SK3000

Yanmar® 4TNV86CT

Operator's Manual

CE

CMW®

Issue 3.0
Original Instruction

053-3198

Overview

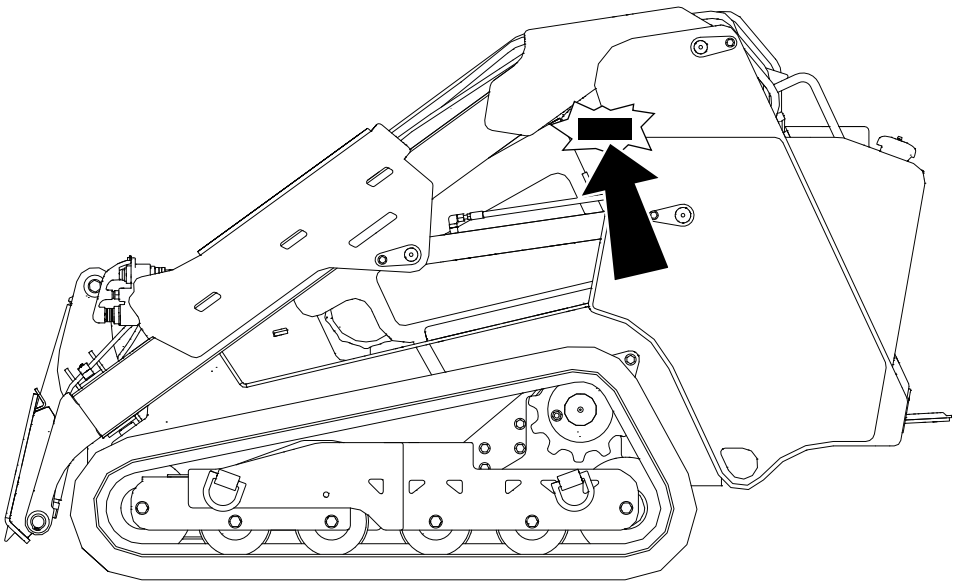
Chapter Contents

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.

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 SK3000 is a platform, rubber track compact tool carrier machine designed for medium-duty construction work. The machine has a quick attach plate which makes it easy for an operator to connect different attachments.

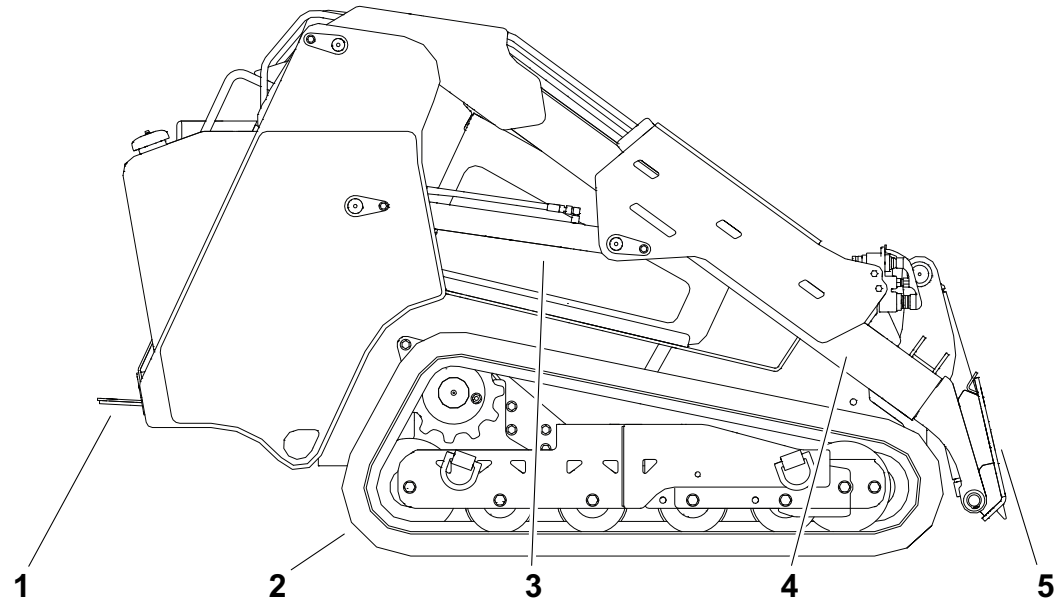
This machine is intended for operation only according to the instructions in this manual. Operate machine in ambient temperatures from 10° to 115°F (-12° to 46°C). Contact your Ditch Witch® dealer for provisions required for operating in extreme temperatures. Use in any other way is considered contrary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



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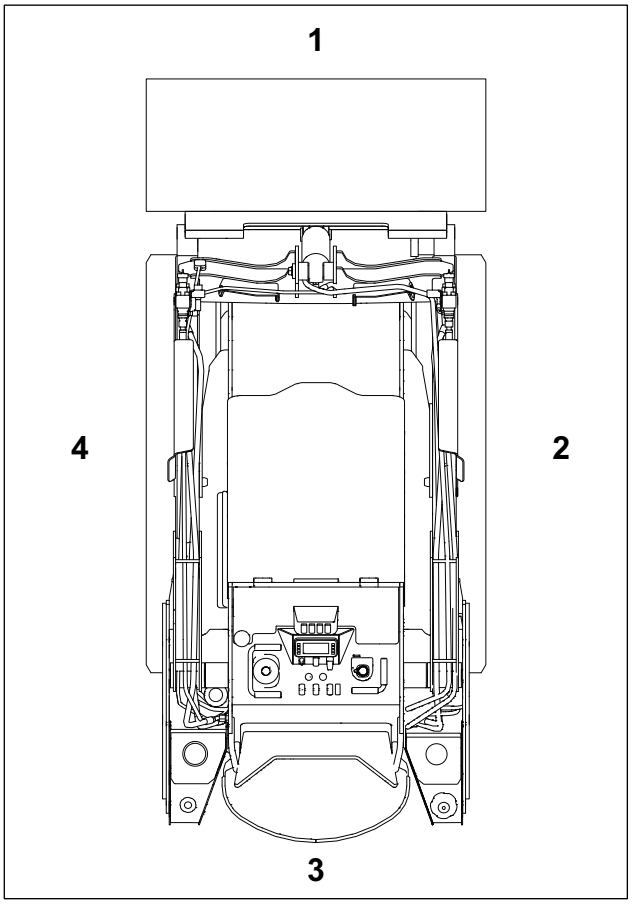
1. Operator station platform
2. Tracks
3. Engine compartment
4. Lift arms
5. Attachment plate

Operator Orientation

IMPORTANT: Top view of machine is shown.

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



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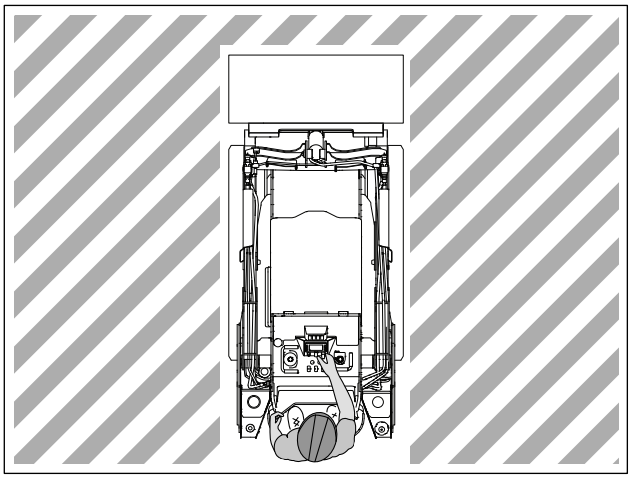
Operating Area

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.

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 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.

SK3000
Operator's Manual

Issue number 3.0/OM-01/23
Part number 053-3198

Contents

Safety

Chapter Contents

For additional precautions, see "Prepare" chapter.

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.

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.

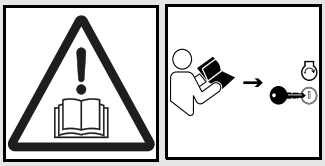
⚠ CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

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

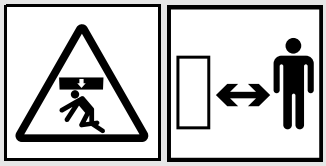
NOTICE indicates information considered important, but not hazard-related (e.g., messages relating to property damage).

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

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.



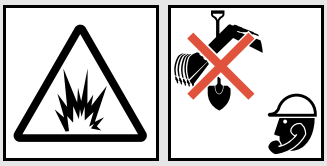
⚠WARNING Raised component. Crushing can cause death or serious injury. Stay away. Use correct equipment and procedures.

Follow these guidelines before operating any jobsite equipment:

- Complete proper training.
- Read and understand operator's manual before using equipment.
- Wear personal protective equipment including long pants, hard hat, eye protection, hearing protection, and protective footwear.
- Do not wear jewelry or loose clothing.
- 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/safety. Safety Data Sheets (SDS) are available at 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/safety.

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

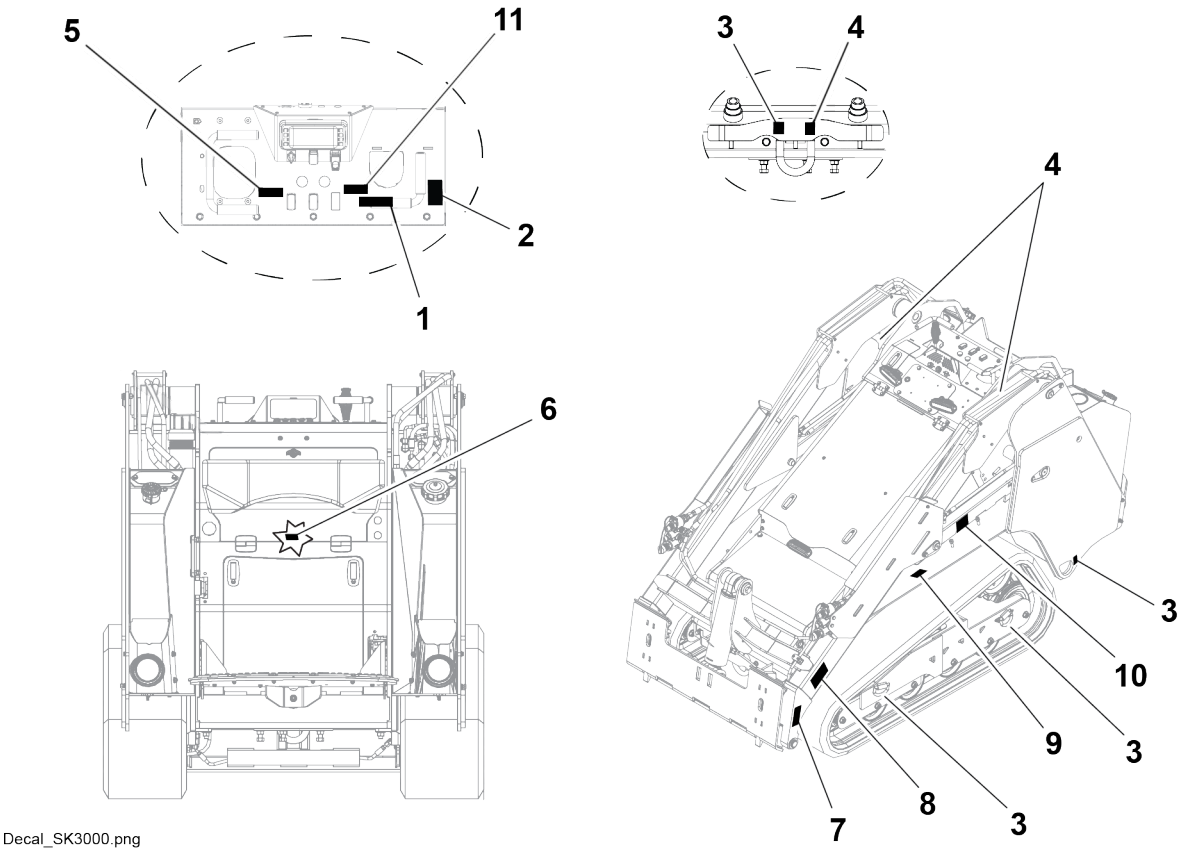
Do not look into cut ends of fiber optic or unidentified cable. Vision damage can occur. Contact utility company.

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.

Machine Safety Alerts



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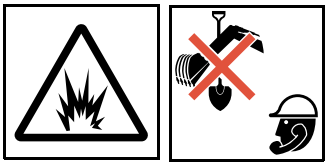
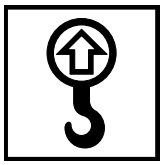
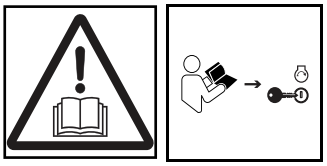
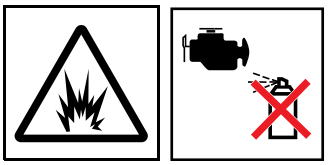
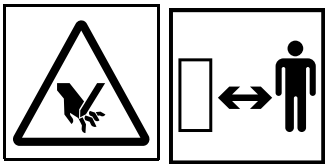
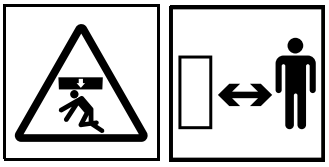
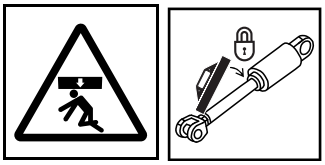
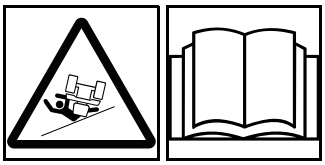
1		**WARNING** Underground utilities. Contact can cause death or serious injury. Locate and verify underground utilities before digging or drilling.
2		**CAUTION** High noise levels. Exposure can cause hearing loss. Wear hearing protection.
3		Tiedown location. See Transport chapter for more information.

4		Lift point. See Transport chapter for more information.
5		**⚠ 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.
6		**⚠ WARNING** Pre-heater. Fire or explosion can cause death or serious injury. Never use starter fluid.
7		**⚠ WARNING** Moving parts. Contact can cause serious injury. Stay away.
8		**⚠ WARNING** Lifted load. Crushing can cause death or serious injury. Stay away from lifted load and its range of movement.
9		**⚠ CAUTION** Hot parts. Contact can cause burns. Only touch when cool or wear gloves.
10		**⚠ WARNING** Raised component. Crushing can cause death or serious injury. Stay away or secure raised component with locking device. Use correct equipment and procedures.
11		**⚠ WARNING** Tipover. Crushing can cause death or serious injury. Follow procedure in operator's manual. Drive cautiously.

