Operator's Manual

45RC

Model—Serial Range

45RC Standard——AU01001 — and Up
45RC California Compliant——AV01001 — and Up

09.10209 Rev 01

Original Instructions (EN)

09.10209 REV 01

Reader Comments

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Disclaimers and Regulatory Information

⚠ WARNING

CALIFORNIA
Proposition 65

This product contains a chemical or chemicals known to the State of California to cause cancer, birth defects, or reproductive harm.

⚠ WARNING ⚠

Operating, servicing, and maintaining off-road equipment can expose you to chemicals including engine exhaust, carbon monoxide, phthalates, and lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, service equipment in a well-ventilated area and wear gloves or wash your hands frequently when servicing your equipment.

For more information go to www.P65Warnings.ca.gov

IMPORTANT

It is a violation of California Public Resource Code Section 4442 or 4443 to use or operate this engine on any forest-covered, brush-covered, or grass-covered land unless the exhaust system is equipped with a spark arrestor, as defined in Section 4442 maintained in effective working order or the engine is constructed, equipped, and maintained for the prevention of fire.

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Intended Use

The Ventrac 45RC is intended to be used only with approved Ventrac attachments by professional operators in commercial applications. Using this product for purposes other than its intended use could prove dangerous to you and bystanders.

Read this information carefully to learn how to operate and maintain your product properly and to avoid injury and product damage. You are responsible for operating the product properly and safely.

Product Description

The Ventrac 45RC combines all-wheel drive and an articulating chassis with a low center of gravity to provide superior traction, braking, stability, and security on tough terrain and slopes without disturbing turf when turning. The attachment is placed out in front in a natural view, offering greater precision, as well as maximum protection for the operator.

The multifunction joystick, located next to the operator, allows for easy control of machine speed and direction, the front hitch functions, auxiliary functions, and the 12-volt front functions.

Standard features include:

- a fold down roll bar
- a wiring harness that is pre-wired for optional accessories
- an electronic information display that includes gauges, warnings, and other machine information and operator notifications
- a complete electrical system circuit breaker and battery disconnect
- a hydraulic oil cooler with a thermostatically controlled fan
- two sets of front hydraulic quick couplers
- a front 12 volt 4-pin socket
- a remote control

IMPORTANT

The 45RC must only be used with approved attachments. Refer to the 45RC product page at www.Ventrac.com for a list of attachments that are approved for use with the 45RC.

Getting Help

Visit www.Ventrac.com for product safety and operation training materials, accessory information, help finding a dealer, or to register your product.

Whenever you need service, genuine Ventrac parts, or additional information, contact an Authorized Service Dealer or Ventrac Customer Service and have the model and serial numbers of your product ready. These numbers are located on the serial plate on your product ①. Write the numbers in the space provided.



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IMPORTANT

With your mobile device, you can scan the QR code on the serial number decal (if equipped) to access warranty, parts, and other product information.

Model Number:		**Serial Number:**	

Why do I Need an Operator's Manual?

This manual has been created to help you gain the important knowledge of what is needed to safely operate and maintain your machine, and to avoid injury and product damage. It is divided into chapters for convenient reference of the appropriate information.

You must read and understand the *Operator's Manual* for each piece of Ventrac equipment you own. Reading the *Operator's Manual* will help you become familiar with each specific piece of equipment. If this manual becomes damaged or unreadable, it should be replaced immediately. Contact your local Ventrac dealer for a replacement.

When using a Ventrac attachment, be sure to read and follow the safety and operating instructions of both the machine and the attachment being used to ensure the safest operation possible.

The information in this manual provides the operator with the safest procedures to operate the machine while getting the maximum use out of the unit. Failure to follow the safety precautions listed in this manual may result in personal injury and/or damage to the equipment.

Manual Conventions

This manual identifies potential hazards and has safety messages identified by the safety-alert symbol, which signals a hazard that may cause serious injury or death if you do not follow the recommended precautions.



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This manual uses 2 words to highlight information. **Important** calls attention to special mechanical information and **Note** emphasizes general information worthy of special attention.

Safety Alert Classifications

The safety-alert symbol shown in this manual and on the machine identifies important safety messages that you must follow to prevent accidents.

Safety-alert symbol appears above information that alerts you to unsafe actions or situations and is followed by the word **DANGER**, **WARNING**, or **CAUTION**.

DANGER

Danger indicates an imminently hazardous situation which, if not avoided, *will* result in death or serious injury.

WARNING

Warning indicates a potentially hazardous situation which, if not avoided, *could* result in death or serious injury.

CAUTION

Caution indicates a potentially hazardous situation which, if not avoided, *may* result in minor or moderate injury.

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General Safety

Training Required

- The owner of this machine is solely responsible for properly training the operators.
- The owner/operator is solely responsible for the operation of this machine and for the prevention of accidents or injuries occurring to him/herself, other people, or property.
- Do not allow operation or service by children or untrained personnel. Local regulations may restrict the age of the operator.
- Before operating this machine, read the *Operator's Manual* and understand its contents.
- If the operator of the machine cannot understand this manual, then it is the responsibility of this machine's owner to fully explain the material within this manual to the operator.
- Learn and understand the use of all the controls.
- Know how to stop the machine and the attachments quickly in the event of an emergency.

Requirements for Personal Protective Equipment (PPE)

The owner is responsible for ensuring that all the operators use the proper PPE while operating the machine. Whenever you use the machine, use the following PPE:

- Certified eye protection and hearing protection.
- Closed toe, slip resistant footwear.
- Long pants or trousers.
- A dust mask for dusty conditions.
- Additional PPE may be required. Refer to the product safety procedures for any additional requirements.

Operation Safety

- Secure long hair and loose clothing. Do not wear jewelry.
- Inspect the machine before operation. Repair or replace any damaged, worn, or missing parts. Be sure the guards and shields are in proper working condition and are secured in place. Make any necessary adjustments before operating the machine.
- Some pictures in this manual may show shields or covers opened or removed in order to clearly illustrate the instructions. Under no circumstance should the machine be operated without these devices in place.
- Alterations or modifications to this machine can reduce safety and could cause damage to the machine. Do not alter the safety devices or operate with the shields or covers removed.

Operation Safety (continued)

- Before each use, verify that all the controls function properly and inspect all the safety devices. Do not operate if the controls or safety devices are not in proper working condition.
- Check the parking brake function before operating. Repair or adjust the parking brake if necessary.
- Observe and follow all of the safety decals.
- All the controls are to be operated from the operator's station only.
- Always wear a seat belt if the machine has a roll cage/bar installed and in the upright position.
- Ensure the attachment or accessory is locked or fastened securely to the machine before operating.
- Ensure that all bystanders are clear of the machine and the attachment before operating. Stop the machine if someone enters your work area.
- Always be alert to what is happening around you, but do not lose focus on the task you are performing. Always look in the direction the machine is moving.
- Look behind and down before backing up to be sure of a clear path.
- If you hit an object, stop and inspect the machine. Make any necessary repairs before operating the machine again.
- Stop operation immediately at any sign of equipment failure. An unusual noise can be a warning of equipment failure or a sign that maintenance is required. Make any necessary repairs before operating the machine again.
- If equipped with a high/low range feature, never shift between high and low range while on a slope. Always move the machine to level ground and engage the parking brake before shifting range.
- Do not leave the machine unattended while it is running.
- Always park the machine on level ground.
- Always shut off the engine when connecting the attachment drive belt to the machine.
- Never leave the operator's station without lowering the attachment to the ground, engaging the parking brake, shutting off the engine, and removing the ignition key. Make sure all moving parts have come to a complete stop before dismounting.
- Never leave the machine unattended without lowering the attachment to the ground, engaging the parking brake, shutting off the engine, and removing the ignition key.
- Only operate in well-lit conditions.
- Do not operate when there is a risk of lightning.
- Never direct the discharge of any attachment in the direction of people, buildings, animals, vehicles, or other objects of value.
- Never discharge material against a wall or obstruction. The material may ricochet back toward the operator.
- Use extra caution when approaching blind corners, shrubs, trees, or other objects that may obscure your vision.

Operation Safety (continued)

- Do not run the engine in a building without adequate ventilation.
- Do not touch the engine or the muffler while the engine is running or immediately after stopping the engine. These areas may be hot enough to cause a burn.
- Do not change the engine governor settings or over-speed the engine. Operating the engine at excessive speeds may increase the hazard of personal injury.
- To reduce the hazard of fire, keep the battery compartment, engine, and muffler areas free of grass, leaves, excessive grease, and other flammable materials.
- Clear the working area of objects that might be hit or thrown from the machine.
- Keep people and pets out of the working area.
- Know the work area well before operation. Do not operate where traction or stability is questionable.
- Reduce speed when you are operating over rough ground.
- Equipment can cause serious injury and/or death when improperly used. Before operating, know and understand the operation and safety of the machine and the attachment being used.
- Do not operate the machine if you are not in good physical and mental health, if you will be distracted by personal devices, or if you are under the influence of any substance which might impair your decisions, dexterity, or judgment.
- Children are attracted to machine activity. Be aware of children and do not allow them in the work area. Turn off the machine if a child enters the work area.
- Machines, attachments, and accessories are not designed or intended for travel on public roadways. Never operate or travel on public roads or highways.
- Operate with safety lights when operating near roadways.
- Slow down and be careful of traffic when operating near or crossing roadways. Stop before crossing roads or sidewalks. Use care when approaching areas or objects that may obscure vision.
- Only allow the operator on the machine. Keep riders off.
- Never allow riders on any attachment or accessory.

Keep Riders Off

- Only allow the operator on the machine. Keep riders off.
- Never allow riders on any attachment or accessory.

Operating On Slopes

- Slopes can cause loss-of-control and tip-over accidents, which can result in severe injury or death. Be familiar with the emergency parking brake, along with the machine controls and their functions.
- If the machine is equipped with a fold down roll bar, it must be locked in the upright position when operating on any slope.
- Use low range (if equipped) when operating on slopes greater than 15 degrees.

Operating On Slopes (continued)

- Do not stop or start suddenly when operating on slopes.
- Never shift between high and low range while on a slope. Always move the machine to level ground and engage the parking brake before shifting range or placing the machine in neutral.
- Variables such as wet surfaces and loose ground will reduce the degree of safety. Do not drive where the machine could lose traction or tip over.
- Keep alert for hidden hazards in the terrain.
- Stay away from drop-offs, ditches, and embankments.
- Sharp turns should be avoided when operating on slopes.
- Pulling loads on hills decreases safety. It is the responsibility of the owner/operator to determine loads that can safely be controlled on slopes.
- Transport the machine with the attachment lowered or close to the ground to improve stability.
- Attachments and accessories may affect the stability of the traction unit. Refer to the attachment safety section of the attachment *Operator's Manual* for restrictions on the maximum angle of operation.
- While operating on slopes, drive in an up and down direction whenever possible. If turning is necessary while driving across slopes, reduce your speed and turn slowly in the downhill direction.
- Ensure a sufficient supply of fuel for continuous operation. A minimum of one-half tank of fuel is recommended.

Hauling the Machine

- Use care when loading or unloading the machine into a truck or trailer.
- Use full width ramps for loading the machine into a truck or trailer.
- The parking brake is not sufficient to lock the machine during transport. Always secure the machine and/or attachment to the transporting vehicle securely using straps, chains, cables, or ropes. Both the front and rear straps should be directed down and outward from the machine.
- Shut off the fuel supply to the machine during transport on a truck or trailer.
- Turn the machine's battery disconnect switch to the OFF position to shut off electrical power.

Maintenance Safety

- Keep the safety decals legible. Remove all grease, dirt, and debris from the safety decals and instructional labels.
- If any decals are faded, illegible, or missing, contact your dealer promptly for replacements.
- When new components are installed, be sure that the current safety decals are affixed to the replacement components.

Maintenance Safety (continued)

- If any component requires replacement, use only original Ventrac replacement parts.
- Always turn the battery disconnect to the OFF position or disconnect the battery before performing any repairs. Disconnect the negative terminal first and the positive terminal last. Reconnect the positive terminal first and the negative terminal last.
- Keep all bolts, nuts, screws, and other fasteners properly tightened.
- Always lower the attachment to the ground, engage the parking brake, shut off the engine, and remove the ignition key. Make sure all moving parts have come to a complete stop before cleaning, inspecting, adjusting, or repairing.
- If the machine, attachment, or accessory requires repairs or adjustments not instructed in the operator's manual, the machine, attachment, or accessory must be taken to an authorized Ventrac dealer for service.
- Never perform maintenance on the machine and/or attachment if someone is in the operator's station.
- Always use protective glasses when handling the battery.
- Check the fuel lines for tightness and wear on a regular basis. Tighten or repair them as needed.
- To reduce the hazard of fire, keep the battery compartment, engine, and muffler areas free of grass, leaves, and excess grease.
- Do not touch the engine, the muffler, or other exhaust components while the engine is running or immediately after stopping the engine. These areas may be hot enough to cause a burn.
- Allow the engine to cool before storing and do not store near an open flame.
- Do not change the engine governor settings or over-speed the engine. Operating engine at excessive speeds may increase the hazard of personal injury.
- Springs may contain stored energy. Use caution when disengaging or removing springs and/or spring-loaded components.
- An obstruction or blockage in a drive system or moving/rotating parts may cause a buildup of stored energy. When the obstruction or blockage is removed, the drive system or moving/rotating parts may move suddenly. Do not attempt to remove an obstruction or blockage with your hands. Keep your hands, feet, and clothing away from all power-driven parts.

Fuel Safety

- To avoid personal injury or property damage, use extreme care in handling gasoline. Gasoline is extremely flammable, and the vapors are explosive.
- Do not refuel the machine while smoking or at a location near flames or sparks.
- Always refuel the machine outdoors.
- Do not store the machine or fuel container indoors where the fumes or fuel can reach an open flame, spark, or pilot light.
- Only store fuel in an approved container. Keep out of the reach of children.

Fuel Safety (continued)

- Never fill containers inside a vehicle or on a truck or trailer bed with a plastic liner. Always place the containers on the ground away from your vehicle before filling.
- Remove the machine from the truck or trailer and refuel it on the ground. If this is not possible, refuel the machine using a portable container, rather than from a fuel dispenser nozzle.
- Never remove the fuel cap or add fuel with the engine running. Allow the engine to cool before refueling.
- Never remove the fuel cap while on a slope. Only remove the fuel cap when parked on a level surface.
- Replace the fuel tank cap and the container cap securely.
- Do not overfill the fuel tank. Only fill to the bottom of the fuel neck, do not fill the fuel neck full. Overfilling of the fuel tank could result in engine flooding, fuel leakage from the tank, and/or damage to the emissions control system.
- If fuel is spilled, do not attempt to start the engine. Move the machine away from the fuel spill and avoid creating any source of ignition until the fuel vapors have dissipated.
- If the fuel tank must be drained, it should be drained outdoors into an approved container.
- Check the fuel lines for tightness and wear on a regular basis. Tighten or repair them as needed.
- The fuel system is equipped with a shut-off valve. Shut off the fuel when transporting the machine to and from the job, when parking the machine indoors, or when servicing the fuel system.

Hydraulic Safety

- Make sure the hydraulic connections are tight and all hydraulic hoses and tubes are in good condition. Repair any leaks and replace any damaged or deteriorated hoses or tubes before starting the machine.
- Hydraulic leaks can occur under high pressure. Hydraulic leaks require special care and attention. Use a piece of cardboard and a magnifying glass to locate suspected hydraulic leaks.
- Keep your body and hands away from pinhole leaks or nozzles that eject high pressure hydraulic fluid. Hydraulic fluid escaping under high pressure can penetrate the skin causing serious injury, leading to severe complications and/or secondary infections if left untreated. If hydraulic fluid is injected into the skin, seek immediate medical attention no matter how minor the injury appears.
- Safely relieve all pressure in the hydraulic system before performing any work on the hydraulic system. Refer to Relieving Pressure in the Auxiliary Hydraulic Circuits.
- Safely relieve all pressure on the auxiliary hydraulic system before disconnecting the auxiliary hydraulic quick couplers. Refer to Relieving Pressure in the Auxiliary Hydraulic Circuits.

Hydraulic Safety (continued)

- Always disengage the weight transfer system (if equipped) before performing maintenance or repairs on the weight transfer system, the front hitch, or the lift hydraulics. Refer to .

FCC/IC Statement

United States Requirements

This product contains 6 modular approvals:

FCC ID	IC	Module
NO9TC242	2977A-TC242	TC242 RF Module
2AGPOAVTX24	33278-AVTX24	AVTX24E0
2AGPOAVRX24	33278-AVRX24	AVRX2471
2AQ33-DWM1001	23794-DWM1001	TFB10030
NO9TF011	2977A-TF011	iLog Reader
NO9TF010	2977A-TF010	TUC Reader

WARNING

The Federal Communications Commission warns that changes or modifications of the radio module within this device not expressly approved by Ventrac could void the user's authority to operate the equipment.

Note: To comply with FCC's RF radiation exposure requirements, the antenna(s) used for this transmitter must be installed such that a minimum separation distance of 20 cm is maintained between the radiating element (antenna) & any user's or bystander at all times and must not be co-located or operating in conjunction with any other antenna or transmitter.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his expense.

Canadian Requirements

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Antenna Requirements:

This radio transmitter IC: 2977A-TC242 has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent émetteur radio IC: 2977A-TC242 a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

This radio transmitter IC: 33278-AVTX24 has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent émetteur radio IC: 33278-AVTX24 a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

This radio transmitter IC: 33278-AVRX24 has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de

brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r. e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent émetteur radio IC: 33278-AVRX24 a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

This radio transmitter IC: 23794-DWM1001 has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r. e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent émetteur radio IC: 23794-DWM1001 a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

This radio transmitter IC: 2977A-TF011 has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r. e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Le présent émetteur radio IC: 2977A-TF011 a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Manufacturer	Antenna	Description	Type	Peak Gain (dBi)
Venture Products, Inc	35.0188	Amphenol Procom; MU2404–MMS	Colinar	2
Venture Products, Inc	35.0189	HBC Radiomatic; RERC2020	Omni	-41.3 dBm/MHz [1]
[1]This module has a value presented for mean spectral density rather than Peak Gain				

45RC Safety Procedures

Roll Over Protective Structure (ROPS)

WARNING

Keep the ROPS locked in the upright position and the seat belt securely fastened during operation. Failure to do so could result in serious injury or death.

WARNING

Alterations or modifications to this machine and/or the ROPS structure can reduce safety and could cause damage to the machine. Do not alter the ROPS. Do not alter any other safety devices.

Your machine is equipped with a Roll Over Protective Structure (ROPS). This ROPS was tested and certified in accordance with the following standards.

ROPS: OSHA 1928.51 = maximum GVW of 1,587 kg (3,500 pounds).

ISO 21299 = maximum GVW of 1,587 kg (3,500 pounds).

Seat Belt Anchorage: ISO 3776-2, ISO 3776-3, ISO 6683, & SAE J386

- The ROPS certification applies only when the roll bar is locked in the upright position. Be aware that there is no rollover protection when a folding ROPS is in the down position.
- DO NOT remove the ROPS. Alterations to the ROPS structure are not permitted.
- Lower the roll bar only when absolutely necessary and raise the roll bar to the upright position as soon as clearance allows. Never lower a folding ROPS in areas where there are slopes, drop offs, or water.
- Check carefully for overhead clearances (i.e. branches, doorways, electrical wires) before driving under any objects and do not contact them.
- Always wear the seat belt when the roll bar is locked in the upright position. Be certain the seat belt can be released quickly in the event of an emergency.
- Do not wear a seat belt when the roll bar has been lowered to the down position.
- If any part of this ROPS experiences structural damage, the entire ROPS must be replaced.
- Inspect the seat belt for wear or damage before use. Failure to inspect or maintain the seat belt can cause injury or death.

ROPS and Seat Belt Inspection

WARNING

Failure to inspect and maintain the Roll-Over Protection System (ROPS) and the seat belt can lead to serious injury or death.

If any part of the ROPS sustains structural damage, the entire ROPS must be replaced.

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1. Inspect the roll bar for damage, missing components, and loose or missing hardware. Replace any damaged or missing components and tighten loose hardware prior to operating the machine.
2. Inspect the seat belt for cuts, abrasions, fraying, or excessive wear.
3. Inspect the seat belt for damage from exposure to the sun's ultraviolet rays. If the color of the seat belt is extremely faded, its physical strength may be deteriorated.
4. Inspect the seat belt for dust and dirt. If the seat belt is packed with dirt, its physical strength may be deteriorated.
5. Inspect the seat belt for stiffness. If the seat belt is no longer flexible, its physical strength may be deteriorated.
6. Inspect the seat belt buckle and latch for damage, cracks, or excessive wear.
7. Inspect the seat belt for proper operation. The seat belt should latch securely and release smoothly. Seat belt adjustment should be accomplished without excessive resistance.
8. If any problems are detected during this inspection, replace the component prior to operating the machine.

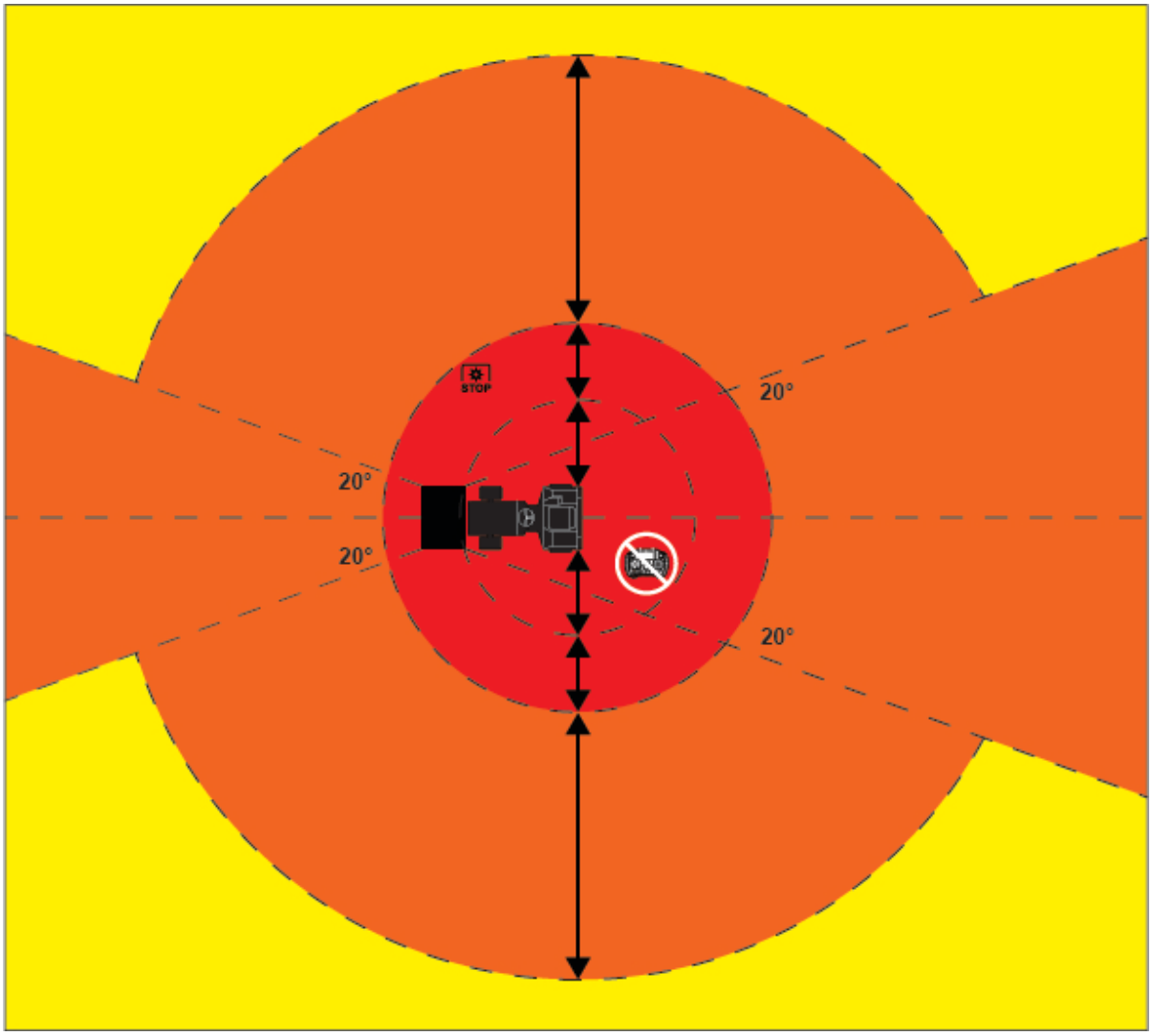
Operator Access

The operator access is on the left side of the machine. Mount and dismount the machine only from the left side.

Remote Control Safety

When operating the machine using the remote control, be aware of the safety zones around the machine.

Remote Control Safety (continued)



G527665

- The inner circle of the danger zone (red) extends to 2.4 meters (8 feet). Do not use the remote control within this area. The outer circle of the danger zone (red) extends to 4.5 meters (15 feet). If you are within the danger zone (red), the PTO will not engage. If the PTO is running and you enter the danger zone, the PTO will disengage.
- The operator must be aware of the possibility of thrown objects in the warning and caution zones. The warning zone (orange) extends to a 10.7 meter (35 foot) radius and also extends at 20 degrees from the center line in the front and rear of the machine. The caution zone (yellow) is the area outside the warning zone.
- When operating the machine on slopes using the remote control, stand uphill from the working area whenever possible. Do not stand directly below the machine while in operation.
- Never allow anyone on the machine while it is being operated by remote control.
- The maximum distance from the machine for the remote operator to control the machine is 152.4 meters (500 feet).

Operator Safety Interlock System

The 45RC is equipped with a safety interlock system. This system:

- Prevents the engine from starting if the parking brake switch is disengaged or the PTO switch is engaged.
- Prevents the PTO from starting if the operator is not in the seat (unless in remote mode).
- Shuts off the PTO if the operator leaves the seat.
- Automatically applies the service brake and then the parking brake if the operator leaves the seat without engaging the parking brake.
- Shuts off the engine for various sensor failures and/or forces the machine into LIMP home mode.
- Shuts off the engine if the remote control mode switch is toggled.
- In remote control mode, prevents the engine from starting if a person is in the seat.
- In remote control mode, shuts off the PTO if the remote operator is too close to the machine.
- In remote control mode, shuts off the engine if the radio connection is lost.

