

CTX160 mini skid steer

Maintenance manual



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Introduction

This manual explains the proper maintenance of your machine. Do not attempt any maintenance procedure that is not fully understood, or that cannot be safely and accurately performed with the available tools and equipment. If an issue is encountered that is not understood or cannot be solved, contact your authorized independent Vermeer dealer.

The instructions, illustrations, and specifications in this manual are based on the latest information available at time of publication. Your machine may have product improvements and options not yet contained in this manual.

The maintenance intervals are based on normal operating conditions. When operating under severe conditions, the maintenance intervals should be shortened.

To provide a better view, some photographs or illustrations in the maintenance sections may show the machine shields removed. **Never operate the machine with the shields removed - keep all shields in place.** If removing a shield is necessary, return it to its operating position before operating the machine.

Vermeer Corporation reserves the right to make changes at any time without notice or obligation.

This manual is supplied with each machine. Refer to it for all lubrication and maintenance procedures. Keep this manual with the machine for ready reference. Store it in a protected location when not in use.

Additional copies of the manuals are available from your dealer. Reorder numbers are listed on the front covers of the manuals.

Copies of this manual are available in Spanish from your dealer. Other languages may also be available.

Su distribuidor dispone de ejemplares en español de este manual.

Notice to owner

Replacement manuals are free of charge by registering your **used** Vermeer machine. Your machine's operator's, maintenance and parts manuals may be available online at www.myvermeer.com. For questions about online or printed manuals, or to register a used machine, contact the data analytics department by telephone: 800-829-0051 or 641-628-3141; email: dataanalytics@vermeer.com; internet: www.vermeer.com or www.myvermeer.com; or, letter: Data analytics department., Vermeer Corporation, P.O. Box 200, Pella IA 50219 USA.

Attachment maintenance

Refer to the attachment manual supplied by the attachment manufacturer for maintenance intervals and instructions.

Service

Service instructions are contained in a separate service manual. Service manuals can be obtained by contacting your Vermeer dealer. If you are considering servicing the machine without the assistance of a Vermeer dealer, remember this is a complex machine which often involves complex service procedures.

There are also many components which are not user-serviceable. Do not attempt any service which you do not fully understand, nor any service that you cannot do accurately and safely with proper tools and equipment. If you encounter an issue that you do not understand or cannot solve, contact your Vermeer dealer.

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Section 10: Safety messages

General safety messages appear in this Safety messages section. Specific safety messages are located in appropriate sections of the manual where a potential hazard may occur if the instructions or procedures are not followed.

A signal word **DANGER**, **WARNING** or **CAUTION** is used with the safety alert symbol.

Safety signs with signal word **DANGER**, **WARNING** or **CAUTION** are located near specific hazards.

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.
NOTICE	Indicates information considered important, but not hazard-related.

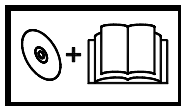
Safety symbol explanation



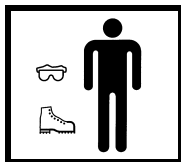
This is the safety alert symbol. This symbol is used in combination with an exclamation mark or other symbols to alert you to the potential for death or serious injury.



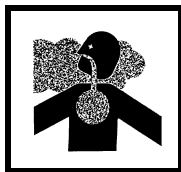
This symbol indicates that at least one part of the machine is not operating correctly. Shutting down the machine may not be necessary, but some maintenance may be required.



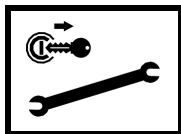
WARNING: Read operator's manual and safety signs, and watch the operations and safety video, before operating machine.



WARNING: Always wear safety glasses and safety shoes. Some working conditions and regulations may require the use of other appropriate Personal Protective Equipment (PPE), such as hearing protection, hard hat, gloves, face shield, or any other PPE necessary to provide proper safety protection for the work being performed.



WARNING: Engine exhaust can asphyxiate or poison resulting in death or serious injury. Operate machine outdoors. If it is necessary to operate engine in an enclosed area, properly vent exhaust gases.



WARNING: Failure to use shutdown procedure can result in unexpected hazard(s). Death or serious injury could result due to entanglement, crushing, cutting, or other hazardous contact. Follow Shutdown Procedure after operating, before performing any service or maintenance, and before transporting. Follow [Shutdown procedure](#), page [12-1](#).



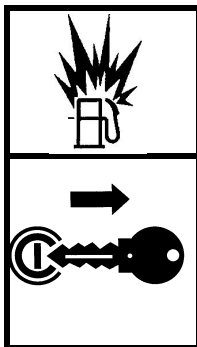
WARNING: Moving parts can crush.

Keep hands, feet, and clothing away from power-driven parts.



WARNING: Hot fluid under pressure can scald.

Allow engine to cool before opening radiator cap.



WARNING: Fuel and fumes can explode and burn.

Shut off engine before refueling. No flame. No smoking.



WARNING: Pressurized fluid can penetrate body tissue and result in death or serious injury. Leaks can be invisible. Keep away from any suspected leaks. Relieve pressure in the hydraulic system before searching for leaks, disconnecting hoses, or performing any other work on the system. If you must pressurize the system to find a suspected leak, use an object such as a piece of wood or cardboard rather than your hands. When loosening a fitting where some residual pressure may exist, slowly loosen the fitting until oil begins to leak. Wait for leaking to stop before disconnecting the fitting. Fluid injected under the skin must be removed immediately by a surgeon familiar with this type of injury.



WARNING: Make no modifications to this equipment unless specifically recommended by Vermeer Corporation.



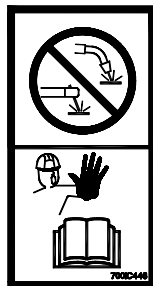
WARNING: Be sure that all safety devices, including shields, are installed and functioning properly after servicing the machine.



WARNING: Failure to follow any of the preceding safety instructions or those that follow within this manual, could result in death or serious injury. This machine is to be used only for those purposes for which it was intended as explained in the operator's manual.

Section 11: Welding precautions

Welding alert - electronic components



NOTICE: Welding will damage electronic components. Disconnecting the battery cables will not prevent damage to electronic components during welding.

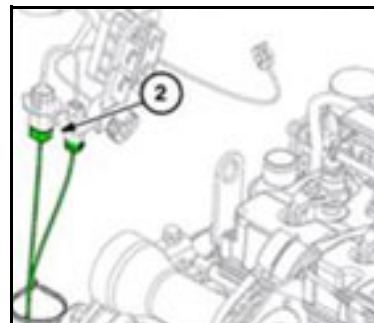
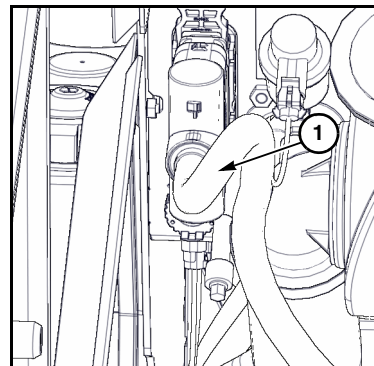
To prevent damage to electronic modules and controllers, unplug them before welding. Observe the following precautions:

- Do not clamp welding ground to any electrical component.
- Clamp welding ground on the part being welded, or as close to it as possible. Do not allow weld current to pass thorough bearings or other moving components.
- Thoroughly clean the welding location and remove paint.
- Protect wiring and wiring harness from weld spatter.
- If welding an engine-mounted component, remove it before welding.
- Use proper welding procedures.

Step 1: Follow **Shutdown procedure**, page **12-1**.

Step 2: Disconnect battery cables. Disconnect wire harness (1) from engine ECU A5

Step 3: Disconnect TCU Power Connection (2).



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Section 12: Shutdown procedure

For your safety and the safety of others, follow shutdown procedure before working on the machine for any reason, including servicing, maintaining, cleaning, inspecting, unclogging or transporting machine, or as otherwise directed in operator's manual.

Step 1: Park machine on a level surface.

Step 2: Move *ground drive joystick* to NEUTRAL.

Step 3: Move *auxiliary attachment drive lever* to NEUTRAL.

Step 4: Fully lower attachment onto the ground.

Step 5: Move *throttle* to low position and run for a minimum of 15 seconds.

NOTICE: Whenever practical and safe, allow engine to idle for 1 to 5 minutes before shutting down after operating at full power. Please consult machine's engine manual for details.

Step 6: Shut off engine and remove key.

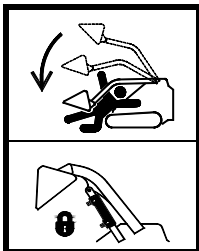
A variation of the above procedure may be used if so instructed within this manual or if an emergency requires it.

Park brake will engage when operator steps off platform or engine is shut off and spring-applied park brake pin is aligned between sprocket teeth. The brake will engage within 4" (10 cm) of travel.

