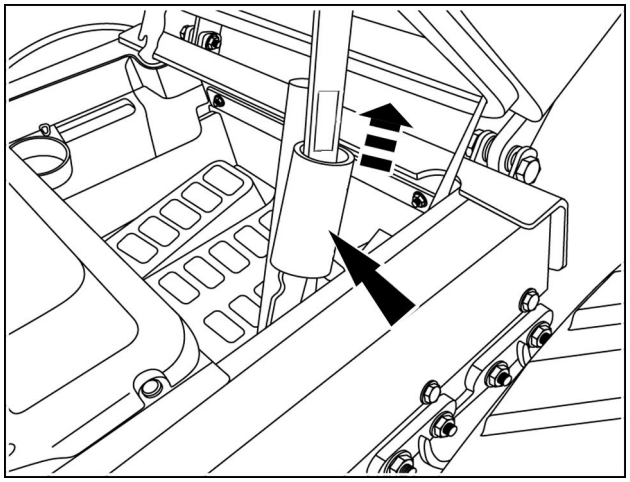
3. Confirm that the red lock tube has lowered over the cab pivot linkage. If it has, the cab tilt position is now secure.



RAPH12SSL0420BA 8

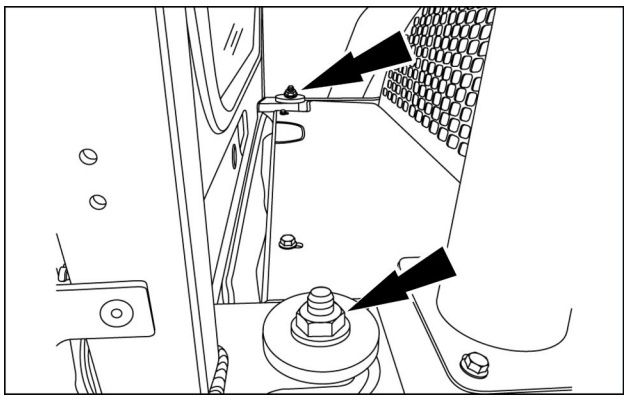
Tilt and secure the cab for machine operation

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



RAPH12SSL0420BA 9

3. Install the retaining nuts. Torque the nuts to **170 N·m** (**125 lb ft**).



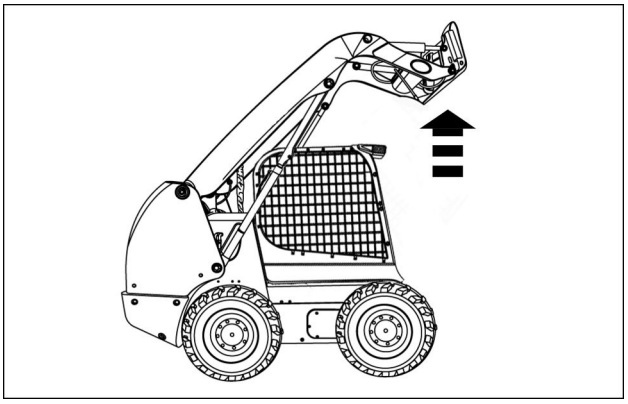
931001633 10

Unlock and lower the loader arm for machine operation

⚠ DANGER

Crushing hazard!
The loader arm is unsupported during support strut removal. Do not enter or exit the operator's compartment with an unsupported loader arm. Two persons are required during storage. One person should remove and store the support strut while the operator remains in the operator's compartment.
Failure to comply will result in death or serious injury.

D0021B

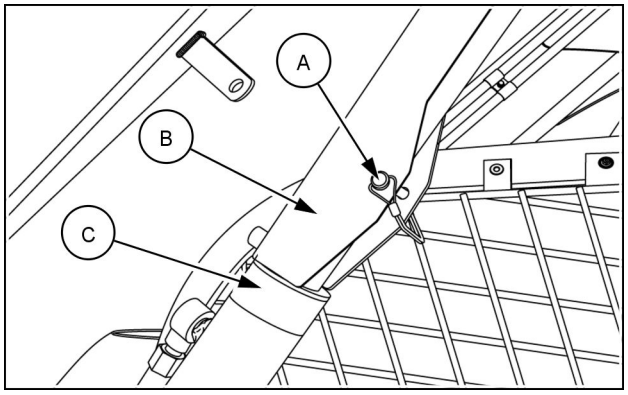


RAIL14SSL0418AA 11

NOTE: *An instructional decal on the inside of the right-hand loader arm, just above the support strut is also available. Understand the loader arm unlock procedure before continuing.*

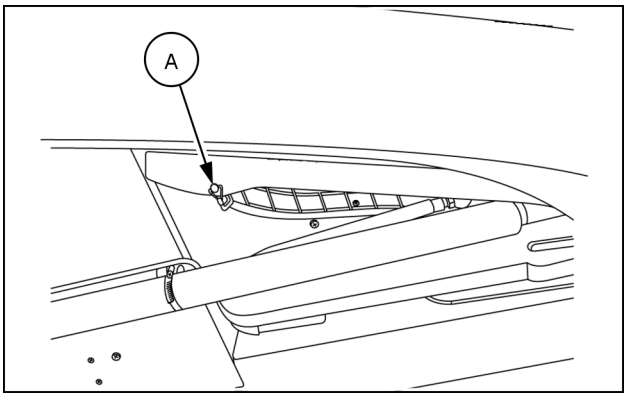
Placing the support strut in the storage position requires a second person. The operator must remain in the seat during this procedure.

1. Sit in the operator's seat, fasten the seat belt, pull the restraint bar down (if equipped), and start the engine.
2. Press the operate button to enable the hydraulics.
3. Raise the loader arm until the support strut **(B)** is not resting on the end of the cylinder barrel **(C)**.



93106854A 12

4. Instruct the second person to remove the support strut pin **(A)** and place the support strut in the stowed position and reinstall the support strut pin **(A)**. When the second person has cleared the area, the operator may now lower the loader arm.
5. Commence work operations or park the machine and stop the engine.



93106848A 13

Loader arm lock and cab tilt procedure - vertical lift machines

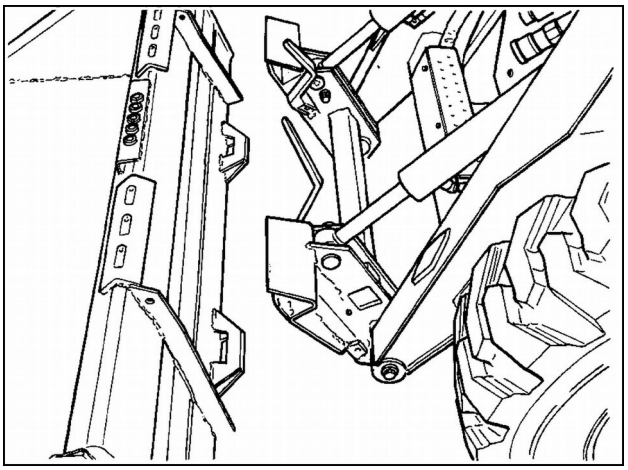
⚠ DANGER

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 will result in death or serious injury.

D0168A

Raise and lock the loader arm for machine service

1. Sit in the operator's seat, fasten the seat belt, pull the restraint bar down (if equipped), and start the engine.
2. Press the operate button to enable the hydraulics.
3. Remove the bucket or attachment from the mounting plate.
4. Park the machine on a level surface.



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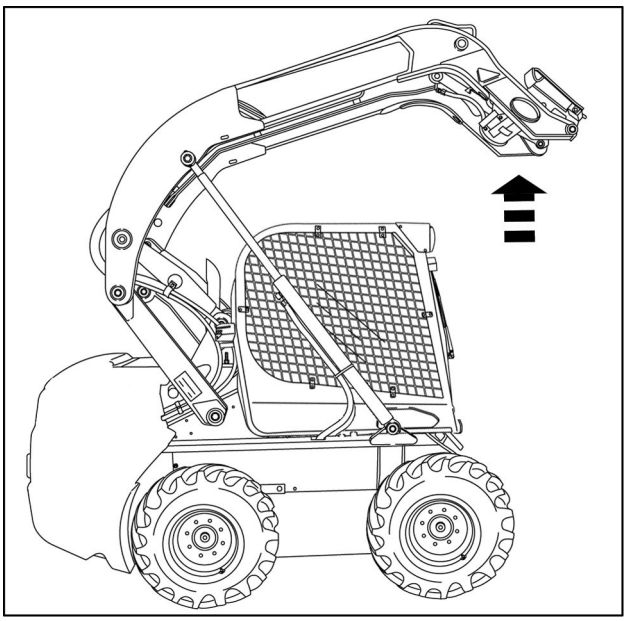
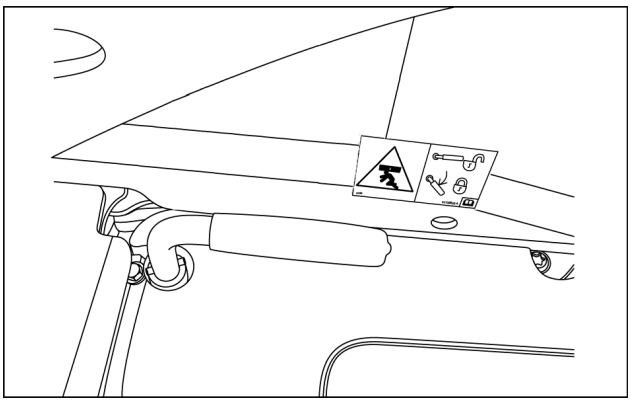
5. Fully raise the loader arm.



RAPH14SSL0351BA 2

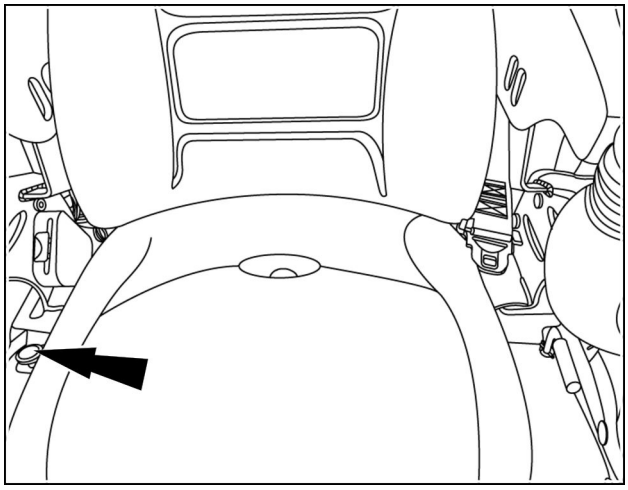
6. Locate the loader arm lock lever on the right-hand side of the operator's seat.
7. Rotate the lock lever toward the operator's seat (clockwise) to engage the lock support pin(s).
8. Stop the engine.



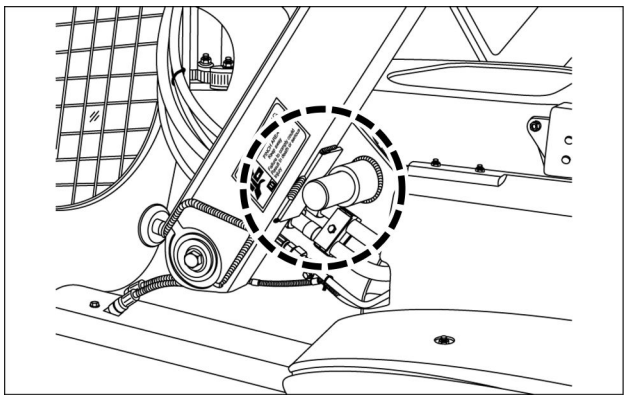
RAIL16SSL0012AA 3

9. Pull up on the override control knob (red control knob near the right-hand side of the operator's seat). The loader will brace against the lock support pin and keep the loader arm in a raised position.

NOTE: *Only use the override control knob to lower the loader arm in emergency situations when engine power is not available or to lower it onto the lock support pin for servicing the machine.*



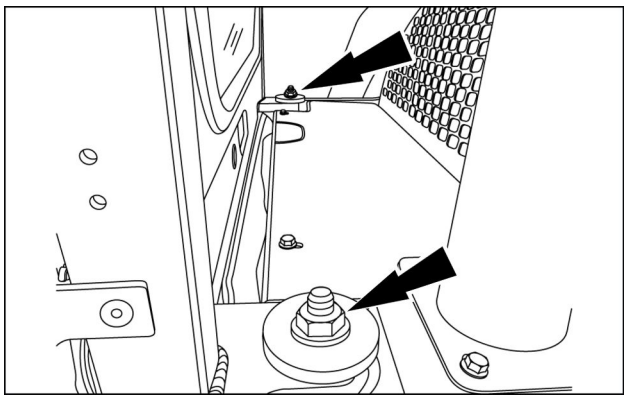
93107465A 4



93107457 5

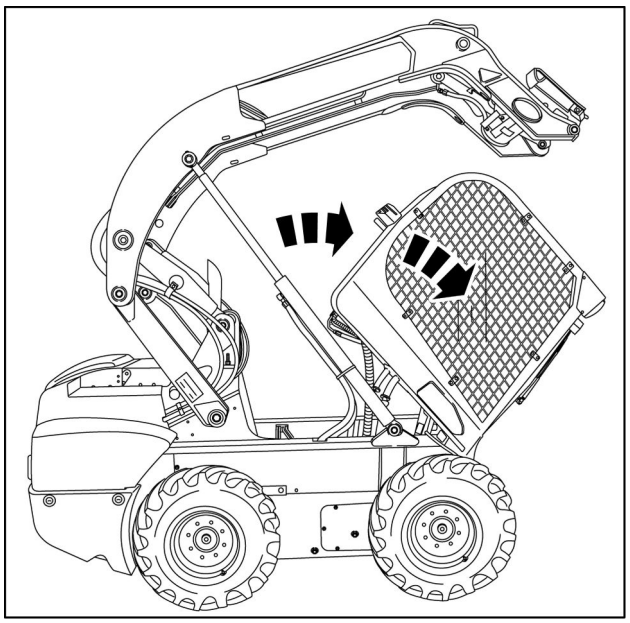
Tilt and lock the cab forward for machine service

1. Remove the two, rear retaining nuts, located at the rear of the cab.



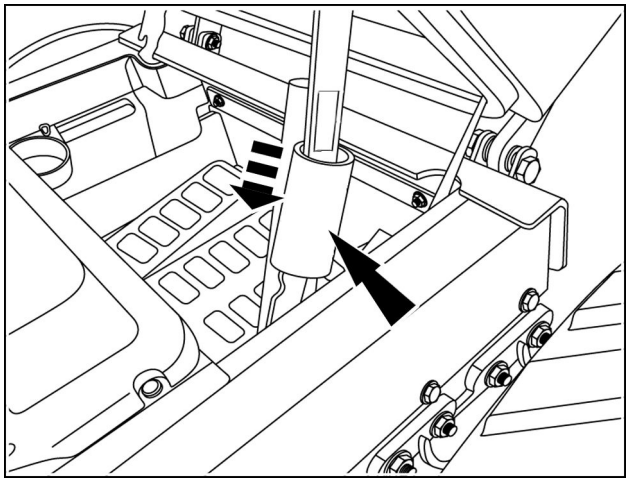
931001633 6

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



RAPH11SSL0016BA 7

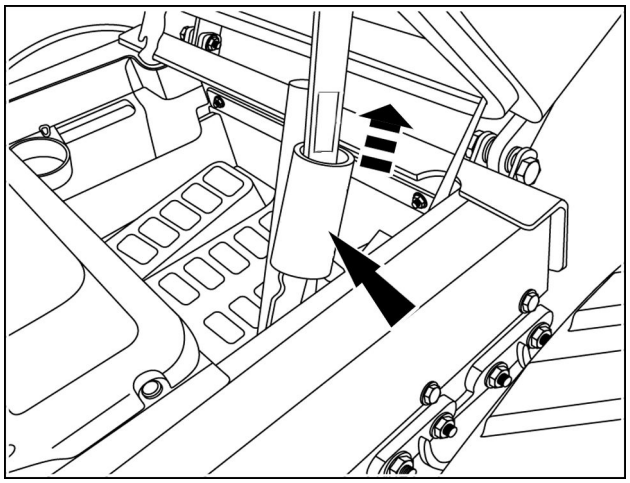
3. Confirm that the red lock tube has lowered over the cab pivot linkage. If it has, the cab tilt position is now secure.



RAPH12SSL0420BA 8

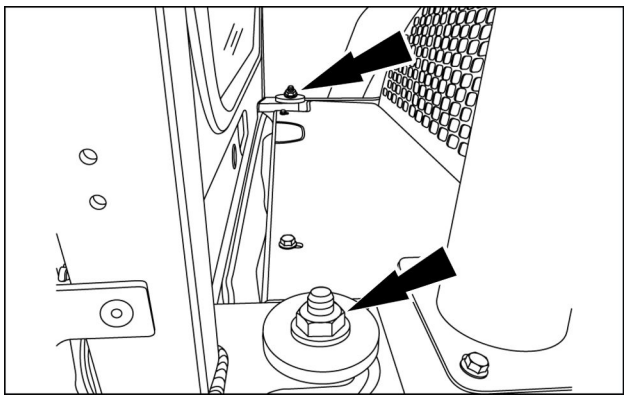
Tilt and secure the cab for machine operation

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



RAPH12SSL0420BA 9

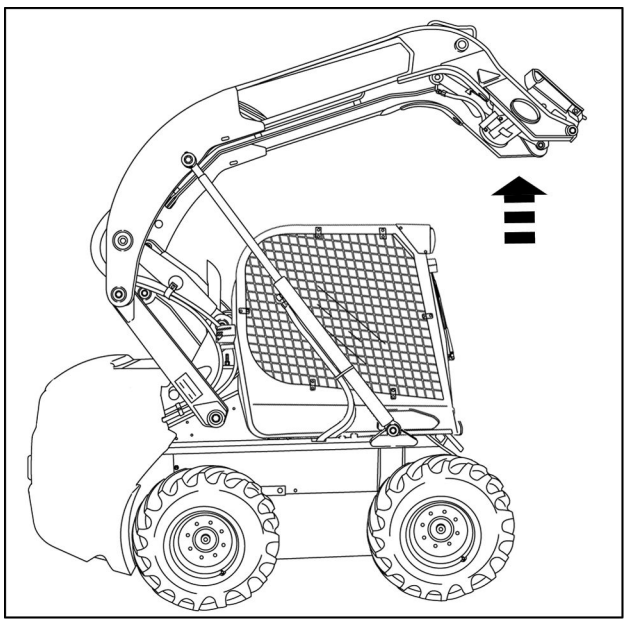
3. Install the retaining nuts. Torque the nuts to **170 N·m** (**125 lb ft**).



931001633 10

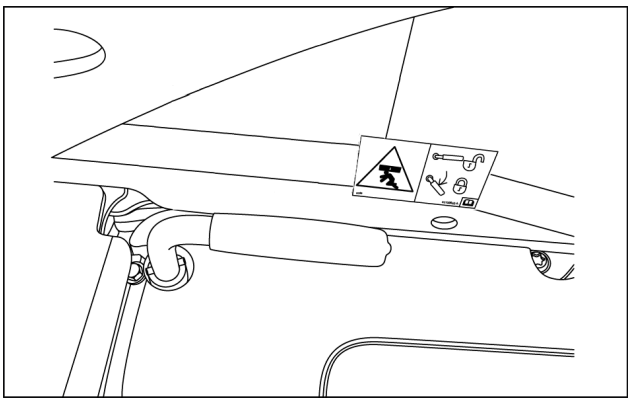
Unlock and lower the loader arm for machine operation

1. Sit in the operator's seat, fasten the seat belt, pull the restraint bar down (if equipped), and start the engine.
2. Press the operate button to enable the hydraulics.
3. Fully raise the loader arm.



RAPH14SSL0351BA 11

4. Rotate the lock lever away from the seat (counter clockwise) to retract the lock pin(s).
5. Lower the loader arm.
6. Commence work operations or park the machine and stop the engine.



RAIL16SSL0012AA 12

No engine power - loader arm up and down control

⚠ DANGER

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 will result in death or serious injury.

D0168A

NOTE: *The override control knob is for service and emergency situations only and should not be used in day-to-day operations.*

In the event of the loss of engine power, the override control knob will allow the operator to raise or lower the loader arm. See the decal on the override control knob **(1)** (red control knob on the right-hand side of the operator's seat).

Before attempting to raise or lower the loader arm/attachment on a machine that has lost engine power, alert personnel in the area of your intention. Do not leave the seat, or unfasten the seat belt or raise the restraint bar (if equipped).

To lower the loader arm/attachment:

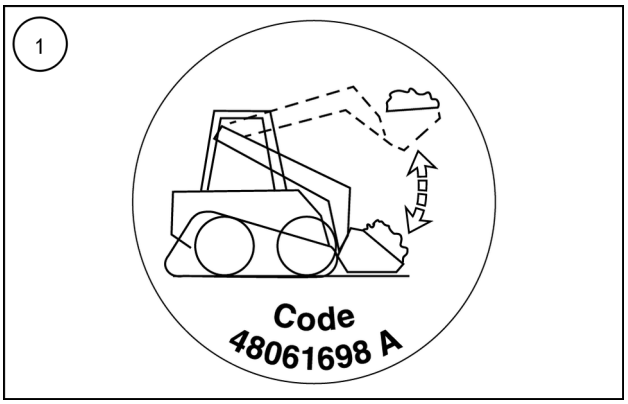
1. Confirm that personnel and obstacles are clear.
2. Pull the override control knob UP. The loader arm/attachment will start to lower.
3. To stop the loader arm/attachment from lowering, press the control knob DOWN at any time.
4. Once the loader arm/attachment is safely supported on the ground or on the loader arm lock support, make sure that the override control knob is completely in the DOWN position.

To raise the loader arm/attachment:

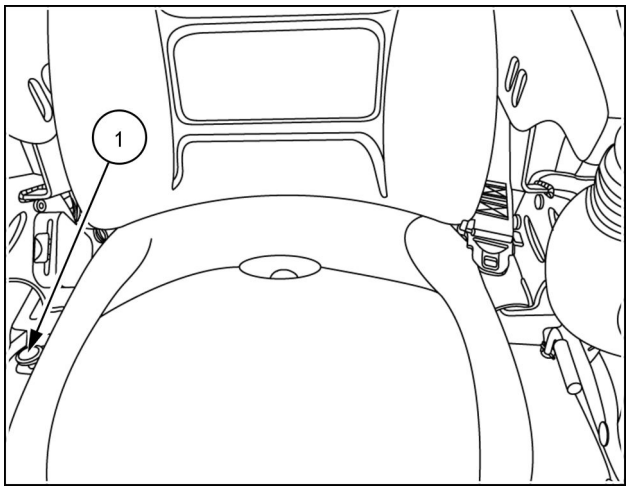
1. Have an assistant attach a secondary external lifting device to the front of the loader arm.

   NOTICE: *Do not attempt to move or lift the machine while raising the loader arms. You may damage the loader arm or attachment.*

2. Confirm that personnel and obstacles are clear.
3. Pull the override control knob UP while the assistant raises the secondary external lifting device.
4. Engage the loader arm lock as shown on "Loader arm lock and cab tilt procedure - radial lift machines" **2-18** or "Loader arm lock and cab tilt procedure - vertical lift machines" **2-22**.
5. Press the override control knob DOWN before disconnecting the external lifting device.



48061698A 1



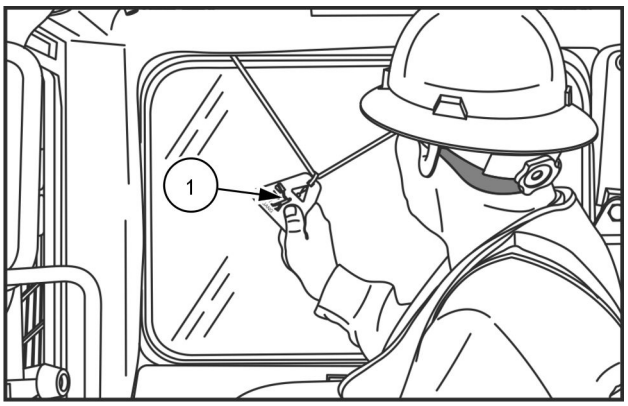
93107465A 2

Emergency exit

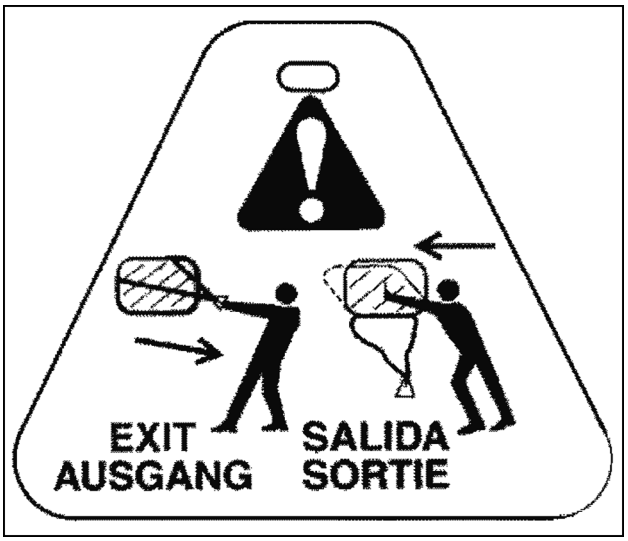
The rear window can be removed to provide an exit for the operator in the event the front exit is blocked.

To remove the rear window, pull on the tag **(1)** and remove the window molding strip. Push on the bottom half of the window to force it away from the molding.

NOTICE: *If the rear window was removed for use as an exit, do the following before you operate the machine: Install the rear window and the molding. Secure the window in place with the locking strip.*



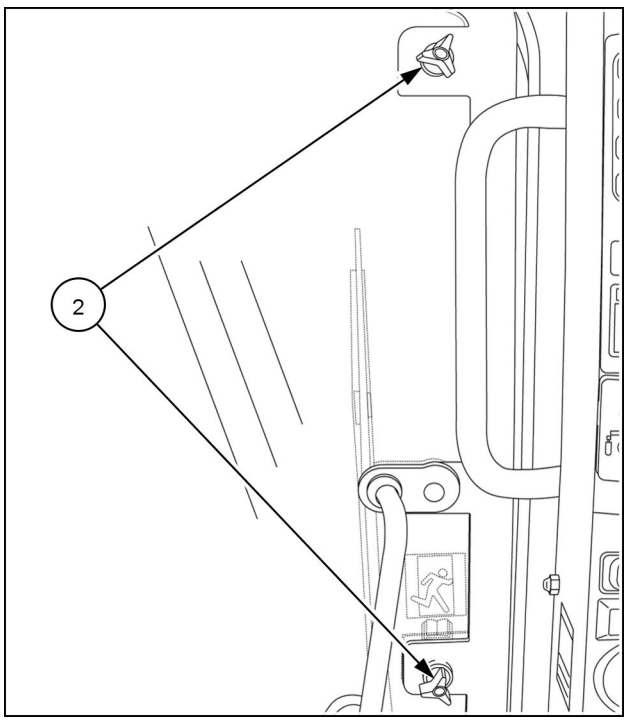
20100005 1



RAPH12SSL0289BA 2

The front door can be removed from the inside to provide an exit for the operator in the event the front door will not open. To remove the front door from inside the unit, unscrew and remove the two hand knobs **(2)** on the right side of the door window and push to remove the front door.

NOTICE: *If the front door was removed for exiting, reinstall the front door before operating the skid steer.*



RAIL13SSL0083BA 3

Ecology and the environment

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

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

Helpful hints

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

Battery recycling

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

NHIL14GEN0038AA 1

Mandatory battery recycling

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

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

Points of sale are obliged to:

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

Safety signs

⚠ WARNING

Avoid injury!
Make sure safety signs are legible. Clean safety signs regularly. Replace all damaged, missing, painted over, or illegible safety signs. See your dealer for replacement safety signs. If a safety sign is on a part that is replaced, make sure the new part has a safety sign.
Failure to comply could result in death or serious injury.

W0168A

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

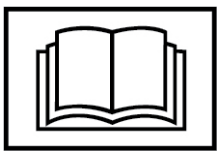
Keep all safety signs clean and legible. Clean safety signs with a soft cloth, water, and gentle detergent.

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

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

Read operator's manual symbol

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



Read service manual symbol

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

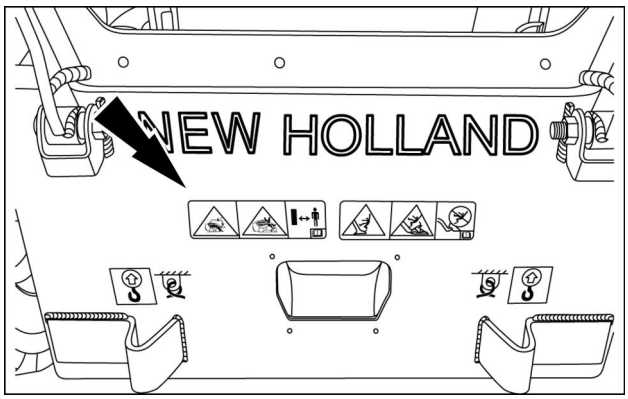
Following is a listing of Safety signs and locations. Read and understand them before operating the machine.

DANGER
CRUSH HAZARD
Keep out of this area when lift arm is raised, unless lift arm is supported by the support strut. Failure to comply will result in death or serious injury.

Quantity: 1
Part number: 84367564

84367564_A 1

Location:
Under the entry door way.



931002312 2

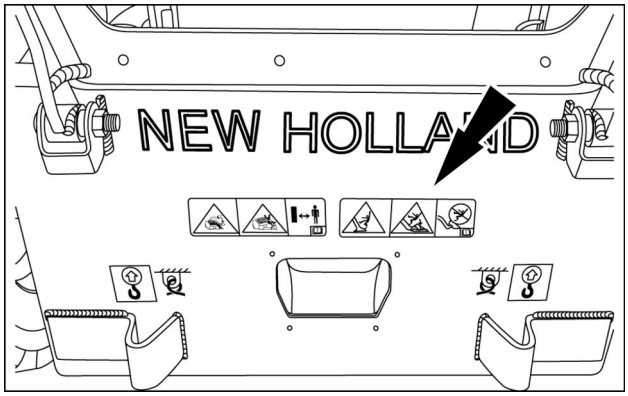
NOTE: *Read and understand the "Loader arm lock and cab tilt procedure - radial lift machines" page* ***2-18*** *or "Loader arm lock and cab tilt procedure - vertical lift machines" page* ***2-22*** *in this manual.*

WARNING
FALL HAZARD
NO Riders. Not a man lift or work platform. Failure to comply could result in death or serious injury.

Quantity: 1
Part number: 84374821

84374821_A 3

Location:
Under the entry door way.



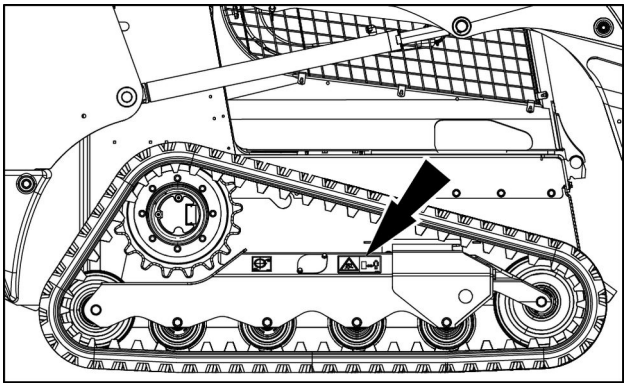
931002312A 4

CAUTION
Flying debris. Stay clear. Failure to comply could result in minor or moderate injury.

Quantity: 2
Part number: 84004739

84004739 D 5

Location:
On the track debris guard. One on each side of the machine.

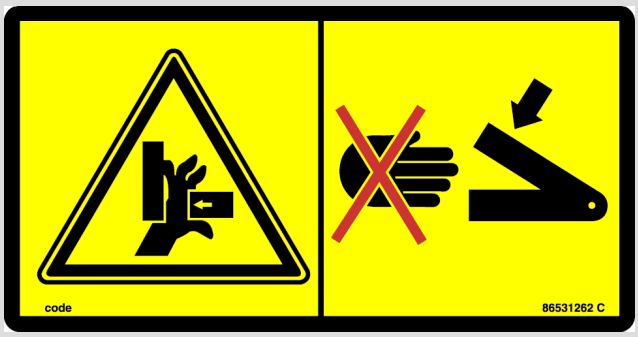


RAIL15SSL0357AA 6

NOTE: *Only applicable to Compact Track Loaders (CTL) models C227, C232, and C238.*

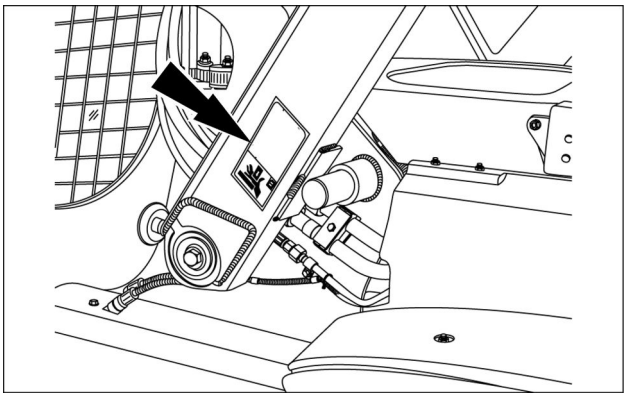
WARNING
Avoid pinch area. Keep clear of moving parts. Keep bystanders clear of the skid steer when operating unless the lift arm is down on the ground or the lift arm is resting on the lift arm lock and engine is off. Never extend any part of the body outside of the operators area. Failure to comply could result in death or serious injury.

Quantity: 1
Part number: 86531262



86531262 7

Location:
On the left-hand side of the boom where it rests against the lift arm support pin.



93107457 8

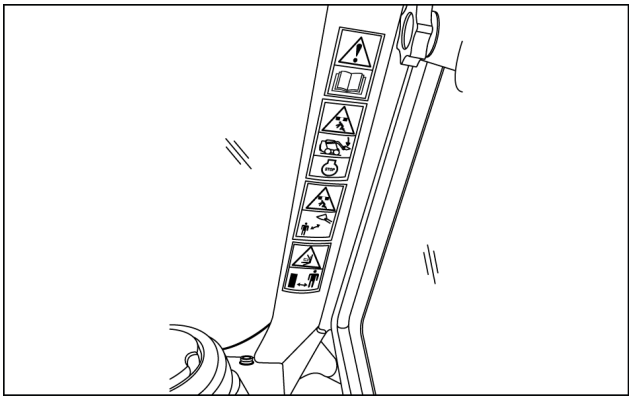
NOTE: *Read and understand the "Loader arm lock and cab tilt procedure - vertical lift machines" page* ***2-22*** *in this manual. Only applicable to models L218, L220, L223, L225, L230, C232, and C238.*

WARNING
Read Operator's manual. Fasten seat belt. No riders. Keep others away. Not a man lift machine. Failure to comply could result in death or serious injury.
DANGER
CRUSH HAZARD
Before leaving seat:
Lower lift arm or engage lift arm lock pin or strut. STOP engine. Move loader controls to check for loader movement. Failure to comply will result in death or serious injury.

Quantity: 1
Part number: 84367418

84367418_A 9

Location:
Under the right-hand side of the instrument cluster.



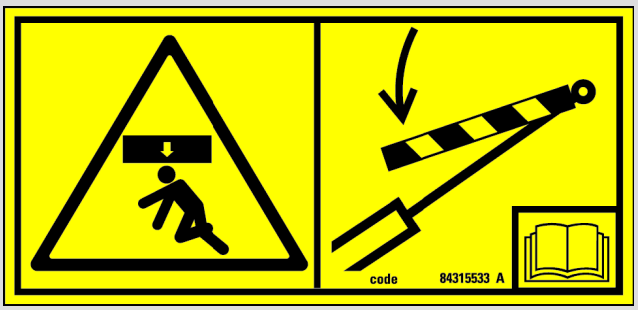
931002315 10

NOTE: *Read and understand the "General safety rules" on page* ***2-2****.*

NOTE: *Read and understand the "Loader arm lock and cab tilt procedure - radial lift machines" page* ***2-18*** *or "Loader arm lock and cab tilt procedure - vertical lift machines" page* ***2-22*** *in this manual.*

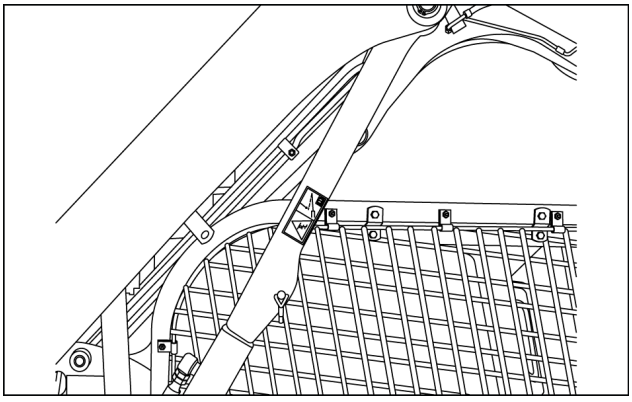
WARNING
CRUSH HAZARD
Always engage the loader lift arm support strut when the lift arms are raised for service and / or maintenance. Failure to comply could result in death or serious injury.

Quantity: 1
Part number: 84315533



84315533 11

Location
On the inside of lift arm above the support strut that is mounted on the right-hand side of the loader arm.

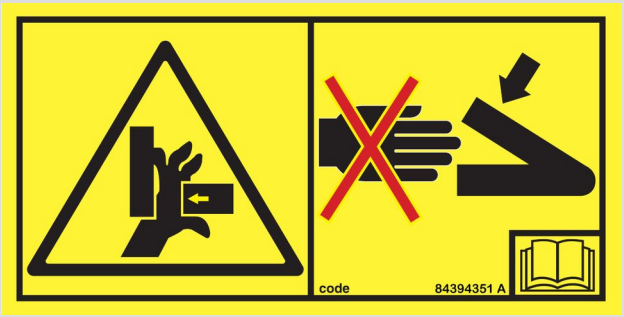


931002327 12

NOTE: *Read and understand the "Loader arm lock and cab tilt procedure - radial lift machines" page* ***2-18*** *in this manual. Only applicable to models L213, L215, and C227.*

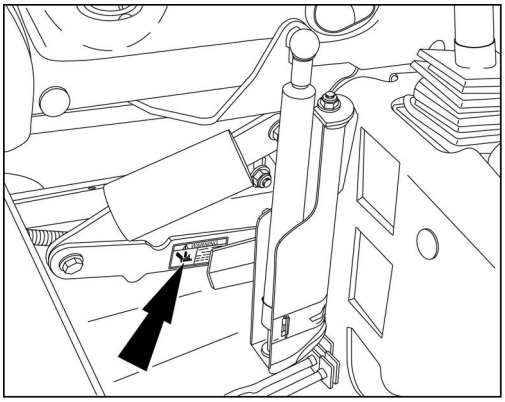
WARNING
CRUSH HAZARD
Always engage the cab pivot support strut when the cab is tilted forward. Failure to comply could result in death or serious injury.

Quantity: 2
Part number: 84394351



84394351_A 13

Location:
On each side of the Roll Over Protective Structure (ROPS) lock mechanism.



RAIL13SSL0973BA 14

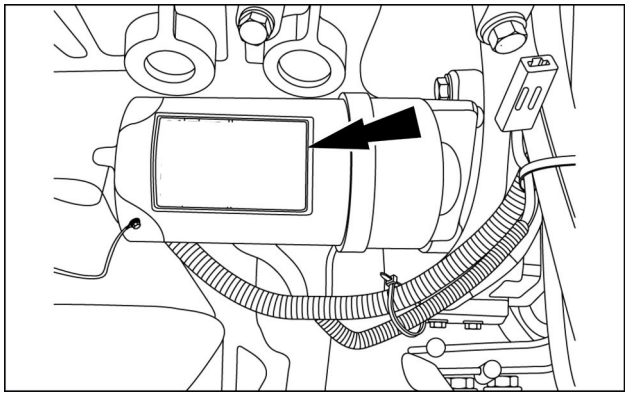
NOTE: *Read and understand the "Loader arm lock and cab tilt procedure - radial lift machines" page* ***2-18*** *or "Loader arm lock and cab tilt procedure - vertical lift machines" page* ***2-22*** *in this manual.*

DANGER
Starting in gear can cause death. Start engine only from the operator seat with transmission control(s) in NEUTRAL. Failure to comply WILL result in death or serious injury.

Quantity: 1
Part number: 175509A1

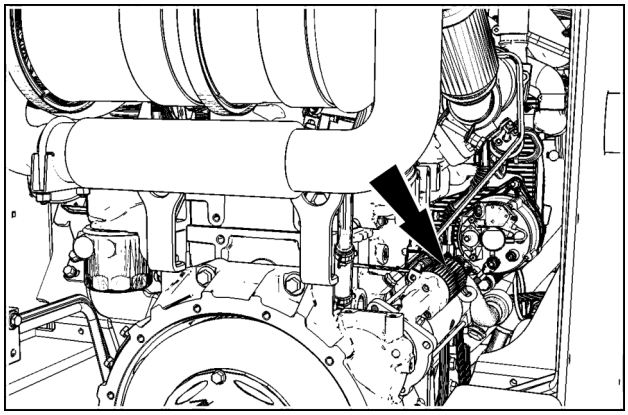
175509A1 15

Location:
On the right-hand side of the engine on top of the starter.
Models L213, L215, L218, and L220 only.



931002035 16

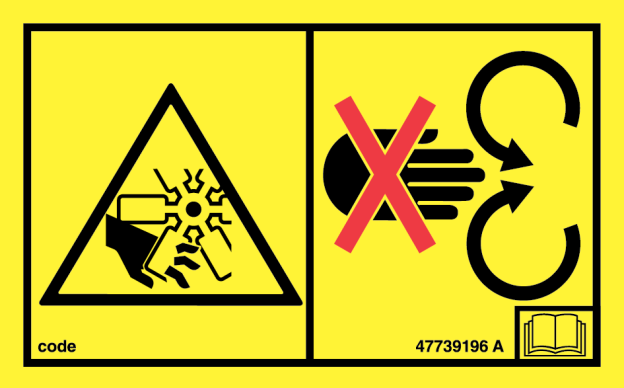
Location:
On the left-hand side of the engine on top of the starter.
Models L223, L225, L230, C227, C232, and C238 only.



RAPH16SSL0185BA 17

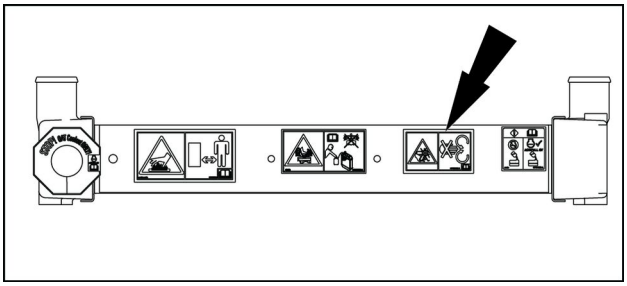
WARNING
Entanglement hazard! Keep hands and clothing away from rotating fan and belts. Failure to comply could result in death or serious injury.

Quantity: 1
Part number: 47739196



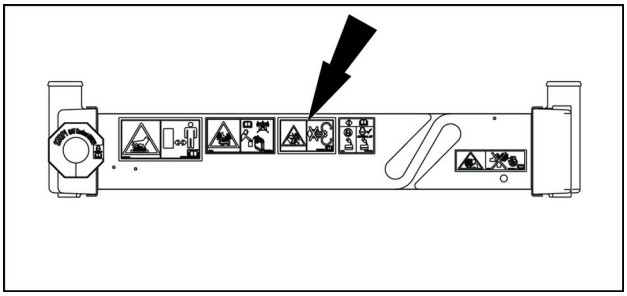
47739196_A 18

Location:
On top of the radiator under the hood. Model L213 only.



RAIL16SSL0014AA 19

Location:
On top of the radiator under the hood.



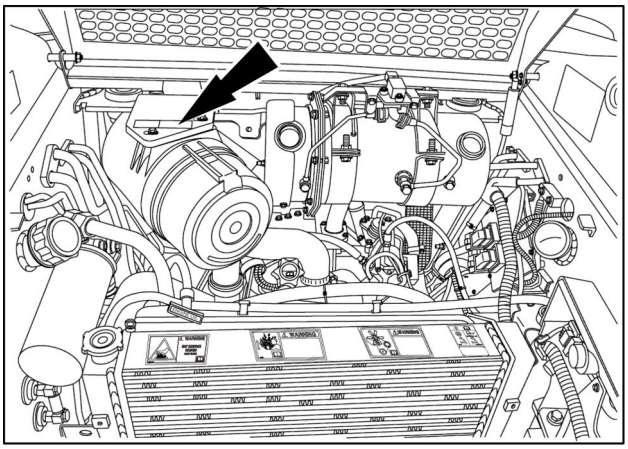
RAIL16SSL0015AA 20

WARNING
Explosion hazard! DO NOT use ether starting fluid. Failure to comply could result in death or serious injury.

Quantity: 1
Part number: 84535230

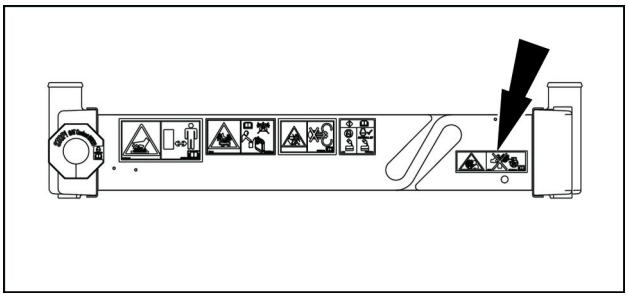
RAPH12SSL0074AA 21

Location:
Under the hood, on top of the air cleaner bracket. Model L213 only.



RAIL16SSL0034BA 22

Location:
Under the hood, on top of the radiator.



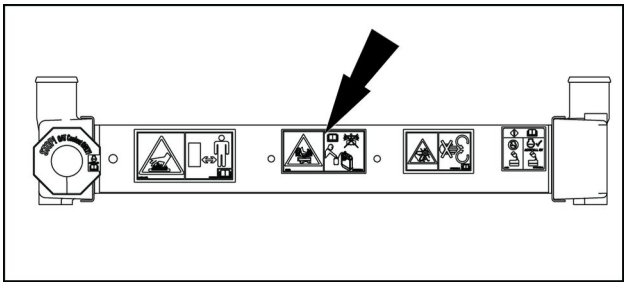
RAIL16SSL0015AA 23

WARNING
Burn hazard! DO NOT remove radiator cap. CHECK coolant level in recovery tank. Failure to comply could result in death or serious injury.

Quantity: 1
Part number: 87658005

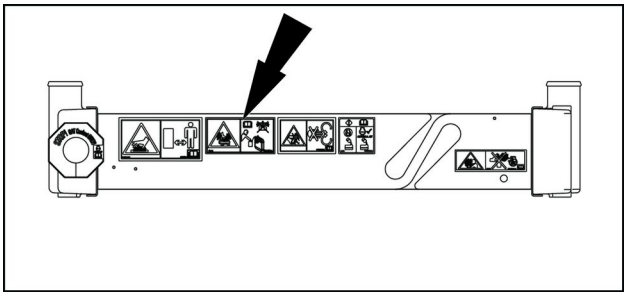
87658005_A 24

Location:
On top of the radiator under the hood. Model L213 only.



RAIL16SSL0014AA 25

Location:
On top of the radiator under the hood.

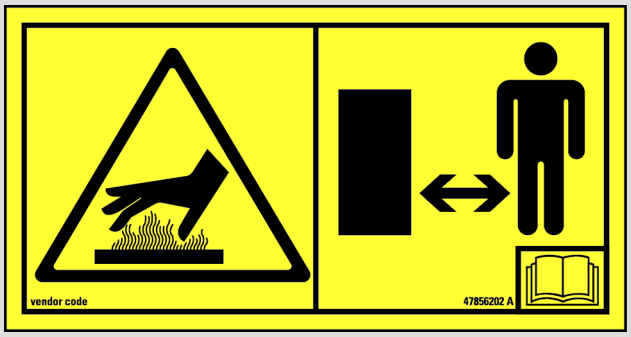


RAIL16SSL0015AA 26

NOTE: *Follow the procedures in the maintenance section of this manual.*

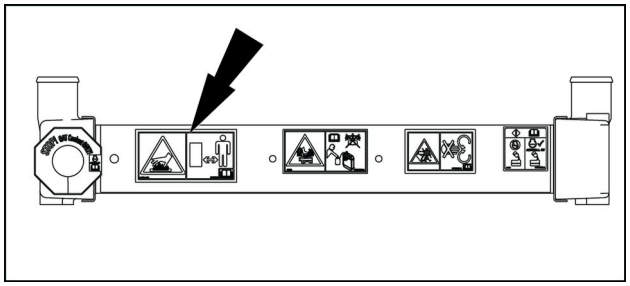
WARNING
Hot Surface Hazard. Stay clear.
Failure to comply could result in death or serious injury.

Quantity: 1
Part number: 47856202



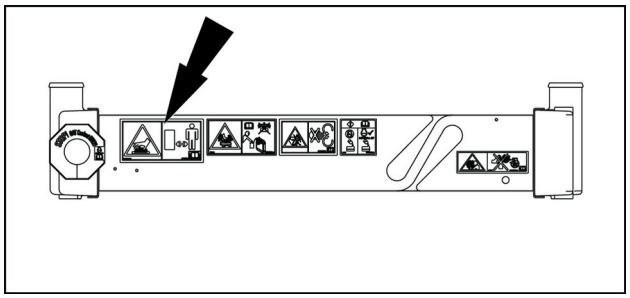
47856202_A 27

Location:
On top of the radiator. Model L213 only.



RAIL16SSL0014AA 28

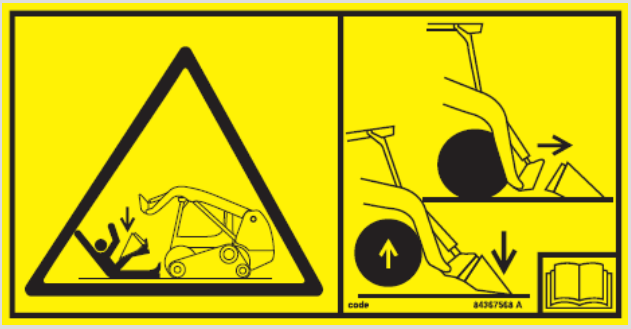
Location:
On top of the radiator.



RAIL16SSL0015AA 29

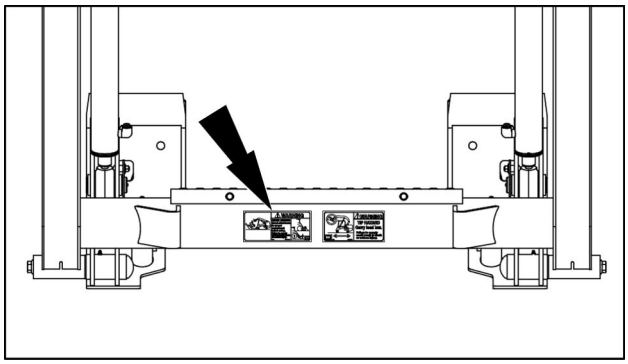
WARNING
CRUSH HAZARD
Check attachment for proper engagement before using. Failure to comply could result in death or serious injury.

Quantity: 1
Part number: 84367568



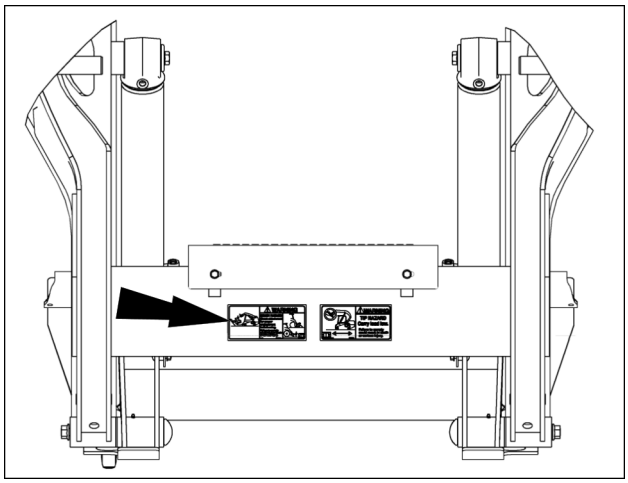
84367568_A 30

Location:
On the back side of the coupler cross member. Models L213 and L215 only.



RAIL16SSL0011AA 31

Location:
On the back side of the front loader arm cross tube. Models L218, L220, L223, L225, L230, C227, C232, and C238.

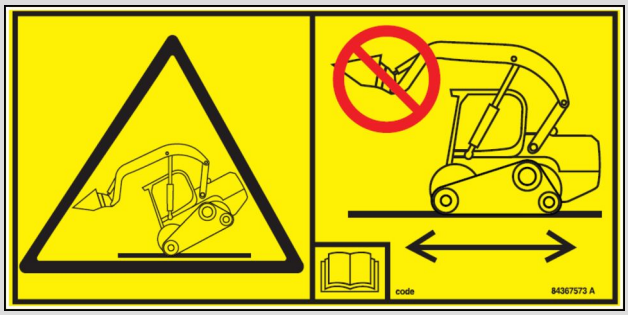


RAIL15SSL0374BA 32

NOTE: *Read and understand the "Mechanical attachment mounting system" page* ***6-1*** *or "Hydraulic attachment mounting system" page* ***6-4*** *in this manual.*

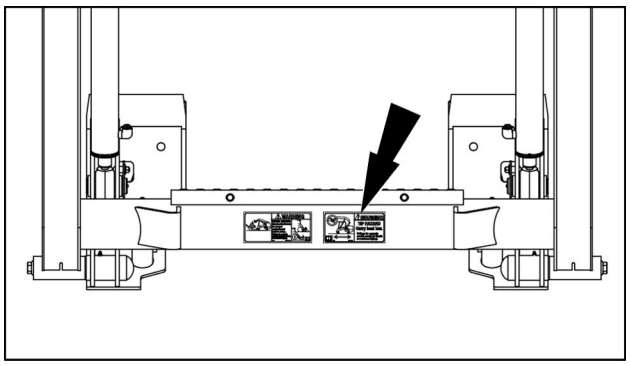
WARNING
TIP HAZARD
Carry load low. Failure to comply could result in death or serious injury.

Quantity: 1
Part number: 84367573



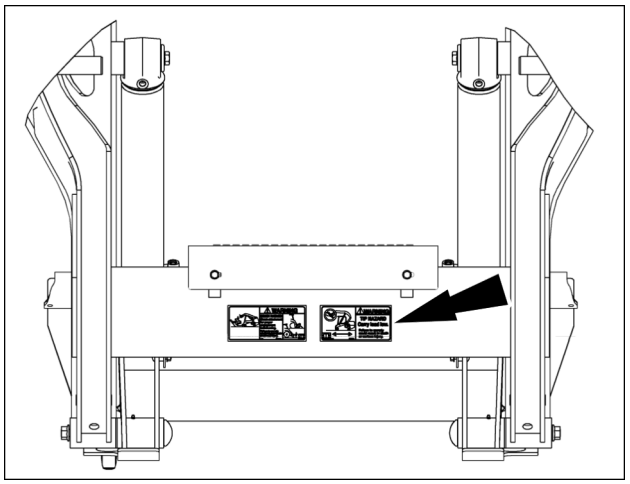
84367573_A 33

Location:
On the back side of the coupler cross member. Models L213 and L215 only.



RAIL16SSL0011AA 34

Location:
On the back side of the front loader arm cross tube. Models L218, L220, L223, L225, L230, C227, C232, and C238.



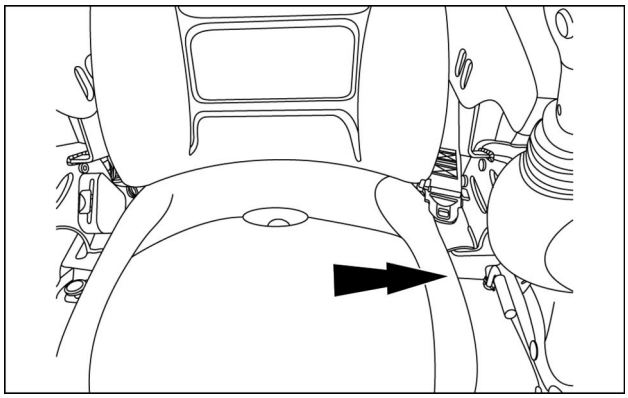
RAIL15SSL0374BA 35

WARNING
CRUSH HAZARD
Always engage the Loader Lift Arms support pin when Lift Arms are raised for service and/or maintenance. Failure to comply could result in death or serious injury.

Quantity: 1
Part number: 47739940

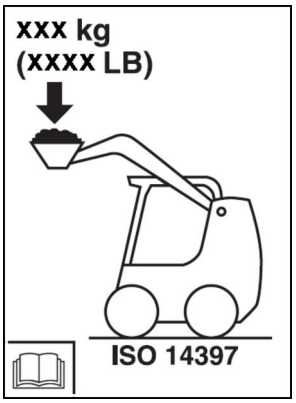
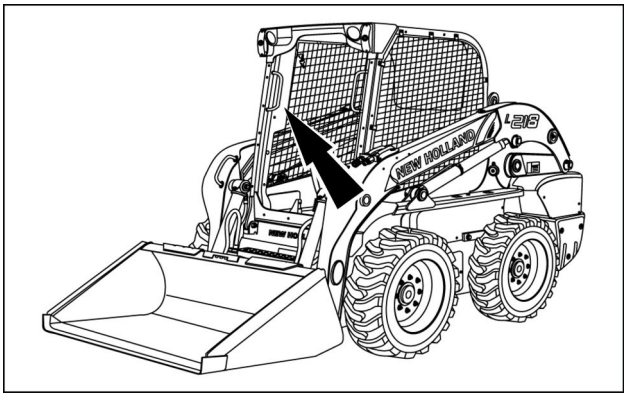
47739940 36

Location:
On the lower left-hand side of the operators seat, attached to the ROPS.



93107465 37

NOTE: *Read and understand the "Loader arm lock and cab tilt procedure - vertical lift machines" page* ***2-22*** *in this manual. Only applicable to models L218, L220, L223, L225, L230, C232, and C238.*

Model		SAE Rated Operating Capacity (ROC)	Decal part number	Decal/placement location
SSL	*L213	**590 kg** (**1300 lb**)	84350672	 93109348 38
	*L215	**680 kg** (**1500 lb**)	84350653	
	*L218	**818 kg** (**1800 lb**)	84373065	
	*L220	**905 kg** (**2000 lb**)	84350658	
	*L223	**1050 kg** (**2250 lb**)	84350676	
	*L225	**1135 kg** (**2500 lb**)	84350661	
	*L230	**1360 kg** (**3000 lb**)	84350664	
CTL	*C227	**859 kg** (**1894 lb**)	84350666	
	*C232	**1018 kg** (**2244 lb**)	84350667	
	*C238	**1209 kg** (**2665 lb**)	84350668	 931002659A 39

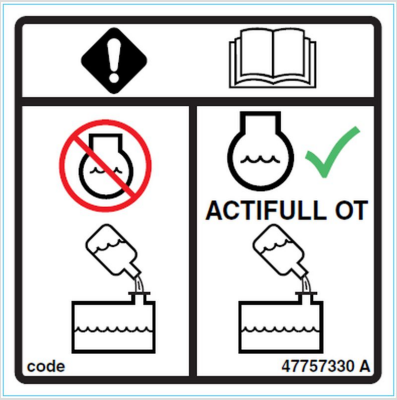
Location:
On right-hand console (post).

NOTE: **The Compact Track Loaders (CTL) are rated at **35%** of tipping capacity and the Skid Steer Loaders (SSL) are rated at **50%** of tipping capacity.*

NEVER mix Organic Acid Technology (OAT) coolant with conventional coolant. Under no circumstances should you top off a cooling system with only water.

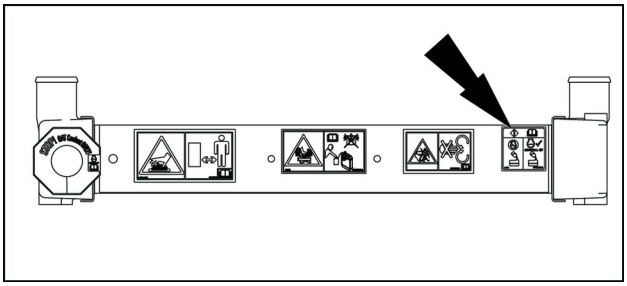
Quantity: 1

Part number: 47757330



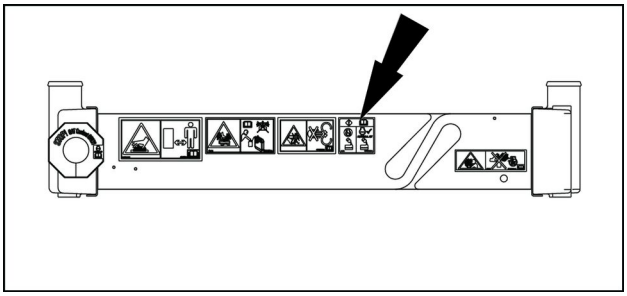
47757330 40

Location:
On top of the radiator. Model L213 only.



RAIL16SSL0014AA 41

Location:
On top of the radiator.



RAIL16SSL0015AA 42

NOTE: *See "Organic Acid Technology (OAT) coolant" **7-14** for more details.*

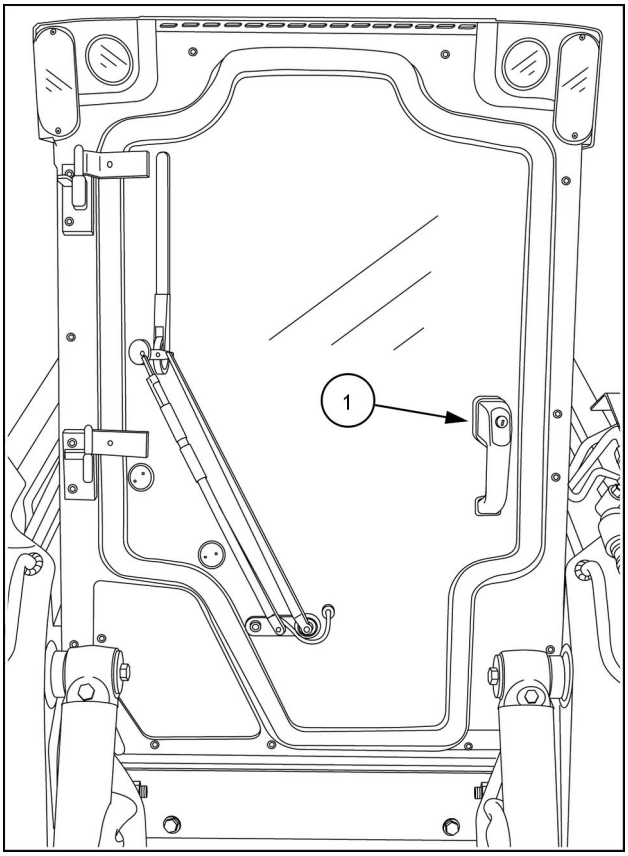
3 - CONTROLS AND INSTRUMENTS

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.

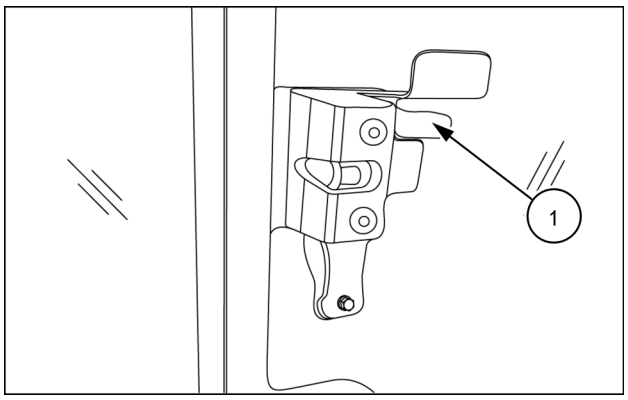


RAIL13SSL0706BA 1

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.*



93106894 2

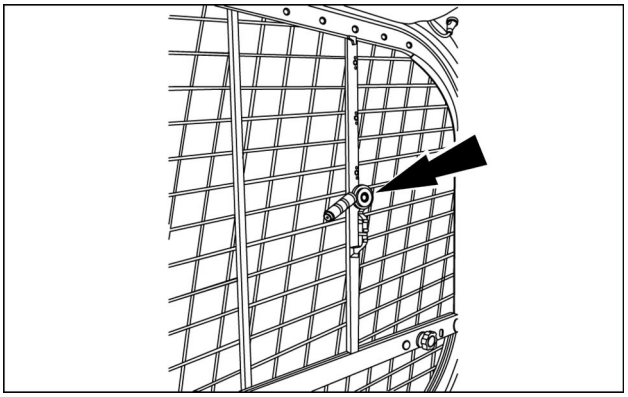
Window glass, cab

Opening and closing window glass

NOTE: *Machines may be equipped with either one of the styles shown. Follow the procedure that is applicable to your machine.*

Pivot lever window style

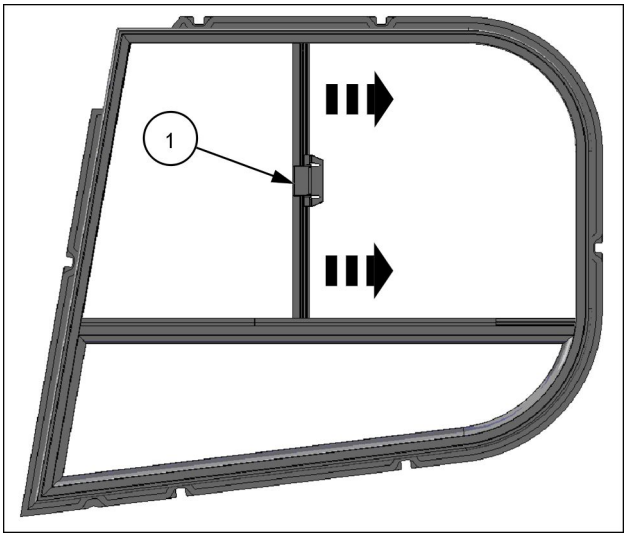
Each sliding glass section, when equipped, has an individual lever for window opening adjustment. Pivot lever down, to allow window movement and slide the glass to the desired position. Once the window is open, release the lever and window will maintain that spot.



931002268 1

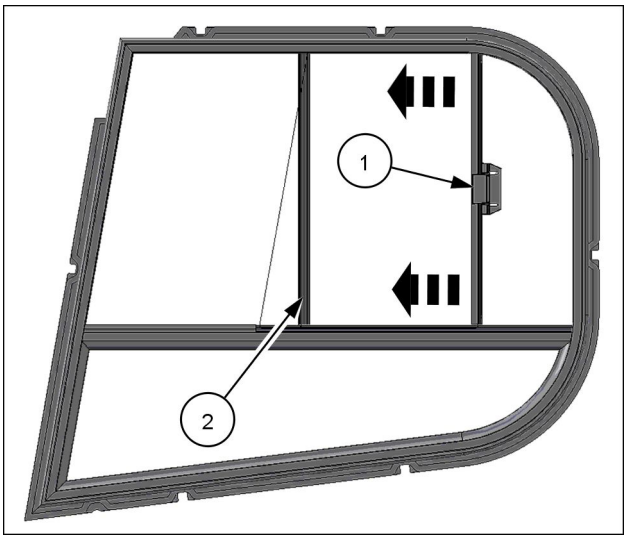
Window latch style

To open the window. Pull the front part of the window latch **(1)** and slide the window into the desired position. The window will maintain that spot.



RAIL17SSL0039BA 2

To close the window. Pull the front part of the window latch **(1)** and slide the window forward until the latch can engage the vertical rail of the fixed window **(2)**.

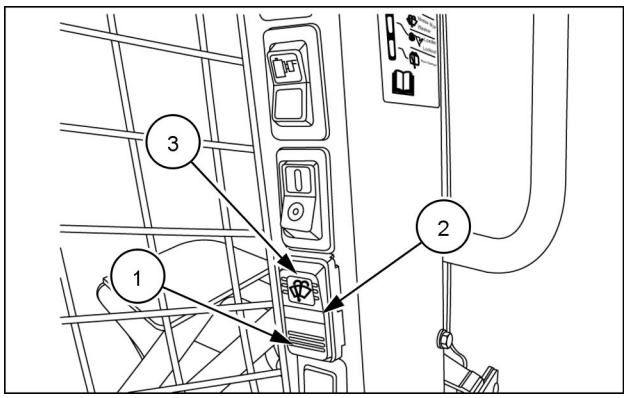


RAIL17SSL0038BA 3

Windshield wiper and washer controls

Windshield wiper switch

- This three position switch located on the left "A" post console turns the wiper ON, OFF and operates the washer fluid spray.
- Off position **(1)**.
- Center, on position **(2)**.
- Momentary spray, when released, switch returns to ON position **(3)**.

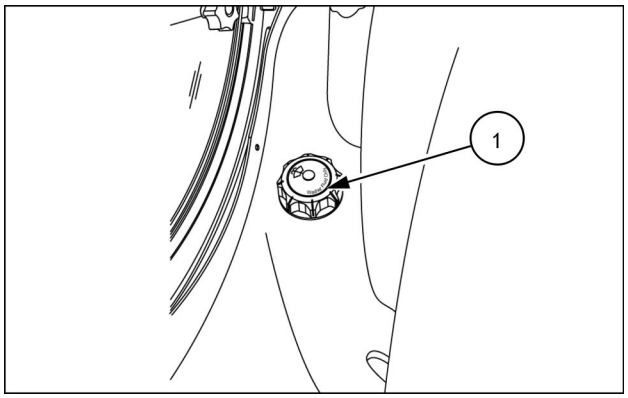


931007502A 1

Windshield washer reservoir **(1)**.

- The windshield washer reservoir is located in the lower right hand side of the cab behind the operators elbow.

NOTICE: *Never operate the windshield washer motor without fluid in the reservoir. Damage to the motor could occur.*

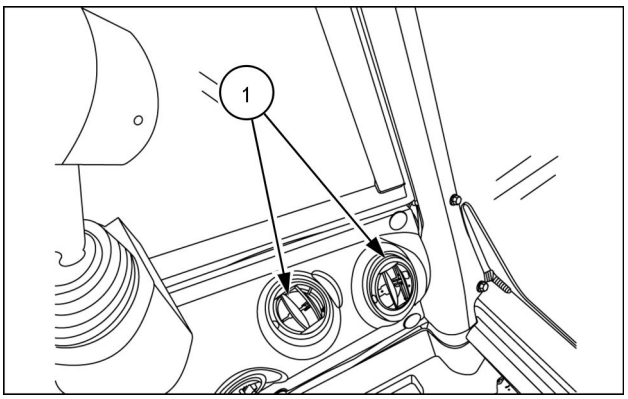


93109373 2

Cab air louvers

The air louvers **(1)** are located to the lower right and left of the operator and are adjustable for operator comfort. Air flow, direction and volume can be adjusted.

For maximum defrosting, point louvers in direction of desired defrost area. Air louvers can rotate **360°** and tilt up and down, to achieve the direction of operators desire.

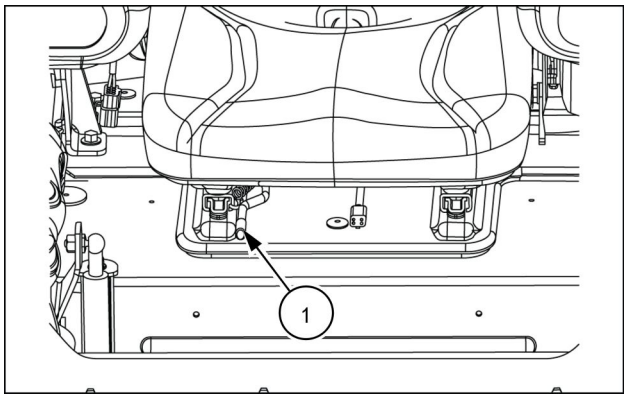


931007498 1

OPERATOR'S SEAT

Standard seat

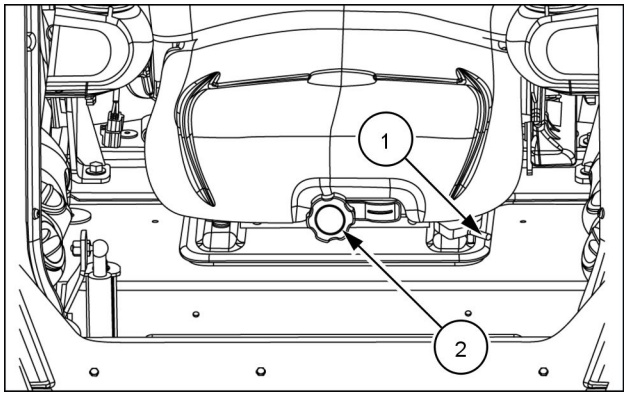
The standard seat is adjustable fore and aft using adjustment lever **(1)**.



93109314 1

Mechanical suspension seat

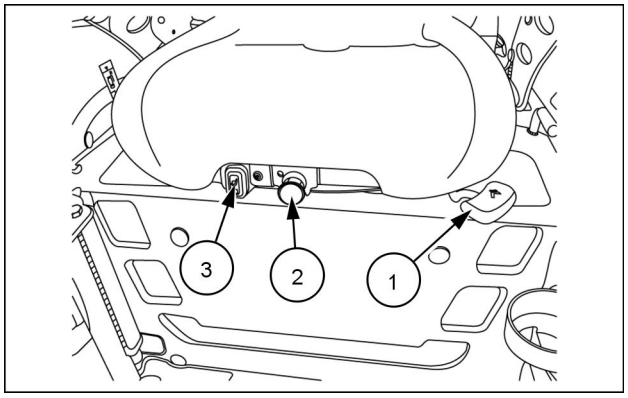
The mechanical suspension seat is adjustable fore and aft using adjustment lever **(1)**, and has a weight adjustment knob **(2)**. Turn the weight adjustment knob clockwise for heavier operators.



20109159 1

Air seat

The air seat is adjustable fore and aft using adjustment lever **(1)**, and has a weight adjustment system that uses an air pressure adjustment switch **(2)** that can be activated for heavier operators. Push to release pressure, for lighter operators and pull to add air pressure for heavier operators. This seat is also equipped with a heating element that is controlled by switch **(3)**.



93107461 1

Seat belt operation

⚠ 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

⚠ WARNING

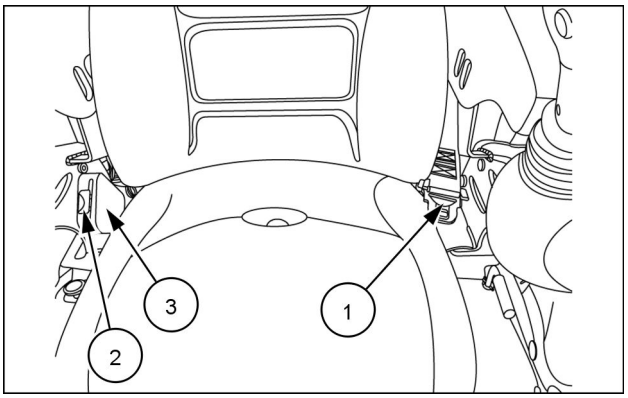
Avoid injury!
Before starting the engine, securely fasten the seat belt. The seat belt can help ensure your safety if it is properly used and maintained. Never wear a seat belt loosely or with slack in the belt system. Never wear the belt if it is twisted or pinched between the seat structures.
Failure to comply could result in death or serious injury.

W0142A

Overview

The unit is equipped with a retractable seat belt **(1)** that should be worn at all times.

Always securely fasten your seat belt before operating the machine. Carefully inspect the seat belts at regular six-month intervals for proper fit and function, oil-soaked or stained webbing, web fraying and corrosion. Replace the seat belt assembly immediately if damage such as worn or damaged hardware, nicked or frayed strap, buckle or retractor malfunction, or loose stitching is found. If such damage or wear is not found, some seat belt manufacturers recommend replacement of the seat belt every three years.
The belt can be cleaned with clean, soapy water. Do not use solvents, bleach, or dye on the belt as they may weaken it.

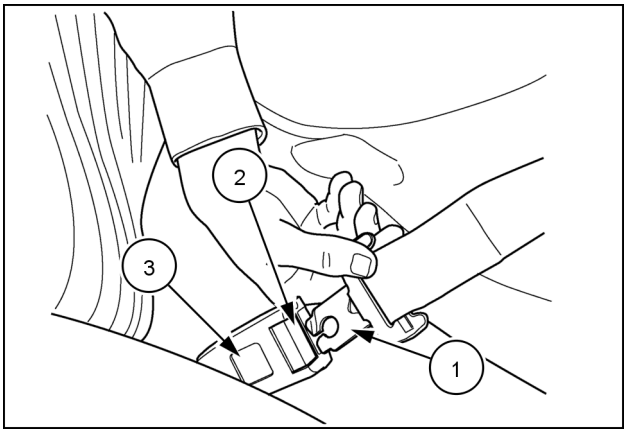


93107465 1

Seat belt

To fasten the belt, pull it from the reel and push the tongue end **(1)** into the buckle end **(3)** until a "click" indicates it is fully engaged.

To release the belt, push the red release button **(2)** on the buckle and pull the tongue from the buckle.



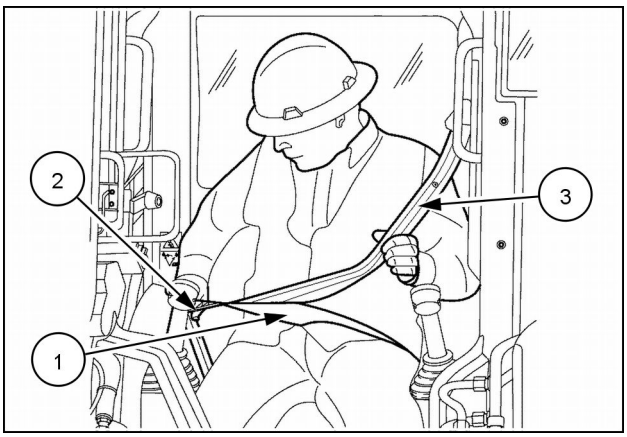
10041220 2

Shoulder belt

Pull the seat belt retractable half **(1)** across the operator and buckle securely with the buckle half **(2)**.

A shoulder belt **(3)** is available from your dealer. Some machine configurations are equipped with a shoulder belt.

NOTE: *A California required 3 inch webbing seat belt kit is available through dealer service parts. This belt may be necessary in some industrial applications. Check your local codes.*

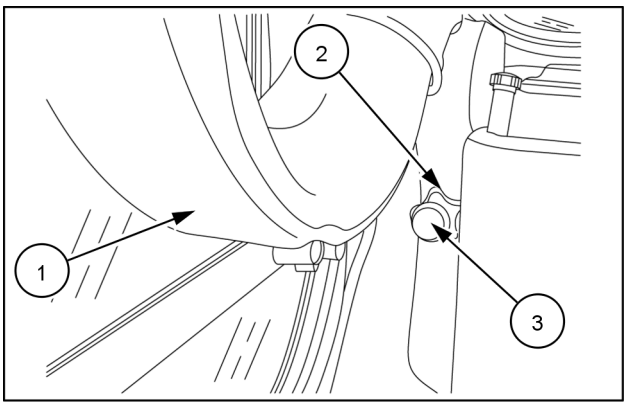


BD07C132I-3 1

Restraint bar (if equipped)

The restraint bar can be adjusted for operator comfort. To adjust the height of the restraint bar **(1)**:

1. Loosen the two lock knobs **(2)**. One on each side where the restraint rests on the back of the cab.
2. Turn the adjusting stops **(3)** out to raise the resting position of the restraint bar and in to lower the position.
3. Adjust the stops **(3)** so the restraint bar rests on both of the stops evenly.
4. Tighten the lock knobs **(2)**.



RAPH12SSL0066AA 1

MECHANICAL HYDRAULIC CONTROLS

Steering and travel

Moving the machine

⚠ 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

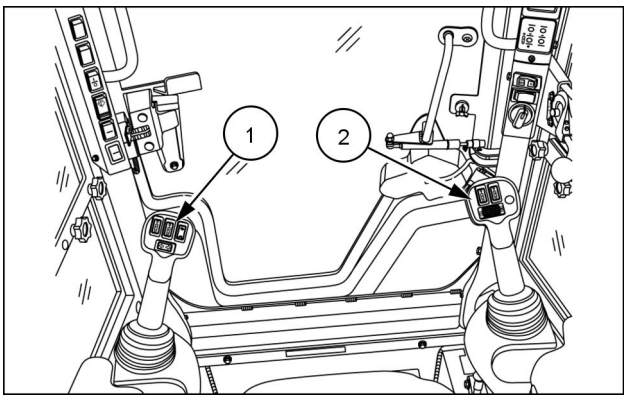
⚠ WARNING

Loss of control hazard!
Keep hands and feet on the appropriate controls at all times to maintain control of the machine.
Failure to comply could result in death or serious injury.

W0237A

Push both the left-hand control lever **(1)** and the right-hand control lever **(2)** forward, from neutral, to move the machine forward. Pull both of the control levers rearward, from neutral, to move the machine in the reverse direction. Move the control levers forward a short distance for slow speed. Move the control levers completely forward for maximum speed.

Move both control levers to NEUTRAL to stop movement of the machine.

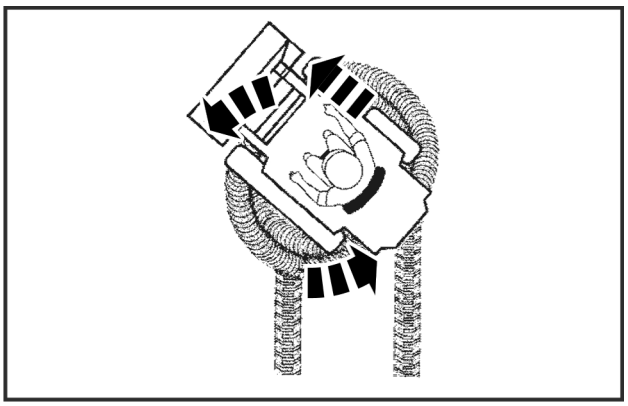


931007524 1

Turning the machine

Pivot turn - power to only one side

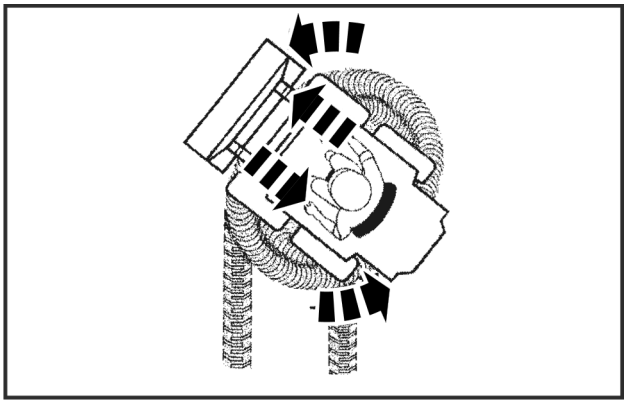
- To make a pivot turn left: hold the left steering control lever in neutral and move the right steering control lever forward.
- To make a pivot turn right: hold the right steering control lever in neutral and move the left steering control lever forward.
- To make a pivot turn in reverse left: after confirming that all personnel and objects are clear, hold the left steering control lever in neutral and move the right steering control lever rearward.
- To make a pivot turn in reverse right: after confirming that all personnel and objects are clear, hold the right steering control lever in neutral and move the left steering control lever rearward.



BT06G022 1

Counter rotation turn - power to both sides in opposing directions

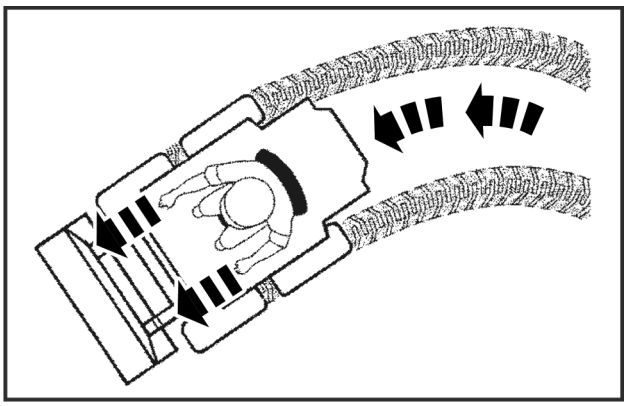
- To counter rotate left: move the left steering control lever rearward and push the right steering control lever forward.
- To counter rotate right: move the right steering control lever rearward and push the left steering control lever forward.



BT06G023 2

Gradual turn - power to both sides in the same direction

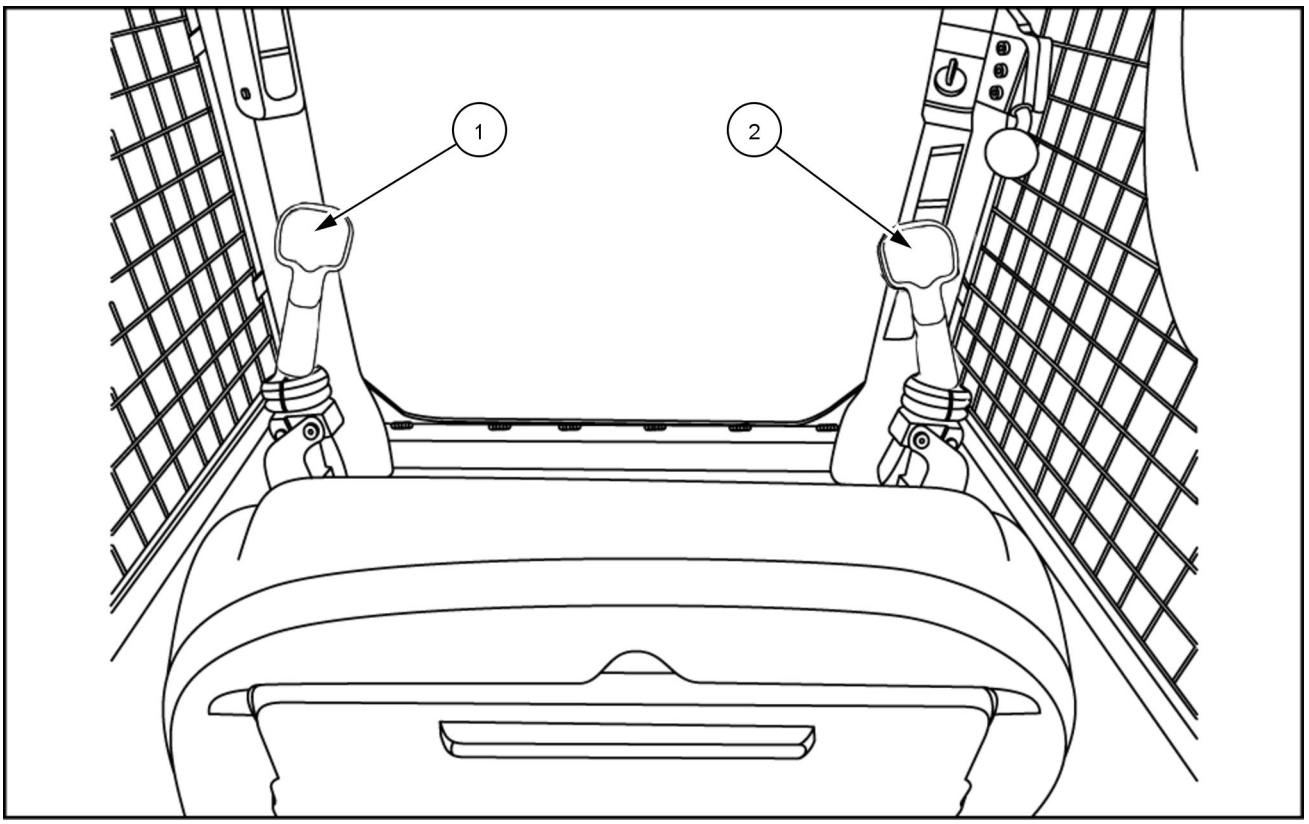
- To make a gradual turn left: move the right steering control lever further forward while pushing the left steering control lever partially forward.
- To make a gradual turn right: move the left steering control lever further forward while pushing the right steering control lever partially forward.