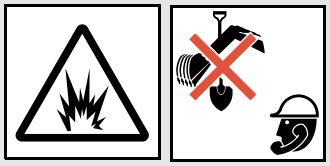
Prepare

Chapter Contents

See "Safety" for additional precautions.

Wear proper personal protective equipment.

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.
- All vegetation near operator station must be removed. Contact with trees, shrubs, or weeds during electrical strike could result in electrocution.
- 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

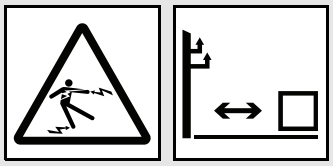
Mark proposed path with white paint and have underground utilities located before working.

- 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

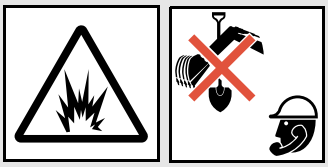
Select a Classification

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:

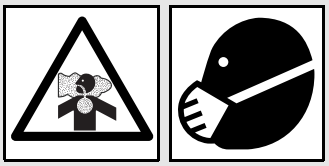
- Expose line by careful hand digging or soft excavation.
- Have service shut down while work is in progress. Have electric company test lines before returning them to service.

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



WARNING 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. Safety Data Sheets (SDS) are available at www.ditchwitch.com/support.
- Use equipment carefully. Stop operation and investigate anything that does not look or feel right.

Any time the jobsite is classified as electric, operator must wear boots and gloves meeting the following standards:

- Boots must have high tops and meet the electric hazard protection requirements of ASTM f2413 or ASTM F1117 when tested at 18,000 volts. Tuck legs of pants completely inside boots.
- Gloves must have 17,000 AC maximum use voltage, according to ASTM specification D120.
- If working around higher voltage, use gloves and boots with appropriately higher ratings.

Prepare Equipment

Check Supplies

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

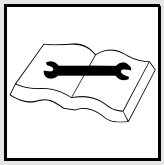
Check Equipment

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

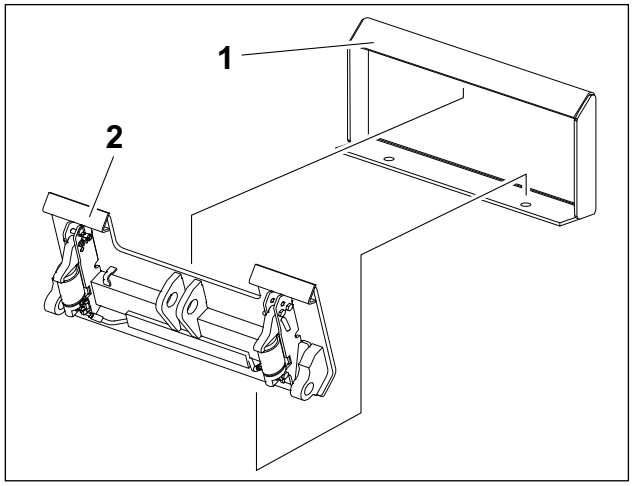
If required, mount fire extinguisher near the power unit but away from possible points of ignition. The fire extinguisher should always be classified for both oil and electric fires. It should meet legal and regulatory requirements.

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 (1) and receiver plates (2) are free of dirt and debris.

1. Position attachment on level surface with enough space behind it to accommodate machine.
2. Start engine.
3. Ensure attachment pins are disengaged.



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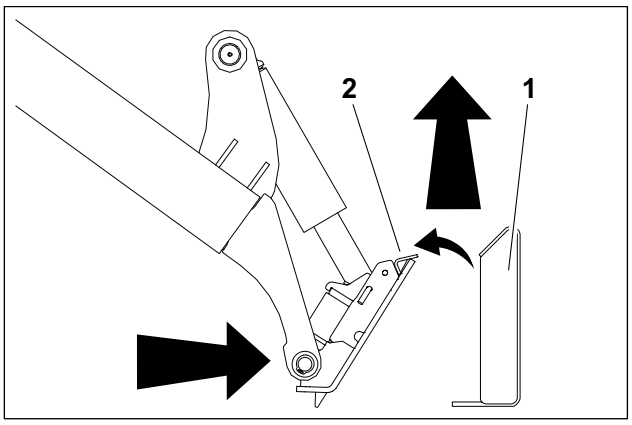
4. Tilt attachment plate (2) forward.
5. Position attachment plate in upper lip of receiver plate (1) on attachment.
6. Raise lift arms while tilting back attachment plate and engage pins.



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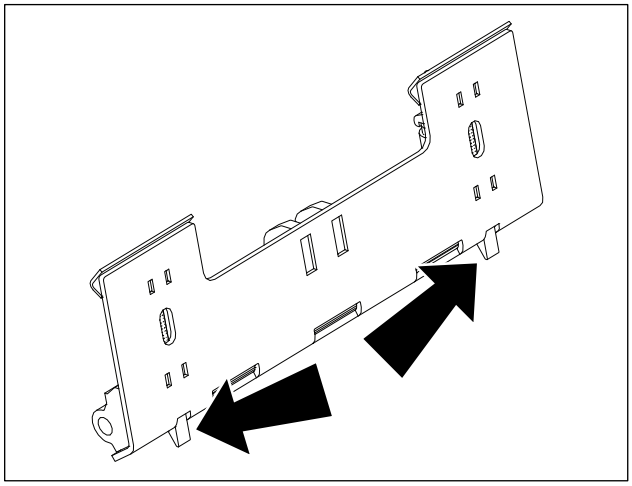
IMPORTANT:

- See "Attachment pin control" on page 50.
- If necessary, drive forward while tilting back attachment plate to engage pins.

7. Ensure pins (shown) are engaged by rotating attachment down.



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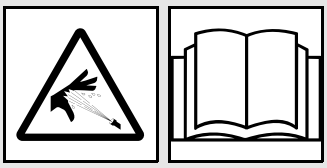
Hydraulic Connection

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.

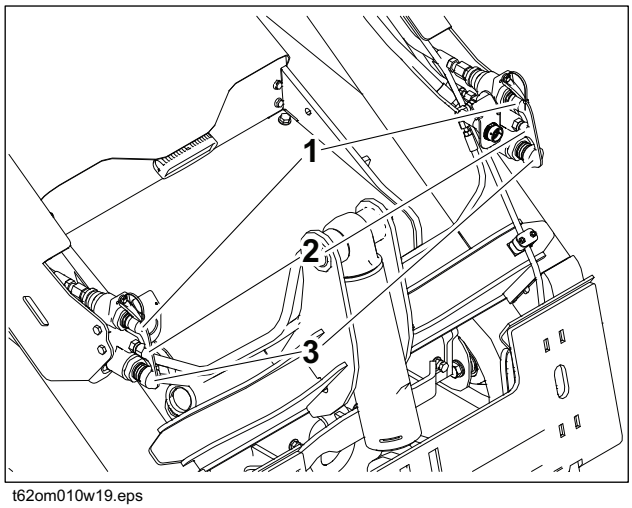
To help avoid injury:

- 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 on 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.



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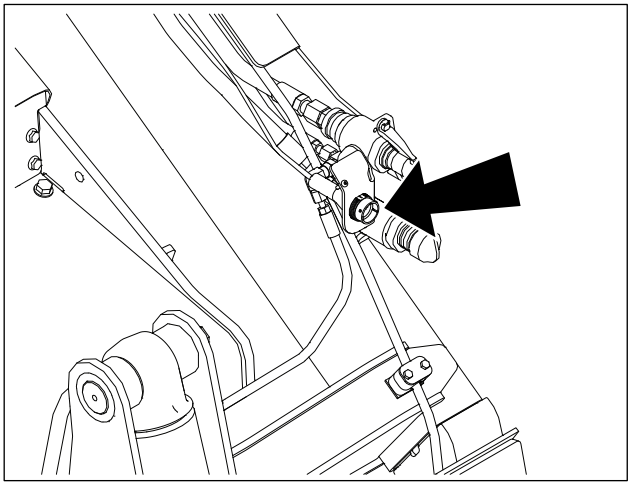
Electrical Connection

If attachment requires electrical power for operation, connect electrical connector from attachment to machine where shown.

Ref.	Connection
1	Live always
2	Momentary switch
3	Momentary switch
4	Momentary switch
5	Ground
6	Switch on/off
7	Live always



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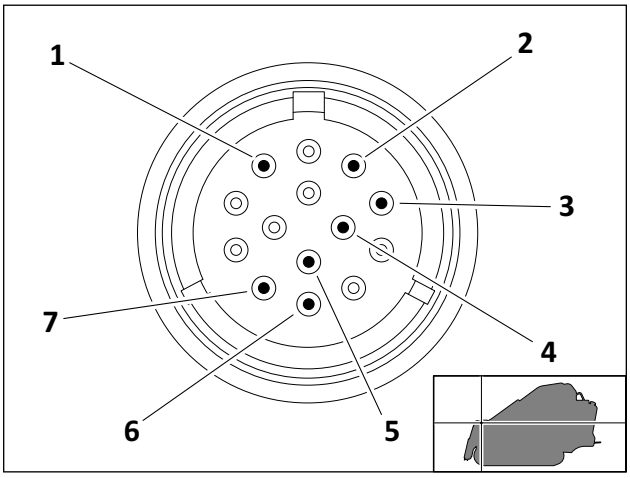

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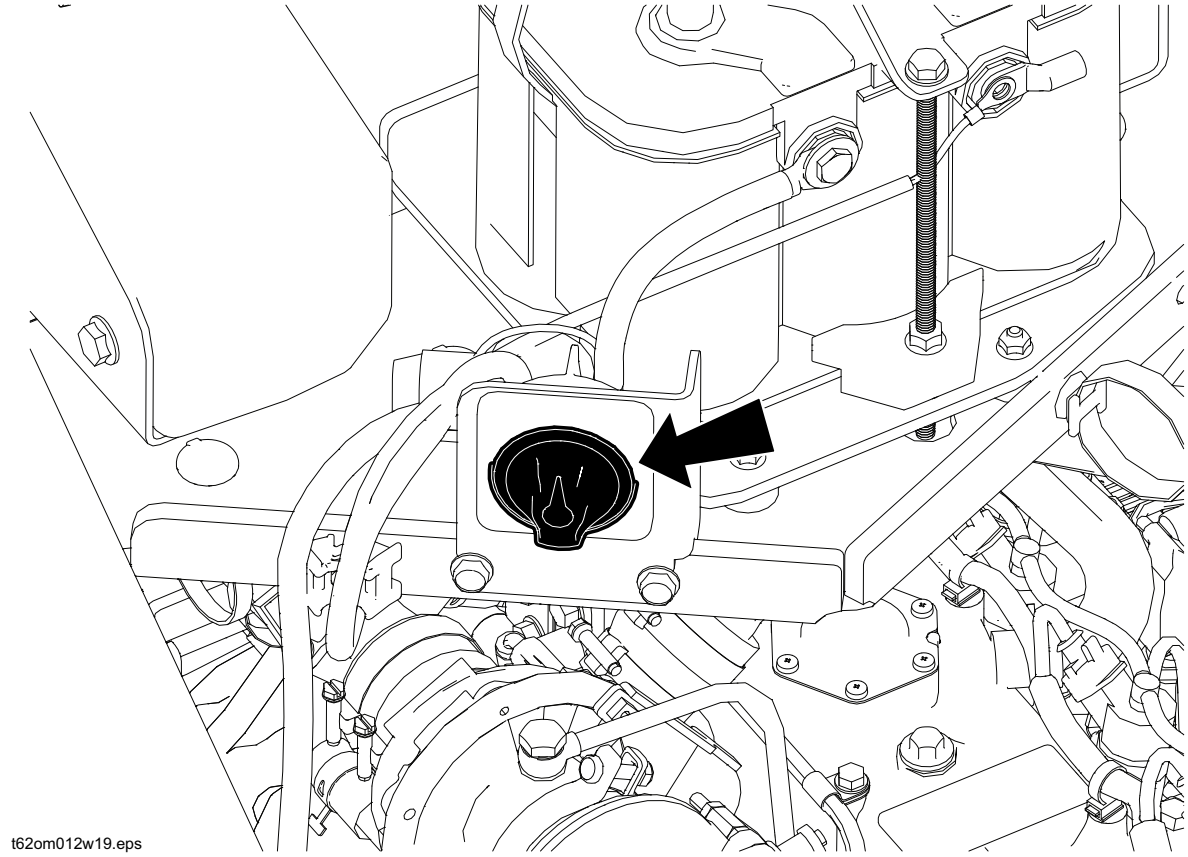
Controls

Chapter Contents

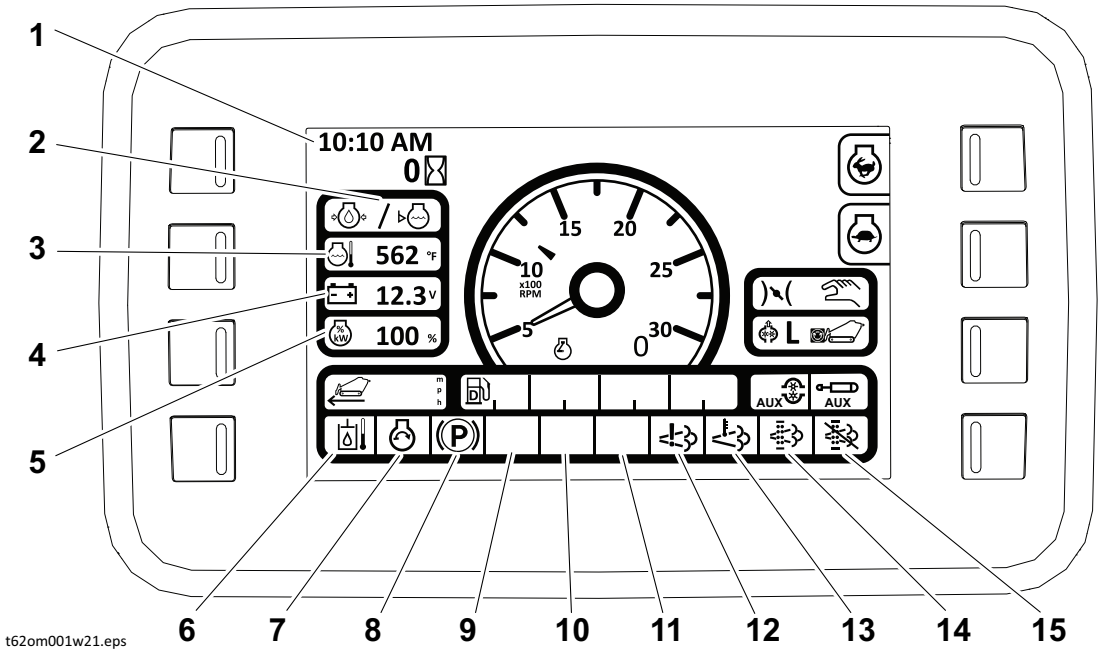
Battery Disconnect



Item	Description	IMPORTANT
Battery disconnect switch	To disconnect, move left. To connect, move right.	***NOTICE:*** • Do not disconnect with engine running. • To avoid equipment damage, wait two minutes after turning engine off before disconnecting battery. Top of battery disconnect switch can be removed for maintenance or long-term storage.