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Section 15: Support bars

Lift arm support bar - install/remove

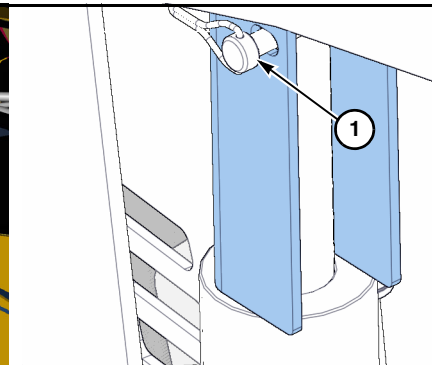
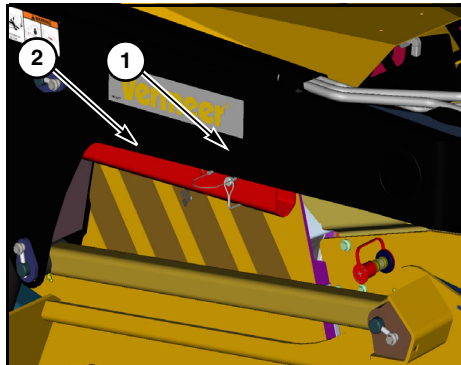


WARNING: Falling loader arms can crush.

Completely lower the loader arms or engage lock bar before disconnecting and removing hydraulic components or working under raised arms.

Always empty attachment and install loader arm support bar before working beneath raised loader arms.

- Step 1:** Remove pin (1) and support bar (2) from stow location shown in left photo.
- Step 2:** Raise lift arms to support bar height.
- Step 3:** Install support bar over lift arm cylinder as shown in right photo. Secure with pin (1).
- Step 4:** Follow [Shutdown procedure](#), page [12-1](#).
- Step 5:** When work is finished, return support bar to stow location. Install pin to retain support bar in stow location.



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Section 20: Maintenance - 10 service hours/daily

Engine maintenance

Check air intake and cooling areas, clean as necessary.

Refer to the engine operation manual supplied with machine for instructions.

Engine oil - check

(1) Oil fill cap

(2) Dipstick

Check oil level daily before operating machine. Engine must be level and not running. Unlatch top engine shield and open.

Step 1: Follow [Shutdown procedure](#), page [12-1](#).

Step 2: Clean area around dipstick before removing it. Remove dipstick and wipe clean.

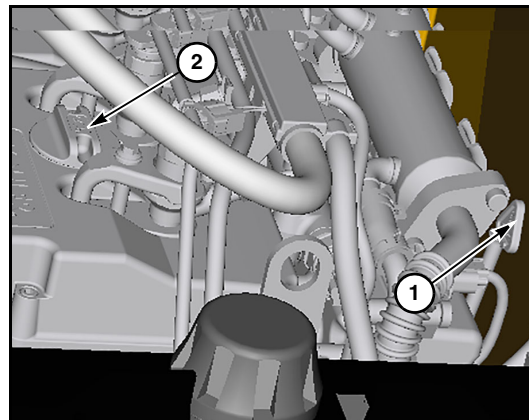
Step 3: Insert dipstick into tube and press it down fully.

Step 4: Remove dipstick and check oil level. Oil level should be up to, but not over, the "F" (full) mark.

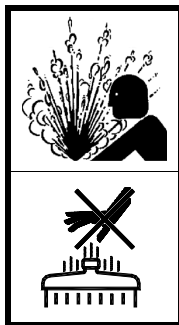
NOTICE: Do not allow oil level to go below low mark. Engine damage can result.

Step 5: If low, add oil to "F" mark on dipstick.

NOTICE: Do not overfill crankcase. Engine damage can result.



Engine coolant level - check



WARNING: Hot fluid under pressure can scald.

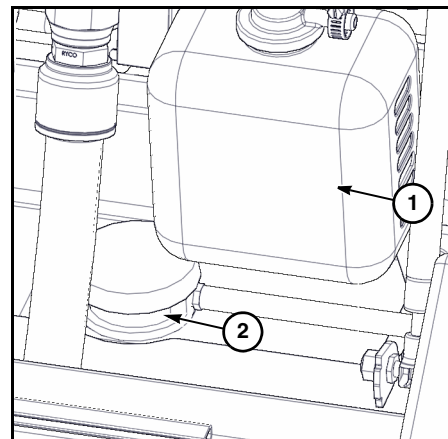
Allow engine to cool before opening radiator cap.

When machine is cold, maintain half full level in overflow bottle (1) with an Extended Life (ELC) Nitrite Free (NF) antifreeze and clean water mixture. Remove radiator cap (2) and fill to bottom of radiator full neck.

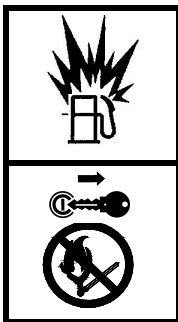
NOTICE: This machine was factory filled with a 50/50 mixture of Shell Rotella ELC NF (Extended Life Nitrite Free) coolant. Compatible coolants include Chevron Delo ELC NF and Exxon Mobil Delvac ELC NF. Never add pure antifreeze to a cooling system. Always dilute to a 50/50 mixture.

(1) **Overflow bottle**

(2) **Radiator fill cap**



Fuel tanks - fill (diesel)



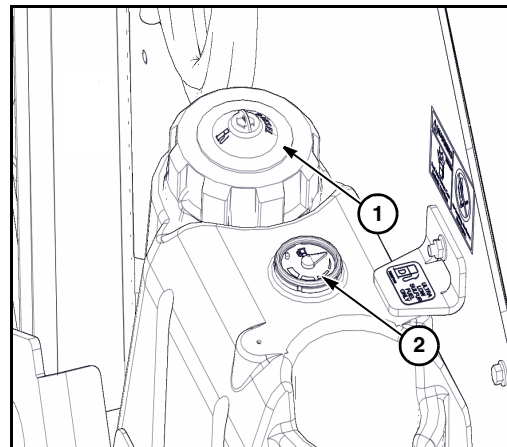
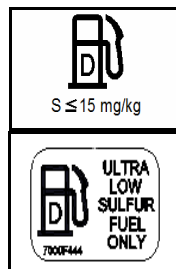
WARNING: Fuel and fumes can explode and burn.

Shut off engine before refueling. No flame. No smoking.

Fill fuel tanks at the end of each day to prevent condensation. Do not fill tanks to the very top, leave room for expansion.

- (1) **Fill caps**
- (2) **Fuel gauge**

NOTICE: Use Ultra Low Sulfur Diesel with sulfur content of less than 15 ppm.

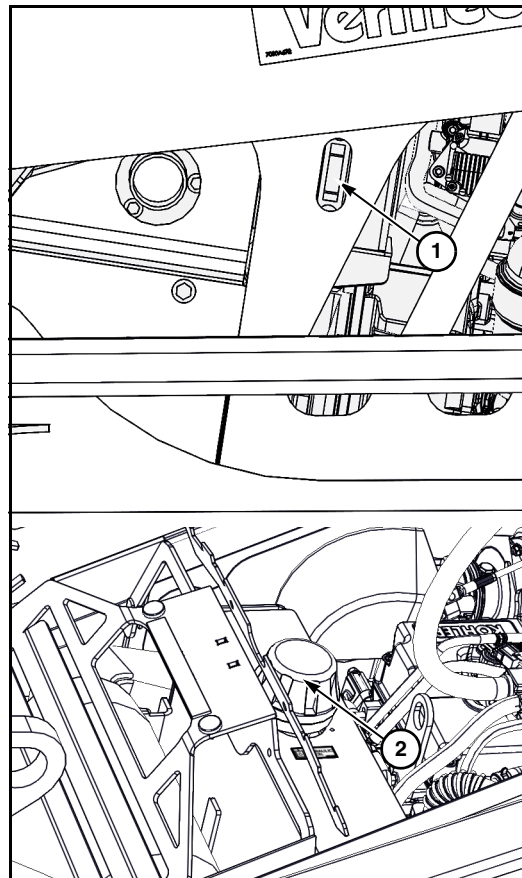


Hydraulic fluid - check

NOTICE: Clean hydraulic fluid is very important. Do not spill dirt or other contaminants into the tank. Filter all hydraulic fluid through a 10-micron filter before adding it to the tank. Check hydraulic fluid level.

Machine must be level and the boom in transport position. Oil in hydraulic tank must be cold.

- Step 1:** Look through shields on left side of machine. If hydraulic fluid is not visible in sight glass (1) continue to next step.
- Step 2:** Open hood.
- Step 3:** Remove cap (2), hydraulic oil must be to the upper mark on sight glass. If fluid low, fill to upper mark.
- Step 4:** Install fill cap.



Air cleaner - check/service

Air cleaner element must be replaced when air cleaner restriction indicator (1) reaches red area.

- **DO NOT** wash or blow out element; **it must be replaced.**

Further instructions are provided in this manual. Refer to “Air cleaner element - replace,” [page 60-1](#).