BT06G024 3

Lift arm and bucket controls

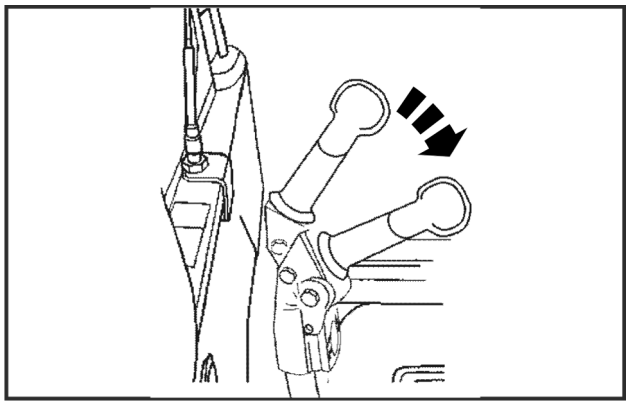
Hand controls



93109347C 1

Lift arm raise and lower control.

- The left-hand control lever **(1)** controls the lift arm. The lift arm will raise by pivoting the handle “UP” to the outside of the cab. Pivoting the handle “DOWN” to the inside of the cab will lower the lift arm.
- The lift arm spool is equipped with a detented “FLOAT” circuit if the operator wants the lift arm to float over changing ground contour. To put the valve in “FLOAT” position, pivot the left handle “DOWN” until a slight “jump” is felt. In this position, the handle is locked in float and does not return to the neutral position unassisted, but will do so when light pressure is applied to the handle to pivot it “UP”.

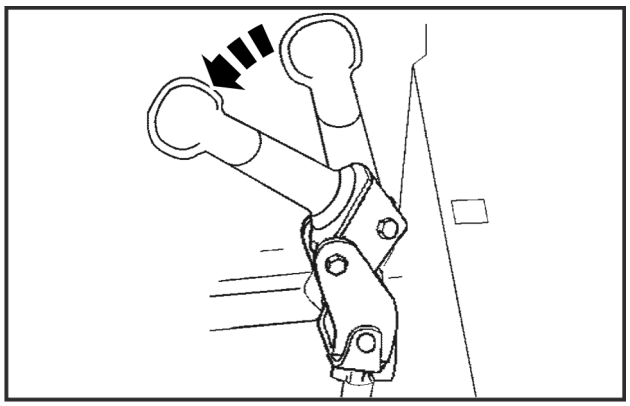


BT06H186 2

Bucket dump and curl control.

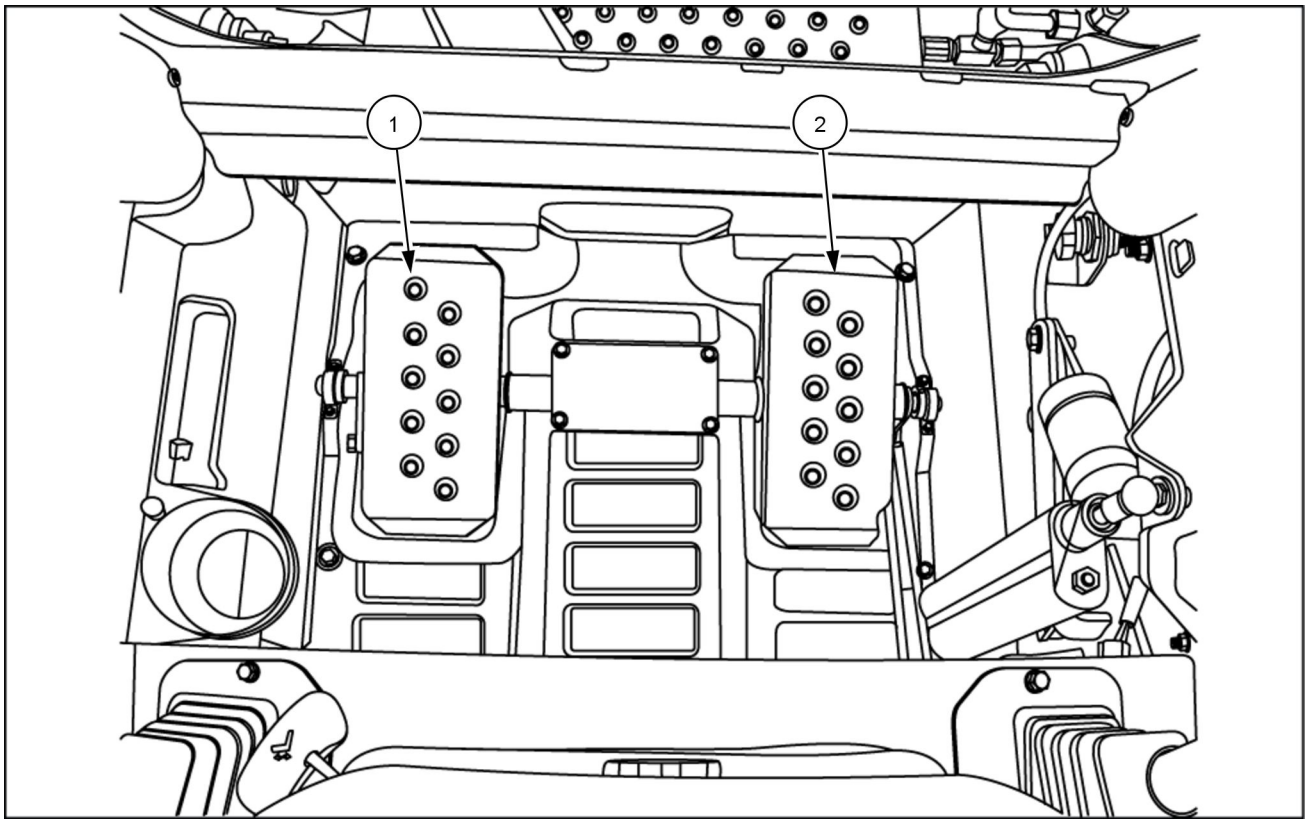
- The right hand control lever **(2)** controls the bucket. The bucket will dump by pivoting the handle “UP” to the outside of the cab. Pivoting the handle “DOWN” to the inside of the cab and the bucket will roll back (curl).

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



BT06H187 3

Foot pedals



931007501 1

Lift arm raise and lower control.

- The lift arm is controlled by the left foot pedal **(1)** located on the floor and is marked with a decal. The lift arm is raised by depressing the heel (rear) of the pedal. The lift arm is lowered by depressing the toe (front) of the pedal.
- The lift arm spool is equipped with a detented FLOAT circuit if the operator wants the lift arm to float over changing ground contour. To put the valve in FLOAT position, depress the toe of the pedal until a slight jump is felt. In this position, the pedal is locked in float and does not return to the neutral position unassisted, but will do so when light pressure is applied to the heel of the pedal.

Bucket dump and curl control.

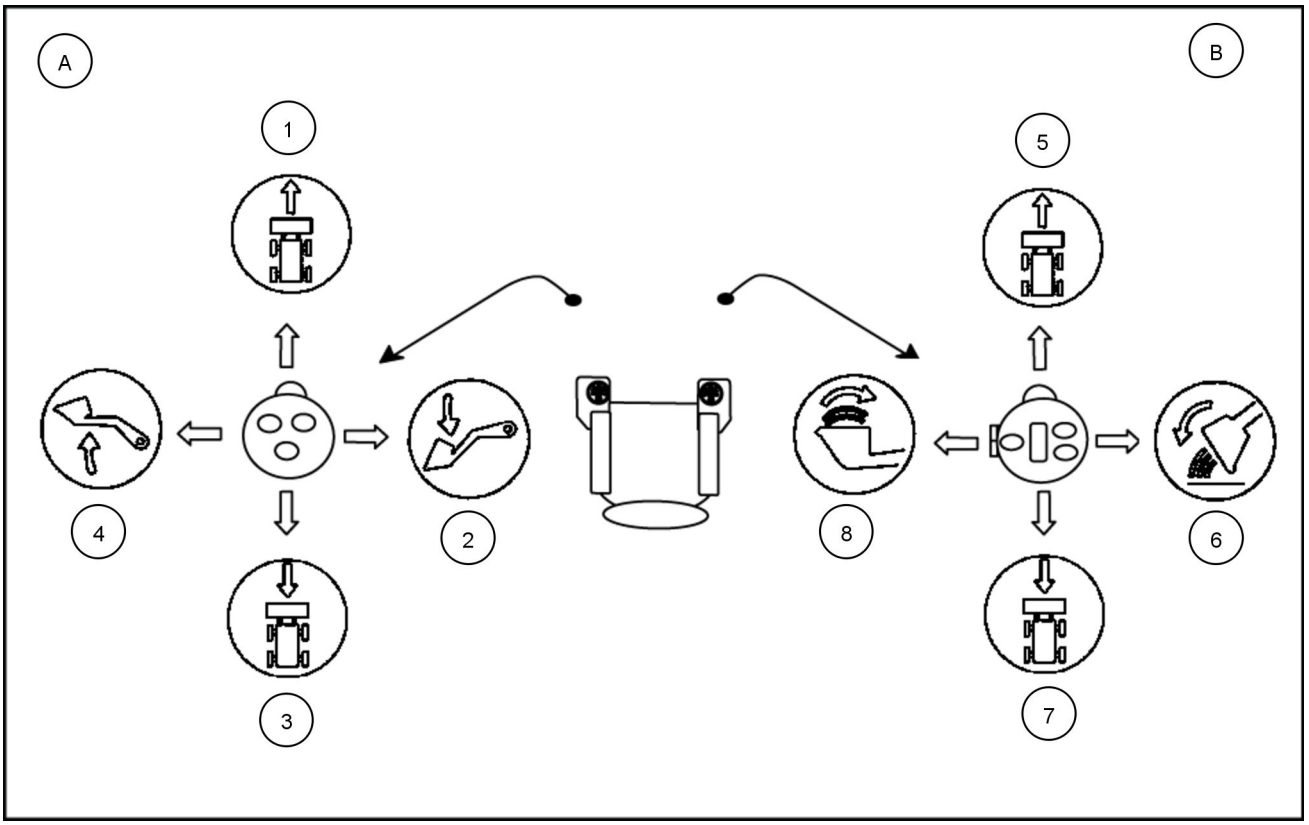
- The bucket is tilted by activation of the right foot pedal **(2)** located on the floor and is marked with a decal. For dumping, depress the toe end of the pedal. To achieve rollback (curl), push the pedal downward at the heel.

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

ELECTRO HYDRAULIC CONTROLS

Control pattern overview

Standard H control pattern



93100555 A1 1

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).

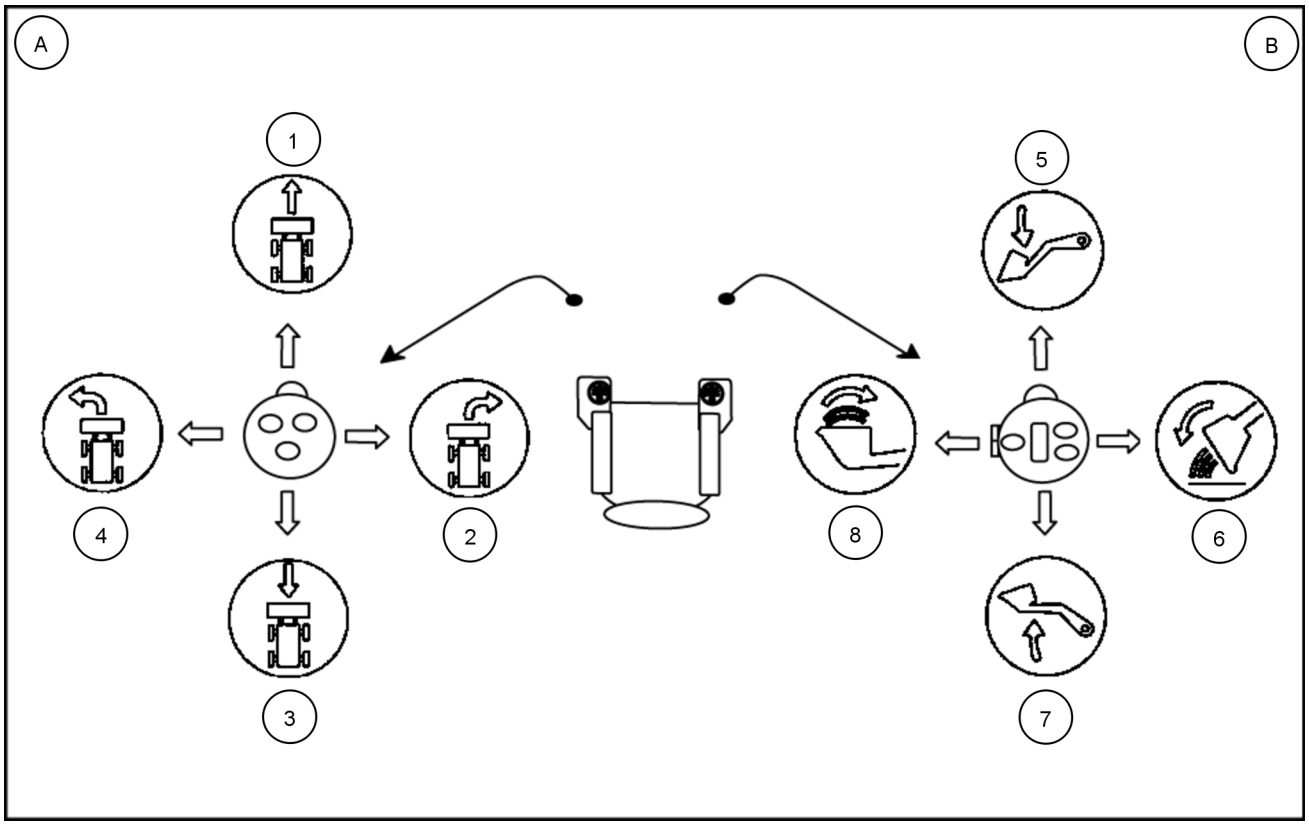
(A) Left-hand control lever	
(1)	Left side drive forward.
(2)	Loader arm lower.
(3)	Left side drive reverse.
(4)	Loader arm raise.

(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.*

Standard ISO control pattern



RAIL14SSL0314FA 1

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)	Drive forward.
(2)	Turn right, clockwise rotate.
(3)	Reverse.
(4)	Turn left, counter-clockwise rotate.

(B) Right-hand control lever	
(5)	Loader arm lower.
(6)	Dump bucket.
(7)	Loader arm raise.
(8)	Rollback bucket (curl).

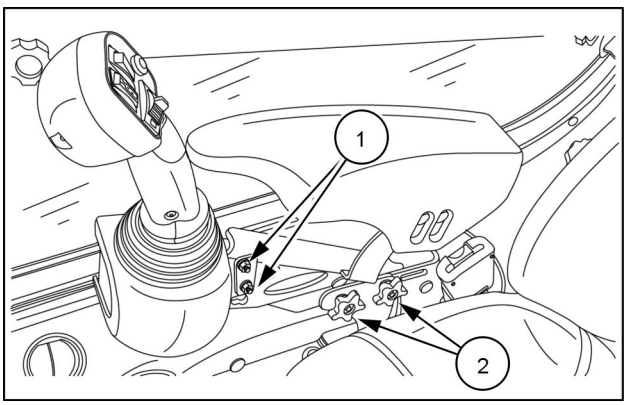
NOTE: *The standard ISO control pattern uses the left-hand control lever for ground drive functions and the right-hand control lever for loader arm and bucket functions.*

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

Electro-hydraulic control handle adjustment

The control levers can be adjusted for operator comfort.

1. Adjust the height of the control lever by loosening two nuts **(1)** and moving the control lever assembly into one of the three notches provided in the mounting bracket. Tighten the two nuts **(1)**.
2. Adjust the forward and rearward position of the control lever by loosening two hand knobs **(2)** and sliding the control lever assembly to the desired position. Tighten the hand knobs **(2)**.



RAIL14SSL0329AA 1

H control pattern steering and travel

Hand controls

⚠ 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

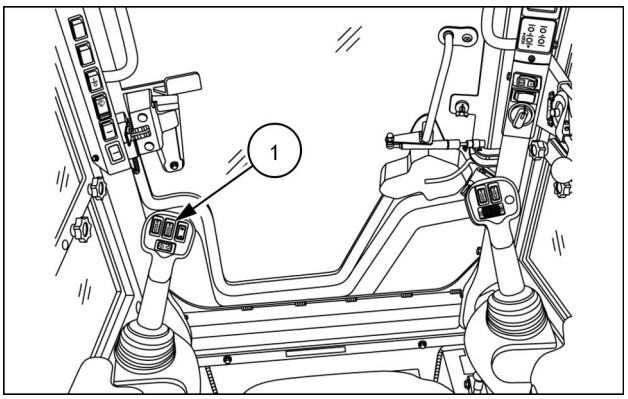
⚠ WARNING

Loss of control hazard!
Keep hands and feet on the appropriate controls at all times to maintain control of the machine.
Failure to comply could result in death or serious injury.

W0237A

Left-hand control lever

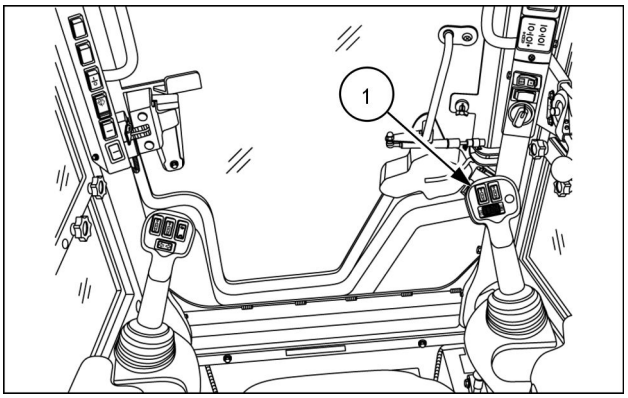
By moving the left-hand control lever **(1)** forward from neutral, the left side tires will rotate forward. When the left-hand control lever is moved rearward from neutral, the left side tires will rotate in reverse.



931007524 1

Right-hand control lever

By moving the right-hand control lever **(1)** forward from neutral, the right side tires will move forward. When the right-hand control lever is moved rearward from neutral, the right side tires will move in reverse.

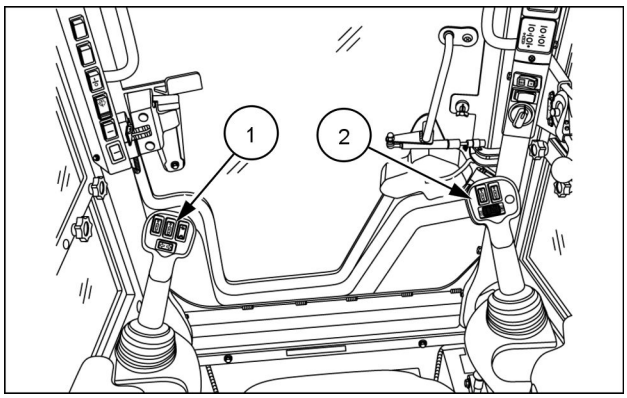


931007524 2

Moving the machine

Push both the left-hand control lever **(1)** and the right-hand control lever **(2)** forward from neutral, to move the machine forward. Pull both of the control levers rearward from neutral, to move the machine in reverse. Move the control levers forward a short distance for maximum power and slow speed. Move the control levers completely forward for maximum speed.

Move both control levers to NEUTRAL to stop movement of the machine.

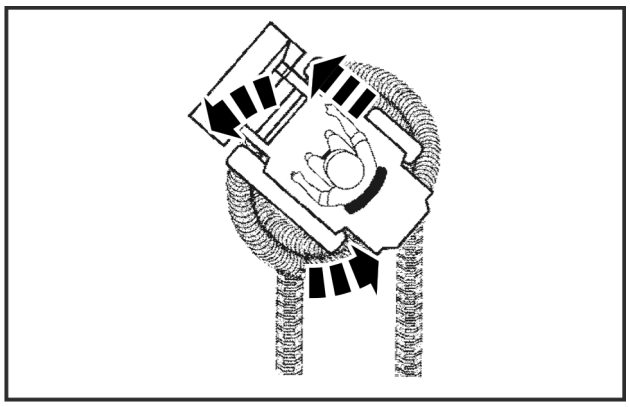


931007524 1

Turning the machine

Pivot turn - power to only one side

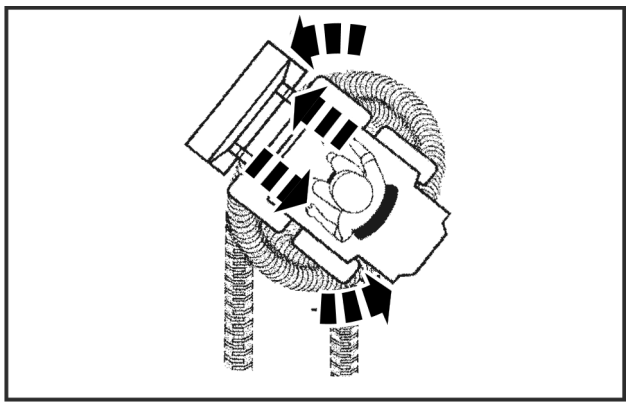
- To make a pivot turn left: hold the left-hand control lever in neutral and move the right-hand control lever forward.
- To make a pivot turn right: hold the right-hand control lever in neutral and move the left-hand control lever forward.
- To make a pivot turn in reverse left: after confirming that all personnel and objects are clear, hold the left-hand control lever in neutral and move the right-hand control lever rearward.
- To make a pivot turn in reverse right: after confirming that all personnel and objects are clear, hold the right-hand control lever in neutral and move the left-hand control lever rearward.



BT06G022 1

Counter rotation turn - power to both sides in opposing directions

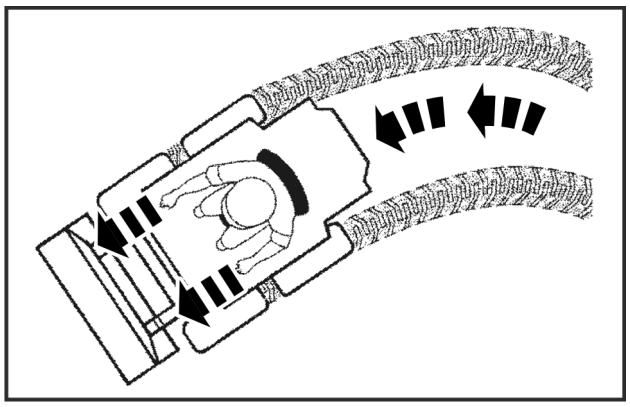
- To counter rotate left: move the left-hand control lever rearward and push the right-hand control lever forward.
- To counter rotate right: move the right-hand control lever rearward and push the left-hand control lever forward.



BT06G023 2

Gradual turn - power to both sides in the same direction

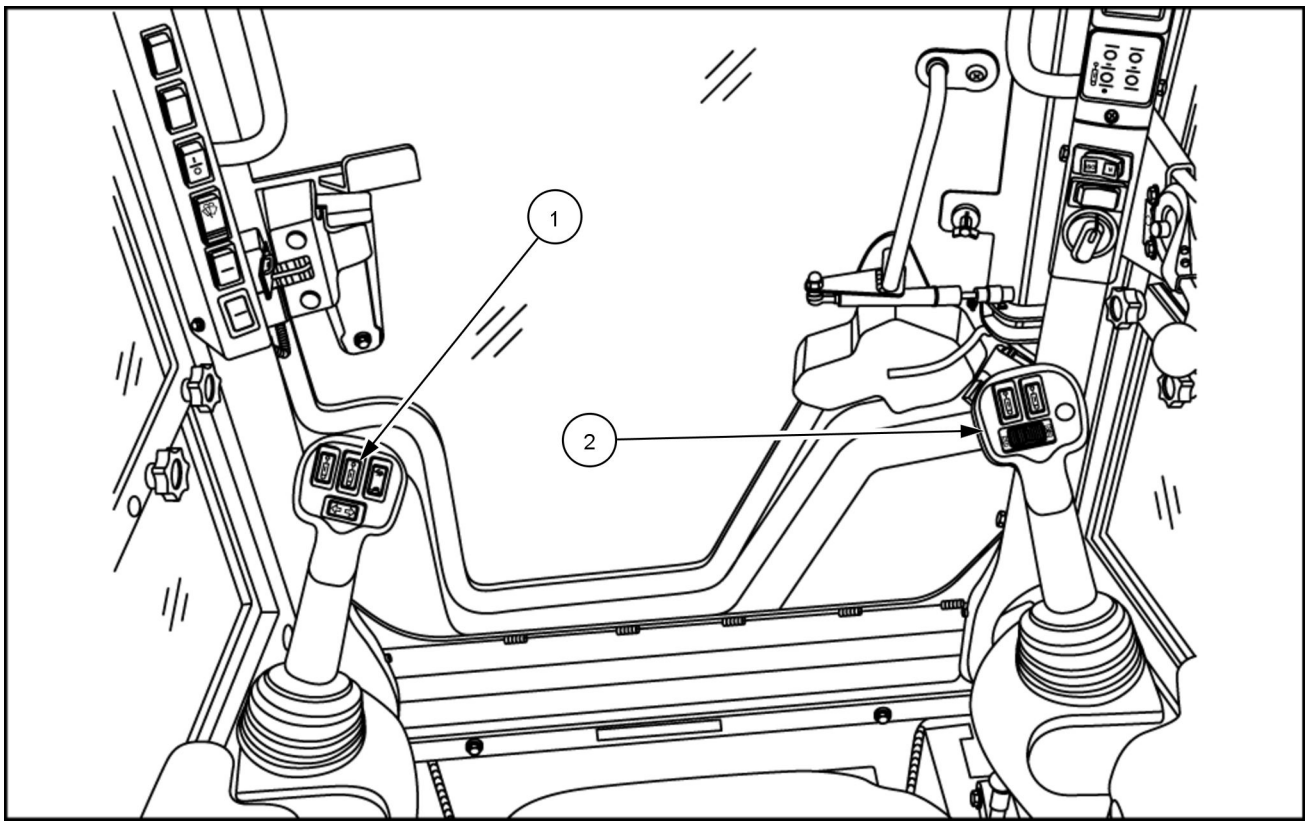
- To make a gradual turn left: move the right-hand control lever further forward while pushing the left-hand control lever partially forward.
- To make a gradual turn right: move the left-hand control lever further forward while pushing the right-hand control lever partially forward.



BT06G024 3

H control pattern lift arm and bucket controls

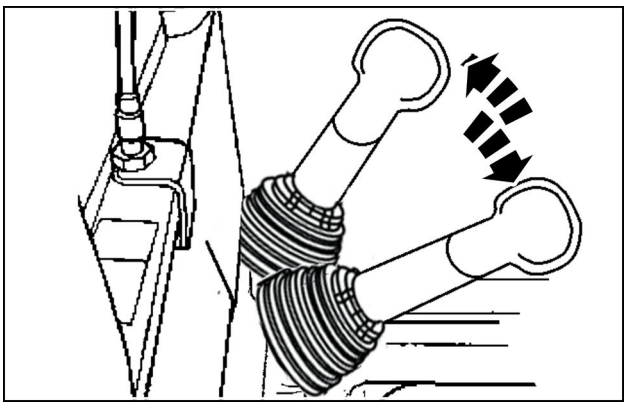
Lift arm raise/lower control



931007524 1

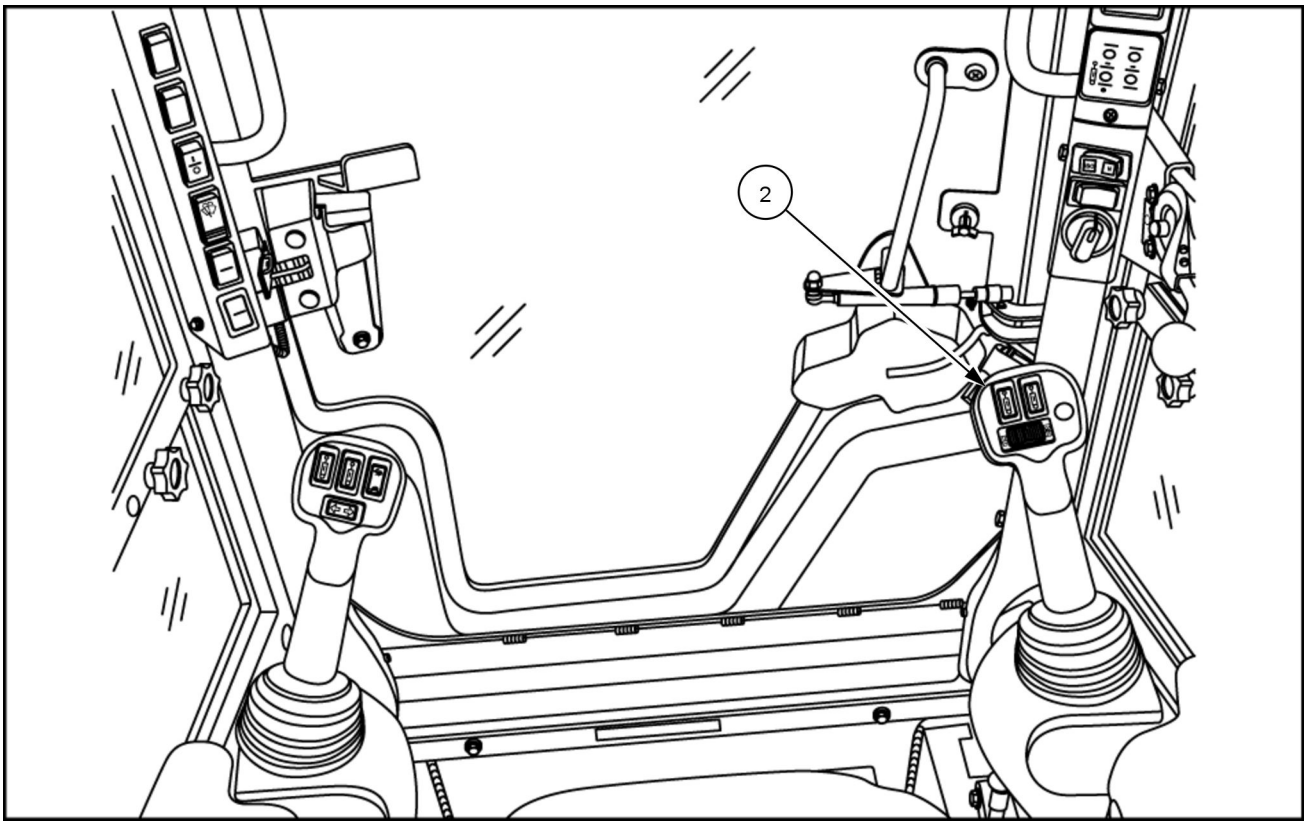
Lift arm raise and lower control.

- The left-hand control lever **(1)** controls the lift arm. The lift arm will raise by pivoting the handle “UP” to the outside of the cab. Pivoting the handle “DOWN” to the inside of the cab will lower the lift arm.
- The lift arm spool is equipped with a detent “FLOAT” circuit if the operator wants the lift arm to float over changing ground contour.
  For the Electro-Hydraulic (EH) system, the float is engaged by pressing the float button on the right-hand control lever **(2)** and pushing the left-hand control lever **(1)** partially to the down stroke. If the operator has the left-hand control lever partially in the down stroke position and then presses the float button, the float will engage. To disengage the float, pull the left-hand control lever to the up stroke slightly.



BS06H186B 2

Bucket curl/dump control

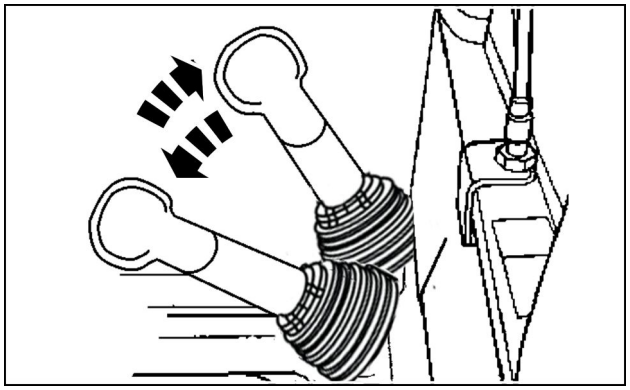


931007524 1

Bucket dump and curl control.

- The right-hand control lever **(2)** controls the bucket. The bucket will dump by pivoting the handle “UP” to the outside of the cab. Pivoting the handle “DOWN” to the inside of the cab and the bucket will roll back (curl).

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



BS06H186AA 2

ISO control pattern steering and travel

Moving the machine

⚠ WARNING

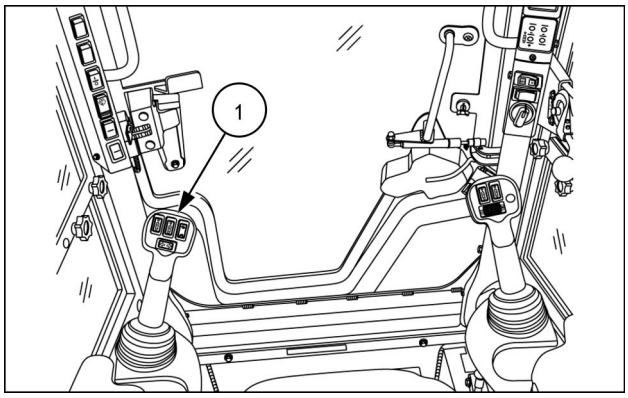
Loss of control hazard!
Keep hands and feet on the appropriate controls at all times to maintain control of the machine.
Failure to comply could result in death or serious injury.

W0237A

⚠ 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



931007524 1

All steering and travel controls are directed with the left-hand control lever **(1)** only. Use the face of a clock for orientation. The machine will move in the direction the lever is moved from neutral, center. Release the lever and it will detent to neutral. Although the machine will turn and counter-turn sharply, it is best to travel through forward or reverse gradually when turning.

NOTE: *Use the arm rest for maximum stability of controls and to reduce operator fatigue.*

Straight forward drive:

- Push the control lever straight forward (12:00 position) and the machine will move forward.

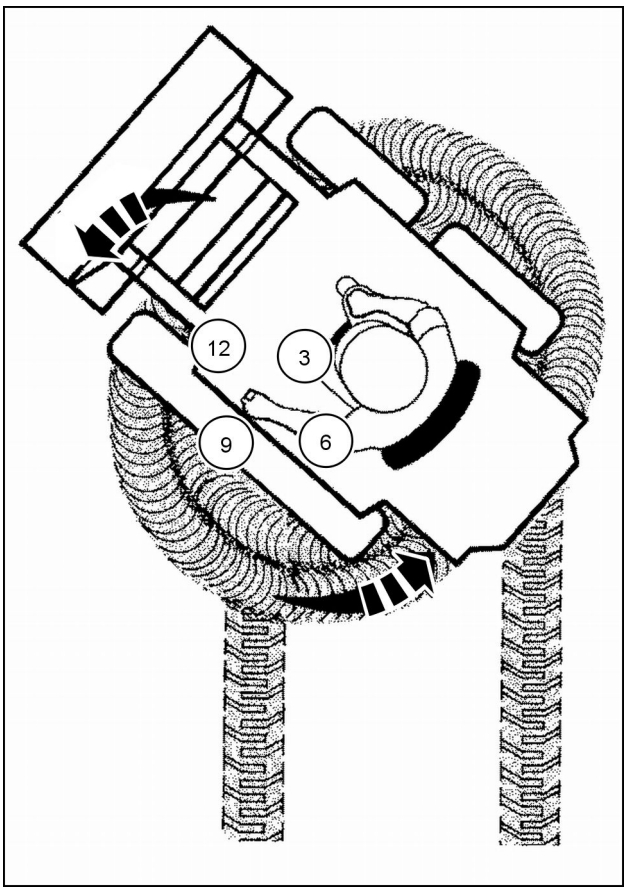
Straight rearward drive:

- Pull the control lever straight rearward (6:00 position) and the machine will move rearward.

Turning the machine

Pivot turn - power to only one side

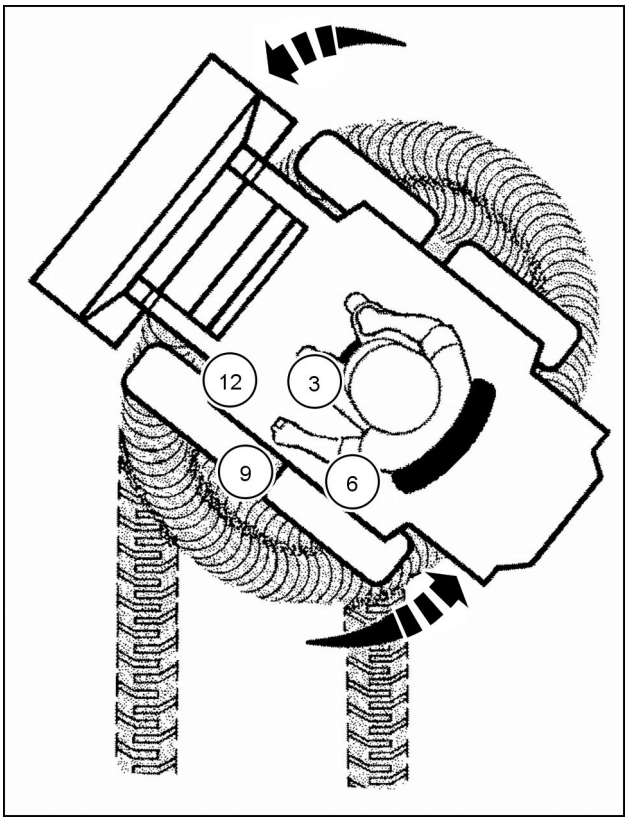
- To make a pivot turn left: from neutral, push the left-hand control lever slightly forward, and then left to the 10:00 position.
- To make a pivot turn right: from neutral, push the left-hand control lever slightly forward, and then right to the 2:00 position.
- To make a pivot turn reverse left: from neutral, pull the left-hand control lever slightly rearward, and then right to the 4:00 position.
- To make a pivot turn reverse right: from neutral, pull the left-hand control lever slightly rearward, and then left to the 8:00 position.



BS06G035 1

Counter rotation turn - power to both sides in opposing directions

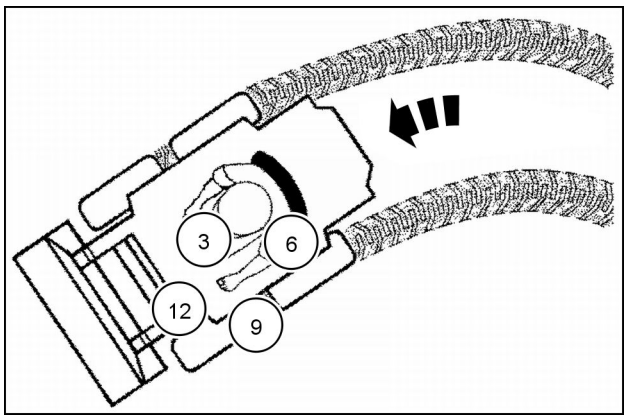
- To counter- rotate left: from neutral, push the left-hand control lever straight to the left (outward) toward the 9:00 position. The left-hand side drive will engage in reverse travel as the right-hand side drive will engage forward travel.
- To counter-rotate right: from neutral, push the left-hand control lever straight to the right (inward) toward the 3:00 position. The right-hand side drive will engage in reverse travel as the left-hand side drive will engage in forward travel.



BS06G036 2

Gradual turn - power to both sides in the same direction

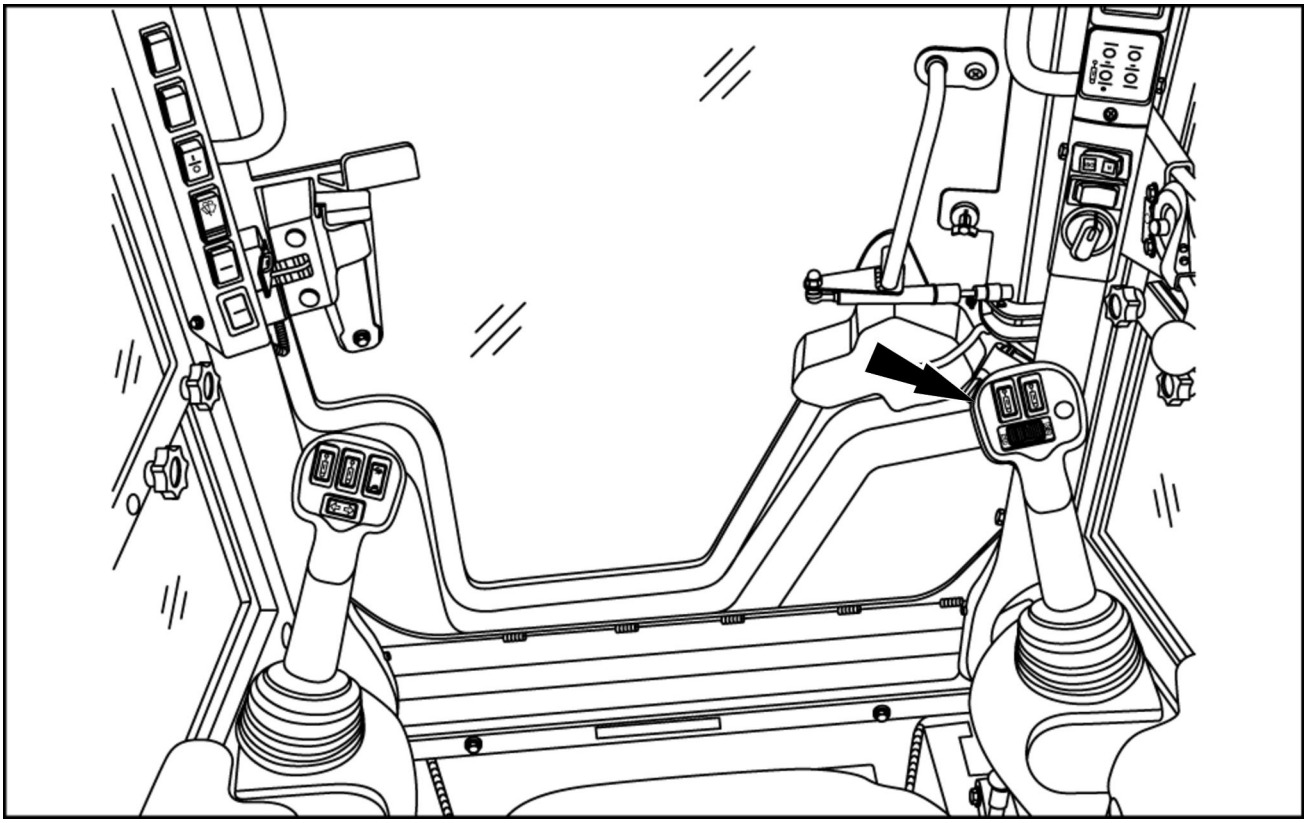
- To make a gradual forward turn left: from neutral, push the left-hand control lever forward and slightly toward the 11:00 position.
- To make a gradual forward turn right: from neutral, push the left-hand control lever forward and slightly toward the 1:00 position.



BS06G037 3

ISO control pattern lift arm and bucket controls

Lift arm and bucket controls



931007524 1

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.*

CONTROL HANDLES

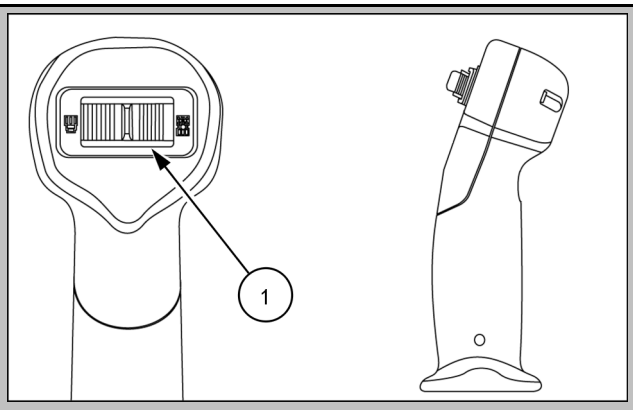
Switch configurations

The following functions can be activated from the control handles depending on your machine's configuration.

- Horn — Press the horn button to sound the horn.
- Proportional auxiliary — Activate the hydraulic component attached to the standard or high flow auxiliary hydraulic ports.
- 2nd auxiliary hydraulics — Activate the hydraulic component attached to the secondary auxiliary hydraulic ports.
- High flow/Enhanced high flow — Activate the hydraulic component attached to the enhanced high flow or high flow auxiliary hydraulic ports.
- 2 Speed — Press the tortoise once to downshift from second gear to first gear. Press the rabbit to shift back to second gear. For more details refer to **3-28**.
- Glide ride — Press and hold to activate glide ride and release to deactivate. Glide ride reduces machine rocking motion during transport and material hauling operations. When engaged, loader down pressure is limited to the weight of the loader plus the attachment, and also reduces shock loads to the machine. The weight of the attachment is hydraulically cushioned during transport.
- Float — Press to activate or deactivate the lift arm float function. When float is activated, the lift arm will float over the ground contour the machine is traveling over. For more details refer to page **3-17** for the H control pattern, and page **3-22** for the ISO control pattern. Mechanical units do not have a float switch.
- Multi-functional #1, #2, #3, and #4 — Press to control additional components attached to the machine. Refer to the owner's manual of the attachment for operating functions.

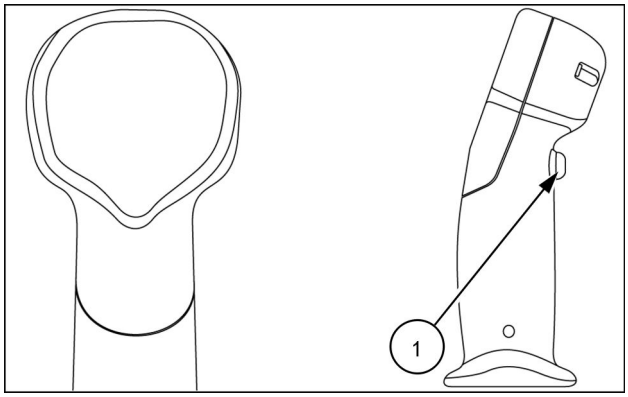
Level 100

Right side
(1) Proportional auxiliary



RAIL14SSL0310AA 1

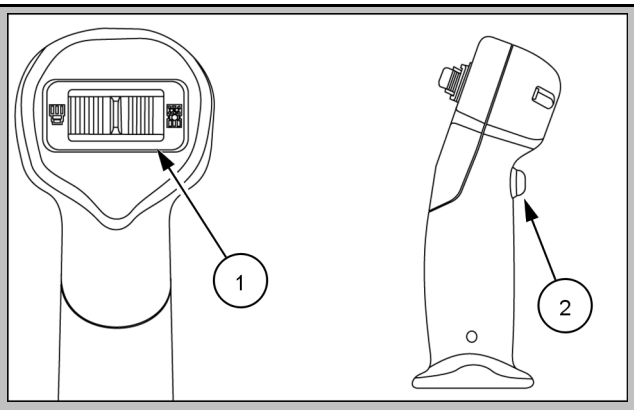
Left side
(1) Horn



93109403 2

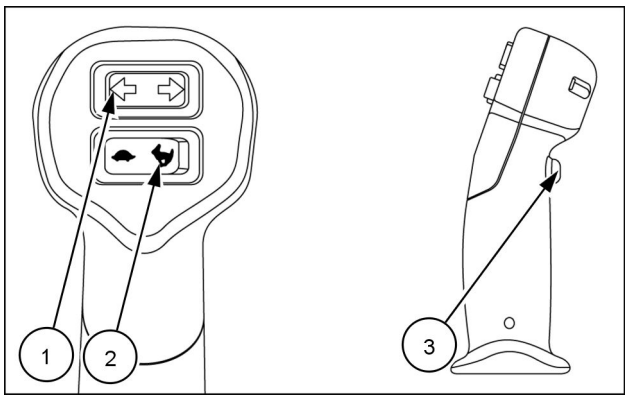
Level 200

Right side
(1) Proportional auxiliary
(2) Glide ride



RAIL14SSL0309AA 3

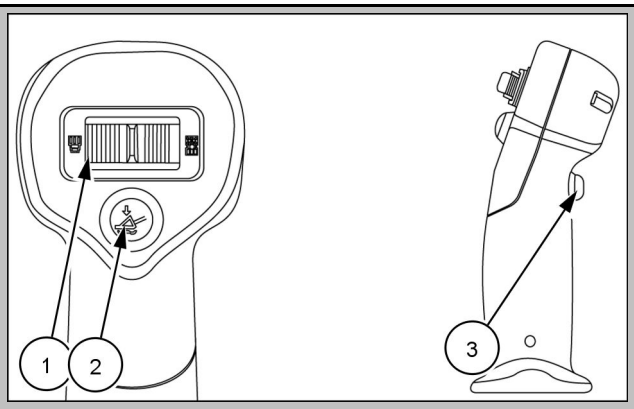
Left side
(1) Turn signal
(2) 2 Speed
(3) Horn



93109405 4

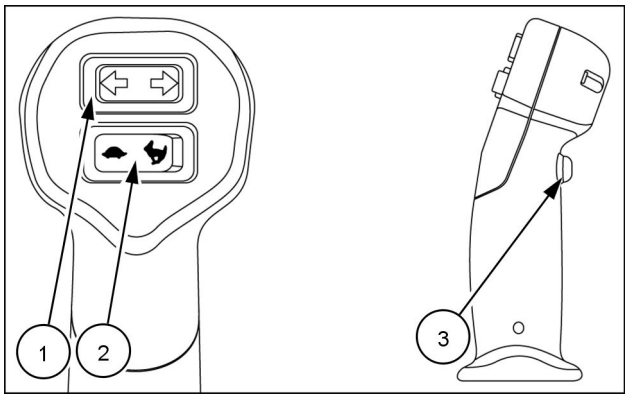
Level 250

Right side
(1) Proportional auxiliary
(2) Float
(3) Glide ride



93109408 5

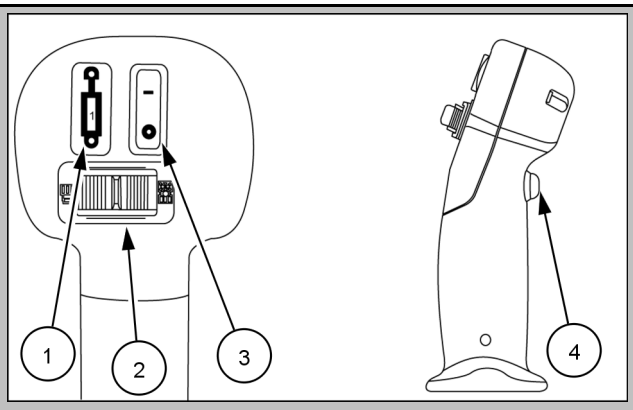
Left side
(1) Turn signal
(2) 2 speed
(3) Horn



93109407 6

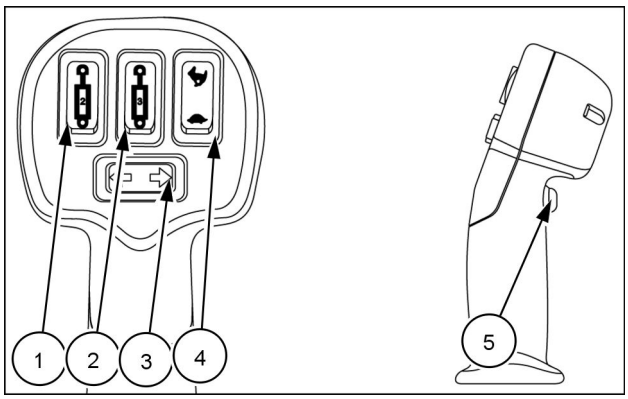
Level 300

Right side
(1) Multi-functional #1
(2) Proportional auxiliary
(3) Multi-functional #4
(4) Glide ride



RAIL14SSL0311AA 7

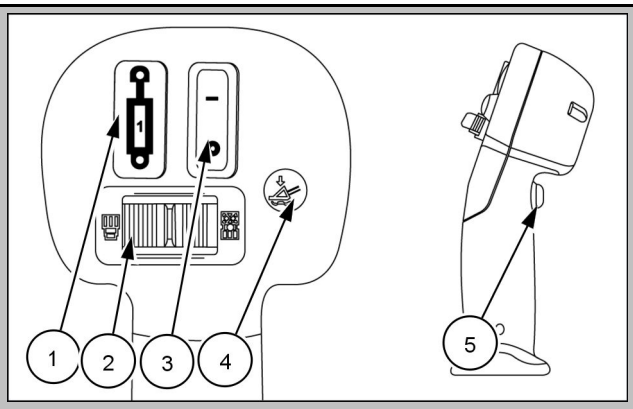
Left side
(1) Multi-functional #2
(2) Multi-functional #3
(3) Turn signal
(4) 2 speed
(5) Horn



93109409 8

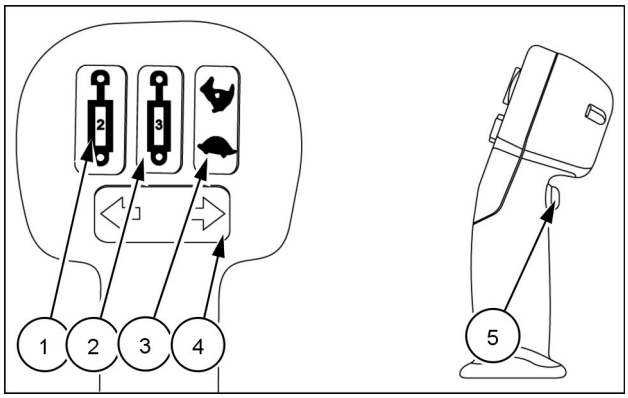
Level 350

Right side
(1) Multi-functional #1
(2) Proportional auxiliary
(3) Multi-functional #4
(4) Float
(5) Glide ride



9310105522 9

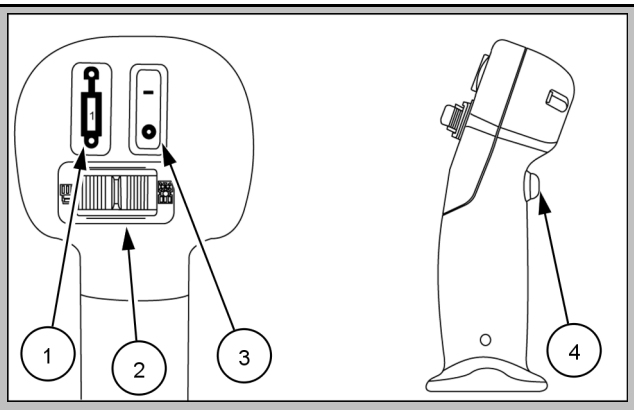
Left side
(1) Multi-functional #2
(2) Multi-functional #3
(3) 2 Speed
(4) Turn signal
(5) Horn



93109411 10

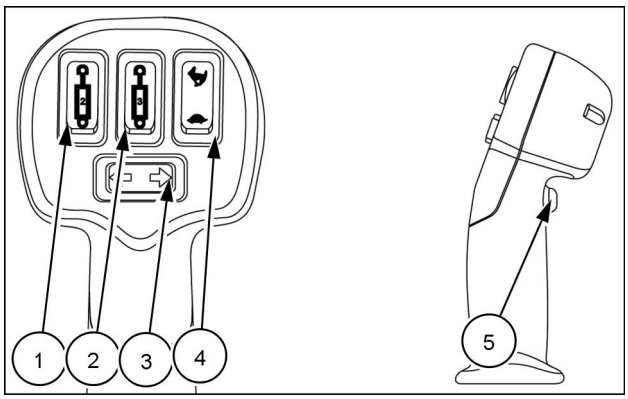
Level 400

Right side
(1) Multi-functional #1
(2) Proportional auxiliary
(3) Multi-functional #4
(4) Glide ride



RAIL14SSL0311AA 11

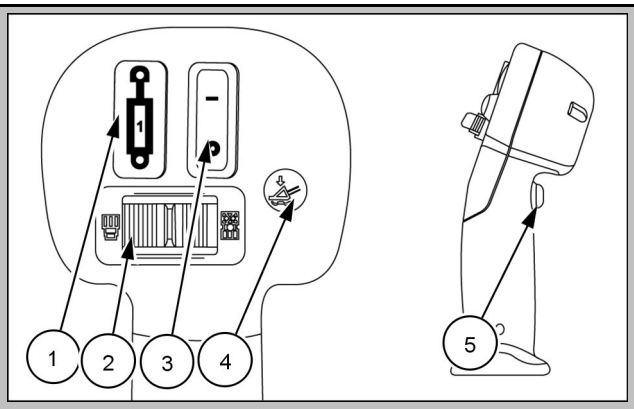
Left side
(1) 2nd auxiliary hydraulics
(2) Multi-functional #3
(3) Turn signal
(4) 2 speed
(5) Horn



93109409 12

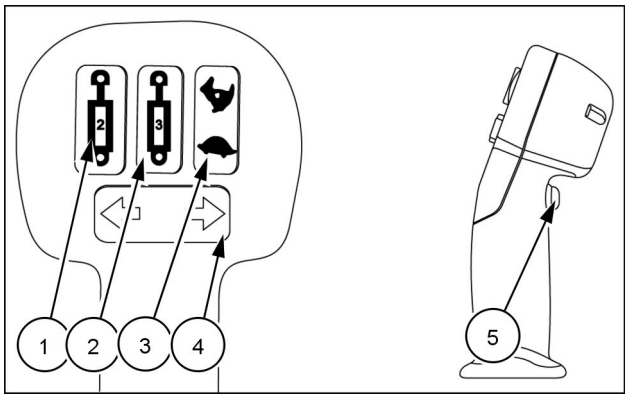
Level 450

Right side
(1) Multi-functional #1
(2) Proportional auxiliary
(3) Multi-functional #4
(4) Float
(5) Glide ride



9310105522 13

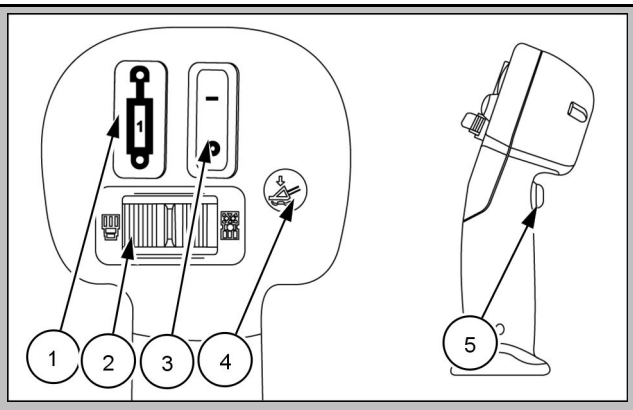
Left side
(1) 2nd auxiliary hydraulics
(2) Multi-functional #3
(3) 2 Speed
(4) Turn signal
(5) Horn.



93109411 14

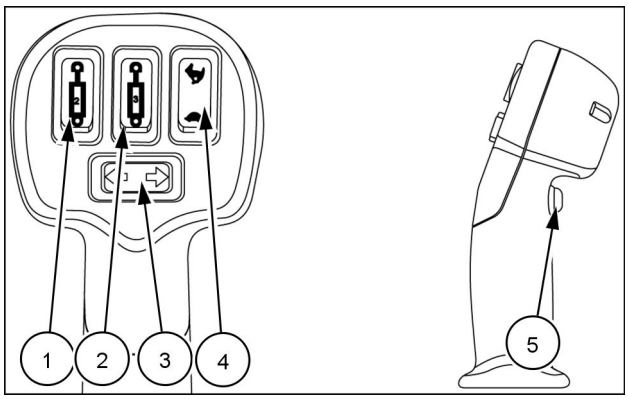
Level 550

Right side
(1) Multi-functional #1
(2) Proportional auxiliary
(3) Multi-functional #4
(4) Float
(5) Glide ride



9310105522 **15**

Left side
(1) High flow/Enhanced high flow auxiliary
(2) Multi-functional #3
(3) Turn signal
(4) 2 Speed
(5) Horn



9310105523 16

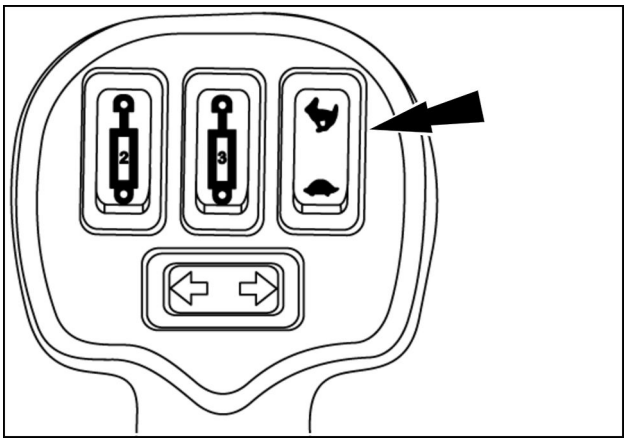
Two-speed function

Two-Speed Function

Press the top portion of the switch  on the left-hand control lever to shift from first gear to second gear.

NOTE: *The two-speed indicator*  *on the left-hand column illuminates when the two-speed function is active.*

Press the bottom portion of the switch  on the left-hand control lever once to downshift from second gear to first gear.



63109409 1

Function-enable conditions

The two-speed function can be activated ONLY IF ALL of the following conditions are met.

- Operator is seated properly.
- The seat belt is latched or the restraint bar (if equipped) is down while the operator is in the seat.
- Hydraulics enable is activated.
- Park brake is not set.
- If applicable, the key switch is in the ON position.

AUXILIARY HYDRAULICS

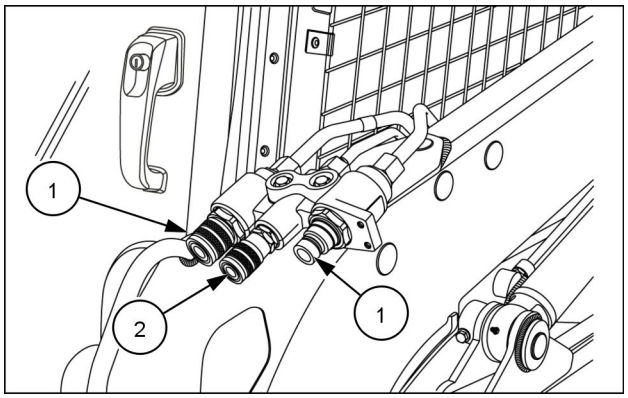
Standard auxiliary hydraulics

Follow the attachment's operator's manual on specific installation procedures, operation, and removal procedures.

Auxiliary hydraulic couplers are located on the left-hand loader arm.

1. Work ports — 1/2 inch coupler size
2. Case drain — 3/8 inch coupler size

Use the Proportional Auxiliary "rotary" switch on the right-hand control lever to operate the attachment connected to the standard auxiliary hydraulics ports. See your control lever switch configurations **3-23** for more details.

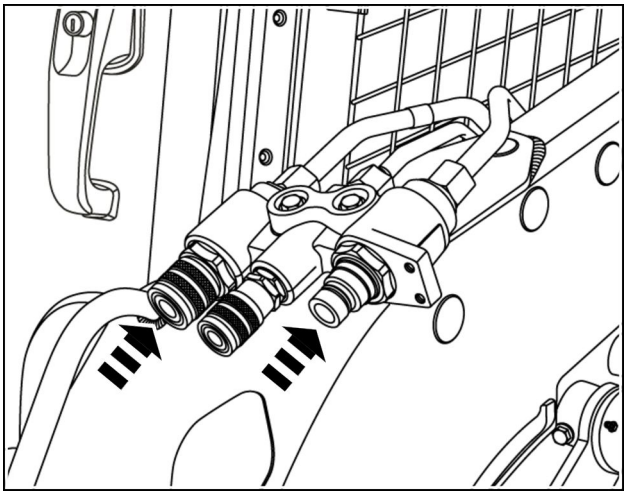


63106839 1

Relieve pressure before connecting attachment hoses

Machines with auxiliary hydraulic ports are built with a Connect-Under-Pressure (CUP) valve for the auxiliary hydraulic quick disconnects. Follow this procedure to relieve the pressure prior to connecting the hydraulic hoses from the attachment:

1. Using the palm of your hand push the 1/2 inch female quick disconnect coupling toward CUP valve. When done properly, the coupling will move about **10.0 mm** (**0.4 in**), relieving the stored pressure.
2. Perform the same action for the 1/2 inch male quick disconnect coupling, relieving the stored pressure.

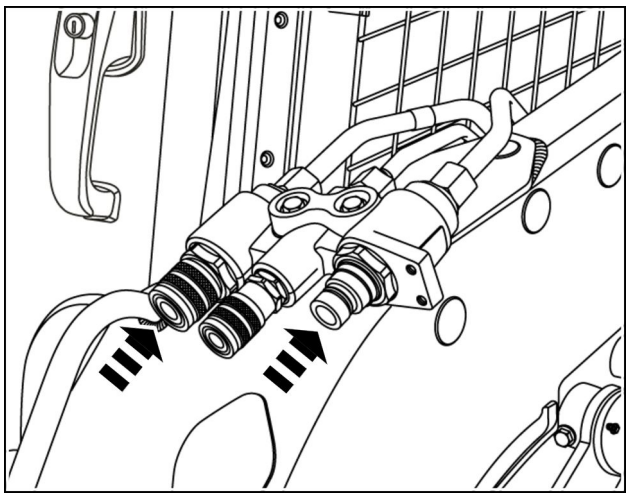


631068399 2

Relieve pressure before disconnecting attachment hoses

NOTICE: *Before removing attachments, make sure that you relieve pressure from the hydraulic system BEFORE disconnecting the auxiliary hoses. If the pressure is not relieved, you WILL NOT be able to reattach hoses.*

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, raise the restraint bar (if equipped), and safely exit the machine.
7. Prior to disconnecting the attachment hoses, grab each hose and push it toward the Connect-Under-Pressure (CUP) valve. When done properly, the coupling will move about **6.00 mm** (**0.24 in**), relieving any stored pressure in that circuit. Repeat on the outside hose/coupling.
8. Disconnect the attachment hydraulic hoses from the Connect-Under-Pressure (CUP) valve quick disconnects.
9. Install the coupler port covers, if available.



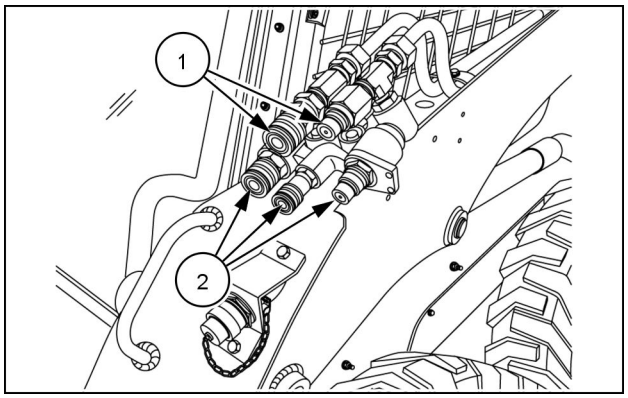
631068399 3

High flow auxiliary hydraulics

The high flow auxiliary hydraulic feature provides **207 bar** (**3000 psi**) or limited to **132 l/min** (**35 US gpm**) to the auxiliary circuit. Follow the attachment's operator's manual on specific installation procedures, operation, and removal procedures.

If the machine is equipped with a high flow auxiliary hydraulics there will be two 5/8 inch couplers **(1)** attached to the top of the standard auxiliary hydraulic coupler block **(2)** on the left-hand loader arm.

NOTICE: *Always use the 5/8 inch couplers during high flow operation to prevent high back pressure and overheating of the hydraulic system.*

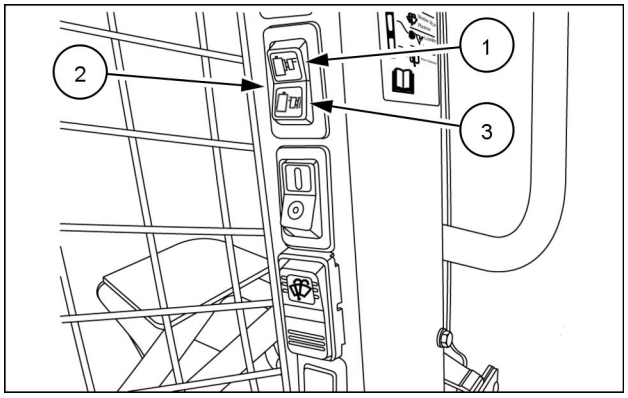


93106839B 1

Use the three position switch on the left-hand ROPS post to activate the high flow option

- Position **(1)** — HF High Flow is activated
- Position **(2)** — Neutral or standard flow
- Position **(3)** — HP High Pressure is activated if equipped with Enhanced High Flow auxiliary hydraulics

  NOTE: *Only machines equipped with Enhanced high flow auxiliary hydraulics will be able to activate the HP function.*



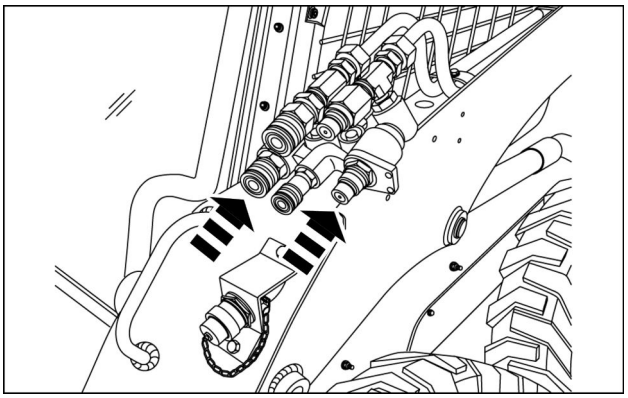
RCPH11SSL003AAD 2

NOTICE: *The high flow switch must be turned to the neutral position when not in use or required. Otherwise, overheating of the hydraulic oil or poor attachment operation may occur.*

Use the Proportional Auxiliary "rotary" switch on the right-hand control lever to operate the attachment connected to the high flow auxiliary ports. Refer to your control lever switch configurations **3-23** for more details.

NOTICE: *Before removing attachments, make sure that you relieve pressure from the hydraulic system BEFORE disconnecting the auxiliary hoses. If the pressure is not relieved, you WILL NOT be able to reattach hoses. The high flow 5/8 inch quick disconnects on the machine do not have the ability to relieve pressure when connecting or disconnecting, but the following procedure shows how to release the pressure.*

Relieve pressure before disconnecting attachment hoses



93106839B 3

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, raise the restraint bar (if equipped), 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.

Enhanced High Flow (EHF) auxiliary hydraulics

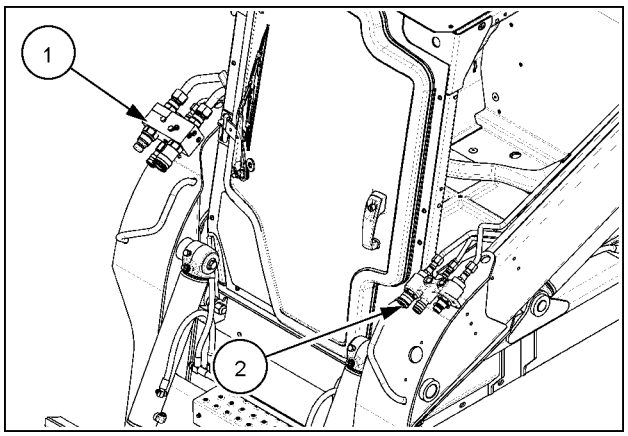
The Enhanced High Flow (EHF) auxiliary hydraulic feature provides **276 bar** (**4000 psi**) or **132 l/min** (**35 US gpm**) to the auxiliary circuit. Follow the attachment's operator's manual on specific installation procedures, operation, and removal procedures.

NOTE: *The enhanced high flow setting can only be used with approved attachments and is controlled by a circuit interlock installed at the multifunction plug with the attachment.*

If the machine is equipped with the enhanced high flow auxiliary hydraulics, two 5/8 inch couplers and a 3/8 inch case drain coupler block **(1)** will be attached to the right-hand loader arm.

The standard auxiliary hydraulic Connect-Under-Pressure (CUP) valve **(2)** with two 1/2 inch ports and one 3/8 inch case drain will remain on the left-hand loader arm.

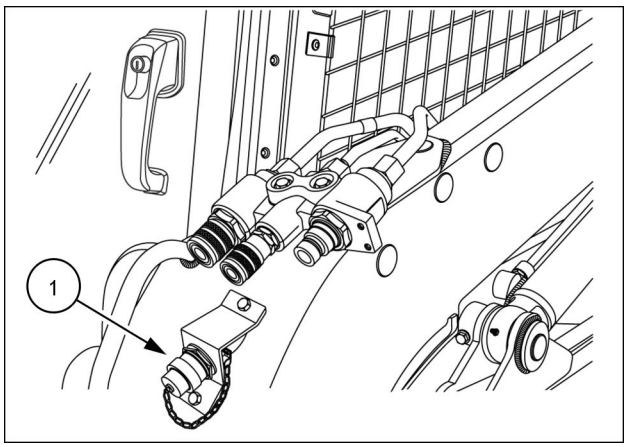
NOTICE: *Always use the 5/8 inch couplers during high flow operation to prevent high back pressure and overheating of the hydraulic system.*



RCPH11SSL015BAD 1

Before operating the approved attachment, confirm the electrical connection **(1)** is secured in place. Without completion of the circuit within the attachment side of the connector, only standard high flow can be achieved.

NOTE: *All approved Enhanced High Flow (EHF) attachments will have an electrical connection. This prevents operating attachments that are not approved to handle* ***276 bar*** *(****4000 psi****) in High Pressure (HP) mode.*



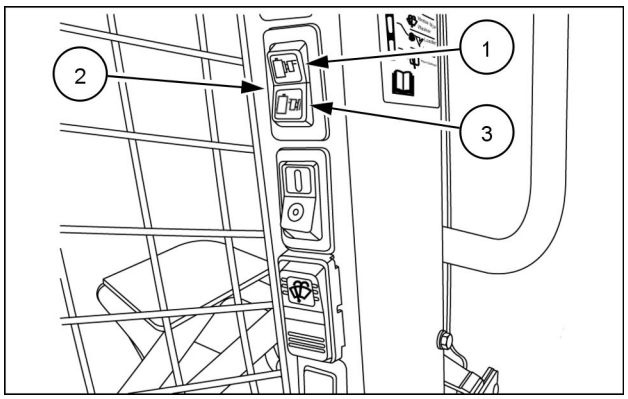
RCPH11SSL016BAD 2

Use the three position switch on the left hand ROPS post to activate the high flow option.

- Position **(1)** — HF High Flow is activated
- Position **(2)** — Neutral or standard flow
- Position **(3)** — HP High Pressure is activated

NOTICE: *The high flow switch must be turned to the neutral position when not in use or required. Overheating of the hydraulic oil or poor attachment operation may occur.*

Use the number 2 cylinder button on the left-hand control lever to operate the enhanced high flow attachments. Refer to your control lever switch configurations **3-23** for more details.



RCPH11SSL003AAD 3

Disconnect the attachment

NOTE: *Unlike the standard auxiliary hydraulics or the high flow auxiliary hydraulics you do not have to release hydraulic pressure from the system before disconnecting the attachments auxiliary hoses.*

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, raise the restraint bar (if equipped), and safely exit the machine.
7. Disconnect the electrical connector and install the cap.
8. Disconnect the 5/8 inch enhanced high flow attachment hydraulic hoses from the quick disconnects.
9. Install the coupler covers, if equipped.

INSTRUMENT CLUSTER

Electronic Instrument Cluster (EIC)

The Electronic Instrument Cluster (EIC) is on the right-hand cab post.

Once in the seat, the alarm sounds and selected lamps illuminate briefly. Monitor these lamps on a daily basis to confirm that they will function in the event of a system alarm. The fuel gauge and hour meter will remain illuminated for operator monitoring.

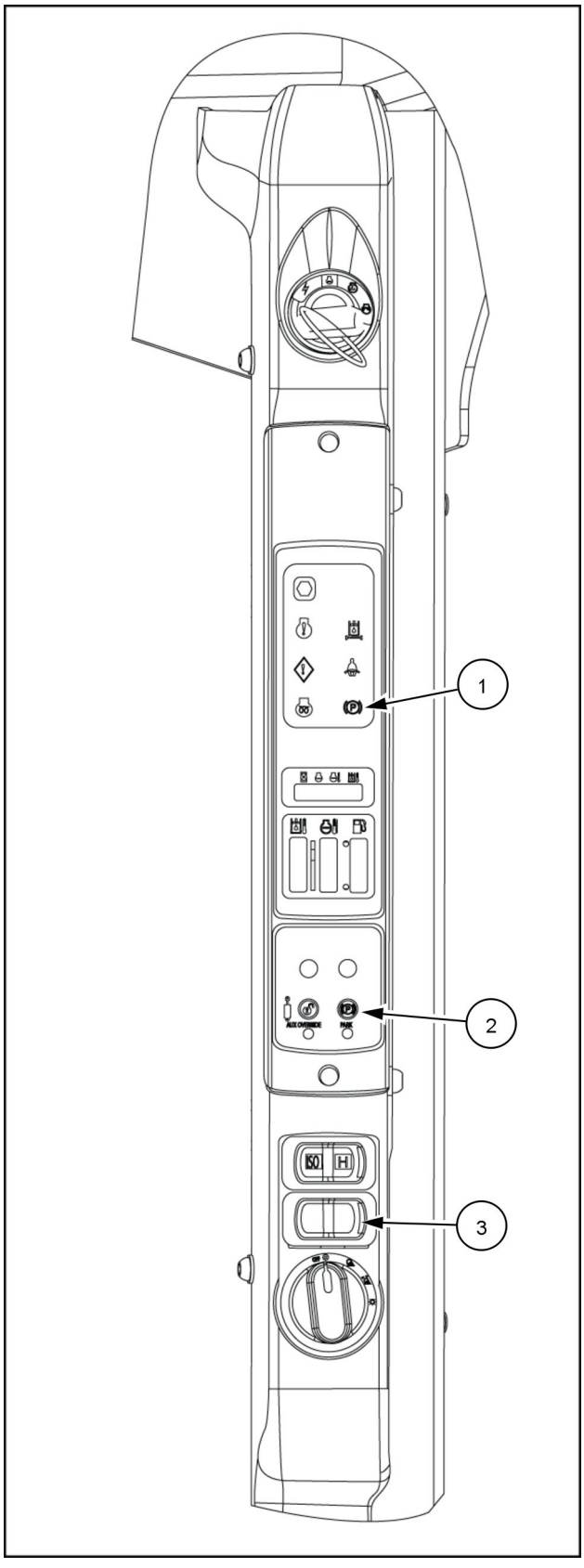
When started, the machine will be in park with the park brake lamp **(1)** illuminated. The park brake switch **(3)** is on the lower right-hand instrument panel.

The operator must be in the seat with the seat belt fastened and the restraint bar lowered (if equipped). After the operator starts the machine, the operator must push the OPERATE button **(2)** to activate the loader arms and ground drive.

A semi-hidden “Setup” menu allows the user to view, select, change, and customize a number of machine settings. A security code may be entered into the Instrument Cluster. Once the security code has been entered, each user will have to enter the code before the machine will start. Contact your dealer for detailed information on the “Setup” menu and security feature activation.

NOTE: *Fault code definitions are located in the troubleshooting section. The updated fault code is visible to the operator on the display on the right-hand column.*

NOTICE: *Low hydraulic charge pressure will cause engagement of the park brake. With an Electro-Hydraulic (EH) control unit, the park brake lamp will flash and an audible alarm will sound, if this condition exists.*

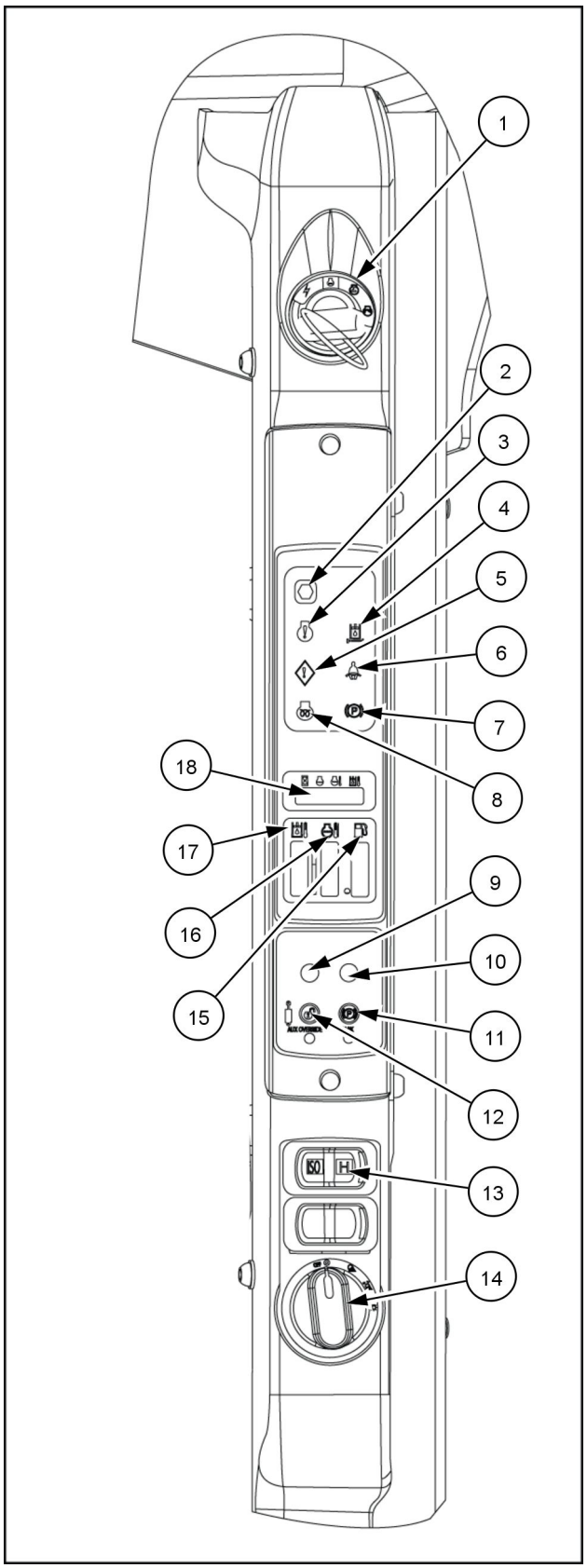


93109329A 1

(1)	KEY SWITCH (four position) ***NOTE:*** *Follow the starting procedure* ***4-3*** *described in this manual.*
	Accessory position Turn the key to the left, the machine's electrical system is now active. ***NOTICE:*** *Do not leave the key in this position otherwise you may drain the battery power.*
	Stop position Turn the key to the Stop position. The engine will stop and the electrical system will be inactive to the operator. ***NOTE:*** *Some electrical components continue to receive power from the battery.*
	Run position Turn the key to the RUN position. The machine's electrical system becomes active, the system checks all starting criteria is met, and prepares the engine for starting.
	Start position (temporary position) Turn and hold the key to the Start position, release the key to the Run position once the engine starts. ***NOTICE:*** *Do not operate the starter motor continuously for more than 30 seconds.*

(2)	STOP
	Severe warning requiring immediate shut down, RED lamp will flash and audible alarm will sound. Use the fault code that appeared in text display and reference it in the trouble shooting section of this manual.

(3)	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 trouble shooting section of this manual.



93109329A 2

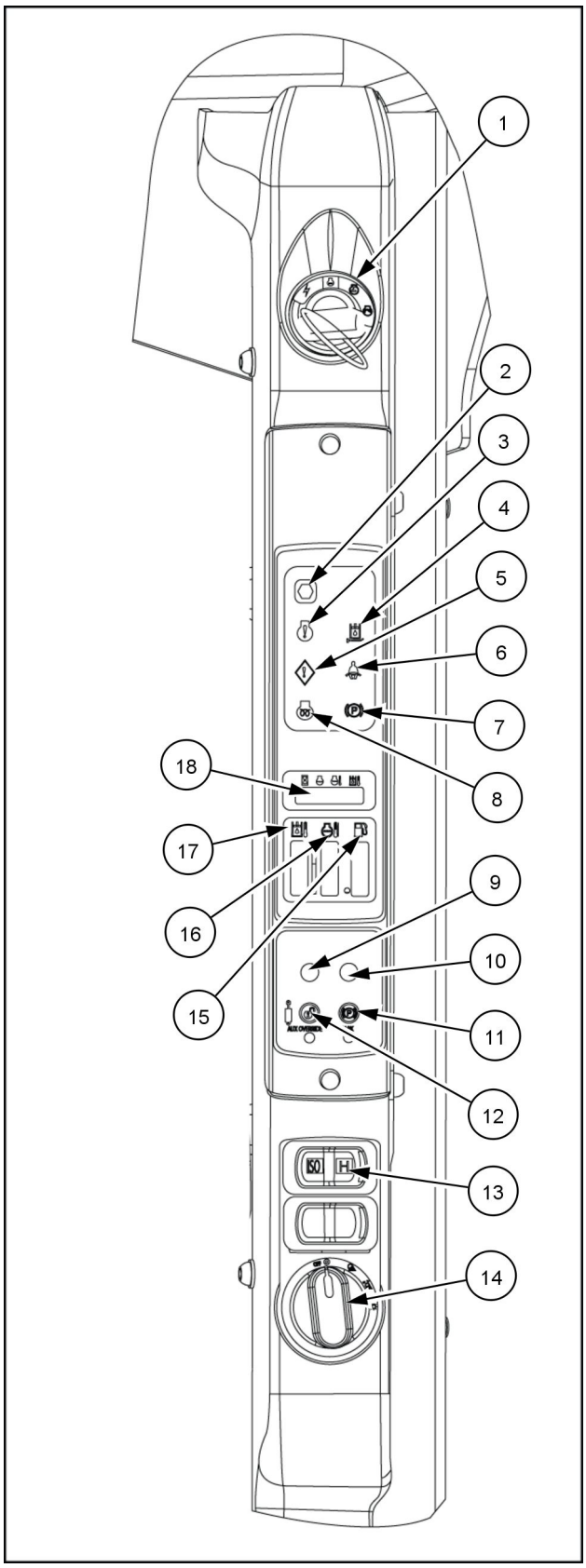
(4)	HYDRAULIC SYSTEM MALFUNCTION
	Yellow Lamp will flash when a hydraulic fault is detected. Use the fault code that appeared in text display and reference it in the trouble shooting section of this manual.

(5)	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.

(6)	SEAT BELT
	RED lamp will illuminate when the seat belt is not latched or the restraint bar (if equipped) is raised. RED lamp will also illuminate when the operator leaves the operator's seat.

(7)	PARK BRAKE LAMP:
	This Red lamp illuminates to indicate the park brake is engaged. Under normal conditions the park brake will be set when: • The park brake button is activated (located on the right-hand control lever) • The OPERATE button is activated • The engine is shut off • The engine is running and the seat belt is not latched or the restraint bar (if equipped) is raised • The operator leaves the seat

(8)	ENGINE PREHEATING LAMP:
	In cold climate starting conditions, after turning the key switch to run position, this yellow engine pre-heating lamp will illuminate, instructing the operator that incoming air is being preconditioned for smoother starting. The operator must wait until the lamp goes out before attempting to start the engine.

