

# SK1550

Yanmar® 3TNV86C

## Operator's Manual



CMW®

Issue 2.0  
Original Instruction

053-2996

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# Overview

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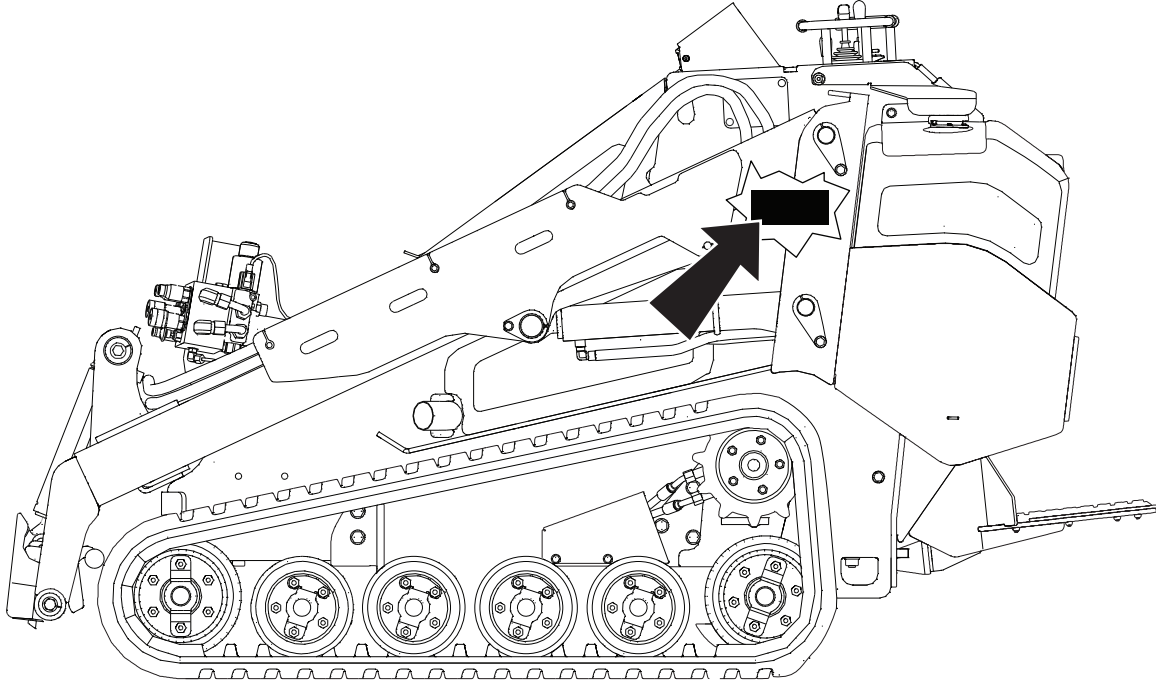
- Bulleted Lists ..... 6
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## California Proposition 65

 **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. [www.P65warnings.ca.gov](http://www.P65warnings.ca.gov).

## Serial Number Location

Record serial number and date of purchase in spaces provided. Serial number is located as shown.



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Item	
Date of manufacture	
Date of purchase	
Machine serial number	

## **Intended Use**

The SK1550 is a platform, rubber track compact tool carrier unit designed for medium-duty construction work. The machine has a quick attach plate which makes it easy for an operator to connect different attachments.

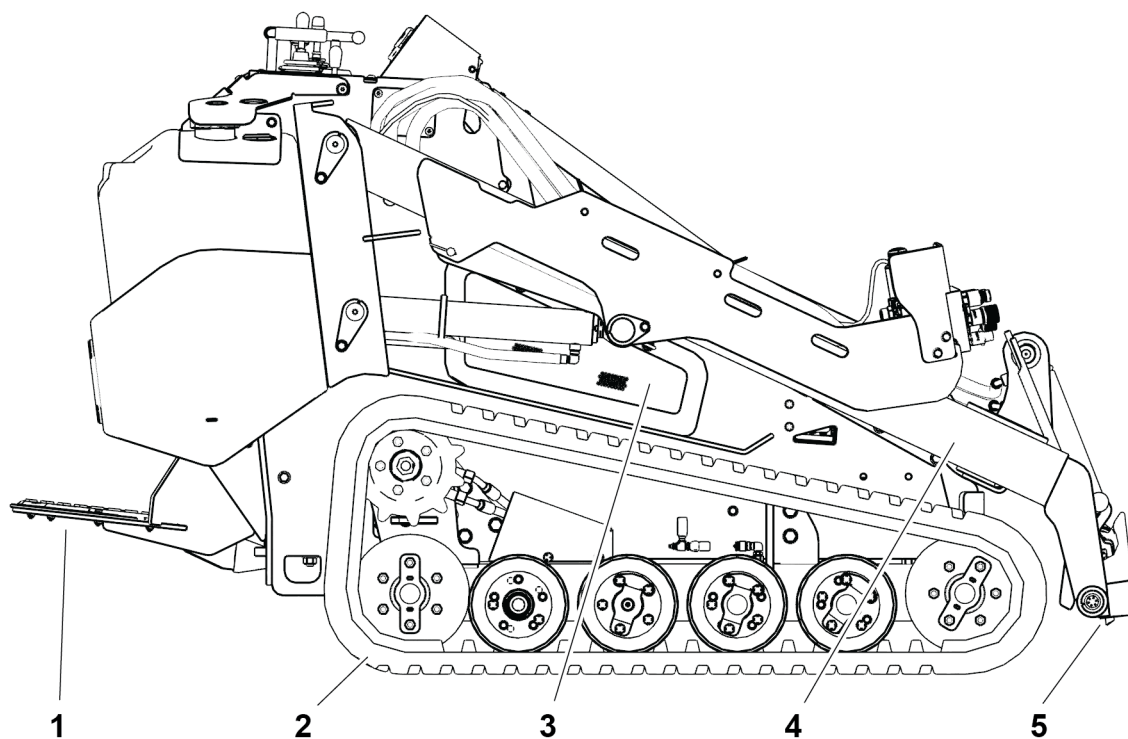
This machine is intended for operation only according to the instructions in this manual. Operate machine in ambient temperatures from 10° to 115°F (-12° to 46°C). Contact your Ditch Witch® dealer for provisions required for operating in extreme temperatures. Use in any other way is considered contrary to the intended use.

This machine should be operated, serviced, and repaired only by professionals familiar with its particular characteristics and acquainted with the relevant safety procedures.

## **Equipment Modification**

This equipment was designed and built in accordance with applicable standards and regulations. Modification of equipment could mean that it will no longer meet regulations and may not function properly or in accordance with the operating instructions. Modification of equipment should only be made by competent personnel possessing knowledge of applicable standards, regulations, equipment design functionality/requirements and any required specialized training.

## Machine Components



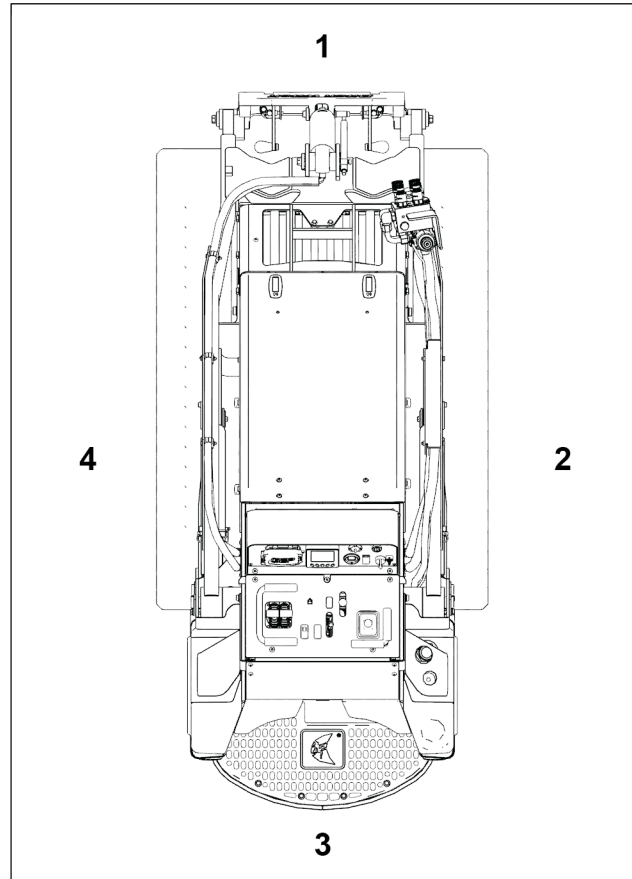
t55om002w.png

1. Operator station platform
2. Tracks
3. Engine compartment
4. Lift arms
5. Attachment plate

## Operator Orientation

**IMPORTANT:** Top view of machine is shown.

1. Front
2. Right side
3. Rear
4. Left side

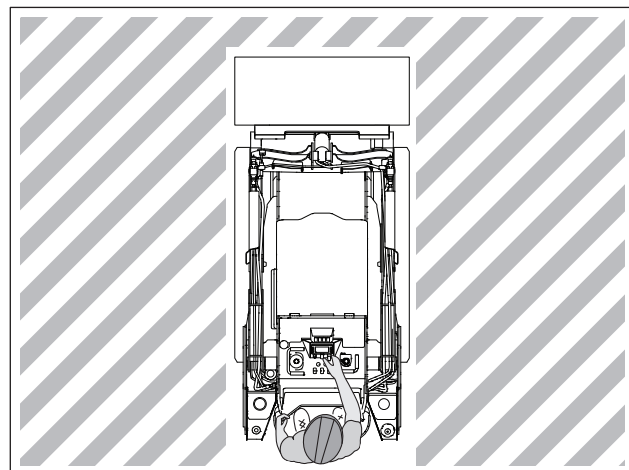


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## Operating Area

**IMPORTANT:** Top view of machine is shown.

Operator should stand only in the location shown.



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## **About This Manual**

This manual contains information for the proper use of this machine. Cross references such as “See page 50” will direct you to detailed procedures.

### **Bulleted Lists**

Bulleted lists provide helpful or important information or contain procedures that do not have to be performed in a specific order.

### **Numbered Lists**

Numbered lists contain illustration callouts or list steps that must be performed in order.

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# Foreword

This manual is an important part of your equipment. It provides safety information and operation instructions to help maintain your Ditch Witch® equipment.

Read this manual before using your equipment. Keep it with the equipment at all times for future reference. If you sell your equipment, be sure to give this manual to the new owner.

If you need a replacement copy, contact your Ditch Witch dealer. If you need assistance in locating a dealer, visit our website at [www.ditchwitch.com](http://www.ditchwitch.com) or write to the following address:

The Charles Machine Works, Inc.  
ATTN: Marketing Department  
PO Box 66  
Perry, OK 73077-0066  
USA

The descriptions and specifications in this manual are subject to change without notice. The Charles Machine Works, Inc. reserves the right to improve equipment. Some product improvements may have taken place after this manual was published. For the latest information on Ditch Witch equipment, see your Ditch Witch dealer.

Thank you for buying and using Ditch Witch equipment.



**SK1550  
Operator's Manual**

**Yanmar® 3TNV86C**

**Issue number 2.0/OM-1/20**

**Part number 053-2996**

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This product and its use may be covered by one or more patents at <http://patents.charlesmachine.works>.

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Machine serial number, information about the type of work this machine is designed to perform, basic machine components, and how to use this manual

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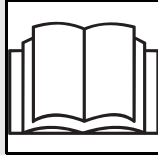
# Safety Awareness

## Chapter Contents

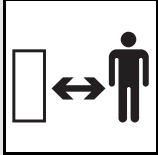
	For additional precautions, see "Prepare" chapter.
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## Guidelines

**⚠ WARNING**

Misuse of machine can cause death or serious injury. Read and understand operator's manual and all other safety instructions before use. Know how to use all controls.

**⚠ WARNING**


Raised component. Crushing can cause death or serious injury. Stay away. Use correct equipment and procedures.

Follow these guidelines before operating any jobsite equipment:

- Complete proper training.
- Read and understand operator's manual before using equipment.
- Wear personal protective equipment. See "Prepare Operator" in "Prepare" chapter.
- Mark proposed path with white paint and have underground utilities located before working. In the US or Canada, call 811 (US) or 888-258-0808 (US and Canada). Also contact any local utilities that do not participate in the One-Call service. In countries that do not have a One-Call service, contact all local utility companies to have underground utilities located.
- Classify jobsite based on its hazards and use correct tools and machinery, safety equipment, and work methods for jobsite.
- Mark jobsite clearly and keep spectators away.
- Review jobsite hazards, safety and emergency procedures, and individual responsibilities with all personnel before work begins. Safety videos are available from your Ditch Witch® dealer or at [www.ditchwitch.com/safe](http://www.ditchwitch.com/safe). Safety Data Sheets (SDS) are available at [www.ditchwitch.com/support](http://www.ditchwitch.com/support).
- Fully inspect equipment before operating. Repair or replace any worn or damaged parts. Replace missing or damaged safety shields and safety alert signs. Contact your Ditch Witch dealer for assistance.
- Follow instructions on all safety alert signs on machine.
- Use equipment carefully per the instructions in this manual. Stop operation and investigate anything that does not look or feel right.
- Do not operate machine where flammable gas may be present.
- Only operate equipment in well ventilated areas.
- Always tie down equipment and properly stow accessories, even if traveling short distances.
- Contact your Ditch Witch dealer if you have any questions about operation, maintenance, or equipment use.

- Complete the equipment checklist located at [www.ditchwitch.com/safe](http://www.ditchwitch.com/safe).

## Emergency Procedures



**⚠ WARNING** Underground utilities. Contact can cause death or serious injury. Locate and verify underground utilities before digging or drilling.

Before operating any equipment, review emergency procedures and check that all safety precautions have been taken.

**EMERGENCY SHUTDOWN:** Shut off machine or press remote engine stop button (if equipped).

## Electric Strike Description

When working near electric cables, remember the following:

- Electricity follows all paths to ground, not just path of least resistance.
- Pipes, hoses, and cables will conduct electricity back to all equipment.
- Low voltage current can injure or kill. Many work-related electrocutions result from contact with less than 440 volts.

Most electric strikes are not noticeable, but indications of a strike include:

- power outage
- smoke
- explosion
- popping noises
- arcing electricity

**If any of these occur, assume an electric strike has occurred.**

## **If an Electric Line is Damaged**

If you suspect an electric line has been damaged, DO NOT MOVE. Take the following actions. The order and degree of action will depend on the situation.

- If you are **on the machine**, REMAIN ON MACHINE. Raise attachments and drive from immediate area.
- If you are **off the machine**,
  - DO NOT TOUCH ANY EQUIPMENT.
  - If you must leave the area, take small steps with feet close together to reduce the hazard of being shocked from one foot to the other.
- Warn people nearby that an electric strike has occurred. Instruct them to leave the area.
- Have someone contact electric company to shut off power.
- If you leave the area, do not return to jobsite or allow anyone into area until given permission by utility company.

## **If a Gas Line is Damaged**

If you suspect a gas line has been damaged, take the following actions. The order and degree of action will depend on the situation.

- Immediately shut off engine(s), if this can be done safely and quickly.
- Remove any ignition source(s), if this can be done safely and quickly.
- Warn others that a gas line has been cut and that they should leave the area.
- After warning others to leave the area, leave jobsite as quickly as possible.
- Immediately call your local emergency phone number and utility company.
- If jobsite is along street, stop traffic from driving near jobsite.
- Do not return to jobsite until given permission by emergency personnel and utility company.

## **If a Fiber Optic Cable is Damaged**

Do not look into cut ends of fiber optic or unidentified cable. Vision damage can occur. Contact utility company.

## **If Machine Catches on Fire**

Perform emergency shutdown procedure and then take the following actions. The order and degree of action will depend on the situation.

- Immediately move battery disconnect switch (if equipped and accessible) to disconnect position.
- If fire is small and fire extinguisher is available, attempt to extinguish fire.
- If fire cannot be extinguished, leave area as quickly as possible and contact emergency personnel.

## Safety Alert Classifications

These classifications and the icons defined on the following pages work together to alert you to situations which could be harmful to you, jobsite bystanders, or your equipment. When you see these words and icons in the book or on the machine, carefully read and follow all instructions. **YOUR SAFETY IS AT STAKE.**



When you see this safety alert sign, carefully read and follow all instructions. **YOUR SAFETY IS AT STAKE.** Read this entire section before using your equipment.

Watch for the three safety alert levels: **DANGER**, **WARNING**, and **CAUTION**. Learn what each level means.



**DANGER** indicates a hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.



**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.

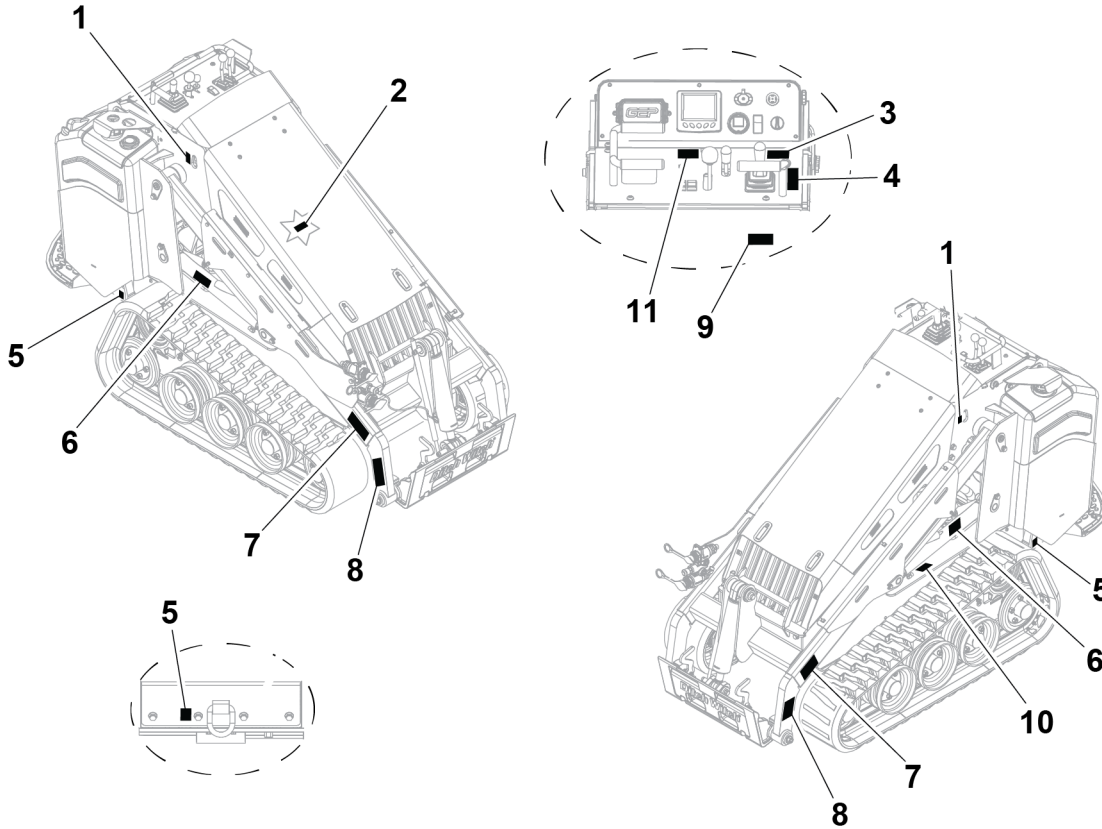
Watch for two other words: **NOTICE** and **IMPORTANT**.

