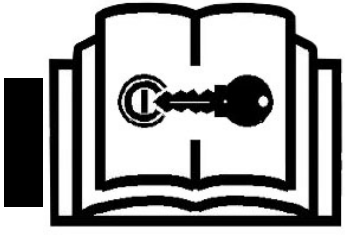
S450TX Mini Skid Steer

Operator's Manual



EN_o3_01 original instructions
Serial No. 910 -
Order No. 105400EX3
Cabled Assembly No. 163762735

Vermeer® | EQUIPPED TO DO MORE.®

Introduction

This manual explains the proper operation of your machine. Study and understand these instructions thoroughly before operating or maintaining the machine. Failure to do so could result in personal injury or equipment damage. Consult your Vermeer dealer if you do not understand the instructions in this manual, or need additional information.

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

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

Operation instructions are included in the two Operator's Manuals provided with the machine. The tethered (cabled) manual must remain attached to the machine for ready reference. Store it in the manual storage box when not in use.

Lubrication and maintenance procedures are in the Maintenance Manual provided with the machine. Refer to it for all lubrication and maintenance procedures.

Additional copies of the manuals, and Operations and Safety video, are available from your dealer. Use the reorder numbers listed on the front covers of the manuals and on the video.

Copies of this manual, and the Operations and Safety video, are available in Spanish from your dealer. Other languages may also be available.

Su distribuidor dispone de ejemplares en español de este manual y del vídeo de Operaciones y Seguridad.

Notice to Owner

Replacement manuals are free of charge by registering your **used** Vermeer machine. Your machine's Operator's, Maintenance and Parts Manuals may be available online at www.myvermeer.com. For questions about online or printed manuals, or to register a used machine, contact the Data Analytics Department by telephone: 800-829-0051 or 641-628-3141; email: dataanalytics@vermeer.com; internet: www.vermeer.com or www.myvermeer.com; or, letter: Data Analytics Dept., Vermeer Corporation, PO Box 200, Pella IA 50219 USA.



Orientation: Right and left sides of the machine are determined by standing on the operator platform and facing forward.

TRADEMARKS

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KUBOTA is a trademark of Kubota, Ltd., Osaka, Japan.
CHEVRON and DELO are trademarks of Chevron Intellectual Property LLC.
MOBIL and DELVAC are trademarks of Exxon Mobil Corporation.
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VERMEER NEW INDUSTRIAL EQUIPMENT LIMITED WARRANTY

EFFECTIVE AUGUST 1, 2018 **WARRANTY PERIOD: 12 Months / 1000 Hours**

Vermeer Corporation (hereinafter "Vermeer") warrants each new Industrial product of Vermeer's manufacture to be free from defects in material and workmanship, under normal use and service for one (1) full year after initial purchase/retail sale or 1000 operating hours, whichever occurs first. This Limited Warranty shall apply only to complete machines of Vermeer's manufacture, parts are covered by a separate Limited Warranty. **EQUIPMENT AND ACCESSORIES NOT OF VERMEER'S MANUFACTURE ARE WARRANTED ONLY TO THE EXTENT OF THE ORIGINAL MANUFACTURER'S WARRANTY AND SUBJECT TO THEIR ALLOWANCE TO VERMEER ONLY IF FOUND DEFECTIVE BY SUCH MANUFACTURER.**

EXTENDED WARRANTY OPTIONS ARE AVAILABLE FOR PURCHASE

WARRANTY TERMS During the Limited Warranty period specified above, any defect in material or workmanship in any warranted item of Vermeer Industrial Equipment not excluded below shall be repaired or replaced at Vermeer's option without charge by any authorized independent Vermeer dealer. The warranty repair or replacement must be made by a Vermeer independent authorized dealer at the dealer's location. Vermeer will pay for replacement parts and such authorized dealer's labor in accordance with Vermeer's labor reimbursement policy. Vermeer reserves the right to supply remanufactured replacement parts as it deems appropriate.

RETAIL PURCHASER RESPONSIBILITY: This Limited Warranty requires proper maintenance and periodic inspections of the Industrial Equipment as indicated in the Operator's/Maintenance Manual furnished with each new Industrial Equipment. The cost of routine or required maintenance and services is the responsibility of the retail purchaser. The retail purchaser is required to keep documented evidence that these services were performed. This Vermeer New Industrial Equipment Limited Warranty may be subject to cancellation if the above requirements are not performed. Vermeer Industrial Equipment with known failed or defective parts must be immediately removed from service.

EXCLUSIONS AND LIMITATIONS

The warranties contained herein shall **NOT APPLY TO:**

(1) Any defect which was caused (in Vermeer's sole judgment) by other than normal use and service of the Industrial Equipment, or by any of the following; (i) accident (ii) misuse or negligence (iii) overloading (iv) lack of reasonable and proper maintenance (v) improper repair or installation (vi) unsuitable storage (vii) non-Vermeer approved alteration or modification (viii) natural calamities (ix) vandalism (x) parts or accessories installed on Industrial Equipment which were not manufactured or installed by Vermeer authorized dealers (xi) the elements (xii) collision or other accident.

(2) Any Industrial Equipment whose identification numbers or marks have been altered or removed or whose hour meter has been altered or tampered with.

(3) Any Industrial Equipment which any of the required or recommended periodic inspection or services have been performed using parts not manufactured or supplied by Vermeer or meeting Vermeer Specifications including, but without limitation, engine tune-up parts, engine oil filters, air filters, hydraulic oil filters, and fuel filters.

(4) New Industrial Equipment delivered to the retail purchaser in which the equipment/warranty registration has not been completed and returned to Vermeer within ten (10) days from the date of purchase.

(5) Any defect which was caused (in Vermeer's sole judgment) by operation of the Industrial Equipment not abiding by standard operating procedures outlined in the Operator's Manual.

(6) Engine, battery, and tire Limited Warranties and support are the responsibility of the respective product's manufacturer.

(7) Transportation costs, if any, of transporting to the Vermeer dealer. Freight costs, if any, of transporting replacement parts to the Vermeer dealer.

(8) The travel time of the Vermeer dealer's service personnel to make a repair on the retail purchaser's site or other location.

(9) In no event shall Vermeer's liability exceed the purchase price of the product,

(10) Vermeer shall not be liable to any person under any circumstances for any incidental or consequential damages (including but not limited to, loss of profits, out of service time) occurring for any reason at any time.

(11) Diagnostic and overtime labor premiums are not covered under this Limited Warranty Policy. Oils and fluids are not covered under this Limited Warranty.

(12) Depreciation damage caused by normal wear, lack of reasonable and proper maintenance, failure to follow operating instructions, misuse, lack of proper protection during storage.
(13) Accessory systems and electronics not of Vermeer's manufacture are warranted only to the extent of such manufacturer's respective Limited Warranty if any.
(14) Down hole toolage is not covered under this warranty.
(15) Wear items which are listed below:

Antenna, Augers, Base Plates, Bearing Seals, Bearings, Belts, Brake Pads, Brushes, Bolts/Torqued Parts, Boom Wear Items, Booms, Brake Pads, Bushings, Buckets, Cable Fingers, Chain, Clamping Vise Parts, Clutches, Clutch Components, Conveyor Belts, Cups, Curtains, Cutter Wheels, Dies, Digging Chain, Digging Rims, Discharge Conveyor Belts, Drive Chuck, Drums, Earth Stakes, End Idler, End Rollers, Fan Belts, Flashings, Fuel Filters, Hammers, Infeed Conveyor Belts, Infeed Conveyor Chains, Jaws, Knives, Leaf Chain, Lights, Lights On Light Kits, Oil Filters, Packing Assemblies, Pins and Bushings, Pivot Rings, Plastic Wear Strips, Plow Blades, Pockets, Rods, Rollers, Rod Loader Parts, Rooter Bands, Rotor Plates, Rubber Grouser Bars, Rubber Shielding, Rubber Track Bands, Scraper Knives, Screens, Service Items, Shear Bar/Bedknife, Sprockets, Teeth, Tips, Tip Mounts, Tires, Tooling, Track Chain, Track Guides, Track Idlers, Track Pads, Track Rollers, Track Sprockets, Trench Cleaner (Crumber), Trip Cleaners, Valve Seats, Water Hoses, Water Swivels, Wear Bars, Wear Blocks, Wear Plates, Wear Strips, Winch Cable, Windshield Wiper Parts.

PARTS WARRANTY:

Parts replaced in the warranty period will receive the balance of the first year New Industrial Equipment Limited Warranty, during the first (12) months or 1000 hours, whichever comes first. Replacement parts after the original machine warranty, are warranted to be free from defects of material for ninety (90) days or the part will be repaired or replaced, without labor coverage for removal and reinstallation.

EXCLUSIONS OF WARRANTIES: EXCEPT FOR THE WARRANTIES EXPRESSLY AND SPECIFICALLY MADE HEREIN, VERMEER MAKES NO OTHER WARRANTIES, AND ANY POSSIBLE LIABILITY OF VERMEER HEREINUNDER IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED, OR STATUTORY, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. VERMEER RESERVES THE RIGHT TO MODIFY, ALTER AND IMPROVE ANY PRODUCT WITHOUT INCURRING ANY OBLIGATION TO REPLACE ANY PRODUCT PREVIOUSLY SOLD WITH SUCH MODIFICATION. NO PERSON IS AUTHORIZED TO GIVE ANY OTHER WARRANTY, OR TO ASSUME ANY ADDITIONAL OBLIGATION ON VERMEER'S BEHALF.

NO DEALER WARRANTY. The selling dealer makes no warranty of its own and the dealer has no authority to make any representation or promise on behalf of Vermeer or to modify the terms or limitations of this warranty in any way.

ELECTRONIC SIGNATURES. Each of the parties hereto expressly agrees to conduct transactions by electronic means. Accordingly, the parties agree and intend that all electronic transmissions including, without limitation, electronic signatures, shall be considered equivalent to an original writing as provided under Iowa law, as it may be amended from time to time.

MANUFACTURED BY:
VERMEER CORPORATION
Pella, Iowa 50219 USA

VERMEER EQUIPMENT EXTENDED LIMITED WARRANTY RIDER
COMPACT SKID STEER FRAME AND LOADER ARMS
3 Years* / 3,000 Hours
(Parts only coverage during extended term)

VERMEER CORPORATION (hereinafter "Vermeer") agrees to extend only the parts coverage of the applicable Vermeer Industrial New Equipment Limited Warranty (the "Standard Limited Warranty") for the Covered Components of the Specified Models of New Vermeer Industrial Equipment for the Extended Term, provided the Equipment is operated and maintained in accordance with the directions and instructions set forth in the Operator's and Maintenance Manual(s). All conditions, exclusions, and limitations of the Standard Limited Warranty apply.

SPECIFIED MODELS: **S450TX, S600, S600TX, S650TX, S725TX, S800TX, S925TX, CTX50, CTX100**

COVERED COMPONENTS: Tractor Main frame and boom loader arms.

NON-COVERED COMPONENTS: Greaseable pins, mounting plates and wear items (as specified on the Vermeer's New Industrial Equipment Limited Warranty).

EXTENDED TERM*: Three (3) full years from original retail sale date of the Equipment or 3,000 hours of machine operation, whichever occurs first. This warranty is extended to the original purchaser and subsequent owners.

EXCEPT FOR THE STANDARD LIMITED WARRANTY AND THIS RIDER, VERMEER MAKES NO OTHER WARRANTIES, AND ANY POSSIBLE LIABILITY OF VERMEER HEREUNDER IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, INCLUDING, BUT NOT LIMITED TO ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

TELEMATICS EQUIPMENT NOTICE AND CONSENT

This machine may be equipped with Vermeer GPS tracking equipment that collects and transmits data about the machine's performance and location. This data is collected by Vermeer and held, used and shared consistently with the terms of the Vermeer Privacy Policy and any applicable provisions of the End User License Agreement ("EULA") which may be found at: http://www2.vermeer.com/vermeer/NA/en/N/privacy and http://telematics.vermeer.com.