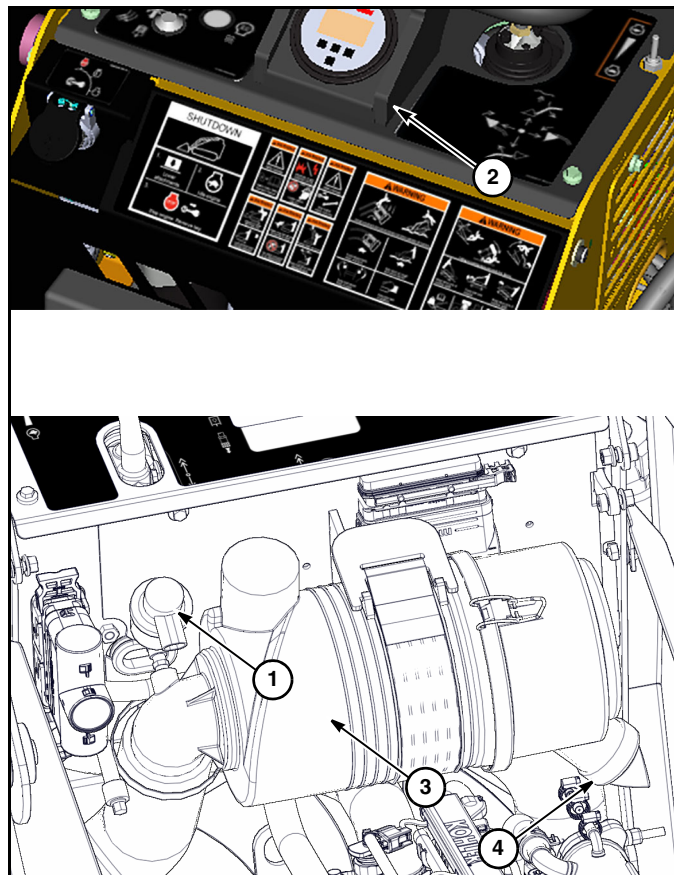
- Operating the engine with loose or damaged air cleaner components could allow unfiltered air into the engine, causing premature wear and failure.
- Never run engine without the air cleaner element.
- Refer to engine operation manual.

Step 1: Check air restriction indicator (1) daily or every 10 hours.

Step 2: Look for restriction indicator on display (2).

Step 3: Check air cleaner housing (3) for damage and debris.

Check evacuator valve (4) for wear or damage, squeeze to remove dust



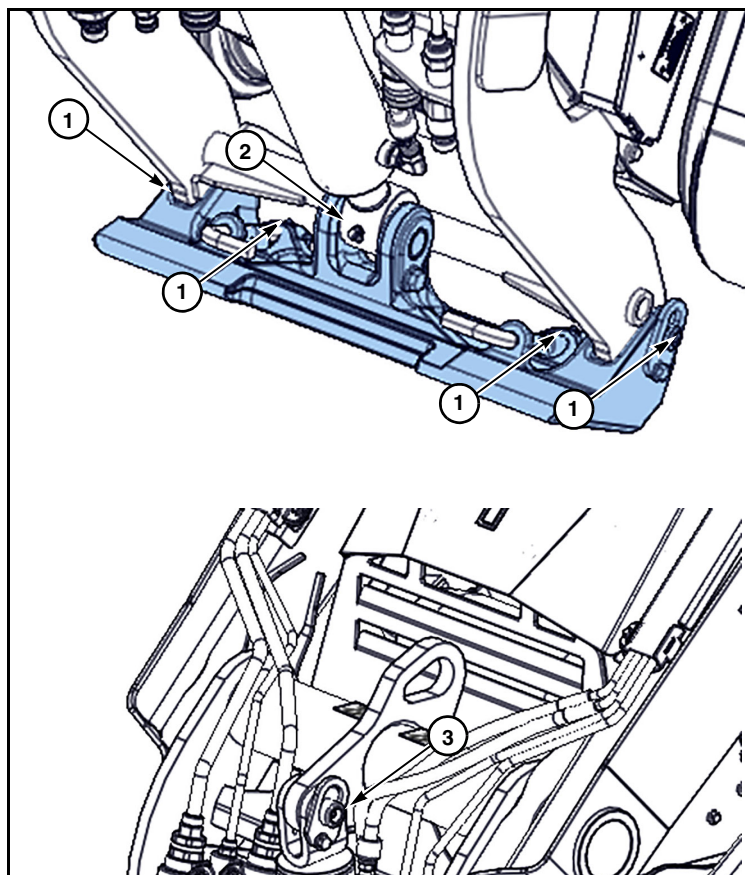
Machine - grease

Boom pivot - grease

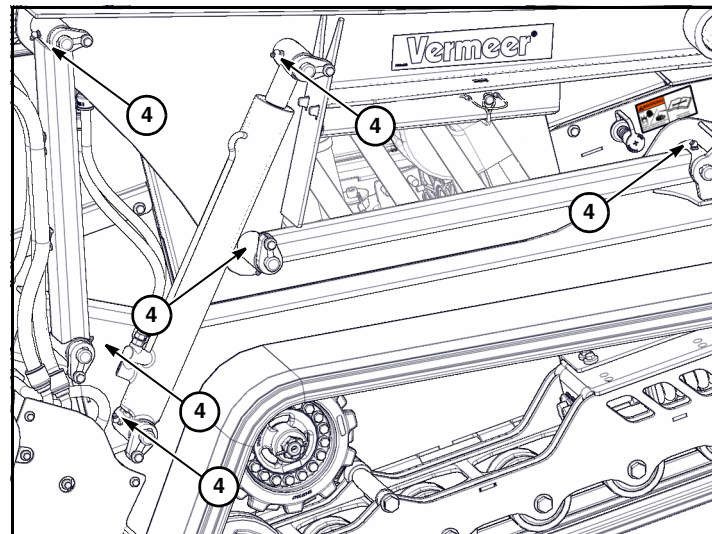
As a general rule, grease machine after it is shut down for the day. This protects the metal under the seals from corrosion caused by condensation as the temperature drops.

Ensure all fittings and the nozzle of the grease applicator are clean before applying the grease. If any grease fittings are missing, replace them immediately.

- (1) 2 shotsfour fittings (lower)
- (2) 2 shotsone fitting (pivot lower)
- (3) 2 shots one fitting (pivot upper)



(4) 2 shots..... six fittings (each side)

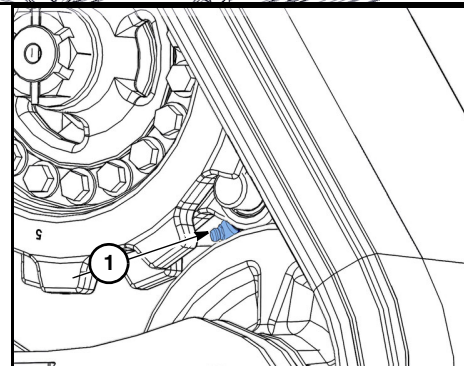


Park brake - grease

(1) 2 shots..... one fitting left side of machine

Track condition - check

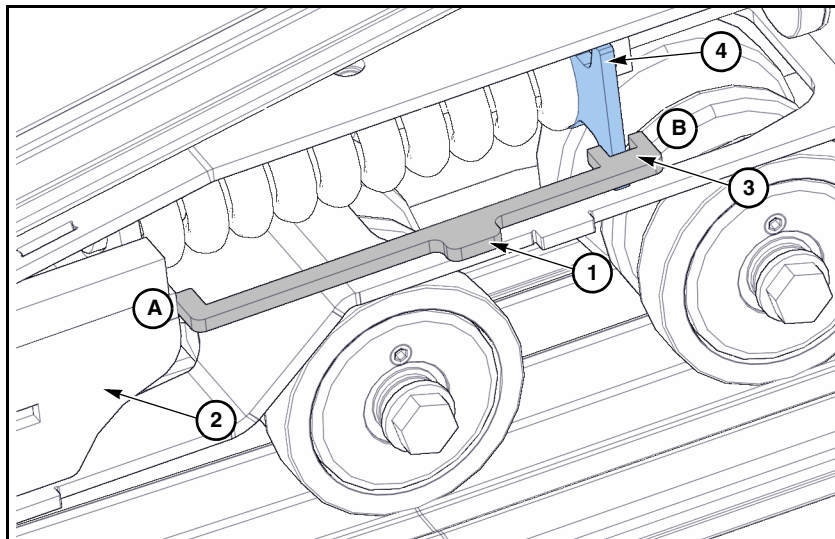
Inspect tracks daily for rips, tears, or signs of wear, replace as needed.



Track tension - check

If supplied, use gauge shipped with machine to check track tension daily.

Insert gauge (1) through slot in shield. Align front of gauge (A) with track tension fork (2) as shown. Align the fork (3) at the rear of the gauge (B) to capture the spring compressor plate (4). Fork width inside to inside is equal to the maximum tolerance allowed for track tension. If track tension falls outside of this measurement, plus or minus, adjust spring tension accordingly. Repeat for opposite side track. Refer to "Track tension - adjust," [page 60-5](#).



Section 25: Maintenance - 50 service hours/weekly

Engine maintenance

Check fuel lines and clamp bands.

Refer to the engine operation manual supplied with the machine for procedures.