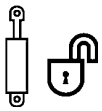


93109329A 3

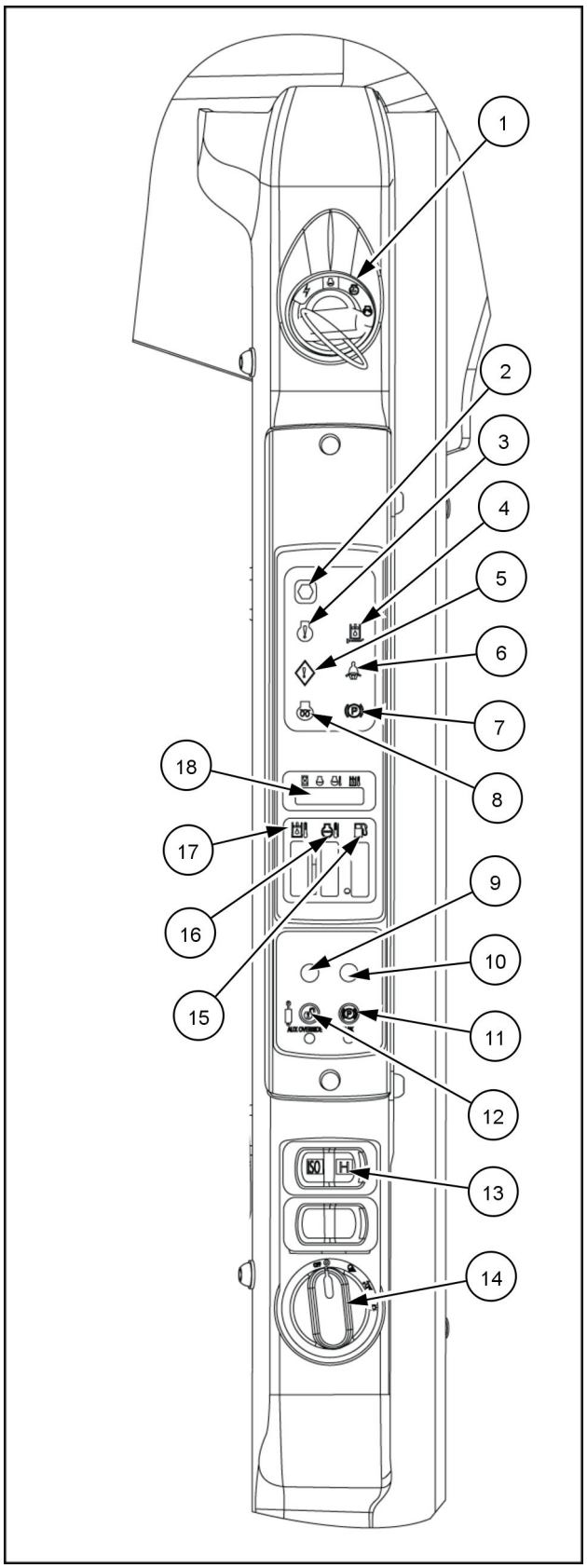
(9)	FUNCTION BUTTON
	Use this, when in the “Setup” menu, as the "enter" data key ***NOTE:*** *This button is used for user code lock and unlock.*

(10)	FUNCTION BUTTON
	Use this when in the “Setup” menu, also used to scroll within the setup menu. ***NOTE:*** *This button is used for user code lock and unlock.*

(11)	OPERATE
	This button activates and deactivates the hydraulic system when the engine is running. ***NOTE:*** *This button is used for user code lock and unlock.*

(12)	AUX OVERRIDE – AUXILIARY HYDRAULIC INTERLOCK OVERRIDE: ***NOTE:*** *Some attachments have their own controls and this feature allows the auxiliary hydraulic oil flow to continue when the operator is out of the seat. The machine’s control levers will be inactive.*
	When the operator leaves the seat, hydraulic oil flow and control levers are disabled. Press the AUX OVERRIDE button and leave the seat within 30 seconds to override the auxiliary hydraulic interlock. The small red indicator lamp below the switch illuminates when the override feature is active. ***NOTE:*** *This button is used for user code lock and unlock.*

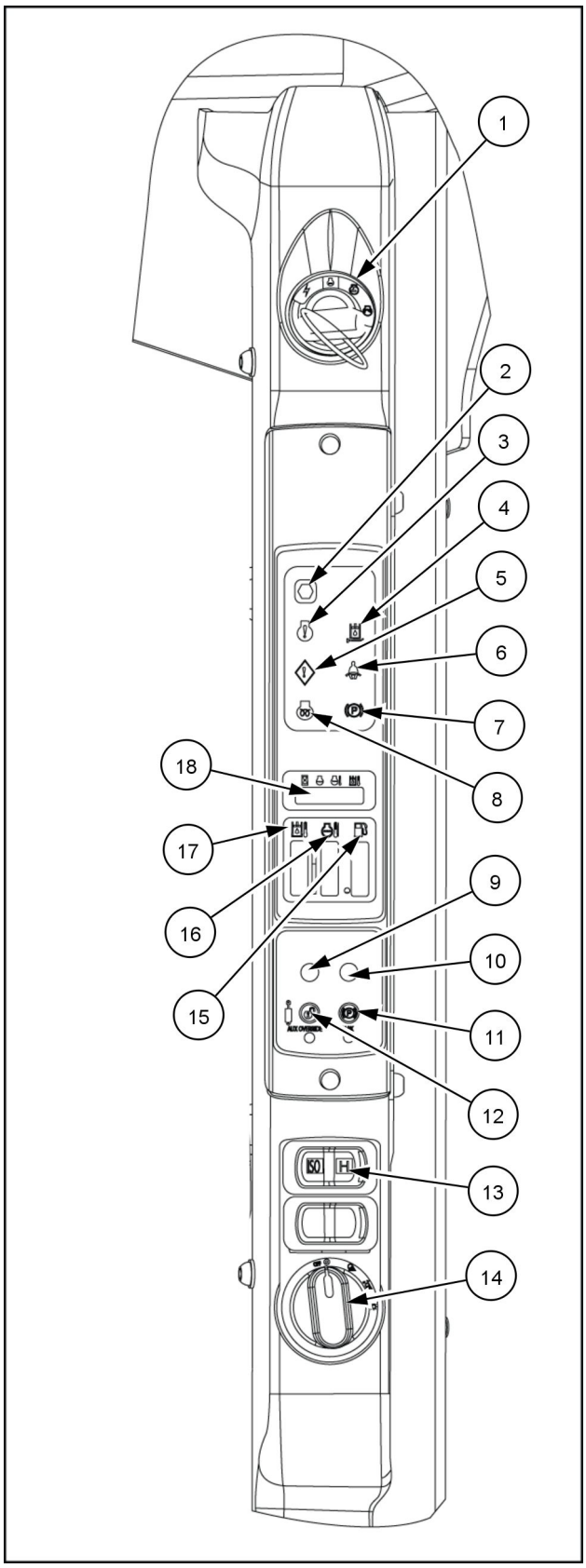
NOTE: *For a fault code associated with a yellow amber light, record the code number and press the Aux Override button twice to silence the code and return to normal operation. If the code appears again, contact your dealer for support.*



93109329A 4

(13)	H / ISO control pattern selector, if equipped
	This selects the drive pattern type of hand control operation. Read the proper steps listed in this chapter to activate.

(14)	WORK LIGHTS
	This knob controls the external working lights and road lights. Work light switch positions: • **(1)** - All lights OFF. • **(2)** - Front work lights ON, rear work lights ON, rear red lights OFF. • **(3)** - Front work lights ON, rear work lights OFF, rear red lights ON. • **(4)** - Front work lights ON, rear work lights ON, rear red lights OFF.



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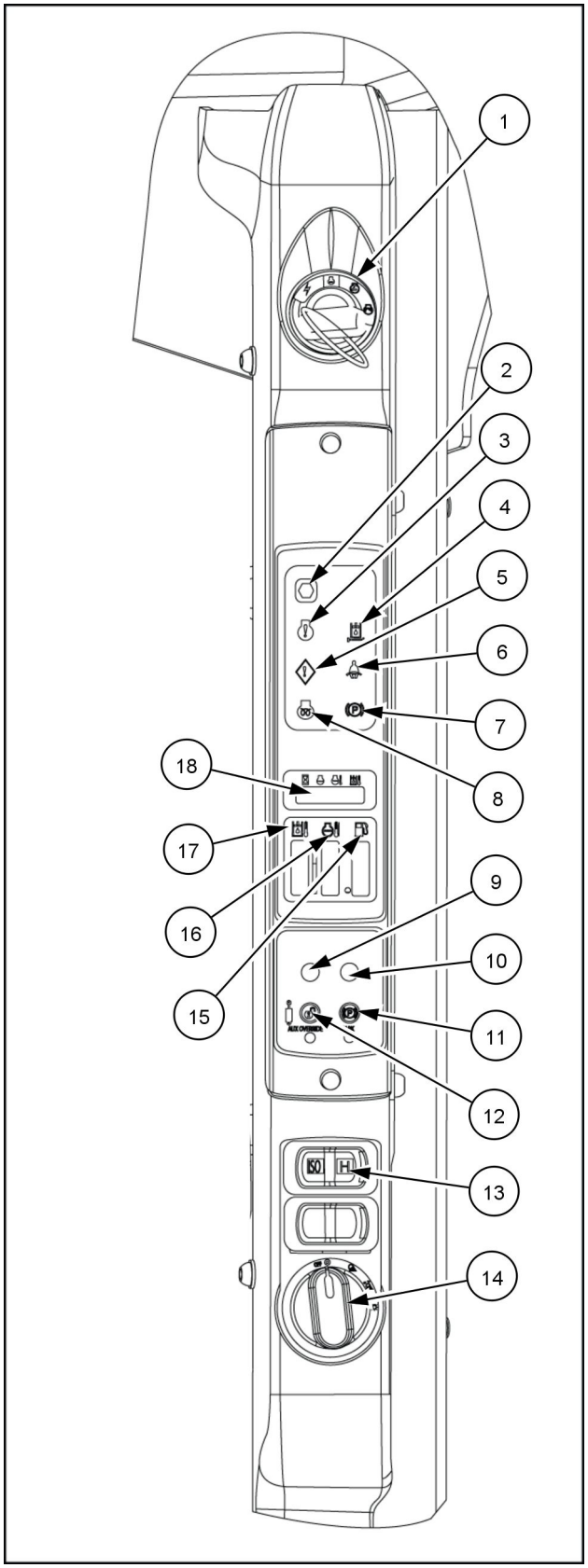
(15)	FUEL GAUGE:
	The fuel gauge consists of a series of bars that indicate the level of fuel in the fuel tank. When all 8 bars are visible the fuel tank is full. Bottom bar flashing indicates approximately **3.8 L** (**1.0 US gal**) of fuel remaining.

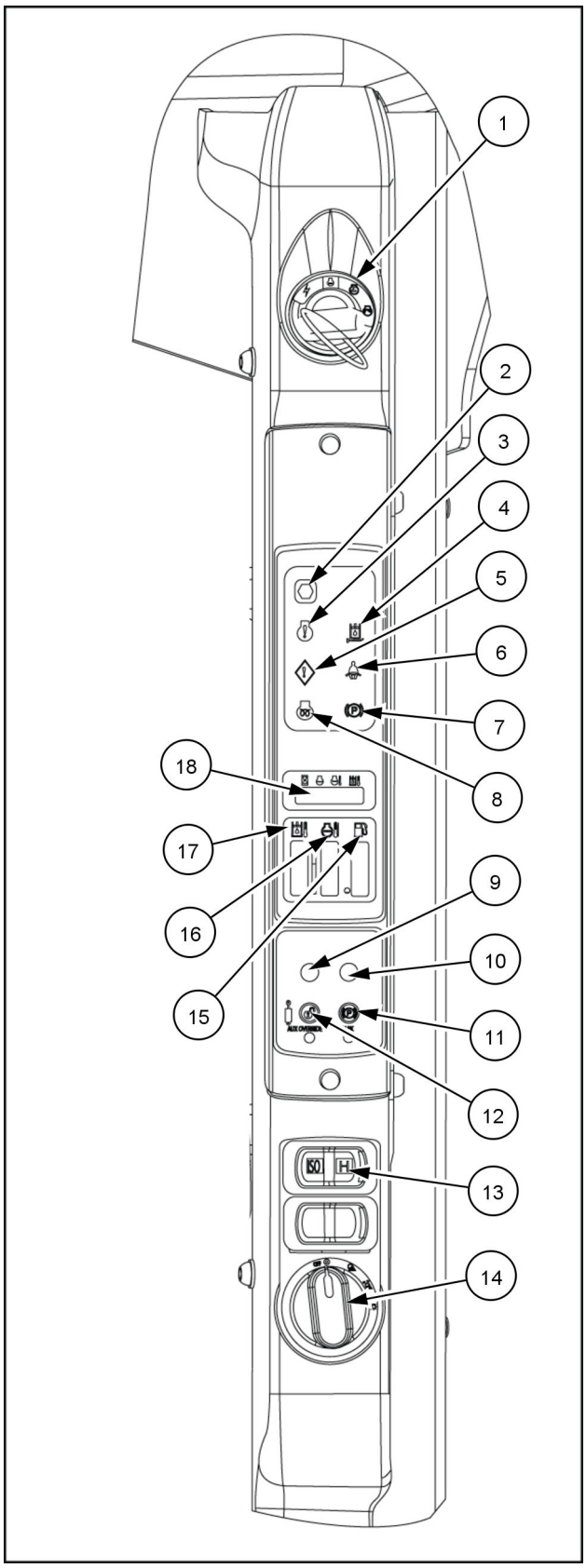
(16)	ENGINE COOLANT TEMPERATURE BAR GRAPH:
	This bar graph indicates the relative temperature of the engine coolant from **0 – 110 °C** (**32 – 230 °F**). If the coolant temperature rises above **110 °C** (**230 °F**), all 8 bars will display, the backlighting will flash, and the audible alarm will sound.

(17)	HYDRAULIC FLUID TEMPERATURE BAR GRAPH:
	This hydraulic oil temperature bar graph indicates the relative temperature of the hydraulic oil from **0 – 110 °C** (**32 – 230 °F**). If the temperature exceeds **110 °C** (**230 °F**), all 8 graph segments will display, backlighting will flash, and the audible alarm will sound.



93109329A 6

(18)	TEXT DISPLAY:
	This display will show the following during normal operation, as selected by the operator. • Engine hours: Engine hours will always be displayed momentarily when the operator initially sits in the seat. The operator may choose to leave engine hours on display continuously or select one of the following. • Engine RPM • Engine coolant temperature (degrees F or C) • Hydraulic oil temperature (degrees F or C) • Cycle: If this display option is chosen, the display will continuously cycle through all four of the above items The text display will also help the operator or technician with information as the “Setup” menu is utilized. ***NOTE:*** *To change display mode "on the go" hold the AUX OVERRIDE* ***(12)*** *until the current option name is displayed, push the AUX OVERRIDE button repeatedly until desired option name is displayed. This display mode value will continue to be shown until another selection is made.*



93109329A 7

Advanced Instrument Cluster (AIC)

The Advanced Instrument Cluster (AIC) is on the right-hand cab post.

Once in the seat, the alarm sounds and selected lamps illuminate briefly. Monitor these lamps on a daily basis to confirm that they will function in the event of a system alarm. The fuel gauge and hour meter will remain illuminated for operator monitoring.

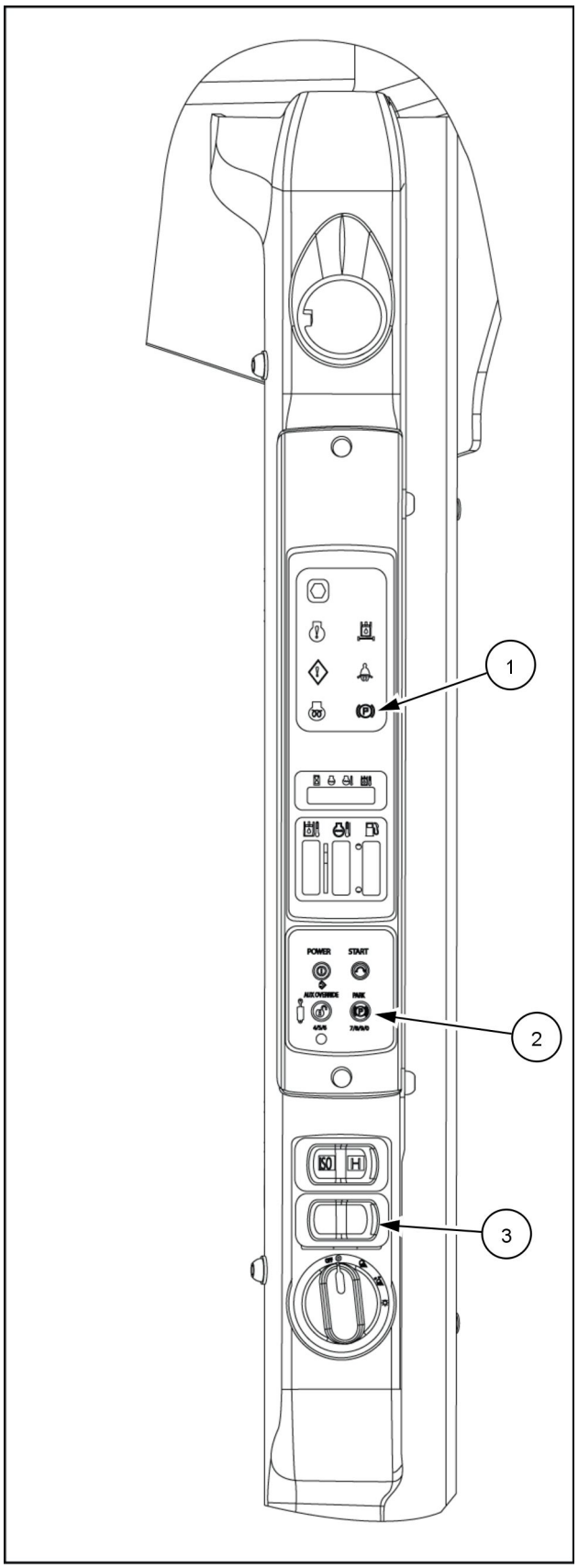
When started, the machine will be in park with the park brake **(1)** lamp illuminated. The park brake switch **(3)** is on the lower right-hand instrument panel.

The operator must be in the seat with seat belt fastened and the restraint bar lowered (if equipped). After the machine starts, the operator must push the OPERATE button **(2)** to activate the loader arms and ground drive.

A semi-hidden “Setup” menu allows the user to view, select, change and customize a number of machine settings. A security code may be entered into the Instrument Cluster. Once the security code has been entered, each user will have to enter the code before the machine will start. Contact your dealer for detailed information on the “Setup” menu and security feature activation.

NOTE: *Fault code definitions are located in the troubleshooting section. The updated fault code is visible to the operator on the display on the right-hand column.*

NOTICE: *Low hydraulic charge pressure will cause engagement of the park brake. With an Electro-Hydraulic (EH) control unit, the park brake **(1)** lamp will flash and an audible alarm will sound, if this condition exists.*

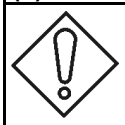


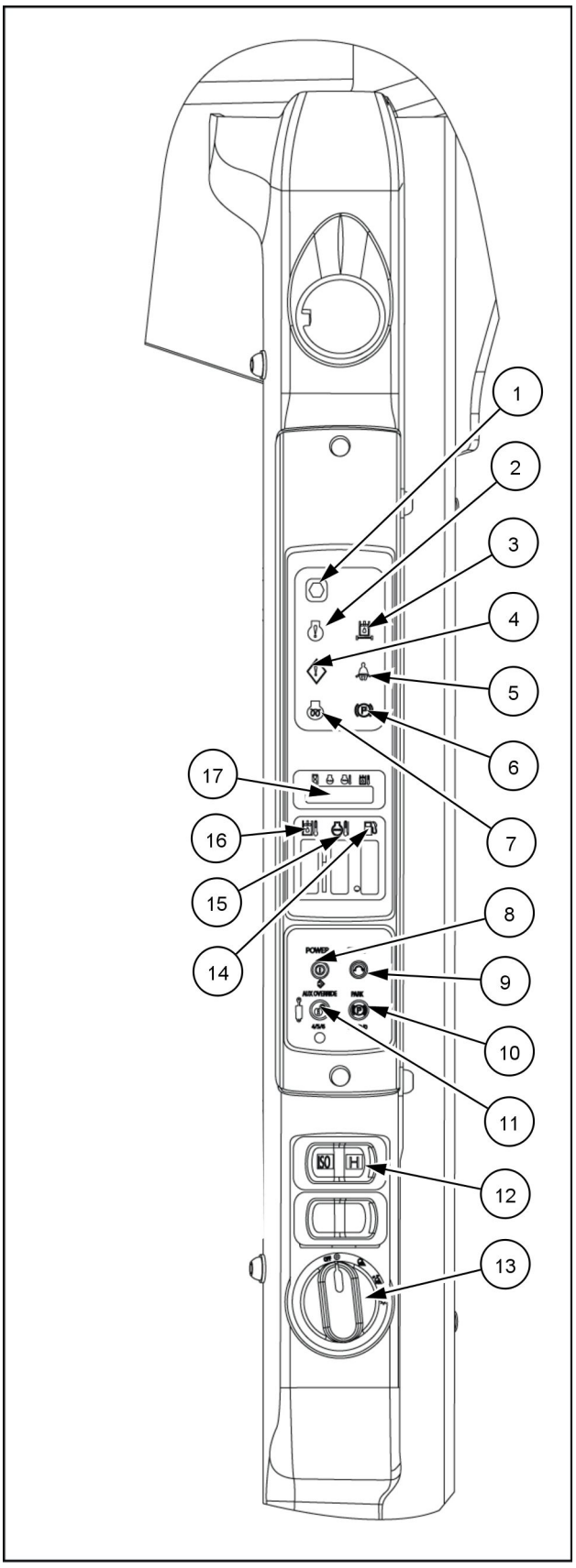
93109330 1

(1)	STOP
	Severe warning requiring immediate shut down, RED lamp will flash and audible alarm will sound. Use the fault code that appeared in text display and reference it in the trouble shooting section of this manual.

(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.

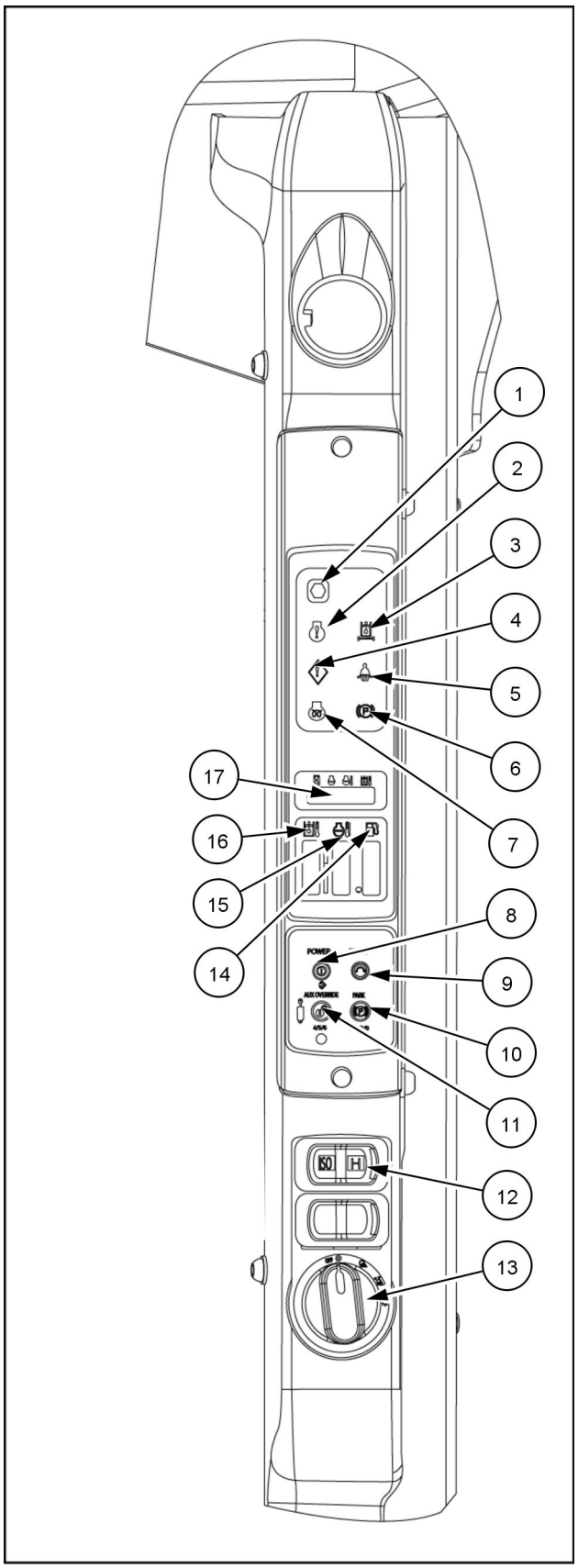


93109330 2

(5)	SEAT BELT
	RED lamp will illuminate when the seat belt is unlatched or the restraint bar (if equipped) is raised. RED lamp will also illuminate when the operator leaves the operator's seat.

(6)	PARK BRAKE LAMP:
	This Red lamp illuminates to indicate the park brake is engaged. Under normal conditions the Park Brake will be set when: • The PARK BRAKE button is activated (located on the right-hand control lever) • The OPERATE button is activated • The engine is shut off • The engine is running and the seat belt is not latched or the restraint bar (if equipped) is raised • The operator leaves the seat

(7)	ENGINE PREHEATING LAMP:
	In cold climate starting conditions this yellow Engine Pre-Heating Lamp will illuminate, instructing the operator that incoming air is being preconditioned for smoother starting. The operator must wait until the lamp goes out before attempting to start the engine.

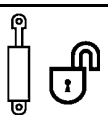


93109330 3

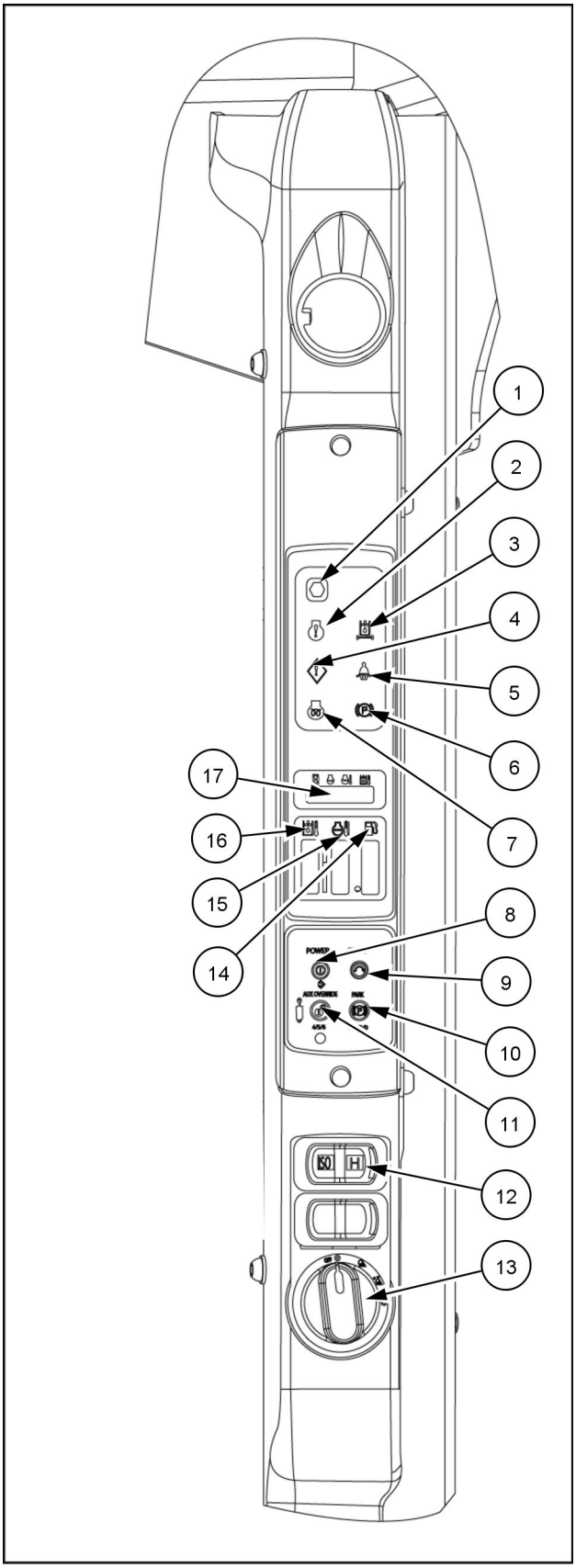
(8)	POWER:
	Push for Start-up power or push for engine shut down. Use this, when in the “Setup” menu, as the "enter" Data Key. ***NOTE:*** *This button is used for user code lock and unlock.*

(9)	START:
	NOTE: *Follow the starting procedure described in this manual.*
	Push to actuate the starter motor and start the engine. Use this when in the “Setup” menu, Also used to scroll within the setup menu. ***NOTE:*** *This button is used for user code lock and unlock.*

(10)	OPERATE
	This button activates and deactivates the hydraulic system when engine is running. NOTE: This button is used for user code lock and unlock.

(11)	AUX OVERRIDE AUXILIARY HYDRAULIC INTERLOCK OVERRIDE: ***NOTE:*** *Some attachments have their own controls and this feature allows the auxiliary hydraulic oil flow to continue when the operator is out of the seat. The machine’s control levers will be inactive.*
	When the operator leaves the seat, hydraulic oil flow and control levers are disabled. Press the AUX OVERRIDE button and leave the seat within 30 seconds to override the auxiliary hydraulic interlock. The small red indicator lamp below the switch illuminates when the override feature is active. ***NOTE:*** *This button is used for user code lock and unlock.*

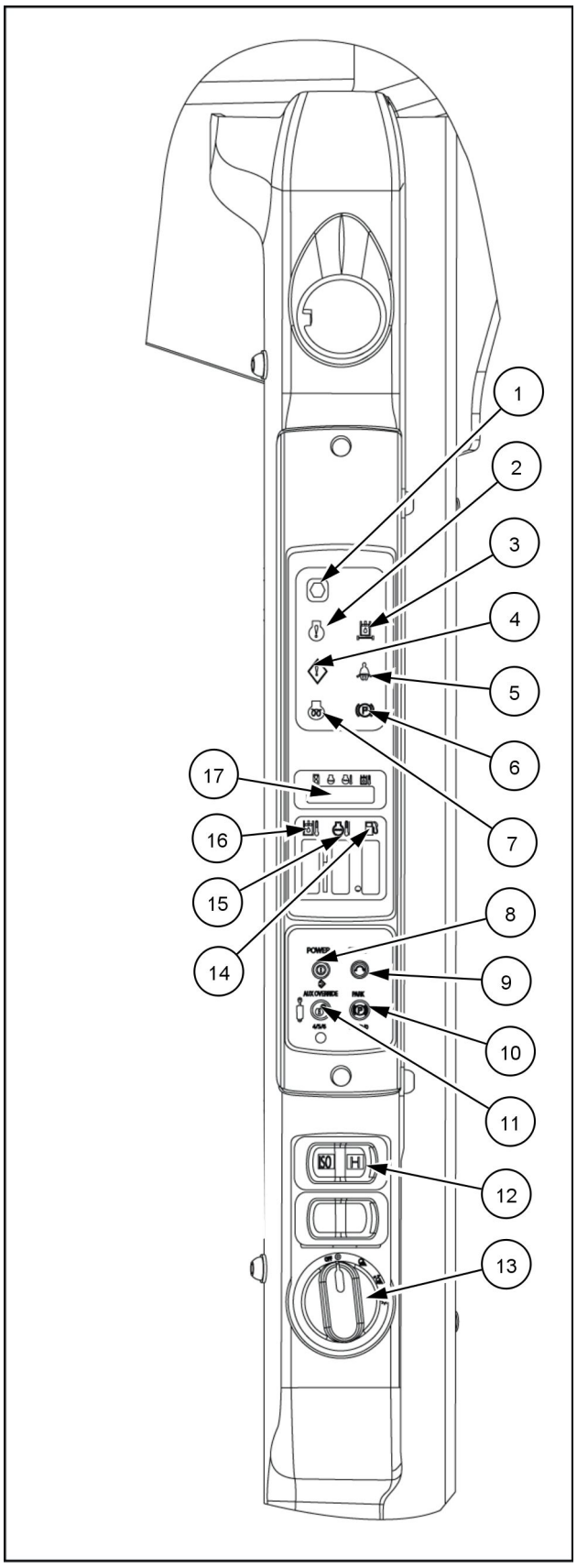
NOTE: *For a fault code associated with a yellow amber light, record the code number and press the Aux Override button twice to silence the code and return to normal operation. If the code appears again, contact your dealer for support.*



93109330 4

(12)	H / ISO control pattern selector, if equipped
	This selects the drive pattern type of hand control operation. Read the proper steps listed in this chapter to activate.

(13)	WORK LIGHTS
	This knob controls the external working lights and road lights. Work light switch positions: • **(1)** - All lights OFF. • **(2)** - Front work lights ON, rear work lights ON, rear red lights OFF. • **(3)** - Front work lights ON, rear work lights OFF, rear red lights ON. • **(4)** - Front work lights ON, rear work lights ON, rear red lights OFF.

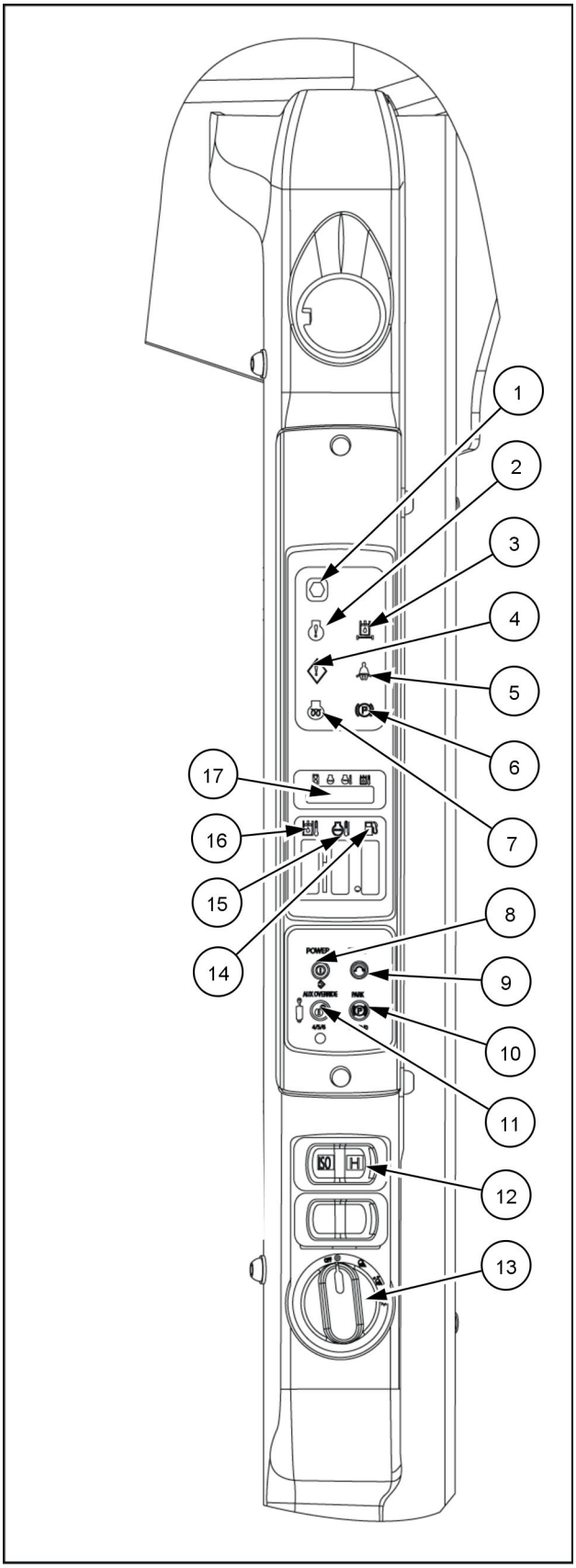


93109330 5

(14)	FUEL GAUGE:
	The fuel gauge consists of a series of bars that indicate the level of fuel in the fuel tank. When all 8 bars are visible the fuel tank is full. Bottom bar flashing indicates approximately **3.8 L** (**1.0 US gal**) of fuel remaining.

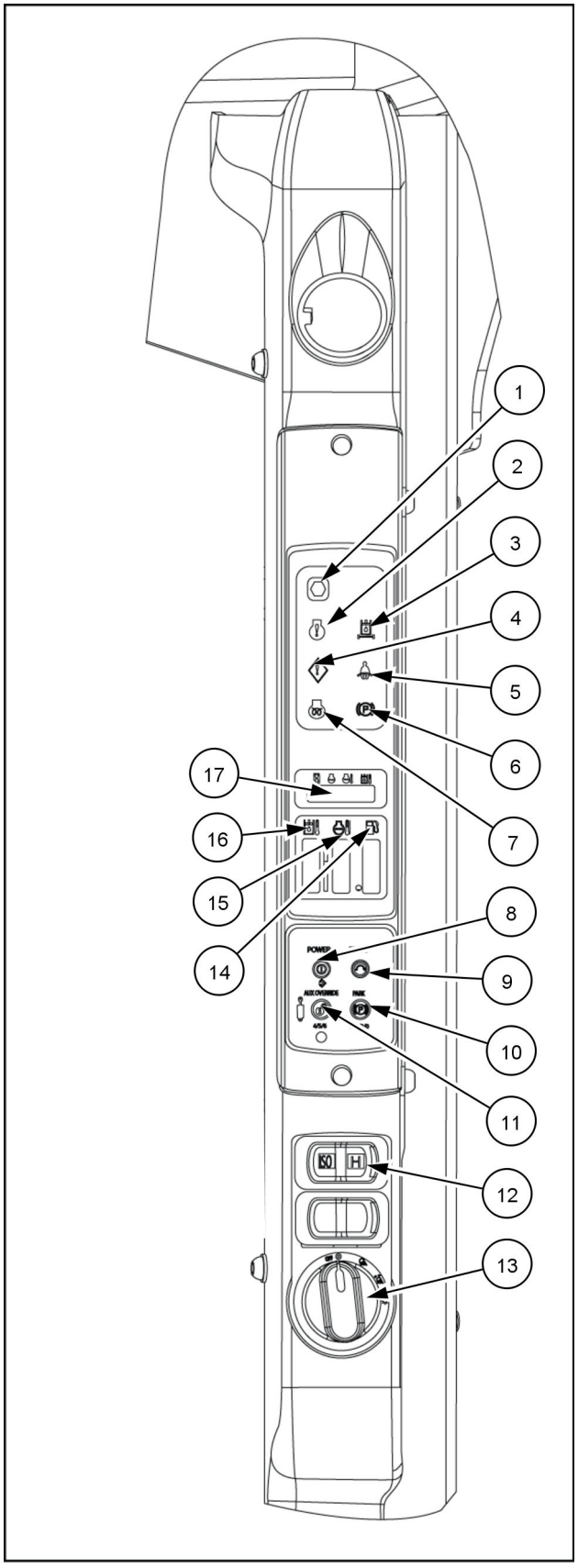
(15)	ENGINE COOLANT TEMPERATURE BAR GRAPH:
	This bar graph indicates the relative temperature of the engine coolant from **0 – 110 °C** (**32 – 230 °F**). If the coolant temperature rises above **110 °C** (**230 °F**), all 8 bars will display, the backlighting will flash, and the audible alarm will sound.

(16)	HYDRAULIC FLUID TEMPERATURE BAR GRAPH:
	This Hydraulic Oil Temperature Bar Graph indicates the relative temperature of the hydraulic oil from **0 – 110 °C** (**32 – 230 °F**). If the temperature exceeds **110 °C** (**230 °F**), all 8 graph segments will display, backlighting will flash, and the audible alarm will sound.



93109330 6

(17)	TEXT DISPLAY:
	This display will show the following during normal operation, as selected by the operator. • Engine Hours: Engine hours will always be displayed momentarily when the operator initially sits in the seat. The operator may choose to leave engine hours on display continuously or select one of the following. • Engine RPM • Engine Coolant Temperature (degrees F or C) • Hydraulic Oil Temperature (degrees F or C) • Cycle: If this display option is chosen, the display will continuously cycle through all four of the above items The text display will also help the operator or technician with information as the SETUP menu is utilized. ***NOTE:*** *To change display mode "on the go" hold the AUX OVERRIDE* ***(11)*** *until the current option name is displayed, push the AUX OVERRIDE button repeatedly until desired option name is displayed. This display mode value will continue to be shown until another selection is made.*



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Instrument cluster

Menu navigation controls

Use the four switch buttons to navigate through the instrument cluster Menu by following the setup menu functions. Many of the setup menu functions are intended for service technicians and owners. Contact your dealer for the service manual or security code information.

(1) TEXT DISPLAY

Displays the menu text.

(2) START

Navigates selections on every menu level.

Certain menus will prompt the user to enter an access code or allow the user to change a numerical value.

NOTE: *Pushing the Start button will increment the flashing digit 1,2,3 for number entry.*

(3) OPERATE

Increments the flashing digit 7,8,9,0 for number entry.

(4) AUX OVERRIDE :

Exits the sub-menu and moves top level to the next option.

Increments the flashing digit 4,5,6 for number entry.

(5) POWER

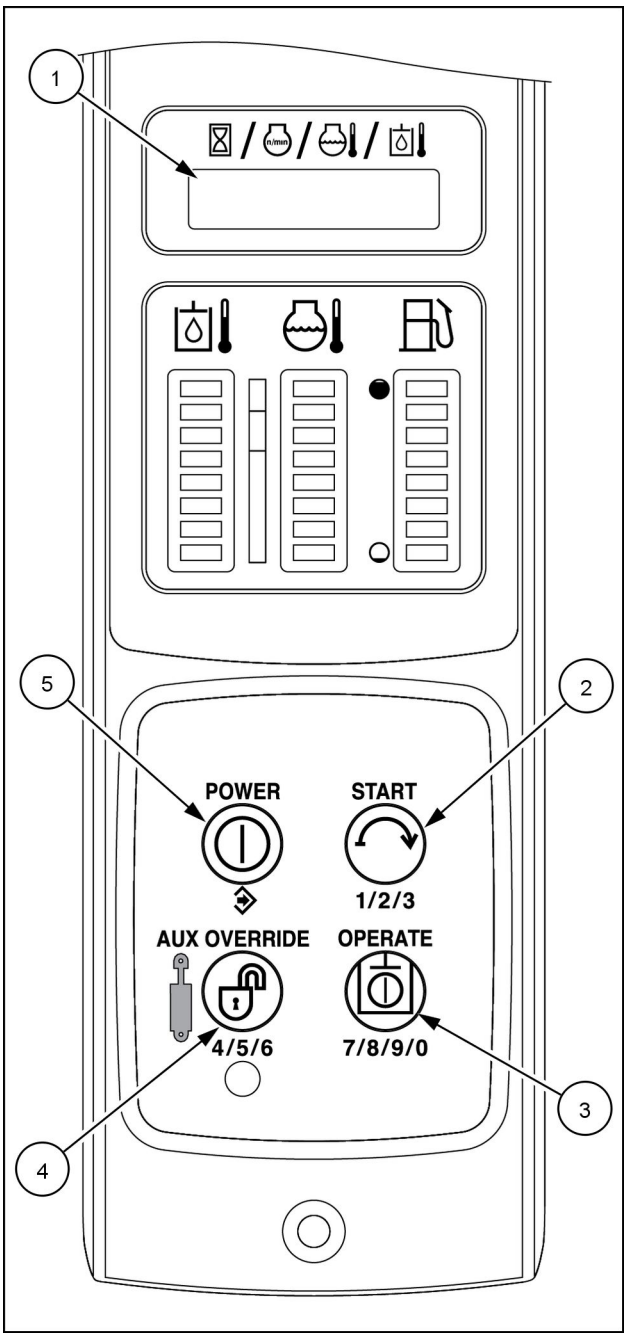
For number entry, moves flashing digit to the next place.

Saves entry.

Enters the sub-menu.

Top level menu options

- EXIT — Exit the setup menu.
- EH — Customize the speed of the machine's Electro hydraulic controls (if equipped).
- dSPLY — Alternate method to select between the selected display parameters.
- UNITS — Allows the operator to select Fahrenheit (Imperial units) or Celsius (Standard Imperial units).
- JTIME — Job timer. Timer that displays engine operating hours since last reset. Ideal for rentals or job tracking.
- LOCK — Used to create/change owner and user codes



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NOTE: *The Advanced Instrument Cluster (AIC) images are shown in this section for the four switch buttons* ***(2)****,* ***(3)****,* ***(4)*** *and* ***(5)*** *used to navigate through the instrument cluster. The top two switch buttons on the Electronic Instrument Cluster (EIC) are function buttons and function the same as the POWER* ***(5)*** *and START* ***(2)*** *switch buttons on the AIC instrument panel for the setup menu functions.*

Instrument cluster SETUP menu

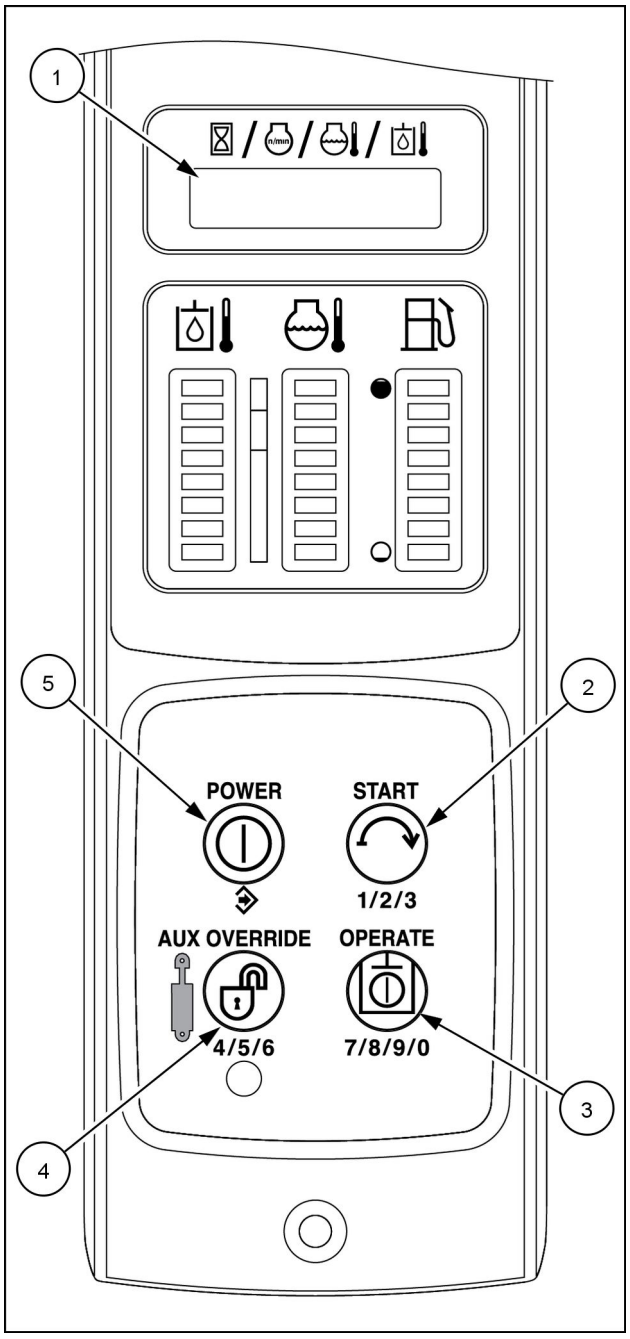
NOTE: *The Advanced Instrument Cluster (AIC) images are shown in this section for the four switch buttons* ***(2)****,* ***(3)****,* ***(4)****, and* ***(5)*** *used to navigate through the instrument cluster. The top two switch buttons on the Electronic Instrument Cluster (EIC) are function buttons and function the same as the POWER* ***(5)*** *and START* ***(2)*** *switch buttons on the AIC instrument panel for the setup menu functions.*

Entering the set up mode: (“Setup”)

1. Place the machine on firm, level ground with the loader arm and bucket down.

   NOTE: *For machines with the Electronic Instrument Cluster (EIC); you will need the key for these procedures.*

2. Before sitting in the seat, push and hold the OPERATE button **(3)** and the AUX OVERRIDE button **(4)** for five seconds until the display **(1)** shows the word SETUP.
3. You may now sit down and navigate through the “Setup” menu. Familiarize yourself with the use of the switch buttons in order to help prevent erroneous settings.



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Instrument cluster display setting

NOTE: *The Advanced Instrument Cluster (AIC) images are shown in this section for the four switch buttons* ***(2)****,* ***(3)****,* ***(4)****, and* ***(5)*** *used to navigate through the instrument cluster. The top two switch buttons on the Electronic Instrument Cluster (EIC) are function buttons and function the same as the POWER* ***(5)*** *and START* ***(2)*** *switch buttons on the AIC instrument panel for the setup menu functions.*

The operator may choose a continuous display of one of the four following parameters or select cycle from the dSPLY top level menu and momentarily display all four of the parameters in a cycle for a few seconds each.

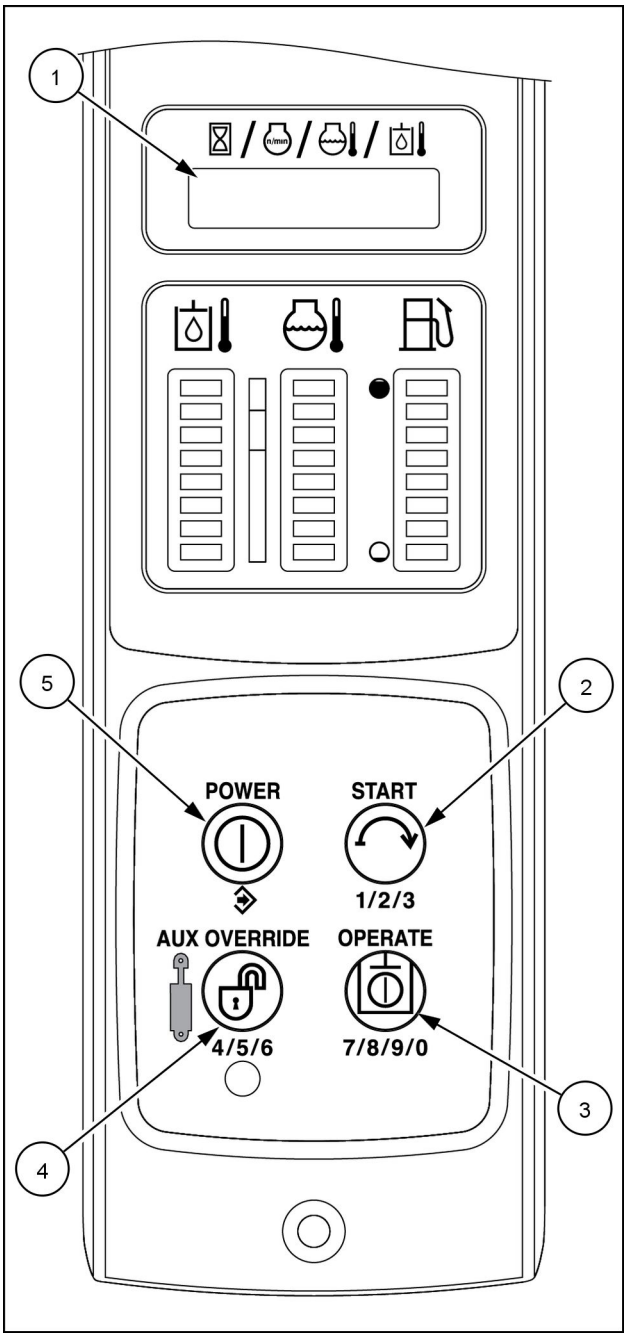
- HOUR - Engine hours.
- RPM - Engine RPM.
- COOLT - Engine coolant temperature.
- HOILT - Hydraulic fluid temperature.
- CYCLE - Cycle though all four parameters.

NOTE: *The instrument cluster is programmed to display the last setting selected when you sit in the seat.*

To change or select from the dSPLY top level menu

Once in the “Setup” menu, press the START button until dSPLY appears on the screen.

1. Push the POWER button **(5)** to display the current selection.
2. Push the START button **(2)** to toggle through the selections.
3. Once the desired selection appears on the text display, push the POWER button **(5)** to save the selection.



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Electro-Hydraulic (EH) controllability selection

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 lift arm settings.

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

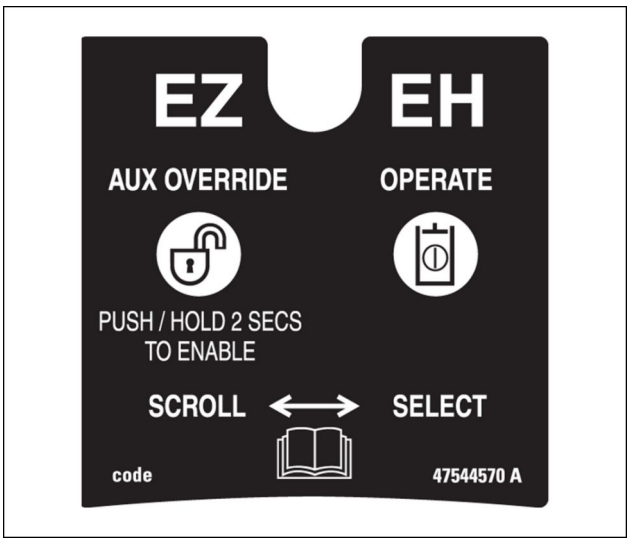
1. Press and hold the AUX OVERRIDE button **(1)** for two seconds to enter the EH shortcut menu.
2. SPEEd will display on the display **(2)**. Press the AUX OVERRIDE button **(1)** to select a different menu item (DRIVE, EXIT, HOUR, HOILT, COOLT, RPM, or CYCLE).
3. Press the OPERATE button **(3)** to 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.

Speed setting	Drive, lift, and tilt response to control lever movement
SP-C	Custom or default setting
SP-L	Slow response
SP-M	Medium response
SP-H	Quick response

Control setting	Drive and loader arm response to control lever movement
CR-C	Custom or default setting
CR-L	Smooth response
CR-M	Medium response
CR-H	Aggressive response



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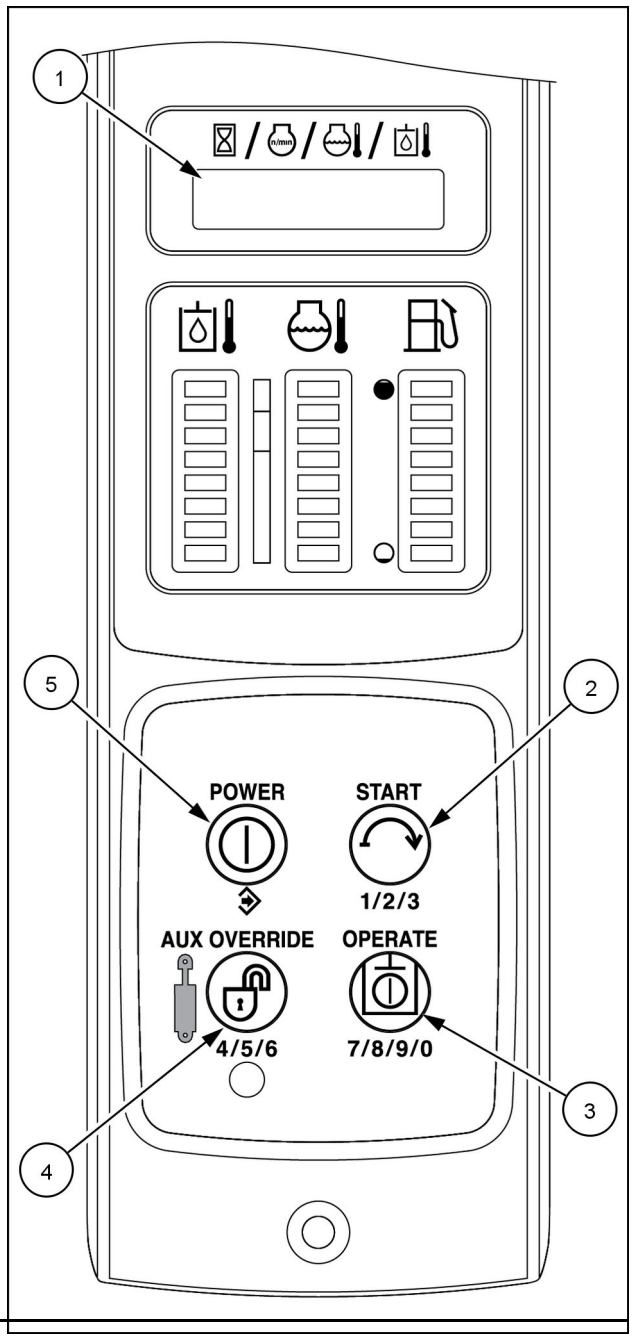

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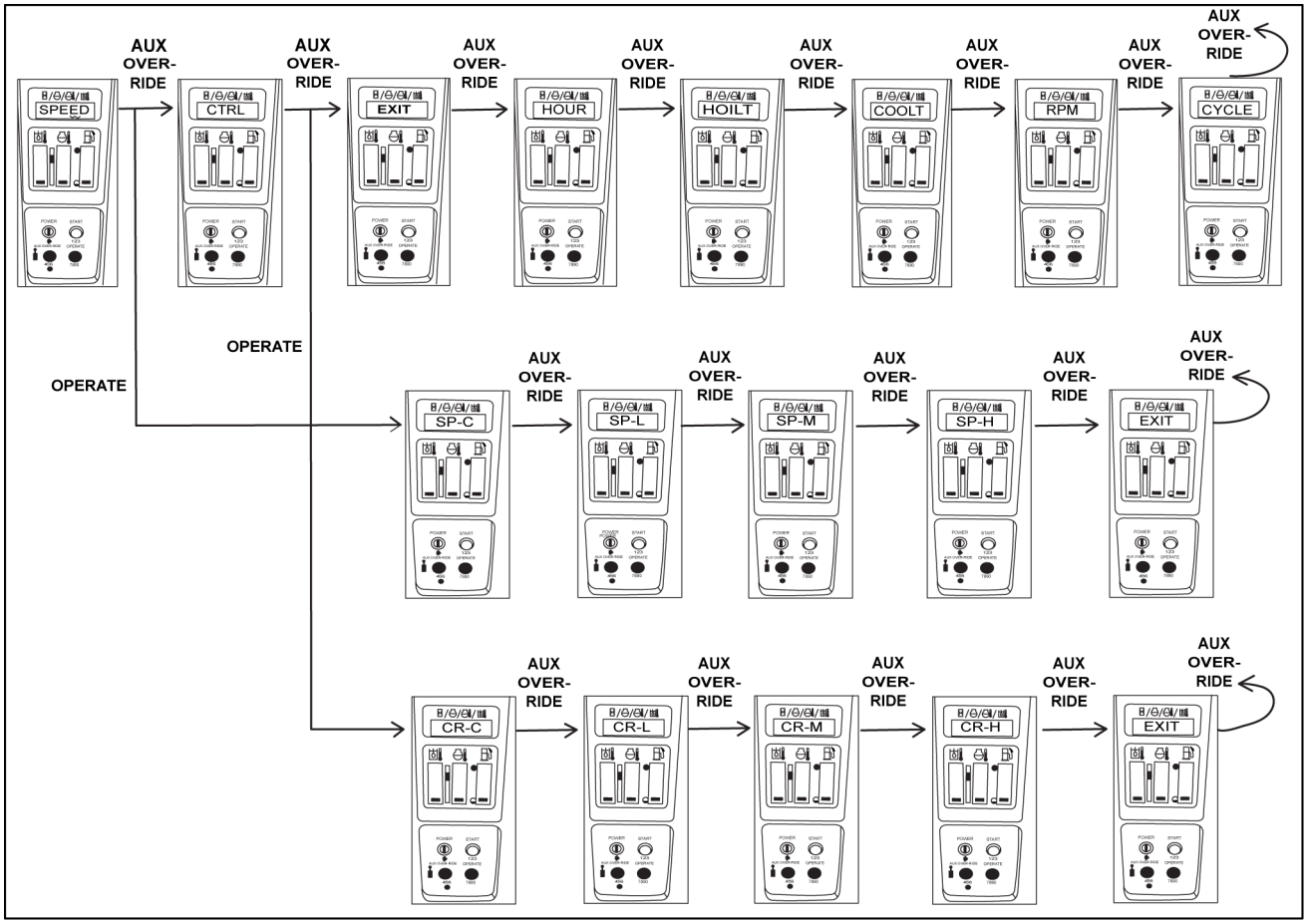
Easy-Electro-Hydraulic (EZ-EH) Flow chart



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Customize settings

- Custom settings SP-C and CR-C allow you to fully customize the EH settings using the setup menu.
- SP-C sets to the SETUP menu SPEEd settings: DRIVE, LIFT, and TILT. CR-C sets to setup menu CRTL settings DRIVE and L-ARM.
- If you do not use the SETUP menu to customize settings, SP-C and CR-C will be set by default to the default settings shown in the following pages. To fully customize the EH controls, refer to the instructions on the following page.

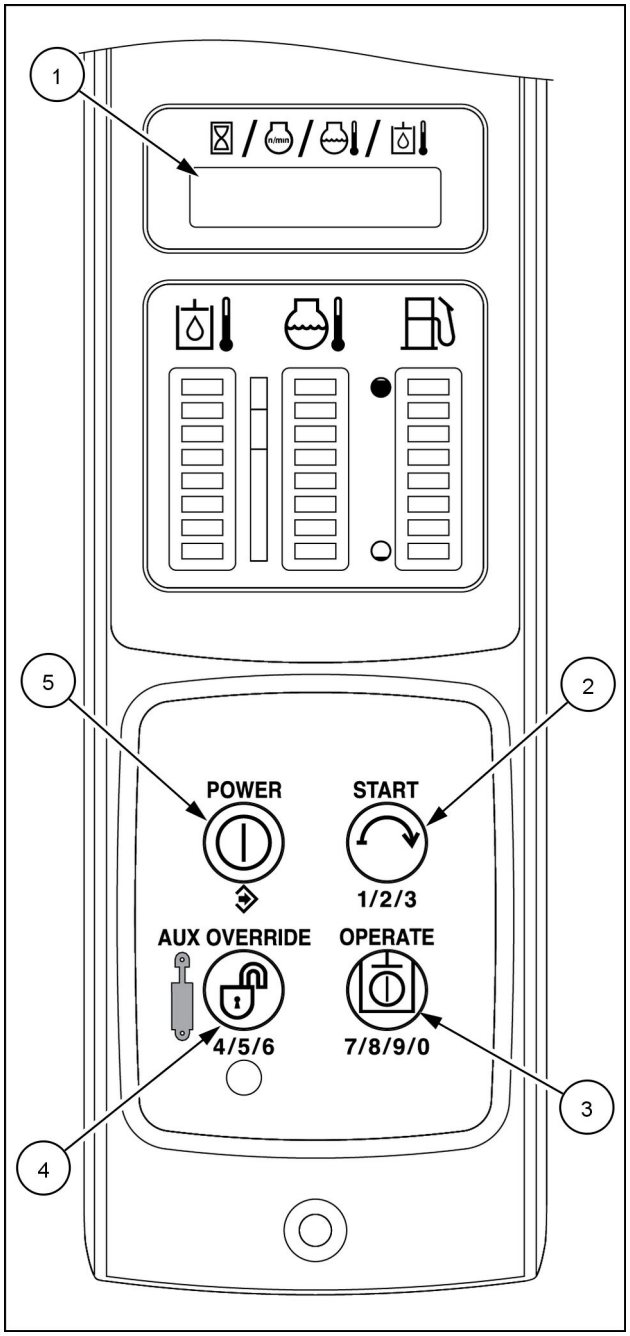
Setting custom controllability settings for Electro–Hydraulic (EH)

NOTE: *These settings can be activated using the Easy Electro-Hydraulic (EZ-EH) menu custom settings SP-C and CR-C.*

All changes must be made with the engine in the off position and the electronics asleep.

1. Before sitting in the seat, press and hold the AUX OVERRIDE button **(4)** and the OPERATE button **(3)** at the same time for five to seven seconds until SETUP **(1)** appears in the display. After seeing setup in the display, you may sit in the operator's seat and make changes.
2. Press the START button **(2)** to scroll between the different menus until EH **(1)** appears on the display.
3. Press the POWER button **(5)** to enter the next menu.
4. Press the START button **(2)** to scroll to the setting selection you want to adjust (Speed: Drive, Lift, or Tilt) or (CTLR: Drive or L-ARM), then press the POWER button **(5)** to save the entry. For DFLT, press the POWER button **(5)** to save the settings back to the factory default settings. The default settings are shown in tables for each model on the following pages.

   NOTE: *Use the AUX OVERRIDE button **(4)** when you want to go up a level.*
5. Press the START button **(2)** to scroll to the desired speed level (High, Med-2, Med-1, or Low) or (DRV1, DRV2, or DRV3) or (LDR1, LDR2, or LDR3), then press the POWER button **(5)** to save the entry.
6. After you have saved your selection; the monitor will revert back to step 3 so you can make another adjustment. If no other adjustments are needed, use the AUX OVERRIDE button **(4)** to exit the machine function menu. You will now be in the main SETUP menu; use the START button **(2)** to scroll to EXIT and then push the POWER button **(5)** again to exit the setup menu.
7. Leave the operator's seat for ten seconds before trying to start the unit.



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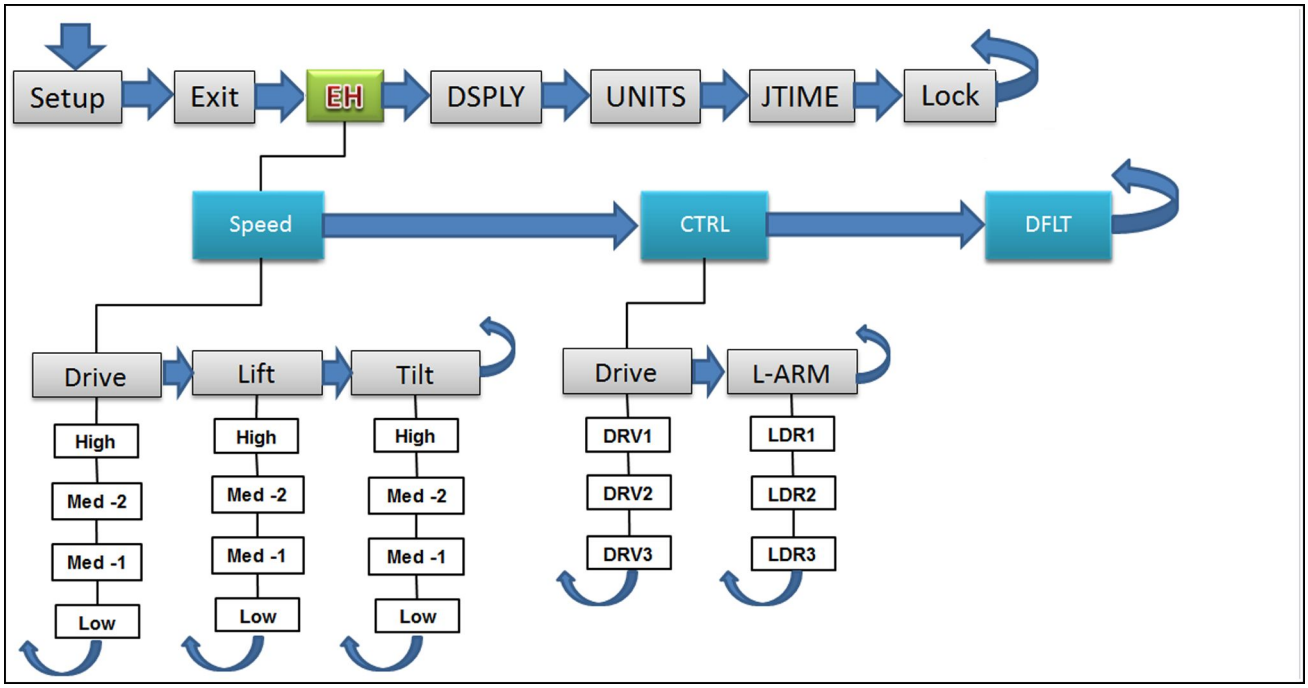
Custom EH settings



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Menu structure for Electro-Hydraulic (EH) controls

Menu structure for Electro Hydraulic (EH) controls

Setup	Display setup menu.	Tilt	Attachment tilt function.
Exit	Exit the setup menu.	L-ARM	Loader arm.
EH	Customize the speed of the machine's EH controls.	High	Quick response to control lever movement.
DSPLY	Alternate method to select between the selected display parameters.	Med-2	Medium/quick response to control lever movement.
UNITS	Allows the operator to select between Fahrenheit/Imperial units and Celsius/SI units.	Med-1	Medium/slow response to control lever movement.
JTIME	Job Timer. Displays engine operating hours since last reset.	Low	Slow response to control lever movement.
Lock	Used to create/change owner and user codes.	DRV1	Aggressive response to control lever movement.
Speed	Speed of the drive, lift, and tilt functions.	DRV2	Medium response to control lever movement.
CTRL	Controls for drive and loader arm.	DRV3	Smooth response to control lever movement.
DFLT	Factory default settings.	LDR1	Aggressive response to control lever movement.
Drive	Travel forward and reverse function.	LDR2	Medium response to control lever movement.
Lift	Loader arm up and down function.	LDR3	Smooth response to control lever movement.

Default settings for models L213 and L215

SPEED				
Tilt	Low	Med-1	Med-2	High
Lift	Low	Med-1	Med-2	High
Drive	Low	Med-1	Med-2	High
CTRL				
Drive	DRV3	DRV2	DRV1	

SPEED				
L-Arm	LDR3	LDR2	LDR1	

Default settings for models L223, L225 and L230

SPEED				
Tilt	Low	Med-1	Med-2	High
Lift	Low	Med-1	Med-2	High
Drive	Low	Med-1	Med-2	High
CTRL				
Drive	DRV3	DRV2	DRV1	
L-Arm	LDR3	LDR2	LDR1	

Default settings for models C227, C232 and C238

SPEED				
Tilt	Low	Med-1	Med-2	High
Lift	Low	Med-1	Med-2	High
Drive	Low	Med-1	Med-2	High
CTRL				
Drive	DRV3	DRV2	DRV1	
L-Arm	LDR3	LDR2	LDR1	

Default settings for models L218 and L220

SPEED				
Tilt	Low	Med-1	Med-2	High
Lift	Low	Med-1	Med-2	High
Drive	Low	Med-1	Med-2	High
CTRL				
Drive	DRV3	DRV2	DRV1	
L-Arm	LDR3	LDR2	LDR1	

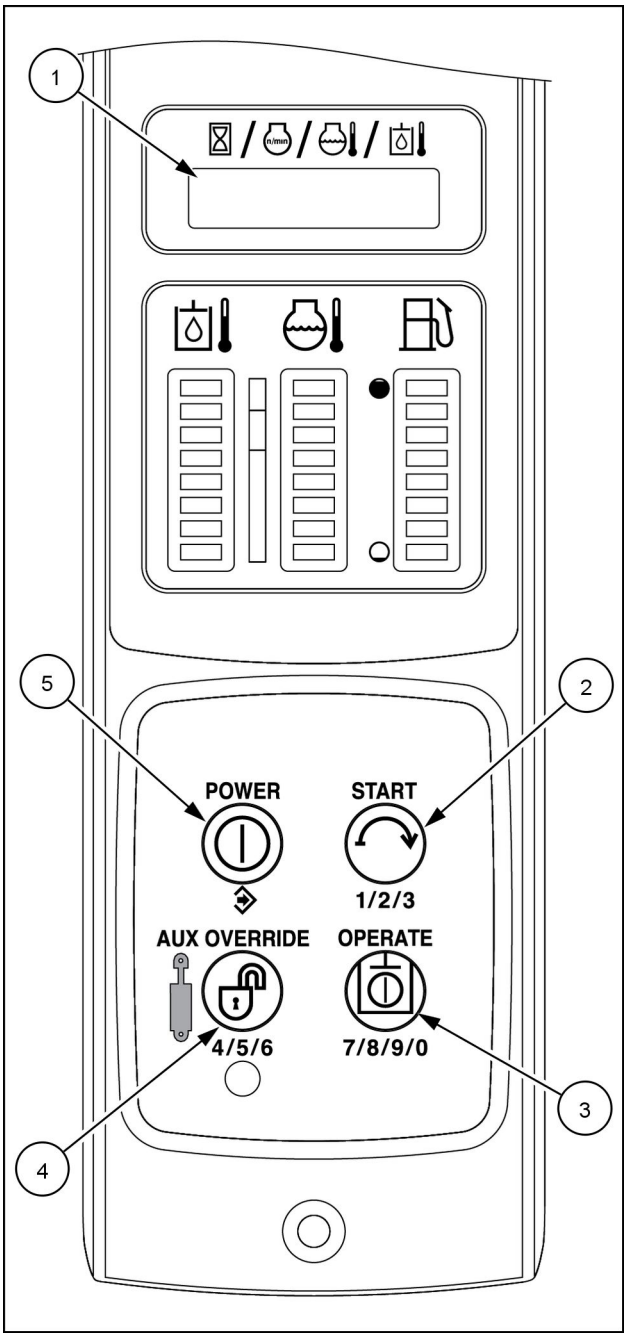
Temperature display selection

NOTE: *The Advanced Instrument Cluster (AIC) images are shown in this section for the four switch buttons* ***(2)****,* ***(3)****,* ***(4)****, and* ***(5)*** *used to navigate through the instrument cluster. The top two switch buttons on the Electronic Instrument Cluster (EIC) are function buttons and function the same as the POWER* ***(5)*** *and START* ***(2)*** *switch buttons on the AIC instrument panel for the setup menu functions.*

The operator may choose to display either Celsius (°C) or Fahrenheit (°F) temperature scales.

Once in the “Setup” menu, press the START button until UNITS appears on the screen.

1. Push the POWER button **(5)** to drop down into the sub-menu. Fahrenheit or Celsius will appear in the display.
2. Push the START button **(2)** to select the temperature scale desired.
3. Once the selected scale appears on the display **(1)**, push the POWER button **(5)**. The display **(1)** will blink OFF then ON and show the selected temperature scale.
4. To exit, press START button **(2)** until the display **(1)** shows the word EXIT.
5. With EXIT in the display **(1)** press the POWER button **(5)** to return to normal operation.



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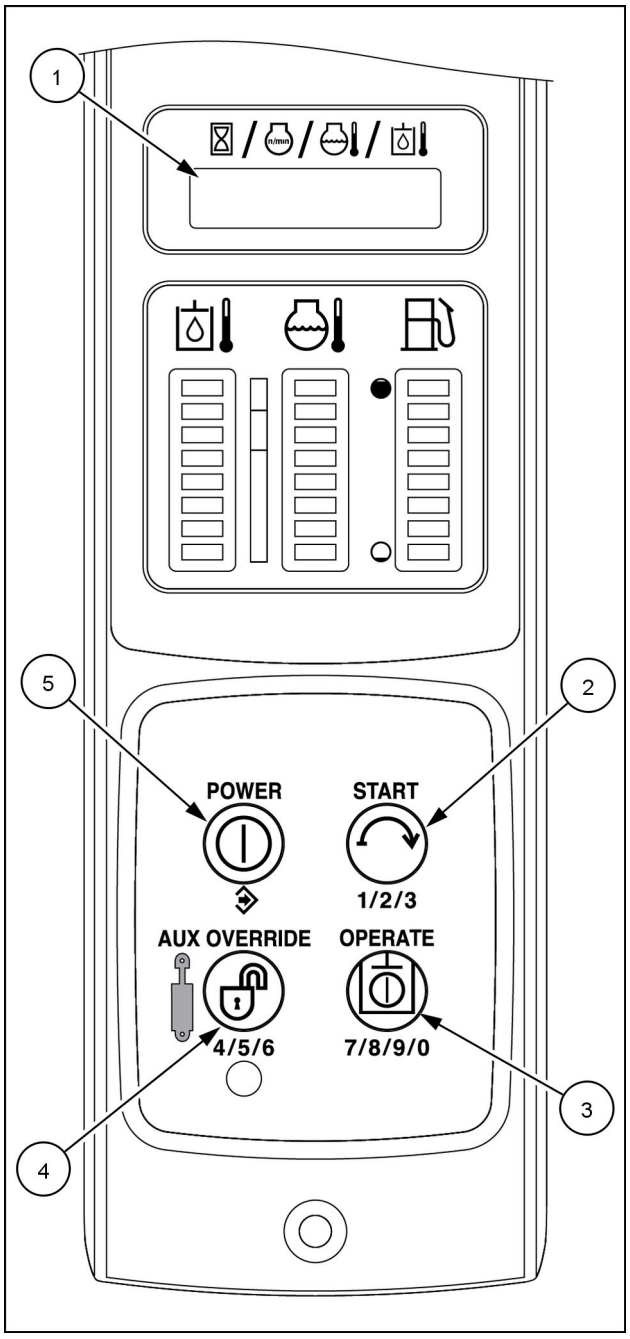
View or reset Job Timer (JTIME)

NOTE: *The Advanced Instrument Cluster (AIC) images are shown in this section for the four switch buttons* ***(2)****,* ***(3)****,* ***(4)****, and* ***(5)*** *used to navigate through the instrument cluster. The top two switch buttons on the Electronic Instrument Cluster (EIC) are function buttons and function the same as the POWER* ***(5)*** *and START* ***(2)*** *switch buttons on the AIC instrument panel for the setup menu functions.*

The operator may choose to set a timer that will run independent from the machine hours. To view or reset the timer:

Once in the “Setup” menu, press the START button until JTIME appears on the screen.

1. Push the POWER button **(5)** to view the current timer.
2. Push the START button **(2)** to reset or view the timer.
3. Use the POWER button **(5)** to save the selection.



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Anti-theft protection

NOTE: *The Advanced Instrument Cluster (AIC) images are shown in this section for the four switch buttons* ***(2)****,* ***(3)****,* ***(4)****, and* ***(5)*** *used to navigate through the instrument cluster. The top two switch buttons on the Electronic Instrument Cluster (EIC) are function buttons and function the same as the POWER* ***(5)*** *and START* ***(2)*** *switch buttons on the AIC instrument panel for the setup menu functions.*

Locking the instrument panel – Manual Lock, Auto Lock, Off:

Manual Lock feature:

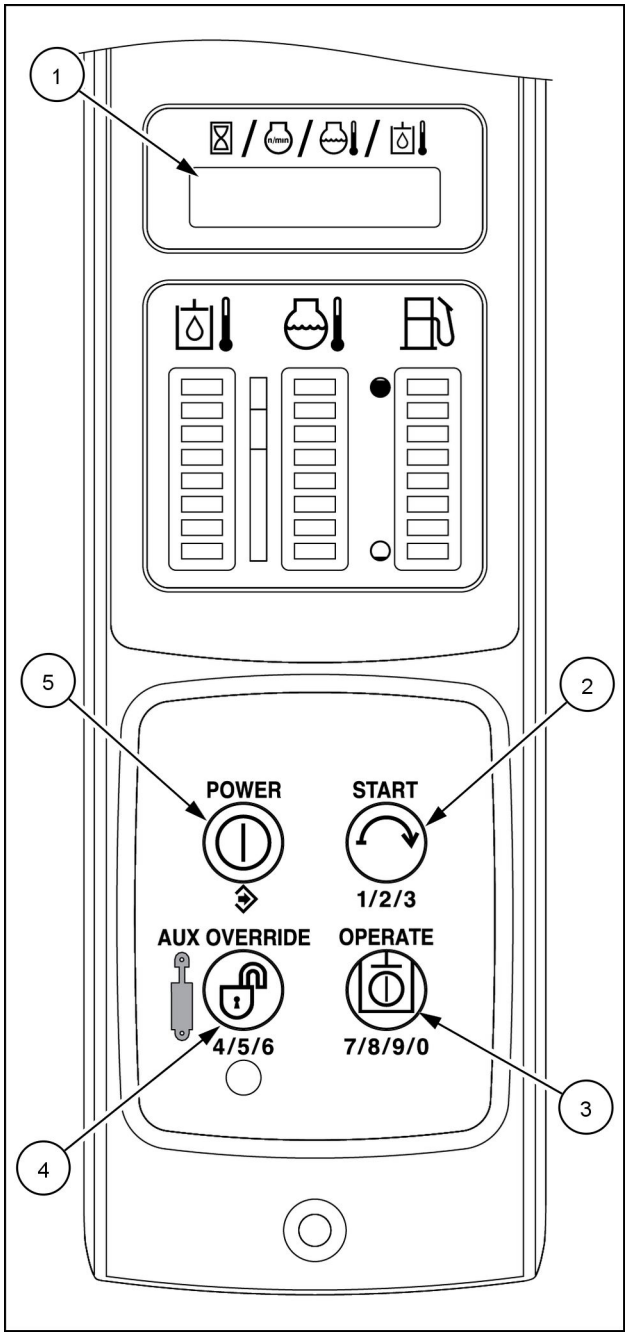
If a lock code has been entered; immediately after shutting off the engine the display will show PRESS TO LOCK and the AUX OVERRIDE button will flash. Anti-theft is set by pressing the AUX OVERRIDE button. The panel is now locked and LOCKd is displayed. Restarting requires entering the code. If the AUX OVERRIDE button is not pressed, the machine can be started without a code.

Auto Lock feature:

If a lock code has been entered; after shutting off the engine the instrument panel will automatically lock. Anti-theft is set. The panel is now locked and LOCKd is displayed. Restarting requires entering the code. The operator may choose to override the Auto Lock feature at engine shutdown. Anti-theft will not be set if the operator presses the AUX OVERRIDE button when the display shows the prompt PRESS TO UNLOCK, the machine can be started without a code.

Off feature:

If a lock code has not been entered; when the engine is shut off the display will not show lock? and the machine can be started without a code until a lock code is entered.



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Unlocking the instrument panel:

1. Sit in the seat to power the instrument panel. The warning lamps will illuminate and there will be an audible beep.
2. Press the flashing POWER button **(5)**. The display **(1)** will show unloc.
3. 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.

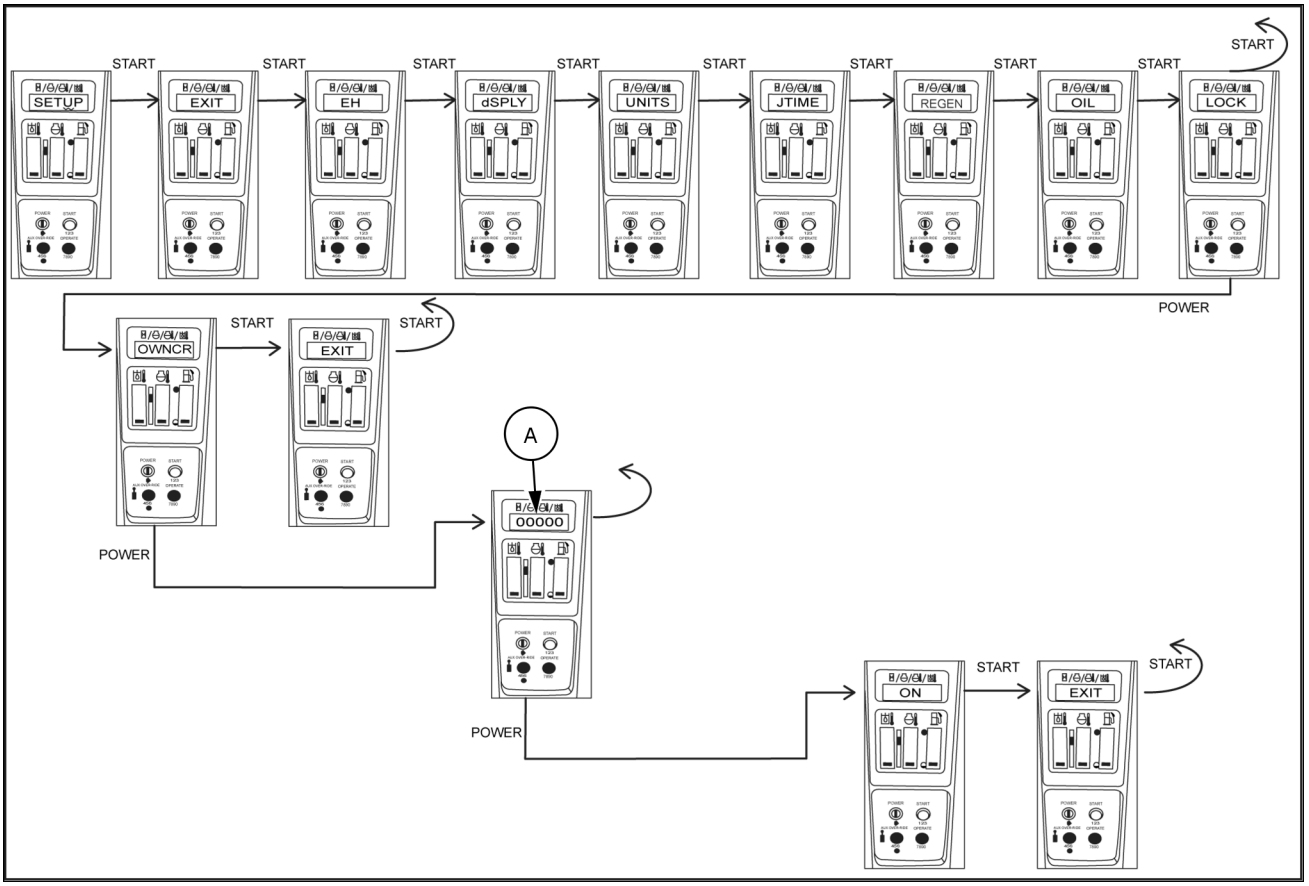
   NOTE: *For numbers 1, 2, 3 use the START button. For numbers 4, 5, 6 use the AUX OVERRIDE button. For numbers 7, 8, 9, 0 use the OPERATE button.*

4. Press the POWER button **(5)** after the fifth digit to enter the code. The engine preheat lamp will illuminate and the display **(1)** will begin the thirty second countdown.

   NOTE: *If the incorrect code is entered, ERROR is displayed, followed by 00000 prompting the operator to enter the correct code.*

If no owner code has been created

1. If you decide you do not want to create a code, enter all 0s **(A)**, you will return to OWNCR.



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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:

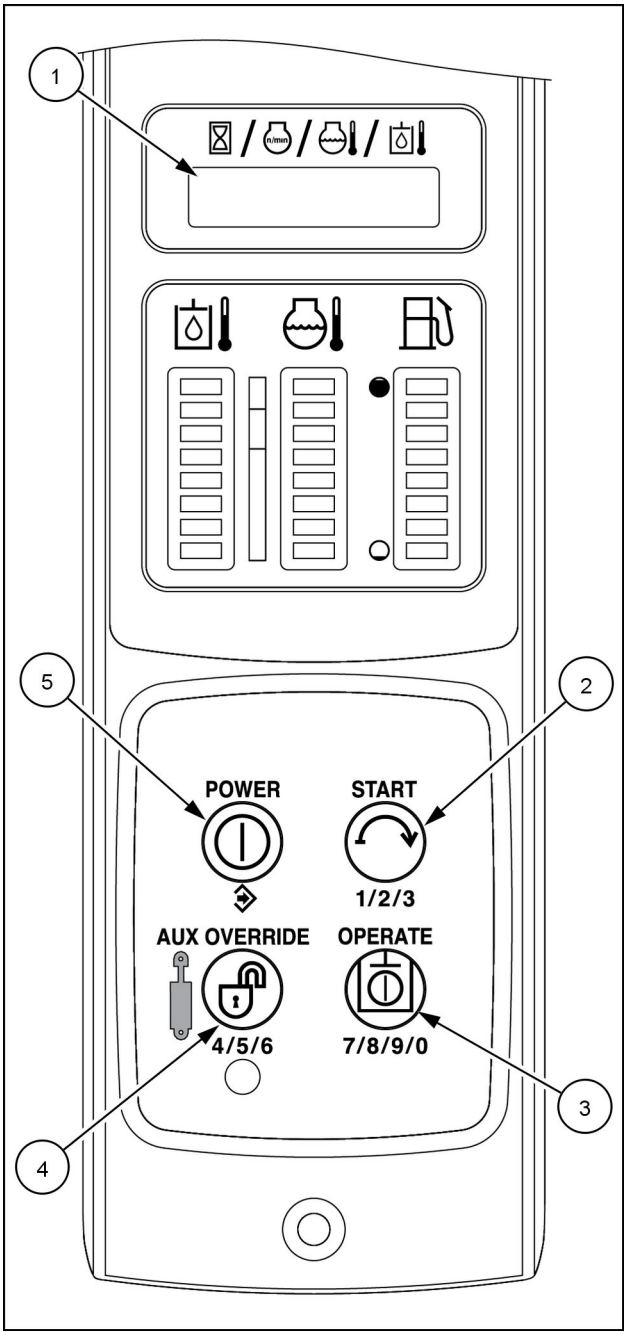
If no owner code exists, the display will show the word OWNCR (Owner Create), followed by 00000 . Write down the planned 5 digit code or use a code you already know.