Testing the Safety Interlock System (Operator On)

Before operating the machine in Operator On mode, complete the following tests to verify the safety functions are working properly.

1. Set the remote control mode switch to the OFF position, then turn the ignition key to the ON position and wait until the information panel completes its startup and displays the main screen.
2. Pull the parking brake switch up to the DISENGAGED position. The yellow parking brake fault indicator lights up. Turn the ignition key to the START position. The engine starter does not engage.
3. Push the parking brake switch down to the ENGAGED position. The parking brake fault indicator will clear. Turn the ignition key to the START position.

   The engine will start.

4. With the engine running, pull the parking brake switch up to the DISENGAGED position. Raise yourself up off the seat. The parking brake engages and the yellow parking brake fault indicator lights up.
5. Shut the engine off and turn the ignition key to the ON position. Wait for the information panel to display the main screen.
6. Pull the PTO switch up to the ENGAGED position. The yellow PTO fault indicator lights up and the PTO clutch does not engage. Turn the ignition key to the START position. The engine starter does not engage.
7. Push the PTO switch down to the DISENGAGED position. The PTO fault indicator will clear. Turn the ignition key to the START position. The engine will start.
8. With the engine running, pull the parking brake switch up to the DISENGAGED position. Pull the PTO switch up to the ENGAGED position. The PTO clutch will

Testing the Safety Interlock System (Operator On) (continued)

engage. Push the parking brake switch down to the ENGAGED position. The PTO clutch disengages, and the yellow PTO fault indicator lights up.

9. With the engine running and the parking brake engaged, pull the PTO switch up to the ENGAGED position. Raise yourself up off the seat. The PTO clutch disengages, and the yellow PTO fault indicator lights up.
10. With the engine running and the parking brake engaged, move the joystick forward out of neutral. The yellow joystick neutral fault indicator lights up and the machine does not move.
11. Pull the parking brake switch up to the DISENGAGED position. The joystick neutral fault indicator is still displayed, the yellow parking brake fault indicator lights up, and the parking brake does not release.
12. Move the joystick back to the neutral position. The joystick neutral fault indicator will clear, the parking brake fault indicator will clear, and the parking brake will disengage.
13. With the engine running, move the joystick backward without depressing the reverse confirmation trigger. The machine does not move.
14. Set the remote control mode switch to the ON position. The engine will turn off. Turn the ignition key to the START position. The starter will not engage.

If any one of the outcomes of the tests does not match the stated outcome, the issue must be corrected before operating the machine in Operator On mode.

Testing the Safety Interlock System (Remote Control)

Before operating the machine in Remote Control mode, complete the following tests to verify the safety functions are working properly.

1. Set the remote control mode switch to the OFF position, then turn the ignition key to the ON position and wait until the information panel completes its startup and displays the main screen.
2. Sit on the machine's seat.
3. Set the remote control mode switch to the ON position. The RC icon will appear on the display and the yellow operator presence fault indicator will light up. Turn the ignition key to the START position. The engine starter does not engage.
4. Pull the parking brake switch up to the DISENGAGED position. The yellow parking brake fault indicator lights up.
5. Leave the machine's seat. The operator presence fault indicator will clear.
6. Turn the ignition key to the START position. The engine starter does not engage.
7. Perform the starting sequence on the remote control. The engine starter does not engage.
8. Push the parking brake switch down to the ENGAGED position. The parking brake fault indicator will clear.
9. Perform the starting sequence on the remote control. The engine will start.

Testing the Safety Interlock System (Remote Control) (continued)

10. Position yourself approximately 3 meters (10 feet) from the rear corner of the machine. Press the PTO switch. The PTO clutch does not engage.
11. Move away from the machine until you are outside the danger zone. Press the PTO switch. The PTO clutch engages. Walk toward the machine. As you enter the danger zone of 4.5 meters (15 feet), the PTO clutch disengages.
12. Press the engine stop switch. The engine will shut off.

If any one of the outcomes of the tests does not match the stated outcome, the issue must be corrected before operating the machine in Remote Control mode.

Safety and Instructional Decals

Safety decals and instructions are easily visible to the operator and are located near any area of potential danger. Replace any decal that is damaged or missing.

Keep all safety decals legible. Remove all grease, dirt, and debris from safety decals and instructional labels. If any decals are faded, illegible, or missing, contact your dealer promptly for replacements.

When new components are installed, be sure that current safety decals are affixed to the replacement components.

Safety Decal Locations

The following safety decals must be maintained on your machine.

Keep all safety decals legible. Remove all grease, dirt, and debris from safety decals and instructional labels. If any decals are faded, illegible, or missing, contact your dealer promptly for replacements.

When new components are installed, be sure that current safety decals are affixed to the replacement components.

Decal Part: 00.0644



G496278

1 Warning—Read *Operator's Manual*.

2 Rollover hazard—Roll bar must be in the raised and locked position when operating on slopes.

3 Always wear a seat belt when operating with the roll bar in the upright position. Do not wear a seat belt when operating with the roll bar in the lowered position.

Safety Decal Locations (continued)

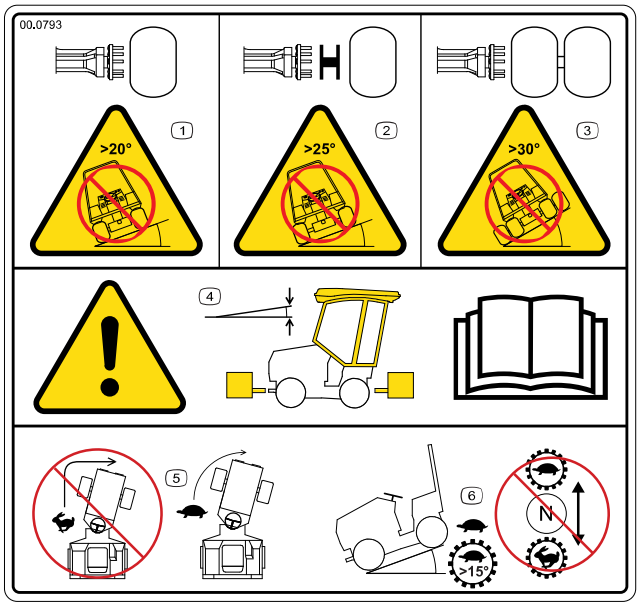
Decal Part: 00.0694



G524028

1. Read the *Operator's Manual*.
2. Wear personal protective gear, such as safety glasses, closed toe shoes or boots, and ear protection.
3. Stay away from moving parts.
4. Keep all guards and shields in place.
5. Warning—Hydraulic fluid is under high pressure and can penetrate skin, causing injury. Keep hands, face, and body away from pinholes or nozzles that eject hydraulic fluid under high pressure.
6. Do not operate while under the influence of drugs or alcohol.
7. Do not carry passengers. Stop the machine if someone enters the area.
8. Warning—Stay away from the edge of drop-offs, ditches, and embankments. The machine could roll over if a wheel drops over the edge or if the edge caves in.
9. Warning—Read slope operation instructions. Use low range when operating on slopes. Keep the roll bar in the raised and locked position and the seat belt securely fastened.
10. When towing or pushing the machine, the transaxles must be disengaged by moving the high/low range shift handle to the neutral position or damage to the hydraulic system will result.

Decal Part: 00.0793



G511878

1. Warning—20 degree maximum slope rating when equipped with single wheels.
2. Warning—25 degree maximum slope rating when equipped with 7.6 cm (3 inch) wheel extensions.
3. Warning—30 degree maximum slope rating when equipped with dual wheels.
4. Slope rating may be reduced when adding a cab and other accessories or attachments. Read the *Operator's Manual* for the cab, accessory, or attachment being used.
5. Reduce speed on slopes, especially when turning. Avoid sharp turns when operating on slopes.
6. Use low range when operating on slopes. Do not shift between high and low range on a slope.

Safety Decal Locations (continued)

Decal Part: 00.0457



G496279

1 Warning—Explosion/fire hazard.

2 Keep away from fire, sparks, and pilot lights when refueling or storing machine and fuel.

3 Smoking is prohibited.

4 Use unleaded gasoline only with an ethanol content of 10 percent or less.

Decal Part: 00.0339



G496280

1 Cutting/entanglement hazard—Stay away from moving parts.

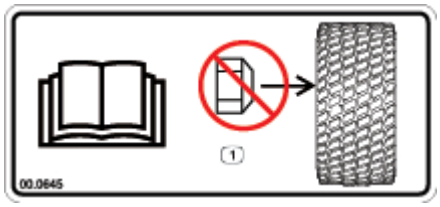
Decal Part: 00.0639



G496283

1 Pinching or crushing hazard—foot. Stay away from moving parts.

Decal Part: 00.0645



G496298

1 Place this side of the rim against the axle hub. Do not install the wheel lug nuts on this side of the rim. Refer to the *Operator's Manual*.

Safety Decal Locations (continued)

Decal Part: 00.0629



G496282

1 Caustic liquid/chemical burns hazard.

2 Explosion hazard—batteries produce flammable and explosive gases.

3 Do not expose the battery to arcs, sparks, or open flame. Do not smoke near batteries.

4 Keep bystanders away from the battery.

5 Wear eye protection, such as goggles or a face shield, when checking or servicing batteries.

6 Wear protective gear, such as rubber gloves and an apron, when checking or servicing batteries.

Decal Part: 00.0638

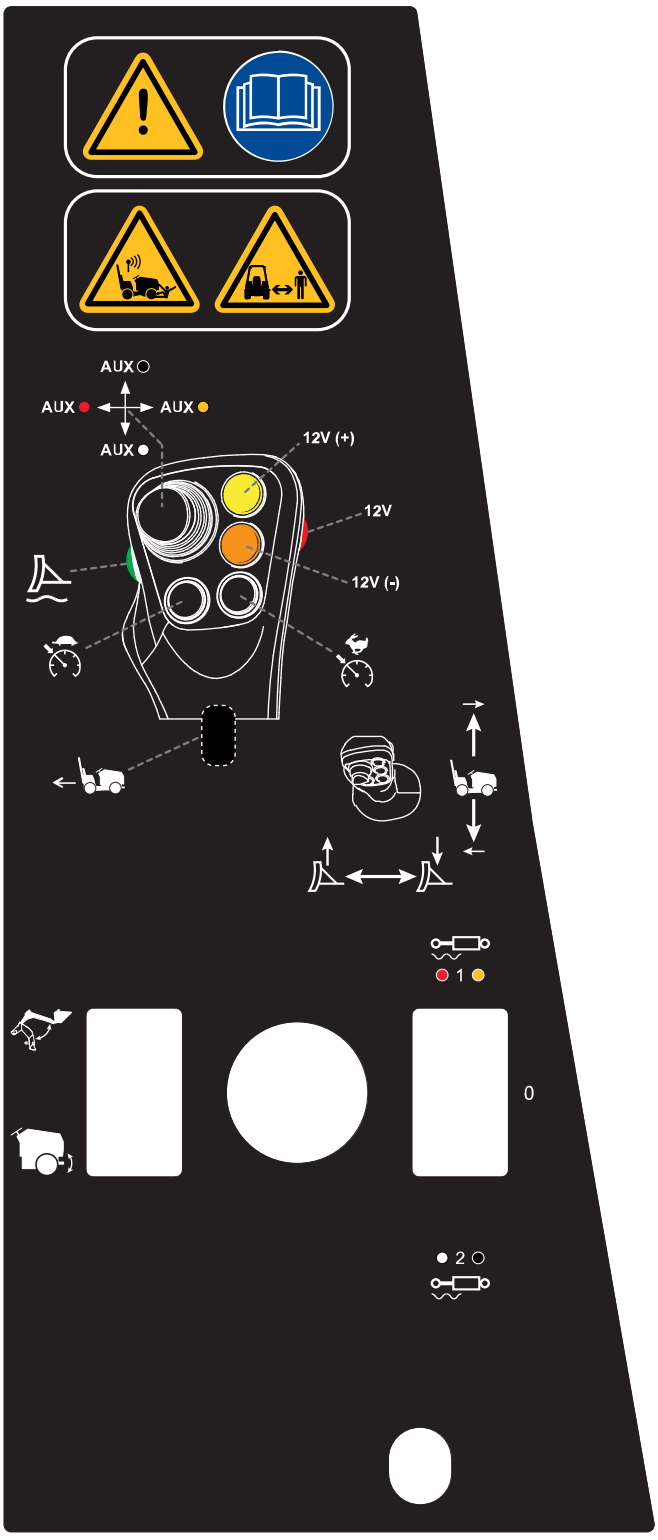


G496296

1 Severing of fingers or hand—engine fan. Stay away from moving parts.

Safety Decal Locations (continued)

Decal Part: 00.0780



G511890

(1) Read the *Operator's Manual*.

(2) This machine can be operated by remote control. The operator must stay away from the machine during remote operation.

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Machine Controls — Operator On

Control Layout

Become familiar with all the controls before you start the engine and operate the machine.



G517681

1. Information Display
2. Steering Wheel
3. Remote Control Mode Switch
4. Ignition Switch
5. High/Low Shift Lever
6. Weight Transfer Select Lever
7. Power Balance Switch
8. Throttle Switch
9. Warning Alarm
10. Auxiliary Hydraulic Float Switch
11. Front Hitch Latch Lever and Lock
12. Auxiliary Hydraulic Quick Couplers
13. Front 12 Volt 4–Pin Socket
14. PTO Belt Tensioner Rod
15. Power Take Off (PTO) Switch
16. Headlight Switch
17. Work Light Switch
18. Parking Brake Switch
19. Strobe Light Switch
20. Horn Switch
21. Joystick
22. Armrest
23. Seat Slide Lever
24. Fuel Shut-off Valve
25. Circuit Breaker and Battery Disconnect
26. Seat Prop Plate
27. Seat Latch Strap

Control Layout (continued)

28 USB Receptacle

29 Optional 3rd Aux Function Switch

30 Optional Hazard Flasher Switch

31 Optional Directional Signal Switch

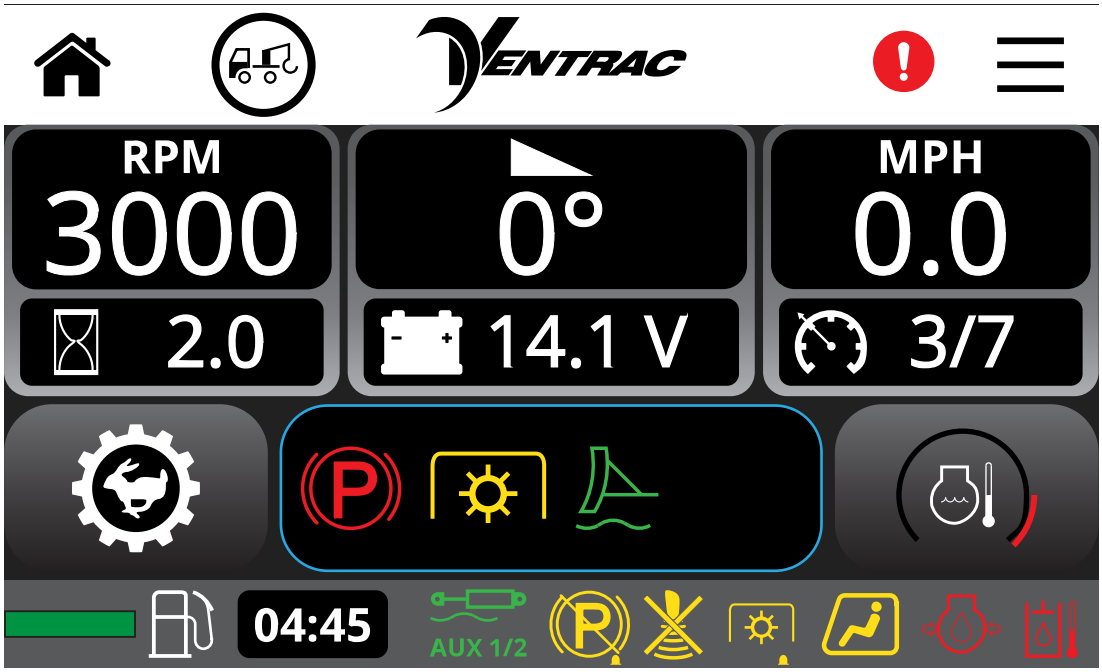
32 Optional Rear 12 Volt On/Off Switch

33 Optional Rear 12 Volt Momentary On/Off/On Switch

34 Front Hitch Valve

Information Display

The information display shows information about your machine, such as gauges and operating status, warnings, operator notifications, and various diagnostics.



G542371

	Home Page Button	Returns to the home page from any other screen.
	Tow Mode Button	Selects tow mode if the machine needs to be towed or pushed.
	Tow Mode Indicator	Displays on the speedometer window to indicate the machine is in tow mode. When tow mode is active, the machine drive and the PTO are disabled. The ignition key must be cycled to exit tow mode.
	Limp Mode Indicator	Displays on the speedometer window to indicate the machine is in limp mode. Limp mode is activated automatically when certain faults occur. When limp mode is active, the machine drive is limited and the PTO is disabled.
	Fault Indicator	Activates to indicate a fault condition. Pressing the fault indicator will display the current fault condition(s).
	Menu Button	Drops down a menu of screen page options.
RPM 3000	Tachometer	Displays the engine speed in Revolutions per Minute (RPM).

Information Display (continued)

	Slope Indicator	Displays the total composite slope angle of the machine. The total slope angle combines side-to-side angle with front-to-back angle to provide a true overall measurement of slope angle, regardless of the machine orientation.
	Speedometer	Displays the speed of the machine in Miles per Hour (mph) or Kilometers per Hour (km/h).
	Hour Meter	Records the accumulated run t ime of the engine.
	Volt Meter	Displays the voltage level of the charging system. If voltage drops too low, the symbol turns red and an alarm sounds.
	V-Trim Indicator	Displays the V-Trim level setting.
	Transaxle Range Indicator	Displays the range of the transaxles — low range (turtle), neutral (N), or high range (rabbit).
	Power Balance Indicator	Turns green to indicate when power balance is engaged. Returns to white when power balance is disengaged.
	Parking Brake Indicator	Displays when the parking brake is engaged.
	PTO Indicator	Displays when the PTO switch is engaged.
	Float Indicator	Displays when the front hitch is placed in float.
	Water Temperature Gauge	Displays the temperature of the engine cooling system. The gauge and symbol turn red and an alarm sounds if the cooling system overheats.
	Fuel Gauge	Displays the level of fuel in the tank. The fuel meter and symbol turn yellow to alert the operator when the fuel level is low.
	Clock	Displays the time of day. The clock is visible on all screens.
	Aux Float Indicator	Lights up to indicate when an auxiliary hydraulic circuit is in float. It will display AUX 1, AUX2, or AUX 1/2 to indicate the circuit(s) that are in float.
	Parking Brake Fault Indicator	Lights up to indicate that the parking brake switch is not engaged when the engine is not running.
	Joystick Neutral Fault Indicator	Lights up to indicate the joystick is not in the neutral position on startup.
	PTO Fault Indicator	Lights up to indicate the PTO switch is engaged when the engine is not running.
	Operator Presence Fault Indicator	Lights up to indicate a person is seated on the machine while the machine is set to remote control operation.

Information Display (continued)

	Engine Oil Low Pressure Indicator	Lights up and sounds an alarm if the oil pressure is too low. Shut off the engine immediately to prevent engine failure.
	Hydraulic Oil High Temperature Indicator	Lights up and sounds an alarm if the hydraulic system overheats.

Logging In to the Information Display

1. Press the menu button to drop down the menu.
2. Select the User Login.

   Note: If a user is already logged in, the User Profile will display instead of User Login.
3. Select the User Profile type (e.g. Customer, Dealer, Etc.).
4. Enter the User Pin. The customer pin is 00000000.

   If the pin is entered correctly, a green check mark will display and then the information panel will automatically return to the home page.

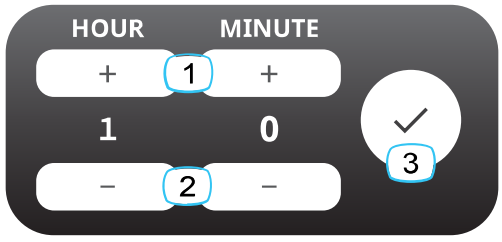
Settings Page

Adjusting the Screen Brightness

1. Drag the slider to the right to increase the screen brightness.
2. Drag the slider to the left to decrease the screen brightness.

Setting the Clock

1. Use the plus(1) and minus(2) buttons to adjust the hour and minute to the correct time.
2. Press the check mark(3) to update the clock on the information display.



G543332

Information Display (continued)

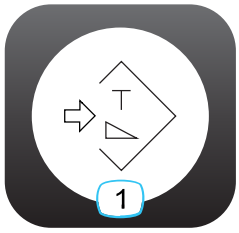
Calibrating the Slope Gauge

WARNING

If the machine is on an incline when calibrating the slope gauge, the slope gauge will display incorrect slope angles which could lead to rollover accidents.

Always park the machine on level ground when calibrating the slope gauge.

1. Ensure the machine is parked on ground that is level both front-to-back and side-to-side.
2. On the settings page screen, press and hold the slope calibration button① for 5 seconds until the outer ring turns yellow to indicate that calibration is in process.



G543334

   The yellow outer ring disappears to indicate calibration is complete.

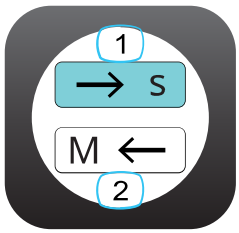
3. Return to the home screen and verify the slope gauge readout is 0 degrees.

Setting the Speedometer Display (mph or km/h)

The speedometer can be set to display in either mile per hour (mph) or kilometers per hour (km/h).

Note: The speedometer display on the remote control is set to display the same unit of measure (mph or km/h) as the information panel.

1. Park the machine and engage the parking brake.
2. On the settings page screen, select either **S**① to display the mph unit of measure or select **M**② to display the km/h unit of measure.



G543373

   The selected setting will be highlighted in light blue.

3. Return to the home screen and verify the speedometer is displaying the correct unit of measure.

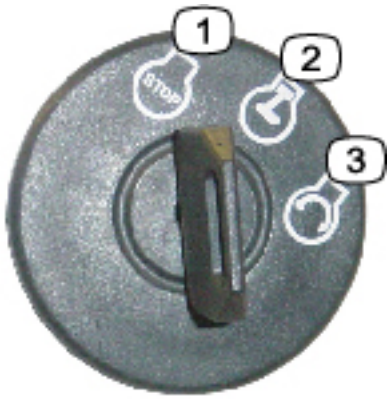
Steering Wheel

The steering wheel controls the direction of the machine. Turn the steering wheel to the left (counterclockwise) to turn the machine to the left. Turn the steering wheel to the right (clockwise) to turn the machine to the right.

Remote Control Mode Switch

Press the top of the switch to change the machine to remote control mode. Press the bottom of the switch to change the machine to operator on mode.

Ignition Switch



G156132

1 OFF Position
2 ON Position
3 START Position

OFF position 1—shuts off the engine, shuts off all electrical power that runs through the ignition switch.

ON position 2—engine run position, electrical power is sent to the accessories

START position 3—engages the starter.

High/Low Shift Lever

WARNING

When the shift lever is moved through the neutral position while shifting, the machine can freewheel on slopes leading to personal injury if the machine strikes an object.

Never shift ranges while on a slope. Always ensure the shift lever is secured in the lock position at the end of each shift stroke. Always install the ball pin to prevent the shift lever from accidentally moving to the neutral position.

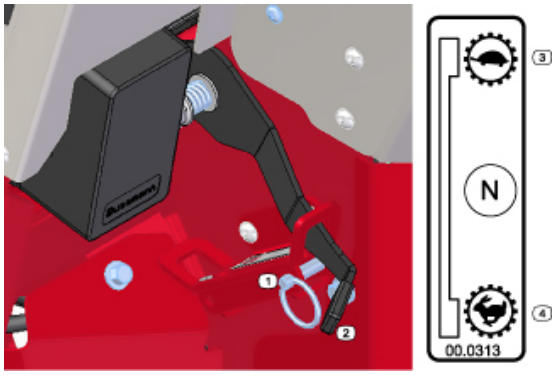
IMPORTANT

Shifting ranges while the machine is moving can damage the transaxle gears. Do not shift while moving or while the transaxle is under load.

The high/low range shift lever shifts both the front and rear transaxles simultaneously. Occasionally, the engagement of the transaxle gears is prevented by misalignment. Moving the steering wheel slightly to the right or left will move the gears enough to complete the engagement.

High/Low Shift Lever (continued)

With the machine parked on level ground, remove the ball pin① and push the shift lever② forward to select low range③. Pull the shift lever back toward the operator to select high range④. Ensure the shift lever is secured in the lock position at the end of the shift stroke. Install the ball pin into the shift select bracket position at the same end as the shift lever, in order to prevent the shift lever from being accidentally disengaged.



G501174

Weight Transfer Traction Control Select Lever

The weight transfer system transfers weight from the attachment to the front wheels of the machine. Transferring weight from the attachment to the machine increases the traction control, improves hillside maneuverability, aids in lifting the attachment, reduces the steering effort, and lessens the attachment resistance when in contact with the ground. The operator can select different transfer rates by selecting one of the five positions from no weight transfer (0) to maximum weight transfer (4). Set the weight transfer to 0 when attaching or detaching any attachment.



G502015

To set the weight transfer, raise the front hitch to its maximum height and move the weight transfer select lever to the desired position.

Selecting the proper amount of weight to transfer depends on the attachment, the ground conditions, and operator preference. A lightweight attachment will not operate in float with full weight transfer on. With full weight transfer on and mowing in the float position, the mower may not lower quickly enough when mowing through uneven terrain. The machine speed or the weight transfer rate must be reduced.

Power Balance Switch

Press the top of the switch to turn on the power balance setting. Press the bottom of the switch to turn off the power balance setting. Turning this switch on enables the power balance feature for both operator on and remote control operation. It is recommended to enable power balance when operating PTO powered attachments, especially during remote control operation. Refer to the Power Balance section for more details on the power balance feature.

Throttle Switch

Press the top of the throttle switch to increase the engine speed. Press the bottom of the throttle switch to decrease the engine speed. Press and hold the top or bottom of the switch to adjust to the maximum or minimum engine speed.

Warning Alarm

The warning alarm works with the information panel to alert the operator to problems. When a condition activates a warning light on the gauge, the warning alarm also activates and sounds a continuous signal alarm to alert the operator. If the warning alarm sounds, check the information panel to determine the cause of the warning alarm and then take appropriate action.