Engine oil and filter - initial change

Change engine oil and replace filter after initial 50 hours of service. Change engine oil and replace engine oil filter every 500 hours thereafter.

Refer to “Engine oil/filter - change/replace,” [page 45-2](#).

Track tension - check

Proper track tension must be maintained for optimal performance and track/undercarriage life.

- Loose tracks may result in sprocket slip, possibly damaging the track and or undercarriage components.
- Ensure front of track does not contact frame. If track contacts frame, it is not adjusted properly or it is too tight. Refer to “Track tension - adjust,” [page 60-5](#).

Fuel filter replacement - initial change

Refer to “Fuel filter - replace,” [page 40-1](#).

Hydraulic filter - initial replacement

Replace hydraulic filter initially after 50 service hours.

Replace hydraulic filter every 250 service hours thereafter.

Change hydraulic fluid every 1000 service hours. Refer to “Hydraulic fluid - change,” [page 50-1](#).

Step 1: Shut down engine. Follow [Shutdown procedure](#), page [12-1](#).

Step 2: Open rear service door (1) and remove back panel (2).

Step 3: Loosen bolts (x) and (y) and allow filter to shift downward in slot. Pivot bottom of filter toward rear of machine and tighten the bolt (x) to hold filter position.

Step 4: Use a filter wrench to turn hydraulic filter (3) counterclockwise to remove filter bowl and element.

Step 5: Install filter element and bowl rotating clockwise onto filter head.

Step 6: Loosen bolt (x) and return back to mounting location and tighten bolts (x) and (y).

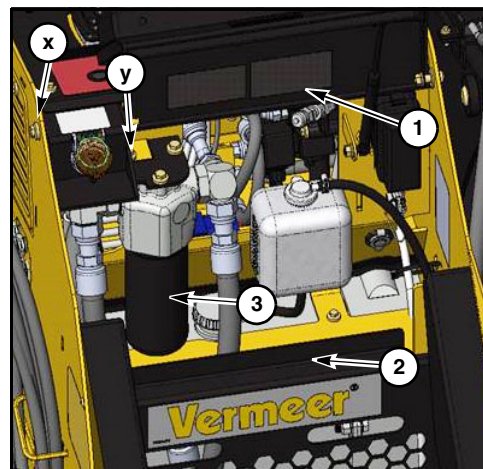
Step 7: Ensure filter bowl is tight.

Step 8: Install filter by hand, rotating clockwise onto the filter head until it contacts filter head surface.

Step 9: Install back panel (2) and lower service door (1).

Step 10: Start engine and cycle levers to pressurize the system.

Step 11: Check fluid level. Refer to “Hydraulic fluid - check,” [page 20-4](#).



Section 30: Maintenance - 100 service hours

Engine maintenance

- Check fan belt tightness.
- Clean fuel filter

Refer to the Engine Operation Manual for additional information and service requirements.

Safety signs maintenance

Safety signs located on your machine contain important and useful information that will help you operate your equipment safely and correctly. Refer to the [parts manual](#) for identification and location of safety signs.

To assure that all safety signs remain in place and in good condition, follow instructions given below:

- Keep safety signs clean. Use soap and water - not mineral spirits, abrasive cleaners, or other similar cleaners that will damage the sign.
- Replace any damaged or missing safety signs. When attaching safety signs, the temperature of the mounting surface must be at least 40°F (5°C). The mounting surface must be clean and dry.
- When replacing a machine component with a safety sign attached, replace safety sign also.
- Replacement safety signs can be purchased from your Vermeer equipment dealer.

Machine - overall check

Follow the items below and thoroughly inspect the machine. If the machine doesn't sound or operate correctly, inspect the machine to determine the cause and correct it. Refer to the Parts Manual for replacement parts.

Shields and guards - Check that all shields and guards are installed and securely fastened to the machine. Replace or repair shields, guards, or parts that are damaged or missing.

Safety and control decals - Check condition of safety and control decals on machine. Replace worn, damaged, or missing safety and control decals. Refer to manual for replacement instructions.

Parts and hardware - Check machine for worn, damaged, loose, or missing parts and hardware. Tighten loose hardware and replace worn, damaged, or missing parts and hardware.

Electrical harness - Check electrical wiring for places that are pinched, rubbed, or unsupported. Replace or repair any damaged wires and properly secure them.

Frame - Check frame and other machine structures and immediately contact your Vermeer dealer if you notice any bending or cracking.

Lock bars - Check that all machine and cylinder lock bars are present. Replace damaged or missing lock bars.

Reflectors - Check condition of reflectors on machine. Replace damaged or missing reflectors.

Fire prevention - Flammable materials can ignite on hot surfaces or in areas where friction can create heat. Keep engine, exhaust, battery, bearings, hydraulics, and fuel areas free of flammable materials and accumulated debris. Check and clean more frequently in conditions where high build-up or higher temperatures exist.

Slip resistant material - Check condition of slip resistant material on machine. Replace worn, damaged, or missing slip resistant material.

Control joystick and levers - check

Check joysticks and attachment levers for freedom of movement and proper operation.

Check that the following controls spring-return to NEUTRAL:

- Joystick controls
- Auxiliary low flow lever

Controls - check neutral positions

Machine or attachments must not move with the operator on the foot plate and engine at full rpm when controls are in the NEUTRAL position.

Contact your Vermeer dealer if any movement is detected when controls are in NEUTRAL.

Neutral start interlocks - check

Neutral start interlock system must operate correctly for safety.

Machine must not start and attachment must not move if the Auxiliary Attachment Drive Lever is out of NEUTRAL when trying to start engine.

Contact your Vermeer dealer if machine starts or if movement is detected.

Operator presence system - check

- The operator presence system must operate correctly for safety.
- If the operator leaves the platform while the ground drive, lift/tilt functions, and/or attachment drive are engaged, all ground drive, lift/tilt, and auxiliary attachment functions must stop. If *Lift / Tilt Joystick* is in FLOAT, it will continue to lower/float.
- The *auxiliary attachment drive lever* must be manually returned to NEUTRAL, *attachment* and *ground drive joysticks* released, and the operator standing on the platform, before ground drive, lift/tilt function, or attachment drive can be re-engaged.

NOTICE: This system is intended for your safety and must be maintained in good, functional condition. Contact Vermeer dealer if system requires repair or adjustment.

Hydraulic system - check



WARNING: Pressurized fluid can penetrate body tissue and result in death or serious injury. Leaks can be invisible. Keep away from any suspected leaks. Relieve pressure in the hydraulic system before searching for leaks, disconnecting hoses, or performing any other work on the system. If you must pressurize the system to find a suspected leak, use an object such as a piece of wood or cardboard rather than your hands. When loosening a fitting where some residual pressure may exist, slowly loosen the fitting until oil begins to leak. Wait for leaking to stop before disconnecting the fitting. Fluid injected under the skin must be removed immediately by a surgeon familiar with this type of injury.

- Ensure all connections are tight and hoses are in good condition before applying hydraulic pressure to the system.
- Check for leaking hoses, kinked hoses, and for hoses that rub against each other or other parts of the machine. Replace all deteriorated or damaged hoses. When a hose with a protective sleeve is replaced, always install a new protective sleeve over the new hose.
- Check hydraulic cylinders and motors for leaks and damage. Repair or replace as required.

System hydraulic pressure - relieve

Always lower loader arms and place attachment securely on the ground. Relieve all pressure in the hydraulic system before disconnecting hoses or performing other work on the system.

To relieve system pressure:

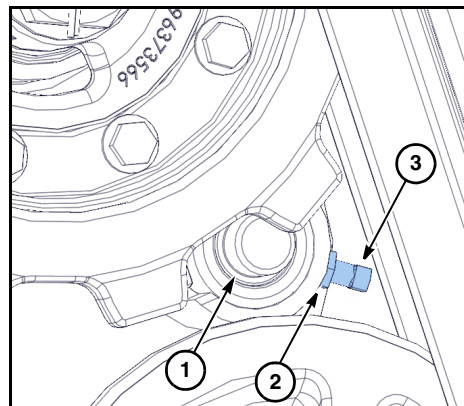
- Step 1:** Follow **Shutdown procedure**, page **12-1**.
- Step 2:** Stand on operator's platform.
- Step 3:** Turn *ignition switch* to RUN position, but do not start engine.
- Step 4:** Move *right joystick - lift/tilt controls* in all four directions, holding in each direction for a few seconds to relieve pressure.
- Step 5:** Move *auxiliary attachment drive lever* forward and back to relieve pressure in the auxiliary lines.

When loosening fittings in hoses where residual pressure may exist, slowly loosen fitting until oil begins to leak. Wait for leaking to stop before disconnecting the fitting. Ensure all connections are tight and hoses are in good condition before applying pressure to the system.

Park brake - check

Clear area around machine before testing braking system.