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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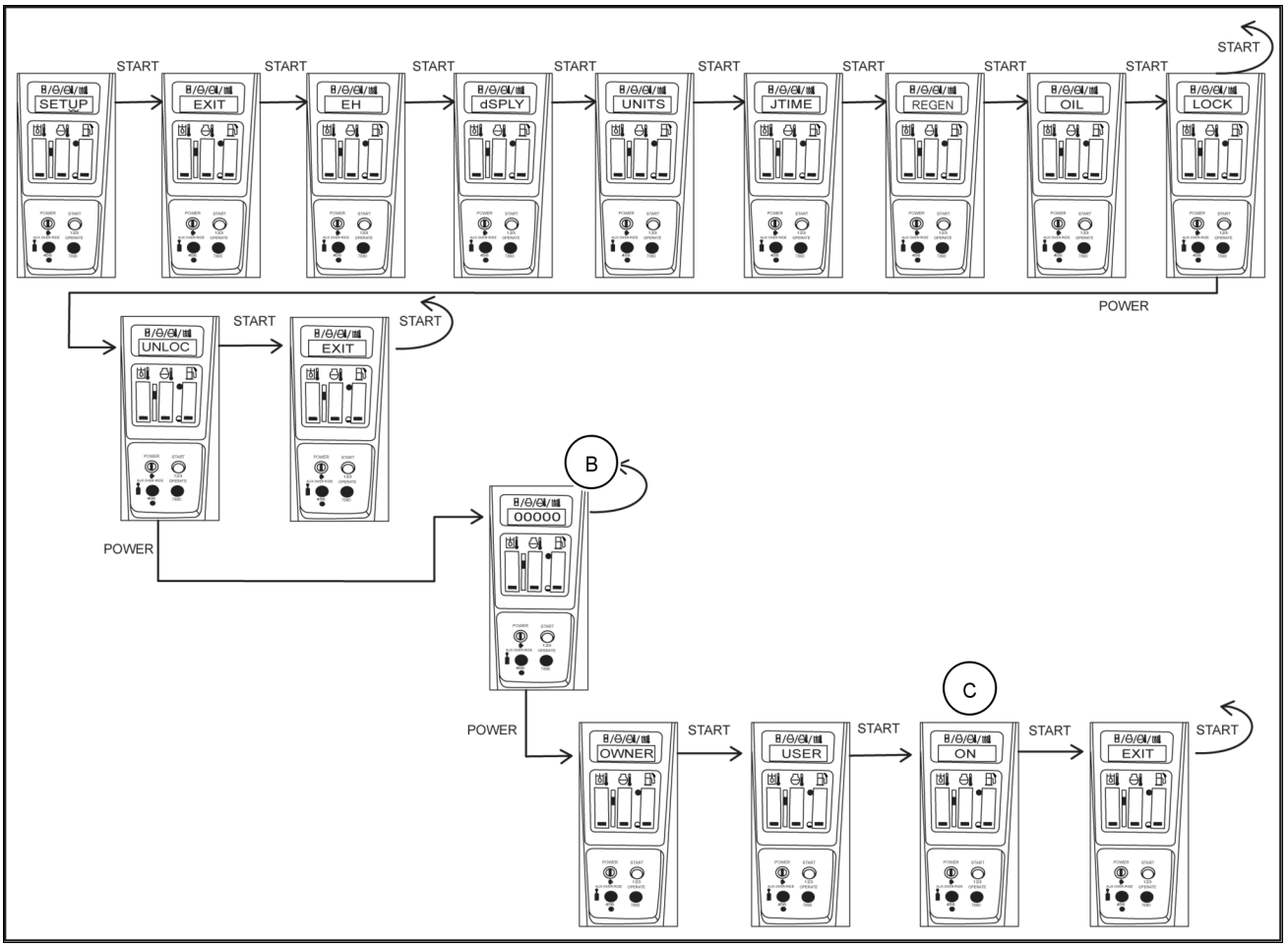
If an owner code has been created and LOCK function is disabled

NOTE: *You can set the lock function to one of three settings OFF, MANUAL LOCK, or AUTO LOCK by pressing the POWER button at point* ***(C)*** *as shown in the Figure below.*

1. If you cannot remember or enter an incorrect code **(B)**, you will return to OWNCR.



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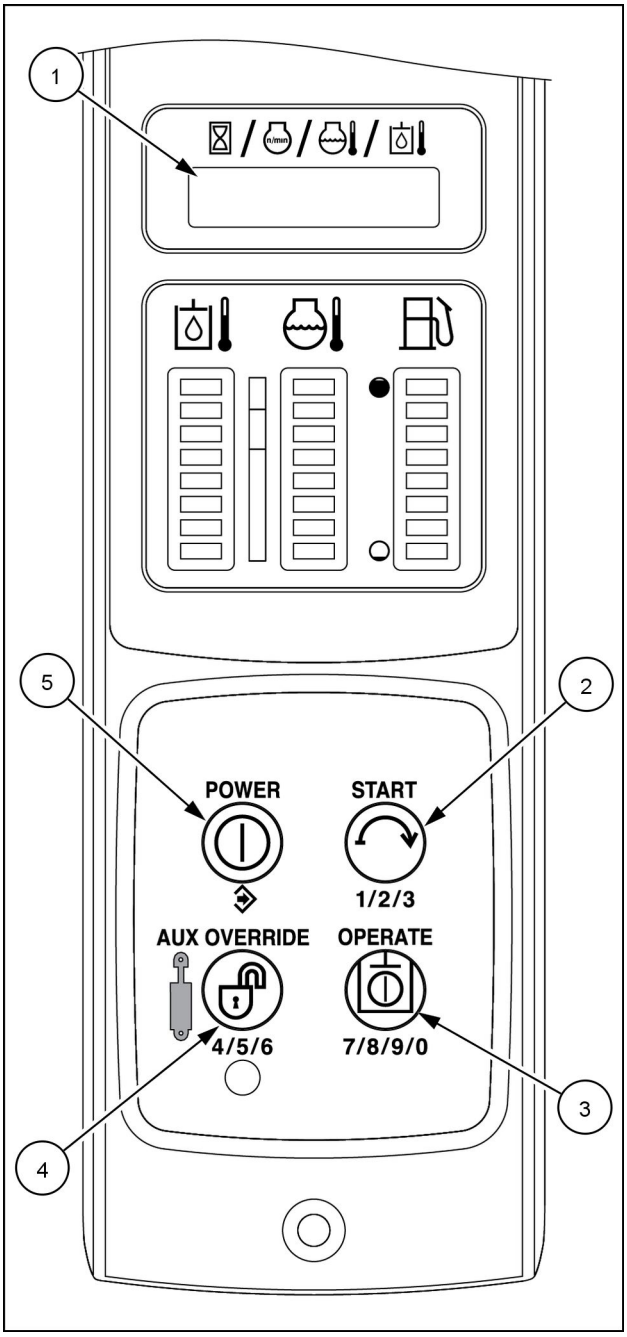
To modify the owner code:

Once in the LOCK menu, the display will show OWNER. Press the POWER button to enter the OWNER menu. The display will show open followed by 00000.

1. Enter the current owner 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 save the code. The display **(1)** will show the word OWNCR followed by the saved owner code.
3. Enter a new owner code to overwrite the existing code. The panel will return to the “Setup” menu.



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User codes

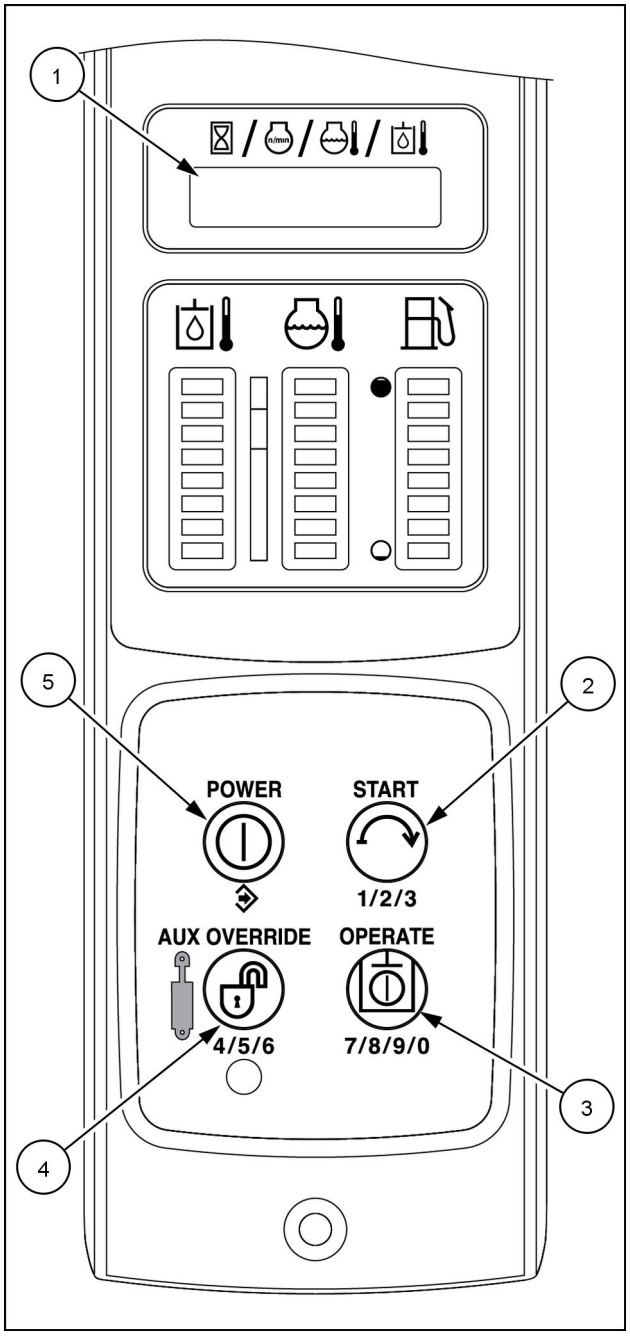
Once in the “Setup” menu, press the START button to move to the LOCK menu. Press the POWER button to enter the LOCK menu.

To create or modify a user code:

NOTE: *An owner code must be saved before a user code.*

Once in the LOCK menu, the display will show the word OWNER. Press the START button to move to the USER menu.

1. Use the START button **(2)** to move to user0 through user9. Press the POWER button **(5)** to create or change that user code. The display **(1)** will show the word USRCR (user create) followed by 00000 .
2. Enter the owner code. 00000 or the existing user code will be displayed.
3. Enter a new user code to enter or overwrite the existing code. The panel will return to the “Setup” menu.
4. 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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Left-hand column switch identification

(1)	Heating, Ventilation, Air-Conditioning (HVAC) dial
	Rotate this dial to adjust temperature.

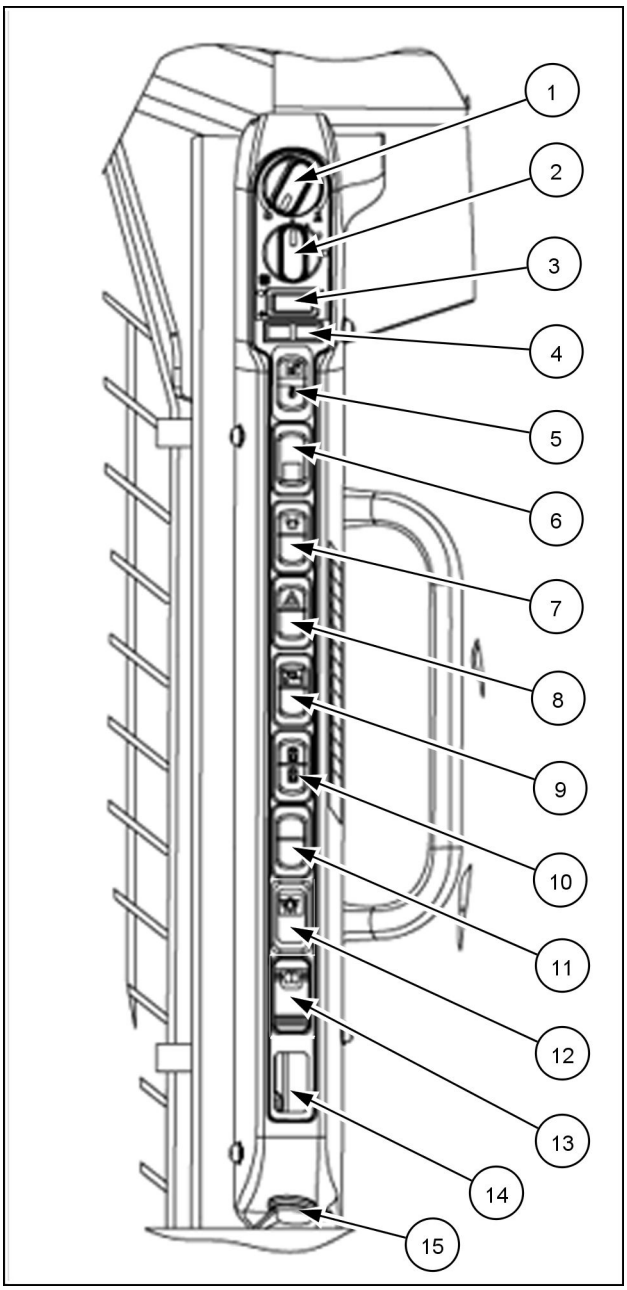
(2)	Fan dial
	Rotate this dial to activate the fan.

(3)	Air-conditioning switch
	The lamp will illuminate, to confirm the system is operational, once the fan switch has been activated.

(4)	Turn signal indicator
	Indicates directional turn signal operation when flashing. ***NOTE:*** *The Turn signal indicator will not function when the Hazard flasher switch is On.*

(5)	Hydraulic attachment coupler switch
	Push the unlock side of this switch to unlock the coupler from the attachment. This switch must be used in conjunction with hydraulic pressure from the loader arm down, attachment curl in or auxiliary. To Lock: with the coupler properly inserted in the attachment, apply hydraulic pressure from the loader arm down, attachment curl in or auxiliary making sure that the hydraulic system goes over system relief to set lock pins.

(6)	Two-speed indicator
	Indicates the two-speed system is in use.



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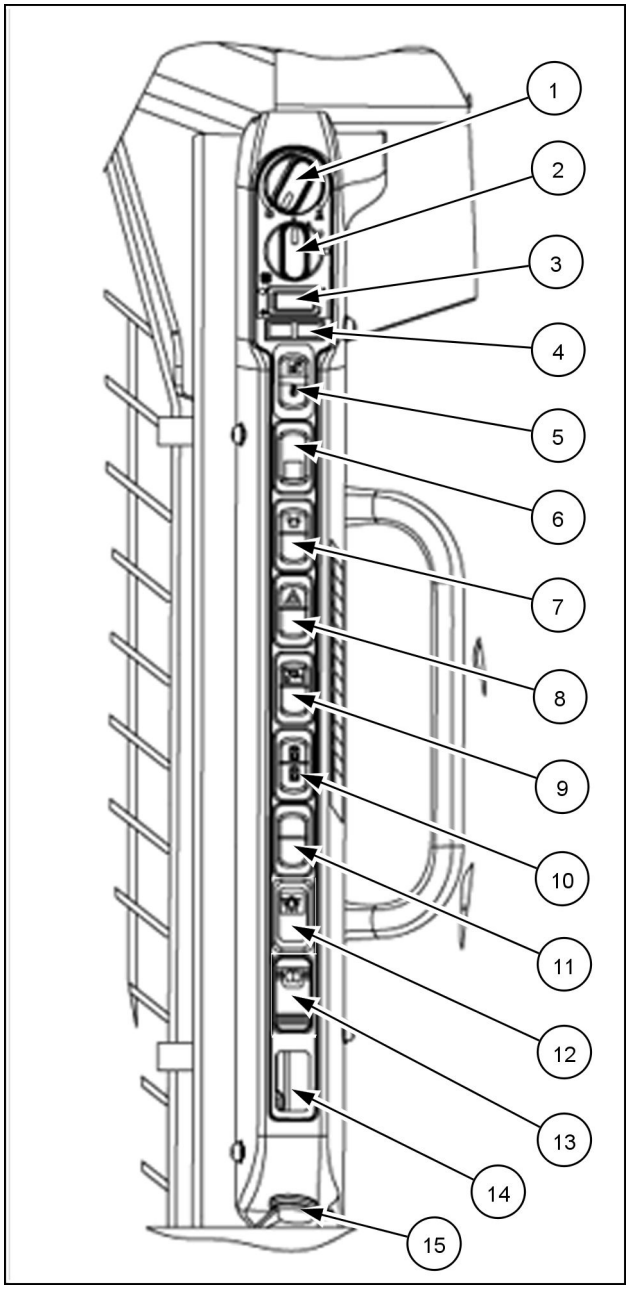
(7)	Rotating beacon switch
	If equipped, push the switch to activate the rotating beacon.

(8)	Hazard flasher switch
	If equipped, push the switch to activate the 4-way flashers.

(9)	Self-leveling switch
	If equipped, use this switch to activate the self-leveling feature.

(10)	Auxiliary hydraulic switch
	Push the switch to the upper High Flow (HF) position to engage the high flow auxiliary hydraulic mode that produces **207 bar** (**3000 psi**). Push the switch into the lower High pressure (HP) position to engage the enhanced high flow mode to produce **276 bar** (**4000 psi**) if equipped with approved attachment. The lamp will illuminate when activated. Keep the switch in the neutral position to disable high flow.

(11)	Auxiliary electric switch #2
	If equipped, this switch is for the front electric connector.



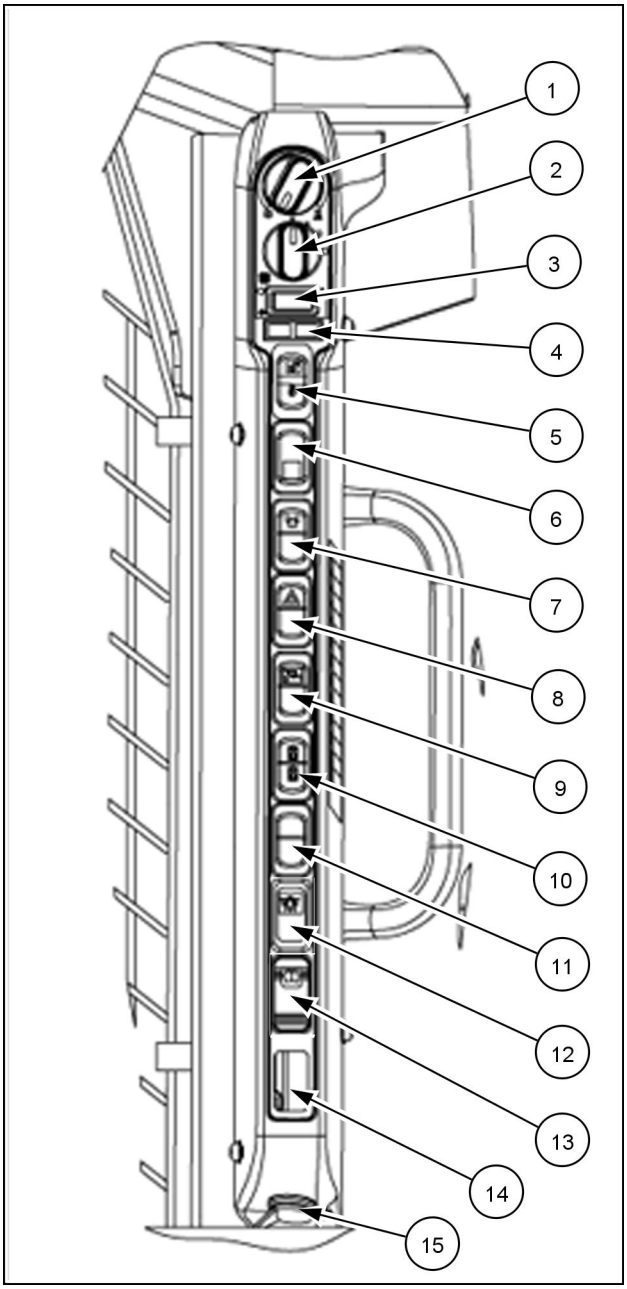
RAPH12SSL0031DA 2

(12)	Loader lockout switch
	If equipped, push to disable loader control while roading the unit. The bucket and loader arm will be locked in the position they are in when the loader lockout switch is pressed to the ON position. This prevents the operator from inadvertently lowering or raising the loader arm or bucket while driving the machine on roads. ***NOTE:*** *A mechanical machine with the loader lockout activated will result in an active fault code 4952 along with an amber lamp and buzzer. The auxiliary override button (lower left) on the instrument cluster can be pressed to clear the display and silence the buzzer. The amber lamp will remain illuminated.*

(13)	Windshield wiper switch
	If equipped, this three position switch turns the wiper ON/OFF and operates the washer fluid spray.

(14)	Blank (empty)
	This location is left open for any options you may add in the future.

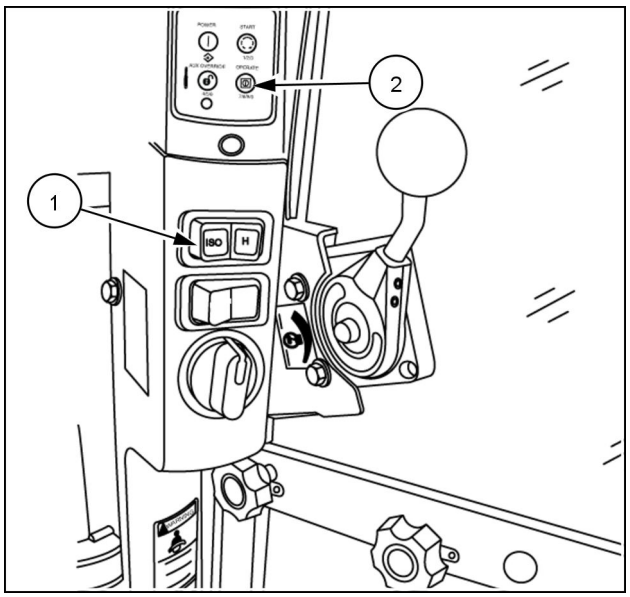
(15)	**12 V** Power port
	Supplies **12 V** of power for accessories.



RAPH12SSL0031DA 3

ISO or H pattern control switch

On machines with ISO or H drive, switch **(1)** determines which drive system the machine is operating. ISO drive (single lever controls drive) or H drive (traditional 2 lever drive control).



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Switching from ISO to H pattern

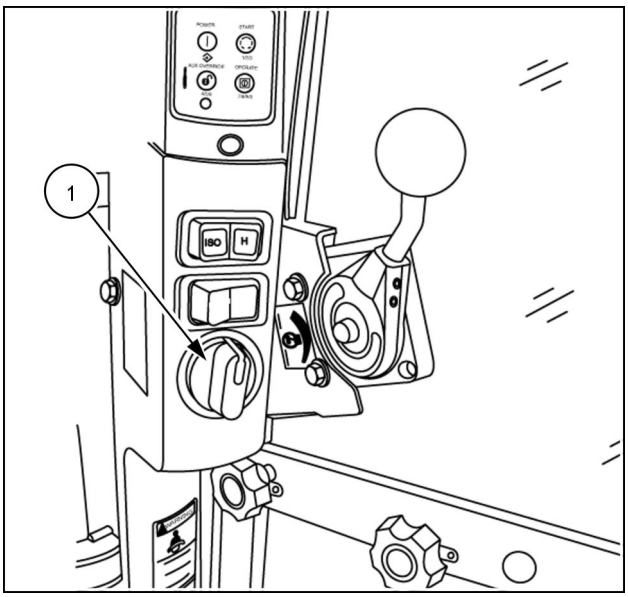
1. Make sure the machine is parked on level ground with the engine running at idle, and lower the loader lift arms to the ground.
2. Press OPERATE button **(2)** to stop all hydraulic functions. Confirm that the AUX roller switch in right-hand handle is in the neutral position.

   NOTE: *The AUX roller switch must be in neutral to change the pattern.*
3. Push and hold the ISO - H pattern select switch **(1)** to desired pattern for a few seconds, an audio alarm will sound letting you know that the pattern switch was successful.
4. Then confirm that the control pattern switch occurred by referencing the text display. Plus the switch will illuminate only on the selected side.
5. Then activate the hydraulic system by pressing the OPERATE button **(2)**.

Machine lights

Activate the cab exterior lights (if equipped) by a rotary switch **(1)** on the bottom of the right-hand instrument panel. The rotary switch **(1)**:

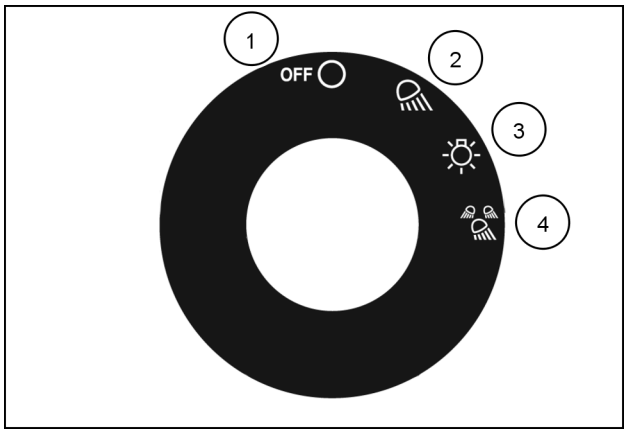
- remains in the last position that you select.
- will not function without the key (Machines equipped with the Electronic Instrument Cluster (EIC)).
- will not function without the POWER button engaged (Machines equipped with the Advanced Instrument Cluster (AIC)).



931007504A 1

The rotary switch **(1)** has four positions

Position	Front work light	Rear work lights	Rear red lights
(1)	OFF	OFF	OFF
(2)	ON	ON	OFF
(3)	ON	OFF	ON
(4)	ON	ON	OFF



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4 - OPERATING INSTRUCTIONS

COMMISSIONING THE UNIT

Operating Instructions

Before each operating period, it is the responsibility of the operator to confirm that the machine is safe and serviced.

During the first **20 h** of operation, make sure to do the following:

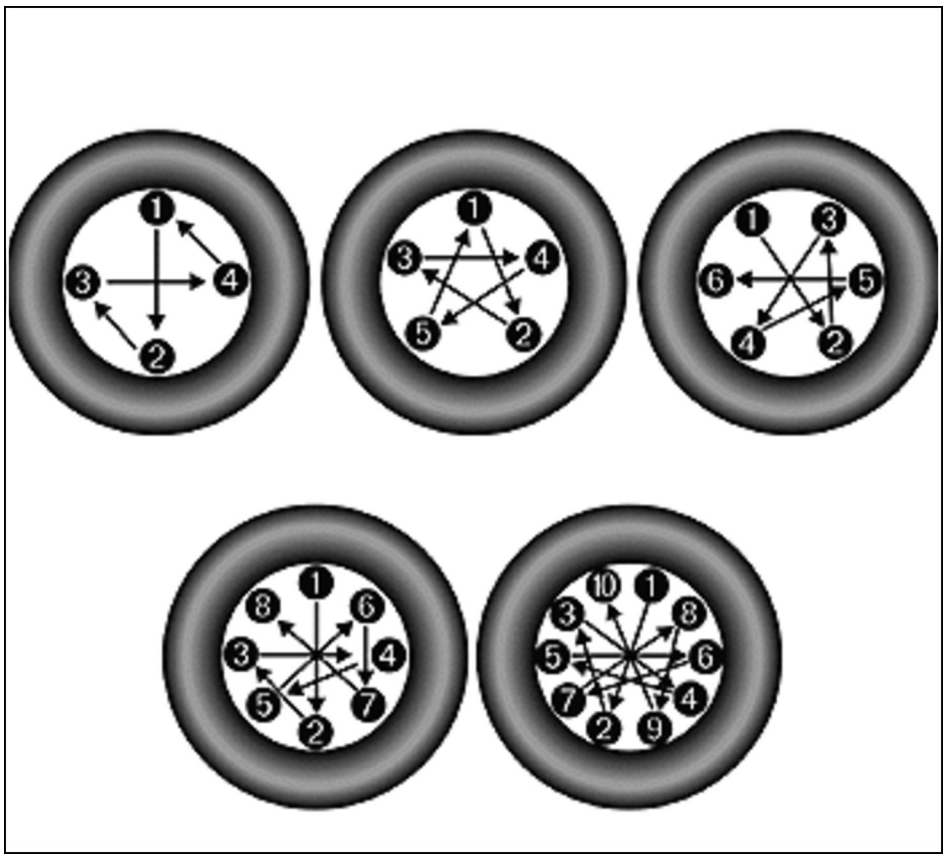
1. If possible, operate the engine at intermittent heavy loads and engine speeds for this period to ensure proper engine break-in.
2. Keep the engine at normal operating temperature.
3. Do not run the engine at idle speeds for long periods of time.
4. During the first **20 h** break-in period, check the oil level at approximately **1 h** intervals. Oil consumption may be higher during the initial break-in period.
5. It is recommended that the operator run the engine at full throttle when operating conditions permit.

NOTICE: *After the first **50 h** of operation, change the engine oil and filter.*

Wheel bolts

If the machine is new or if a wheel is removed for service, check and tighten the wheel bolts every **2 h** of operation until they remain tight. If the machine is equipped with stamped center wheels, the lug nuts will be tapered. Tighten each lug nut to a torque of **162.7 – 196.6 N·m** (**120 – 145 lb ft**).

If the machine is equipped with solid center wheels, the lug nuts will be flanged. Tighten each lug nut to a torque of, **189.8 – 223.7 N·m** (**140 – 165 lb ft**).



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Pre - start checklist

Operating and environmental conditions must be considered and the following checked:

1. Fill the tank with No. 1 diesel or No. 2 diesel fuel. Use No. 1 diesel if the ambient temperature is expected to be less than **4 °C** (**40 °F**) or if the machine is to be used at an altitude exceeding **1524 m** (**5000 ft**). The sulfur content of the fuel should be no more than **0.5%**. The sediment and water content should not exceed **0.5%**. Use ultra low sulfur fuel only (less than **15 ppm**).
2. Remove all dirt and debris from the floor board area to maintain full range of foot pedal travel and foot throttle if equipped.
3. Confirm that the radiator and coolers are clean of debris and obstruction.
4. **⚠ WARNING**

   Hot liquid under pressure!
   Service when cool.
   Failure to comply could result in death or serious injury.

   W1187A

   Check fluid levels of the engine, hydraulic reservoir and coolant tank.
5. Lubricate any fittings in accordance with the lubrication and maintenance schedule.
6. Inspect the machine for loose parts, damaged components or missing items. Keep all shields in the proper position.
7. Confirm that all safety signs are legible and properly placed on the correct component. Replace any safety signs that are not legible. Contact your dealer for replacement safety signs.
8. Check the seat belt and seat switch for damage and proper operation. See the maintenance section of this manual under daily maintenance for the complete procedure.
9. Confirm that all controls operate freely and correctly.
10. Confirm that the drive control is correct and that the machine does not creep forward or rearward. Contact your dealer if the machine does not remain stationary with the drive controls in the neutral position.
11. Confirm that the parking brake holds the machine from movement when powered or on an incline.
12. **⚠ WARNING**

    Falling object hazard!
    Before operating the machine, always make sure the bucket or attachment is securely locked into the quick-attach plate. A loader bucket or attachment that is not securely locked into the quick-attach plate could come off during loader operation.
    Failure to comply could result in death or serious injury.

    W0166A

    Confirm that the attachment is properly secured to the attachment coupler .

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 cannot 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. It is recommended that you run the engine at full throttle when operating conditions permit and when safe.*

Starting the engine

When the operator sits in the seat the instrument cluster panel will light all functions for about **3 s**, during this time the instrument cluster is self-checking the electrical circuits. All lights will go off except the parking brake and the fasten seat belt light will flash until the seat belt is buckled or the restraint bar (if equipped) is lowered. The instrument cluster will sense this and the fasten seat belt light will go off allowing the operator to start the machine.

NOTICE: *If the machine is to be operated in consistently low temperatures, contact your dealer for the correct oil.*

NOTICE: *ALWAYS allow the engine and hydraulic system to warm up before applying a load.*

NOTICE: *If the engine does not start within **30 s**, allow the starter to cool for one minute and then begin the procedure again.*

Start the engine:

1. Adjust the seat, fasten the seat belt, and lower the restraint bar (if equipped).
2. Place the control levers in the neutral position.
3. If applicable, put the High Flow (HF)/High Pressure (HP) switch in the standard flow (center) position.
4. Increase the throttle to approximately 1/8 throttle.
5. Sound the horn to alert others of your intentions. Follow the applicable system start procedure.

Keyless system start:

6. Press the POWER button.
7. Monitor the instrument cluster lamps. If the engine preheat lamp illuminates, wait until the lamp is off before you start the engine.
8. Press and hold the START button until the engine starts. Do not hold the START button for longer than **30 s**.
9. After starting the engine, monitor the indicator lights and confirm that the machine functions are normal.

Keyed system start:

6. Turn the key switch to the RUN position.
7. Monitor the instrument cluster lamps. If the engine preheat lamp illuminates, wait until the lamp is off before you start the engine.
8. Turn and hold the key in the START position until the engine starts. Do not hold the key in the START position for longer than **30 s**.
9. After starting the engine, monitor the indicator lights and confirm that the machine functions are normal.

Operating in extreme temperatures

⚠ 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

Operating in cold weather

Cold weather conditions require specific procedures. During these conditions your machine will require special attention to prevent serious damage. Cold weather maintenance will extend the service life of the machine.

Cold weather increases the viscosity of the oil in the hydraulic system. Cold oil can cause changes in the operational characteristics of the machine, particularly in machines equipped with the electro-hydraulic control system. It is recommended to warm the machine to sufficient operating temperature and take care when starting and stopping, and making steering adjustments until you are comfortable with the controls.

Allow extra time during cold weather to bring the machine and components up to operating temperature. Run the engine below **1500 RPM** until the engine temperature rises. Once the engine temperature rises, throttle the engine up to operating speed and operate the machine. DO NOT run the engine at idle speed for extended periods.

Battery and electrical system

Clean the battery and make sure it is at full charge. Inspect the battery cables and terminals. Clean and spray the terminals with battery terminal protector to prevent corrosion.

A fully charged battery at **-17 °C** (**0 °F**) has only **40%** of the normal starting power.

Lubricants

Use the correct oil viscosity in each component based on climate condition. Consideration for extreme temperatures and the correct viscosity are recommended.

Diesel fuel system

Verify with your fuel supplier for the correct cold weather fuel. Diesel engine power will be reduced if wax particles are in the fuel filter. Consult your dealer for the best fuel for these machines.

Cold temperature operation can cause moisture condensation in the fuel tank. Keep the fuel tank full and check for water frequently.

NOTICE: *Failure to remove water from the fuel may result in an inoperative engine and damage to the fuel system.*

Cold temperature starting aids

See your dealer for additional starting aids.

Cooling system

Keep the coolant at the correct level in the reservoir and radiator. Use **NEW HOLLAND AMBRA ACTIFULL™ OT EXTENDED LIFE COOLANT** premix (**50%** concentrate and 50% distilled water). This mixture protects the engine cooling system to **-35.0 °C** (**-31.0 °F**).

NOTICE: *DO NOT mix ethylene glycol coolant with* ***NEW HOLLAND AMBRA ACTIFULL™ OT EXTENDED LIFE COOLANT****. See* ***7-14*** *for more information.*

Keep dirt and debris from restricting the radiator and coolers. Take extra precaution to monitor build up while operating.

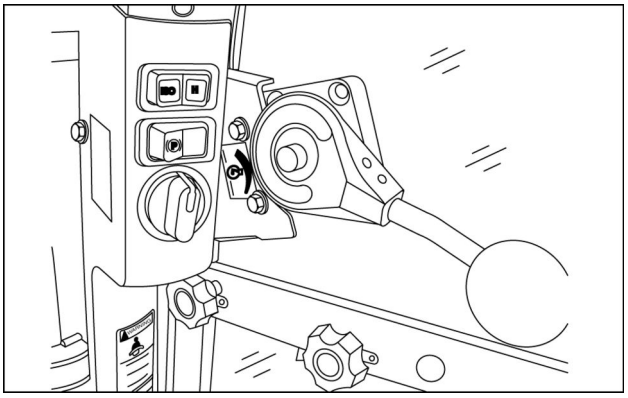
Improper fan belt tension may cause an overheating issue.

Throttle

Hand throttle

Manual throttle control lever in the low idle position.

NOTE: *If the throttle control lever is not in the low idle position when starting the engine, the engine speed will be limited to low idle until the throttle control lever is returned to the low idle position.*



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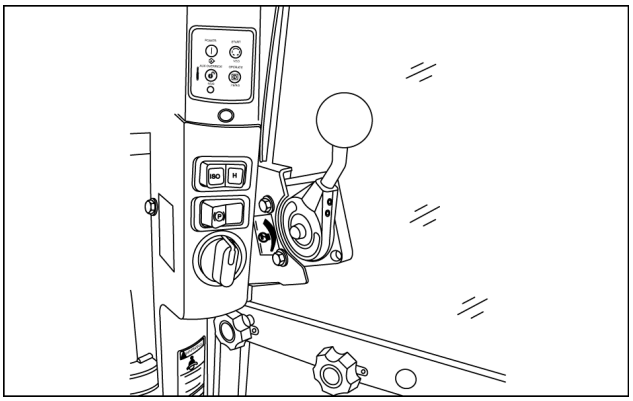
Manual throttle control lever in the high idle position.

NOTE: *Most operating conditions require full throttle (high idle) position.*



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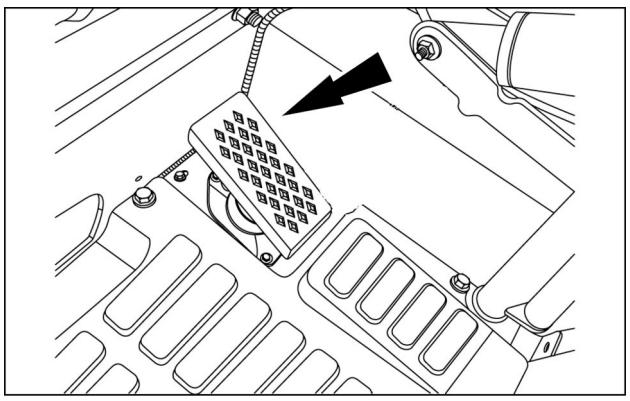
Foot throttle

The foot throttle is located next to the right foot pedal, if equipped. Push the pedal down to increase engine speed. Release the pedal to decrease engine speed. When released completely the foot throttle will default to the idle position of the manual throttle lever.



93109350 3

Booster battery procedure

⚠ 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

Two persons are required for this procedure. Make sure the person making the connections is wearing face protection.

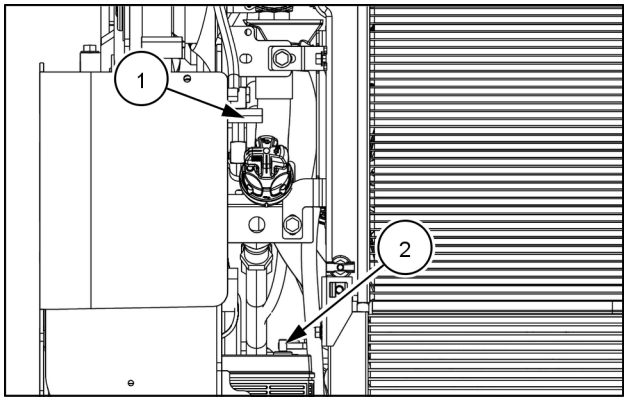
1. Sit in the operator's seat and have the other person make the connections. Make sure the booster battery is **12 V**.

   NOTICE: *Prevent the primary machine's electrical system from receiving excess voltage. Make sure that the secondary machine's engine is not operating or if applicable the charger is not in the boost position when you attempt to start the primary vehicle.*

2. If using another machine for power, make sure the two machines do not touch.
3. Connect the positive jumper cable from the boost battery to the positive battery terminal **(2)** of the dead battery first.
4. Connect the negative jumper cable from the boost battery to a good frame ground **(1)**, away from the dead battery.

   NOTE: *Follow the engine starting procedure in this manual **4-3**.*

5. After starting the engine, have the other person disconnect the negative jumper cable **(1)** first and the positive jumper cable **(2)** last.



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STOPPING THE UNIT

Parking the machine and stopping the engine

⚠ WARNING

Equipment rolling hazard!
Always try to park the machine on firm level ground. Avoid parking on slopes. Block the wheels in both directions.
Failure to comply could result in death or serious injury.

W0265A

⚠ 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

NOTICE: *The turbocharger (if equipped) may be damaged if the engine is not properly shut down.*

1. When the work day is finished, make sure the machine is parked on level ground and lower the loader lift arms to the ground.
2. Before exiting the machine, ensure that the loader arm or attachment is not supporting the weight of the machine with the front tires off the ground.
3. Run the engine at idle speed and allow time for the engine and component parts to cool evenly.
4. Place all control levers in the neutral position.
5. Turn the key switch to the OFF position or activate the POWER button to stop the engine. The parking brake is engaged automatically.
6. Remove the key (if equipped), release the seat belt, and raise the restraint bar (if equipped).
7. Use the grab handles and safely exit the machine.

MOVING THE UNIT

Machine operation

⚠ WARNING

Loss of control hazard!
Keep hands and feet on the appropriate controls at all times to maintain control of the machine.
Failure to comply could result in death or serious injury.

W0237A

⚠ WARNING

Impact hazard!
Refer to the cold weather operations section of this manual for start-up and operation in low temperatures 0 °C (32 °F). Follow these procedures to avoid sluggish operation or a change in operation characteristics.
Failure to comply could result in death or serious injury.

W1239A

⚠ 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

⚠ WARNING

Roll-over hazard! A full bucket in the raised position alters the center of gravity of the machine.
When operating a loader with a full bucket on slopes, observe the following precautions:
1. Avoid turning the machine on slopes.
2. Always drive slowly straight up and down slopes.
3. Always carry the load as low as possible.
Failure to comply could result in death or serious injury.

W0018A

⚠ WARNING

Misuse hazard!
Multiple sensors on your machine control safety functions. For example, a sensor in the operator's seat automatically disengages the drive to the attachment when the operator leaves the seat. To ensure a safe operating mode, DO NOT disconnect or bypass these sensors. Repair all inoperable sensors.
Failure to comply could result in death or serious injury.

W0014A

⚠ 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

NOTICE: *Before you operate the machine, check the control levers, instruments, warning lamps, engine throttle, and attachment hydraulic controls. Also check the seat belt/seat switch, and the restraint bar switch (if equipped). If you know there is a malfunction, missing part, or part that needs adjustment, stop the machine and correct the problem immediately.*

NOTICE: *For Electro-Hydraulic (EH) machines, when the operator presses the OPERATE button on the right-hand instrument cluster to enable the hydraulic system and a control lever is not in the neutral position; the hydraulics will not enable. JOYNU will appear on the display to inform the operator. Move the control levers to their neutral positions and press the OPERATE button. If JOYNU continues to appear contact your Dealer.*

NOTICE: *For all machines (mechanical or EH), if the operator is out of the seat, the seat belt is not fasten or unplugged, the restraint bar (if equipped) is unplugged, and the OPERATE button is pressed, error message OPRPR will appear on the display. Check the seat belt and the restraint bar (if equipped) plug connections. Sit in the operator's seat, engage the seat belt, lower the restraint bar (if equipped), and press the OPERATE button. If OPRPR continues to appear contact your Dealer.*

1. Set the engine speed at the desired throttle setting. Control the machine ground speed with the control levers. When the job site conditions permit, the throttle should be set at full throttle.

   NOTE: *The minimum throttle setting should be* ***1400 to 1500 RPM*** *for acceptable control.*

2. If you are a new operator, always operate the machine in an open area at a reduced machine ground speed until you get a feel for the controls. Move the control levers slowly and smoothly to avoid machine bouncing. If the machine starts to bounce, bring the control levers back to the neutral position.
3. Keep all machine and loader arm movements smooth, and the work cycle as short as possible. Complete more work in a shorter time frame with a smooth, short work cycle.
4. Keep the work site as smooth and level as possible.

NOTE: *Use the correct tires for the job site conditions.*
Contact your dealer for tire options.

5 - TRANSPORT OPERATIONS

SHIPPING TRANSPORT

Transporting the machine

⚠ 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

⚠ 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

Transport hazard!
Only use the identified tie-down points to secure the machine for transport on a trailer.
Failure to comply could result in death or serious injury.

W1431A

You must know the rules or laws for safety that are used in each area that you will be in. Make sure that your truck and machine are equipped with the correct safety equipment.

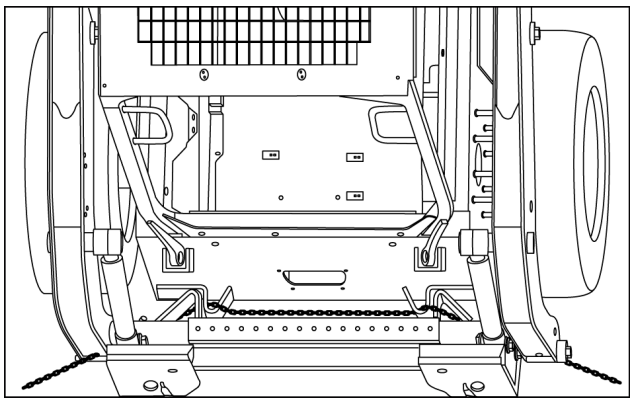
Load the machine on to a trailer:

1. Put a chock block to the front and rear of all trailer wheels.
2. Use low idle speed, move the skid steer slowly onto the trailer. Keep the machine in the center of the ramp and trailer.
3. Lower the bucket or attachments onto the trailer. Make sure not to lift the front of the machine off the trailer.
4. Shut the engine off.
5. If applicable, remove the key.

   NOTE: *Small frame units should route the strap as the top image shows. Medium and large frame units should route the strap as the third image shows, through the hand holds or use the key hole available on the lift arm stops.*
6. Use straps to fasten the skid steer to the trailer. Only use the tie-down locations, in the front and rear identified with the tie-down decal.
7. Put chock blocks at both ends of the wheels or tracks of the machine.
8. Remove the chock blocks from the trailer wheels.

Unload the machine from a trailer:

1. Put a chock block to the front and rear of all trailer wheels.
2. Remove the tie down straps.
3. Remove the chock blocks at both ends of the wheels or tracks of the machine.
4. Start the machine and keep at a low idle speed.
5. Drive slowly down the center of the trailer or ramps.



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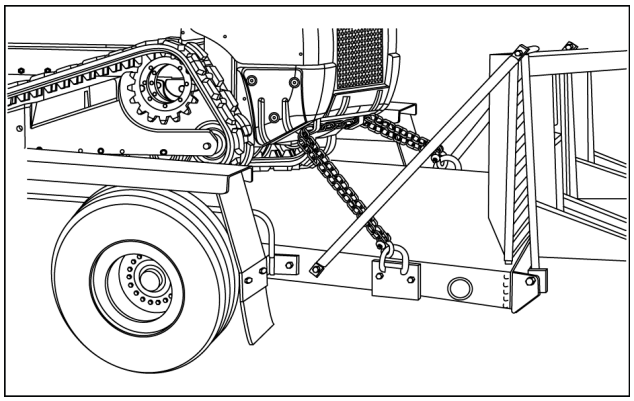

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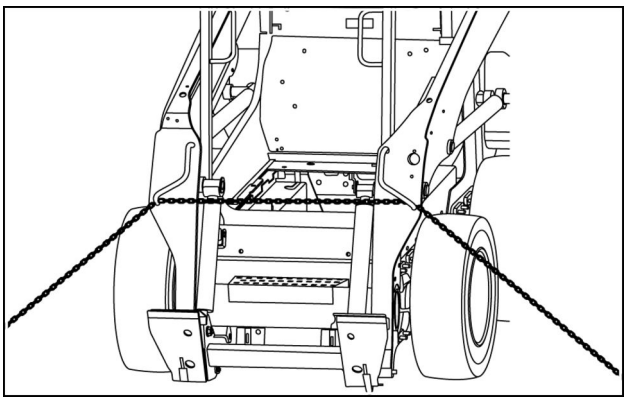

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Lifting the machine with a four-point lifting device

⚠ 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.

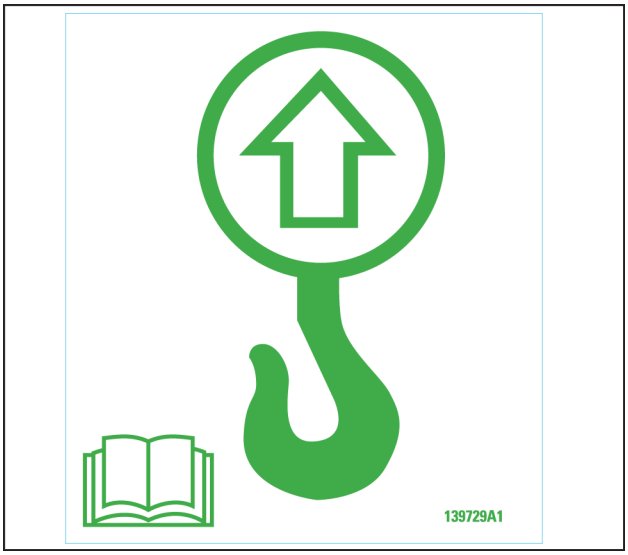
1. Remove any and all attachments before lifting the machine.
2. Use the two front lift points and the two rear lift points (one on each side).

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.

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.



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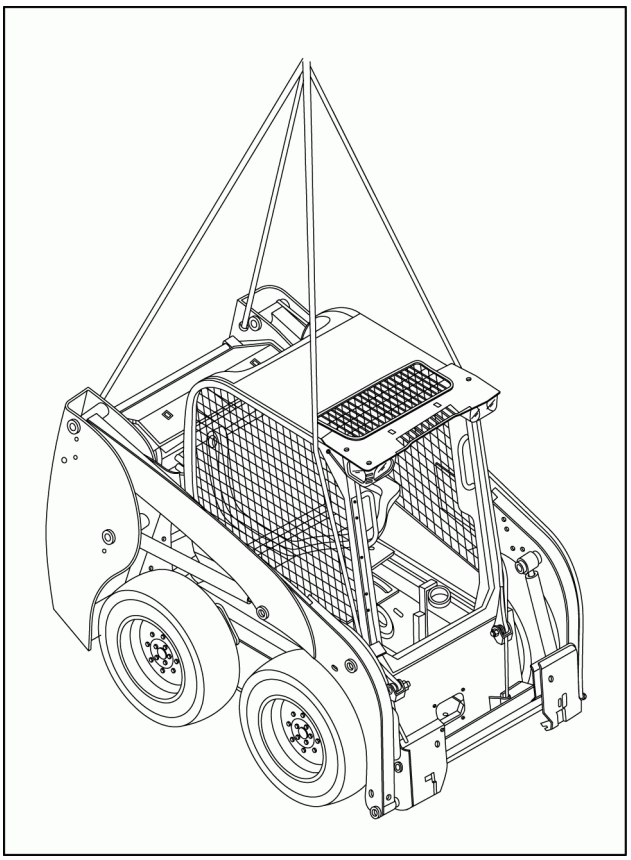
L213 and L215 only

Front sling requirements:

- Two synthetic slings **3.7 m** (**12.0 ft**) in length.
- Each sling must have a rated lifting capacity of equal to or greater than 0.706 x Gross Vehicle Weight (GVW).

Rear sling requirements:

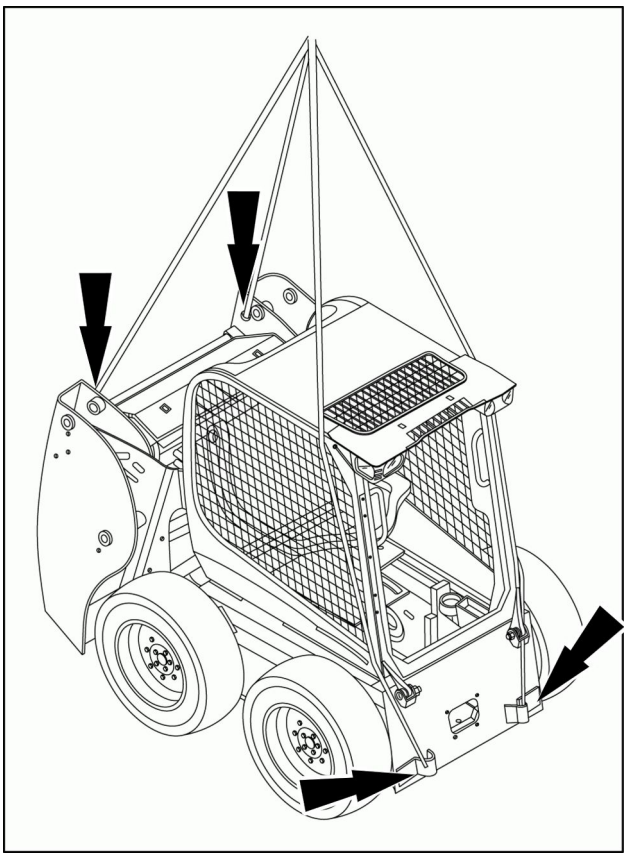
- Two chains approximately **2.5 m** (**8.1 ft**) in length. Some adjustment may be required for a level lift.
- Each chain must have a rated lifting capacity of equal to or greater than 0.550 x Gross Vehicle Weight (GVW).



RAIL14SSL0403BA 5

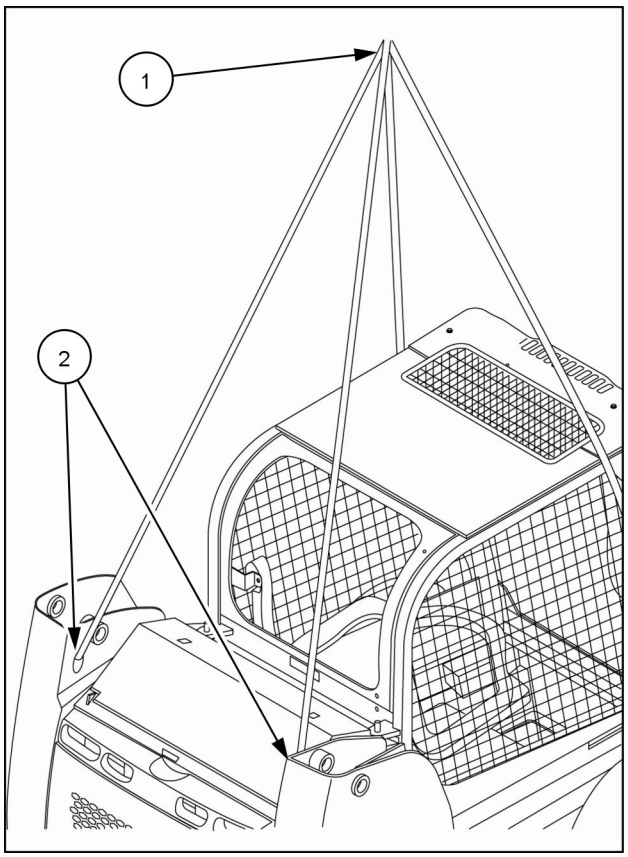
NOTE: *For a clear view of the machine's lifting points and the sling routing the loader arm is not shown. Do not remove the loader arms.*

At each of the machine's lifting points will be a lifting point decal



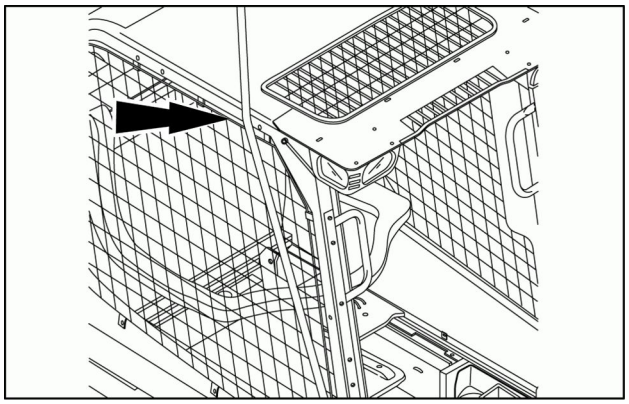
RAIL14SSL0405BA 6

1. Connect all slings to a single point **(1)** on the suitable craning equipment above the cab.
2. Attach chains to the machine's rear lifting points **(2)** on the machine.



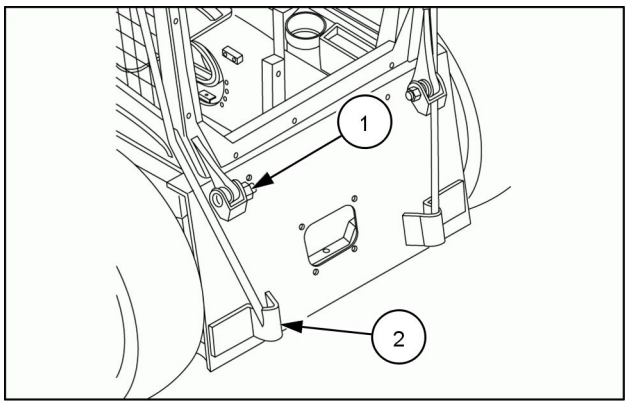
RAIL14SSL0406BA 7

3. Route the front sling down the right-hand side of the Roll Over Protective Structure (ROPS).



RAIL14SSL0407BA 8

4. Route the front sling down the outside of the ROPS front pivot point **(1)** and attach to the machine's right-hand side lifting point **(2)**.
5. Repeat on the left-hand side of the machine.
6. Clear the area.
7. Lift the machine just off the ground. The machine should stay level. If it is not level lower the machine to the ground and adjust the length of the rear chains. Repeat until you achieve a level lift.



RAIL14SSL0404BA 9

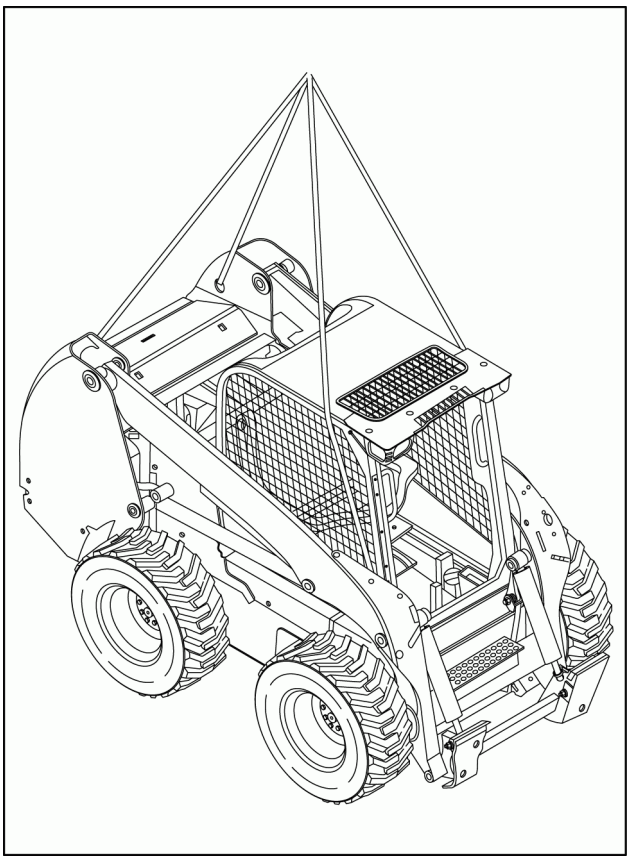
C227 only

Front sling requirements:

- Two synthetic slings **3.7 m** (**12.0 ft**) in length.
- Each sling must have a rated lifting capacity of equal to or greater than 0.741 x Gross Vehicle Weight (GVW).

Rear sling requirements:

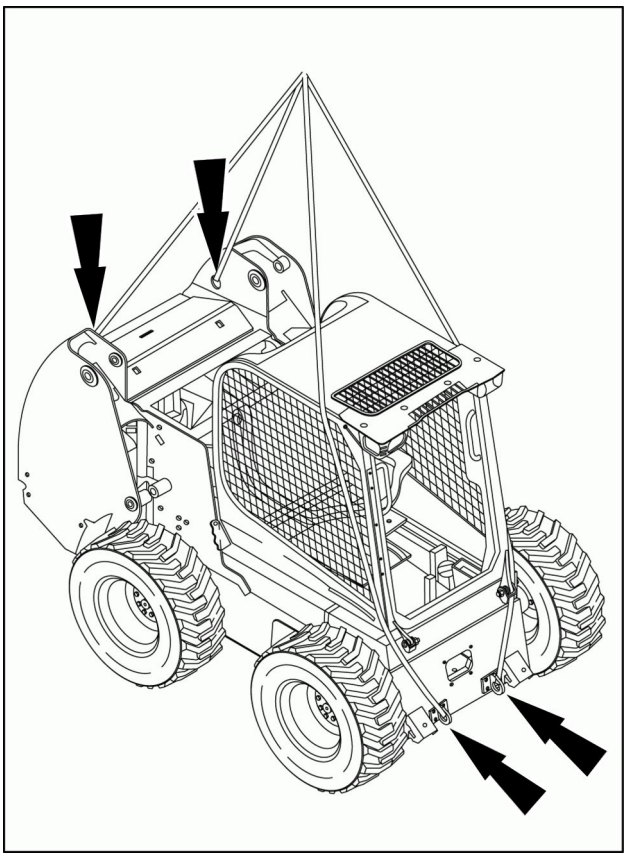
- Two chains approximately **2.4 m** (**8.0 ft**) in length. Some adjustment may be required for a level lift.
- Each chain must have a rated lifting capacity of equal to or greater than 0.536 x Gross Vehicle Weight (GVW).



RAIL14SSL0393BA 10

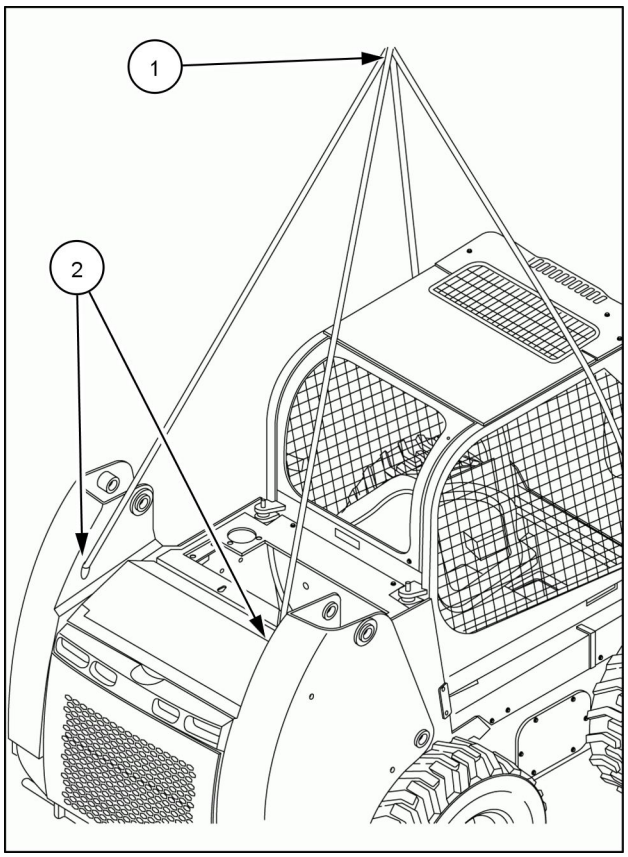
NOTE: *For a clear view of the machine's lifting points and the sling routing the loader arm is not shown. Do not remove the loader arms.*

At each of the machine's lifting points will be a lifting point decal



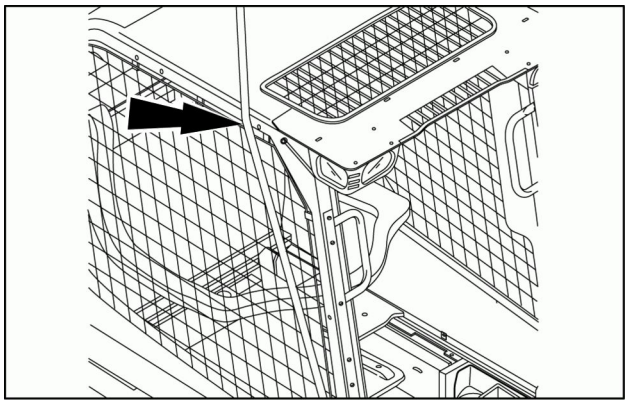
RAIL14SSL0394BA 11

1. Connect all slings to a single point **(1)** on the suitable craning equipment above the cab.
2. Attach chains to the machine's rear lifting points **(2)** on the machine.



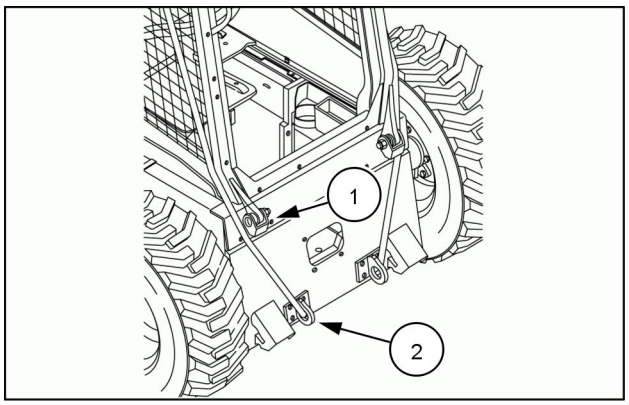
RAIL14SSL0397BA 12

3. Route the front sling down the right-hand side of the Roll Over Protective Structure (ROPS).



RAIL14SSL0395BA 13

4. Route the front sling down the outside of the ROPS front pivot point **(1)** and attach to the machine's right-hand side lifting point **(2)**.
5. Repeat on the left-hand side of the machine.
6. Clear the area.
7. Lift the machine just off the ground. The machine should stay level. If it is not level lower the machine to the ground and adjust the length of the rear chains. Repeat until you achieve a level lift.



RAIL14SSL0396BA 14

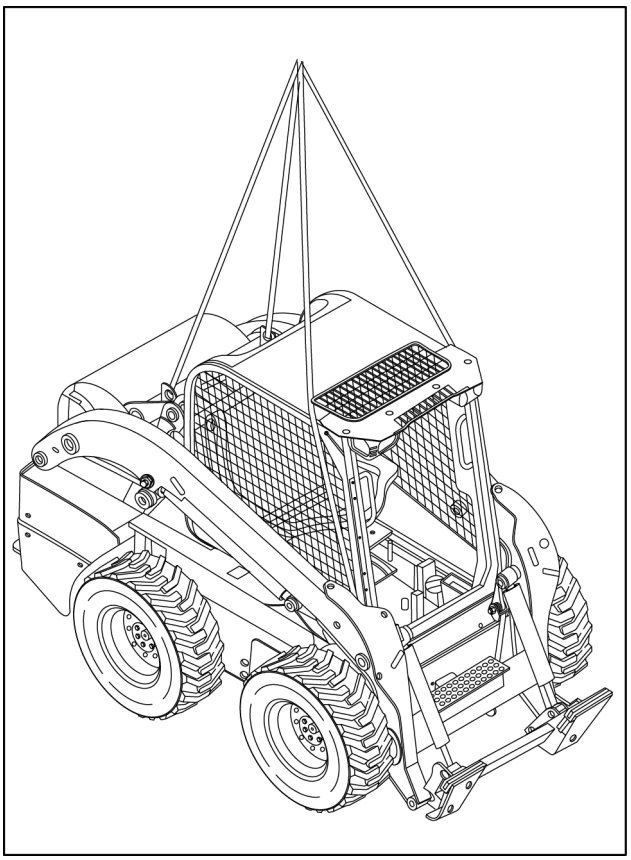
L218 and L220 only

Front sling requirements:

- Two synthetic slings **3.7 m** (**12.0 ft**) in length.
- Each sling must have a rated lifting capacity of equal to or greater than 0.552 x Gross Vehicle Weight (GVW).

Rear sling requirements:

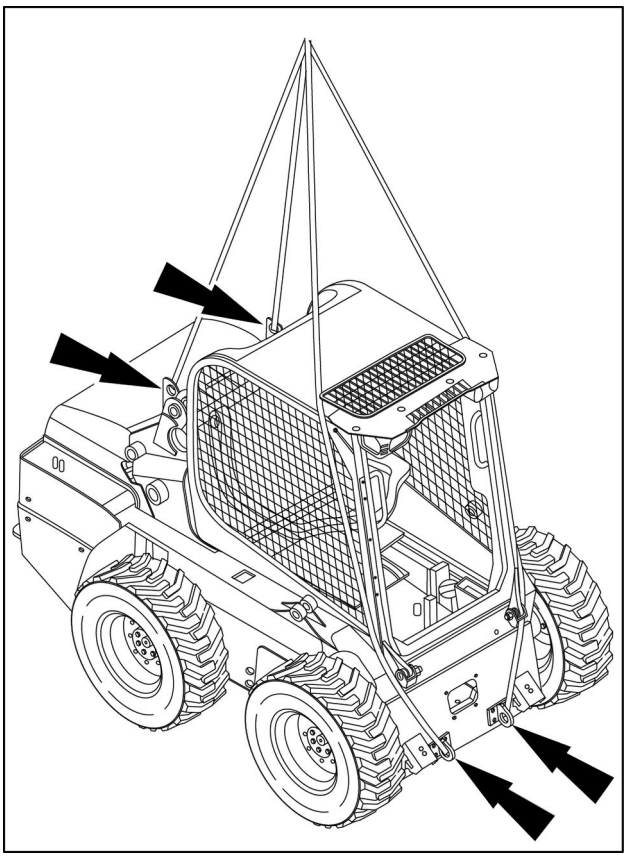
- Two chains approximately **2.2 m** (**7.1 ft**) in length. Some adjustment may be required for a level lift.
- Each chain must have a rated lifting capacity of equal to or greater than 0.676 x Gross Vehicle Weight (GVW).



RAIL14SSL0481BA 15

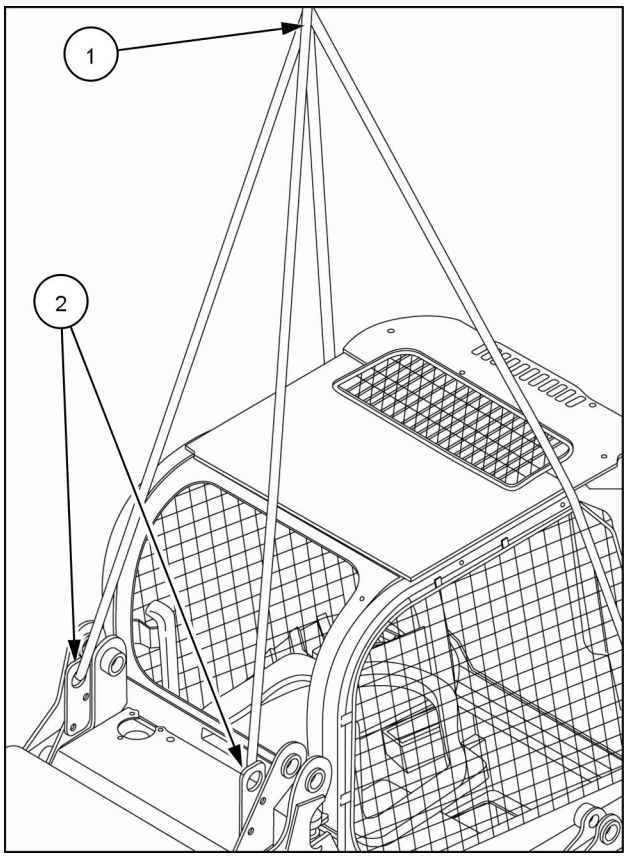
NOTE: *For a clear view of the machine's lifting points and the sling routing the loader arm is not shown. Do not remove the loader arms.*

At each of the machine's lifting points will be a lifting point decal.



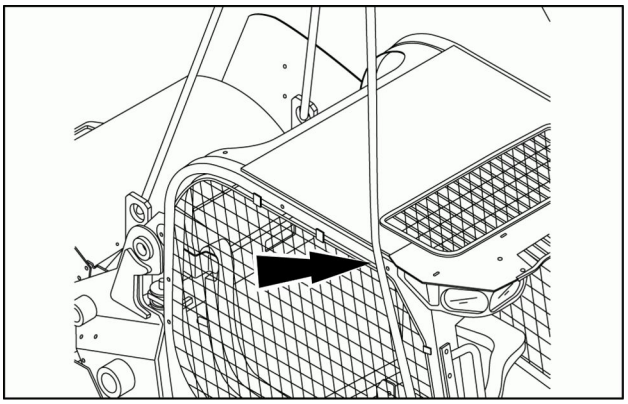
RAIL14SSL0482BA 16

1. Connect all slings to a single point **(1)** on the suitable craning equipment above the cab.
2. Attach chains to the machine's rear lifting points **(2)** on the machine.



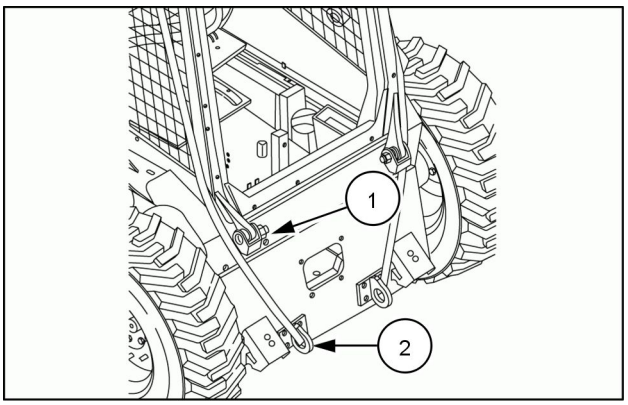
RAIL14SSL0402BA 17

3. Route the front sling down the right-hand side of the Roll Over Protective Structure (ROPS).



RAIL14SSL0401BA 18

4. Route the front sling down the outside of the ROPS front pivot point **(1)** and attach to the machine's right-hand side lifting point **(2)**.
5. Repeat on the left-hand side of the machine.
6. Clear the area.
7. Lift the machine just off the ground. The machine should stay level. If it is not level lower the machine to the ground and adjust the length of the rear chains. Repeat until you achieve a level lift.



RAIL14SSL0400BA 19

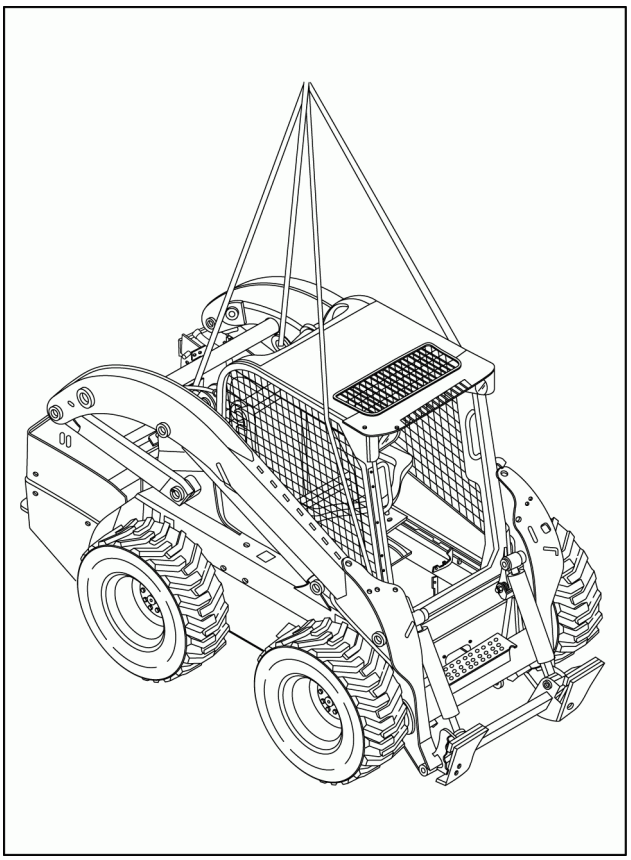
L223, L225, L230, C232, and C238 only

Front sling requirements:

- Two synthetic slings **3.7 m** (**12.0 ft**) in length.
- Each sling must have a rated lifting capacity of equal to or greater than 0.501 x Gross Vehicle Weight (GVW).

Rear sling requirements:

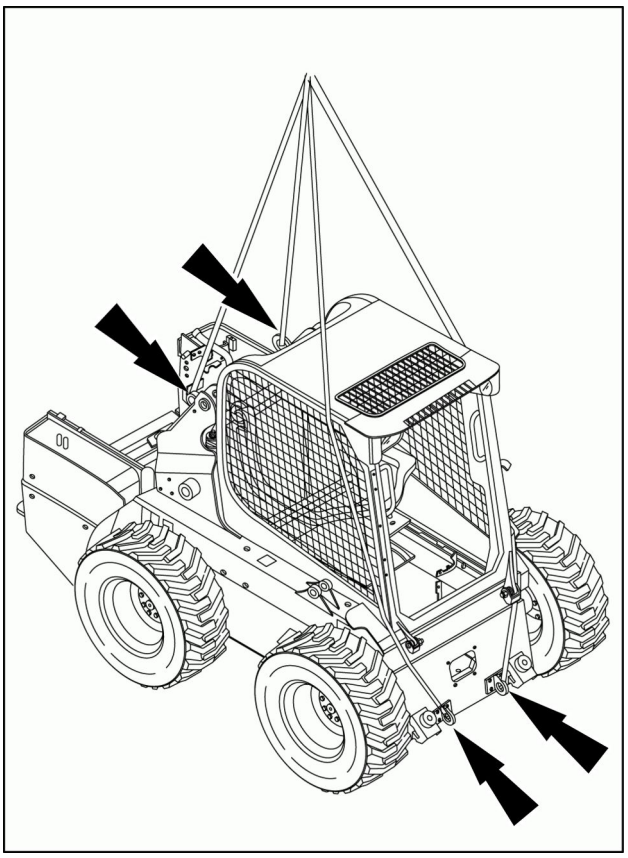
- Two chains approximately **2.21 m** (**7.25 ft**) in length. Some adjustment may be required for a level lift.
- Each chain must have a rated lifting capacity of equal to or greater than 0.729 x Gross Vehicle Weight (GVW).



RAIL14SSL0408BA 20

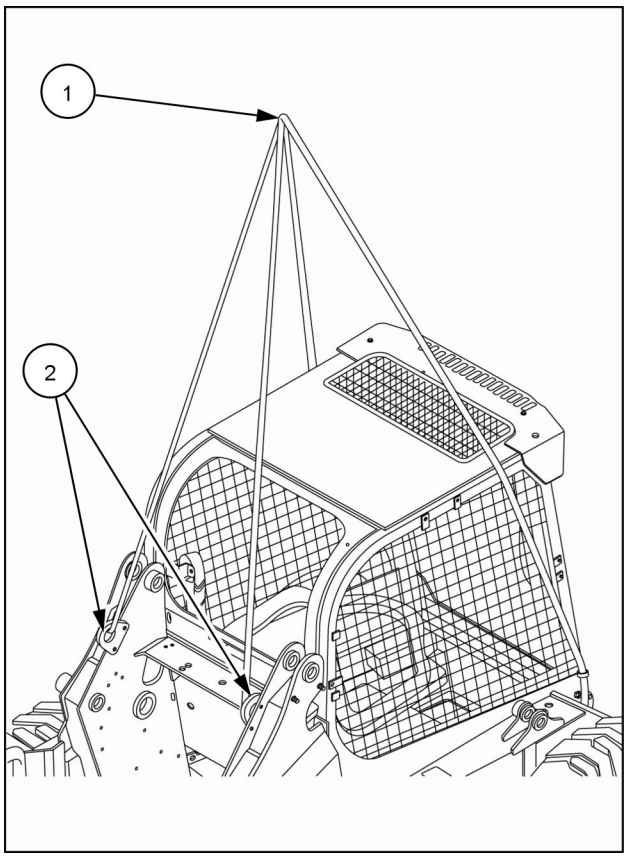
NOTE: *For a clear view of the machine's lifting points and the sling routing the loader arm is not shown. Do not remove the loader arms.*

At each of the machine's lifting points will be a lifting point decal.



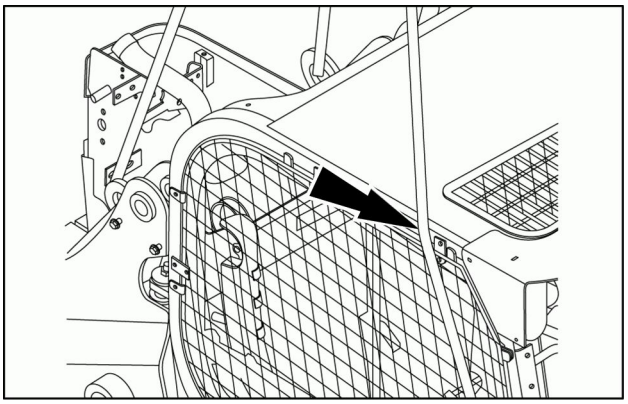
RAIL14SSL0409BA 21

1. Connect all slings to a single point **(1)** on the suitable craning equipment above the cab.
2. Attach chains to the machine's rear lifting points **(2)** on the machine.



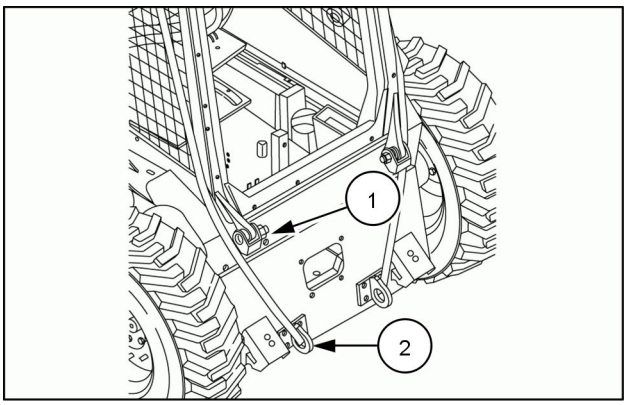
RAIL14SSL0412BA 22

3. Route the front sling down the right-hand side of the Roll Over Protective Structure (ROPS).



RAIL14SSL0410BA 23

4. Route the front sling down the outside of the ROPS front pivot point **(1)** and attach to the machine's right-hand side lifting point **(2)**.
5. Repeat on the left-hand side of the machine.
6. Clear the area.
7. Lift the machine just off the ground. The machine should stay level. If it is not level lower the machine to the ground and adjust the length of the rear chains. Repeat until you achieve a level lift.



RAIL14SSL0400BA 24

Lifting the machine with a single-point lifting device

⚠ WARNING

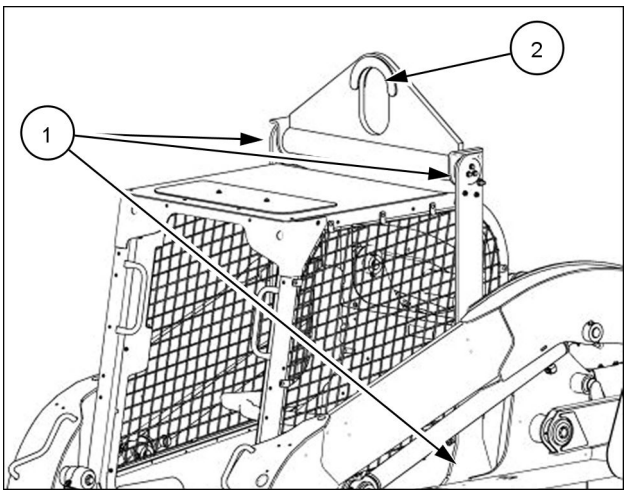
Heavy objects!
Lift and handle all heavy components using lifting equipment with adequate capacity. Always support units or parts with suitable slings or hooks. Make sure the work area is clear of all bystanders. Failure to comply could result in death or serious injury.

W0398A

NOTICE: *The craning (lifting) device must be centered over the attachment point when lifting the unit equipped with a single point lifting device. If not centered properly (off to either side or fore and aft of attachment point), this may cause damage to the single point lifting device mounting hardware.*

NOTICE: *Never drag the unit by connecting to the single point lifting device attachment point. Never pull or tow anything by connecting to the single point lifting device attachment point. Either of these actions may result in damage to the single point lifting device mounting hardware.*

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



RCPH11SSL016BAD 25

Use only lifting equipment with a rated capacity to handle the weight of the model skid steer being lifted. The lifting equipment weight must be added.

1. Remove any and all attachments before lifting the machine.
2. Only use a NEW HOLLAND CONSTRUCTION approved single-point lifting attachment specifically designed for your machine. Confirm all four hardware **(1)** locations are properly tightened (right-hand side lower hardware not shown).
3. Only attach a suitable lifting device to the single point lifting attachment at point **(2)**.

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

- Never allow personnel on the machine while craning.
- 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 completely lowered position.
- Make sure the engine is shut 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: *NEW HOLLAND CONSTRUCTION does not recommend towing the machine. Do not attempt to move the machine if you believe more damage to the machine will occur. You may damage the machine more severely if you attempt to tow or move a disabled machine. If possible, repair the machine at the job site. Contact your dealer if the machine is disabled.*

6 - WORKING OPERATIONS

GENERAL INFORMATION

Mechanical attachment mounting systems

⚠ WARNING

Unexpected machine movement!
Always make sure the machine is at operating temperature before mounting or removing tools or attachments.
Failure to comply could result in death or serious injury.

W0184A

⚠ WARNING

Crushing hazard!
Always use approved attachments. Make sure the attachment is compatible with the machine mounting system.
Failure to comply could result in death or serious injury.

W0183A

⚠ WARNING

Crushing hazard!
On some attachments, it may appear there are two saddle positions for the coupler. Always use the lower position to ensure proper latching of the attachments.
Failure to comply could result in death or serious injury.

W0182B

⚠ WARNING

Falling parts!
Debris build up may interfere with proper and complete mounting or removal of a tool or attachment. Always make sure all debris is cleared from the machine, attachment, or tool before attempting any mounting or removal procedures.
Failure to comply could result in death or serious injury.

W0214A

⚠ WARNING

Crushing hazard!
Never extend any part of the body from the operator's compartment to latch or unlatch components while changing attachments. Always follow the correct procedure in this manual.
Failure to comply could result in death or serious injury.

W0213A

⚠ WARNING

Falling object hazard!
Before operating the machine, always make sure the bucket or attachment is securely locked into the quick-attach plate. A loader bucket or attachment that is not securely locked into the quick-attach plate could come off during loader operation.
Failure to comply could result in death or serious injury.

W0166A

⚠ DANGER

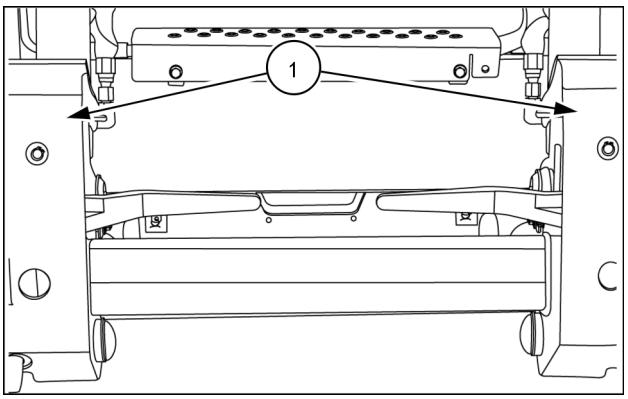
Crushing hazard!
The loader arm is unsupported during support strut removal. Do not enter or exit the operator's compartment with an unsupported loader arm. Two persons are required during storage. One person should remove and store the support strut while the operator remains in the operator's compartment.
Failure to comply will result in death or serious injury.

D0021B

Installing the attachment

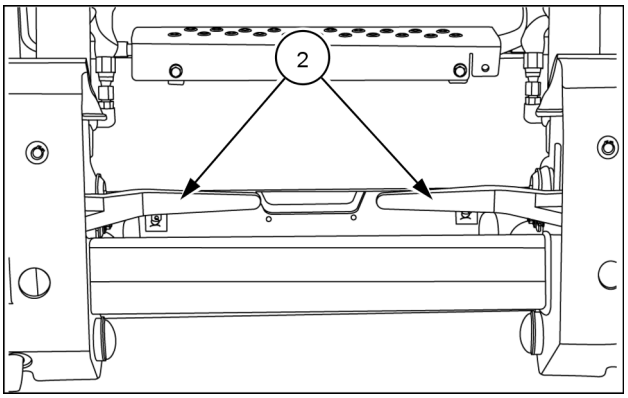
NOTICE: *Read the manufacturer's instruction manual for attachments not included in this manual.*

A pivoting coupler **(1)** is supplied with the skid steer as standard equipment and remains attached to the loader lift arm.



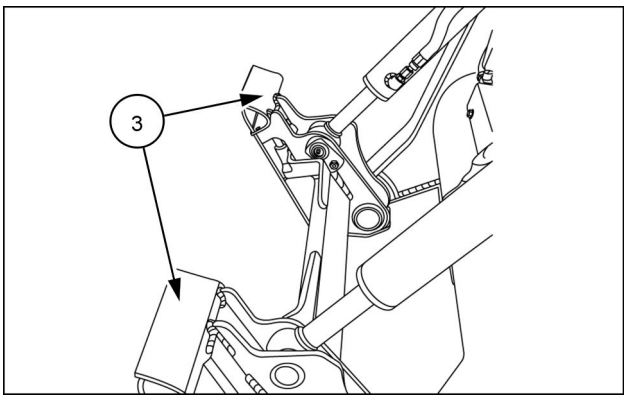
931007516A 1

1. Rotate the latch handles **(2)** up to the unlatched position. Be sure the latch handles are all the way up so the lock pins are fully retracted.



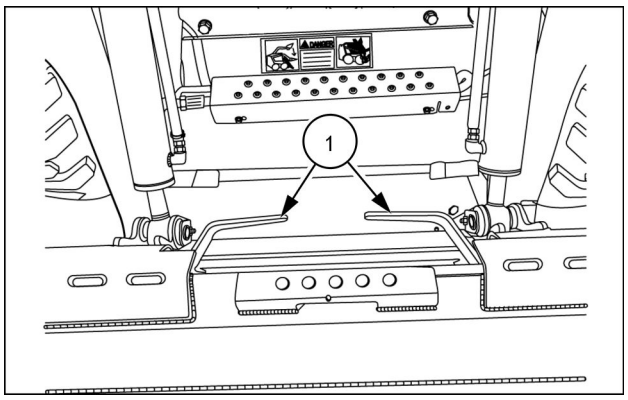
931007516 2

2. Hydraulically tilt the couplers **(3)** forward while guiding the crest of the coupler under the attachment saddle.



931007517 3

3. Raise and curl the coupler until the back surface of the attachment comes to rest flat against the front surface of the coupler.
4. When the attachment is fully supported, lower the lift arm until the lift arm is completely down on the loader stops.
5. Roll the bucket or attachment out, stopping with the bucket edge just off the ground.
6. Turn off the engine, unfasten seat belt, raise the restraint bar (if equipped), and exit the operator's compartment.
7. Push the two latch handles **(1)** down over center to engage the lock pins into the retaining tabs on the attachment to secure the attachment to the coupler.



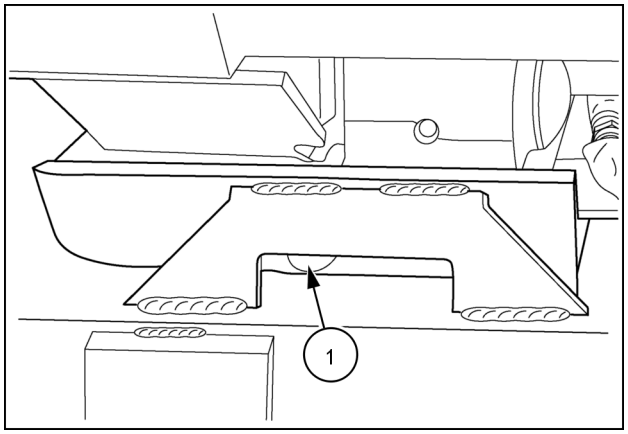
93106897 4

⚠ WARNING

Falling object hazard!
Before operating the machine, always make sure the bucket or attachment is securely locked into the quick-attach plate. A loader bucket or attachment that is not securely locked into the quick-attach plate could come off during loader operation.
Failure to comply could result in death or serious injury.

W0166A

8. Raise the attachment and slowly roll the bucket or attachment out. Make a visual inspection of the lock pins **(1)** engagement in the attachment lower tab slots.



86092926 5

- If the attachment is not properly secured to the coupler, lower the lift arm and repeat the mounting procedure.
- Before using the attachment, the operator must operate it through its full range of motion and confirm that the attachment is secure and safe.

Removing the attachment

1. Lower the attachment to the ground, stop the engine, confirm that the parking brake is set and exit the skid steer.
2. Pull the latching handles up to the unlatched position to release the pins from the lower attachment tabs.

NOTICE: *Be sure the latch handles are fully raised.*

3. Fasten your seat belt, lower the restraint bar (if equipped), start the engine, and release the park brake.
4. Tilt the attachment forward so that the front edge is resting on the ground.
5. Continue tilting the coupler forward and back the skid steer away from the attachment at the same time.

Hydraulic attachment mounting systems

The optional hydraulic coupler allows the operator to remain in the operator seat and quickly change the loader arm attachments.

The hydraulic coupler switch must be used in conjunction with the one of the three hydraulic functions (held to the end of its stroke):

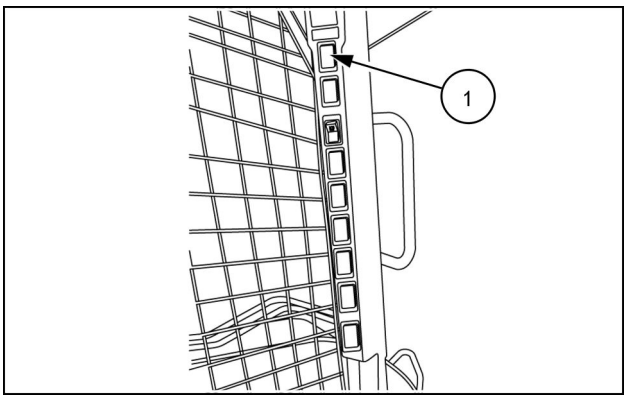
- The control lever's auxiliary switch
- The loader arm down operation
- The attachment curl-in operation

To simplify the instructions only one of the three hydraulic functions is mentioned.

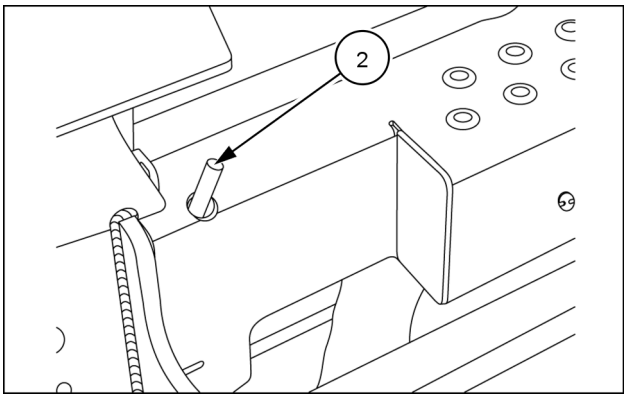
NOTE: *If you have any questions about installing or removing attachments, contact your dealer.*

Removing the attachment

1. Position the attachment above the dismount surface.
2. Press and hold the hydraulic coupler switch **(1)** in the unlock direction. With the other hand activate and hold the control lever's auxiliary switch.
3. Continue to hold the switches as you watch for the red markings on the indicator pins **(2)** to appear. Visible red markings indicate the coupler is in the unlock position.
4. Release the control lever's auxiliary switch and the hydraulic coupler switch.
5. Place the attachment on the dismount surface, roll the coupler out, and back the machine away from the attachment.



93106917 1



93106838 2

Installing the attachment

1. Confirm the red markings on the indicator pins **(2)** are visible (unlock position). If the red markings are not visible, press and hold the hydraulic coupler switch **(1)** in the unlock direction. With the other hand activate and hold the control lever's auxiliary switch.
2. Tilt the hydraulic coupler forward.
3. Slowly move the machine toward the attachment until both tabs on top of the coupler are underneath and in alignment with the attachment's mounting points.
4. Raise the loader arm enough to engage the attachment.
5. Curl the coupler back towards the machine until the attachment is completely resting on the coupler and off the ground.

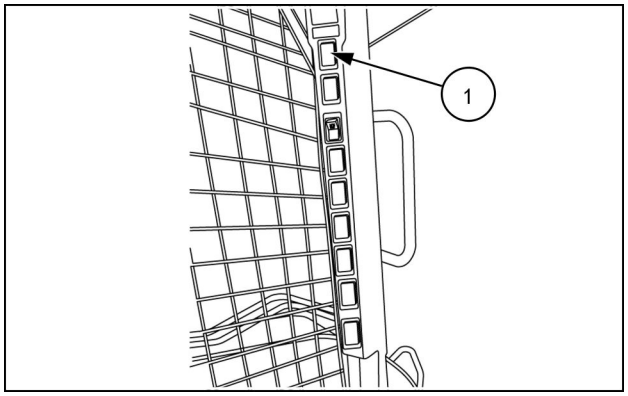
   NOTE: *In the next step, if the indicator pins do not retract you may need to reposition the attachment on the coupler.*
6. Activate the auxiliary switch on the control lever to the end of its control stroke. The indicator pins **(2)** on the coupler will retract into the lock position and the red markings will no longer be visible on the indicator pins.
7. Slowly raise and roll the attachment outward. Do not leave the operator seat but make a visual inspection from the cab that the hydraulic coupler's lower lock pins **(1)** extend fully into the attachment's lower tab slots.

⚠ WARNING

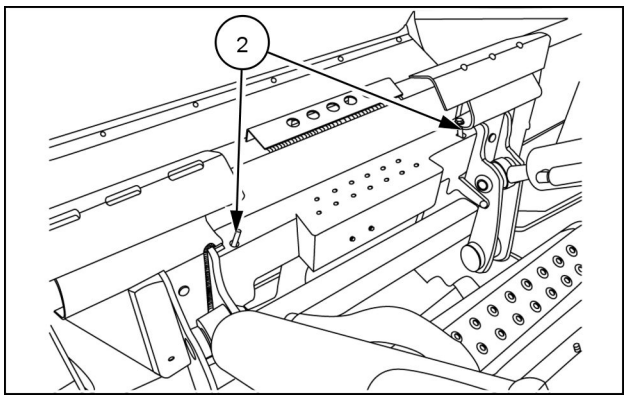
Falling object hazard!
Before operating the machine, always make sure the bucket or attachment is securely locked into the coupler. A loader bucket or attachment that is not securely locked into the coupler could come off during loader operation.
Failure to comply could result in death or serious injury.

W0947A

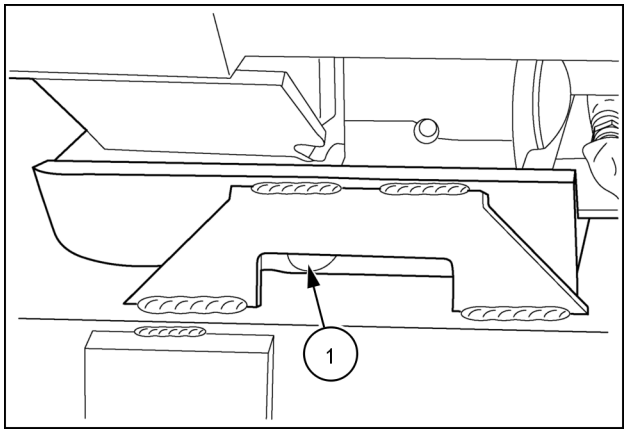
8. Make sure that the attachment is secure and safe to use. Operate the attachment through the full range of motions before you begin normal work operations.



93106917 3



93106837A 4



86092926 5

Field operation

⚠ 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

⚠ WARNING

Roll-over hazard! A full bucket in the raised position alters the center of gravity of the machine.
When operating a loader with a full bucket on slopes, observe the following precautions:
1. Avoid turning the machine on slopes.
2. Always drive slowly straight up and down slopes.
3. Always carry the load as low as possible.
Failure to comply could result in death or serious injury.

W0018A

⚠ WARNING

Overturning hazard!
Always try to park the machine on firm level ground. Avoid parking on slopes. Block the wheels in both directions.
Failure to comply could result in death or serious injury.

W0051A

⚠ WARNING

Electrical shock hazard!
Do not work under overhangs or electric wires. Do not work where there is a danger of sliding.
Failure to comply could result in death or serious injury.

W0215A

⚠ WARNING

Falling object hazard!
Wear an approved safety hat when operating the machine and while in any work area.
Failure to comply could result in death or serious injury.

W0219A

⚠ WARNING

Loss of control hazard!
Keep hands and feet on the appropriate controls at all times to maintain control of the machine.
Failure to comply could result in death or serious injury.

W0237A

Job layout

For efficient operation, arrange the job to minimize the time required to perform the work cycle. In spotting the dump site, consider wind direction and ground slope. Whenever possible, position the dump site so that the wind will carry dust away from the operator. Before the operator begins work, take a few minutes to level off the work area if it is not smooth. Minimize transport distances for a faster work cycle.

Operating load capacities

⚠ WARNING

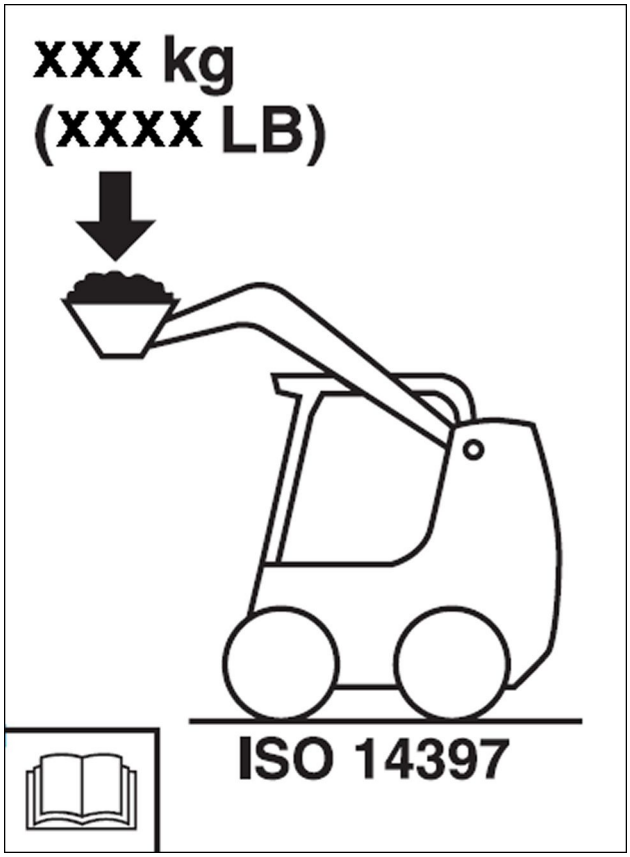
Roll-over hazard!
Overloading the rated capacity of the machine could cause the machine to roll over. Always follow the recommended load limits. Never overload the rated capacity of the machine.
Failure to comply could result in death or serious injury.

W0217A

⚠ WARNING

Overturning hazard!
The operator must know the correct OPERATING LOAD capacity of the machine before attempting to operate the machine. Always follow the recommended load limits.
Failure to comply could result in death or serious injury.

W0216A



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See page **9-2** for a list of models and specifications. For your specific machine, see the decal on your machine for the operating load capacity. The decal is located on the cab right-hand console post. If you have questions about the load capacity of your machine, contact your dealer.

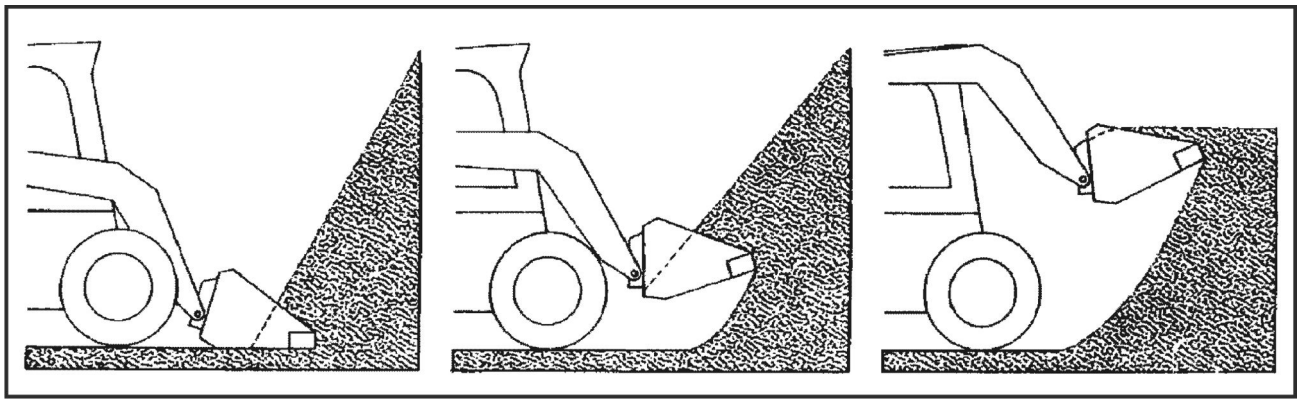
- Before starting work, familiarize yourself with the work area. Locate holes, obstacles and debris that can be cleared from the site. Be aware that the job site may change repeatedly during the course of the work day.
- Locate any unavoidable danger areas such as, power lines, bridges and tight corners to make sure you can operate safely in these areas.
- Confirm the possibility of other personnel in the machine vicinity and clear the area of unauthorized personnel.
- If possible, arrange the job site to minimize the time required to perform the work cycle. Consider wind direction and ground slope. Position the dump site so that the wind will carry dust and dirt away from the operator.
- Use low range for maximum skid steer efficiency.

Filling the bucket

There are two basic methods of filling a bucket from a pile: arc penetration and step penetration. Judge the type of penetration needed for loading and vary the methods to suit the materials.

Arc penetration

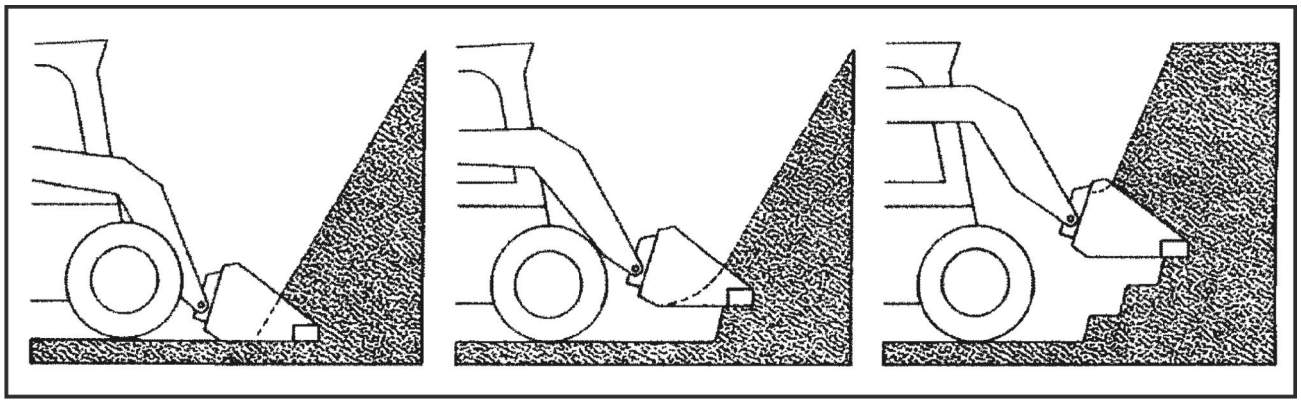
With the arc penetration method, the bucket is forced into the pile and rolled back while raised in a continuous upward arc until the bucket is filled. When using this method, remember that too much roll back may over load the lift system. When activating both the lift and bucket hydraulic systems at the same time, the lift system may occasionally stall. When this happens, disengage either the lift or roll back function to allow maximum hydraulic force to act upon one set of cylinders.



BT09A228 2

Step penetration

With the step penetration method, the bucket is forced into the pile at ground level with the bucket bottom horizontal. Force the bucket into the pile as far as possible during the initial thrust. Raise the bucket about **0.3 m** (**1 ft**) and then force it further into the pile. Repeat this cycle as many times as necessary to fill the bucket.



BT09A229 3

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

When digging with the skid steer, 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 skid steer 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 skid steers.*

Transporting the load

When backing out and transporting a load, carry the bucket just high enough to clear obstacles in the loaders path. Raising the bucket higher than necessary reduces stability.

Dumping the bucket

Coordinate the forward ground speed and lift arm lift speed to attain the desired bucket height when arriving at the dump site.

Before the forward and lifting motions are stopped, begin dumping the bucket to gradually empty the load at minimum lift arm height. By emptying before stopping, machine stability can be maximized.

When loading into a truck, the bucket can be used to push materials to the far side of the truck if the bucket is in a tilted down position. For greatest efficiency this should be done as the load is being dumped, before the machine's forward motion is stopped. Try to spot the truck so that you dump over the low side and into the far side of the truck first.

When handling adhesive materials, the bucket can be fluttered to loosen the materials which tend to stick to the back of the bucket.

Returning the bucket load to the loading position

Immediately after the bucket has been fully dumped, begin the roll back cycle as the machine is backed away from the dump site. Repositioning the bucket for the filling cycle while lowering the lift arms is a good time saver. Fine adjustments in bucket height can be made as the skid steer begins forward on the filling cycle, thereby saving a period of dead time between the dumping and filling cycles.

Dozing with the bucket

The skid steer can be used for dozing by controlling the tilt of the bucket.

The skid steer can be used for leveling, by placing the bucket in the dump position and back dragging loose soil. The tilt of the bucket will control the amount of soil that is moved.

Place the lift arm control valve spool in the detent position to allow the bucket to follow the ground contour and deposit soil in the low areas.

NOTICE: *Do not push against objects with the lift arms fully raised or damage to the lift arms or lift arm cylinders may occur.*

NOTICE: *Do not push forward with the bucket fully dumped as the bucket cylinders may be damaged.*

Dislodging mired machine

In most cases, when a machine becomes bogged down, the bucket can be used to push the loader to more solid ground. When this is done, the bucket is in the fully dumped position and the lift arms are lowered. The bucket is then curled back as the steering control levers are pulled back. When the bucket has stroked out of ground engagement, immediately return the steering control levers to neutral. DO NOT spin the wheels. Repeat this cycle as necessary to move the machine to solid ground.

7 - MAINTENANCE

GENERAL INFORMATION

General safety before you service

⚠ DANGER

Pressurized system!
Always remove all pressure before working on the hydraulic system. Follow the pressure BLEED program in the Configuration Mode to remove the pressure in the entire hydraulic system.
Failure to comply will result in death or serious injury.

D0035A

⚠ WARNING

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

W0161A

⚠ WARNING

Improper operation or service of this machine can result in an accident.
If you do not understand a maintenance procedure, or doubt your ability to perform a maintenance procedure correctly, see your authorized dealer.
Failure to comply could result in death or serious injury.

W0157A

⚠ 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

Crushing hazard!
Never use the machine lift arms or attachment to raise the machine for service. Use adequate blocking to ensure the machine is supported safely with all four wheels off the ground.
Failure to comply could result in death or serious injury.

W0345A

⚠ WARNING

Overturning hazard!
Always try to park the machine on firm level ground. Avoid parking on slopes. Block the wheels in both directions.
Failure to comply could result in death or serious injury.

W0051A

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

NOTE: *Read the safety decals and instructional decals on the machine. Read the operator's manual and safety manual. Understand the operation of the machine before you start servicing.*

NOTE: *Use the correct safety clothing and safety equipment. Understand how to use a fire extinguisher and first aid kit.*

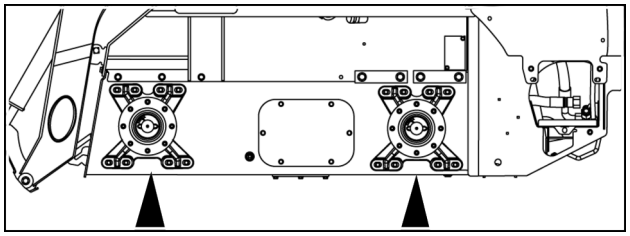
NOTE: *Maintenance and lubrication schedules are defined for NORMAL working environments and conditions. Extreme working conditions and environments require more frequent service and care. Contact your dealer if you have any questions about your service intervals or requirements.*

321_4614 1

Before you service the machine, put a DO NOT OPERATE TAG **(1)** on the instrument panel or key switch.

Properly support a raised machine without tires

If servicing, lubrication or maintenance requires the machine being raised, securely support the machine with adequate blocks before removing the tires (if needed).



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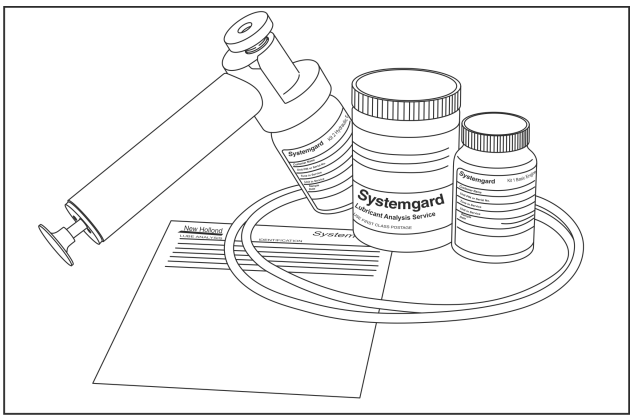
Lubrication analysis program

Ask your dealer about a lubricant analysis program. Through this service, your lubricants are tested in an independent laboratory. You simply remove a sample of lubricant from your machine and send the sample to the independent laboratory. After the sample is processed, the laboratory will report back to you and guide you with maintenance requirements. A lubricant analysis program can help support your equipment up time and provide you with a service that can pay back dividends when you trade for another piece of equipment. The normal engine oil change interval is listed in the maintenance chart. Operating conditions, quality of the engine oil and sulfur content of the fuel can change this interval. It is recommended that you use a lubricant analysis program. See your dealer.



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Plastic and resin parts

Avoid using gasoline, kerosene, paint thinner, etc., when cleaning plastic windows, console, instrument cluster, monitor, gauges, etc. Use ONLY water, mild soap and a soft cloth when you clean these parts. Using gasoline, kerosene, thinners, etc., will cause discoloration, cracking or deformation of the part being cleaned.

Machine cleaning

⚠ WARNING

Fire hazard!
Failure to inspect and clean machine and engine compartment could result in reduced machine performance, machine damage, and increased risk of fire. Fire can result in total loss of vehicle and property, and may cause serious personal injury. Check machine and engine compartment daily for debris build up, especially in operating environments with high debris. Remove any debris immediately.
Failure to comply could result in death or serious injury.

W1181A

⚠ WARNING

Moving parts!
Install all covers, panels, and guards after servicing or cleaning the machine. Never operate the machine with covers, panels, or guards removed.
Failure to comply could result in death or serious injury.

W0135A

NOTICE: *When washing the machine, DO NOT direct the water jet onto electrical or electronic components, assemblies or openings. Water ingress may cause malfunctions or the failure of the entire electronic system.*

NOTICE: *Avoid direct power washing of interior electrical components such as the instrument panel, switches, radio and speakers.*

Keep the machine clean. Machine operation in water, mud, dust, landfill, land clearing, or forestry will require complete machine clean up. Cleaning includes:

- Periodic removal of inspection covers and guards to gain access to clean and remove dirt and debris.
- Clean all dirt and foreign material from the engine area and from around all access doors and panels.
- Clean all cooling systems and radiators.

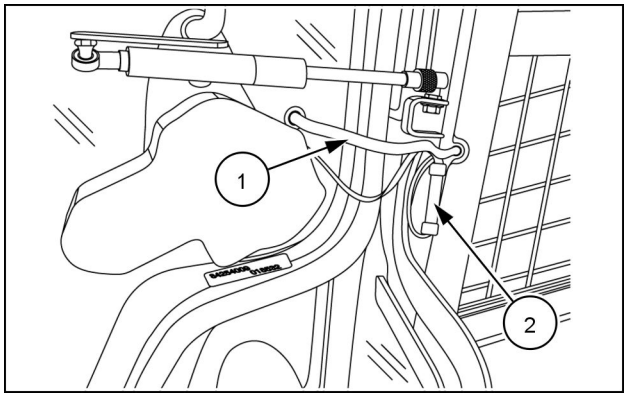
After cleaning is complete, install all covers and guards.

Cab door removal and installation

NOTICE: *During the removal process retain all door hinge shims and keep in a secure location. The shims are required for a proper fit when installing the door at a later date.*

1. Open door.
2. Disconnect the washer hose **(1)**.
3. Disconnect the wire harness **(2)**.
4. Plug the jumper connector into the harness **(2)**.

   NOTE: *Jumper connector is tied to the door harness.*



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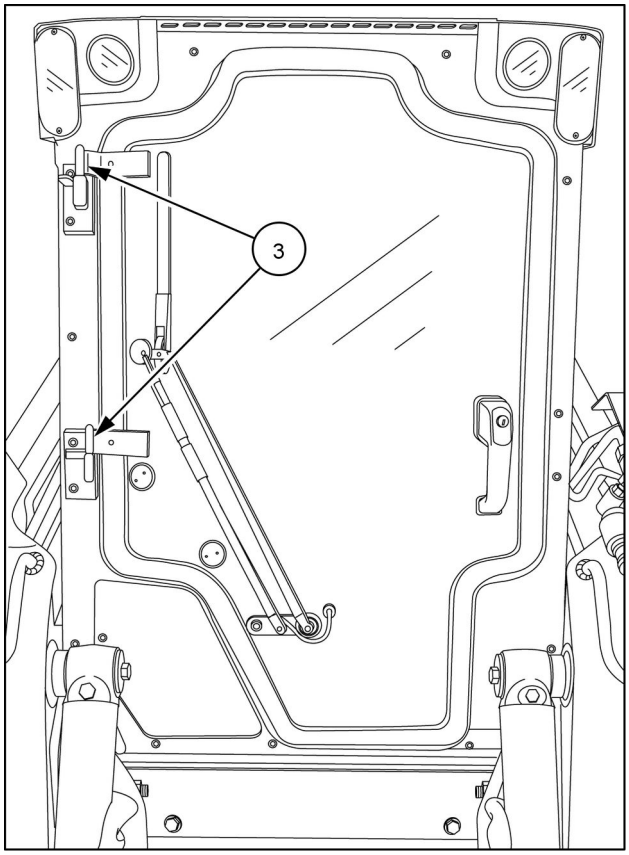
5. Lift off hinges **(3)**.



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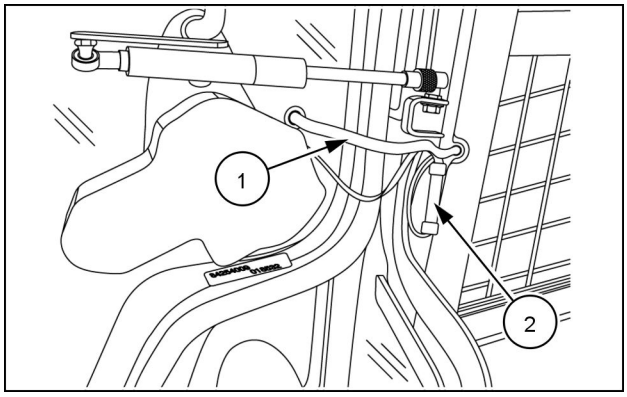
Installation

NOTE: *If door hinge shims were removed during the removal procedure, install the shims.*

1. Install the door on the hinges.
2. Install the washer hose **(1)**.
3. Unplug the jumper connector from the wire harness **(2)**.
4. Connect the wire harness **(2)**.
5. Tie the jumper connector to the door harness.



93106895 3

Battery safety - check and cleaning

⚠ WARNING

Battery acid causes burns. Batteries contain sulfuric acid.
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.

W0120A

⚠ WARNING

Chemical hazard!
Always wear protective clothing and goggles when cleaning with solvents, acids, or alkaline chemical agents. Always follow the chemical manufacturer's instructions.
Failure to comply could result in death or serious injury.

W0180A

⚠ WARNING

Explosive gas!
Batteries emit explosive hydrogen gas and other fumes while charging. Ventilate the charging area. Keep the battery away from sparks, open flames, and other ignition sources. Never charge a frozen battery.
Failure to comply could result in death or serious injury.

W0005A

⚠ WARNING

Battery gas can explode!
To prevent an explosion: 1. Always disconnect the negative (-) battery cable first. 2. Always connect the negative (-) battery cable last. 3. Do not short circuit the battery posts with metal objects. 4. Do not weld, grind, or smoke near a battery.
Failure to comply could result in death or serious injury.

W0011A

⚠ 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

Arc flash 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.

W1366A

⚠ WARNING

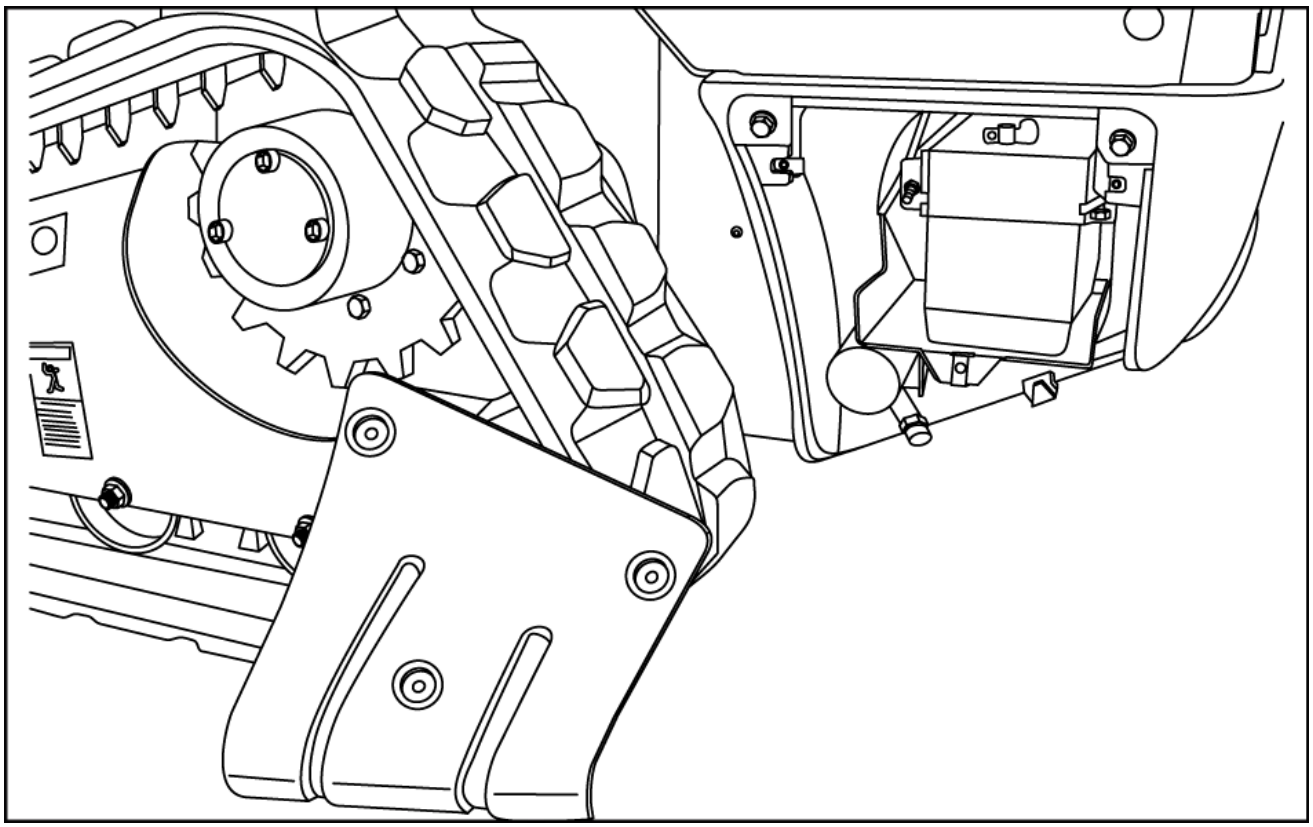
Battery acid causes burns. Batteries contain sulfuric acid.
Avoid contact with skin, eyes or clothing. Antidote (external): Flush with water. Antidote (eyes): flush with water for 15 minutes and seek medical attention immediately. Antidote (internal): Drink large quantities of water or milk. Do not induce vomiting. Seek medical attention immediately.
Failure to comply could result in death or serious injury.

W0111A

⚠ WARNING

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.

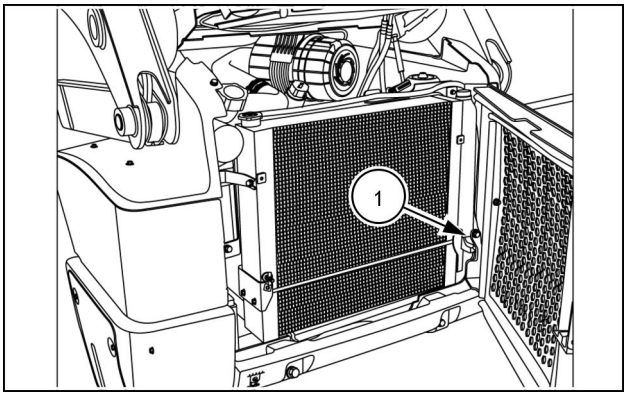
Battery disconnect switch

NOTE: *The battery disconnect switch is an optional feature.*

Use the battery disconnect switch the enable or disable electrical power from the machine batteries to the electrical components.

1. Open the engine hood and rear service door. Engage the rear service door latch **(1)** located near the lower hinge.
2. Turn the battery disconnect switch **(2)** clockwise for the ON position (shown) and counter-clockwise for the OFF position.

NOTICE: *Some machine service procedures require an actual terminal disconnect of the batteries. Do not use the battery disconnect switch for those types of procedures, such as welding on the machine.*



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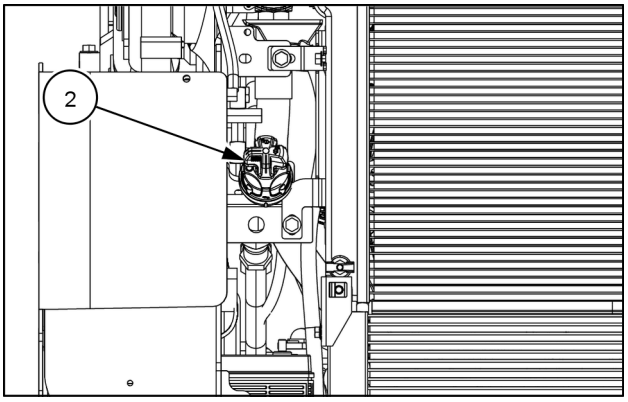

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Fire extinguisher

It is recommended that you have a fire extinguisher on your machine. See your dealer for the type and mounting information.

NOTICE: *Use the fire extinguisher mounting kit provided by your dealer. DO NOT make any modifications to the ROPS or FOPS structure.*

NOTICE: *For fire extinguisher inspection and service, see manufactures recommendation, located on fire extinguisher.*

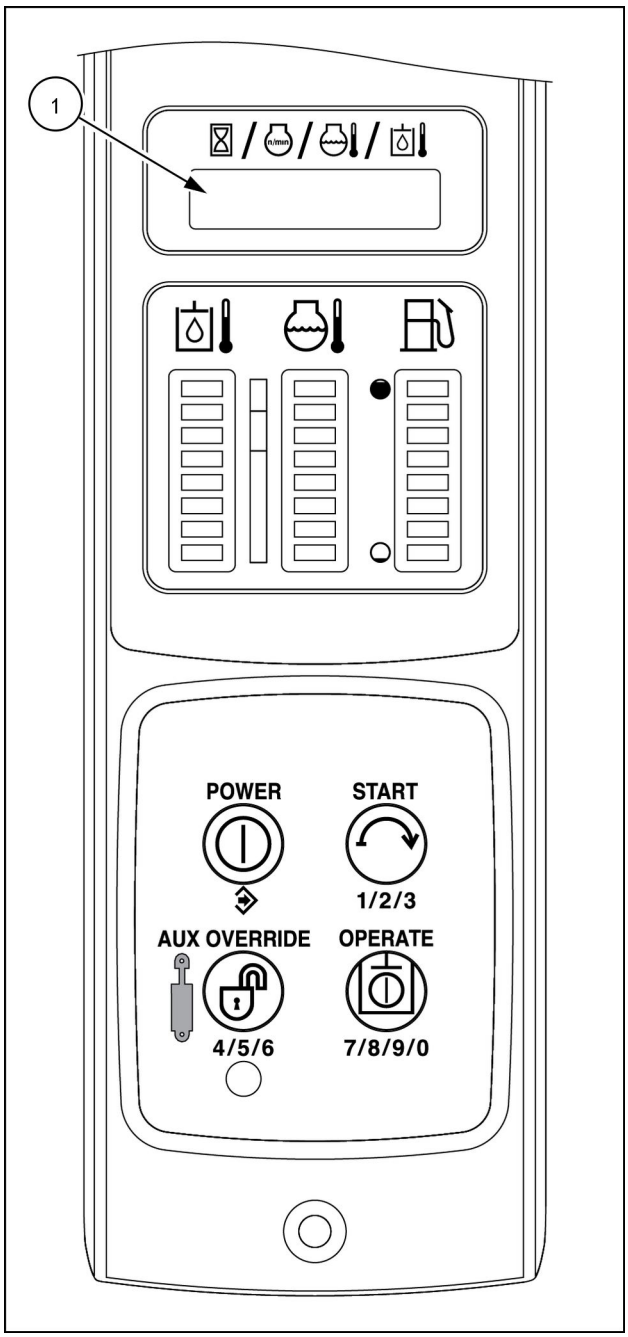
Engine hourmeter

NOTE: *The display shown is an Advanced Instrument Cluster (AIC). The procedure is the same for both AIC and Electronic Instrument Cluster (EIC) displays.*

Service your machine at the intervals and locations given in the maintenance and lubrication chart. When you service your machine, use only high quality lubricants.

The engine hourmeter **(1)** shows the amount of actual hours the engine has run. The first number to the right displays tenths of an hour and the remaining digits to the left display hours. Use the engine hourmeter along with the lubrication and maintenance chart to service your machine at the correct intervals.

Engine hours are displayed with the key switch off or with the engine running, if the operator chooses.



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Fluids and lubricants

Fuel tank

Capacity	
L213, L215	**60.5 l** (**16.0 US gal**)
L218, L220, C227	**75.5 l** (**20.0 US gal**)
L223, L225, L230, C232, C238	**95.5 l** (**25.5 US gal**)
Specifications	#2 Diesel ultra low sulfur

Cooling system

Capacity	
L213	**15 l** (**4.0 US gal**)
L215, L218, L220	**15.6 l** (**4.2 US gal**)
L223, L225, L230, C232, C238	**19 l** (**5 US gal**)
C227	**17 l** (**4.5 US gal**)
Specifications	**NEW HOLLAND AMBRA ACTIFULL™ OT EXTENDED LIFE COOLANT**

Hydraulic system

Reservoir capacity	**15.0 l** (**3.96 US gal**)
System capacity:	
L213, L215	**29.2 l** (**7.7 US gal**)
L218, L220, C227	**38.1 l** (**10.0 US gal**)
L223, L225, L230, C232, C238	**45.4 l** (**12.0 US gal**)
Specifications	**TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30**

NOTE: *See the "Hydraulic oil viscosity" chart* ***7-12*** *for more specification details.*

Chain compartments

Capacity - each side	
L213, L215	**6.25 l** (**6.6 US qt**)
L218, L220	**7.4 l** (**7.9 US qt**)
L223, L225, L230	**22.2 l** (**23.5 US qt**)
Specifications	**TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30**

Grease fittings

Quantity	As required
Specifications	**TUTELA MOLY GREASE GR-75** (Molydisulfide)

Engine crank case oil

Capacity - with filter change	
L213, L215, L218, L220	**7.0 l** (**7.5 US qt**)
L223, L225, L230, C227, C232, C238	**9.5 l** (**10 US qt**)
Specifications	**NEW HOLLAND AMBRA UNITEK MASTERGOLD SBL CJ-4**

NOTE: *See the "Recommended engine oil for operating temperature ranges" chart* ***7-11*** *for more specification details.*

Final track drive

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**

Engine oils

NEW HOLLAND CONSTRUCTION prefers the use of **NEW HOLLAND AMBRA UNITEK MASTERGOLD SBL CJ-4** engine oil in your engine. This multi-viscosity oil will lubricate your engine correctly under all operating conditions. **NEW HOLLAND AMBRA UNITEK MASTERGOLD SBL CJ-4** engine oil has a maximum service change interval of **500 h**.

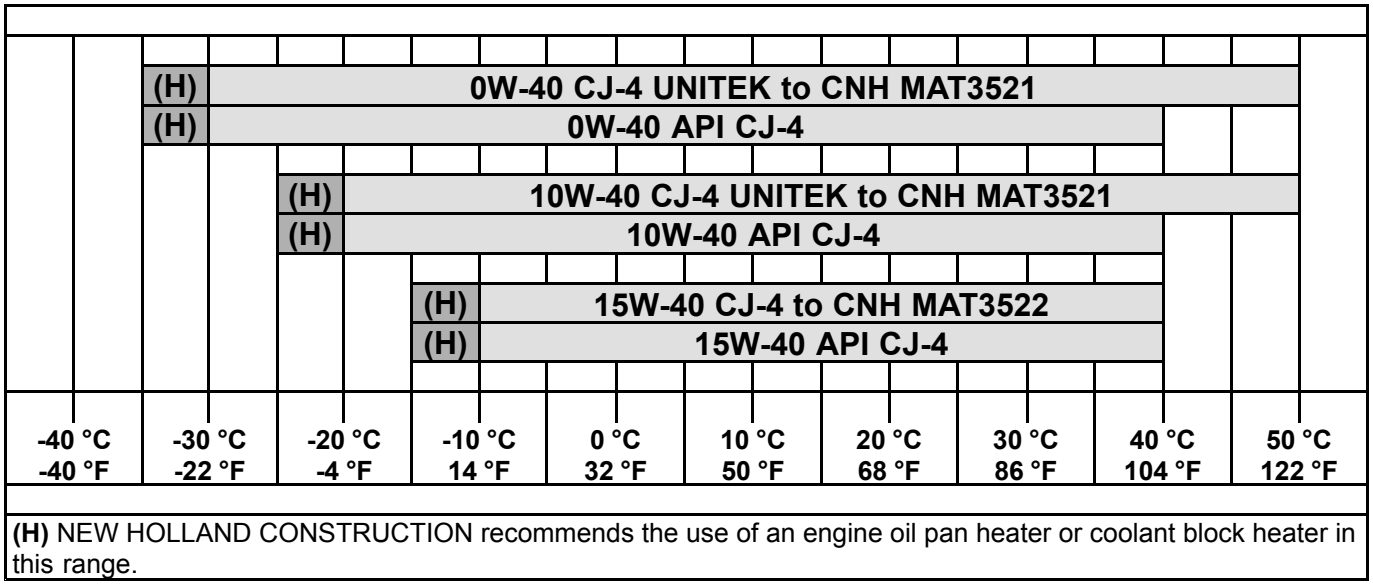
You may use other engine oils if the engine oils meet **API CJ-4** performance requirements. The maximum service change interval for these engine oils is **250 h**.

NEW HOLLAND CONSTRUCTION engine oils exceed **API CJ-4** performance requirements.

See the following chart for recommended viscosity at varying ambient air temperature ranges.

NOTE: *Do not put performance additives or other oil additive products in the engine crankcase. NEW HOLLAND CONSTRUCTION develops the oil change intervals given in this manual from tests with NEW HOLLAND CONSTRUCTION lubricants.*

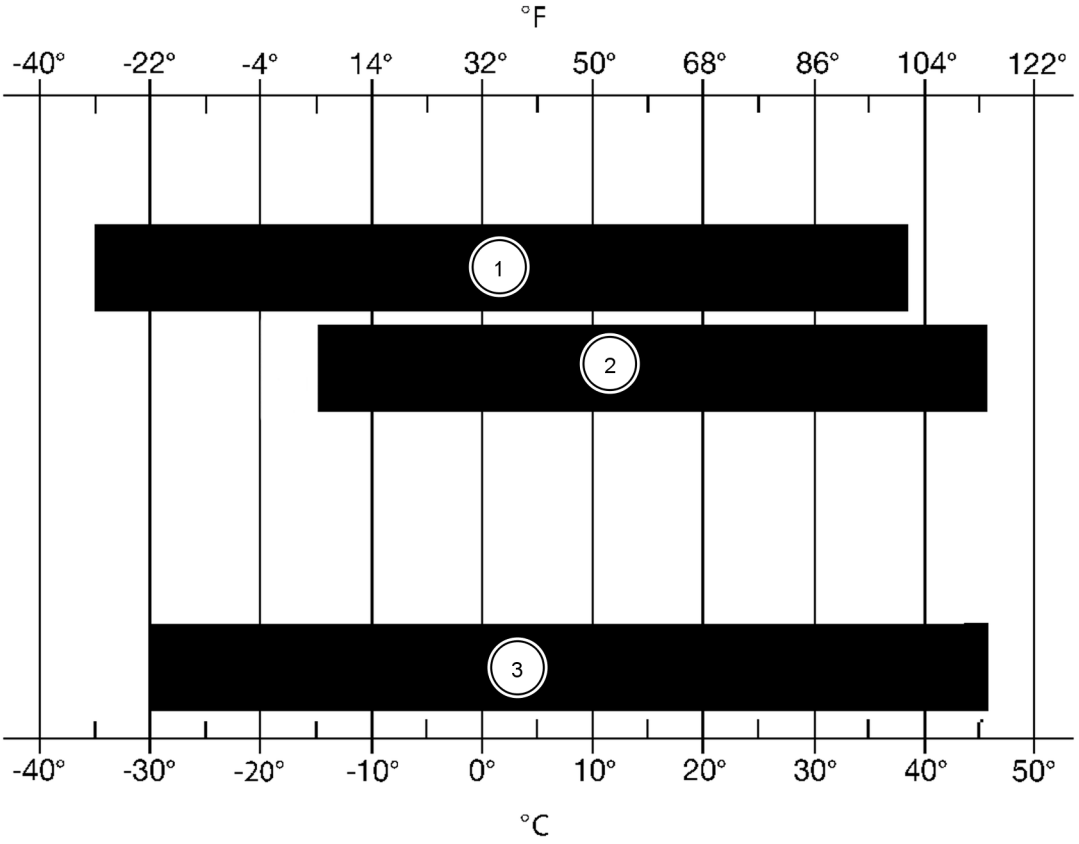
For machines with Tier 4B (final) engines



(H) NEW HOLLAND CONSTRUCTION recommends the use of an engine oil pan heater or coolant block heater in this range.

Hydraulic oil viscosity

Hydraulic oil for all models



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Block	Viscosity	Temperature range
(1)	NEW HOLLAND AMBRA HYDROSYSTEM 46 HV	-35 – 38 °C (-31 – 100 °F)
(2)	TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30	-15 – 46 °C (5 – 115 °F)
(3)	NEW HOLLAND AMBRA UNITEK MASTERGOLD SSL CJ-4 SAE 0W-40	-30 – 46 °C (-22 – 115 °F)

NOTE: *NEW HOLLAND CONSTRUCTION recommends* ***TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30*** *for applications where continuous operations above* ***38 °C (100 °F)*** *ambient temperature or frequent roading applications (above 20 to 30 minutes) are common.*

NOTE: *NEW HOLLAND CONSTRUCTION recommends* ***NEW HOLLAND AMBRA HYDROSYSTEM 46 HV*** *for improved cold weather operation. Standard factory fill oil* ***TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30*** *is acceptable for cold weather operation when sufficient warm up time is provided.*

Biodiesel fuel

Fatty Acid Methyl Ester Biodiesel (Biodiesel Fuel) consists of a family of fuels derived from vegetable oils treated with methyl esters.

NOTICE: *Biodiesel Fuel blends are approved for your engine only if they comply with* ***EN14214*** *Specification Standards or* ***ASTM D6751****.*

NOTICE: *It is imperative that you check which blend is approved for your engine with your NEW HOLLAND CONSTRUCTION dealer. Be aware that the use of Biodiesel Fuel that does not comply with the Standards mentioned above could lead to severe damage to the engine and fuel system of your machine. The use of fuels that are not approved may void NEW HOLLAND CONSTRUCTION Warranty coverage.*

Biodiesel fuel usage conditions

NOTICE: *The Biodiesel Fuel must meet the fuel Specification mentioned above.*

Biodiesel Fuel must be purchased from a trusted supplier that understands the product and maintains good fuel quality. Biodiesel Fuel must be pre-blended by the supplier. Mixing Biodiesel Fuels on-site can result incorrect mixture that can lead to problems with both engine and fuel system.

Engine performance is affected by the use of Biodiesel Fuel. There may be up to **12%** reduction in power or torque depending on the blend used.

NOTICE: *DO NOT modify the engine and/or injection pump settings to recover the reduced performance.*

The reduced power must be accepted if using any Biodiesel Fuel blend.

Some modification may be required to allow your engine to run Biodiesel Fuel. Consult you dealer for complete information on these modifications.

Biodiesel Fuel has a higher cloud point than Diesel Fuel.

NOTICE: *The use of high Biodiesel Fuel blends are not recommended in cold weather conditions.*

With Biodiesel Fuels, it may be necessary to change the engine oil, engine oil filter and fuel filter elements more frequently than with Diesel Fuels. Biodiesel Fuel can remove rust and particles from the inside of on-site fuel storage tanks that would normally adhere to the sides of the tank. Like particle deposits that commonly occur with Diesel Fuel, these particles can become trapped by the machine fuel filters, causing blockage and shortening filter life. In cold weather, this is more likely to happen. Consult your NEW HOLLAND CONSTRUCTION dealer for information on cold weather operation and proper maintenance intervals when using any Biodiesel Fuel blend.

When handling Biodiesel Fuel, care must be taken not to allow water into the fuel supply. Biodiesel Fuel will actually attract moisture from the atmosphere.

Fuel tanks must be kept as full as possible to limit the amount of air and water vapors in them. It may be necessary to drain the fuel filter water tap more frequently.

Potential oxidation and stability could be a problem with the fuel stored in the machine.

NOTICE: *Machines must not be stored for more than three months with Biodiesel Fuel blends in the fuel system.*

If long storage periods are necessary, the engine must run on Diesel Fuel for 20 hours to flush the Biodiesel Fuel out of the engine fuel system prior to storage.

NOTICE: *Biodiesel Fuel must not be stored in on-site storage tanks for more than three months.*

Any spillage of Biodiesel Fuel must be cleaned up immediately before it can cause damage to the environment and the paint finish of the machine.

Before using Biodiesel Fuel blends you should consult with your dealer to receive full information about the approved blend for your machine and any detailed conditions of its usage.

NOTICE: *Be aware that not fulfilling the requirements and conditions of Biodiesel Fuel usage will void your machine's NEW HOLLAND CONSTRUCTION Warranty coverage.*

Organic Acid Technology (OAT) coolant

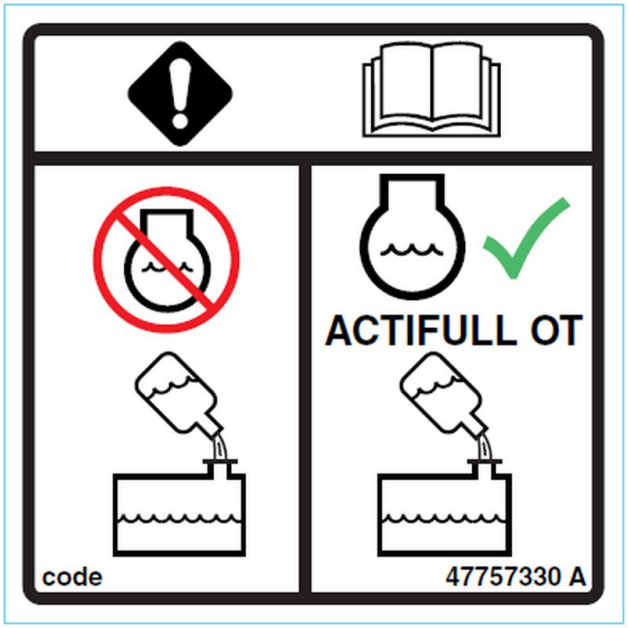
Depending on the date of manufacture, your cooling system may be equipped with conventional ethylene glycol coolant such as **CNH XHD HEAVY DUTY COOLANT / ANTI-FREEZE** or an Organic Acid Technology (OAT) coolant solution such as **NEW HOLLAND AMBRA ACTIFULL™ OT EXTENDED LIFE COOLANT**. You can easily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

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

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

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

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



47757330 1

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

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

Changing coolant types

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

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

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

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

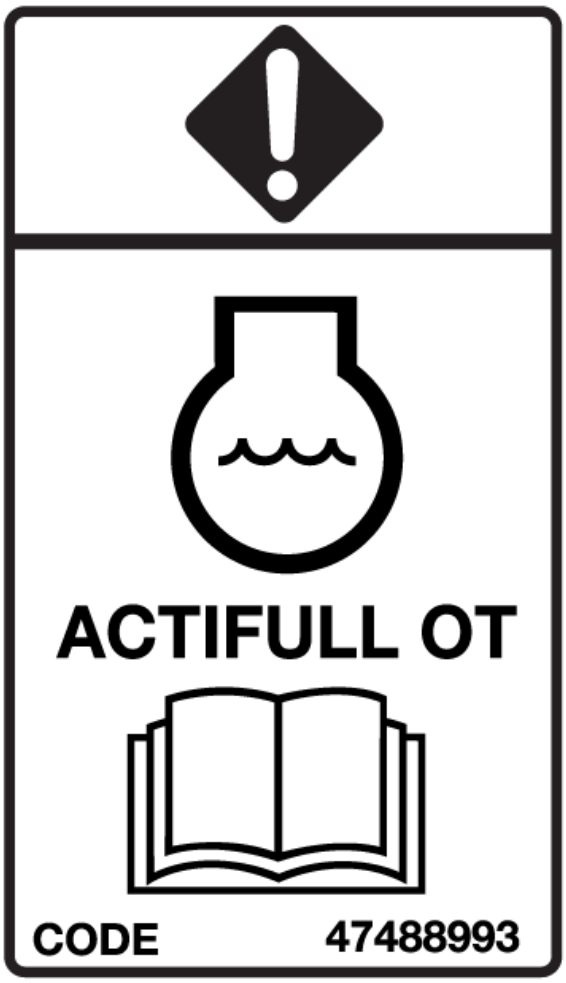
Definitions

Conventional coolant:

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

Organic Acid Technology (OAT) coolant:

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



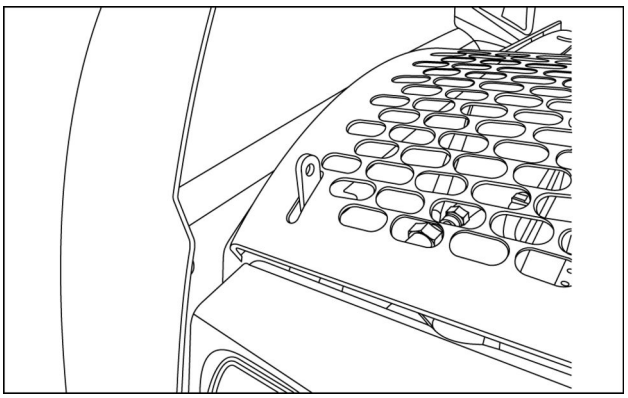
47488993 2

Lubrication and maintenance access

1. Open the engine compartment hood by pivoting upward.

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

2. Lift up on the latch tab to open the rear service door.



93106858 1

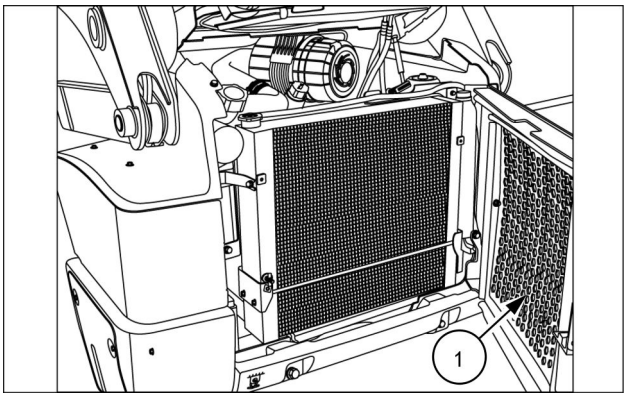
The open engine hood and rear access door **(1)** will allow the operator or technician to:

- Check the engine oil.
- Access engine oil fill.
- Add fuel.
- Check radiator and hydraulic oil coolers (fill, drain and clean debris).
- **⚠ WARNING**

  Hot liquid under pressure!
  Scalding can result from fast removal of the radiator cap. Check and service the engine cooling system according to the maintenance instructions in this manual.
  Failure to comply could result in death or serious injury.

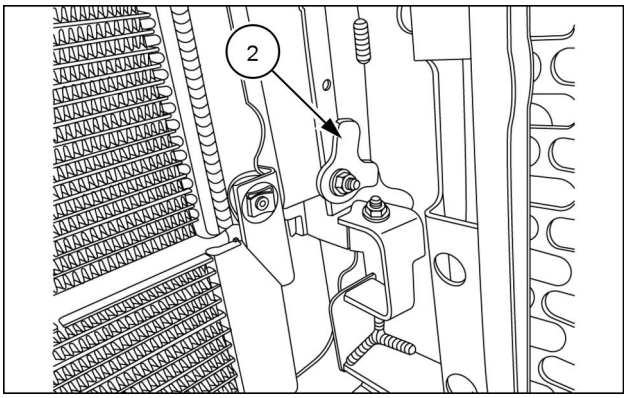
  W0163A

  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.
- Check the drive belts.
- Check the alternator.



93107480 2

Always lock the rear access door open when servicing or monitoring components, as shown **(2)**.



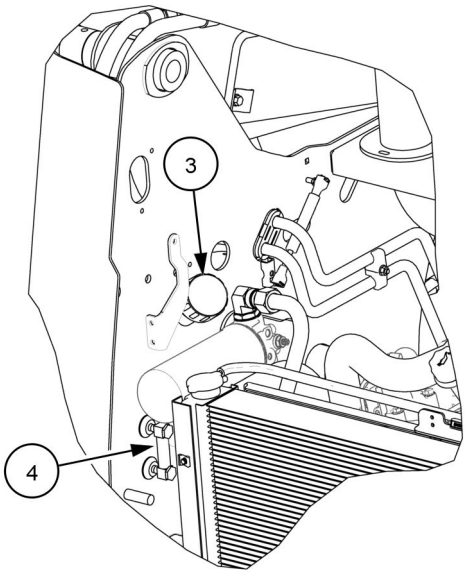
93106878 3

Open the rear service door to access the following:

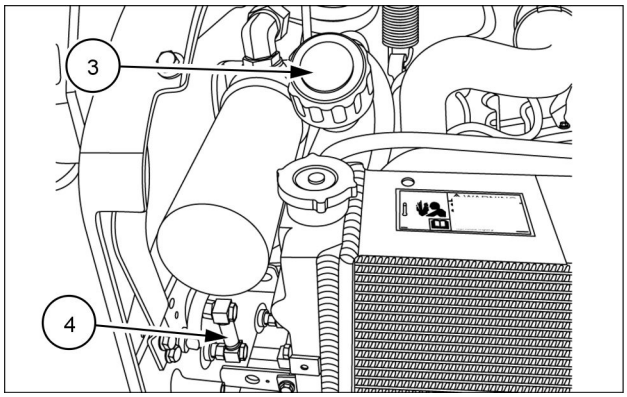
- Hydraulic oil fill **(3)**.
- Hydraulic oil level indicator sight glass **(4)**.

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

NOTE: *See the top figure for radial lift machines and the bottom figure for vertical lift machines.*



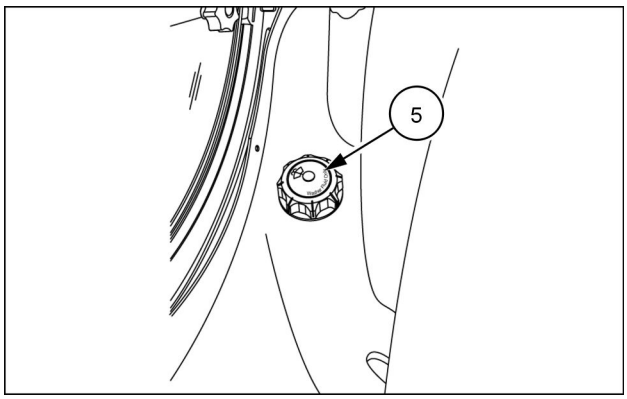
63109366 4



93107490 5

The rear inside cab.

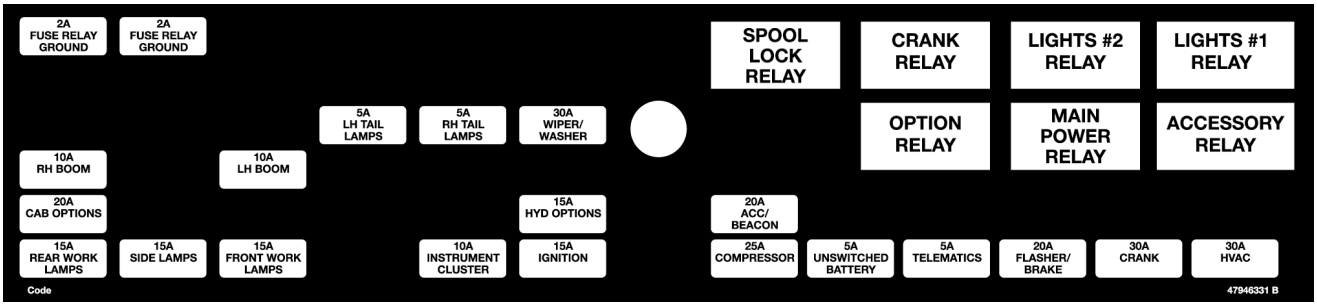
- Windshield washer reservoir **(5)** is inside the cab, right-hand side of the seat between the side window and the seat.



93109373A 6

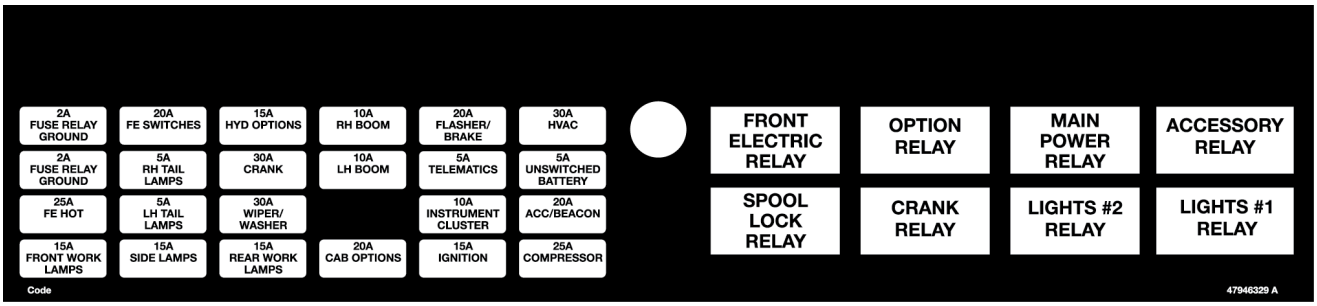
Fuses and relays

L213 and L215 machines with mechanical controls



47946331B 1

L218, L220, L223, L225, L230, C227, C232, and C238 machines with mechanical controls



47946329A 2

Fuse and relays in the cab area – Mechanical controls only

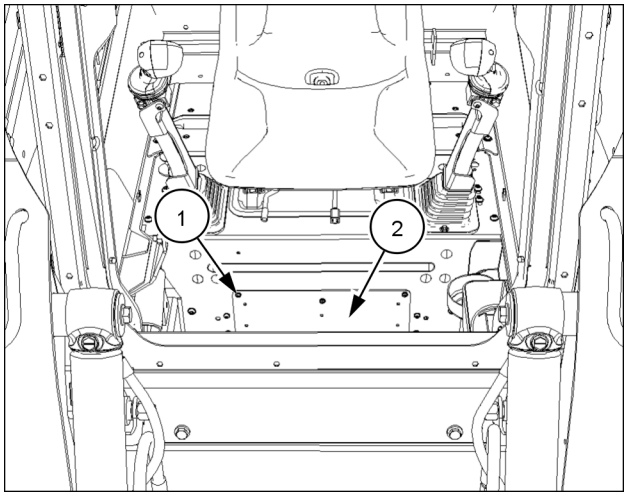
1. Remove all the screws **(1)** from the cover panel **(2)** to expose the fuse and relay blocks.

   NOTE: *The fuse and relay identification decal is on the back side of the cover panel.*

2. Remove the fuse panel **(2)** to expose the cab area fuses and relays **(3)**
3. Press both locking tabs **(4)** to release and remove the cover.

   NOTICE: *Only replace fuse and relays with the same type and amperage rating. Failure to do so may result in an electrical system failure.*

4. Locate and check the problem fuse or relay. If necessary, replace the fuse or relay.



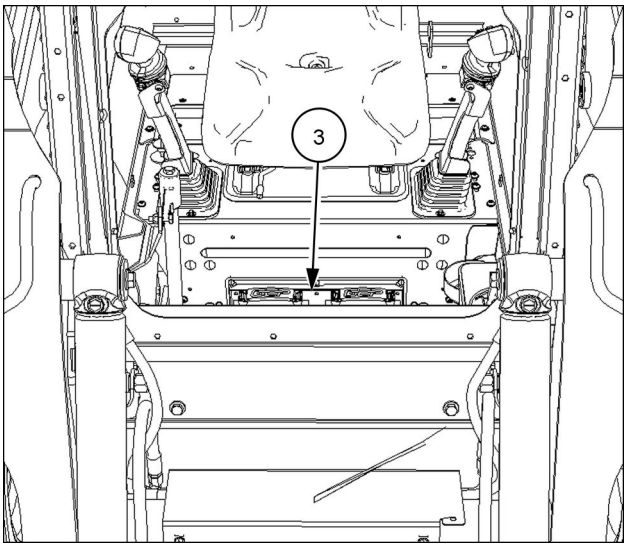
RAIL15SSL0101BA 3

NOTICE: *Avoid water and moisture from entering the fuse and relay block, make sure that the cover is properly positioned and fully latched. Failure to do so may allow water or moisture to enter the power center and possibly result in an electrical system failure.*

5. Align the locking tabs on the fuse block cover and push down to secure in place. Make sure that the cover is in proper position and secure.

NOTICE: *Avoid water from entering the power center, make sure that the fuse panel cover is in the proper position and secure. Failure to do so may allow water to enter the power center and possibly result in an electrical system failure.*

6. Position the fuse and relay cover so that all sides are flush or even with the heel kick plate.
7. Hold the fuse and relay panel cover in position.
8. Tighten the screws to secure the cover in position.



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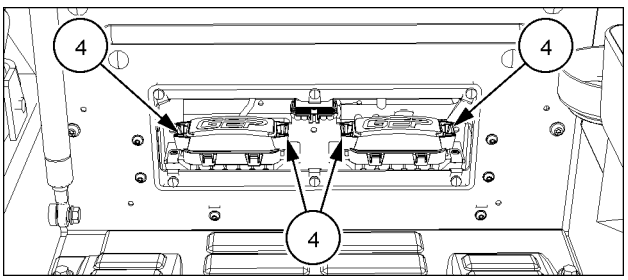
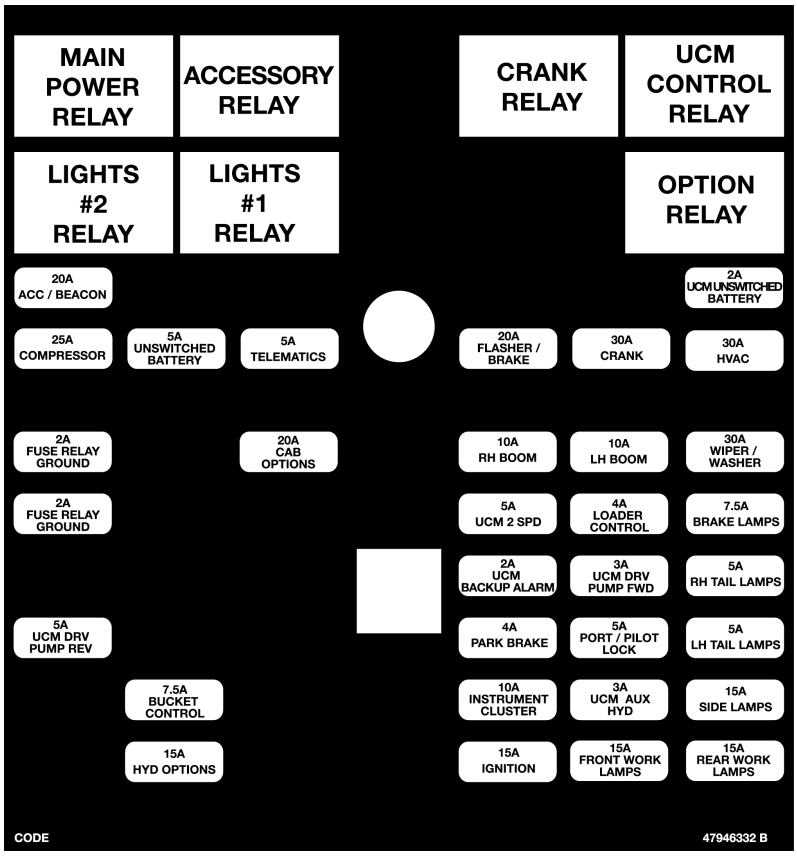


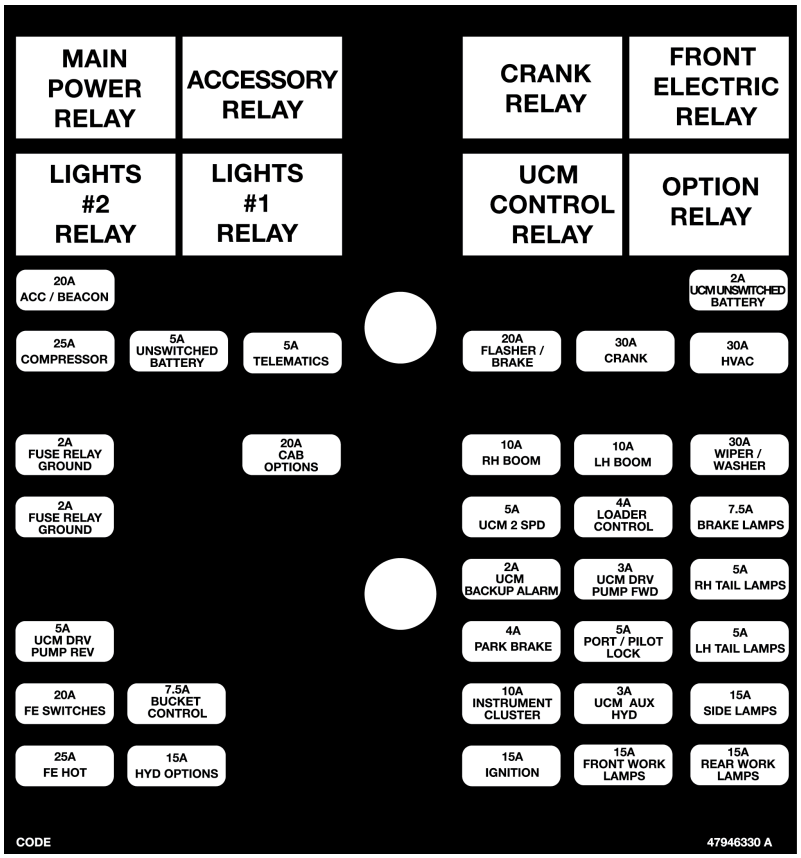
RAIL15SSL0355AA 5

L213 and L215 machines with Electro-Hydraulic (EH) controls



47946332B 6

L218, L220, L223, L225, L230, C227, C232, and C238 machines with Electro-Hydraulic (EH) controls

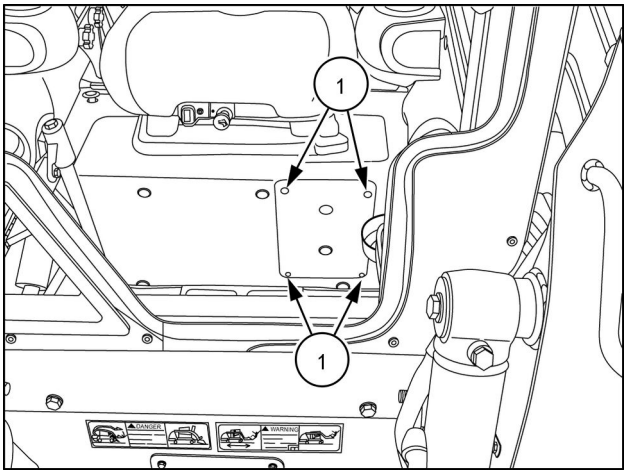


47946330A 7

Fuse and relays in the cab area – Electro-Hydraulic (EH) controls only

1. Remove the screws **(1)** from the cover panel to expose the fuse and relay blocks.

NOTE: *The fuse and relay identification decal is on the back side of the cover panel.*



RAIL14SSL0717AA 8

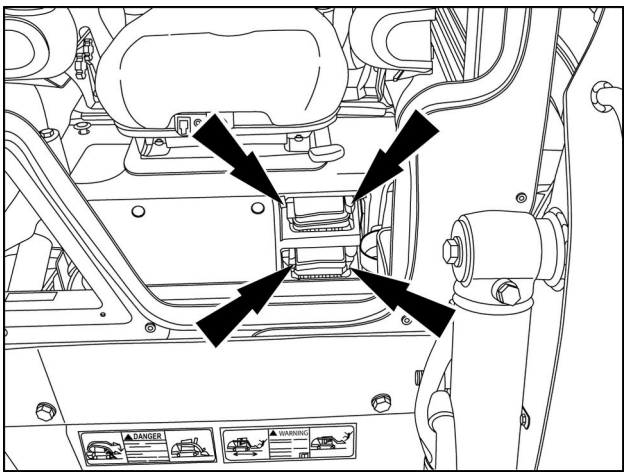
2. Press both of the locking tabs on each side of the cover and lift off of the fuse and relay block.

   NOTICE: *Only replace fuse and relays with the same type and amperage rating. Failure to do so may result in an electrical system failure.*

3. Locate and check the problem fuse or relay. If necessary, replace the fuse or relay.

   NOTICE: *Avoid water and moisture from entering the fuse and relay block, make sure that the cover is properly positioned and fully latched. Failure to do so may allow water or moisture to enter the power center and possibly result in an electrical system failure.*

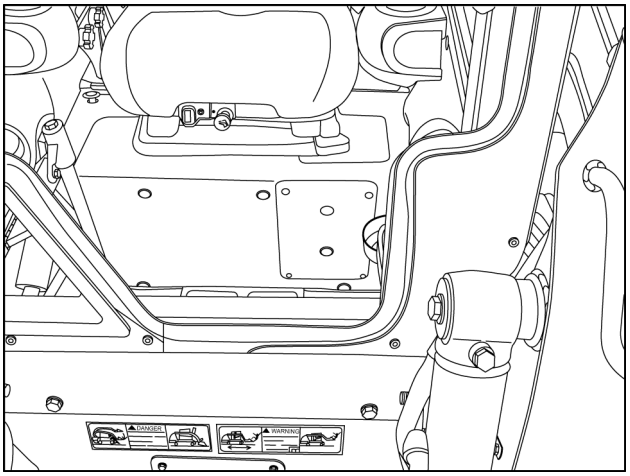
4. Align the locking tabs on the fuse block cover and push down to secure in place. Make sure that the cover is in proper position and secure.



RAIL14SSL0715AA 9

NOTICE: *Avoid water from entering the power center, make sure that the fuse panel cover is in the proper position and secure. Failure to do so may allow water to enter the power center and possibly result in an electrical system failure.*

5. Position the fuse and relay cover so that all sides are flush or even with the heel kick plate.
6. Hold the fuse and relay panel cover in position.
7. Tighten the screws to secure the cover in position.



RAIL14SSL0717AA 10

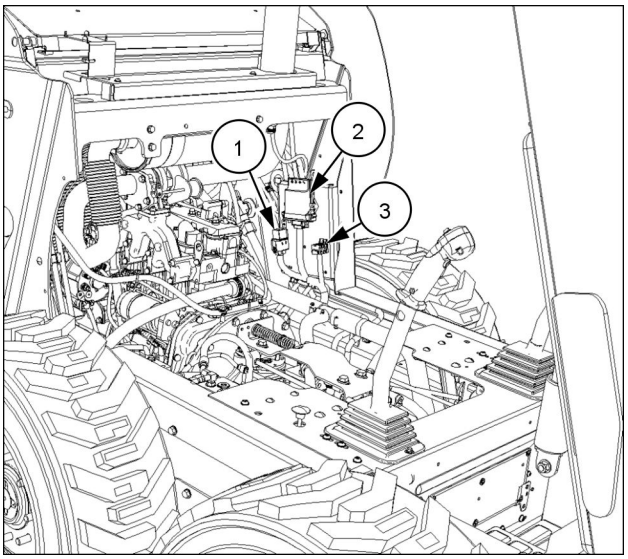
Relays in the engine area (all models)

Tilt the cab forward. See “Loader arm lock and cab tilt procedure - radial lift machines” **2-18** or “Loader arm lock and cab tilt procedure - vertical lift machines” **2-22**.

L213 and L215 relays

Relay identification

- Pre-heat power relay **(1)**
- Telematics module **(2)** (if equipped with Telematics)
- Flasher relay **(3)** (if equipped with turn signals)

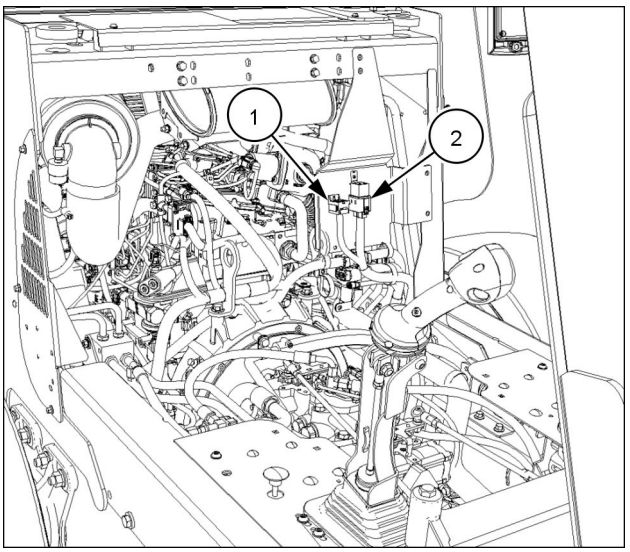


RAIL15SSL0136BA 11

C227 relays

Relay identification

- Flasher relay **(1)** (if equipped with turn signals)
- Pre-heat power relay **(2)**

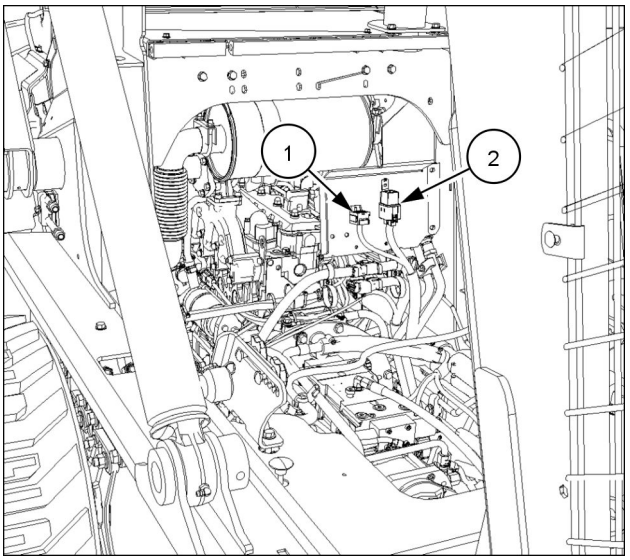


RAIL15SSL0128BA 12

L218 and L220 relays

Relay identification

- Flasher relay **(1)** (if equipped with turn signals)
- Pre-heat power relay **(2)**

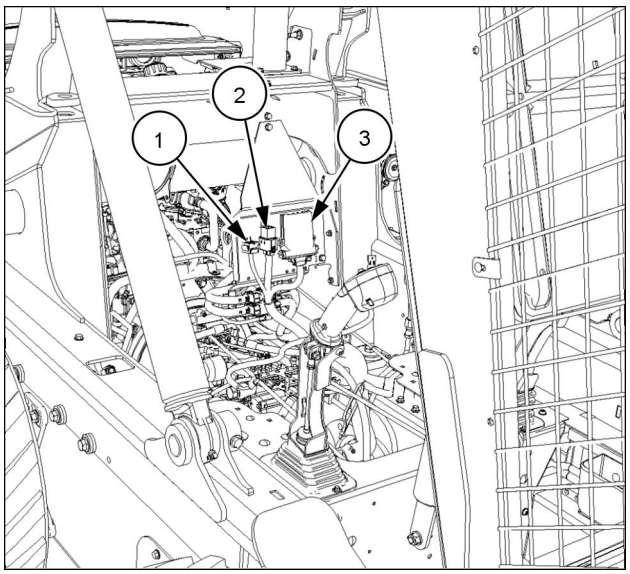


RAIL15SSL0127BA 13

L223, L225, L230, C232, and C238 relays

Relay identification

- Flasher relay **(1)** (if equipped with turn signals)
- Pre-heat power relay **(2)**
- Telematics module **(3)** (if equipped with Telematics)



RAIL15SSL0130BA 14

MAINTENANCE CHART

Maintenance chart

Maintenance action	Check	Cleaning	Grease	Drain fluid	Change fluid	Replace	Page no.
INITIAL 10 HOURS							
Track tension check and adjustment	x						**7-26**
Tire pressure and wheel hardware torque	x						**7-27**
Alternator and air conditioning compressor (if equipped) belt tension	x						**7-29**
EVERY 10 HOURS OR EACH DAY							
Clean tracks and components		x					**7-30**
Engine and hydraulic coolers	x						**7-30**
Engine coolant level	x						**7-32**
Engine oil level	x						**7-34**
Loader arm pivot points, coupler pins, and cylinder pins			x				**7-35**
Hydraulic oil level	x						**7-36**
Loader arm and bucket hydraulic interlock	x						**7-37**
INITIAL 50 HOURS							
Engine oil and filter				x			**7-38**
Roll Over Protective Structure (ROPS) mechanism and hardware check	x						**7-42**
EVERY 50 HOURS							
Cab intake filter	x						**7-43**
Track tension check	x						**7-44**
Seat belt	x						**7-45**
INITIAL 100 HOURS							
Final drive oil (track models)				x			**7-46**
EVERY 250 HOURS							
Fuel filter					x		**7-47**
In-line fuel filter						x	**7-48**
Wheels and tires	x						**7-50**
Drive chain tension check	x						**7-52**
EVERY 500 HOURS							
Air cleaner elements						x	**7-53**
Engine oil and filter				x			**7-55**
Final drive chain tank oil	x						**7-59**
Primary fuel filter						x	**7-60**
Hydraulic oil filter						x	**7-61**
Final drive oil (track models)				x			**7-62**
Roll Over Protective Structure (ROPS) mechanism and hardware check	x						**7-63**
Cab door - Grease			x				**7-64**
EVERY 1000 HOURS							
Hydraulic fluid and filter					x		**7-65**
Final drive chain tank oil					x		**7-70**
Engine valve clearance	x						**7-72**
EVERY 2000 HOURS							
Radiator drain and flush				x			**7-73**
AS REQUIRED							
Hardware - loose or damaged	x						**7-75**
Window removal and cleaning		x					**7-76**

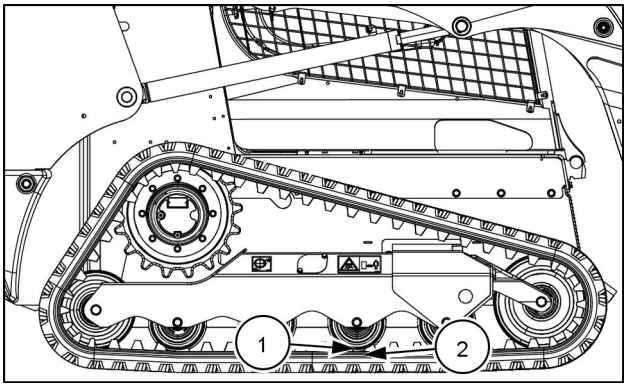
INITIAL 10 HOURS

Track tension check and adjustment

Check the track tension after the first **10 h** on a new machine or if new tracks have been installed. After the initial **10 h** check, the track tension should be checked every **50 h** thereafter. For this procedure, the tracks, rollers, idler wheels, debris guard, and final drive sprockets must be clean of dirt and debris.

Track tension check

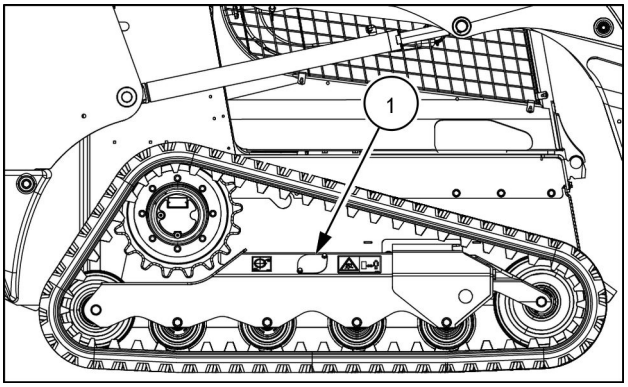
1. Park the machine on firm level surface.
2. Raise, block, and support machine properly until the tracks are about **50 mm** (**2.0 in**) off the surface.
3. Measure from the bottom of the center roller wheel **(1)** to the lower track top surface **(2)**. The allowable track sag is **12 – 19 mm** (**0.5 – 0.75 in**).