Auxiliary Hydraulic Float Switch

The auxiliary hydraulic float switch allows the operator to apply float to the auxiliary hydraulic circuits. This allows the selected auxiliary circuit to float when desired and relieves pressure within the selected circuit when disconnecting an attachment's auxiliary hydraulic hoses from the machine's quick couplers.

Note: The machine must be in Operator On mode and the engine must be running for the auxiliary hydraulic float to function.

Press the top of the switch to apply float to the circuit with the red and yellow quick couplers (AUX 1). Press the top of the switch again to disengage the AUX 1 float function and allow the hydraulic circuit to function normally.

Press the bottom of the switch to apply float to the circuit with the black and white quick couplers (AUX 2). Press the bottom of the switch again to disengage the AUX 2 float function and allow the hydraulic circuit to function normally.

To relieve pressure in the hydraulic circuits when connecting or disconnecting an attachment's auxiliary hydraulic hoses, refer to Relieving Pressure in the Auxiliary Hydraulic Circuits.

Front Hitch Latch Lever and Lock

The front hitch latch lever① locks and unlocks the hitch latch and the lever lock② prevents the accidental release of the front hitch latch lever.

Lift the tab on the lever lock and raise the front hitch latch lever to the unlock position ③ to unlock the hitch latch when attaching or detaching a front mounted attachment.

Lower the front hitch latch lever to the lock position④ to lock the hitch latch over the hitch arm pins on the attachment. Ensure the front hitch latch lever is secured in the frame detent and the lever lock is in place.



G516196

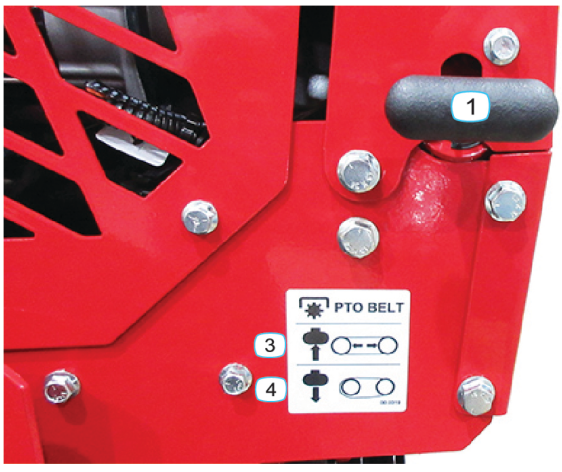
Front Auxiliary Hydraulic Couplers

The front auxiliary hydraulic couplers are part of the auxiliary hydraulic circuit and are used with attachments that require hydraulic functions.

Front 12 Volt 4–Pin Socket

The front 4-pin socket provides electrical power to attachments that are equipped with electrical controls. The electrical power is controlled by switches on the joystick or the remote control.

PTO Belt Tensioner Rod





The PTO belt tensioner rod① applies or releases belt tension to the attachment drive belt. After placing the attachment drive belt onto the PTO drive pulley②, push the PTO belt tensioner rod in③ until it locks in position with tension applied to the attachment drive belt. Pulling the PTO belt tensioner rod out④ releases the belt tension, allowing the operator to remove or install the attachment drive belt.

Power Take Off (PTO) Switch

Pull the PTO switch up to the ON position (2) to engage the electric clutch and send power to the front attachment. Push the PTO switch down to the OFF position (1) to disengage the clutch and stop the attachment.

Note: The PTO will shut off automatically if the operator leaves the seat. To restart the PTO, cycle the PTO switch to the OFF position, then back to the ON position.



G502040

Headlight Switch

Press the top of the headlight switch to turn ON the headlights and taillights. Press the bottom of the switch to turn the lights OFF.

Work Light Switch

Press the top of the work light switch to turn ON the work lights. Press the bottom of the switch to turn the work lights OFF.

Parking Brake Switch

When parking the machine, always engage the parking brake to prevent accidental movement of the machine. Push the parking brake switch down to engage the parking brake. Pull the parking brake switch up to disengage the parking brake.

If the parking brake is engaged, the joystick will be inoperable. If the joystick is moved out of the neutral position before the parking brake is disengaged, the joystick must be moved to the neutral position before the parking brake will release and the machine can be operated. If the operator leaves the seat without engaging the parking brake, the service brake and then the parking brake will be engaged automatically. When the operator returns to the seat, the operator must cycle the parking brake switch ON and back OFF to release the parking brake.

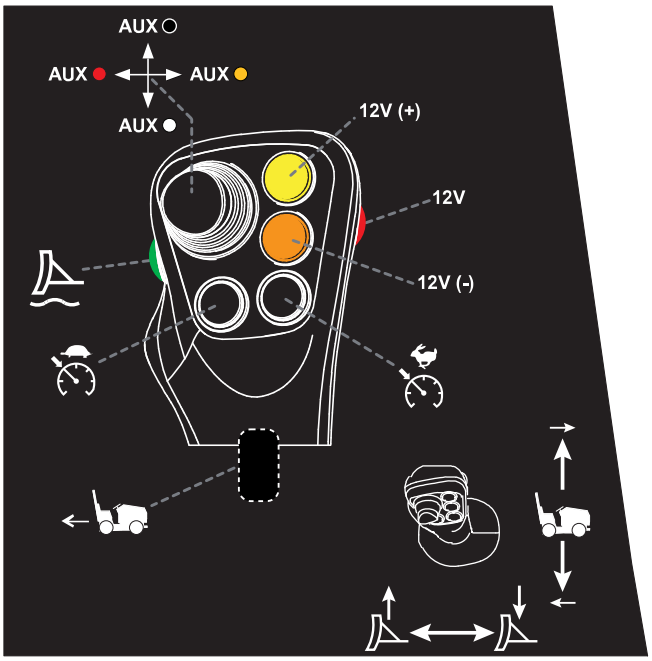
Strobe Light Switch

Press the top of the strobe light switch to turn ON the amber strobe light. Press the bottom of the switch to turn the strobe light OFF.

Horn Switch

Press the top or bottom of the horn switch to sound the signal horn. The horn will sound until the horn switch is released.

Joystick



G516402

The joystick is the primary control for the machine. It controls the speed and direction of travel, along with raising and lowering the front hitch. The joystick also controls the auxiliary hydraulic quick couplers, the front hitch float, the 12 volt front plug, and the v-trim function. The joystick is also equipped with a reverse confirmation trigger.

The forward or backward movement of the joystick controls the direction of the machine. The amount of forward or backward movement combined with the v-trim setting controls the ground speed of the machine.

Note: the reverse confirmation trigger must be depressed and held during the entire reverse movement.

The side-to-side movement of the joystick controls the front hitch. Move the joystick to the left to raise the front hitch. Move the joystick to the right to lower the front hitch. Press the green button on the left side of the joystick to engage the float function of the front hitch. Press the green button again or raise the front hitch and attachment to disengage the float function.

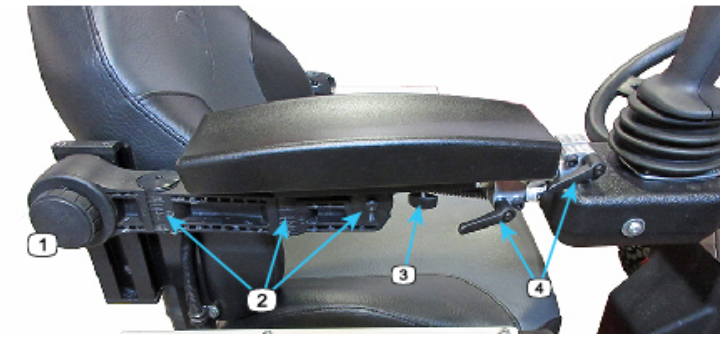
Note: it is not possible to put down force on the front hitch and attachment while the float function is activated.

The mini joystick controls the auxiliary hydraulic quick couplers. Forward and backward movement controls the set of quick couplers with the black and white indicators. Side-to-side movement controls the set of quick couplers with the red and yellow indicators.

The 12V buttons control the front 12 volt 4-pin plug.

The v-trim buttons decrease or increase the speed of the machine relative to the movement of the joystick. When the v-trim setting is decreased, the forward or backward movement of the joystick produces less machine speed. This feature allows for more precision when working in tight areas and can also be used to limit maximum speed when learning the system.

Armrest



G518342

1 Height Adjustment Knob

2 Armrest Adjustment Joints

3 Armrest Slide Adjustment Knob

4 Joystick Adjustment Handles

The armrest and joystick positions are adjustable for operator comfort. Adjust the height by loosening the height adjustment knob 1 and moving the armrest up or down to the desired position, then retighten the adjustment knob.

The armrest joints 2 can be pivoted to position the armrest closer to or further away from the operator and to tilt the armrest up or down. The joint bolts can be loosened or tightened as needed to make and hold adjustments. A 5 mm hex key wrench located by the control panel is provided for adjusting the joint bolts.

Loosen the armrest slide adjustment knob 3 to slide the armrest forward or backward, then retighten the adjustment knob.

Loosen the joystick adjustment handles 4 and move the joystick to a comfortable position, then retighten the adjustment handles. Pulling out on the joystick adjustment handles allows the handle to be rotated without tightening or loosening the joint. This allows the handle to be repositioned if it contacts the joystick or armrest before the joint is tight or if the handle is in an unsuitable position after the joint is tight.

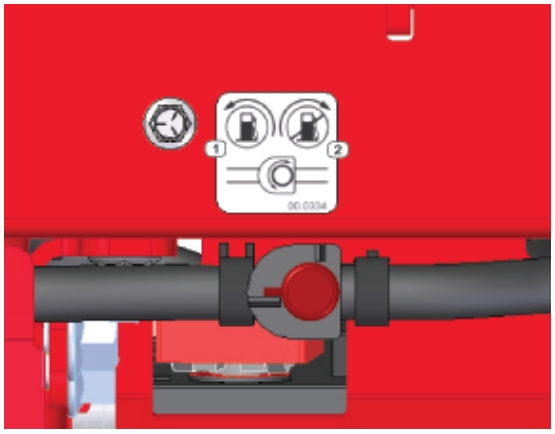
When operating in Remote Control mode, it is recommended to pivot the armrest and joystick in front of the seat back to protect it from contact with branches and other objects.

Seat Slide Lever

Lift the seat slide lever up to release the seat lock. Move the seat forward or backward to the desired position and release the seat slide lever to lock the seat in place.

Fuel Shut-off Valve

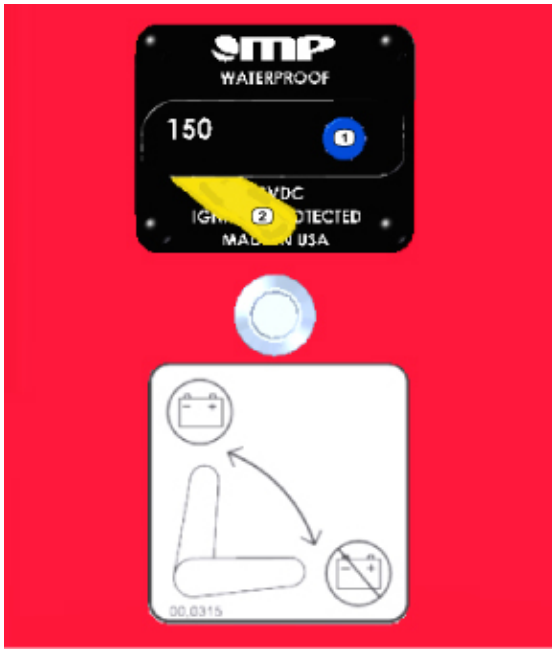
The fuel shut-off valve controls the flow of fuel to the machine's engine. Turn the valve counterclockwise① to the stop to allow fuel to flow to the engine. Turn the valve clockwise② to the stop to shut off fuel flow to prevent fuel leakage when changing the fuel filters or when servicing the fuel system. Turn off the fuel shut-off valve when transporting the machine on a truck or trailer and when parking the machine indoors.



G502231

Circuit Breaker and Battery Disconnect

The circuit breaker/battery disconnect switch controls power to the entire electrical system. Pushing the button① on the switch disables the electrical system, allowing electrical components to be serviced. When the button on the switch is pushed to disengage electrical power, a reset lever② drops down from the switch body. Lift up on the reset lever to restore electrical power.



G502225

Seat Prop Plate

IMPORTANT

If the seat is flipped forward with the joystick in the operating position, the joystick can be damaged by striking the dash. Prior to flipping the seat forward, rotate the armrest to the up position (1) or rotate the armrest out away from the operating position (2) to provide clearance to the dash when flipping the seat forward.



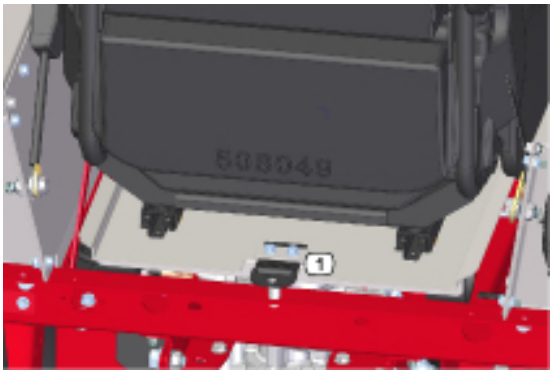
G526343

The seat prop plate secures the seat in the flipped forward position while service is performed under the seat. To secure, tilt the seat forward while checking to ensure the joystick does not strike the dash. If the armrest is in the up position (1), support it with one hand while tilting the seat forward. Lift up the seat prop plate, and insert the end into the wide portion of the seat plate slot. Ensure the seat prop plate snaps into the narrow portion of the slot to prevent accidental release.

To release, move the seat prop plate over into the wide portion of the seat slot and tilt the seat forward. Lower the seat prop plate back into the seat box and lower the seat back down to the operating position.

Seat Latch Strap

The seat latch strap secures the seat to the machine. To secure the seat, place the tab of the seat latch strap over the seat latch pin. Install the linchpin through the hole in the seat latch pin to secure. To release the seat so that it can be tilted forward for service, remove the linchpin and lift the tab of the seat latch strap off the seat latch pin.



G502226

USB Receptacle

The USB receptacle has two USB charging ports with a sealed cover.

Optional 3rd Aux Function Switch

The third auxiliary function switch is used in conjunction with the KM500 loader. The switch determines whether the joystick side-to-side movement controls the raising and lowering of the front hitch or the raising and lowering of the loader arms.

Optional Hazard Flasher Switch

Pressing the top of the hazard flasher switch turns On the hazard flasher lights. Press the bottom of the switch to turn the hazard flasher lights Off. Use of the directional turn signals will override the hazard flashers until the turn signal is turned Off.

Optional Directional Signal Switch

Press the top or bottom of the switch to turn On the indicated right or left turn signal. Return the switch to the middle position to turn Off the signals. The left and right turn signals will override the hazard flashers.

Optional 12 Volt Rear Switches and 4–Pin Socket

IMPORTANT

The 4-pin socket is designed for use with Ventrac original equipment only. This connector is rated for 20 amp maximum current draw. The engine alternator and/or battery capacity determine allowable continuous draw.

The rear 4-pin socket provides electrical power to rear mounted attachments that are equipped with electrical controls. The switches turn off and on the electrical power to the rear 4-pin socket.

Optional 12 Volt Rear Switches and 4–Pin Socket (continued)

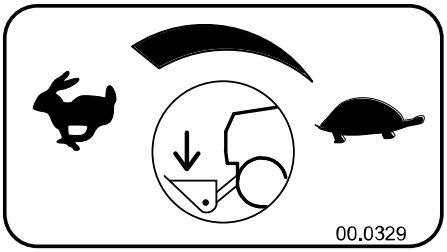
Press the top of the 12 volt On/Off switch(32) to turn ON electrical power to the 4-pin socket. Press the bottom of the switch to turn OFF the electrical power.

Press and hold either the top or bottom of the 12 volt momentary switch(33) to turn ON electrical power to the 4-pin socket. Release the switch to turn OFF the electrical power.

Front Hitch Valve

The front hitch valve locks the front hitch in place to prevent accidental lowering of the front attachment or limits the speed at which the attachment is lowered. The front hitch valve is standard on international models. It is an optional accessory for all other models.

Note: When operating implements on the rear 3 point hitch, it may be helpful to lock the front hitch and attachment in a raised position.



Rotate the front hitch valve handle clockwise to the stop to lock the front hitch in place. Rotate the handle counterclockwise to the stop to fully open the valve. Place the handle between the fully open and closed positions to limit the speed when raising or lowering the front hitch and attachment.

Machine Controls — Remote

Remote Control Layout

Become familiar with the layout of the remote control before you start the engine and operate the machine.



G517014

1. Right Joystick
2. Left Joystick
3. Connect Button
4. Horn Button
5. Right Steering Trim Button
6. Multifunction Switch (iCON)
7. Engine Start Button
8. Left Steering Trim Button
9. Throttle Up Button
10. Throttle Down Button
11. Display View Selector
12. Auxiliary Coupler Selector Switch
13. Front 12V Switch (On/Off)
14. Front 12V Switch (Momentary On/Off/On)
15. Parking Brake Switch
16. PTO Switch
17. Front Hitch Float Switch
18. Power Switch
19. Not Used
20. V-Trim Dial
21. Remote Battery Voltage Light
22. Fault Light
23. Parking Brake Light
24. PTO Light
25. Front Hitch Float Light
26. Not Used
27. Slope Indicator Light
28. Menu Navigation Buttons
29. Remote Control Display Screen
30. Engine Stop Switch

Right Joystick

The right joystick controls the machine speed and direction of travel, along with raising and lowering the front hitch.

The forward or backward movement of the right joystick controls the direction of the machine. The amount of forward or backward movement combined with the v-trim setting controls the ground speed of the machine.

The side-to-side movement of the joystick controls the front hitch. Move the joystick to the left to raise the front hitch. Move the joystick to the right to lower the front hitch.

Left Joystick

The left joystick controls the machine steering and the auxiliary hydraulic quick couplers.

Move the left joystick to the left or right to steer the machine left or right.

The forward or backward movement of the left joystick controls the selected set of front hydraulic quick couplers.

Connect Button

The connect button is used to turn on and connect the remote control to the machine.

Horn Button

Press the horn button to sound the signal horn. The horn will sound until the button is released.

Steering Trim Buttons

The left and right steering trim buttons are used to adjust the return to straight steering if the machine is tracking to the left or the right during operation.

Multifunction Switch

The multifunction switch can be rotated to scroll through the display menu and settings and pushed to make a selection.

Engine Start Button

Press the engine start button to engage the starter. Release the button when the engine has started.

Throttle Up Button

Press the throttle up button to increase the engine speed. Press and hold the button to adjust to the maximum engine speed.

Throttle Down Button

Press the throttle down button to decrease the engine speed. Press and hold the button to adjust to the minimum engine speed.

Display View Selector

The display view selector switches the screen view between the standard machine status screen and the camera view.

The camera is mounted on the machine's ROPS and allows the operator to see the area in front of the machine, the attachment, and obstacles that may be in the vicinity.

Auxiliary Coupler Selector Switch

The auxiliary coupler selector switch toggles the auxiliary coupler control between the red and yellow couplers (AUX1) and the black and white couplers (AUX 2). Positioning the switch in the center position deactivates both auxiliary circuits.

Front 12V Switch On/Off

Controls the constant power to the 4-pin front socket.

Front 12V Switch Momentary On/Off/On

Controls the momentary power to the 4-pin front socket.

Parking Brake Switch

Press the switch to engage the parking brake. Press the switch again to disengage the parking brake. The light next to the switch is red when the parking brake is engaged and green when the parking brake is disengaged.

PTO Switch

Press the switch to engage the electric clutch and send power to the front attachment. The light next to the switch will light up when the PTO clutch is engaged. Press the switch again to disengage the clutch and stop the attachment.

Note: If you are too close to the machine, the PTO will not engage, and the display will indicate that you are within the danger zone.

If the machine passes into the danger zone during operation, the PTO will automatically disengage. After moving out of the danger zone, the PTO switch must be cycled OFF, then back ON to reengage the PTO clutch.

Front Hitch Float Switch

Press the switch to engage the float function of the front hitch. The light next to the switch will light up when the float function is engaged. To disengage the float function, press the switch again or raise the attachment off the ground.

Note: it is not possible to put down force on the front hitch and attachment while the float function is activated.

Power Switch

The power switch controls 12 volt power to a specified accessory output. Push the switch forward to turn on power. Pull the switch backward to turn off power.

V-Trim Dial

The v-trim dial decreases or increases the speed of the machine relative to the movement of the joystick. When the v-trim setting is decreased, the forward or backward movement of the joystick produces less machine speed. This feature allows for more precision when working in tight areas and can also be used to limit overall speed when learning the system.

Note: If the v-trim dial is turned all the way to the minimum position, the maximum machine speed will be imperceptible to the operator. If the forward/reverse joystick seems unresponsive, check the v-trim dial and increase the setting if necessary.

Remote Battery Voltage Light

The remote battery voltage light gives the operator an indication of the charge level of the battery in the remote control. The light will be green if the battery charge percentage is high and will change to yellow as the percentage lowers. The light will change to red when it is nearing complete discharge.

Fault Light

The fault light turns on as a visual indicator that there is a fault. If the screen is displaying the camera view, switch back to the machine status view to display the fault.

Parking Brake Light

The parking brake light is displayed as green when the parking brake is disengaged and turns red when the parking brake is engaged.

PTO Light

The PTO light turns on as a visual confirmation that the PTO is engaged.

Front Hitch Float Light

The front hitch float light turns on as a visual confirmation that the front hitch float function is engaged.

Slope Indicator Light

The slope indicator light is displayed as green when the machine is on level ground or slopes up to 20 degrees. The light will turn yellow when the machine is on slopes between 20 and 30 degrees. The light will turn red if the machine is on slopes greater than 30 degrees.

Note: on slopes greater than 30 degrees, both the slope indicator light will turn red and the slope angle indicator on the screen will flash a hazard indicator.

Menu Navigation Buttons

The menu navigation buttons are used to navigate menus and make selections within the menus.

Remote Control Screen

The remote control screen displays either the machine status screen or the camera view. The machine status screen displays information such as gauges, warnings, operator notifications, and diagnostic information.

Engine Stop Switch

The engine stop switch is used to shut off the engine and disconnect the remote control when operation is complete. It is also used to shut off all machine functions and engage the parking brake in the event of an emergency.

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Before Operation

Daily Inspection

WARNING

Always engage the parking brake, shut off the engine, remove the ignition key, and ensure that all moving parts have come to a complete stop before inspecting the components, or attempting any repair or adjustment.

1. Park the machine on a level surface, with the engine shut off and all fluids cold.
2. Perform a visual inspection of the machine. Look for loose or missing hardware, damaged components, or signs of wear.
3. Inspect the ROPS structure and seat belt for damage or signs of wear.
4. Inspect the battery, the electrical connections, and the lights.
5. Inspect the hydraulic hoses and the hydraulic fittings to ensure tight, leak free connections.
6. Inspect the fuel lines to ensure tight, leak free connections.
7. Inspect the belts for damage or excessive wear. Refer to the Belt Inspection section of this manual.
8. Inspect the machine's engine oil level, the hydraulic oil level, the coolant level, and the fuel level. Add fluid or service as required.
9. Ensure the radiator screen, the air cleaner, and the engine compartment are clean.
10. Check the tires for proper inflation.
11. Test the operator safety interlock system.

During Operation

Operating Attachments

Read and understand each attachment *Operator's Manual* before using the attachment.

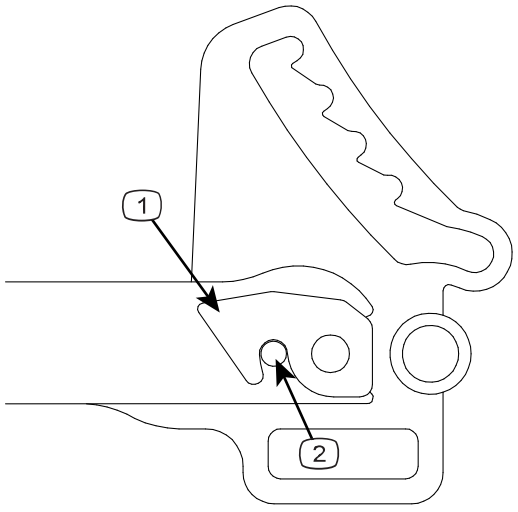
Relieving Pressure in the Auxiliary Hydraulic Circuits

Note: The machine must be in Operator On mode and the engine must be running for the auxiliary hydraulic float to function.

1. Press the top of the switch to apply float to the circuit with the red and yellow quick couplers (AUX 1). Press the bottom of the switch to apply float to the circuit with the black and white quick couplers (AUX 2).
2. Shut off the engine.
3. Connect or disconnect the hydraulic hoses.
4. To relieve pressure in the attachment hose, loosen the hose end and retighten after the pressure is relieved.

Attaching the Attachment

1. Drive the machine slowly forward into the hitch arms of the attachment. Align the lift arms of the machine with the attachment hitch arms by raising or lowering the front hitch and complete the engagement.
2. Once completely engaged, move the front hitch latch lever to the locked position. The latch (1) must lock over the attachment's hitch arm pin (2).
3. Engage the parking brake and shut off the engine.
4. Release the PTO belt tensioner rod.
5. Place the attachment belt onto the PTO drive pulley. Ensure the belt is properly seated in each pulley.
6. Engage the PTO belt tensioner rod.
7. Wipe the attachment hose ends clean, and connect them to the hydraulic quick couplers. If equipped, connect the hoses and the quick couplers so the colored indicators are paired together (red to red, etc.).



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Note: If the hoses are difficult to connect, it may be due to pressure in the hydraulic system or hoses. To relieve the hydraulic pressure, refer to Relieving Pressure in the Auxiliary Hydraulic Circuits

Attaching the Attachment (continued)

8. Connect the attachment's electric plug (if equipped) to the machine's matching socket.

Detaching the Attachment

1. Park the machine on a level surface and engage the parking brake.
2. Fully raise the front hitch and set the weight transfer to 0.
3. Lower the attachment to the ground and activate the front hitch float function.

Note: The remote control does not have an auxiliary hydraulic float switch. The following step must be performed on the machine.

4. If the attachment uses the auxiliary hydraulic quick couplers, press the auxiliary hydraulic float switch for the circuit(s) that are connected (red/yellow or black/white).
5. Shut off the engine.
6. Release the PTO belt tensioner rod.
7. Remove the attachment belt from the machine's PTO drive pulley.
8. Disconnect the attachment hoses from the machine.
9. Disconnect the attachment's electric plug from the socket on the machine.
10. Lift the front hitch lever lock to release the front hitch latch lever and move the front hitch latch lever to the unlocked position.
11. Restart the machine and slowly back away from the attachment. A side to side movement of the steering wheel may aid in disengagement.

Power Balance

The power balance feature aids the operator by automatically limiting the ground speed to maintain an optimum PTO output speed for PTO powered attachments. It is recommended to enable this feature especially during remote control operation as it is generally more difficult to maintain the engine RPM due to distance from the machine. It can also be helpful in operator on mode when operating under varying load and slope conditions. Under heavy load conditions, the power balance feature will automatically reduce and increase ground speed to prioritize maintaining the PTO output.

Turning the power balance feature off allows the operator to maintain full control of the machine.

Shifting Between High/Low Range

CAUTION

Never shift range while under load, while moving, or while on a slope. Always ensure the shift lever is secured in the lock position at the end of the shift stroke. Always install the ball pin to prevent the shift lever from accidentally moving to the neutral position. Always use low range when operating on slopes of greater than 15 degrees.

IMPORTANT

Occasionally the engagement of the transaxle gears is prevented by misalignment. Moving the steering wheel slightly to the right or left will move the gears enough to complete the engagement.

Low range is recommended for most pulling, pushing, and slow travel and is required on slopes greater than 15 degrees. High range is ideal for transport and light duty tasks.

1. Park the machine on level ground and engage the parking brake.
2. Remove the ball pin and move the shift lever to the desired range position.
3. Reinstall the ball pin to lock the shift lever in place.

Using the Front Auxiliary Hydraulic Couplers

WARNING

Hydraulic fluid is under high pressure and can penetrate skin causing injury. Keep your hands, face, and body away from pinholes or nozzles that can eject hydraulic fluid under high pressure.

IMPORTANT

Dirt and other debris in the hydraulic system can cause damage to the system. Wipe the mating parts of the couplers clean before attaching the hoses to the hydraulic couplers. Install the dust plugs in the hydraulic couplers when not in use.

Some attachments require auxiliary hydraulic power delivered through the front auxiliary couplers.

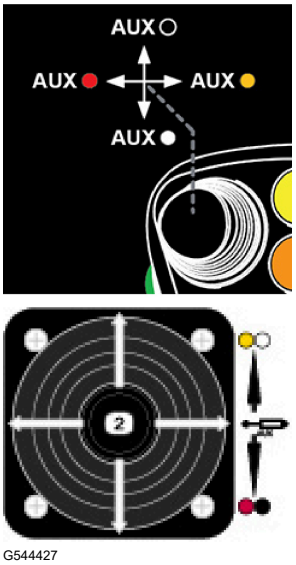
Note: Connect the attachment hoses to the front auxiliary hydraulic couplers so the colored indicators are paired together (red to red, etc.).

Using the Front Auxiliary Hydraulic Couplers (continued)

1. Couple the attachment hoses to the front auxiliary hydraulic couplers by sliding the collar on the coupler rearward.

Note: pressure build-up in the attachment hoses and the machine couplers may occur, causing difficult installation of the hoses. If the hoses do not easily connect, refer to Relieving Pressure in the Auxiliary Hydraulic Circuits.

2. Insert the male coupler of the attachment hose into the coupler and release the collar. If the collar does not snap forward to lock the couplers together, pull the collar forward manually.
3. When operating from the seat, use the mini joystick on the main joystick to control the auxiliary hydraulic functions.
   A. Move the mini joystick forward or backward to control the black and white coupler set.
   B. Move the mini joystick left or right to control the red and yellow coupler set.
4. When operating by remote control, use the left joystick and the auxiliary coupler selector switch to control the auxiliary hydraulic functions.
   A. Move the left joystick forward or backward to control the selected coupler set.
   B. Toggle the auxiliary coupler selector switch to select the black and white coupler set or the red and yellow coupler set.



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Note: moving the auxiliary coupler selector switch to the middle position deactivates both sets of hydraulic couplers, preventing accidental engagement.

Using the 12 Volt 4–Pin Front Socket

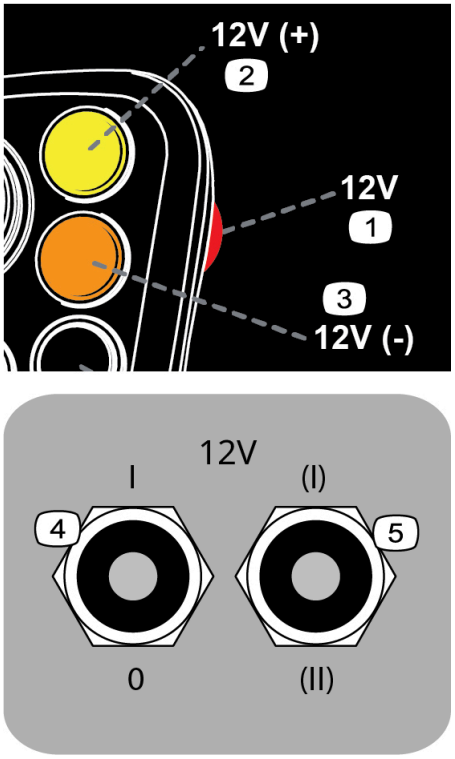
IMPORTANT

The 4-pin socket is designed for use with Ventrac original equipment only. This connector is rated for 20 amp maximum current draw. The engine alternator and/or battery capacity determine allowable continuous draw.

Some attachments require 12 volt auxiliary power. The 12 volt 4–pin front socket can deliver constant power to activate equipment and select functions or it can deliver momentary power to control movement that is only needed for a brief time.

Using the 12 Volt 4–Pin Front Socket (continued)

1. Plug the attachment's power cord into the 4–pin socket.
2. When operating from the seat, use the on/off (12V) button① and the two momentary buttons (12V [+])② and (12V [-])③ on the joystick to control the 12 volt power.
   A. Press the on/off button to turn on constant 12 volt power. Press the button again to turn off 12 volt power.
   B. Press and hold the 12V+ or 12V- button to turn on momentary 12 volt power. Release the button to turn off 12 volt power.
3. When operating by remote control, use the on/off switch④ and the momentary on/off/of switch⑤ on the remote to control the 12 volt power.
   A. Move the on/off switch forward to turn on constant 12 volt power. Move the switch back to turn off 12 volt power.
   B. Move and hold the on/off/on switch forward or backward to turn on momentary 12 volt power. Release the switch to turn off 12 volt power.



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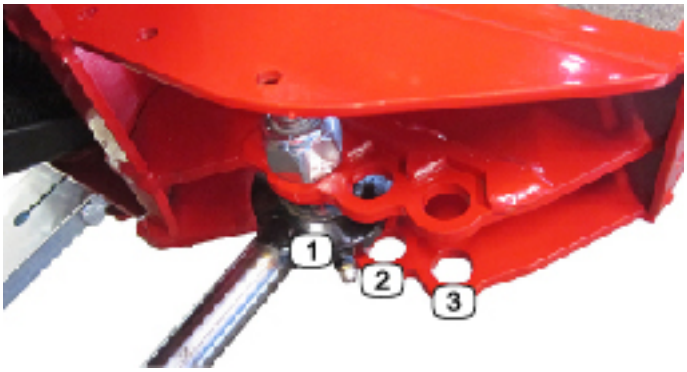
Turning Radius

The machine has three mounting positions for the steering cylinder that determine the machine's turning radius.



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(1) **Inner position:** this position enables the tightest turning radius.

(2) **Middle position:** the steering cylinder must be installed in this position when operating with dual wheels. The resulting turning radius is larger than position number 1.

(3) **Outer position:** the steering cylinder must be installed in this position when a cab is installed or when operating a loader. The resulting turning radius is larger than position number 2.

Slope Operation

WARNING

Operation on slopes decreases the machine stability and increases the potential for unexpected difficulties. Only experienced operators should operate the machine on slopes and extra caution should be exercised. Failure to follow safety instructions while operating on slopes can result in injury or death. Always use caution when operating on slopes.

- **Use low range when operating on slopes greater than 15 degrees.**
- **Never shift between high and low range while on a slope. Always move the machine to level ground and engage the parking brake before shifting range.**
- **Avoid uneven, loose, or wet terrain.**
- **Stay clear of drop-offs, holes, ditches, rocks, or objects that could cause a sudden and/or unexpected force on the machine.**
- **Make slow and cautious starts, stops, and turns.**
- **Do not exceed the maximum degree of operation. Refer to the machine capability illustrations.**
- **Turn downhill when possible and/or reduce the sharpness of turns.**
- **Ensure a sufficient supply of fuel for continuous operation. A minimum of one-half tank of fuel is recommended.**
- **To prevent fuel spillage, do not remove the fuel tank cap while the machine is on a slope.**

Slope Operation (continued)

WARNING

Some attachments or accessories have further limitations on the maximum angle of operation. Refer to the attachment *Operator's Manuals* for limitations.

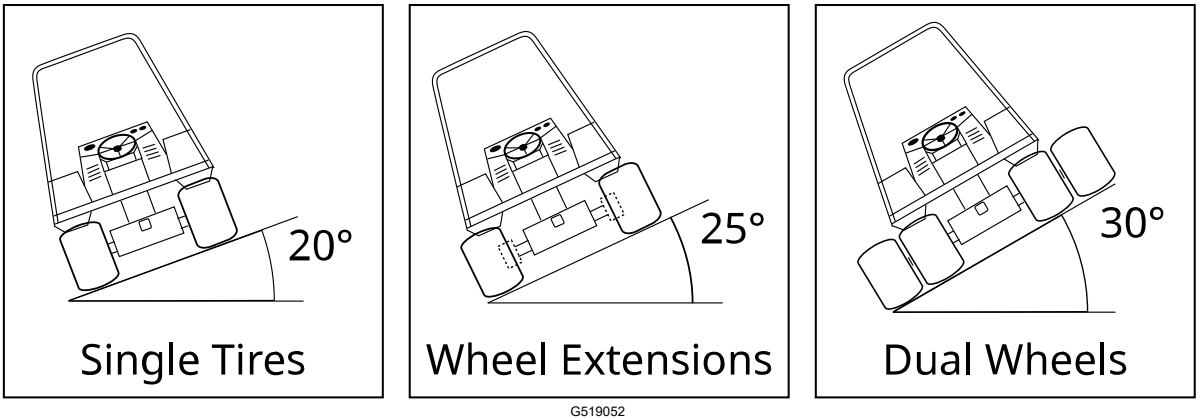
IMPORTANT

Maximum angle of operation for the engine (Kubota WG972-G-E4) in the 45RC machine: 20° continuous, 30° intermittent^.

^Intermittent: the engine may operate between 20° and 30° for up to 10 minutes. If 10 minutes is reached, the engine must be returned to 20° or less to ensure proper oil lubrication. After returning to 20° or less, the intermittent cycle may be repeated.

- Cease operation if the machine stability is questionable, or if the operator is uncomfortable or unsure of continuing safely.
- Attachments can affect the stability of the machine. Each attachment will affect the machine differently.
- Increase the amount of weight being transferred to the machine from the attachment while operating on slopes; refer to .
- Always operate carefully and in a manner that does not compromise safety.
- Always keep the roll bar in the upright, locked position and fasten yourself securely with the seat belt.

Refer to the following illustrations for machine capability with different equipment options.



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Model	Single Tires	Wheel Extensions	Dual Wheels
	Any Direction		
45RC	20 degrees	25 degrees	30 degrees

Operation in Water, Mud, Snow, or Ice

WARNING

Operation in water, mud, snow, or ice decreases machine traction and increases the potential for unexpected difficulties or loss of control. Reduce your speed and exercise caution.

WARNING

Operation on frozen bodies of water can be dangerous. The machine could fall through the ice and cause the operator to drown. Never operate on ice unless you have verified the thickness of the ice and that the travel path is safe.

CAUTION

Operation in water may cause damage to the hydraulic system, axles, or other parts. If the water level reaches the tire rim, the water is too deep.

Towing or Pushing the Machine

WARNING

When the transaxles are in neutral and the parking brake is disengaged, the machine can freewheel. Do not attempt to tow or push the machine while on slopes. Keep bystanders clear and use extreme caution when towing or pushing the machine. Be prepared to engage the parking brake to stop the machine.

CAUTION

When the machine's engine is not running, the steering will not function and the machine can only be moved forward or backward.

IMPORTANT

Failure to place the transaxles in neutral when towing or pushing the machine may result in severe damage to the machine drivetrain. Always make sure the transaxles are in neutral before towing or pushing the machine.

Towing or Pushing the Machine (continued)

Note: The machine must have electrical power to release the brakes. If the battery is discharged, it is recommended that the battery be charged or connected to a portable jump starter before attempting to move the machine.

1. Move the high/low range shift lever to the neutral position.

Note: Do not start the engine. Tow mode cannot be activated with the engine running.

2. Turn the ignition key to the RUN position.

Note: Tow mode cannot be activated without an operator on the seat.

3. Ensure the information panel is on the home screen. While sitting on the seat, press and hold the tow mode symbol until tow mode activates.

Note: The forward and reverse function of the joystick is disabled, but you can perform other functions such as raising or lowering the front hitch.

4. The engine can now be started to allow you to steer the unit.

Note: If you are pushing the machine, tow mode allows you to leave the seat without automatically engaging the brakes.

5. Disengage the parking brake.
6. Push or tow the machine to the desired location. Do not exceed 8 km/h (5 mph). Be prepared to engage the brake switch to stop the machine.
7. After reaching the desired location, engage the parking brake and turn the ignition key to the OFF position to exit the tow mode.
8. Move the high/low range shift lever to either the high or low range position and install the ball pin to prevent accidental disengagement of the shift lever.

Operation—Operator On

Starting the Engine

CAUTION

Use of ether or starting fluids may cause engine damage and/or personal injury. Do not use ether or starting fluids to aid in starting the engine.

IMPORTANT

Do not run the electric starter continuously for more than 10 seconds. If the engine does not start in this time, wait 30 seconds and try again.

IMPORTANT

Allow time for the hydraulic oil to circulate before operating the machine. Failure to allow adequate warm up time may result in severe damage to the hydraulic system. Warm up time is increased in colder weather.

The 45RC is equipped with an interlock system for operator safety. The safety interlock system requires the parking brake to be engaged for the machine to start.

1. Turn the fuel shut-off valve to the ON position.
2. Turn the battery disconnect switch to the ON position.
3. Position the joystick in the neutral position.
4. Turn the ignition key to the start position and hold to engage the starter. Release the key when the engine starts.
5. The engine and hydraulic oil must be warmed up before operating. Allow the machine to run at approximately 2,000 rpm until the hydraulic filter is warm to the touch.

   Note: The filter(1) is located to the inside of the left front fender.



G529126

Driving the Machine

1. Verify that the intended path is safe and free from obstacles.
2. Disengage the parking brake.
3. Adjust the throttle to the desired RPM.
4. Move the joystick forward or reverse in the intended direction.

   Note: The reverse confirmation trigger on the joystick must be depressed and held before moving the joystick back in the reverse direction.
5. Adjust the v-trim setting as needed; refer to Joystick.
6. Steer the machine using the steering wheel.

CAUTION

If the parking brake is engaged while the machine is moving, the machine may come to an abrupt stop.

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7. To slow or stop the machine, move the joystick toward the neutral position to slow the machine. Return the joystick to the neutral position to stop the machine. If the machine cannot be stopped using the joystick, push the parking brake switch to engage the brakes and stop the machine.

Shutting Off the Engine

1. Park the machine on a level surface and engage the parking brake.
2. Decrease the throttle to the slow idle position.
3. Allow the engine to idle for 2 - 3 minutes.
4. Turn the key to the OFF position and remove the key from the ignition switch.
5. When parking the machine at the end of the day, turn the battery disconnect switch and the fuel shut-off valve to the OFF positions.

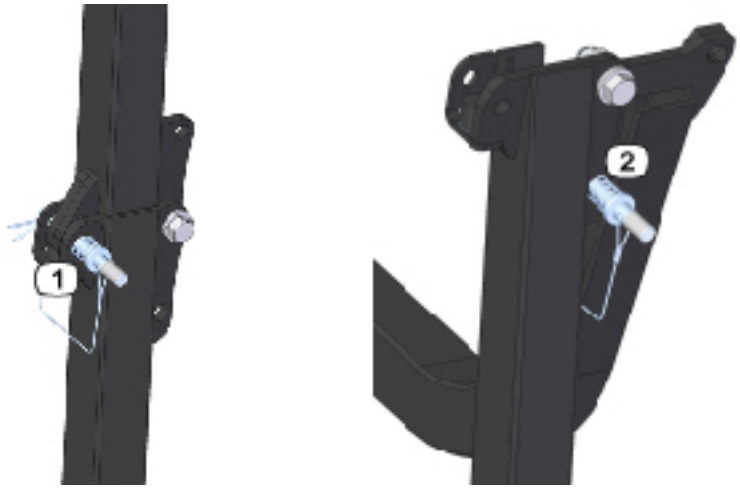
Lowering and Raising the ROPS

WARNING

Keep the ROPS locked in the upright position and the seat belt securely fastened during operation. Failure to do so could result in serious injury or death.

WARNING

Do not wear a seat belt when ROPS has been lowered to the down position.



G519143

1. To lower the ROPS, remove the pins from the right and left hinge plates (1).
2. Fold the ROPS down and install the pins in the hinge plates (2) to lock in place.

   Note: Remote control performance will be diminished with the ROPS in the down position.
3. To raise the ROPS, remove the pins from the right and left hinge plates (1).
4. Raise the ROPS to the upright position and install the pins in the hinge plates (1) to lock in place.

Operation—Remote Control

Using the Remote Control Shoulder Harness



G537882

1. Insert your arms through the harness straps with the harness pad① in the back between your shoulder blades.
2. Fasten the harness clips② to the remote control.
3. Adjust the length of the shoulder straps until the remote control is in a comfortable working position.

Using the Optional Remote Control Shoulder Hook



G537914

1. Place the shoulder hook mount① over your left shoulder
2. Fasten the remote control onto the clips② on the shoulder hook mount.
3. Press up on the adjustment latch③ and slide the bottom mount up or down until the remote control is in a comfortable working position.

Using the Optional Remote Control Shoulder Hook (continued)

4. Release the adjustment latch to secure the mount in position.

Starting the Engine

⚠ CAUTION ⚠

Use of ether or starting fluids may cause engine damage and/or personal injury. Do not use ether or starting fluids to aid in starting the engine.

IMPORTANT

Do not run the electric starter continuously for more than 10 seconds. If the engine does not start in this time, wait 30 seconds and try again.

IMPORTANT

Allow time for the hydraulic oil to circulate before operating the machine. Failure to allow adequate warm up time may result in severe damage to the hydraulic system. Warm up time is increased in colder weather.

1. Turn the fuel shut-off valve to the ON position.
2. Turn the battery disconnect switch to the ON position.
3. Turn the remote control switch on the machine to the ON position.
4. Turn the ignition key to the RUN position.

   The green strobe light will flash periodically to alert the operator that the ignition key is in the RUN position.

5. Twist the engine stop switch on the remote control to release.
6. Quickly press and release the connect button, then press and hold the connect button until the display screen wakes up.

   If the connection with the machine is successful, the green strobe light on the machine will change to a continuous flash sequence. If the connection is unsuccessful, check for warnings on the display and correct if necessary, then repeat the start sequence.

Starting the Engine (continued)

7. Press and hold the engine start button to engage the starter. Release the button when the engine starts.

   Note: if the engine fails to start, refer to the troubleshooting section.

Note: The engine and hydraulic oil must be warmed up before operating. The filter① is located to the inside of the left front fender.

8. Allow the machine to run at approximately 2,000 rpm until the hydraulic filter is warm to the touch.



G529126

Driving the Machine

1. Verify that the intended path is safe and free from obstacles.

WARNING

If the machine is parked in an articulated position, releasing the parking brake will cause the machine to return to the straight position. Keep away from the machine when releasing the parking brake.

If the machine is parked in a position where it not desirable for the machine to return to straight alignment, use the left joystick to steer in the direction the machine is turned. When the remote control reaches the position that aligns with the machine orientation, the remote control takes control of the steering. Releasing the parking brake at this point will not affect the machine steering position and the machine articulation will follow the position of the joystick.

2. Disengage the parking brake.
3. Adjust the throttle to the desired RPM.
4. Move the right joystick forward or reverse in the intended direction.
5. Adjust the v-trim setting as needed; refer to V-Trim Dial.
6. Steer the machine using the left joystick.
7. To slow or stop the machine, move the right joystick toward the neutral position to slow the machine. Release the right joystick to stop the machine.

   In case of an emergency, press the engine stop switch to apply the brakes and shut off the engine.

Shutting Off the Engine

1. Turn off the PTO, stop the machine on a level surface, and engage the parking brake.
2. Decrease the throttle to the slow idle position.
3. Allow the engine to idle for 2 - 3 minutes.
4. Press the engine stop switch to shut off the engine.
5. On the machine, turn the key to the OFF position and remove the key from the ignition switch.

   If the ignition key is left in the RUN position, the strobe light will flash periodically to alert you that the key is not in the OFF position.

6. When parking the machine at the end of the day, turn the battery disconnect switch and the fuel shut-off valve to the OFF positions.

Adjusting the Steering Trim

If the machine tracks to the left or right without any steering input, the steering trim can be adjusted to correct the machine tracking

Note: the amount of steering trim adjustment is limited to +/- 10 percent of the total steering function.

1. To enter the steering trim mode, press both the left and right steering trim buttons for approximately 1 second.

   You will feel a vibrating pulse to indicate that you have entered the steering trim mode. When you are in the steering trim mode, you must make an adjustment within 90 seconds or the remote control will automatically exit the steering trim mode.

2. Adjust the steering trim using the steering trim buttons.

   The right steering trim button adjusts the machine to the right and the left steering trim button adjusts the machine to the left. i.e. if the machine tracks to the left, press the right steering trim button to adjust the machine back toward the center line. Each press adjusts the machine slightly in the selected direction and is accompanied by a vibration to confirm the input. After each adjustment, the timer resets to 90 seconds to make the next adjustment. If you exceed the 10 percent value, you will continue to receive vibrations but no trim adjustment will be made. If you have made the maximum adjustments but the machine still tracks to the left or right, contact your Ventrac dealer.

3. To save your changes and exit the steering trim mode, either shut off the remote control or allow the steering trim mode to time out (90 seconds of inactivity). You may operate the machine normally during the 90 second wait period.
4. To check the tracking after adjusting the steering trim, start the machine, adjust the engine speed to full throttle, and turn the machine to both the left and the right while driving the machine. If the machine still tracks to the left or right, return to the steering trim mode and make further adjustments.

Adjusting the Steering Trim (continued)

5. To reset the articulation sensor back to the factory default setting, press both the left and right steering trim buttons to enter steering trim mode. Continue to hold both the left and right steering trim buttons for 5 seconds.

   Once the factory default settings have been restored, you will feel a vibrating pulse until you release the buttons. This will also automatically exit the steering trim mode.

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WARNING

Always engage the parking brake, shut off the engine, remove the ignition key, and ensure that all moving parts have come to a complete stop before inspecting the components or attempting any repair or adjustment.

IMPORTANT

Ventrac recommends that service of the machine be performed by a qualified technician. If you are unsure how to perform the service procedure(s), contact your Ventrac dealer.

IMPORTANT

If any component requires replacement, use only original Ventrac replacement parts.

Proper and timely service of this machine is critical to keep the machine in a safe and reliable operating condition. Follow the maintenance schedule at the end of the service section. For convenience, a frequent service guide decal and a quick reference decal have been placed on the machine under the hood.

Maintenance Schedules

Grease and Lubrication Recommended Maintenance Schedule

Maintenance Service Interval	Maintenance Procedure Refer to Lubricating the Machine	Quantity
Every 50 hours	Grease Front Hitch	1 pump
	Grease Lift Cylinder	1 pump
	Grease Center Pivot	1 pump
	Grease Steering Cylinder	1 pump
	Grease Drive Shaft	1 pump
	Grease 3 Point Cylinder (if equipped)	1 pump
	Grease 3 Point Hitch Pivot (if equipped)	1 pump
	Grease Lower Connector Link	1 pump
	Lubricate Seat Slide	As needed

Engine Recommended Maintenance Schedule

Maintenance Service Interval	Maintenance Procedure
After the first 50 hours	Change the engine oil and filter
Before each use or daily	Check the engine oil level.
	Inspect the primary air filter
	Check the engine coolant level
	Clean the engine compartment, engine, and radiator
Every 100 hours	Change the engine oil and filter
Every 200 hours	Replace the primary air filter
Every 400 hours	Replace the safety air filter
	Replace the fuel filter
Every 1,000 hours	Replace Spark Plugs; refer to the engine operator's manual.
	Adjust the Valve Clearance; refer to the engine operator's manual
	Clean the Combustion Chamber; refer to the engine operator's manual
Yearly or before storage	Service the Cooling System
	Drain Water and Sediment from the Fuel tank

Hydraulic System Recommended Maintenance Schedule

Maintenance Service Interval	Maintenance Procedure
Before each use or daily	Check the Hydraulic Oil Level
After the first 100 hours	Change the Hydraulic Filters
Every 250 hours	Check the Rear Transaxle Oil Level
Every 500 hours	Change the Hydraulic Oil and Rear Transaxle Oil

Pre-Maintenance Procedures

WARNING

Park the machine on level ground, disengage the PTO, lower attachments to the ground, engage the parking brake, shut off the engine, and remove the ignition key. Ensure that all moving parts have come to a complete stop before inspecting, cleaning, adjusting or repairing the machine.

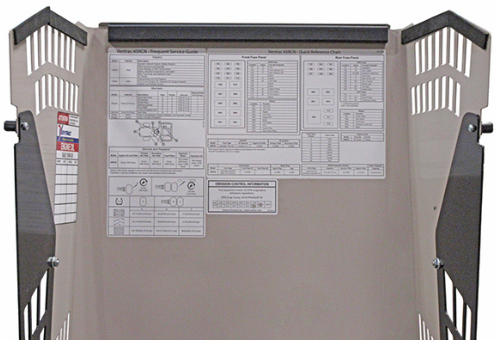
IMPORTANT

Never allow untrained personnel to service the machine. If your machine requires major repairs or if you desire assistance, contact your Ventrac dealer.

IMPORTANT

Use only genuine Ventrac replacement parts and accessories. Replacement parts and accessories made by other manufacturers could be dangerous, and such use could void the product warranty.

Proper and timely service of this machine is critical to keep your machine in a safe and reliable operating condition. Follow the maintenance schedule at the beginning of the maintenance section. For convenience, a frequent service guide decal and a quick reference decal have been placed on the machine under the hood.



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Service Access Points

Throughout the maintenance chapter, various access points are referred to. The following list and images identify shields and covers that may need to be removed or opened during service.



G534376

1. Hood
2. Pump Cover
3. Right Pump Access Cover
4. Right Engine Cover
5. Control Panel
6. Front Grill Plater
7. Left Engine Cover
8. Left Access Cover
9. Lower Rear Frame Cover
10. Debris Barrier

Lubricating the Machine

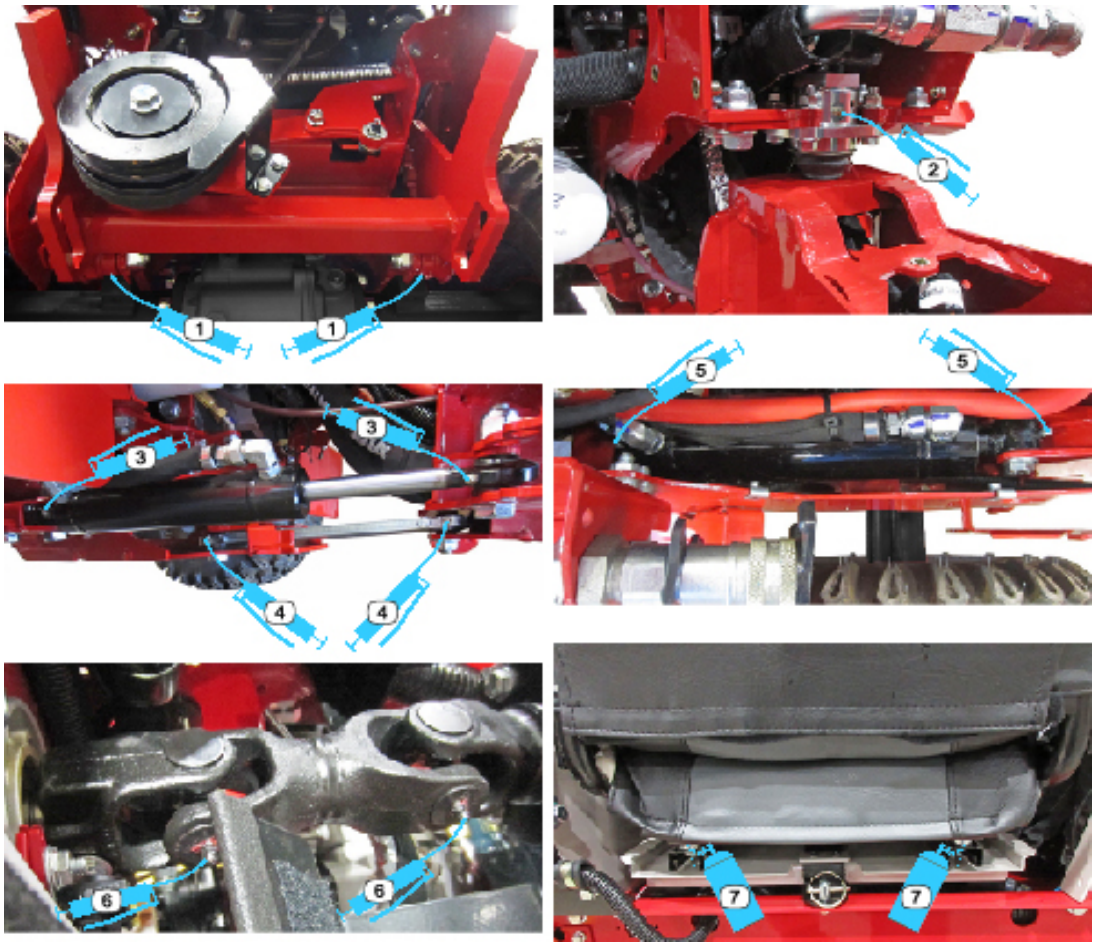


G537608

Lubrication is required at the following locations. Refer to the Grease and Lubrication Recommended Maintenance Scheduleforservice intervals and the amount of Lithium Complex NLGI #2 Grease(1) or Silicone Based Spray Lubricant(2).

1. Wipe the grease fittings clean.
2. Apply one pump of grease to all of the grease fittings.

Note: The front fitting of the drive shaft can be reached under the radiator, from the right side of the machine, using a grease gun with a 33 cm (13 inch) or longer rubber hose. Remove the right engine cover and rotate the drive shaft so the grease fitting is pointed directly toward the right side of the machine. Insert the hose from the right side, in line with the grease fitting. Push the hose onto the grease fitting and hold in place while greasing. The rear fitting can be reached by pulling back the canvas debris barrier to the rear of the radiator.



G529718

(1) Front Hitch
(2) Ball Joint
(3) Steering Cylinder
(4) Connector Link
(5) Lift Cylinder
(6) Drive Shaft
(7) Seat Slides

Machine Appearance Maintenance

IMPORTANT

To maintain the finish of the machine, thoroughly wash the equipment after each use to remove any corrosive agents (e.g. salt). Failure to clean the equipment may result in corrosion of (including but not limited to) steel, aluminum, and electrical components. Equipment that will experience repeated exposure to corrosive agents should be pretreated with a corrosion preventative.

Cleaning the Machine

⚠ CAUTION ⚠

If the engine has been running, it must be allowed to cool in order to prevent damage to the block and the exhaust manifold.

Do not direct high pressure water at the engine, air cleaner, muffler, radiator, hydraulic oil cooler, or any electrical components.

Do not use harsh chemical cleaners, as they may damage the finish or components.

1. Wash the machine, using mild soap and water.

   Note: It is necessary to periodically remove the lower rear frame cover and blow out or wash out any accumulated debris.
2. Allow the machine to dry thoroughly.
3. After cleaning, use touch up paint to repair any chips or scratches.

Cleaning the Engine Compartment and Engine

Clean the engine compartment and the engine daily or prior to each use, to reduce the risk of the engine overheating or the ignition of accumulated debris.

1. If the machine has been running, allow the engine to cool.
2. Remove the left and right engine covers.
3. Remove accumulated debris and dust from the engine compartment and the engine.
4. Clean the radiator and radiator screen. Refer to the Cleaning the Radiator and Screen section.
5. Install the left and right engine covers.

Hydraulic System

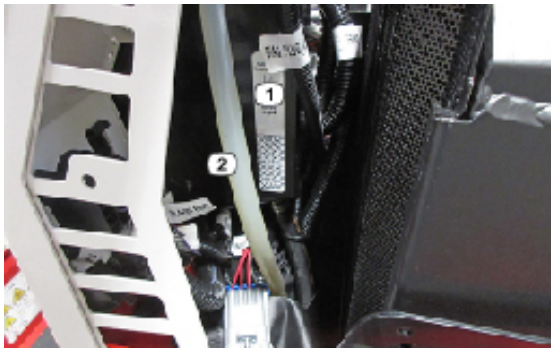
Checking the Hydraulic Oil Level

Check the hydraulic oil level when the hydraulic system is cold, prior to operating the machine. If the hydraulic system is warm, allow one hour for the hydraulic system to cool before checking the oil level. Checking the oil level when the hydraulic system is warm will produce an inaccurate oil level reading.

IMPORTANT

After connecting a new attachment or kit that runs off the machine's hydraulic system, run the attachment through a complete cycle, then stop and check the hydraulic oil level.

1. Park the machine on a level surface and adjust the steering to aim the machine straight ahead.
2. Fully raise the front hitch.
3. Shut off the engine and allow time for the hydraulic system to cool.
4. The hydraulic oil tank (1) is located under the hood and dash.
5. Check the oil level in the plastic sight tube (2) next to the hydraulic oil tank. The oil level should be within the proper range indicated by the oil level decal on the hydraulic oil tank.
6. If the hydraulic oil level is below the low mark on the decal, add hydraulic oil until the proper level is reached; refer to Fluid Capacities and Specifications.



G525455

Checking the Rear Transaxle Oil Level

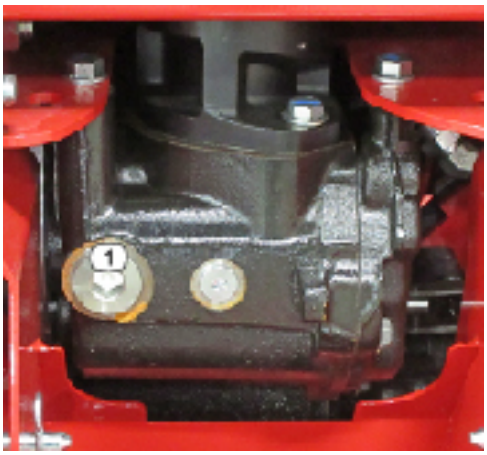
IMPORTANT

Check the rear transaxle oil level when the oil is cold, prior to operating the machine.

1. Remove the oil fill plug (1) from the transaxle and check to see if the oil level is even with the bottom of the oil fill hole.
2. If the oil level is low, add hydraulic oil until the oil is level with the bottom of the oil fill hole; refer to Fluid Capacities and Specifications.



3. Reinstall the plug into the rear transaxle and torque to **34–39 N·m (25–29 ft-lb).**
4. Clean up any spilled oil.



G525511

Changing the Hydraulic Oil Filters

WARNING

Hot oil can cause severe burns. Allow the oil temperature to drop from hot to warm before changing the oil filters.

IMPORTANT

Oil is hazardous to the environment. Drain oil into an approved container and dispose of used oil in accordance with local laws.

1. If the machine has been running, allow time for the hydraulic system to cool.
2. Remove the hydraulic filter access cover.
3. Clean the hydraulic filters, the filter heads, and the area around the filters.

Changing the Hydraulic Oil Filters (continued)

4. Place a drain pan (minimum 3.8 liter / 4 quart) under the large hydraulic filter (1) in front of the left foot platform.
5. Use a strap type filter wrench to unscrew the filter from the filter head and allow the oil to drain into the pan.
6. Wipe the filter mounting surface with a clean cloth.
7. Apply a thin film of clean oil to the gasket of the new filter and screw onto the filter head until the gasket makes contact with the mounting surface. Tighten the filter an additional 3/4 of a turn (may require using a strap type filter wrench).



G529126

8. Place the drain pan under the right rear axle beneath the small hydraulic filter (2).
9. Use a strap type filter wrench to unscrew the filter from the filter head and allow the oil to drain into the pan.
10. Wipe the filter mounting surface with a clean cloth.
11. Apply a thin film of clean oil to the gasket of the new filter and screw onto the filter head until the gasket makes contact with the mounting surface. Tighten the filter an additional 1 turn (may require using a strap type filter wrench).



G525556

12. Clean up any spilled oil and dispose of oil and filters in accordance with local laws.
13. If the hydraulic oil is being changed at the same time as the filters, skip the remaining steps and proceed to the Changing the Hydraulic Oil section.
14. Add hydraulic oil to the hydraulic oil tank until the oil level in the plastic sight tube is within the proper range indicated by the oil level decal; refer to Fluid Capacities and Specifications.
15. Start the machine and let it run at low idle engine speed for a few minutes. Turn the steering wheel to the left and right a couple of times to purge any trapped air out of the hydraulic system.
16. Shut off the machine engine and allow the machine to sit for a minimum of five minutes.
17. Check the hydraulic oil level. Refer to the Checking the Hydraulic Oil Level section.
18. Inspect both of the hydraulic filters for signs of leakage. If any leaks are evident, the filter may need tightened further, or the filter may need to be removed, the gasket and filter mount cleaned, and the filter reinstalled following the procedures for changing the filter.

Changing the Hydraulic Oil Filters (continued)

19. Reinstall the hydraulic filter access cover.

Changing the Hydraulic Oil

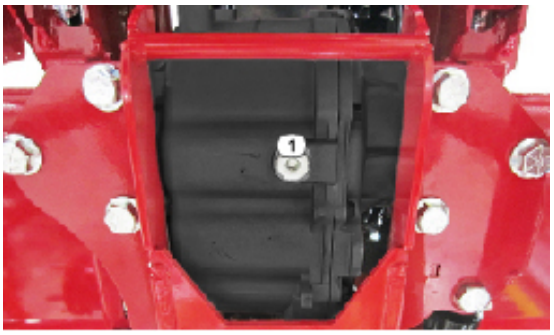
WARNING

Hot oil can cause severe burns. Allow the oil temperature to drop from hot to warm before draining the hydraulic oil.

IMPORTANT

Oil is hazardous to the environment. Drain oil into an approved container and dispose of used oil in accordance with local laws.

1. Wash the underside of both the front and rear transaxles thoroughly.
2. Park the machine on a level surface and adjust the steering to aim the machine straight ahead.
3. Fully raise the front hitch.
4. Shut off the engine and allow time for the hydraulic system to cool.
5. Place a drain pan (minimum 13.5 liter / 14 quart) under the front transaxle.
6. Remove the drain plug (1) from the front transaxle and allow the hydraulic oil to drain from the system. Loosen the cap on the hydraulic oil tank to allow venting.



G525732

7. Replace the O-ring and install the plug into the front transaxle and torque to **37 N·m (27 ft-lb)**.
8. Clean up any spilled oil and dispose of oil in accordance with local laws.
9. If the hydraulic filters are being changed with the oil, proceed to the Changing the Hydraulic Oil Filters section before completing the remaining steps in this section.
10. Add hydraulic oil to the hydraulic oil tank until the oil level in the plastic sight tube is within the proper range indicated by the oil level decal; refer to Fluid Capacities and Specifications.
11. Start the machine and let it run at low idle engine speed for a few minutes. Turn the steering wheel to the left and right a couple of times to purge any trapped air out of the hydraulic system.
12. Shut off the machine engine and allow the machine to sit for a minimum of five minutes.

Changing the Hydraulic Oil (continued)

13. Check the hydraulic oil level. Adjust the oil level as needed.

Changing the Rear Transaxle Differential Oil



G525744

IMPORTANT

Oil is hazardous to the environment. Drain oil into an approved container and dispose of used oil in accordance with local laws.

1. Place a drain pan (minimum 5.5 liter / 6 quart) under the rear transaxle.
2. Remove the drain plug(1) from the rear transaxle and allow the hydraulic oil to drain. Remove the oil fill plug(2) from the rear transaxle to allow venting.
3. Reinstall the drain plug(1) into the rear transaxle and torque to **34–39 N·m (25–29 ft-lb).**
4. Add hydraulic oil (approximately 3.8 liters / 4 quarts) to the fill port in the rear transaxle until the oil is level with the bottom of the oil fill hole; refer to Fluid Capacities and Specifications.
5. Reinstall the oil fill plug(2) into the rear transaxle and torque to **34–39 N·m (25–29 ft-lb).**
6. Clean up any spilled oil and dispose of the oil in accordance with local laws.

Closed Loop Hydrostatic Drive Circuit

IMPORTANT

Service or repair of the closed loop drive circuit must be performed by an authorized Ventrac dealer.

If any part of the closed loop hydrostatic drive circuit (the pump, the front drive motor, the rear drive motor, or any of the three 1/2" hydraulic lines connecting them together) is serviced or replaced, the Ventrac closed loop drive circuit filtration procedure must be performed. The procedure requires a special Ventrac remote filtering tool and must be performed by a Ventrac authorized technician.

Servicing the Hydraulic Cooler

1. Brush dirt and debris from the oil cooler screen in the right fender.
2. Remove the control panel from the top of the right fender.
3. Remove any accumulated debris from inside the fender area.
4. Blow the dust out of the cooler fins from inside the fender area using low pressure air.
5. Reinstall the control panel.

Engine

Checking the Engine RPM

Check the engine RPM when the engine is warm and is not under load.

1. Press and hold the bottom of the throttle switch to adjust to the minimum engine speed. The tachometer should read 1,500 ±100 RPM.
2. Press and hold the top of the throttle switch to adjust to the maximum engine speed. The tachometer should read 3,600 ±100 RPM.

If the minimum or maximum RPM is out of the specified range, contact your Ventrac dealer.

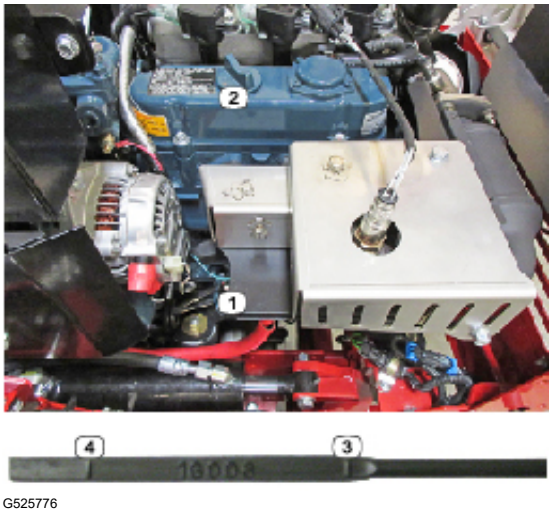
Checking the Engine Oil Level

IMPORTANT

Failure to check the engine oil regularly could lead to serious damage to your engine, if the engine is run with an incorrect oil level.

- **Check the engine oil level with the machine sitting on a level surface and with the engine shut off and the oil cold.**
- **Keep the oil level between the *Full* and *Add* marks.**
- **Do not add oil with the engine running.**

1. If the machine has been running, allow the engine and oil to cool.
2. Remove the oil dipstick(1) from the engine and wipe with a clean cloth.
3. Insert the dipstick back into the engine and remove again.
4. Check the oil level. The level should be between the Full(3) and Add(4) marks on the dipstick.
5. If the oil level is low, remove the oil fill cap(2) and add small amounts of engine oil to bring the oil level no higher than the Full(3) level on the dipstick.
6. If the oil level is above the Full(3) mark, drain some engine oil to achieve the proper level.
7. Reinstall the dipstick and the oil fill cap.



G525776

Changing the Engine Oil and Filter

WARNING

Hot engine oil can cause severe burns. Allow the engine temperature to drop from hot to warm before draining the engine oil.

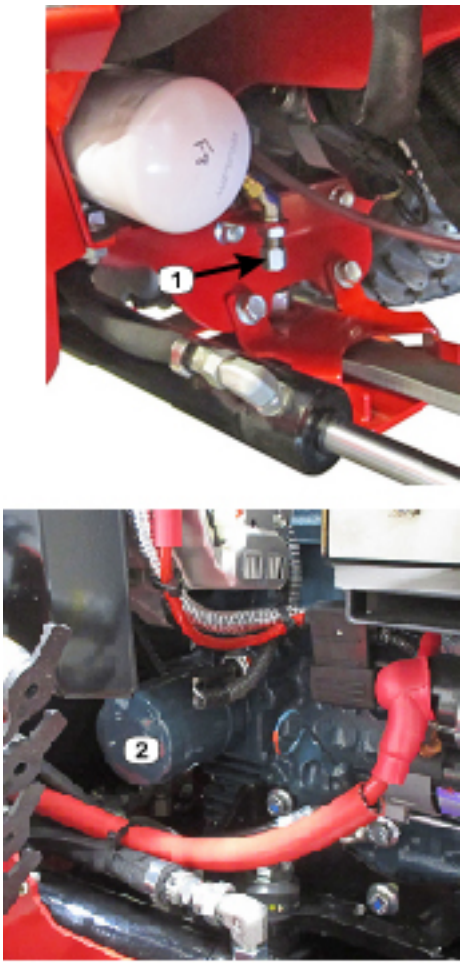
CAUTION

Contact with engine oil can irritate your skin. Wear protective gloves when working with engine oil. If you come in contact with engine oil, wash if off your skin immediately.

IMPORTANT

Oil is hazardous to the environment. Drain engine oil into an approved container. Dispose of used engine oil in accordance with local laws.

1. Start the engine and allow it to run until the engine reaches operating temperature.
2. Park the machine on a level surface.
3. Shut off the engine and allow the engine to cool from hot to warm.
4. Remove the right engine cover to access the oil filter.
5. Place a drain pan underneath the oil drain (1) located beside the hydraulic oil filter on the left side of the machine.
6. Remove the drain cap from the oil drain and drain into the pan while the oil is warm.
7. Remove the oil filter (2) located on the side of the engine.
8. Wipe the filter mounting surface with a clean cloth.
9. Apply a thin film of clean oil to the gasket of the new oil filter.
10. Screw the new filter onto the engine until the gasket makes contact with the mounting surface. Tighten the filter 1/2 to 3/4 turn more by hand.



G525920

Changing the Engine Oil and Filter (continued)

11. Install the drain cap onto the oil drain. Do not overtighten.
12. Remove the oil fill cap.
13. Add oil to the engine. Refer to the Engine Owner's Manual for proper oil specifications and capacity.

IMPORTANT

For optimal engine life and performance, use Ventrac full synthetic engine oil (Part Number 15.0037-1).

14. Install the oil fill cap and wipe up any oil spills.
15. Start the machine and let it run at low idle engine speed for approximately two to three minutes.
16. Shut off the engine and remove the ignition key.
17. Check for leaks around the oil filter. If any leaks are evident, the filter may need tightened further, or the filter may need to be removed, the gasket and filter mount cleaned, and the filter reinstalled.
18. Check the engine oil level after allowing the engine to cool for approximately two minutes and add oil if necessary.
19. Reinstall the right engine cover.

Changing the Air Filter Elements

IMPORTANT

When both air filter elements are removed, an opening is created to the internal parts of the engine.

Be sure nothing falls into the canister that could make its way into the engine. Have the new filter elements ready to install immediately after removing the old filter elements.

Improper service to the engine air filter can result in severe engine damage.

- **Inspect the filter daily in extreme heat, dust, or other severe conditions.**
- **Never run the engine without a proper air filter installed.**
- **Never wash or clean the paper filter element.**

1. If the machine has been running, allow the engine to cool.

Changing the Air Filter Elements (continued)

2. Remove the right access cover①.
3. Release both latches③ on the engine air filter assembly② and unhook the latches from the main filter housing.
4. Remove the filter cap④.
5. Remove and discard the primary (outer) air filter element⑤.
6. If the safety (inner) air filter element⑥ is scheduled for replacement, remove and discard the safety air filter element.
7. Install the new air filter element(s).
8. Install the filter cap and fasten both latches.
9. Install the right access cover.





G525798

Filling the Fuel Tank

DANGER

Fuel is flammable and explosive. Follow all safety instructions in the Fuel Safety section and in the engine owner's manual.

WARNING

Long term exposure to fuel vapors can cause serious injury or illness. Avoid prolonged breathing of fuel vapors.

If fuel is spilled on your skin or clothing, change your clothing and wash the affected area immediately.

IMPORTANT

Improper fuel can damage your engine. Only use fuel that meets the fuel grade and specifications listed in the engine owner's manual.

Filling the Fuel Tank (continued)

IMPORTANT

If the machine will not be used after filling the fuel tank, only fill the tank to within 25 mm (1 inch) of the bottom of the fuel neck to allow room for fuel expansion from temperature changes. Failure to do so may cause engine flooding, leakage from the tank, and/or damage to the emissions control system.

1. Park the machine on a level surface.
2. If the machine has been running, allow the engine to cool.
3. The fuel tank cap is located on top of the left rear fender. Wipe any dust and dirt off the fuel cap to prevent dirt from falling into the fuel tank and remove the fuel cap.
4. Add fuel to the tank until the fuel level reaches the bottom of the fuel neck. Do not overfill the tank by filling the fuel neck, as this may cause engine flooding, fuel leakage from the tank, and/or damage to the emissions control system. Keep the fuel nozzle in contact with the rim of the fuel neck until fueling is completed.
5. Replace the fuel cap and tighten.
6. Wipe up any fuel spills and allow fuel vapors to dissipate before starting the engine.

Changing the In-line Fuel Filter

1. Turn the fuel shut-off valve to the OFF position.
2. Remove the lower rear frame cover.
3. Loosen the hose clamps and remove the fuel filter①.
4. Install the new fuel filter with the arrow pointing toward the engine and fasten securely with the hose clamps.
5. Turn the fuel shut-off valve to the ON position.
6. Inspect the fuel filter hose connections for leaks.
7. Install the lower rear frame cover.



G526079

Priming the Fuel System

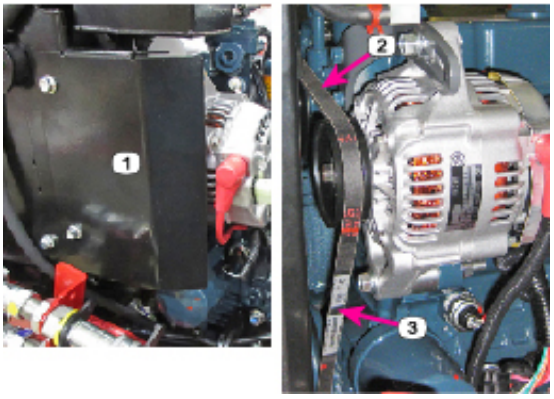
1. Turn the ignition key to the run position for approximately 30 seconds. The operator should hear the fuel pump operating.
2. Start the machine. Repeat step 1 if necessary.

Checking the Fan/Alternator Belt

WARNING

Fingers or loose clothing can get caught in rotating parts. Shut off the engine, remove the ignition key, and wait for all moving parts to stop rotating before working on the machine.

1. If the machine has been running, allow the engine to cool.
2. Turn the battery disconnect switch to the OFF position.
3. Remove the airflow baffle (1) from the radiator.
4. Check the fan belt (2) for excessive wear, cracks, or damage. Replace if necessary.
5. Check the fan belt for proper tension. Depress the belt halfway (3) between the drive pulley and the alternator pulley and measure the belt deflection at the specified force of 98 N (10 kgf, 22 lbf). The belt deflection should measure 7 to 9 mm (1/4 to 3/8 inches). If the belt deflection is not within the specifications, adjust the belt tension.



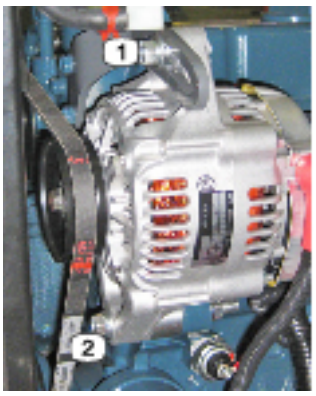
G526114

Adjusting the Fan/Alternator Belt Tension

WARNING

Fingers or loose clothing can get caught in rotating parts. Shut off the engine, remove the ignition key, and wait for all moving parts to stop rotating before working on the machine.

1. Loosen the alternator adjustment bolt①.
2. Loosen the lower alternator mounting bolt②.
3. Move the alternator in the desired direction to increase or decrease belt tension.
4. Tighten the alternator adjustment bolt.
5. Tighten the lower alternator mounting bolt.
6. Recheck the belt for proper tension.



G526175

Cooling System

DANGER

Engine coolant can cause poisoning.

- **Do not swallow engine coolant.**
- **Keep out of reach from children or pets.**

WARNING

Discharge of hot, pressurized coolant or touching a hot radiator and surrounding parts can cause severe burns.

- **Do not remove the radiator cap when the engine is hot. Always allow the engine to cool for at least 15 minutes or until the radiator is cool enough to touch without burning your hand before removing the radiator cap.**
- **Do not touch the radiator or surrounding parts that are hot.**

WARNING

Wear personal protective equipment to protect your eyes and hands when opening the radiator cap to protect against any pressure in the radiator.

If coolant is spilled on your skin or clothing, change your clothing and wash the affected skin immediately.

IMPORTANT

Using an incorrect coolant mixture and/or type can cause engine damage. Use only a mixture of 50 percent distilled water and 50 percent ethylene glycol antifreeze.

Recommended antifreeze: a low silicate, phosphate free antifreeze (ethylene glycol) containing supplemental coolant additives (SCAs) to inhibit corrosion and rust.

Dye color does not determine the antifreeze properties. Ethylene glycol antifreeze of different colors can be mixed.

Checking the Cooling System

1. Park the machine on a level surface.
2. If the machine has been running, allow the engine to cool.
3. Check the coolant level in the coolant recovery tank[1]. When the system is cold, the coolant level should be approximately half full of coolant.
4. If the coolant level is low, add coolant to the tank.
5. If the coolant recovery tank is empty, slowly open the radiator cap[2] until any pressure begins to vent. After all pressure has been released, remove the radiator cap.
6. Check to ensure the coolant level is up to the bottom of the fill neck.

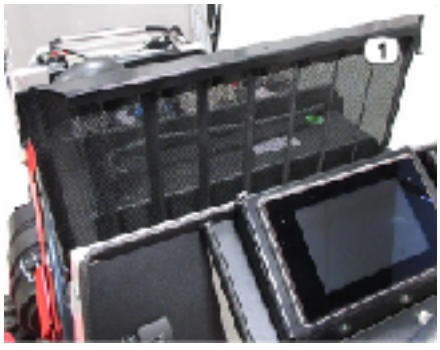


G526464

7. If the coolant is low, add coolant to the radiator until it reaches the bottom of the fill neck.
8. Install the radiator cap.
9. Inspect the radiator hoses and clamps for leaks and deterioration. Replace as needed.

Cleaning the Radiator and Screen

1. If the machine has been running, allow the engine and radiator to cool.
2. Remove the radiator screen[1].
3. Remove debris from the radiator screen using a brush, compressed air, or water.
4. When required, clean debris from the radiator using low pressure compressed air.
5. Check the radiator fins for damage.
6. Install the radiator screen.



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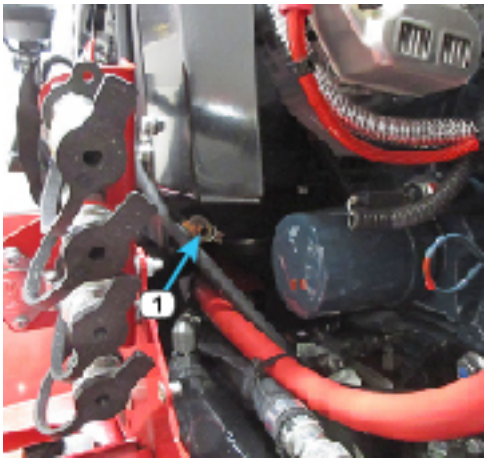
Draining the Cooling System

IMPORTANT

Coolant is poisonous to humans and animals and hazardous to the environment. Drain coolant into an approved container. Dispose of used coolant in accordance with local laws.

1. Park the machine on a level surface.
2. If the machine has been running, allow the engine to cool.
3. Remove the right engine cover to access the radiator drain.
4. Slowly loosen the radiator cap to relieve any pressure.
5. Place a drain pan or jug under the right side of the front frame.
6. Install an 11 mm (7/16 inch) ID hose onto the radiator drain port (1) and route down to the drain pan.
7. Turn the drain valve counterclockwise to open and drain the coolant into the drain pan.



G526517

Flushing the Cooling System

WARNING

Hot coolant can cause severe burns. Allow the temperature of the radiator to drop from hot to warm before draining the coolant.

IMPORTANT

Adding cold water to a hot engine can cause engine damage. Allow the engine and radiator to cool completely before adding water.

1. Drain the cooling system.
2. Close the radiator drain valve, leaving the drain hose in place.
3. Add one can of radiator flush to the radiator and fill the radiator with clean water.
4. Install the radiator cap, start the engine, and run until the engine reaches operating temperature (71-82° C / 160-180° F).

Flushing the Cooling System (continued)

5. Shut off the engine and remove the ignition key.
6. Carefully drain the cooling system while the coolant is still warm.
7. Allow the engine and radiator to cool completely.
8. Add clean water to the radiator and allow the water to run through the system. Add more water as needed, until the water flowing from the drain valve is clear and free of sediment.
9. After the water has drained completely, close the drain valve and remove the drain hose.
10. Slowly add the new coolant mixture to the radiator until the level reaches the bottom of the fill neck.

    Note: residual water may be present in the radiator and the engine block. Adjust the coolant mixture to achieve a 50/50 ratio of coolant to water.
11. Install the radiator cap, start the engine, and run until the engine reaches operating temperature (71-82° C / 160-180° F).
12. Shut off the engine and allow the engine to cool.
13. Recheck the coolant level when the engine is cold. Add additional coolant if needed.
14. Install the right engine cover.

Electrical System

Battery

CAUTION

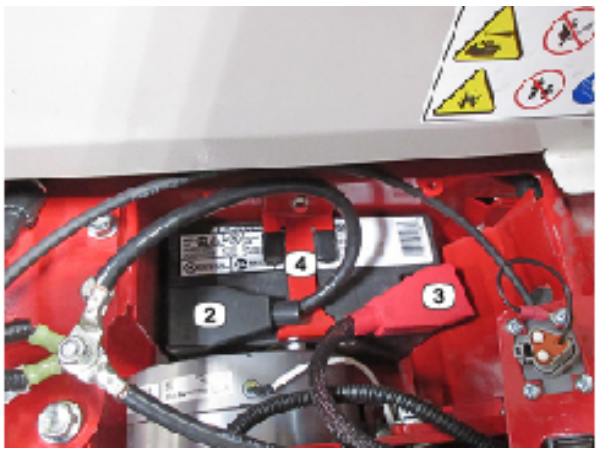
Battery-electrolyte is corrosive and can burn skin and eyes and damage clothing. While working with the batteries, use extreme caution to avoid splashing or spilling the electrolyte. Always wear safety goggles and a face shield while working with batteries.

The 45RC is equipped with a 12 volt, 340 CCA absorbed glass mat (AGM) Battery. AGM batteries contain fiberglass mats, electrolyte, and lead plates.

Removing the Battery

1. Tilt the seat forward and fasten in place with the seat prop.
2. Remove the left foot platform panel①.





3. Disconnect the negative (-) battery cable②.
4. Disconnect the positive (+) battery cable③.
5. Remove the battery retainer④.
6. Slide the battery forward out of the battery compartment.

Installing the Battery

1. Slide the battery into the battery compartment with the positive (-) post to the rear.
2. Install the battery retainer and torque the bolt to **8 N·m (72 in-lb)**.
3. Install the left foot platform panel and torque the bolt to **11 N·m (100 in-lb)**.
4. Connect the positive (+) battery cable to the positive battery post first.
5. Connect the negative (-) battery cable to the negative battery post last.

Battery (continued)

6. Apply dielectric grease to the battery terminals to prevent corrosion.
7. Place the covers back over the battery terminals.

Cleaning the Battery and Terminals

1. Remove the battery from the machine.
2. Wash the battery with a solution of 60 mL (4 tablespoons) of baking soda to 3.8 liters (1 gallon) of water. Do not allow the soda solution to get into the battery cells.
3. Rinse the battery with clean water.
4. Clean the battery posts and battery cable terminals with a wire brush.
5. Reinstall the battery.

Charging the Battery

DANGER

Batteries produce explosive gases. Charge the battery in a well ventilated area where the gases produced by charging can dissipate. Do not charge where the battery could be exposed to sparks, open flames, or other sources of ignition.

Never charge a frozen battery, as it may explode. Allow the battery to warm up and inspect for cracks or damage before charging.

WARNING

If electrolyte is expelled or excessive gassing occurs during charging, immediately stop charging the battery. Over charging can lead to battery damage or explosion.

IMPORTANT

The 45RC is equipped with a 12 volt, 340 CCA absorbed glass mat (AGM) Battery. AGM batteries need to be charged with an AGM compatible battery charger.

To preserve optimum battery performance and life, do not allow the battery to stand in a discharged state for long periods of time. If the battery is not being used, check the battery voltage every 30 days and recharge the battery if the voltage drops to 12.4 volts or lower.

Keep the battery fully charged in cold weather to prevent damage due to freezing.

1. If possible, remove the battery from the machine before charging.

Battery (continued)

2. Refer to the battery charger's manual for specific charging instructions.
3. If electrolyte is expelled or excessive gassing occurs, immediately stop charging and allow the battery to cool. Inspect the battery for cracks or leaks. Inspect the charger, ensure that the charger is compatible with AGM batteries and is set to the voltage and settings.

Jump Starting Procedure

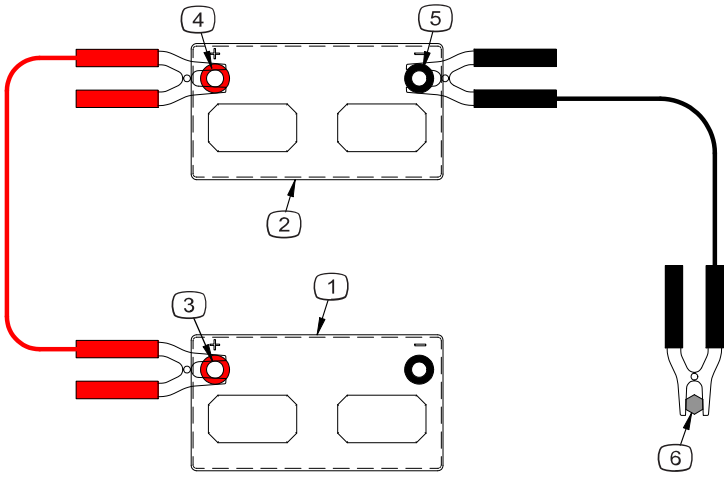
DANGER

The battery produces a flammable and explosive gas. The battery may explode.

- **Wear eye protection and gloves.**
- **Do not jump start a cold or frozen battery. Allow the battery to warm up and inspect for cracks or damage.**
- **Do not jump start a cracked or damaged battery.**
- **Do not attempt to jump start the machine using a battery of a different voltage.**

IMPORTANT

Attempting to start the disabled unit with the boosting vehicle's engine running could cause damage to the regulator.



1. Discharged battery
2. Booster battery
3. Discharged battery positive terminal
4. Booster battery positive terminal
5. Booster battery negative terminal
6. Ground stud

1. Inspect the discharged battery for terminal corrosion and loose connections. Clean the terminals and tighten the connections prior to jump starting.
2. Make sure the vehicle used to jump start the machine has a 12 volt, negative ground electrical system.

Battery (continued)

3. Pull the boosting vehicle up close to the disabled machine. Be sure the vehicles do not touch.
4. Shut off the boosting vehicle's engine and engage the parking brake.
5. Connect one end of the positive (+) booster cable to the positive (+) terminal (3) of the discharged battery.
6. Connect the other end of the positive (+) booster cable to the positive (+) terminal (4) of the booster battery.
7. Connect the negative (-) booster cable to the negative (-) terminal (5) of the booster battery.
8. Connect the other end of the negative (-) booster cable to the disabled machine's ground stud (6).
9. Start the disabled machine and remove the booster cables in reverse order of installation (negative booster cable first).

Fuses

Replacing Fuses in the Front Fuse Panel

1. Turn the battery disconnect switch to the OFF position.
2. Remove the sealed cover (1) from the fuse panel.
3. Identify and remove the defective fuse from the socket. Refer to the Quick Reference decal under the hood for fuse locations.
4. Insert a new fuse into the socket. Be sure the fuse is the correct amperage or damage may occur to the machine.



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5. Install the sealed cover onto the fuse panel.
6. Turn the battery disconnect switch to the ON position.

Fuses (continued)

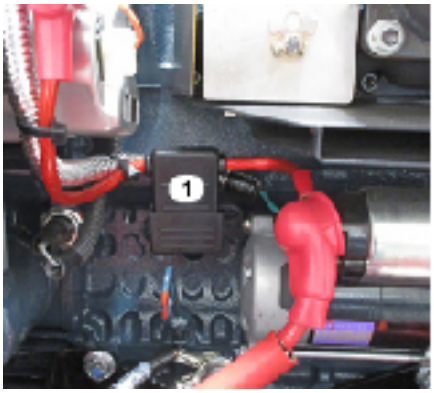
Replacing Fuses in the Rear Fuse Panel



G526697

1. Turn the battery disconnect switch to the OFF position.
2. Tilt the seat forward and fasten in place with the seat prop.
3. Remove the sealed cover (1) from the fuse panel.
4. Identify and remove the defective fuse from the socket. Refer to the Quick Reference decal under the hood for fuse locations.
5. Insert a new fuse into the socket. Be sure the fuse is the correct amperage or damage may occur to the machine.
6. Install the sealed cover onto the fuse panel and lower the seat back down to the operating position.
7. Turn the battery disconnect switch to the ON position.

Replacing the Engine Fuse



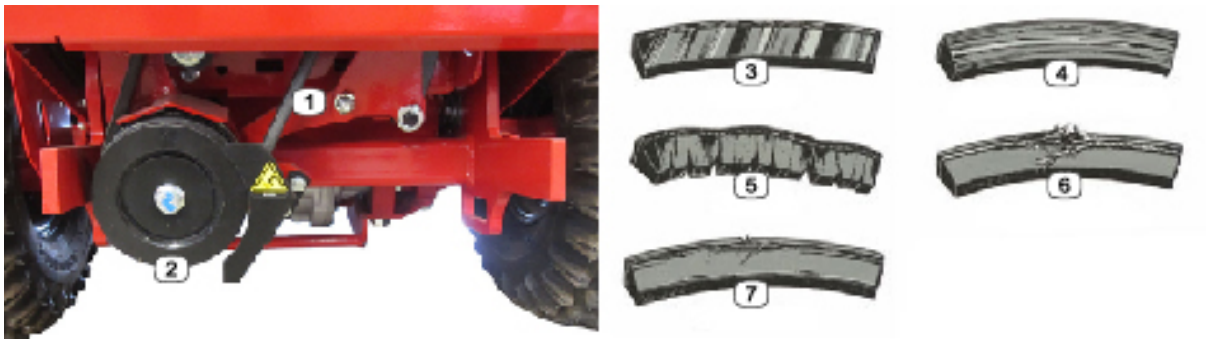
G527132

1. If the machine has been running, allow the engine to cool.
2. Turn the battery disconnect switch to the OFF position.
3. Remove the right engine cover.
4. Remove the defective fuse from the in-line fuse holder (1).
5. Insert a new fuse into the fuse holder. Be sure the fuse is the correct amperage or damage may occur to the machine.
6. Install the right engine cover.
7. Turn the battery disconnect switch to the ON position.

Power Take-Off (PTO)

Inspecting the PTO Drive Belt

Inspecting the PTO belt of this machine can prevent sudden belt failure by finding problems before they cause a belt to break. Inspect the PTO belt prior to operation, as part of the daily inspection or anytime a problem is suspected. There may be a PTO belt problem if there is a squealing or chattering sound, or the smell of a slipping belt.



G528187

1. Inspect the PTO belt① at the PTO idler pulley②.

   Typical wear on a belt may result in the conditions shown in the diagram. If the PTO belt show signs of glazing③, streaked sidewalls④, cracks⑤, broken tensile cord(s)⑥, or separation⑦, replace the PTO drive belt.
2. Replace the PTO drive belt as required; refer to Replacing the PTO Drive Belt.

Adjusting the PTO Belt Tension

1. Pull out on the PTO belt tensioner rod to release tension from the belt tensioner linkage.
2. Loosen the adjustment bolt① and rotate the tension adjustment link② clockwise to increase the tension applied to the PTO and attachment belts. Rotate the tension adjustment link counterclockwise to decrease the tension applied to the PTO and attachment belts.



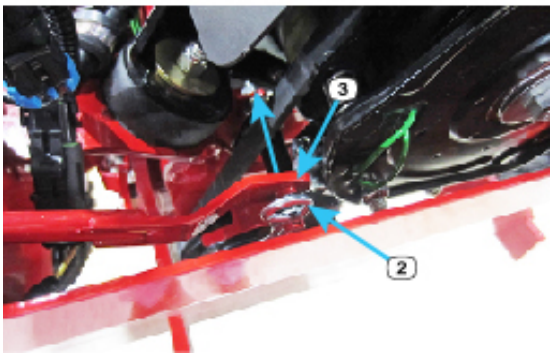
G528232

3. Tighten the adjustment bolt securely. Torque to **42 N·m (31 ft-lb)**.

Replacing the PTO Drive Belt

1. If the machine has been running, allow the engine to cool.
2. Remove the front grill plate.
3. Remove the PTO idler pulley guard①.
4. Pull the PTO belt tensioner rod out to release the belt tension.
5. Reach through the grill opening and remove the hairpin② and washer that fastens the belt tensioner rod③ to the belt tension rocker.
6. Remove the belt tensioner rod from the belt tension rocker.
7. Lift up on the PTO idler pulley and remove the belt from the pulley.
8. Pull the belt up between the PTO tension rocker and the front grill and remove from the clutch pulley.





G528329

9. Push the new belt down between the PTO tension rocker and the front grill.
10. Install the belt onto the clutch pulley.
11. Lift up on the PTO idler pulley and install the belt into the rear groove of the idler pulley.
12. Install the PTO belt tensioner rod to the belt tension rocker and fasten with the washer and hairpin.

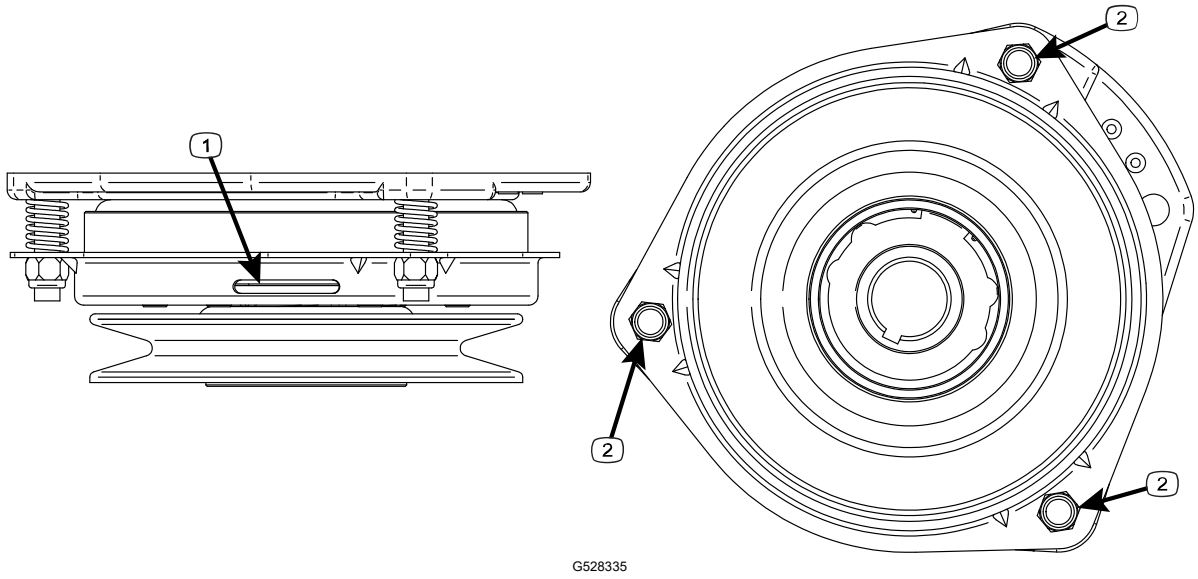
13. Install the PTO idler pulley guard. Torque the bolts to **11 N·m (100 in-lb)**.
14. Install the front grill plate.

Inspecting and Adjusting the PTO Clutch Air Gap

The electric clutch is activated by the PTO switch to engage or disengage power to belt driven attachments. The clutch also provides braking action to stop the attachment when the PTO is disengaged or the operator presence circuit is interrupted.

For proper operation, the air gap between the armature and the rotor must be set at .5 mm (.020 inch). If the air gap is too narrow, the clutch armature may drag when disengaged, causing premature failure. If the air gap is too wide, the clutch may not engage correctly or it may disengage when it becomes hot.

Check the air gap annually and adjust the clutch air gap as needed.



1. Locate the three inspection windows (1) on the clutch.
2. Insert a .5 mm (.020 inch) feeler gauge through the inspection window and into the slot between the armature and the rotor.
3. Tighten or loosen the clutch adjustment nut (2) as needed to achieve the .5 mm (.020 inch) air gap at all three inspection windows.

Wheels and Tires

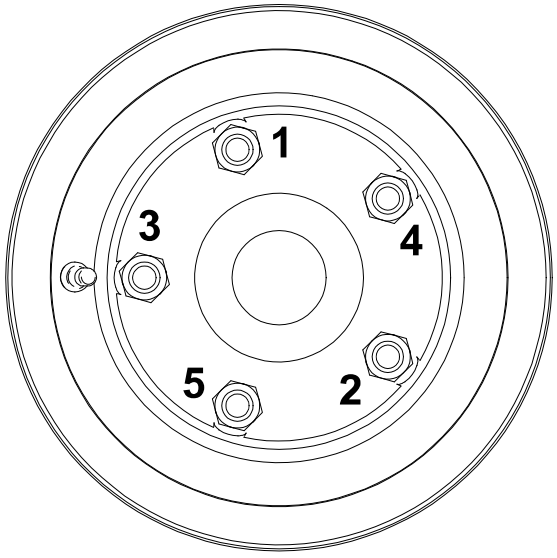
Removing and Installing the Wheels

WARNING

If the machine is not adequately supported, the machine could fall and trap or crush a person or appendage, causing severe injury or death. Use jack stands to securely support the machine.

1. Remove any attachments from the machine, park the machine on a level surface, engage the parking brake, and remove the ignition key.
2. Loosen the wheel lug nuts, but do not remove.
3. Lift up the corner of the machine and secure with a jack stand.
4. Remove the lug nuts and lift the wheel off the mounting studs.
5. To install the wheel, place the wheel onto the mounting studs with the hub side of the rim against the axle hub.

   Note: If the wheel is equipped with dual valve stems, there is a decal on the rim that indicates the hub side of the rim.
6. Install the lug nuts and tighten by hand until the wheel is held against the axle hub.
7. Lift the machine up slightly and remove the jack stand. Lower the machine to the ground.



G528368

8. Tighten the lug nuts in a crisscross sequence as shown. Torque to **75 N·m (55 ft-lb)**.

Removing and Installing the Outer Dual Wheels

1. Raise the machine approximately 5 cm (2 inches) by driving the machine onto wood planks positioned in line with the inner wheels. The outer dual wheels should not contact the wood planks.

   Note: A jack and jack stands may be used to raise and support the machine if planks are not available.
2. Place wheel chocks in front and back of the inner wheels to prevent the machine from rolling forward or backward during removal or installation of the outer dual wheels.

Removing and Installing the Outer Dual Wheels (continued)

3. Place wheel chocks in front and back of the inner wheels to prevent accidental movement.
4. Loosen the draw bolts approximately five turns.
5. With a medium size hammer, hit the end of the draw bolt until the draw cone releases.
6. Remove the dual wheel assemblies by rotating them counterclockwise.
7. Install the four plastic plugs from the dual wheel kit into the inner dual wheel hubs.

8. If desired, move the steering cylinder to the inner hole setting of the cylinder mount under the left front corner of the foot platform. Torque to **203 N·m (150 ft-lb)**.
9. To install the outer dual wheels, remove the plastic plugs from the inner dual wheel hubs.
10. Inspect the threaded end of the dual wheel extensions to ensure the draw cone, the draw bolt, and the external threads of the dual wheel extension have a light coating of grease. Apply grease if necessary.
11. The draw cone must be loose before installing the dual wheel extension into the inner hub. Check by sliding the draw bolt in and out. It should have 6.5–13 mm (1/4–1/2 inch) of travel.
12. Insert the threaded end of the dual wheel extension into the inner dual wheel hub. Using both hands, turn the dual wheel clockwise until the wheel is tight and there are four threads or fewer visible on the outer wheel extension. This is to ensure the hubs lock correctly when the draw bolt is tightened. Repeat for the other three wheels.


G528414

13. Tighten the draw bolt and torque to **163 N·m (120 ft-lb)** Repeat for the other three wheels.

14. If the steering cylinder is mounted to the inner hole setting of the steering cylinder mount, move the steering cylinder to the center hole setting of the cylinder mount under the left front corner of the foot platform. Torque to **203 N·m (150 ft-lb)**.

Tire Pressure

Keep tires evenly inflated. Keep tire pressures within the proper range to prevent premature wear and/or poor traction.

Tire	Single Wheel	Dual Wheels	
		Inner	Outer
All Terrain	55-110 kPa (8–16 psi)	55-69 kPa (8–10 psi)	41-55 kPa (6–8 psi)
Bar	55-110 kPa (8–16 psi)	55-69 kPa (8–10 psi)	41-55 kPa (6–8 psi)
Turf	103-138 kPa (15–20 psi)	103-117 kPa (15–17 psi)	69-83 kPa (10–12 psi)

Canopy

Synchronizing the Canopy Strobe Light

If a canopy strobe light requires replacement, the canopy strobe lights will need to be synchronized after the new light is installed and the flash pattern may need to be reset.

1. Turn the ignition key to the engine RUN position. Do not start the engine.
2. Turn the strobe light switch to the ON position.
3. In the left rear corner of the canopy, locate the harness connector with a cap.
4. Remove the cap from the connector.
5. Use a jumper wire to connect the two terminals for seven seconds.
6. Remove the jumper wire.
7. Proceed to changing the flash pattern.

Changing the Canopy Strobe Light Flasher Mode

The canopy strobe lights have seventeen different flash patterns. Follow the steps below to change the flash pattern.

1. Turn the ignition key to the engine RUN position. Do not start the engine.
2. Turn the strobe light switch to the ON position.
3. In the left rear corner of the canopy, locate the harness connector with a cap.
4. Remove the cap from the connector.
5. Use a jumper wire to connect the two terminals momentarily (less than one second) to change to the next flash pattern. Repeat until the desired flash pattern is reached.
6. Turn the strobe light switch to the OFF position.
7. Turn the ignition key to the OFF position.
8. Install the cap onto the connector.

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Preparing the Machine for Storage

1. To maintain the finish of the machine, thoroughly wash the equipment to remove any corrosive agents (e.g., salt). Failure to clean the equipment may result in corrosion of (including but not limited to) steel, aluminum, and electrical components.
2. Clean the machine.
3. Inspect for loose or missing hardware, damaged components, or signs of wear. Repair or replace any damaged or worn components.
4. Inspect the ROPS structure and seat belt for signs of damage or wear.
5. Inspect the safety decals. Replace any decals that are faded, illegible, or missing.
6. Inspect the hydraulic hoses and fittings for leaks and/or wear. Service as required.
7. Inspect the fuel lines for leaks.
8. Inspect the electrical system and connections.
9. Test the operator safety interlock system.
10. Inspect the PTO pulley and belt for damage or excessive wear. Service as required.
11. Perform the PTO clutch air gap inspection
12. Check the hydraulic oil level. Add fluid or service as required.
13. Check the coolant level and make sure the temperature protection range is at least -37° C (-34° F). Add fluid or service as required.
14. Clean the radiator screen, the radiator, and the engine compartment.
15. Check the tires for proper inflation.
16. Grease or lubricate all points specified in the Lubrication section. Wipe off any excess grease or oil.

Note: After all the steps have been performed, complete the preparation for storage by performing the steps for either long term storage (four months or longer) or short term storage (less than four months).

17. Inspect the painted components for chips, scratches, or rust. Clean and touch up the surfaces as needed.

Storing the Machine (Long Term)

Long term storage is any amount of time greater than four months.

1. Change the engine oil to prevent damage that can be caused by acidic buildup in used motor oil.
2. Drain all the fuel out of the fuel tank, start the engine, and allow to run until the engine stops to ensure all the fuel is out of the fuel lines, injectors, etc.
3. Turn the key to the OFF position and remove the ignition key.
4. Engage the parking brake.
5. Turn the fuel shut-off valve to the OFF position.
6. Turn the battery disconnect to the OFF position.
7. If the machine is being stored in a cold climate (below 2° C / 35° F), remove the battery and store it in a warm location. Check the battery charge periodically and charge the battery, if needed.
8. Store the remote control in a clean dry location where it is protected from accidental damage. Remove the battery pack from the remote control while it is in storage.

Storing the Machine (Short Term)

Short term storage is any amount of time less than four months.

1. Add a quality gasoline fuel stabilizer to the fuel tank. Follow the manufacturer's recommended mixing ratios.
2. Start the engine and run for ten minutes to allow the fuel stabilizer to travel all through the fuel system.
3. Engage the parking brake, shut off the engine, and remove the ignition key.
4. Turn the fuel shut-off valve to the OFF position.
5. Turn the battery disconnect to the OFF position.
6. Check the battery charge periodically and charge the battery, if needed.
7. Store the remote control in a clean dry location where it is protected from accidental damage. Remove the battery pack from the remote control while it is in storage.

Removing the Machine from Storage

1. Clean the machine to remove any accumulated dust or debris.
2. Inspect the machine, in accordance with the Daily Inspection procedure in this manual.
3. Test the machine to ensure that all the components and systems are working properly.

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General Hydraulic System Problems

Hydraulic fluid is leaking from the system.

Possible Cause	Corrective Action
The fitting(s), hose(s), or tube(s) are loose or damaged.	Secure or replace loose or damaged hydraulic connections and components.
The O-ring(s) or seal(s) are missing or damaged.	Install new O-ring(s) or seal(s).

The hydraulic fluid foams excessively causing fluid leakage from the hydraulic tank breather.

Possible Cause	Corrective Action
The hydraulic fluid level is low.	Adjust the hydraulic fluid level. **Note:** Refer to the machine *Operator's Manual* for hydraulic fluid specifications.
Incorrect hydraulic fluid type.	Replace the hydraulic fluid.
Incompatible hydraulic fluids are mixed in the system.	Replace the hydraulic fluid.
There is water in the hydraulic system.	Replace the hydraulic fluid.
The pump suction line has an air leak.	Replace the pump suction line.
The suction filter is loose or the filter seal has failed.	Tighten the filter until secure or replace the filter.

The hydraulic system operates hot.

Possible Cause	Corrective Action
The circuit breaker for the hydraulic cooling fan is tripped.	Determine what is causing the circuit breaker to trip.
The hydraulic cooler air flow is obstructed.	Verify cooling fan operation and remove debris from in and around the hydraulic fluid cooler.
A faulty hydraulic cooling fan temperature sender.	Replace the cooling fan temperature sender as required.
A faulty hydraulic cooler fan.	Replace the hydraulic cooler fan.

Possible Cause	Corrective Action
The hydraulic cooler is damaged or plugged.	Repair or replace the hydraulic fluid cooler.
The hydraulic system is overstressed (using high range instead of low range for heavy workloads).	Allow the system to cool and reduce load on the system.
The hydraulic fluid level is low.	Adjust the hydraulic fluid level.
The suction filter is loose, or filter seal has failed.	Secure, or replace the filter.
The hydraulic fluid suction filter is plugged.	Replace the suction filter.
The hydraulic fluid is contaminated, or the fluid viscosity is too light.	Replace the hydraulic fluid.

The front attachment does not lift.

Possible Cause	Corrective Action
The hydraulic fluid level is low.	Adjust the hydraulic fluid level.
An excessive load on the front lift.	Reduce the load on the front lift.
The hydraulic fluid suction filter is plugged.	Replace the suction filter.
A faulty hydraulic lift cylinder.	Replace the hydraulic lift cylinder.
The pump charge pressure is low.	Check the static implement pressure.
Missing hardware on the lift cylinder.	Repair / install the missing hardware.

Steering is difficult.

Possible Cause	Corrective Action
The hydraulic fluid level is low.	Adjust the hydraulic fluid level.
The hydraulic fluid suction filter is plugged.	Replace the suction filter.
A faulty steering cylinder.	Replace the steering cylinder.
The pump charge pressure is low.	Check the static implement pressure.
An excessive load on the hydraulic system.	Reduce the load on the hydraulic system.

Poor hydrostatic drive performance.

Possible Cause	Corrective Action
Hydraulic pump damage.	Inspect and repair or replace the hydraulic pump as needed.
Hydraulic motor damage.	Inspect and repair or replace the hydraulic motor as needed.
Hydraulic fluid flow restriction.	Replace the hydraulic filters.

Excessive noise in the hydraulic system.

Possible Cause	Corrective Action
The hydraulic fluid level is low.	Adjust the hydraulic fluid level.
The hydraulic fluid suction filter is plugged.	Replace the suction filter.
Incorrect hydraulic fluid type.	Replace the hydraulic fluid.
The hydraulic system is cold.	Allow the hydraulic system to warm up.

Forward and reverse movement lack power and torque.

Possible Cause	Corrective Action
The tow valve on the hydraulic pump is allowing oil to bypass.	Tighten the tow valve.
The high / low shift cable is out of adjustment or broken.	Inspect the high / low shift cable and adjust or replace the cable as needed.
Rotating group in the hydraulic pump or a hydraulic motor is worn.	Inspect the hydraulic pumps and motors. Repair or replace as needed.

General Electrical System Problems

If there is an electrical issue;

- Ensure that the main circuit breaker/ battery disconnect switch is in the ON position.
- Inspect the 25 amp fuses in positions F10 and F11. Replace the fuses if necessary.

The battery does not charge.

Possible Cause	Corrective Action
Loose or corroded battery connections.	Inspect and clean/tighten the battery connections.
A broken or loose wire in the charging system.	Inspect and tighten connections or replace wires as required.
A blown fuse in the charging system.	Replace blown fuses.
The alternator/fan belt is loose.	Tighten the alternator/fan belt.
A faulty regulator.	Replace the regulator.
A faulty alternator.	Replace the alternator.
The battery is defective.	Replace the battery.

The lights do not activate.

Possible Cause	Corrective Action
A blown fuse.	Replace the fuse.
A faulty light.	Replace the light.
A faulty switch.	Replace the switch.
A broken wire.	Locate and repair/replace the wire.

The PTO does not engage.

Possible Cause	Corrective Action
A blown fuse.	Replace the fuse.
A faulty seat switch.	Replace the seat switch.
A faulty PTO switch.	Replace the PTO switch.
PTO clutch air gap is out of adjustment.	Adjust the PTO clutch air gap.

Possible Cause	Corrective Action
A damaged PTO clutch wiring harness/ electrical connection.	Repair or replace the harness or connector.
A faulty PTO clutch.	Replace the PTO clutch.

General Engine Problems

Additional engine troubleshooting information and advanced engine service procedures can be found in the engine service manual. Engine service manuals are available at https://network.ventrac.com/resources/manuals_engine.

The starter will not engage.

Possible Cause	Corrective Action
The main circuit breaker is in the OFF position.	Switch the main circuit breaker to the ON position.
A blown fuse in the start circuit.	Replace the blown fuse.
The parking brake is not engaged.	Engage the parking brake.
Low battery voltage.	Check the battery voltage. Charge or replace the battery as needed.

The engine cranks but will not start.

Possible Cause	Corrective Action
The fuel shut-off valve is in the OFF position.	Turn the fuel shut-off valve to the ON position.
The fuel tank is empty.	Fill the fuel tank.
A faulty fuel pump.	Inspect the fuel pump and replace the pump as needed.
A plugged fuel filter.	Inspect the fuel filter and replace the fuel filter as needed.
A blockage in the fuel supply hose.	Inspect the fuel hoses. Clean or replace the fuel hoses as needed.
Poor engine compression.	Complete engine compression test.
Improper valve clearance.	Check and adjust valve clearance.
Defective ignition coil.	Test and inspect the ignition coil, replace the coil as needed.
Defective spark plug.	Adjust the spark plug gap or replace the spark plug as needed.
Clogged air cleaner.	Inspect and clean or replace the air filter as needed.

The engine runs rough.

Possible Cause	Corrective Action
Clogged air cleaner.	Inspect and clean or replace the air filter as needed.
A plugged fuel filter.	Inspect the fuel filter and replace the filter as needed.
A blockage in the fuel supply hose.	Inspect the fuel hoses. Clean or replace the fuel hoses as needed.
Stale or dirty fuel or wrong seasonal fuel mixture.	Drain the fuel system and replenish with fresh fuel.
The fuel level is low.	Fill the fuel tank.
Defective spark plug.	Adjust the spark plug gap or replace the spark plug as needed.
A faulty fuel pump.	Inspect the fuel pump and replace the pump as needed.
Improper valve clearance.	Check and adjust valve clearance.

The engine is low on power.

Possible Cause	Corrective Action
Clogged air cleaner.	Inspect and clean or replace the air filter as needed.
A plugged fuel filter.	Inspect the fuel filter and replace the filter as needed.
A blockage in the fuel supply hose.	Inspect the fuel hoses. Clean or replace the fuel hoses as needed.
Poor engine compression.	Complete engine compression test.

The engine overheats.

Possible Cause	Corrective Action
Radiator screen is dirty.	Clean the radiator screen.
The radiator is dirty.	Clean the radiator.
The coolant level is low.	Inspect the coolant level and add coolant as required.
The engine compartment has debris buildup.	Clean the engine compartment.

Possible Cause	Corrective Action
Defective radiator cap.	Replace the radiator cap.
Defective thermostat.	Replace the thermostat.
The alternator/fan belt is loose.	Tighten the alternator/fan belt.
Blown head gasket.	Replace the head gasket.

The oil light comes on when the engine is running.

Possible Cause	Corrective Action
The oil level is low.	Check the oil level and add oil as needed.
Faulty oil sender.	Replace the oil sender.
Faulty oil pump.	Replace the oil pump.

The engine emits white smoke.

Possible Cause	Corrective Action
Engine temperature is low.	Allow the engine to warm up.
A faulty head gasket.	Replace the head gasket.
There is water in the combustion chamber.	Inspect the engine.

The engine uses excessive fuel.

Possible Cause	Corrective Action
Clogged air cleaner.	Inspect and clean or replace the air filter as needed.

The engine uses excessive oil.

Possible Cause	Corrective Action
The engine has an oil leak.	Inspect the engine and repair as needed.
The oil is an incorrect viscosity.	Change the oil and filter. Use oil with the correct viscosity.
Clogged air cleaner.	Inspect and clean or replace the air filter as needed.

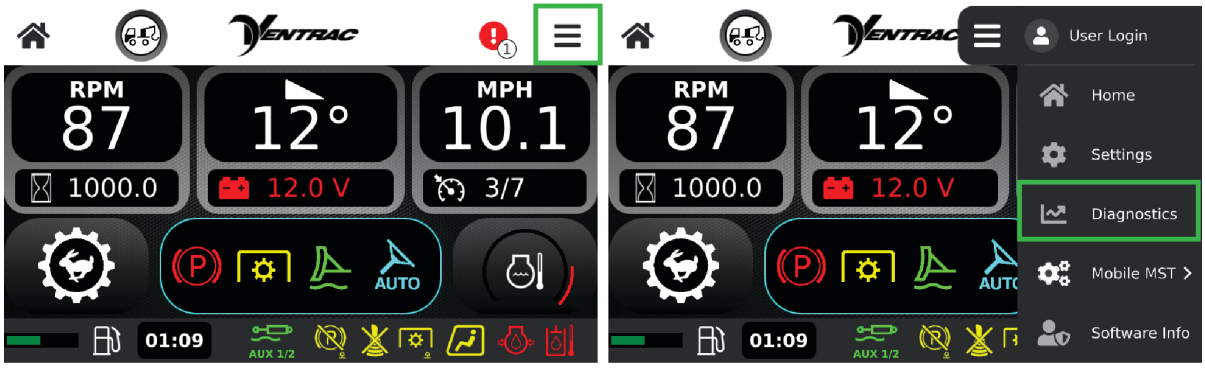
Possible Cause	Corrective Action
The engine has worn rings and cylinder walls.	Inspect the engine and repair as needed.
Improper valve clearance.	Check and adjust valve clearance.

General Problems

The machine will not move with the engine running.

Possible Cause	Corrective Action
The high/low range shift lever is in the neutral position.	Adjust the high/low range shift lever to the desired range.
The hydraulic fluid level is low.	Adjust the hydraulic fluid level.
The parking brake is engaged	Disengage the parking brake.
The tow valve is bypassing the hydraulic pump.	Tighten the hydraulic pump tow valve.
A faulty hydraulic pump.	Inspect and repair or replace the hydraulic pump.
A faulty hydraulic motor.	Inspect and repair or replace the hydraulic motor.

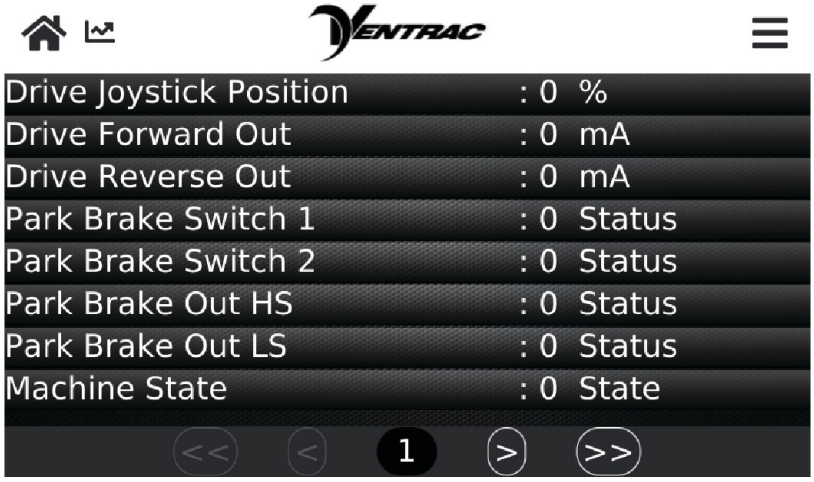
Diagnostic Screens



The diagnostic screens contain information that may be helpful for troubleshooting. Refer to the following pages for diagnostic sensor line items and descriptions.

Note: The page number is displayed at the bottom of the diagnostics page. Use the arrows to navigate between diagnostic pages.

Diagnostic Page 1



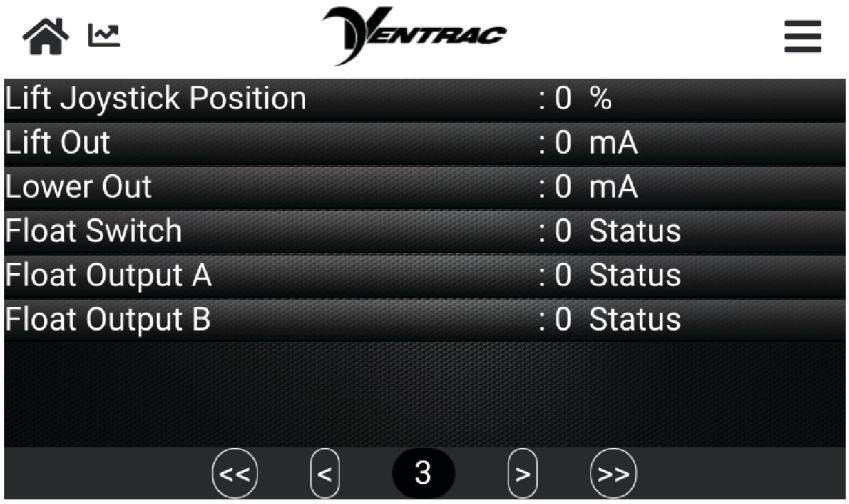
Sensor	Readout	Explanation
Drive Joystick Position	0%	The main drive joystick is in neutral position.
	1 — 100%	The main drive joystick is out of neutral position.
Drive Forward Out	200mA	Current to the drive forward coil when the main drive joystick is in neutral.
	380 — 930mA	Current to the drive forward coil when the main drive joystick is moved forward.
Drive Reverse Out	200mA	Current to the drive reverse coil when the main drive joystick is in neutral.
	380 — 850mA	Current to the drive reverse coil when the main drive joystick is moved backward.
Park Brake Switch 1	0 = switch up 1 = switch down	State of contact 1 of the park brake switch.
Park Brake Switch 2	0 = switch down 1 = switch up	State of contact 2 of the park brake switch.
Park Brake Out HS	0 = Off 1 = On	State of the park brake high-side output.
Park Brake Out LS	0 = Off 1 = On	State of the park brake low-side output.
Machine State	State 0–12	Defines the active machine state.

Diagnostic Page 2



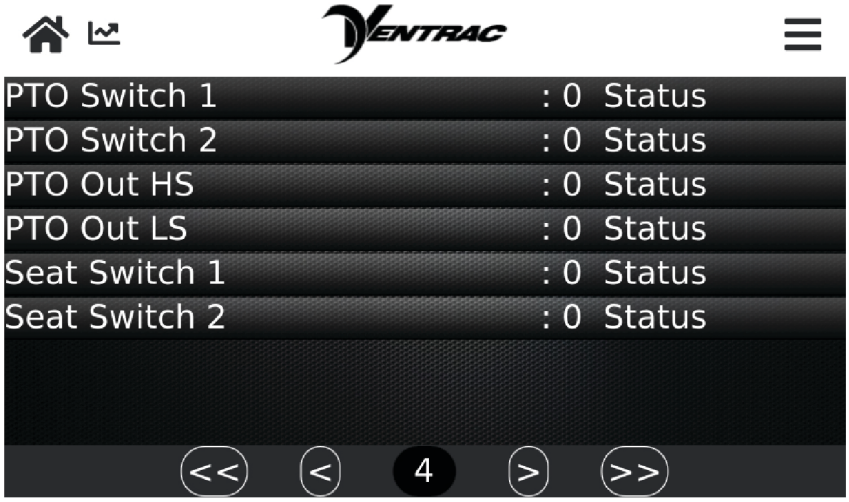
Sensor	Readout	Explanation
Steering Sensor 1	250 - 4900	Steering wheel position (signal 1).
		180 degrees out of phase with signal 2.
Steering Sensor 2	250 - 4900	Steering wheel position (signal 2).
		180 degrees out of phase with signal 1.
Artic Sensor 1	750 - 4250mV	Output signal of articulation sensor.
		The signal increases when turning to the right.
Artic Sensor 2	750 - 4250mV	Output signal of articulation sensor.
		The signal decreases when turning to the right.
Steer Left Out	400mA	Current to steer left coil with no steer command.
	800 - 1200mA	Current to steer left coil when steer left command.
Steer Right Out	400mA	Current to steer right coil with no steer command.
	800 - 1200mA	Current to steer right coil when steer right command.
Steering Brake Out	250mA	State of the park brake low-side output.

Diagnostic Page 3



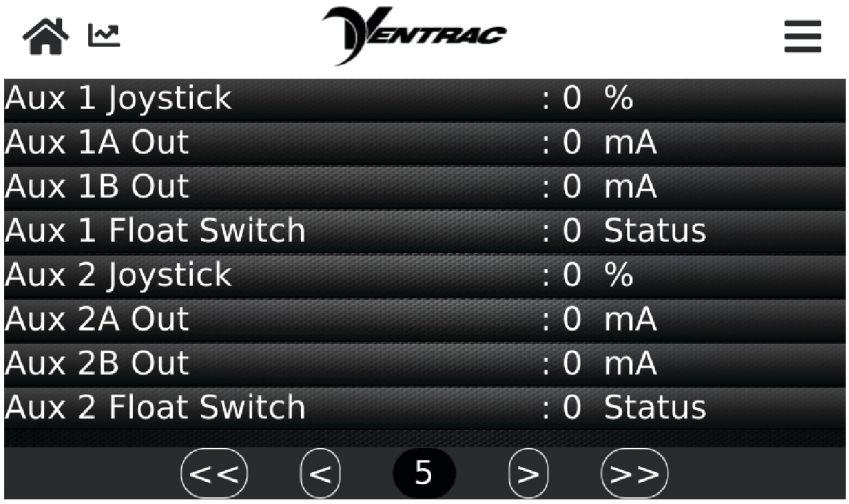
Sensor	Readout	Explanation
Lift Joystick Position	0%	The main lift joystick is in neutral position.
	1 - 100%	The main lift joystick is out of neutral position.
Lift Out	400mA	Current to the front hitch lift coil when the lift joystick is in neutral.
	800 - 1500mA	Current to the front hitch lift coil when the lift joystick is moved right.
Lower Out	400mA	Current to the front hitch lower coil when the lift joystick is in neutral.
	800 - 1500mA	Current to the front hitch lower coil when the lift joystick is moved left.
Float Switch	0 = Off 1 = On	State of the float switch.
Float Output A	0 = Off 1 = On	State of the float output A coil.
Float Output B	0 = Off 1 = On	State of the float output B coil.

Diagnostic Page 4



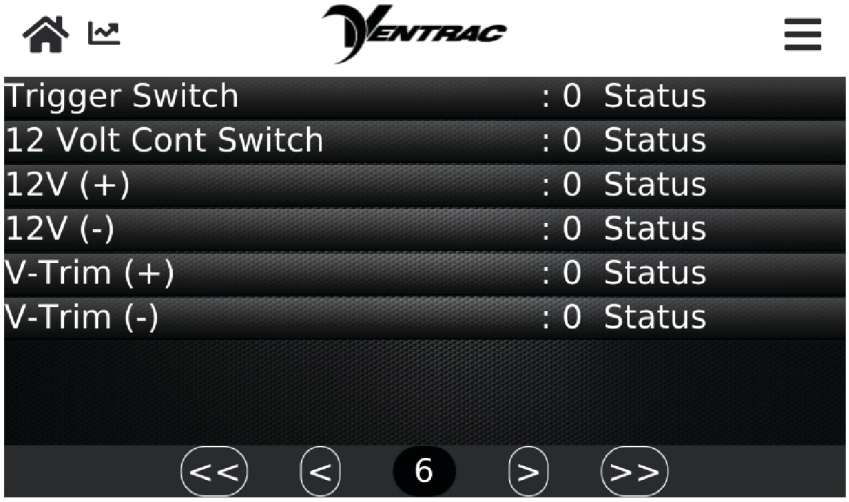
Sensor	Readout	Explanation
PTO Switch 1	0 = Switch depressed. 1 = Switch pulled.	State of the PTO switch.
PTO Switch 2	0 = Switch pulled. 1 = Switch depressed.	State of the PTO switch.
PTO Out HS	0 = Off 1 = On	State of the PTO HS output.
PTO Out LS	0 = Off 1 = On	State of the PTO LS output.
Seat Switch 1	0 = In Seat 1 = Out of Seat	State of the seat switch.
Seat Switch 2	0 = In Seat 1 = Out of Seat	State of the seat switch.

Diagnostic Page 5



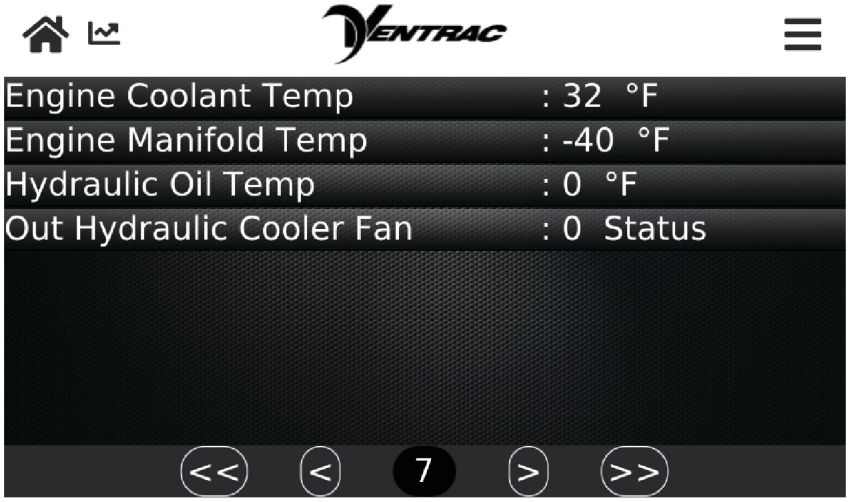
Sensor	Readout	Explanation
Aux 1 Joystick	0 - 100%	Defines the Aux 1 joystick position.
Aux 1A Out	0 - 1075mA	Current to Aux 1A coil.
	1500mA	Current when Aux 1 float is active.
Aux 1B Out	0 - 1500mA	Current to Aux 1B coil.
Aux 1 Float Switch	0 = Off 1 = On	State of the Aux 1 float switch.
Aux 2 Joystick	0 - 100%	Defines the Aux 2 joystick position.
Aux 2A Out	0 - 1075mA	Current to Aux 2A coil.
	1500mA	Current when Aux 2 float is active.
Aux 2B Out	0 - 1500mA	Current to Aux 1B coil.
Aux 2 Float Switch	0 = Off 1 = On	State of the Aux 2 float switch.

Diagnostic Page 6



Sensor	Readout	Explanation
Trigger Switch	0 = Off 1 = On	State of the trigger switch on the joystick.
12 Volt Cont Switch	0 = Off 1 = On	State of the 12V continuous switch on the joystick.
12V (+)	0 = Off 1 = On	State of the 12V (+) switch on the joystick.
12V (-)	0 = Off 1 = On	State of the 12V (-) switch on the joystick.
V-Trim (+)	0 = Off 1 = On	State of the V-Trim (+) switch on the joystick.
V-Trim (-)	0 = Off 1 = On	State of the V-Trim (-) switch on the joystick.

Diagnostic Page 7



Sensor	Readout	Explanation
Engine Coolant Temperature	xxx.x° F	Displays the engine coolant temperature in degrees Fahrenheit.
Engine Manifold Temperature	xxx.x° F	Displays the engine manifold temperature in degrees Fahrenheit.
Hydraulic Oil Temperature	xxx.x° F	Displays the hydraulic oil temperature in degrees Fahrenheit.
Out Hydraulic Cooling Fan	0 = Off 1 = On	State of the hydraulic cooler fan.

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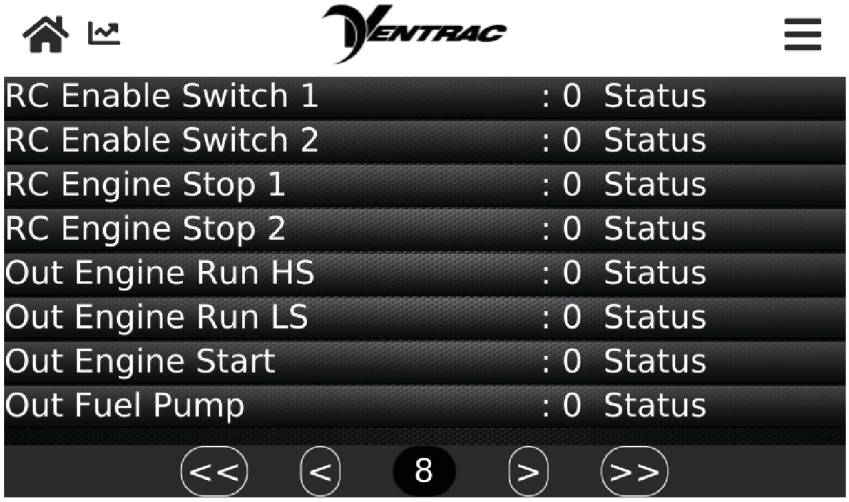

Sensor	Readout	Explanation
RC Enable Switch 1	0 = Off 1 = On	State of the RC Enable Switch 1.
RC Enable Switch 2	0 = Off 1 = On	State of the RC Enable Switch 2.
RC Engine Stop 1	0 = Switch In 1 = Switch Out	State of the RC Engine Stop Switch 1.
RC Engine Stop 2	0 = Switch In 1 = Switch Out	State of the RC Engine Stop Switch 2.
Out Engine Run HS	0 = Off 1 = On	State of the engine run HS output.
Out Engine Run LS	0 = Off 1 = On	State of the engine run LS output.
Out Engine Start	0 = Off 1 = On	State of the engine start output.
Out Fuel Pump	0 = Off 1 = On	State of the fuel pump output.

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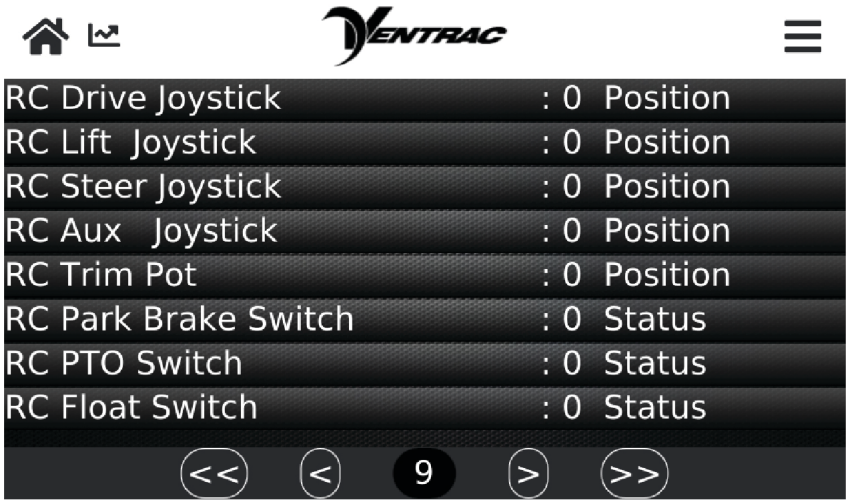

Sensor	Readout	Explanation
RC Drive Joystick	0 - 255	Defines the RC drive joystick position.
RC Lift Joystick	0 - 255	Defines the RC lift joystick position.
RC Steer Joystick	0 - 255	Defines the RC steer joystick position.
RC Aux Joystick	0 - 255	Defines the RC aux joystick position.
RC Trim Pot	0 - 255	Defines the RC trim pot position.
RC Park Brake Switch	0 = Off 1 = On	State of the RC park brake switch.
RC PTO Switch	0 = Off 1 = On	State of the RC PTO switch.
RC Float Switch	0 = Off 1 = On	State of the RC float switch.

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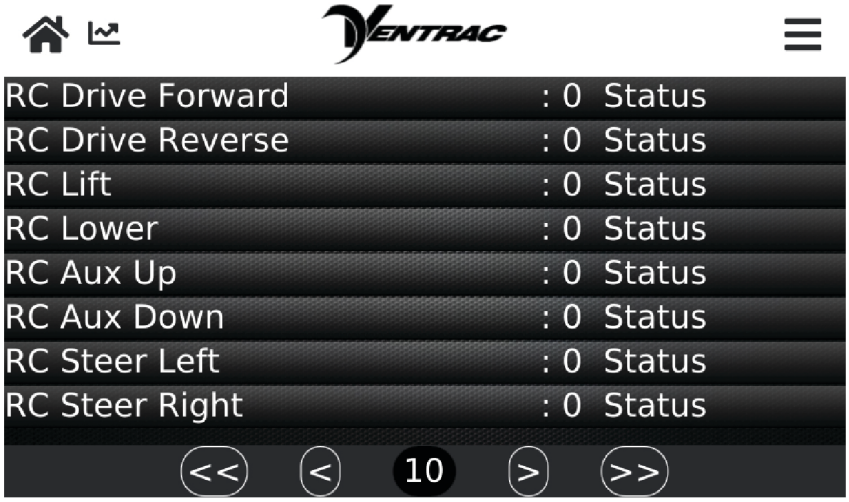

Sensor	Readout	Explanation
RC Drive Forward	0 = Off 1 = On	State of the RC drive forward direction bit.
RC Drive Reverse	0 = Off 1 = On	State of the RC drive reverse direction bit.
RC Lift	0 = Off 1 = On	State of the RC lift direction bit.
RC Lower	0 = Off 1 = On	State of the RC lower direction bit.
RC Aux Up	0 = Off 1 = On	State of the RC Aux up direction bit.
RC Aux Down	0 = Off 1 = On	State of the RC Aux down direction bit.
RC Steer Left	0 = Off 1 = On	State of the RC steer left direction bit.
RC Steer Right	0 = Off 1 = On	State of the RC steer right direction bit.

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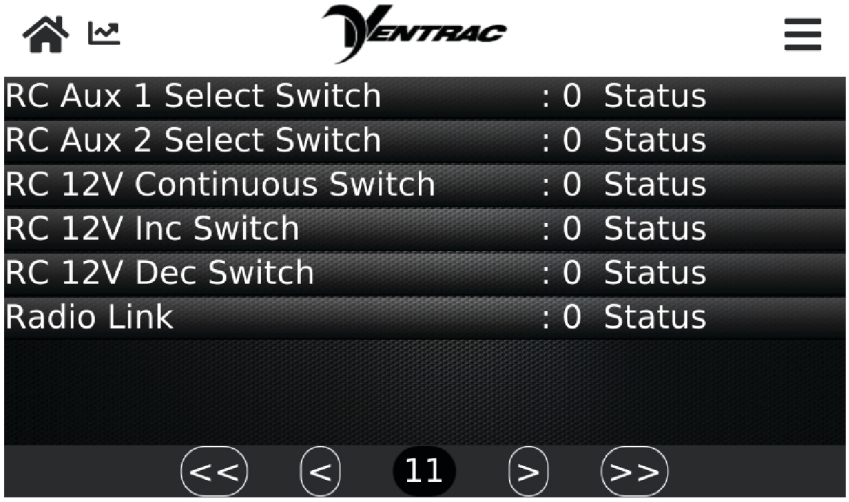

Sensor	Readout	Explanation
RC Aux 1 Select Switch	0 = Off 1 = On	State of the RC Aux 1 select switch.
RC Aux 2 Select Switch	0 = Off 1 = On	State of the RC Aux 2 select switch.
RC 12V Continuous Switch	0 = Off 1 = On	State of the RC 12V continuous switch.
RC 12V Inc Switch	0 = Off 1 = On	State of the RC 12V inc switch.
RC 12V Dec Switch	0 = Off 1 = On	State of the RC 12V dec switch.
Radio Link	0 = Disconnected 1 = Connected	State of the RC radio link.

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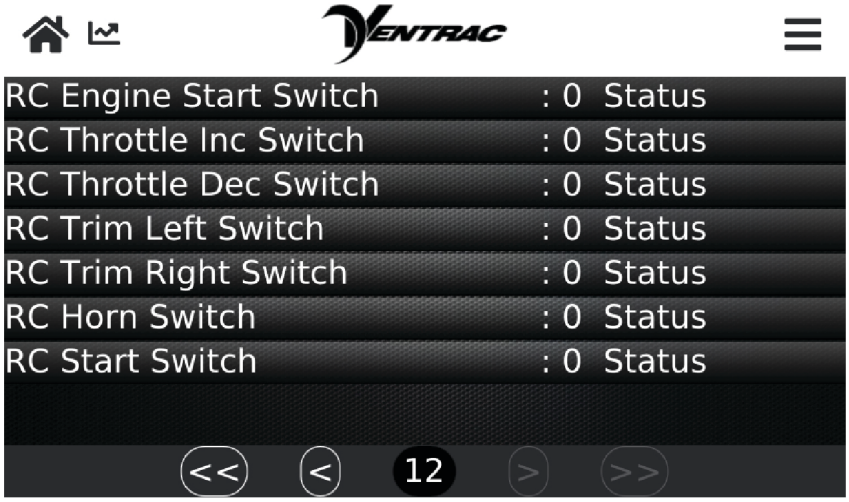

Sensor	Readout	Explanation
RC Engine Start Switch	0 = Off 1 = On	State of the RC engine start switch.
RC Throttle Inc Switch	0 = Off 1 = On	State of the RC throttle increase switch.
RC Throttle Dec Switch	0 = Off 1 = On	State of the RC throttle decrease switch.
RC Trim Left Switch	0 = Off 1 = On	State of the RC trim left switch.
RC Trim Right Switch	0 = Off 1 = On	State of the RC trim right switch.
RC Horn Switch	0 = Off 1 = On	State of the RC horn switch.
RC Start Switch	0 = Off 1 = On	State of the RC start switch.

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Venture Products Inc.® and Ventrac reserve the right to change these specifications without notice.

Engine Specifications

Manufacturer	Kubota
Model Number	WG972–G-E4
Type	Gasoline
Cylinders	3
Displacement	962 cc
Engine Gross Power	24.2 kW (32.5 hp)
Operating Range (RPM)	1,500–3,650
Cooling System	Liquid Cooled
Alternator	60 Amp

Electrical Specifications

Battery	AGM, 340 Cold Cranking Amps
Voltage	12 Volts

Power Train Specifications

Type	Hydrostatic (All Wheel Drive)
Hydrostatic Transaxles	Progear
Forward Speed (High)[1]	16.1 km/h (10 mph)
Forward Speed (Low)[1]	8.4 km/h (5.2 mph)
Brakes	Spring Applied, Electromagnetic Release
Hydraulic Oil Filtration	10 Micron and 25 Micron
[1]May vary based on the tire size, type, and inflation.	

Controls and Instrument Panel Specifications

Steering	Power
PTO (Power Take Off)	Electric with brake
Throttle Control	Electronic
Directional Control	Joystick and Steering Wheel

Control Orientation	Hand
Gauges	Tachometer, Speedometer, Hour Meter, Volt Meter, Water Temperature, Fuel Level, Slope Gauge

Other Features

Turning Radius	99 cm (39 inches)
Standard Tires	All Terrain (22 x 12-8) (56 x 30-20 cm)
Optional Tires	Turf (22 x 11-10)(56 x 28-26 cm)
Headlight	LED (1,000 lumen)
Attachment System	Ventrac Mount

Dimensions

Wheelbase	114 cm (45 inches)
Overall Length	207 cm (81-1/2 inches)
Overall Height (with/without Proximity antenna)	183/201 cm (72/79 inches)
Overall Width (single tires)[1]	123 cm (48-1/2 inches)
Overall Width (dual tires)[1]	185 cm (73 inches)
Weight[2]	907 kg (2,000 pounds)
[1]May vary based on the tire size, type, and inflation. [2]Weight varies based on the engine size, tire options, and optional accessories.	

Fluid Capacities and Specifications

	Fluid Type	**Capacity**	**Filter #1**	**Filter #2**
Engine Oil	Synthetic 10W-30[1]	3.7 L (3.9 qt)	13.0267	
Hydraulic Oil (Front transaxle and reservoir)	HydroTorq XL Synthetic Hydraulic Oil	11.6 L (12.3 qt)	21.0122 (Suction Filter)	21.0124 (Return Filter)
Hydraulic Oil (Rear transaxle)	HydroTorq XL Synthetic Hydraulic Oil	4.4 L (4.6 qt)		

	Fluid Type	Capacity	Filter #1	Filter #2
Cooling System	50% distilled water and 50% ethylene glycol antifreeze[2]	6.6 L (7 qt)		
Fuel System	Unleaded Gasoline (Max 10% Ethanol)	22.7 L (6 gal)	13.0053	
Grease	Lithium Complex NLGI #2	Refer to the Maintenance Chart		

[1]Use API Classification SL or higher. For optimal engine life and performance, use Ventrac full synthetic engine oil (Part Number 15.0037-1).

[2]Recommended antifreeze: a low silicate, phosphate free antifreeze (ethylene glycol) containing supplemental coolant additives (SCAs) to inhibit corrosion and rust.

California Proposition 65 Warning

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⚠ WARNING

CALIFORNIA
Proposition 65

This product contains a chemical or chemicals known to the State of California to cause cancer, birth defects, or reproductive harm.

⚠ WARNING ⚠

Operating, servicing, and maintaining off-road equipment can expose you to chemicals including engine exhaust, carbon monoxide, phthalates, and lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, service equipment in a well-ventilated area and wear gloves or wash your hands frequently when servicing your equipment.

For more information go to www.P65Warnings.ca.gov

IMPORTANT

It is a violation of California Public Resource Code Section 4442 or 4443 to use or operate this engine on any forest-covered, brush-covered, or grass-covered land unless the exhaust system is equipped with a spark arrestor, as defined in Section 4442 maintained in effective working order or the engine is constructed, equipped, and maintained for the prevention of fire.

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Limited Warranty — Ventrac Commercial Equipment

Venture Products, Inc., (henceforth referred to as V.P.I.) warrants on the terms and conditions herein, that it will repair, replace, or adjust any part manufactured by V.P.I., and found by V.P.I., to be defective in material and/or workmanship during the applicable warranty term.

All Ventrac commercial equipment purchased on or after January 1, 2019, will carry a 2-year commercial warranty. The warranty period begins on the date of original customer purchase:

Ventrac Commercial Equipment	Warranty Term
2000 Series SSV's and Attachments	2–year
3000 Series Tractors and Attachments	2–year
4000 Series Tractors and Attachments	2–year

All Ventrac add-on kits and accessories such as: 3-point hitch, 12V front & rear power outlets, foot pedal, dual wheel kit, etc., will be covered under the above warranty periods provided they are installed by an Authorized Ventrac Dealer. This warranty may be transferred and will carry the remainder of the warranty starting from the original purchase/registration date with the dealership and/or V.P.I.

The engine warranty is covered by its respective engine manufacturer. Please refer to the engine manufacturer's warranty statement that is included in the owner's manual.

For warranty consideration, the Ventrac commercial equipment, including any defective part, must be returned to an Authorized Ventrac Dealer within the warranty period. The warranty shall extend to the cost to repair or replace (as determined by V. P.I.) the defective part. The expense of pickup and delivery of equipment, service call drive time or any transportation expense incurred for warranty repair is the sole responsibility of the owner and is not covered under warranty by Ventrac and/or V.P.I. Ventrac and V.P.I.'s responsibility in respect to claims is limited to making the required repairs or replacements, and no claim of breach of warranty shall be cause for cancellation or rescission of the contract of sale of any Ventrac equipment. Proof of purchase may be required by the dealer to substantiate any warranty claim. Only warranty work performed and submitted by an Authorized Ventrac Dealer may be eligible for warranty credit.

This warranty extends only to Ventrac commercial equipment operated under normal conditions and properly serviced and maintained. The warranty expressly does NOT cover: (a) any defects, damage or deterioration due to normal use, wear and tear, or exposure; (b) normal maintenance services, such as cleaning, lubrication, oil change; (c) replacement of service items, such as oil, lubricants, spark plugs, belts, rubber hoses, bearings or other items subject to normal service replacement; (d) damage or defects arising out of, or relating to abuse, misuse, neglect, alteration, negligence or accident; (e) repair or replacement arising from operation of, or use of the equipment which is not in accordance with operating instructions as specified in the operator's manual or other operational instructions provided by V.P.I.; (f) repair or replacement arising as a result of any operation from Ventrac equipment that has been altered or modified so as to, in the determination of V.P.I., adversely affect the operation,

performance or durability of the equipment or that has altered, modified or affected the equipment so as to change the intended use of the product; (g) repair or replacement necessitated by the use of parts, accessories or supplies, including gasoline, oil or lubricants, incompatible with the equipment or other than as recommended in the operator's manual or other operational instructions provided by V.P.I.; (h) repairs or replacements resulting from parts or accessories which have adversely affected the operation, performance or durability of the equipment; or (i) damage or defects due to or arising out of repair of Ventrac equipment by person or persons other than an authorized Ventrac service dealer or the installation of parts other than genuine Ventrac parts or Ventrac recommended parts.

The sole liability of V.P.I. with respect to this warranty shall be the repair and replacement as set forth herein. V.P.I. shall have no liability for any other cost, loss, or damage. In particular V.P.I shall have no liability or responsibility for: (i) expenses relating to gasoline, oil, lubricants; (ii) loss, cost or expense relating to transportation or delivery of turf equipment from the location of owner or location where used by owner to or from any Authorized Ventrac Dealer; (iii) travel time, overtime, after hours' time or other extraordinary repair charges or charge relating to repairs or replacements outside of normal business hours at the place of business of an Authorized Ventrac Dealer; (iv) rental of like or similar replacement equipment during the period of any warranty repair or replacement work; (v) any telephone or data charges; (vi) loss or damage to person or property other than that covered by the terms of this warranty; (vii) any claims for lost revenue, lost profit or additional cost or expense incurred as a result of a claim of breach of warranty; or (viii) attorney's fees.

The remedies of buyer set forth herein are exclusive and are in lieu of all other remedies. The liability of V.P.I., whether in contract, tort, under any warranty, or otherwise, shall not extend beyond its obligation as set forth herein. V.P.I. shall not be liable for cost of removal or installation nor shall V.P.I. be responsible for any direct, indirect, special or consequential damages of any nature. In no event shall V.P.I. be liable for any sum in excess of the price received for the goods for which liability is claimed.

All implied warranties, including merchantability and fitness for a particular purpose, are limited to the duration of the express warranty.

There are no representations or warranties which have been authorized to the buyer of the Ventrac commercial equipment other than set forth in this warranty. Any and all statements or representations made by any seller of this equipment, including those set forth in any sales literature or made orally by any sales representative, are superseded by the terms of this warranty. Any affirmation of fact or promise made by V.P.I. or any of its representatives to the buyer which relates to the goods that are the subject to this warranty shall not be regarded as part of the basis of the bargain and shall not be deemed to create any express warranty that such goods shall conform to the affirmation or promise.

No employee, distributor, or representative is authorized to change the foregoing warranties in any way or grant any other warranty on behalf of V.P.I.

Some states do not allow limitations on how long an implied warranty lasts or allow the exclusion on limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

This warranty applies to all Ventrac commercial equipment sold by Venture Products Inc.

California Evaporative Emission Control Warranty Statement

Your Warranty Rights and Obligations

The California Air Resources Board and Venture Products, Inc. are pleased to explain the evaporative emission control system's warranty on your 2024-2025 model year Ventrac machine. In California, new equipment must be designed, built, and equipped to meet the State's stringent anti-smog standards. Venture Products, Inc. must warrant the evaporative emission control system on your machine for the period listed below provided there has been no abuse, neglect, or improper maintenance of your equipment leading to the failure of the evaporative emission control system.

Your evaporative emission control system may include parts such as: carburetors, fuel tanks, fuel lines (for liquid fuel and fuel vapors), fuel caps, valves, canisters, filters, clamps, connectors, and other associated components.

Manufacturer's Warranty Coverage

This evaporative emission control system is warranted for two years. If any evaporative emission-related part on your equipment is defective, the part will be repaired or replaced by Venture Products, Inc.

Owner's Warranty Responsibilities

As the machine's owner, you are responsible for performance of the required maintenance listed in your owner's manual. Venture Products, Inc. recommends that you retain all receipts covering maintenance on your machine, but Venture Products, Inc. cannot deny warranty coverage solely for the lack of receipts.

As the machine owner, you should be aware that Venture Products, Inc. may deny you warranty coverage if your machine or a part has failed due to abuse, neglect, or improper maintenance or unapproved modifications.

You are responsible for presenting your machine to a Venture Products, Inc. distribution center or service center as soon as the problem exists. The warranty repairs shall be completed in a reasonable amount of time, not to exceed 30 days. If you have a question regarding your warranty coverage, you should contact Venture Products, Inc. at 1-866-836-8722.

General Emissions Warranty Coverage

Venture Products, Inc. warrants to the ultimate purchaser and each subsequent purchaser that the machine is:

1. Designed, built and equipped so as to conform with all applicable regulations; and
2. Free from defects in materials and workmanship that cause the failure of a warranted part to be identical in all material respects to that part as described in Venture Products, Inc.'s application for certification.

General Emissions Warranty Coverage (continued)

The warranty period begins on the date the machine is delivered to an ultimate purchaser or first placed into service. The warranty period is two years.

Subject to certain conditions and exclusions as stated below, the warranty on emission-related parts is as follows:

1. Any warranted part that is not scheduled for replacement as required maintenance in the written instructions supplied, is warranted for the warranty period stated above. If the part fails during the period of warranty coverage, the part will be repaired or replaced by Venture Products, Inc. according to subsection (4) below. Any such part repaired or replaced under warranty will be warranted for the remainder of the period.
2. Any warranted part that is scheduled only for regular inspection in the written instructions supplied is warranted for the warranty period stated above. Any such part repaired or replaced under warranty will be warranted for the remaining warranty period.
3. Any warranted part that is scheduled for replacement as required maintenance in the written instructions supplied is warranted for the period of time before the first scheduled replacement date for that part. If the part fails before the first scheduled replacement, the part will be repaired or replaced by Venture Products, Inc. according to subsection (4) below. Any such part repaired or replaced under warranty will be warranted for the remainder of the period prior to the first scheduled replacement point for the part.
4. Repair or replacement of any warranted part under the warranty provisions herein must be performed at a warranty station at no charge to the owner.
5. Notwithstanding the provisions herein, warranty services or repairs will be provided at all of our distribution centers that are franchised to service the subject engines or equipment.
6. The machine owner will not be charged for diagnostic labor that is directly associated with diagnosis of a defective, emission-related warranted part, provided that such diagnostic work is performed at a warranty station.
7. Venture Products, Inc. is liable for damages to other engine or equipment components proximately caused by a failure under warranty of any warranted part.
8. Throughout the machine warranty period stated above, Venture Products, Inc. will maintain a supply of warranted parts sufficient to meet the expected demand for such parts.
9. Any replacement part may be used in the performance of any warranty maintenance or repairs and must be provided without charge to the owner. Such use will not reduce the warranty obligations of Venture Products, Inc.
10. Add-on or modified parts that are not exempted by the Air Resources Board may not be used. The use of any non-exempted add-on or modified parts by the ultimate purchaser will be grounds for disallowing a warranty claims. Venture Products, Inc. will not be liable to warrant failures of warranted parts caused by the use of a non-exempted add-on or modified part.

Warranted Parts

The repair or replacement of any warranted part otherwise eligible for warranty coverage may be excluded from such warranty coverage if Venture Products, Inc. demonstrates that the machine has been abused, neglected, or improperly maintained, and that such abuse, neglect, or improper maintenance was the direct cause of the need for repair or replacement of the part. That notwithstanding, any adjustment of a component that has a factory installed, and properly operating, adjustment limiting device is still eligible for warranty coverage. The following emission warranty parts list are covered:

- Carbon canister
- Fuel tank
- Vent rollover valve
- Fuel line fittings
- Fuel line clamps
- Fuel line (for liquid fuel and fuel vapors)
- Fuel cap


VENTRAC