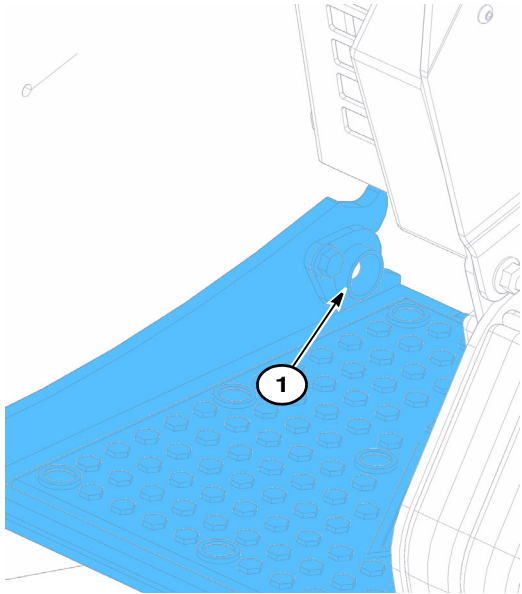
- Step 1:** Position machine on a level surface.
- Step 2:** Step on operator platform.
- Step 3:** Start engine.
- Step 4:** Increase throttle and drive forward a short distance.
- Step 5:** Step off operator platform, and check that pin (1) has moved into position between sprocket teeth. It should engage by approximately 5/8 in (15.875 mm).



- Machine may need to be moved forward or backward slightly to align pin between sprocket teeth.
- If pin does not engage sprocket teeth by at least 1/4 in(6.35 mm), loosen jam nut **(2)**, loosen setscrew, **(3)**, and move pin outward. Retighten setscrew and jam nut. Verify proper operation.

Operator platform - grease

1 shot.....one fitting (each side)



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Section 35: Maintenance - 200 service hours

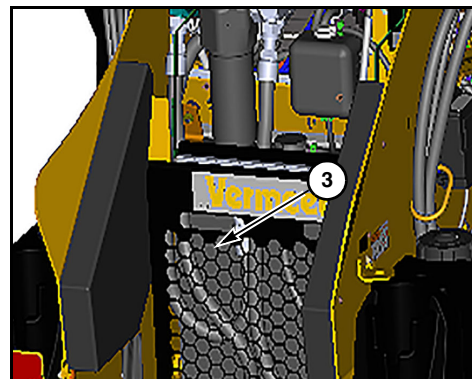
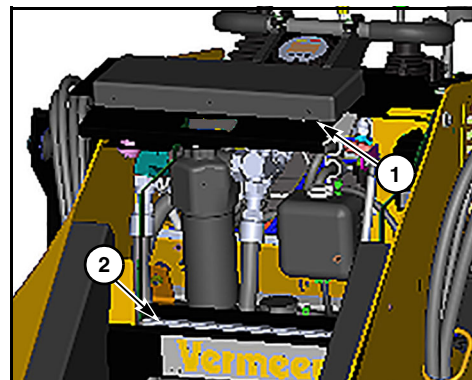
Engine maintenance

Check radiator hoses and clamp bands.

Refer to the engine operation manual supplied with the machine for procedures.

Hydraulic oil cooling fan - check/service

- Raise the rear service door (1) and lift radiator shield (2) straight up to remove.
- Clean screen (3) with water or air pressure. Partially blocked screen will increase hydraulic oil and engine operating temperature.
- Check cooling fan and cooling areas and clean as necessary.



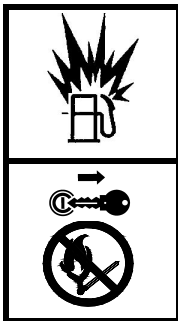
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Section 40: Maintenance - 250 service hours

Hydraulic filter - replace

- Refer to “Hydraulic filter - initial replacement,” [page 25-2](#).
- Change hydraulic fluid every 1000 service hours. Refer to “Hydraulic fluid - change,” [page 50-1](#).

Fuel filter - replace



WARNING: Fuel and fumes can explode and burn.

Shut off engine before refueling. No flame. No smoking.

Replace fuel filter (1) every 250 hours or sooner if dirty.

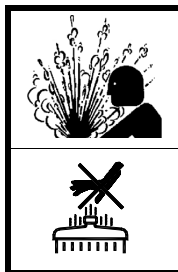
Follow [*Shutdown procedure*](#), page [*12-1*](#).

Refer to the engine operation manual for instructions.



Section 45: Maintenance - 500 service hours

Engine maintenance



WARNING: Hot fluid under pressure can scald.

Allow engine to cool before opening radiator cap.

- Remove fuel tank sediment.
- Clean engine cooling system.
- Replace fan belt.
- Fuel line check.
- Check air cleaner restriction indicator. Replace air cleaner element if necessary. Refer to “Air cleaner - check/service,” [page 20-5](#). Refer to “Air cleaner element - replace,” [page 60-1](#).
- Replace hydraulic filter. Refer to “Hydraulic filter - initial replacement,” [page 25-2](#).

Refer to the engine operation manual for additional information and service requirements.

Engine oil/filter - change/replace

Change engine oil and replace filter after initial 50 hours of service and every 500 hours thereafter. Refer to Kohler engine manual.

Engine must be level. Change oil while engine is still warm.

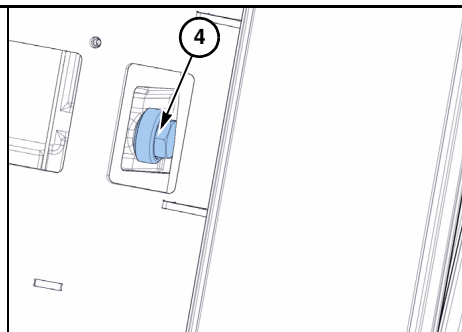
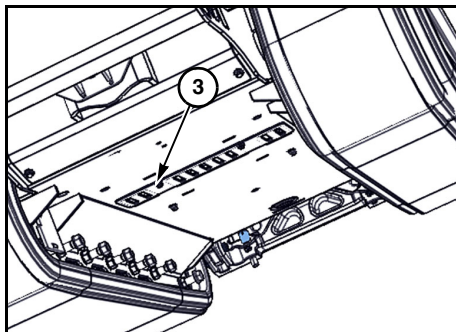
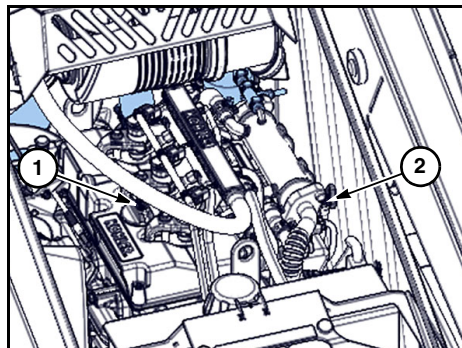
Unit may need to be elevated slightly for oil change. Drive unit onto 2 x 10 in (5 x 25 cm) or similar size pieces of lumber of sufficient length to fully support both tracks.

Step 1: Shut down engine. Follow [Shutdown procedure](#), page [12-1](#).

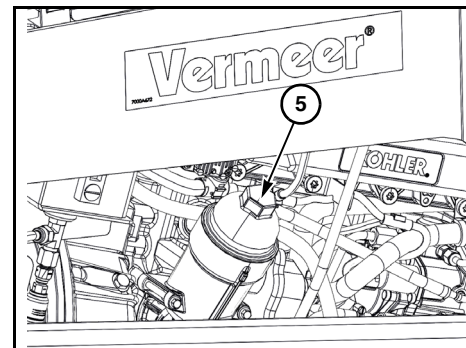
Step 2: Unlatch and open top engine shield.

Step 3: Remove oil fill cap (1) and dipstick (2).

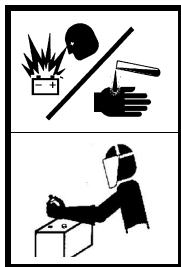
Remove screws and drain access plate (3). Remove fitting cap (4) to drain oil into suitable container, capacity 4.8 qt (4.5 L) minimum.



- Step 4:** Clean area around oil filter (5) to keep dirt and debris out of engine. Use wrench to open oil filter housing.
- Step 5:** Install new filter.
- Step 6:** Close oil filter housing.
- Step 7:** Attach fitting cap on drain line and stow. Install drain access plate and bolt.
- Step 8:** Fill crankcase to upper mark on dipstick. Refer to “Lubricants,” [page 70-1](#). Always check oil level with dipstick before adding more oil.
- Step 9:** Install oil fill cap and tighten securely. Install dipstick.
- To prevent extensive engine wear or damage, always maintain proper oil level.



Battery electrolyte levels and terminals - check/clean



WARNING: Battery fumes are flammable and can explode. Keep all burning materials away from battery. Battery explosion can blind. Acid can blind and burn. Tools and cable clamps can make sparks.

Do not smoke. Shield eyes and face. Read instructions.

- Use a flashlight to check electrolyte level.
- Work in a well-ventilated area.
- Avoid breathing fumes from battery.
- Avoid contact with skin, eyes, or clothing.
- Keep flame and sparks away, and do not smoke.
- Keep out of reach of children.
- Do not short across battery terminals or allow tools to short from battery terminals to frame.
- Do not jump-start or charge a battery with frozen electrolyte.