RAIL15SSL0356AA 1

Track tension adjustment

1. Use a **13 mm** tool and remove the track adjustment access cover **(1)** to expose the track adjustment fitting.



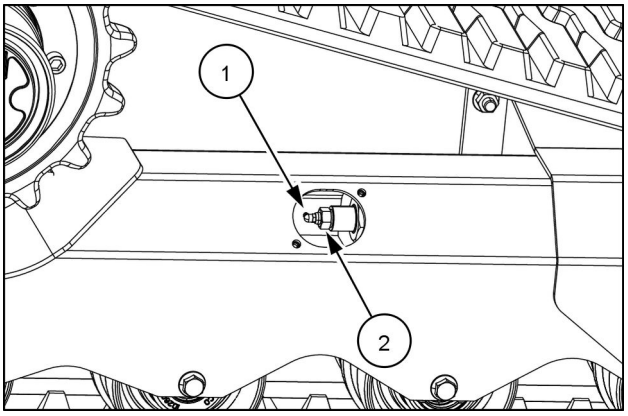
RAIL15SSL0356AA 2

Increase track tension:

Add **TUTELA MOLY GREASE GR-75** grease to increase track tension adjustment fitting **(1)**.

Decrease track tension:

Use a **19 mm** tool and slowly turn the fitting **(2)** counterclockwise. Grease will escape from the bottom of the fitting and decrease tension.



RAIL15SSL0382BA 3

Tire pressure and wheel hardware torque

⚠ WARNING

Explosion hazard!
Always maintain correct tire pressure as indicated in this manual. DO NOT inflate tires above the recommended pressure. Excessive pressure could result in tire failure.
Failure to comply could result in death or serious injury.

W0109A

⚠ WARNING

Explosion hazard!
Tires must be replaced by skilled personnel with the proper tools and technical knowledge. Unskilled personnel replacing wheels or tires could result in serious physical injuries, tire damage, and/or wheel distortion. Always have a qualified tire mechanic service wheels and tires.
Failure to comply could result in death or serious injury.

W0171A

The skid steer will be hard to turn and the tires will wear faster if the correct pressure is not maintained. When a worn or damaged tire is replaced, the replacement must be the same size and tread design as the other tires on the machine. Two different sized tires on one side of the machine will cause accelerated tire wear, loss of power, and excessive strain on the drivetrain. Replace worn tires in pairs with the two new tires used on the same side of the loader. If this tilts the loader too much, replace all four tires.

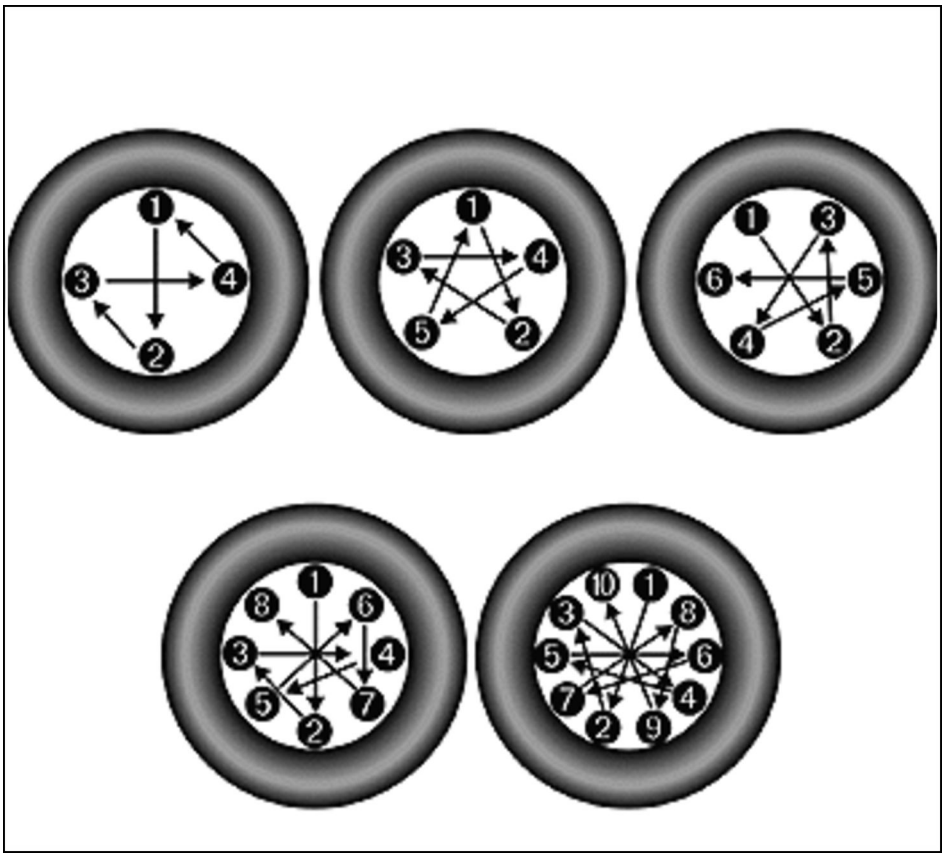
Adding air to the tire

NOTICE: *Tire pressure gauges should be checked at regular intervals for calibration and accuracy.*

1. Check the tire pressure.
2. Before you add air, have the wheel correctly installed on the machine or put the wheel in a restraining device (tire inflation cage).
3. Use an air hose with a remote shutoff valve, self-locking air chuck and wear eye protection.
4. Stand BEHIND the tread of the tire and make sure ALL persons are away from the side of the tire before you start to add air.
5. Inflate the tire to the recommended air pressure. DO NOT inflate the tire more than the recommended maximum pressure given on the tire.

TIRE	SIZE	PRESSURE
Heavy Duty	10 x 16.5	**290 – 345 kPa** (**42 – 50 psi**)
	12 x 16.5	
	14 x 17.5	**359 – 414 kPa** (**52 – 60 psi**)
Premium	27/10.5 x 15	**290 – 345 kPa** (**42 – 50 psi**)
	10 x 16.5	
	12 x 16.5	
	14 x 17.5	**359 – 414 kPa** (**52 – 60 psi**)
Premium with liner	10 x 16.5	**290 – 345 kPa** (**42 – 50 psi**)
	12 x 16.5	
Severe Duty	10 x 16.5	**290 – 345 kPa** (**42 – 50 psi**)
	12 x 16.5	
	14 x 17.5	**531 – 586 kPa** (**77 – 85 psi**)
Flotation	31.5 x 13 x 16.5	**179 – 241 kPa** (**26 – 35 psi**)
	33 x 15.5 x 16.5	**290 – 345 kPa** (**42 – 50 psi**)
Mining	12 x 16.5	**290 – 345 kPa** (**42 – 50 psi**)
Non-Pneumatic	12 x 16.5	not required
	14 x 17.5	

Wheel torque



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1. Check that the wheel nuts have the proper torque setting.

Wheel taper nut torque	**169.5 N·m** (**125 lb ft**)
Flange nut	**203.5 N·m** (**150 lb ft**)

2. If necessary, tighten the nuts in a cross-pattern sequence as shown.

Alternator and air conditioning compressor (if equipped) belt tension

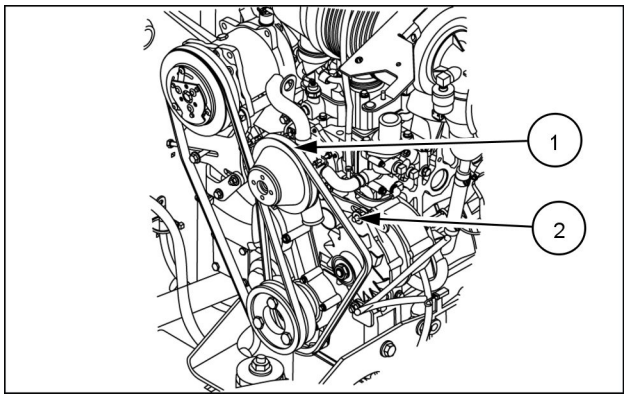
NOTE: *The alternator belt and air-conditioning belt tension check and adjust procedure only apples to models L213, L215, L218, and L220.*

Check the alternator belt tension after the first **10 h** of operation on a new machine or if a new belt has been installed. After the initial **10 h**, check the belt tension every **10 h** of operation.

Alternator belt tension check and adjust

Use the following procedure to adjust the alternator belt tension.

1. Loosen the adjusting bracket bolt **(2)**.
2. Pull the alternator toward the outside of the machine to tighten the belt. The belt is tightened properly when a force of **1 kg** (**2 lb**) is applied perpendicular to the belt at the center of the span with a **3 mm** (**0.118 in**) deflection.
3. Tighten the adjusting bracket bolt **(2)**.

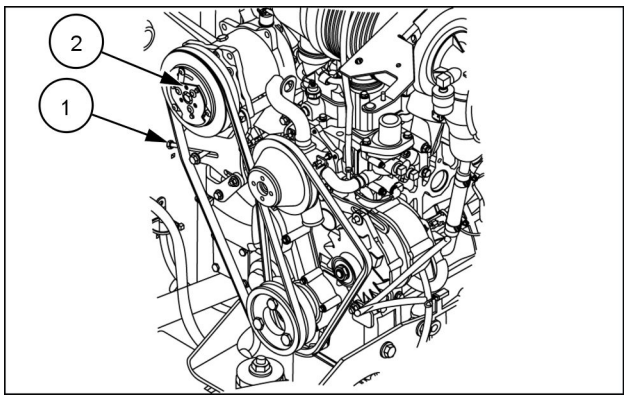


93109316 1

Air conditioning belt tension check and adjust

If your machine is equipped with air conditioning, use the following procedure to adjust the air conditioning belt tension.

1. Loosen the adjusting bracket bolt **(1)**.
2. Pull the air compressor **(2)** toward the outside of the machine to tighten the belt. The belt is tightened properly when a force of **1 kg** (**2 lb**) is applied perpendicular to the belt at the center of the span with a **3 mm** (**0.118 in**) deflection.
3. Tighten the adjusting bracket bolt **(1)**.



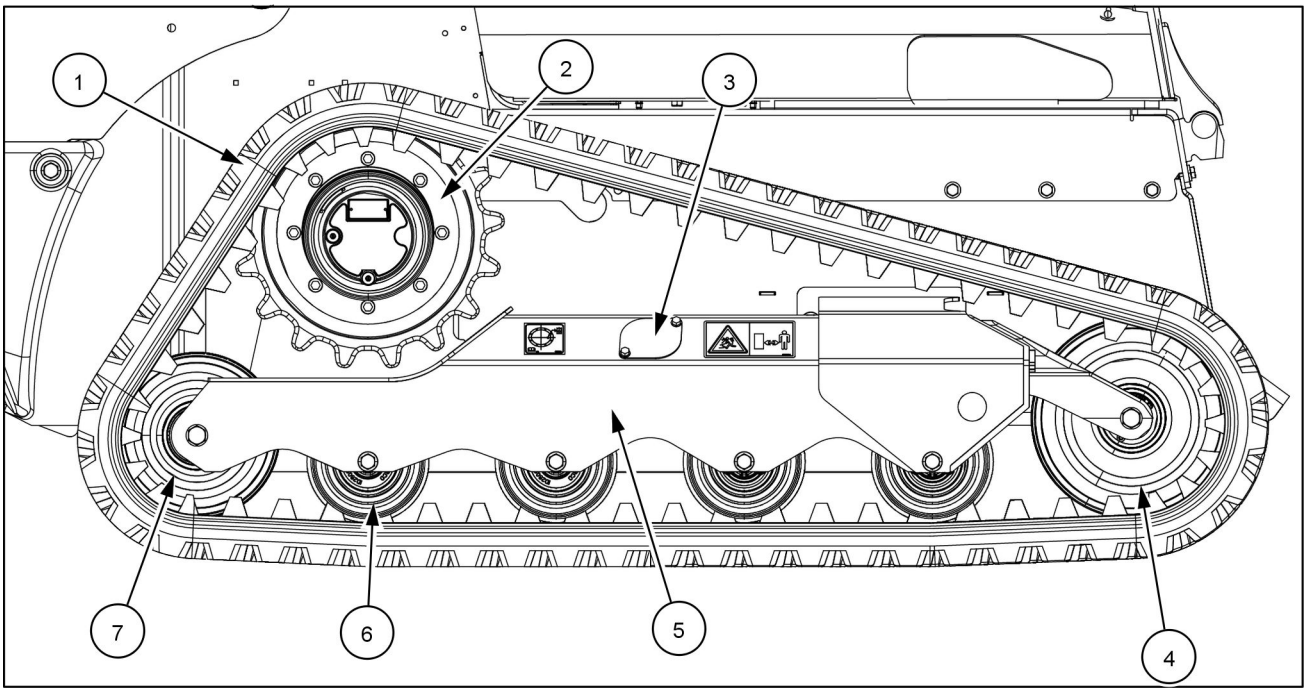
93109316 2

NOTE: *Models L223, L225, L230, C227, C232, and C238 equipped with an authorized CNH belt the proper adjustment is with the alternator in its fully extended mounting position. The same machines equipped with air-conditioning (AC) the AC compressor must also be in the fully extended mounting position.*

EVERY 10 HOURS OR EACH DAY

Clean tracks and components

Clean the components in the illustration every **10 h** or daily, and when the machine has worked in muddy conditions.



RAIL15SSL0395FA 1

1	Rubber track	5	Track debris guard
2	Final drive sprocket (1 each side)	6	Track roller wheels (4 or 3 on each side)
3	Track adjustment access cover (1 each side)	7	Rear idler wheel (1 each side)
4	Front idler wheel (1 each side)		

Engine and hydraulic coolers

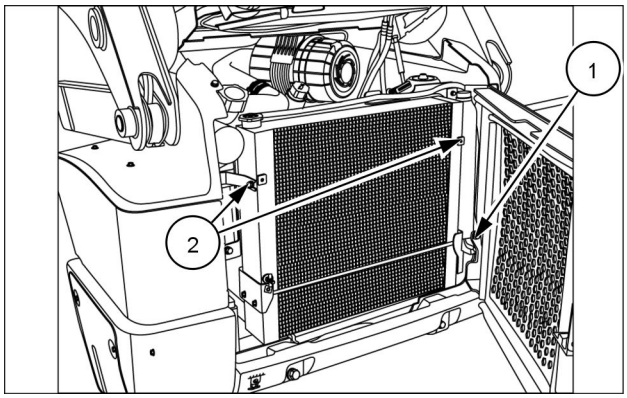
⚠ CAUTION

Flying debris!
Compressed air can propel dirt, rust, etc. into the air. Wear eye and face protection when using compressed air.
Failure to comply could result in minor or moderate injury.

C0049A

NOTICE: *DO NOT USE A PRESSURE WASHER! The machine should be cool before you proceed. If compressed air is used, keep the attachment enough distance away from the cooler fins to prevent damage or bending over and restricting air flow. The bent fins may restrict flow enough to cause overheating. If compressed air is not available, use water regulated to a low pressure.*

1. Raise the engine hood and ensure it stays in the open position. Lift up on the latch to open the rear service door. Use the service lock **(1)** in the lower right to secure the door in the open position.
2. Remove bolts **(2)** to allow radiator/cooler assembly to pivot out for inspection and cleaning.
3. Use compressed air to clean the cooler fins.



93107480A 1

Engine coolant level

⚠ WARNING

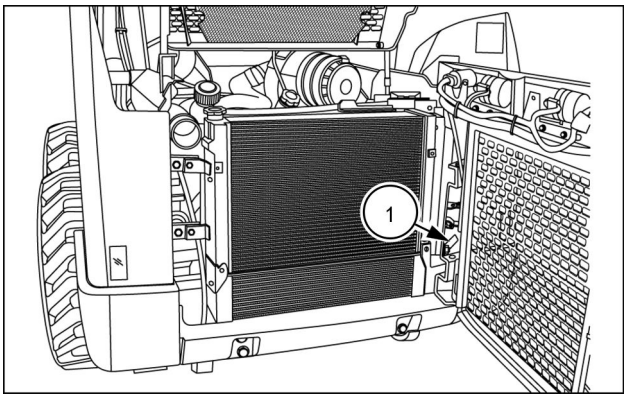
Hot liquid under pressure!
Scalding can result from fast removal of the radiator cap. Check and service the engine cooling system according to the maintenance instructions in this manual.
Failure to comply could result in death or serious injury.

W0163A

NOTICE: *NEVER mix OAT coolant with conventional coolant. Under no circumstances should you top off a cooling system with only water. You can use a refractometer to check the concentration level. You should not use Supplemental Coolant Additives (SCA) when using* ***NEW HOLLAND AMBRA ACTIFULL™ OT EXTENDED LIFE COOLANT****. See "Organic Acid Technology (OAT) coolant"* ***7-14*** *for more details.*

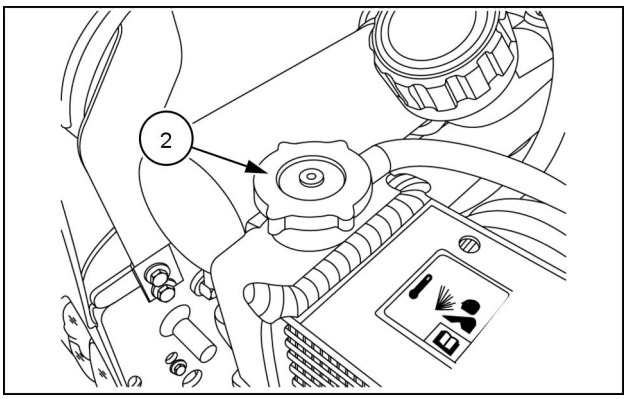
Check the radiator coolant level every **10 h** of operation or daily. when the engine is off and the coolant is COLD.

1. Park the machine on level ground.
2. Turn off the engine.
3. Open the engine hood.
4. Open the rear service door and engage the door latch **(1)** on the lower right-hand side.



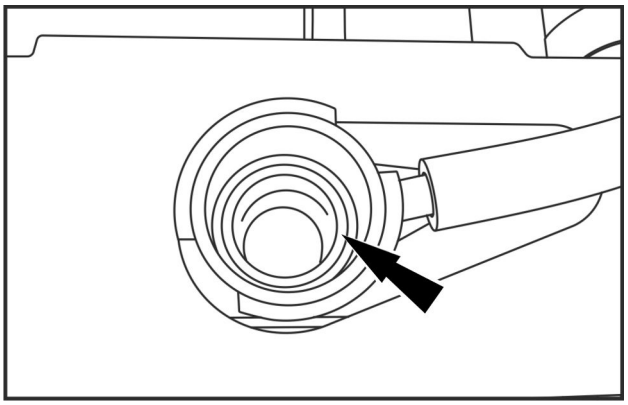
63107488 1

5. Locate and slowly remove the radiator cap **(2)** by turning it counter-clockwise to the first notch. Be sure that all the pressure has been released. Push down and continue to turn counter-clockwise until you can remove it.



93107492A 2

6. The coolant level must be up to the radiator top, just under the overflow tube. Only add **NEW HOLLAND AMBRA ACTIFULL™ OT EXTENDED LIFE COOLANT** to the radiator.



BT04H069-01 3

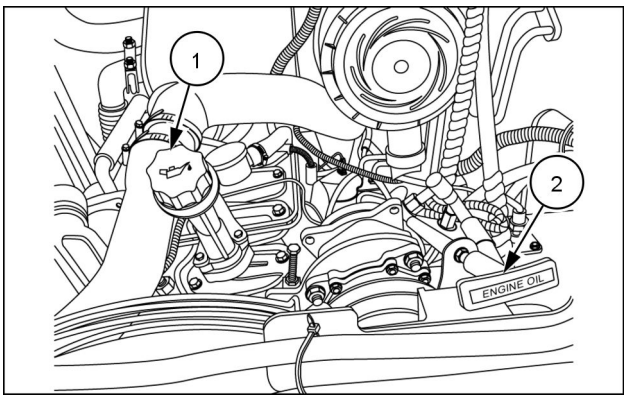
Engine oil level

During the first **20 h** of operation check the oil level at one hour intervals. After the initial **20 h** check the engine oil level every **10 h** or daily of operation.

Engine oil specification: **NEW HOLLAND AMBRA UNITEK MASTERGOLD SBL CJ-4 SAE 10W-40** or see the “Recommended engine oil for operating temperature ranges” chart **7-11** for more details.

Engine oil level

1. Park the machine on level ground.
2. Turn off the engine.
3. Allow time for the engine oil to return to the oil pan.
4. Locate the engine oil dipstick **(2)** just above the radiator toward the right-hand side of the machine.
5. Push the engine oil dipstick **(2)** completely in.
6. Pull the engine oil dipstick **(2)** out and check the oil level on the end of the dipstick.
7. If the oil level is below the ADD mark, add oil at the engine oil fill tube **(1)**. DO NOT raise the oil level above the FULL mark.



93106871 1

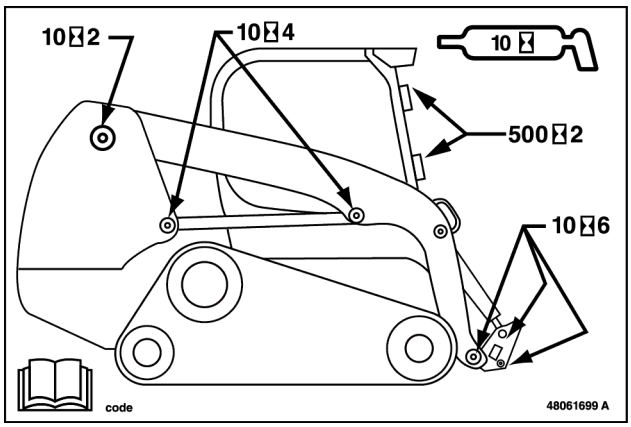
Loader arm pivot points, coupler pins, and cylinder pins

Use **TUTELA MOLY GREASE GR-75** every 10 hours of operation. Lower pins may require more frequent service intervals if submerged in water.

Radial lift machines

NOTE: *All of the loader arm lubrication points are easily accessible with the loader arm down.*

1. Lower the loader arms and tilt the coupler forward. The attachment does not need to be removed.
2. Clean the grease fittings before greasing.
3. Grease the loader arm pivot points, coupler pins, and cylinder pins.
4. Repeat on the other side of the machine.

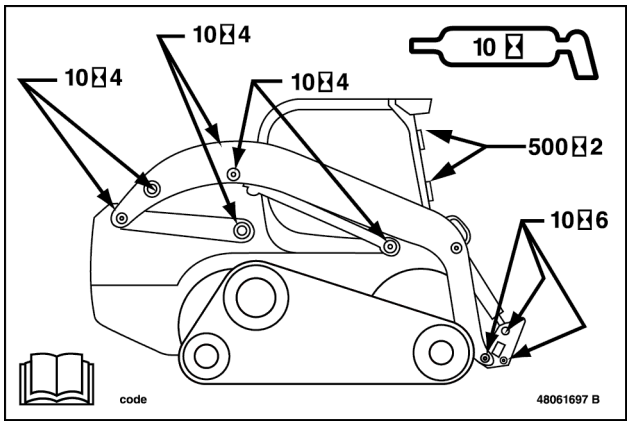


48061699A 1

Vertical lift machines

NOTE: *All of the loader arm lubrication points are easily accessible with the loader arm down.*

1. Lower the loader arms and tilt the coupler forward. The attachment does not need to be removed.
2. Clean the grease fittings before greasing.
3. Grease the loader arm pivot points, coupler pins, and cylinder pins.
4. Repeat on the other side of the machine.



48061697B 2

Hydraulic oil level

Check the hydraulic reservoir oil level daily, before beginning operation or every **10 h** of operation.

Hydraulic oil specification: **TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30** or see the “Hydraulic oil viscosity” **7-12** for more details.

Hydraulic reservoir oil check

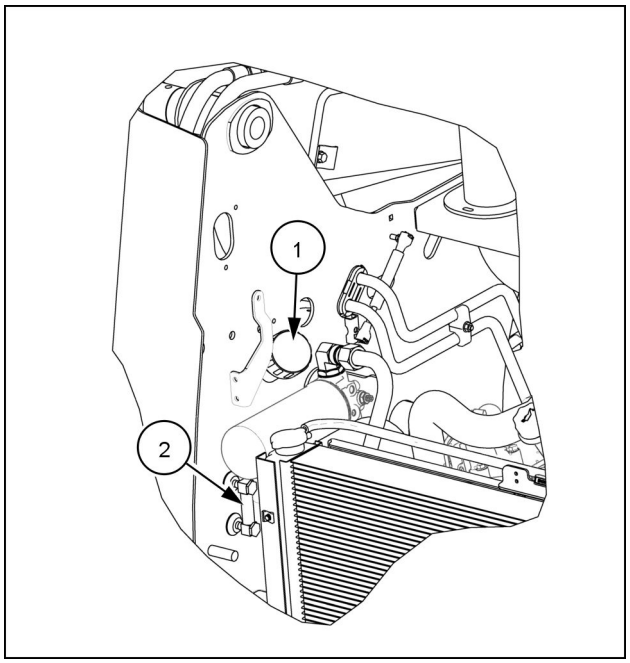
NOTICE: *When servicing the reservoir it is important to prevent contamination. Clean the components and all areas around the components to help reduce the risk of contamination.*

1. Park the machine on a firm, level surface with safe access all around.
2. Lower the loader arms down on the ground.
3. Lift engine compartment hood and open the rear access door, engage lock.
4. Locate the hydraulic oil fill cap **(1)** and the hydraulic oil level. **(2)**.

NOTE: *See the top figure for radial lift machines and the bottom figure for vertical lift machines.*

5. Check the fluid level. The oil level should be within the middle one third of the sight glass **(2)**.
6. 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.*



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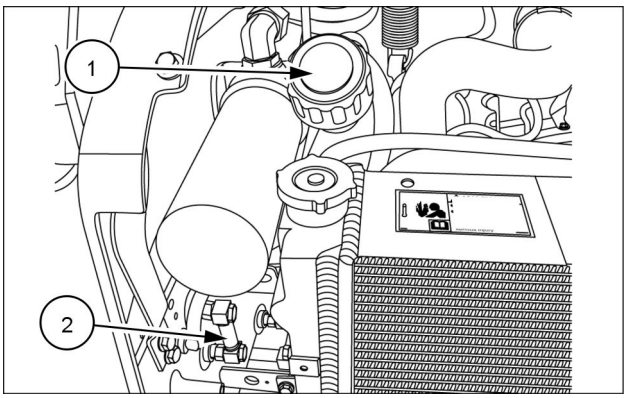


93107490 2

Loader arm and bucket hydraulic interlock

⚠ WARNING

Machine damage can cause accidents!
If you discover any problem or defect on the machine, repair it immediately or see your authorized dealer. Do not operate the machine until all problems are corrected.
Failure to comply could result in death or serious injury.

W0159A

The loader arm and bucket hydraulic interlock prevents the loader arm and bucket controls from movement if the operator unbuckles the seat belt, raises the restraint bar (if equipped), or leaves the seat with the ignition switch on.

Check the interlock operation:

1. Enter the machine, sit in the seat, connect the seat belt, and lower the restraint bar (if equipped).
2. Start the engine and run at idle speed.
3. Make sure that the loader arm is completely lowered to the ground and the attachment is empty.
4. Push the operate button to activate the hydraulic and ground drive systems.
5. Engage the park brake, push the Park Brake button on the lower right-hand side of the instrument panel.
6. Operate the loader arm and bucket controls to ensure they function properly.
7. Unbuckle the seat belt, raise the restraint bar (if equipped) and attempt to move the loader arm and bucket controls. The operation should be locked.
8. Buckle the seat belt, lower the restraint bar (if equipped), and push the Operate Button to reactivate the hydraulic functions.
9. Operate the loader arm and bucket controls to ensure they function properly.
10. Lift yourself for **5 s** with no more than **25 mm** (**1 in**) off the seat and attempt to move the loader arm and bucket controls. The operation should be locked.
11. If the controls are not locked properly, contact your dealer for assistance. Do not operate the machine until the fault is resolved.

INITIAL 50 HOURS

Engine oil and filter

⚠ DANGER

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 will result in death or serious injury.

D0076A

⚠ CAUTION

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

C0107B

⚠ CAUTION

Chemical hazard!
Avoid getting engine oil on your skin. In case of skin contact, wash with running water.
Failure to comply could result in minor or moderate injury.

C0202B

Change the engine oil and filter after the initial **50 h** of operation on a new machine or a rebuilt engine. Change engine oil and filter at **500 h** intervals after the initial service.

Engine oil specification: **NEW HOLLAND AMBRA UNITEK MASTERGOLD SBL CJ-4 SAE 10W-40** see the “Engine oils” **7-11** for more details.

For models L223, L225, L230, C227, C232, and C238 use quick disconnect drain fitting 48103849 and quick-disconnect hose assembly 48109944 .

For models L213, L215, L218, and L220 use quick disconnect drain fitting 48103847 and quick-disconnect hose assembly 48109944.

NOTE: *For a more complete removal of foreign material, change the engine oil when the engine is still warm, but not hot from operation.*

1. Place the machine on firm, level ground.

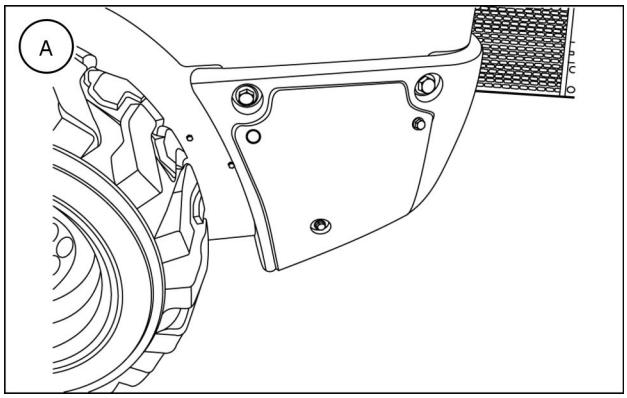
2. Remove the access cover from the rear lower left-hand side of the machine.

NOTE: *Both style access panels shown.*

3. Locate the engine oil remote filter.

4. If applicable, use compressed air to clean the engine oil filter assembly.

NOTICE: *If compressed air is not available, use a clean rag or cloth to wipe the area clean. This reduces the potential of dirt contamination into the engine.*



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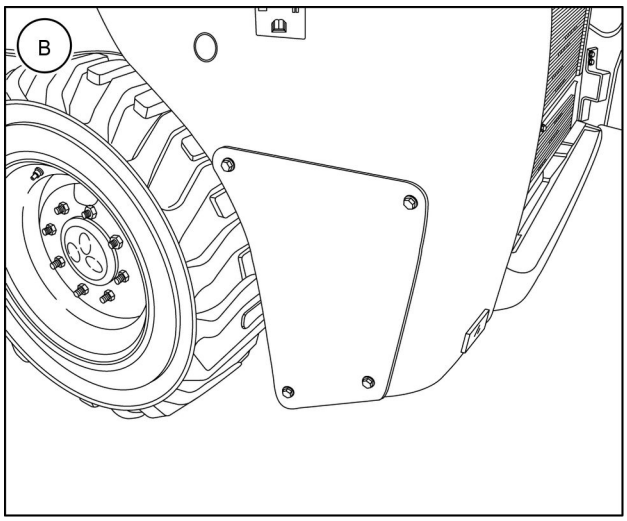

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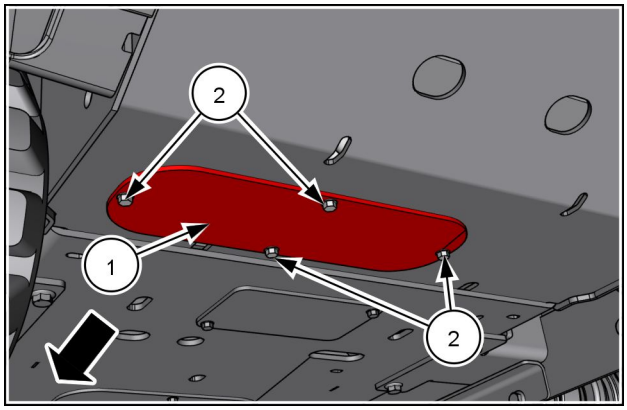
5. Remove the mounting hardware **(2)** and cover **(1)** from underneath the machine.



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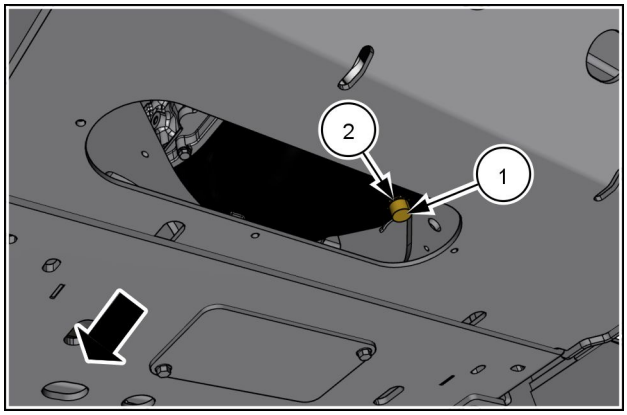
6. Remove the cap **(1)** from the quick disconnect drain fitting **(2)**.



RAPH17SSL0169QA 4

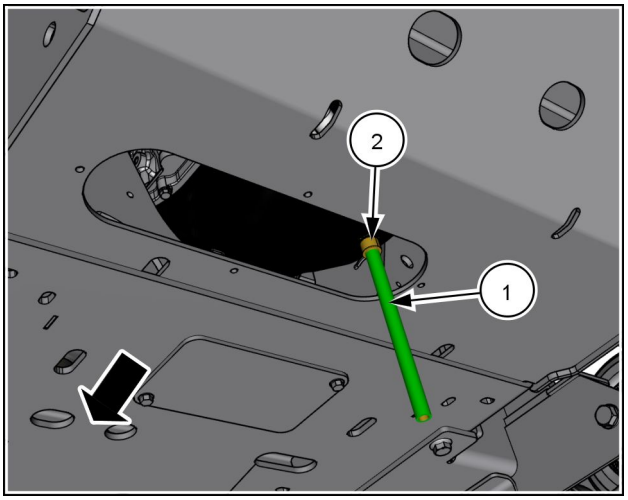
7. Place a drain receptacle under the machine.

NOTE: *After the quick-disconnect hose installation, oil will automatically begin to flow out of the hose.*

8. Thread the quick-disconnect hose assembly **(1)** onto the quick-disconnect drain fitting **(2)**.
9. Allow the oil to drain completely from the crankcase.
10. Remove the receptacle, with the used oil, from under the machine.
11. Dispose of the oil in accordance with the local regulations.
12. Turn the old engine oil filter counter-clockwise to remove.
13. Dispose of the filter in accordance with the local regulations.
14. Use a clean cloth and wipe sealing surface of the old filter base to remove all dirt.
15. Apply a thin layer of clean grease or oil to the gasket of the new filter.
16. Turn the new oil filter clockwise onto the base until the gasket makes contact with the base. Continue to tighten the filter with your hand for 3/4 to one full turn as directed on the filter label.

NOTICE: *DO NOT use a filter strap wrench to install the oil filter. An oil filter strap wrench can cause a leak if the filter is dented or overstressed.*

17. Remove the quick-disconnect hose assembly **(1)** from the quick-disconnect drain fitting **(2)**.



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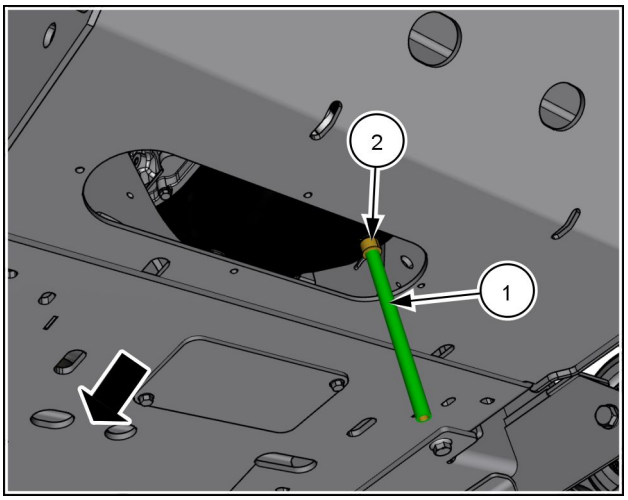
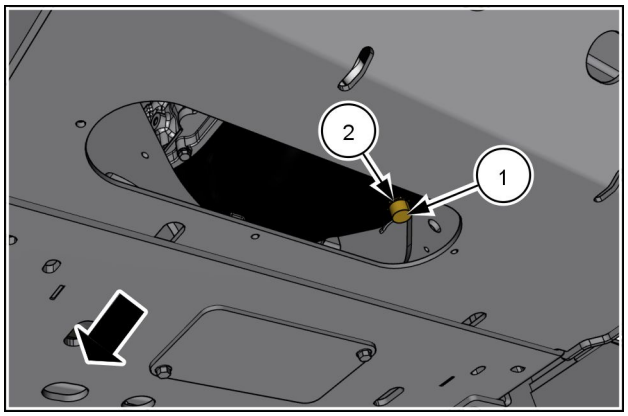


RAPH17SSL0170QA 6

18. Install the cap **(1)** onto the quick-disconnect drain fitting **(2)**.

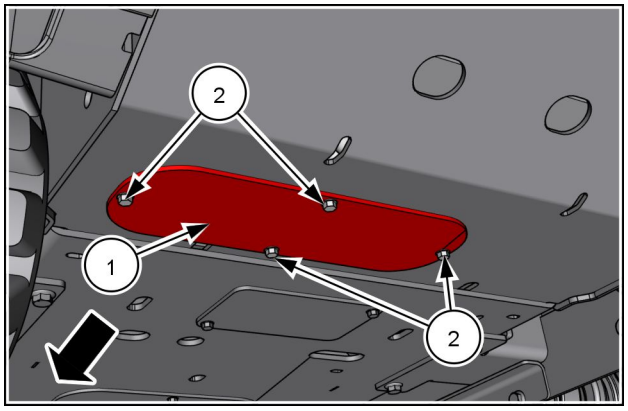
NOTE: *Make sure the o-ring is installed on the drain fitting* ***(2)****, if it is damaged, then replace with new.*

NOTE: *The cap* ***(1)*** *is only hand tight on the drain fitting* ***(2)****.*



RAPH17SSL0169QA 7

19. Install the cover **(1)** underneath the machine and secure with the hardware **(2)**.



RAPH17SSL0168QA 8

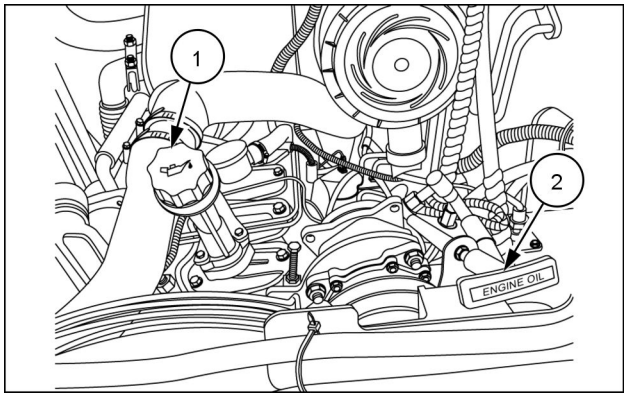
20. Remove the engine oil dipstick **(2)** to provide crankcase ventilation.

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

21. Use an oil spout that is smaller than the engine oil fill neck **(1)**, 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.*

22. Install the engine oil fill cap.
23. Install the engine oil dipstick.
24. 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.
25. Install access cover and secure with bolts
26. Close rear access door and engine hood.



93106871 9

Engine crank case oil

Capacity - with filter change	
L213, L215, L218, L220	**7.0 l (7.5 US qt)**
L223, L225, L230, C227, C232, C238	**9.5 l (10 US qt)**
Specifications	**NEW HOLLAND AMBRA UNITEK MASTERGOLD SBL CJ-4**

Roll Over Protective Structure (ROPS) mechanism and hardware check

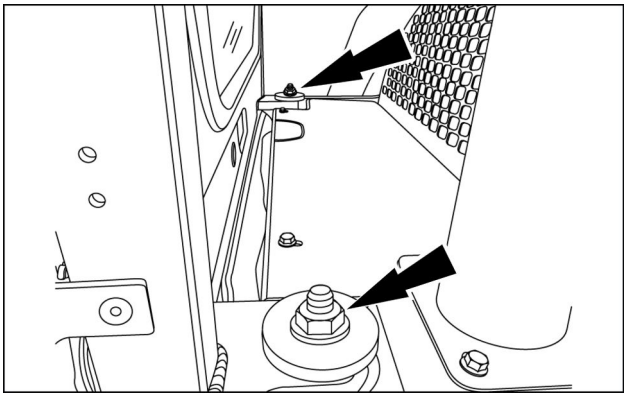
⚠ WARNING

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

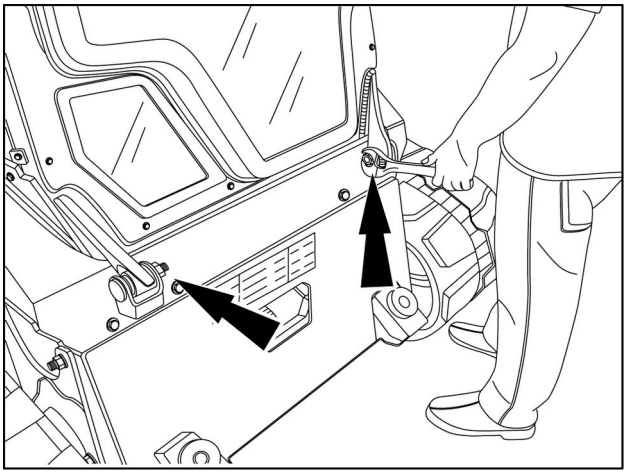
Check the ROPS cab to lower mainframe hardware for proper torque.

1. Check the ROPS hardware at the back of the machine that are used to secure the cab. Torque the hardware to **170 N·m** (**125.4 lb ft**).



931001633 1

2. Check the ROPS front pivot bolts. Torque these bolts to **42 N·m** (**31.0 lb ft**).



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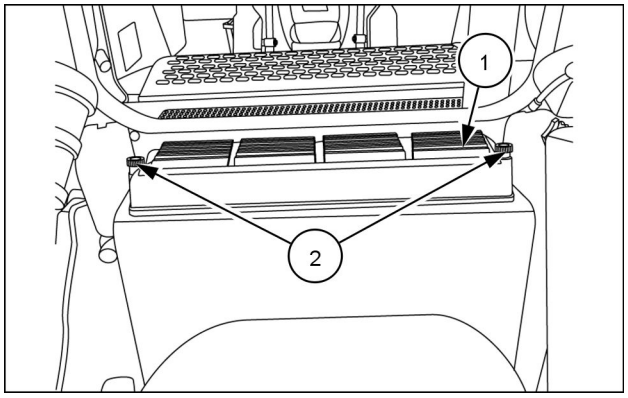
EVERY 50 HOURS

Cab intake filter

If the machine is equipped with a cab heater or air conditioning, the cab intake filter should be inspected as shown. The cab intake filter **(1)** is located inside the cab behind the seat below the rear window.

NOTE: *The service interval for the cab intake filter is dependent on the amount of use and the operating conditions. It is recommended to check more often if working in extreme environmental conditions.*

1. Open the access cover using knobs **(2)**. Replace the cab intake filter if it is damaged, torn, or if it is clogged with debris and dirt.



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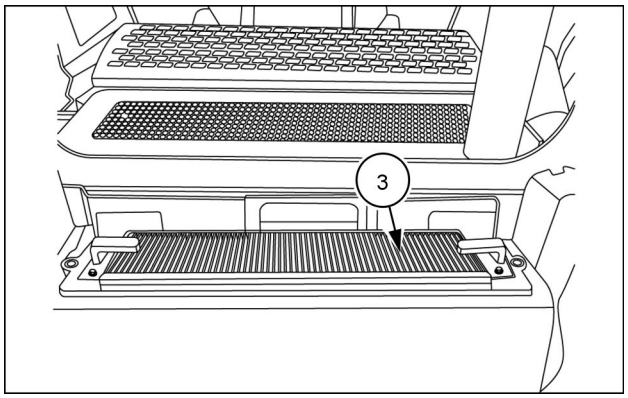
2. Remove the cab intake filter **(3)**.

NOTICE: *Maintain the filter in a horizontal orientation when removing from the air box. This will prevent dust and debris from being accidently dumped in the cab.*



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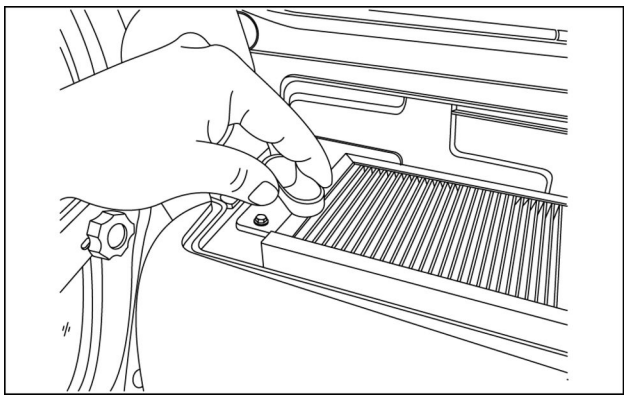
3. Clean the cab intake filter compartment of dirt and debris. The rubber gasket on the filter must seal properly with the compartment filter flange.
4. Replace the new or cleaned components in the reverse order.



93107489A 3

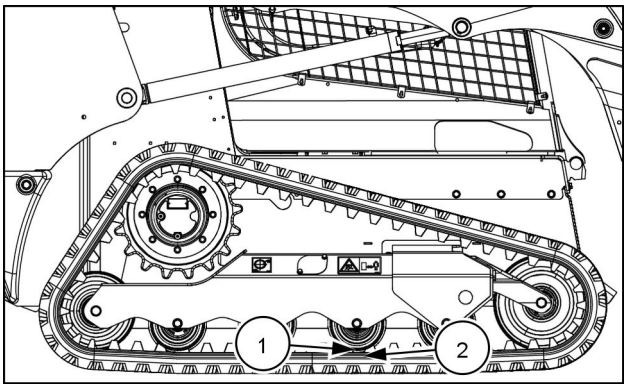
NOTICE: *Make sure to get a good seal between the filter and the housing.*

Track tension check

Check the track tension every **50 h**. For this procedure, the tracks, rollers, idler wheels, debris guard, and final drive sprockets must be clean of dirt and debris.

Track tension check

1. Park the machine on firm level surface.
2. Raise, block, and support machine properly until the tracks are about **50 mm** (**2.0 in**) off the surface.
3. Measure from the bottom of the center roller wheel **(1)** to the lower track top surface **(2)**. The allowable track sag is **12 – 19 mm** (**0.5 – 0.75 in**).



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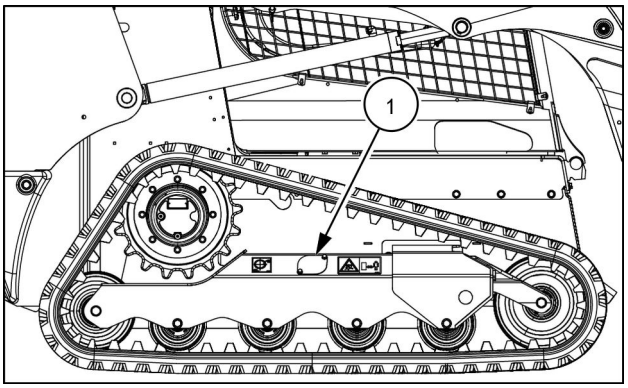
Track tension adjustment

1. Use a **13 mm** tool and remove the track adjustment access cover **(1)** to expose the track adjustment fitting.



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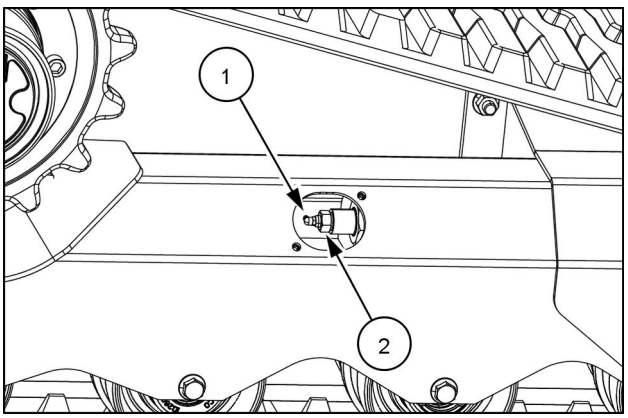
Increase track tension:

Add **TUTELA MOLY GREASE GR-75** grease to increase track tension adjustment fitting **(1)**.

Decrease track tension:

Use a **19 mm** tool and slowly turn the fitting **(2)** counterclockwise. Grease will escape from the bottom of the fitting and decrease tension.



RAIL15SSL0382BA 3

Seat belt

⚠ WARNING

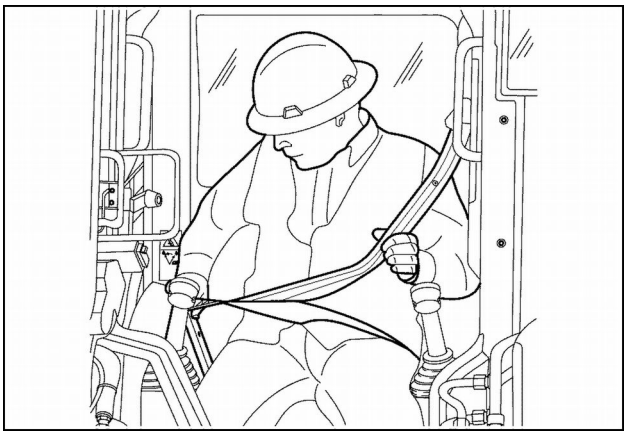
Equipment failure could cause accident or injury!
Always fasten the seat belt securely before you operate the machine. Inspect seat belt parts for wear and damage. Replace any and all worn or damaged parts of the seat belt prior to operation.
Failure to comply could result in death or serious injury.

W0046C

Inspect the seat belt every **50 h** of operation. Contact your NEW HOLLAND CONSTRUCTION dealer if you need to replace the seat belt.

Seat belt inspection and maintenance:

- Keep seat belts in good working condition.
- Make sure that the seat belt with or without shoulder strap moves easily and smoothly, but with some resistance from the retraction receptacle.
- Make sure that the seat belt retracts easily and completely into the seat belt receptacle.
- Make sure that the seat belt engages and disengages easily.
- 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, tears, holes, or are frayed.
- Make sure that the seat belt and seat belt brackets are mounted securely. If necessary, tighten all hardware.
- 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.



BD07C132I-3 1

INITIAL 100 HOURS

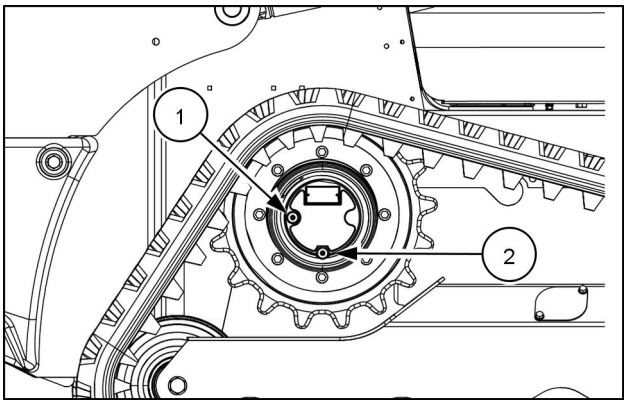
Final drive oil (track models)

Change the final track drive gear oil after the initial **100 h** of operation and then every **500 h** of operation.

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

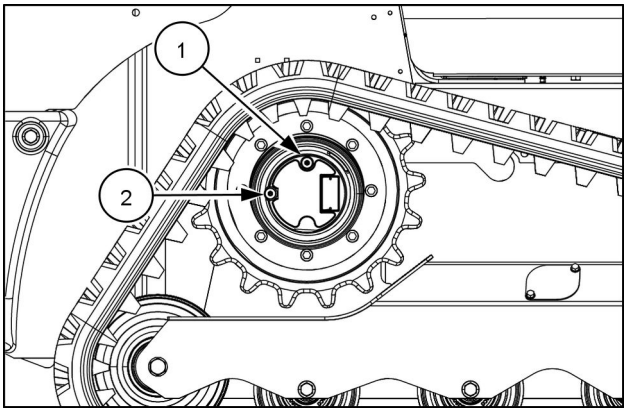
To change oil

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.



RAIL15SSL0358AA 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.

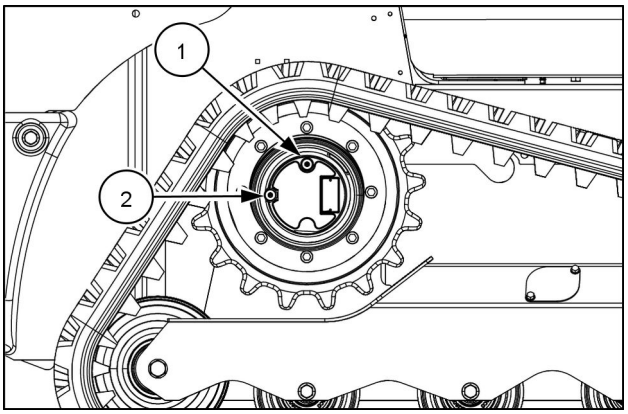


RAIL15SSL0359AA 2

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)**.



RAIL15SSL0359AA 3

EVERY 250 HOURS

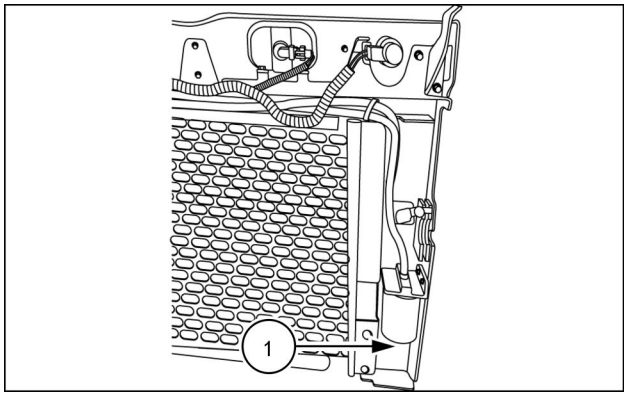
Fuel filter

Check the fuel filter for water every **250 h** of operation.

Poor fuel quality will require you to drain the water separator more frequently than **250 h**.

1. Park the machine on level ground.
2. Turn off the engine.
3. Open the engine hood.
4. Open the rear service door and engage the door latch on the lower right-hand side.
5. Place a clean suitable container underneath the fuel filter.
6. Turn the drain valve **(1)** on the bottom of the fuel filter counter-clockwise 2 or 3 turns and drain the water until only fuel is present. Close the valve.

NOTE: *If excess water is found in the filter, check the fuel tank. Contact your NEW HOLLAND CONSTRUCTION for assistance.*



93106863 1

In-line fuel filter

⚠ CAUTION

Burn hazard!
Wait for all components to cool before performing any operation.
Failure to comply could result in minor or moderate injury.

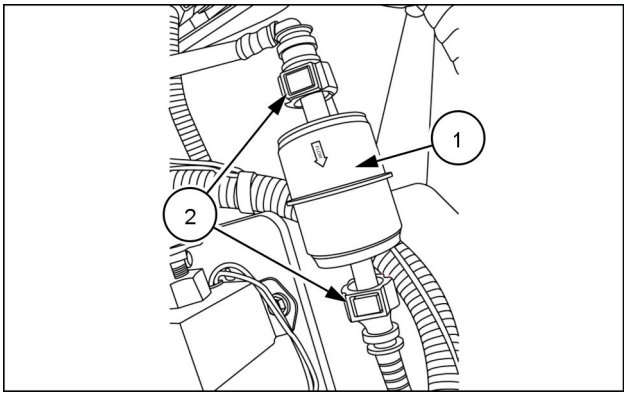
C0053A

Replace the in-line fuel filter every **250 h** of operation.

1. Park the machine on level ground.
2. Turn off the engine.
3. Open the engine hood.
4. Open the rear service door and engage the door latch on the lower right-hand side.
5. Locate the in-line filter on the right-hand side of the machine near the fuel tank cap.
6. Clean the in-line fuel filter and hoses.

In-line filter removal

1. Depending on the type of in-line fuel filter clamps you have perform one of the following procedures:
   - Loosen and slide the clamp **(2)** away from the in-line fuel filter **(1)**. Repeat on the other side of the in-line filter.
   - Squeeze the two tabs on the clamp and slide the clamp away from the in-line fuel filter. Repeat on the other side of the in-line filter.
2. Take note of which way the arrow on the in-line filter is pointing before you remove.
3. Grab the fuel hose with one hand and the in-line filter with the other. Twist and pull away from each other to remove the in-line filter from the hose. Repeat procedure for the other side.



93109371 1

In-line filter install

1. Be sure the arrow on the in-line filter is facing in the same direction as the old filter.
2. Grab the fuel hose with one hand and the in-line filter with the other. Push the fuel hose onto the fuel filter. Repeat procedure for the other side.
3. Depending on the type of in-line fuel filter clamps you have perform one of the following procedures:
   - Slide the clamps **(2)** toward the in-line fuel filter **(1)** and tighten.
   - Squeeze the two tabs on the clamp and slide the clamp towards the in-line fuel filter. Repeat on the other side of the in-line filter.

NOTE: *Do not start the engine until you purge the air from the fuel system.*

4. Press the POWER button or turn the key switch to the RUN position. Wait approximately one minute to allow the fuel pump to purge any air form the fuel system
5. Start the engine.
6. Inspect the area around the in-line fuel filter for leaks.
7. Unlatch and close the rear service door.
8. Close the engine hood.

Wheels and tires

⚠ WARNING

Explosion hazard!
Always maintain correct tire pressure as indicated in this manual. DO NOT inflate tires above the recommended pressure. Excessive pressure could result in tire failure.
Failure to comply could result in death or serious injury.

W0109A

⚠ WARNING

Explosion hazard!
Tires must be replaced by skilled personnel with the proper tools and technical knowledge. Unskilled personnel replacing wheels or tires could result in serious physical injuries, tire damage, and/or wheel distortion. Always have a qualified tire mechanic service wheels and tires.
Failure to comply could result in death or serious injury.

W0171A

The skid steer will be hard to turn and the tires will wear faster if the correct pressure is not maintained. When a worn or damaged tire is replaced, the replacement must be the same size and tread design as the other tires on the machine. Two different sized tires on one side of the machine will cause accelerated tire wear, loss of power, and excessive strain on the drivetrain. Replace worn tires in pairs with the two new tires used on the same side of the loader. If this tilts the loader too much, replace all four tires.

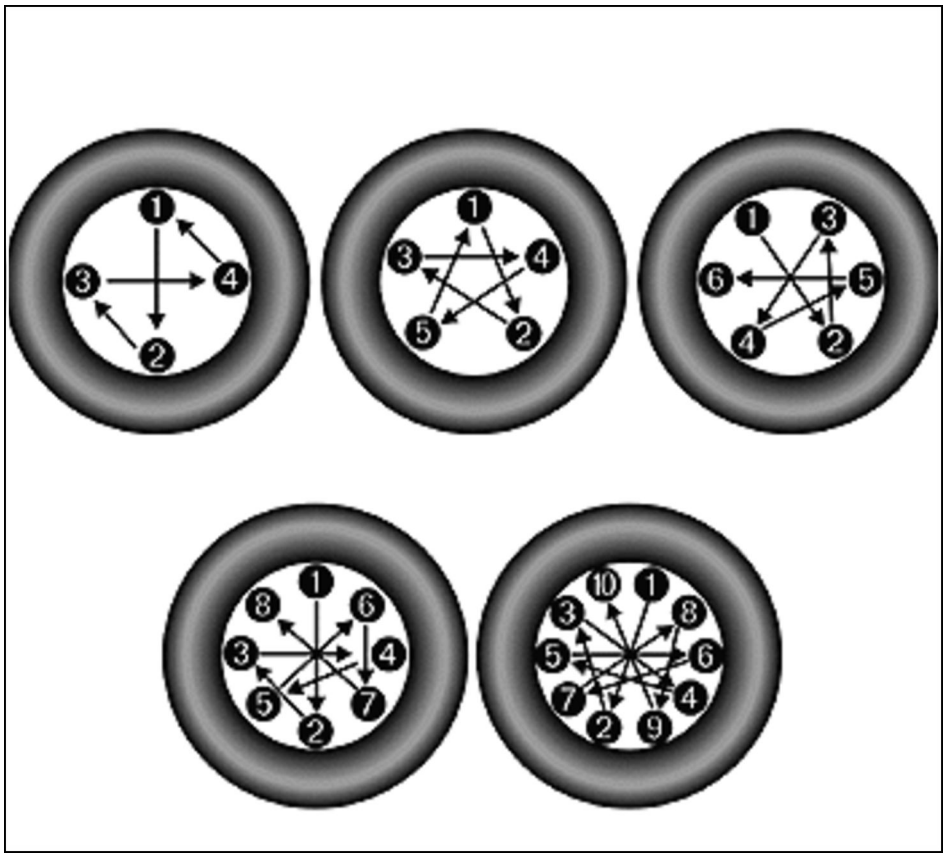
Adding air to the tire

NOTICE: *Tire pressure gauges should be checked at regular intervals for calibration and accuracy.*

1. Check the tire pressure.
2. Before you add air, have the wheel correctly installed on the machine or put the wheel in a restraining device (tire inflation cage).
3. Use an air hose with a remote shutoff valve, self-locking air chuck and wear eye protection.
4. Stand BEHIND the tread of the tire and make sure ALL persons are away from the side of the tire before you start to add air.
5. Inflate the tire to the recommended air pressure. DO NOT inflate the tire more than the recommended maximum pressure given on the tire.

TIRE	SIZE	PRESSURE
Heavy Duty	10 x 16.5	**290 – 345 kPa** (**42 – 50 psi**)
	12 x 16.5	
	14 x 17.5	**359 – 414 kPa** (**52 – 60 psi**)
Premium	27/10.5 x 15	**290 – 345 kPa** (**42 – 50 psi**)
	10 x 16.5	
	12 x 16.5	
	14 x 17.5	**359 – 414 kPa** (**52 – 60 psi**)
Premium with liner	10 x 16.5	**290 – 345 kPa** (**42 – 50 psi**)
	12 x 16.5	
Severe Duty	10 x 16.5	**290 – 345 kPa** (**42 – 50 psi**)
	12 x 16.5	
	14 x 17.5	**531 – 586 kPa** (**77 – 85 psi**)
Flotation	31.5 x 13 x 16.5	**179 – 241 kPa** (**26 – 35 psi**)
	33 x 15.5 x 16.5	**290 – 345 kPa** (**42 – 50 psi**)
Mining	12 x 16.5	**290 – 345 kPa** (**42 – 50 psi**)
Non-Pneumatic	12 x 16.5	not required
	14 x 17.5	

Wheel torque



63109344 1

1. Check that the wheel nuts have the proper torque setting.

Wheel taper nut torque	**169.5 N·m** (**125 lb ft**)
Flange nut	**203.5 N·m** (**150 lb ft**)

2. If necessary, tighten the nuts in a cross-pattern sequence as shown.

Drive chain tension check

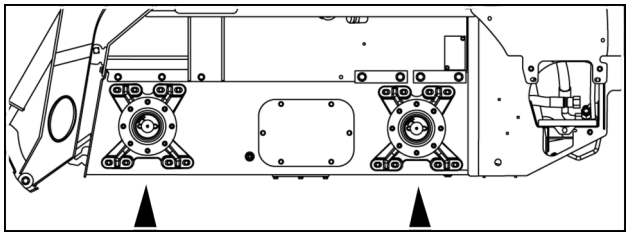
⚠ WARNING

Jack stands can slip or fall over. Dropping, tipping, or slipping of machine or its components is possible.
DO NOT work under a vehicle supported by jack stands only. Park machine on a level surface. Block wheels. Support machine with safety stands.
Failure to comply could result in death or serious injury.

W0069A

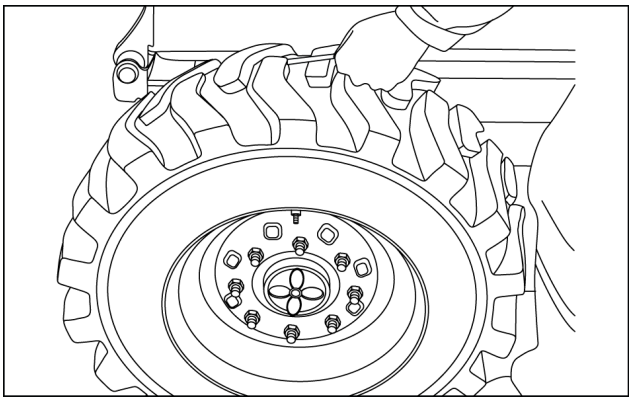
Check the tension of the four drive chains every **250 h** s of operation.

1. With suitable equipment properly support the machine securely off the ground at the points shown (only one side shown, total four locations).



931002280 1

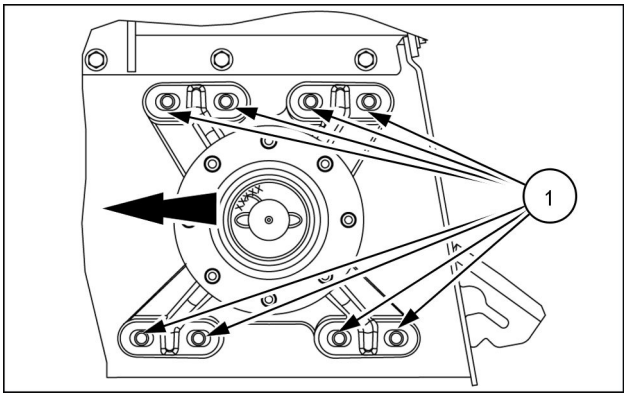
2. With the machine off the ground, rotate each tire and check for allowable movement. **6 – 12 mm** (**0.2 – 0.5 in**) is the acceptable range.



63107489 2

Drive chain adjustment

1. Adjust each axle drive chain by loosening the retaining nuts **(1)** (left front shown) and sliding the axle-hub assembly to remove the excessive slack.
2. To tighten the chains, slide the front axle-hubs forward and rear axle-hubs rearward.
3. Torque the axle retaining hardware to **244 N·m** (**180 lb ft**).



93109317 3

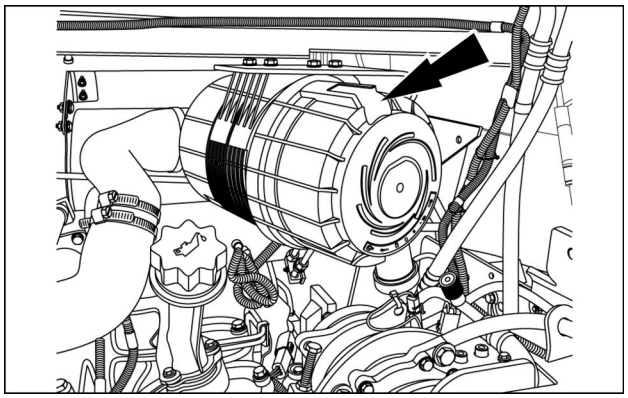
EVERY 500 HOURS

Air cleaner elements

Both air cleaner elements should be changed at 500 hours of operation or if the air restriction indicator is illuminated.

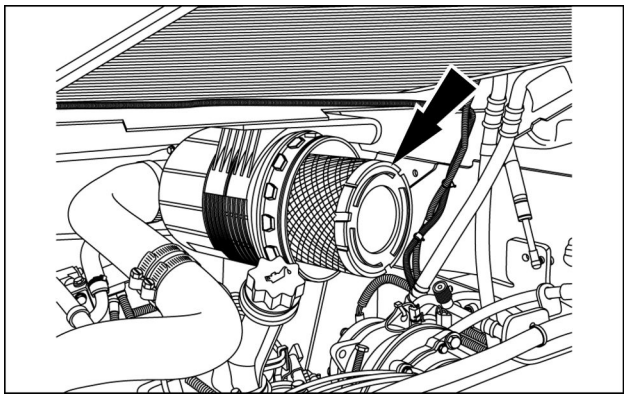
Air cleaner filter removal

1. Open the engine hood and rear service door. Engage the rear service door latch located near the lower hinge.
2. Pull the yellow tab out, rotate the cover counterclockwise until the cap turns to open. See instructions symbols and decal on the cover. Pull the cap off and clean the inside.



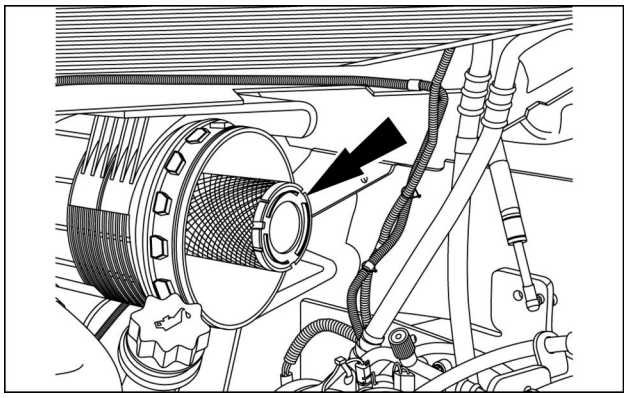
93107494 1

3. Remove the primary filter.



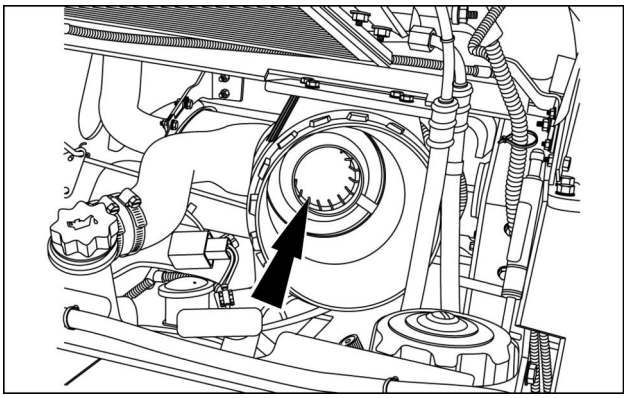
93107495 2

4. Remove the secondary filter.



93107496 3

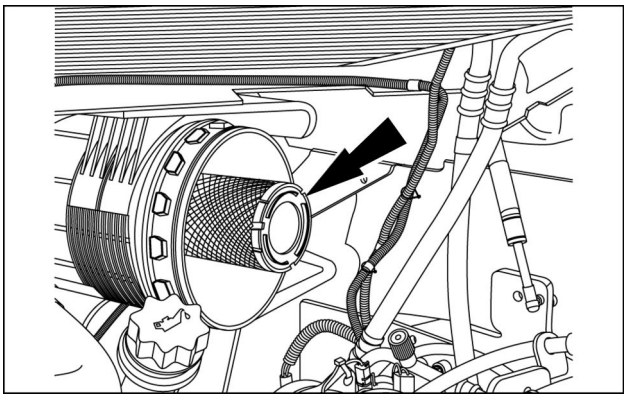
5. When both of the air cleaner filters have been removed, be sure to clean out the box, without allowing any debris to fall into the intake track.



93107497 4

Air cleaner filter installation

1. Install the secondary filter.

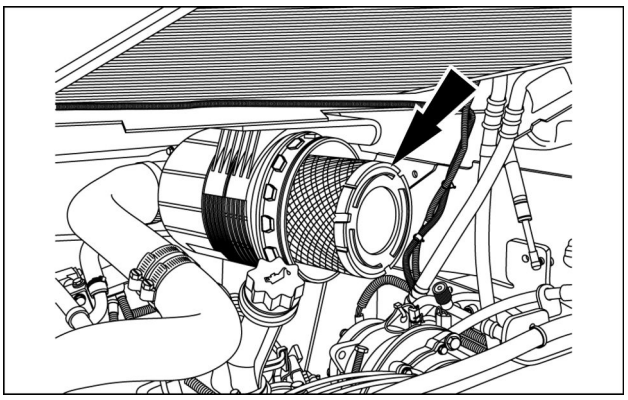


93107496 5

2. Install the primary filter.

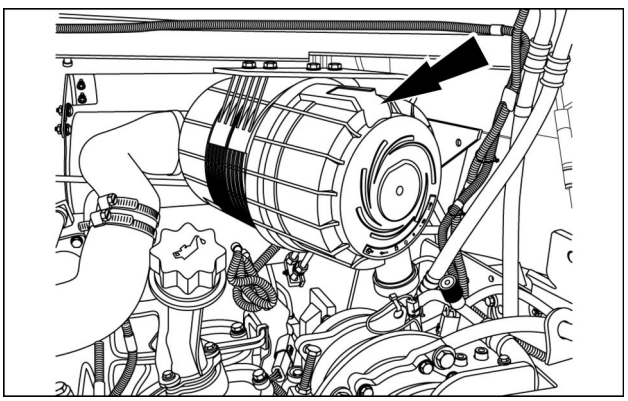
NOTE: *Make sure the filters are seated properly into the filter housing.*

NOTICE: *The inner end of the canister must be free of dirt and debris to insure the filters will seal properly. Failure of a good seal between the filter and canister may cause major engine damage.*



93107495 6

3. Install the cover by rotating clockwise until tight and push the yellow tab in to lock the cover in place.



93107494 7

Engine oil and filter

⚠ DANGER

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 will result in death or serious injury.

D0076A

⚠ CAUTION

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

C0107B

⚠ CAUTION

Chemical hazard!
Avoid getting engine oil on your skin. In case of skin contact, wash with running water.
Failure to comply could result in minor or moderate injury.

C0202B

Change the engine oil and filter after the initial **50 h** of operation on a new machine or a rebuilt engine. Change engine oil and filter at **500 h** intervals after the initial service.

Engine oil specification: **NEW HOLLAND AMBRA UNITEK MASTERGOLD SBL CJ-4 SAE 10W-40** see the “Engine oils” **7-11** for more details.

For models L223, L225, L230, C227, C232, and C238 use quick disconnect drain fitting 48103849 and quick-disconnect hose assembly 48109944 .

For models L213, L215, L218, and L220 use quick disconnect drain fitting 48103847 and quick-disconnect hose assembly 48109944.

NOTE: *For a more complete removal of foreign material, change the engine oil when the engine is still warm, but not hot from operation.*

1. Place the machine on firm, level ground.

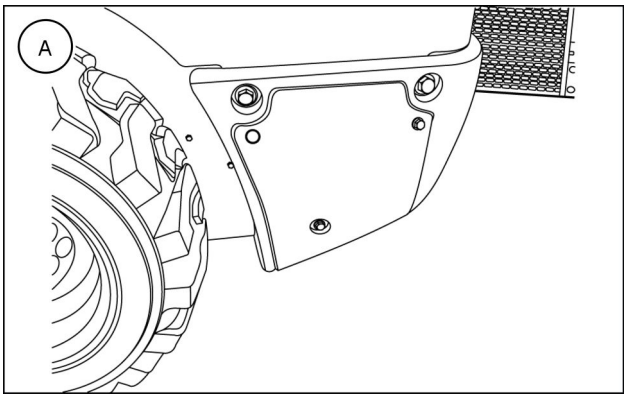
2. Remove the access cover from the rear lower left-hand side of the machine.

NOTE: *Both style access panels shown.*

3. Locate the engine oil remote filter.

4. If applicable, use compressed air to clean the engine oil filter assembly.

NOTICE: *If compressed air is not available, use a clean rag or cloth to wipe the area clean. This reduces the potential of dirt contamination into the engine.*



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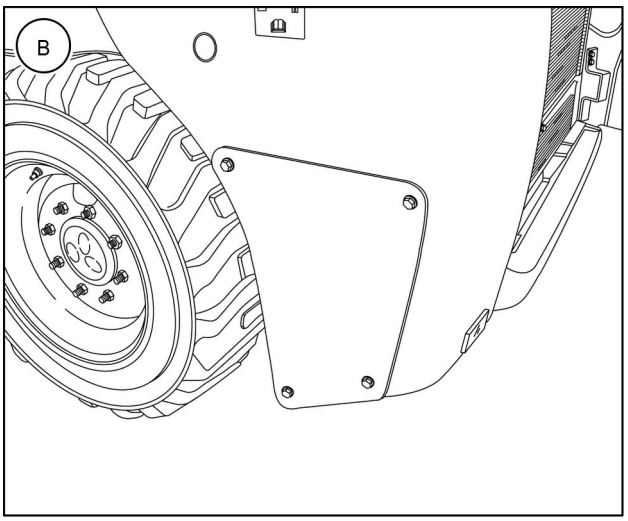
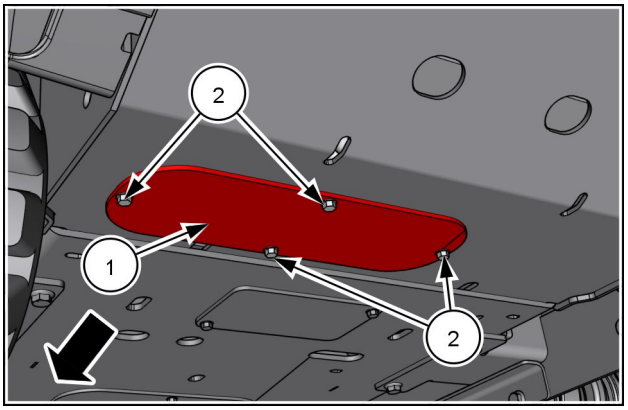


RAIL13SSL0582BA 2

5. Remove the mounting hardware **(2)** and cover **(1)** from underneath the machine.



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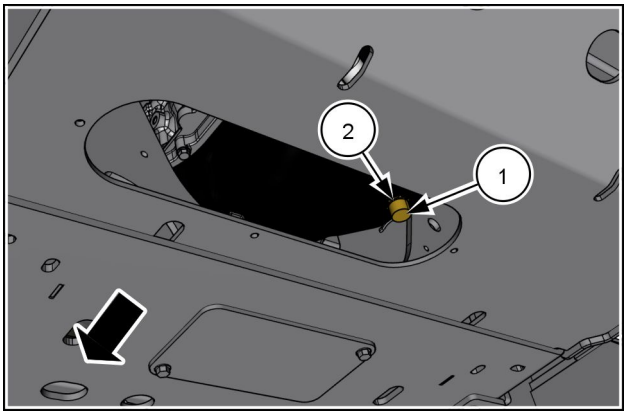
6. Remove the cap **(1)** from the quick disconnect drain fitting **(2)**.



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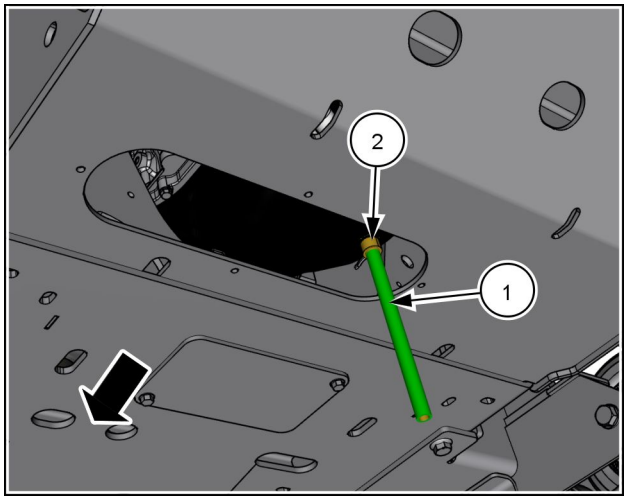
7. Place a drain receptacle under the machine.

NOTE: *After the quick-disconnect hose installation, oil will automatically begin to flow out of the hose.*

8. Thread the quick-disconnect hose assembly **(1)** onto the quick-disconnect drain fitting **(2)**.
9. Allow the oil to drain completely from the crankcase.
10. Remove the receptacle, with the used oil, from under the machine.
11. Dispose of the oil in accordance with the local regulations.
12. Turn the old engine oil filter counter-clockwise to remove.
13. Dispose of the filter in accordance with the local regulations.
14. Use a clean cloth and wipe sealing surface of the old filter base to remove all dirt.
15. Apply a thin layer of clean grease or oil to the gasket of the new filter.
16. Turn the new oil filter clockwise onto the base until the gasket makes contact with the base. Continue to tighten the filter with your hand for 3/4 to one full turn as directed on the filter label.

NOTICE: *DO NOT use a filter strap wrench to install the oil filter. An oil filter strap wrench can cause a leak if the filter is dented or overstressed.*

17. Remove the quick-disconnect hose assembly **(1)** from the quick-disconnect drain fitting **(2)**.



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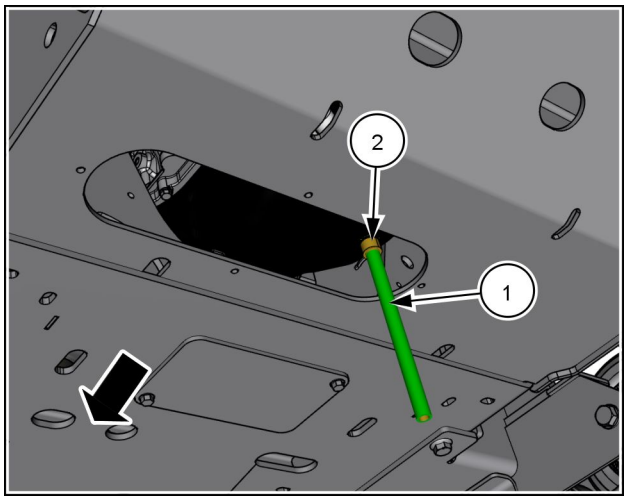

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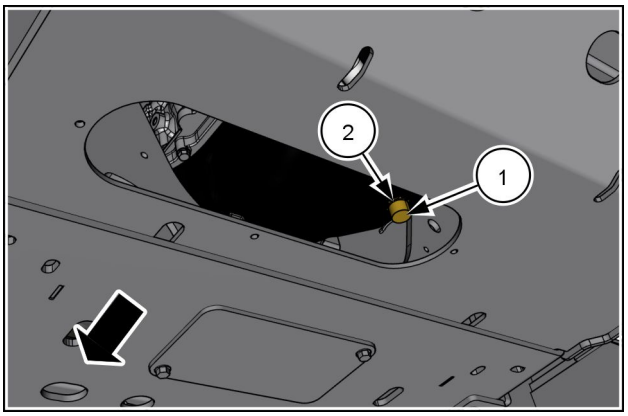
18. Install the cap **(1)** onto the quick-disconnect drain fitting **(2)**.

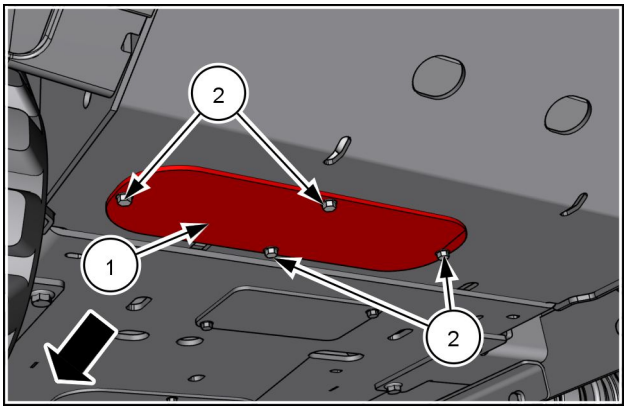
NOTE: *Make sure the o-ring is installed on the drain fitting **(2)**, if it is damaged, then replace with new.*

NOTE: *The cap **(1)** is only hand tight on the drain fitting **(2)**.*



RAPH17SSL0169QA 7

19. Install the cover **(1)** underneath the machine and secure with the hardware **(2)**.



RAPH17SSL0168QA 8

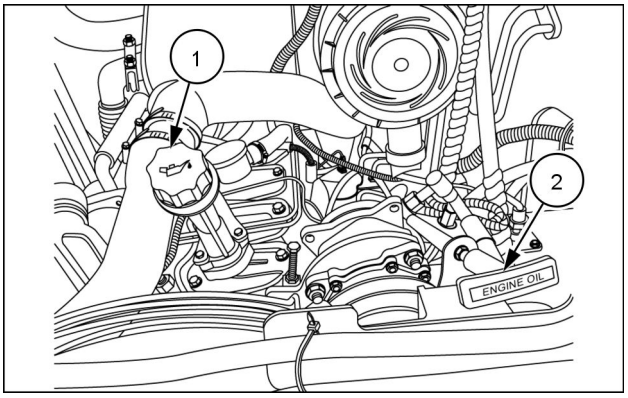
20. Remove the engine oil dipstick **(2)** to provide crankcase ventilation.

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

21. Use an oil spout that is smaller than the engine oil fill neck **(1)**, 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.*

22. Install the engine oil fill cap.
23. Install the engine oil dipstick.
24. 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.
25. Install access cover and secure with bolts
26. Close rear access door and engine hood.



93106871 9

Engine crank case oil

Capacity - with filter change	
L213, L215, L218, L220	**7.0 l** (**7.5 US qt**)
L223, L225, L230, C227, C232, C238	**9.5 l** (**10 US qt**)
Specifications	**NEW HOLLAND AMBRA UNITEK MASTERGOLD SBL CJ-4**

Final drive chain tank oil

The final drive chain tank oil should be checked every **500 h** of operation.

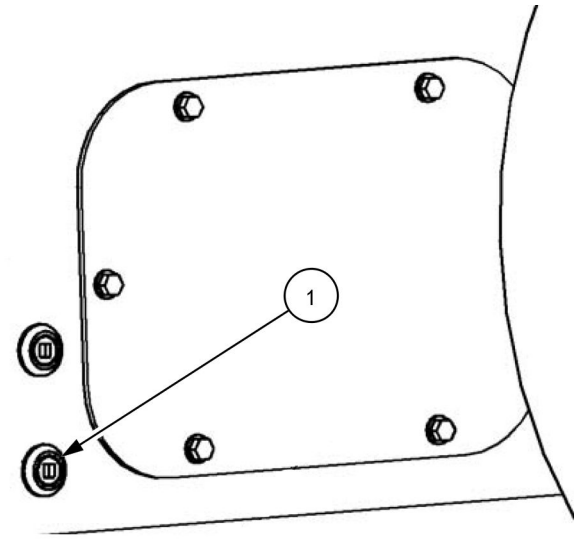
Final drive chain tank oil specifications: **TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30**

L218 and L220 models only

1. Park the machine on a firm level surface.
2. Clean the area around the chain tank fill/level plug **(1)**.
3. Remove the chain tank fill/level plug **(1)**. The oil should be up to the bottom of the inspection orifice.
4. Add oil if necessary.
5. Replace the chain tank fill/level plug **(1)**.

NOTE: *Use **LOCTITE® 545™** or an equivalent product on the threads of the plug.*

6. Repeat this procedure for the other side.



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Capacity - each side	
L218, L220	**7.4 l** (**7.9 US qt**)

L213, L215, L223, L225, and L230 models only

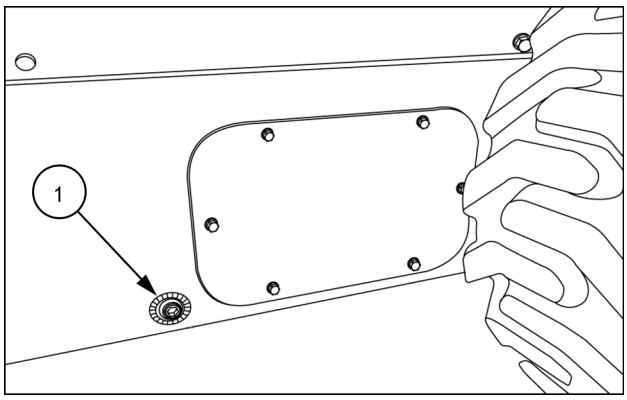
1. Park the machine on firm level surface.

NOTE: *For Models L213 and L215 only: Raise the machine enough to remove the wheels and block the machine with support blocks to secure the machine in a level position. Remove the front right wheel and the rear left wheel from the machine to access the chain tank fill/level plug **(1)**.*

2. Clean the area around the chain tank fill/level plug **(1)**.
3. Remove the chain tank fill/level plug **(1)**. The oil should be up to the bottom of the inspection orifice.
4. Add oil if necessary.
5. Replace the chain tank fill/level plug **(1)**.

NOTE: *Use **LOCTITE® 545™** or an equivalent product on the threads of the plug.*

6. Repeat this procedure for the other side.



RCPH11SSL006AAD 2

Capacity - each side	
L213, L215	**6.25 l** (**6.6 US qt**)
L223, L225, L230	**22.2 l** (**23.5 US qt**)

Primary fuel filter

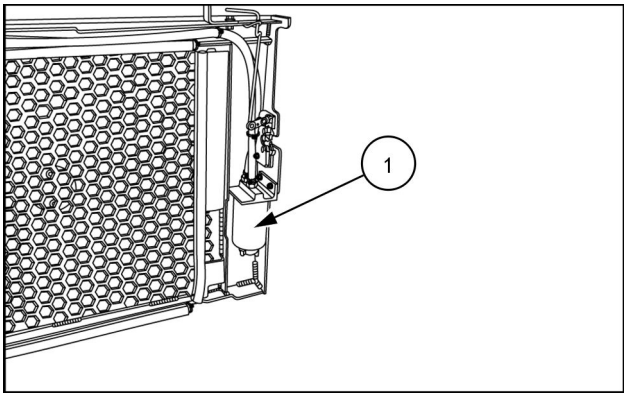
Replace the primary fuel filter every **500 h** of operation.

1. Place the machine on firm, level surface.
2. Turn off the engine.
3. Open the engine hood.
4. Open the rear service door and engage the rear service door latch located near the lower hinge.
5. Clean the area around the primary fuel filter with water separator **(1)** before proceeding.
6. Place a clean suitable container underneath the fuel pre-filter.
7. Use a strap wrench and remove the filter.
8. Remove the rubber seal from the stud on the filter head.
9. Use a cloth and clean the gasket surfaces of the filter body.
10. Apply clean engine oil to the new rubber seal.
11. Install the rubber seal on the filter head stud.
12. Apply clean engine oil to the gasket of the new filter. DO NOT fill the new filter with fuel before installation.
13. Turn the filter onto the filter body until the filter gasket makes contact with the filter body. Continue to tighten the filter with your hand for 1/2 to 3/4 turn.

NOTICE: *Do not use a strap wrench to tighten the filter.*

NOTICE: *Do not start the engine until you purge the air from the fuel system.*

14. Press the POWER button or turn the key switch to the RUN position. Wait approximately one minute to allow the fuel pump to purge air from the fuel system.
15. Start the engine and check for fuel leaks around the fuel filter.
16. Unlatch and close the rear service door.
17. Close the engine hood



93107493 1

Hydraulic oil filter

⚠ 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

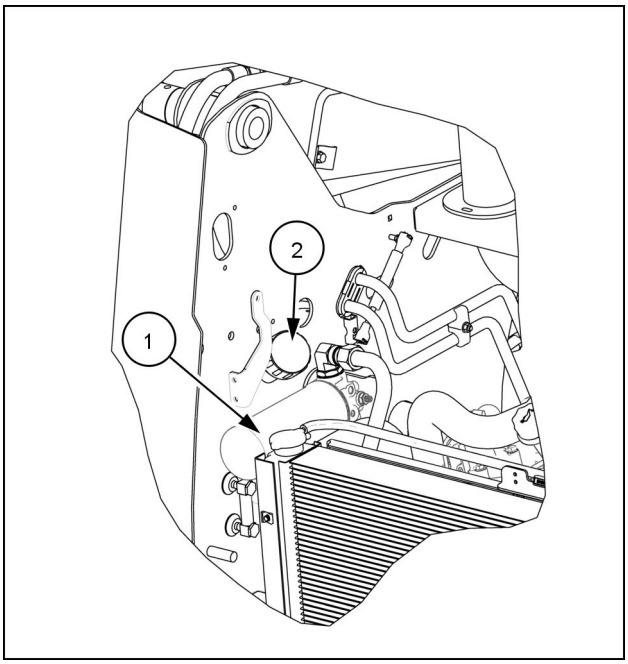
Replace the hydraulic oil filter every **500 h** of operation or if the warning lamp illuminates.

NOTICE: *Replace the hydraulic oil filter after the first **20 h** of operation or if a major hydraulic component has been replaced.*

1. Remove any attachments and place the machine on firm level ground.
2. Open the engine hood.
3. Open the rear service door and engage the rear service door latch located near the lower hinge.
4. Locate the Hydraulic oil filter **(1)** to the left of the radiator. See the top figure for radial machines and the bottom figure for vertical machines.
5. Make sure that the funnel and drain hose are secure.
6. Direct the drain hose into a suitable container.
7. Slowly loosen the hydraulic fill cap **(2)** to relieve pressure in the system. Leave the cap on, but loose.
8. Clean the area around the hydraulic filter.
9. Turn the hydraulic oil filter counter - clockwise and remove. Dispose of the filter properly.
10. Apply a thin layer of clean oil on the O-ring of the new filter.
11. Install the filter. Hand tighten the filter 1/2 to 3/4 turn after the filter O-ring touches the filter head.

NOTICE: *DO NOT use a filter strap wrench to tighten the filter. Hand tighten only.*

12. Start the engine and check for oil leaks around the hydraulic filter.
13. Check the fluid level. The oil level should be within the middle one third of the sight glass. Add oil as required.
14. Unlatch and close the rear service door.



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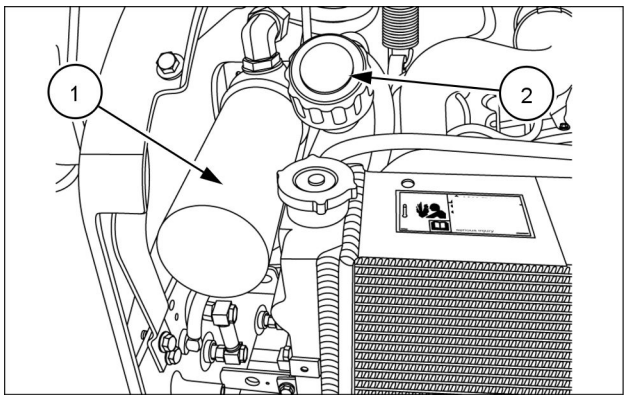


93107490 2

15. Close the engine hood.

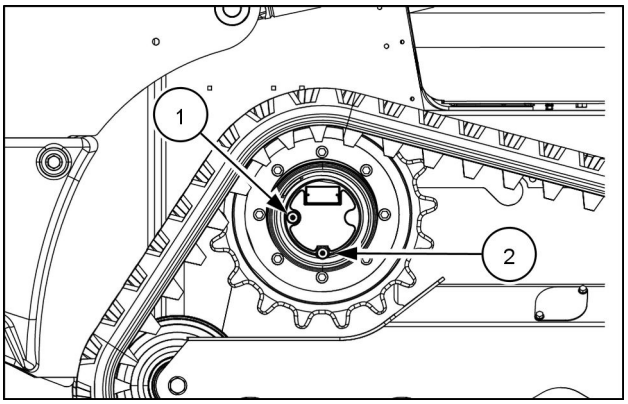
Final drive oil (track models)

Change the final track drive gear oil after the initial **100 h** of operation and then every **500 h** of operation.

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

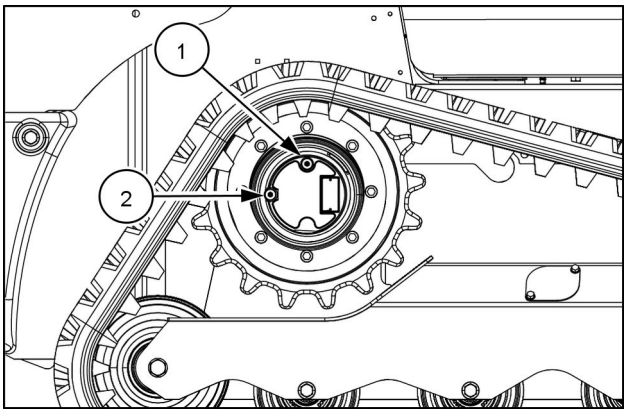
To change oil

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.



RAIL15SSL0358AA 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.

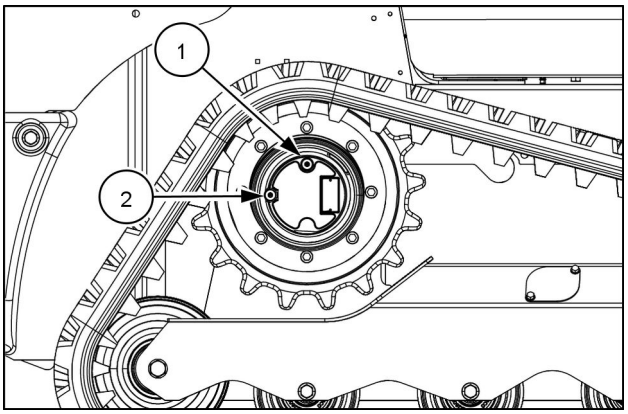


RAIL15SSL0359AA 2

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)**.



RAIL15SSL0359AA 3

Roll Over Protective Structure (ROPS) mechanism and hardware check

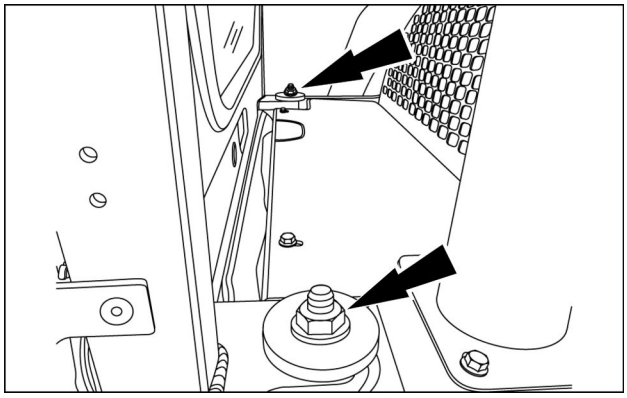
⚠ WARNING

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

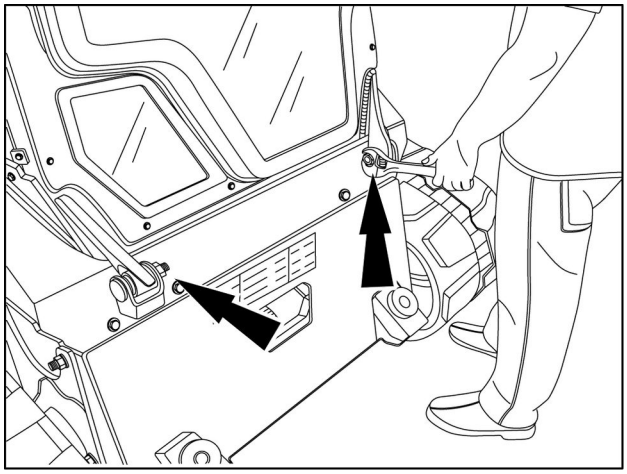
Check the ROPS cab to lower mainframe hardware for proper torque.

1. Check the ROPS hardware at the back of the machine that are used to secure the cab. Torque the hardware to **170 N·m** (**125.4 lb ft**).



931001633 1

2. Check the ROPS front pivot bolts. Torque these bolts to **42 N·m** (**31.0 lb ft**).

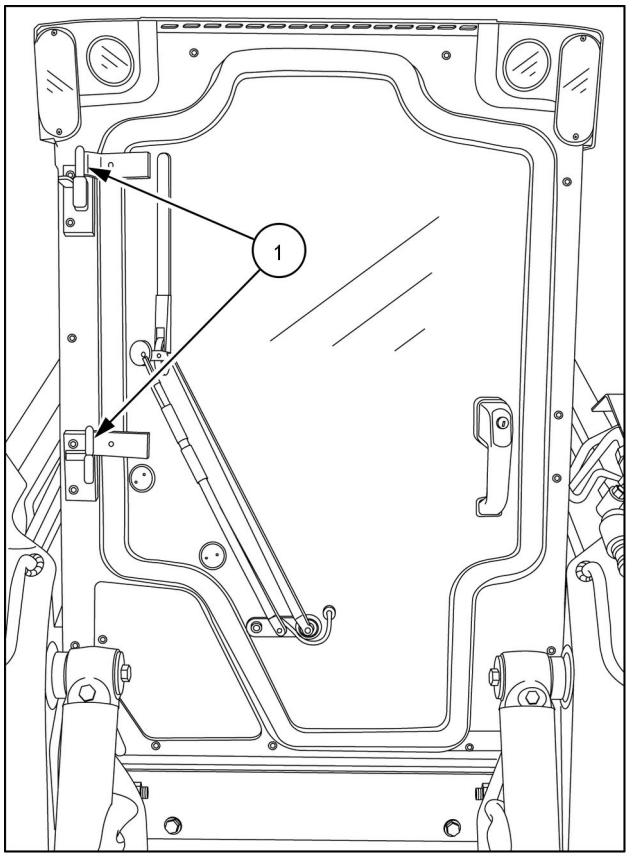


RAIL14SSL0469BA 2

Cab door - Grease

Grease both door hinges every **500 h** with **TUTELA MOLY GREASE GR-75**.

1. Clean the grease fittings **(1)** before greasing.
2. Open and close the door to work in the grease.



RAIL13SSL0706BA 1

EVERY 1000 HOURS

Hydraulic fluid and filter

⚠ 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

⚠ 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

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

⚠ WARNING

Chemical hazard!
When handling fuel, lubricants, and other service chemicals, follow the manufacturer's instructions. Wear Personal Protective Equipment (PPE) as instructed. Do not smoke or use open flame. Collect fluids in proper containers. Obey all local and environmental regulations when disposing of chemicals.
Failure to comply could result in death or serious injury.

W0371A

Every **1000 h** of operation or if a major hydraulic component has been replaced, rebuilt, or damaged, the hydraulic oil and filter should be changed.

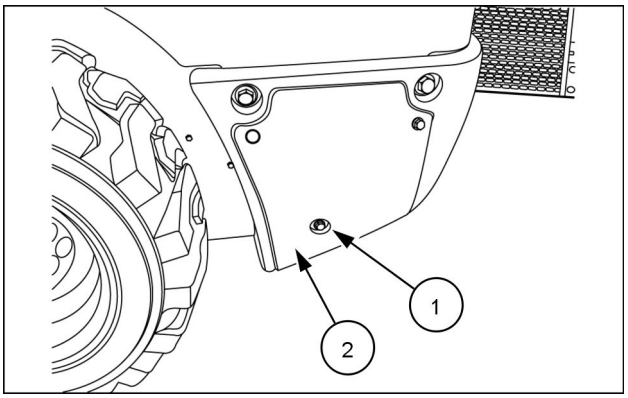
Hydraulic oil specification – **TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30** or see the hydraulic oil viscosity chart at the end of this procedure.

1. Park the machine on a firm level surface.
2. Lower the loader lift arms to the ground and shut off the engine.

NOTICE: *See **7-61** to replace the hydraulic oil filter.*

NOTE: *The drain plug for the hydraulic tank is in the battery compartment. The battery must be removed before draining the hydraulic oil.*

1. Remove the battery cover hardware **(1)** and the battery cover **(2)**.



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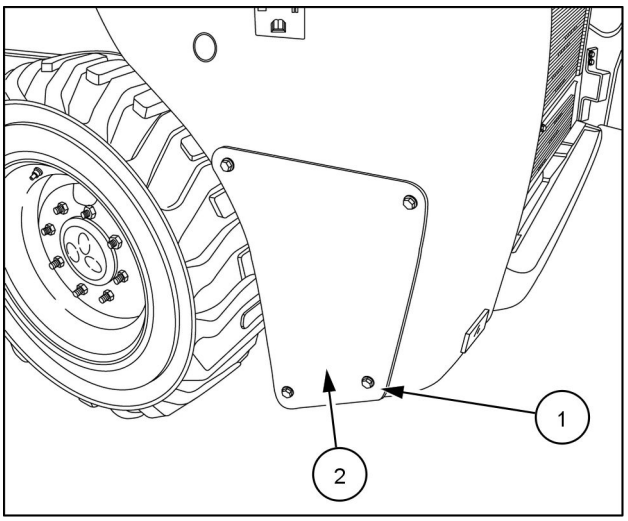
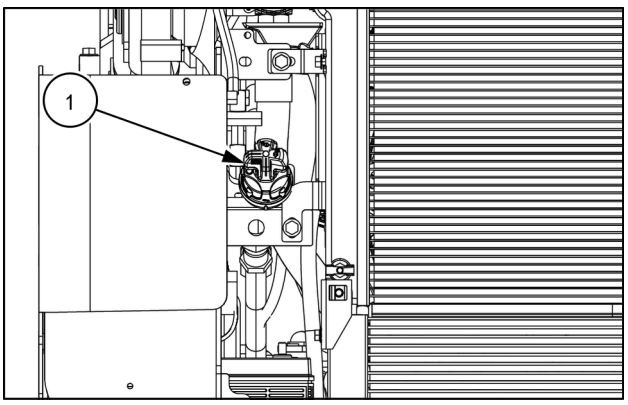


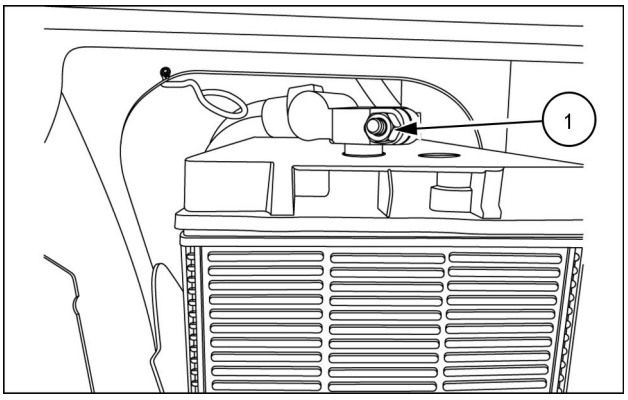
RAIL13SSL0582BA 2

2. Turn the Battery Disconnect Switch **(1)**, if equipped, to the OFF position.



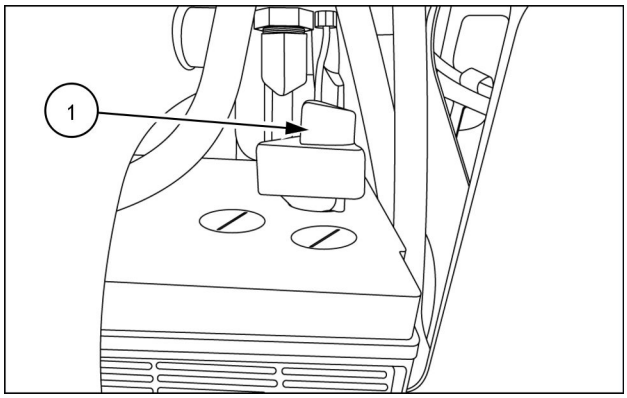
RAIL17SSL0040BA 3

3. Disconnect the negative cable connection **(1)**.



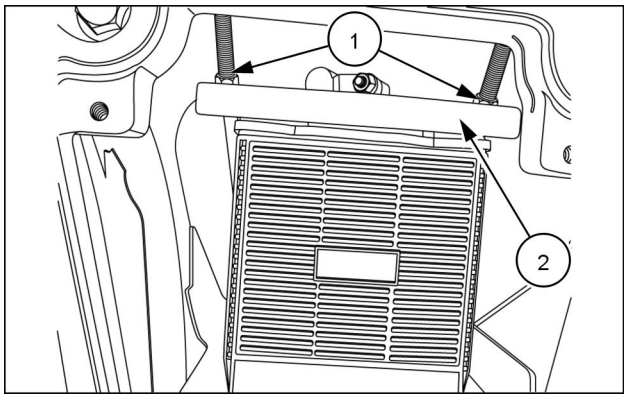
931001641 4

4. Disconnect the positive cable connection **(1)**.



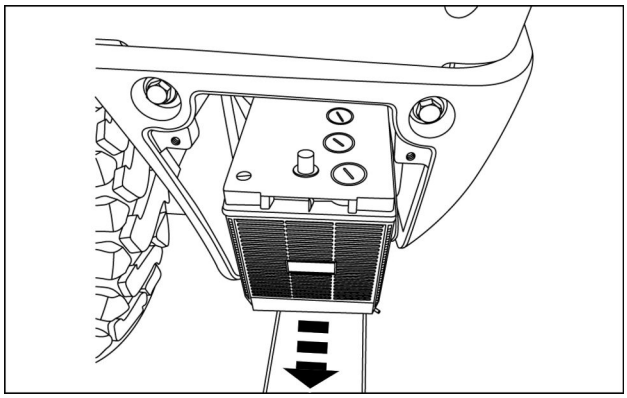
931002054 5

5. Loosen the nuts **(1)** and remove the battery hold-down **(2)**.

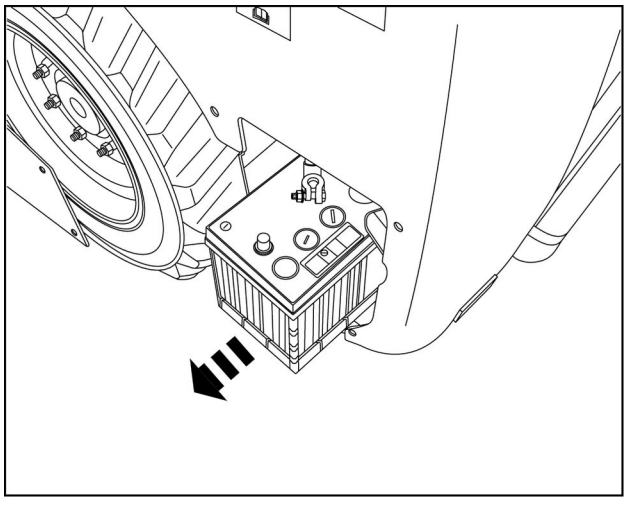


931001639 6

6. Remove the battery **(1)** in direction of the arrow.



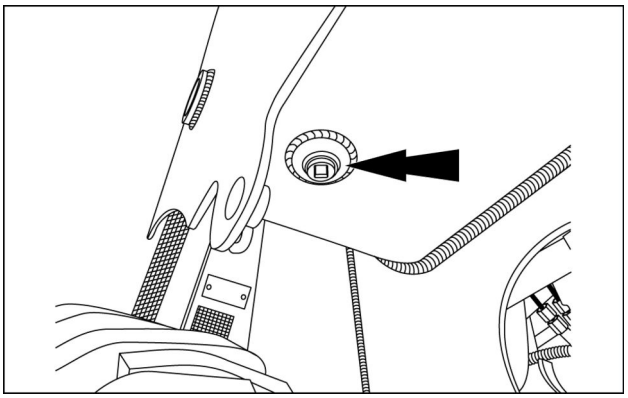
931001642 7



RAIL13SSL0581BA 8

NOTE: *The drain plug for the hydraulic tank is located inside of the battery compartment.*

1. Remove the filler cap on the battery compartment.
2. Place a container under the battery compartment.
3. Slowly remove the drain plug.



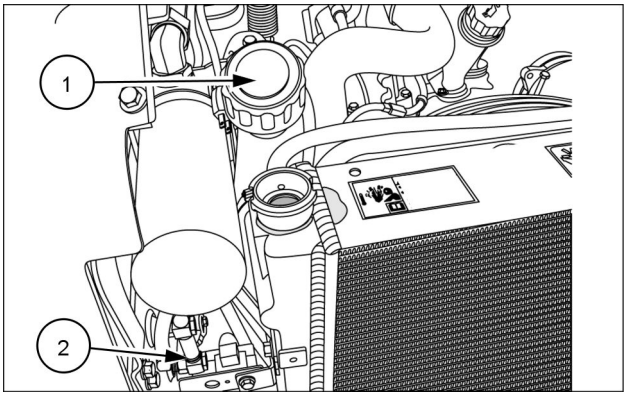
931001657 9

NOTE: *The loader arms should be all the way down before filling the hydraulic tank.*

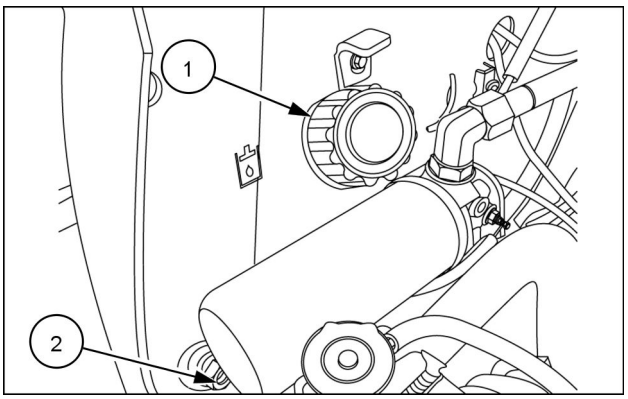
1. Clean the reservoir filler cap **(1)** and the area around the filler cap with cleaning solvent.
2. Turn the filler cap 1/2 turn to relieve air pressure from the reservoir. Do not remove the filler cap from the reservoir until the pressure is relieved.
3. Remove the filler cap from the reservoir.
4. Add the correct oil to the reservoir until the proper oil level in the reservoir is established. Fill the reservoir until the oil level is at the midpoint of the sight gauge **(2)**.

NOTE: *See the hydraulic oil chart on the following page.*

5. Install the reservoir cap.
6. Start and run the engine and operate the hydraulics. Lower the loader lift arms to the ground.
7. Stop the engine and check the oil level in the reservoir. Add oil as required.

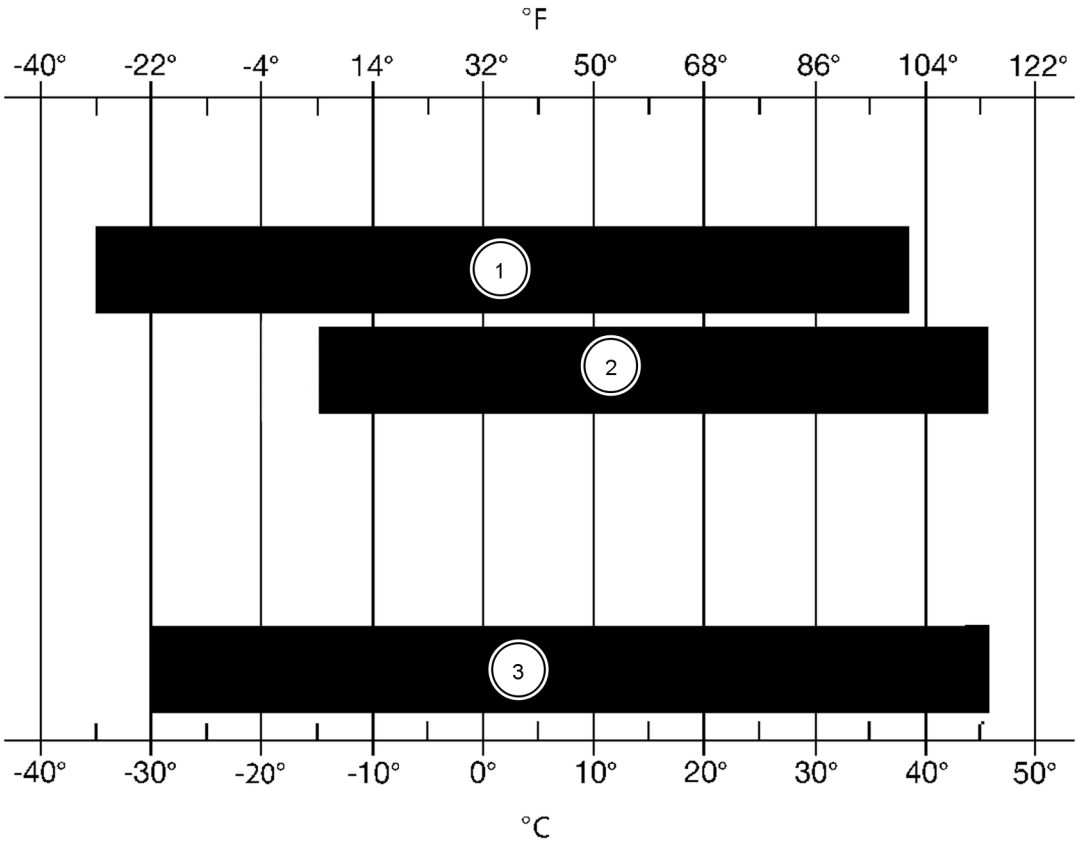


93107491 10



93106865 11

Hydraulic oil



RAPH12SSL0110FA 12

Block	Viscosity	Temperature range
(1)	NEW HOLLAND AMBRA HYDROSYSTEM 46 HV	-35 – 38 °C (-31 – 100 °F)
(2)	TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30	-15 – 46 °C (5 – 115 °F)
(3)	NEW HOLLAND AMBRA UNITEK MASTERGOLD SSL CJ-4 SAE 0W-40	-30 – 46 °C (-22 – 115 °F)

NOTE: *NEW HOLLAND CONSTRUCTION recommends* ***TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30*** *for applications where continuous operations above* ***38 °C (100 °F)*** *ambient temperature or frequent roading applications (above 20 to 30 minutes) are common.*

NOTE: *NEW HOLLAND CONSTRUCTION recommends* ***NEW HOLLAND AMBRA HYDROSYSTEM 46 HV*** *for improved cold weather operation. Standard factory fill oil* ***TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30*** *is acceptable for cold weather operation when sufficient warm up time is provided.*

Final drive chain tank oil

Change the oil in the chain tanks every **1000 h** of operation.

Final drive chain tank oil specification: **TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30**

L218 and L220 models only

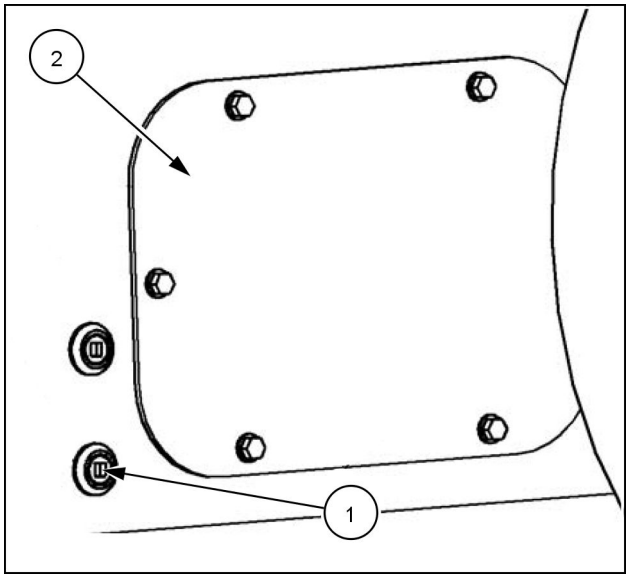
1. Park the machine on firm level surface.
2. Clean the area around the chain tank drain plugs (not shown), located on the bottom of the drive chain tank, near the rear of the drive chain tank, one on each side.
3. Clean the area around the chain tank fill/level plug **(1)**.
4. Place a suitable container under the chain tank drain plug and slowly remove the drain plug.

NOTE: *Use a jack and raise the front of the machine slightly for better draining.*

5. Remove the chain tank fill/level plug **(1)**.
6. After the oil has been completely drained, replace the chain tank drain plug.
7. Fill the tank with new oil and replace the chain tank fill/level plug **(1)**.

NOTE: *Use **LOCTITE® 545™** or an equivalent product on the thread of the plugs.*

8. Repeat this procedure for the other side.



RAPH12SSL0298BA 1

NOTE: *The chain tank may be cleaned with a solvent based cleaner by removing the inspection cover **(2)** on each side, after the oil has been removed. Allow the tank to dry thoroughly before filling with oil.*

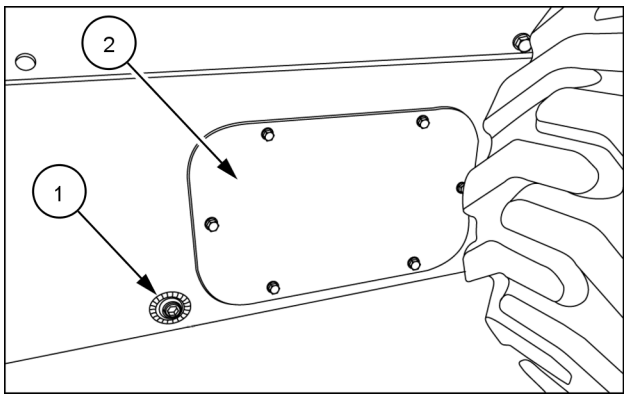
Capacity - each side	
L218, L220	**7.4 l** (**7.9 US qt**)

L213, L215, L223, L225, and L230 models only

1. Park the machine on firm level surface.

NOTE: *For Models L213 and L215 only: Raise the machine enough to remove the wheels and block the machine with support blocks to secure the machine in a level position. Remove the front right wheel and the rear left wheel from the machine to access the chain tank fill/level plug* ***(1)****.*

2. Clean the area around the chain tank drain plugs (not shown), located on the bottom of the drive chain tank, near the rear of the drive chain tank, one on each side.
3. Clean the area around the chain tank fill/level plug **(1)**.
4. Place a suitable container under the chain tank and slowly remove the tank drain plug.



RCPH11SSL006AAD 2

NOTE: *Use* ***LOCTITE® 545™*** *or an equivalent product on the thread of the plugs.*

5. Remove the chain tank fill/level plug **(1)**.
6. After the oil has been completely drained, replace the chain tank drain plug.
7. Fill the tank with new oil and replace the chain tank fill/level plug **(1)**.
8. Repeat this procedure for the other side.

NOTE: *The chain tank may be cleaned with a solvent based cleaner by removing the inspection cover* ***(2)*** *on each side, after the oil has been removed. Allow the tank to dry thoroughly before filling with oil.*

Capacity - each side	
L213, L215	**6.25 l** (**6.6 US qt**)
L223, L225, L230	**22.2 l** (**23.5 US qt**)

Engine valve clearance

Check the engine valve clearance every **1000 h** of operation.

Contact your authorized dealer for assistance or see the engine service manual for the engine valve clearance check procedure.

EVERY 2000 HOURS

Radiator drain and flush

⚠ 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 liquid under pressure!
Never remove the filler cap or the recovery tank cap while the engine is running or the coolant is hot. Let the system cool. Turn the filler cap to the first notch and allow any pressure to escape, and then remove the filler cap. Loosen the recovery tank cap slowly to allow any pressure to escape.
Failure to comply could result in death or serious injury.

W0296A

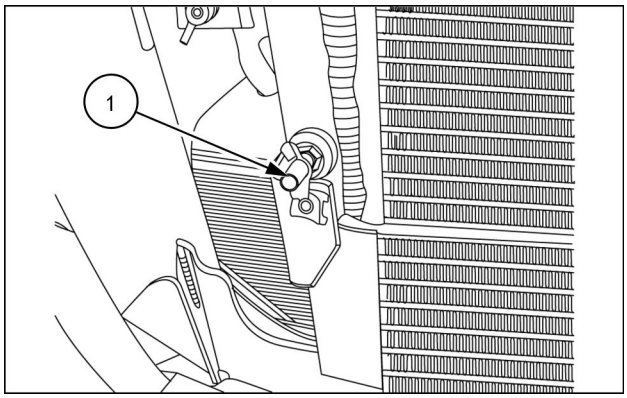
NOTICE: *Clean the system and replace the coolant if the coolant becomes dirty or has the color of rust.*

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

Drain and flush the cooling system every **1000 h** of operation or every year.

Coolant fluid specifications: **NEW HOLLAND AMBRA ACTIFULL™ OT EXTENDED LIFE COOLANT**.

1. Remove the radiator cap.
2. Attach a hose to the radiator drain valve and run to a suitable container that will hold at minimum of **18 l** (**19.0 US qt**).
3. Open the radiator drain valve and drain fluid into the suitable container.



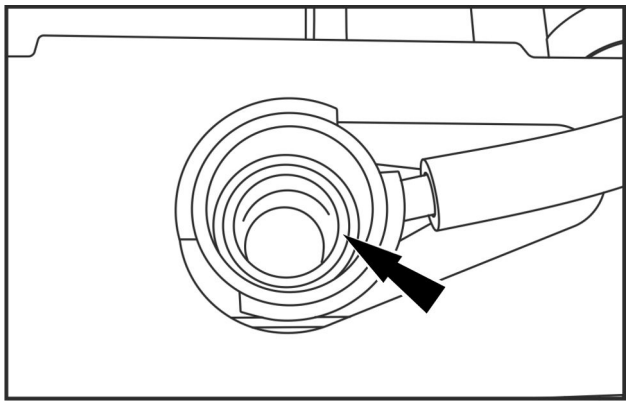
93106867 1

4. After the coolant fluid drains, do not remove the drain hose but close the radiator drain valve.
5. Fill the system with clean water.
6. Start the engine and run the engine for at least **30 min**.

NOTE: *Make sure that you activate the heating system (if equipped) to circulate fluid through the heater core.*

7. Repeat Steps **3** – **6** for a total of two washes.

8. Fill the cooling system with **NEW HOLLAND AMBRA ACTIFULL™ OT EXTENDED LIFE COOLANT** until the coolant level is just to the overflow tube.
9. Install the radiator cap.
10. Fill the coolant reservoir up to the COLD mark.
11. Start the engine and increase the temperature of the engine coolant. Once the coolant is at operating temperature, stop the engine and allow to cool.
12. Check the coolant level at the reservoir only. DO NOT remove the radiator cap. Add coolant to the reservoir, if necessary.
13. Check the hoses, elbows and system for leaks.



BT04H069-01 2

Capacity	
L213	**15 l** (**4.0 US gal**)
L215, L218, L220	**15.6 l** (**4.2 US gal**)
L223, L225, L230, C232, C238	**19 l** (**5 US gal**)
C227	**17 l** (**4.5 US gal**)
Specifications	**NEW HOLLAND AMBRA ACTIFULL™ OT EXTENDED LIFE COOLANT**

NOTICE: *DO NOT mix ethylene glycol coolant with* ***NEW HOLLAND AMBRA ACTIFULL™ OT EXTENDED LIFE COOLANT****. See* ***7-14*** *for more information.*

AS REQUIRED

Hardware - loose or damaged

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

Window removal and cleaning

⚠ WARNING

Avoid injury and/or machine damage!
Debris on the window can severely obstruct the operator's vision. To ensure that the operator has clear visibility through the windows, always keep the windows clean.
Failure to comply could result in death or serious injury.

W1517A

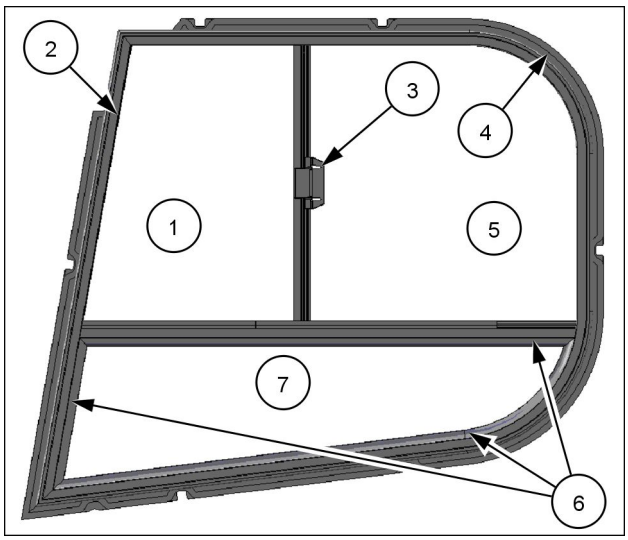
NOTE: *Machines may be equipped with either the pivot lever window style or the window latch style. Follow the procedure that is applicable to your machine.*

NOTICE: *DO NOT change the window position without properly locking the window latch! Improper use WILL result in premature wear.*

NOTICE: *It is suggested that for normal cleaning, a water hose or power washer on low pressure be used to clear the glass from outside of the machine. Do not direct the stream from a power washer into the seals or joints of the window. If removal of the glass is necessary for maintenance, replacement, or more thorough cleaning, each pane can be removed from inside the cab.*

Window latch style

Removal



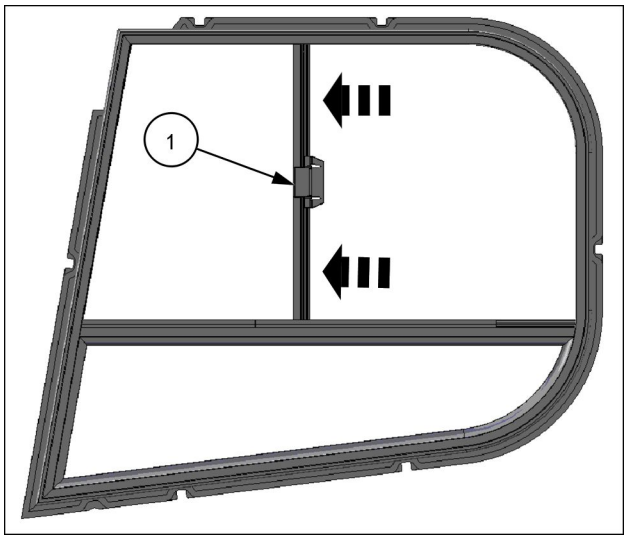
RAIL17SSL0039BA 1

1	Slider glass	5	Fixed upper glass
2	Frame	6	Lower seals
3	Latch	7	Lower glass
4	Frame		

Tools required: Small screwdriver, flat drive, about **178 – 203 mm** (**7 – 8 in**).

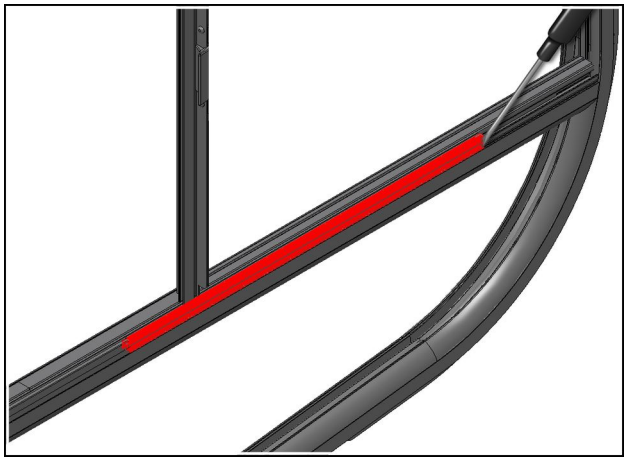
Slider glass

1. Verify that the slider glass is shut and latched.



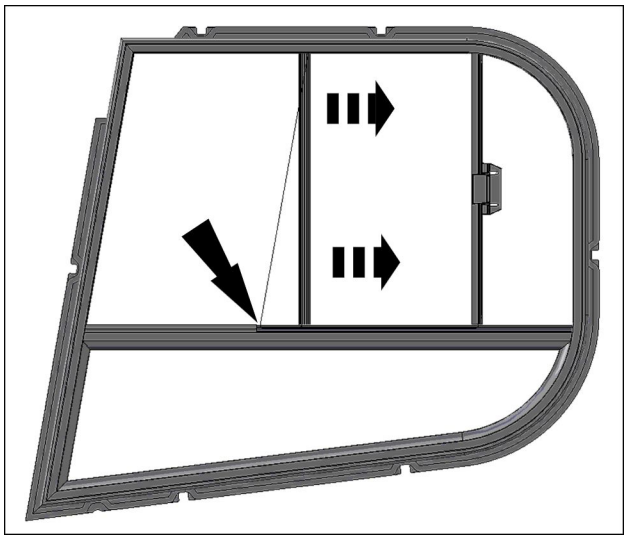
RAIL17SSL0039BA 2

2. Slip the screwdriver down into the aluminum track from the back, and slide forward underneath the rear inner rigid PVC slider channel.



RAIL17SSL0348BA 3

3. Pry upward until you are able to grab hold of the end of the PVC channel.
4. Lift the PVC channel up and out of the track. Pull rearward until it slides free from underneath the slider glass.
5. Unlatch and move the slider glass rearward until it clears the front PVC channel.

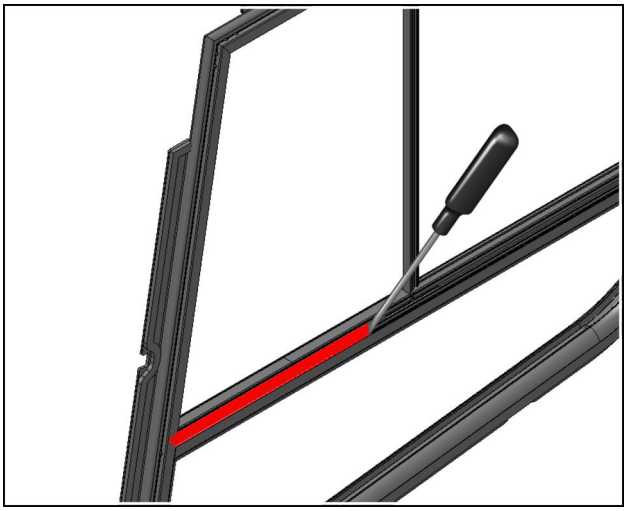


RAIL17SSL0038BA 4

6. Tip the lower edge of the glass into the cab and drop down and out of the frame.

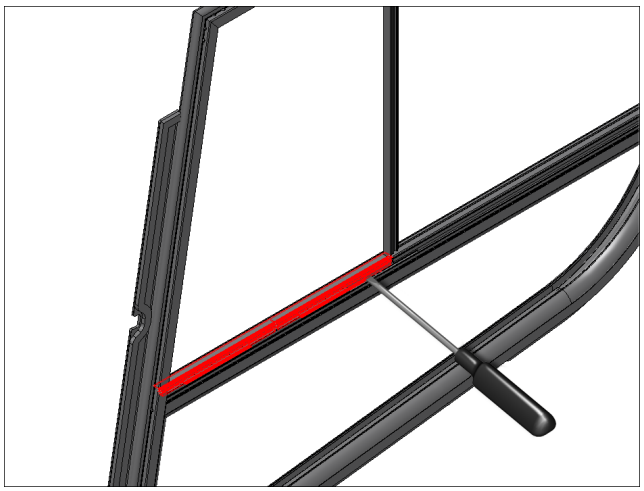
Fixed upper glass

7. Slip the screwdriver down into the aluminum track from the back, and slide forward underneath the front inner rigid PVC slider channel.



RAIL17SSL0349BA 5

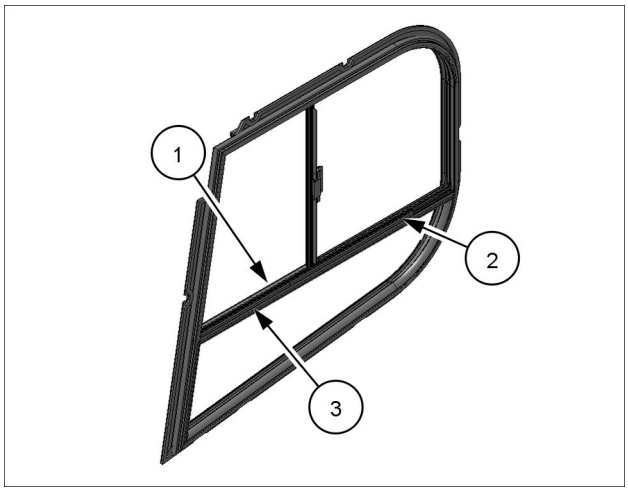
8. Pry upward until you are able to grab hold of the end of the PVC channel.
9. Using the flat drive end of the screwdriver, place it under the edge of the outer PVC channel as shown and pry the PVC channel up and out of the aluminum frame.



RAIL17SSL0322BA 6

10. Slide the fixed glass forward until it clears the remaining PVC channel.
11. Tip the lower edge into the cab and drop down and out of the frame.

Lower glass



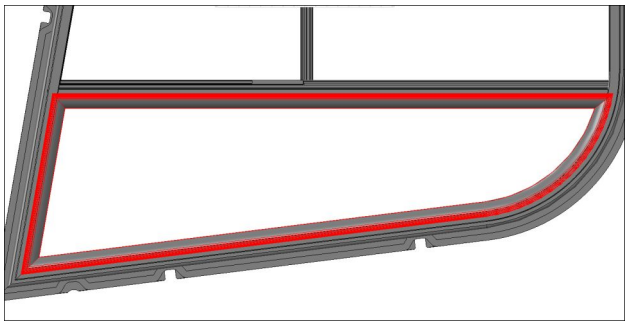
RAIL17SSL0325BA 7

1	Outer PVC channel	3	Front inner PVC channel
2	Rear inner PVC channel		

NOTICE: *While the lower glass seal is removable, it was designed to be removed only when replacement of the glass is necessary. It is not intended as a means for cleaning. If removed periodically, the ability to seal out water and dust from the cab may be diminished. When a lower glass pane is ordered for replacement, new inner seals will be included for replacement as well.*

NOTICE: *Do not remove the outer seal. Damage can occur that may lead to leaks.*

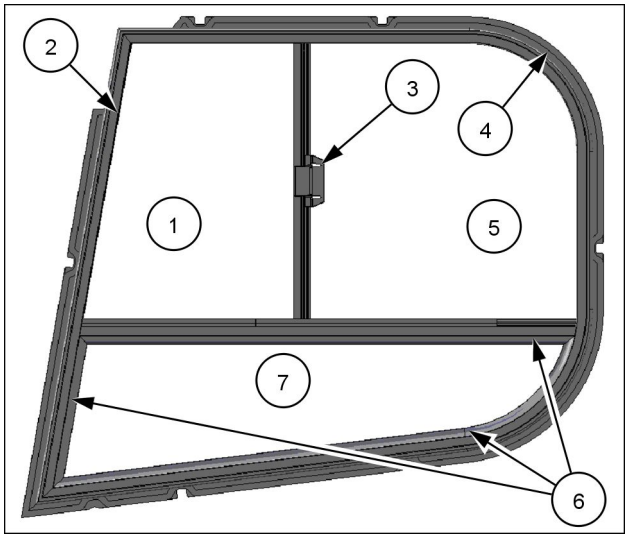
12. Push the flat end of the screwdriver between the ends of the top and front vertical seals where they meet.



RAIL17SSL0324AA 8

13. Pry the end of the front vertical seal out.
14. Pull the seal out of the aluminum frame.
15. Repeat for the remaining pieces.
16. The glass can then be tipped in and removed.

Installation



RAIL17SSL0039BA 9

1	Slider glass	5	Fixed upper glass
2	Frame	6	Lower seals
3	Latch	7	Lower glass
4	Frame		

Lower glass

1. Place the glass into the outer seal.
2. Starting at the front, bottom corner, press the lower seal down into the frame all the way to the back.
3. Starting at the front, top corner, press the upper seal up into the frame all the way to the back.
4. Starting at the top, press the front seal into the frame all the way down to the bottom corner.

Fixed upper glass

5. Place glass back into the frame and slide into rearward position just as it was removed.
6. Press the outer PVC channel down into the frame until it snaps in place.

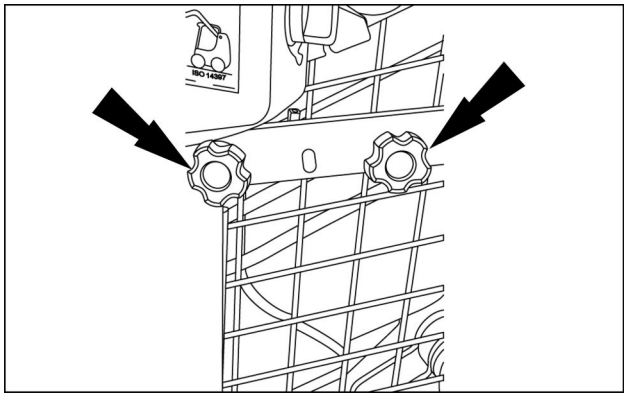
Slider glass

7. Press the front, inner PVC channel down into the frame, sliding it forward as far as possible.
8. Place the slider glass into the track and push forward until latched.
9. Press the front edge of the last PVC channel down into the frame just behind the slider glass until and push forward until it meets the front PVC channel underneath the glass.
10. Press the channel down into the frame working from front to back until it snaps into place.

Pivot lever window style

Removal

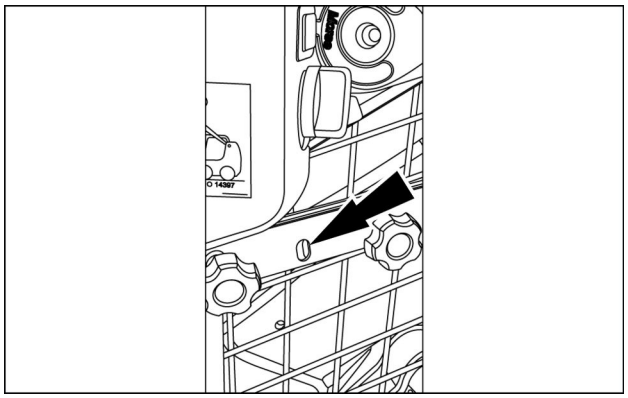
1. Loosen the four engagement knobs at both ends of the window, until they are backed out about **13 mm** (**0.5 in**).



93109340 10

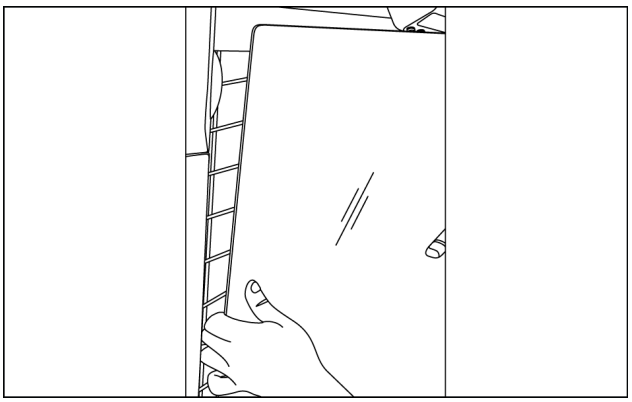
2. Slide the front two knobs and the rear two knobs toward the center of the window until the green indicator has changed to red. Now the window bar can drop down slightly, allowing the top of the window to drop down just below the window frame.

NOTE: *The restraint bar (if equipped) must be in the operating position for window removal.*



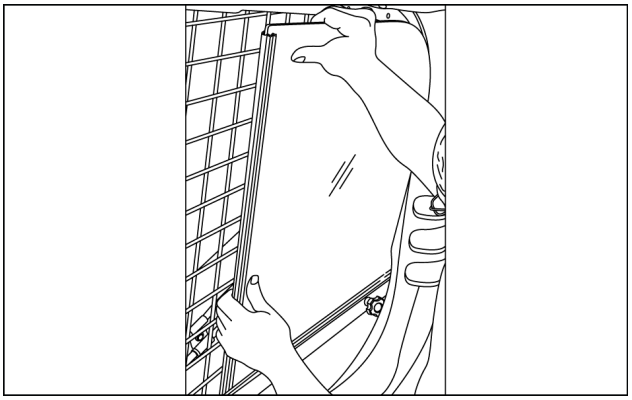
93109336A 11

3. Tilt the top of the forward most window inward so it can be lifted up and out for proper window cleaning.



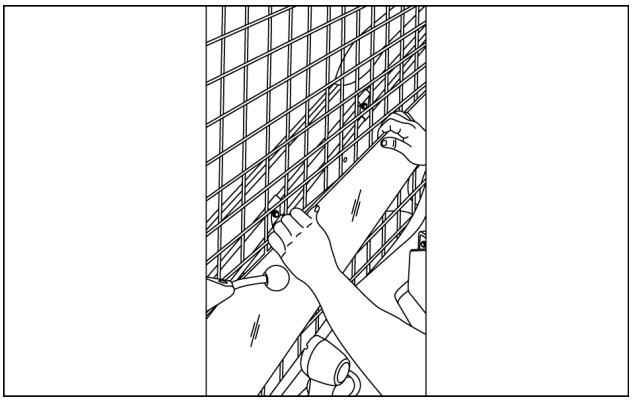
93109338 12

4. With the rear window remaining, it can be pulled forward in the track, exposing the window away from the window frame. Then tilt the window in and lift it up just like the first window to remove.
5. Once both upper windows have been removed, the lower window frame and track with the engagement knobs can be lifted up and off the top of the lower window.



93109337 13

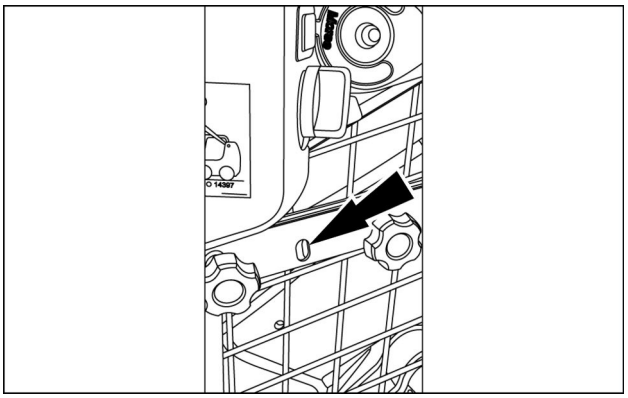
6. Pick up and remove the lower window for cleaning.



93109339 14

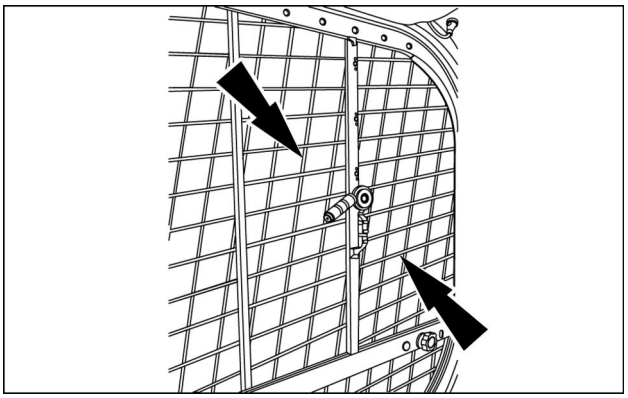
Installation

1. Install the lower window.
2. Push the window frame and track with the engagement knobs down on top of the lower window.
3. Install the rear window in the outside track and slide it back into place.
4. Install the front window.
5. Pull the window frame and track with engagement knobs up and slide the two front knobs and the two rear knobs away from the center until the indicator turns green.
6. Tighten the four knobs.



93109336A 15

NOTICE: *DO NOT change the window position without properly locking the window latch! Improper use WILL result in premature wear.*



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STORAGE

Storing the machine

Geographic, environmental and actual storage conditions make it difficult to follow a set storage procedure for all areas and conditions. The following procedure is for a storage period of six months or longer. This procedure is a good starting point but may not be all inclusive. If you have questions about storing your machine, contact your dealer.

1. Prior to storing, inspect the machine for visible signs of wear, breakage, or damage. Order any parts required and make the necessary repairs to avoid delays when starting the next operating period.
2. Prior to storing, wash the machine.
3. Lubricate the entire machine.
4. Paint any areas where the paint has been damaged.
5. Move all hydraulic controls through their complete ranges several times to relieve any pressure in the circuits.
6. Drain the fuel tank.
7. Put approximately **8 l** (**2.1 US gal**) of diesel flushing oil in the fuel tank. Run the engine until the exhaust smoke is blue-white.
8. Drain the flushing oil from tank.
9. Fill the fuel tank and add diesel fuel conditioner by following the directions on the container.
10. Change the engine oil and replace the filter.
11. Drain the cooling system. Leave the drains open and do not tighten the radiator cap.
12. Put a DO NOT OPERATE or OUT OF SERVICE tag or marker in the cab.
13. Replace the air filter elements if the hours of operation or time interval will lapse during storage.
14. Cover the exposed cylinder rods, and valve spools and any other bare metal parts with a rust and corrosion preventive.
15. Remove and clean the battery. Fully charge the battery. Store the battery in a cool dry place where it will not freeze.
16. Cover exhaust outlet.
17. Park the machine inside a building. If a building is not available, park the machine in a dry area on planks and cover with a waterproof cover.

⚠ WARNING

Crushing hazard!
Never use the machine lift arms or attachment to raise the machine for service. Use adequate blocking to ensure the machine is supported safely with all four wheels off the ground.
Failure to comply could result in death or serious injury.

W0345A

18. Block the machine up so that the tires are just off the ground, a maximum of **25 mm** (**1.0 in**) above the surface.
19. Do periodic checks for protection. Look for corrosion.

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. Actuate the starter for about **10 s** to **15 s**.
    - 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 min**. Check for leaks around the filters and drain plugs.

14. Stop the engine and check the fluid levels of the engine cooling system and drive chain compartments. See the **7-32** and the **7-70** sections for the correct procedure on checking the fluid levels.

8 - TROUBLESHOOTING

FAULT CODE RESOLUTION

Error code index

NOTE: *If you have a fault code associated with a red light flashing and an audible alarm, shut the unit down and call your dealer for support. For a fault code associated with a yellow amber light, record the code number and use the Aux Override button to move past this fault code. If the code appears again, contact your dealer for support.*

JOYNu – Control handle error

JOYNu appears on the instrument panel. Make sure that the control handles and the auxiliary thumbwheel are in the neutral position. If JOYNu continues to be displayed contact your dealer for support.

OPRPr – Operator presence error

OPRPr appears on the instrument panel. Make sure that you are sitting in the operator seat, the seat belt is fully engaged, and the restraint bar (if equipped) is in the down position. If OPRPr continues to be displayed contact your dealer for support.

CRKOn – Hydraulic enable error (EH machines only)

CRKOn appears on the instrument panel. CRKOn indicates the OPERATE button is being pressed while attempting to start the machine. Follow the starting procedure as described in this manual. If CRKOn continues to be displayed contact your dealer for support.

The following is a display of error codes and associated functions.

1000 to 1999 (vehicle errors)

Code	Function	Description
1002	Engine Coolant Temperature	High Temperature
1004	Hydraulic Oil Filter Restriction	Filter Restricted
1009	Hydraulic Oil Temperature	High Temperature
1014	Cluster System Voltage	Over Voltage
1015	Cluster System Voltage	Under Voltage
1025	Load Control	Short Circuit
1030	Load Control	Open Circuit
1041	RPM Monitoring	Over Speed
1045	Fuel Level Monitoring	Open Circuit
1201	Hydraulic Oil Filter Restriction	Open Circuit
1202	RPM Monitoring	Over Speed
1203	RPM Monitoring	Open / Short Circuit
1204	Start Sequence	Engine State Plausibility Check
1205	Hydraulic Enable	Short Circuit to Power
1206	UCM	Configuration Time out

Code	Function	Description
1350	Hydraulics Enable	Switch Implausible State
1511	Right Brake Light Actuation	Open Circuit
1512	Right Brake Light Actuation	Short Circuit
1513	Right Brake Light Actuation	Short Circuit to Ground
1521	Left Brake Light Actuation	Open Circuit
1522	Left Brake Light Actuation	Short Circuit to Ground
1523	Left Brake Light Actuation	Short Circuit
1531	Backup Alarm Activation	Open Circuit
1532	Backup Alarm Activation	Short Circuit to Ground
1533	Backup Alarm Activation	Short Circuit
1901	Power Supply	Supply Voltage High
1903	Power Supply	Low Voltage
1904	Power Supply	Input Voltage Out of Range
1905	Power Supply	Supply Voltage Out of Range
1906	Power Supply	Supply Voltage Out of Range

Code	Function	Description	Code	Function	Description
1207	UCM	Invalid Configuration	1907	Power Supply	Aux Retract Input Power OFF
1208	Seat Switch Validation	Switch Plausibility Check	1908	Power Supply	Bucket Extend Input Power OFF

1000 to 1999 (vehicle errors) – continued

Code	Function	Description	Code	Function	Description
1909	Power Supply	Boom Raise/Lower Input Power OFF	1914	Power Supply	Backup Alarm Input Power OFF
1910	Power Supply	Loader Pilot Interlock & Port Lock Input Power OFF	1915	Power Supply	Two Speed Input Power OFF
1911	Power Supply	Left & Right Pump Reverse Input Power OFF	1916	Power Supply	Right & Left Pumps Forward Input Power OFF
1912	Power Supply	Left & right Brake Lights & Aux Extend Input Power OFF	1917	Power Supply	Park Brake Solenoid Input Power OFF
1913	Power Supply	Bucket Curl Input Power OFF			

3000 to 3999 (engine errors)

Code	Function	Description	Code	Function	Description
3000	Engine Malfunction	Air Filter Restriction	3154	Engine Preheat	Short Circuit to Power
3007	Engine Coolant Temperature	Short Circuit to Ground	3156	Engine Preheat	Open Circuit
3008	Engine Coolant Temperature	Open Circuit	3401	Engine Start	Short Circuit to Power
3028	Engine Oil Pressure	Low Oil Pressure	3402	Engine Start	Open Circuit
3029	Engine Oil Pressure	Open Circuit	3404	Starter Cranking	Short Circuit to Power

4000 to 4999 (transmission errors)

Code	Function	Description	Code	Function	Description
4043	Hydraulic Oil Temperature	Short Circuit to Ground	4401	Park Brake (Mechanical Machines)	Open Circuit
4044	Hydraulic Oil Temperature	Open Circuit	4402	Park Brake (Mechanical Machines)	Short Circuit to Power
4055	Hydraulics Enable	Open Circuit	4431	Park Brake	Switch Plausibility Check
4056	Hydraulics Enable	Short Circuit to Ground	4731	Ground Drive	Open Circuit
4057	Hydraulics Enable	Short Circuit to Power	4734	Ground Drive	Open Circuit
4061	Ground Drive	Open Circuit	4735	Ground Drive	Short Circuit to Power
4062	Ground Drive	Short Circuit to Ground	4737	Ground Drive	Sensor out of range
4071	Ground Drive	Open Circuit	4741	Ground Drive	Open Circuit
4072	Ground Drive	Short Circuit to Power	4742	Ground Drive	Short Circuit to Power
4081	Ground Drive	Short Circuit to Power	4744	Ground Drive	Open Circuit
4082	Ground Drive	Short Circuit to Ground	4745	Ground Drive	Short Circuit to Power
4083	Ground Drive	Open Circuit	4747	Ground Drive	Sensor out of range
4309	Park Brake	Park Brake Button Timeout	*4752	Ground Drive	Command Plausibility Check
4361	Ground Drive	Open Circuit	*4754	Ground Drive	Command Plausibility Check

Code	Function	Description
4362	Ground Drive	Short Circuit to Ground
4371	Ground Drive	Open Circuit
4372	Ground Drive	Short Circuit to Ground
4381	Ground Drive	Short Circuit to Power
4382	Ground Drive	Short Circuit to Ground
4383	Ground Drive	Open Circuit
4781	2 speed	Open Circuit
4782	2 speed	Short Circuit to Ground
4783	2 speed	Short Circuit to Power
4951	Hydraulic Enable (Mechanical Machines)	Short Circuit to Power
4952	Hydraulic Enable (Mechanical Machines)	Open Circuit

*4752 and 4754 may trigger when operating an electro-hydraulic machine in cold temperatures. It is recommended to warm the machine to sufficient operating temperature. Continue operation by cycling the hydraulic off and back on with the Operate button.

5000 to 5999 (electro-hydraulic system errors)

Code	Function	Description
5051	Hydraulics Enable	Open Circuit
5052	Hydraulics Enable	Short Circuit to Ground
5053	Hydraulics Enable	Short Circuit to Power
5061	Loader Port Lock	Open Circuit
5062	Loader Port Lock	Short Circuit to Ground
5063	Loader Port Lock	Short Circuit to Power
5121	Ground Drive	Open / Short Circuit
5122	Ground Drive	Open / Short Circuit
5124	Ground Drive	Open Circuit
5131	Bucket Rollback / Dump	Short Circuit to Power
5132	Bucket Rollback / Dump	Short Circuit to Power
5134	Bucket Rollback / Dump	Open Circuit
5135	Bucket Rollback / Dump	Short Circuit to Power
5137	Bucket Rollback / Dump	Sensor out of range
5141	Aux Control Function	Open Circuit
5142	Aux Control Function	Short Circuit to Power
5144	Aux Control Function	Open Circuit
5145	Aux Control Function	Short Circuit to Power
5147	Aux Control Function	Sensor out of range
5201	Ground Drive	Open Circuit
5202	Ground Drive	Open / Short Circuit
5204	Boom Raise/Lower	Open / Short Circuit
5211	Ground Drive	Open Circuit
5212	Ground Drive	Short Circuit to Power
5221	Boom Raise/Lower	Open Circuit
5222	Boom Raise/Lower	Open Circuit
5231	Boom Raise/Lower	Open Circuit
5232	Boom Raise/Lower	Short Circuit to Ground
5241	Boom Raise/Lower	Short Circuit to Power
5242	Boom Raise/Lower	Short Circuit to Ground
5243	Boom Raise/Lower	Open Circuit
5251	Bucket Rollback / Dump	Open Circuit
5252	Bucket Rollback / Dump	Short Circuit to Ground
5261	Bucket Rollback / Dump	Open Circuit
5262	Bucket Rollback / Dump	Short Circuit to Ground
5271	Bucket Rollback / Dump	Short Circuit to Power
5272	Bucket Rollback / Dump	Short Circuit to Ground
5273	Bucket Rollback / Dump	Open Circuit
5281	Aux Control Function	Open Circuit
5282	Aux Control Function	Short Circuit to Ground
5291	Aux Control Function	Open Circuit
5292	Aux Control Function	Short Circuit to Ground
5309	Boom Float	Button Timeout
5409	Aux Override	Button Timeout
5501	Boom Raise/Lower	Open Circuit
5502	Boom Raise/Lower	Short Circuit to Power
5503	Hydraulic Enable (Mechanical Machines)	Short Circuit to Power
5504	Bucket Rollback / Dump	Open Circuit

Code	Function	Description		Code	Function	Description
5214	Ground Drive	Short Circuit to Ground		5505	Bucket Rollback / Dump	Short Circuit to Power
5215	Ground Drive	Short Circuit to Power		5507	Aux Control Function	Open Circuit
5217	Ground Drive	Joystick out of range		5508	Aux Control Function	Short Circuit to Power

5000 to 5999 (electro-hydraulic system errors) – continued

Code	Function	Description		Code	Function	Description
5511	Boom Raise/Lower	Sensor Implausible State		5603	Aux Control Function	Open Circuit
5512	Bucket Rollback / Dump	Sensor Implausible State		5701	Pattern Select (ISO/H)	Open Circuit
5513	Aux Control Function	Sensor Implausible State		5703	Pattern Select (ISO/H)	Short Circuit to Power
5601	Aux Control Function	Short Circuit to Power		5709	Pattern Select (ISO/H)	Switch Timeout
5602	Aux Control Function	Short Circuit to Ground		5911	Pattern Select (ISO/H)	Switch Timeout

9000 to 9999 (internal display errors)

Code	Function	Description		Code	Function	Description
9151	CAN Bus Communication	Non message CAN-Bus		9403	Memory Error	Instrument Cluster Memory Error
9156	Hydraulics Enable	Button State Error		9404	Memory Error	Instrument Cluster Memory Error
9157	Aux Override	CAN message Error		9405	CAN Communication	Loss of Communication from UCM
9158	Pattern Select (ISO/H)	Short Circuit to Ground		9406	CAN Communication	Loss of Communication from UCM
9159	Pattern Select (ISO/H)	Short Circuit to Ground		9407	Memory Error	Instrument Cluster Memory Error
9160	Pattern Select (ISO/H)	Short Circuit to Power		9408	Memory Error	Instrument Cluster Memory Error
9161	Pattern Select (ISO/H)	Short Circuit to Power				

9 - SPECIFICATIONS

Fluids and lubricants

Fuel tank

Capacity	
L213, L215	**60.5 l** (**16.0 US gal**)
L218, L220, C227	**75.5 l** (**20.0 US gal**)
L223, L225, L230, C232, C238	**95.5 l** (**25.5 US gal**)
Specifications	#2 Diesel ultra low sulfur

Cooling system

Capacity	
L213	**15 l** (**4.0 US gal**)
L215, L218, L220	**15.6 l** (**4.2 US gal**)
L223, L225, L230, C232, C238	**19 l** (**5 US gal**)
C227	**17 l** (**4.5 US gal**)
Specifications	**NEW HOLLAND AMBRA ACTIFULL™ OT EXTENDED LIFE COOLANT**

Hydraulic system

Reservoir capacity	**15.0 l** (**3.96 US gal**)
System capacity:	
L213, L215	**29.2 l** (**7.7 US gal**)
L218, L220, C227	**38.1 l** (**10.0 US gal**)
L223, L225, L230, C232, C238	**45.4 l** (**12.0 US gal**)
Specifications	**TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30**

NOTE: *See the "Hydraulic oil viscosity" chart* ***7-12*** *for more specification details.*

Chain compartments

Capacity - each side	
L213, L215	**6.25 l** (**6.6 US qt**)
L218, L220	**7.4 l** (**7.9 US qt**)
L223, L225, L230	**22.2 l** (**23.5 US qt**)
Specifications	**TUTELA AUTO SUPREME™ ENGINE OIL SAE 10W-30**

Grease fittings

Quantity	As required
Specifications	**TUTELA MOLY GREASE GR-75** (Molydisulfide)

Engine crank case oil

Capacity - with filter change	
L213, L215, L218, L220	**7.0 l** (**7.5 US qt**)
L223, L225, L230, C227, C232, C238	**9.5 l** (**10 US qt**)
Specifications	**NEW HOLLAND AMBRA UNITEK MASTERGOLD SBL CJ-4**

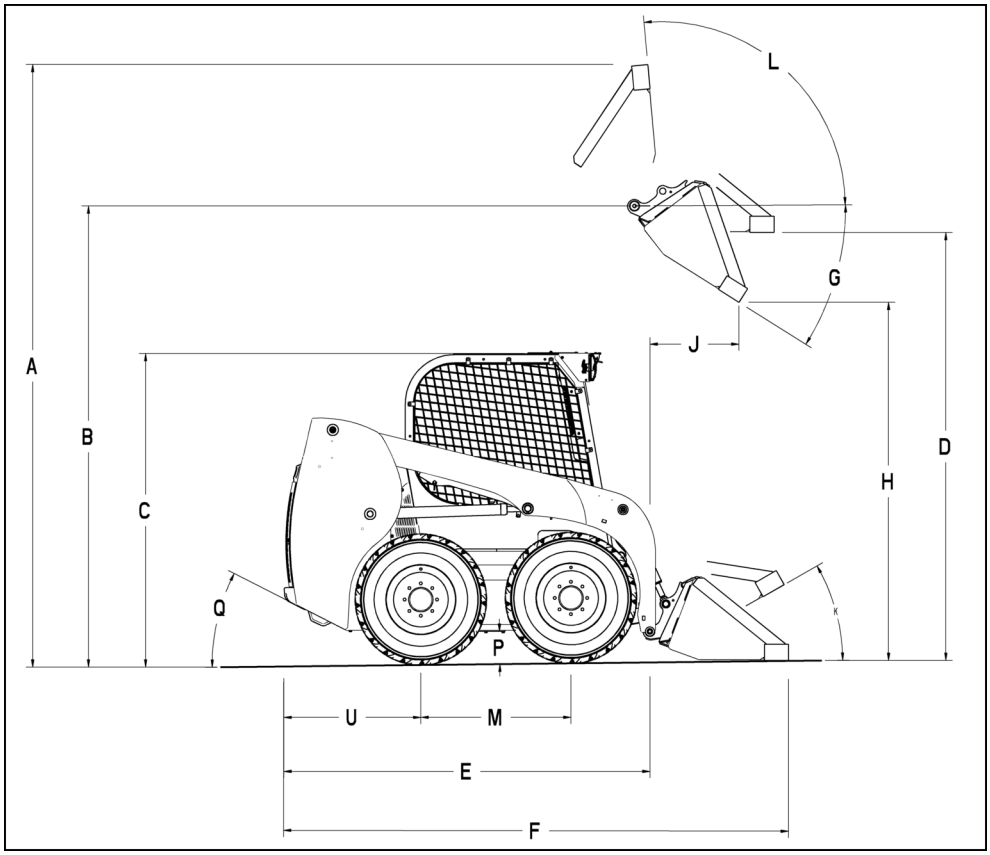
NOTE: *See the "Recommended engine oil for operating temperature ranges" chart* ***7-11*** *for more specification details.*

Final track drive

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**

General specification

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



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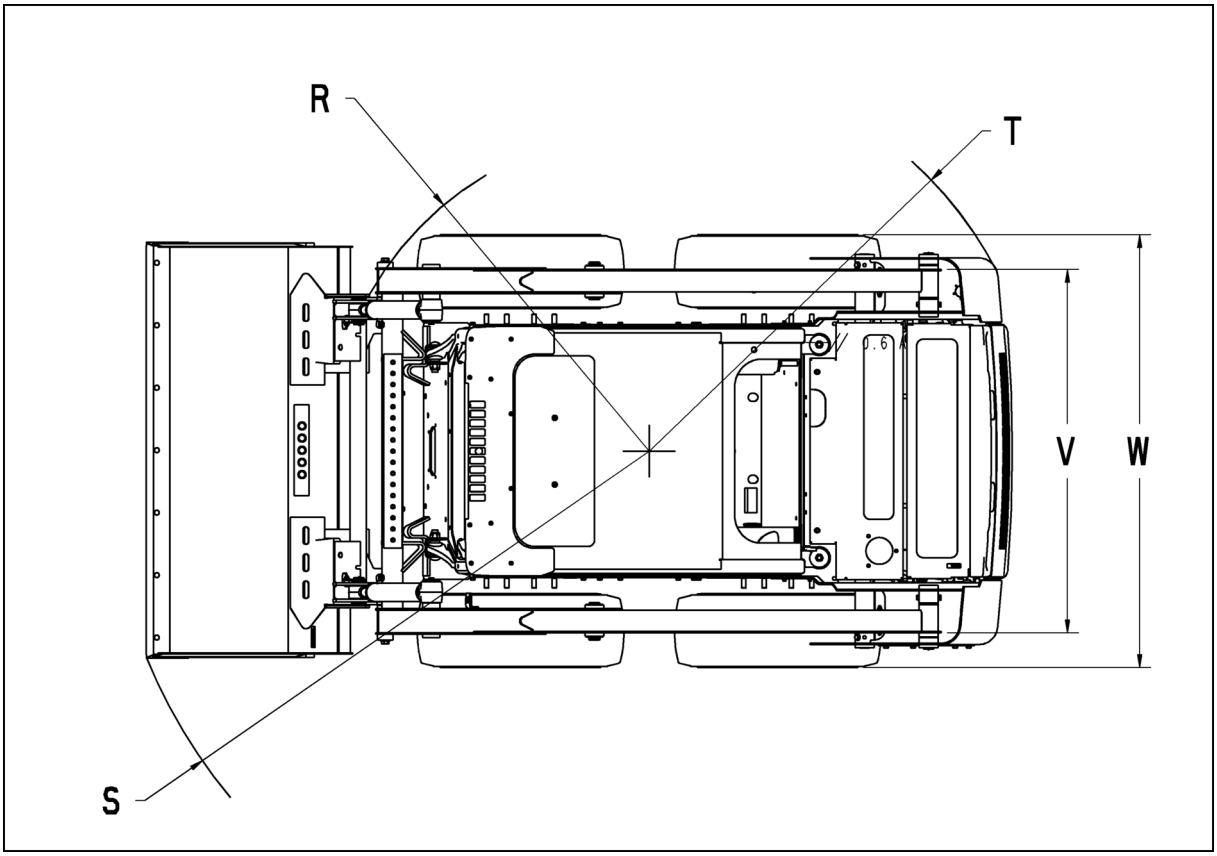
SMALL RADIAL FRAME UNITS (L213, L215)

ITEM	COMPONENT	MEASUREMENT
A	Overall Operating Height (Fully Raised)	**3591 mm** (**141.4 in**)
B	Height to bucket hinge pin (Fully Raised)	**2845 mm** (**112 in**)
C	Top of Roll Over Protective Structure (ROPS)	**1919 mm** (**75.5 in**)
D	Highest Level Bucket Height	**2682 mm** (**105.6 in**)
E	Overall Length (No Attachment)	**2435 mm** (**95.9 in**)
F	Overall Length (With standard Bucket)	**3028.0 mm** (**119.2 in**)
G	Dump Angle (Fully Raised)	**40.2°**
H	Dump Height (Maximum Reach) at full dump angle	**2246.0 mm** (**88.4 in**)
J	Dump Reach (Fully Raised) at full dump angle	**469 mm** (**18.5 in**)
K	Maximum Rollback at Ground	**26.1°**
L	Maximum Rollback (Fully Raised)	**95.2°**
M	Wheel Base	**941 mm** (**37 in**)
P	Ground Clearance (Belly Pan)	**178 mm** (**7 in**)
Q	Angle of Departure	**22°**
U	Rear Axle to Bumper	**858 mm** (**33.8 in**)
NOTE: *All measurements are based on machines with 10 x 16.5 tires and a* ***1524.0 mm*** *(**60.0 in**) Dirt & Foundry (DF) bucket.*		



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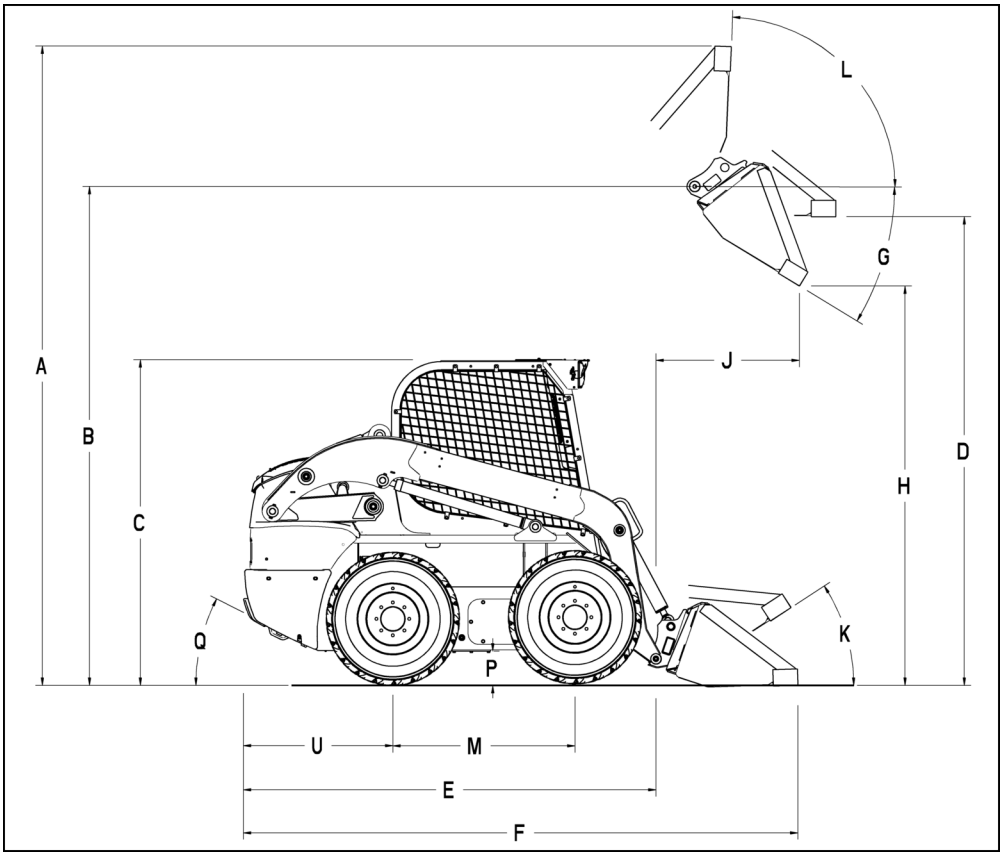
SMALL RADIAL FRAME UNITS (L213, L215)

ITEM	COMPONENT	MEASUREMENT	
		L213	L215
R	Clearance circle radius without tool	**1240.0 mm** (**48.8 in**)	
S	Clearance circle radius with **1524.0 mm** (**60.0 in**) DF bucket	**1862.0 mm** (**73.3 in**)	
S	Clearance circle radius with **1524.0 mm** (**60.0 in**) LP bucket	**1994.0 mm** (**78.5 in**)	
S	Clearance circle radius with **1524.0 mm** (**60.0 in**) LPE bucket	**2112.0 mm** (**83.1 in**)	
T	Clearance circle radius rear	**1433.0 mm** (**56.4 in**)	
V	Over the tire width	**1248.0 mm** (**49.1 in**)	
W	Overall width	**1518.0 mm** (**59.8 in**)	
Operating weight		**2300 kg** (**5071 lb**)	**2430 kg** (**5357 lb**)
SAE Rated Operating Capacity (ROC)		**590 kg** (**1301 lb**)	**680 kg** (**1499 lb**)
Tipping load		**1179 kg** (**2599 lb**)	**1361 kg** (**3000 lb**)
Counter weight (optional)		**76.6 kg** (**168.9 lb**)	
Cab side glass (optional)		**21.3 kg** (**47.0 lb**)	
Cab glass door (optional)		**34.0 kg** (**75.0 lb**)	
Cab Lexan door (optional)		**34.0 kg** (**75.0 lb**)	
Suspension seat (optional)		**10.0 kg** (**22.0 lb**)	

NOTE: *All measurements are based on machines with 10 x 16.5 tires and a* ***1524.0 mm*** *(****60.0 in****) Dirt & Foundry (DF) bucket.*

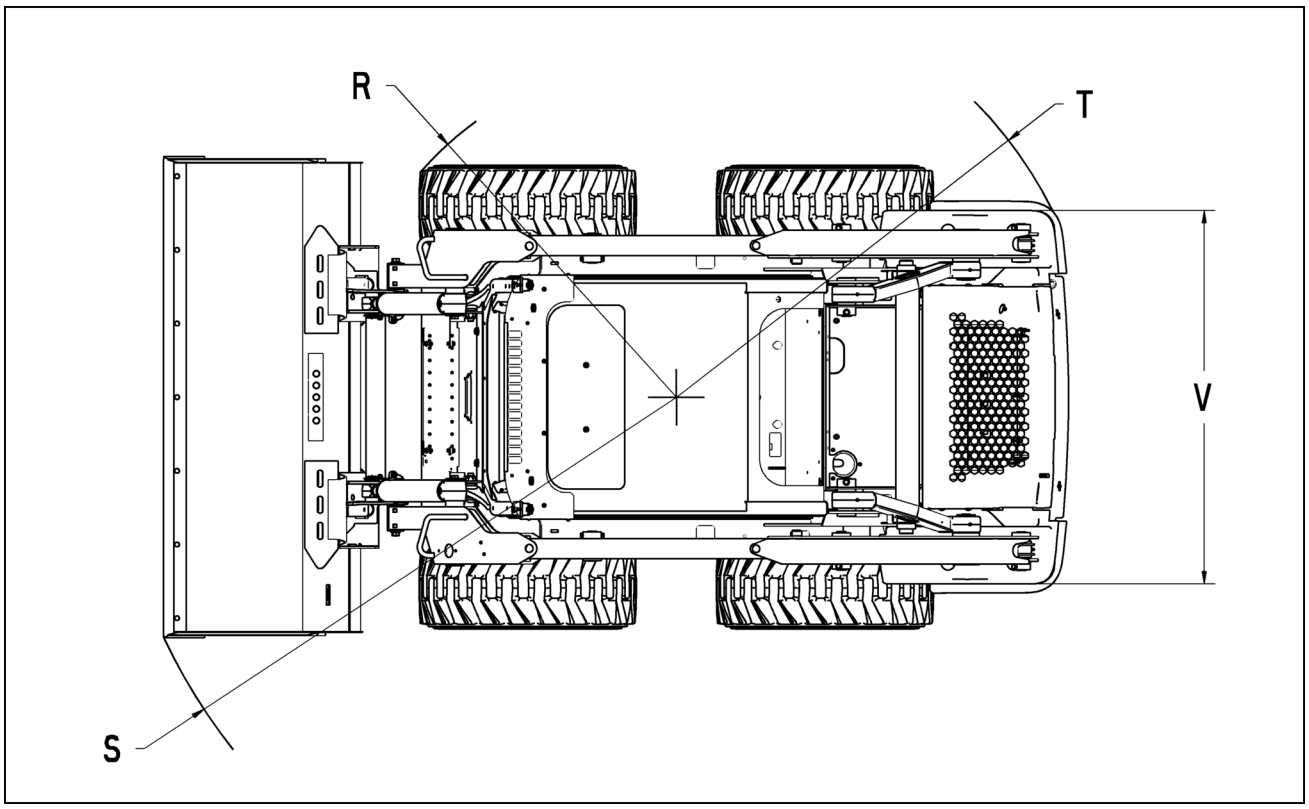
NOTE: *Clearance Circle Radius (R, S, T) values were calculated using a 50/50 weight distribution (center point of counter rotation centered between the axles) and with the bucket resting flat on ground.*



631002257 3

MEDIUM VERTICAL FRAME (L218)

ITEM	COMPONENT	MEASUREMENT
A	Overall Operating Height (Fully Raised)	**3820 mm** (**150.4 in**)
B	Height to Hinge Pin (Fully Raised)	**3048 mm** (**120 in**)
C	Cab Height	**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)	**2380.0 mm** (**93.7 in**)
J	Dump Reach (Fully Raised)	**783 mm** (**30.8 in**)
K	Maximum Rollback @ 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.*		



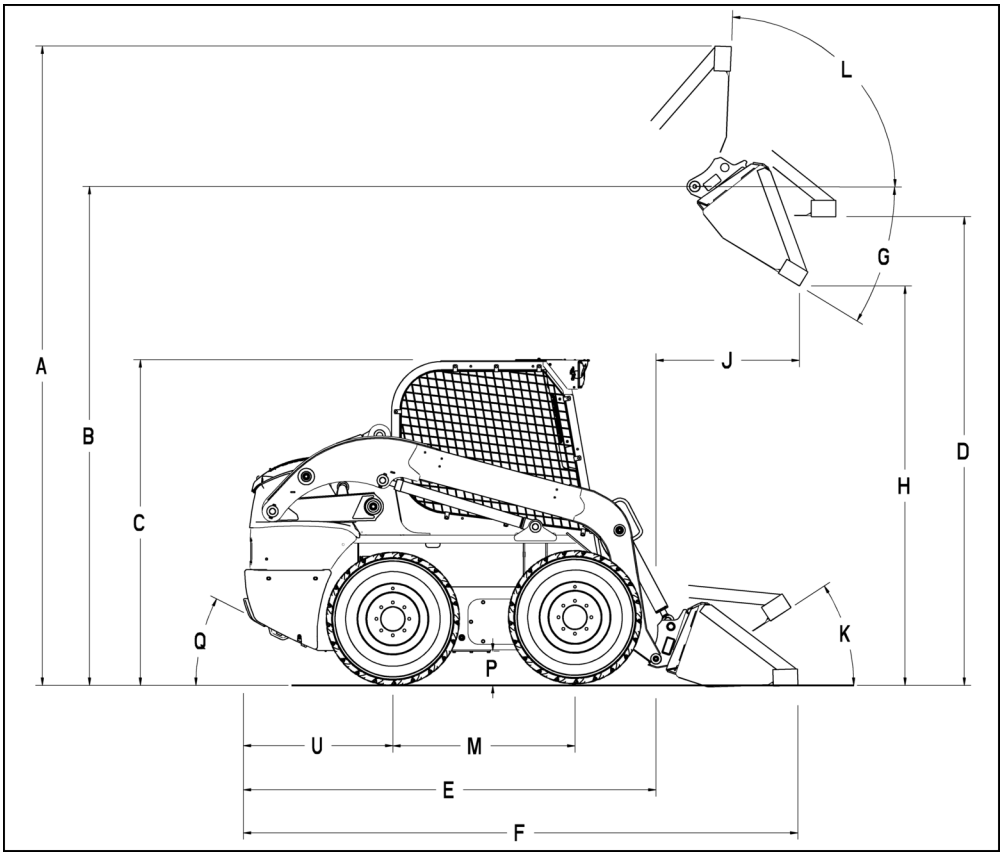
631002258 4

MEDIUM VERTICAL FRAME (L218)

ITEM	COMPONENT	MEASUREMENT
R	Clearance circle radius without tool	**1347.0 mm** (**53.0 in**)
S	Clearance circle radius with **1676.4 mm** (**66.0 in**) DF bucket	**2037.0 mm** (**80.2 in**)
S	Clearance circle radius with **1676.4 mm** (**66.0 in**) LP bucket	**2133.0 mm** (**84.0 in**)
S	Clearance circle radius with **1676.4 mm** (**66.0 in**) LPE bucket	**2251.0 mm** (**88.6 in**)
T	Clearance circle radius rear	**1606.0 mm** (**63.2 in**)
V	Over the tire width	**1371.0 mm** (**54.0 in**)
W	Overall width	**1642.0 mm** (**64.6 in**)
Operating weight		**2690 kg** (**5930 lb**)
SAE Rated Operating Capacity (ROC)		**818 kg** (**1803 lb**)
Tipping load		**1633 kg** (**3600 lb**)
Counter weight (optional)		**63.8 kg** (**140.7 lb**)
Cab side glass (optional)		**21.3 kg** (**47.0 lb**)
Cab glass door (optional)		**34.0 kg** (**75.0 lb**)
Cab Lexan door (optional)		**34.0 kg** (**75.0 lb**)
Suspension seat (optional)		**10.0 kg** (**22.0 lb**)

NOTE: *Measurements are based on machines with 10 x 16.5 tires and a* ***1676.4 mm*** *(****66.0 in****) Dirt & Foundry (DF) bucket.*

NOTE: *Clearance Circle Radius (R, S, T) values were calculated using a 50/50 weight distribution (center point of counter rotation centered between the axles) and with the bucket resting flat on ground.*



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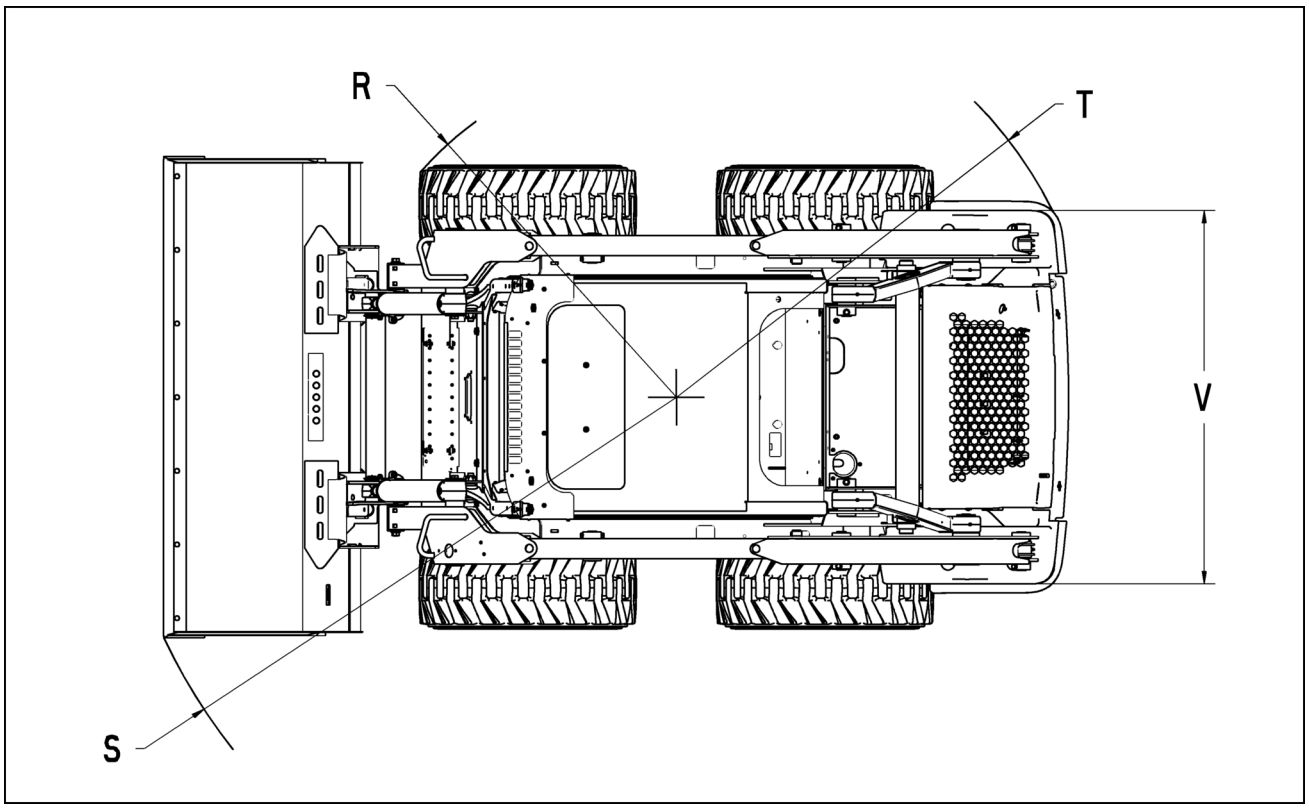
MEDIUM VERTICAL FRAME (L220)

ITEM	COMPONENT	MEASUREMENT
A	Overall Operating Height (Fully Raised)	**3845 mm** (**151.4 in**)
B	Height to Hinge Pin (Fully Raised)	**3073 mm** (**121 in**)
C	Cab Height	**1998 mm** (**78.7 in**)
D	Highest Level Bucket Height	**2902 mm** (**114.3 in**)
E	Overall Length (No Attachment)	**2685 mm** (**105.7 in**)
F	Overall Length (With standard Bucket)	**3338 mm** (**131.4 in**)
G	Dump Angle (Fully Raised)	**51.9°**
H	Dump Height (Maximum Reach)	**2405 mm** (**94.7 in**)
J	Dump Reach (Fully Raised)	**758 mm** (**29.8 in**)
K	Maximum Rollback @ Ground	**34.4°**
L	Maximum Rollback (Fully Raised)	**87.6°**
M	Wheel Base	**1128 mm** (**44.4 in**)
P	Ground Clearance (Belly Pan)	**203 mm** (**8 in**)
Q	Angle of Departure	**25°**
U	Rear Axle to Bumper	**924 mm** (**36.4 in**)
NOTE: *Measurements are based on machines with 12 x 16.5 tires and a* ***1828.8 mm*** *(**72.0 in**) Dirt & Foundry (DF) bucket.*		



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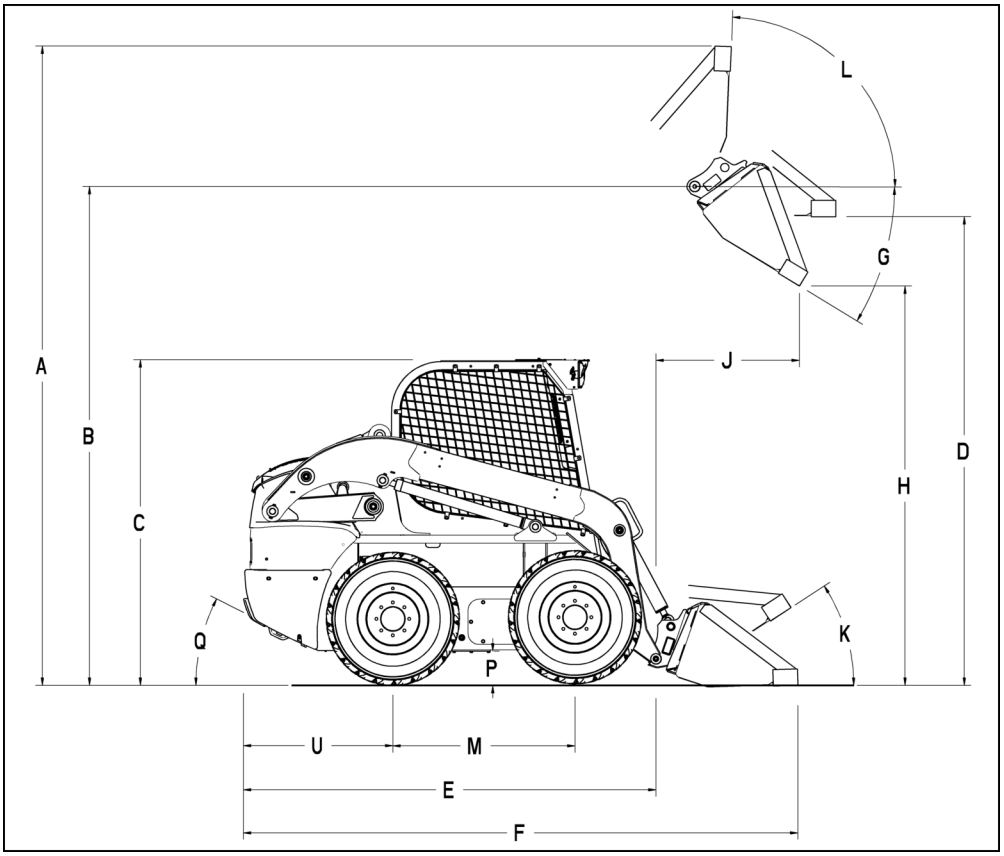
MEDIUM VERTICAL FRAME (L220)

ITEM	COMPONENT	MEASUREMENT
R	Clearance circle radius without tool	**1340 mm** (**52.8 in**)
S	Clearance circle radius with **1828.8 mm** (**72.0 in**) DF bucket	**2062 mm** (**81.2 in**)
S	Clearance circle radius with **1828.8 mm** (**72.0 in**) LP bucket	**2156 mm** (**84.9 in**)
S	Clearance circle radius with **1828.8 mm** (**72.0 in**) LPE bucket	**2273 mm** (**89.5 in**)
T	Clearance circle radius rear	**1599 mm** (**63.0 in**)
V	Over the tire width	**1448 mm** (**57.0 in**)
W	Overall width	**1755 mm** (**69.1 in**)
Operating weight		**2930 kg** (**6460 lb**)
SAE Rated Operating Capacity (ROC)		**905 kg** (**1995 lb**)
Tipping load		**1814 kg** (**3999 lb**)
Counter weight (optional)		**63.8 kg** (**140.7 lb**)
Cab side glass (optional)		**21.3 kg** (**47.0 lb**)
Cab glass door (optional)		**34.0 kg** (**75.0 lb**)
Cab Lexan door (optional)		**34.0 kg** (**75.0 lb**)
Suspension seat (optional)		**10.0 kg** (**22.0 lb**)

NOTE: *Measurements are based on machines with 12 x 16.5 tires and a* ***1828.8 mm*** *(**72.0 in**) Dirt & Foundry (DF) bucket.*

NOTE: *Clearance Circle Radius (R, S, T) values were calculated using a 50/50 weight distribution (center point of counter rotation centered between the axles) and with the bucket resting flat on ground.*



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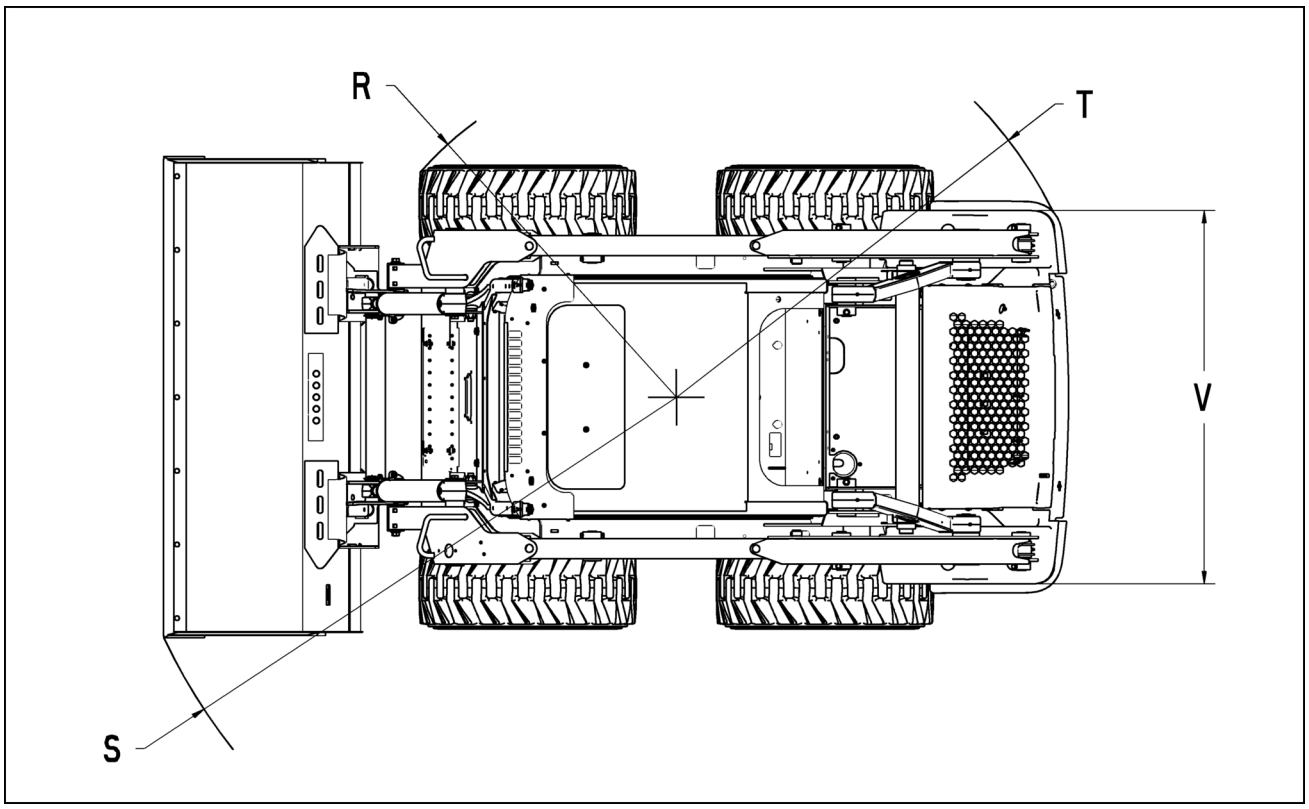
LARGE VERTICAL FRAME (L223, L225)

ITEM	COMPONENT	MEASUREMENT
A	Overall Operating Height (Fully Raised)	**4159 mm** (**164 in**)
B	Height to Hinge Pin (Fully Raised)	**3287 mm** (**129 in**)
C	Cab Height	**2002 mm** (**78.8 in**)
D	Highest Level Bucket Height	**3115 mm** (**123 in**)
E	Overall Length (No Attachment)	**2993 mm** (**117.8 in**)
F	Overall Length (With standard Bucket)	**3734 mm** (**147 in**)
G	Dump Angle (Fully Raised)	**54.7°**
H	Dump Height (Maximum Reach)	**2541 mm** (**100 in**)
J	Dump Reach (Fully Raised)	**892 mm** (**35 in**)
K	Maximum Rollback @ Ground	**33.6°**
L	Maximum Rollback (Fully Raised)	**84.8°**
M	Wheel Base	**1322 mm** (**52 in**)
P	Ground Clearance (Belly Pan)	**203 mm** (**8 in**)
Q	Angle of Departure	**23.5°**
U	Rear Axle to Bumper	**1034 mm** (**40.7 in**)
NOTE: *Measurements are based on machines with 12 x 16.5 tires and a* ***1829 mm*** *(**72 in**) Dirt & Foundry (DF) bucket.*		



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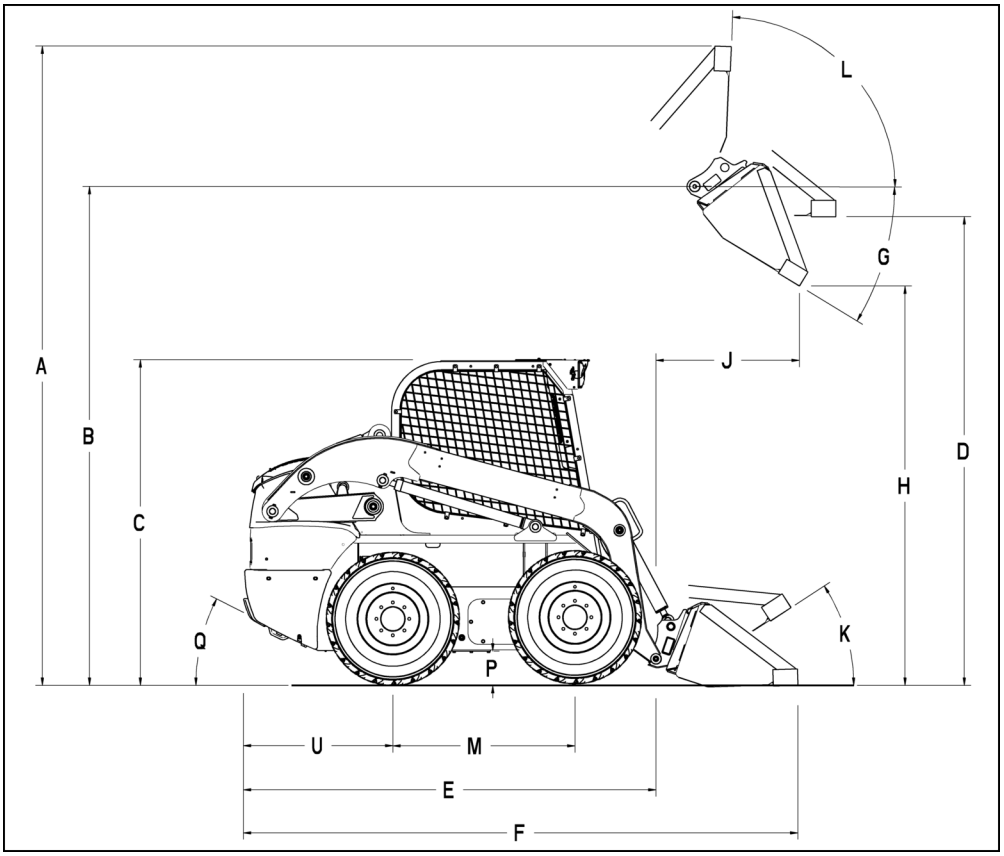
LARGE VERTICAL FRAME (L223, L225)

ITEM	COMPONENT	MEASUREMENT	
		L223	L225
R	Clearance circle radius without tool	**1412 mm** (**55.6 in**)	
S	Clearance circle radius with **1828.8 mm** (**72.0 in**) DF bucket	**2134 mm** (**84.0 in**)	
S	Clearance circle radius with **1828.8 mm** (**72.0 in**) LP bucket	**2228 mm** (**87.7 in**)	
S	Clearance circle radius with **1828.8 mm** (**72.0 in**) LPE bucket	**2345 mm** (**92.3 in**)	
T	Clearance circle radius rear	**1789.0 mm** (**70.4 in**)	
V	Over the tire width	**1448.0 mm** (**57.0 in**)	
W	Overall width	**1768.0 mm** (**69.6 in**)	
Operating weight		**3350 kg** (**7385 lb**)	**3580 kg** (**7893 lb**)
SAE Rated Operating Capacity (ROC)		**1020 kg** (**2249 lb**)	**1135 kg** (**2502 lb**)
Tipping load		**2045 kg** (**4508 lb**)	**2268 kg** (**5000 lb**)
Counter weight (optional)		**136.0 kg** (**299.8 lb**)	
Cab side glass (optional)		**21.3 kg** (**47.0 lb**)	
Cab glass door (optional)		**34.0 kg** (**75.0 lb**)	
Cab Lexan door (optional)		**34.0 kg** (**75.0 lb**)	
Suspension seat (optional)		**10.0 kg** (**22.0 lb**)	

NOTE: *Measurements are based on machines with 12 x 16.5 tires and a* ***1829 mm*** *(**72 in**) Dirt & Foundry (DF) bucket.*

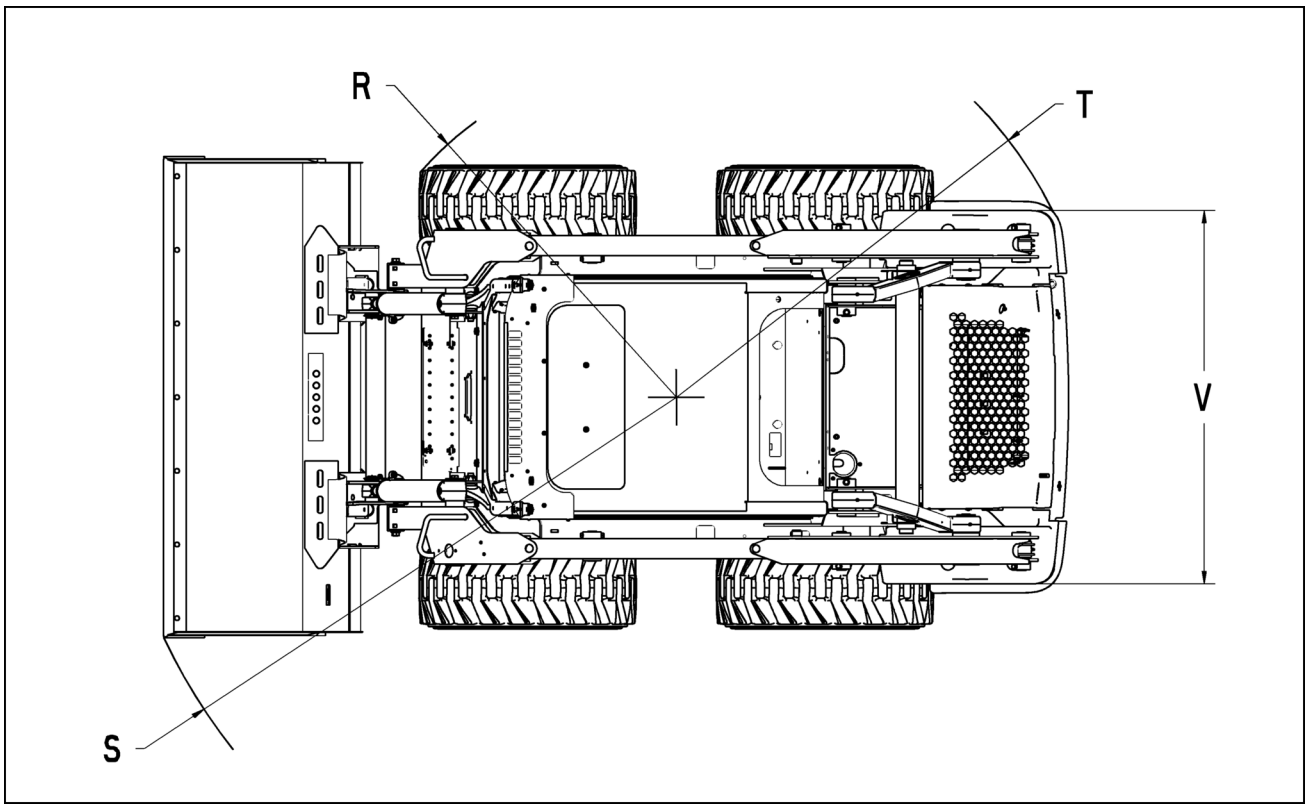
NOTE: *Clearance Circle Radius (R, S, T) values were calculated using a 50/50 weight distribution (center point of counter rotation centered between the axles) and with the bucket resting flat on ground.*



631002257 9

LARGE VERTICAL FRAME (L230)

ITEM	COMPONENT	MEASUREMENT
A	Overall Operating Height (Fully Raised)	**4096 mm** (**161.3 in**)
B	Height to Hinge Pin (Fully Raised)	**3327 mm** (**131 in**)
C	Cab Height	**2042 mm** (**80.4 in**)
D	Highest Level Bucket Height	**3155 mm** (**124.2 in**)
E	Overall Length (No Attachment)	**2685 mm** (**105.7 in**)
F	Overall Length (With standard Bucket)	**2986 mm** (**117.6 in**)
G	Dump Angle (Fully Raised)	**54.7°**
H	Dump Height (Maximum Reach)	**2655 mm** (**94.7 in**)
J	Dump Reach (Fully Raised)	**781 mm** (**29.8 in**)
K	Maximum Rollback @ Ground	**32.8°**
L	Maximum Rollback (Fully Raised)	**84.8°**
M	Wheel Base	**1322 mm** (**52.0 in**)
P	Ground Clearance (Belly Pan)	**243 mm** (**10 in**)
Q	Angle of Departure	**26.5°**
U	Rear Axle to Bumper	**1034 mm** (**40.7 in**)
NOTE: *Measurements are based on machines with 14 x 17.5 tires and a* ***1981.2 mm*** *(**78.0 in**) Dirt & Foundry (DF) bucket.*		



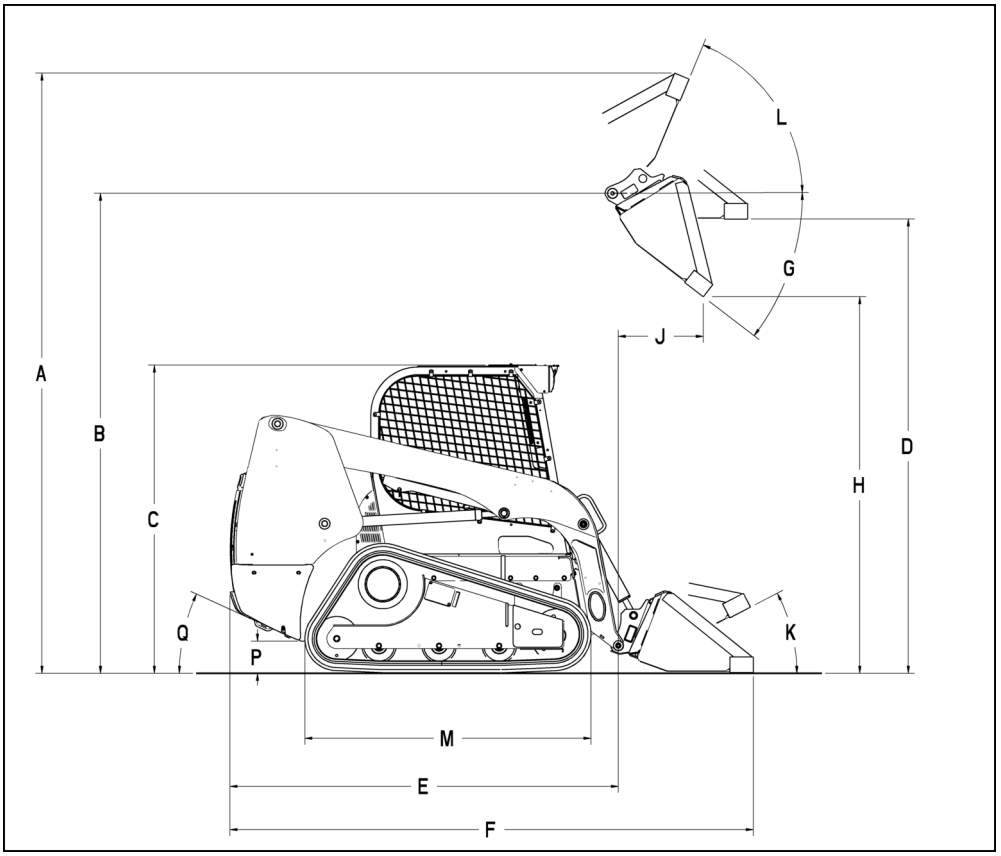
631002258 10

LARGE VERTICAL FRAME (L230)

ITEM	COMPONENT	MEASUREMENT
R	Clearance circle radius without tool	**1399 mm** (**55.1 in**)
S	Clearance circle radius with **1981.2 mm** (**78.0 in**) DF bucket	**2155 mm** (**84.8 in**)
S	Clearance circle radius with **1981.2 mm** (**78.0 in**) LP bucket	**2251 mm** (**88.6 in**)
S	Clearance circle radius with **1981.2 mm** (**78.0 in**) LPE bucket	**2363 mm** (**93.0 in**)
T	Clearance circle radius rear	**1789 mm** (**70.4 in**)
V	Over the tire width	**1580 mm** (**62.2 in**)
W	Overall width	**1930 mm** (**76.0 in**)
Operating weight		**3765 kg** (**8300 lb**)
SAE Rated Operating Capacity (ROC)		**1360 kg** (**2998 lb**)
Tipping load		**2722 kg** (**6001 lb**)
Counter weight (optional)		**136 kg** (**299.8 lb**)
Cab side glass (optional)		**21.3 kg** (**47.0 lb**)
Cab glass door (optional)		**34.0 kg** (**75.0 lb**)
Cab Lexan door (optional)		**34.0 kg** (**75.0 lb**)
Suspension seat (optional)		**10.0 kg** (**22.0 lb**)

NOTE: *Measurements are based on machines with 14 x 17.5 tires and a* ***1981.2 mm*** *(**78.0 in**) Dirt & Foundry (DF) bucket.*

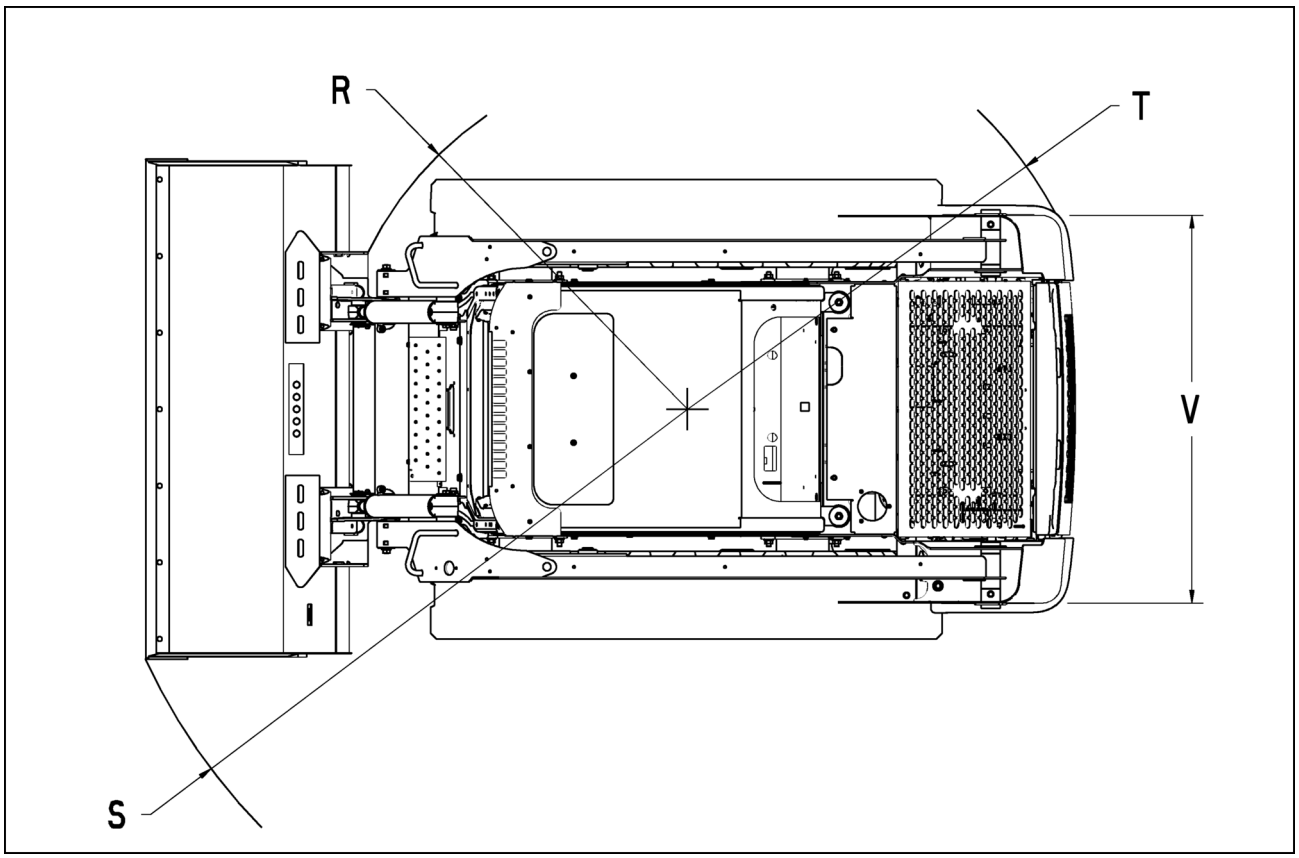
NOTE: *Clearance Circle Radius (R, S, T) values were calculated using a 50/50 weight distribution (center point of counter rotation centered between the axles) and with the bucket resting flat on ground.*



631002261 11

MEDIUM RADIAL FRAME TRACK UNITS (C227)

LOCATION	COMPONENT	MEASUREMENT
A	Overall Operating Height (Fully Raised)	**3920 mm** (**154.3 in**)
B	Height to Hinge Pin (Fully Raised)	**3124 mm** (**123 in**)
C	Cab Height	**1998 mm** (**78.7 in**)
D	Highest Level Bucket Height	**2950 mm** (**116.1 in**)
E	Overall Length (No Attachment)	**2669 mm** (**105.1 in**)
F	Overall Length (With standard Bucket)	**3292 mm** (**129.6 in**)
G	Dump Angle (Fully Raised)	**39.6°**
H	Dump Height (Maximum Reach)	**2495 mm** (**98.2 in**)
J	Dump Reach (Fully Raised)	**568 mm** (**22.3 in**)
K	Maximum Rollback @ Ground	**31°**
L	Maximum Rollback (Fully Raised)	**98.6°**
M	Track length on ground	**1419.0 mm** (**55.9 in**)
P	Ground Clearance (Belly Pan)	**203 mm** (**8 in**)
Q	Angle of Departure	**32°**
NOTE: *All measurements are based on machines with a* ***1828.8 mm*** *(****72.0 in****) Dirt & Foundry (DF) bucket.*		



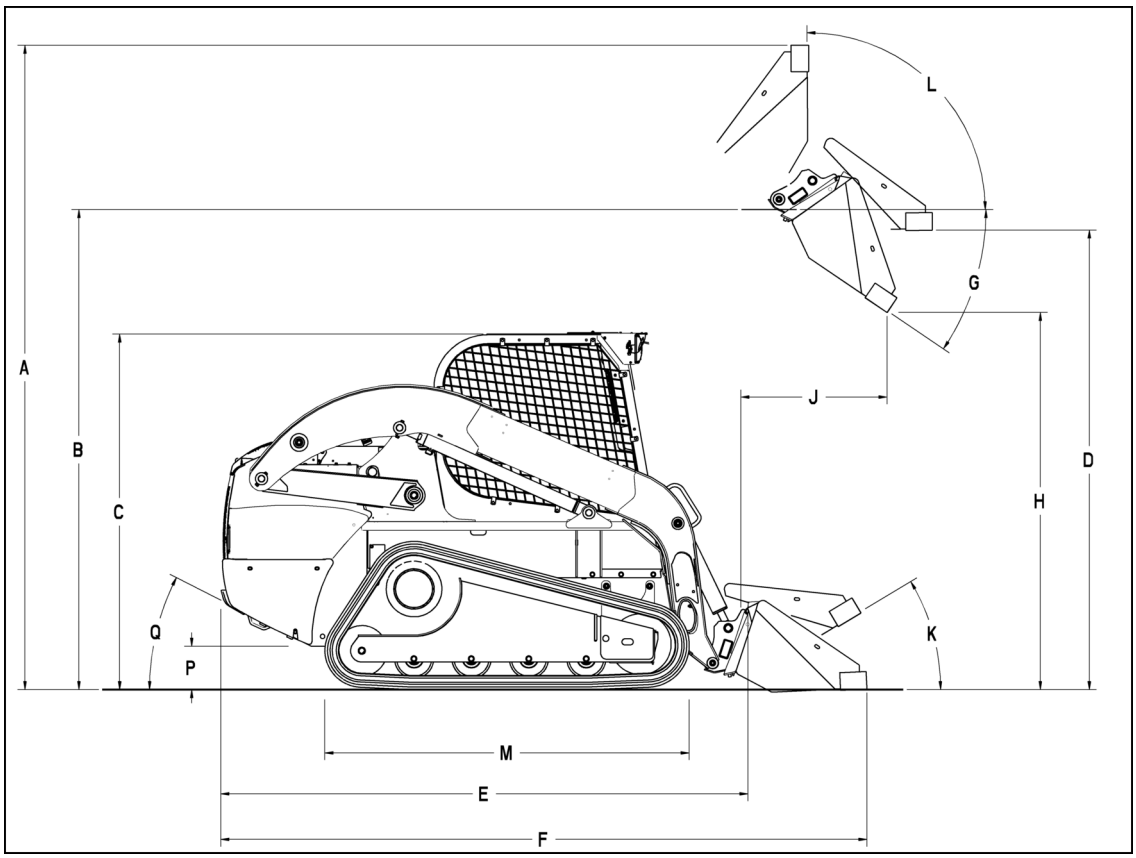
631002262 12

MEDIUM RADIAL FRAME TRACK UNITS (C227)

ITEM	COMPONENT	MEASUREMENT
R	Clearance circle radius without tool	**1410.0 mm** (**55.5 in**)
S	Clearance circle radius with **1828.8 mm** (**72.0 in**) DF bucket	**2132.0 mm** (**83.9 in**)
S	Clearance circle radius with **1828.8 mm** (**72.0 in**) LP bucket	**2226.0 mm** (**87.6 in**)
S	Clearance circle radius with **1828.8 mm** (**72.0 in**) LPE bucket	**2344.0 mm** (**92.3 in**)
T	Clearance circle radius rear	**1501.0 mm** (**59.1 in**)
V	Over the track width	**1356.0 mm** (**53.4 in**)
W	Overall width	**1676.0 mm** (**66.0 in**)
Operating weight		**3750 kg** (**8267 lb**)
SAE Rated Operating Capacity (ROC)		
	35% of tipping load	**860 kg** (**1896 lb**)
	50% of tipping load	**1225 kg** (**2701 lb**)
Tipping load		**2450 kg** (**5401 lb**)
Counter weight (optional)		**63.8 kg** (**140.7 lb**)
Cab side glass (optional)		**21.3 kg** (**47.0 lb**)
Cab glass door (optional)		**34.0 kg** (**75.0 lb**)
Cab Lexan door (optional)		**34.0 kg** (**75.0 lb**)
Suspension seat (optional)		**10.0 kg** (**22.0 lb**)

NOTE: *All measurements are based on machines with a* ***1828.8 mm*** *(****72.0 in****) Dirt & Foundry (DF) bucket.*

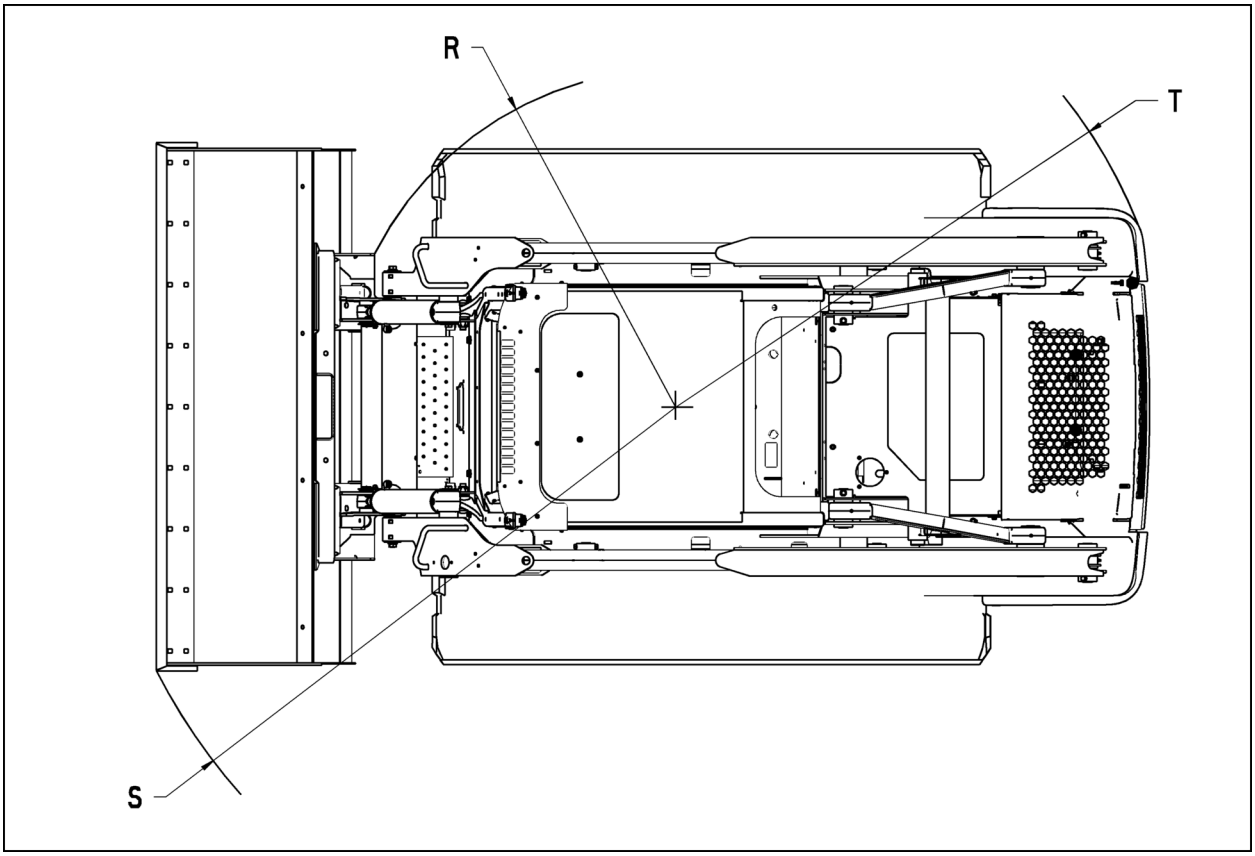
NOTE: *Clearance Circle Radius (R, S, T) values were calculated using a 50/50 weight distribution (center point of counter rotation centered between the axles) and with the bucket resting flat on ground.*



631002263 13

LARGE VERTICAL FRAME TRACK UNITS (C232 C238)

LOCATION	COMPONENT	MEASUREMENT	
		C232	C238
A	Overall Operating Height (Fully Raised)	**4199 mm** (**166.0 in**)	
B	Height to Hinge Pin (Fully Raised)	**3330 mm** (**132 in**)	
C	Cab Height	**2043 mm** (**80.4 in**)	
D	Highest Level Bucket Height	**3155 mm** (**124.8 in**)	
E	Overall Length (No Attachment)	**2993 mm** (**117.7 in**)	**2986 mm** (**117.7 in**)
F	Overall Length (With standard Bucket)	**3734 mm** (**146.0 in**)	**3727 mm** (**146.7 in**)
G	Dump Angle (Fully Raised)	**53.5°**	**54.7°**
H	Dump Height (Maximum Reach)	**2581 mm** (**101.6 in**)	
J	Dump Reach (Fully Raised)	**946 mm** (**37.2 in**)	
K	Maximum Rollback @ Ground	**32.8°**	
L	Maximum Rollback (Fully Raised)	**84.8°**	
M	Track length on ground	**1639 mm** (**64.5 in**)	
P	Ground Clearance (Belly Pan)	**243 mm** (**10 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.*			



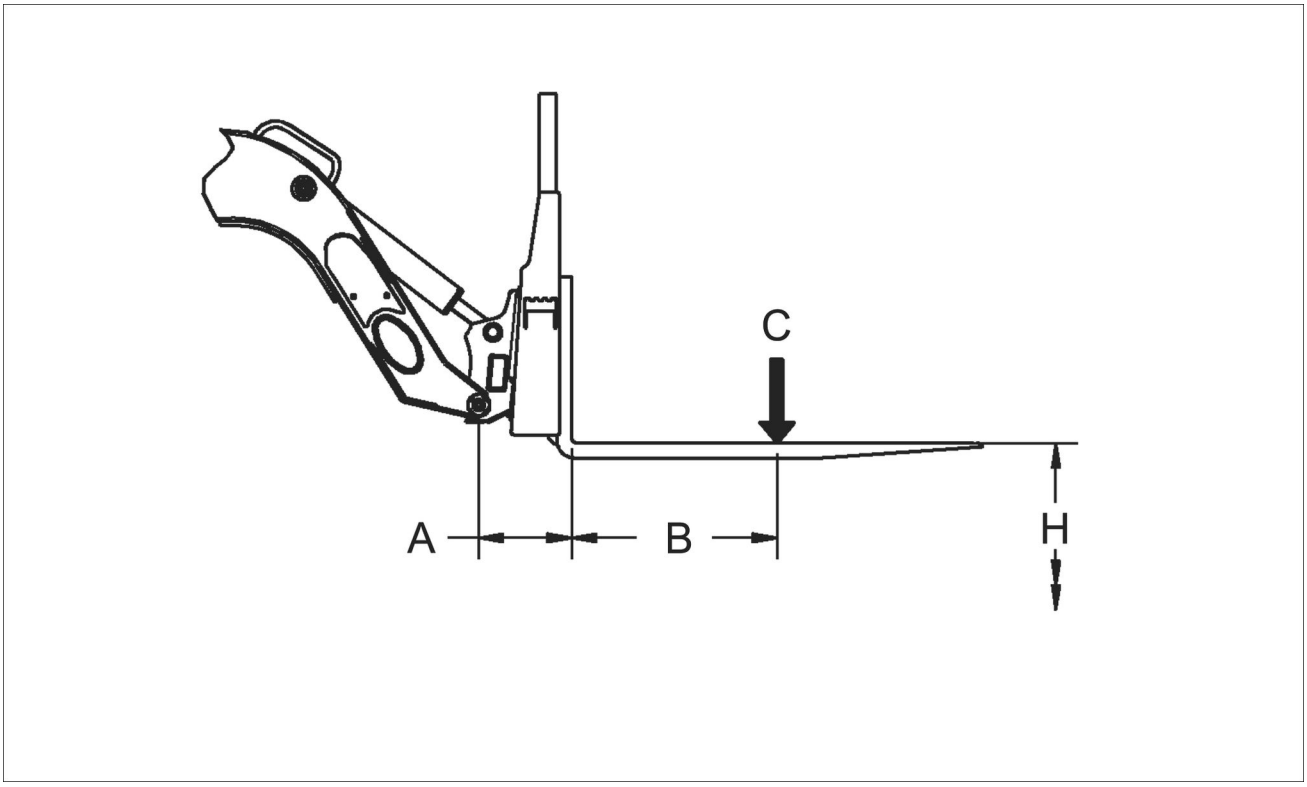
631002264 14

LARGE VERTICAL FRAME (C232, C238)

ITEM	COMPONENT	MEASUREMENT	
		C232	C238
R	Clearance circle radius without tool	**1485 mm** (**58.5 in**)	
S	Clearance circle radius with **1981.2 mm** (**78.0 in**) DF bucket	**2225 mm** (**87.6 in**)	
S	Clearance circle radius with **1981.2 mm** (**78.0 in**) HD bucket	**2322 mm** (**91.4 in**)	
S	Clearance circle radius with **1981.2 mm** (**78.0 in**) LPE bucket	**2434 mm** (**95.8 in**)	
T	Clearance circle radius rear	**1702 mm** (**67.0 in**)	
V	Over the track width	**1480 mm** (**58.3 in**)	
W	Overall width	**1930 mm** (**76.0 in**)	
Operating weight		**4370 kg** (**9634 lb**)	**4581 kg** (**10099 lb**)
SAE Rated Operating Capacity (ROC)			
	35% of tipping load	**1018 kg** (**2244 lb**)	**1209 kg** (**2665 lb**)
	50% of tipping load	**1451 kg** (**3199 lb**)	**1723 kg** (**3799 lb**)
Tipping load		**2902 kg** (**6398 lb**)	**3447 kg** (**7599 lb**)
Counter weight (optional)		**273 kg** (**601.9 lb**)	
Cab side glass (optional)		**21.3 kg** (**47.0 lb**)	
Cab glass door (optional)		**34.0 kg** (**75.0 lb**)	
Cab Lexan door (optional)		**34.0 kg** (**75.0 lb**)	
Suspension seat (optional)		**10.0 kg** (**22.0 lb**)	

NOTE: *All measurements are based on machines with a* ***1981.2 mm*** *(**78.0 in**) Heavy Dirt (HD) bucket.*

NOTE: *Clearance Circle Radius (R, S, T) values were calculated using a 50/50 weight distribution (center point of counter rotation centered between the axles) and with the bucket resting flat on ground.*



RCPH11WHL007FAN 15

Pallet Fork 201 kg (443 lb) – Rated Operating Capacity (ROC)

Legend:	A = **277 mm** (**10.9 in**)	B= **610 mm** (**24.0 in**)	C= Load Center of Gravity (CG)
Model	H = Height @ maximum reach	ROC	ROC w/Standard Weight Kit
L213	**1330 mm** (**52.4 in**)	**290 kg** (**639 lb**)	**320 kg** (**705 lb**)
L215	**1330 mm** (**52.4 in**)	**345 kg** (**639 lb**)	**375 kg** (**827 lb**)
L218	**2495 mm** (**52.4 in**)	**410 kg** (**904 lb**)	**440 kg** (**970 lb**)
L220	**2495 mm** (**52.4 in**)	**490 kg** (**1080 lb**)	**520 kg** (**1146 lb**)
L223	**2650 mm** (**104 in**)	**560 kg** (**1235 lb**)	**635 kg** (**1400 lb**)
L225	**2650 mm** (**104 in**)	**630 kg** (**1389 lb**)	**705 kg** (**1554 lb**)
L230	**2690 mm** (**106 in**)	**770 kg** (**1698 lb**)	**845 kg** (**1863 lb**)
C227[1]	**1505 mm** (**59.3 in**)	**470 kg** (**1036 lb**)	**490 kg** (**1080 lb**)
C232[1]	**2690 mm** (**106 in**)	**550 kg** (**1213 lb**)	**660 kg** (**1455 lb**)
C238[1]	**2657 mm** (**105 in**)	**790 kg** (**1742 lb**)	**901 kg** (**1986 lb**)
[1]Specified ROC for track models is 35% tipping load.			

Loader arm stop pucks

The loader arm stop pucks are stoppers located where the loader arm and frame meet. By design, the loader arm stop pucks allow the operator to lower the arms to the bottom position and level the bucket for precision grading. These pucks can also be used to change the grade of a bucket. A thinner puck will lower the grade and a thicker puck will raise the grade. The pucks installed at the factory are based on the tire size of the machine.

Frame size	Tire size width	Loader geometry	Loader stop height	Stop bolt hole location
Medium	10x	Radial	**50 mm** (**2.0 in**)	Lower
Medium	10x	Vertical	**63 mm** (**2.5 in**)	Lower
Medium	12x	Radial	**23 mm** (**0.9 in**)	Lower
Medium	12x	Vertical	**40 mm** (**1.6 in**)	Lower
Medium	Track	Radial	**23 mm** (**0.9 in**)	Lower
Medium	Track	Vertical	**40 mm** (**1.6 in**)	Lower
Large	12x	Radial	**50 mm** (**2.0 in**)	Upper
Large	12x	Vertical	**63 mm** (**2.5 in**)	Upper
Large	14x	Radial	**23 mm** (**0.9 in**)	Upper
Large	14x	Vertical	**40 mm** (**1.6 in**)	Upper
Large	Track	Radial	**23 mm** (**0.9 in**)	Upper
Large	Track	Vertical	**40 mm** (**1.6 in**)	Upper

Product identification – attachments

NOTE: *Contact your NEW HOLLAND CONSTRUCTION dealer if you need any assistance.*

Table legend:

A = Approved for this model

HF = Requires High Flow Hydraulics

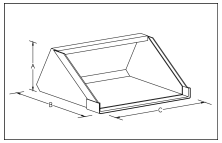
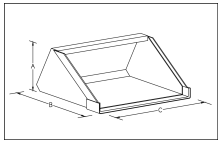
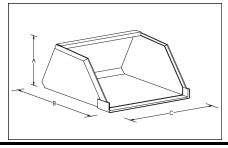
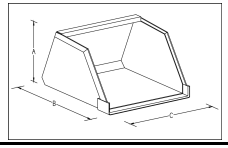
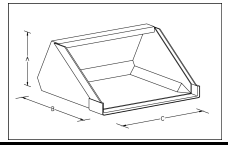
SF = Requires Standard Flow Hydraulics

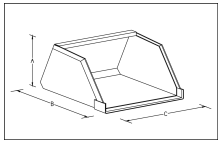
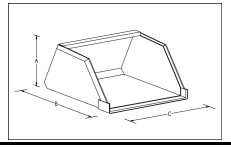
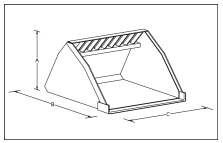
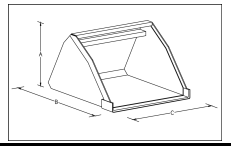
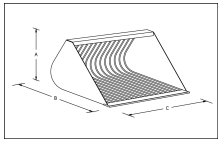
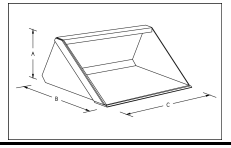
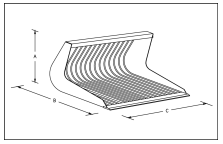
MM = Millimeters

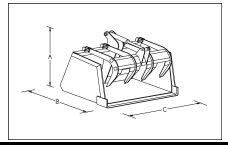
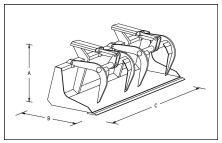
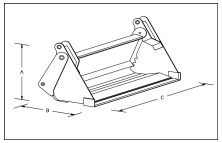
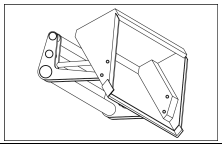
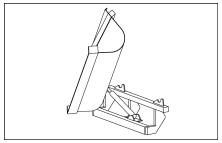
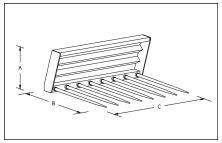
M3 = Meters cubed

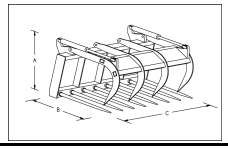
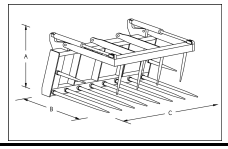
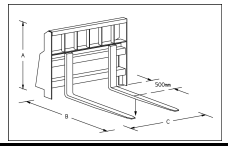
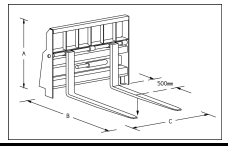
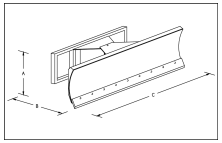
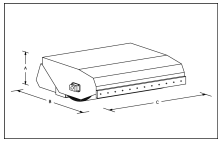
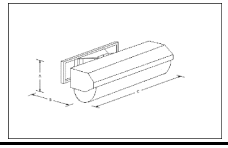
KG = Kilograms

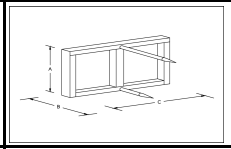
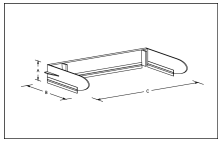
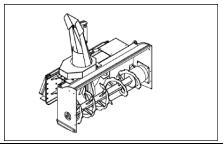
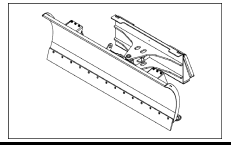
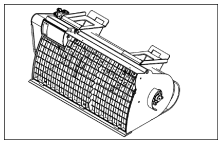
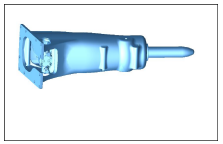
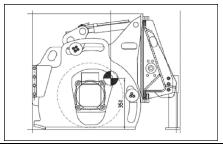
L/MIN = Liters per minute

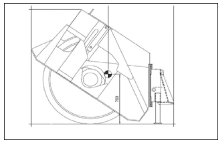
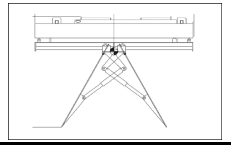
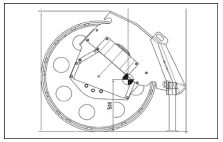
ATTACHMENT FAMILY	IMAGE	PART NUMBER	WIDTH (MM)	LENGTH (MM)	HEIGHT (MM)	CAPACITY (M3)	MASS (KG)	OPER-ATING PRES-SURE (BAR)	FLOW (L/MIN)	L213 L215	L218 L220	L223 L225 L230	C227	C232 C237
BUCKET STANDARD		87014951	1,525	725	532	0.35	150			A				
		87014952	1,680	775	556	0.48	176				A			
		87014953	1,850	906	601	0.61	230				A			
		84537069	1,525	818	532	0.35	171			A				
		84537071	1,680	868	556	0.48	200				A			
		84537072	1,850	999	601	0.61	257				A			
BUCKET HD		84537066	1,850	890	586	0.57	230					A	A	
		84537067	2,080	890	586	0.65	330					A		A
		84537073	1,850	1,010	586	0.57	257					A	A	
		84537074	2,080	1,010	586	0.65	290					A		A
BUCKET LOW PROFILE		87014890	1,525	807	540	0.40	120			A				
		87014891	1,680	807	540	0.44	160				A			
		87014892	1,830	807	540	0.48	220				A			
		87014893	1,525	893	540	0.40	155			A				
		87014894	1,680	893	540	0.44	183				A			
		87014895	1,830	893	540	0.48	249				A			
		87014896	1,525	934	540	0.47	140			A				
		87014897	1,680	934	540	0.52	155				A			
		87014898	1,830	934	540	0.57	225				A			
BUCKET LOW PROFILE - HD		84537075	1,850	870	536	0.58	250					A	A	
		84537090	2,080	870	536	0.65	278					A		A
		84537091	1,850	960	536	0.60	259					A	A	
		84537092	2,080	960	536	0.66	288					A		A
		84537127	1,850	990	536	0.65	260					A	A	
		84537129	2,080	990	536	0.74	282					A		A
BUCKET UTILITY		86590496	1,525	862	714	0.59	141			A				
		86590497	1,680	862	714	0.72	280			A	A			
		86590498	1,830	862	714	0.85	318				A			
BUCKET UTILITY - HD		84537202	1,850	1,058	727	0.90	322					A	A	
		84537203	2,080	1,058	727	1.01	366					A		A
BUCKET SLURRY		B510387	1,525	949	594	0.53	145			A				
		B510388	1,680	949	594	0.59	154				A			
		B510389	1,830	949	594	0.65	225				A			
BUCKET SLURRY - HD		84537258	1,850	949	594	0.53	150					A	A	
		84537259	2,080	949	594	0.59	159					A		A
BUCKET DIRT - HD		86590492	1,525	778	559	0.43	195			A				
		86590493	1,680	778	559	0.48	246				A			
		84537265	1,850	890	586	0.56	272					A	A	
		84537266	2,080	890	586	0.63	320					A		A

ATTACHMENT FAMILY	IMAGE	PART NUMBER	WIDTH (MM)	LENGTH (MM)	HEIGHT (MM)	CAPACITY (M3)	MASS (KG)	OPER-ATING PRES-SURE (BAR)	FLOW (L/MIN)	L213 L215	L218 L220	L223 L225 L230	C227	C232 C237
BUCKET LIGHT MATERIAL		87014899	1,525	907	630	0.63	185			A				
		86590499	1,680	907	630	0.69	222				A			
		86590500	1,830	907	630	0.77	332				A			
		86590501	1,980	907	630	0.85	342							
BUCKET LIGHT MATERIAL - HD		84537275	1,850	1,083	830	1.10	342					A	A	
		84537276	2,080	1,083	830	1.20	373					A		A
BUCKET FERTILIZER		87014124	1,680	958	599	0.67	185			A	A			
		87014125	1,830	958	599	0.73	222				A			
		87014126	2,000	958	599	0.80	332							
BUCKET FERTILIZER - HD		84537280	1,850	1,391	833	1.24	322					A	A	
		84537281	2,080	1,391	833	1.40	342					A		A
BUCKET SHIP TRIMMING		87014660	1,680	944	687	0.71	260				A			
		87014661	1,850	944	687	0.79	300				A			
		87014662	2,000	944	687	0.85	345				A			
BUCKET SHIP TRIMMING - HD		84537292	1,850	1,400	974	0.79	305					A	A	
		84537293	2,080	1,400	974	0.89	315					A		A
BUCKET POULTRY		87014628	1,750	1,004	802	0.95	264				A			
		87014629	1,830	1,004	802	0.99	342				A			
		87014630	2,000	1,004	802	1.09	346				A			
BUCKET POULTRY - HD		84537300	1,850	1,004	802	1.00	350					A	A	
		84537301	2,080	1,004	802	1.13	410					A		A
BUCKET ROOT CROP		87014136	1,680	1,008	685	0.63	185			A				
		87014137	1,825	1,008	685	0.70	266				A			
		87014138	1,980	1,008	685	0.75	340				A			
BUCKET ROOT CROP - HD		84537306	1,850	1,008	685	0.72	290					A	A	
		84537307	2,080	1,008	685	0.79	327					A		A
BUCKET CALIBRATED		87014703	1,180	832	497	0.20	117			A	A	A	A	A
		87014704	1,406	1,064	618	0.40	148				A	A	A	A
		87014705	1,748	1,064	618	0.50	161					A	A	A
BUCKET DUTCH STONE		87014663	1,525	955	625	0.36	175			A				
		B510793	1,525	1,040	625	0.36	204			A				
		87014664	1,680	955	625	0.40	186				A			
		B510794	1,680	1,040	625	0.40	220				A			
		87014665	1,850	955	625	0.44	276				A			
		B510795	1,850	1,040	625	0.44	310				A			
BUCKET DUTCH STONE - HD		84537317	1,850	835	695	0.33	238					A	A	
		84537319	1,850	835	695	0.33	242					A	A	
		84537318	2,080	835	695	0.38	242					A		A
		84537320	2,080	835	695	0.38	245					A		A

ATTACHMENT FAMILY	IMAGE	PART NUMBER	WIDTH (MM)	LENGTH (MM)	HEIGHT (MM)	CAPACITY (M3)	MASS (KG)	OPERATING PRESSURE (BAR)	FLOW (L/MIN)	L213 L215	L218 L220	L223 L225 L230	C227	C232 C237
BUCKET with GRAPPLE		B510414	1,525	762	819	0.60	300	225	20-80	A, SF				
		B510415	1,680	762	819	0.75	324	225	20-80		A, SF			
BUCKET INDUSTRIAL		B510416	1,525	986	765	0.60	350	225	20-80	A, SF				
		B510417	1,680	986	765	0.75	400	225	20-80		A, SF			
		B510418	1,830	986	765	0.77	450	225	20-80		A, SF			
BUCKET INDUSTRIAL - HD		84539680	1,850	986	765	0.77	495	225	20-80			A, SF	A, SF	
		84539682	2,080	986	765	0.87	522	225	20-80			A, SF		A, SF
BUCKET 4 IN 1		B510419	1,525	734	722	0.33	253	225	20-80	A, SF				
		B510424	1,525	868	724	0.35	280	225	20-80	A, SF				
		B510420	1,525	734	722	0.35	290	225	20-80	A, SF				
		B510425	1,525	868	724	0.35	280	225	20-80	A, SF				
		B510421	1,680	734	722	0.40	283	225	20-80		A, SF			
		B510426	1,680	868	724	0.40	320	225	20-80		A, SF			
		B510422	1,680	734	722	0.40	308	225	20-80		A, SF			
		B510427	1,680	868	724	0.40	320	225	20-80		A, SF			
		B510423	1,850	753	768	0.43	310	225	20-80			A, SF	A, SF	
		B510428	1,850	868	724	0.44	367	225	20-80		A, SF			
BUCKET 4 IN 1 - HD		84539689	1,850	807	724	0.44	387	225	20-80			A, SF	A, SF	
		84539692	1,850	868	724	0.44	403	225	20-80			A, SF	A, SF	
		84539690	2,080	807	724	0.50	435	225	20-80			A, SF		A, SF
		84539693	2,080	868	724	0.50	453	225	20-80			A, SF		A, SF
BUCKET HIGH TIP		B510429	1,525	968	606	0.55	336	225	20-80	A, SF				
		B510430	1,680	968	606	0.61	370	225	20-80		A, SF			
		B510431	1,850	968	606	0.67	407	225	20-80		A, SF			
BUCKET HIGH TIP - HD		84539712	1,850	968	606	0.67	407	225	20-80			A, SF	A, SF	
		84539713	2,080	968	606	0.76	426	225	20-80			A, SF		A, SF
BUCKET SIDE TIP		B510432	1,525	1,048	748	0.40	230	225	20-80	A, SF				
		B510433	1,525	1,048	748	0.40	230	225	20-80	A, SF				
		B510434	1,680	1,048	748	0.50	245	225	20-80		A, SF			
		B510435	1,680	1,048	748	0.50	245	225	20-80		A, SF			
		B510436	1,850	1,048	748	0.55	250	225	20-80		A, SF			
		B510437	1,850	1,048	748	0.55	250	225	20-80		A, SF			
BUCKET SIDE TIP - HD		84539719	1,850	1,048	748	0.55	250	225	20-80			A, SF	A, SF	
		84539721	1,850	1,048	748	0.55	250	225	20-80			A, SF	A, SF	
		84539722	2,080	1,048	748	0.60	295	225	20-80			A, SF		A, SF
		84539723	2,080	1,048	748	0.60	295	225	20-80			A, SF		A, SF
FORK FARM		86590511	1,525	893	593		153			A				
		86590512	1,680	893	593		170				A			
		84539728	1,850	893	593		221				A	A	A	
FORK FARM - HD		84539729	2,080	893	593		211					A		A

ATTACHMENT FAMILY	IMAGE	PART NUMBER	WIDTH (MM)	LENGTH (MM)	HEIGHT (MM)	CAPACITY (M3)	MASS (KG)	OPER-ATING PRES-SURE (BAR)	FLOW (L/MIN)	L213 L215	L218 L220	L223 L225 L230	C227	C232 C237
FORK FARM with GRAPPLE		B510441	1,525	1,010	796	0.85	250	225	20-80	A, SF				
		B510442	1,680	1,010	796	0.92	260	225	20-80		A, SF			
		B510443	1,850	1,010	796	1.01	310	225	20-80		A, SF			
FORK FARM with GRAPPLE - HD		84539731	1,850	1,010	796	1.01	341	225	20-80			A, SF	A, SF	
		84539732	2,080	1,010	796	1.14	381	225	20-80			A, SF		A, SF
FORK SILAGE with GRAPPLE		B510444	1,525	903	776	0.85	255	225	20-80	A, SF				
		B510445	1,680	903	776	0.91	302	225	20-80		A, SF			
		B510446	1,850	903	776	1.01	334	225	20-80		A, SF			
FORK SILAGE with GRAPPLE - HD		84539750	1,850	903	776	1.02	367	225	20-80			A, SF	A, SF	
		84539751	2,080	903	776	1.14	407	225	20-80			A, SF		A, SF
FORK PALLET		86590518	1,216	1,096	904		126			A	A			
		86590519	1,216	1,248	904		144			A	A			
FORK PALLET - HD		84539760	1,220	1,401	904		194			A	A	A	A	A
FORK PALLET with SIDE SHIFT		B510450	1,220	1,300	900		308	225	20-80	A, SF	A, SF			
		B510451	1,220	1,450	900		312	225	20-80	A, SF	A, SF			
FORK PALLET with SIDE SHIFT - HD		84539763	1,220	1,760	900		320	225	20-80	A, SF	A, SF	A, SF	A, SF	A, SF
SNOW PLOW / DOZER BLADE		B510453	1,980	812	627		285			A	A		A	
		B510454	1,980	812	627		305	225	20-80	A, SF	A, SF		A, SF	
		B510455	2,135	812	627		288				A		A	
		B510456	2,135	812	627		325	225	20-80		A, SF		A, SF	
SNOW PLOW / DOZER BLADE - HD		84539789	2,135	812	679		316					A	A	
		84539790	2,135	812	627		358	225	20-80			A, SF	A, SF	
		84539791	2,365	812	679		328					A		A
		84539792	2,365	812	627		370	225	20-80			A, SF		A, SF
		84539793	2,640	1,068	716		650	225	20-80			A, SF		A, SF
BROOM BUCKET		B510796	1,778	1,310	683	0.35	400	225	20-80	A, SF				
		B510797	1,933	1,310	683	0.38	430	225	20-80		A, SF		A, SF	
		B510798	2,100	1,310	683	0.43	460	225	20-80		A, SF		A, SF	
		B507386	2,100	1,314	683	0.43	460	225	20-80			A, SF		
		B507387	2,333	1,314	683	0.48	490	225	20-80			A, SF		A, SF
		B510457	1,778	1,314	696	0.35	405	225	20-80	A, SF				
		B510458	1,933	1,314	696	0.38	435	225	20-80		A, SF		A, SF	
		B510459	2,130	1,314	696	0.43	465	225	20-80		A, SF		A, SF	
BROOM ANGLE		73318553	1,960	1,342	772		405	<300	<95	A, SF				
		73318554	2,250	1,342	772		435	<300	<95		A, SF		A, SF	
BROOM ANGLE - HD		84539819	2,610	1,342	772		465	<300	<95		A, SF	A, SF		A, SF

ATTACHMENT FAMILY	IMAGE	PART NUMBER	WIDTH (MM)	LENGTH (MM)	HEIGHT (MM)	CAPACITY (M3)	MASS (KG)	OPER-ATING PRES-SURE (BAR)	FLOW (L/MIN)	L213 L215	L218 L220	L223 L225 L230	C227	C232 C237
BALE SPIKE		86590517	1,220	980	610		55			A	A	A	A	A
SCRAPER		B510463	1,750	1,092	600		145			A				
		B510464	2,080	1,092	600		176				A			
SCRAPER - HD		84531892	2,080	1,092	600		198					A	A	A
SNOW BLOWER		47858507	1,590	990	780		494	170-210	65-90	A, SF				
		47687772	1,790	990	780		506	170-210	65-90		A, SF	A, SF	A, SF	
		47687773	1,790	990	780		506	170-210	65-90		A, HF	A, HF	A, HF	
		47687774	2,080	990	780		524	170-210	65-90			A, SF	A, SF	A, SF
		47687775	2,080	990	780		524	170-210	65-90			A, HF	A, HF	A, HF
SNOW BLADE		47730544	2,100	990	700		315	<180	<80	A, SF	A, SF		A, SF	
		47730546	2,400	990	800		410	<180	<80			A, SF		A, SF
CEMENT MIXER		47730579	1,170	750	630	0.15	255	140-260	60-115		A, SF	A, SF	A, SF	A, SF
		47730580	1,490	750	630	0.20	290	140-260	60-115		A, SF	A, SF	A, SF	A, SF
		47730581	1,490	820	720	0.25	345	140-260	60-115			A, SF	A, SF	A, SF
		47730582	1,490	820	720	0.25	340	140-260	60-115			A, SF	A, SF	A, SF
		47730583	1,575	820	820	0.30	365	140-260	60-115			A, SF	A, SF	A, SF
		47730584	1,575	820	820	0.30	355	140-260	60-115			A, SF	A, SF	A, SF
		47730585	1,700	820	820	0.35	420	210-280	80-120				A, SF	A, SF
		47730586	1,760	980	980	0.45	590	210-280	80-120					A, SF
HAMMER		48034745	292	361	869		180	120-140	30-63	A, SF				
		48034752	380	417	911		275	80-130	35-90	A, SF				
		48034754	380	417	911		275	80-130	35-90		A, SF	A, SF	A, SF	A, SF
		48034780	380	453	1,032		385	80-130	40-120		A, SF	A, SF	A, SF	A, SF
		48034783	380	453	1,032		385	80-130	40-120		A, HF	A, HF	A, HF	A, HF
		48035225	400	508	1,217		505	100-140	50-150			A, HF		A, HF
COLD PLANER		84515395	1,520	1,025	810		615	<250	<90		A, SF	A, SF	A, SF	A, SF
		84515396	1,740	1,165	890		780	<215	<120		A, HF		A, HF	
		84515397	1,740	1,165	890		810	<215	<120		A, HF		A, HF	
		84515398	1,740	1,165	890		780	<215	<135			A, HF	A, HF	A, HF
		84515399	1,740	1,165	890		1,100	<215	<155			A, HF	A, HF	A, HF

ATTACHMENT FAMILY	IMAGE	PART NUMBER	WIDTH (MM)	LENGTH (MM)	HEIGHT (MM)	CAPACITY (M3)	MASS (KG)	OPER-ATING PRES-SURE (BAR)	FLOW (L/MIN)	L213 L215	L218 L220	L223 L225 L230	C227	C232 C237
ROCK WHEEL		84515523	1,740	1,900	1,650		1,255	<215	<155			A, HF	A, HF	A, HF
		84515524	1,740	1,900	1,650		1,125	<215	<155			A, HF	A, HF	A, HF
		84515526	1,740	1,900	1,650		1,180	<215	<155			A, HF	A, HF	A, HF
		84515527	1,740	2,130	1,930		1,595	<215	<155				A, HF	A, HF
		84515528	1,740	2,130	1,930		1,340	<215	<155				A, HF	A, HF
		84515530	1,740	2,130	1,930		1,390	<215	<155				A, HF	A, HF
ASPHALT FLOAT		84515674	2,012	1,459	823		675	<250	<90			A, SF	A, SF	A, SF
WHEEL COMPACTOR		84515687	1,341	1,334	1,154		615	<215	<90			A, SF	A, SF	A, SF
		84515688	1,740	1,555	1,215		615	<250	<90			A, SF	A, SF	A, SF
		84515689	1,740	1,555	1,215		615	<250	<90			A, SF	A, SF	A, SF

Material weights

MATERIAL	kg/m³	lbs/ft³
Alum		
Lump	881	55
Pulverized	769	48
Ashes	561–833	35 - 52
Bauxite	1202 - 1922	75 - 120
Beans	769	48
Charcoal	368	23
Chips	288	18
Coal	1282	80
Coke - Lump - Loose	849 - 1009	53 - 63
Clay	368 - 513	23 - 32
Concrete	1378 - 1778	86 - 111
Copper Ore	1666	104
Corn - Shelled	673	42
Cottonseed	401	25
Earth		
Dry Loam	929 - 1089	58 - 68
Wet	1602 - 1666	100 - 104
Earth - Sand Gravel	1570	98
Ensilage	577	36
Granite	1490 - 1778	93 - 111
Gravel		
Dry	1522	95
Wet	1906	119
Ice - Crushed	593	37
Iron Ore	2323	145
Limestone - Loose - Crushed	1538 - 1602	96 - 100
Oats	416	26
Peanuts - Shelled	280	17
Peas	769	48
Peat - Solid	753	47
Phosphate - Granular	1442	90
Potash	1089	68
Potatoes	769	48
Quartz - Granular	1762	110
Rice	769	48
Rye	705	44
Salt - Rock - Solid	2163	135
Sand & Gravel		
Dry	1730	108
Wet	2003	125
Sand - Foundry	1522	95
Shale	1410	88
Slag - Crushed	1121	70
Slate	2243	130
Snow	240 - 801	15 - 50
Soybeans	743	46
Sugar Beet Pulp - Wet	561	35
Sugar - Raw	961	60
Sulfur - Lumpy	1330	83
Taconite	1714	107
Wheat	769	48

Units of measure and conversion

QUANTITY	TYPICAL APPLICATION	FROM U.S. UNIT	TO SI UNIT	MULTIPLY BY
Flow, volume	Liquid flow, pump capacity	US gpm	l/min	3.7854117834
Force, thrust, drag	Pedal, spring, belt, lever	lb	N	4.4482216153
Length or distance	Land distance, odometers	miles	km	1.6093440001
		yd	m	0.9144000003
		ft	m	0.3048000000
		in	mm	25.4000000001
Torque bending moment	General, engine torque, fasteners	lb in	N·m	0.1129848333
		lb ft	N·m	1.3558179999
		kgf cm	N·m	.0980665
Power	Air conditioning, heating	btu/min	W	17.58427
		btu/h	W	.2930711
	Motors	Hp	kW	0.7354990839
	Engine	Hp	kW	0.7354990839
Power quotient	Engine performance	lb/hp	kg/kW	.6080327
Temp scale	General use	°F	°C	°C = (°F-32)/1.8
Velocity, linear	Vehicle	mph	km/h	1.6093439998
Volume	Bucket capacity	yd^3	m^3	0.7645548582
		ft^3	m^3	0.0283168466
		Bu	m^3	.03523907
		Bu	l	35.2390700035
	Liquid, fuel, lubricants	US gal	l	3.7854117834
		US qt	l	0.9463529464
		US pt	l	0.4731764730
		US fl oz	ml	29.5735295641
Flow, mass		psi	bar	0.0689655172
		psi	kPa	6.8947572946
		lb	kg	0.4535923700

Ampere	A
Volt	V
kiloNewton	kN
Newton	N
pound	lb
ounce	oz
Newton meters	N·m
pound inches	lb in
revolutions per minute	RPM
kilometer	km
meter	m
centimeter	cm
millimeter	mm
miles	miles
yard	yd
foot	ft
inch	in
kilogram	kg
kiloWatts	kW
Watt	W
horsepower	Hp
Btu per hour	Btu/hr
kiloPascal	kPa
pound per square inch	psi
degrees Celsius	°C
degrees Fahrenheit	°F
pound feet	lb ft
kilometers per hour	km/h
miles per hour	mph
cubic meter	m^3
cubic yard	yd^3
liter	l
milliliters	ml
cubic inches	in^3
US gallons	US gal
US quarts	US qt
US fluid ounces	US fl oz

Torque charts - Minimum tightening torques for normal assembly

METRIC NON-FLANGED HARDWARE

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

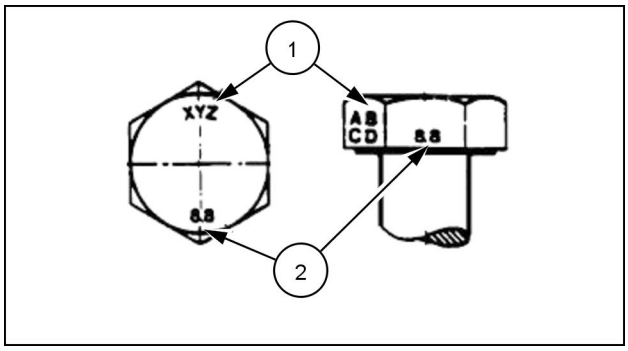
NOTE: *M4 through M8 hardware torque specifications are shown in pound-inches. M10 through M24 hardware torque specifications are shown in pound-feet.*

METRIC FLANGED HARDWARE

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

IDENTIFICATION

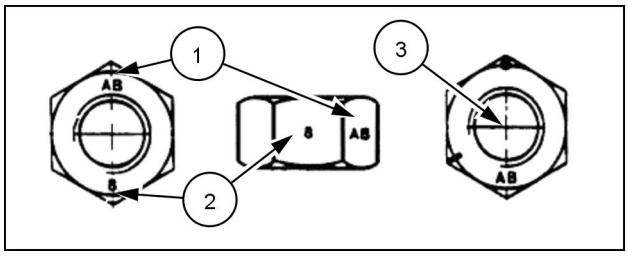
Metric Hex head and carriage bolts, classes 5.6 and up



20083680 1

1. Manufacturer's Identification
2. Property Class

Metric Hex nuts and locknuts, classes 05 and up



20083681 2

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.

INCH NON-FLANGED HARDWARE

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

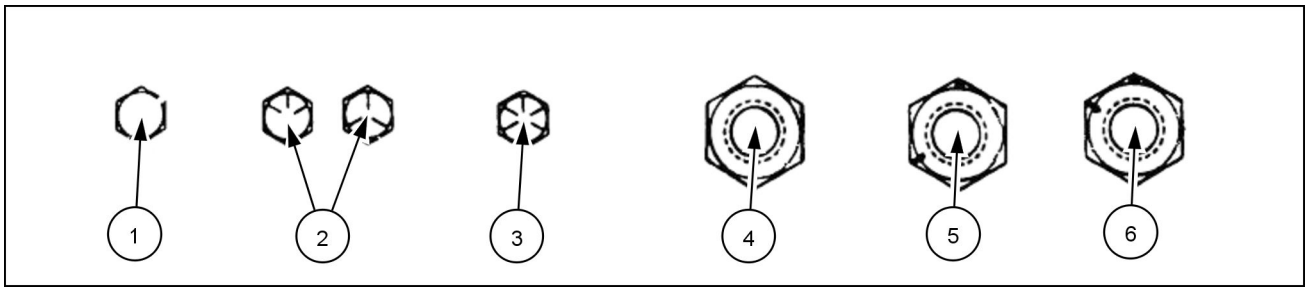
NOTE: *For Imperial Units,* ***1/4 in*** *and* ***5/16 in*** *hardware torque specifications are shown in pound-inches.* ***3/8 in*** *through* ***1 in*** *hardware torque specifications are shown in pound-feet.*

INCH FLANGED HARDWARE

NOM-INAL SIZE	SAE GRADE 5 BOLT and NUT		SAE GRADE 8 BOLT and NUT		LOCKNUT GrF W/ Gr5 BOLT	LOCKNUT GrG W/ Gr8 BOLT
	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD	UNPLATED or PLATED SILVER	PLATED W/ZnCr GOLD		
1/4	**9 N·m (80 lb in)**	**12 N·m (106 lb in)**	**13 N·m (115 lb in)**	**17 N·m (150 lb in)**	**8 N·m (71 lb in)**	**12 N·m (106 lb in)**
5/16	**19 N·m (168 lb in)**	**25 N·m (221 lb in)**	**26 N·m (230 lb in)**	**35 N·m (310 lb in)**	**17 N·m (150 lb in)**	**24 N·m (212 lb in)**
3/8	**33 N·m (25 lb ft)**	**44 N·m (33 lb ft)**	**47 N·m (35 lb ft)**	**63 N·m (46 lb ft)**	**30 N·m (22 lb ft)**	**43 N·m (32 lb ft)**
7/16	**53 N·m (39 lb ft)**	**71 N·m (52 lb ft)**	**75 N·m (55 lb ft)**	**100 N·m (74 lb ft)**	**48 N·m (35 lb ft)**	**68 N·m (50 lb ft)**
1/2	**81 N·m (60 lb ft)**	**108 N·m (80 lb ft)**	**115 N·m (85 lb ft)**	**153 N·m (113 lb ft)**	**74 N·m (55 lb ft)**	**104 N·m (77 lb ft)**
9/16	**117 N·m (86 lb ft)**	**156 N·m (115 lb ft)**	**165 N·m (122 lb ft)**	**221 N·m (163 lb ft)**	**106 N·m (78 lb ft)**	**157 N·m (116 lb ft)**
5/8	**162 N·m (119 lb ft)**	**216 N·m (159 lb ft)**	**228 N·m (168 lb ft)**	**304 N·m (225 lb ft)**	**147 N·m (108 lb ft)**	**207 N·m (153 lb ft)**
3/4	**287 N·m (212 lb ft)**	**383 N·m (282 lb ft)**	**405 N·m (299 lb ft)**	**541 N·m (399 lb ft)**	**261 N·m (193 lb ft)**	**369 N·m (272 lb ft)**
7/8	**462 N·m (341 lb ft)**	**617 N·m (455 lb ft)**	**653 N·m (482 lb ft)**	**871 N·m (642 lb ft)**	**421 N·m (311 lb ft)**	**594 N·m (438 lb ft)**
1	**693 N·m (512 lb ft)**	**925 N·m (682 lb ft)**	**979 N·m (722 lb ft)**	**1305 N·m (963 lb ft)**	**631 N·m (465 lb ft)**	**890 N·m (656 lb ft)**

IDENTIFICATION

Inch Bolts and free-spinning nuts



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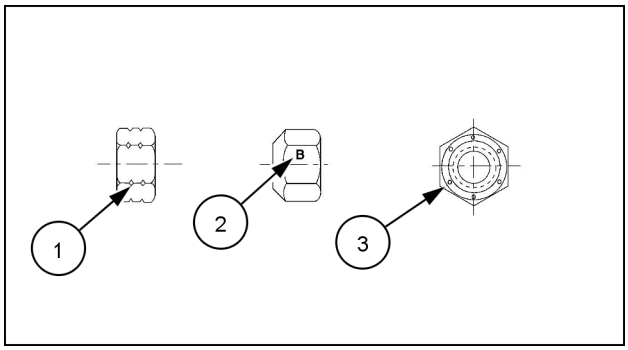
Grade Marking Examples

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

Inch Lock Nuts, All Metal (Three optional methods)



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Grade Identification

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

10 - ACCESSORIES

Telematics - Overview with New Holland FleetForce™

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

This machine may be equipped with a Telematics system. This is an asset-monitoring system that combines Internet, cellular, and GPS technologies. A transponder unit is mounted on the equipment that wirelessly communicates with the user interface NEW HOLLAND CONSTRUCTION **FleetForce™** at www.newhollandfleetforce.com. Using cellular technology, the transponder can send equipment data, including location, on/off status, usage and production metrics, diagnostic data, movement alarms, unauthorized usage and monitor machine maintenance to the user interface NEW HOLLAND CONSTRUCTION **FleetForce™**. The system will help cut costs and keep accurate records.

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Dealer's stamp

CNH Industrial America LLC reserves the right to make improvements in design and changes in specifications at any time without notice and without incurring any obligation to install them on units previously sold. Specifications, descriptions, and illustrative material herein are as accurate as known at time of publication, but are subject to change without notice.

Availability of some models and equipment builds varies according to the country in which the equipment is being used. For exact information about any particular product, please consult your New Holland dealer.