Display

Gauges and Indicators



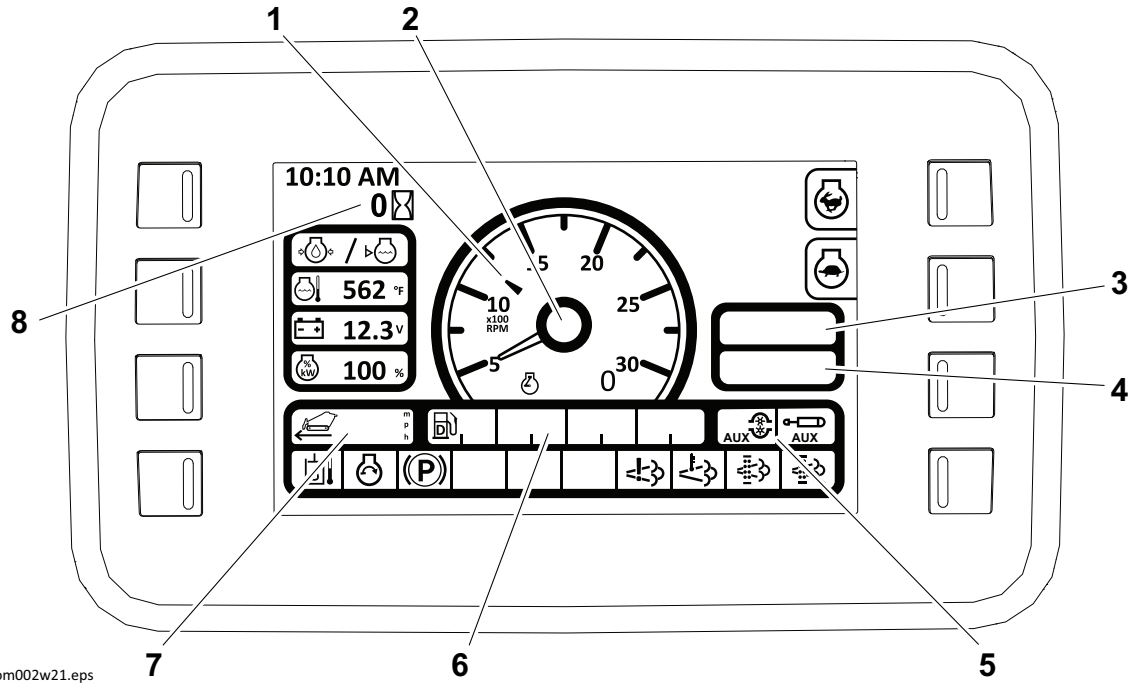
1. Real time clock
2. Engine coolant/oil pressure indicator
3. Engine coolant temperature gauge
4. Voltmeter
5. Engine load gauge
6. Hydraulic fluid temperature indicator
7. Engine start indicator
8. Parking brake indicator
9. Ride control/Self-level indicator
10. Engine warning/stop indicator
11. Operator presence indicator
12. Exhaust cleaning system error indicator
13. High exhaust temperature indicator
14. Exhaust cleaning indicator
15. Exhaust cleaning disabled indicator

Item	Description	IMPORTANT
1. Real time clock	Displays time.	
2. Engine coolant/oil pressure indicator	 Lights when engine coolant level and/or engine oil pressure is low.	

Item	Description	IMPORTANT
3. Engine coolant temperature gauge	 Displays engine coolant temperature.	
4. Voltmeter	 Displays system voltage.	
5. Engine load gauge	 Displays engine load.	
6. Hydraulic fluid temperature indicator	 Lights when hydraulic fluid temperature is high.	
7. Engine start indicator	 Lights during engine startup.	If indicator turns off while starting engine, allow starter to cool 30 seconds. See "Start" on page 52.
8. Parking brake indicator	 Lights when parking brake is set.	
9. Ride control/Self-level indicator	 Lights when ride control is selected.  Lights when self-level is selected.	See "Ride control/Self-level switch" on page 50.
10. Engine warning/stop indicator	 Lights when engine needs attention.  Lights when operator needs to stop engine.	
11. Operator presence indicator	 Lights when operator is not on platform.  Lights when operator is on platform.	
12. Exhaust cleaning system error indicator	 Lights when an error is detected in exhaust cleaning system.	If indicator lights, contact your Ditch Witch dealer.
13. High exhaust temperature indicator	 Lights when exhaust temperature is high.	Will light during exhaust cleaning.
14. Exhaust cleaning indicator	 Lights when exhaust cleaning is needed.	

Item	Description	IMPORTANT
15. Exhaust cleaning disabled indicator	 Lights when operator has disabled exhaust cleaning.	***NOTICE:*** Failure to complete an exhaust cleaning when required can cause engine damage.

Gauges and Indicators

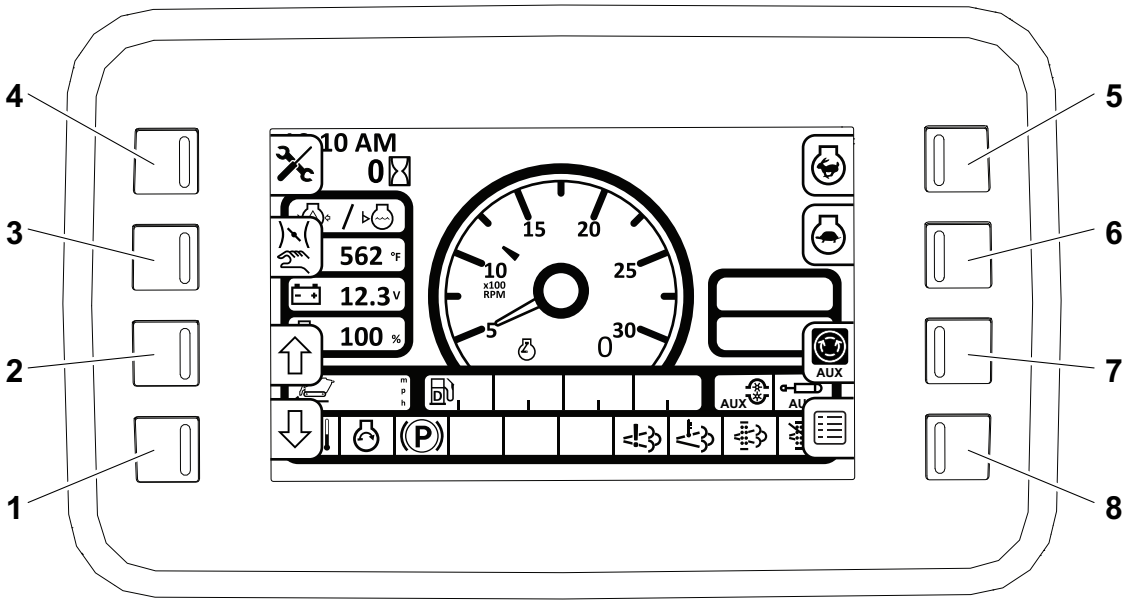


1. Tachometer setpoint indicator
2. Tachometer
3. Throttle mode indicator
4. Attachment lock/Flow selection indicator
5. Spool mode indicator
6. Fuel gauge
7. Ground drive speed
8. Hourmeter

Item	Description	IMPORTANT
1. Tachometer setpoint indicator	Indicates target engine speed.	Set by operator.
2. Tachometer	Displays engine speed.	
3. Throttle mode indicator	Lights when throttle is inhibited.	Throttle has ten second delay when engine coolant temperature is below 0°F (38°C).
	Lights when manual throttle is enabled.	
	AUTO Lights when autothrottle is enabled.	
	Lights when throttle needs to be returned to low.	See "Throttle" on page 49.

Item	Description	IMPORTANT
4. Attachment lock/Flow selection indicator	 Lights when auxiliary function is not locked.  Lights when auxiliary function is locked.  Lights when high flow is selected.  Lights when low flow is selected.	Only auxiliary A (high/low) circuit is lockable. See "Auxiliary lock switch" on page 49. Background turns green when auxiliary function is locked.
5. Spool mode indicator	 Lights when circuit is in motor spool mode.  Lights when circuit is in cylinder spool mode.	Only auxiliary A (high/low) circuit can be configured. Auxiliary B (medium) circuit is always in cylinder mode.
6. Fuel gauge	 Displays level of fuel.	
7. Ground drive speed	 Displays ground drive speed.	
8. Hourmeter	 Displays engine operating time.	Use these times to schedule maintenance.

Soft Keys



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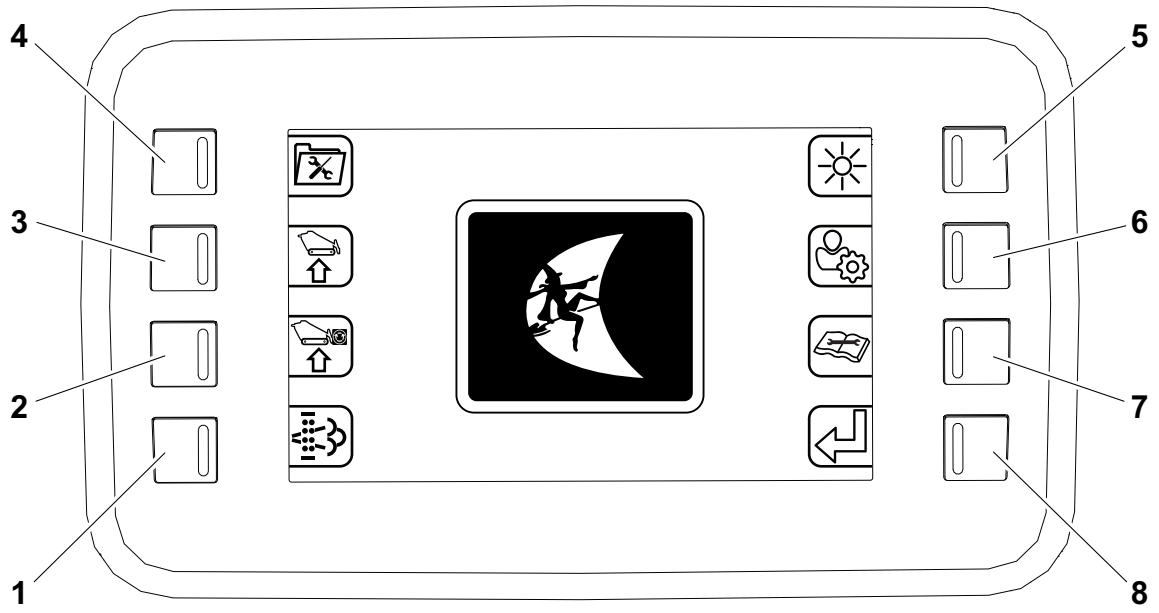
1. Previous key
2. Next key
3. Autothrottle key
4. Hide/Recall key
5. Throttle up control
6. Throttle down control
7. Service reminder/spool mode selector key
8. Main menu key

Item	Description	IMPORTANT
1. Previous key	To scroll to previous message, press.	
2. Next key	To scroll to next message, press.	
3. Autothrottle key	To enable autothrottle mode, press. AUTO To enable manual throttle mode, press again.	See "SmartThrottle™" on page 56.
4. Hide/Recall key	To hide/recall diagnostic or interlock message, press.	

Item	Description	IMPORTANT
5. Throttle up control	 To increase engine speed when in display throttle mode, press.	
6. Throttle down control	 To decrease engine speed when in display throttle mode, press.	
7. Spool mode select/ service reminder key	 To view/enter spool mode select screen, press.  If service interval is due, pressing key will display that information.	To enter spool mode select screen after viewing service interval information, return to main screen and press key again.
8. Main menu key	 To select main menu, press.	

Main Menu



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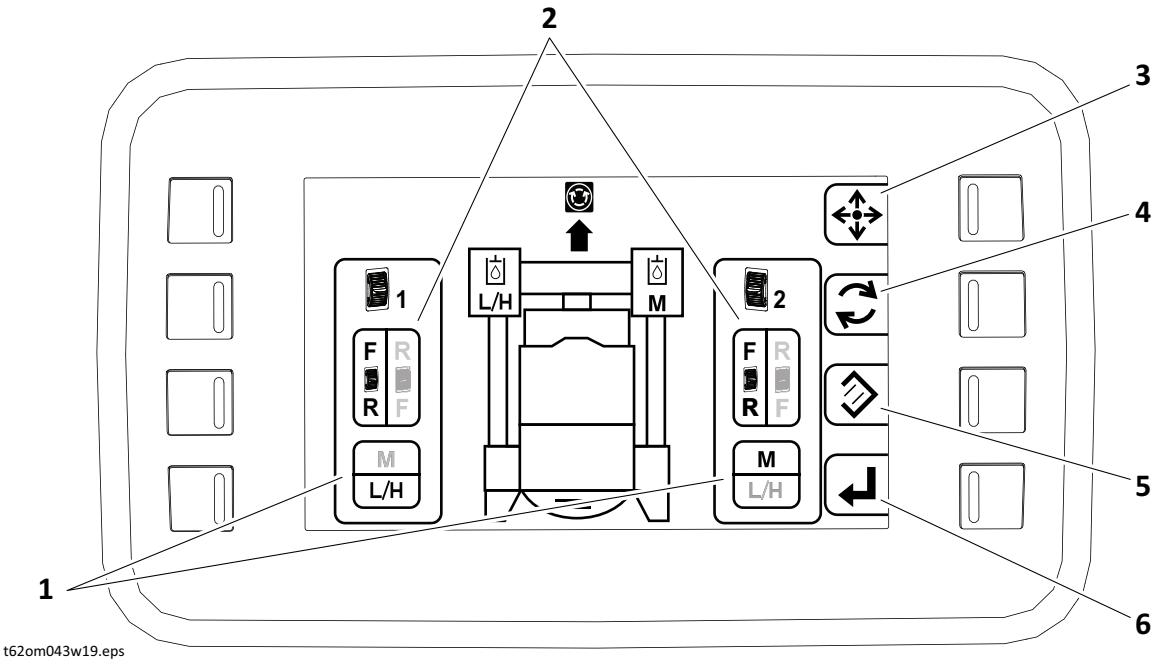
1. Exhaust cleaning menu key
2. Auxiliary setup menu key
3. Machine settings key
4. Diagnostics key
5. Brightness key
6. User settings menu key
7. Service menu key
8. Return key

Item	Description	IMPORTANT
1. Exhaust cleaning menu key	To display exhaust cleaning information, press.	Parked cleanings can be initiated and automatic exhaust cleanings can be enabled/disabled in this screen.
2. Auxiliary setup menu key	To customize auxiliary functions, press.	See "Auxiliary Setup Menu" on page 42.
3. Machine settings key	To customize settings, press.	Throttle mode and ride control speed can be adjusted in this screen.
4. Diagnostics key	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.
5. Brightness key	To change brightness of display, press.	

Item	Description	IMPORTANT
6. User settings menu key	 To customize settings, press.	See "User Settings Menu" on page 44.
7. Service menu key	 To display service menu, press.	Total hours for engine, pump and attachment can be viewed and service intervals can be reset in this screen.
8. Return key	 To return to main screen, press.	

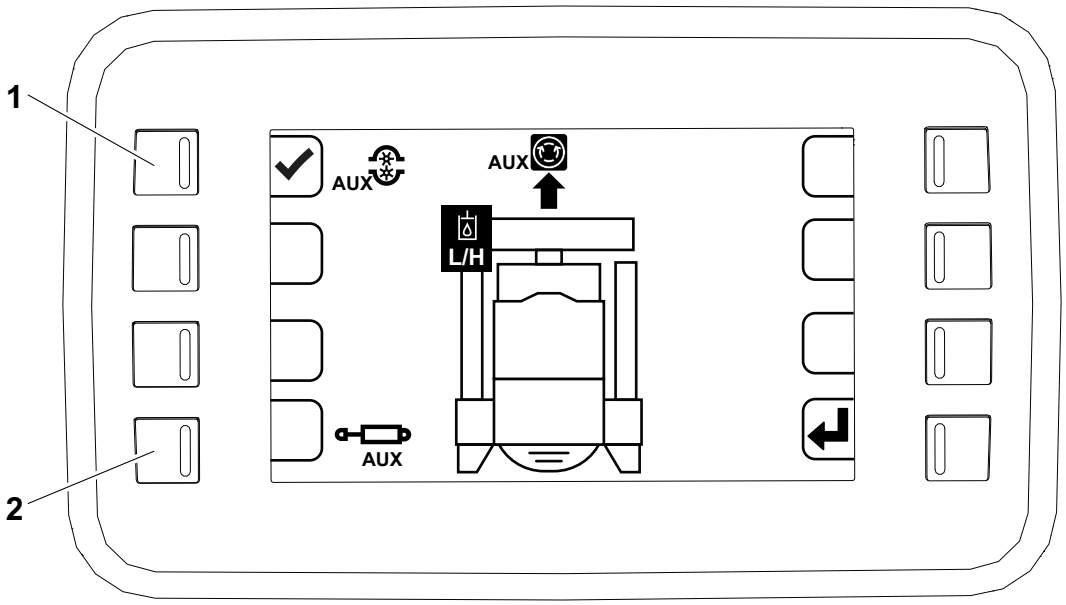
Auxiliary Setup Menu



IMPORTANT: Use the auxiliary control menu to invert auxiliary control function and to change hydraulic fluid flow selection. Auxiliary control setup options are saved until changed.

Item	Description	IMPORTANT
1. Flow selection indicator	Indicates flow selection.	
2. Auxiliary control direction indicator	Indicates auxiliary control direction.	
3. Function selection key	To scroll through function selections, press.	Current selection will be highlighted.
4. Change selection key	To change selection setting, press.	Ensure auxiliary controls are in neutral before changing setting.
5. Reset key	To restore auxiliary functions to default settings, press.	
6. Return key	To return to main screen, press.	

Spool Mode Select Screen



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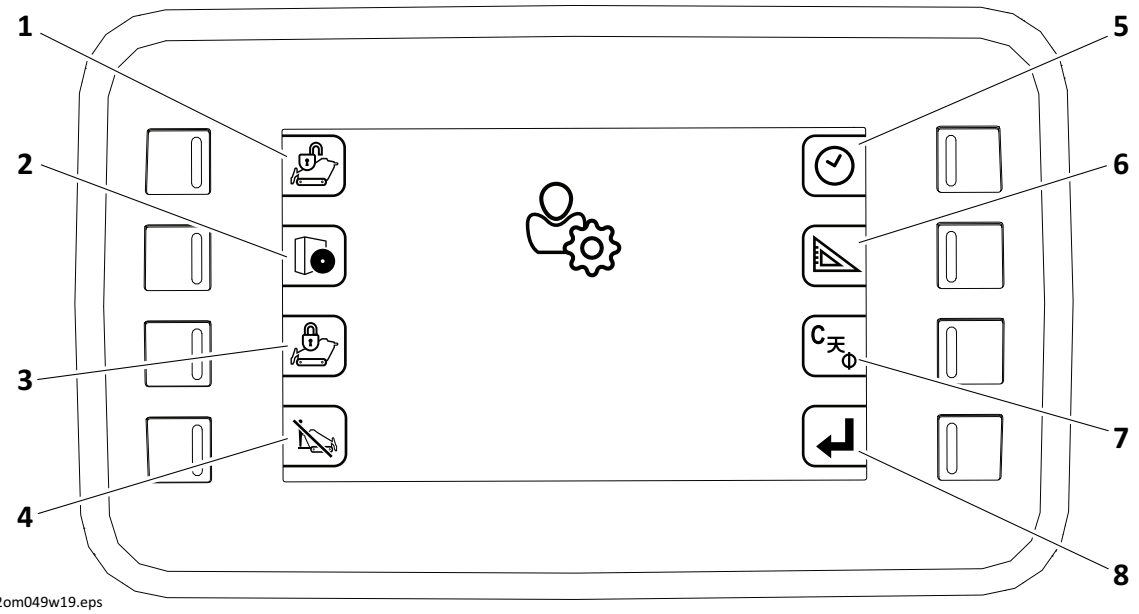
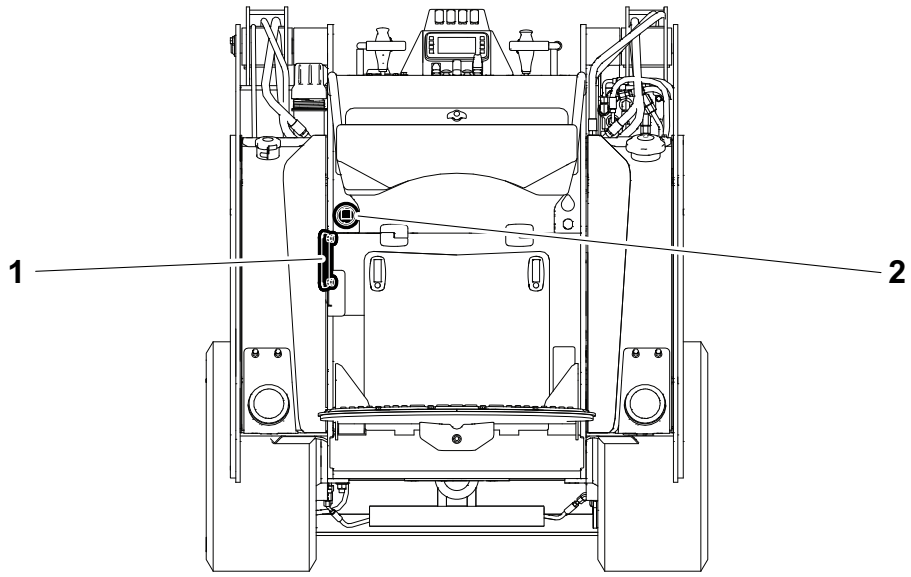
Item	Description	IMPORTANT
1. Motor spool mode	AUX To enter motor spool mode, press.	In this mode: • High/low circuit will have ramp up and ramp down. • Ramping time can be adjusted by dealer.
2. Cylinder spool mode	AUX To enter cylinder spool mode, press.	***NOTICE:*** Machine and attachment damage can occur if motor attachment is used in cylinder mode. In this mode: • High/low circuit will immediately open and close according to input control. • There is no ramping.

User Settings Menu



Item	Description	IMPORTANT
1. Passcode setting menu key	To customize passcode settings, press.	Only accessible when logged in as machine owner.
2. Software version key	To view software version, press.	
3. Lock machine key	To lock machine, press.	If machine is locked, operator will be required to re-enter password next time engine is started.
4. Secondary operator sensing (SOS) key	To temporarily operate if platform is raised, press.	See "Secondary Operator Sensing (SOS)" on page 56.
5. Real time clock key	To customize real time clock, press.	
6. Units of measurement key	To customize units of measurement, press.	
7. Language key	To customize language, press.	
8. Return key	To return to main screen, press.	

Gauges and Indicators



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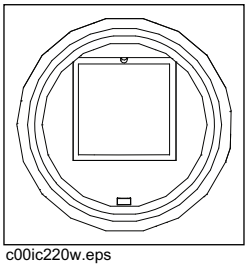
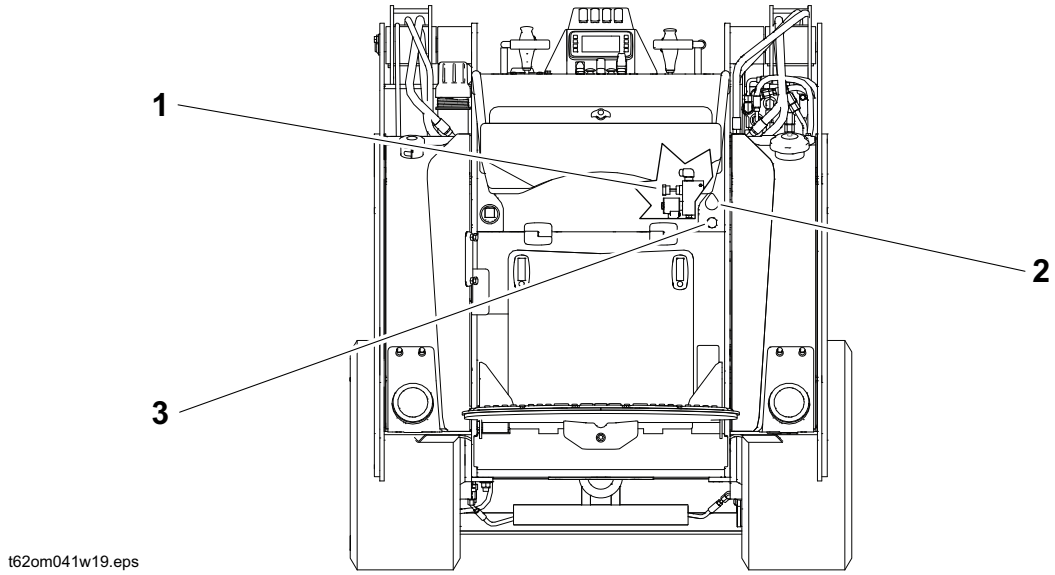
Item	Description	IMPORTANT
1. Hydraulic fluid level sight glass	Shows level of hydraulic fluid in tank.	
2. Air filter service indicator  c00ic220w.eps	Indicates condition of air filter.	Replace air filter when red band on indicator is visible. See "Filter, Air" on page 81.

Miscellaneous



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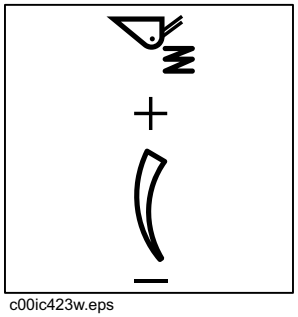
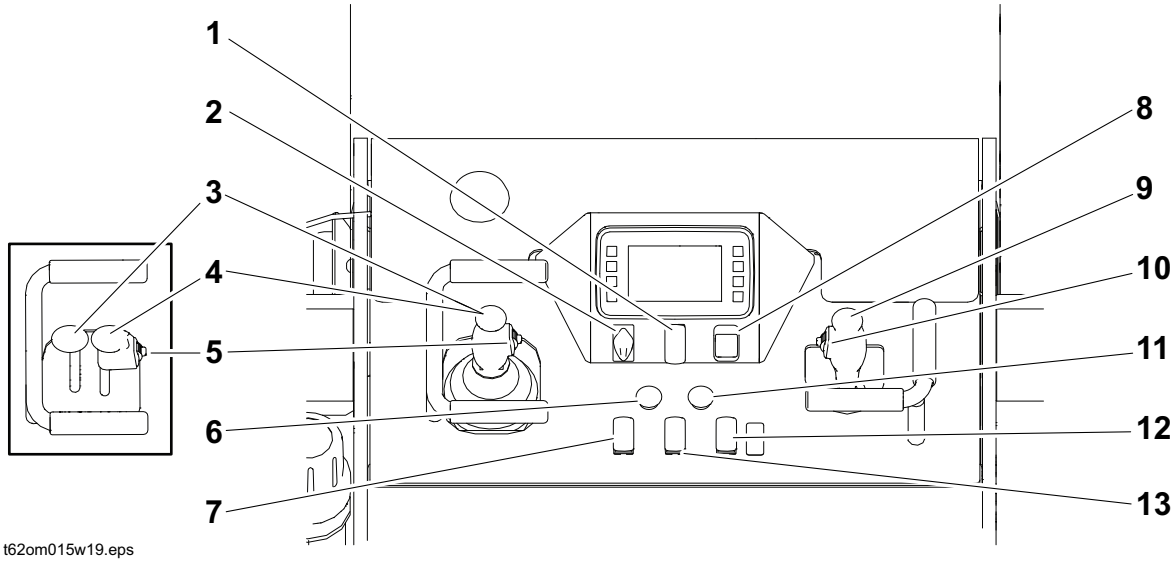
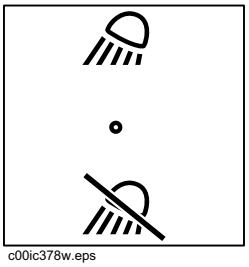
Item	Description	IMPORTANT
1. Accumulator manual valve  c00ic423w.eps	Follow procedure below before using this knob to prevent trapped pressure in accumulator. 1. Lower lift arms. 2. Push lift arms into float. 3. Shut off machine. Turn right to close valve and disable ride control. Turn left to open and enable.	Valve must be open and ride control selected at ride control/self-level switch for ride control to function.
2. Auxiliary outlet	Provides power for other equipment.	DC12V, 15A (180W)
3. USB port	Provides power for mobile devices.	DC5V, 1A (5W) DC5V, 2.1A (10.5W)

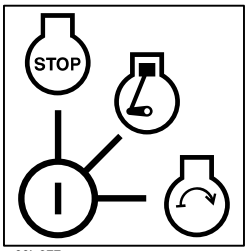
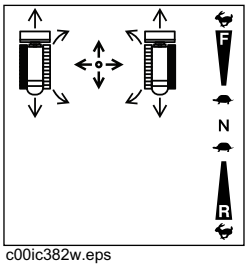
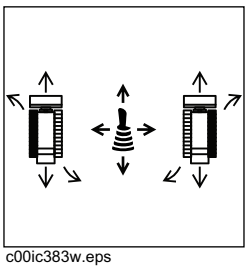
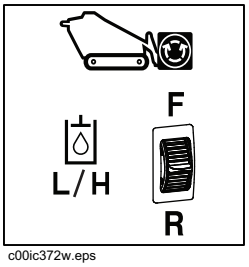
Operator Station Console

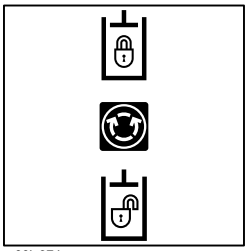
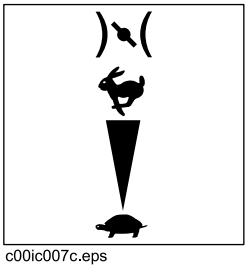
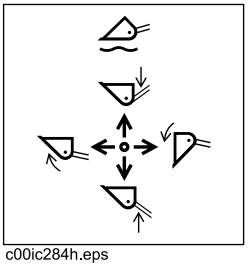


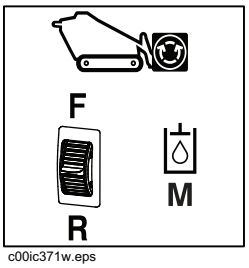
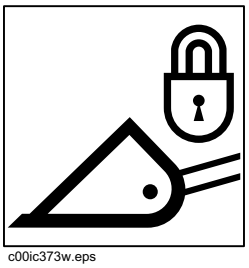
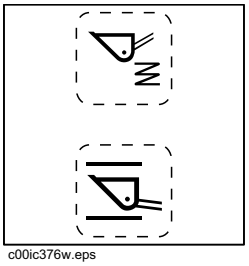
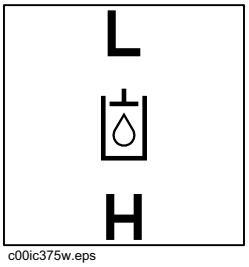
1. Work light switch
2. Ignition switch
3. Left track drive control/Track drive joystick*
4. Right track drive control/Track drive joystick*
5. High/Low auxiliary control
6. Parking brake
7. Auxiliary lock switch
8. Throttle
9. Lift arm control
10. Medium auxiliary control
11. Attachment pin control
12. Ride control/Self-level switch*
13. Auxiliary flow selection switch

*If equipped

Item	Description	IMPORTANT
1. Work light switch  c00ic378w.eps	To turn on, press top. To turn off, press bottom.	

Item	Description	IMPORTANT
2. Ignition switch  c00ic377w.eps	To activate accessories, turn right. To start engine, turn fully right. To shut off machine, turn left.	If needed, follow display prompts to enter passcode.
3. Left track drive control **4. Right track drive control**  c00ic382w.eps	To drive forward, push both controls forward. To move in reverse, pull back. To go faster in any direction, move farther from neutral position. To steer, move left or right.	See "Steer" on page 54.
Track drive joystick  c00ic383w.eps	To drive forward, push. To drive in reverse, pull. To go faster in any direction, move farther from neutral position. To steer, move left or right.	See "Steer" on page 54.
5. High/Low auxiliary control  c00ic372w.eps	To move attachment forward, move up. To stop movement, release. To move in reverse, move down.	Use this control based on attachment flow requirements. See "Medium auxiliary control" on page 50.

Item	Description	IMPORTANT
6. Parking brake  c00ic055t.eps	To set, pull. To release, push.	
7. Auxiliary lock switch  c00ic374w.eps	To lock auxiliary function, press. To unlock, press again.	Auxiliary function must be at 80% or greater in either direction to be locked. See "High/Low auxiliary control" on page 48. Control locks high/low auxiliary function at 100%.
8. Throttle  c00ic007c.eps	To increase engine speed, push. To decrease, pull.	Control only functions if console throttle mode is selected. See "Main Menu" on page 40. 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.
9. Lift arm control  c00ic284h.eps	To move lift arms down, push. To float, push to end. To move lift arms up, pull. To curl attachment up, move left. To curl attachment down, move right.	

Item	Description	IMPORTANT
10. Medium auxiliary control  c00ic371w.eps	To rotate attachment forward, move up. To stop attachment movement, move to middle. To rotate attachment in reverse, move down.	Use this control based on attachment flow requirements. See "High/Low auxiliary control" on page 48.
11. Attachment pin control  c00ic373w.eps	To engage attachment pins, push down. To disengage attachment pins, pull up.	Alarm sounds and pop-up message appears on display when pins are disengaged.
12. Ride control/Self-level switch  c00ic376w.eps	To select ride control, press top. To select self-level, press bottom.	When ride control is selected, machine automatically dampens loader arms based on ground drive speed set in display by operator. If self-level is selected, machine automatically keeps attachment plate level when operating.
13. Auxiliary flow selection switch  c00ic375w.eps	To select low, press top. To select high, press bottom.	Select low or high auxiliary flow based on attachment.

Drive

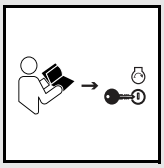
Chapter Contents

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

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

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.

Initial Use

Machine will come preset with default owner and operator passcodes. Change passcodes immediately upon purchase of machine. See "Passcode setting menu key" on page 44.

Default owner passcode: 9 + last four digits of machine serial number.
Default operator passcode: last four digits of machine serial number.

Standard Operation

1. Ensure all controls are in neutral.
2. Set parking brake.
3. Activate accessories using ignition switch.
4. Enter operator passcode, if required.

> **IMPORTANT:** If operation becomes locked out due to too many password attempts, follow on-screen prompts and contact your Ditch Witch dealer.

5. **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:

   5.1 Start engine.

   5.2 Set parking brake.

   5.3 Warm engine and hydraulic fluid by gradually increasing engine speed for up to 30 minutes.

   5.4 After warmup, carefully operate all hydraulic controls at low throttle until controls operate as described in controls chapter.

Steer

Single Joystick Ground Drive

To steer while moving forward, push joystick and then move left or right. Machine will gradually turn.

To steer while moving in reverse, pull joystick and then move left or right. Machine will gradually turn.

For tight steering at low speed, return joystick to neutral position and then to a corner. Tracks will counter-rotate and machine will turn in a tight circle.

Dual Lever Ground Drive

To steer while moving forward, move one joystick slightly more than the other to turn in desired direction. Machine will gradually turn.

To steer while moving in reverse, move one joystick slightly more than the other to turn in desired direction. Machine will gradually turn.

For tight steering at low speed, release joystick and then move left or right.

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 49.

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

Slope Guidelines

⚠ WARNING Tipover. Crushing can cause death or serious injury. Follow procedure in operator's manual. Drive cautiously.

To help avoid injury:

- Operate at slow speed when on rough terrain.
- Avoid driving across slopes.
- Never jerk control levers. Use a steady, even motion.
- Always operate with heavy end uphill.
- Always drive with attachment low to the ground.
- See page 78 for operating capacity.

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 both tracks

SmartThrottle™

The SK3000 is equipped with two automatic throttle modes: autothrottle and platform throttle.

Autothrottle

IMPORTANT:

- Engine coolant temperature must be at least 140°F (60°C) for autothrottle to function.
- See "Autothrottle key" on page 38.
- Once ground drive speed and engine load are lowered, there is a ten second delay before engine throttle automatically decreases.

When using autothrottle, machine will automatically adjust engine throttle depending on ground drive speed and engine load. When either ground drive speed or engine load is high, throttle will be increased to target engine speed. When both ground drive speed and engine load are low, throttle will be decreased to low.

Platform Throttle

Platform throttle will automatically adjust engine throttle depending on operator's presence. When operator steps off of platform, throttle will be decreased to low, disabling auxiliary function. When operator steps back on platform, throttle will be increased to target engine speed and auxiliary functions will be enabled.

Secondary Operator Sensing (SOS)

IMPORTANT:

- Auxiliary function is disabled when using secondary operator sensing.
- Do not use for normal operation.

To temporarily operate if platform is raised, use secondary operator sensing (SOS).

1. Start engine.
2. Move throttle to desired position.
3. Enable secondary operator sensing (SOS). See "Secondary operator sensing (SOS) key" on page 44.
4. Move and hold medium auxiliary control fully in either direction. Throttle will increase to target engine speed.
5. Using ground drive and lift arm controls, move machine until platform returns to normal position.
6. Return all controls to neutral.
7. Return to main display screen.
8. Continue normal operation.

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, lock machine.
9. For maintenance or long-term storage, disconnect battery using battery disconnect switch.

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

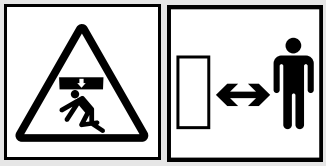
Transport

Chapter Contents

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

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

Lift

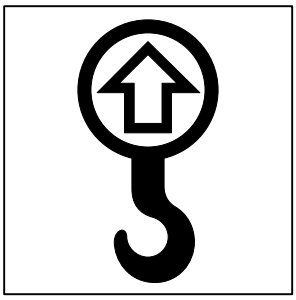


WARNING Lifted load. Crushing weight can cause death or serious injury. Stay away from lifted load and its range of movement.

To help avoid injury: Only lift unit without attachment installed.

Points

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



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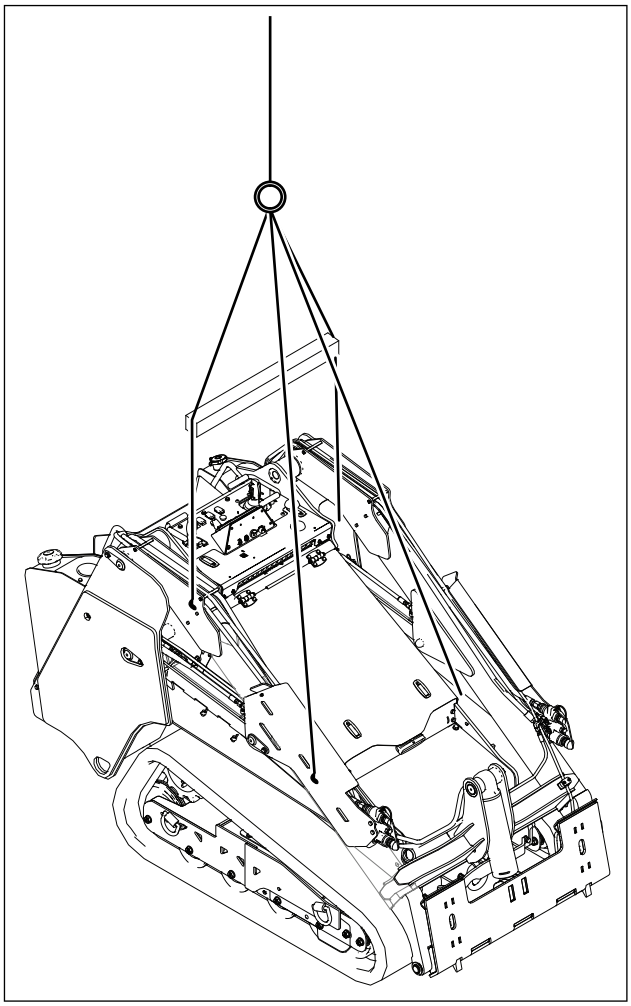
Procedure

NOTICE: Do not lift machine with attachments installed.

Use a equipment capable of supporting the machine's size and weight to lift as shown. See "SK3000" on page 94 or measure and weigh equipment before lifting.



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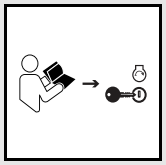
Haul

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.

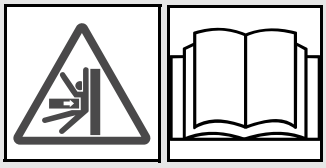
To help avoid injury:

- 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.

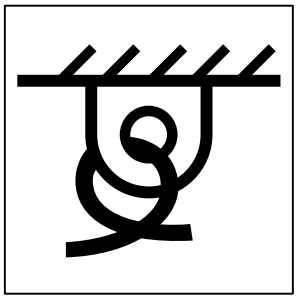
To help avoid injury: Start and operate only from platform.

1. Start engine.
2. Release parking brake.
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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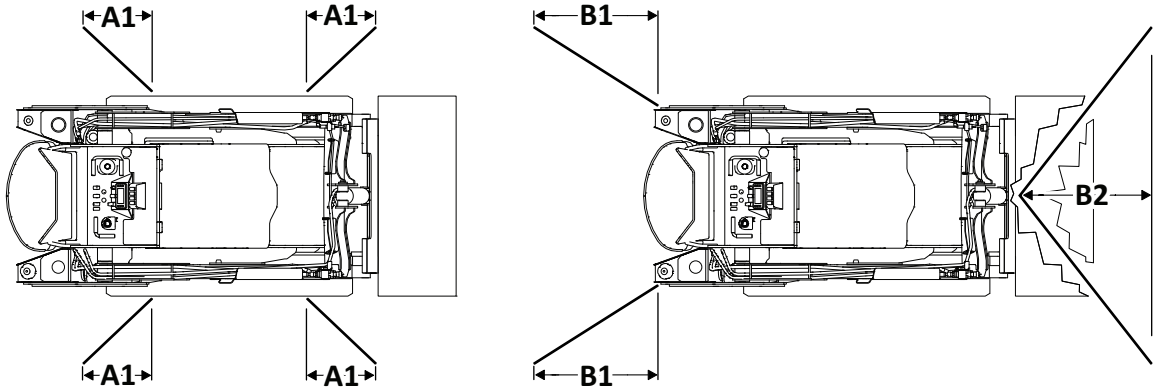
Procedure

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



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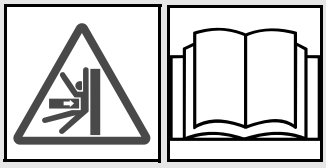
Distance	US	Metric
A1	8-18”	20-46cm
B1	8-10”	20-25cm
B2	24-40”	61-102cm

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.

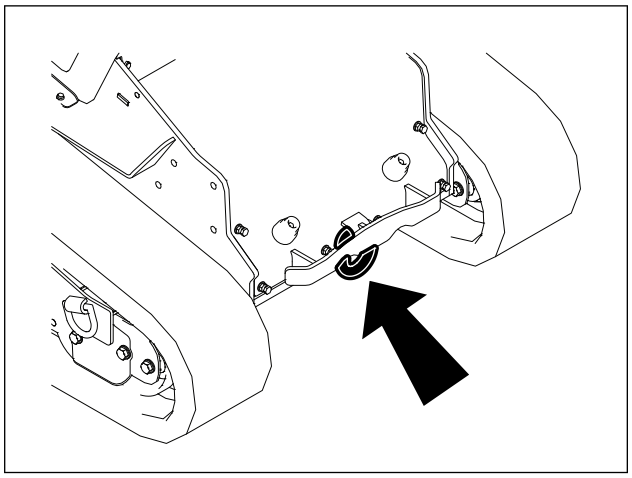
Retrieve

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 if engine will start.
2. Block tracks to prevent machine from rolling.

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



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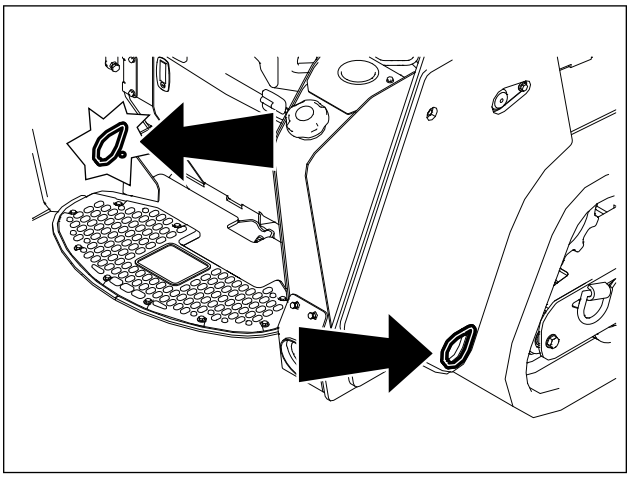

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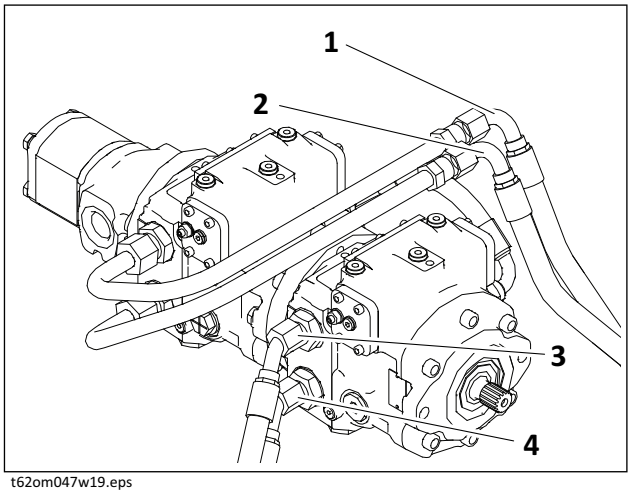
4. Disconnect hoses (1, 2) and connect ends together with connector.
5. Cap ports on ground drive pump.
6. Disconnect hoses (3, 4) and connect ends together with connector.
7. Cap ports on ground drive pump.



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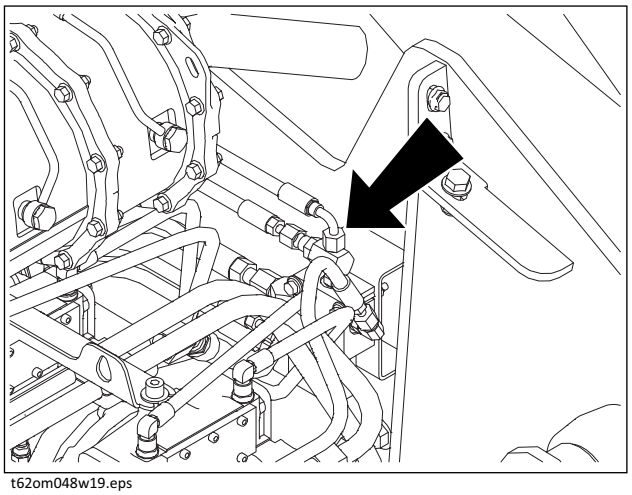
8. If engine will start, release parking brake.

   If engine will not start, disconnect brake hose (shown) and connect to external power pack to provide hydraulic pressure to release parking brake.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> ***NOTICE:*** Do not exceed 400psi (27.6bar).

> **IMPORTANT:**
>
> - If brake hose is disconnected, machine will have no brakes.
> - Ensure machine is shut off.
> - Maintain hydraulic flow during retrieval.

9. Cap port on brake valve.
10. Remove blocks.
11. Reconnect brake hose, if required.
12. Reconnect hoses to ground drive pump.
13. Remove blocks.

Complete the Job

Chapter Contents

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

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.

Disconnect Attachment

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

Stow Tools

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

Store Machine

Before storing, ensure machine is rinsed, equipment is stowed, and all fluids are filled. For more information for filling fluids, see Maintenance chapter or contact your Ditch Witch dealer.

Store Long-Term

To store machine for periods of time exceeding two months:

- Ensure exposed parts are treated with anti rust agent.
- Touch up paint as needed to prevent rusting.
- Lubricate machine and apply grease to unpainted surfaces.
- Cover exhaust pipe.

Decommission Machine

Before decommissioning machine, follow local regulations for disposing of hazardous substances. For more information on draining fluids, see Maintenance chapter or contact your Ditch Witch dealer.

Maintenance

Chapter Contents

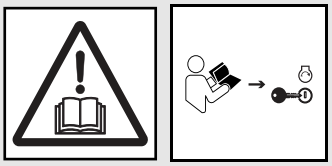
For additional precautions, see "Safety" and "Prepare" chapters.

Maintenance 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 maintenance should be performed with the engine off and cool.
- Lower unsecured, raised components before servicing equipment.
- Unless otherwise instructed, all maintenance 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

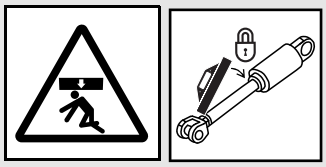
NOTICE: Do not spray water onto operator's console or electrical center in engine compartment. Water can damage electrical components. Wipe down instead.

Welding Precaution

NOTICE: Welding can damage electronics.

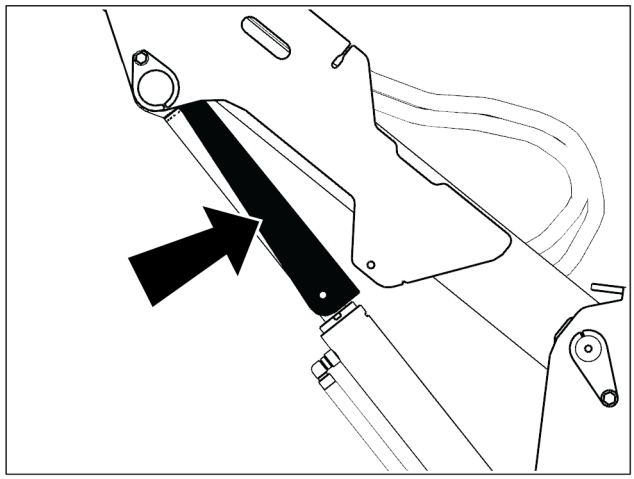
- Welding currents can damage electronic components. Always disconnect the ECU ground connection from the frame, harness connections to the ECU, and other electronic components prior to welding on machine or attachments.
- Connect welder ground close to welding point and make sure no electronic components are in the ground path.
- Disconnect battery at battery disconnect switch before welding to prevent damage to battery. See "Battery" on page 79.
- 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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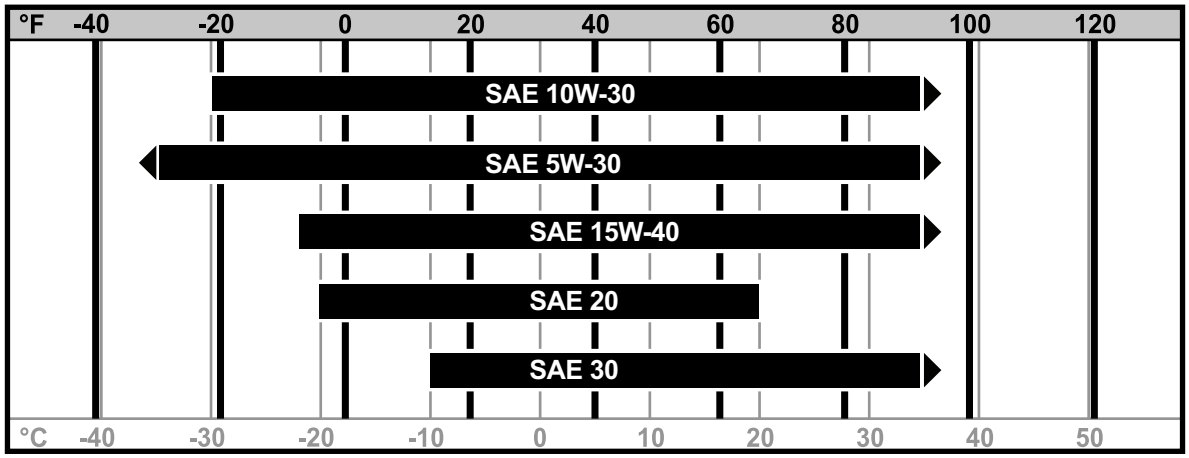
Recommended Lubricants

Item	Description
DEAC	Diesel engine antifreeze/coolant, low silicate, fully-formulated meeting ASTM D6210 See "Approved Coolant" on page 75.
DEO	Diesel engine oil meeting or exceeding API service classification CJ-4, ACEA E6, or JASO DH-2. Engine must use low sulfated ash, phosphorous, and sulfer (low SAPs) oil. See viscosity chart. 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 Fuid, Mobilfluid® 423, Chevron® Tractor Hydraulic Fluid, Texaco® TDH Oil, or equivalent

Proper lubrication and maintenance protects Ditch Witch equipment from damage and failure. Maintenance 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 "SK3000" on page 94.

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

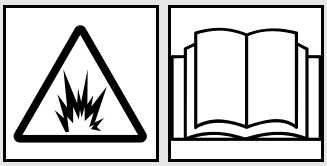
Approved Coolant

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 ASTM D6210 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 separates soot caused by the combustion of diesel fuel from the exhaust gases exiting the engine. The DPF must be cleaned as the soot level increases.

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. Contact your Yanmar® engine distributor for this service.

Maintenance Interval Chart

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

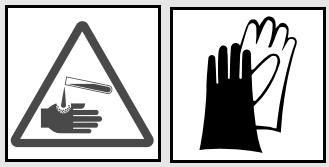
▽	Adjust, service, or test	□	Change, initial	○	Lube, initial
▲	Check	■	Change	●	Lube

Service	Startup	10 Hours	50 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	▲	▲					
Intake air line				▲			
Oil, engine	▲	▲	□	■			
Platform switch							▽

Service	Startup	10 Hours	50 Hours	250 Hours	500 Hours	1000 Hours	As Needed
Radiator/Hydraulic fluid cooler			▲				▽
Track tension	▲	▲					▽

Procedures

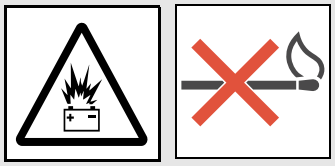
Battery



WARNING 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.



WARNING 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:

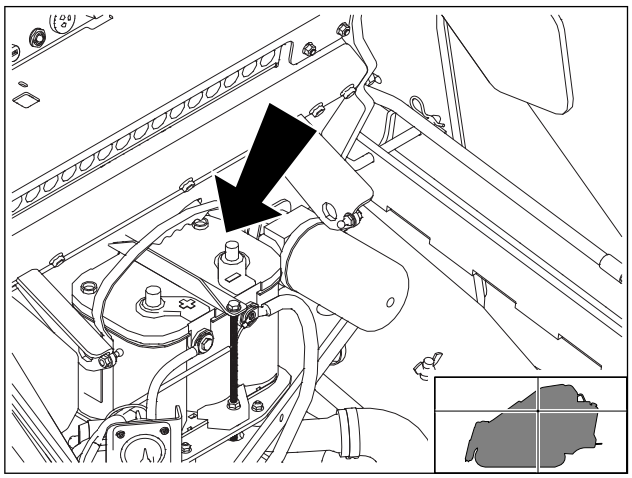
- Use a single 12V maximum source for charging. Never connect to rapid chargers or dual batteries.
- Never lean over battery when making connections.
- Never allow vehicles to touch when charging.
- Never short-circuit battery terminals for any reason or strike battery posts or cable terminals.
- Refer 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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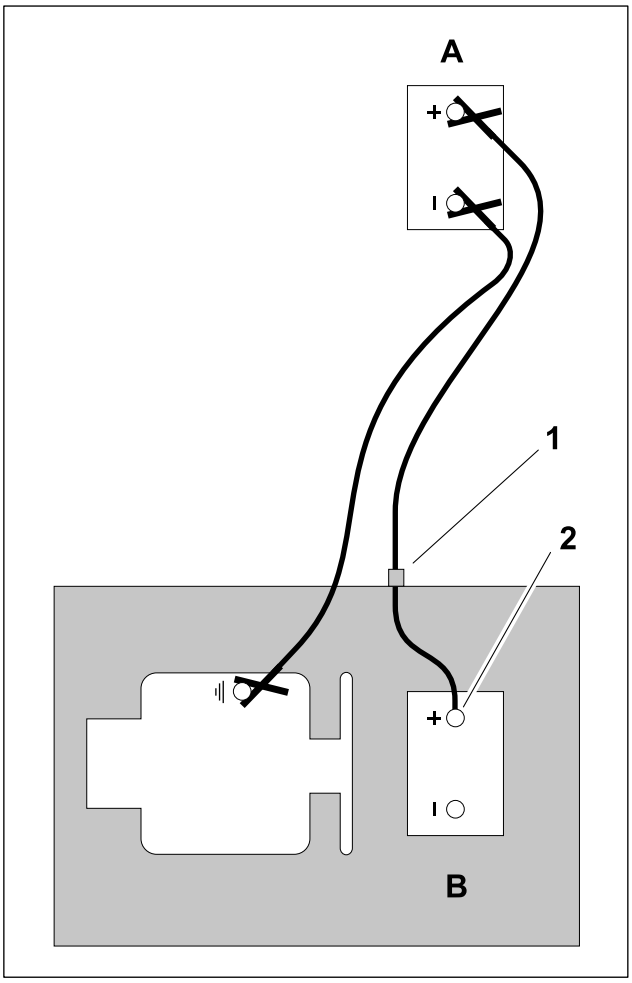
1. Disconnect battery at battery disconnect switch, if equipped.
2. Ensure no ignition sources are near battery.
3. Loosen and remove battery cable clamps carefully, negative (-) cable first.
4. Clean cable clamps and terminals to remove dull glaze.
5. Check for signs of internal corrosion in cables.
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.

Charge

1. Park service vehicle close to disabled equipment but do not allow vehicles to touch.
2. Set parking brake in both vehicles.
3. Turn ignition switch off in both vehicles and turn off all electrical loads.
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.



Battery_Jumpstart_B.eps

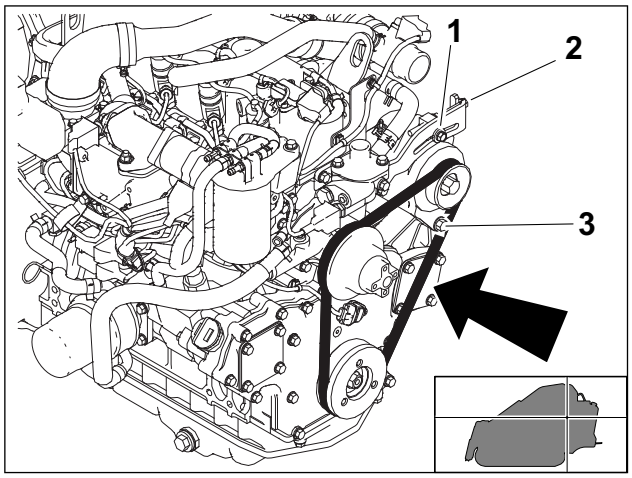
9. Connect the other black negative (-) cable clamp to engine or frame ground on disabled machine, at least 12" (305 mm) from failed battery, as shown.
10. Operate service vehicle engine at 1500-2000 rpm for a few minutes to build an electrical charge in failed battery.
11. Stop engine in service vehicle.
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

IMPORTANT: Use Gates® Krikit belt tensioning tool to check belt tension.

- New belt measurement should be 187lb (85kg).
- Used belt tension measurement should be 140lb (64kg).

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



t62om028w19.eps

Check

Check for excessive slack, damage, or wear. Check belt tension.

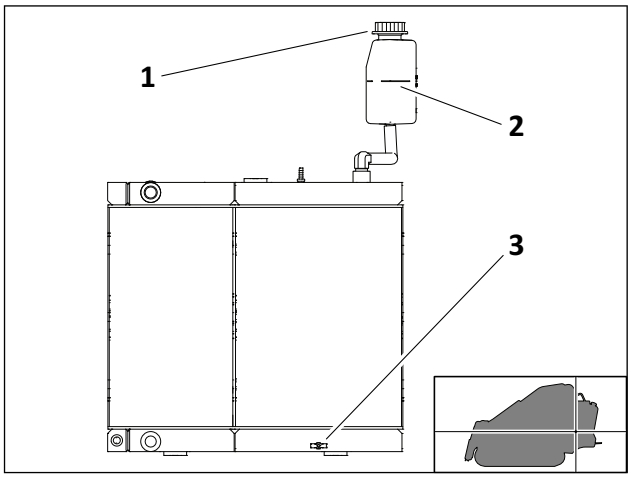
Adjust Tension

1. Loosen tension bolt (2).
2. Loosen two alternator bolts (1, 3).
3. Adjust position as needed using tension bolt.
4. Tighten bolts.
5. 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.

Coolant



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NOTICE: See "Approved Coolant" on page 75.

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

Check Level

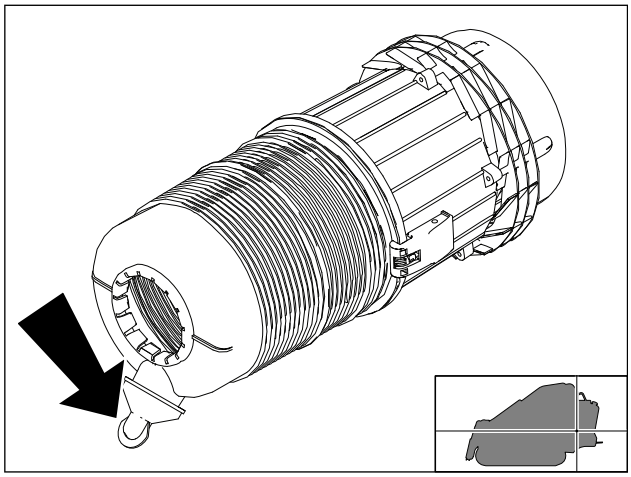
1. Check at overflow bottle (2).
2. Add DEAC at fill (1) as needed to keep level at halfway point on overflow bottle.

Change

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

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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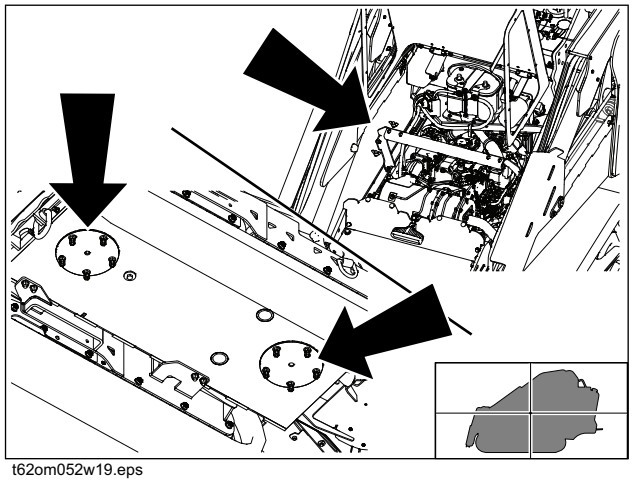
Engine Compartment

NOTICE:

- Check more often if operating in large brush, grassy conditions, or if machine is being stored.
- Do not use water or compressed air to remove debris.

Check engine compartment (shown) for debris every 10 hours and after long-term storage. Manually clean out debris as needed.


t62om052w19.eps

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.

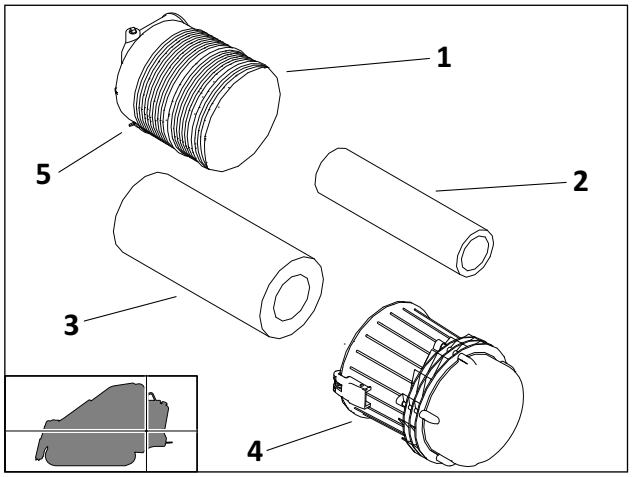
Check before startup and every 10 hours. Change when needed.

Check

Check air filter service indicator (3). Change filter when red band on indicator is visible.

Change

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



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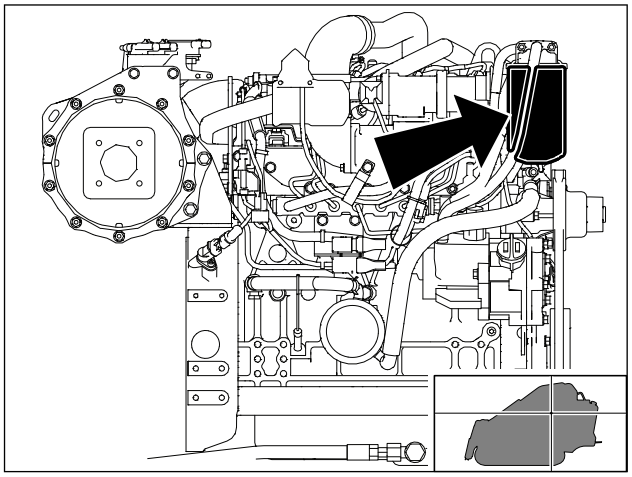
Filter, Fuel

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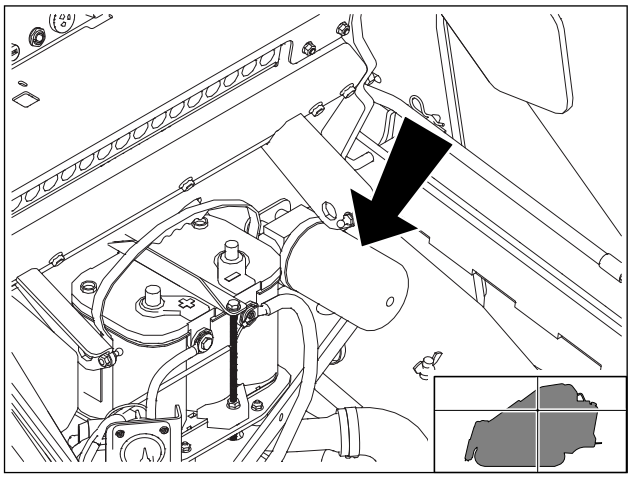
Filter, Hydraulic Fluid

Change filter (shown) at 50 hours and every 250 hours thereafter.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Filter, Water Separator

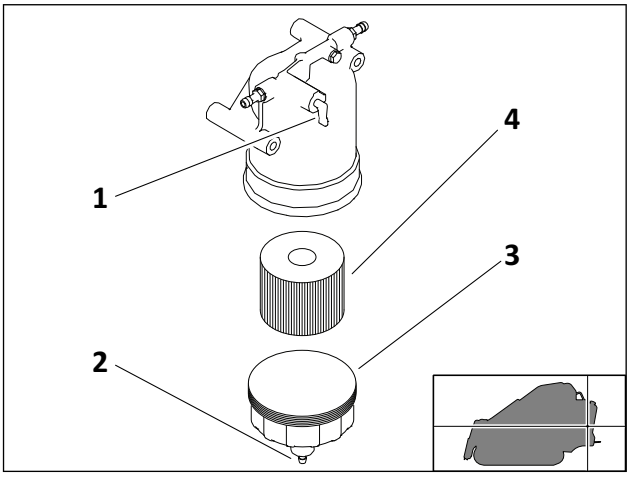
Check before startup and every 10 hours. Change every 500 hours. Drain as needed.

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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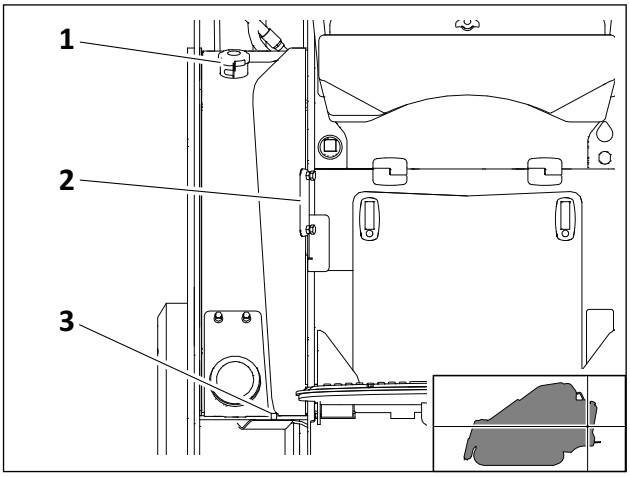
Change

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.



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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.

Change Fluid

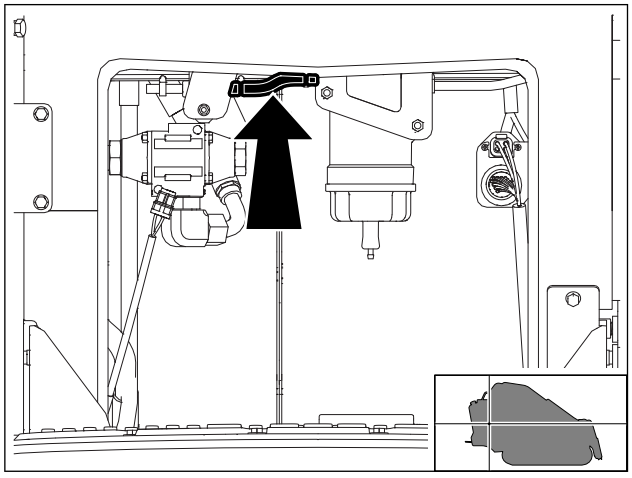
1. Remove plug (3) to drain.
2. Install plug.
3. Add THF at fill to keep level at halfway point on sight glass.

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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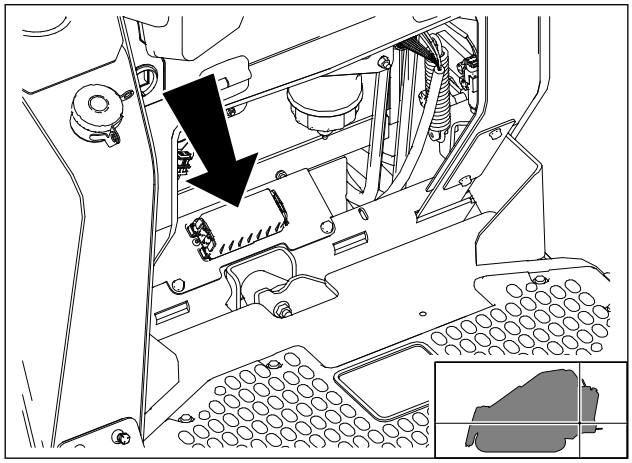
Fuse Box

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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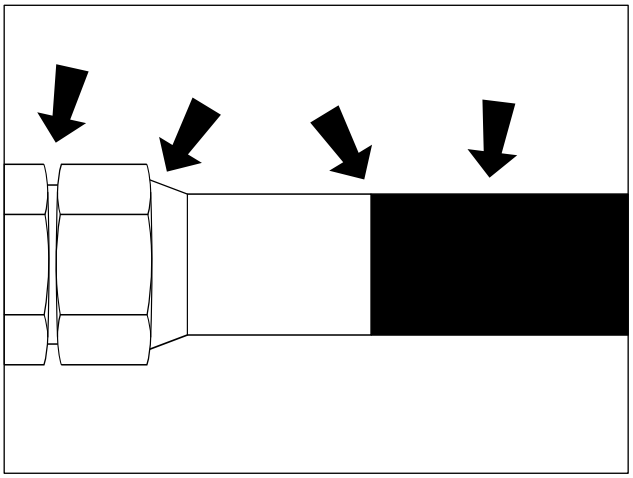
Hydraulic Hoses

⚠ 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

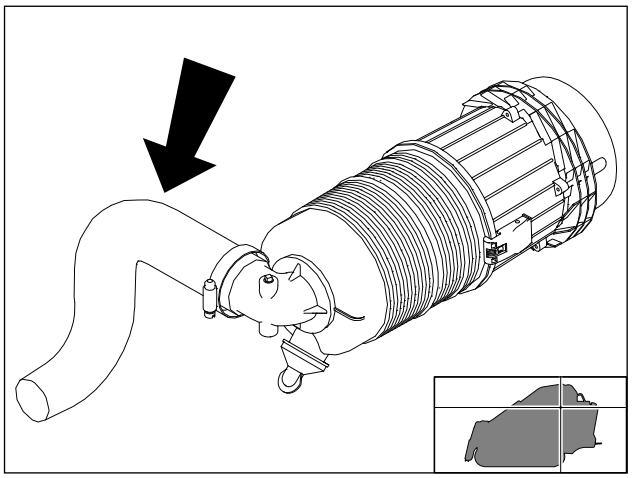
Intake Air Line

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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Oil, Engine

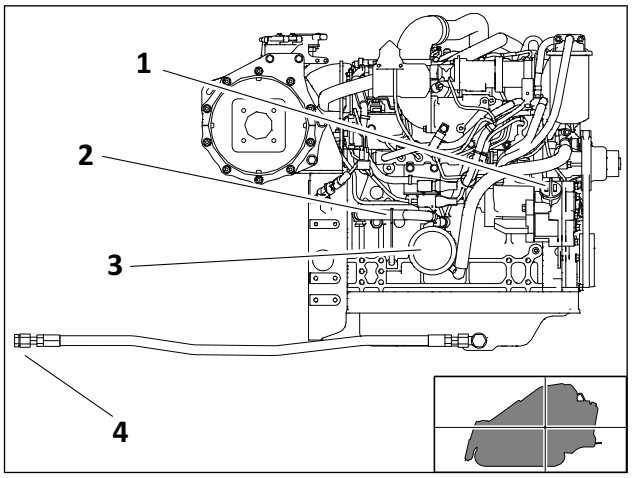
Check before startup and every 10 hours. Change at 50 hours and every 250 hours thereafter.

Check Level

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

Change Oil and Filter

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



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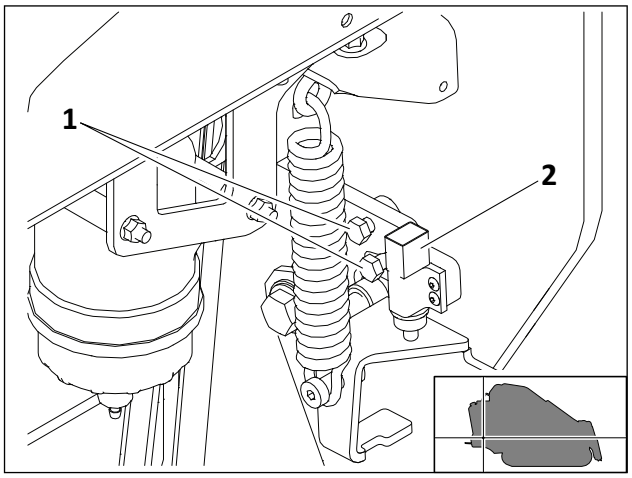
Platform Switch

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



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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.

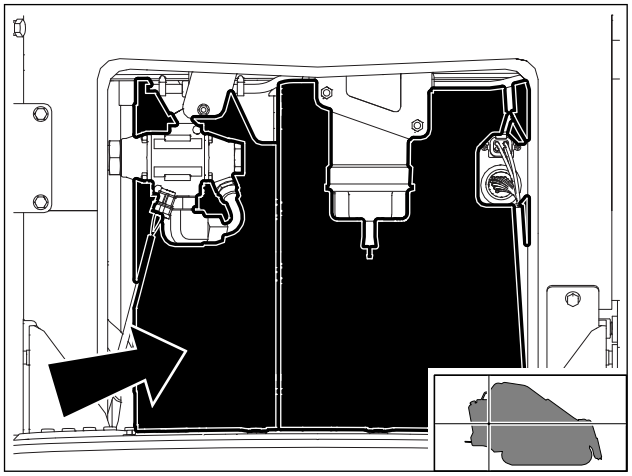
If control does not return to neutral when operator steps off platform:

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.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Check

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

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:

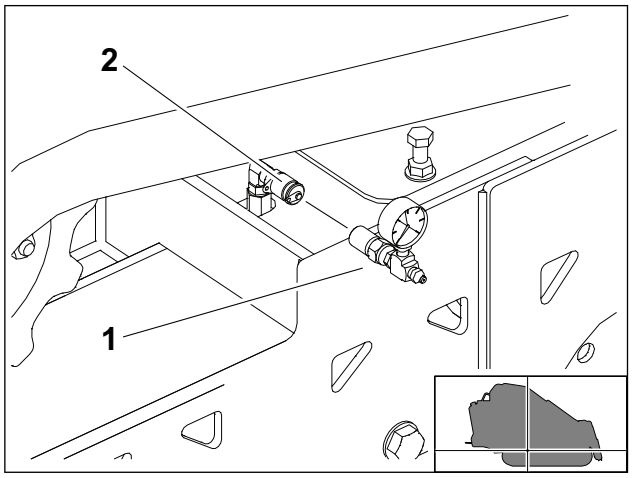
- Service track grease cylinder only while standing away from zerk.
- Cover connection with heavy cloth when relieving pressure in cylinder.

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

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 900psi (62bar) and needle is in green.

> ***NOTICE:*** Checking track tension with gauge will cause pressure to drop.



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Adjust

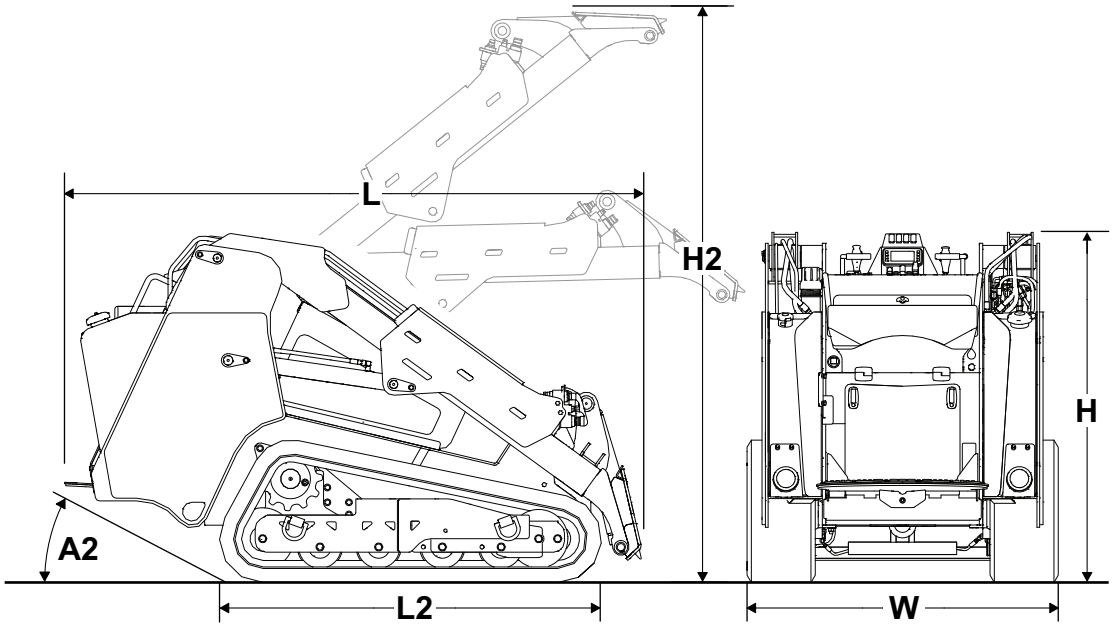
1. Lift track.
2. Remove gauge from stored location.
3. Thread gauge into connection.
4. Adjust tension.
   - To tighten, pump MPG into grease zerk until gauge measures 900psi (62bar) and needle is in green.
   - To loosen, remove plug and drain all grease. Then follow tightening procedure.

Specifications

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.

Chapter Contents

SK3000



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Dimensions		US	Metric
H2	Hinge pin height, max	118in	2997mm
	Operating height, max, standard bucket	153in	3876mm
H	Overall height of machine	65in	1641mm
L	Overall length of loader, no attachment	107in	2713mm
	Overall length of machine, standard bucket	138in	3495mm
L2	Wheelbase/track length	51.5in	1308mm
A2	Angle of departure	27.3°	27.3°
	Ground clearance, min (center/side)	10.4in/8.1in	264mm/ 206mm
W	Track width	57.5in	1460.5mm
	Loader width, excluding tracks	52in	1318mm
	Dump height, max, standard bucket	88.5in	2248mm
	Reach, standard bucket at max dump height	35.4in	899mm
	Bucket rollback angle, ground level	30°	30°
	Bucket rollback angle, full height	102°	102°

Dimensions		**US**	**Metric**
	Dump angle, standard bucket at max dump height	47°	47°
	Bucket width, max	72in	1829mm
	Bucket width, min	60in	1524mm
	Swing radius, max, standard bucket	76in	1938mm
	Swing radius, no attachment	56.5in	1435mm
	Rear overhang, max	37in	932mm

Performance	**US**	**Metric**
Ground drive speed, forward	5.8mph	9.3km/h
Ground pressure, 12.5" (320mm) tracks *	5.8psi	0.39bar
Tipping capacity 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.	8863lb	4020kg
Operating capacity (35% of tipping capacity)	3102lb	1407kg
Machine weight (no attachment, fluids full)	7600lb	3447kg

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

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

Fluid Capacities	**US**	**Metric**
Fuel tank	21.1gal	79.9L
Engine oil, with filter	6.1qt	5.8L
Hydraulic reservoir	21.1gal	79.9L

Engine		**US**	**Metric**
Engine: Yanmar® 4TNV86CT, EPS Tier 4, EU Stage V			
	Fuel	Diesel	
	Number of cylinders	4	
	Displacement	127.5in^3	2.09L
	Bore	3.39in	86mm
	Stroke	3.5in	90mm
Manufacturer's gross power rating (per SAE J1995)		58.9hp	43.9kW
Rated engine speed		3000rpm	3000rpm

Hydraulic System		**US**	**Metric**
Auxiliary: double gear pump			
	Low flow	8gpm	30.3L/min
	Medium flow	14gpm	53L/min
	High flow	22gpm	83.3L/min
	Pressure	4000psi	275bar
Ground drive: dual hydrostat			
	Flow rate	22.2gpm	84L/min
	Pressure	5366psi	370bar

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, or contact customersupport@ditchwitch.com.

Vibration Levels

Average vibration transmitted to the operator's hand during normal operation with a loader bucket is 3.4m/sec^2. Average vibration transmitted to the whole body during normal operation with a loader bucket is 1.1m/sec^2. Actual vibration will depend on the attachment being used.

EU Declaration of Conformity

The Charles Machine Works Inc., PO Box 66, 1959 West Fir Avenue, Perry, Oklahoma, USA, declares that the following unit(s):

Model	Serial Number	Description
XXXXX	XXXXXXXXXXXXXXXX	Loader

Conform(s) to the following directives:

2006/42/EC (Machinery Directive), 2014/30/EU (Electromagnetic Compatibility Directive), and
2000/14/EC (Noise Emission Directive)

Each model listed has been evaluated with the following standards and/or other normative documents:

EN 474-1:2006+A6:2019
EN 474-3:2006+A1:2009
EN ISO 13766-1:2018

Notified Body:

Data for 2000/14/EC Noise Emission Directive:

Model	Classification	Measured Sound Power (dBA)	Guaranteed Sound Power (dBA)	Engine Speed (rpm)	Engine Power (kW)
XXXXX	Loader	XXX	XXX	XXXX	XXX

Determined in accordance with ISO 6395:2008.
Conformity Assessment: Annex VI

Data for Regulation (EU) No 517/2014 on Fluorinated Greenhouse Gases (if equipped with cab):

Model	HFC	kg	GWP	CO_2 Equivalent (metric tonnes)
XXXXX	134A	xxxx	1430	XXXX

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

This declaration has been issued under the sole responsibility of the manufacturer.
The object of the declaration is in conformity with relevant Union harmonization legislation.

Certified:

Authorized Representative:

Marcel Dutrieux
Manager European Product Integrity
Toro Europe NV
Nijverheidsstraat 5
2260 Oevel
Belgium

Engineering Director
1959 West Fir Avenue
Perry, OK 73077, USA

Date _____

UK Declaration of Conformity

The Charles Machine Works Inc., PO Box 66, 1959 West Fir Avenue, Perry, Oklahoma, USA, declares that the following unit(s):

Model	Serial Number	Description
XXXXX	XXXXXXXXXXXXXXXX	Loader

Conform(s) to the following UK national laws:

S.I. 2001 No.1701 (Noise), S.I. 2008 No.1597 (Machinery Safety), and S.I. 2016 No.1091 (EMC).

Each model listed has been evaluated with the following standards and/or other normative documents:

EN 474-1:2006+A6:2019
EN 474-3:2006+A1:2009
EN ISO 13766-1:2018

Notified Body:

Data for Noise Regulation (S.I. 2001 No. 1701)

Model	Classification	Measured Sound Power (dBA)	Guaranteed Sound Power (dBA)	Engine Speed (rpm)	Engine Power (kW)
XXXX	Loader	XXX	XXX	XXXX	XXX

Determined in accordance with ISO 6395:2008.
Conformity Assessment: Schedule 9

Data for S.I. 2019 No. 583 (Fluorinated Greenhouse Gases) (if equipped with cab):

Model	HFC	kg	GWP	CO_2 Equivalent (metric tonnes)
XXXX	134A	XXXX	1430	XXXX

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

This declaration has been issued under the sole responsibility of the manufacturer.
The object of the declaration is in conformity with relevant UK legislation.

Certified:

Authorized Representative:

Marcel Dutrieux
Manager European Product Integrity
Toro U.K. Limited
Spellbrook Lane West
Bishop's Stortford
CM23 4BU
United Kingdom

Engineering Director
1959 West Fir Avenue
Perry, OK 73077, USA

Date _____

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 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, maintenance, 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 replacements 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.

First version: 1/91; Latest version: 7/19