In case of acid contact:

External: Flush with plenty of water. If eyes have been exposed, flush with water for 15 minutes and get prompt medical attention.

Internal: Drink large quantities of water or milk, follow with milk of magnesia, beaten egg, or vegetable oil. Call a physician immediately.

Electrolyte level - check

Step 1: Follow *Shutdown procedure*, page **12-1**.

Step 2: Raise the boom and install the lock bar. Refer to “Lift arm support bar - install/remove,” *page 15-1*.

Step 3: Open top engine shield, remove side shield and front nose shield.

Step 4: If equipped, remove cell caps (1) and check battery level.

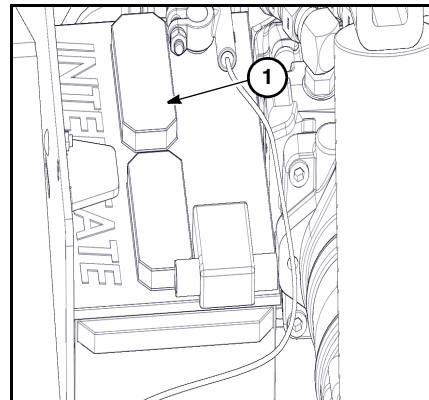
Step 5: If needed fill each cell with distilled water.

NOTICE: If battery is under filled, the electrolyte will be too concentrated, causing plates to deteriorate more rapidly and become chemically inactive. Do not overfill. In freezing weather, run engine for a few minutes immediately after filling battery to allow proper mixing of water and electrolyte. If battery uses too much water, check it for overcharging.

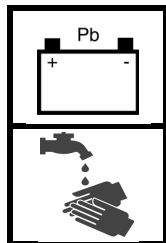
Step 6: Install cell caps.

Step 7: Reinstall front nose shield, side shield.

Step 8: Close top engine shield and secure.



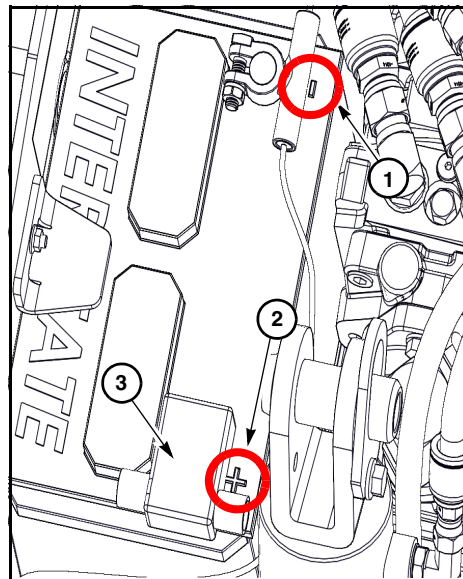
Battery terminals - clean



WARNING: Battery posts, terminals, and related accessories contain lead and lead compounds.

Wash hands after handling.

- Step 1:** Follow [Shutdown procedure](#), page [12-1](#).
- Step 2:** Raise the boom and install the lock bar. Refer to “Lift arm support bar - install/remove,” [page 15-1](#).
- Step 3:** Open top engine shield and remove the side shield and front nose shield.
- Step 4:** Remove NEGATIVE (-) cable **(1)** first, then remove POSITIVE (+) cable **(2)**.
- Step 5:** Clean battery terminals and cable terminals with a stiff wire brush.
- Step 6:** Apply a light coating of petroleum jelly around base of each terminal.
- Step 7:** Install POSITIVE (+) cable, then install NEGATIVE (-) cable. Install red plastic cap **(3)** over positive cable clamp.
- Keep top of battery clean. If necessary, wash it with a baking soda solution, then rinse with clean water. Do not let any baking soda solution enter battery.
- Step 8:** Reinstall front nose shield, side shield.
- Step 9:** Close top engine shield and secure.



Section 50: Maintenance - 1000 service hours/yearly

Engine system - check

Check fuel lines for leaks, kinked hoses, and hoses that are rubbing against another part.

Hydraulic fluid - change

Hydraulic fluid - drain

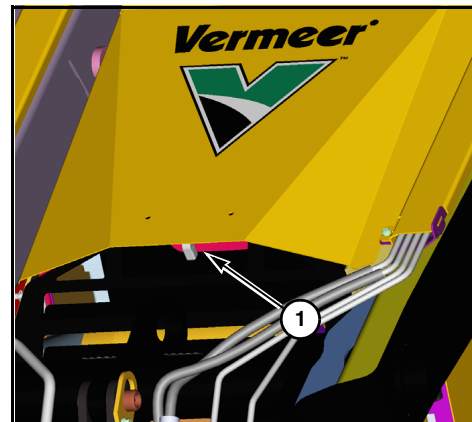
NOTICE: If fluid smells burnt, contains air bubbles, or appears contaminated, contact your Vermeer dealer immediately.

Fluid requirements are provided in this manual. Refer to “Lubricants,” [page 70-1](#).

Step 1: Run engine until hydraulic fluid is warm.

Step 2: Follow [Shutdown procedure](#), page [12-1](#).

Step 3: Open top engine shield (1).





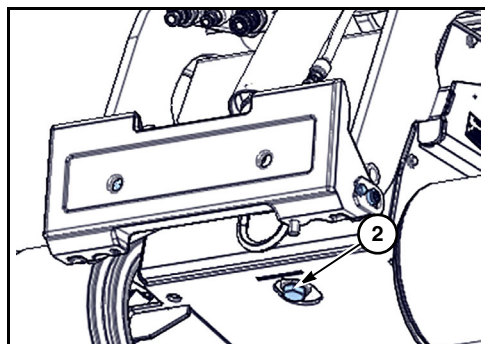
WARNING: Raised load can shift or fall. Death or serious injury could be possible if struck or crushed by falling load. Never allow anyone under a raised load unless load is securely supported to prevent it from shifting or falling.

Step 4: The sole use of a hoist or jack is not an acceptable means of secure support.

Step 5: Access to the oil drain plug (2) requires the machine to be raised off the ground. Lift machine to access drain plug on bottom of machine. Position suitable blocking capable of supporting the weight of the machine under each corner of the frame. Use suitable lifting device and blocking. Machine without attachments weighs approximately 4000 lb (1814 kg). Remove drain plug and drain fluid into a suitable container (minimum capacity 14 gal/53 L). Dispose of properly.

Step 6: Clean, inspect, and install drain plug.

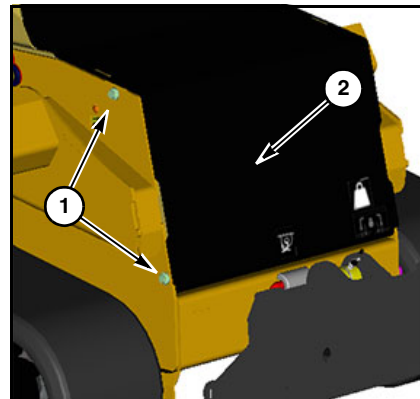
Step 7: Replace hydraulic filter. Refer to "Hydraulic filter - initial replacement," [page 25-2](#).



Strainer - service

Step 1: Raise lift arms and install lift arm support bar. Refer to “Support bars,” [page 15-1](#).

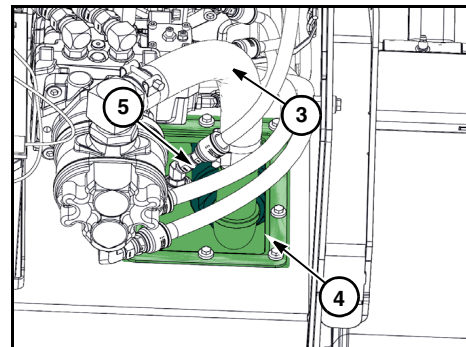
Step 2: Remove bolts (1) and shield (2).

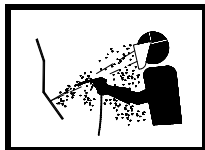


Step 3: After performing hydraulic fluid drain, disconnect hydraulic hose (3) and drain any oil into a suitable container. Refer to “Hydraulic fluid - drain,” [page 50-1](#).

Step 4: Remove access plate (4) and strainer (5).

Step 5: Clean strainer with a petroleum-based paint thinner or other good cleaning solvent. Scrub strainer with a soft-bristled brush.





WARNING: Eye injury possible. Wear a face shield when using compressed air to clean or dry solvent-coated parts.

Step 6: Inspect strainer; contact your Vermeer dealer if you find any of the following:

- lacquers which may have formed as a result of hot spots in the hydraulic system
- an extremely dirty strainer that will not come clean
- metallic particles on the screen mesh
- any evidence of hydraulic system failure
- any evidence of holes or other damage that would allow unfiltered oil to circulate in the hydraulic system

Strainer - Install

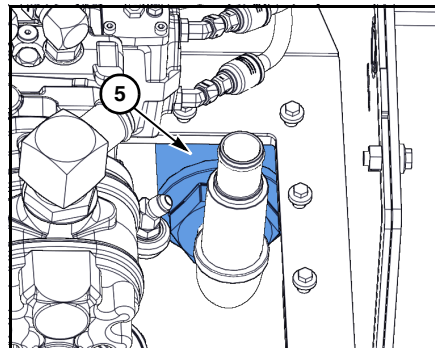
Step 1: Apply a suitable thread sealant to strainer and fitting threads.