Machine owner and designated representatives ("subscribers") may access the data through a subscription based website called Vermeer Telematics (formerly known as Vermeer Fleet/Fleet Edge). Use of Vermeer Telematics is subject to the subscriber's acceptance of the terms and conditions of use and payment of any applicable subscription or license fees. If you are a current subscriber, you may obtain a copy of the currently effective terms and conditions through your login or by contacting appsupport@vermeer.com.

More information about Vermeer Telematics may be found at: http://store.vermeer.com.

Machine owner may opt-out of the telematics service and collection of data by Vermeer Telematics at any time by contacting your Vermeer dealer or appsupport@vermeer.com.

EC Declaration of Conformity

Vermeer machines manufactured to comply with European Union directive **2006/42/EC** include a complete EC Declaration of Conformity. Refer to it for details of all applicable directives. The following information is from an EC Declaration of Conformity and only applies to machines that were originally marked ***CE*** and have not been modified.

We, **Vermeer Manufacturing Company,** declare under our sole responsibility that the product to which this declaration relates is in conformity with all relevant provisions of Directives **2006/42/EC, 2014/30/EU, 2000/14/EC, 2002/44/EC and EU 2016/1628.**

Machine Type: **Mini Skid Steer**
Model: **S450TX**
Net Installed Power: **18.2 kW**
Representative Measured Sound Power Level: **102 dB(A)**
Guaranteed Sound Power Level: **103 dB(A)**

A Technical file is maintained by the manufacturer at:
Vermeer Manufacturing Company
PO Box 200,
Pella, Iowa 50219, USA
Phone: (641)628-3141 ext. 5595
(800)829-0051

The authorized representative to compile the technical file and who is located within the community is:
Managing Director, Vermeer International B.V.
PO Box 323
4460 AS Goes
The Netherlands
Phone +31/113-272700
FAX +31/113-272727

Place of Issue: **Vermeer Manufacturing Company, Pella, Iowa USA**

Receiving and Delivery Report

DEALER PREP

Check or perform the following:

___ Check that all optional and loose items are included with the machine.
___ Check that Operator's Manual is cabled to machine.
___ Check air cleaner condition.
___ Check engine oil level.
___ Check engine operation.
___ Check machine lubrication.
___ Check bolts for tightness.
___ Check shield installation and condition.
___ Check that auxiliary attachment drive neutral start interlock functions.
___ Check that *Ground Drive Joystick* and *Lift / Tilt Joystick* spring-return to NEUTRAL.
___ Check that Operator Presence system functions.
___ Check that machine does not move when controls are in NEUTRAL and the engine is running at full throttle (operator standing on foot platform).
___ Check that attachment does not tilt with key in OFF position and tilt lever pushed.
___ Check that loader arms do not lower with key in OFF position and lift lever pushed.

___ Check forward and reverse ground drive operation.

___ Check that *Park Brake* functions.

___ Check track tension.

___ Check condition of all safety signs and decals.

___ Check all phases of operation.

Hydraulics

___ Check hydraulic fluid level.

___ Check hydraulic components for leaks or damage.

___ Check hydraulic controls for proper function.

Attachments

___ Check that Operator's Manuals supplied by the attachment manufacturer are in the S450TX manual storage box or in the storage box located on the attachment. Bucket attachment instructions are contained in this S450TX Operator's Manual. Contact your authorized Vermeer dealer, or visit www.vermeer.com for information on attachments authorized for use by Vermeer Corporation.

DELIVERY

Check and perform the following with the customer:

___ Review all sections of the *Operator's Manual*.

___ Grease or oil all lubrication points.

Review of Operation

Review and demonstrate with the customer the various aspects of machine operation:

___ overall explanation of how the machine works

___ machine safety

___ preparing the machine for operation

___ operating the machine

DEALER/OWNER INFORMATION

dealer	owner
address	address
city	city
state / province	state / province
zip / postal code	zip / postal code
country	country
phone number	phone number
email address	email address

IDENTIFICATION NUMBERS - RECORD

Machine Model Number _____

Machine Serial Number _____



Kubota Engine Model Number _____

Kubota Engine Serial Number _____



IDENTIFICATION DECALS

These decals provide easy identification of the model and 17-digit identification number for the machine and attachments. The barcode contains the VIN number and can be scanned with any barcode reading device.

Mini Skid Steer Identification Decal



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Section 10: Safety Messages

General safety messages appear in this Safety Messages section. Specific safety messages are located in appropriate sections of the manual where a potential hazard may occur if the instructions or procedures are not followed. Messages that are specific to an attachment will be found in the attachment manual.

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

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

DANGER	Indicates a hazardous situation that, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazardous situation that, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates information considered important, but not hazard-related.

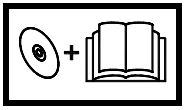
Safety Symbol Explanation



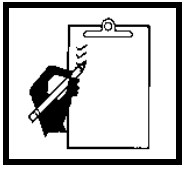
This is the safety alert symbol. This symbol is used in combination with an exclamation mark or other symbols to alert you to the potential for death or serious injury.



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



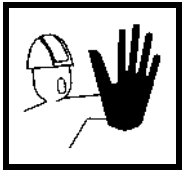
WARNING: Read Operator's Manual and safety signs, and watch the operations and safety video, before operating machine.



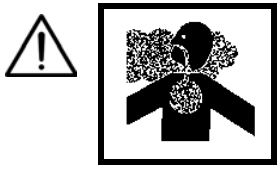
WARNING: Check machine before operating. Machine must be in good operating condition and all safety equipment installed and functioning properly.



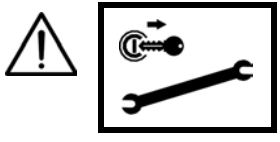
WARNING: Wear required personal protective equipment. Wear close-fitting clothing and confine long hair. Additional personal protection requirements are explained separately. Refer to "Personal Protection," *page 40-2.*



WARNING: Keep spectators away.



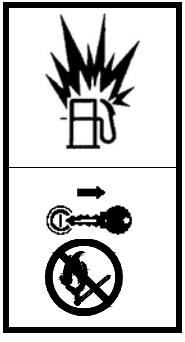
WARNING: Engine exhaust can asphyxiate or poison resulting in death or serious injury. Operate only outdoors. If it is necessary to operate engine in an enclosed area, properly vent exhaust gases.



WARNING: Failure to use shutdown procedure can result in unexpected hazard(s). Death or serious injury could result due to entanglement, crushing, cutting, or other hazardous contact. Follow Shutdown Procedure after operating, before preforming any service or maintenance, and before transporting. Refer to *Shutdown Procedure,* page *23-1.*

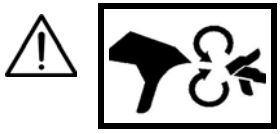


WARNING: Pressurized fluid can penetrate body tissue and result in death or serious injury. Leaks can be invisible. Keep away from any suspected leak. Relieve pressure in the hydraulic system before searching for leaks, disconnecting hoses, or performing any work on the system. If you must pressurize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

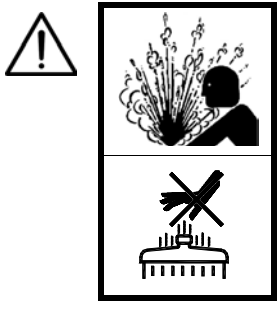


WARNING: Fuel and fumes can explode and burn.

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



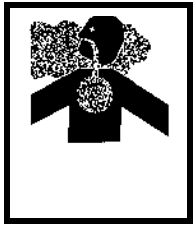
WARNING: Moving parts can crush. Keep hands, feet, and clothing away from power-driven parts. Keep shields in place and properly secured.



WARNING: Hot fluid under pressure can scald.

Allow engine to cool before opening radiator cap.

CRYSTALLINE SILICA



WARNING: Breathing crystalline silica puts workers at increased risk of developing serious silica-related diseases including: silicosis, lung cancer, kidney disease, Chronic Obstructive Pulmonary Disease (COPD). Death or serious illness could result. Avoid exposure to crystalline silica dust according to OSHA guideline 29 CFR 1926.1153.

Breathing crystalline silica dust over time can result in silicosis, a disabling, non-reversible and sometimes fatal disease of the lungs. United States Federal OSHA has established exposure limits for employees. Avoid exposure to dust containing crystalline silica in excess of these limits.

Crystalline silica is a basic component of sand, rock, concrete, brick, block and mortar. Many activities at construction sites such as breaking, chipping, drilling, cutting, etc., produce dust containing crystalline silica. Air monitoring may be necessary to determine whether jobsite conditions expose workers to excessive levels of crystalline silica dust. Depending upon air monitoring results, the following measures may be necessary to avoid exposure to excessive levels of crystalline silica dust:

- Perform an Exposure Assessment.
- Create a Written Exposure Control Plan.
- Housekeeping
- Medical surveillance
- Employee training

Be aware of and follow the guidelines of United States OSHA 29CRF1926.55 and 1926.1153, or other applicable regulatory guidelines. This includes having a jobsite plan for mitigating hazards.

- A jobsite plan can include jobsite dust reduction measures, including using water spray, vacuum, or other methods.
- Do not eat, drink, use tobacco products,
- Store food, drink and personal belongings away from the work area.



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



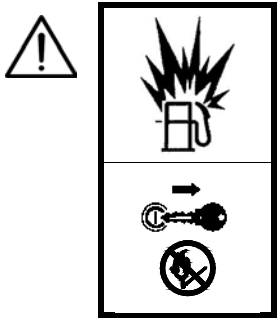
Be sure that all safety devices, including shields, are installed and functioning properly after servicing the machine.



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

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Section 12: Fuel Tank Fill



WARNING: Fuel and fumes can explode and burn.

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

Diesel Fuel Engines - Sulfur Content

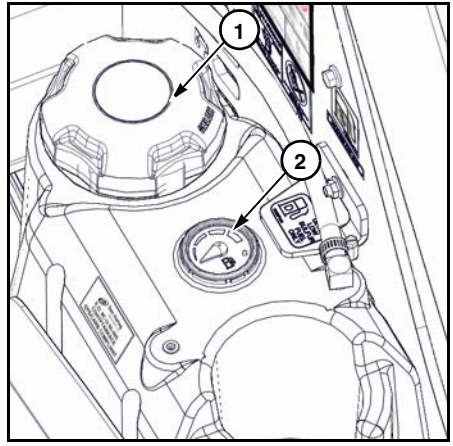
Requires Ultra Low Sulfur Diesel (ULSD) fuel, with sulfur content less than 15 ppm (15 mg/kg). Use of fuels other than what is specified in the engine manual will impact engine performance, damage engine emissions systems and may result in engine and exhaust system warranty being voided.

(1) Fuel Cap

(2) Fuel Gauge

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





FUEL TANK - FILL (BIODIESEL FUEL)

NOTICE: Refer to the Engine Operation Manual supplied with machine for instructions.

- Blended diesel fuels containing 6% thru 20% Biodiesel Fuel (B6 - B20) which comply with American Society of Testing Materials ASTM D7467-09a standard, as revised, can be used without adversely affecting the performance and durability of the engine and fuel system components.
- Mineral oil diesel fuel, if used, must conform to ASTM D975009b Standard, as revised. The final blended Fuel B20 must conform to ASTM D7467-09a Standard, as revised. Pure vegetable oil is not allowed in any blended fuel.
- Before using Biodiesel fuel concentrations greater than B5, you are advised to replace the oil, oil filter and fuel filter with new oil and filters.
- Biodiesel fuel may cause restricted or clogged fuel filters during cod weather conditions, resulting in the engine not operating properly. Replace the fuel filters at one half of the replacement interval listed in this manual.

Section 15: Intended Use

The S450TX Mini Skid Steer can be equipped with a variety of attachments for light and medium duty work. Contact your Vermeer dealer, or visit www.vermeer.com, for information on the list of authorized attachments. The S450TX must not be used with attachments which have not been evaluated by Vermeer Corporation and authorized for use.

WARNING: Using attachments authorized by Vermeer Corporation is important for your safety. Using unauthorized attachments may cause difficulties with steering, stopping, stability and other undesirable performance or handling characteristics. Never use unauthorized attachments.

Always use this machine in accordance with the instructions contained in this manual and the attachment manuals supplied with the attachments; safety signs on the machine and attachments, and other materials provided by Vermeer Corporation and the attachment manufacturers.

Proper maintenance and repair is essential for safety, and efficient machine operation. Do not use the machine if it is not in suitable operating condition.

In addition, ensure new operator is familiar with all the safety signs and control operations.

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Section 16: Vermeer Productivity Tools

VERMEER GPS TRACKING EQUIPMENT (TELEMATICS)

- Serial numbers 2001 and up are equipped with Vermeer GPS tracking equipment.

Vermeer uses GPS tracking equipment to collect data about the machine's performance and location. When activated, the telematics control unit (TCU) transmits the data to a subscription-based website called Vermeer Telematics (formerly known as Vermeer Fleet/Fleet Edge). Subscribers can access the data through a computer or mobile device.

Each subscription is valid for a current registered owner's specific machine. The subscription cannot be transferred to another machine or to a new machine owner.

- After subscribing, go to http://telematics.vermeer.com and refer to the bulletin for instructions on accessing the user's guides.
- Subscriptions can be canceled at any time by contacting your local Vermeer dealer or emailing appsupport@vermeer.com.
- Subscribers must notify appsupport@vermeer.com to cancel a subscription when selling a machine.

There are two levels of data access, as well as a third option which turns off the system.

- Full Implementation - The subscription owner, Vermeer and authorized dealers can all access the data. A new machine, manufactured by Vermeer Corporation and equipped with telematics, automatically begins transmitting data to Vermeer and its authorized dealer. The owner must activate the subscription to access the data. For more information on subscribing, contact your Vermeer dealer or email appsupport@vermeer.com
- Partial Implementation - only the registered owner and Vermeer Corporation can access the data. To select this option, contact your dealer or email appsupport@vermeer.com.
- Shut System Off - To discontinue data collection and turn off the system, email appsupport@vermeer.com.

Used Machines - to activate machine telematics after purchasing a used machine:

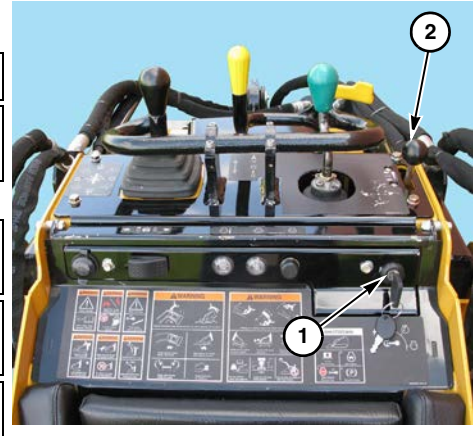
Step 1: View the compatible machine list online at http://store.vermeer.com, or contact your local Vermeer dealer or appsupport@vermeer.com to determine if machine telematics is available for installation.

Step 2: Contact your dealer or email appsupport@vermeer.com to ensure that any previous subscription related to your machine has been canceled.

For more information, contact your Vermeer dealer or email appsupport@vermeer.com.

Section 20: Controls

ENGINE CONTROLS



(1) Ignition Switch



Counterclockwise . . . . . accessories
Low engine oil pressure light also comes on in ACC position.



Vertical . . . . . engine STOP



1st position clockwise . . . . . engine RUN
Electrical system on



2nd position clockwise . . . . . engine START
Returns to RUN when released



(2) Throttle Lever



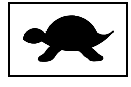


Push forward . . . . . increase engine speed





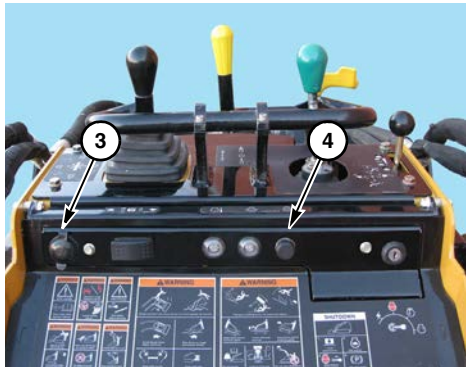
Pull back. . . . . decrease engine speed



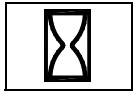
(3) 12V DC Auxiliary Electrical Outlet
12V 20 amp available in Key ACC and Key RUN positions.

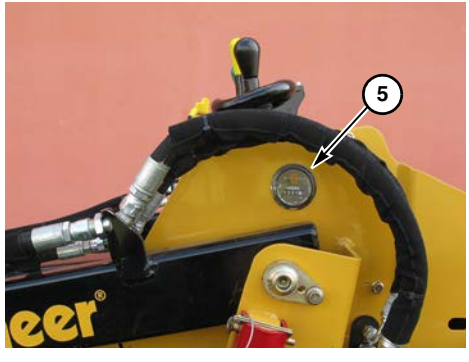
(4) Glow Plug Button
Turn ignition key to RUN position, then press *Glow Plug Button* and hold for 10–15 seconds. Continue to hold button while starting engine.





(5) Hourmeter
Indicates total number of hours engine has been in operation.





INDICATOR LIGHTS



(1) High Engine Temp. Indicator Light

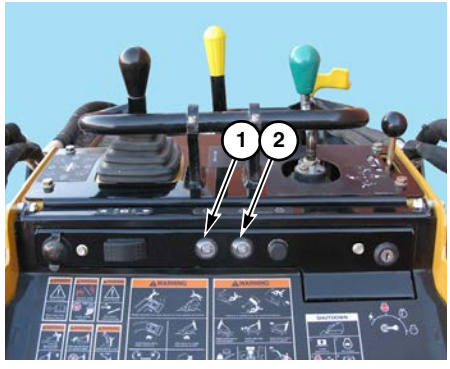
Light turns on when engine temperature is too high. If light turns on during operation, shut off engine and correct the issue.

Engine will shut down when High Engine Temperature Indicator Light comes on and will not restart until engine cools down enough for the light to turn off.



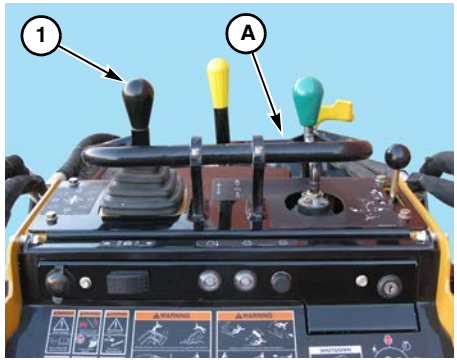
(2) Low Engine Oil Pressure Indicator Light

Light indicates low engine oil pressure and comes on when the ignition switch is initially turned ON. If the light does not shut off within 30 seconds after starting the engine or comes on during normal operation, shut off the engine and correct the issue.



CONTROL STATION

Handgrip bar **(A)** enables the operator to keep both hands on the bar to remain secure during machine travel and operation. The handgrip bar also provides a steady rest for smooth control of joysticks.



Steering Operation Note:
Front of machine moves sideways in same direction as control lever is moved when traveling both FORWARD and REVERSE.

(1) Left Joystick - Ground Drive Controls



Forward . . . . . variable speed forward



Back . . . . . .variable speed reverse



Left . . . . . counter-rotate left



Right. . . . . .counter-rotate right



Forward left . . . . . steers left when moving forward



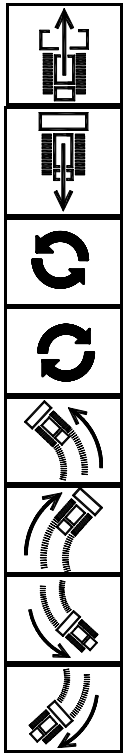
Forward right . . . . . steers right when moving forward

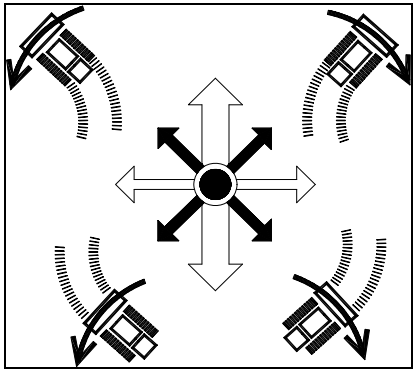


Back left . . . . . front turns left when moving in reverse



Back right . . . . . front turns right when moving in reverse

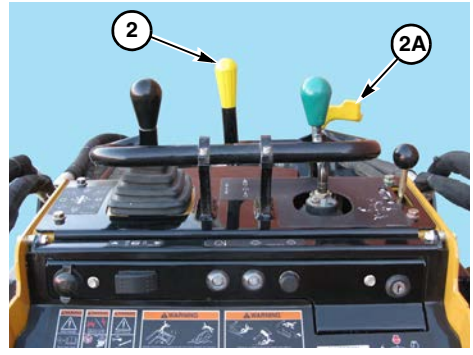




(2) Auxiliary Attachment Drive Lever

Lever is detented in full-forward and full-reverse positions. Lever must be in NEUTRAL for engine to start.





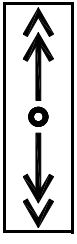
Standard Machines

Maximum hydraulic flow through this valve is 12.5 gpm (47.3 L/min) at 2950 psi (203 bar) with engine running at full RPM.

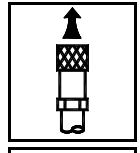
European CE Certified Diesel Machines

Maximum hydraulic flow through this valve is 11.8 gpm (44.7 L/min) at 2950 psi (203 bar) with engine running at full RPM.

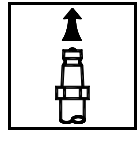
Lever extension **(2A)** allows operator to move the control without releasing right joystick.



Forward . . . . .oil flows to attachment through female coupler



Center . . . . . .OFF



Back. . . . . oil flows to attachment through male coupler



(3) Right Joystick - Lift/Tilt Controls



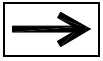
Forward . . . . . lower boom



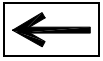
Forward to detent . . . . . boom FLOAT



Back . . . . . raise boom



Right. . . . . tilt attachment forward



Left . . . . . tilt attachment back





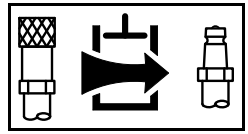








(4) Auxiliary Flow Speed Selector Switch (Option)
Switch selects flow rate for auxiliary attachment circuit.

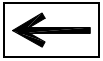




Standard Machines
6.3 gpm (23.8 L/min) - max flow rate on low setting
12.5 gpm (47.3 L/min) - max flow rate on high setting
(with engine running at full RPM)

European CE Certified Diesel Machines
5.9 gpm (22.3 L/min) - max flow rate on low setting
11.8 gpm (44.7 L/min) - max flow rate on high setting
(with engine running at full RPM)

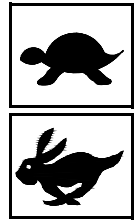
Low flow is not recommended for attachments with hydraulic motors.



Press left . . . . . low auxiliary flow rate



Press right. . . . . high auxiliary flow rate



Operator Presence System



The Operator Presence system uses a switch in the operator platform to detect the presence of an operator. The operator must be standing on the operator presence foot plate **(1)** for the ground drive, lift/tilt functions, or auxiliary attachment drive to be engaged.

If the operator leaves the platform while the ground drive, lift/tilt functions, and/or attachment drive are engaged, these functions will stop. If *Lift / Tilt Joystick* is in FLOAT, it will continue to lower/float. The *Auxiliary Attachment Drive Lever* must be returned to OFF before ground drive, lift/tilt, and attachment drive can be re-engaged.

The Operator Presence system is intended for your safety and must be maintained in good functional condition. Contact your Vermeer dealer if it does not function correctly.

Park Brake

A spring-applied, hydraulic-released park brake engages the left track when the engine is OFF or the operator leaves the platform with the engine ON. The brakes will engage within 4" (10 cm) of travel.

Boom Lift/Attachment Tilt Lockout Override

In the event of a non-functioning machine, the boom can be lowered and the attachment tilted by standing on operator's platform, and turning the ignition key to the RUN position and then moving the *Lift / Tilt Joystick*. In case of a discharged battery, connect jumper battery to the discharged battery posts. Refer to "Jump-Starting Procedure," *page 22-4.*

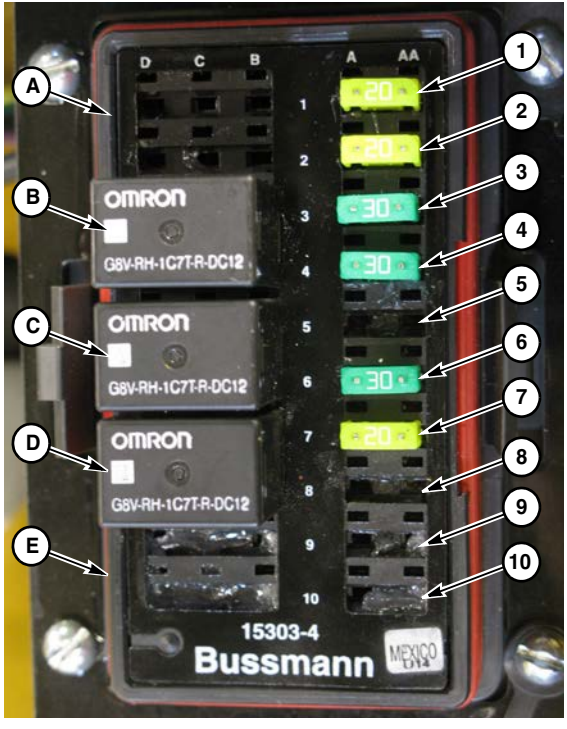
FUSES AND RELAYS

Fuses and relays protect electrical circuits. They are located in the compartment under the top console. Replace fuses with the correct rating to prevent damage to electrical system.

Fuses and Relays

Fuse Location	Function
(1) 20A	Ignition Breaker/All Solenoid Cartridges
(2) 20A	12 Vdc
(3) 30A	Starter Solenoid
(4) 30A	Glow Plug
(5) Open	Not used
(6) 30A	Spare
(7) 20A	Spare
(8) Open	Not used
(9) Open	Not used
(10) Open	Not used

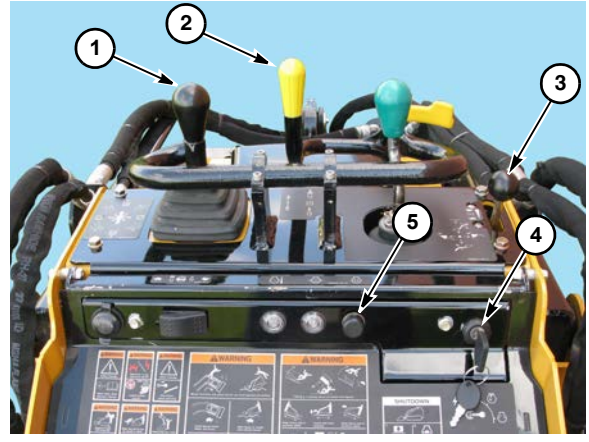
Relay Location	Function
(A)	Not used
(B)	Operator Presence Latch
(C)	Neutral Start
(D)	Fuel Shutdown
(E)	Not used



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Section 22: Starting Procedure

STARTING THE ENGINE



Step 1: Stand with both feet on operator platform.

Step 2: Ensure *Ground Drive Joystick* **(1)** is in NEUTRAL.

Step 3: Move *Auxiliary Attachment Drive Lever* **(2)** to NEUTRAL.

Step 4: Move *Throttle* **(3)** to half throttle position.

Step 5: Turn ignition key **(4)** to RUN position, then press *Glow Plug Button* **(5)** and hold for 10–15 seconds. Continue to hold button while starting engine.

Step 6: Turn ignition key to START position; release when engine starts.

NOTICE: If engine does not start within 10 seconds, turn key OFF, wait 30 seconds, then start engine starting sequence over again. Do not allow the starter motor to run continuously for more than 20 seconds.

Step 7: Check to see that oil pressure warning light goes off. If not, shut off engine and correct the issue.

Step 8: Warm up engine at medium speed. Do not operate the engine under load until engine has warmed up.

Refer to the Engine Operation Manual for detailed information.

COLD WEATHER STARTING

Engine



CAUTION: Handheld aerosol starting aid use can cause explosion. Personal injury is possible from flying debris and fire. Do not use handheld aerosol starting aids such as ether.

NOTICE: Handheld aerosol starting aid can cause explosion. Engine damage is possible. Do not use handheld aerosol starting aids such as ether.

Refer to Steps 5–6, page 22-1, for cold-weather starting. Whenever temperature drops below 5°F (-15°C), remove battery from machine and store indoors until next machine use.

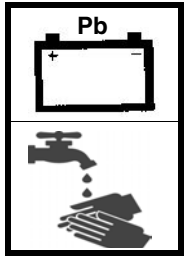
- An electric block heater is available from your Vermeer Dealer.
- Refer to the Engine Operation Manual for recommendations and procedures for use of cold weather starting aids.

Hydraulic Fluid

Allow adequate time for hydraulic oil to warm up, especially in cold weather. Refer to the *Specifications* section of the *Maintenance Manual* for recommended hydraulic fluids.

NOTICE: Reduce engine speed if hydraulic pump squeals, indicating lack of oil which can damage the pump.

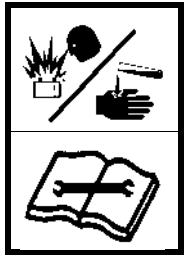
JUMP-STARTING



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

Wash hands after handling.

Battery Explosion - Avoid



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

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

Do not jump-start or charge a battery that is frozen or low on electrolyte.

Do not allow vehicle used to jump-start to be in contact with the disabled machine. Vehicles in contact have a ground connection which allows a spark to occur at the battery when the positive jumper cable is connected or removed. If equipped with battery caps, they must be in place and tight to reduce risk of battery explosion.

NOTICE: Use only a 12-volt system for jump-starting.

Battery Burns - Avoid

Battery contains sulfuric acid which can cause severe burns. Avoid contact with eyes, skin, and clothing.

In case of acid contact:

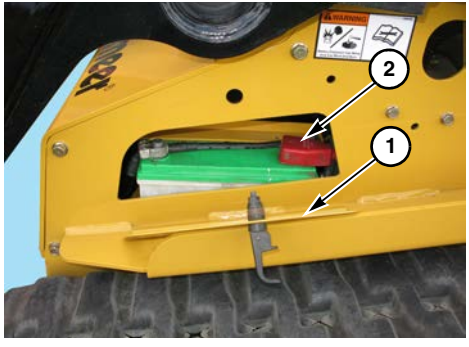
External: Flush with plenty of water. If eyes have been exposed, flush with water for 15 minutes and get prompt medical attention.

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

Jump-Starting Procedure

Step 1: Turn ignition switch to OFF.

Step 2: Open battery cable access door **(1)**.



Step 3: Connect jumper cables in the following order:

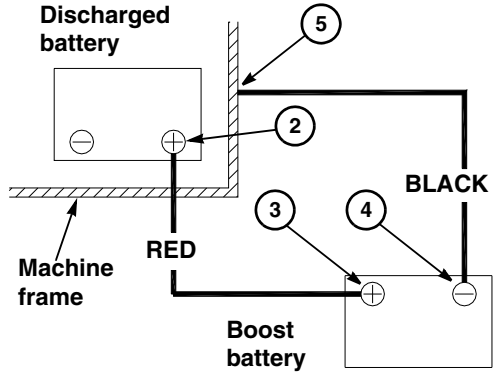
a. Red to discharged battery POSITIVE (+) terminal **(2)**.

b. Red to boost battery POSITIVE (+) terminal **(3)**.

c. Black to boost battery NEGATIVE (-) terminal **(4)**.

d. Black to frame **(5)** of machine with the discharged battery. Make connection away from battery, hydraulic lines, and moving parts.

NOTICE: To avoid sparks, disconnect black cable at point **(5)** before adjusting red cable at point **(2)**.

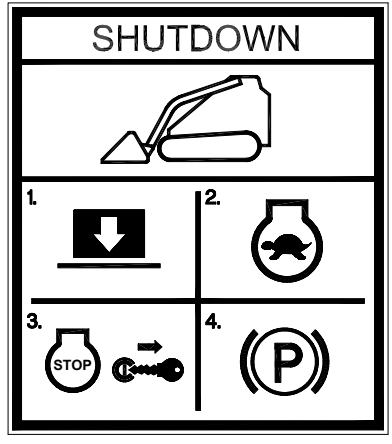


Step 4: Start engine.

Step 5: Remove cables in **reverse** order and install covers over cable clamps. Close and latch battery cable access door.

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Section 23: Shutdown Procedure



For your safety and the safety of others, use the shutdown procedure before working on the machine for any reason, including servicing, cleaning, or inspecting the machine.

Step 1: Park machine on a level surface.

Step 2: Move *Ground Drive Joystick* to NEUTRAL.

Step 3: Move *Auxiliary Attachment Drive Lever* to NEUTRAL.

Step 4: Fully lower attachment onto the ground.

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

Step 6: Move *Throttle* fully back to idle.

Step 7: Shut off engine and remove key.

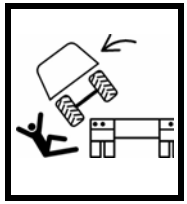
A variation of the above procedure may be used if so instructed within this manual or if an emergency requires it.

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

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Section 30: Transporting the Machine

LOADING/UNLOADING THE MACHINE



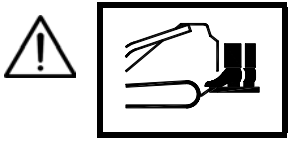
WARNING: Unintended machine movement may occur when loading or unloading on slippery, dirty or uneven trailer surfaces. Death or serious injury can result if struck or crushed by machine. Ensure trailer is level and all loading surfaces are clean and free of debris. Do not attempt to load onto slippery trailer surfaces. Use smooth and controlled steering movements.

- Read the towing vehicle and trailer manuals for safety precautions and information.
- Ensure gross weight of the machine with attachments is within the weight limits of the trailer and towing vehicle.
- Properly attach trailer to towing vehicle and chock wheels or engage park brake of towing vehicle.
- Ensure you are qualified to operate the machine. Refer to "Operator Qualifications," *page 40-1.*
- Keep attachment(s) as low as practical while loading and unloading.
- Slowly drive machine on and off trailer squarely to minimize steering.
- Do not attempt to steer machine when balanced at trailer/ramp transition.
- Position machine at location for tie-downs and weight distribution as recommended by trailer manufacturer.

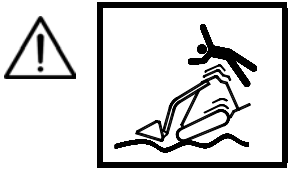
See "Machine Specifications" in the *Maintenance Manual* for tractor weights.

Loading/Unloading

- Back up the ramp while loading, and drive forward down the ramp while unloading when there is a light attachment on the front weighing less than 200 lb (90 kg), such as a standard bucket or forks, or when the attachment has been removed. Driving with operator downhill may result in machine tipping backward.
- Drive forward up the ramp while loading, and back down the ramp while unloading when there is a heavier attachment on the front. Driving with the heavy attachment downhill may result in machine tipping forward.
- Always travel on ramp with attachment as low as practical.
- Never stop or start suddenly while on ramp. Sudden stopping or starting may result in tipping forward or backward. Drive slowly and smoothly while on ramp.
- Avoid steering on ramps. Steering may cause machine to turn suddenly and fall off ramp, or cause ramp to move and fall.
- Position machine and attachments to provide the trailer tongue load recommended by the trailer manufacturer.
- Securely attach loose attachments and machine to trailer.



WARNING: Operator's leg can be crushed if machine is moved rearward while standing on the ground. Operator Presence foot plate must function properly. Never attempt to move machine with one or both feet on the ground.



WARNING: Machine travel stops if foot platform lifts up during machine travel. Sudden stops from higher travel speeds could throw you from machine, or the machine could tip over. To help avoid sudden stops, keep both feet fully on the platform and stand as far to the rear as practical. Slow down when traveling over uneven ground.

Driving onto Trailer

NOTICE: Machine is not intended to be driven on public roads.

Step 1: Follow *Starting Procedure,* page *22-1.*

Step 2: Prepare machine to drive onto the trailer. Load and unload machine and attachments in a sequence that does not require you to back off the trailer without an attachment on the machine. Backing down a ramp without an attachment, or with a light attachment, may cause the machine to tip rearward.

Step 3: Align machine with trailer ramps, with the heavy end on the uphill side.

Step 4: Position loader arms to avoid having to move the attachment while driving on the ramps:

- Before backing onto the ramps, the attachment should be raised just enough so the attachment will not contact the ground as the tracks start up the ramps.
- Before driving forward onto the ramps, the attachment should be raised just enough to prevent the attachment from contacting the ramps.

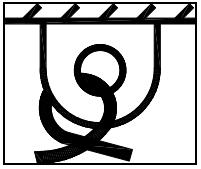
Step 5: Slowly move the machine up the trailer ramps. Minimize steering while on the ramps. Steering while on the ramps may result in the machine driving off the side of the ramps or cause ramps to move and drop off the trailer deck.

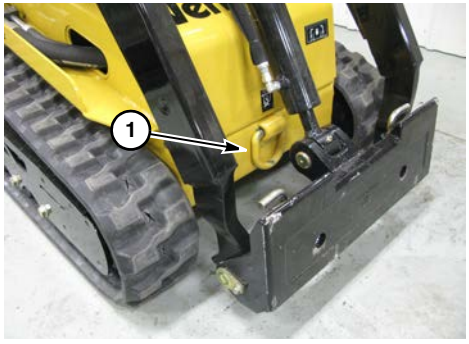
Step 6: Once the machine is off the ramps and onto the trailer deck, lower the attachment as low as possible.

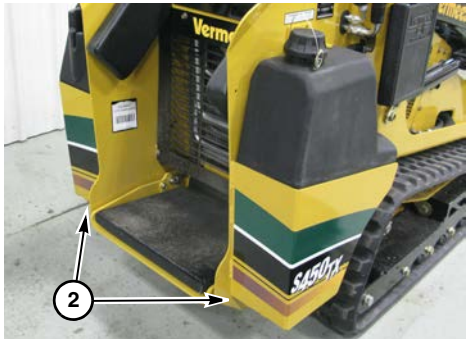
Step 7: Stop machine when tie-down position is reached. Tie-down position distributes machine weight on the trailer as recommended by the trailer manufacturer.

Step 8: Lower loader arms and adjust tilt until attachment is firmly on trailer deck.

Step 9: Shut off engine and remove key.







Step 10: Fasten machine to trailer using front **(1)** and rear **(2)** tie-down points provided on the machine. Attachments that are detached from the loader need to be properly secured for transport.

WARNING: Attachments could slip off the trailer after being disconnected from the machine, resulting in a crushing injury. When disconnecting and backing the machine away from the side of a trailer, take precautions to assure the attachments are properly secured to the trailer.

Driving off Trailer

Step 1: Remove tie-down straps or chains.

Step 2: Prepare machine to be unloaded.

Step 3: *Follow Starting Procedure,* page *22-1.*

Step 4: Align machine with the trailer ramps, with the heavy end on the uphill side.

Step 5: Position loader arms to avoid having to move the attachment while driving down the ramps:

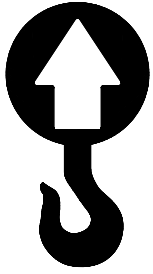
- Before backing down the ramp, the attachment should be raised so the attachment will not contact the ramps as the tracks leave the ramp.
- Before driving forward down the ramp, the attachment should be raised to prevent the attachment from contacting the ground as the machine reaches the end of the ramps.

Step 6: Slowly move machine down the ramp to the ground. Minimize steering while on the ramps. Steering while on the ramps may result in the machine driving off the ramps or cause the ramps to move and drop off the trailer deck.

Loading with Crane

A lift eye **(1)** is provided to hoist the machine onto the transport vehicle with a crane. Fully raise loader arms before lifting for proper machine balance.



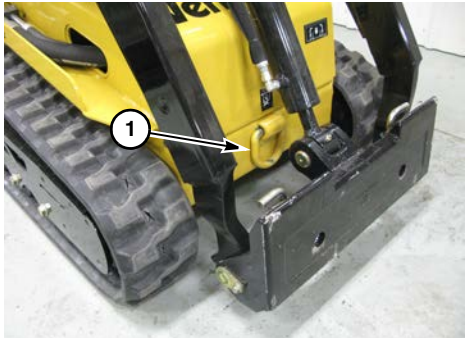


TOWING THE MACHINE

Towing requires bypassing the ground drive pump and releasing the park brake.

Step 1: Apply park brake. Refer to "Park Brake," *page 20-8.*

Step 2: Attach a suitable towing chain to front tie-down point **(1)** or rear tie-down points **(2)** to retrieve the machine if the machine becomes mired or disabled.





Step 3: Raise loader arms and install lift arm support bar. Refer to "Lift Arm Support Bar - Install/Remove," *page 60-2.*

Step 4: Follow *Shutdown Procedure*, page *23-1.* Leave loader arms raised. Refer to "Lift Arm Support Bar - Install/Remove," *page 60-2.*

Towing requires bypassing the ground drive pump.

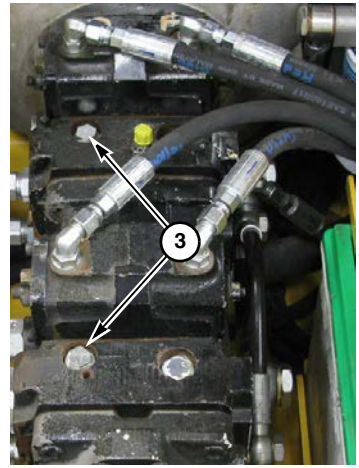
Step 5: Place chocks in front and back of right track.

Step 6: Access to tow valves is under front pump cover **(3)**.

NOTICE: Towing requires bypassing the ground drive pump.

Step 7: Open engine shield and remove front pump cover **(3)**. Unscrew the bypass valves **(4)** located on side of ground drive pumps a maximum of two turns. These valves allow the motors to turn.

Step 8: Release park brake. To release park brake, loosen jam nut **(5)**, then loosen setscrew **(6)**. Push in pin **(7)** enough to clear sprocket teeth. Tighten setscrew and jam nut to hold pin in released position. Grease fitting may have to be removed.



NOTICE: Machine could roll downhill after park brake is released and chocks are removed. If possible, ensure machine is on a stable and reasonably level surface prior to attempting to retrieve. Proper chocking of tracks is critical to keep machine stationary until ready to tow.

Step 9: Move towing vehicle in direction of intended travel to take up slack in towing chain. Carefully remove wheel chocks.

Step 10: Tow disabled skid steer to a firm and level surface.

NOTICE: While towing, the ground speed of the machine must not exceed 1–2 mph (2–3 km/h). Higher speeds will cause heat buildup which will damage the pumps and motors.

Do not tow more than 100 ft (30 m).

Step 11: Re-engage park brake, loosen jam nut **(5)**, then loosen setscrew **(6)** to free pin.

Step 12: Tighten jam nut **(5)** to secure setscrew **(6)**.

- Ensure pin operates freely after jam nut **(5)** is tightened.
- Pin must align between sprocket teeth to engage park brake. Pin has to engage sprocket teeth by at least 5/8" (16 mm).

Step 13: Tighten bypass valves prior to returning machine to service. These valves must be fully closed after towing for normal tractor operation. Torque bypass valves to 15–18 ft-lb (20–24.5 Nm).

NOTICE: Do not attempt to push-start the machine. Damage to ground drive pumps or motors will result if towing instructions are not followed correctly.

Do not tow more than 100 ft (30 m).

NOTICE: These valves must be fully closed after towing for normal tractor operation. Torque bypass valves to 15–18 ft-lb (20–25 Nm).

Machine could roll downhill after *Park Brake* is released. If possible, ensure that machine is on a stable and reasonably level surface prior to attempting to retrieve. Proper chocking of tracks is critical to keep machine stationary until ready to tow.

Park Brake is located on left side of machine.

Step 14: To release *Park Brake*, loosen jam nut **(4)**, then loosen setscrew **(5)**. Push in pin **(6)** enough to clear sprocket teeth. Tighten setscrew and jam nut to hold pin in released position. Grease fitting may have to be removed.

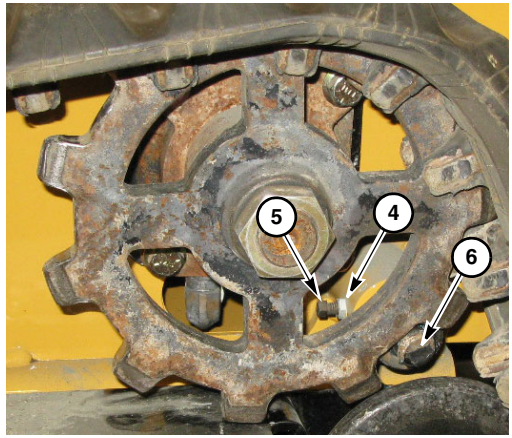
Step 15: Move towing vehicle in direction of intended travel to take up slack in towing chain. Carefully remove wheel chocks.

Step 16: Tow disabled skid steer to a firm and level surface.

Step 17: To re-engage *Park Brake*, loosen jam nut, then loosen setscrew to free pin. Tighten jam nut to secure setscrew. Ensure pin operates freely after jam nut is tightened.

Pin must align between sprocket teeth to engage *Park Brake*. If pin is behind a sprocket tooth, see “Park Brake - Check” in the *Maintenance Manual* for instructions.

Step 18: Tighten bypass valves prior to returning unit to service.



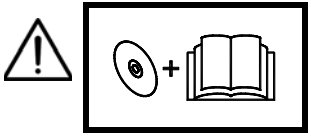
CLEAN MACHINE

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

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Section 40: Preparation

OPERATOR QUALIFICATIONS



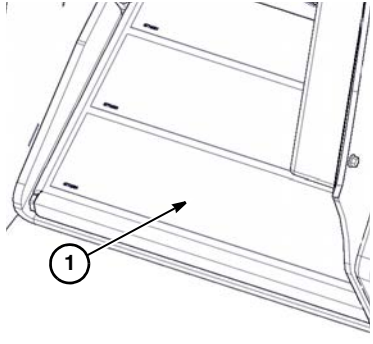
WARNING: Read Operator's Manual and safety signs, and watch the operations and safety video, before operating machine.

Allow only responsible, properly instructed individuals to operate machine.

Become familiar with the controls, operation and use of the machine under the supervision of a trained and experienced operator.

The operator must be familiar with the workplace's safety rules and regulations, and must be mentally and physically capable of operating the machine safely.

Operator Presence Switch

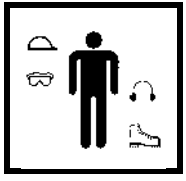


The Operator Presence system uses a switch in the operator platform to detect the presence of an operator. The operator must be standing on the operator presence foot plate **(1)** for the ground drive, lift/tilt functions, or auxiliary attachment drive to be engaged.

If the operator leaves the platform while the ground drive, lift/tilt functions, and/or attachment drive are engaged, these functions will stop. If Lift/Tilt Joystick is in FLOAT, it will continue to lower/float. The Auxiliary Attachment Drive Lever must be returned to OFF before ground drive and attachment drive can be re-engaged.

The Operator Presence system is intended for your safety and must be maintained in good functional condition. Contact your Vermeer dealer if it does not function correctly.

PERSONAL PROTECTION



WARNING: Wear personal protective equipment. Wear close-fitting clothing and confine long hair. Avoid jewelry, such as rings, wristwatches, necklaces, or bracelets.

Operating the machine will require you to wear protective equipment. You should always wear a hard hat, safety shoes, hearing protection, and eye protection. If working near traffic, you may have to wear high visibility clothing.

Hearing protection is required when operating the machine. Hearing protection devices provide differing levels of sound reduction. It is important to select a device that is adequate and appropriate for your specific work environment. Actual sound levels may vary widely, depending on your working conditions. To determine the level of hearing protection your work environment requires, enlist the help of your local environmental noise specialist.

Eye protection must consist of wraparound safety glasses or goggles.

Other workers in the immediate area must also wear hard hats, safety shoes, hearing protection, and eye protection.

Avoid wearing jewelry, such as rings, wristwatches, necklaces, or bracelets.

SOUND LEVELS



Sound pressure and sound power levels were determined according to test procedures specified in ISO 3744 and ISO 6393 and 6394.

Engine

Standard Machines

Equivalent Continuous A-Weighted Sound Pressure at Operator's Ear as specified by ISO 6394. . . . . 91 dB(A)

Sound Power Level . . . . . 105 dB(A)

European CE Certified Machines

Equivalent Continuous A-Weighted Sound Pressure at Operator's Ear as specified by ISO 6394. . . . . 88 dB(A)

Guaranteed Sound Power Level as determined by directive 2000/14/EC. . . . . 103 dB(A)

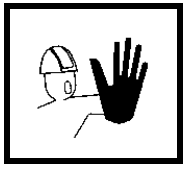
Stated sound levels are representative for a given operating condition. Operating conditions may vary at each site. The actual sound levels for your application and operating conditions may be different.

VIBRATION LEVELS

Whole body vibration exposure has been measured according to ISO 2631. The level is less than 0.5 m/s^2.

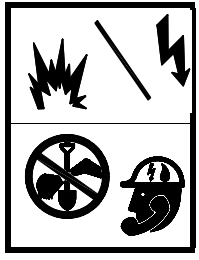
Hand/arm vibration exposure has been measured according to ISO 5349. The level is less than 2.5 m/s^2.

PREPARE THE AREA



WARNING: Keep all spectators and other workers away from the machine and work area while in operation.

UNDERGROUND UTILITY CONTACT



WARNING: Electricity or gas explosion can kill. Laser light in cut cable can cause eye damage.

Locate utilities before digging. Call 811 or 1-888-258-0808 in the U.S. or contact local utility companies or national regulating authority.

Before you start any digging project, call the local One-Call system in your area and any utility company that does not subscribe to the One-Call system. For areas not represented by One-Call Systems International, contact the appropriate utility companies or national regulating authority to locate and mark underground installations. If you do not call, you may have an accident or suffer injuries; cause interruption of services; damage the environment; or experience job delays.

The One-Call representative will notify participating utility companies of your proposed digging activities. Utilities will then mark their underground facilities by using the following international marking codes:

Red	Electric	Green/Brown	Sewer
Yellow	Gas, Oil or Petroleum	White	Proposed Excavation
Orange	Communication, Telephone, TV	Pink	Surveying
Blue	Potable Water		

OSHA CFR 29 1926.651 requires that the estimated location of underground utilities be determined before beginning excavation or underground drilling operation. When actual excavation or bore approaches an estimated utility location, the exact location of the underground installation must be determined by a safe, acceptable and dependable method. If utility cannot be precisely located, it must be shut off by the utility company.

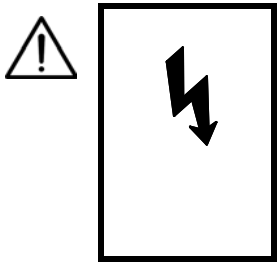
Look for Evidence of Underground Placement

Visually check for:

- notices of underground placements
- manhole covers
- drop boxes
- recent trenching activity

Striking a Utility

Electricity

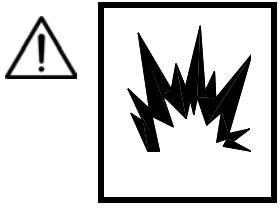


DANGER: Electric shock can kill.

If strike occurs, stay on machine. Contacting the machine and ground while stepping off may result in death or serious injury. Raise auger or trencher to try breaking contact with electric power line. Have someone who is clear of the area contact the utility company to shut off electrical power. Do not continue work until utility company has declared the area safe to resume operation. Do not allow anyone to approach the machine.

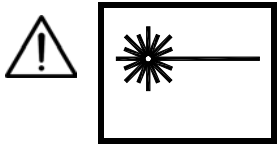
Some circuit breakers automatically reset. Do not assume power has been permanently disconnected until you confirm that the utility company has locked out power to that line.

Gas



DANGER: Gas explosion can kill. If you strike a gas line, shut off engine and evacuate area immediately. Contact utility company and do not return until the utility company gives permission to do so.

Fiber Optic



WARNING: Laser light may damage eyes. Do not look into the end. Fiber optic cables carry laser light which may damage your eyes. If you are not sure what type of cable it is, do not look into the end. Contact appropriate utility company for assistance.

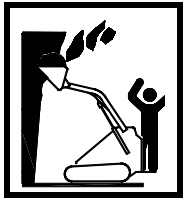
Jobsite Assessment

Examine work area for any obstructions, conditions, or situations which may impair machine operation or create a safety hazard for the operator or other persons. Use the information in this manual combined with your own good judgment when identifying these hazards and implementing hazard avoidance measures.

Check for steep slopes, banks, overhangs, drop-offs, and trenches which can cave in.



WARNING: The weight of your machine may cause the ground to give way. Machine can fall and tip over. Death or serious injury could result. Keep well away from cliff edges. Do not dig under the machine or attachment. Take care when backfilling. Do not go too close to edges. Do not drive or operate on unstable ground.



WARNING: Cliff and high banks can fall on you. Take care when working below overhangs. Do not dig away beneath them. Look out for rock falls and soil slips.

When work is planned inside or around structures such as buildings, bridges, and low-hanging tree limbs, check for adequate overhead and side clearances. Be sure to account for the height of the boom.

The operator or job foreman should also inspect the jobsite for:

- holes, rocks, or other hidden hazards
- traffic/site access

Remove any obstacles or materials that could result in injury or damage the machine.

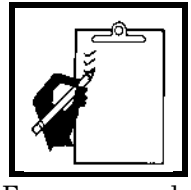


WARNING: Engine exhaust can asphyxiate or poison resulting in death or serious injury. Operate machine outdoors. If it is necessary to operate engine in an enclosed area, properly vent exhaust gases.

Good ventilation is very important. Sparks from the electrical system and engine exhaust can cause an explosion or fire in a flammable or explosive atmosphere. Do not operate this machine in an area with flammable dust or vapors.

Carbon monoxide fumes from the engine can asphyxiate. Operate only outdoors or provide adequate ventilation if indoor operation is essential.

PREPARE THE MACHINE



WARNING: Check machine before operating. Machine must be in good operating condition and all safety equipment installed and functioning properly.

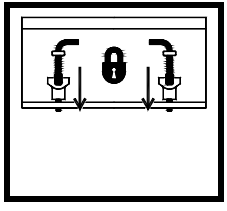
- Ensure you understand and comply with all jobsite rules that might apply to your work situation.
- If operating along a road, properly warn and divert motor and pedestrian traffic. Use all necessary signs, cones, flag persons, or lighting devices needed for the work situation.

ATTACHMENTS

WARNING: Using attachments authorized by Vermeer Corporation is important for your safety. Using unauthorized attachments may cause difficulties with steering, stopping, stability and other undesirable performance or handling characteristics, or they may not attach securely to your machine. Never use unauthorized attachments.

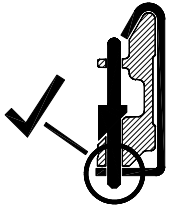
Install/Remove

Before connecting any attachment to the machine, ensure all machine and attachment mounting plates are free of dirt and debris in order to ensure the attachment can be properly connected.

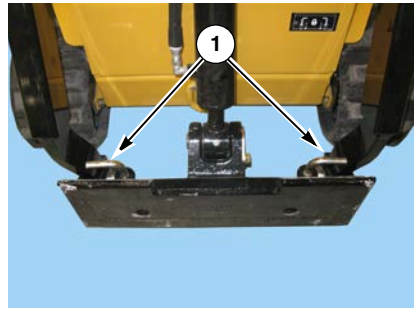


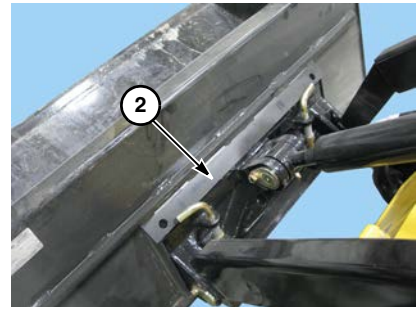
WARNING: Attachment can fall off loader attachment mounting plate if incorrectly attached. Death or serious injury could result.

When installing attachment, be certain that pins snap into place, pin tops are rotated inward, and pin ends are visible beneath attachment mount.



Attachment - Install





Step 1: Position attachment on a level surface with sufficient area behind it to accommodate the machine.

Step 2: Ensure pins are rotated so that tops of pins face outward as shown **(1)**.

Step 3: Start machine, and lower lift arm. Tilt loader mounting plate forward slightly.

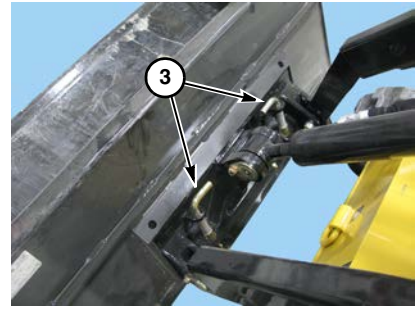
Step 4: Drive machine FORWARD, aligning loader mounting plate with attachment.

Step 5: Once top edge of mounting plate enters under lip of attachment mount as shown **(2)**, raise lift arm while tilting mounting plate back to securely engage attachment.

Step 6: Raise attachment sufficiently to clear the ground. Tilt attachment plate back fully.

Step 7: Ensure *Ground Drive* and *Lift / Tilt Controls* are in NEUTRAL, and shut off machine and remove key.

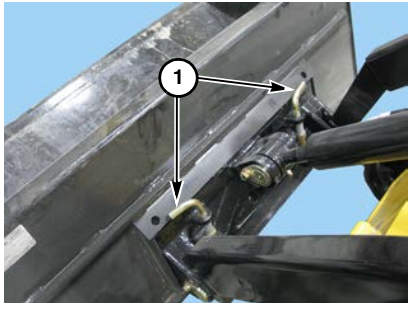
Step 8: Rotate pins 180° so that pins engage and extend through bottom of attachment mount and are visible beneath attachment mount. Tops of pins must face inward as shown **(3)**.

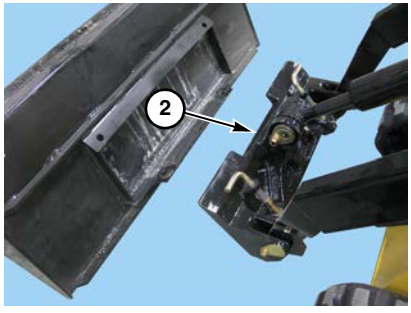


NOTICE: Ensure pin ends extend through and are visible beneath attachment mount.

Step 9: If attachment requires hydraulic power, see “Hydraulics - Attach.” Refer to “Hydraulics - Attach,” *page 40-14.*

Attachment - Remove





Step 1: If attachment requires hydraulic power, see “Hydraulics - Detach.” Refer to “Hydraulics - Detach,” *page 40-14.*

Step 2: Lower loader arms until attachment rests on the ground. Ensure *Ground Drive*, *Auxiliary Drive*, and *Lift / Tilt Controls* are in NEUTRAL, and shut off engine and remove key.

Step 3: To unlatch attachment, rotate pins **(1)** 180° so that top of pin faces outward as shown.

Step 4: Start engine and tilt loader mounting plate **(2)** forward slightly. Lower loader arms if necessary.

Step 5: Drive machine in REVERSE to detach loader from attachment.

If detaching an attachment onto a trailer with the machine positioned on the ground, locate the attachment to prevent it from falling off.

WARNING: Attachments could slip off the trailer after being disconnected from the machine, resulting in a crushing injury. When disconnecting and backing the machine away from the side of a trailer, take precautions to assure the attachments are properly secured to the trailer.

HYDRAULICS - ATTACH/DETACH

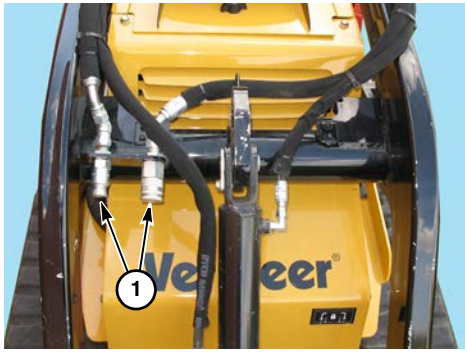


WARNING: Pressurized fluid can penetrate body tissue and result in death or serious injury. Leaks can be invisible. Keep away from any suspected leak. Relieve pressure in the hydraulic system before searching for leaks, disconnecting hoses, or performing any work on the system. If you must pressurize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

WARNING: Contact with hot hydraulic couplers, hoses, and fluid may result in burns. Wear gloves when connecting and disconnecting hydraulic hoses, and wait until unit has cooled before touching hydraulic components.

NOTICE: Ensure all foreign matter is cleaned from hydraulic connectors before making connections.

Hydraulics - Attach



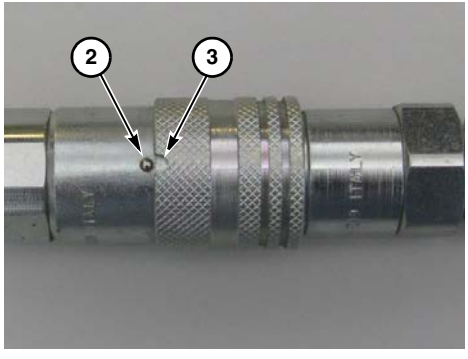
If attachment requires hydraulic power, after securing attachment to the machine:

Step 1: Shut off engine and turn key to RUN position. Move *Auxiliary Attachment Drive Lever* forward, backward, and back to NEUTRAL position to relieve hydraulic pressure. Turn key to STOP and remove key.

Step 2: Connect hoses to auxiliary hydraulic couplers **(1)**. Confirm that connection is secure by pulling on couplers.

NOTICE: Attachments with cylinders or motors may have residual pressure remaining in hydraulic lines from cylinder or motor loading. Ensure cylinders or motors are not loaded to help relieve residual pressure in attachment hydraulic lines before attaching lines to couplers.

Hydraulics - Detach



Step 1: Lower loader arms until attachment rests on the ground. Ensure *Ground Drive* and *Auxiliary Attachment Levers* are in NEUTRAL. Shut off engine.

Step 1: With key in RUN position (engine not running) move *Auxiliary Attachment Drive Lever* forward, backward, and back to NEUTRAL position to relieve hydraulic pressure. Turn key to STOP and remove key.

Step 2: Align pin **(2)** with notch **(3)** on female coupler before disconnecting couplers.

Step 3: Unhook hoses from auxiliary hydraulic couplers. Remove attachment from machine.

Section 50: Operating the Machine

LOAD CAPACITIES

The S450TX has a rated operation capacity of 500 lb (226.8 kg) when tested in accordance with SAE J2752 and ISO 14397-1 standards.

NOTICE: Ensure weight of attachment plus materials being handled does not exceed the machine's operating capacity. Very dense materials weigh more than less dense materials; reduce load size when lifting dense materials. Refer to manuals supplied with attachments for attachment weights.

DRIVING SAFETY

Before Driving

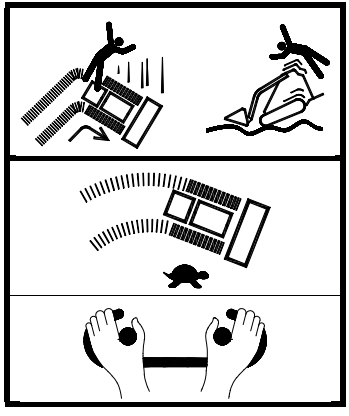
Until the operator is familiar with the controls and understands the capability of the machine, use a slower ground speed to move the machine. Use reduced speeds when operating in rough terrain or in confined areas.

A handgrip bar is provided to allow the operator to keep both hands on the bar to securely ride on the machine. Always keep both hands firmly on the handgrip before starting to move the machine. Keep both hands on the grip whenever moving or operating ground drive controls. Return controls to NEUTRAL before removing your hands from the handgrip bar. Before driving or operating the mini skid steer, survey the area around the machine for persons or obstacles.

Place your hands, palms down, on the handgrip bar so your fingers are on the forward area of the bar and the palms on the rear portion of the bar, with the joystick knob cradled between your thumb and forefinger. This provides a secure grip and good lever control.

This machine is not intended to be driven on public roads.

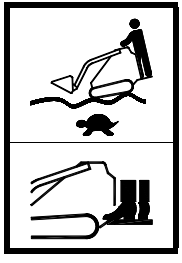
While Driving



WARNING: Abrupt movement and uneven terrain can throw operator off machine.

Avoid abrupt starts, stops, and turns.

Keep both hands firmly on grips.



Slow down on rough and uneven terrain.

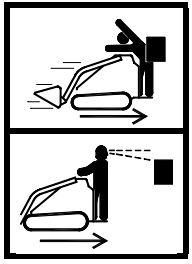
Keep both feet on platform.

Move *Ground Drive Joystick* slowly to start moving the machine smoothly. Avoid sudden stopping, starting, or turning unless necessary.



WARNING: Rider may fall out and be killed or injured.

Do not carry riders.



WARNING: Objects behind can crush you.

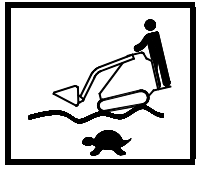
Look behind when moving rearward.

NOTICE: Slow down and use extra caution when traveling around obstructions that may limit visibility.

Drive machine at a speed suitable for the terrain.



WARNING: Operator's leg can be crushed if machine is moved rearward while standing on the ground. Operator Presence foot plate must function properly. Never move machine with one or both feet on the ground.

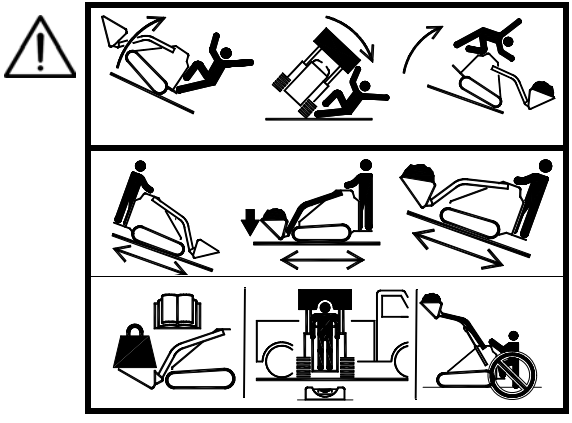


WARNING: Machine travel stops suddenly if foot platform lifts up during machine travel. Sudden stops from higher travel speeds could throw you from machine, or the machine could tip over. To help avoid sudden stops, keep both feet fully on the platform and stand as far to the rear as practical. Slow down when traveling over uneven ground.

Operate machine up and down an incline, not across the incline. Use extra care when working on inclines.

When driving over an object such as a curb, the machine can pitch forward or backward quickly. Watch for these objects and travel very slowly. If you will encounter the same object repeatedly, build a ramp with dirt to make traveling smoother.

Safe Operating on Slopes



WARNING: Traveling on slopes or with load elevated may result in tipover. Death or serious injury can result.

Always travel with load lowered when traveling up or down slopes. You may also need to keep heavy end uphill for added stability.

Do not exceed rated load capacity.
Load on firm and level ground.
Do not step off platform with load raised.

Safe operating on slopes depends on several factors including:

- Machine weight distribution including front loading or absence of load
- Height of load
- Even or rough ground conditions
- Potential for ground giving way, causing either unplanned forward, reverse or sideways tilt
- Nearness of ditches, ruts, stumps or other obstructions and sudden changes in slope
- Speed
- Turning
- Braking performance
- Operator skill

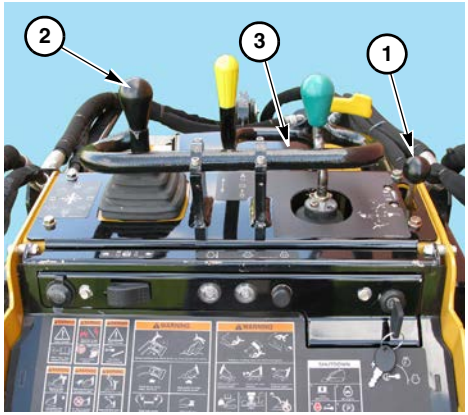
These varying factors make it impractical to specify a maximum safe operating angle in this manual. It is therefore important for the operator to be aware of these conditions and adjust operation accordingly. Maximum engine angle and braking performance are two absolute limits which must never be exceeded. These maximums are stated below since they are **design** limits. These angles are not **operating** limits and therefore must never be used alone to establish safe operating angles for varying conditions.

- Maximum engine lubrication angle is 20°.
- Service brake retarding force - equal to traction of both tracks
- Secondary brake - equal to traction of one track
- *Park Brake* holding force - equal to traction of one track

OPERATING THE MINI SKID STEER

Move *Ground Drive Joystick* slowly to start moving the machine smoothly. Avoid sudden stopping, starting, or turning unless necessary. Operate machine up and down an incline, not across the incline. Use extra care when working on inclines.

When driving over an object such as a curb, the machine can pitch forward or backward quickly. Watch for these objects and travel very slowly. If you will encounter the same object repeatedly, build a ramp with dirt to make traveling smoother.



Step 1: *Follow Starting Procedure,* page *22-1.*

Step 2: Move *Throttle* **(1)** to desired position.

Step 3: Ensure attachment is in transport position (as low as practical and tilted back).

If operator weight is removed from platform, machine hydraulic functions will stop. If attachment *Lift / Tilt Joystick* is in FLOAT, it will continue to lower/float.

Step 4: Use *Ground Drive Joystick* **(2)** to move and steer the machine. Do not jerk control lever. Hold firmly onto handgrip **(3)** with both hands while operating.

Step 5: When parking the machine, always follow shutdown procedure. Follow *Shutdown Procedure,* page *23-1.* Never leave machine with engine running or attachment raised.

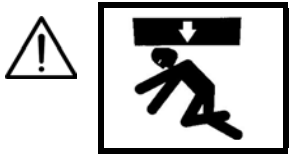
The Operator Presence system in the operator platform detects the presence of an operator. The operator must be standing on the platform for the ground drive, lift/tilt functions, or auxiliary attachment drive to be engaged. Keep both feet on the platform.

BUCKET OPERATION

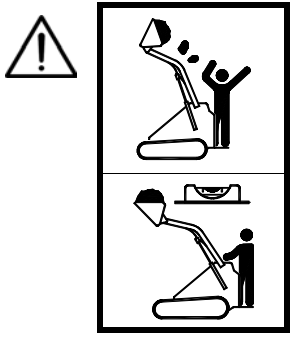
Bucket - Install/Remove

Follow proper procedures for attaching and removing attachments. Refer to “Attachments,” *page 40-10.*

Safety Precautions



WARNING: Never work under an attachment unless it is adequately supported to prevent it from falling unexpectedly.



WARNING: Falling load can crush.

Keep load level when raising loader arms.

Moving Machine with Load

- When moving the machine with a full bucket, go up or down slope with load (heavy end of machine) facing top of slope. When moving the machine with an empty bucket, go up or down slope with bucket (light end of machine) facing bottom of slope.
- Keep bucket level and as low as practical (carry position), raised only enough to clear any ground obstructions.
- Watch terrain and avoid slopes, bumps, or depressions which could make machine unstable. Wherever practical, drive directly up or down a slope or curb.
- Do not overload machine. Refer to “Load Capacities,” *page 50-1.*
- Avoid double stacked loads. Secure any load that could shift during movement.
- Additional safety information is provided in this section. Refer to “Driving Safety,” *page 50-1.*
- Do not step off operator’s platform when loader arms or attachment are raised. Machine stability is reduced and may cause machine to tip forward when you step off.

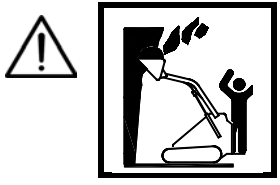
Filling the Bucket

Step 1: Fully lower loader arms.

Step 2: Tilt bucket forward until cutting edge of bucket contacts the ground, and bottom of bucket is level with the ground.

Step 3: Move machine forward slowly into the material while gradually tilting bucket backward as it fills.

Step 4: Move machine backward away from the material.



WARNING: Cliff and high banks can fall on you. Take care when working below overhangs. Do not dig away beneath them. Look out for rock falls and soil slips.

Digging with the Bucket

Step 1: Fully lower loader arms.

Step 2: Tilt bucket forward until cutting edge of bucket contacts the ground.

Step 3: Move machine forward slowly, continuing to tilt bucket down until it enters the ground to desired depth.

Step 4: Tilt bucket backward slightly to increase traction and maintain an even digging depth.

Step 5: Continue driving machine forward until bucket is full.

If ground is hard, tilt bucket forward and backward while driving slowly forward.

Step 6: When bucket is full, tilt bucket fully backward.

Emptying the Bucket

Step 1: Move machine with bucket in carry position until dump site is reached.

Step 2: Raise bucket just enough to clear side of truck box or bin, while tilting bucket to keep load from spilling. Always load on firm and level ground.

Step 3: Move machine forward slowly until the bucket is over the truck box or bin. If possible, avoid steering while load is raised. Steering results in side motion of the load, which could make the machine unstable. If steering is necessary, move very slowly using smooth steering motion.

Step 4: Tilt bucket forward until it empties. If necessary, use bucket to redistribute materials in the truck box or bin.

Step 5: After dumping load, back away just far enough from truck or container to lower the bucket. Lower bucket before steering. Moving the machine with the bucket raised reduces stability.

Backdragging with the Bucket

Step 1: Push *Lift/Tilt Joystick* fully forward into FLOAT position.

Step 2: Tilt bucket down. The farther the bucket is tilted down, the more cutting edge force is applied to move loose material.

Step 3: Move machine in reverse to level loose material.

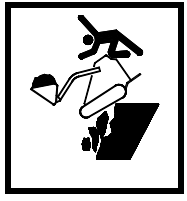
Step 4: Before moving forward, raise loader arms or tilt bucket back to lift the bucket cutting edge off the ground.

Backfilling with the Bucket

Step 1: Fully lower loader arms.

Step 2: Use *Lift/Tilt Controls* to tilt bucket forward until cutting edge of bucket contacts the ground.

Step 3: Move machine forward to the edge of the hole or trench to push material into it.



WARNING: The weight of your machine may cause the ground to give way. Machine can fall and tip over. Death or serious injury could result. Keep well away from cliff edges. Take care when backfilling. Do not go too close to edges. Do not drive or operate on unstable ground.

Step 4: Tilt bucket forward as soon as cutting edge is over the rim of the hole or trench to dump material out of the bucket.

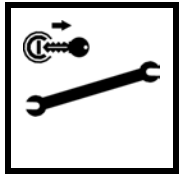
Step 5: If necessary, raise loader arms and tilt bucket forward to empty the bucket.

Operating with Other Vermeer-Authorized Attachments

Refer to the attachment manual supplied by the attachment manufacturer for operating and maintenance instructions for the attachment and additional instructions that may be required for the S450TX.

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Section 60: Maintenance Intervals



WARNING: Failure to use shutdown procedure can result in unexpected hazard(s). Death or serious injury could result due to entanglement, crushing, cutting, or other hazardous contact. Follow Shutdown Procedure after operating, before performing any service or maintenance, and before transporting. Refer to *Shutdown Procedure,* page *23-1.*

Visually inspect machine daily before starting the machine.

Make no modifications to your equipment unless specifically recommended by Vermeer Corporation.

Welding Precautions - Review

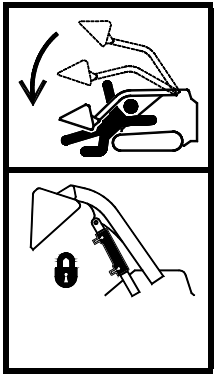
NOTICE: Electronic modules and controllers can be damaged from stray voltages and currents generated during welding. Unplug all electronic components.

Refer to *Welding Precautions* section of the *Maintenance Manual,* and review all information before attempting any welding on the machine.

Safety Signs and Decals

Safety signs and decals located on your machine contain important and useful information that will help you operate you equipment safely. Refer to the *Parts Manual*. Refer to “Controls,” *page 20-1.* Refer to “Safety Signs - Maintain,” in the *Maintenance Manual*, for maintenance information.

Lift Arm Support Bar - Install/Remove



WARNING: Falling loader arms can crush.

Completely lower the loader arms or install lift arm support bar before disconnecting and removing hydraulic components or working under raised arms.

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

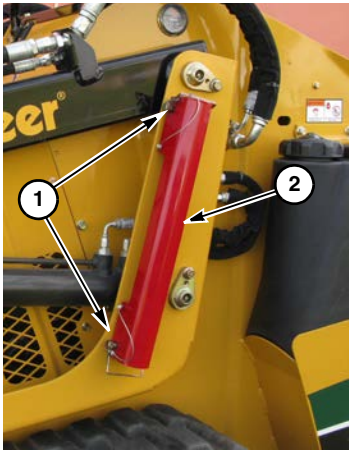
Step 1: Remove pins **(1)** and red support bar **(2)** from stow location shown in top photo.

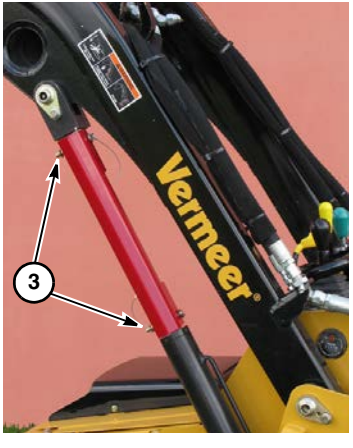
Step 2: Raise lift arms to support bar height.

Step 3: Install support bar over lift arm cylinder as shown in bottom photo. Secure with pins **(3)**.

Step 4: Refer to *Shutdown Procedure,* page *23-1.*

Step 5: When work is finished, return support bar to stow location. Install pins to retain support bar in stow location.





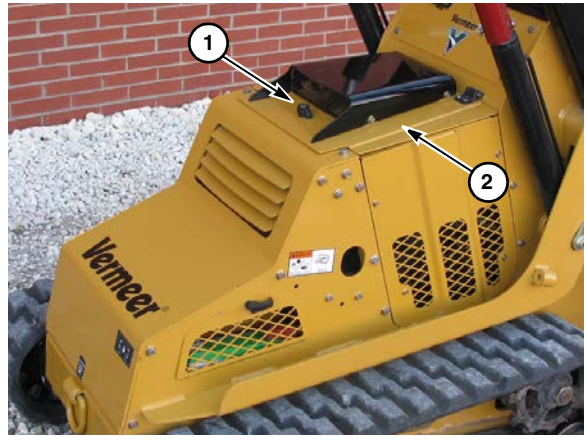
SHIELDS - INSTALL/REMOVE

Step 1: With loader arms raised and supported, turn latch **(1)** and open engine shield **(2)**.

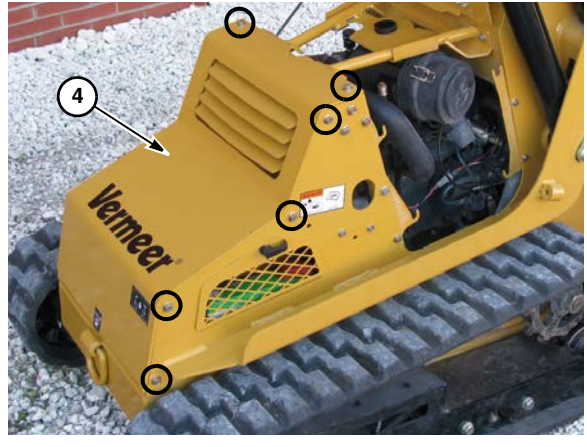
Step 2: Lift up on side shields **(3)** to remove.

Step 3: Remove ten bolts (circled; four on back side of machine are not shown). Remove lower access shield **(4)**.

Step 4: Reverse procedure to install shields.







HOURMETER - CHECK FOR MAINTENANCE INTERVAL

The hourmeter is used to determine maintenance intervals for the machine. The hourmeter indicates the total number of hours the engine has been in operation.

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

ENGINE MAINTENANCE INTERVALS

Refer to the Engine Operation Manual, supplied with each machine, for maintenance instructions that are not included in this manual.

MAINTENANCE INTERVAL SCHEDULE

Initial = Initial maintenance on new machine. Regular maintenance interval may be different.

● = Regular maintenance interval.

For Vermeer maintenance replacement part numbers, refer to the *Parts Manual* or call your Vermeer dealer.

Each maintenance interval is also a chapter title in the *Maintenance Manual*. Refer to the appropriate chapter for instructions. Refer to the Engine Operation Manuals supplied with each machine for complete instructions.

	10 Hrs Day	50 Hrs Week	100 Hrs Month	200 Hours	250 Hours	400 Hours	500 Hours	1000 Hrs Yearly	As Required
Engine Daily Checks	●								
Engine Coolant Level - Check	●								
Engine Oil - Check	●								
Fuel Tank - Fill	●								
Hydraulic Fluid - Check	●								
Air Cleaner - Check/Service	●								
Attachment Plate - Grease	●								

	10 Hrs Day	50 Hrs Week	100 Hrs Month	200 Hours	250 Hours	400 Hours	500 Hours	1000 Hrs Yearly	As Required
Boom - Grease	●								
Park Brake - Grease	●								
Track Condition - Check	●								
Fuel Lines and Clamp Bands - Check		●							
Engine Oil and Filter - Initial Change/Replace		**Initial**							
Hydraulic Filter - Replace		**Initial**							
Track Tension - Check		●							
Fan Belt Tightness - Check			●						
Engine Oil and Filter - Change/Replace			●						
Battery Terminals - Check/ Clean			●						
Fuel Filter Element - Replace			**Initial**						
Machine - Overall Check			●						
Neutral Start Interlocks - Check			●						
Park Brake - Check			●						
Operator Presence System - Check			●						
Safety Signs Maintenance			●						
Hydraulic System - Check			●						
Control Joystick and Levers - Check			●						

	10 Hrs Day	50 Hrs Week	100 Hrs Month	200 Hours	250 Hours	400 Hours	500 Hours	1000 Hrs Yearly	As Required
Controls - Check Neutral Positions			●						
Intake Air Hose - Check				●					
Radiator Hoses and Clamps - Check				●					
Engine/Hydraulic Oil Cooling Fan - Check/Service				●					
Hydraulic Filter - Replace					●				
Fuel Filter Element - Replace							●		
Fuel Tank Sediment - Remove							●		
Fuel Line - Check							●		
Fan Belt - Replace							●		
Radiator - Drain and Refill							●		
Hydraulic Fluid - Change								●	
Hydraulic Strainer - Service								●	
Engine System - Check									●
Battery - Replace									●
Air Cleaner Element - Replace									●
Track Tension - Adjust									●
Lift Arm Cylinders - Adjust									●
Handgrip Bar - Adjust									●
Storage Procedure									●

ATTACHMENT MAINTENANCE

Refer to the attachment manuals provided by the attachment manufacturer. The attachment manuals must be attached to the machine together with the S450TX *Operator's Manual.*

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Revision History

Revision	Date	Page(s)	Description
to1_00	03/12	All	Temporary Operator's Manual released.
o1_00	04/12	All	First Edition Operator's Manual released.
o2_00	10/12	All	Gas option, park brake, air cleaner, controls, shielding.
o2_01	01/13	Sections: 10 and 40	European CE Requirements for diesel machines.
o3_00	04/18	Sections 20, 22, 40, 60	Third Edition Original English Manual released. Removed gas engine. Added Fuel recommendations.
o3_01	11/19	Front, Section 16	Updated decals, included telematics.

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

CALIFORNIA
Proposition 65 Warning

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

CALIFORNIA
Proposition 65 Warning

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

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Vermeer Corporation
1210 Vermeer Road East, P.O. Box 200
Pella, Iowa 50219-0200