

SK850

Operator's Manual



CMW®

Issue 2.0
Original Instruction

053-2790

Overview



Chapter Contents

Serial Number Location 2

Intended Use 3

Equipment Modification 3

Unit Components 4

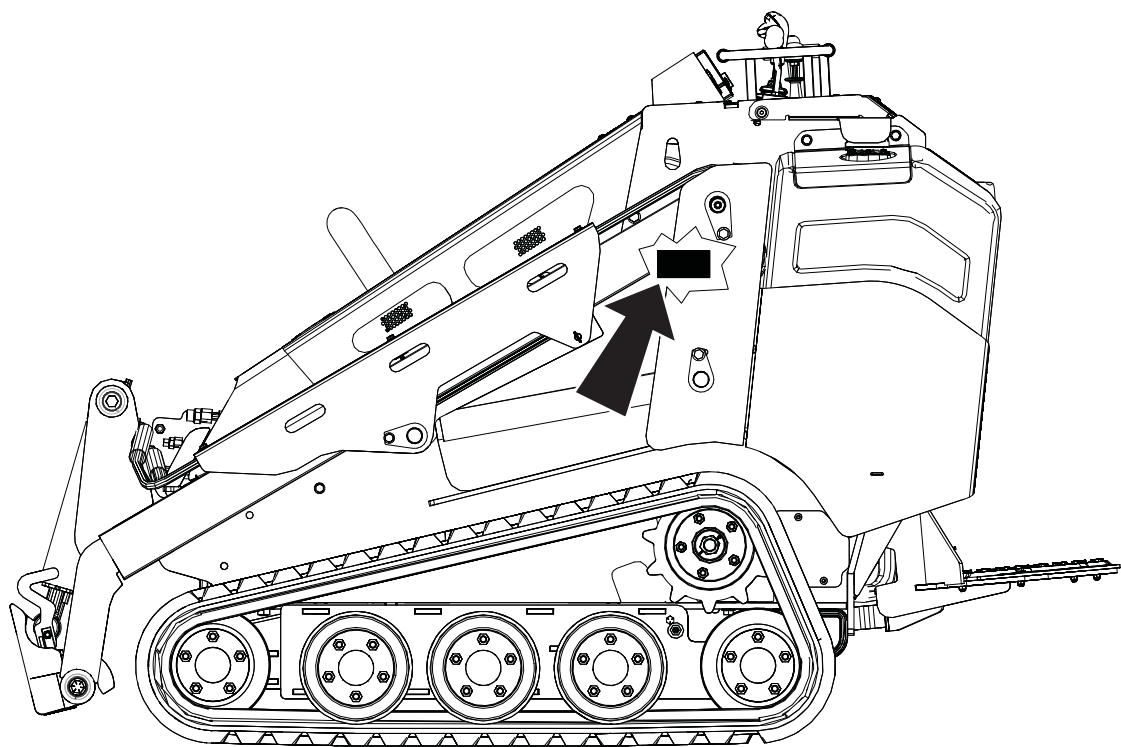
Operator Orientation. 5

About This Manual 6

- Bulleted Lists.6
- Numbered Lists6

Serial Number Location

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



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Item	
date of manufacture	
date of purchase	
unit serial number	
engine serial number	

Intended Use



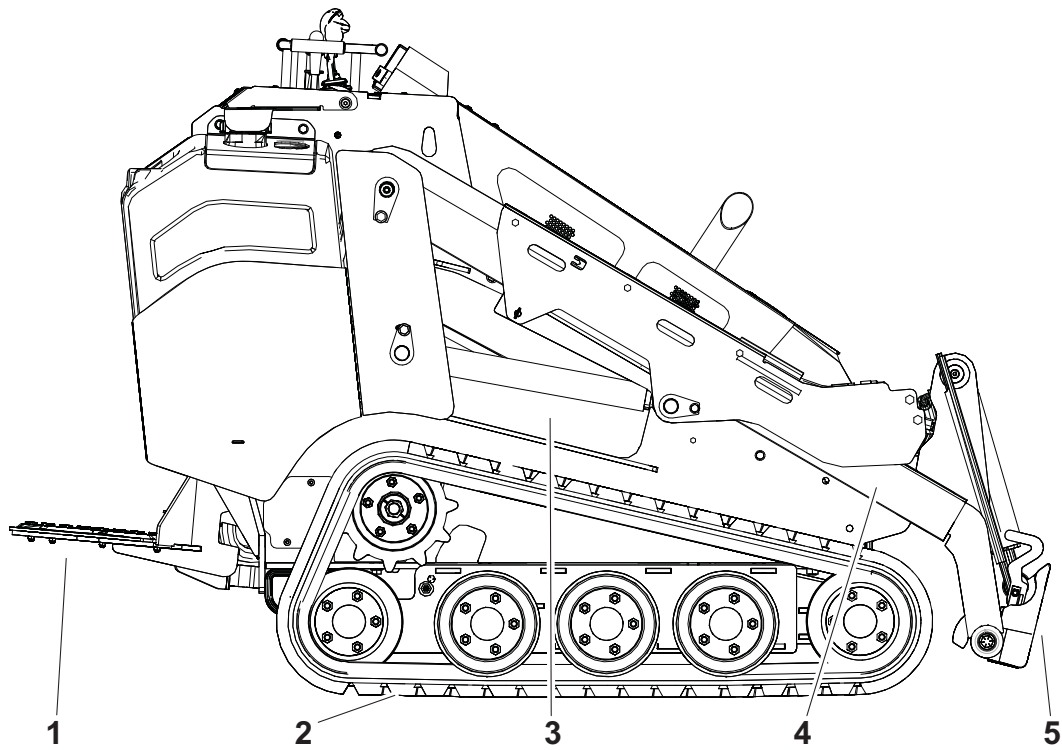
The SK850 is a platform, rubber track mini skid steer unit designed for light-to medium-duty construction work. The SK850 has a quick attach mount plate which makes it easy for an operator to connect different attachments. The SK850 can be used as a dedicated footings trencher using the TR50 trenching attachment. The unit is designed for operation in temperatures typically experienced in earth moving and construction work environments. Provisions may be required to operate in extreme temperatures. Contact your Ditch Witch® dealer. Use in any other way is considered contrary to the intended use.

The SK850 should be operated, serviced, and repaired only by persons 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 testing.

Unit Components

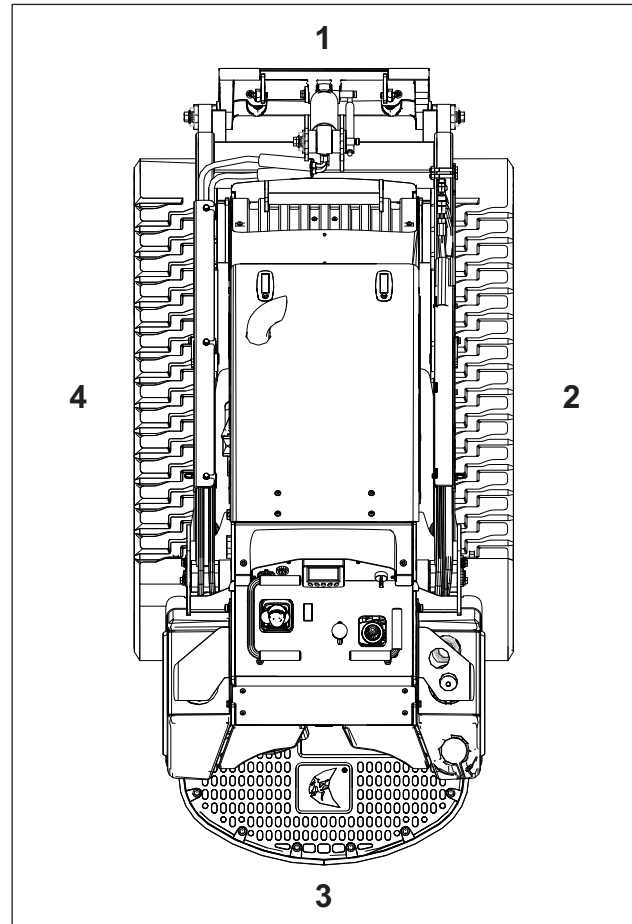


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1. Operator station
2. Tracks
3. Engine compartment
4. Lift arms
5. Mount plate

Operator Orientation

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



t43om003w.eps



About This Manual

This manual contains information for the proper use of this machine. See the beige **Operation Overview** pages for basic operating procedures. 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 you use and 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.

**SK850
Operator's Manual**

Issue number 2.0 / OM-12/14

Part number 053-2790

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Contents



	Overview machine serial number, information about the type of work this machine is designed to perform, basic machine components, and how to use this manual	1
	Foreword part number, revision level, and publication date of this manual, and factory contact information	7
	Safety machine safety alerts and emergency procedures	11
	Controls machine controls, gauges, and indicators and how to use them	21
	Prepare procedures for inspecting and classifying the jobsite, planning the installation path (if needed), preparing the jobsite for work, and connecting attachments	39
	Drive procedures for startup, cold start, driving, and shutdown	49
	Transport procedures for lifting, hauling, and towing	53
	Trench procedures for trenching	61
	Complete the Job procedures for restoring the jobsite and rinsing and storing equipment	65
	Service service intervals and instructions for this machine including lubrication, replacement of wear items, and basic maintenance	67
	Specifications machine specifications including weights, measurements, power ratings, and fluid capacities	97
	Support the warranty policy for this machine, and procedures for obtaining warranty consideration and training	101



Service Record

a record of major service performed on the machine

105

Safety

Chapter Contents



Guidelines 12

Emergency Procedures 13

- Electric Strike Description13
- If an Electric Line is Damaged14
- If a Gas Line is Damaged15
- If a Fiber Optic Cable is Damaged16
- If Machine Catches on Fire16

Safety Alert Classifications 17

Guidelines

Follow these guidelines before operating any jobsite equipment:

- Complete proper training and read operator's manual before using equipment.
- Contact your local One-Call (811 in USA) or the One-Call referral number (888-258-0808 in USA and Canada) to have underground utilities located before digging. Also contact any utilities that do not participate in the One-Call service. Mark proposed path with white paint prior to contacting One-Call or utilities.
- 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.
- Wear personal protective equipment.
- 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 ditchwitch.com/resources/safety.
- Replace missing or damaged safety shields and safety signs.
- Use equipment carefully. Stop operation and investigate anything that does not look or feel right.
- Do not operate unit where flammable gas may be present.
- Contact your Ditch Witch dealer if you have any question about operation, maintenance, or equipment use.
- Complete the equipment checklist located at www.ditchwitch.com/resources/safety.

Emergency Procedures



⚠ WARNING

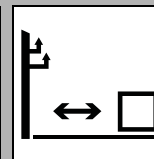
Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment. 274-050



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

EMERGENCY SHUTDOWN - Turn ignition switch to stop position or push remote engine stop button (if equipped).

Electric Strike Description



⚠ DANGER

Electric shock. Contacting electric lines will cause death or serious injury. Know location of lines and stay away.

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

- dealer.
- Contact utility company to shut off power.
- Do not return to jobsite or allow anyone into area until given permission by utility company.

If a Gas Line is Damaged



⚠ WARNING Fire or explosion possible. Fumes could ignite and cause burns. No smoking, no flame, no spark. 275-419 (2P)



⚠ WARNING Explosion possible. Serious injury or equipment damage could occur. Follow directions carefully.

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.
- Leave jobsite as quickly as possible.
- Immediately call your local emergency phone number and utility company.
- If jobsite is along street, stop traffic from driving near jobsite.
- Do not return to jobsite until given permission by emergency personnel and utility company.

If a Fiber Optic Cable is Damaged

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

If Machine Catches on Fire

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

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

Safety Alert Classifications

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



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

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

 **WARNING** indicates a hazardous situation that, if not avoided, could result in death or serious injury.

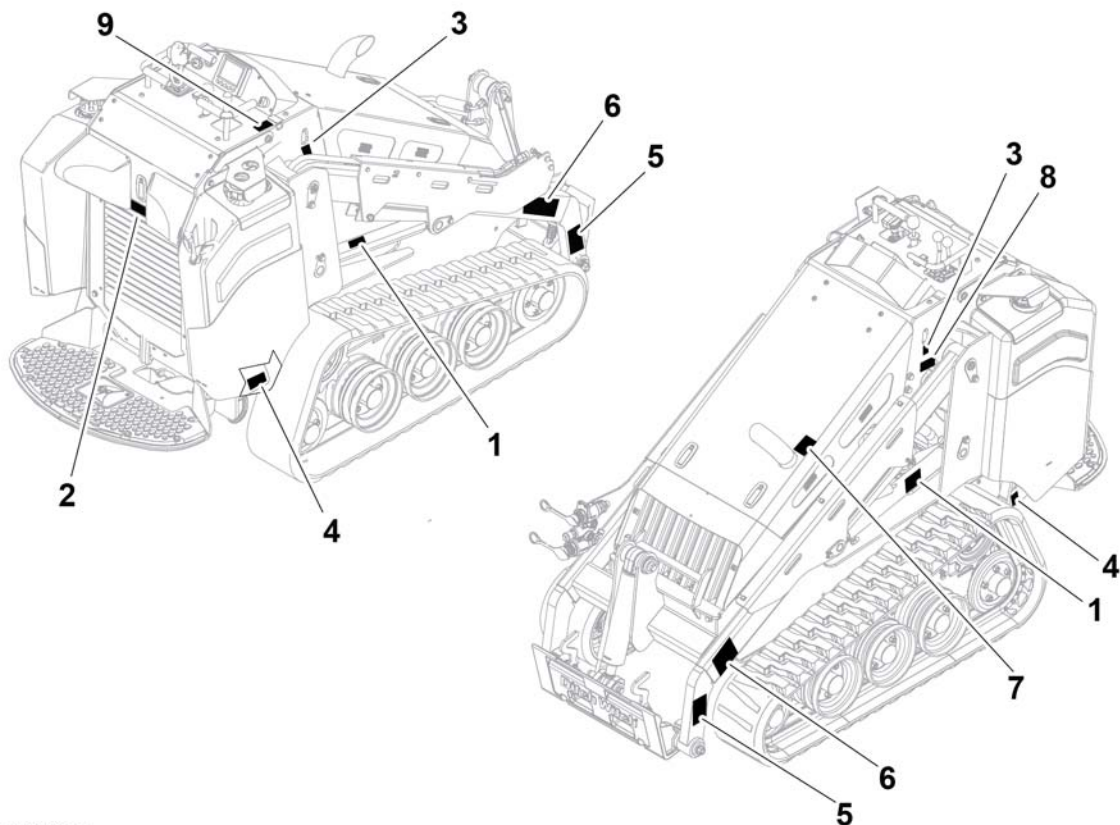
 **CAUTION** indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

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

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

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

Machine Safety Alerts



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1



⚠ WARNING Crushing weight. Place cylinder lock on extended cylinder and secure. 273-413

2

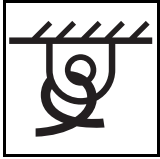
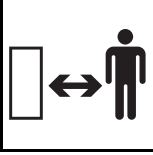
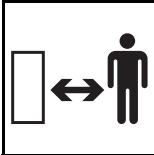
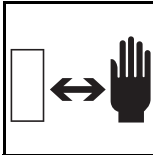


⚠ WARNING Read operator's manual. Know how to use all controls. Your safety is at stake. 273-475

3



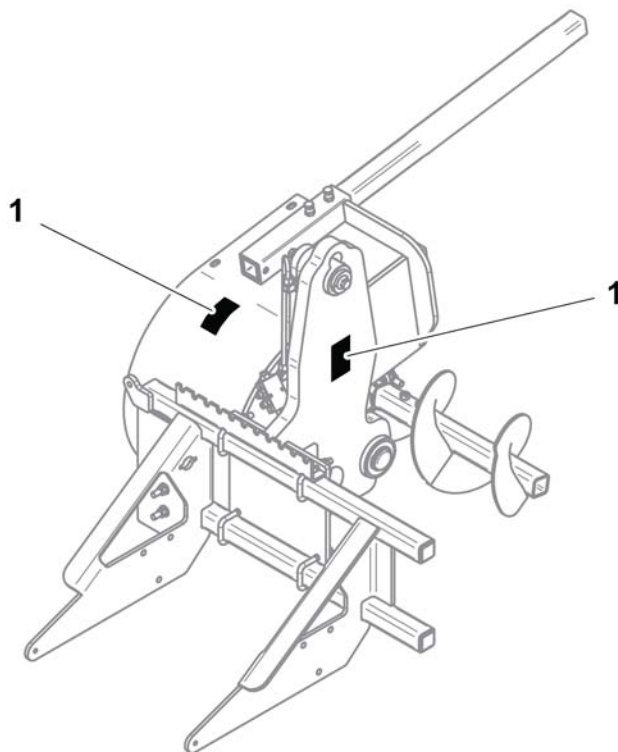
Lift point. See Transport chapter for more information. 274-442

4		Tiedown location. See Transport chapter for more information. 274-318
5	 	WARNING Moving parts could cut off hand or foot. Stay away. 275-184
6	 	WARNING Crushing weight could cause death or serious injury. Stay away. 275-326
7	 	CAUTION Hot parts may cause burns. Do not touch until cool or wear gloves. 275-355 (2-P)
8	 	WARNING Fire or explosion possible. Do not use starter fluid. 273-459 (2P), 274-206 (2P), 700-206 (2P)
9	 	CAUTION Exposure to high noise levels may cause hearing loss. Wear hearing protection. 700-009 (2-P)



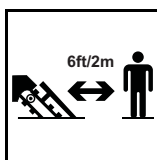
Attachment Safety Alerts

TR50



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1



⚠ DANGER Moving digging teeth can kill. Trench cave-in can cause you to fall. Stay away. 275-097

Controls

Chapter Contents

Gauges and Indicators 22

Graphic Display. 24

Service Interval Screen 31

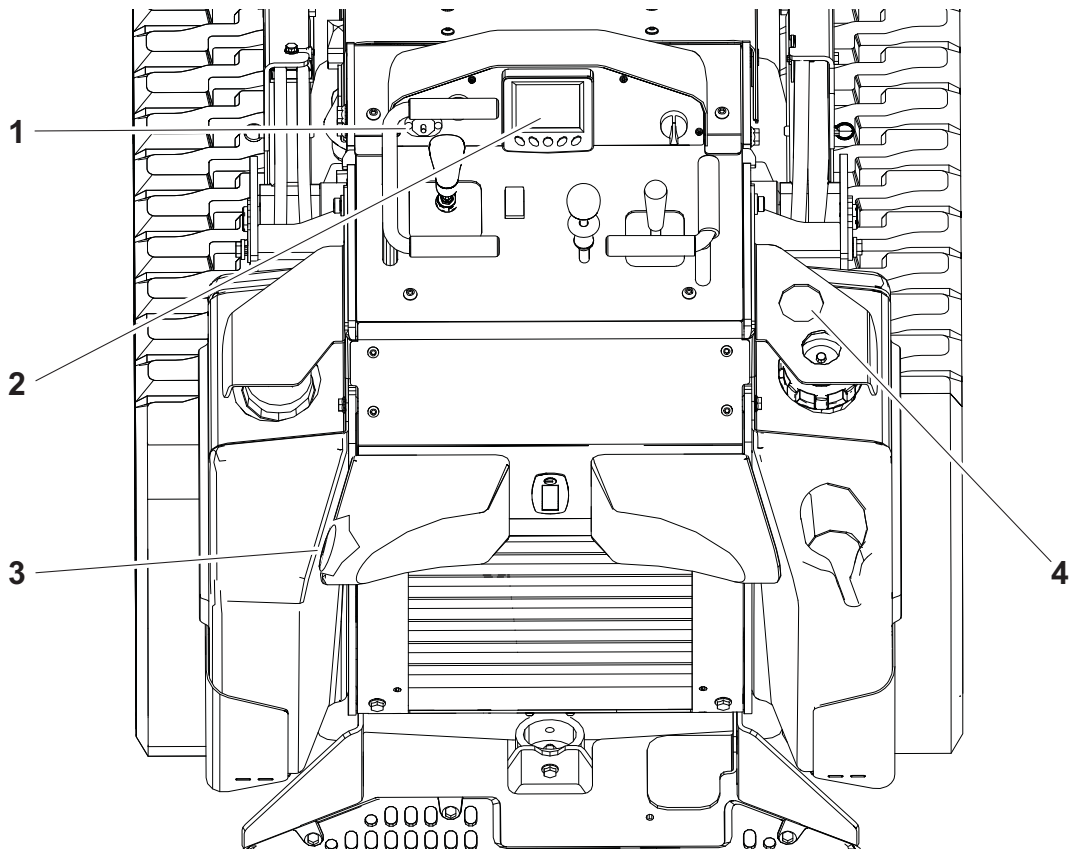
Controls 34

Engine Compartment 37

Tool Carrier 38



Gauges and Indicators

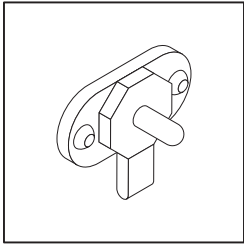


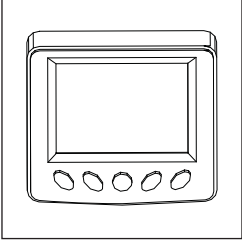
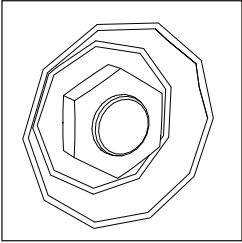
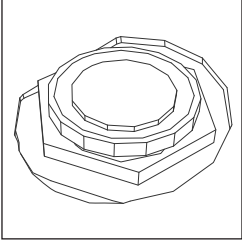
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1. Auxiliary outlet

2. Graphic display
3. Hydraulic fluid level sight glass

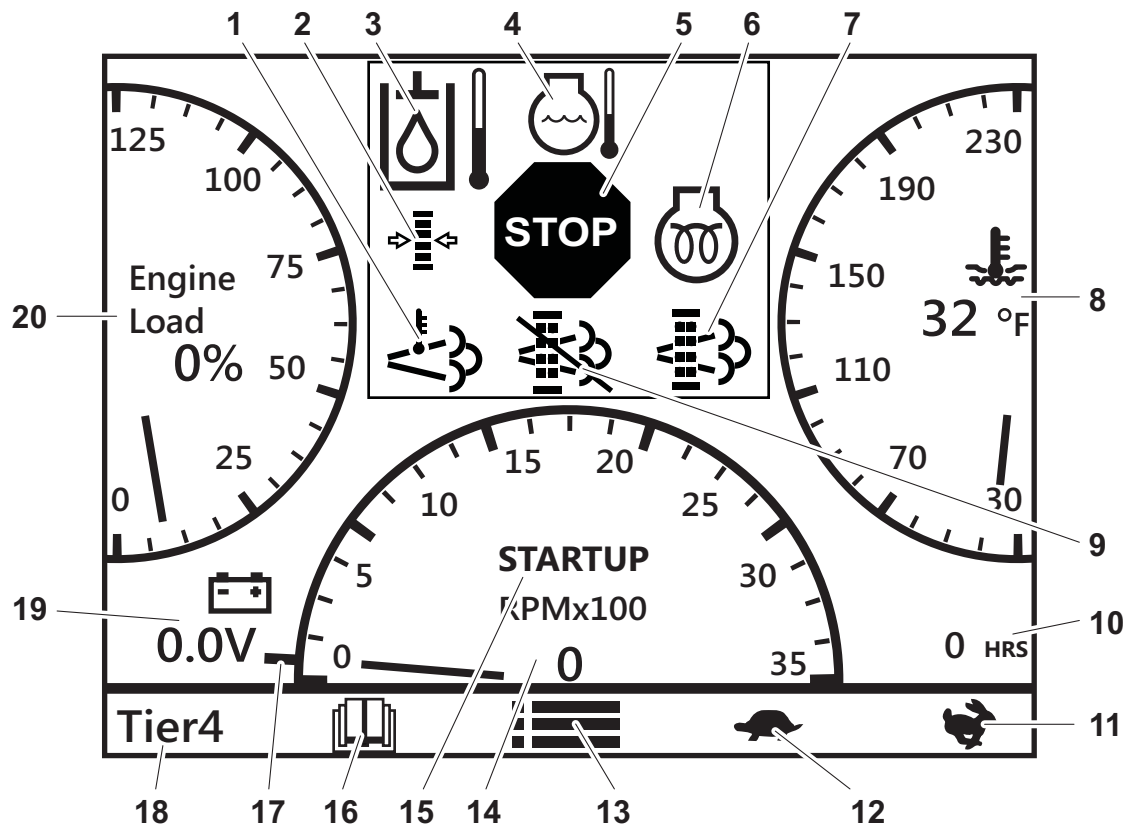
4. Fuel gauge

Item	Description	Notes
1. Auxiliary outlet  c00ic114a.eps	To operate work lights or other 12V devices, plug into outlet.	

Item	Description	Notes
2. Graphic display  c00ic098w.eps	See "Graphic Display" on page 24.	
3. Hydraulic fluid sight glass  c00ic099w.eps	Shows level of hydraulic fluid in tank. Maintain fluid at halfway point on glass.	
4. Fuel gauge  c00ic100w.eps	Shows level of fuel in tank.	NOTICE: Use low sulfur or ultra low sulfur fuel only.

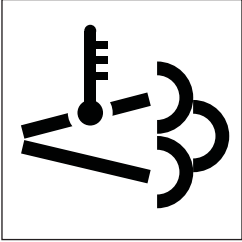
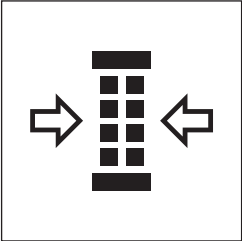
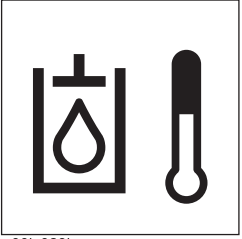
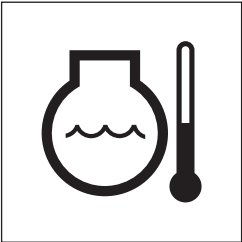


Graphic Display

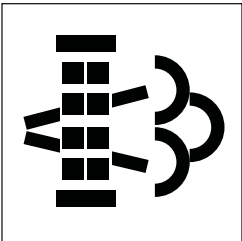


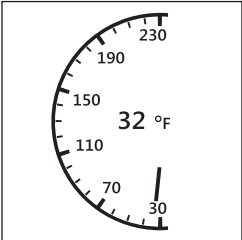
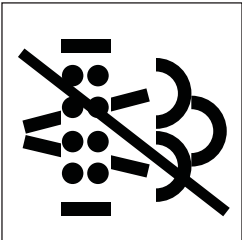
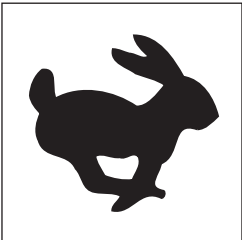
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- | | |
|--|---|
| 1. High exhaust temperature indicator | 11. Engine speed setpoint increase button |
| 2. Air filter restriction indicator | 12. Engine speed setpoint decrease button |
| 3. Hydraulic fluid temperature indicator | 13. Menu button |
| 4. Engine over-temperature indicator | 14. Engine speed (RPM) |
| 5. Diagnostic message indicator | 15. Throttle system state indicator |
| 6. Glow plug indicator | 16. Service reminders button |
| 7. DPF regeneration indicator | 17. Engine RPM setpoint indicator |
| 8. Engine coolant temperature indicator | 18. Tier 4 menu button |
| 9. DPF manual indicator | 19. Electrical system voltage |
| 10. Hourmeter | 20. Engine percent load gauge |

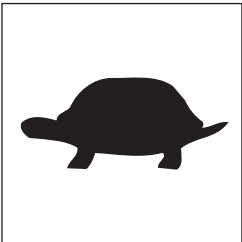
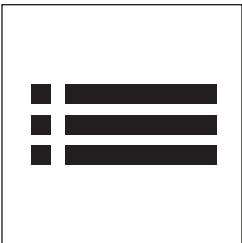
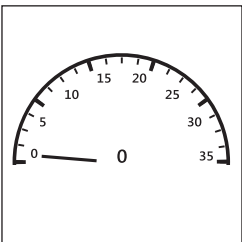
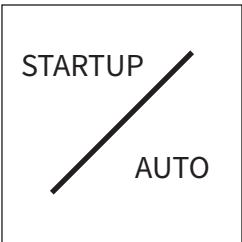
Item	Description	Notes
1. High exhaust temperature indicator  c00ic101w.eps	Indicates high exhaust temperature.	IMPORTANT: Will light when DPF regeneration is occurring.
2. Air filter restriction indicator  c00ic684h.eps	Indicator will begin flashing once the air filter is 25% unrestricted. Percentage will decrease as air filter becomes more restricted. For best results, replace filter between 25% and 0%. Reset after replacing air filter.	To view the air filter percentage before 25% unrestricted, press the diagnostics menu button at any time.
3. Hydraulic fluid temperature indicator  c00ic023h.eps	Lights and alarm sounds when hydraulic fluid is overheating.	Check hydraulic fluid level. Reduce load. Ensure oil cooler is clean.
4. Engine over-temperature indicator  c00ic596h.eps	Flashes when temperature rises above 230°F (110°C).	IMPORTANT: If temperature goes above 230°F (110°C): 1. Stop operation, set throttle to low idle, and allow engine to cool. 2. Stop engine. 3. Check coolant level. 4. Ensure radiator is clean.

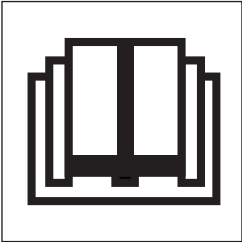
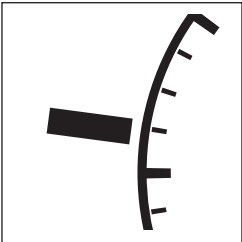
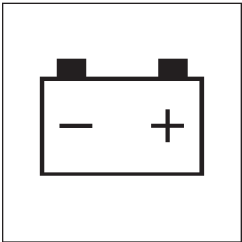


Item	Description	Notes
5. Diagnostic message indicator  c00ic102w.eps  c00ic103w.eps	Appears when there is a diagnostic trouble code. This indicates a warning code. This indicates a stop code.	
6. Glow plug indicator  c00ic180h.eps	Lights when ignition switch is on and glow plug button is pressed.	
7. DPF regeneration indicator  c00ic104w.eps	Will flash if regeneration is needed but has not occurred yet. Will light if regeneration is occurring.	

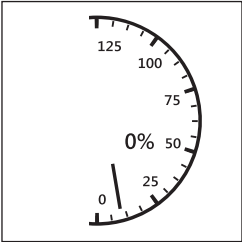
Item	Description	Notes
8. Engine coolant temperature indicator  c00ic116w.eps	Displays coolant temperature.	IMPORTANT: If temperature goes above 230°F (110°C): 1. Stop operation, set throttle to low idle, and allow engine to cool. 2. Stop engine. 3. Check coolant level. 4. Ensure radiator is clean.
9. DPF manual indicator  c00ic105w.eps	Will light when DPF regeneration has been manually delayed.	
10. Hourmeter  c00ic106w.eps	Displays engine operating time.	Use these times to schedule service.
11. Engine speed increase button  c00ic107w.eps	To increase engine speed, push.	IMPORTANT: • Increasing engine speed also increases attachment speed. • Each button press increases engine by 360 rpm. • Press and hold the increase button to automatically set engine speed to high (3000 rpm).



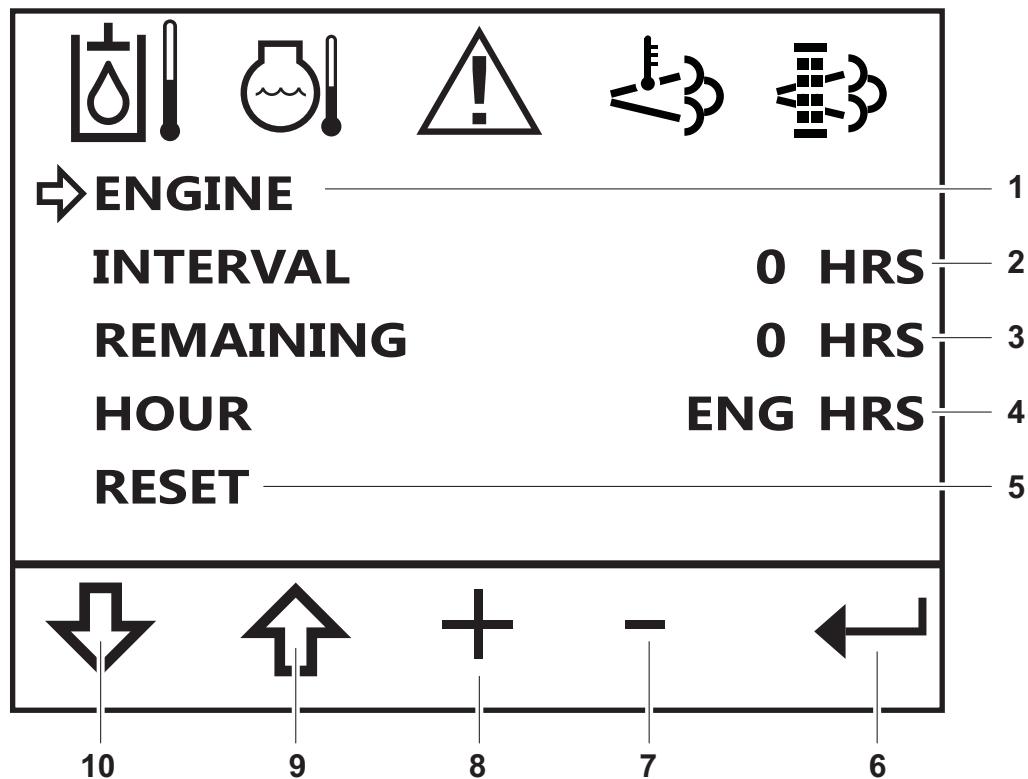
Item	Description	Notes
12. Engine speed decrease button  c00ic108w.eps	To decrease engine speed, push.	IMPORTANT: Each button press decreases engine by 360 rpm.
13. Menu button  c00ic109w.eps	Press to go to the menu screen.	
14. Engine speed (RPM)  c00ic110w.eps	Displays engine RPM.	
15. Throttle system state indicator  c00ic111w.eps	Displays one of the three states of the throttle system.	- Startup indicates the system is controlling its own throttle during startup conditions. - Auto indicates that the auto-throttle system is active and controlling engine throttle based on the user's selected rpm setpoint. To enable auto-throttle, go to the settings menu. - No indication means that the rpm setting is under manual control.

Item	Description	Notes
16. Service reminders button  c00ic112w.eps	Press to go to the service reminders screen.	
17. Engine RPM setpoint indicator  c00ic113w.eps	Indicates the current throttle setpoint.	IMPORTANT: - When in manual throttle mode, this is the RPM the engine will try to maintain. - When in auto-throttle mode, this indicates the full throttle setpoint.
18. Tier 4 menu button  c00ic114w.eps	Press to go to the DPF control menu.	
19. Electrical system voltage  c00ic008w.eps	Displays system voltage.	Should show 12-14V with engine running.



Item	Description	Notes
20. Engine percent load gauge  c00ic115w.eps	Displays the load on the engine.	

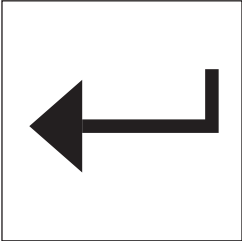
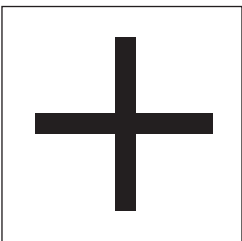
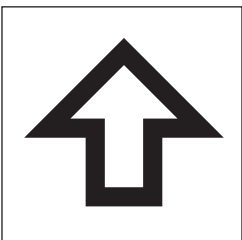
Service Interval Screen

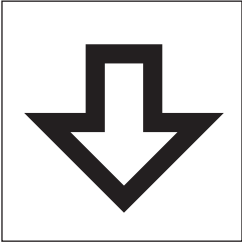


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- | | |
|------------------------------|---------------------------------|
| 1. Selected service reminder | 6. Return to main gauge display |
| 2. Service reminder interval | 7. Interval decrease |
| 3. Time remaining | 8. Interval increase |
| 4. Time base calculator | 9. Up selection |
| 5. Reset option | 10. Down selection |

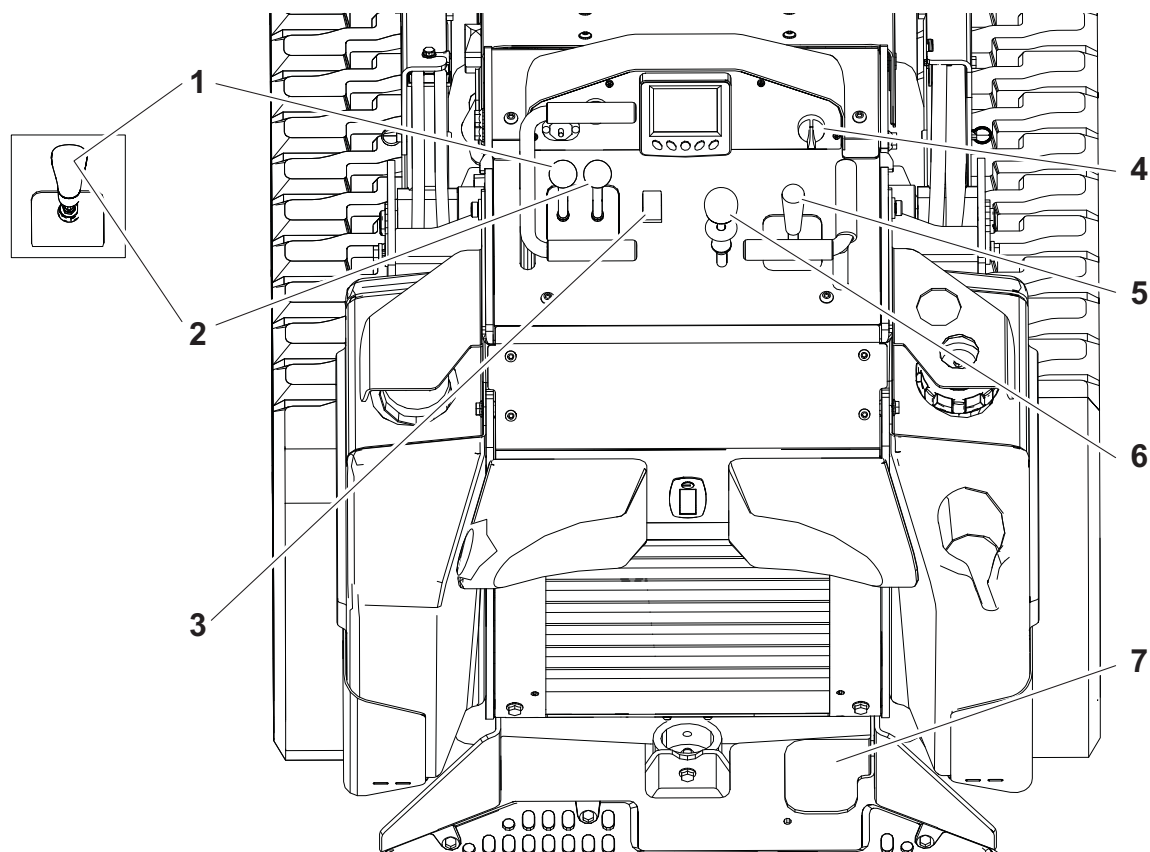
Item	Description	Notes
1. Selected service reminder	Displays current service reminder.	Service reminders are programmed to follow initial service reminders. See the Service chapter on page 67 for intervals.
2. Service reminder interval	Displays current interval of the service reminder.	
3. Time remaining	Displays time remaining until the next service reminder.	

Item	Description	Notes
4. Time base calculator	Displays the time base for the service reminder.	
5. Reset option	Resets service reminder.	
6. Return to main gauge display  c00ic121w.eps	Returns to the main gauge display.	
7. Interval decrease  c00ic120w.eps	Selects the previous reminder or parameter, or decreases service intervals by 10 hours.	IMPORTANT: Use the Service chapter beginning on page 67 to set service reminder intervals.
8. Interval increase  c00ic119w.eps	Selects the next reminder or parameter, or increases service interval by 10 hours.	
9. Up selection  c00ic118w.eps	Will move the selection on the screen up.	

Item	Description	Notes
10. Down selection  c00ic117w.eps	Will move the selection on the screen down.	

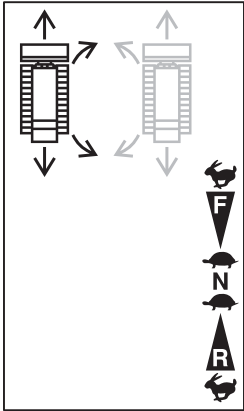
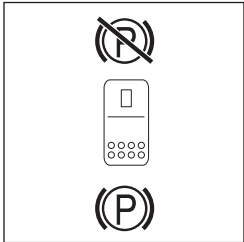


Controls

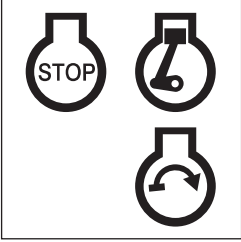
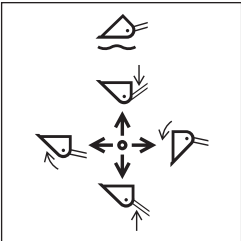
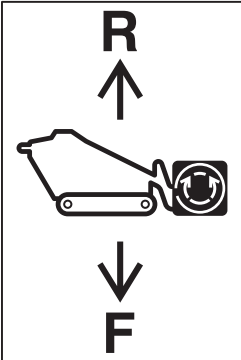


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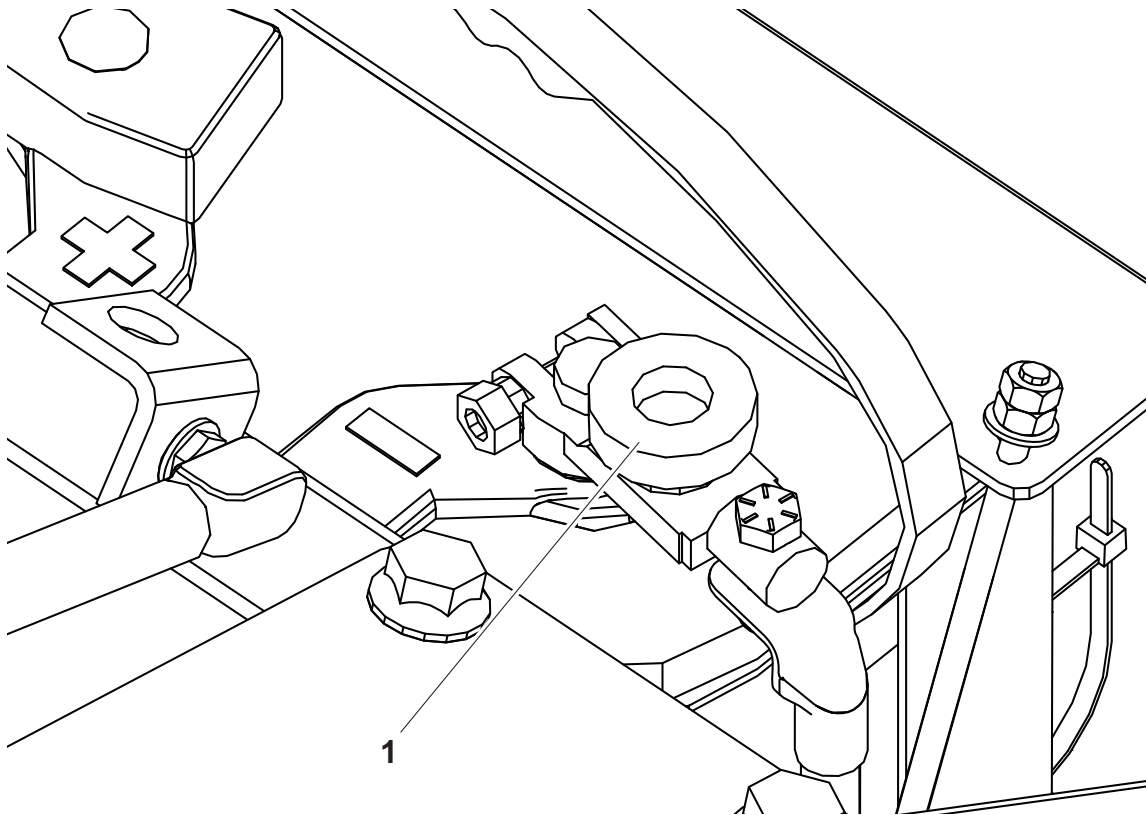
- | | |
|--|----------------------------------|
| 1. Left track drive control or
Track drive joystick (optional) | 4. Ignition switch |
| 2. Right track drive control or
Track drive joystick (optional) | 5. Lift arm control |
| 3. Parking brake switch | 6. Attachment drive control |
| | 7. Attachment drive foot control |

Item	Description	Notes
1. Left track drive control 2. Right track drive control  c00ic087a.eps	To move forward, push. To move backward, pull. To go faster in either direction, move control farther from neutral position. To stop, move to neutral position.	To turn right, move left control farther forward than right control. To turn left, move right control farther forward than left control. To counter-rotate in either direction, move controls in opposite directions as indicated above.
Track drive joystick (optional)	To move forward, push. To move backward, pull. To go faster in either direction, move control farther from neutral. To stop, move to neutral.	To steer while moving forward, push joystick forward, then move left or right. Unit will gradually turn left or right. To steer while moving backward, pull joystick back, then move left or right. Unit will gradually turn left or right. For tight steering in low speed, move joystick to center position then to left or right side. Tracks will counter rotate and turn unit in a tight circle.
3. Parking brake switch  c00ic097w.eps	To engage, move red switch toward operator and press back of switch down. To disengage, move red switch toward operator and press front of switch down.	IMPORTANT: - Only apply parking brake when unit is at rest. - Parking brake disengages hydraulics.



Item	Description	Notes
4. Ignition switch  c00ic065h.eps	To start engine, insert key and turn clockwise. To stop engine, turn key counterclockwise.	IMPORTANT: - If engine does not start or stalls, turn key to STOP and then restart. - Do not allow starter motor to run continuously for more than 20 seconds.
5. Lift arm control  c00ic284h.eps	To move lift arms down, push. To float, push forward to end. To move lift arms up, pull. To curl attachment up, move to left. To curl attachment down, move to right.	IMPORTANT: Exercise caution when lifting loads. See page 98 for operating capacities. IMPORTANT: If unit is equipped with TR50 trencher, this will raise and lower boom.
6. Attachment drive control  c00ic090a.eps	To engage attachment drive in reverse, lift lever lock and push forward. To engage attachment drive in forward, lift lever lock and pull back.	IMPORTANT: - Lever lock engages when control is in neutral. - Use foot pedal to hold attachment control in the on position when hands are busy operating lift arm or track drive controls.
7. Attachment drive foot control	To hold attachment drive in engaged position (forward or reverse), lift lever lock, move lever in desired direction, and press pedal. To return attachment drive control to neutral, release pedal.	IMPORTANT: Use foot pedal to hold attachment control in the on position when hands are busy operating lift arm or track drive controls.

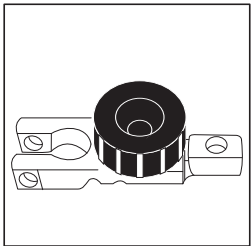
Engine Compartment



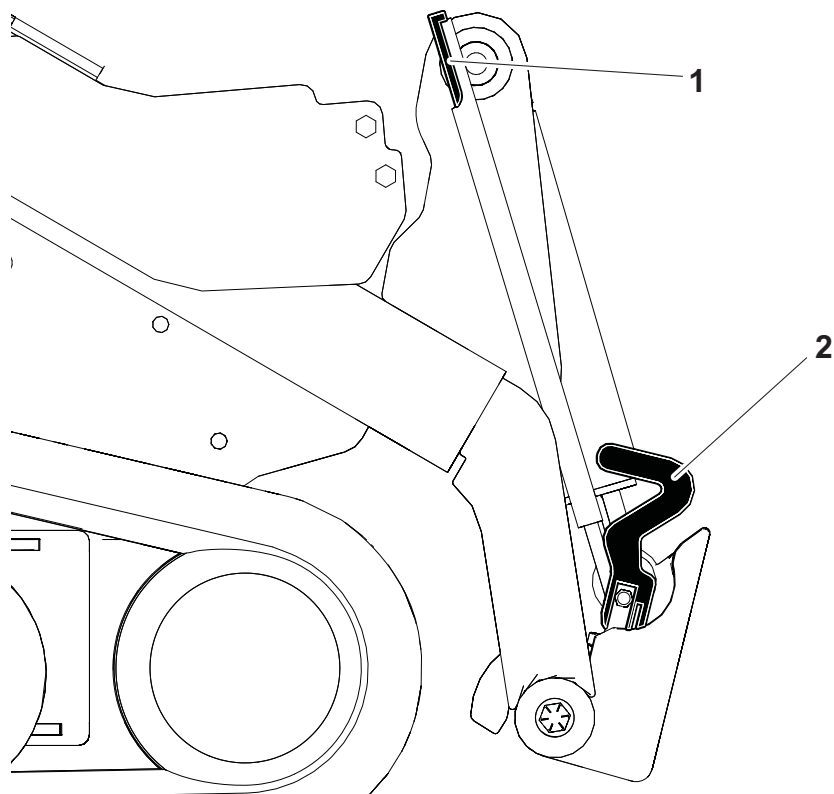
t43om029w.eps



- 1. Battery disconnect switch

Item	Description	Notes
1. Battery disconnect switch  ic0251h.eps	To connect, turn clockwise. To disconnect, turn counterclockwise.	

Tool Carrier



t43om034w.eps

1. Level indicator

2. Attachment latches

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

Prepare

Chapter Contents

Gather Information 40

Inspect Site 41

- Identify Hazards41

Classify Jobsite 42

- Inspect Jobsite42
- Select a Classification42
- Apply Precautions43

Check Supplies and Prepare Equipment 44

- Supplies44
- Fluid Levels44
- Condition and Function44
- Accessories44

Connect Attachment 45



Gather Information

A successful job begins before you start 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.

Arrange for Traffic Control

If working near a road or other traffic area, contact local authorities about safety procedures and regulations.

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.

Notify One-Call Services

Contact your local One-Call (811 in USA) or the One-Call referral number (888-258-0808 in USA and Canada) to have underground utilities located before digging. Also contact any utilities that do not participate in the One-Call service.

Locate Overhead Lines

Note location and height of all overhead lines in jobsite and ensure that fully lifted attachment and/or load cannot touch lines.

Inspect Site

Inspect jobsite before transporting equipment. Check for the following:

- changes in elevation such as hills or other open trenches
- obstacles such as buildings, railroad crossings, or streams
- signs of utilities (See "Inspect Jobsite" on page 42.)
- traffic
- access
- soil type and condition

Identify Hazards

Identify safety hazards and classify jobsite if attachment will penetrate ground. See "Classify Jobsite" on page 42.



⚠ WARNING

Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.

To help avoid injury:

- Wear personal protective equipment including hard hat, safety eye wear, and hearing protection.
- Do not wear jewelry or loose clothing.
- Notify One-Call and companies which do not subscribe to One-Call.
- Comply with all utility notification regulations before digging or drilling.
- Verify location of previously marked underground hazards.
- Mark jobsite clearly and keep spectators away.

Remember, jobsite is classified by hazards in place -- not by line being installed.

Classify Jobsite

Inspect Jobsite

- Inspect jobsite and perimeter for evidence of underground hazards, such as:
 - “buried utility” notices
 - utility facilities without overhead lines
 - gas or water meters
 - junction boxes
 - drop boxes
 - light poles
 - manhole covers
 - sunken ground
- Follow U.S. Department of Labor regulations on excavating and trenching (Part 1926, Subpart P) and other similar regulations.
- Contact your local One-Call (811 in USA) or the One-Call referral number (888-258-0808 in USA and Canada) to have underground utilities located before digging. Also contact any utilities that do not participate in the One-Call service.
- Have an experienced locating equipment operator sweep area within 20' (6 m) to each side of work path. Verify previously marked line and cable locations.
- Mark location of all buried utilities and obstructions.
- Classify jobsite.

Select a Classification

Jobsites are classified according to underground hazards present.

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

NOTICE: If you have any doubt about jobsite classification, or if jobsite might contain unmarked hazards, take steps outlined previously to identify hazards and classify jobsite before working.

Apply Precautions

Once classified, precautions appropriate for jobsite must be taken.

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

In addition to positioning equipment upwind from gas lines, use one or both of these methods.

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



Crystalline Silica (Quartz) Dust Precautions



**CAUTION**

Use breathing protection when exposed to silica dust.

270-4952

Cutting, drilling, or working materials such as concrete, sand, or rock containing quartz may result in exposure to silica dust. Use water spray or other means to control dust. If workers are exposed to dust they must wear appropriate breathing protection. Silica dust may cause lung disease and is known to the State of California to cause cancer.

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.

Check Supplies and Prepare Equipment

Supplies

- fuel

NOTICE: Use low sulfur or ultra low sulfur fuel only.

- keys
- lubricants
- personal protective equipment, such as hard hat and safety glasses

Fluid Levels

- fuel

NOTICE: Use low sulfur or ultra low sulfur fuel only.

- hydraulic fluid
- battery charge
- engine oil

Condition and Function

- parking brake pins (See "Check Brake Operation" on page 73.)
- filters (air, oil, hydraulic)
- tracks
- pumps and motors
- hoses and valves
- signs, guards, and shields

Accessories

Fire Extinguisher

If required, mount a 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 unit. See attachment operation manual for instructions regarding proper operation of attachments.

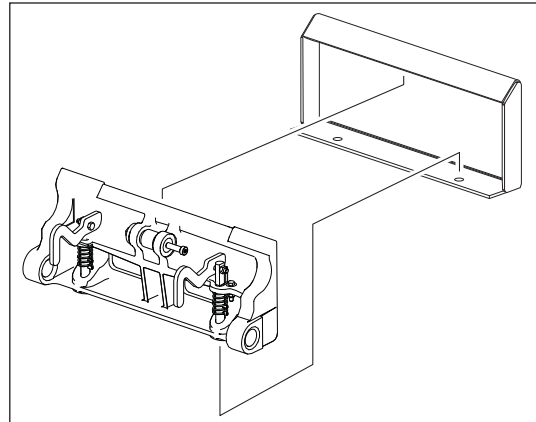
Attachment

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

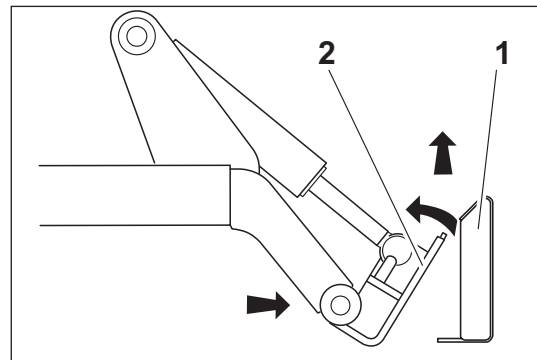
1. Position attachment on level surface with enough space behind it to accommodate unit.
2. Start engine.
3. Tilt mount plate (2) forward.
4. Position mount plate in the upper lip of the receiver plate (1) on attachment.
5. Raise lift arms while tilting back mount plate.

IMPORTANT: Attachment should be raised enough to clear the ground. Mount plate should be tilted back fully.

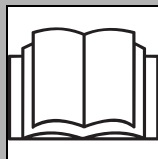
6. Pins will automatically engage.



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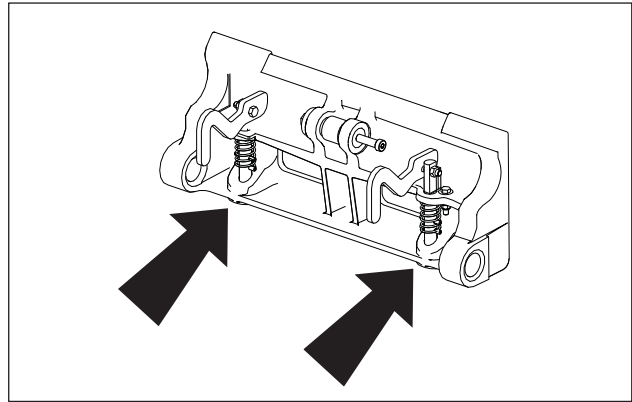
t05om026c.eps



WARNING Read operator's manual. Know how to use all controls. Your safety is at stake.

To help avoid injury: Ensure proper connection by verifying that bottoms of lock pins are visible under attachment receiver plate (shown).

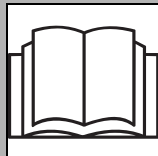
7. Ensure pins are engaged by rotating attachment down.



t43om007w.eps

Hydraulic Hoses

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

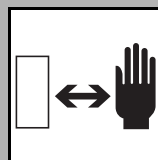


WARNING

Pressurized fluid or air could pierce skin and cause severe injury. Refer to operator's manual for proper use.

To help avoid injury:

- Escaping pressurized fluid can cause injury or pierce skin and poison.
- 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.
- Use a piece of cardboard or wood, rather than hands, to search for leaks.
- Wear protective clothing, including gloves and eye protection.
- If you are injured, seek immediate medical attention from a doctor familiar with this type of injury.

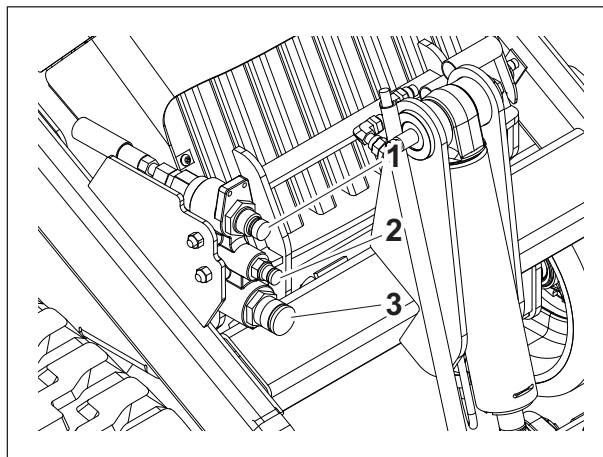


WARNING

Hot parts may cause burns. Do not touch until cool.

To help avoid injury: Wear gloves when connecting and disconnecting hydraulic hoses and wait until unit has cooled before touching hydraulic components.

1. Turn off engine.
2. Cycle attachment drive control to relieve residual pressure at hydraulic couplers.
3. Remove dirt and debris from hydraulic couplers.
4. Connect male coupler on attachment to female coupler (3) on unit.
5. Connect female coupler on attachment to male coupler (1) on unit.
6. If needed, connect attachment case drain hose to case drain connector (2).
7. Ensure that connections are secure by pulling on hoses.



t35om011w.eps

Drive

Chapter Contents

Start Unit 50

Drive 50

Shut Down 52



Start Unit

1. Ensure all controls are in neutral.
2. If necessary, use glow plugs to warm cold engine.
3. Move throttle to half open.
4. Turn ignition switch to start position and release when engine starts.

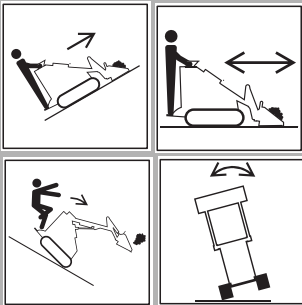
NOTICE:

- Start and operate only from the platform.
- Only operate in well ventilated areas.

EMERGENCY SHUTDOWN: Turn ignition switch to STOP.

Drive

General Operation



WARNING Tipover possible. Machine can tip over and crush you.

To help avoid injury:

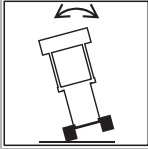
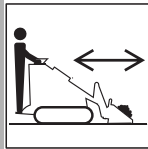
- Always operate with load end uphill.
- Always carry load low. High load can cause tipping, loss of load or loss of visibility.
- Never jerk control levers. Use a steady even motion.
- See page 98 for operating capacity.

1. Disengage parking brake.
2. Pull lift arm control to raise mount plate (and attachment) off ground.
3. Move track drive control to steer unit. See page 35.

IMPORTANT: If needed for attachment operation, push attachment drive foot control to hold attachment control in the forward position while operating track drive and lift arm controls.

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

Safe Slope Operation



WARNING Tipover possible. Machine can tip over and crush you.

To help avoid injury:

- Always operate with heavy end uphill.
- Always carry load low. High load can cause tipping, loss of load or loss of visibility.
- Drive cautiously at all times.
- Never jerk control levers. Use a steady even motion.
- Do not park unit on slope without lowering attachment to the ground, returning all controls to neutral position, shutting down unit, and applying parking brake.
- See page 98 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 park brake holding force – equal to traction of one track.

Shut Down

1. Lower lift arms to ground.
2. Move all controls to neutral position.
3. Engage parking brake.
4. Turn ignition switch to STOP.
5. Remove key.

Transport

Chapter Contents

Lift **54**

- Points54
- Procedure55

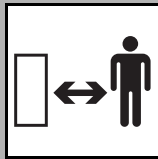
Haul **56**

- Load56
- Tie Down57
- Unload58

Tow **59**



Lift

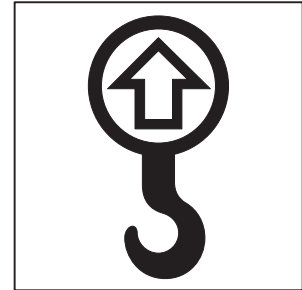


Crushing weight. If load falls or moves it could kill or crush you. Use proper procedures and equipment or stay away.

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.



ic1319a.eps

Procedure

Use a hoist capable of supporting the equipment's size and weight. See "Specifications" on page 97 or measure and weigh equipment before lifting.

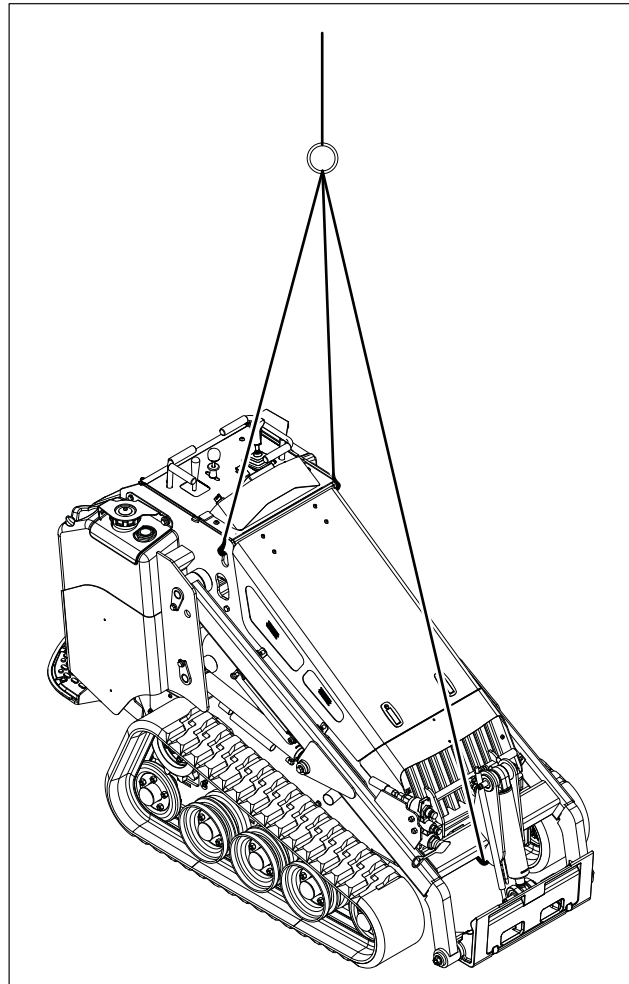
Use one of the methods below:

- Use two points nearest operator station.

IMPORTANT: Front of unit will be lower than rear of unit when using only two lift points.

- Use three lift points as shown.

NOTICE: Do not lift unit with attachments installed.

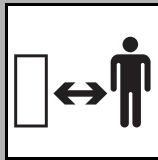


t43om008w.eps



Haul

Load



Crushing weight. If load falls or moves it could kill or crush you. Use proper procedures and equipment or stay away.

To help avoid injury:

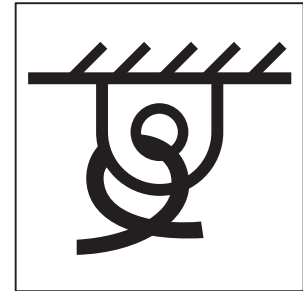
- Load and unload trailer on level ground.
- Incorrect loading can cause trailer swaying.
- Attach trailer to vehicle before loading or unloading.
- Only operate unit from operator platform.
- To help prevent trailer sway, load trailer so that ten to fifteen percent of total vehicle weight (equipment plus trailer) is on tongue.
- If loading onto tilt-bed trailer, be prepared for trailer to tilt.
- Move all controls to neutral position when stopped.

1. Disengage parking brake.
2. Start engine.
3. Adjust throttle to low speed.
4. Pull lift arm control to raise mount plate (and attachment) clear of trailer, but keep it low.
5. Move unit to rear of trailer and align with ramps.
6. Drive forward slowly to move unit onto trailer until tiedown position is reached.
7. Push lift arm control to lower mount plate (and attachment) to trailer bed.
8. Engage parking brake.
9. Ensure that all controls are in neutral position.
10. Turn ignition switch to STOP.
11. Tie down unit.

Tie Down

Points

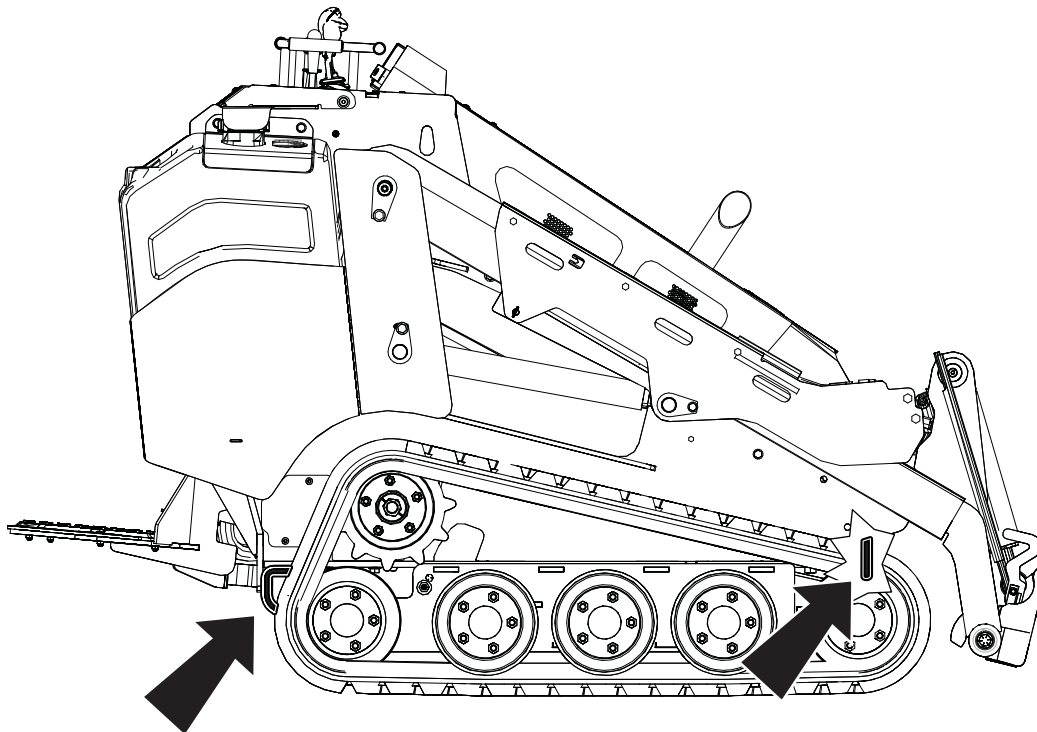
Tiedown points are identified by tiedown decals. Securing to truck or trailer at other points is unsafe and can damage machinery.



lc1320a.eps

Procedure

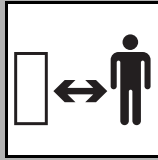
Loop tiedowns around unit at tiedown points. Make sure tiedowns are tight before transporting.



t43om009w.eps



Unload

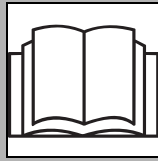
**WARNING**

Crushing weight. If load falls or moves it could kill or crush you. Use proper procedures and equipment or stay away.

To help avoid injury:

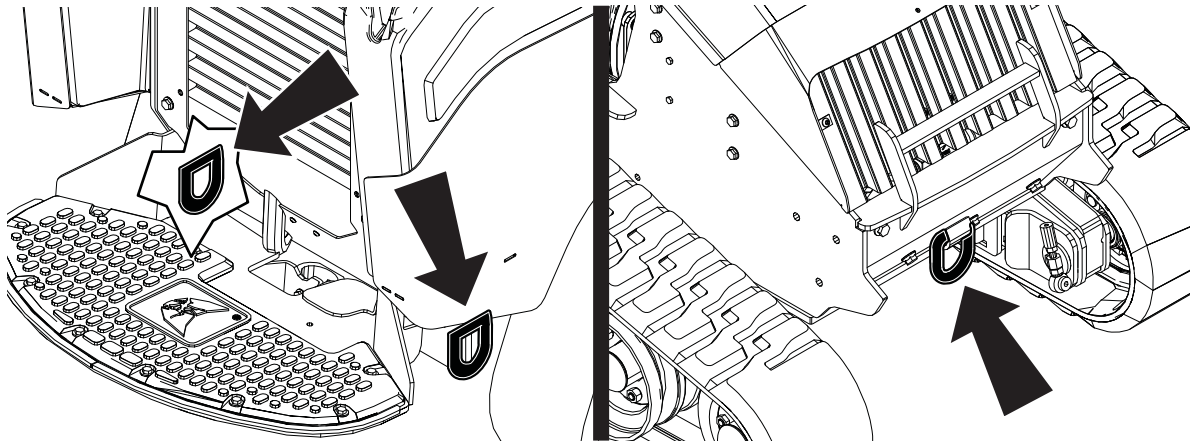
- Load and unload trailer on level ground.
 - Attach trailer to vehicle before loading or unloading.
 - Only operate unit from operator platform.
 - If unloading from tilt-bed trailer, be prepared for trailer to tilt.
1. Prepare trailer and ramps for unloading.
 2. Remove tiedowns.
 3. Start engine.
 4. Disengage parking brake.
 5. Pull lift arm control to raise mount plate (and attachment) off ground, but keep it low.
 6. Adjust throttle to low speed and slowly back unit down trailer or ramps.

Tow



WARNING Read operator's manual. Know how to use all controls.
Your safety is at stake. 273-475

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



t43om010w.eps

rear tow point

front tow point

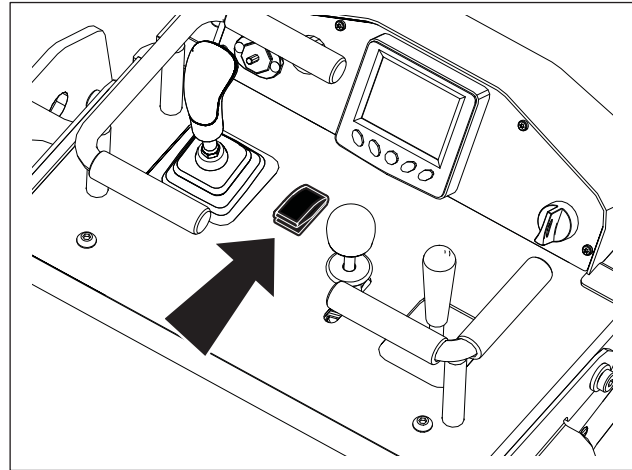
- attach chains to tow points facing towing vehicle
- tow for short distances at less than 1 mph (1.6 km/h)
- do not tow for more than 100' (30 m)
- use no more than 1,300 lb (5800 N) of towing force
- open bypass valve on each pump section

NOTICE: When bypass valve is open, unit has no brakes.

- if engine will not start, remove rear panel and unbolt parking brake assembly.

Prepare Unit for Towing

1. Block tracks.
2. Engage parking brake if engine will start (shown).

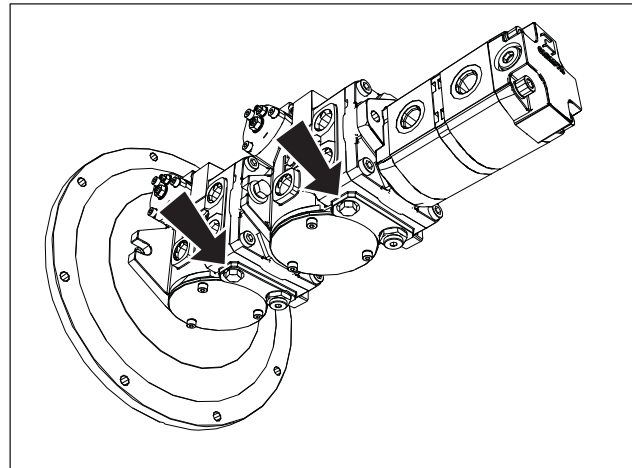


t43om012w.eps

3. Loosen bypass valves (shown) three turns.

IMPORTANT: Open bypass valves in both front and rear pumps.

NOTICE: When bypass valves are open, unit has no brakes.



t43om030w.eps

Return Unit to Normal Operation

1. Tighten bypass valves and tighten locknut to 15-18 ft•lb (20-25 N•m).

IMPORTANT: Close bypass valve in both front and rear pumps.

2. Disengage parking brake.
3. Unblock tracks.



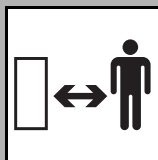
Chapter Contents

Setup 62

Operation..... 63

Setup

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.



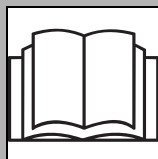
WARNING Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.

To help avoid injury: Use attachments or counterweights to make front and rear loads balance when all attachments are raised. Contact your Ditch Witch® dealer about counterweighting for your equipment.



WARNING Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.

To help avoid injury: Comply with all utility notification regulations before digging or drilling.



WARNING Read operator's manual. Know how to use all controls. Your safety is at stake. 273-475

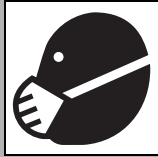
1. Start unit. See page 50 for start-up procedures.
2. Drive to starting point. Move in line with planned trench. See page 50 for operating procedures.

IMPORTANT:

- When cutting asphalt, start trench in soil at edge of road and use shortest possible boom at full depth.
- Sight along center of hood to a stake driven beyond end of trench line for straight trench.

3. Engage parking brake.
4. Lower boom to just above ground.
5. Check that attachment speed/direction control and ground drive controls are in neutral.

Operation



CAUTION

270-4952

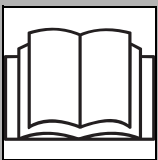
Use breathing protection when exposed to silica dust.



DANGER

Electrical shock. Contacting electrical lines will cause death or serious injury. Know location of lines and stay away.

To help avoid injury: Expose lines by hand before digging. Cutting high voltage cable can cause electrocution.



WARNING

Your safety is at stake. 273-475

Read operator's manual. Know how to use all controls.

To help avoid injury:

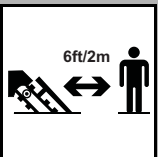
- Comply with all utility notification regulations before digging or drilling.
- Notify companies that do not subscribe to One-Call.



CAUTION

Wear hard hat and safety glasses. 275-193

Flying objects thrown by machine may strike people.



DANGER

Stay away. 275-097

Moving digging teeth will cause death or serious injury.

To help avoid injury:

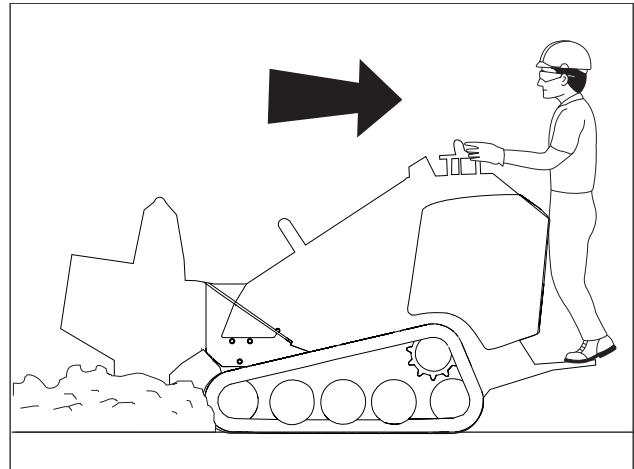
- Ensure parking brake is engaged.
- Allow 3' (1 m) between digging teeth and obstacle. Machine might jerk when digging starts.
- Keep everyone at least 6' (2 m) from machine, attachments, and their range of movement.

1. Adjust throttle to low idle.

2. Engage attachment control.
3. Increase engine speed to full throttle.
4. Slowly lower digging boom to depth.
5. Move ground drive control to desired speed.
6. Pull ground drive control rearward to desired trenching speed. Trenching movement is toward you.

NOTICE:

- Do not make sharp turns. Lower boom to full depth when turning.
- If an object becomes lodged in chain, move attachment speed/direction control to neutral and raise boom slightly. Reverse chain direction. If object must be removed manually, turn engine off and engage parking brake.



t43om033w.eps

7. When trench is complete, move ground drive control to neutral.
8. Adjust throttle to low idle.
9. Raise boom.
10. As boom clears top of trench, move attachment speed/direction control to neutral.
11. Drive a short distance away from work site.
12. Shut down unit. See page 52 for proper shutdown procedures.

Complete the Job

Chapter Contents

Rinse Equipment 66

Disconnect Attachment 66

Stow Tools 66



Rinse Equipment

1. Spray water onto equipment to remove dirt and mud.

NOTICE: Do not spray water onto operator's console. Electrical components could be damaged. Wipe down instead.

2. Open hood and allow unit to cool. Remove debris from inside of unit.
3. Remove mud from track sprockets.
4. Wash undercarriage. Pay special attention to brake pin area.

Disconnect Attachment

1. Lower attachment to the ground.
2. Turn off engine.
3. Disengage lock pins by lifting handles upward.
4. Cycle attachment drive control and disconnect hydraulic hoses, if used.
5. Start engine.
6. Tilt mount plate forward and back unit away from attachment.

Stow Tools

Make sure all tools and accessories are loaded and properly secured on trailer.

Service



Chapter Contents

Precautions 68

- Working under Raised Lift Arms 68
- Welding Precaution 68

Overview 69

Recommended Lubricants/Service Key 69

Engine Oil Temperature Chart 70

10 Hour 72

50 Hour 79

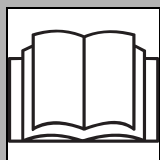
200 Hour. 82

500 Hour 84

2000 Hour 86

As Needed 87

Precautions

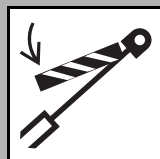
**WARNING**

Read operator's manual. Know how to use all controls.
Your safety is at stake. 273-475

To help avoid injury:

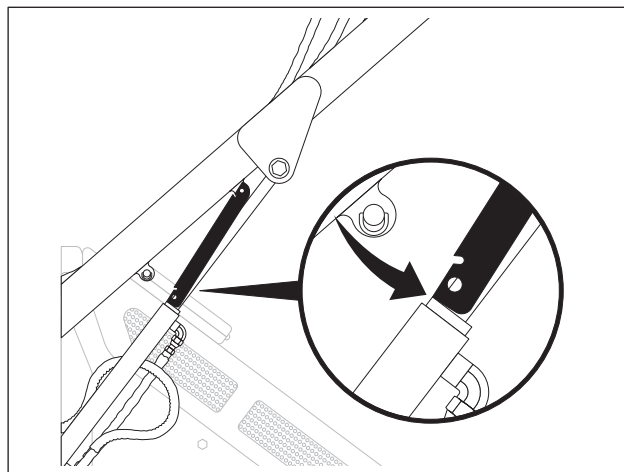
- Unless otherwise instructed, all service should be performed with engine off.
- Before servicing equipment, lower unstowed attachments to ground.

Working under Raised Lift Arms

**WARNING**

Crushing weight. Place cylinder lock on extended cylinder and secure. 273-231

Use safety supports as indicated when working under raised lift arms.



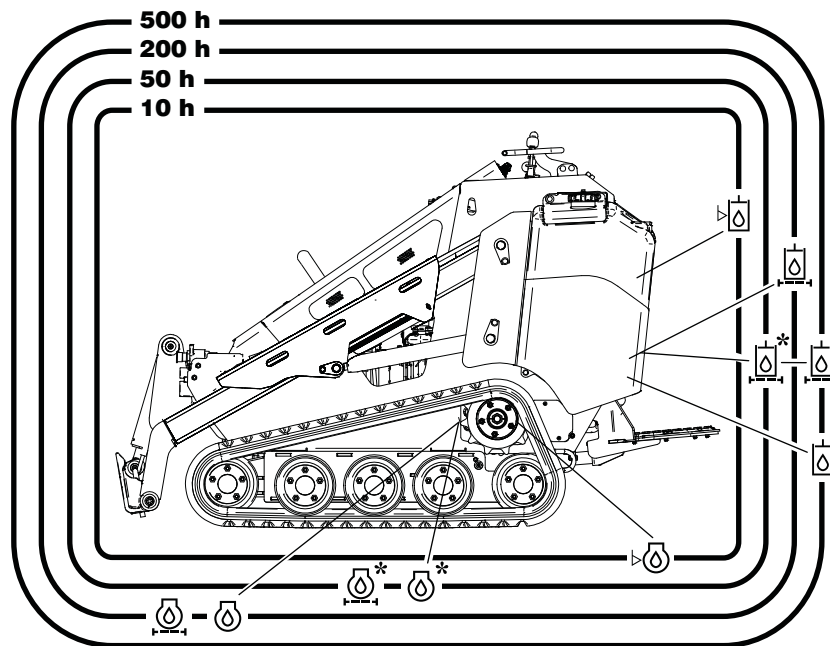
t35om037w.eps

Welding Precaution

NOTICE: Welding can damage electronics.

- Disconnect battery to prevent damage to battery. Do not turn off battery disconnect switch with engine running, or alternator and other electronic devices may be damaged.
- Connect welder ground clamp close to welding point and make sure no electronic components are in the ground path.
- Always disconnect the Engine Control Unit ground connection from the frame, harness connections to the ECU, and other electronic components prior to welding on machine or attachments.

Overview



Recommended Lubricants/Service Key

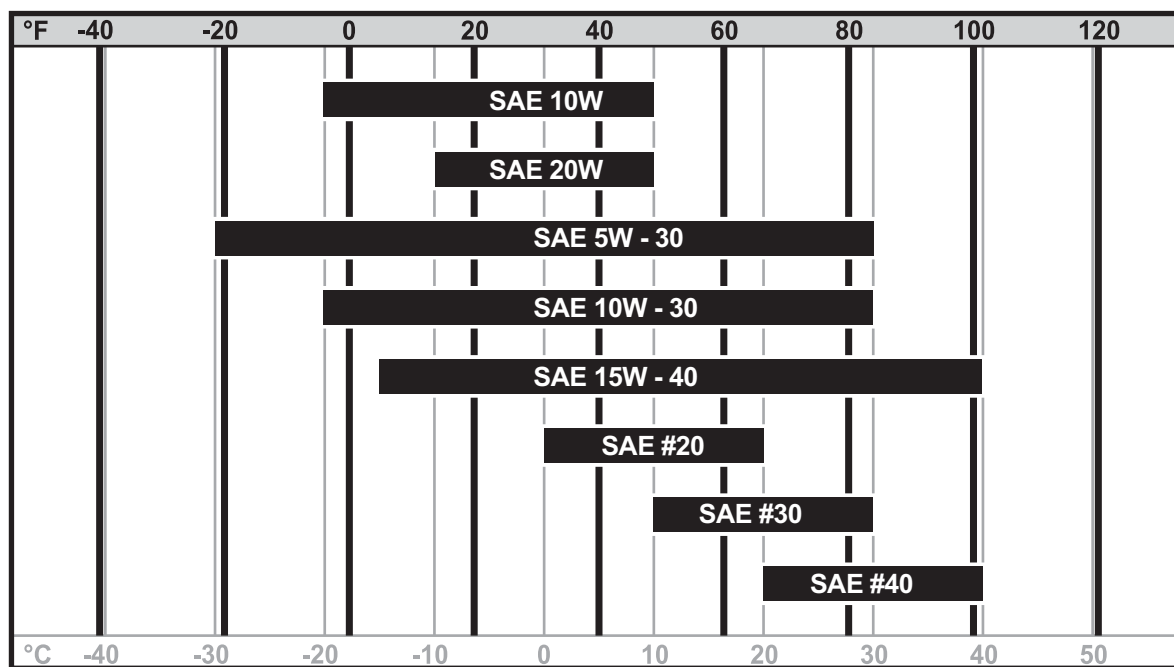
Item	Description		
DEO	Diesel engine oil meeting API service classification CF-4 or E1-96 and SAE viscosity recommended by engine manufacturer (SAE 15W40)		
THF	Tractor hydraulic fluid, similar to Phillips 66® HG, Mobilfluid® 423, Chevron® Tractor Hydraulic Fluid, Texaco® TDH Oil, or equivalent		
MPG	Multipurpose grease meeting NLGI GC-LB Grade 2		
	Check level of fluid or lubricant		Check condition
	Filter		Change, replace, adjust, service or test

Proper lubrication and maintenance protects Ditch Witch® equipment from damage and failure. Service intervals listed are for minimum requirements. In extreme conditions, service machine more frequently. Use only genuine Ditch Witch parts, filters, approved lubricants, TJC, and approved coolants to maintain warranty. Fill to capacities listed in "Specifications" on page 71.

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

IMPORTANT: Use the "Service Record" on page 105 to record all required service to your machine.

Engine Oil Temperature Chart



t43om031w.eps

Temperature range anticipated before next oil change

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

Approved Coolants

This unit was filled with John Deere® Cool-Gard® coolant before shipment from factory. Add only Cool-Gard (p/n 255-006) or any fully-formulated, ethylene glycol based, low-silicate, heavy-duty diesel engine coolant meeting ASTM specification D5345 (prediluted) or D4985 (concentrate). Before using any other kind of coolant, completely flush radiator.

NOTICE: Do not mix heavy-duty diesel engine coolant and automotive-type coolant. This will lead coolant breakdown and engine damage.

Approved Fuel

The engine in this unit 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 engine operation manual for more information.



IMPORTANT:

- For machines operated in the U.S.: The engine in this product is certified to operate on low sulfur diesel fuel (LSD) with a sulfur content of 500 ppm (0.05%) or less. Use LSD or ultra low sulfur fuel (ULSD) only. Using fuels with higher sulfur content will affect exhaust emissions. Such action is a violation of the US Clean Air Act and US EPA regulations and will result in fines.
- For machines operated outside the U.S.: Fuel sulfur content should be less than 5000 ppm (0.05%). Worldwide fuel sulfur regulations vary widely. Fuel used should always comply with local regulations. If fuel sulfur content exceeds 5000 ppm, use a lube oil meeting API CF (or equivalent) with a TBN value of 10 or greater. Do not use lube oils meeting API CJ-4 (or other low SAPS equivalent) under any conditions.

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.

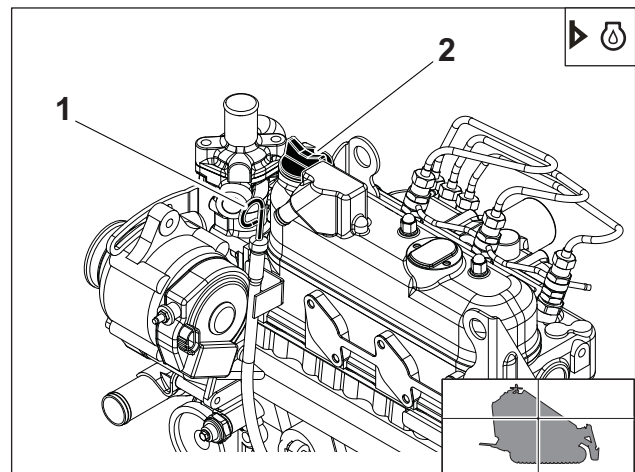
Startup/10 Hour

Location	Task	Notes
	Check engine oil level	DEO
	Check engine air filter service indicator	
	Check engine coolant level	DEAC
	Check hydraulic fluid level	THF
	Check brake operation	
	Check track tension	
	Check lug nut torque	88-95 ft•lb (108-129 N•m)
	Check hydraulic hoses	
TR50	Lube auger bearing	MPG
	Check digging chain tension	
	Check restraint bar position	MPG

Check Engine Oil Level

Check engine oil level at dipstick opening (1) at startup and every 10 hours. Raise lift arms and install safety supports. See "Working under Raised Lift Arms" on page 68. Oil level should be at top of marking. If low, add DEO at fill (2). Check with unit on level surface and at least 15 minutes after stopping engine.

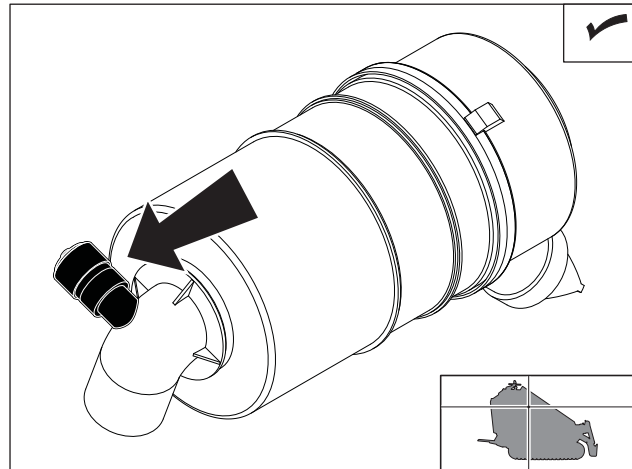
IMPORTANT: Use oil specified in "Engine Oil Temperature Chart" on page 70.



t35om009w.eps

Check Engine Air Filter Service Indicator

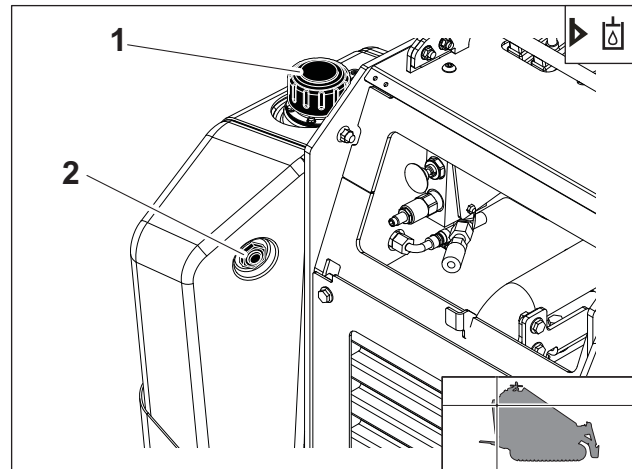
Check air filter service indicator (shown) at startup and every 10 hours and change filter as needed.



t35om010w.eps

Check Hydraulic Fluid Level

Check hydraulic fluid level at startup and every 10 hours. Maintain fluid level at halfway point on sight glass (2), when engine is off, cylinders are fully retracted, and fluid is cool. If low, add THF at fill (1).



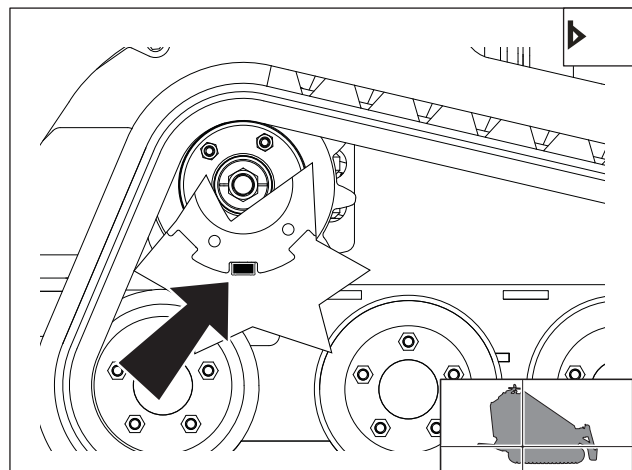
t35om013w.eps

Check Brake Operation

Check brake operation at startup and every 10 hours or more often when conditions warrant..

IMPORTANT: Engine must be running to check brake operation.

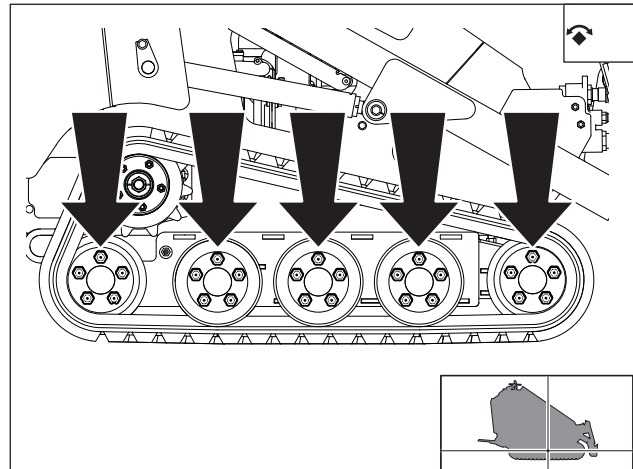
- Ensure parking brake pin (shown) moves freely allowing brake to be engaged and disengaged.
- Clean mud and debris from area around pin.



t35om014w.eps

Check Lug Nut Torque

Check lug nut torque at 10 hours, 50 hours and every 200 hours thereafter. Tighten to 88-95 ft•lb (108-129 N•m) as needed.



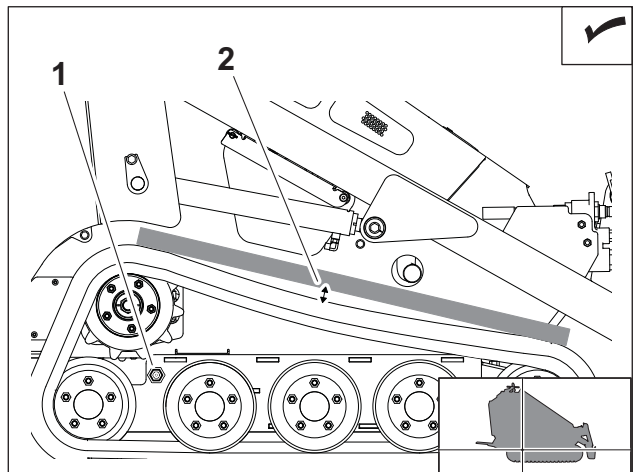
t35om036w.eps

Check Track Tension

Check track tension at startup and every 10 hours and adjust as needed. Track is correctly tensioned when measurement between track and straight edge (2) is 1/2 in (13 mm).

To adjust:

1. Park machine on smooth, flat surface.
2. Lay straight edge on top of track, spanning from sprocket to front idler roller.
3. Clean track cylinder zerk (1). Pump MPG into zerk until distance between track and straight edge (2) is 1/2" (13 mm).
4. **Test:** Drive forward one track length and check tension again.
 - If tension is too loose, repeat step 3 above.
 - If tension is too tight, loosen fitting on grease cylinder and allow a small amount of grease to discharge from cylinder. Tighten fitting and test again.

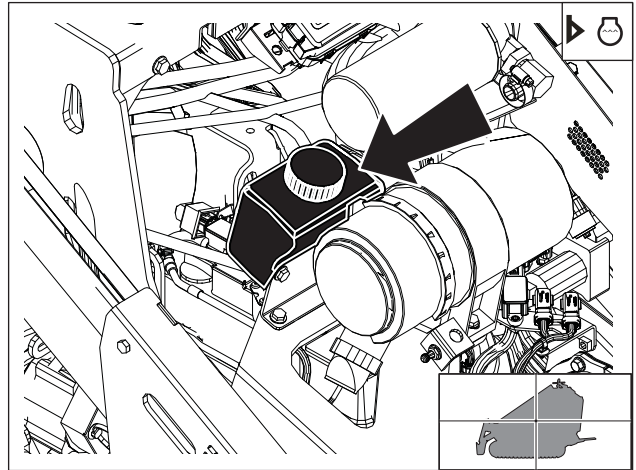


t35om033w.eps

Check Coolant Level

Check coolant level, with engine cool, at overflow bottle at startup and every 10 hours. Maintain coolant level at halfway point on bottle. If low, add approved coolant.

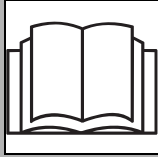
IMPORTANT: See page 70 for information on approved coolants.



t43om015w.eps



Check Hydraulic Hoses

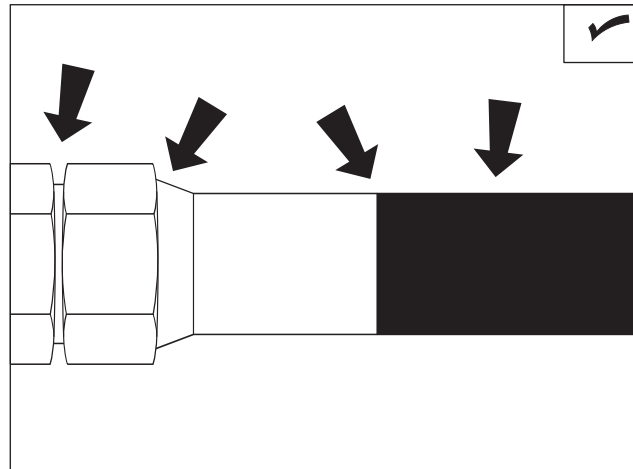
**WARNING**

Pressurized fluid or air could pierce skin and cause severe injury. Refer to operator's manual for proper use. 270-6035

To help avoid injury:

- 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.
- Use a piece of cardboard or wood, rather than hands, to search for leaks.
- Wear protective clothing, including gloves and eye protection.
- If you are injured, seek immediate medical attention from a doctor familiar with this type of injury.

Check hydraulic hoses for leaks at startup and every 10 hours.

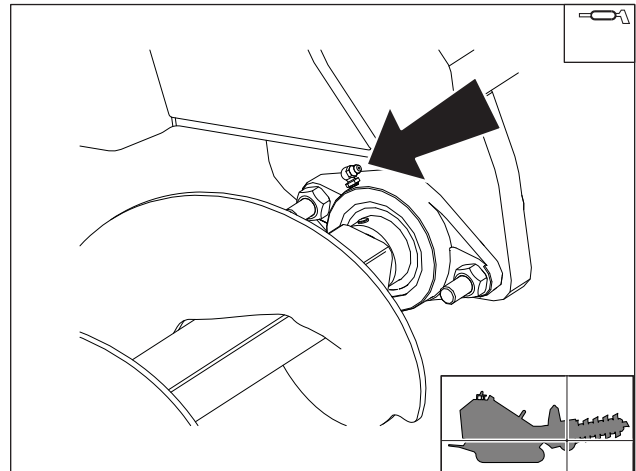


CheckHoses.eps

TR50

Lube Auger Bearing

Lube auger bearing zerk with MPG every 10 hours.

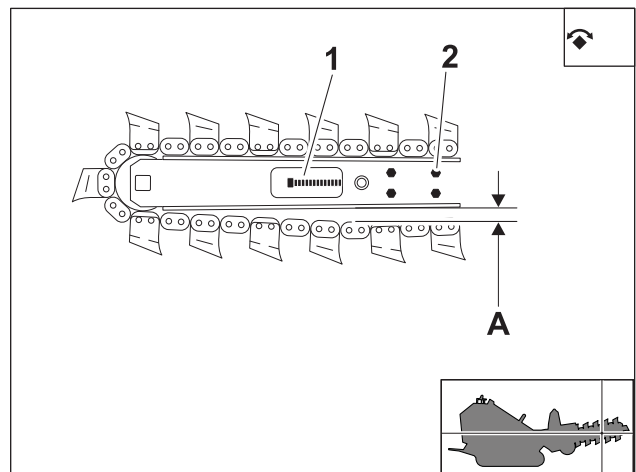


t43om035w.eps

Check Digging Chain Tension

Check digging chain tension every 10 hours and adjust as needed. With boom horizontal, measure distance A from bottom of boom to chain. When properly tensioned, distance A should be 1.5-2.0" (38-51 mm).

NOTICE: Do **not** overtighten chain. Overtightening will cause chain stretch, loss of machine performance, and possible premature chain failure.



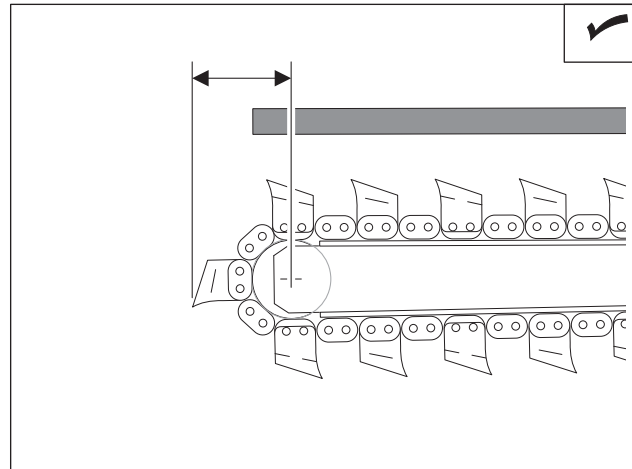
t43om036w.eps

Adjustment Screw:

1. Loosen four clamp bolts (2) so that boom slides freely.
2. Loosen jam nut on adjustment screw (1).
3. To tighten digging chain, turn adjustment screw clockwise. To loosen digging chain, turn counterclockwise.
4. When proper tension is reached, tighten jam nut.
5. Torque clamp bolts to 75 ft•lb (102 N•m).

Check Restraint Bar Position

Check restraint bar position every 10 hours, or anytime the digging chain is adjusted or replaced. The restraint bar is properly positioned when the end of bar extends between the center of the tail roller/sprocket and the end of the digging chain.



RestraintBarPosition.eps

50 Hour

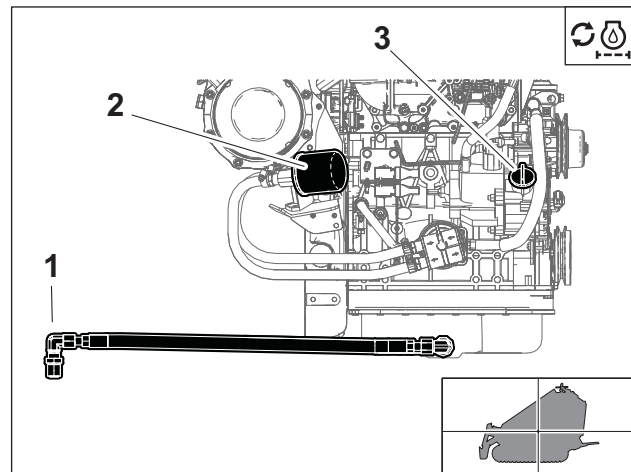


Location	Task	Notes
	Change engine oil and filter	initial service
	Check fan belt tension and damage	1/4-1/3" (7-9 mm)
	Change hydraulic fluid filter	initial
	Check fuel hose and clamp band	
	Check radiator/hydraulic fluid cooler for dirt and debris	
	Check lug nut torque	88-95 ft•lb (108-129 N•m)
	Check idler roller bearings	

Change Engine Oil and Filter (Initial)

Change engine oil after 50 hours. Raise lift arms and install safety supports. See "Working under Raised Lift Arms" on page 68. Drain oil (1) and add 5 qt (4.7 L) of DEO at fill (2).

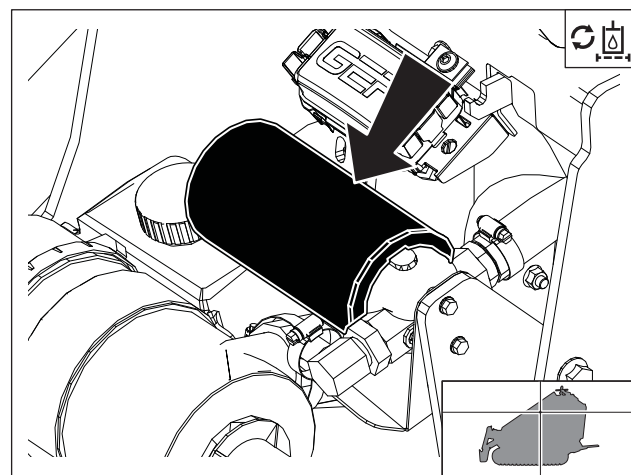
IMPORTANT: Use oil specified in "Engine Oil Temperature Chart" on page 70.



t43om018w.eps

Change Hydraulic Filter (initial)

Change hydraulic filter after 50 hours.



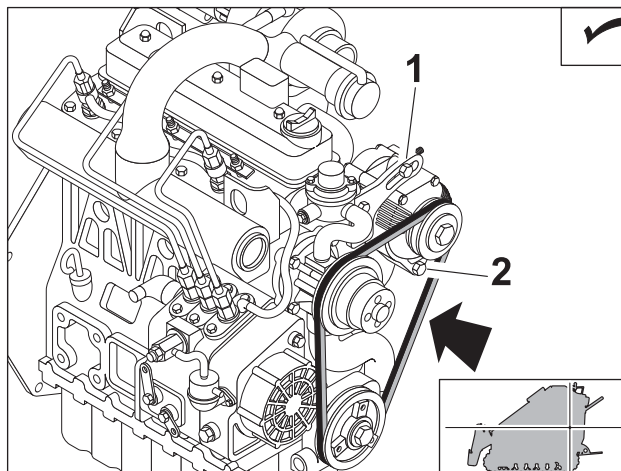
t43om016w.eps

Check Fan Belt for Tension and Damage

Check belt tension every 50 hours. Belt is properly tensioned when it moves about 1/4-3/8" (7-9 mm) when pushed at the long span. Replace the belt when it is worn and sinks into the pulley groove.

Adjust Tension

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



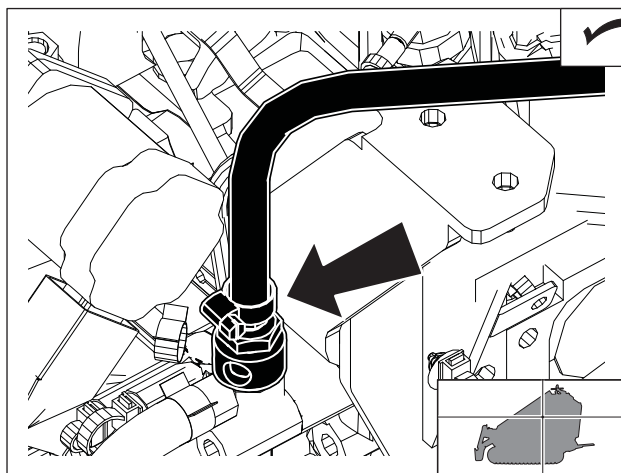
t18om048t.eps

Check Fuel Hose and Clamp Bands

Check fuel hose and clamp bands every 50 hours.

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

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

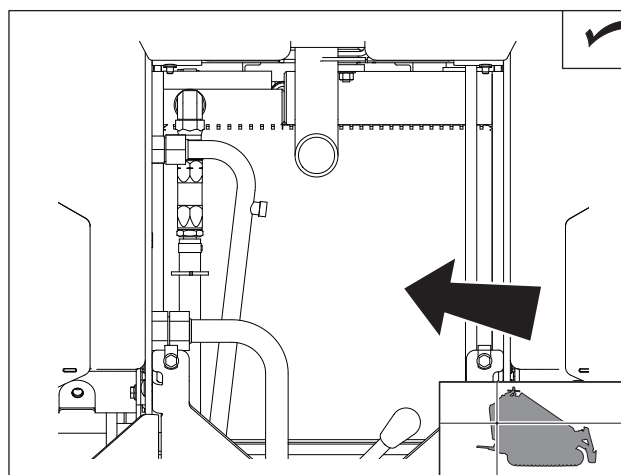


t43om017w.eps

Check Radiator/Fluid Cooler

Check radiator/hydraulic fluid cooler for dirt, grass, and other foreign matter every 50 hours. Clean out with compressed air or spray wash if required. Be careful not to damage fins with high-pressure air or water. Check more often if operating in dusty or grassy conditions.

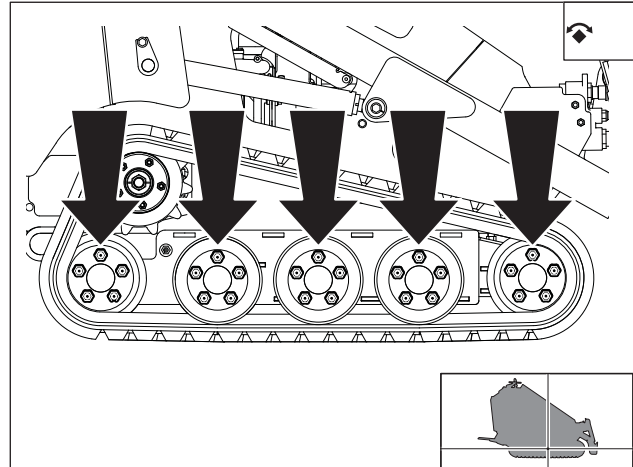
Check radiator hoses for wear. Check hose clamps for proper tightness.



t35om020w.eps

Check Lug Nut Torque

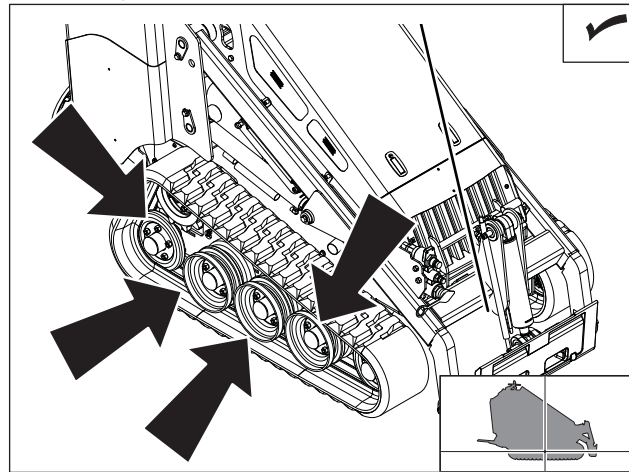
Check lug nut torque at 10 hours, 50 hours and every 200 hours thereafter. Tighten to 88-95 ft•lb (108-129 N•m) as needed.



t35om036w.eps

Check Idler Roller Bearings

Check for proper idler roller bearing positioning by lifting unit off of the ground and rocking each hub to check for movement. If adjustment is needed, see "Adjust Idler Roller Bearings" on page 89.



t43om027w.eps



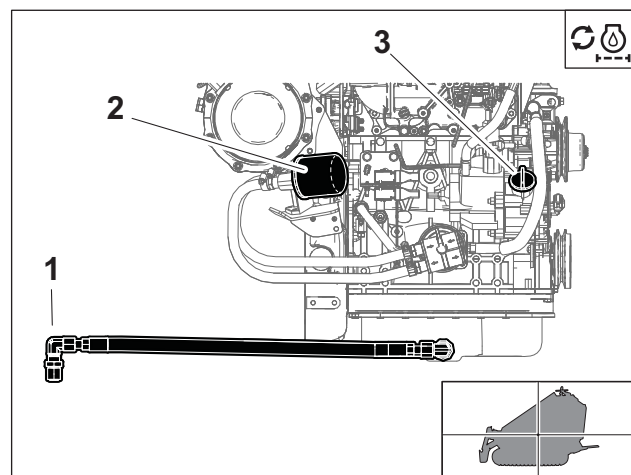
200 Hour

Location	Task	Notes
	Change engine oil and filter	DEO
	Check intake air line	1/4-1/3" (7-9 mm)
	Change hydraulic filter	
	Check lug nut torque	88-95 ft•lb (108-129 N•m)
	Check idler roller bearings	

Change Engine Oil and Filter

Change engine oil and filter every 200 hours. Raise lift arms and install safety supports. See "Working under Raised Lift Arms" on page 68. Drain oil (1), change filter (2) and add 5 qt (4.7 L) of DEO at fill (3). See page 79.

IMPORTANT: Use oil specified in "Engine Oil Temperature Chart" on page 70.



t43om018w.eps

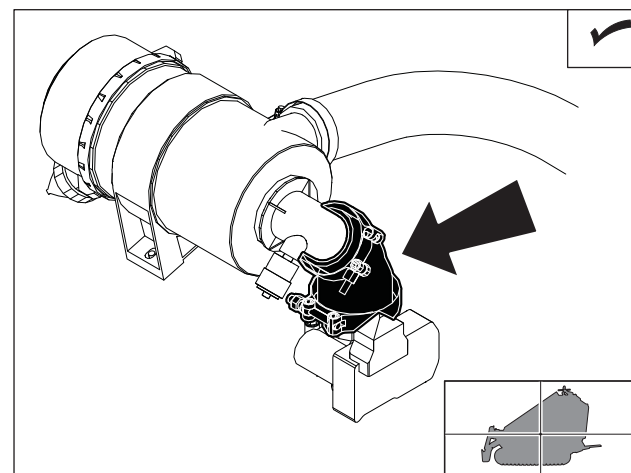
Check Intake Air Line

Check the intake air line every 200 hours.

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

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

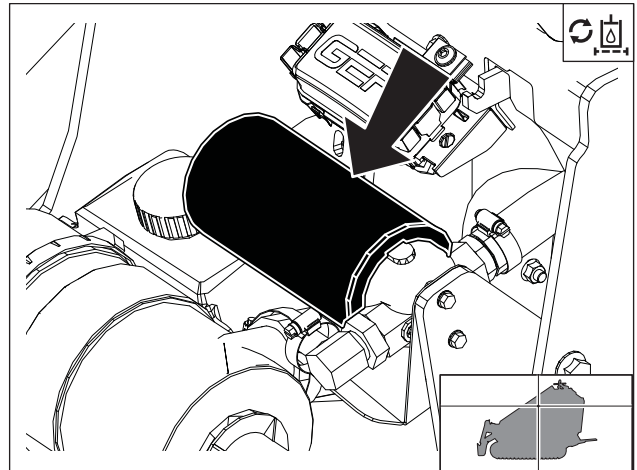
If the hose appears cracked or worn, replace it.



t43om019w.eps

Change Hydraulic Filter

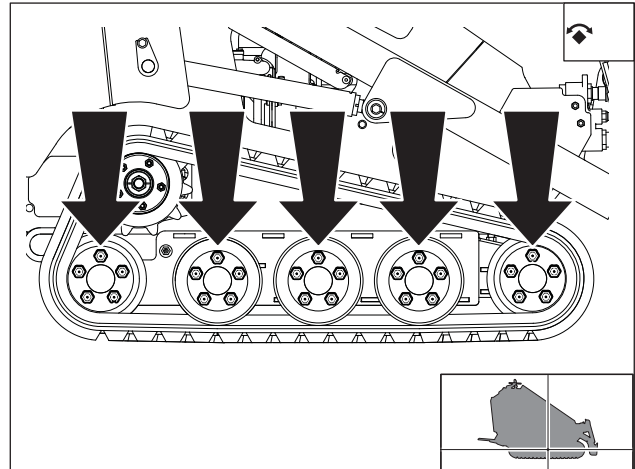
Change hydraulic filter every 200 hours.



t43om016w.eps

Check Lug Nut Torque

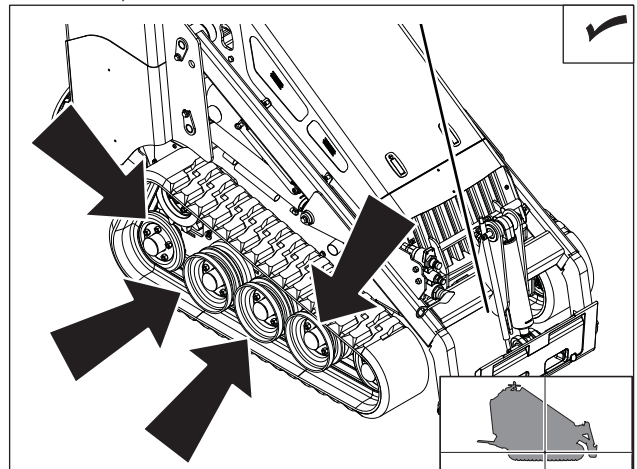
Check lug nut torque at initial intervals and every 200 hours thereafter. Tighten to 88-95 ft•lb (108-129 N•m) as needed.



t35om036w.eps

Check Idler Roller Bearings

Check for proper idler roller bearing positioning by lifting unit off of the ground and rocking each hub to check for movement. If adjustment is needed, see "Adjust Idler Roller Bearings" on page 89.



t43om027w.eps

500 Hour

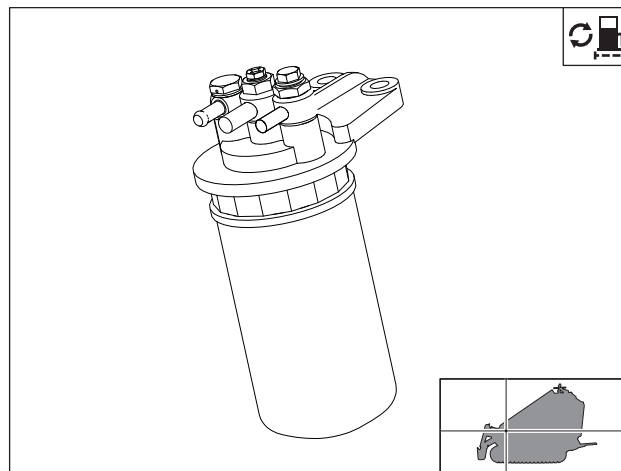
Location	Task	Notes
	Change fuel filter	
	Change hydraulic fluid and filter	
	Change water separator filter	

Change Fuel Filter

Change filter every 500 hours. If you refuel from cans, replace filter more often.

The canister filter is located in the engine compartment.

See parts manual or contact your Ditch Witch® dealer for correct replacement filter.

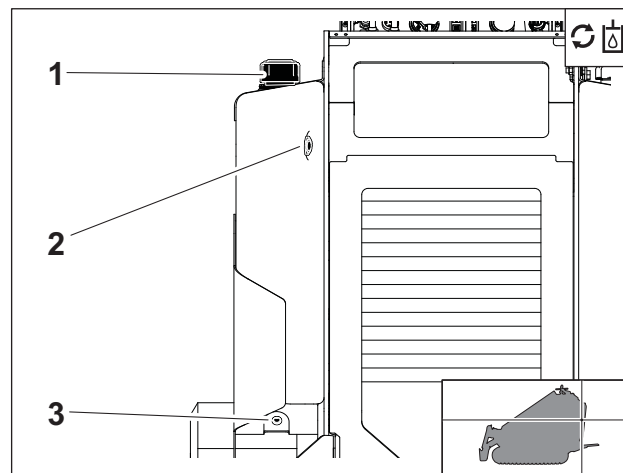


t43om020w.eps

Change Hydraulic Fluid and Filter

Change hydraulic fluid and filter every 500 hours. Change every 250 hours if jobsite temperature exceeds 100°F (38°C) more than 50% of the time.

1. Remove drain plug (3).
2. Drain fluid and replace plug.
3. Change filter. See page 83.
4. Add THF at fill (1) until fluid level is at halfway point on sight glass (2). Capacity is 9.2 gal (35 L).

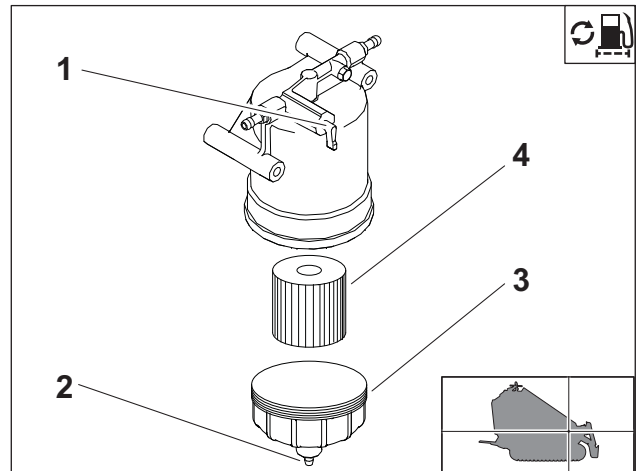


t35om029w.eps

Change Water Separator Filter

Change water separator filter every 500 hours.

1. Turn off at valve (1).
2. Purge fuel out of filter by unscrewing bottom drain plug (2).
3. Unscrew bottom of filter (3).
4. Replace filter (4).
5. Screw bottom of filter back on.
6. Turn on at valve.



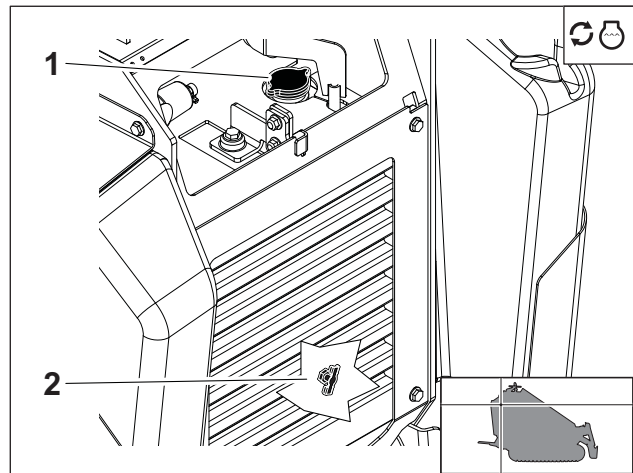
2000 Hour

Change Engine Coolant

Drain cooling system at drain (2). Add approved coolant at fill (1) every two years or 2000 hours.

NOTICE:

- The use of non-approved coolant may lead to engine damage or premature engine failure and will void engine warranty.
- See page 70 for list of approved coolants.



t35om031w.eps

As Needed

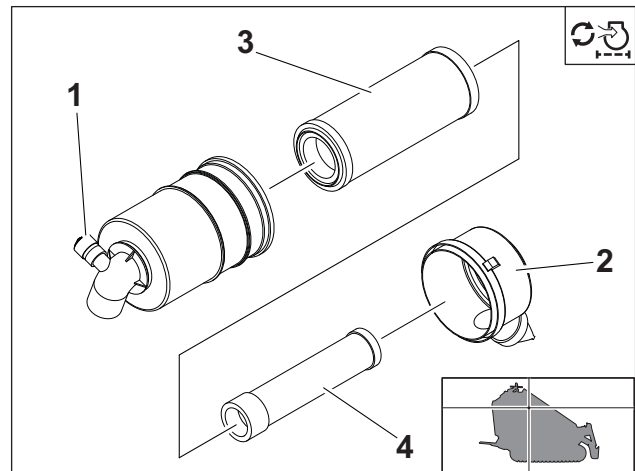


Location	Task	Notes
	Change air filter	
	Check water separator filter	
	Adjust idler roller bearings	
	Check battery	
	Charge battery	
TR50	Check digging chain rollers, sidebars, pins, and bushings	
	Check digging chain teeth and bits	
	Check trencher headshaft sprocket bolts	
	Replace digging chain	

Change Air Filter

Change air filter when red band on indicator (1) is visible. Replace safety element (4) every third change of primary filter (3) or any time primary element has become damaged.

1. Open air filter housing at latches (2).
2. Remove primary element (3).
3. Wipe inside of housing and end cup (2).
4. Insert new primary element.
5. Latch air filter case.
6. Reset air filter service indicator (1).

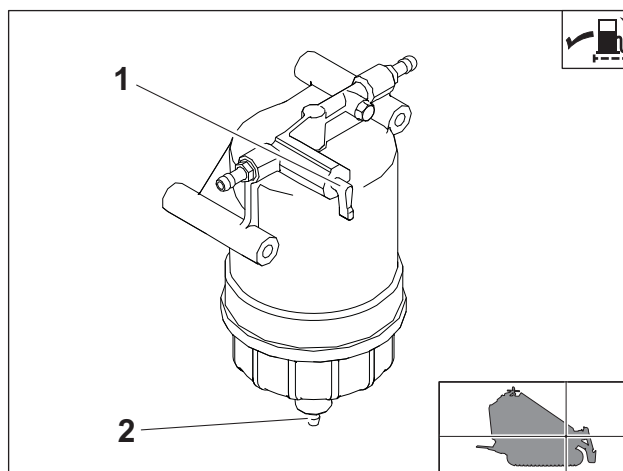


t35om032w.eps

Check Water Separator Filter

Drain water separator filter when red float ring is raised, indicating water in the filter.

1. Turn off at valve (1).
2. Unscrew drain plug (2) at bottom and drain water out.
3. Tighten drain plug.
4. Turn on at valve.



t43om023w.eps

Adjust Idler Roller Bearings

Adjust idler roller bearings to keep dirt, grass, and other foreign matter from damaging bearings as needed when hubs become loose.

1. Remove dust cap (1).
2. Ensure bearings are properly seated by tightening castle nut (2) to 30-40 ft•lb (40.7-54.2 N•m) while turning the hub (3).

IMPORTANT: Do not move the hub after this step is completed.

3. Loosen the castle nut (2).
4. Hand-tighten the castle nut.
5. Insert the cotter pin (4) into the wheel spindle (5).

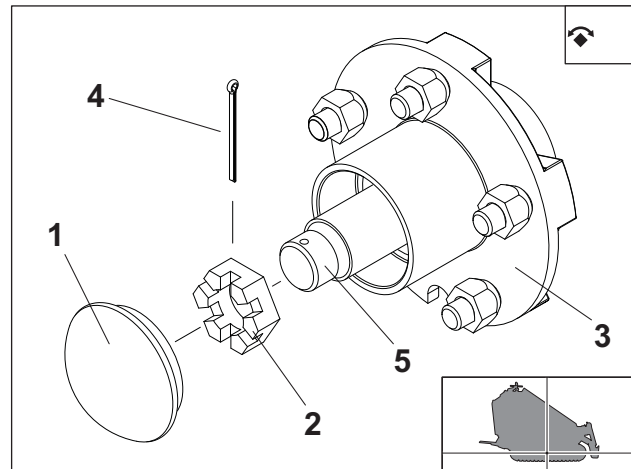
IMPORTANT: If cotter pin cannot be inserted, loosen the castle nut until it can be.

6. Bend the legs of the cotter pin over the top of the spindle.

IMPORTANT:

- When assembled correctly, the castle nut should be free to move by hand with only the cotter pin holding it in place.
- The hub should not have noticeable movement when rocked back and forth.

7. Clean the lip seal on the bearing cap and replace using Loctite® 242.



t43om028w.eps

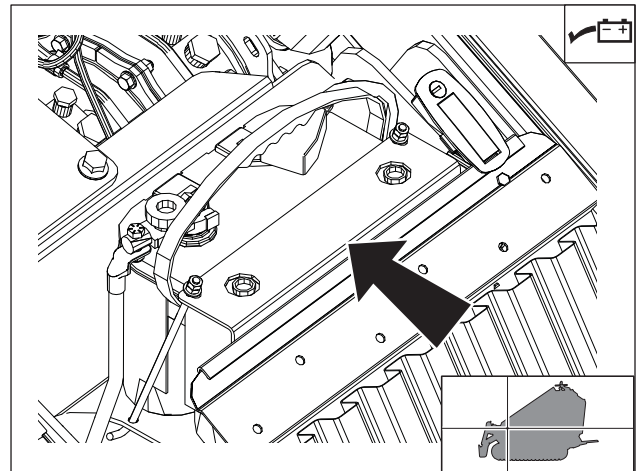


Check Battery

Check battery as needed. Keep battery clean and terminals free of corrosion.

To clean:

1. Turn battery disconnect switch, if equipped, to the off position.
2. Ensure that no ignition sources are near batteries.
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. Apply MPG to terminals after cleaning to reduce corrosion.
7. Connect battery cable clamps, **positive (+)** cable first.
8. Tighten any loose connections.
9. Ensure that battery tiedowns are secure.
10. Turn battery disconnect switch to the on position.



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**WARNING**

Explosion possible. Serious injury or equipment damage could occur. Follow directions carefully.

To help avoid injury: Do not create sparks and do not short across battery terminals for any reason.

Charge Battery



⚠ WARNING

Explosion possible. Serious injury or equipment damage could occur. Follow directions carefully.

To help avoid injury:

- Use a single 12V maximum source for charging. Do not connect to rapid chargers or dual batteries.
- Use caution and wear personal protective equipment such as safety eyewear, when charging or cleaning battery.
- Keep sparks, flames, and any ignition source away from batteries at all times. Internal contents are extremely hazardous. Leaking fluid is corrosive. Battery may be explosive at higher temperatures.
- NEVER lean over battery when making connections.
- Do not allow vehicles to touch when charging.
- Do not attempt to charge a battery that is leaking, bulging, heavily corroded, frozen, or otherwise damaged.
- NEVER short-circuit battery terminals for any reason or strike battery posts or cable terminals.
- Refer to MSDS for additional information regarding this battery.

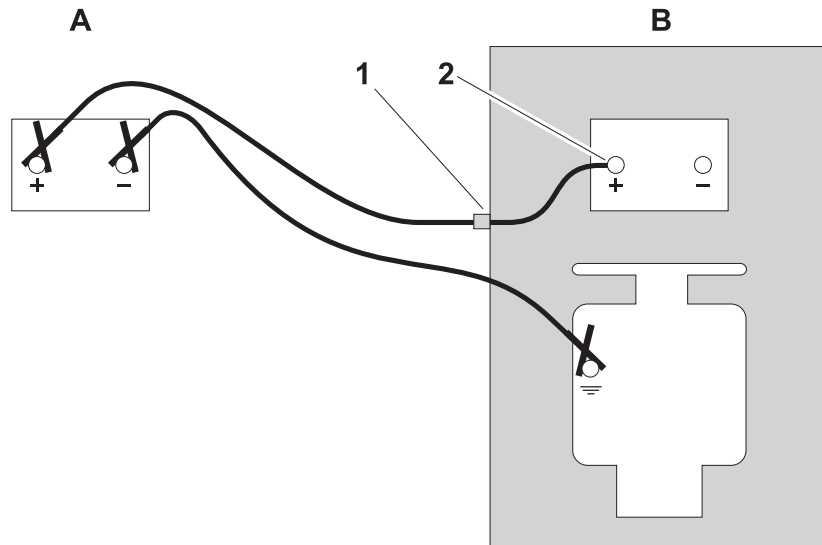
Before You Start

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). Cheap cables may not allow enough current flow to charge a dead/discharged battery.

Read all steps thoroughly and review illustration before performing procedure.

Charging Procedure (Engine Off)

1. Park service vehicle close to disabled equipment but do not allow vehicles to touch. Engage parking brake in both vehicles.
2. Turn the ignition switch to the OFF position in both vehicles, and turn off all electrical loads. Disconnect the machine controller.



3. Inspect battery in disabled vehicle (B) for signs of cracking, bulging, leaking, or other damage. Connect red positive (+) jumper cable clamp to positive (+) post (2) of battery in disabled vehicle first.

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

4. Connect the other red positive (+) jumper cable clamp to positive (+) post of battery (A) in the service vehicle.
5. Connect black negative (-) cable clamp to negative (-) post of battery (A) in service vehicle.
6. Connect the other black negative (-) cable clamp to the engine or frame ground on the disabled vehicle, at least 12" (305 mm) from the failed battery, as shown.
7. Operate service vehicle engine at 1500-2000 rpm for a few minutes to build an electrical charge in the failed battery.
8. Stop engine in service vehicle.
9. Remove jumper cables from the service vehicle, black negative (-) clamp first. Do not allow clamps to touch.
10. Remove black negative (-) cable clamp from the disabled engine or frame ground first.
11. Remove red positive (+) cable clamp from the disabled vehicle positive (+) battery post last.
12. Reconnect machine controller and try to start disabled vehicle.
13. If the disabled vehicle did not start, check for loose or corroded battery cable connections. Poor connections will prevent current from charging the failed battery. Clean terminals and posts if necessary and repeat steps above.

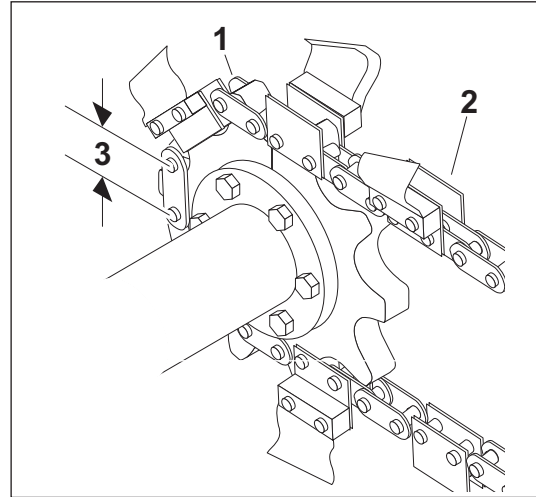
TR50

Check Digging Chain Rollers, Sidebars, Pins, and Bushings

Perform periodic visual inspections of digging chain. Check for wear on rollers (1) and sidebars (2). Check pins and bushing wear by measuring distance (3) between chain pins and comparing it to new chain.

NOTICE:

- If sidebars are bending or getting loose on chain pins, use chain spacers to join sidebars.
- Replace worn or broken chains.
- Replace sprockets when new chain is installed.



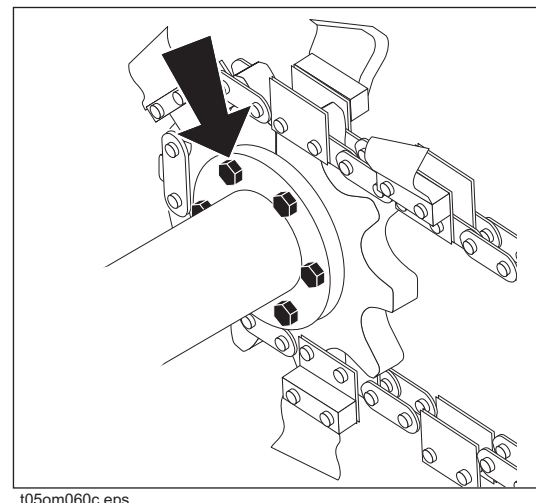
Check Digging Chain Teeth and Bits

Inspect digging chain teeth for wear as needed. Replace worn teeth with new Ditch Witch teeth. Each unit is equipped with a standard tooth configuration. When replacing teeth, maintain original tooth pattern. Depending on soil conditions and type of chain, a different configuration might produce better results. Contact your authorized Ditch Witch dealer for more information about digging teeth patterns.

Alligator chain bits, like teeth, wear out. When tungsten cap or insert is gone, bit will wear quickly. Replace it before bit adapter is damaged.

Check Trencher Headshaft Sprocket Bolts

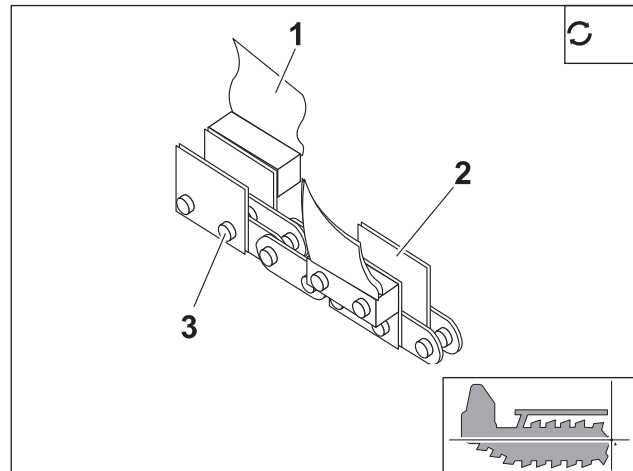
Check tightness of headshaft sprocket bolts as needed. Tighten lubricated bolts to 85 ft•lb (115 N•m)



Replace Digging Chain

Visually check digging chains for wear on rollers and sidebars (2). Check pins (3) and bushing wear by measuring distance between chain pins and comparing it with a new chain. Also check digging teeth (1).

NOTICE: Replace sprockets when a new chain is installed.

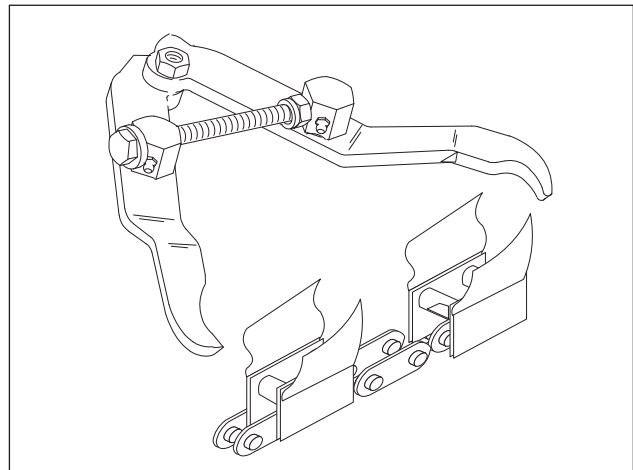


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To remove chain:

1. Fasten and adjust seat belt.
2. Start unit. See page 50 for proper start-up procedures.
3. Move attachment direction/speed control until digging chain connector pin is on top of boom.
4. Lower boom to ground.
5. Engage parking brake.
6. Turn ignition switch to STOP.
7. Roller booms: Secure chain by clamping links on either side of connector pin with chain jaws (shown). Squeeze jaws to reduce pressure on connector pin.

Sprocket booms: Lock rear idler sprocket.

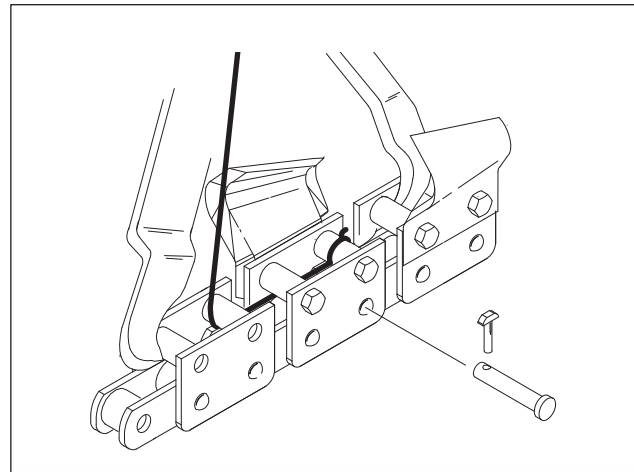


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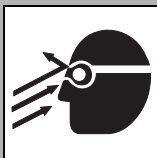


To install digging chain:

1. Position digging chain on ground with teeth down and pointed toward unit.
2. Loop cable through end links.
3. Start engine.
4. Back unit up until digging chain extends past headshaft about 12" (30 cm).
5. Lower boom to horizontal position.
6. Stop engine.
7. Secure chain on sprocket booms by locking rear idler sprocket.
8. Pull rear end of chain over tail sprocket or roller. Pull cable until chain is in place on boom.
9. Attach chain jaws to end links and bring links into place.
10. Install connector pin and lock key.
11. Loop cable through links nearest connector pin.



Digging_Chain_Remove_02.eps



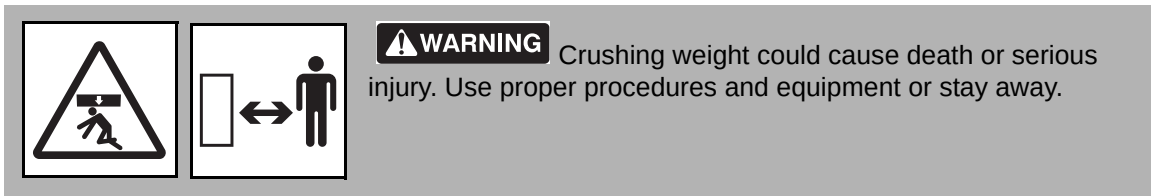
⚠ WARNING

Fluid pressure could pierce skin and cause injury or death. Stay away.

To help avoid injury:

- Service digging boom grease cylinder only while standing on opposite side of boom.
- Wear gloves and safety glasses, and cover fitting with cloth when relieving pressure in cylinder.

12. Loosen plug on grease cylinder or turn tension bolts counterclockwise to relieve chain tension.
13. Stand clear of chain and remove lock key from connector pin. Drive connector pin out of link.



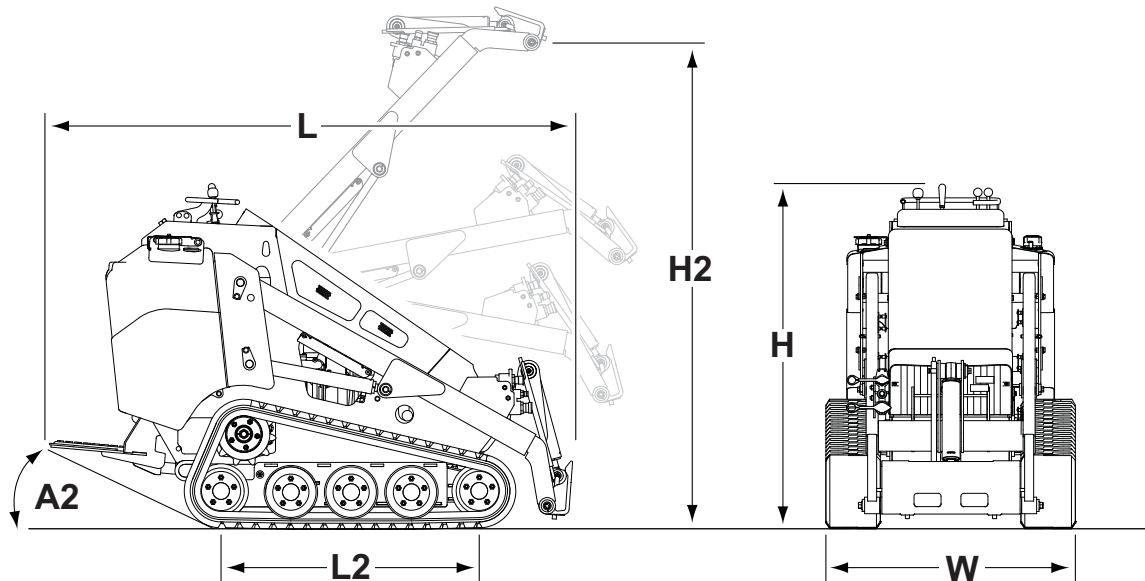
14. Unclamp links. Slowly release cable and lower chain to ground.
15. Lay chain on ground with teeth down.

To install chain:

1. Lay chain on ground with teeth down and pointed toward unit. Loop cable through end links.
2. Fasten and adjust seatbelt.
3. Start tractor. See page 72 for start-up procedures.
4. Disengage parking brake.
5. Move ground drive control to reverse.
6. Back unit up until chain extends past head shaft about 1' (305 mm).
7. Move ground drive control to neutral.
8. Lower backfill blade to ground.
9. Lower boom to horizontal position.
10. Engage parking brake.
11. Turn ignition switch to STOP.
12. Pull rear end of chain over tail roller or sprocket.
13. Pull until chain is in place on boom.
14. Move chain down boom until chain connector pin and lock key can be installed. Install connector pin and lock key.
15. Tighten chain by pumping EPG into grease cylinder.

Specifications

SK850 Basic Unit



Dimensions		U.S.	Metric
H2	Hinge pin height, max	83 in	2108 mm
	Operating height, max, standard bucket	105 in	2667 mm
H	Overall height of machine	57 in	1450 mm
L	Overall length of loader, no attachment	86 in	2190 mm
	Overall length of machine, with standard bucket	105 in	2670 mm
L2	Wheelbase/track length	43 in	1092 mm
A2	Angle of departure	27°	27°
	Ground clearance, min (center/side)	8.9 in / 3.7 in	170 mm / 124 mm
W	Track width, max	42 in	1065 mm
	Track width, min	36 in	914 mm
	Unit width, excluding tracks	35 in	890 mm
	Dump height, max, with standard bucket	66 in	1676 mm
	Reach, standard bucket at max dump height	17 in	430 mm

Dimensions		U.S.	Metric
	Bucket rollback angle, ground level	25°	25°
	Bucket rollback angle, full height	90°	90°
	Dump angle, standard bucket at max dump height	35°	35°
	Bucket width, max	44 in	1120 mm
	Bucket width, min	36 in	915 mm
	Swing radius, max, with standard bucket	65 in	1650 mm
	Swing radius, no attachment	44 in	1120 mm
	Rear overhang, max	29 in	735 mm

Performance		U.S.	Metric
	Ground drive speed, forward and reverse	4.7 mph	7.6 km/h
	Ground pressure, 7" (180 mm) tracks *	5.5 psi	0.38 bar
	Ground pressure, 9" (230 mm) tracks *	4.5 psi	0.31 bar
	Tipping capacity	2465 lb	1118 kg
	The rated operating capacity for this machine was determined using a standard bucket in the drive position with center of gravity 7 in (18 cm) from the mounting plate. Depending on the attachment, the actual operating capacity of the attachment may vary.		
	Operating capacity (35% of tipping capacity)	860 lb	390 kg
	Machine weight (fluids full)	3100 lb	1406 kg

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

Battery

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

Fluid Capacities		U.S.	Metric
	Fuel tank	10.5 gal	40 L
	Engine oil, with filter	5.0 qt	4.7 L
	Hydraulic reservoir	9.2 gal	35 L
	Coolant capacity	1.28 gal	4.8 L

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 necessarily match that shown.

SK850 Power Specifications

Power	U.S.	Metric
Engine: Yanmar® 3TNV88C, diesel, EPA Tier 4 Final, EU Stage IIIA		
Number of cylinders	3	
Displacement	100.1 in ³	1.64 L
Bore	3.46 in	88 mm
Stroke	3.54 in	90 mm
Manufacturer's gross power rating (per SAE J1955)	36.9 hp	27.5 kW
Estimated net power rating (per SAE 1348)	35.1 hp	26.2 kW
Rated engine speed	3000 rpm	3000 rpm



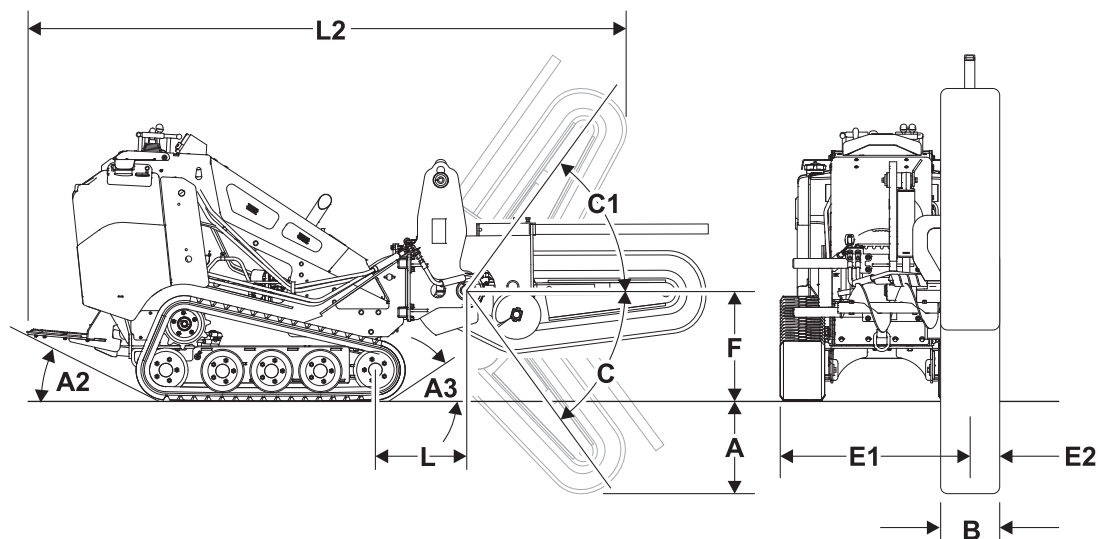
Hydraulic System	U.S.	Metric
Auxiliary: double gear pump		
Flow rate (pump 1)	8.8 gpm	33 L/min
Flow rate (pump 2)	5.1 gpm	20 L/min
Pressure	3625 psi	250 bar
Ground drive: dual hydrostat		
Flow rate	15 gpm	56.8 L/min
Pressure	3625 psi	250 bar

Noise Levels
Operator 91 dBA sound pressure per ISO 6394
Exterior 104 dBA sound power per ISO 6393

Vibration Level
Average vibration transmitted to the operator's hand during normal operation with a loader bucket is 4.31 m/sec ² . Average vibration transmitted to the whole body during normal operation with a loader bucket is 1.07 m/sec ² . Actual vibration will depend upon the attachment being used.

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 necessarily match that shown.

SK850 with TR50



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Dimensions*		U.S.	Metric
A	Trench depth, maximum	36 in	914 in
A2	Angle of approach	30°	30°
A3	Angle of departure	27°	27°
B	Trench width, minimum to maximum	6-16 in	152-406 mm
C	Boom travel down	60°	60°
C1	Boom travel up	60°	60°
E1	Centerline trench to outside edge of unit, left	4-20 in	102-508 mm
E2	Centerline trench to outside edge of unit, right	21-37 in	533-940
F	Headshaft height, digging chain	23 in	584 mm
L	Headshaft overhang	18 in	457 mm
L2	Length, transport	124 in	3150 mm

Dimensions are based on TR50 attachment and 24" (609.6) boom.

Support

Procedure

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

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

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

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



Resources

Publications

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

Ditch Witch® Training

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

Warranty

Ditch Witch® Equipment and Replacement Parts Limited Warranty Policy

Subject to the limitation and exclusions herein, free replacement parts will be provided at any authorized Ditch Witch dealership for any Ditch Witch equipment or parts manufactured by The Charles Machine Works, Inc. (CMW) 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, 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 CMW or its authorized dealer. CMW will provide the location of its inspection facilities or its nearest authorized dealer upon inquiry. CMW reserves the right to supply remanufactured replacement parts under this warranty as it deems appropriate.

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

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 CMW's Product Support department, P.O. Box 66, Perry, OK 73077-0066, or contact your local Ditch Witch dealer.

First version: 1/91; Latest version: 11/11

**A Note To
Ditch Witch
Equipment Owners:**

If your equipment was purchased through a Ditch Witch dealer, there is no need to read further.

However, if you purchased from any other source, please fill out the form on the reverse side and return it to us.

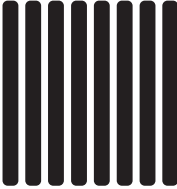
This will enable you to receive updates on this equipment as well as information on new products of interest.

Thanks for using Ditch Witch equipment.

(Please Fold Along This Line And Seal At Bottom With Tape)



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IN THE
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FIRST CLASS PERMIT NO 23 PERRY OKLAHOMA

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**The Charles Machine Works, Inc.
P.O. Box 66
Perry, Oklahoma 73077-9989**



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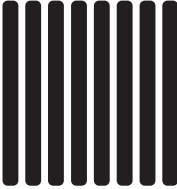
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**The Charles Machine Works, Inc.
P.O. Box 66
Perry, Oklahoma 73077-9989**



Ditch Witch® Registration Card

Please Type or Print All Information

Purchaser's Company Name		
Attention		
Street Address or P.O. Box		
City	County	
State	Zip	Nation
()		
Phone Number With Area Code		
Model	Serial Number	
Attachments/Accessories	Serial Numbers	
Attachments/Accessories	Serial Numbers	
Attachments/Accessories	Serial Numbers	
Name of Ditch Witch Dealership		
Your Signature		

Ditch Witch® Registration Card

Please Type or Print All Information

Purchaser's Company Name		
Attention		
Street Address or P.O. Box		
City	County	
State	Zip	Nation
()		
Phone Number With Area Code		
Model	Serial Number	
Attachments/Accessories	Serial Numbers	
Attachments/Accessories	Serial Numbers	
Attachments/Accessories	Serial Numbers	
Name of Ditch Witch Dealership		
Your Signature		

Service Record

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