Step 2: Install strainer (5) and fitting.

Step 3: Install access plate.

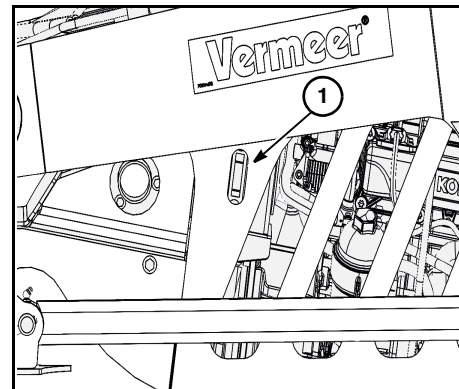
Step 4: Connect and tighten hydraulic hose.

Step 5: Reinstall bolts and shield.



Hydraulic tank - fill

- Step 1: Remove fill cap.
- Step 2: Fill hydraulic fluid tank to middle of sight gauge. Refer to “Lubricants,” [page 70-1](#).
- Step 3: Install and tighten fill cap.
- Step 4: Start engine and operate hydraulic system.
- Step 5: Look through right side shield to check hydraulic oil level (1). Fill fluid level to the middle of sight gauge.



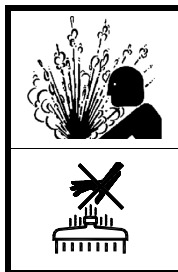
Secondary air cleaner - service

Refer to “Air cleaner element - replace,” [page 60-1](#).

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Section 55: Maintenance - 2000 service hours

Engine cooling system - drain and clean



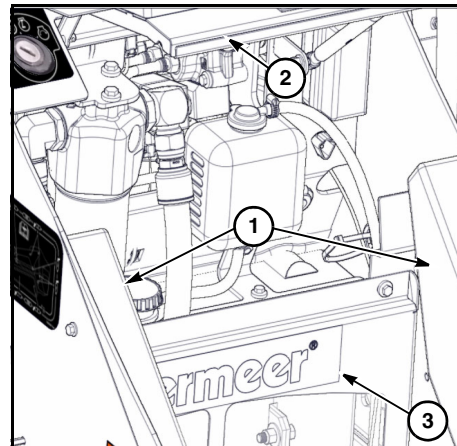
WARNING: Hot fluid under pressure can scald.

Allow engine to cool before opening radiator cap.

Capacities and specifications are listed in “*Lubricants*,” [page 70-1](#)

To drain system:

- Step 1:** Follow [Shutdown procedure](#), page [12-1](#). Allow system to cool before removing radiator cap.
- Step 2:** Rotate side cushions (1) back and lift rear service door (2).
- Step 3:** Remove bolts and shield (3).



Step 4: Drain coolant from system by opening petcock (4) on radiator. The system holds approximately 3.7 qt (3.5 L). Drain into suitable container and dispose of properly.

NOTICE: This machine was factory-filled with a 50/50 mixture of Shell Rotella ELC NF (Extended Life Nitrite Free) coolant. Compatible coolants include Chevron Delo ELC NF and Exxon Mobil Delvac ELC NF. Never add pure antifreeze to the system; always dilute to a 50/50 mixture.

Step 5: Close petcock (4), remove radiator cap (5) and fill radiator and reservoir bottle (6) to “full” mark.

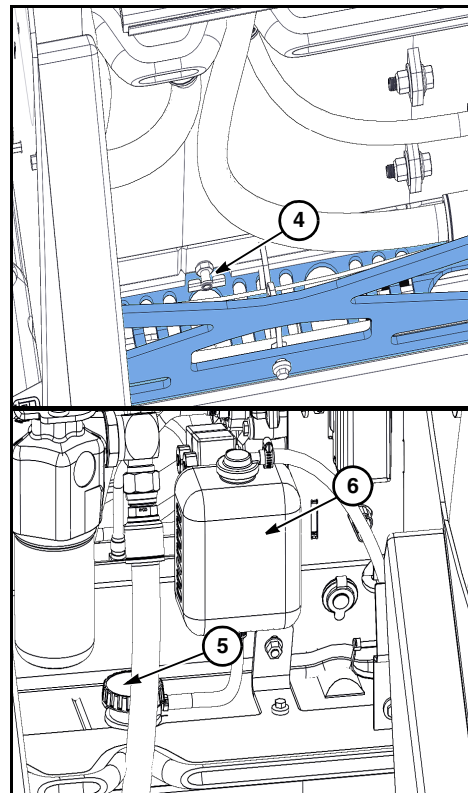
Refer to the engine operation manual for additional procedures and information for cleaning and refilling radiator.

Step 6: Install radiator cap. Start engine. Refer to “Starting Procedure” in *operator’s manual*.

Step 7: After system has reached normal operating temperature, fill reservoir bottle (6) to “full” mark.

Step 8: Replace shield, bolts and secure.

Step 9: Close rear service door.



Section 60: Maintenance as required

Engine system - check

Check fuel lines for leaks, kinked hoses, and hoses that are rubbing against another part.

Engine cooling system - drain and clean

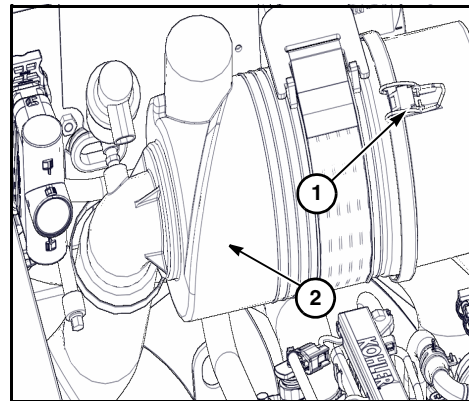
Refer to “Engine cooling system - drain and clean,” [page 55-1](#).

Air cleaner element - replace

NOTICE: Air cleaner elements must be replaced. The air cleaner elements are not to be cleaned at any time by washing or blowing off dirt with compressed air. Doing so may damage the filter element, resulting in engine damage and voiding the engine warranty.

Step 1: Open top engine shield.

Step 2: Release air cleaner cover latches (1), and remove air cleaner cover (2).



Step 3: Remove dirty primary element **(3)**.

Step 4: Remove secondary element **(4)**.

Step 5: Clean the sealing surface of the inlet tube with a clean cloth.

Step 6: Check replacement air cleaner elements for damage.

Step 7: Install secondary air cleaner element by pushing in firmly. Ensure element is seated properly.

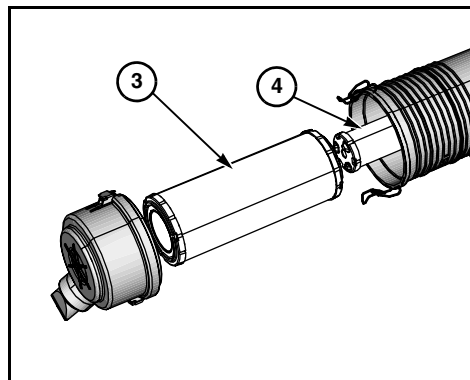
Step 8: Install primary air cleaner element.

Step 9: Install air cleaner cover. Ensure fasteners and strap are tight.

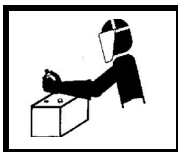
NOTICE: Never use latches on air cleaner cover to force filter into air cleaner. Doing so could damage the housing.

Step 10: Close engine shield.

Refer to the engine operation manual for additional information and the [parts manual](#) for replacement parts.



Battery - replace



WARNING: Tools and cable clamps can make sparks.

Shield eyes and face.

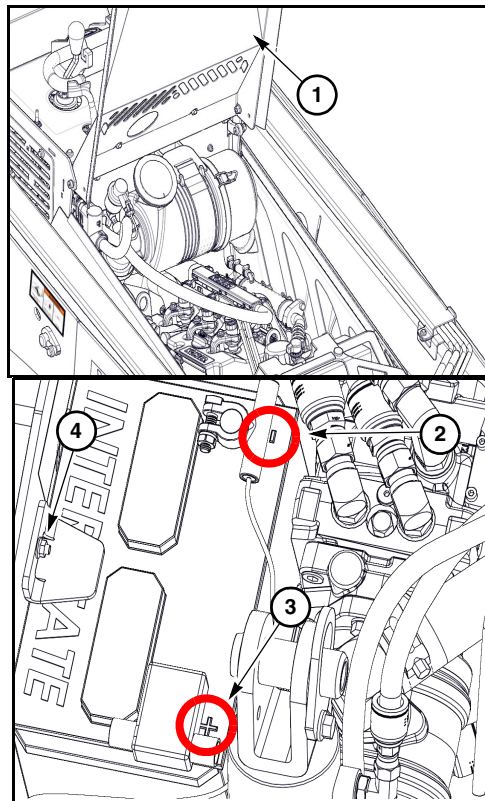


WARNING: Battery posts, terminals, and related accessories contain lead and lead compounds.