**NOTICE** indicates information considered important, but not hazard-related (e.g., messages relating to property damage).

**IMPORTANT** can help you do a better job or make your job easier in some way.



# Machine Safety Alerts



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1



Lift point. See Transport chapter for more information.

2




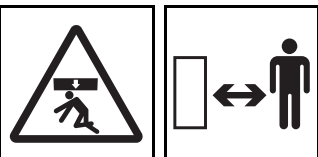
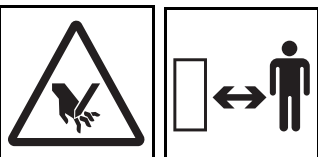
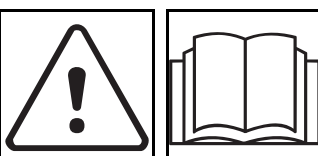

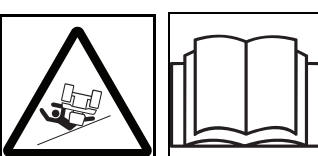


**⚠ WARNING** Pre-heater. Fire or explosion can cause death or serious injury. Never use starter fluid.

3



**⚠ WARNING** Underground utilities. Contact can cause death or serious injury. Locate and verify underground utilities before digging or drilling.

4		<p><b>⚠ CAUTION</b> High noise levels. Exposure can cause hearing loss. Wear hearing protection.</p>
5		<p>Tiedown location. See Transport chapter for more information.</p>
6		<p><b>⚠ WARNING</b> Raised component. Crushing can cause death or serious injury. Stay away or secure raised component with locking device. Use correct equipment and procedures.</p>
7		<p><b>⚠ WARNING</b> Lifted load. Crushing can cause death or serious injury. Stay away from lifted load and its range of movement.</p>
8		<p><b>⚠ WARNING</b> Moving parts. Contact can cause serious injury. Stay away.</p>
9		<p><b>⚠ WARNING</b> Misuse of machine can cause death or serious injury. Read and understand operator's manual and all other safety instructions before use. Know how to use all controls.</p>
10		<p><b>⚠ CAUTION</b> Hot parts. Contact can cause burns. Only touch when cool or wear gloves.</p>
11		<p><b>⚠ WARNING</b> Tipover. Crushing can cause death or serious injury. Follow procedure in operator's manual. Drive cautiously.</p>



# Prepare

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See "Safety Awareness" for additional precautions.

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- Check Equipment . . . . . 26
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## Prepare Jobsite



**WARNING**

Underground utilities. Contact can cause death or serious injury. Locate and verify underground utilities before digging or drilling.

**To help avoid injury:**

- Expose lines by careful hand digging or soft excavation before operating equipment. Use appropriate equipment and procedures for exposing utility lines.
- Classify jobsite and follow precautions based on classification.
- Follow local regulations for digging near utilities.

A successful job begins before working. The first step in planning is reviewing information already available about the job and jobsite.

### Review Job Plan

Review blueprints or other plans. Check for information about existing or planned structures, elevations, or proposed work that may be taking place at the same time.

### Select Start and End Points

Select one end to use as a starting point. Consider the following when selecting a starting point:

#### Slope

Equipment should be parked on a level site. Consider how slope will affect setup and operation. Assess the risks on each slope to determine if factors affecting risks create an unsafe condition for working. See "Slope Guidelines" on page 55.

#### Space

Check that starting and ending points allow enough space for working.

#### Comfort

Consider shade, wind, fumes, and other site features.

---

## Identify Hazards

Inspect jobsite before transporting equipment. Check for the following:

- overall grade or slope
- changes in elevation such as hills or open trenches
- obstacles such as buildings, railroad crossings, or streams
- signs of utilities
  - “buried utility” notices
  - gas or water meters
  - drop boxes
  - manhole covers
  - utility facilities without overhead lines
  - junction boxes
  - light poles
  - sunken ground
- traffic
- access
- soil type and condition
- loose material such as fencing or cable

Identify safety hazards and classify jobsite if attachment will penetrate ground. See “Classify Jobsite” on page 23.

## Locate Utilities

### Notify One-Call Services

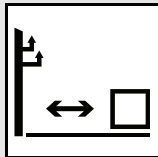
Mark proposed path with white paint and have underground utilities located before working.

- In the US or Canada, call 811 (US) or 888-258-0808 (US and Canada). Also contact any local utilities that do not participate in the One-Call service.
- In countries that do not have a One-Call service, contact all local utility companies to have underground utilities located.

### Verify Underground Utilities

Have an experienced locating equipment operator sweep area within 20' (6 m) to each side of proposed excavation to verify previously marked line and cable locations. Mark location of all buried utilities and obstructions.

### Locate Overhead Lines



**⚠ DANGER** Overhead electrical lines. Contact will cause death or serious injury. Know location of lines. Stay away.

Note location and height of all overhead lines in jobsite and ensure that equipment maintains proper distance from live lines.

## Classify Jobsite


### Select a Classification

Jobsites are classified according to underground hazards present, not by line being installed. Jobsite may have more than one classification.

If working . . .	then classify jobsite as . . .
within 10' (3m) of a buried electric line	electric
within 10' (3m) of a natural gas line	natural gas
in concrete, sand, or granite which is capable of producing crystalline silica dust	crystalline silica dust
within 10' (3m) of any other hazard	other

Classify jobsite as electric if jobsite is in question or if the possibility of unmarked electric utilities exists.

### Apply Precautions



**⚠ WARNING** Underground utilities. Contact can cause death or serious injury. Locate and verify underground utilities before digging or drilling.

Once classified, precautions appropriate for jobsite must be taken. Follow US Department of Labor regulations on excavating and trenching (Part 1926, Subpart P) and other similar regulations.

#### Electric Jobsite Precautions

Use one or both of these methods:

- Expose line by careful hand digging or soft excavation.
- Have service shut down while work is in progress. Have electric company test lines before returning them to service.

#### Natural Gas Jobsite Precautions

Position equipment upwind from gas lines and use one or both of these methods:

- Expose line by careful hand digging or soft excavation.
- Have service shut down while work is in progress. Have gas company test lines before returning them to service.



### **Crystalline Dust Jobsite Precautions**

		<b>CAUTION</b> Silica dust. Exposure can cause lung disease or cancer. Use breathing protection.
-----------------------------------------------------------------------------------	-----------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------

Crystalline silica dust is a naturally occurring substance found in soil, sand, concrete, granite, and quartz.

To reduce exposure when cutting, drilling, or working these materials:

- Use water spray or other means to control dust.
- Refer to US Occupational Safety and Health Administration (OSHA) guidelines or other applicable regulating guidelines for appropriate breathing protection or dust control methods.

### **Other Jobsite Precautions**

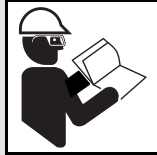
You may need to use different methods to safely avoid other underground hazards. Talk with those knowledgeable about hazards present at each site to determine which precautions should be taken or if job should be attempted.

Clear objects such as landscaping fabric, cable, and wire from the work area. These objects may be underground or partially buried.

### **Arrange for Traffic Control**

Vehicle and pedestrian traffic must be a safe distance from equipment. Evaluate jobsite and allow an appropriate buffer zone around equipment. If working near a road or other traffic area, contact local authorities about safety procedures and regulations.

## Prepare Operator



**⚠ WARNING** Jobsite hazards. Exposure can cause death or serious injury. Use correct equipment and work methods. Use and maintain appropriate safety equipment.

### To help avoid injury:

- Wear personal protective equipment including hard hat, safety eye wear, foot protection, hearing protection, and gloves (except when near rotating equipment).
- Remove jewelry.
- Wear close-fitting, high visibility clothing.
- Have other personal protective equipment, such as insulated boots and gloves, breathing protection, and face shield, etc. available for use depending on jobsite hazards or requirements.

Follow these guidelines before operating any jobsite equipment:

- Complete proper training and read operator's manual before using equipment.
- Plan for emergency services. Have the telephone numbers for local emergency and medical facilities on hand. Check that you will have access to a telephone.
- Review jobsite hazards, safety and emergency procedures, and individual responsibilities with all personnel before work begins. Safety videos are available from your Ditch Witch® dealer or at [www.ditchwitch.com/safe](http://www.ditchwitch.com/safe). Safety Data Sheets (SDS) are available at [www.ditchwitch.com/support](http://www.ditchwitch.com/support).
- Use equipment carefully. Stop operation and investigate anything that does not look or feel right.

## Prepare Equipment

### Check Supplies

- fuel
- diesel exhaust fluid (DEF), if needed
- marking flags or paint
- notepad and pencil
- spare fuses
- lubricants

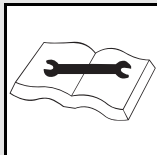
### Check Equipment

#### Fluid Levels

- fuel
- engine oil
- diesel exhaust fluid (DEF), if needed
- hydraulic fluid
- engine coolant

#### Condition and Function

- all controls



**⚠ WARNING** Improper control function. Use can cause death or serious injury. If control does not work as described in instructions, stop machine and have it serviced.

- battery
- hoses and valves
- pumps and motors
- tires or tracks
- signs, guards, and shields
- filters (air, oil, hydraulic, fuel)
- belts

## Assemble Accessories

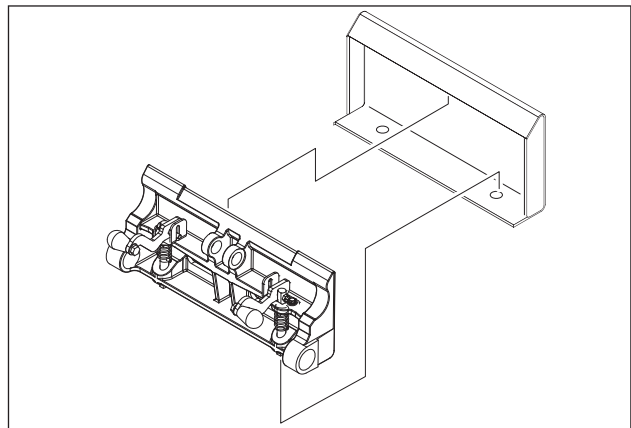
If required, mount fire extinguisher near the power unit but away from possible points of ignition. The fire extinguisher should always be classified for both oil and electric fires. It should meet legal and regulatory requirements.

## Connect Attachment

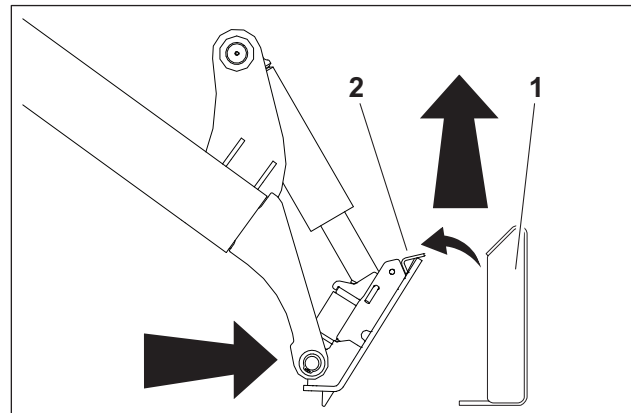
**NOTICE:** Use only Ditch Witch®-approved attachments. Attachments can change the stability and operating characteristics of the machine. See attachment operation manual for instructions regarding proper operation of attachments.

**IMPORTANT:** Before connecting attachment to machine, ensure that attachment and receiver plates are free of dirt and debris.

1. Position attachment on level surface with enough space behind it to accommodate machine.
2. Start engine.



3. Tilt attachment plate (2) forward.
4. Position attachment plate in upper lip of receiver plate (1) on attachment.
5. Raise lift arms while tilting back attachment plate to engage pins.

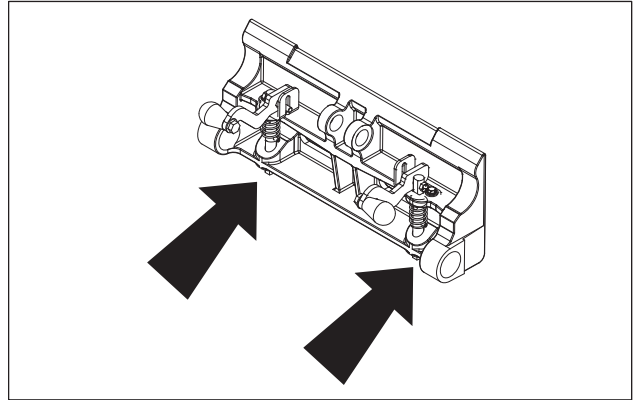


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**Prepare Equipment**

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6. Ensure pins are engaged by rotating attachment down.



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## Hydraulic Connection

If attachment requires hydraulic power for operation, connect hydraulic hoses.



**⚠ WARNING** Pressurized fluid or air. Injection can cause death or serious injury. Refer to operator's manual for correct use.

### To help avoid injury:

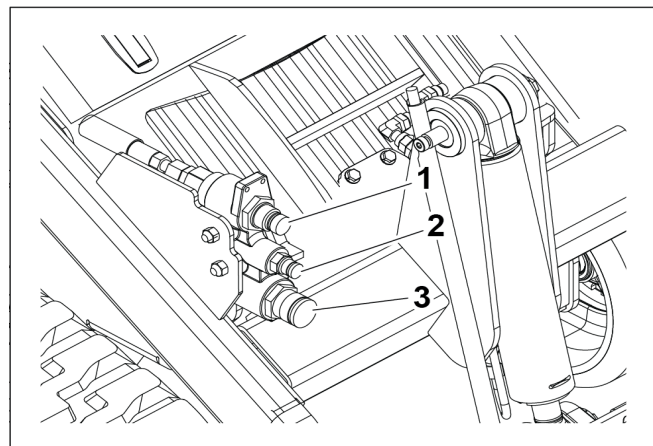
- Use a piece of cardboard or wood, rather than hands, to check for leaks.
- Before disconnecting a hydraulic line, turn engine off and operate all controls to relieve pressure.
- Lower, block, or support any raised component with a hoist.
- Cover connection with heavy cloth and loosen connector nut slightly to relieve residual pressure. Catch all fluid in a container.
- Before using system, check that all connections are tight and all lines are undamaged.
- If you are injured, seek immediate medical attention from a doctor familiar with this type of injury.



**⚠ CAUTION** Hot parts. Contact can cause burns. Only touch when cool or wear gloves.

**IMPORTANT:** Right side is medium flow and left side is high/low flow.

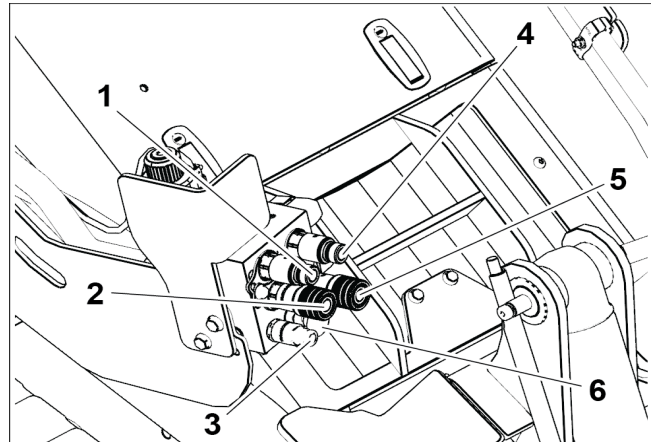
1. Ensure machine is shut off.
2. Activate accessories using ignition switch.
3. Operate auxiliary controls to relieve residual pressure at hydraulic couplers.
4. Remove dirt and debris from hydraulic couplers.
5. Connect male coupler from attachment to female coupler (3) on machine.
6. Connect female coupler from attachment to male coupler (1) on machine.
7. If needed, connect attachment case drain hose to case drain connector (2).
8. Ensure that connections are secure by pulling on hoses.



t55om008w.eps

**Dual Auxiliary Circuit**

1. Ensure machine is shut off.
2. Activate accessories using ignition switch.
3. Operate auxiliary controls to relieve residual pressure at hydraulic couplers.
4. Remove dirt and debris from hydraulic couplers.
5. Pull knob (6) to relieve residual pressure in manifold.
6. Connect male coupler from attachment to female coupler (2) on machine.
7. Connect female coupler from attachment to male coupler (1) on machine.
8. If needed, connect attachment case drain hose to case drain connector (3).
9. For attachments that have a secondary function, connect those hoses to the secondary circuit (4, 5).
10. Ensure that connections are secure by pulling on hoses.
11. Select secondary auxiliary circuit. See "Auxiliary circuit switch" on page 47.



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Primary circuit: connectors 1 & 2  
Secondary circuit: connectors 4 & 5

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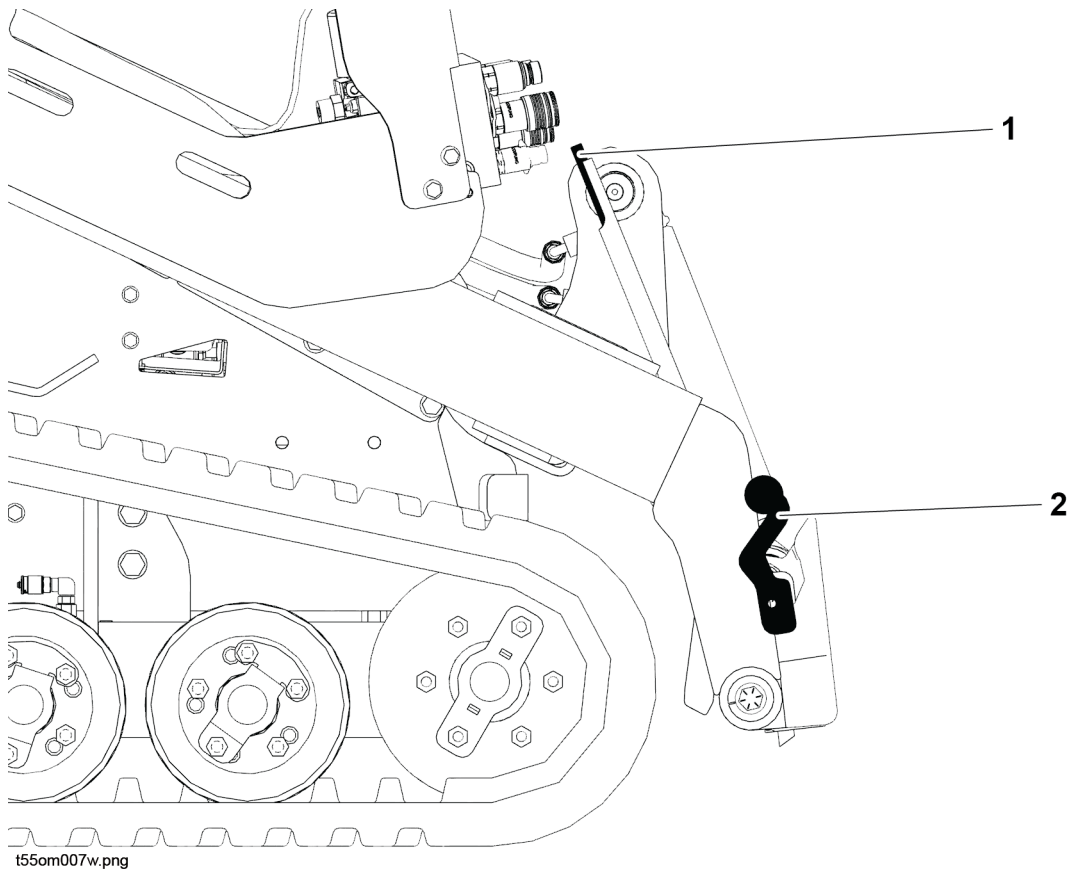
# Controls

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<b>Gauges and Indicators . . . . .</b>	<b>42</b>
<b>Miscellaneous . . . . .</b>	<b>43</b>
<b>Operator Station . . . . .</b>	<b>43</b>

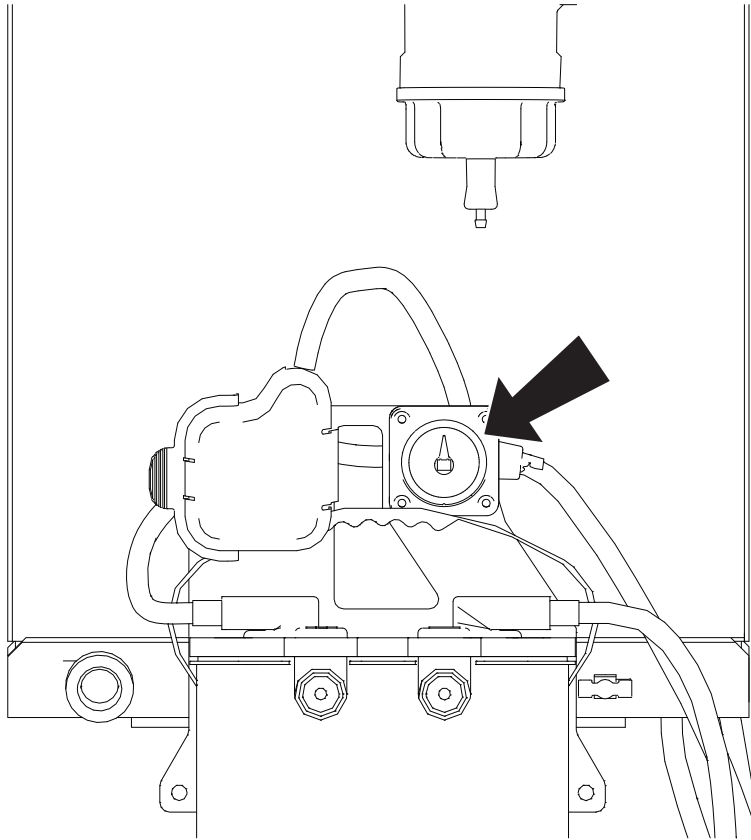


## Attachment Plate

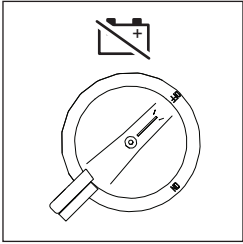


Item	Description	IMPORTANT
1. Level indicator	To level bucket, adjust until indicator is at top of sleeve.	To level other attachments, adjust until level and mark indicator position on sleeve. Use mark to indicate level with that attachment.
2. Attachment latch	To lock attachment, move latch down.  To unlock attachment, move latch up.	

# Battery Disconnect

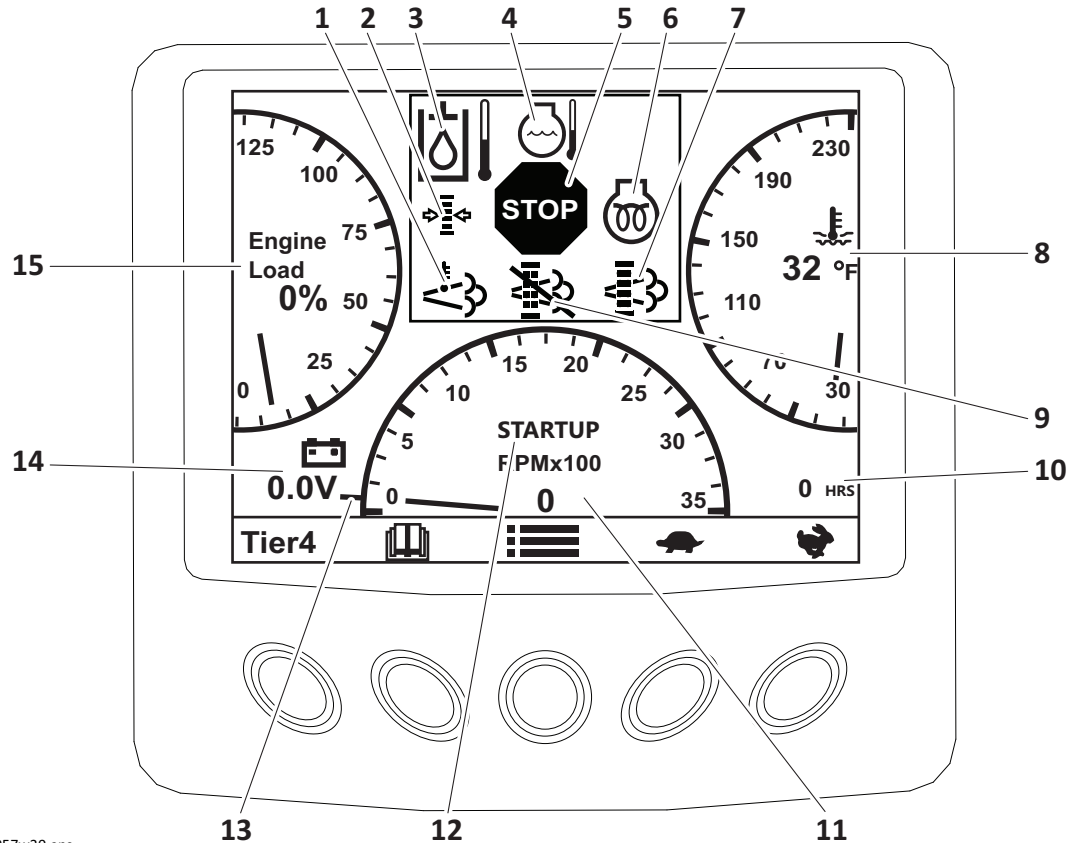


t53om034w20.eps

Item	Description	IMPORTANT
<p data-bbox="203 1228 516 1255"><b>Battery disconnect switch</b></p>  <p data-bbox="259 1507 370 1526">c00ic156w.eps</p>	<p data-bbox="586 1228 883 1255">To disconnect, move left.</p> <p data-bbox="586 1297 862 1325">To connect, move right.</p>	<p data-bbox="967 1228 1068 1255"><b>NOTICE:</b></p> <ul data-bbox="967 1297 1414 1482" style="list-style-type: none"> <li data-bbox="967 1297 1414 1360">• Do not disconnect with engine running.</li> <li data-bbox="967 1381 1414 1482">• To avoid equipment damage, wait two minutes after turning engine off before disconnecting battery.</li> </ul>


# Display Version 1












## Gauges and Indicators



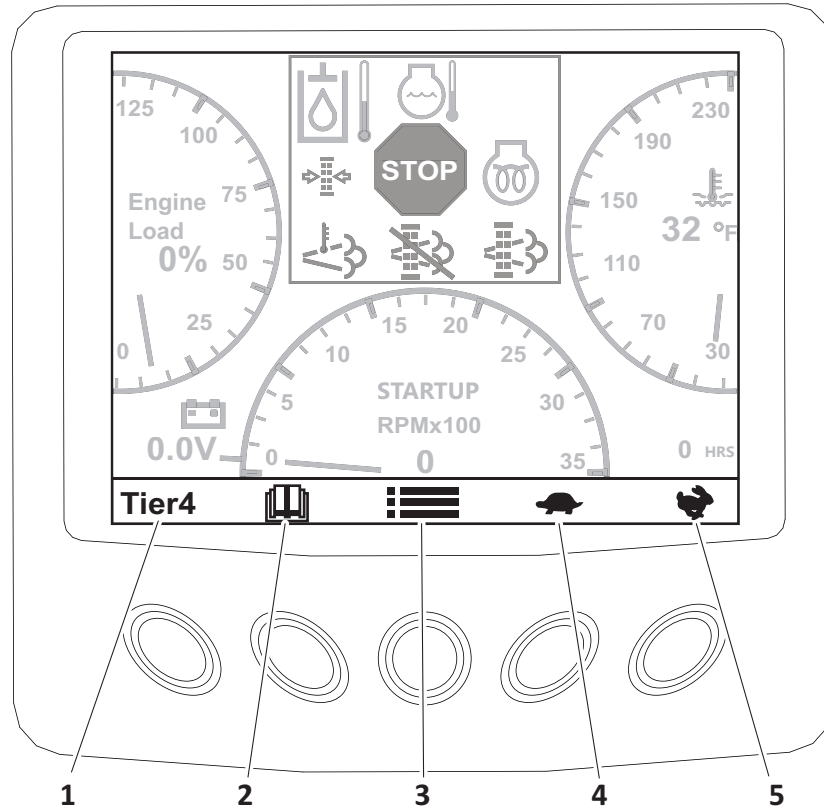
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- |                                          |                                        |
|------------------------------------------|----------------------------------------|
| 1. High exhaust temperature indicator    | 9. Exhaust cleaning disabled indicator |
| 2. Air filter restriction indicator      | 10. Hourmeter                          |
| 3. Hydraulic fluid temperature indicator | 11. Tachometer                         |
| 4. Engine temperature indicator          | 12. Throttle mode indicator            |
| 5. Engine warning/stop indicator         | 13. Tachometer setpoint indicator      |
| 6. Glow plug indicator                   | 14. Voltmeter gauge                    |
| 7. Exhaust cleaning indicator            | 15. Engine load gauge                  |
| 8. Engine coolant temperature gauge      |                                        |





Item	Description	IMPORTANT
1. High exhaust temperature indicator	 Lights when exhaust temperature is high.	<b>IMPORTANT:</b> Will light during exhaust cleaning.

Item	Description	IMPORTANT
2. Air filter restriction indicator	 Flashes when air filter is restricted.	See "Filter, Air" on page 78.
3. Hydraulic fluid temperature indicator	 Lights when hydraulic fluid temperature is too high.	
4. Engine temperature indicator	 Lights when engine temperature is too high.	Normal operating temperature is below 230°F (110°C).
5. Engine warning/stop indicator	  Lights when engine needs attention. Lights when operator needs to stop engine.	
6. Glow plug indicator	 Lights when glow plugs are required to start machine.	
7. Exhaust cleaning indicator	 Lights when exhaust cleaning is needed.	
8. Engine coolant temperature gauge	 Displays engine coolant temperature	
9. Exhaust cleaning disabled indicator	 Lights when operator has disabled exhaust cleaning.	<b>NOTICE:</b> Failure to complete an exhaust cleaning when required can cause engine damage.
10. Hourmeter	Displays engine operating time.	Use these times to schedule service.
11. Tachometer	Displays engine speed.	
12. Throttle mode indicator	Displays startup, auto, or manual throttle mode.	Throttle is controlled by system during startup mode.  Throttle mode can be changed in user settings menu.
13. Tachometer setpoint indicator	Indicates target engine speed.	Set by operator in autothrottle mode.
14. Voltmeter gauge	 Displays system voltage.	
15. Engine load gauge	 Displays engine load.	

## Soft Keys

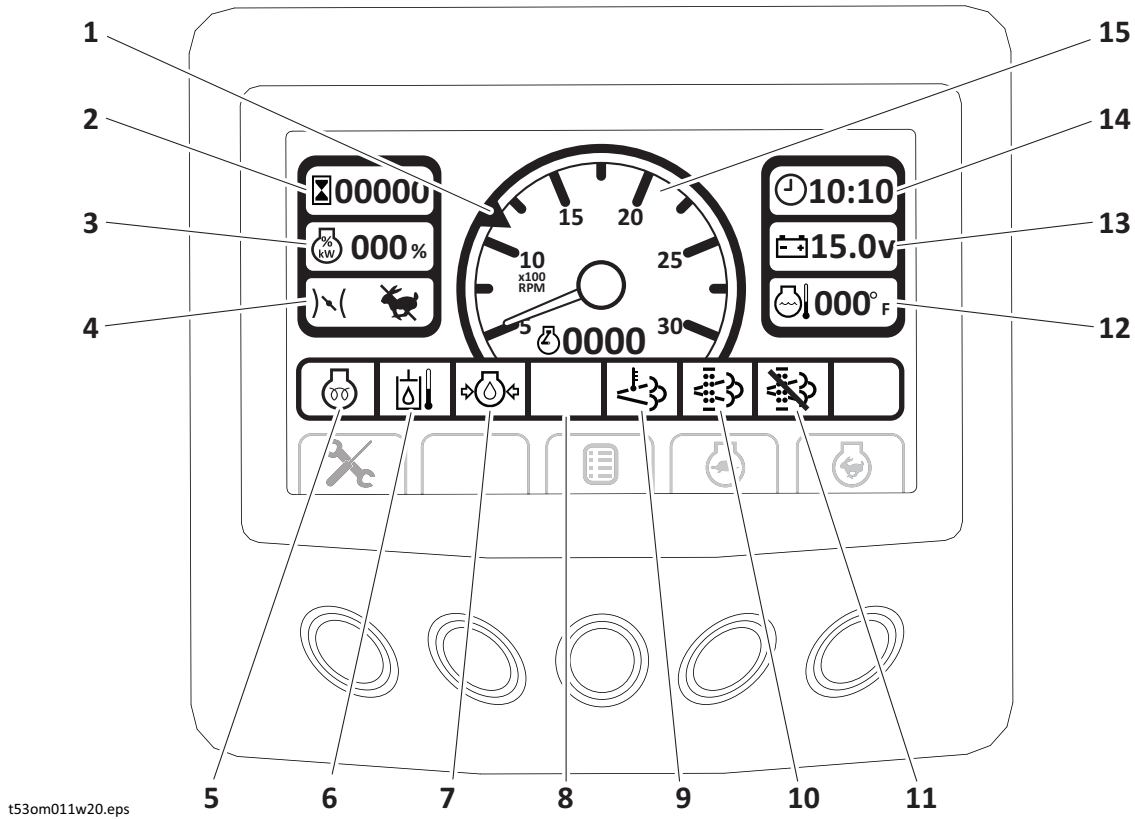


t53om058w20.eps

Item	Description	IMPORTANT
1. Tier 4 menu key	Tier 4 To select Tier 4 menu, press.	
2. Service menu key	 To select service menu, press.	
3. Main menu key	 To select main menu, press.	
4. Throttle up control	 To increase engine speed setpoint when in autothrottle mode, press.	
5. Throttle down control	 To decrease engine speed setpoint when in autothrottle mode, press.	

# Display Version 2















## Gauges and Indicators



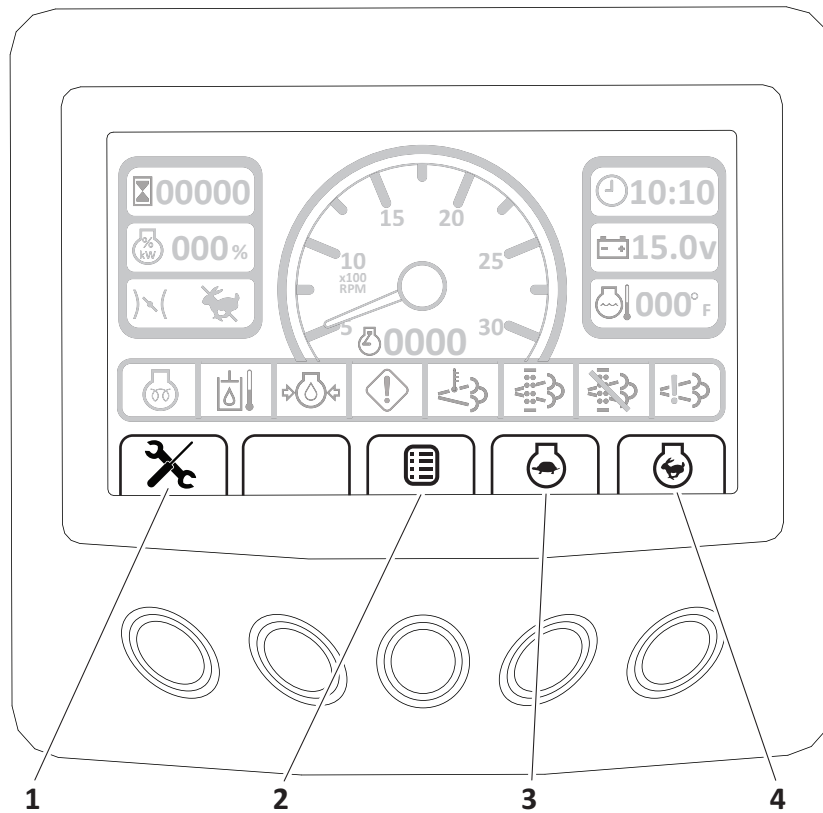
t53om011w20.eps

- |                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>1. Tachometer setpoint indicator</li> <li>2. Hourmeter</li> <li>3. Engine load gauge</li> <li>4. Throttle mode indicator</li> <li>5. Glow plug indicator</li> <li>6. Hydraulic fluid temperature indicator</li> <li>7. Engine oil pressure gauge</li> <li>8. Engine warning/stop indicator</li> </ul> | <ul style="list-style-type: none"> <li>9. High exhaust temperature indicator</li> <li>10. Exhaust cleaning indicator</li> <li>11. Exhaust cleaning disabled indicator</li> <li>12. Engine coolant temperature gauge</li> <li>13. Voltmeter gauge</li> <li>14. Real time clock</li> <li>15. Tachometer</li> </ul> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|





Item	Description	IMPORTANT
1. Tachometer setpoint indicator	Indicates target engine speed.	Set by operator.

Item	Description	IMPORTANT
2. Hourmeter	 Displays engine operating time.	Use these times to schedule service.
3. Engine load gauge	 Displays engine load.	
4. Throttle mode indicator	 Lights when throttle is inhibited.	Throttle has ten second delay when engine coolant temperature is below 0°F (38°C).
5. Glow plug indicator	 Lights when glow plugs are required to start machine.	See "Start" on page 50.
6. Hydraulic fluid temperature indicator	 Lights when hydraulic fluid temperature is too high.	
7. Engine oil pressure gauge	 Lights when engine oil pressure is too high.	
8. Engine warning/stop indicator	 Lights when engine needs attention.   Lights when operator needs to stop engine.	
9. High exhaust temperature indicator	 Lights when exhaust temperature is high.	<b>IMPORTANT:</b> Will light during exhaust cleaning.
10. Exhaust cleaning indicator	 Lights when exhaust cleaning is needed.	
11. Exhaust cleaning disabled indicator	 Lights when operator has disabled exhaust cleaning.	<b>NOTICE:</b> Failure to complete an exhaust cleaning when required can cause engine damage.
12. Engine coolant temperature gauge	 Lights when engine coolant level is low.	
13. Voltmeter gauge	 Displays system voltage.	
14. Real time clock	 Displays time.	
15. Tachometer	Displays engine speed.	

## Soft Keys

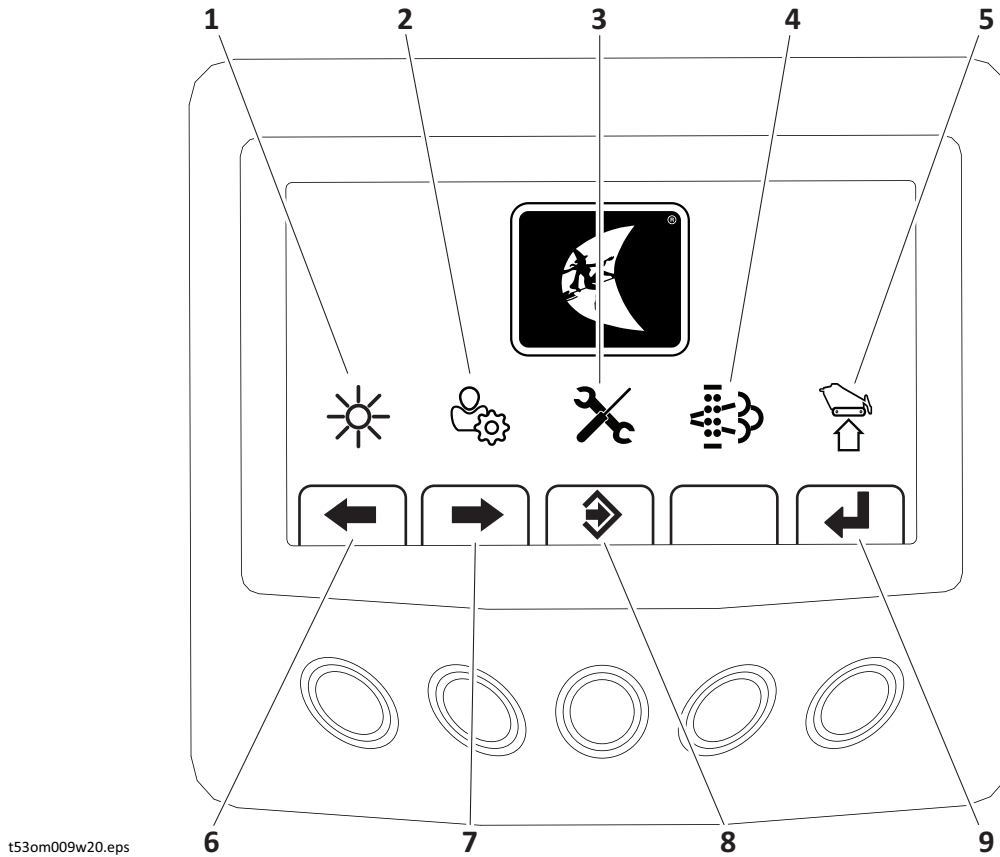


t530m007w20.eps



Item	Description	IMPORTANT
1. Hide/Recall key	 To hide/recall diagnostic or interlock message, press.	
2. Main menu key	 To select main menu, press.	
3. Throttle down control	 To decrease engine speed when in display throttle mode, press.	
4. Throttle up control	 To increase engine speed when in display throttle mode, press.	










**Main Menu**

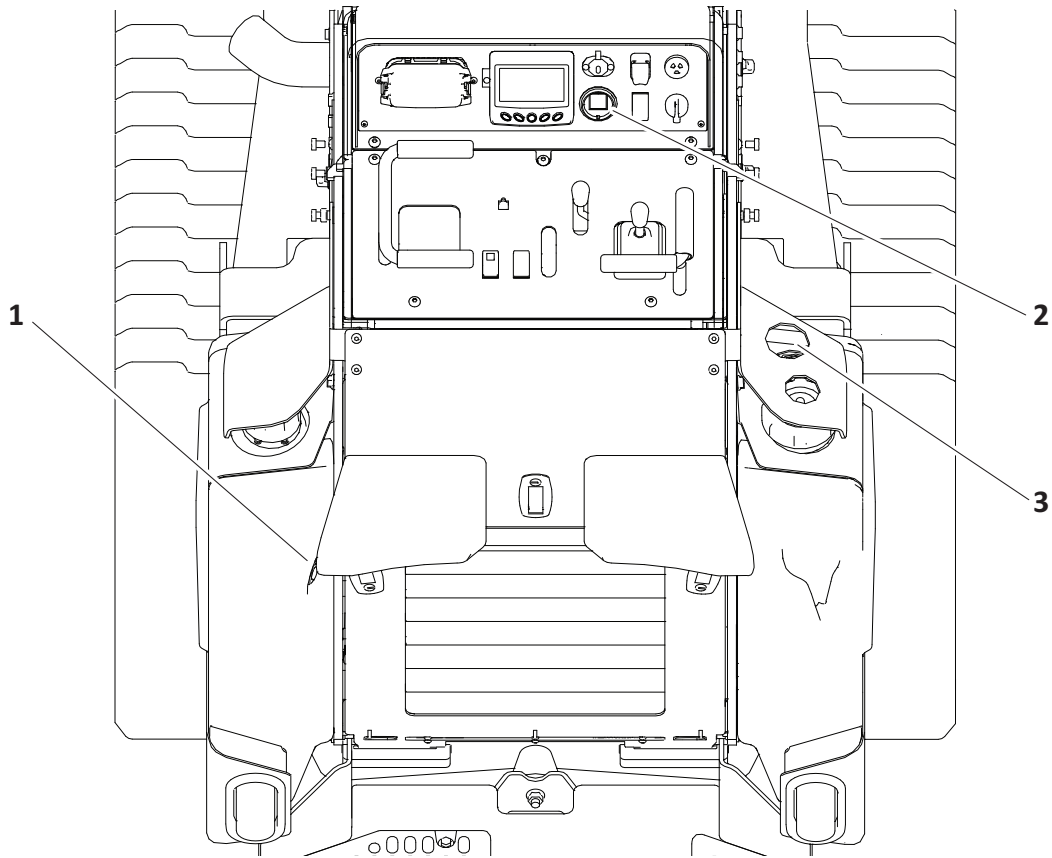


- |                              |                           |
|------------------------------|---------------------------|
| 1. Brightness key            | 6. Previous selection key |
| 2. User settings menu key    | 7. Next selection key     |
| 3. Diagnostics key           | 8. Select key             |
| 4. Exhaust cleaning menu key | 9. Return key             |
| 5. Machine settings key      |                           |

Item	Description	IMPORTANT
1. <b>Brightness key</b>	 To change brightness of display, press.	
2. <b>User settings menu key</b>	 To customize settings, press.	Language, real time clock, and units of measurement can be adjusted in this screen.

Item	Description	IMPORTANT
3. <b>Diagnostics key</b>	 To display engine and controller diagnostic codes, press.	For use only by qualified Ditch Witch® technicians.  If diagnostic codes are displayed, contact your Ditch Witch dealer.
4. <b>Exhaust cleaning menu key</b>	 To display exhaust cleaning information, press.	Parked cleanings can be initiated and automatic exhaust cleanings can be enabled/disabled in this screen.
5. <b>Machine settings key</b>	 To customize settings, press.	Throttle mode and ride control speed can be adjusted in this screen.
6. <b>Previous selection key</b>	 To scroll to previous menu selection, press.	
7. <b>Next selection key</b>	 To scroll to next menu selection, press.	
8. <b>Select key</b>	 To select menu, press.	
9. <b>Return key</b>	 To return to main screen, press.	

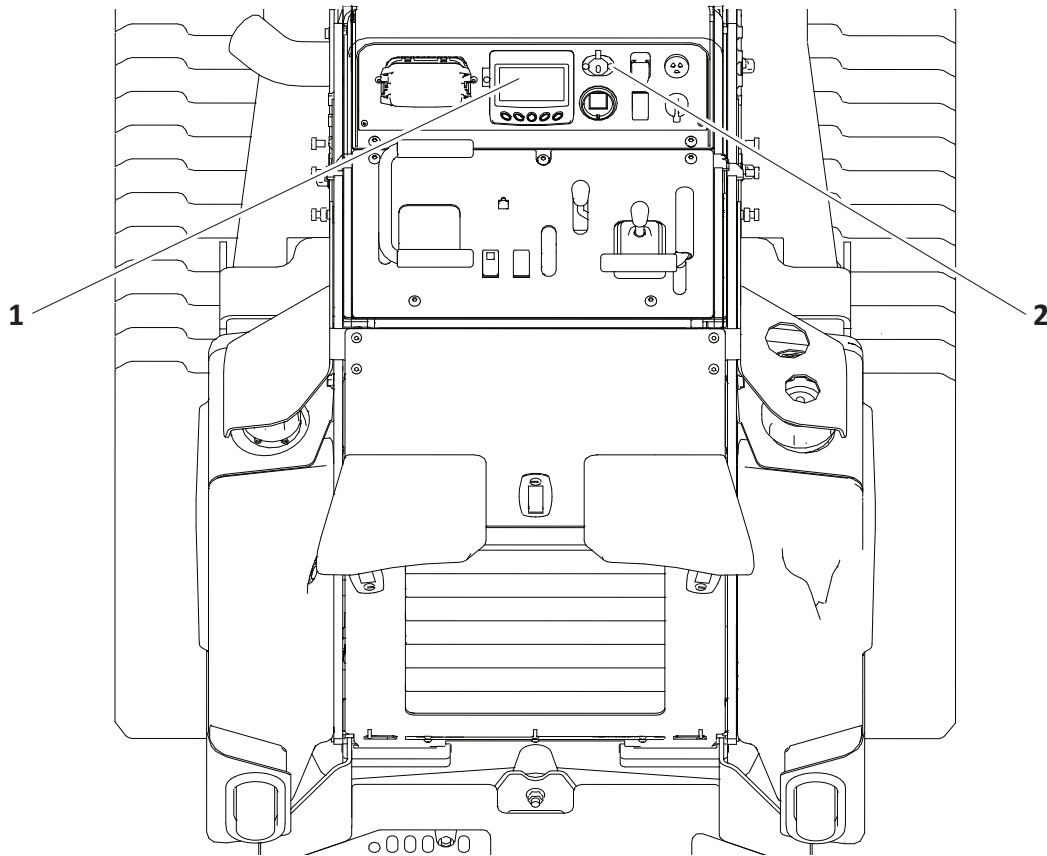
## Gauges and Indicators



t53om035w20.eps

Item	Description	IMPORTANT
1. Hydraulic fluid level sight glass	Shows level of hydraulic fluid in tank.	
2. Air filter service indicator	Indicates condition of air filter.	See "Filter, Air" on page 78.
3. Fuel gauge	Displays level of fuel.	See "Approved Fuel" on page 70.

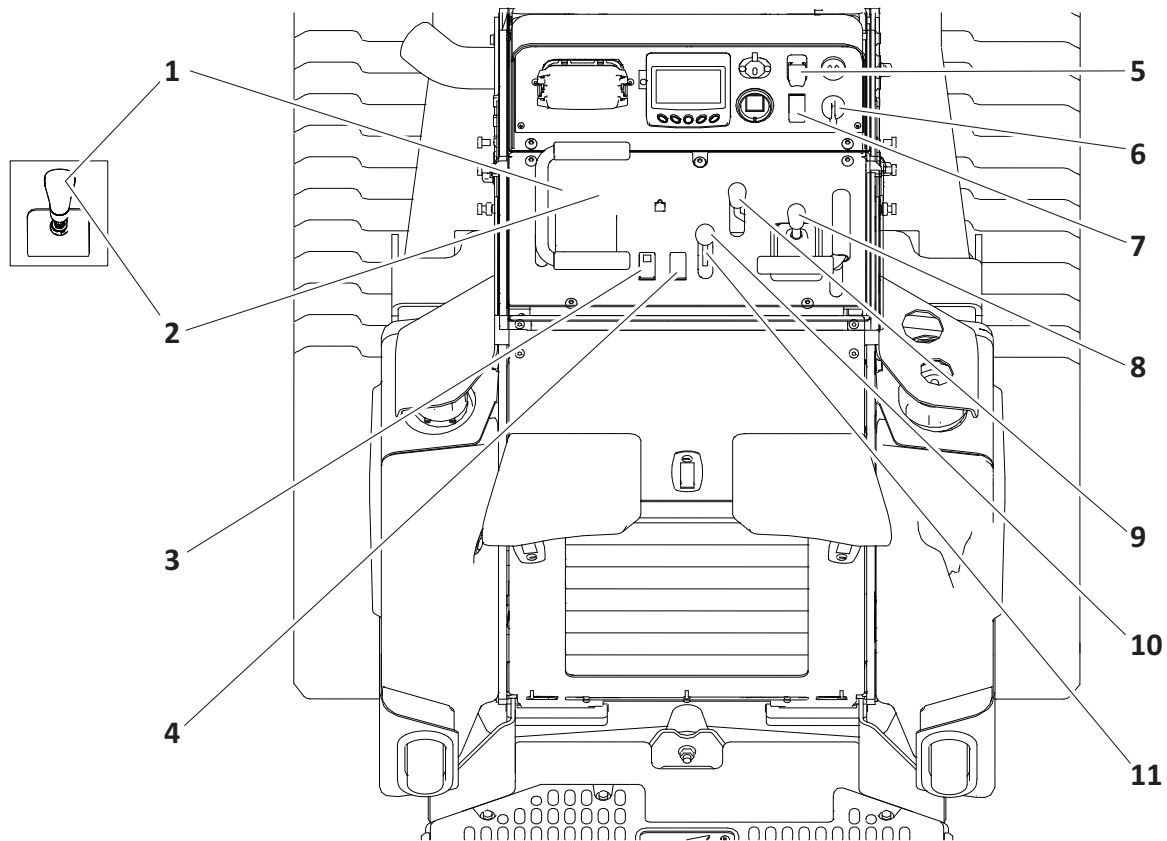
# Miscellaneous



t53om001w20.eps

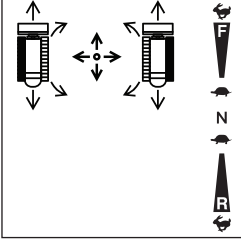
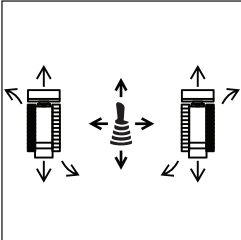
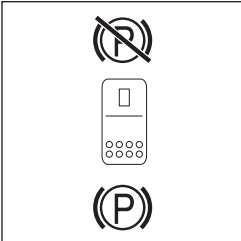

Item	Description	IMPORTANT
1. <b>Graphic display</b>	Displays graphic symbols for indicators and conditions.	
2. <b>Auxiliary outlet</b>	Provides power for other equipment.	12VDC, 5A


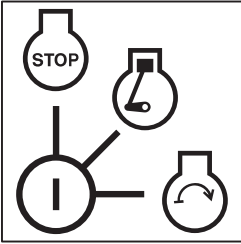
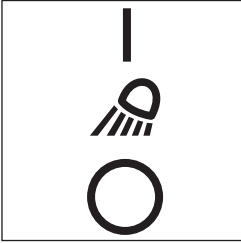
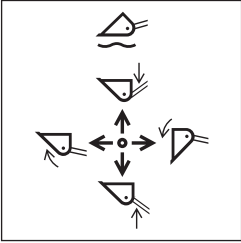
## Operator Station

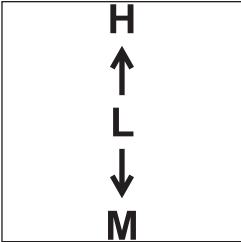
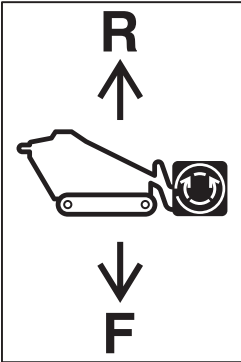
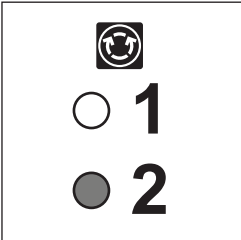


t53om002w20.eps

- |                                                    |                                     |
|----------------------------------------------------|-------------------------------------|
| 1. Left track drive control/Track drive joystick*  | 7. Worklight switch                 |
| 2. Right track drive control/Track drive joystick* | 8. Lift arm control                 |
| 3. Parking brake switch                            | 9. Auxiliary flow selection control |
| 4. Auxiliary lock switch                           | 10. Attachment drive control        |
| 5. Throttle                                        | 11. Auxiliary circuit switch        |
| 6. Ignition switch                                 |                                     |

Item	Description	IMPORTANT
<p>1. <b>Left track drive control</b></p> <p>2. <b>Right track drive control</b></p>  <p>c00ic382w.eps</p>	<p>To drive forward, push both controls forward.</p> <p>To move in reverse, pull back.</p> <p>To go faster in any direction, move control farther from neutral position.</p> <p>To steer, move left or right.</p>	
<p><b>Track drive joystick</b></p>  <p>c00ic383w.eps</p>	<p>To drive forward, push.</p> <p>To drive in reverse, pull.</p> <p>To go faster in any direction, move farther from neutral position.</p> <p>To steer, move left or right.</p>	<p>See "Steer" on page 54.</p>
<p>3. <b>Parking brake</b></p>  <p>c00ic097w.eps</p>	<p>To set, press bottom.</p> <p>To release, press top.</p>	
<p>4. <b>Auxiliary lock switch</b></p>  <p>c00ic225w.eps</p>	<p>To lock auxiliary function, press top.</p> <p>To unlock, press bottom.</p>	

Item	Description	IMPORTANT
<p><b>5. Throttle</b></p>  <p>c00ic391w.eps</p>	<p>To increase engine speed, push.</p> <p>To decrease, pull.</p>	<p>Control only functions if console throttle mode is selected. See "Main Menu" on page 40.</p> <p>If throttle is not set to low when engine is started or throttle mode is changed, it must be returned to low in order to function.</p>
<p><b>6. Ignition switch</b></p>  <p>c00ic377w.eps</p>	<p>To activate accessories, turn right.</p> <p>To start engine, turn fully right.</p> <p>To shut off machine, turn left.</p>	
<p><b>7. Work light switch</b></p>  <p>c00ic048w.eps</p>	<p>To turn on, press top.</p> <p>To turn off, press bottom.</p>	
<p><b>8. Lift arm control</b></p>  <p>c00ic284h.eps</p>	<p>To move lift arms down, push.</p> <p>To float, push to end.</p> <p>To move lift arms up, pull.</p> <p>To curl attachment up, move left.</p> <p>To curl attachment down, move right.</p>	

Item	Description	IMPORTANT
<p><b>9. Auxiliary flow selection control</b></p>  <p><small>c00ic392w.eps</small></p>	<p>To select high, push.</p> <p>To select low, move to middle.</p> <p>To select medium, pull.</p>	<p>Select auxiliary flow based on attachment.</p>
<p><b>10. Attachment drive control</b></p>  <p><small>c00ic090a.eps</small></p>	<p>To move attachment in reverse, push.</p> <p>To move attachment forward, pull.</p>	<p>Use auxiliary lock switch to lock auxiliary function.</p> <p>See "Auxiliary lock switch" on page 45.</p>
<p><b>11. Auxiliary circuit switch</b></p>  <p><small>c00ic226w.eps</small></p>	<p>To toggle between primary and secondary auxiliary circuits, press.</p>	<p>Use this control based on attachment selection.</p> <p>See "Hydraulic Connection" on page 29.</p>





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# Drive

## Chapter Contents



For additional precautions, see "Safety Awareness" and "Prepare" chapters.

**IMPORTANT:** For more information on how to operate controls, see "Controls" chapter.

**Start** ..... **50**

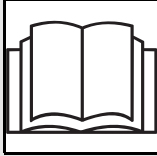
**Operate** ..... **51**

- Slope Guidelines ..... 52
- Reduce Track Wear ..... 53

**Shut Down** ..... **53**

# Start

**EMERGENCY SHUTDOWN:** Shut off machine or press remote engine stop button (if equipped).



**⚠ WARNING**

Misuse of machine can cause death or serious injury. Read and understand operator's manual and all other safety instructions before use. Know how to use all controls.

**To help avoid injury:**

- Allow hydraulic fluid time to warm before operating in cold weather. Cold hydraulic fluid can lengthen ground drive stopping time.
- For starting in extreme temperatures, contact your Ditch Witch® dealer.



**⚠ WARNING**

Pre-heater. Fire or explosion can cause death or serious injury. Never use starter fluid.

**NOTICE:** If engine turns but does not start within 10 seconds, allow starter to cool. Wait at least 30 seconds and try again.

1. Ensure all controls are in neutral.
2. Set parking brake.
3. Activate accessories using ignition switch.
4. **If starting machine in normal conditions,** start engine and run at low throttle under light load for at least one minute before applying heavier load.

**If starting machine in cold weather:**

1. Start engine.
2. Set parking brake.
3. Warm engine and hydraulic fluid by gradually increasing engine speed for up to 30 minutes.
4. After warmup, carefully operate all hydraulic controls at low throttle until controls operate as described in controls chapter.

# Operate

**NOTICE:**

- Drive carefully in congested areas. Know machine's clearance and turning radius.
- Survey field of vision when operating machine.


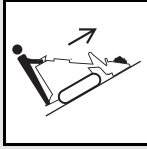

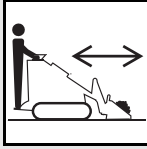
**EMERGENCY EXIT:** Release controls and step off platform.

1. Release parking brake.
2. Raise attachment off ground.
3. Drive machine.

**IMPORTANT:** If needed for attachment operation, lock auxiliary function. See "Auxiliary lock switch" on page 45.

4. Adjust throttle as needed.
5. See attachment operation manual for instructions regarding proper operation of attachments.

## Slope Guidelines

		<p><b>⚠ WARNING</b> Tipover. Crushing can cause death or serious injury. Follow procedure in operator's manual. Drive cautiously.</p> <p><b>To help avoid injury:</b></p> <ul style="list-style-type: none"> <li>• Operate at slow speed when on rough terrain.</li> <li>• Avoid driving across slopes.</li> <li>• Never jerk control levers. Use a steady, even motion.</li> <li>• Always operate with heavy end uphill.</li> <li>• Always drive with attachment low to the ground.</li> <li>• See page 78 for operating capacity.</li> </ul>
		

Operating safely on a slope depends upon many factors including:

- distribution of machine weight, including front loading and absence of load
- height of load
- even or rough ground conditions
- potential for ground giving way causing unplanned tilt forward, reverse or sideways
- 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 design limits usually exceed the operating limits and must never be used alone to establish safe operating angle for variable conditions.**

Maximum engine lubrication angle: 20°

Maximum service brake retarding force: equal to traction of both tracks

Maximum parking brake holding force: equal to traction of one track

## Reduce Track Wear

Rubber tracks are best suited at soil-based jobsites with minimal rocks and debris. To reduce track wear drive slowly and make wide turns. Avoid the following:

- spinning tracks under heavy load
- turning on sharp objects such as stones, broken concrete, or debris
- quick turns on asphalt or concrete
- driving over curbs or ledges
- driving with track edges pressed against hard walls or curbs
- operating on corrosive materials such as salt or fertilizer

## Shut Down

1. When job is complete, move machine to level ground.
2. Stop machine movement.
3. Set parking brake.
4. Lower lift arms to ground.
5. Return all controls to neutral.
6. Run engine at low throttle with no load for at least five minutes to cool.
7. Shut off machine.
8. If leaving machine unattended, remove key.
9. For maintenance or long-term storage, disconnect battery using battery disconnect switch.

**NOTICE:** Wait two minutes after shutting off machine before disconnecting battery.



# Transport

## Chapter Contents



For additional precautions, see "Safety Awareness" and "Prepare" chapters.

**IMPORTANT:** For more information on how to operate controls, see "Controls" chapter.

**Lift** ..... **56**

- Points ..... 56
- Procedure ..... 56


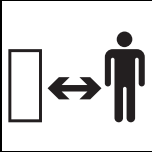
**Haul** ..... **57**

- Inspect Trailer ..... 57
- Load ..... 58
- Tie Down ..... 59
- Unload ..... 60

**Retrieve** ..... **60**

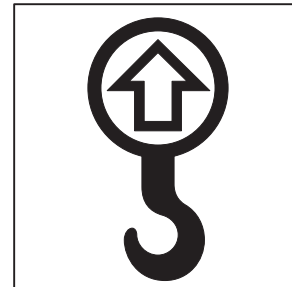


# Lift

		<p><b>⚠ WARNING</b> Lifted load. Crushing weight can cause death or serious injury. Stay away from lifted load and its range of movement.</p> <p><b>To help avoid injury:</b> Only lift unit without attachment installed.</p>
-----------------------------------------------------------------------------------	-----------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

## Points

Lifting points are identified by lifting decals. Lifting at other points is unsafe and can damage machinery.



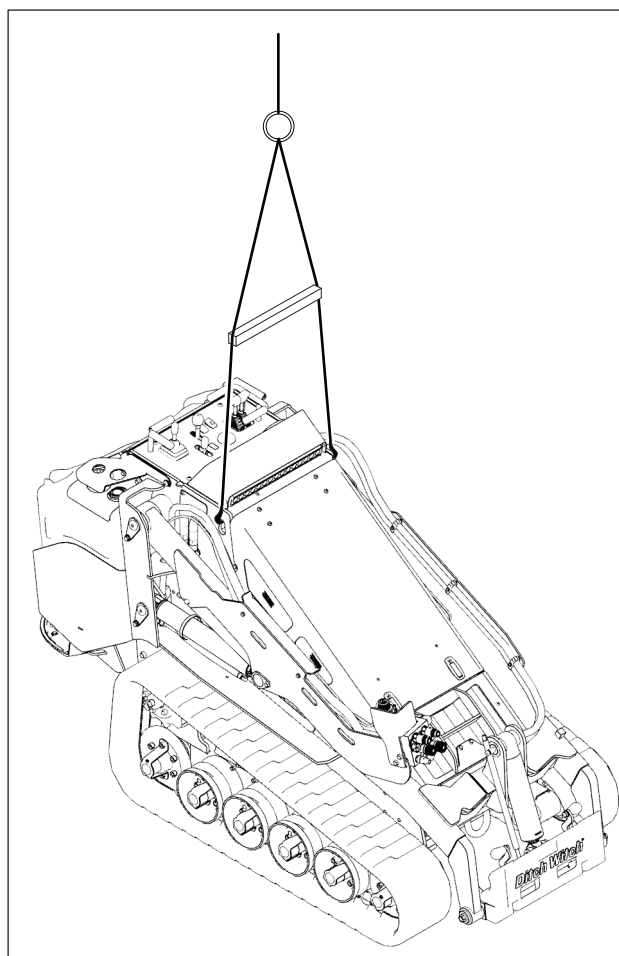
ic1319a.eps

## Procedure

**NOTICE:** Do not lift machine with attachments installed.

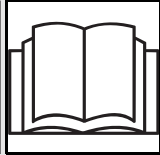
**IMPORTANT:** Front of unit will be lower than rear.

Use a equipment capable of supporting the machine's size and weight to lift as shown. See "Specifications" on page 89 or measure and weigh equipment before lifting.



t55om010w.eps

## Haul

**⚠ WARNING**

Misuse of machine can cause death or serious injury. Read and understand operator's manual and all other safety instructions before use. Know how to use all controls.

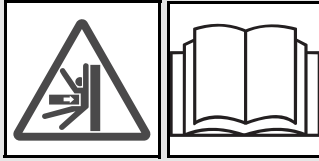
**To help avoid injury:**

- Read trailer operator's manual before loading or transporting machine.
- Ensure tow vehicle has proper tow capacity rating.
- Attach trailer to vehicle before loading or unloading.
- Load and unload trailer on level ground.
- To help prevent trailer sway, load trailer so that 10-15 percent of total vehicle weight (equipment plus trailer) is on tongue.
- If loading onto tilt-bed trailer, be prepared for trailer to tilt.

## Inspect Trailer

- Check hitch for wear and cracks.
- Check battery for 12V charge.
- Inspect lights for cleanliness and correct operation.
- Inspect reflectors and replace if needed.
- Check tire pressure.
- Check lug nut torque.
- Ensure trailer brakes are adjusted to come on with tow vehicle brakes.
- Check trailer bed for cracks.

## Load



**⚠ WARNING** Horizontal movement. Crushing can cause death or serious injury. Read and understand operator's manual and all safety instructions before use.

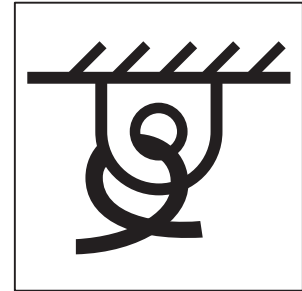
**To help avoid injury:** Start and operate only from platform.

1. Release parking brake.
2. Start engine.
3. Move throttle to low speed.
4. Raise attachment clear of trailer, but keep it low.
5. Move machine to rear of trailer and align with ramps.
6. Drive forward slowly to move machine onto trailer until tiedown position is reached.
7. Lower attachment to trailer bed.
8. Set parking brake.
9. Ensure all controls are in neutral position.
10. Shut off machine.
11. Tie down machine.

## Tie Down

### Points

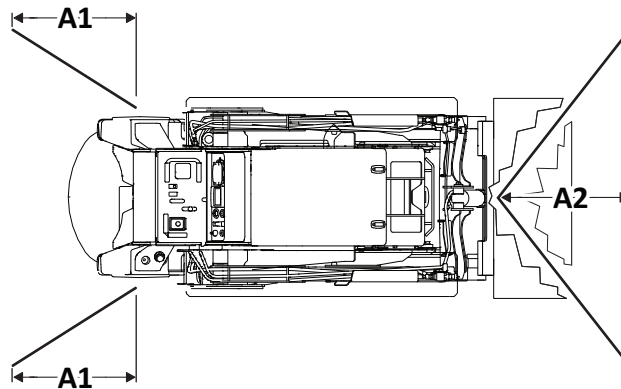
Tiedown points are identified by tiedown decals. Securing to truck or trailer at other points is unsafe and can damage machinery.



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### Procedure

Loop a transport chain around each tie down point. See chart below for correct distances between tiedown ends. Ensure tiedowns are tight before transporting.



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Distance	US	Metric
A1	10-30"	25-76cm
A2	16-40"	41-102cm

## Unload

**⚠ WARNING**

Horizontal movement. Crushing can cause death or serious injury. Read and understand operator's manual and all safety instructions before use.

**To help avoid injury:** Start and operate only from platform.

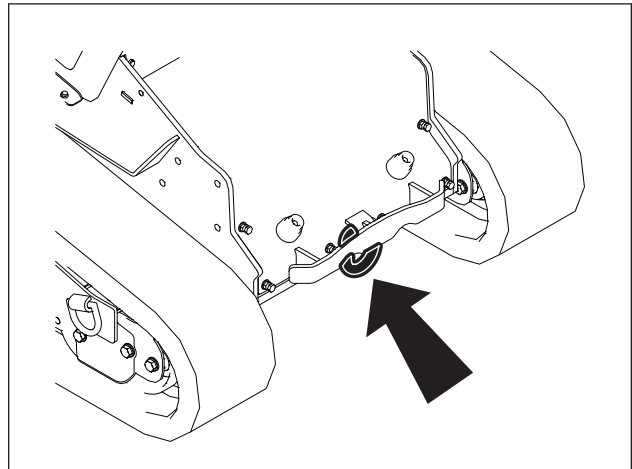
1. Prepare trailer and ramps for unloading.
2. Remove tiedowns.
3. Start engine.
4. Release parking brake.
5. Raise attachment off ground, but keep it low.
6. Move throttle to low speed and slowly back machine down trailer or ramps.

## Retrieve

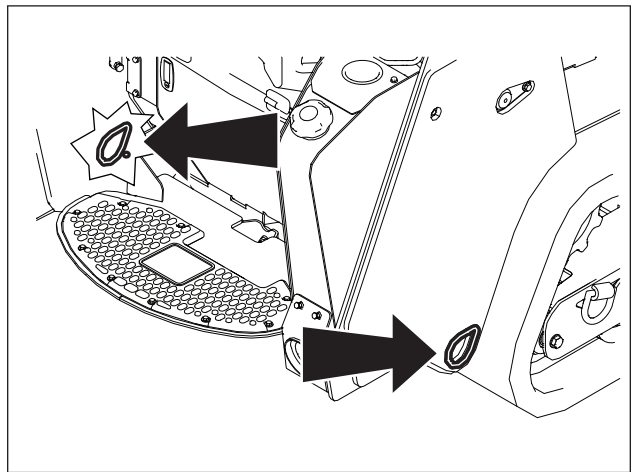
Under normal conditions, machine should not be towed. If machine breaks down and retrieval is necessary:

- Tow for no more than 100' (30m) at less than 1mph (1.6km/h).
  - Use towing chains appropriately rated for maximum towing force.
  - Use maximum force of 1.5 times machine weight.
1. Set parking brake.
  2. Block tracks to prevent machine from rolling.

3. Attach chain to tow points shown facing towing vehicle.

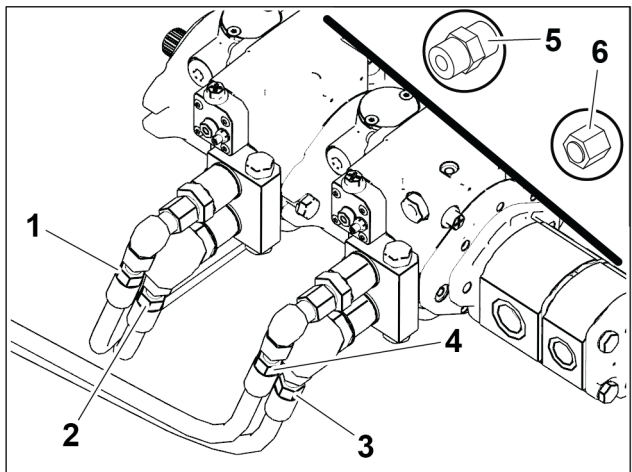


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t62om046w19.eps

4. Disconnect hoses (1, 2) and connect ends together with connector (5).
5. Cap ports on ground drive pump.
6. Disconnect hoses (3, 4) and connect ends together with connector (6).
7. Cap ports on ground drive pump.
8. Remove blocks.
9. If engine will start, release parking brake.  
If engine will not start, remove rear panel and unbolt parking brake assembly.
10. After towing, reassemble brake assembly, if needed.
11. Reconnect hoses to ground drive pump.



t55om041w.png



---

# Complete the Job

## Chapter Contents



For additional precautions, see "Safety Awareness" and "Prepare" chapters.

<b>Rinse Equipment</b> .....	<b>64</b>
<b>Disconnect Attachment</b> .....	<b>64</b>
<b>Stow Tools</b> .....	<b>64</b>



## **Rinse Equipment**

**NOTICE:**

- Never spray water onto operator's console or electrical center in engine compartment. Water can damage electrical components. Wipe down instead.
- Ensure all mud and debris is rinsed from tracks before parking unit overnight.

1. Spray water onto equipment to remove dirt and mud.
2. Remove mud from track sprockets.
3. Wash undercarriage. Pay special attention to brake pin area.

## **Disconnect Attachment**


1. Lower attachment to the ground.
2. Turn off engine.
3. Disconnect hydraulic hoses, if used.
4. Start engine.
5. Disengage attachment pins.
6. Tilt mount plate forward and back machine away from attachment.

## **Stow Tools**

Ensure all tools and accessories are loaded and properly secured on trailer.

# Service

## Chapter Contents

 For additional precautions, see "Safety Awareness" and "Prepare" chapters.

**Service Precautions . . . . . 66**

- Washing Precaution . . . . . 66
- Welding Precaution . . . . . 67
- Working under Raised Lift Arms . . . . . 67

**Recommended Lubricants . . . . . 68**

- Engine Oil Temperature Chart . . . . . 69
- Approved Coolant . . . . . 69
- Approved Fuel . . . . . 70
- Exhaust Cleaning . . . . . 70

**Service Interval Chart . . . . . 71**

**Procedures . . . . . 73**

## Service Precautions



**⚠ WARNING** Jobsite hazards. Exposure can cause death or serious injury. Use correct equipment and work methods. Use and maintain appropriate safety equipment.

### To help avoid injury:

- Wear personal protective equipment including hard hat, safety eye wear, foot protection, hearing protection, and gloves (except when near rotating equipment).
- Remove jewelry.
- Wear close-fitting, high visibility clothing.
- Have other personal protective equipment, such as insulated boots and gloves, breathing protection, and face shield, etc. available for use depending on jobsite hazards or requirements.



**⚠ WARNING** Misuse of machine can cause death or serious injury. Read and understand operator's manual and all other safety instructions before use. Know how to use all controls.

### To help avoid injury:

- Unless otherwise instructed, all service should be performed with the engine off and cool.
- Lower unsecured, raised components before servicing equipment.
- Unless otherwise instructed, all service should be performed with machine parked on level surface.
- Refer to US Occupational Safety and Health Administration (OSHA) guidelines for appropriate lockout-tagout procedures.

## Washing Precaution

**NOTICE:** Do not spray water onto operator's console or electrical center in engine compartment. Water can damage electrical components. Wipe down instead.

## Welding Precaution

**NOTICE:** Welding can damage electronics.

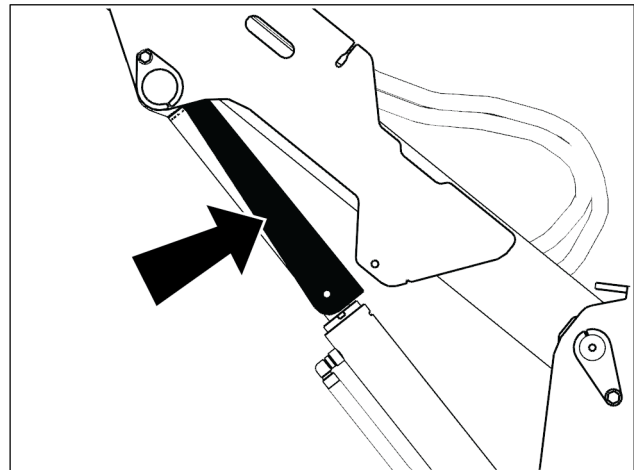
- Welding currents can damage electronic components. Always disconnect the ECU ground connection from the frame, harness connections to the ECU, and other electronic components prior to welding on machine or attachments.
- Connect welder ground close to welding point and make sure no electronic components are in the ground path.
- Disconnect battery at battery disconnect switch before welding to prevent damage to battery.
- Never turn off battery disconnect switch with engine running, or alternator and other electronic equipment devices may be damaged.

## Working under Raised Lift Arms







**WARNING** Raised component. Crushing can cause death or serious injury. Stay away or secure raised component with locking device. Use correct equipment and procedures.

Pin safety supports as shown when working under raised lift arms.



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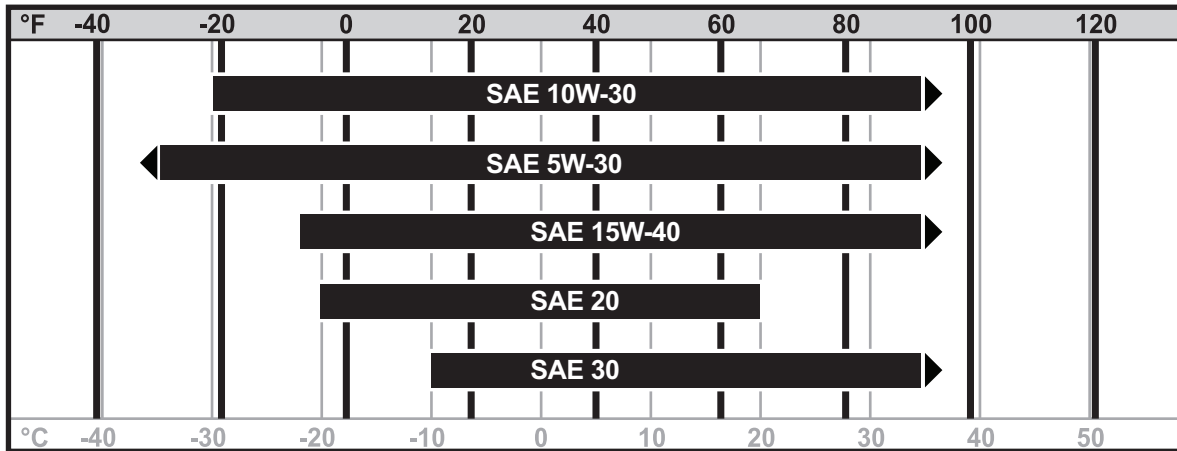
## Recommended Lubricants

Item	Description
 DEAC	Diesel engine antifreeze/coolant, low silicate, fully-formulated meeting CES 14603  See "Approved Coolant" on page 69.
 DEO	Diesel engine oil meeting or exceeding API service classification CJ-4, ACEA E6, or JASO DH-2. See "Engine Oil Temperature Chart" on page 69.  API American Petroleum Institute, ACEA European Automobile Manufacturer's Association
 MPG	Multipurpose grease, lithium based NLGI GC-LB Grade 2
 THF	Tractor hydraulic fluid, Phillips 66® PowerTran Fluid, Mobilfluid® 423, Chevron® Tractor Hydraulic Fluid, Texaco® TDH Oil, or equivalent

Proper lubrication and maintenance protects Ditch Witch® equipment from damage and failure. Service intervals listed are for minimum requirements. In extreme conditions, service machine more frequently. Use only genuine Ditch Witch parts, filters, approved lubricants, TJC, and approved coolants to maintain warranty. Fill to capacities listed in "Specifications" on page 89.

For more information on engine lubrication and maintenance, see your engine manual.

## Engine Oil Temperature Chart



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Temperature range anticipated before next oil change

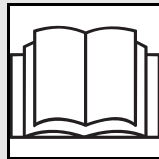
## Approved Coolant

**NOTICE:**

- Use only pre-diluted coolant or concentrated coolant mixed with distilled water. Do not use tap water.
- Using water or high-silicate automotive-type coolant will lead to engine damage or premature engine failure.
- Mixing heavy-duty diesel engine coolant and automotive-type coolants will lead to coolant breakdown and engine damage.

This machine was filled with coolant meeting Cummins CES 14603 before shipment from factory. Add or replace only with coolant meeting this specification. This coolant is available, pre-diluted, from your Ditch Witch® dealer as part number 255-1055.

## Approved Fuel



### ⚠ WARNING

Ultra Low Sulfur Diesel (ULSD) poses a greater static ignition hazard than earlier diesel formulations with higher sulfur content. Avoid death or serious injury from fire or explosion; consult with your fuel or fuel system supplier to ensure the delivery system is in compliance with fueling standards for proper grounding and bonding practices.

This engine is designed to run on diesel fuel. Use only high quality fuel meeting ASTM D975 No. 2D, EN590, or equivalent. At temperatures below 32°F (0°C) winter fuel blends are acceptable. See the engine manual for more information.

**NOTICE:** Use only Ultra Low Sulfur Diesel (less than 15ppm sulfur content in the US and Canada or 10mg/kg in EU and Japan) in this unit. Operating with higher sulfur content will damage the engine and aftertreatment device.

Biodiesel blends up to 5% (B5) are approved for use in this unit. The fuel must meet the specifications for diesel fuel shown above. In certain markets, higher blends may be used if certain steps are taken. Extra attention is needed when using biodiesel, especially when operating in cold weather or storing fuel. Contact your Ditch Witch® dealer or the engine manufacturer for more information.

## Exhaust Cleaning

This engine has a Diesel Particulate Filter (DPF) that purifies NOx emissions in the exhaust into nitrogen and water. The DPF system cleans itself automatically, unless it is manually disabled by the operator.

Automatic exhaust cleaning happens during normal machine operation when sensors in the engine determine the need. During an engine exhaust cleaning cycle, engine exhaust can reach high temperatures. When this happens, the high exhaust temperature icon will light.



If the jobsite is in an area where high exhaust temperature might cause a problem, disable exhaust cleaning for the duration of the job and return to automatic cleaning when the job is finished. The exhaust cleaning disabled icon will light and remain on until the system is returned to automatic cleaning mode.









The exhaust cleaning icon will light when the system is disabled and exhaust cleaning cycle is needed.



- The icon will light when an automatic cleaning is needed. If the area will allow it, return the machine to automatic cleaning mode and let it run automatically.
- A manual exhaust cleaning cycle is required after automatic exhaust cleaning has been disabled multiple times. If manual cleaning is not done when indicated, the engine will derate.
- Ash buildup in DPF will have adverse effects on engine performance. The soot filter must be serviced every 3000 hours of operation or more often if high-ash oil and/or fuel is used. See your Yanmar engine distributor for this service.

# Service Interval Chart

**IMPORTANT:** Chart indicates first instance of repeated service procedures. See detailed information below.

 Adjust, service, or test	 Change, initial	 Lube, initial
 Check	 Change	 Lube

Service	Startup	10 Hours	50 Hours	100 Hours	250 Hours	500 Hours	1000 Hours	As Needed
Battery		▲						▽
Belt, fan			▲		▲	■		▽
Coolant	▲	▲					■	
Dust ejector valve	▲	▲						
Engine compartment		▲						
Filter, air	▲	▲						■
Filter, engine oil (see Oil, engine)								
Filter, fuel						■		
Filter, hydraulic fluid			□		■			
Filter, water separator	▲	▲				■		▽
Fluid, hydraulic	▲	▲				■		
Fuel hose			▲					
Fuse box	▲							
Hydraulic hoses	▲	▲						
Idler roller bearings			▲	●				▽
Intake air line					▲			
Lug nuts		▲	▲		▲			



*Service Interval Chart*

Service	Startup	10 Hours	50 Hours	100 Hours	250 Hours	500 Hours	1000 Hours	As Needed
Oil, engine	▲	▲	□		■			
Parking brake	▲	▲						
Platform switch								▽
Radiator/Hydraulic fluid cooler			▲					▽
Track tension	▲	▲						▽

## Procedures

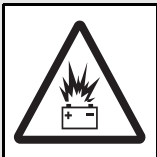
### Battery



**CAUTION** Corrosive fluid. Contact can cause death or serious injury. Avoid contact. Wear appropriate gloves. See Safety Data Sheet (SDS) for more information.

**To help avoid injury:**

- Never attempt to charge a battery that is leaking, bulging, heavily corroded, frozen, or otherwise damaged.
- Refer to Safety Data Sheet (SDS) for additional information regarding battery.



**CAUTION** Explosive hydrogen gas. Fire or explosion can cause death or serious injury. Keep heat flames, sparks, and other sources of ignition away.

**To help avoid injury:**

- Use a single 12V maximum source for charging. Never connect to rapid chargers or dual batteries.
- Never lean over battery when making connections.
- Never allow vehicles to touch when charging.
- Never short-circuit battery terminals for any reason or strike battery posts or cable terminals.
- Refer to Safety Data Sheet (SDS) for additional information regarding battery.

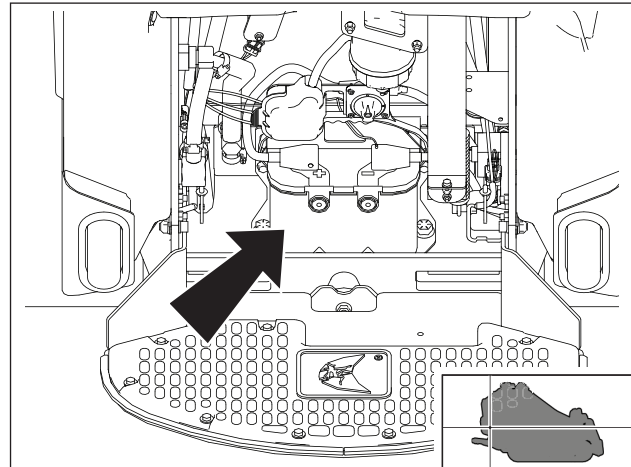
**NOTICE:**

- Electronic components can be easily damaged by electrical surges. Jump starting can damage electronics and electrical systems, and is not recommended. Try to charge the battery instead. Use quality large diameter jumper cables capable of carrying high currents (400 amps or more). Low quality cables may not allow enough current flow to charge a dead/discharged battery.
- Read all steps thoroughly and review illustration before performing procedure.

Check every 10 hours. Charge as needed.

**Check**

1. Disconnect battery at battery disconnect switch, if equipped.
2. Ensure no ignition sources are near battery.
3. Loosen and remove battery cable clamps carefully, negative (-) cable first.
4. Clean cable clamps and terminals to remove dull glaze.
5. Check for signs of internal corrosion in cables.
6. Connect battery cable clamps, positive (+) cable first.
7. Tighten any loose connections.
8. Ensure that battery tiedowns are secure.
9. Turn battery disconnect, if equipped, on.



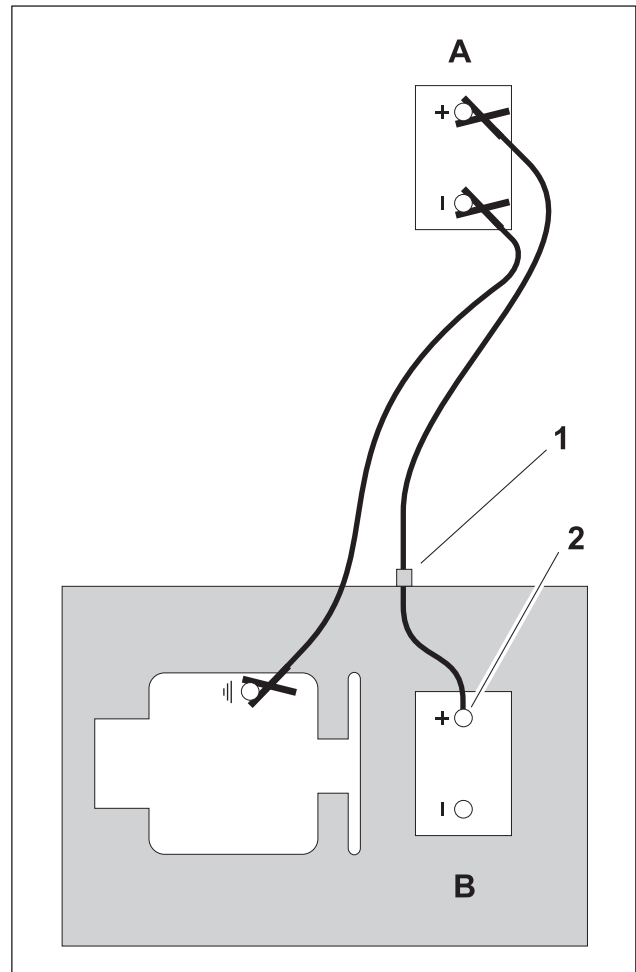
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**Charge**

1. Park service vehicle close to disabled equipment but do not allow vehicles to touch.
2. Set parking brake in both, if equipped.
3. Turn both off.
4. Disconnect machine controller, if equipped.
5. Inspect battery in disabled machine (B) for signs of cracking, bulging, leaking, or other damage.
6. Connect red positive (+) jumper cable clamp to positive (+) post of battery (2) in disabled machine.

**IMPORTANT:** Some equipment may have a positive jumper cable terminal (1) located externally. If so equipped, connect red positive (+) jumper cable clamp to terminal.

7. Connect the other red positive (+) jumper cable clamp to positive (+) post of battery in service vehicle (A).
8. Connect black negative (-) cable clamp to negative (-) post of battery in service vehicle.
9. Connect the other black negative (-) cable clamp to engine or frame ground on disabled machine, at least 12" (305 mm) from failed battery, as shown.
10. Operate service vehicle engine at 1500-2000 rpm for a few minutes to build an electrical charge in failed battery.
11. Stop engine in service vehicle.
12. Remove jumper cables from service vehicle, black negative (-) clamp first. Do not allow clamps to touch.
13. Remove black negative (-) cable clamp from disabled engine or frame ground.
14. Remove red positive (+) cable clamp from disabled machine.
15. Reconnect machine controller, if equipped.
16. Start disabled machine.



## **Belt, Fan**

Check at 50 hours and every 250 hours thereafter. Adjust tension as needed. Change every 500 hours.

### **Check**

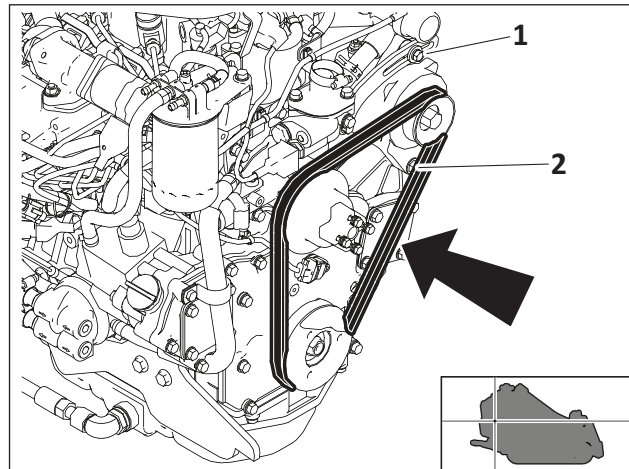
Check for excessive slack, damage, or wear. Belt is properly tensioned when it moves about 1/4-3/8" (7-9mm) when pushed at long span (shown).

### **Adjust Tension**

1. Loosen two alternator bolt (1, 2).
2. Adjust position as needed.
3. Tighten bolts.
4. Check tension.

### **Change**

1. Loosen two alternator bolts (1,2).
2. Replace fan belt.
3. Adjust position as needed.
4. Tighten bolts.
5. Check tension.



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## Coolant

**NOTICE:** See "Approved Coolant" on page 69.

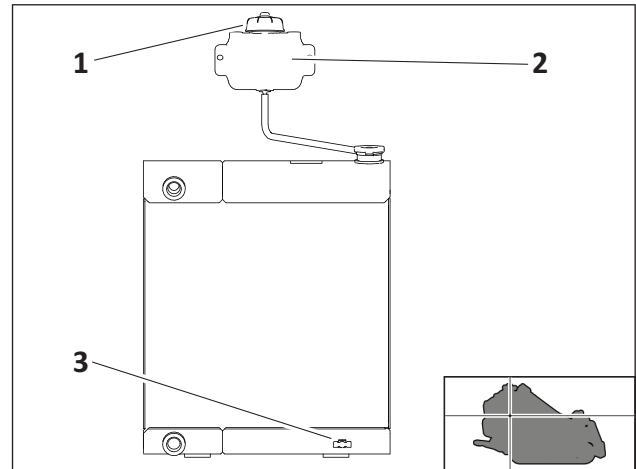
Check before startup and every 10 hours. Change every 1000 hours.

### Check Level

1. Check at overflow bottle (2).
2. Add DEAC at fill (1) as needed to keep level at halfway point on overflow bottle.

### Change

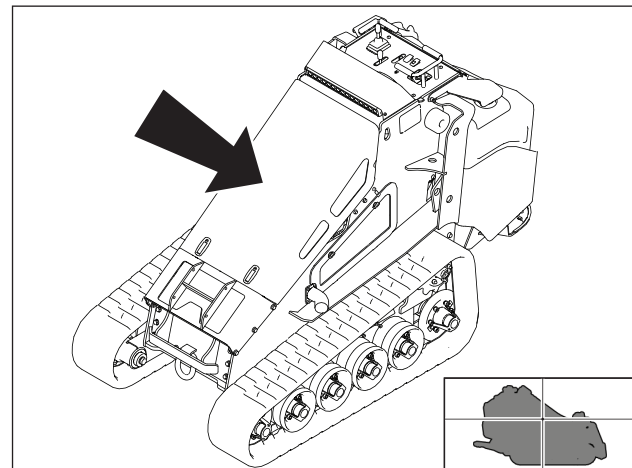
1. Remove plug (3) to drain.
2. Install plug.
3. Add DEAC at fill to keep level at halfway point on overflow bottle.



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## Dust Ejector Valve

Check dust ejector valve (shown) before startup and every 10 hours. Ensure valve is not inverted, damaged, plugged, or cracked.

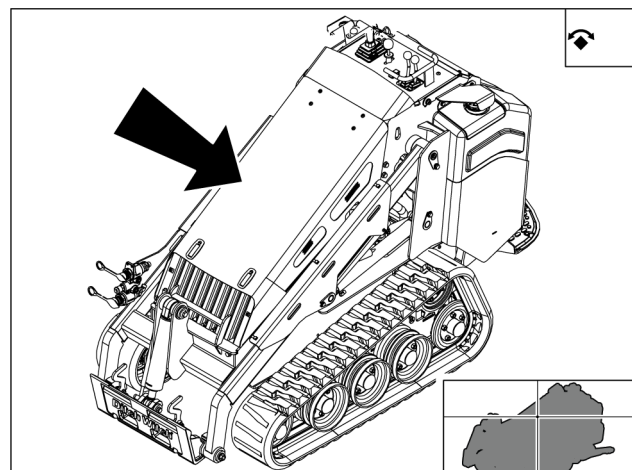


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## Engine Compartment

**NOTICE:** Check more often if operating in large brush, grassy conditions, or if machine is being stored.

Check for debris every 10 hours. Remove debris from engine compartment manually. Do not use water or compressed air.



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## Filter, Air

**NOTICE:** Only open air filter housing when red band on indicator is visible. Change the elements. Do not attempt to clean them.

- Improperly installed primary element can lead to premature engine failure.
- Compressed air or water can damage filter elements.
- Tapping filter elements to loosen dirt can damage elements.

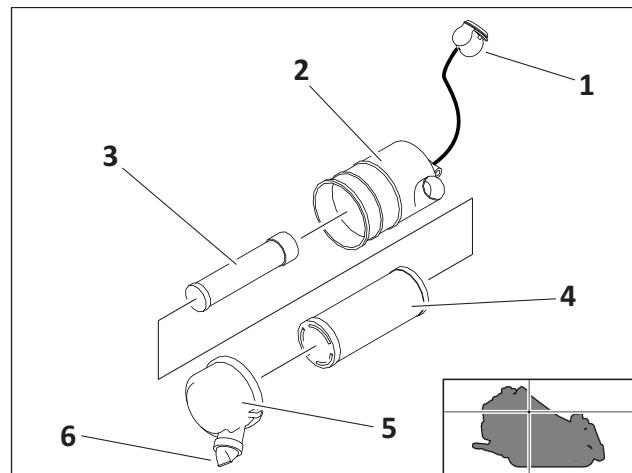
Check before startup and every 10 hours. Change when needed.

### Check

Check air filter service indicator (1). Change filter when red band on indicator is visible.

### Change

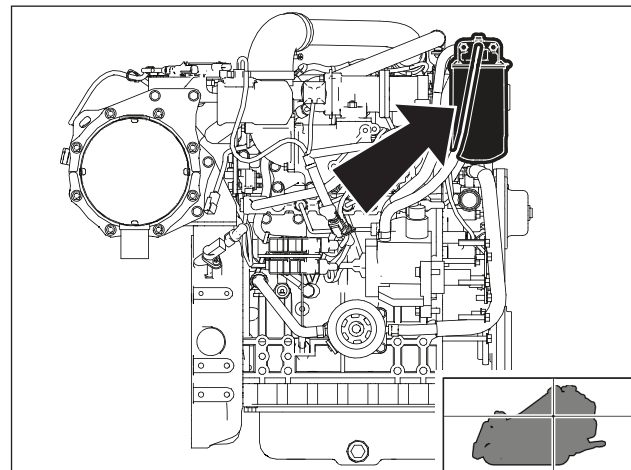
1. Remove cover (5).
2. Remove primary element (4).
3. Wipe inside of housing (2) and cover.
4. Insert secondary element (3) and ensure it is seated correctly.
5. Insert new primary element.
6. Install cover with dust ejector (6) facing down.
7. Reset air filter service indicator.



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## Filter, Fuel

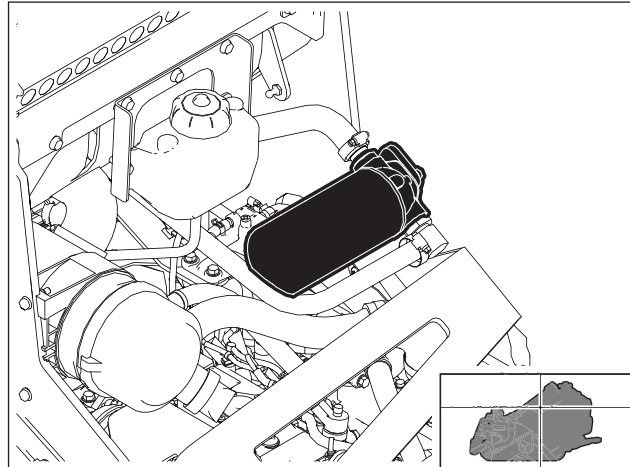
Change filter (shown) every 500 hours. If refueling from cans, replace filters more often.



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## Filter, Hydraulic Fluid

Change filter (shown) at 50 hours and every 250 hours thereafter.



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## Filter, Water Separator

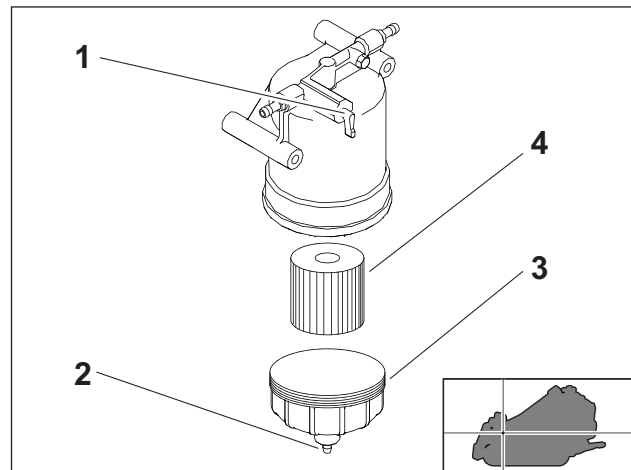
Check before startup and every 10 hours. Drain as needed.

### Check

When red floating ring is raised, drain.

### Drain

1. Turn off at valve (1).
2. Remove plug (2) to drain.
3. Install plug.
4. Turn on at valve.
5. Start engine. Filter will purge air from system.



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### Change

1. Turn off at valve.
2. Remove plug to drain.
3. Remove cover (3).
4. Replace filter (4).
5. Install cover.
6. Install plug.
7. Turn on at valve.
8. Start engine. Filter will purge air from system.



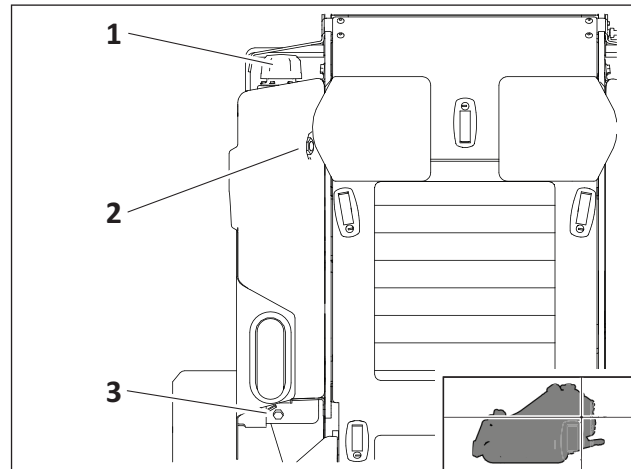
## Fluid, Hydraulic

**NOTICE:** Change every 250 hours if jobsite temperature exceeds 100°F (38°C) more than 50% of the time.

Check before startup and every 10 hours. Change every 500 hours.

### Check Level

1. Check level at sight glass (2).
2. Add THF at fill (1) as needed to keep level at halfway point on sight glass when engine is off, cylinders are fully retracted, and fluid is cool.



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### Change Fluid

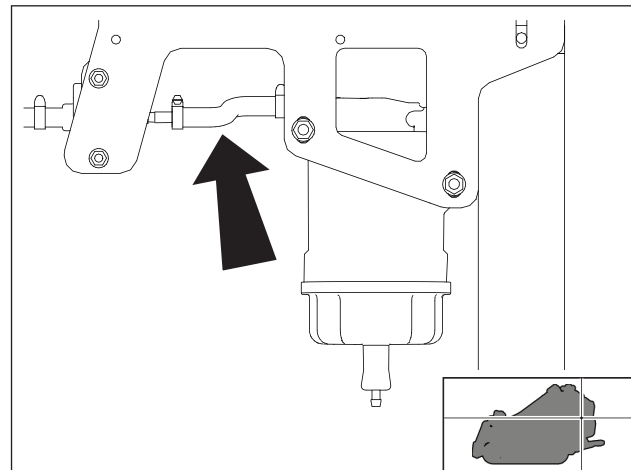
1. Remove plug (3) to drain.
2. Install plug.
3. Add THF at fill to keep level at halfway point on sight glass.

## Fuel Hose

Check fuel hose (shown) and clamp bands every 50 hours.

If clamp is loose, apply oil to the threads and retighten. If hose is worn, replace.

Bleed fuel system if hose and/or clamp is changed.

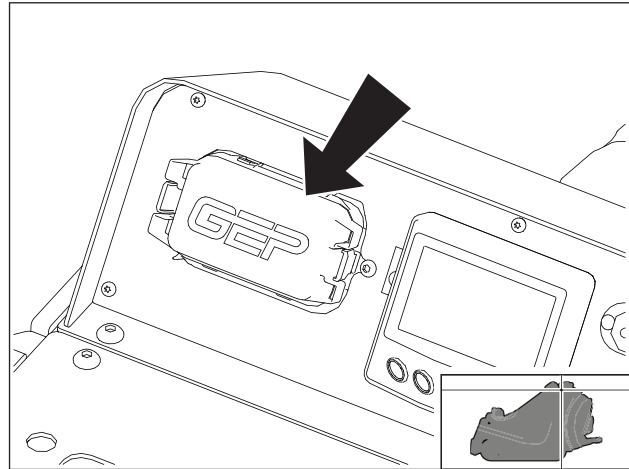


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## Fuse Box

**IMPORTANT:** Leave cover in place unless fuses are being checked or replaced.

Check fuse box cover for damage before startup. If cover is missing or damaged, replace.



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## Hydraulic Hoses

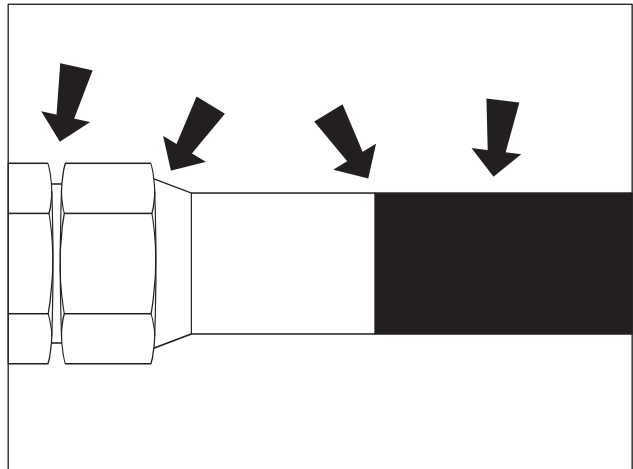


**⚠ WARNING** Pressurized fluid or air. Injection can cause death or serious injury. Refer to operator's manual for correct use.

### To help avoid injury:

- Use a piece of cardboard or wood, rather than hands, to check for leaks.
- Before disconnecting a hydraulic line, turn engine off and operate all controls to relieve pressure.
- Lower, block, or support any raised component with a hoist.
- Cover connection with heavy cloth and loosen connector nut slightly to relieve residual pressure. Catch all fluid in a container.
- Before using system, check that all connections are tight and all lines are undamaged.
- If you are injured, seek immediate medical attention from a doctor familiar with this type of injury.

Check for leaks where shown before startup and every 10 hours of operation.



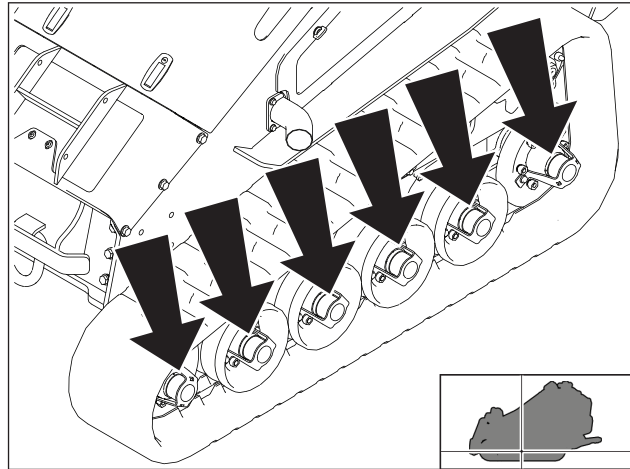
CheckHoses.eps

## Idler Roller Bearings

Check idler roller bearings (shown) at 50 hours and every 250 hours thereafter. Lube at 50 hours and every 100 hours thereafter. Adjust as needed.

### Check

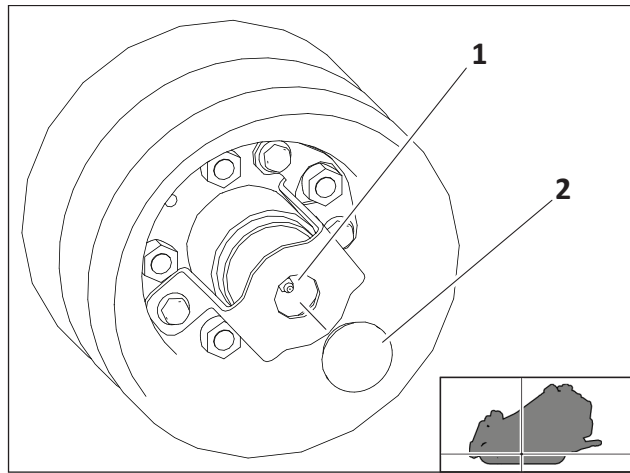
1. Lift machine.
2. Release track tension. See "Track Tension" on page 88.
3. Check for movement of each hub when rocked back and forth. If hub has noticeable movement, adjust.
4. Adjust track tension.



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### Lube

1. Remove cap (2).
2. Add MPG until it comes out small hole (1).
3. Replace cap.

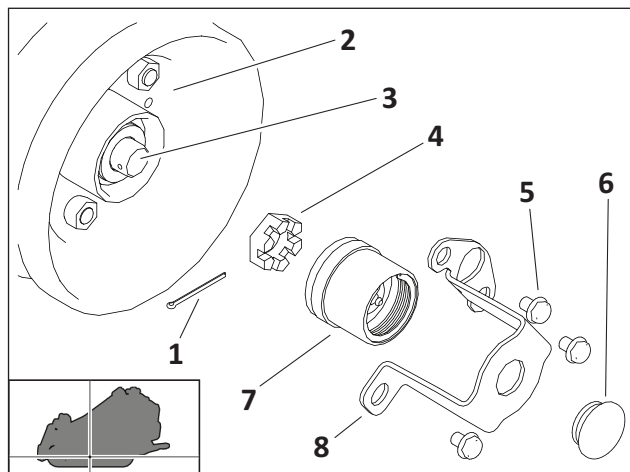


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### Adjust

1. Remove lug nuts (6) to remove dust cap cover (5) and retainer (8).
2. Remove bearing protector (7).
3. Remove cotter pin (1).
4. Ensure bearings are properly seated by tightening castle nut (4) to 30-40ft•lb (41-54N•m) while turning hub.

**NOTICE:** Do not move hub after this step is complete.



t53om048w20.eps

5. Loosen and then hand-tighten castle nut.

6. Insert cotter pin into wheel spindle (3).

**NOTICE:** If hole is visible in slot but cotter pin cannot be inserted, slightly loosen or tighten castle nut to align slot with hole and insert cotter pin. If hole is not visible in slot, loosen to next available slot and insert cotter pin.

7. Bend legs of cotter pin over top of spindle.

**IMPORTANT:** Hub should not have noticeable movement when rocked back and forth.

8. Reassemble. Tighten lug nuts to 80ft•lb (108N•m).
9. Adjust track tension.

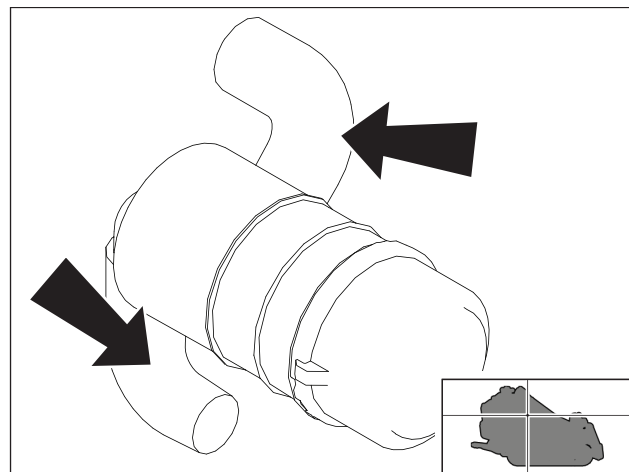
## Intake Air Line

**NOTICE:** Keep dust out of the intake air line to prevent damage to the engine.

Check intake air line (shown) for dirt and debris every 250 hours.

If clamp is loose, apply oil to threads and retighten.

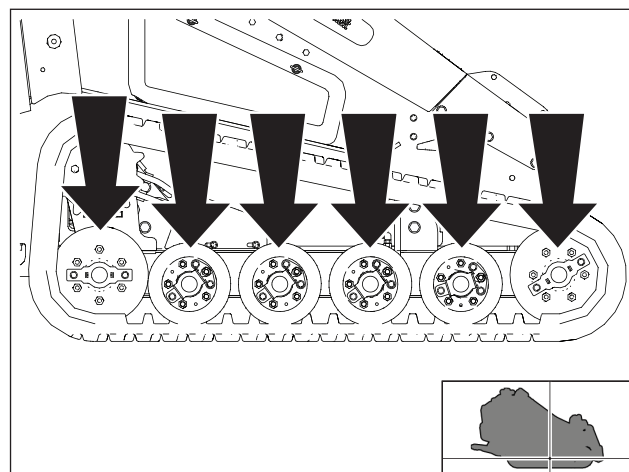
If hose is cracked or worn, replace.



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## Lug Nuts

Check lug nuts (shown) at 10 hours, 50 hours, and every 250 hours thereafter. Tighten to 88-95ft•lb (108-129N•m) as needed.



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## Oil, Engine

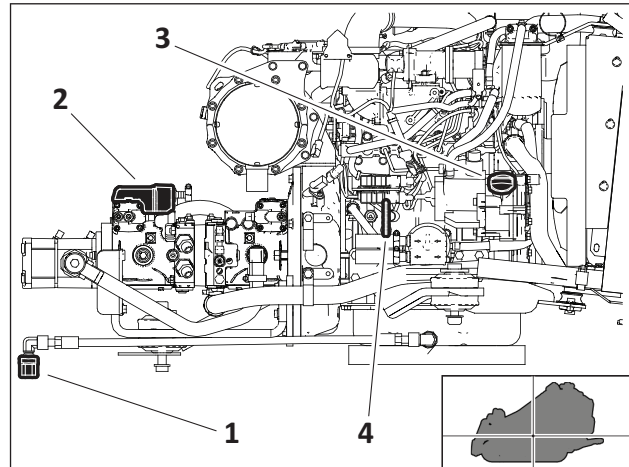
Check before startup and every 10 hours. Change at 50 hours and every 250 hours thereafter.

### Check Level

1. Check level at dipstick (4).
2. Add DEO at fill (3) as needed to keep level at highest line on dipstick.

### Change Oil and Filter

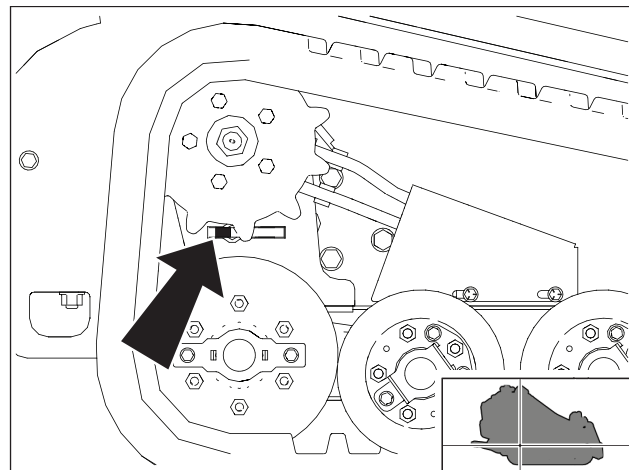
1. While oil is warm, remove plug (1) to drain.
2. Install plug.
3. Remove filter (2) and replace with new filter.
4. Add DEO at fill to keep level at highest line on dipstick.



## Parking Brake

Check before startup and every 10 hours.

1. Start engine.
2. Ensure parking brake pin (shown) moves freely allowing brake to be set and released.
3. Clean mud and debris from area around pin.

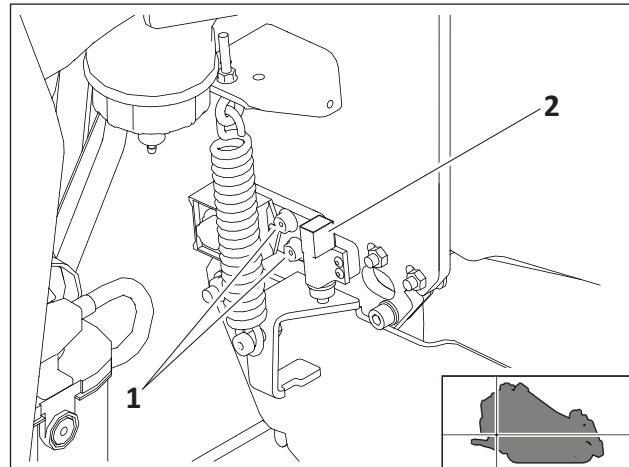


## Platform Switch

Adjust if auxiliary controls do not operate properly when stepping on platform.

### If control does not stay engaged when standing on platform:

1. Loosen two screws (1).
2. Tilt switch (2) up and tighten screws.
3. Stand on platform and turn ignition switch.
4. Ensure auxiliary control(s) stay engaged.
5. Repeat steps 1-4 if needed.



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### If control does not return to neutral when operator steps off platform:

1. Loosen two screws (1).
2. Tilt switch (2) down and tighten screws.
3. Stand on platform and turn ignition switch.
4. Operate auxiliary control(s) and step off platform. Control should return to neutral within two seconds.
5. Repeat steps 1-4 if needed.

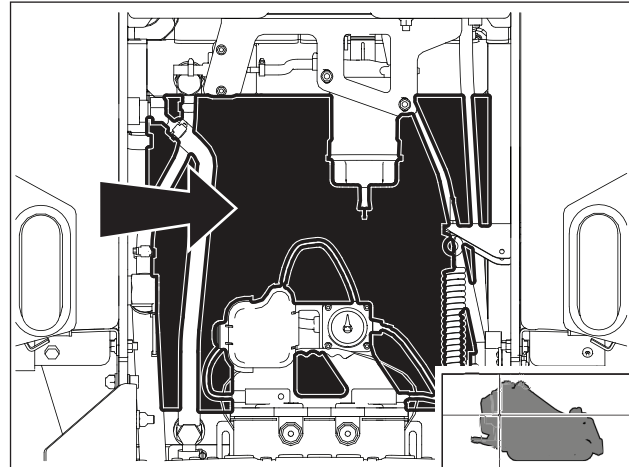
## Radiator/Hydraulic Fluid Cooler

**NOTICE:** Radiator may need to be cleaned more frequently in dusty or grassy conditions.

Check every 50 hours. Clean as needed.

### Check

Check radiator (shown) for dirt, grass, and other debris. Check radiator hoses for wear. Check hose clamps for proper tightness.



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### Clean

1. Clean fins with compressed air or spray wash.

**NOTICE:** Do not damage fins with high pressure air or water.

2. Open rear hood and spray through radiator toward engine.
3. If grease and oil are present on radiator, spray with solvent and allow to soak overnight.



## Track Tension



**⚠ WARNING** Contents under pressure. Impact can cause death or serious injury. Relieve pressure before opening.

### To help avoid injury:

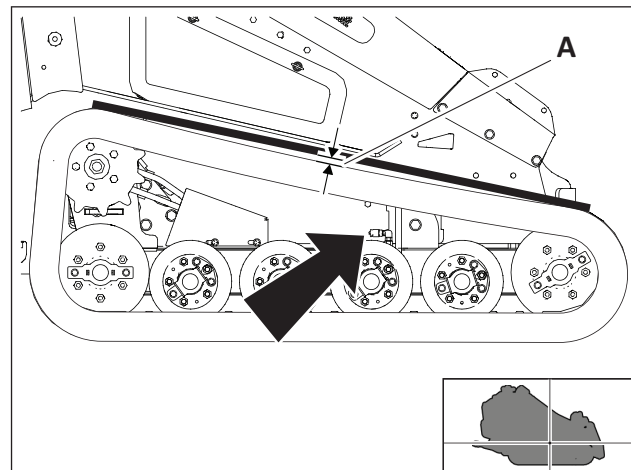
- Service track grease cylinder only while standing away from zerk.
- Cover connection with heavy cloth when relieving pressure in cylinder.

Check before startup and every 10 hours. Adjust as needed using one of the methods below, depending on machine configuration.

## Straightedge Adjustment

### Check

1. Lift track.
2. Place straightedge across front track span from idler to sprocket as shown.
3. Measure distance from top edge of top of track to straightedge (A). Distance should be 0.5" (13mm).



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### Adjust

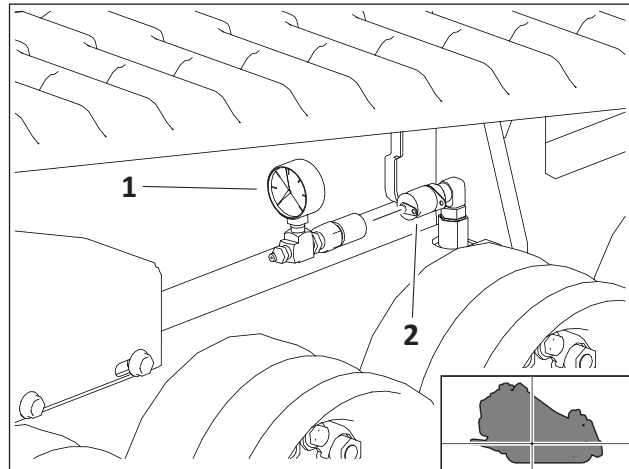
1. Lift track.
2. Adjust tension.
  - To tighten, pump MPG into grease zerk (shown) until distance measures 0.5" (13mm).
  - To loosen, remove zerk and drain all grease. Then follow tightening procedure.
3. Start engine.
4. Drive forward one machine length and check track tension.

**Pressure Gauge Adjustment****Check**

1. Lift track.
2. Remove gauge (1) from stored location.
3. Thread gauge into connection (2).
4. Track is correctly tensioned when gauge measures 700-900psi (48-62bar).

**Adjust**

1. Lift track.
2. Remove gauge from stored location.
3. Thread gauge into connection.
4. Adjust tension.
  - To tighten, pump MPG into grease zerk until gauge measures 700-900psi (48-62bar).
  - To loosen, remove plug and drain all grease. Then follow tightening procedure.
5. Start engine.
6. Drive forward one machine length and check track tension.





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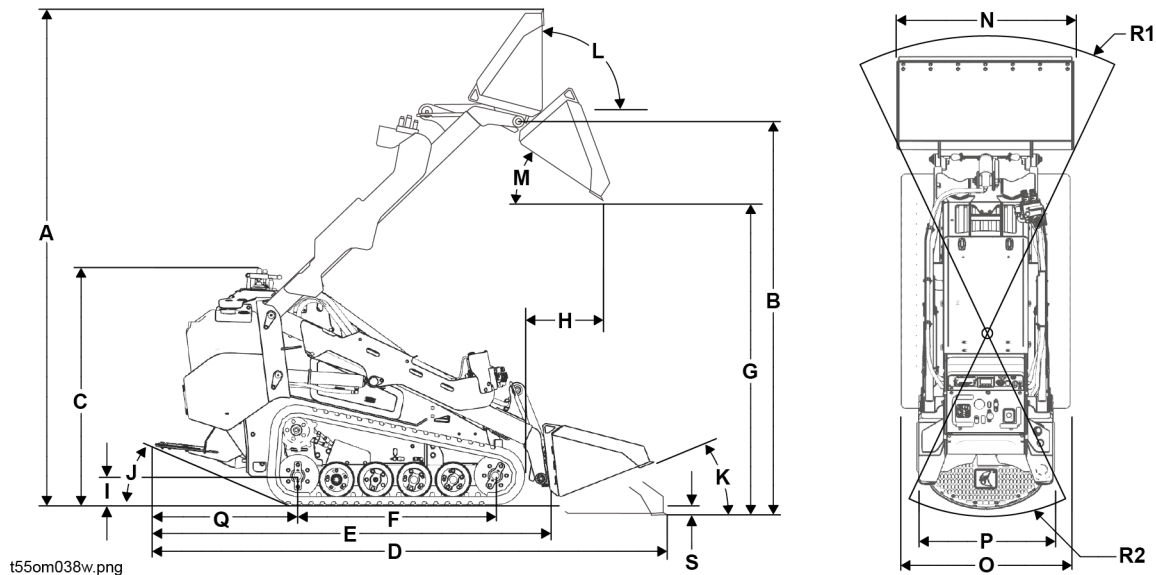
# Specifications

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# SK1550



Dimensions		US	Metric
A	Operating height, max, 60" (1.5m) bucket	128.4"	3261.4mm
B	Hinge pin height, max	94.5"	2400.3mm
C	Overall height of machine	58.5"	1485.9mm
D	Overall length of machine, 60" (1.5m) bucket	124.2"	3154.7mm
E	Overall length of loader, no attachment	99.7"	2531.4mm
F	Wheelbase/track length	50.6"	1285.3mm
G	Dump height, max, with 60" (1.5m) bucket	68.5"	1739.9mm
H	Reach, 60" (1.5m) bucket at max dump height	33.2"	843.3mm
I	Ground clearance, min (center)	9.1"	231.1mm
	Ground clearance, min (side)	4.7"	119.4mm
J	Angle of departure	23.4°	23.4°
K	Bucket rollback angle, ground level	23.7°	23.7°
L	Bucket rollback angle, full height	92°	92°
M	Dump angle, 60" (1.5m) bucket	36.1°	36.1°
N	Bucket width, max	60"	1524mm
	Bucket width, min	44"	1118mm

<b>Dimensions</b>		<b>US</b>	<b>Metric</b>
O	Track width	46.1"	1171mm
P	Machine width, excluding tracks	37.5"	952.5mm
Q	Rear overhang, max	35.4"	899.2mm
R1	Swing radius, max, 60" (1.5m) bucket	59.2"	1943.1mm
R2	Swing radius, no attachment	44"	1503.7mm

<b>Operation</b>		<b>US</b>	<b>Metric</b>
Ground drive speed, forward and reverse		4.7mph	7.6km/h
Ground pressure, 10.4" (265mm) tracks *		4.1psi	0.28bar
Machine weight (no attachment, fluids full)		3435lb	1588kg
Operating capacity (35% of tipping capacity)		1558lb	707kg
Operating capacity, with weight kit		1995lb	905kg
Tipping capacity		4450lb	2019kg
<p>The rated operating capacity for this machine was determined using a standard bucket in the maximum reach position with center of gravity 7" (18cm) from the attachment plate. Depending on the attachment, the actual operating capacity of the attachment may vary.</p>			

\* Includes machine weight, 175-lb (80-kg) bucket, 165-lb (75-kg) operator

<b>Power Plant</b>		<b>US</b>	<b>Metric</b>
Engine: Yanmar® 3TNV86C, EPA Tier 4, EU Stage IIIa			
	Fuel	Diesel	
	Number of cylinders	3	
	Displacement	95.8in <sup>3</sup>	1.57L
	Bore	3.39"	86mm
	Stroke	3.54"	90mm
Manufacturer's gross power rating (per SAE J1955)		43.5hp	32.4kW
Rated engine speed		3000rpm	3000rpm

<b>Hydraulic System</b>		<b>US</b>	<b>Metric</b>
Auxiliary: double gear pump			

<b>Hydraulic System</b>		<b>US</b>	<b>Metric</b>
	Flow rate (high)	16gpm	60.6L/min
	Flow rate (medium)	13gpm	49.2L/min
	Flow rate (low)	3gpm	11.4L/min
	Pressure	3625psi	250bar

Ground drive: dual hydrostat

	Flow rate	15gpm	56.8L/min
	Pressure	4200psi	290bar

<b>Fluid Capacities</b>		<b>US</b>	<b>Metric</b>
	Coolant	1.28gal	4.8L
	Engine oil, with filter	5.0qt	4.7L
	Fuel tank	10.5gal	40L
	Hydraulic reservoir	9.2gal	35L

**Battery**

SAE reserve capacity 110min, SAE cold crank @ 0°F (-18°C) 800amp, 12V electrical system

**Vibration Levels**

Average vibration transmitted to the operator's hand during normal operation with a loader bucket is 3.91m/sec<sup>2</sup>. Average vibration transmitted to the whole body during normal operation with a loader bucket is 1.12m/sec<sup>2</sup>. Actual vibration will depend on the attachment being used.

**Noise Level**

This machine can generate sound levels exceeding 80dBA. Always wear appropriate hearing protection when operating machine. Find sound power and pressure information at [www.ditchwitch.com](http://www.ditchwitch.com), or contact [customersupport@ditchwitch.com](mailto:customersupport@ditchwitch.com).

Specifications are called out according to SAE recommended practices. Specifications are general and subject to change without notice. If exact measurements are required, equipment should be weighed and measured. Due to selected options, delivered equipment may not match that shown.

## **Declaration of Conformity**

Countries in the European Union should have received a Declaration of Conformity (DOC) with this machine similar to the example below.

The Charles Machine Works, Inc.  
PO Box 661959 West Fir Avenue  
Perry, Oklahoma, USA 73077-0066  
Phone: 580 572 3784  
FAX: 580 572 3525

*Declares that the product:*

<b>Model:</b>	<b>Ditch Witch® XXXX</b>
<b>Type:</b>	<b>(Machine Type)</b>
<b>Engine Power:</b>	<b>xxx kW</b>
<b>Serial Number:</b>	<b>CMWXXXXXXXXXXXXXXXX</b>

*Conforms to the requirements of:*

2006/42/EC Machinery Directive  
2004/108/EC Electromagnetic Compatibility Directive  
2000/14/EC Noise Emission Directive  
Measured sound power level (Annex V): **XXXdBA**  
Guaranteed sound power level (Annex V): **XXXdBA**

*The Technical Construction File is maintained at the manufacturer's location.*

*The manufacturer's European representative is:*

Ditch Witch Barcelona  
International Underground Systems, S.L.  
C/EL PLA, 130 \*Poligon Industrial El Pla  
08980 Sant Feliu De Llobregat \*Spain  
Phone: +34 93 632 7344  
FAX: +34 93 632 7343





# Support

## Registration

If your equipment was purchased through a Ditch Witch® dealer, it is already registered. If you purchased from any other source, please email [productsupportwarrantyadmin@ditchwitch.com](mailto:productsupportwarrantyadmin@ditchwitch.com) or fill out the registration card located in the back of the parts manual. Registration enables you to receive updates on this equipment as well as information on new products of interest.

## Procedure

Notify your dealer immediately of any malfunction or failure of Ditch Witch® equipment.

Always give model, serial number, and approximate date of your equipment purchase. This information should be recorded and placed on file by the owner at the time of purchase.

Return damaged parts to dealer for inspection and warranty consideration if in warranty time frame.

Order genuine Ditch Witch replacement or repair parts from your authorized Ditch Witch dealer. Use of another manufacturer's parts may void warranty consideration.

## Resources

### Publications

Contact your Ditch Witch dealer for publications and videos covering safety, operation, service, and repair of your equipment.

### Ditch Witch® Training

For information about on-site individualized training, contact your Ditch Witch dealer.

# Warranty

## **Ditch Witch® Equipment and Replacement Parts Limited Warranty Policy**

Subject to the limitation and exclusions herein, free replacement parts will be provided at any authorized Ditch Witch dealership for any Ditch Witch equipment or parts manufactured by the Ditch Witch factory that fail due to a defect in material or workmanship within one (1) year of first commercial use. Free labor will be provided at any authorized Ditch Witch dealership for installation of parts under this warranty during the first year following "initial commercial" use of the serial-numbered Ditch Witch equipment on which it is installed. The customer is responsible for transporting their equipment to an authorized Ditch Witch dealership for all warranty work.

### **Exclusions from Product Warranty**

- All incidental or consequential damages.
- All defects, damages, or injuries caused by misuse (including, but not limited to, rollover), abuse, improper installation, alteration, neglect, or uses other than those for which products were intended.
- All defects, damages, or injuries caused by improper training, operation, or servicing of products in a manner inconsistent with manufacturer's recommendations.
- All engines and engine accessories (these are covered by original manufacturer's warranty).
- Tires, belts, and other parts which may be subject to another manufacturer's warranty (such warranty will be available to purchaser).
- ALL IMPLIED WARRANTIES NOT EXPRESSLY STATED HEREIN, INCLUDING ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY.

IF THE PRODUCTS ARE PURCHASED FOR COMMERCIAL PURPOSES, AS DEFINED BY THE UNIFORM COMMERCIAL CODE, THEN THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE FACE HEREOF AND THERE ARE NO IMPLIED WARRANTIES OF ANY KIND WHICH EXTEND TO A COMMERCIAL BUYER. ALL OTHER PROVISIONS OF THIS LIMITED WARRANTY APPLY INCLUDING THE DUTIES IMPOSED.

Ditch Witch products have been tested to deliver acceptable performance in most conditions. This does not imply they will deliver acceptable performance in all conditions. Therefore, to assure suitability, products should be operated under anticipated working conditions prior to purchase.

Defects will be determined by an inspection within thirty (30) days of the date of failure of the product or part by Ditch Witch Product Support (DWPS) or its authorized dealer. DWPS will provide the location of its inspection facilities or its nearest authorized dealer upon inquiry. DWPS reserves the right to supply remanufactured replacement parts under this warranty as it deems appropriate.

Extended warranties are available upon request from your local Ditch Witch dealer or the Ditch Witch factory.

Some states do not allow exclusion or limitation of incidental or consequential damages, so above limitation of exclusion may not apply. Further, some states do not allow exclusion of or limitation of how long an implied warranty lasts, so the above limitation may not apply. This limited warranty gives product owner specific legal rights and the product owner may also have other rights which vary from state to state.

For information regarding this limited warranty, contact the DWPS department, P.O. Box 66, Perry, OK 73077-0066, or contact your local dealer.