Wash hands after handling.

Replacement battery must meet standard battery specifications provided in this manual. Refer to “,” [page 70-1](#).

- Step 1:** Shut down engine. Follow *Shutdown procedure*, page **12-1**.
- Step 2:** Raise the boom and install the lock bar. Refer to “Lift arm support bar - install/remove,” *page 15-1*.
- Step 3:** Open top engine shield and remove the side shield and front nose shield.
- Step 4:** Unlatch top engine shield (1) and open.
- Step 5:** Remove NEGATIVE (-) cable first (2), then remove POSITIVE (+) cable (3).
- Step 6:** Remove bolt and battery hold-down bracket (4).
- Step 7:** Remove battery and install new battery.
- Step 8:** Install hold-down bracket over battery and into notch. Install bolt and tighten.
- Step 9:** Apply a light coating of petroleum jelly around base of each terminal.
- Step 10:** Install POSITIVE (+) cable (3), then install NEGATIVE (-) cable (2). Install red plastic cap over positive cable.
- Step 11:** Reinstall front nose shield, side shield.
- Step 12:** Close engine shield (1).

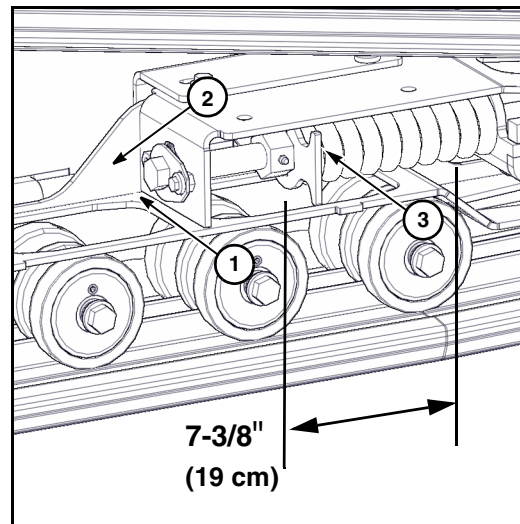


Track tension - adjust

Step 1: Remove tensioner locking plate (1).

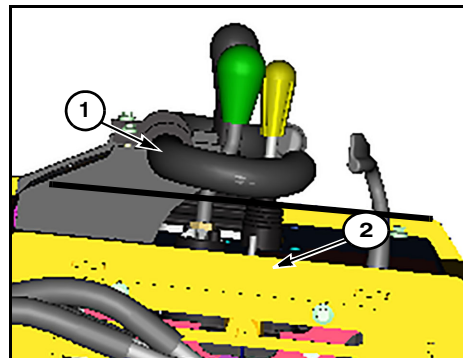
Step 2: Rotate tensioner adjustment nut (2) until spring (3) length is equal to 7-3/8" (19 cm). Refer to "Track tension - check," [page 20-8](#).

If track can not be tightened any further, reaching maximum adjustment range, replace entire track.



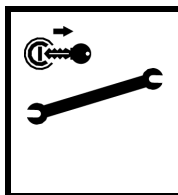
Handgrip bar - adjust

If adjustment becomes necessary, position the handgrip bar (1) so it is level with the top surface of the control panel (2).



Storage

Preparing for storage



WARNING: Failure to use shutdown procedure can result in unexpected hazard(s). Death or serious injury could result due to entanglement, crushing, cutting, or other hazardous contact. Follow Shutdown Procedure after operating, before performing any service or maintenance, and before transporting. Follow *Shutdown procedure*, page *12-1*.

- Store machine inside or under cover.
- Clean off foreign material and wash machine. Paint bare metal to inhibit rust.
- Repair or replace worn or broken parts or damaged safety signs and decals.
- Refer to the engine operation manual for engine storage instructions.
- Disconnect battery cables or remove battery. Refer to “Battery - replace,” *page 60-3*. Check fluid level and charge fully. Recheck every 30 days and charge if necessary.

Clean the machine

NOTICE: Machine controls and electrical/electronic devices are not rated to withstand high pressure water and high temperature power washers. Water intrusion will likely cause malfunction or damage to any devices hit directly by the water spray. Keep pressure washer stream away from machine controls and electrical/electronic devices. Compressed air can also push moisture through some connector and component seals. Do not point air nozzle directly at seal areas.

Removing from storage

- Remove all protective coverings.
- Drain any water and sediment from fuel tank that may have built up during storage. Fill fuel tank.
- Check battery fluid level. Charge battery and install in machine if removed or reconnect cables.
- Refer to the engine operation manual instructions for restoring engine to operation.

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Section 65: Troubleshooting

SYMPTON	CAUSE	SOLUTION
Engine will not start, starts hard or lacks power	No fuel	Add fuel
	Wrong fuel	Use correct fuel.
	Leak in fuel line	Check fuel line and connection
	Dirt or water in fuel system	Remove fuel, clean tank, and replace fuel filter
	Air in fuel system	Remove air from fuel system
	Dirty fuel filter	Replace fuel filter
	Wrong weight engine oil	Use correct oil
	Restricted air filter	Clean or replace air filter
No hydraulic power	No hydraulic fluid	Fill with fluid
	Damaged or worn hydraulic pump	See your Vermeer dealer
Slow hydraulic power	Low hydraulic fluid level	Add hydraulic fluid
	Plugged hydraulic filter	Replace filter
	Worn pump	Contact your Vermeer dealer
	Hydraulic fluid cold	Let machine warm up; operate hydraulic system
Oil foams	Low hydraulic fluid level	Add hydraulic fluid
	Water in hydraulic fluid	Change fluid
	Air leak between tank and pump	Repair leak

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Section 70: Specifications

Lubricants

Lubricant	Capacity	Specification/notes
Engine oil-with filter	9.4 qt (8.9 L)	An engine operation manual is supplied with each machine. Refer to the manual for engine service requirements. Engine must be level when checking engine oil.
Hydraulic fluid <i>Vermeer HyPower 68</i>	14 gal (53 L)	ISO 68: -4–104°F (-20–40°C) NOTICE: Do not get dirt or other contaminants in reservoir. Filter all fluid through a 10-micron filter before adding. NOTICE: Use of any oils other than those recommended without written factory approval will jeopardize warranty.
Grease <i>Vermeer Ultra LC Grease</i>	As required	EP grease: Vermeer Ultra LC or equivalent
General lubricating oil <i>Vermeer Ultra Gold 10W30</i>	Coat lightly	10W30: Vermeer Ultra Gold or equivalent

Machine specifications

General	
Length	92.5" (235 cm) without attachments 114.5" (290.8 cm) with standard bucket
Width	42" (107 cm) without bucket and 9" tracks
Height	59" (150 cm) transport height 88.75" (225 cm) to hinge pin
Weight	4,115 lb (1 867 kg) with standard bucket and 9" tracks 4,000 lb (1 814 kg) without bucket and 9" tracks
Rated operating capacity	1,600 lb (726 kg)
Ground speed	4.4 mph (7.1 km/h)
Maximum engine operating angle - fore and aft	30° intermittent (Engine operating angles do not indicate safe machine operating angles.)
Maximum engine operating angle - left and right	

Engine-diesel	
Model	Kohler KDI 1903 TCR
Type	4-stroke, in-line 3 cylinder, turbocharged, intercooled, direct injected, liquid cooled.
Maximum power	40 hp (29.8 kW) continuous @ 2600 rpm
Fuel type and capacity	13.0 gal (49.3 L)
Coolant capacity	1.5 gal (5.7 L) Use a 50/50 mixture of Extended Life (ELC) Nitrite Free (NF) Coolant and distilled or deionized water. Never add pure antifreeze to the system; always dilute to a 50/50 mixture. Never use Supplemental Cooling Additives (SCA's) with ELC coolant. Refer to the engine operation manual.
Battery	12-volt, MTP-24 800 cca
Hydraulic system	
Flow	16.75 gpm (63.4 L/min) max rpm
Pressure	3045 psi (210 bar) (21 MPa)

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Revision history

Revision	Date	Pages	Description
m1_00	03/20	All	First Edition Maintenance Manual released.
m2_00	7/21	Front Cover, Introduction, 30-7, 25-1, 35-2, 45-2	Updated cosmetic decals, Added page with Operator platform grease, Updated Engine oil and filter - initial change, Removed Engine oil/ filter - change/replace 200 hours and added to 500 hours.

When operated in California, any off-road diesel vehicle may be subject to the California Air Resources Board In-Use Off-Road Diesel Vehicle Regulation. It therefore could be subject to retrofit or accelerated turnover requirements to reduce emissions of air pollutants. For more information, please visit the California Air Resources Board website at <http://www.arb.ca.gov/msprog/ordiesel/ordiesel.htm>.

CALIFORNIA
Proposition 65 Warning

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

CALIFORNIA
Proposition 65 Warning

Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling.