

RT36

Operator's Manual



CMW®

Issue 1.1



054- 131

Overview



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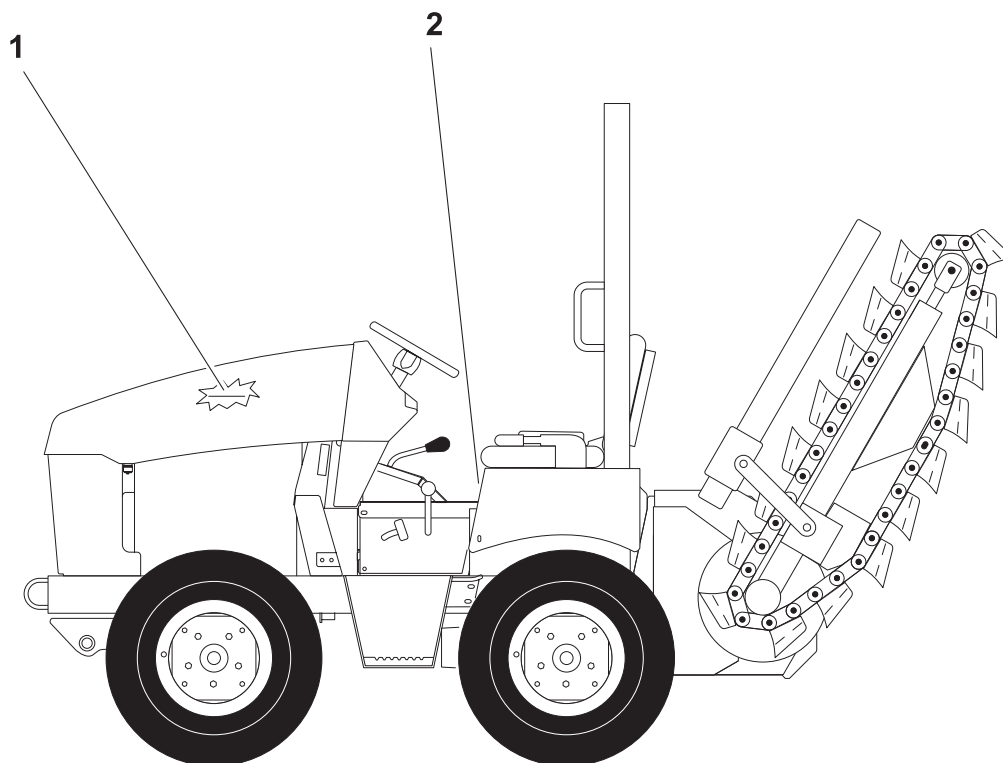
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Serial Number Location

Record serial numbers and date of purchase in spaces provided. RT36 (2) and engine (1) serial numbers are located as shown.



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Date of manufacture	
Date of purchase	
RT36 serial number	
Engine serial number	
Front attachment serial number	
Trailer serial number	

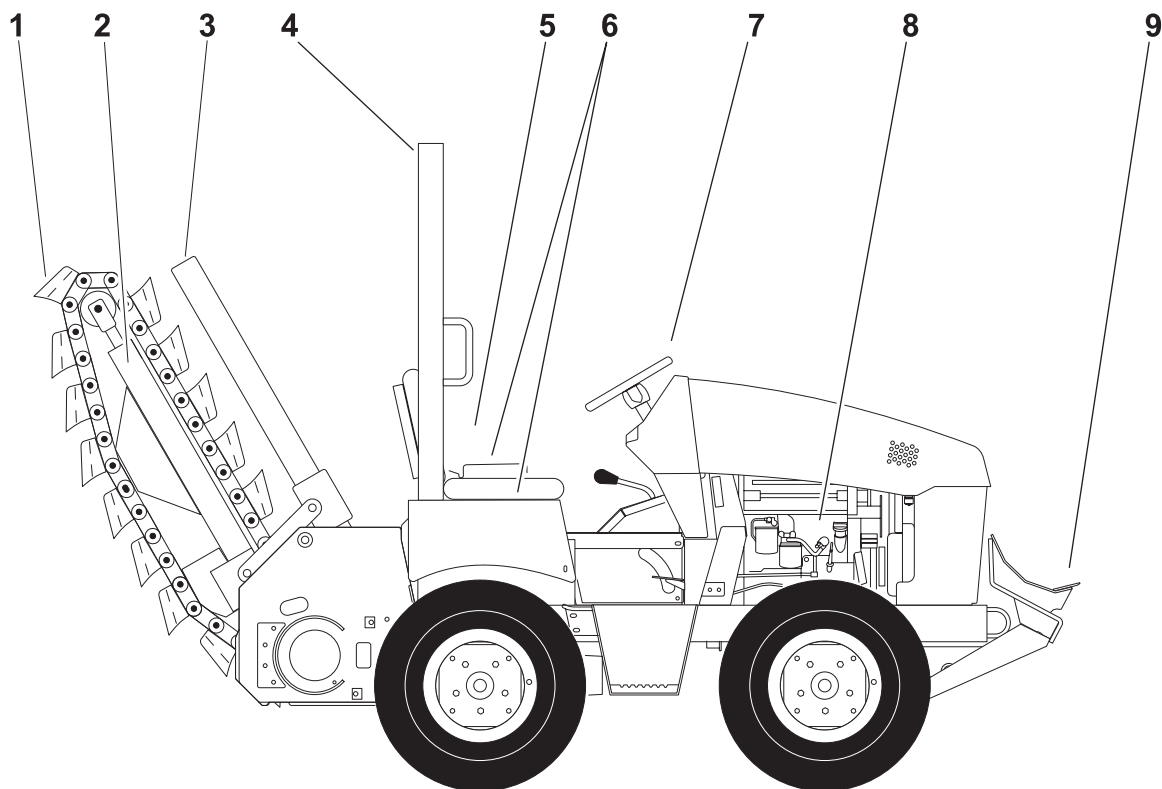
Intended Use

The RT36 is a riding trencher designed to install buried service lines up to 16" (410 mm) in diameter and 60" (1.5 m) deep.

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 RT36 should be used with genuine Ditch Witch chain, teeth, and sprockets. It should be operated, serviced, and repaired only by persons familiar with its particular characteristics and acquainted with the relevant safety procedures.

Unit Components



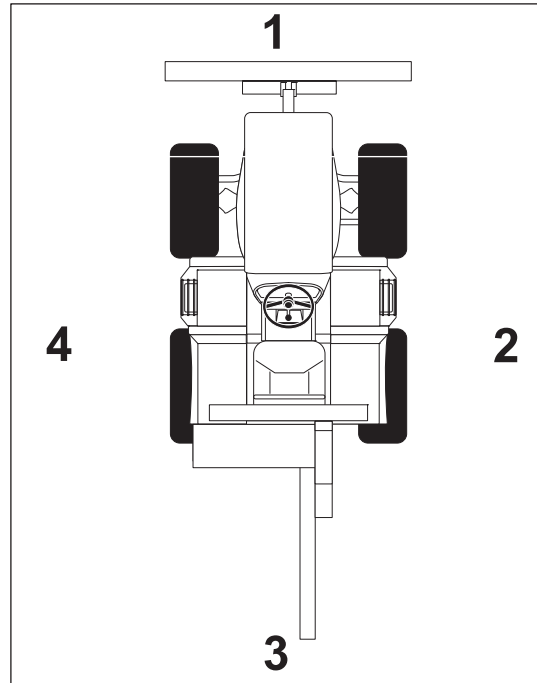
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|---|----------------------------|
| 1. Digging chain | 6. Left and right consoles |
| 2. Boom | 7. Center console |
| 3. Personnel restraint bar | 8. Engine compartment |
| 4. Rollover Protective Structure (ROPS) | 9. Backfill blade |
| 5. Operator's station | |

Operator Orientation

- | | |
|------------------|-----------------|
| 1. Front of unit | 3. Rear of unit |
| 2. Right of unit | 4. Left of unit |

Right and left sides of machine are determined by facing front of unit while seated at the controls.



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About This Manual

This manual contains information for the proper use of this machine. See **Operation Overview** 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.

“Continued” Indicators



indicates that a procedure is continued on the next page.

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.

RT36 Operator's Manual

Issue number 1.1/OM-9/04

Part number 054-131

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Safety

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Guidelines

Follow these guidelines before operating any jobsite equipment:

- Complete proper training and read operator's manual before using equipment.
- Contact One-Call (888-258-0808) and any utility companies which do not subscribe to One-Call. Have all underground pipes and cables located and marked before operating equipment. If you damage a utility, contact utility company.
- 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.
- 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 is present.
- Contact your Ditch Witch dealer if you have any question about operation, maintenance, or equipment use.

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.



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



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



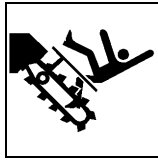
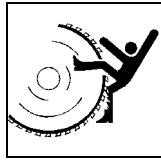
indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

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

NOTICE can keep you from doing something that might damage the machine or someone's property. It can also alert you against unsafe practices.

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

Safety Alerts

**⚠ DANGER**

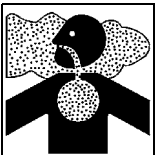
Moving digging teeth will kill you or cut off arm or leg. Stay away.

**⚠ DANGER**

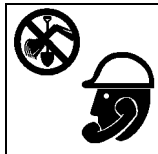
Turning shaft will kill you or crush arm or leg. Stay away.

**⚠ DANGER**

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

**⚠ DANGER**

Deadly gases. Lack of oxygen or presence of gas will cause sickness or death. Provide ventilation.

**⚠ WARNING**

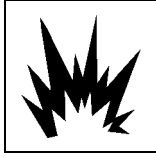
Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.

**⚠ WARNING**

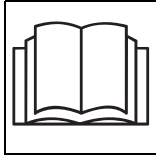
Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.

**⚠ WARNING**

Moving parts could cut off hand or foot. Stay away.



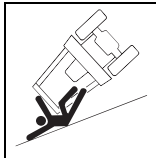
⚠ WARNING Explosion possible. Serious injury or equipment damage could occur. Follow directions carefully.



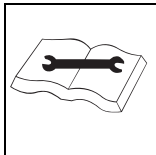
⚠ WARNING Incorrect procedures could result in death, injury, or property damage. Learn to use equipment correctly.



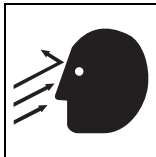
⚠ WARNING Fall possible. Riders can fall from machine and be injured or killed. Only operator is allowed on machine.



⚠ WARNING Rollover possible. If machine rolls over, you could be thrown from seat and killed or crushed. Wear seat belt.



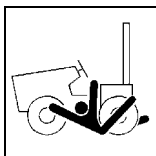
⚠ WARNING Improper control function could cause death or serious injury. If control does not work as described in instructions, stop machine and have it serviced.



⚠ WARNING Looking into fiber optic cable could result in permanent vision damage. Do not look into ends of fiber optic or unidentified cable.



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



⚠ WARNING Runaway possible. Machine could run over you or others. Learn how to use all controls. Start and operate only from operator's position.



⚠ WARNING Fire or explosion possible. Fumes could ignite and cause burns. No smoking, no flame, no spark.



**⚠ WARNING**

Moving traffic - hazardous situation. Death or serious injury could result. Avoid moving vehicles, wear high visibility clothing, post appropriate warning signs.

**⚠ WARNING**

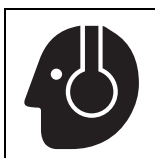
Hot pressurized cooling system fluid could cause serious burns. Allow to cool before servicing.

**⚠ CAUTION**

Flying objects may cause injury. Wear hard hat and safety glasses.

**⚠ CAUTION**

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

**⚠ CAUTION**

Exposure to high noise levels may cause hearing loss. Wear hearing protection.

**⚠ CAUTION**

Fall possible. Slips or trips may result in injury. Keep area clean.

**⚠ CAUTION**

Battery acid may cause burns. Avoid contact.

**⚠ CAUTION**

Improper handling or use of chemicals may result in illness, injury, or equipment damage. Follow instructions on labels and in material safety data sheets (MSDS).

Emergency Procedures

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

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. Almost one-third of work-related electrocutions result from contact with less than 440 volts.

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

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

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

If an Electric Line is Damaged

If you suspect an electric line has been damaged and you are **on tractor**, DO NOT MOVE. Remain on tractor and take the following actions. The order and degree of action will depend upon the situation.

- Warn people nearby that an electric strike has occurred. Instruct them to leave the area and contact utility.
- Raise attachments and drive from immediate area.
- Contact utility company to shut off power.
- Do not return to jobsite or allow anyone into area until given permission by utility company.

If you suspect an electric line has been damaged and you are **off tractor**, DO NOT TOUCH TRACTOR. Take the following actions. The order and degree of action will depend upon the situation.

- LEAVE AREA. The ground surface may be electrified, so take small steps with feet close together to reduce the hazard of being shocked from one foot to the other. For more information, contact your Ditch Witch 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

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.

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) 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.

Controls

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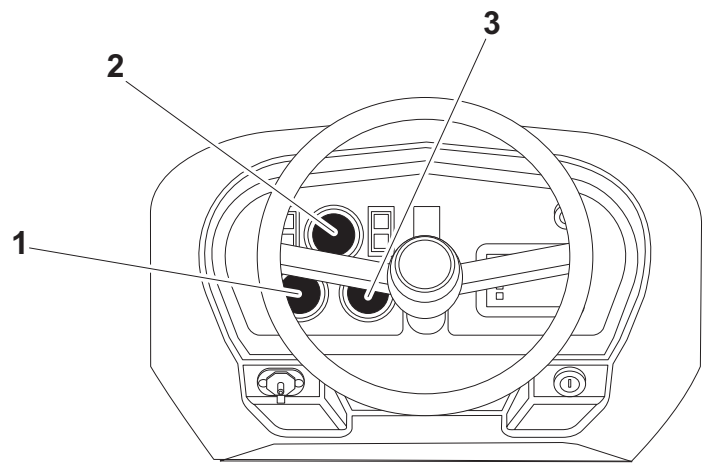
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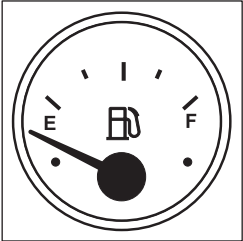
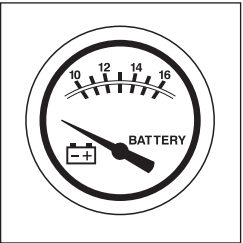
Center Console

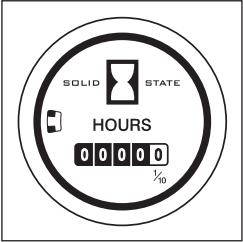
Gauges



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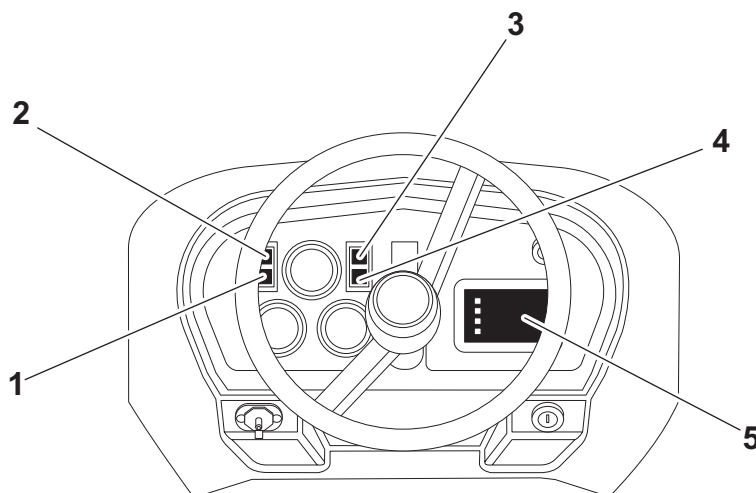
1. Fuel gauge
2. Voltmeter
3. Hourmeter

Item	Description	Notes
1. Fuel gauge  c00ic065c.eps	Displays fuel level in tank.	Use only #2 diesel fuel. Fuel tank holds 13 gal (49 L).
2. Voltmeter  c00ic273h.eps	Displays system voltage.	Should show 12-14V with engine running during normal operation.

Item	Description	Notes
3. Hourmeter  c00ic019h.eps	Records engine operating time.	Use engine operating times to schedule service.

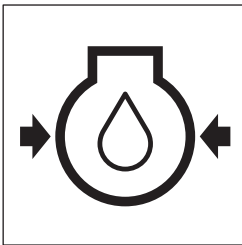
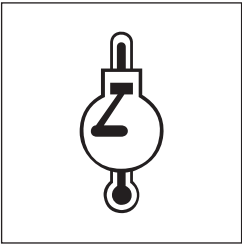


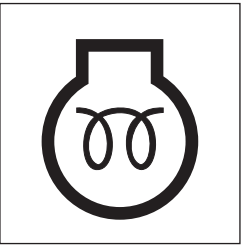
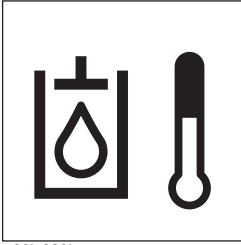
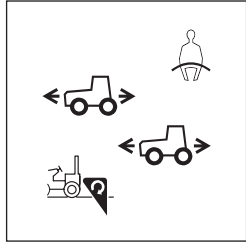
Indicators



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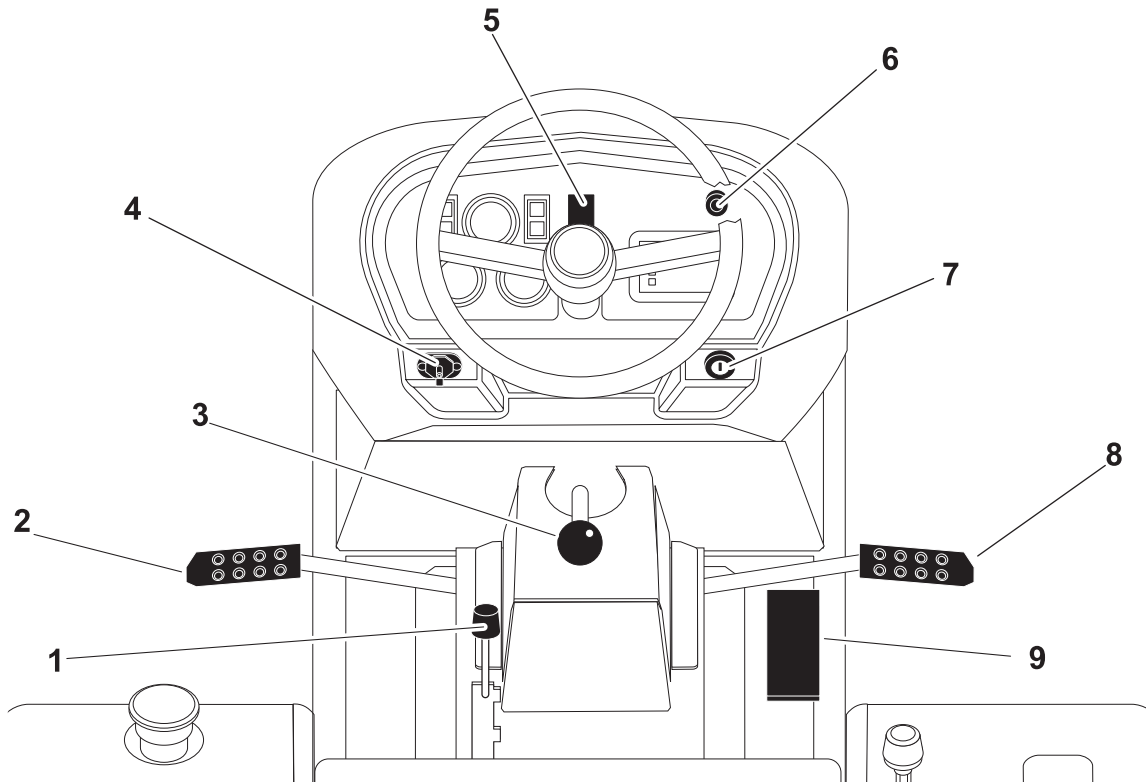
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|----------------------------------|--|
| 1. Engine oil pressure indicator | 4. Hydraulic fluid temperature indicator |
| 2. Engine temperature indicator | 5. Start interlock |
| 3. Cold start wait indicator* | * optional |

Item	Description	Notes
1. Engine oil pressure indicator  c00ic049c.eps	Lights when oil pressure falls below 8-12 psi (.5-.8 bar). Light will come on briefly when engine is started.	If light remains on: • Turn off engine. • Check oil level. • If pressure is still low, consult engine manual.
2. Engine temperature indicator  c00ic274h.eps	Lights and engine shuts down if engine temperature rises above 275° F (135° C). Light will come on briefly when engine is started.	If light remains on: • Turn off engine and let it cool. • Check fan belt tension. • Check for low engine oil level. • Check cooling fins for dirt and debris.

Item	Description	Notes
3. Cold start wait indicator  c00ic180h.eps	Lights when intake air pre-heater is operating. Wait until light goes off before starting engine.	See "Start Unit" on page 48 for more information.
4. Hydraulic fluid temperature indicator  c00ic023h.eps	Lights if hydraulic fluid overheats. Light will come on briefly when engine is started.	If light remains on: • Check that engine fan is turning when engine is running. • Turn off engine and let it cool. • Check hydraulic fluid level. • Check front of hydraulic fluid cooler for debris.
5. Start Interlock  c00ic281h.eps	Lights when conditions necessary to start unit are met. • Operator is in seat. • Ground drive speed/direction control is in neutral. • Transmission control is in neutral. • Digging chain control is in STOP.	IMPORTANT: All four start interlock indicators must be on to start engine.

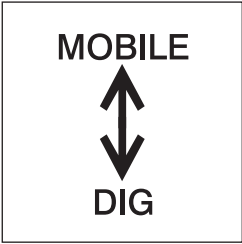


Controls

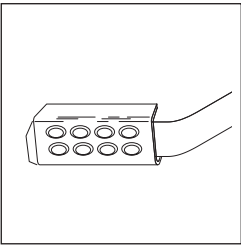
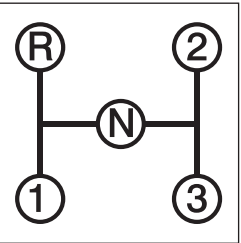
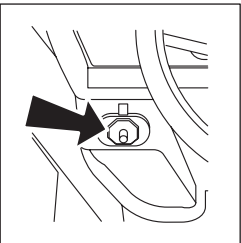
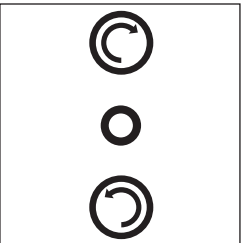
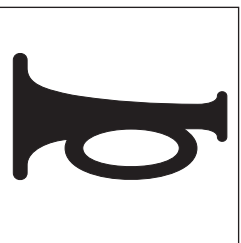


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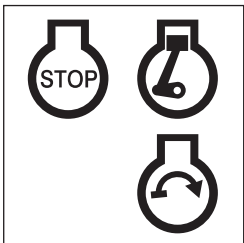
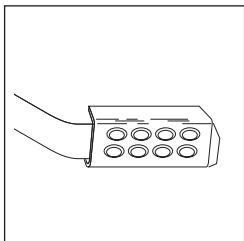
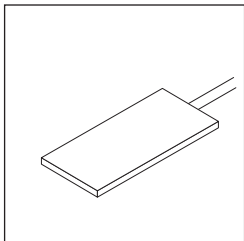
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|---------------------------------|------------------------|
| 1. Mobile/Dig control | 6. Horn |
| 2. Clutch pedal | 7. Ignition switch |
| 3. Transmission lever | 8. Service brake pedal |
| 4. Auxiliary outlet | 9. Foot throttle pedal |
| 5. Drilling attachment control* | *optional |

Item	Description	Notes
1. Mobile/Dig control 	To travel within the jobsite, shift to mobile position. To load and unload, shift to dig position. To operate trencher, shift to dig position.	IMPORTANT: Always shift transmission lever to neutral position before moving mobile/dig control.

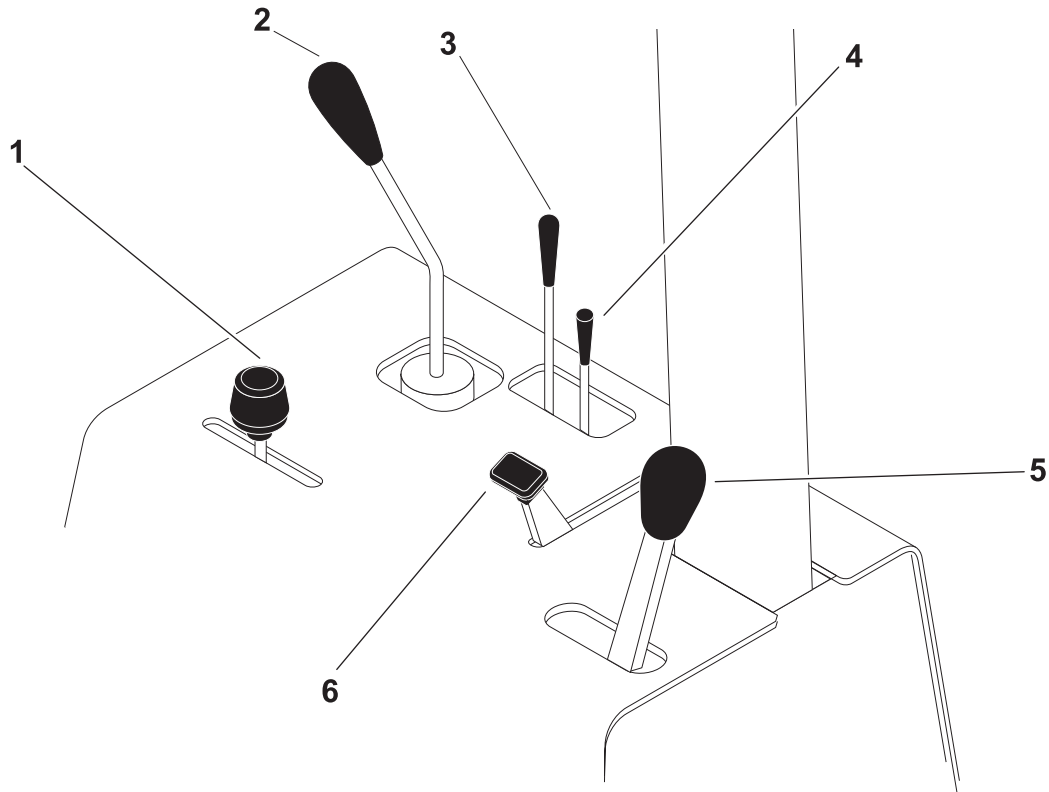
c00ic270h.eps

Item	Description	Notes
2. Clutch pedal  c00ic271h.eps	Use while shifting transmission lever and while applying service brake when mobile/dig control is in mobile position.	IMPORTANT: See transmission lever (page 25) and service brake (page 26) descriptions for more information.
3. Transmission lever  c00ic276h.eps	To select transmission gear or attachment speed, press clutch and shift lever.	IMPORTANT: To change between gear selection and attachment speed modes, move mobile/dig control to appropriate setting.
4. Auxiliary outlet  c00ic075c.eps	Provides power for other equipment.	Power output is 12V, 5A.
5. Drilling attachment control  c00ic218h.eps	To rotate clockwise, press top. To rotate counterclockwise, press bottom.	IMPORTANT: Always rotate clockwise during drilling and backreaming. Rotate counterclockwise only to dislodge a dry bore bit or reamer that has siezed in the bore hole. For more information about drilling attachment, see "Drill" on page 71.
6. Horn  c00ic044h.eps	To sound horn, press.	



Item	Description	Notes
7. Ignition switch  c00ic065h.eps	To start engine, insert key and turn clockwise. To stop engine, turn counterclockwise.	IMPORTANT: If engine does not start on first attempt, check that all interlock requirements have been met, return switch to STOP, and try again.
8. Service brake pedal  c00ic272h.eps	To brake in mobile mode, press clutch pedal, then press brake pedal. To brake in dig mode, move speed/direction control to neutral and press brake pedal.	
9. Foot throttle control  c00ic277h.eps	To increase engine speed, push. To decrease engine speed, release.	IMPORTANT: Spring action returns pedal to up position and engine to idle when released, unless hand throttle lever is set above idle.

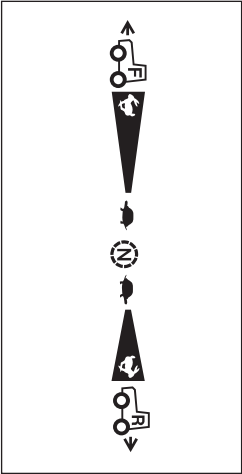
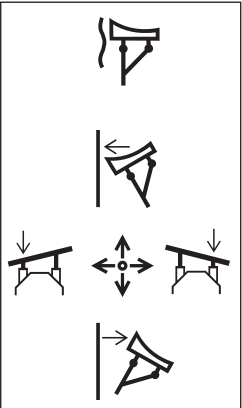
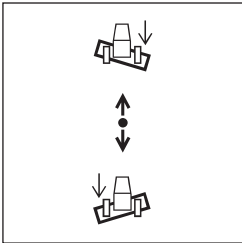
Right Fender

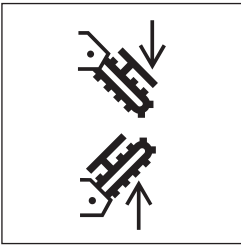
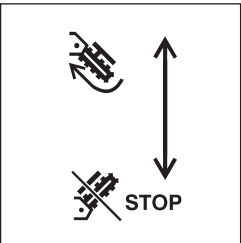
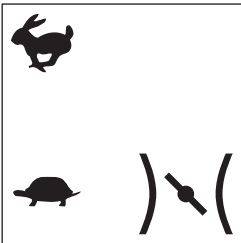


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|---|--------------------------|
| 1. Ground drive speed/direction control | 4. Boom lift control |
| 2. Backfill blade control | 5. Digging chain control |
| 3. Backfill blade tilt control* | 6. Throttle |

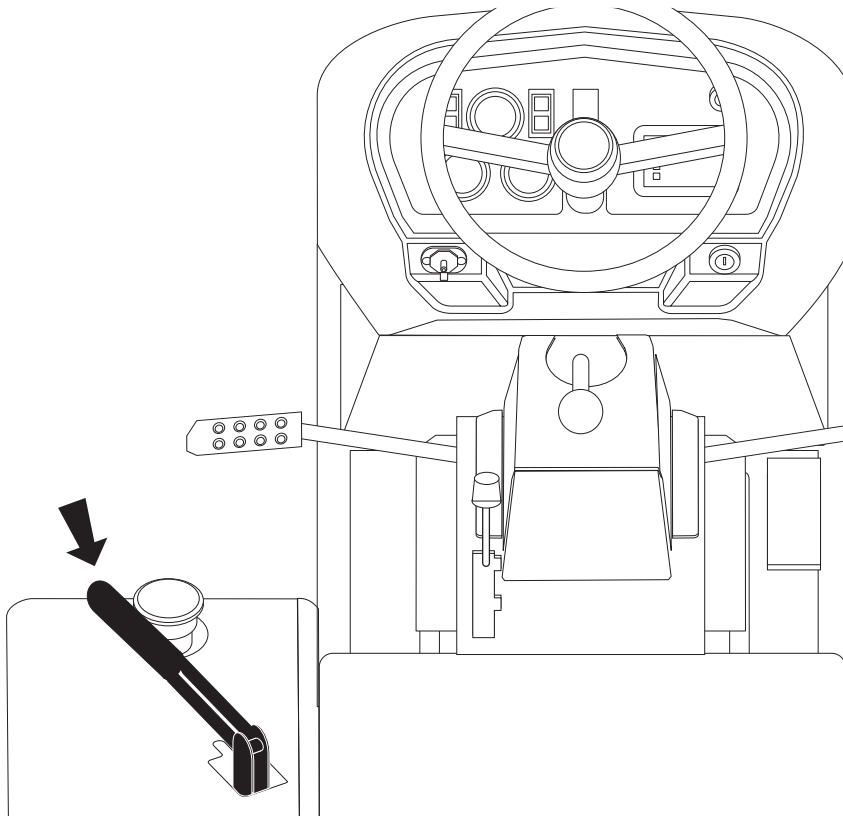
*optional

Item	Description	Notes
1. Ground drive speed/ direction control  c00ic278h.eps	To go forward, push. To go backward, pull. To go faster in either direction, move farther from center. To stop, move to neutral.	
2. Backfill blade control  c00ic252h.eps	To lower blade, push. To put blade in float, push fully forward. To raise blade, pull. To swing blade to right, move right. To swing blade to left, move left.	
3. Backfill blade tilt control  c00ic253h.eps	To tilt right side of blade down, push. To tilt left side of blade down, pull.	

Item	Description	Notes
4. Boom lift control  c00ic200h.eps	To lower, push. To raise, pull.	
5. Digging chain control  c00ic280h.eps	To engage digging chain, push. To disengage digging chain, pull.	IMPORTANT: This control functions only when the mobile/dig control is in dig position.
6. Throttle  c00ic081c.eps	To increase engine speed, push. To decrease engine speed, pull.	



Left Fender

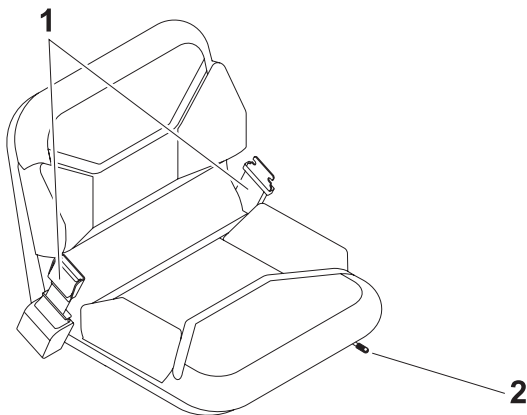


t15om056h.eps

1. Parking brake

Item	Description	Notes
1. Parking brake c00ic268h.eps	To set, pull. To release, push.	

Seat

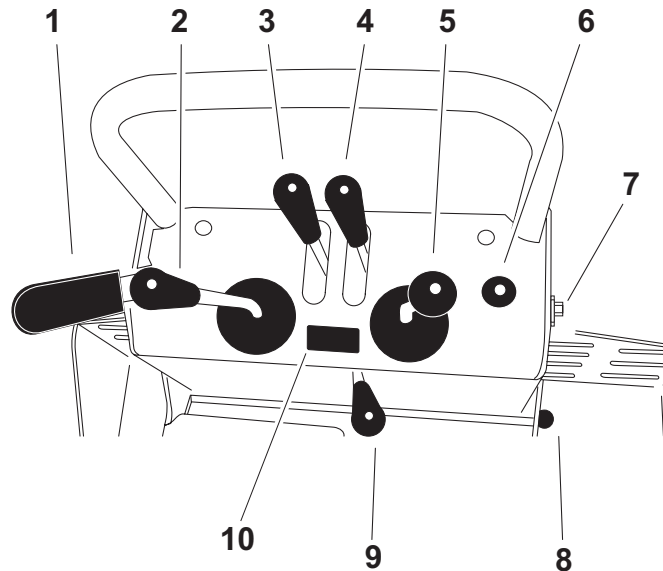


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1. Seat belt
2. Seat slide control

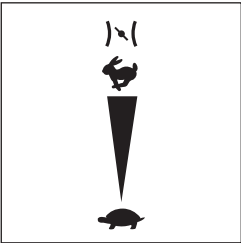
Item	Description	Notes
1. Seat belt	To fasten, insert latch into buckle. Adjust until seat belt is low and tight. To release, lift top of buckle.	
2. Seat slide control	To slide seat forward or backward, pull or push left, then adjust seat. To lock seat in place, release.	

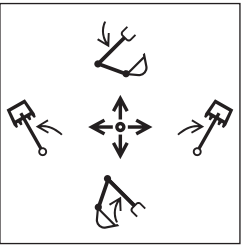
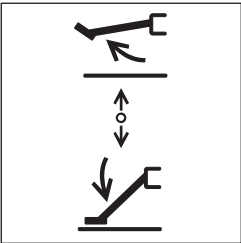
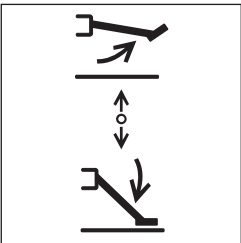
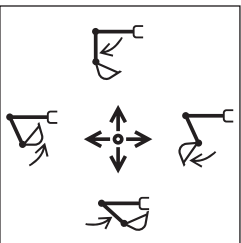
Backhoe Console



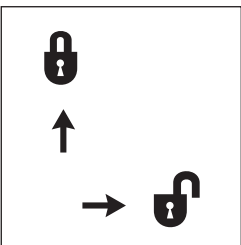
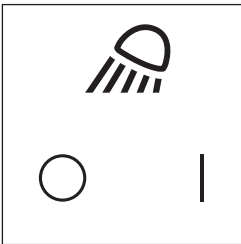
t14om073h.eps

- | | |
|------------------------------|---------------------------------|
| 1. Remote throttle | 7. Seat latch |
| 2. Boom/Swing control | 8. Neutral switch |
| 3. Left stabilizer control | 9. Mechanical stow lock control |
| 4. Right stabilizer control | 10. Work light switch* |
| 5. Bucket/Dipper control | |
| 6. Remote engine stop switch | |
- *optional

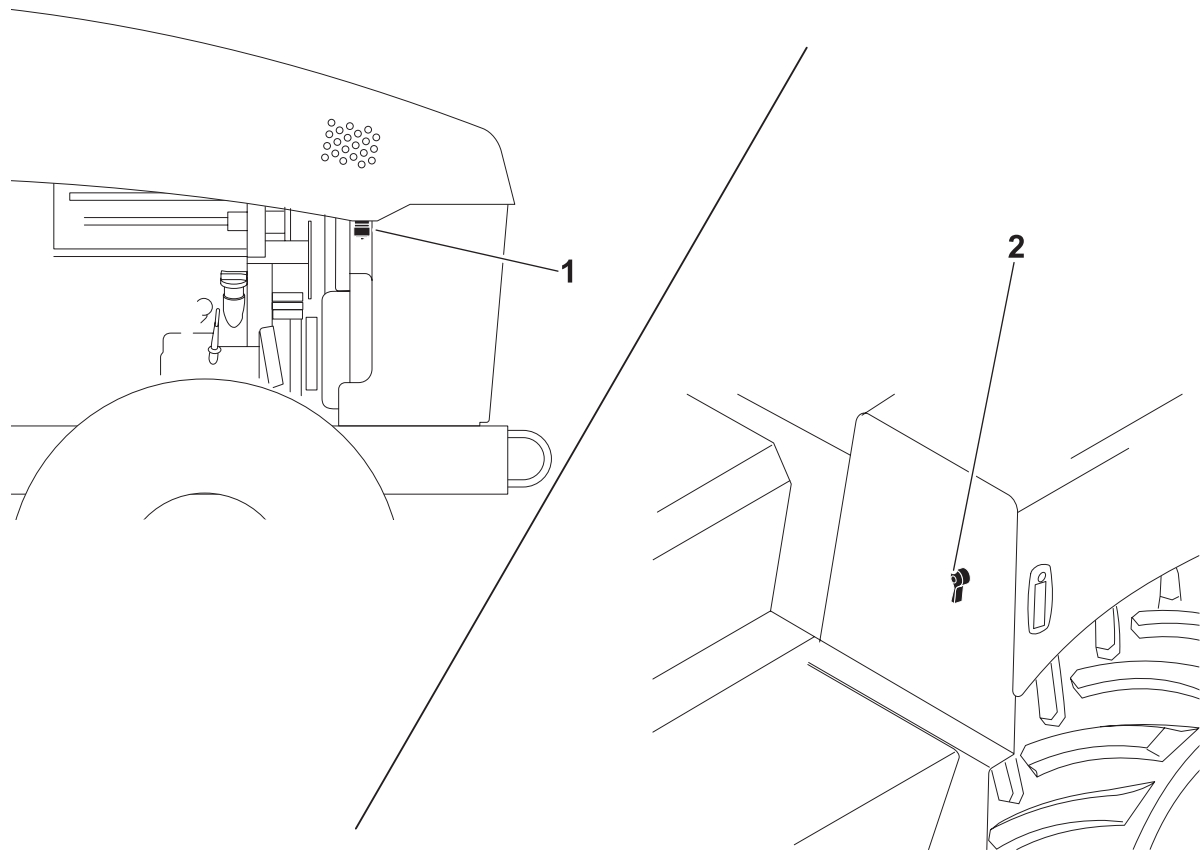
Item	Description	Notes
1. Remote throttle  c00ic116h.eps	To increase engine speed, push. To decrease engine speed, pull.	

Item	Description	Notes
2. Boom/Swing control  c00ic212h.eps	To swing boom left, move left. To swing boom right, move right. To raise boom, pull. To lower boom, push.	Control can perform more than one action at a time. By "feathering" the control, operator can combine backhoe operations. NOTICE: Do not operate with backhoe in the stowed (upright) position. Component failure could occur.
3. Left stabilizer control  c00ic030h.eps	To lower, pull. To raise, push.	
4. Right stabilizer control  c00ic029h.eps	To lower, pull. To raise, push.	
5. Bucket/Dipper control  c00ic213h.eps	To open bucket, move right. To close bucket, move left. To move dipper in, pull. To move dipper out, push.	Control can perform more than one action at a time. By "feathering" the control, operator can combine backhoe operations.
6. Remote engine stop switch  c00ic085c.eps	Stops engine immediately.	IMPORTANT: - Except in an emergency, move throttle to idle before using stop switch. - For normal engine shutdown, use ignition switch.



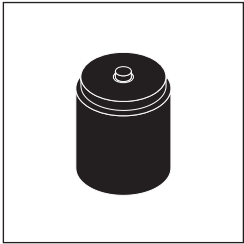
Item	Description	Notes
7. Seat latch	To release backhoe seat, disengage lock by moving hole in latch clear of bolt.	IMPORTANT: Ensure seat is latched before driving unit. See "Backhoe" on page 65 for more information.
8. Neutral switch	To move tractor, press switch, use bucket/dipper control to move tractor, and release switch.	
9. Mechanical stow lock control  c00ic269h.eps	To lock, push. To unlock, move right.	Use this control to lock boom in the stowed position. NOTICE: Always lock boom during transport.
10. Work light switch  c00ic086c.eps	To turn on, press right. To turn off, press left.	

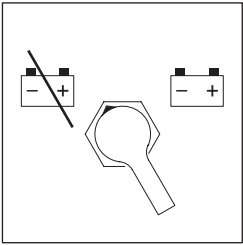
Engine



t15om055h.eps

1. Air filter restriction indicator
2. Battery disconnect switch

Item	Description	Notes
1. Air filter restriction indicator  c00ic262h.eps	When red band is visible, change air filter. Reset after replacing air filter.	For more information, see “Change Air Filter” on page 111.

Item	Description	Notes
2. Battery disconnect switch  c00ic097h.eps	To disconnect, move switch so that indicator points left. To connect, move switch so that indicator points right.	

Operation Overview

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Drilling 38

Digging with Backhoe 39

Leaving Jobsite..... 39



Planning

1. Gather information about jobsite. See page 42.
2. Inspect jobsite. See page 43.
3. Classify jobsite. See page 44.
4. Select chain and teeth to match your soil type, if necessary. See page 78.
5. Check supplies and prepare equipment. See page 46.
6. Haul equipment to jobsite. See page 54.

Trenching

1. Start unit. See page 48.
2. Position tractor and controls. See page 60.
3. Begin trenching. See page 61.
4. Complete the installation. See page 61.
5. Backfill the trench. See page 82.
6. Shut down tractor. See page 50.

Drilling

1. Start unit. See page 48.
2. Dig approach trench and target trench. See page 73.
3. Assemble drill string and position tractor. See page 73.
4. Begin drilling. See page 74.
5. Use drill string guide as needed. See page 74.
6. Add rod. See page 75.
7. Backream. See page 75.
8. Shut down tractor. See page 50.
9. Disassemble joints. See page 76.

Digging with Backhoe

1. Start unit. See page 48.
2. Set stabilizers and unstow backhoe. See page 66.
3. Excavate. See page 67.
4. Stow backhoe properly. See page 68.
5. Shut down tractor. See page 50.

Leaving Jobsite

1. Backfill if necessary. See page 82.
2. Rinse equipment. See page 82.
3. Stow tools. See page 82.
4. Haul equipment away from jobsite. See page 54.



Prepare

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- Notify One-Call Services 42
- Arrange for Traffic Control 42
- Plan for Emergency Services 42

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- Identify Hazards 43

Classify Jobsite 44

- Inspect Jobsite 44
- Select a Classification 44
- Apply Precautions 45

Check Supplies and Prepare Equipment 46

- Supplies 46
- Fluid Levels 46
- Condition and Function 46
- Accessories 46



Gather Information

A successful job begins before you dig. 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.

Notify One-Call Services

Call area One-Call or similar services and have existing lines located and marked. Call any utilities in your area that do not subscribe to One-Call.

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.

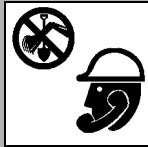
Inspect Site

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 44.)
- traffic
- access
- soil type and condition

Identify Hazards

Identify safety hazards and classify jobsite. See "Classify Jobsite" on page 44.



WARNING

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



NOTICE:

- 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

- Follow U.S. Department of Labor regulations on excavating and trenching (Part 1926, Subpart P) and other similar regulations.
- Contact One-Call (888-258-0808) and any utility companies which do not subscribe to One-Call.
- 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
- Have an experienced locating equipment operator sweep area within 20' (6 m) to each side of trench 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, granite, or concrete 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

Follow OSHA or other guidelines for exposure to crystalline silica when trenching, sawing or drilling through material that might produce dust containing crystalline silica (quartz).

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

Fluid Levels

- fuel
- hydraulic fluid
- battery charge
- engine oil
- transmission fluid

Condition and Function

- digging chain and teeth
- fan belts
- light bulbs
- filters (air, oil, hydraulic)
- tires
- 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.

Drive

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Start Unit 48

Drive 50

Shut Down 50



Start Unit

Before operating tractor, read engine manufacturer's starting and operating instructions. Follow instructions for new engine break-in.

**⚠ WARNING**

Runaway possible. Machine could run over you or others. Learn how to use all controls. Start and operate only from operator's position.

**⚠ WARNING**

Incorrect procedures could result in death, injury, or property damage. Learn to use equipment correctly.

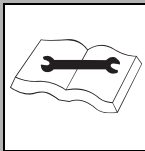
NOTICE:

- Read operator's manual before operating equipment. Follow instructions carefully. Contact Ditch Witch dealership for operation information or demonstration.
- Wear hard hat, safety glasses, and other protective equipment required by job. Do not wear jewelry or loose clothing that can catch on controls.

**⚠ WARNING**

Rollover possible. If machine rolls over, you could be thrown from seat and killed or crushed. Wear seat belt.

1. Fasten and adjust seat belt.
2. Check that speed/direction control and transmission lever are in neutral and that digging chain control is OFF.
3. Check that parking brake is engaged.
4. Press clutch pedal.
5. Move throttle to half open.
6. Turn ignition switch to the run position (key on, engine off). Cold start wait indicator will light.
7. When cold start wait indicator goes off, turn ignition switch all the way clockwise to start tractor. Warning alarm will sound. Indicators will light.
 - If engine does not crank, check start interlock display. See page 23 for start interlock information.
 - If engine turns but does not start within 10 seconds, allow starter to cool before trying to start again.



WARNING

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

NOTICE:

- If warning alarm does not sound, have machine serviced.
- Machine will not start if start interlock requirements are not met. See page 23 for start interlock information.



8. Release clutch pedal.
9. Run engine at half-throttle or less for five minutes before operating tractor. During warmup, check that all controls work properly.

Drive

EMERGENCY SHUTDOWN: Turn ignition switch to STOP.

1. Verify that parking brake is engaged.
2. Raise backfill blade and all attachments.
3. Press clutch pedal.
4. Move mobile/dig control to MOBILE.
5. Shift transmission into desired gear.
6. Disengage parking brake.
7. Press foot throttle about half way.
8. Slowly release clutch pedal. Trencher will move.
9. Change engine speed with foot throttle. Do not use hand throttle when driving.



⚠ WARNING

Moving traffic – hazardous situation. Death or serious injury could result. Avoid moving vehicles, wear high visibility clothing, post appropriate warning signs.

NOTICE:

- Drive carefully in congested areas. Know machine's clearance and turning radius.
- Keep attachments low when operating on slope. Drive slowly and cautiously.

Shut Down

1. When job is complete, move speed/direction control to neutral.
2. Depress clutch pedal and move transmission lever to neutral position.
3. Press service brake.
4. Engage parking brake.
5. Lower all attachments to ground.
6. Move mobile/dig control to MOBILE.
7. Release clutch pedal.
8. Move throttle to idle for 3 minutes to cool.
9. Turn ignition switch to STOP. If leaving machine unattended, remove key.
10. For maintenance or long-term storage, turn battery disconnect switch, to the disconnect position.

Transport

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- Procedure52

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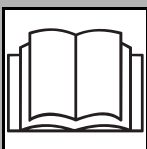
- Procedure57



Lift



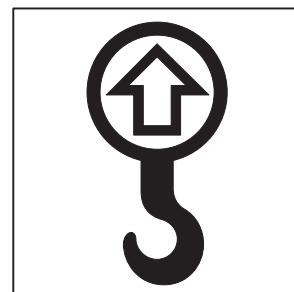
WARNING Crushing weight. If load falls or moves it could kill or crush you. Use proper procedures and equipment or stay away.



WARNING Incorrect procedures could result in death, injury, or property damage. Learn to use equipment correctly.

Points

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

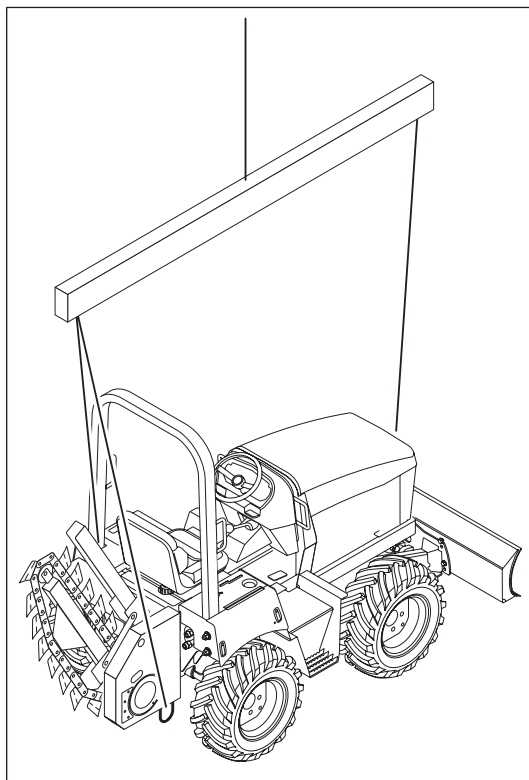


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Procedure

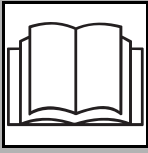
Tractor

Use a crane capable of supporting the equipment's size and weight. See "Specifications" on page 117. Use indicated lift points. Do not attempt to lift tractor with attachments installed.



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Tie Down

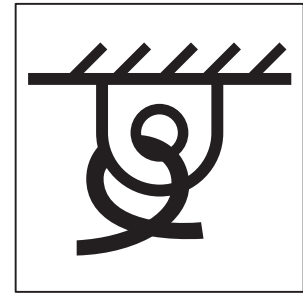


⚠ WARNING

Incorrect procedures could result in death, injury, or property damage. Learn to use equipment correctly.

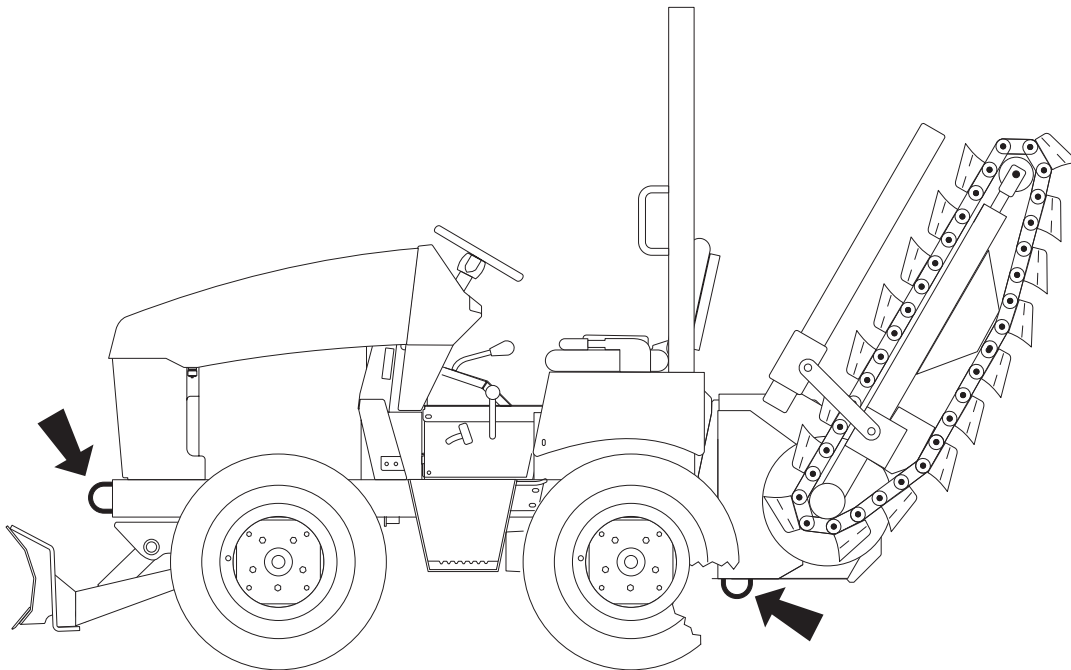
Points

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



ic1320a.eps

Procedure



t15om007h.eps

Attach chains at front and rear tiedown points. Make sure chains are tight before transporting unit.



Haul

**⚠ WARNING**

Incorrect procedures could result in death, injury, or property damage. Learn to use equipment correctly.

NOTICE:

- Read trailer operator's manual before loading or transporting your machine. Incorrectly loaded machine can slip or cause trailer sway.
- Attach trailer to tow vehicle before loading or unloading.
- Park, load, and unload trailer on level ground.
- Check that unit and trailer do not exceed size or weight regulations.
- Ensure that tow vehicle has proper tow capacity rating.
- Ten to fifteen percent of total vehicle weight (equipment plus trailer) must be on tongue to help prevent trailer sway.
- Connect safety chains to tow vehicle. Attach left chain to right side of tow vehicle and vice versa to cradle hitch. Do not connect to pintle hook or hitch ball.
- Connect breakaway switch cable to tow vehicle. Do not connect to pintle hook or hitch ball.

Procedure

Inspect Trailer

1. Check hitch for wear and cracks. Lubricate if needed.
2. Check battery for 12V charge.
3. Inspect lights for cleanliness and correct operation. Inspect reflectors and replace if needed.
4. Check tire pressure. Check lug nut torque with a torque wrench. Adjust if needed.
5. Ensure trailer brakes are adjusted to come on in synchronization with tow vehicle brakes.
6. Check ramps and trailer bed for cracks.

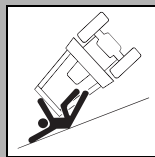
Load



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

NOTICE:

- Attach trailer to tow vehicle before loading or unloading.
- Load and unload trailer on level ground.
- Put manual transmission into first or reverse gear or automatic transmission into park. Turn off ignition. Set parking brake.
- Block trailer wheels.
- Incorrect loading can cause trailer swaying.



WARNING Rollover possible. If machine rolls over, you could be thrown from seat and killed or crushed. Wear seat belt.

1. Fasten and adjust seat belt.
2. Start tractor. See page 48 for proper start-up procedures.
3. Raise attachments, but keep them low.
4. Release parking brake.
5. Move speed/direction control to neutral.
6. Press clutch pedal and service brake.
7. Put transmission lever in neutral.
8. Move mobile/dig control to DIG.
9. Release clutch pedal and service brake.
10. Use speed/direction control to slowly drive unit onto trailer until tiedown position is reached.
11. Engage parking brake.
12. Lower attachments to trailer bed and turn tractor off. See page 50 for proper shutdown procedures.
13. Attach chains to tractor and attachments where tiedown decals are located. See page 53.



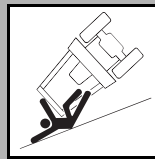
Unload

**⚠ WARNING**

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

NOTICE:

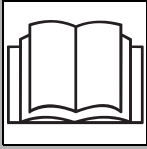
- Attach trailer to tow vehicle before loading or unloading.
- Load and unload trailer on level ground.
- Put manual transmission into first or reverse gear or automatic transmission into park. Turn off ignition. Set parking brake.
- Block trailer wheels.
- Incorrect loading can cause trailer swaying.

**⚠ WARNING**

Rollover possible. If machine rolls over, you could be thrown from seat and killed or crushed. Wear seat belt.

1. Lower trailer or ramps.
2. Remove chains from tiedowns.
3. Fasten and adjust seat belt.
4. Start tractor. See page 48 for proper start-up procedures.
5. Raise attachments, but keep them low.
6. Verify that mobile/dig control is in DIG.
7. Disengage parking brake.
8. Use speed/direction control to slowly back unit down trailer or ramps.

Tow



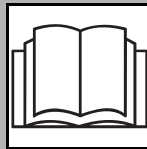
⚠ WARNING

Incorrect procedures could result in death, injury, or property damage.
Learn to use equipment correctly.

Under normal conditions, tractor should not be towed. If tractor becomes disabled and towing is necessary:

- Do not tow for more than 200 yd (180 m).
- Tow at less than 1 mph (1.6 km/h).
- Use maximum towing force of 1.5 times unit weight.

Procedure



⚠ WARNING

Incorrect procedures could result in death, injury, or property damage.
Learn to use equipment correctly.

1. Attach tow line to all available tiedown points facing towing vehicle.
2. Fasten seat belt.
3. Disengage parking brake.
4. Press clutch and service brake.
5. Put transmission lever into neutral.
6. Release clutch pedal.
7. Take up slack in tow line and slowly release service brake.





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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.

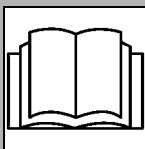
NOTICE: Use attachments or counterweights to make front and rear loads balance when all attachments are raised. Contact your Ditch Witch dealer about counterweighting for your equipment.



WARNING

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

NOTICE: Comply with all utility notification regulations before digging or drilling.

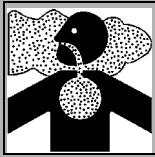


WARNING

Incorrect procedures can result in death, injury, or property damage. Learn to use equipment correctly.

1. Fasten and adjust seat belt.
2. Start tractor. See page 48 for start-up procedures.
3. Drive to starting point. Move in line with planned trench. See page 50 for operating procedures.
4. Move hand throttle to low.
5. Lower backfill blade.
6. Lower boom to just above ground.
7. Engage parking brake.

Operation



⚠ WARNING

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

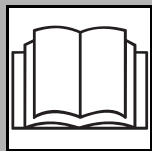
NOTICE: Cutting or drilling concrete containing sand or rock containing quartz may result in exposure to silica dust. Use respirator, water spray or other means to control dust. Silica dust can cause lung disease and is known to the State of California to cause cancer.



⚠ DANGER

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

NOTICE: Cutting high voltage cable can cause electrocution. Expose lines by hand before digging.



⚠ WARNING

Incorrect procedures could result in death, injury, or property damage. Learn to use equipment correctly.

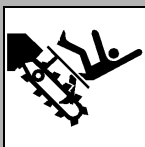
NOTICE:

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



⚠ CAUTION

Flying objects thrown by machine may strike people. Wear hard hat and safety glasses.



⚠ DANGER

Moving digging teeth will cause death or serious injury. Stay away.

NOTICE:

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

1. Press clutch pedal.
2. Verify that transmission lever is in neutral and parking brake is engaged.
3. Verify that speed/direction control is in neutral.
4. Move mobile/dig control to DIG.

IMPORTANT: If mobile/dig control does not easily move into place, splines are not aligned up. DO NOT FORCE mobile/dig control. Move speed/direction control back and forth and try moving mobile/dig control again.

5. Put transmission lever into second gear. See "Operating Tips" on page 63 for information on gear selection.
6. Engage digging chain control.
7. Adjust hand throttle to half open.
8. Slowly release clutch pedal. DIGGING CHAIN WILL MOVE.
9. Slowly lower digging boom to depth.
If engine speed drops, raise boom slightly. Engine speed will increase. Lower boom again. Repeat process until desired depth is reached.
10. Raise backfill blade and release parking brake.
11. Move hand throttle to fully open.
12. Adjust speed/direction control to match digging conditions.
13. When trench is complete, move speed/direction control to neutral.
14. Set parking brake.
15. Adjust throttle to half open.
16. Raise boom.
17. Press clutch pedal and move hand throttle to low.
18. Move transmission lever to neutral.
19. Disengage digging chain control.
20. Drive a short distance away from work site.
21. Shut down tractor. See page 50 for proper shutdown procedures

Operating Tips



Gear Selection

For best results, start trench in first or second gear. Once desired trench depth is reached, select proper chain speed for soil type.

- In normal soils, best production is in second gear.
- Sticky or wet soils require higher chain speed to remove spoils from chain and may be trenched for short periods of time in third gear.
- Rocky and hard soils require slower chain speed to break them up and may be trenched for short periods of time in first gear.

Shift out of second gear only to get through unusual trenching conditions. When unusual soil becomes the rule, see your Ditch Witch dealer about optional sprockets to match soil conditions.

Trenching

- Operate engine at full throttle under load for most productive trenching. If soil conditions permit, operating in this range gives longer engine life and more efficient use of available engine power.
- Use clearance between front wheels and trencher frame as a guide to keep trench straight. If the wheels are kept parallel to the frame, trench will be straight.
- A shorter turn may be made with the digging boom at full depth. Take care to prevent excessive side load.
- If an object become lodged in the digging chain:
 - Move speed/direction control to neutral.
 - Raise boom slightly to clear bottom of trench.
 - Press clutch pedal.
 - Move transmission lever to reverse.
 - Slowly release clutch pedal. Chain should reverse and release object.
- When cutting across asphalt roads, start trench in soil at the edge of the road and dig trench with shortest possible boom at full depth.

Backhoe

Chapter Contents

Setup 66

Operation..... 67

Stowing 68



Setup

1. Move attachment speed/direction control to neutral position.
2. Move ground drive control to neutral position.
3. Shift gearbox control to low.
4. Lower rear attachment to 6" (150 mm) above ground.
5. Check that backfill blade is straight and lower it to ground.
6. Decrease engine speed to low throttle.
7. Move to backhoe operator's station.
8. Lower stabilizers enough to lift front tires.
9. Raise boom to release tension on stow lock.
10. Release stow lock by pushing handle forward.

IMPORTANT: For more information about stow lock, see page 68.

11. Adjust engine speed to 1/2 to 3/4 throttle for digging.

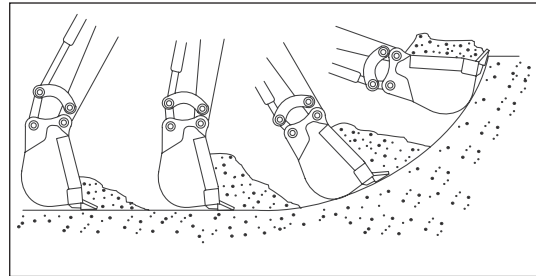
NOTICE: Engine speed affects speed of backhoe operation.

Operation

Use boom/swing control and bucket/dipper control to dig hole or trench.

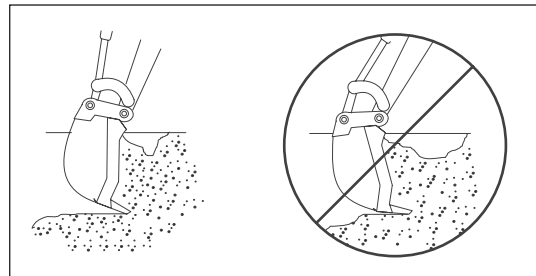
IMPORTANT: For more information about backhoe controls, see page 32.

- Keep dipper and boom at right angles as much as possible for maximum power.
- Keep bucket in line with dipper as much as possible.



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- Position bucket so teeth cut soil. As soil is cut, curl bucket under dipper.
- Move dipper and bucket together. Increasing engine speed will not increase backhoe force.



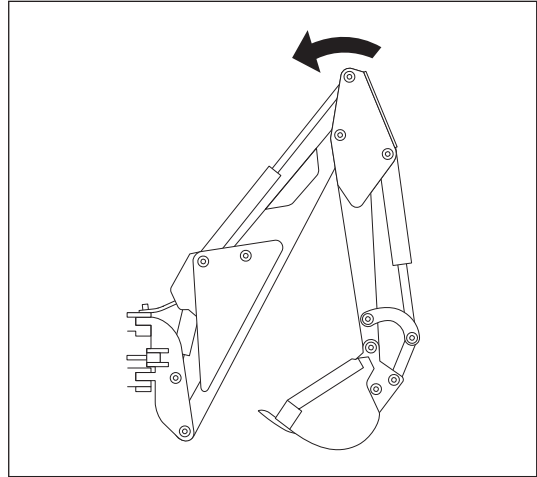
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Stowing

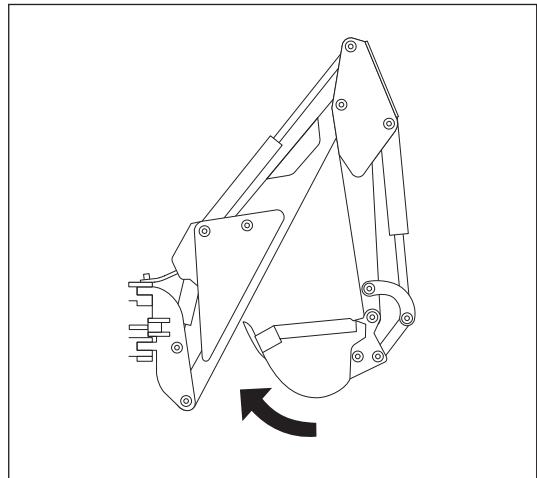
NOTICE: Before returning to tractor operator station, raise stabilizers, return remote throttle to low idle, and stow and lock boom.

1. When hole or trench is complete, lift boom while keeping dipper pointed at ground.



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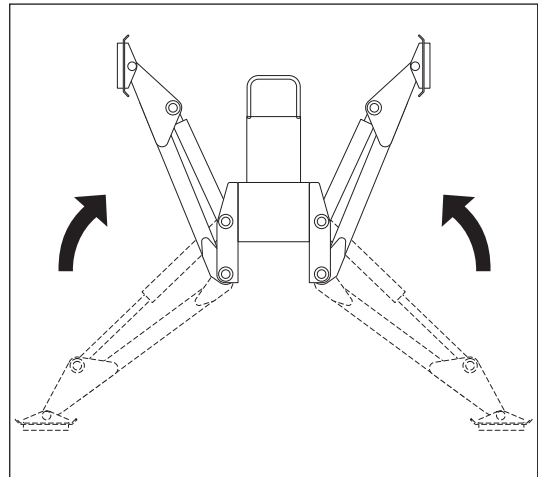
2. Curl bucket closed and move dipper fully toward boom.
3. Lift boom to highest position and latch stow lock.
4. Lower boom slightly to engage lock.



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5. Raise stabilizers.
6. Return remote throttle to low idle.



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Drill

Chapter Contents

Prepare Jobsite and Equipment 73

- Approach Trench.73
- Target Trench73
- Drill Pipe and Equipment.73

Drill 74

- Using Drill String Guide.74

Add Rod 75

Backream 75

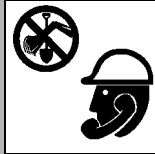
Disassemble Joints. 76



**⚠ DANGER**

Turning shaft will kill you or crush arm or leg. Stay away.

NOTICE: Keep everybody at least 10' (3 m) away from drill pipe during operation. Do not straddle trench or drill pipe while drilling.

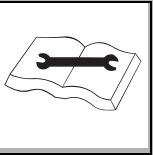
**⚠ WARNING**

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

NOTICE: Set up warning barriers and keep people away from equipment and jobsite while drilling.

**⚠ WARNING**

Incorrect procedures could result in death, injury, or property damage. Learn to use equipment correctly.

**⚠ WARNING**

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

NOTICE: Do not tape or tie down switch or lever.

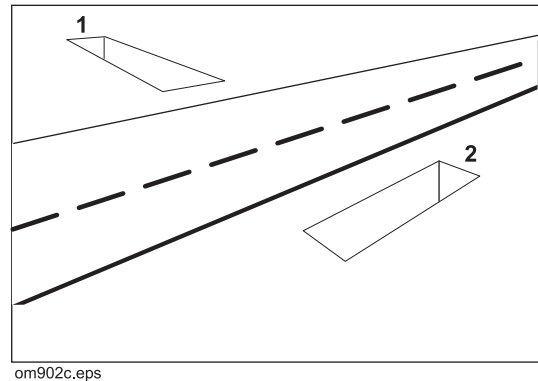
Prepare Jobsite and Equipment

Approach Trench (1)

1. Mark path where you intend to drill.
2. Dig an approach trench (1) along the intended bore path.

IMPORTANT: The approach trench should be at least:

- deep enough for pipe to lay flat and enter soil at correct angle
- 20' (6 m) long
- 4" (100 mm) wide



Target Trench (2)

1. Select a completion point for the drilling project.
2. Dig a target trench (2) **across** the anticipated completion point.

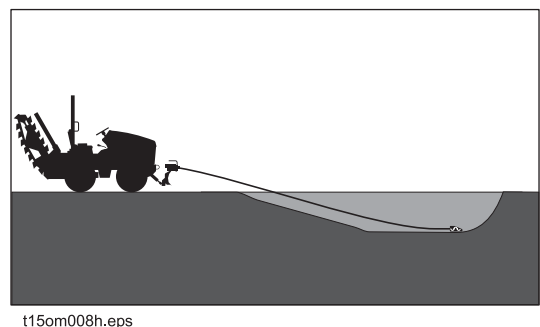
IMPORTANT: The actual length of the target trench depends on soil conditions and length of pipe sections. Make it deep enough for drill bit to enter slightly above the trench floor.

Drill Pipe and Equipment

1. Assemble at least 20' (6 m), but not more than 30' (9 m), of drill rod.

NOTICE: More than 10-15' (3-4.5 m) of drill rod out of the trench increases the tendency of drill rod to bend.

2. Install drill bit to the cutting end of the drill string.
3. Put drill string in approach trench.
4. Move tractor to the approach trench and align the drilling attachment with the intended bore path.
5. Turn off engine.
6. Attach drill string to drilling attachment.



Drill

IMPORTANT: For location and description of drilling control see [ref to controls].

EMERGENCY SHUTDOWN: Release drilling control and turn ignition switch to STOP.

1. Start tractor's engine and begin clockwise (forward) rotation.
2. Slowly advance tractor while maintaining clockwise rotation.

NOTICE:

- Drilling too quickly causes bit to drift off course and may bend drill rod. After bore path is established, speed may be slightly increased.
- If drill rod starts to bend, stop forward movement of unit and back the unit slightly until rod straightens. Do not drill with bent rod.
- If drill rod hits an obstruction, rotate drill string counterclockwise to back up slightly.

Using Drill String Guide

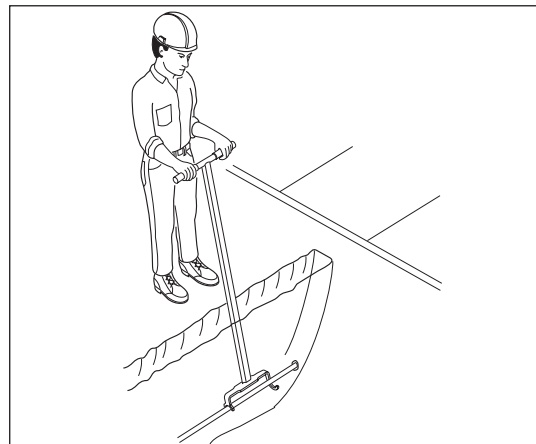


DANGER Turning shaft will kill you or crush arm or leg. Stay away.

NOTICE: Keep everybody at least 10' (3 m) away from drill rod during operation. Do not straddle trench or drill rod while drilling.

Use drill string guide to align drill string as it enters the soil. When using drill string guide, follow these guidelines:

- Use only approved Ditch Witch drill string guide (p/n 179-737).
- Stand only on the **left** side of the approach trench.
- Keep drill string guide at least 3' (1 m) behind bit.
- Use drill string guide to control only the first 5' (1.5 m) of the bore path.
- After drilling 5' (1.5 m), stop unit and remove drill string guide.
- **Do not** use drill string guide during backreaming or any time the drill string is being pulled back.



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Add Rod

1. Stop drilling attachment.
2. Back up tractor 6" (150 mm) to loosen drill rod in ground.
3. Disconnect drill rod from drilling attachment.
4. Move tractor away from bore.
5. Add one drill rod to continue bore.

Backream

After drill bit enters target trench, the bore hole may be enlarged by changing the drill bit to a backreamer and drawing it back through the initial bore.

1. Turn tractor ignition switch to STOP.
2. Replace drill bit with backreamer.
3. Start tractor engine and begin clockwise rotation.

IMPORTANT: Always rotate clockwise during backreaming. Rotate counterclockwise only to dislodge a dry bore bit or reamer that has siezed in the bore hole.

4. Slowly back up tractor while maintaining rotation.
5. When backreamer exits the bore hole, stop rotation immediately.

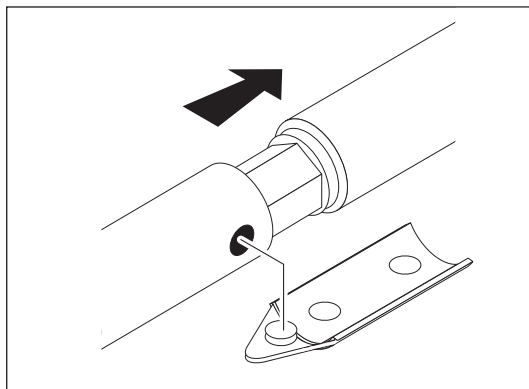
IMPORTANT:

- Do not try to increase hole size too much in one pass. Several passes using successively larger reamers will save wear on machine.
- During backreaming, keep drill string straight. Sharp bends in the drill rod at the motor coupling can cause rod failure.



Disassemble Joints

1. Press tab through hole in female side of joint using special tool or screwdriver.
2. Pull rods apart.



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Systems and Equipment

Chapter Contents

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- Chain and Tooth Maintenance78
- Chain Types78
- Chain Selection79

Optional Equipment 80

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- Trencher80



Chain, Teeth, and Sprockets

Chain and Tooth Maintenance

- Always replace sprockets at the same time you replace the digging chain. Sprockets and chain are designed to work together. Replacing one without the other will cause premature wear of the new part.
- Keep digging teeth sharp. Using dull, worn teeth will decrease production and increase shock load to other trencher components. It can also cause chain stretch, which leads to premature chain wear and failure.
- Maintain the proper amount of tension on the digging chain. Overtightening will cause chain stretch and loss of machine performance. For correct tightening procedure, see page 112.
- Use the tooth pattern most appropriate for your digging conditions. If you move to a different soil type, contact your Ditch Witch dealer for information about the most effective chain type and tooth pattern.

Chain Types

Chain type	Features
4-pitch	standard chain
2-pitch	more teeth for smoother cutting
alternating side bar	prevents spoil compaction on chain
bolt-on adapters	allow easy configuration changes
Shark Chain II	versatile, virtually maintenance-free
combination	provides pick and shovel effect

Chain Selection

These charts are meant as a guideline only. No one chain type works well in all conditions. See your Ditch Witch dealer for soil conditions and chain recommendations for your area. Ask for the latest Chain, Teeth, and Sprockets Parts Catalog.

- 1 = best
- 2 = better
- 3 = good
- 4 = not recommended

Chain	Sandy Soil	Soft Soil	Medium Soil	Hard Soil	Rocky Soil	Sticky Soil
4-pitch cup tooth	3	1	2	3	4	1
2-pitch cup tooth	2	3	1	1	3	4
bolt-on adaptor, 2-pitch	4	4	3	2	1	4
bolt-on adaptor/cup tooth combo	4	3	2	1	2	4
Shark Chain II	4	3	2	1	1	4
alternating side bar	4	4	4	4	4	1



Soil	Description
sandy soil	sugar sand, blow sand, or other soils where sand is the predominant component
soft soil	sandy loam
medium soil	loams, loamy clays
hard soil	packed clays, gumbo, all compacted soils
rocky soil	chunk rock, glacial till, cobble, rip rap, gravel
sticky soil	gumbo, sticky clays

Optional Equipment

See your Ditch Witch dealer for more information about the following optional equipment.

Tractor

Equipment	Description
tires	31" or 35" are available
cold start kit	aids starting in cold weather
rear counterweight	required for some backhoe and reel carrier applications

Trencher

Equipment	Description
booms	provide depth options of 3' (1 m) or 4' (1.2 m); lighter-weight, small tail sprocket booms also are available
mechanical trench cleaner	removes spoils from the trench floor

Complete the Job

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Restore Jobsite 82

- Backfilling 82

Rinse Equipment 82

Stow Tools 82

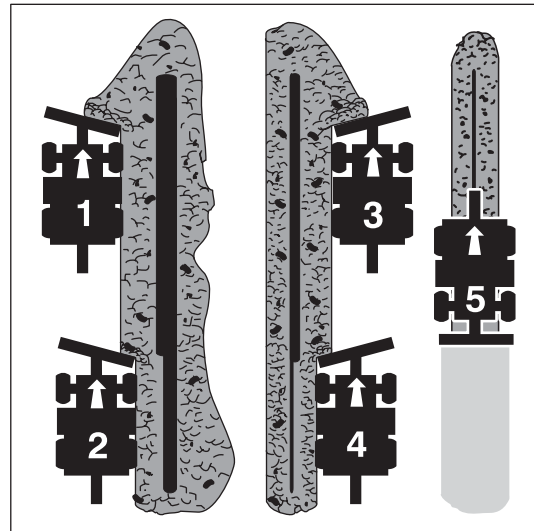


Restore Jobsite

After product is installed, return spoils to the trench with backfill blade.

Backfilling

1. Position unit at end of trench, several feet from spoils. Aim tractor at outer edge of spoils.
2. Adjust backfill blade to fit land contour.
3. Move outer edge of spoils toward trench. Take two or more passes at spoils rather than moving all spoils at once.
4. Repeat on other side of trench, if necessary.
5. Engage float and make final pass in reverse over trench.



Rinse Equipment

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.

Stow Tools

Make sure all tools and accessories are loaded on trailer.

Service



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Recommended Lubricants/Service Key 85

- Engine Oil Selection Chart 86

10 Hour 87

50 Hour 95

100 Hour 99

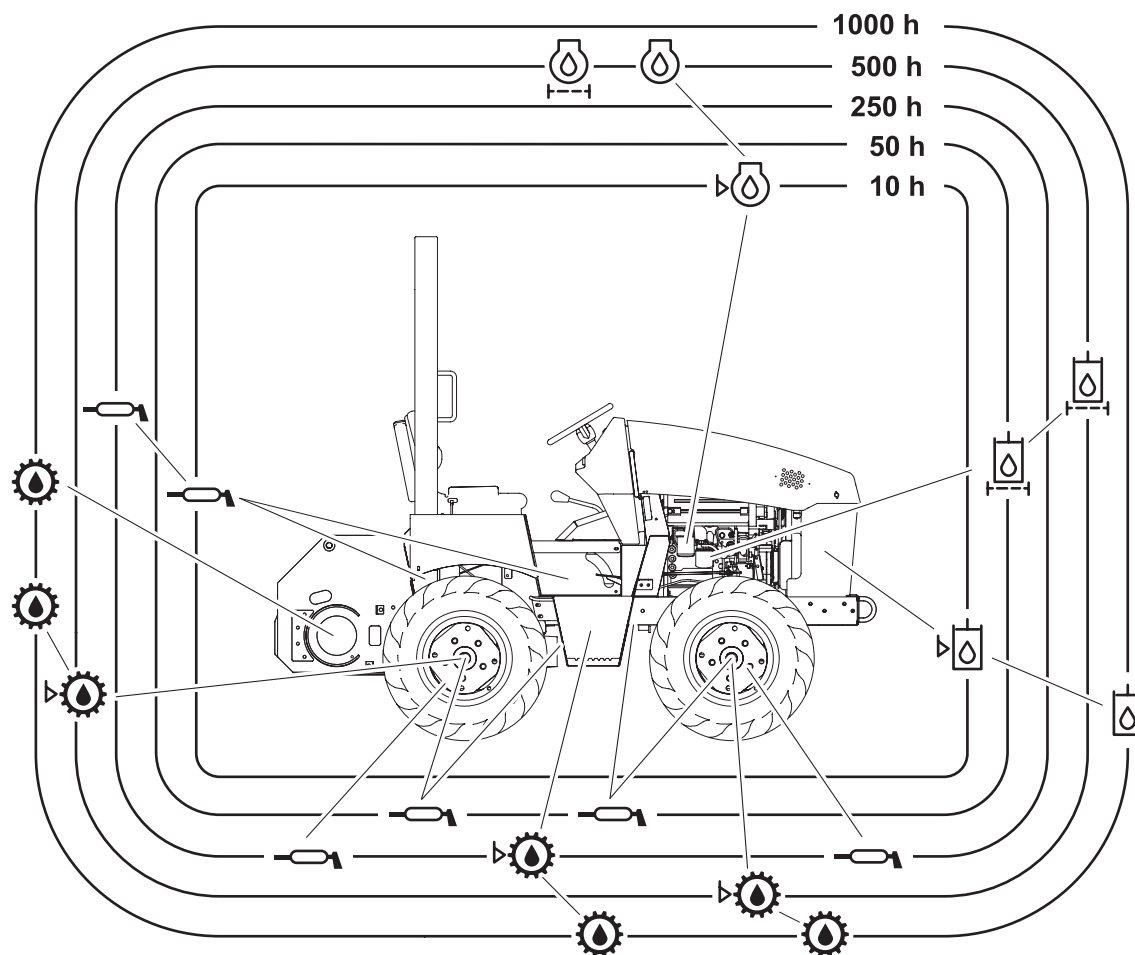
250 Hour 102

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Lubrication Overview



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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)
 MPG	Multipurpose grease meeting ASTM D217 and NLGI 5
 MPL	Multipurpose gear oil meeting API service classification GL-5 (SAE 80W90)
 THF	Tractor hydraulic fluid, similar to Phillips 66 HG, Mobilfluid 423, Chevron Tractor Hydraulic Fluid, Texaco TDH Oil, or equivalent
	Check level of fluid or lubricant
	Check condition
	Filter
	Change, replace, adjust, service, or test

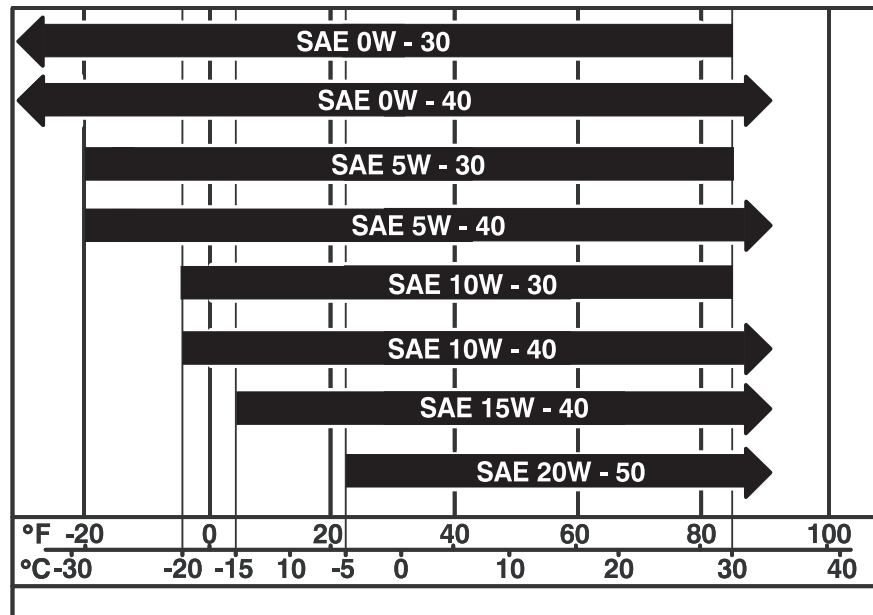
Proper lubrication and maintenance protects Ditch Witch equipment from damage and failure. Service intervals listed are for minimum requirements. In extreme conditions, service machine more frequently. Use only recommended lubricants. Fill to capacities listed in "Specifications" on page 117.

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

NOTICE:

- Use only genuine Ditch Witch parts, filters, approved lubricants, TJC, and approved coolants to maintain warranty.
- Use the "Service Record" on page 129 to record all required service to your machine.

Engine Oil Selection Chart



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Select oil based on ambient temperature range expected before next oil change.


WARNING

Incorrect procedures could result in death, injury, or property damage. Learn to use equipment correctly.

NOTICE:

- Unless otherwise instructed, all service should be performed with engine off.
- Refer to engine manufacturer's manual for engine maintenance instructions.
- Before servicing equipment, lower unstowed attachments to ground.

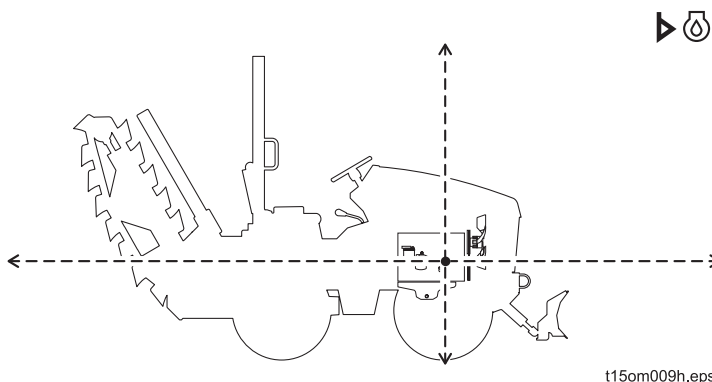
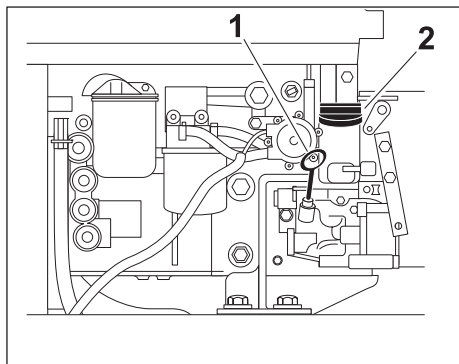
10 Hour



Location	Task	Notes
TRACTOR	Check engine oil level	DEO
	Check hydraulic fluid level	THF
	Check hydraulic reservoir breather cap	
	Lube digging chain clutch	MPG
	Lube digging chain control lever	MPG
	Check tire pressure and lugnuts	standard: 12 psi (0.8 bar) optional: 20 psi (1.4 bar) 150 ft•lb (120 N•m)
	Check air filter restriction indicator	
TRENCHER	Lube trencher tail roller	MPG
	Lube trencher pivot	MPG
	Lube trencher pivot stub	MPG
	Lube trencher headshaft support bearing	MPG
	Check digging chain	
	Check digging chain tension	1.5-2.0" (40-50 mm)

Tractor

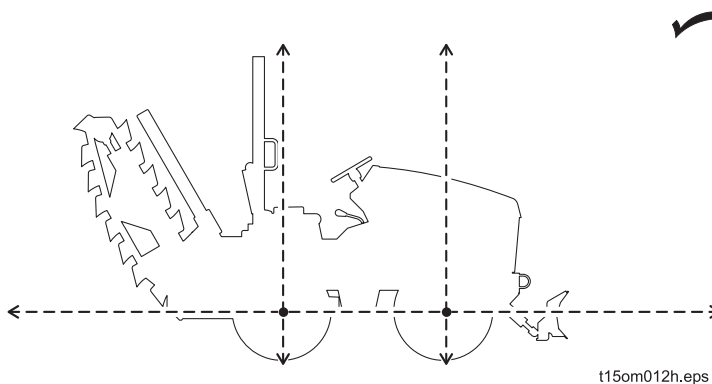
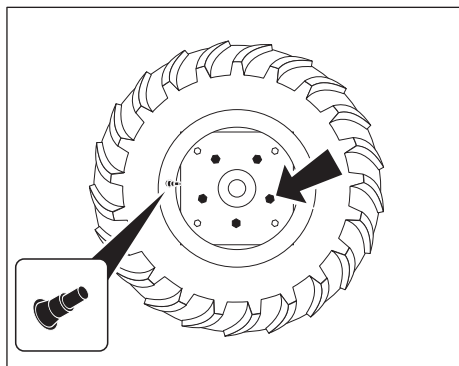
Check Engine Oil Level



While engine oil is warm, check oil level at dipstick (1) every 10 hours. Add DEO at fill (2) as necessary to keep oil level at highest line on dipstick.

IMPORTANT: See page 85 for DEO specifications.

Check Tires

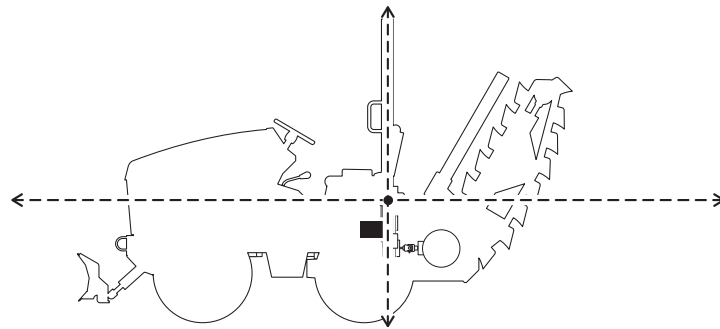
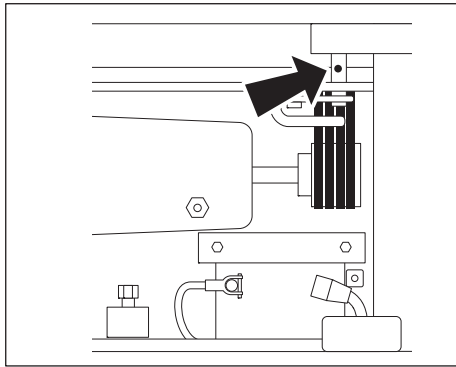


Check tire pressure every 10 hours. Use water-rinsable air gauge if tire ballast is used. Maintain pressure according to the table below.

Tire	U.S.	Metric
26 X 12.00-12	12 psi	0.8 bar
29 X 12.50-15	20 psi	1.4 bar

Tighten lugnuts to 150 ft•lb (120 N•m).

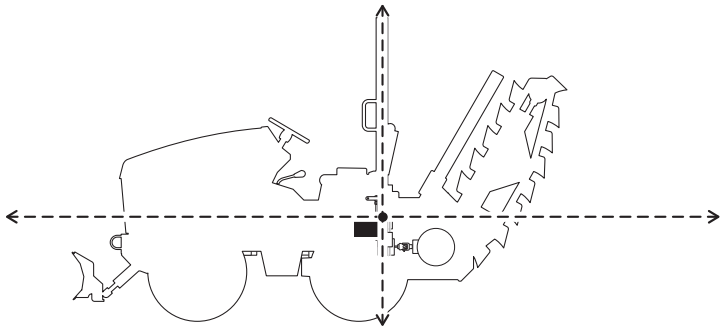
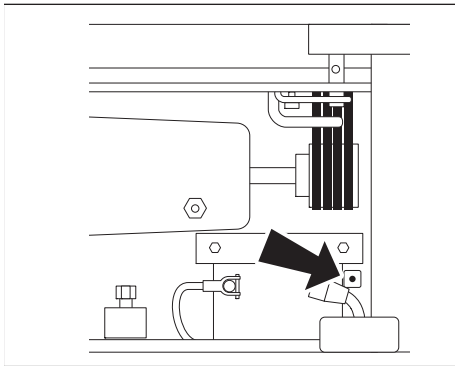
Lube Digging Chain Control Lever



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Lube zerk on frame under seat every 10 hours with MPG.

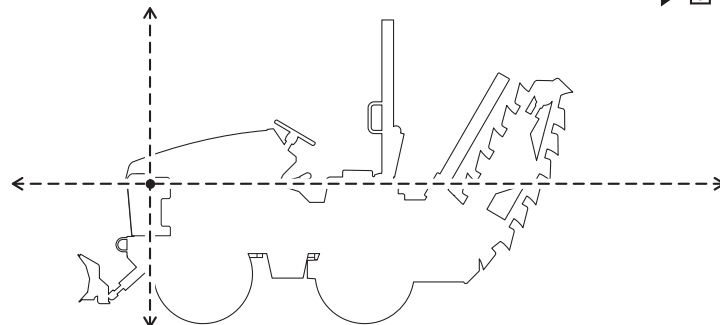
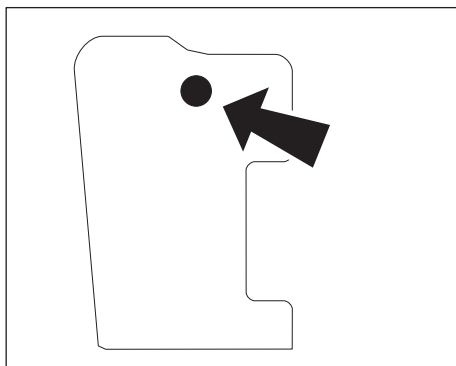
Lube Digging Chain Clutch



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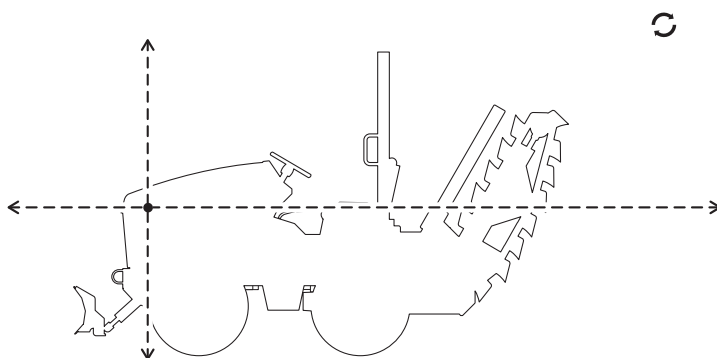
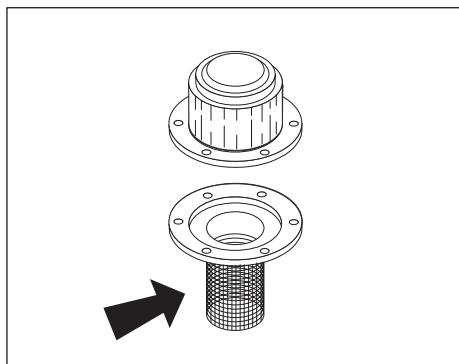
Lube zerk on side of battery box every 10 hours with MPG.

Check Hydraulic Fluid Level



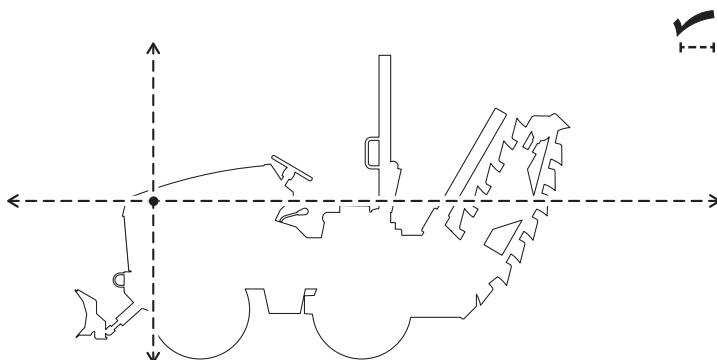
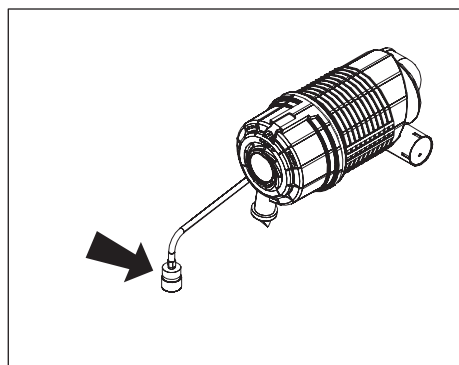
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With tractor level, engine off, and oil cool, check fluid at sight glass every 10 hours. Fluid should be halfway up sight glass. Add THF at fill as necessary.

Check Hydraulic Reservoir Breather Cap

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Check hydraulic reservoir breather cap every 10 hours. Clean as needed.

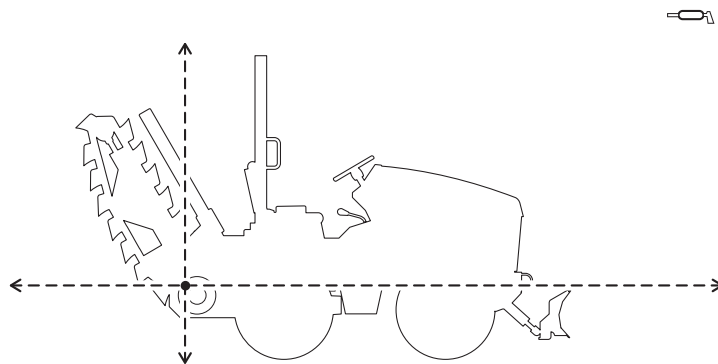
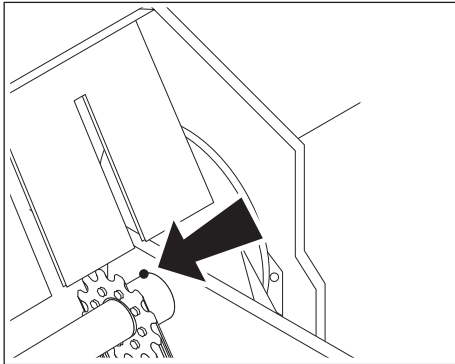
Check Air Filter Restriction Indicator

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Check air filter restriction indicator every 10 hours. Change air filter as indicated. See "Change Air Filter" on page 111.

Trencher

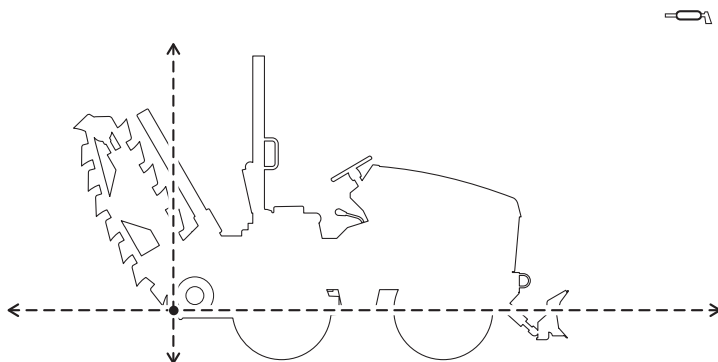
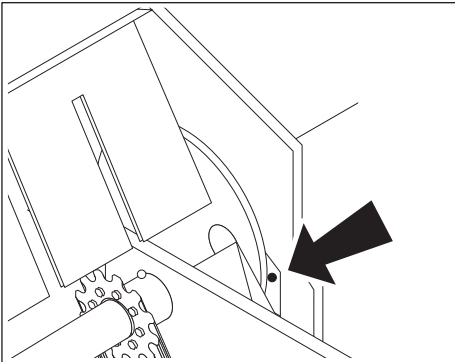
Lube Trencher Pivot



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Lube zerk every 10 hours with MPG.

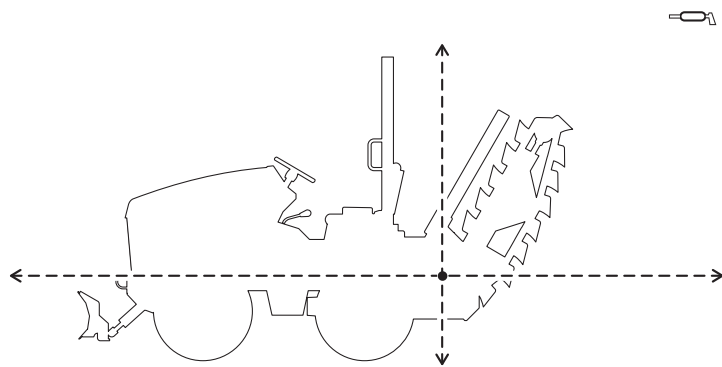
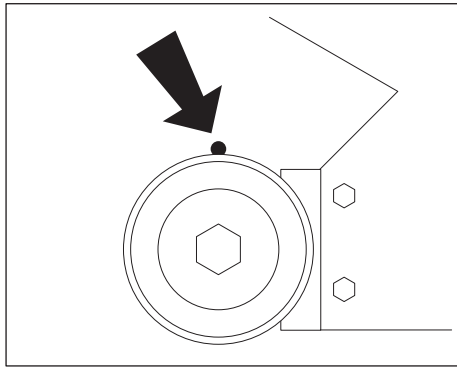
Lube Trencher Pivot Stub



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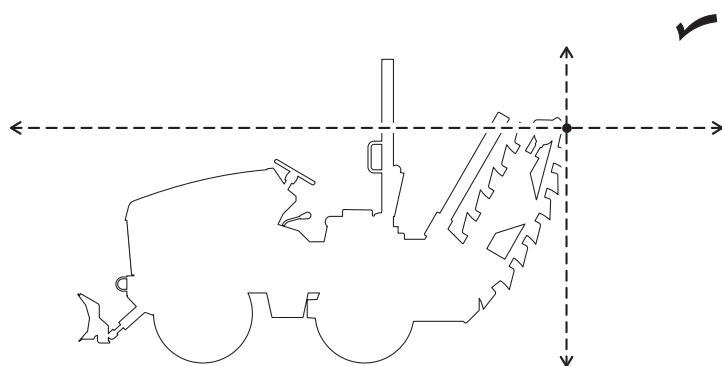
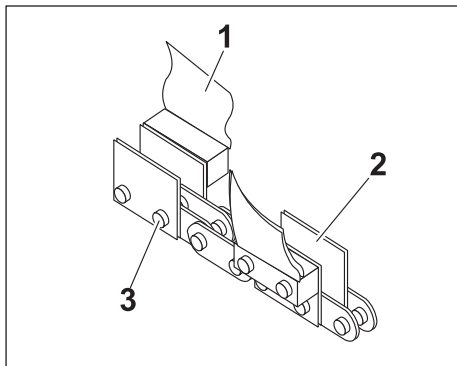
Wipe zerk on right side of trencher clean and lube every 10 hours with MPG. When boom is lowered, zerk is on bottom side of frame.



Lube Headshaft Support Bearing

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Wipe headshaft support bearing zerks (left side beside auger) clean and lube every 10 hours with MPG.

Check Digging Chain

t15om046h.eps

Check teeth (1) for wear every 10 hours. Replace worn teeth, using Ditch Witch replacement parts and maintaining original tooth pattern.

Check chain every 10 hours. Replace worn or broken chains. If sidebars (2) are bent or loose on chain pins (3), chain spacers should be used to join sidebars.

For more efficient digging, contact your Ditch Witch dealer for information about the tooth pattern best suited to your jobsite, or see "Chain Selection" on page 79.

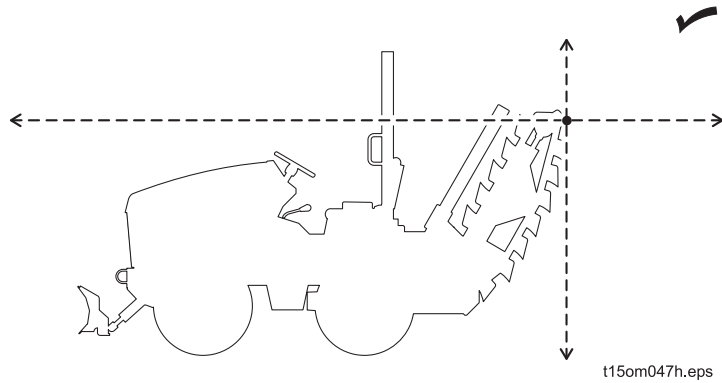
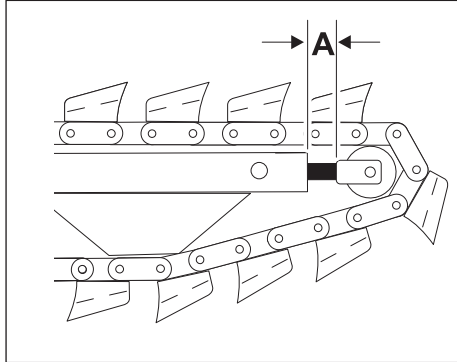
IMPORTANT: If using rock chain bits, check that bits rotate freely. Clean chain and check bits after each use. Replace bit when carbide cap or insert is worn or adapter can be damaged.

Check Digging Chain Tension

Check digging chain tension every 10 hours.



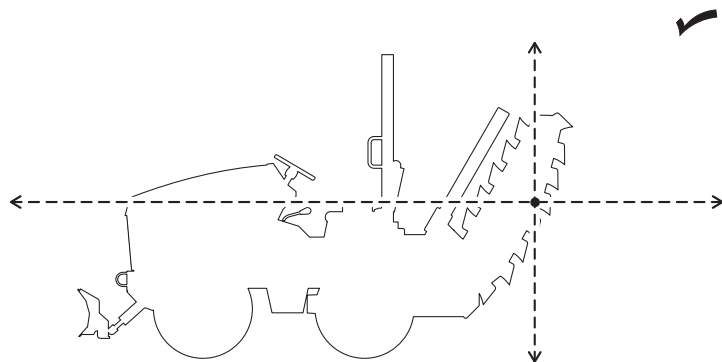
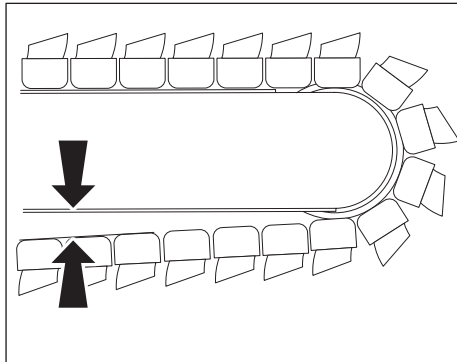
Sprocket Boom



t15om047h.eps

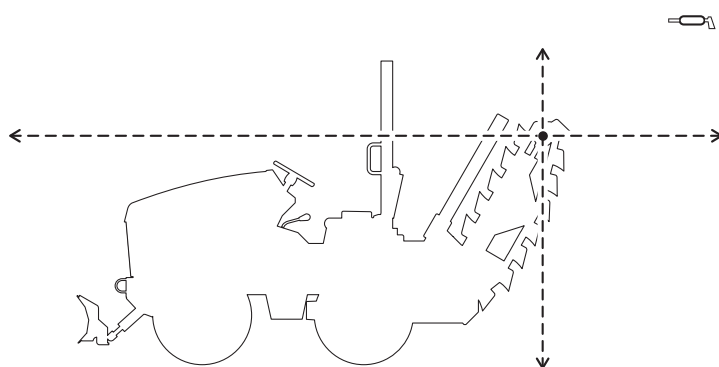
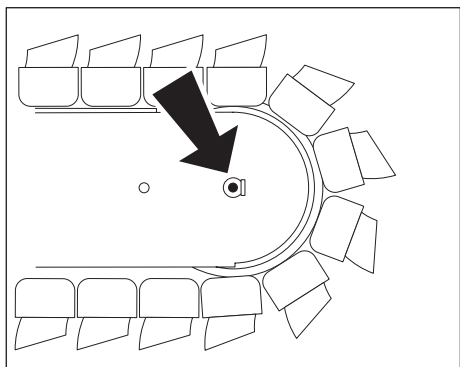
Tension is correct when 2" (50 mm) of slide and stop (A) are exposed.

Roller Boom



t15om049h.eps

With boom horizontal, measure distance from bottom of boom to chain. When properly adjusted, distance should be 1.5-2" (40-50 mm). Adjust tension as needed.

Lube Trencher Tail Roller

t15om039h.eps

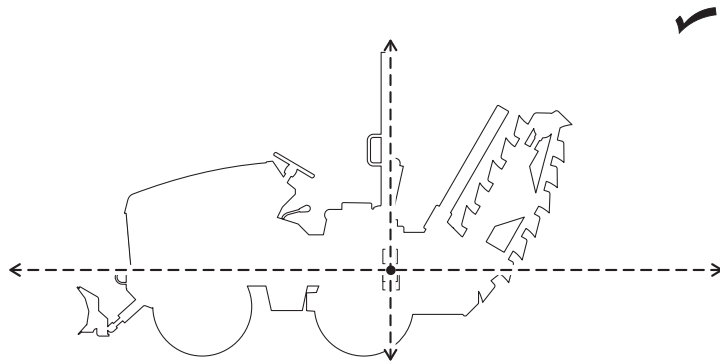
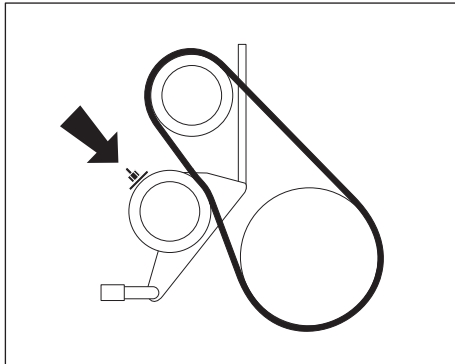
Remove plug, wipe zerk clean and lube every 10 hours with MPG.

50 Hour



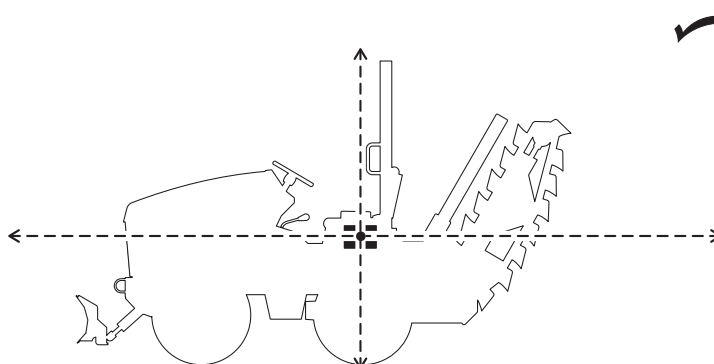
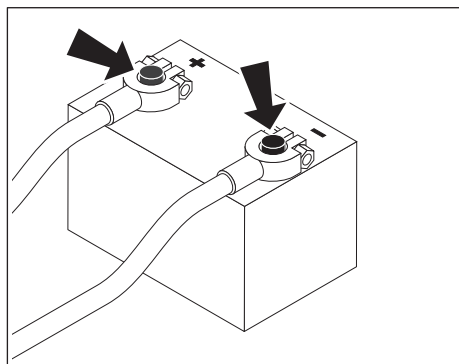
Location	Task	Notes
TRACTOR	Check digging chain drive belts	
	Check fan/alternator belt	27-30 ft•lb (36-40 N•m)
	Inspect hoses	
	Check battery	
	Change hydraulic fluid filter	initial service
	Lube backfill blade swing	MPG

Check Digging Chain Drive Belts



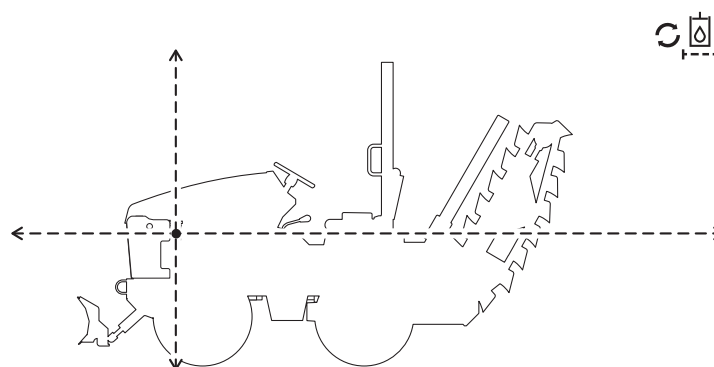
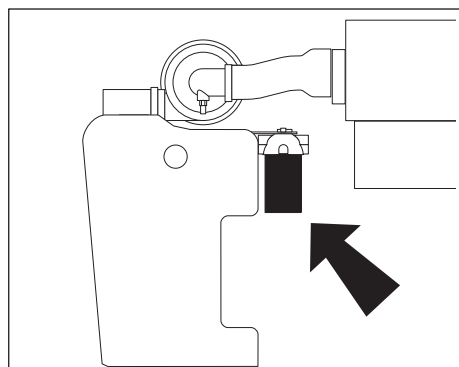
t15om045h.eps

Check belts for wear and proper tension every 50 hours. Replace belt as needed. Adjust roller to maintain even wear on belts.

Check Battery

t15om040h.eps

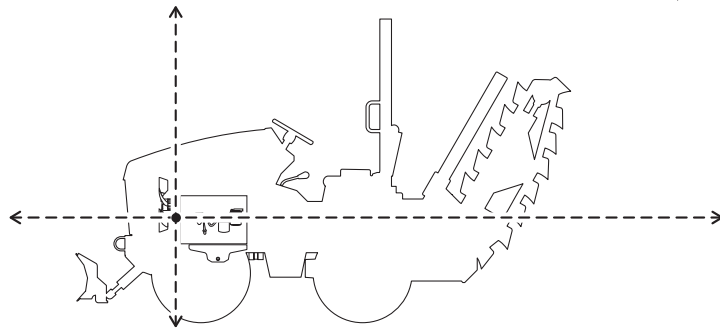
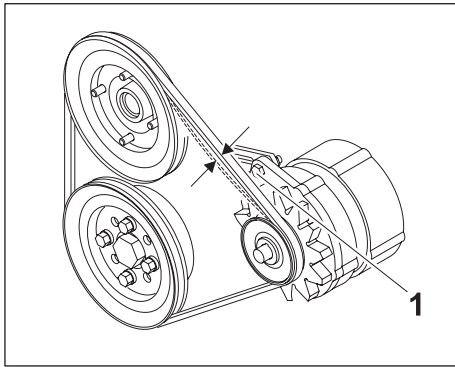
Check battery every 50 hours. Keep battery case and terminals clean. Remove all corrosion from terminals with a wire brush. Wash terminals with a weak solution of baking soda and water. Check battery charge more frequently during cold weather.

Change Hydraulic Fluid Filter

t15om034h.eps

Change filter after 50 hours and every 500 hours thereafter.

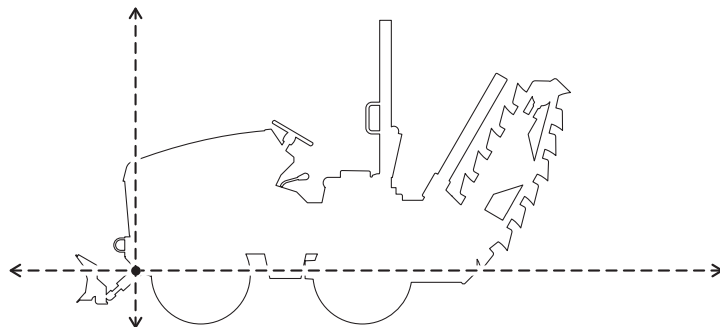
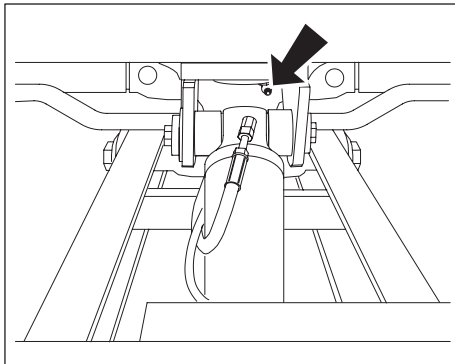
Check Fan/Alternator Belt Tension



t15om013h.eps

Check belt tension every 50 hours. Belt is properly tensioned when it moves about 2/3" (15 mm) when pushed where shown. If belt is loose, loosen bolt (1), slide alternator to create proper tension and tighten bolt. Check tension again.

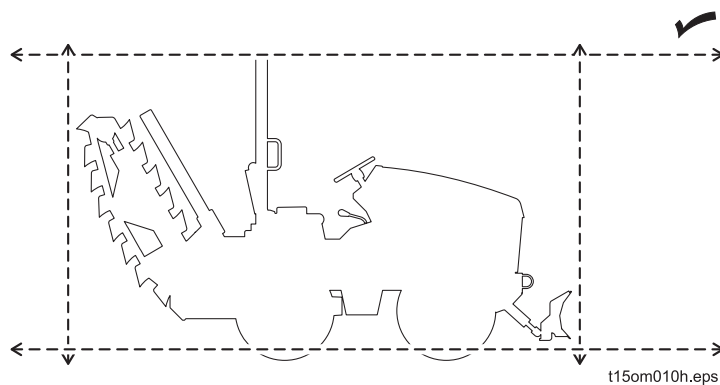
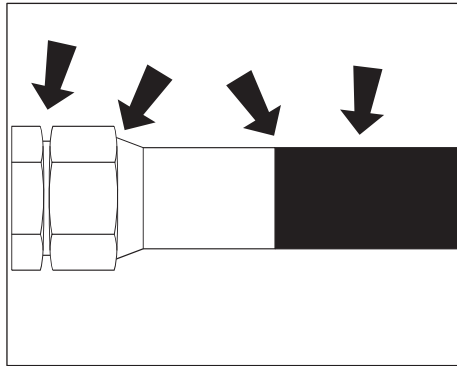
Lube Backfill Blade Swing



t15om019h.eps

Lube zerk with 2-3 shots of MPG every 50 hours.



Check Hydraulic Hoses

Check all hydraulic hoses every 50 hours.

**WARNING**

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

NOTICE: 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.
- Fluid leaks can be hard to detect. Use a piece of cardboard or wood, rather than hands, to search for leaks.
- Wear protective clothing, including gloves and eye protection.

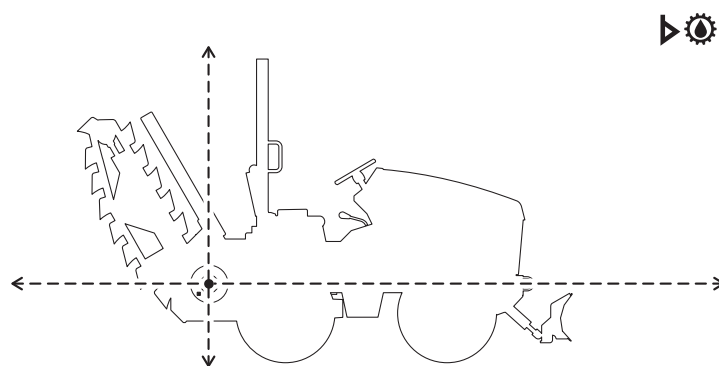
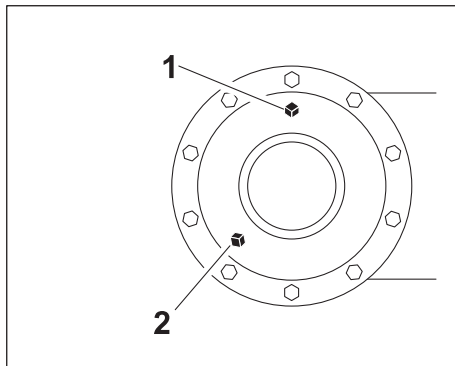
If you are injured, seek immediate medical attention from a doctor familiar with this type of injury.

100 Hour



Location	Task	Notes
TRENCHER	Lube gearbox drive shaft cross and bearings	MPG
	Lube digging chain drive shaft cross and bearings	MPG
	Check digging chain drive oil level	MPL

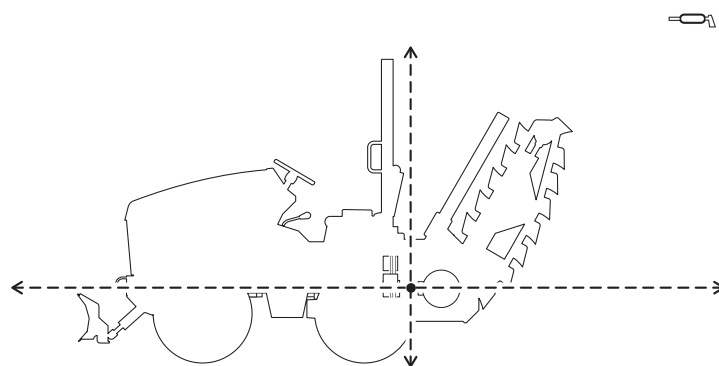
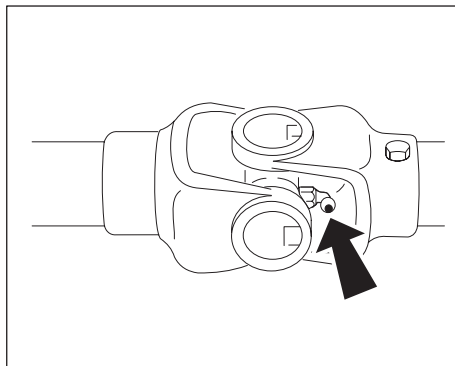
Check Digging Chain Drive Oil Level



t15om021h.eps

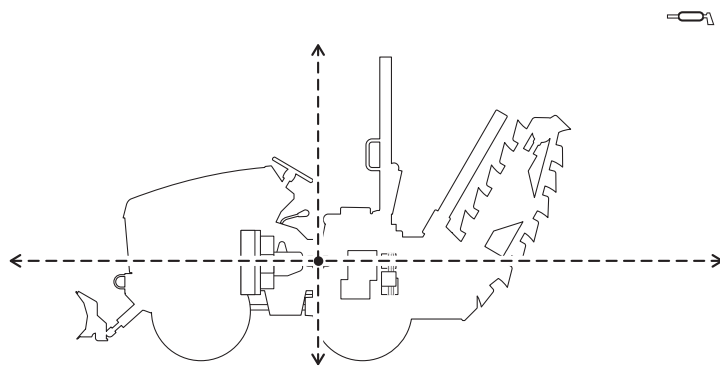
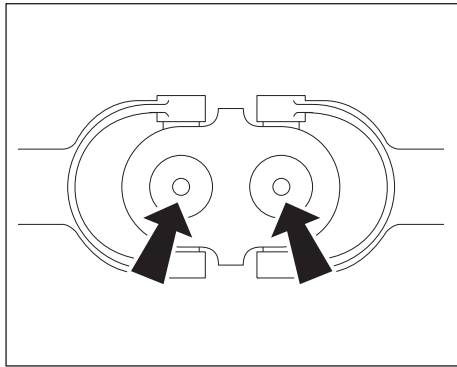
Check oil level every 100 hours. Maintain oil level at check plug (2). Add MPL at fill plug (1) as needed.

Lube Digging Chain Drive Shaft Cross and Bearings



t15om027h.eps

Lube zerks with MPG every 100 hours.

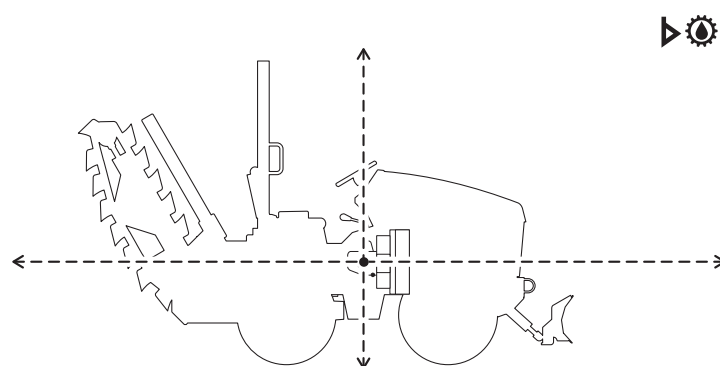
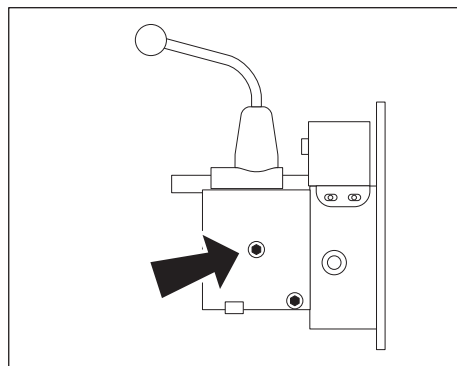
Lube Gearbox Drive Shaft Cross and Bearings

t15om029h.eps

Lube zerks with MPG every 100 hours.

250 Hour

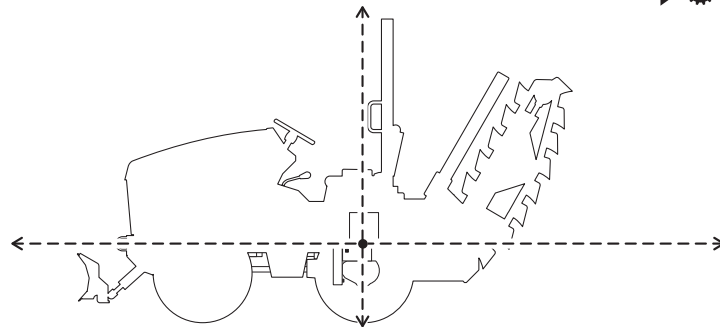
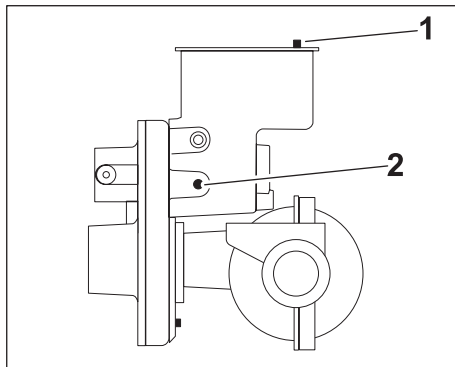
Location	Task	Notes
TRACTOR	Check gearbox oil level	MPL
	Check transmission fluid level	MPL
	Lube drive shaft cross and bearings	MPG

Check Transmission Fluid Level

t15om026h.eps

Check fluid level every 250 hours. Add MPL to maintain oil level at plug.

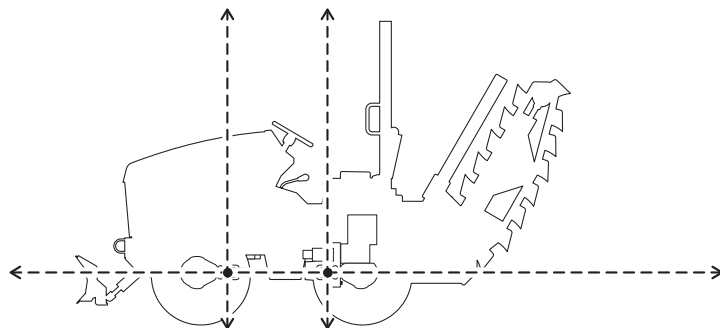
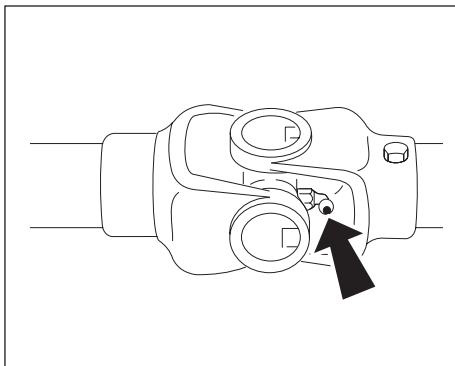
Check Gearbox Oil Level



t15om023h.eps

Check at plug (2) on left side of gearbox every 250 hours. Add MPL at fill (1) as needed.

Lube Drive Shaft Cross and Bearings



t15om028h.eps

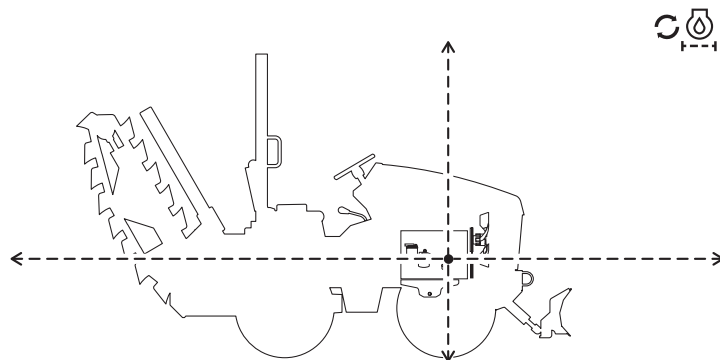
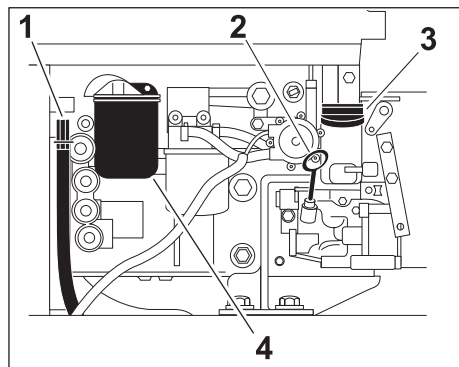
Lube zerks with 2-3 shots of MPG every 250 hours. Access from underneath unit.

500 Hour

Location	Task	Notes
TRACTOR	Change engine oil and filter	DEO
	Change fuel filter	
	Change hydraulic filter	
	Check differential oil	MPG
	Lube universal joints	MPG

Tractor

Change Engine Oil and Filter



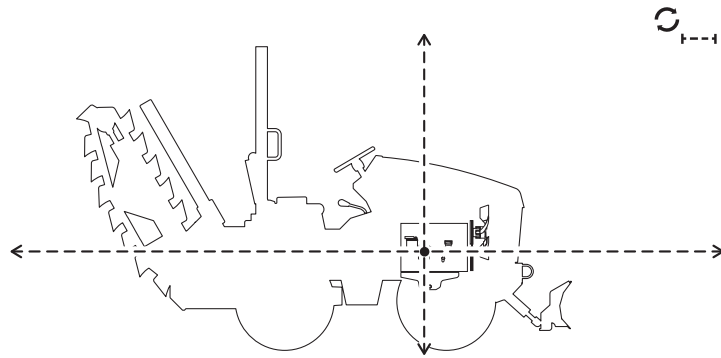
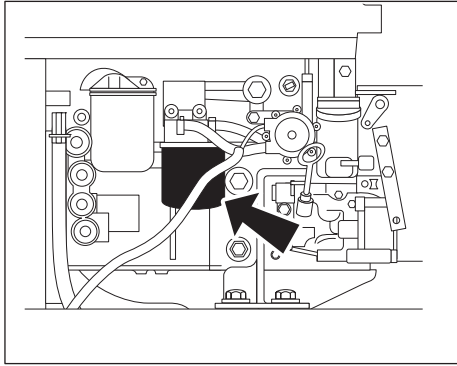
t15om014h.eps

Change engine oil and filter every 500 hours.

To change:

1. Drain crankcase (1) while oil is warm.
2. Replace filter (4) each time oil is changed.
3. Add DEO at fill neck (3) until oil is at highest line on dipstick (2). Capacity with filter is 6 qt (5.5 L).

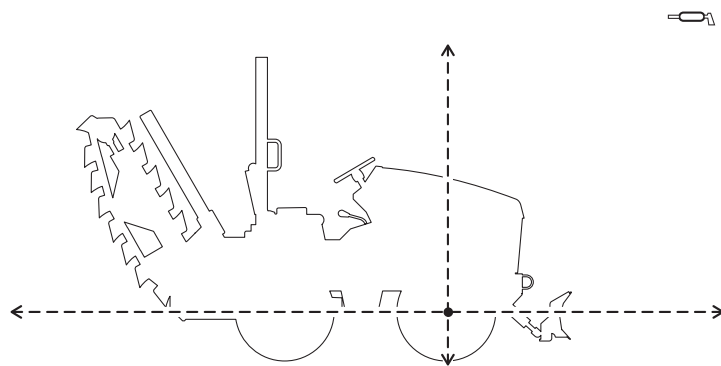
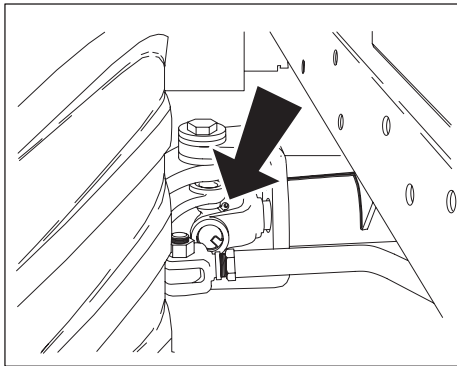
Change Fuel Filter



t15om015h.eps

Change fuel filter every 500 hours.

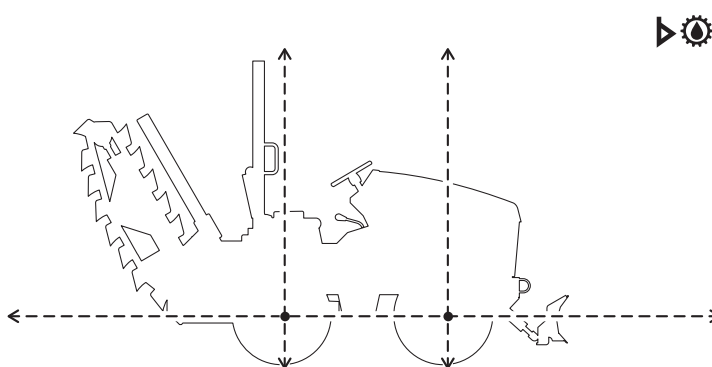
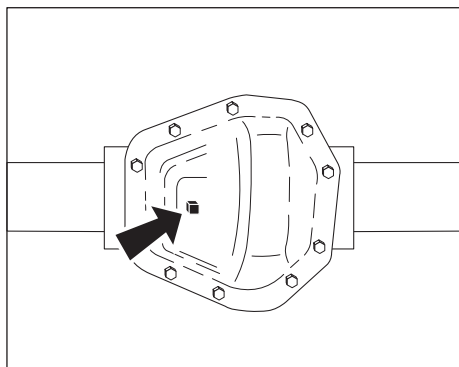
Lube Universal Joints



t15om017h.eps

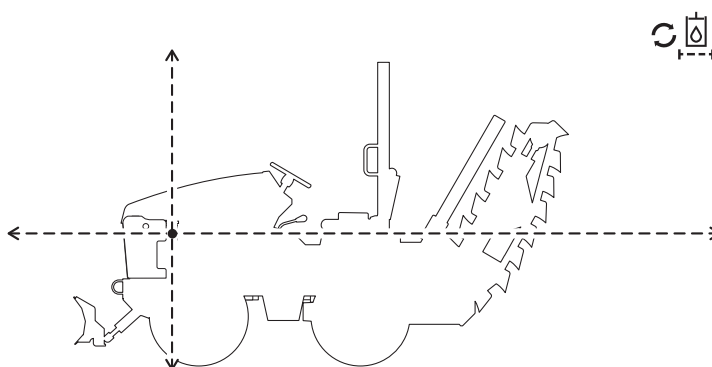
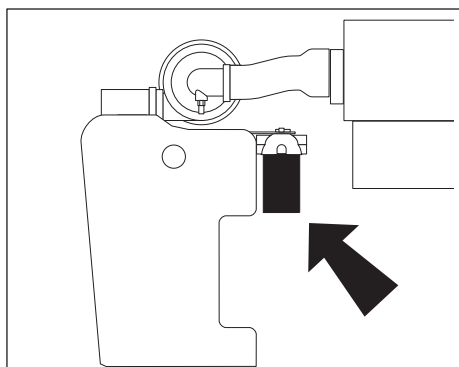
Lube zerks with MPG every 500 hours.



Check Differential Oil Level

t15om018h.eps

Check oil level at fill plug every 500 hours. Add MPL as needed.

Change Hydraulic Filter

t15om034h.eps

Change hydraulic filter every 500 hours. Add hydraulic fluid as needed.

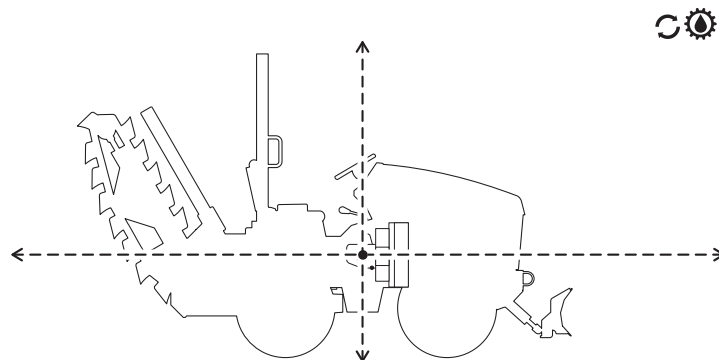
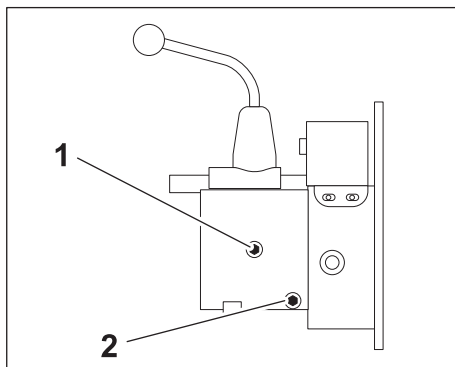
1000 Hour



Location	Task	Notes
TRACTOR	Change differential oil	MPL
	Change hydraulic fluid and filter	THF
	Change ground drive gearbox oil	MPL
	Change transmission fluid	MPL
	Inspect muffler	
	Inspect ROPS	
TRENCHER	Change digging chain drive oil	THF

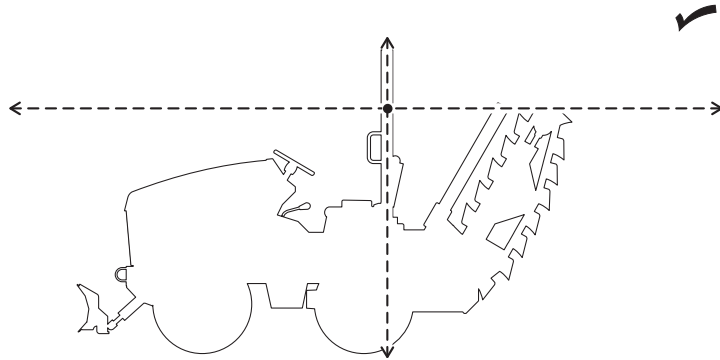
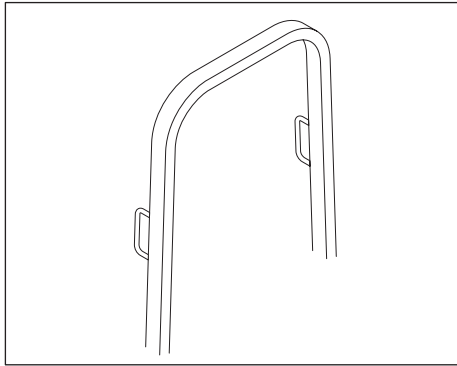
Tractor

Change Transmission Fluid



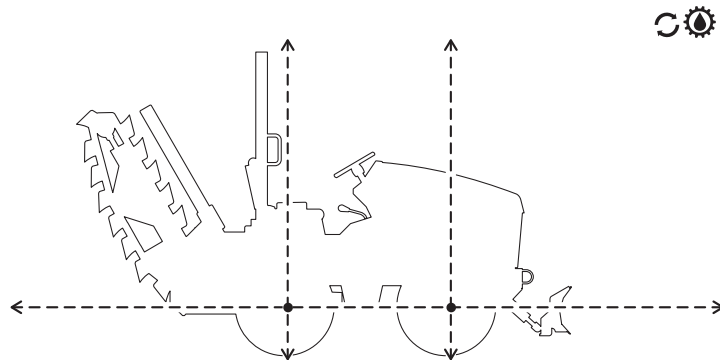
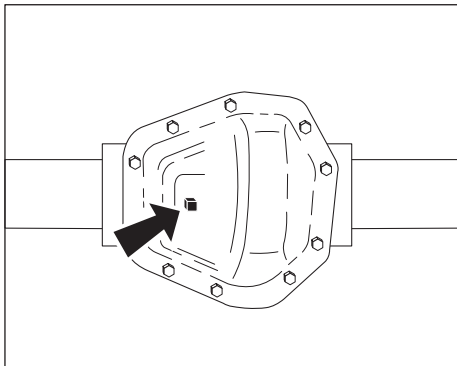
t15om025h.eps

Drain (2) transmission fluid every 1000 hours. Add MPL at fill (1) until it comes out of top plug. Capacity is approximately 3 pt (.8 L).

Inspect ROPS

t15om041h.eps

Check all frame bolts and welds every 1000 hours.

Change Differential Oil

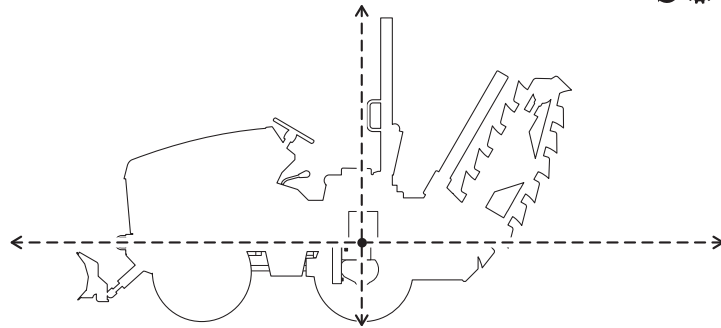
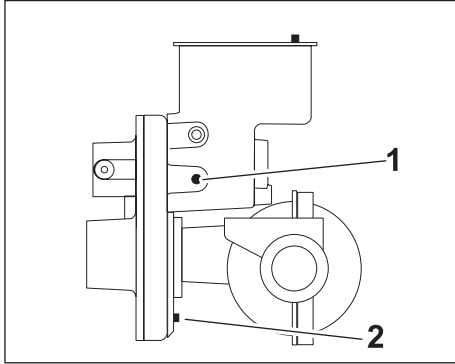
t15om052h.eps

Change differential oil every 1000 hours.

To change:

1. Remove cover and drain oil.
2. Replace cover.
3. Add MPL at fill plug until oil is visible at plug.
 - For model 44 differentials, capacity is 5 pt (2.3 L) for front and 5.5 pt (2.6 L) for rear.
 - For model 60 differentials, capacity is 5.9 pt (2.8 L) for front and 4.5 pt (2.1 L) for rear.

Change Ground Drive Gearbox Oil



t15om024h.eps

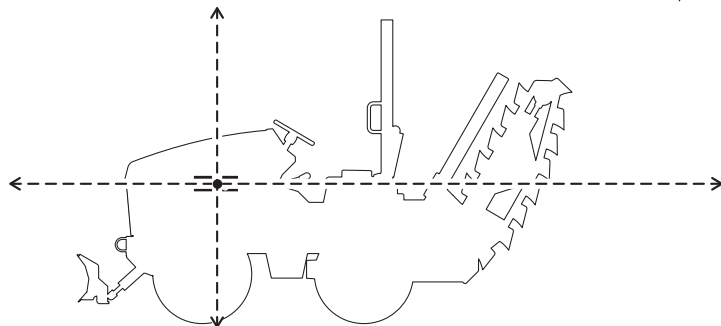
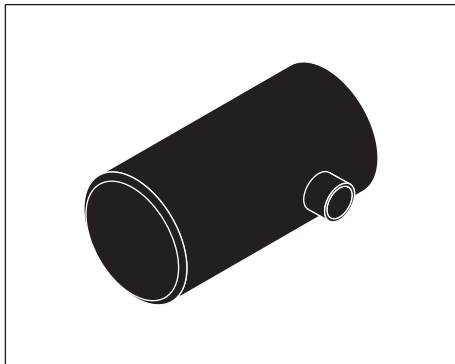


Change ground drive gearbox oil every 1000 hours.

To change:

1. Remove drain plug (2).
2. Drain oil and replace plug.
3. Fill gearbox with MPL at fill (1). Capacity is 2 qt (1.6 L).

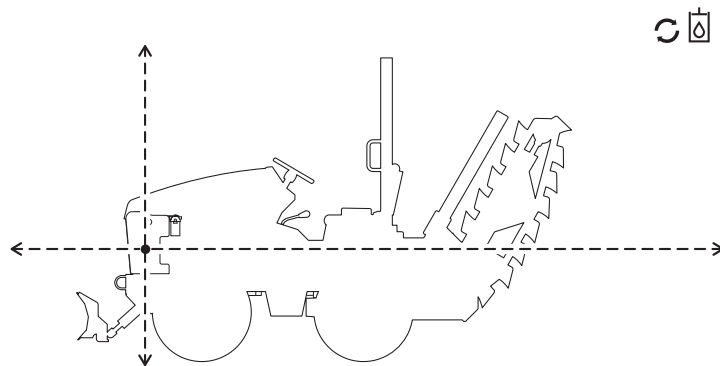
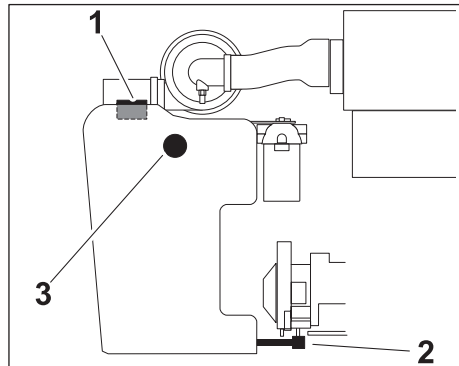
Inspect Muffler



t15om054h.eps



Inspect muffler for looseness every 1000 hours.

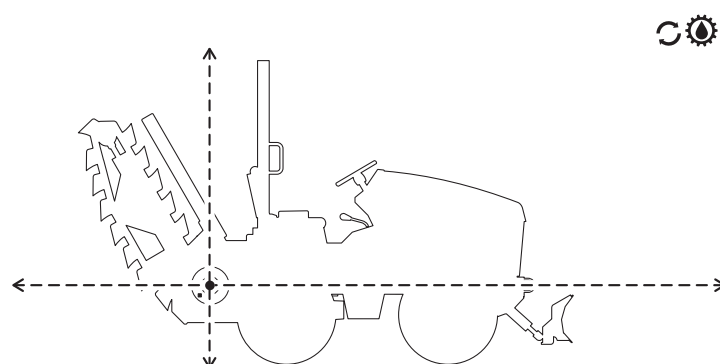
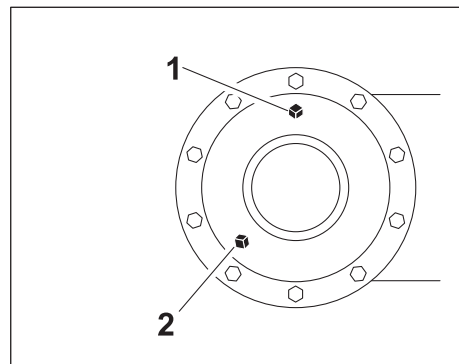
Change Hydraulic Fluid and Filter

t15om035h.eps

Change hydraulic fluid and filter every 1000 hours.

To change:

1. Pull suction hose (2) from bottom of hydraulic pump.
2. Drain fluid and reattach hose.
3. Change filter (see page 104).
4. Add THF at fill (1) until fluid is at halfway point on sight glass (3). Hydraulic reservoir capacity is 9.5 gal (36 L). Hydraulic system capacity is 13 gal (49 L).

Trencher**Change Digging Chain Drive Oil**

t15om022h.eps

Drain (2) digging drive chain oil every 1000 hours. Add MPL at fill (1). Capacity is 2.5 pt (1.25 L).

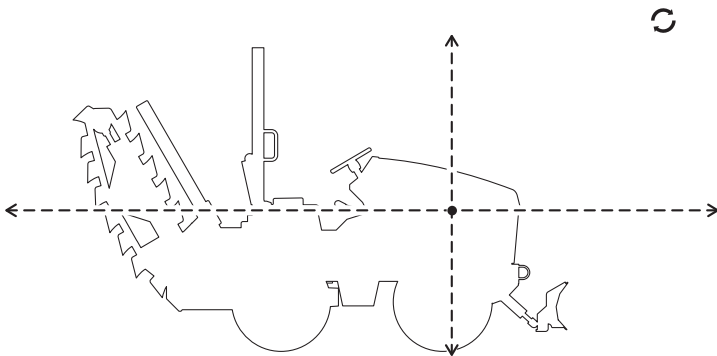
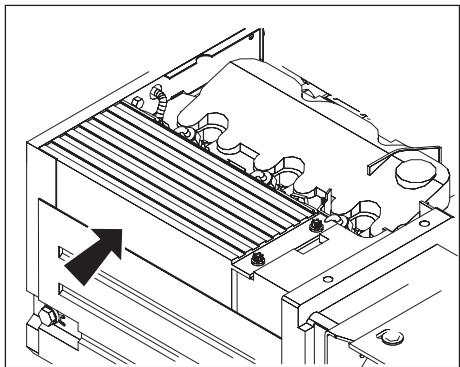
As Needed



Location	Task	Notes
TRACTOR	Adjust parking brake	
	Change air filter	
	Adjust service brake	
	Clean engine cooling system	
	Adjust engine clutch pedal	
TRENCHER	Adjust digging chain tension	
	Replace digging chain and teeth	
	Adjust digging chain control	
BACKHOE	Replace backhoe pins and bushings	

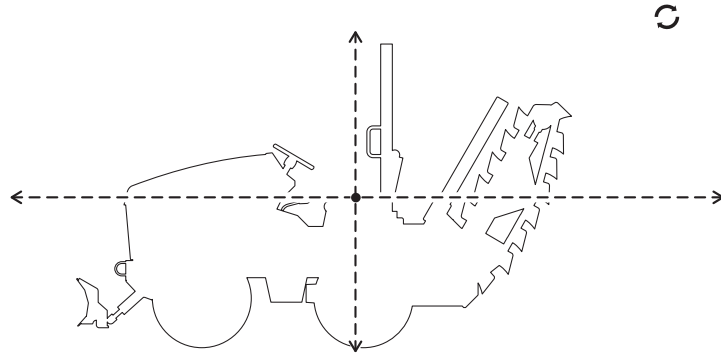
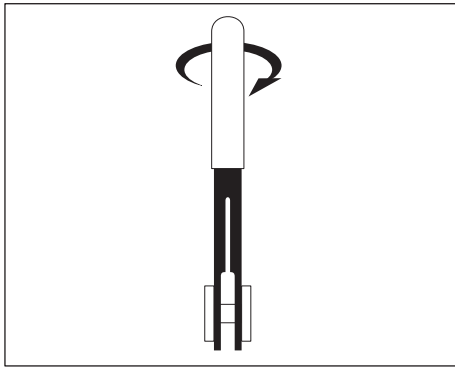
Tractor

Clean Engine Cooling System



t15om042h.eps

Clean engine cooling system as needed with high-pressure air. Remove cowling on right side and top of engine to fully expose cooling fins and oil cooler.

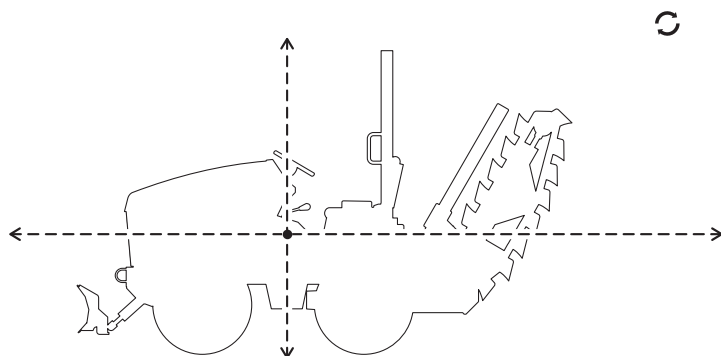
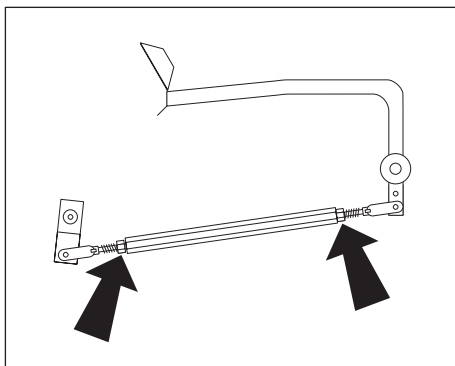
Adjust Parking Brake

t15om020h.eps

Adjust parking brake as needed.

To tighten:

1. Disengage parking brake.
2. Remove orange sleeve.
3. Twist lever clockwise. Engage parking brake to test tension.
4. Repeat 1-3 until parking brake is properly adjusted.
5. Replace orange sleeve.

Adjust Engine Clutch Pedal

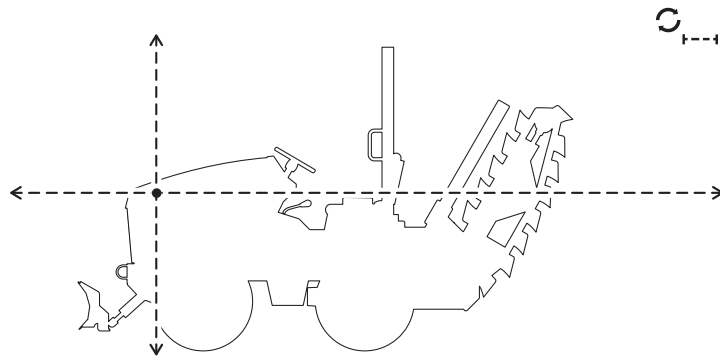
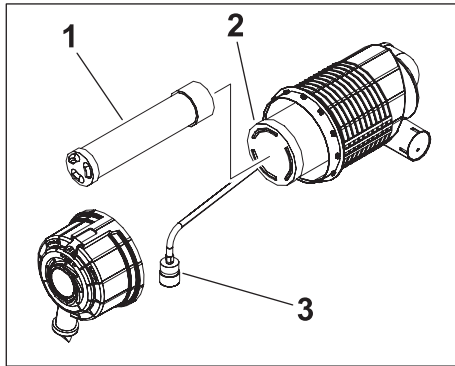
t15om043h.eps

Adjust clutch linkage as needed. Adjustment is correct when free travel of clutch pedal is approximately 1" (25 mm).

To adjust

1. Locate adjustment under left side of unit.
2. Loosen locknuts and turn adjusting nut. Lengthen to increase free travel of clutch pedal.
3. Tighten locknuts after adjusting nut.

Change Air Filter



t15om044h.eps

Change air filter when yellow band reaches red line on air filter service indicator (3).

To change:

1. Remove air filter cover and remove primary (2) and secondary (1) elements.
2. Wipe inside of housing and wash cover.
3. Insert new elements.
4. Replace cover.
5. Reset air filter service indicator.

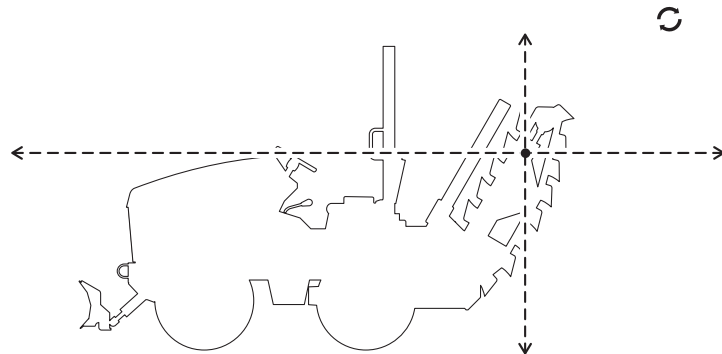
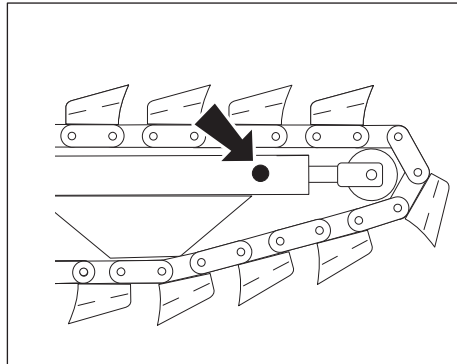


Trencher

Adjust Digging Chain Tension

Adjust digging chain tension as needed.

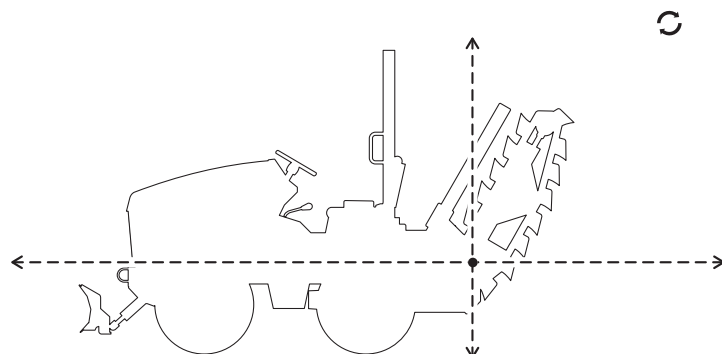
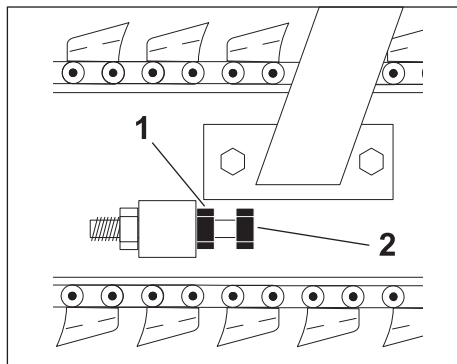
Sprocket Boom



t15om048h.eps

Tension is correct when 2" (50 mm) of slide and stop (3) are exposed. To tighten chain, remove plug and pump MPG into cylinder (1). To relieve chain tension, loosen plug on grease cylinder.

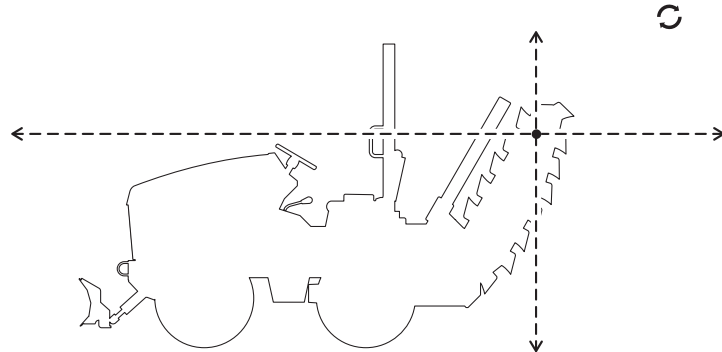
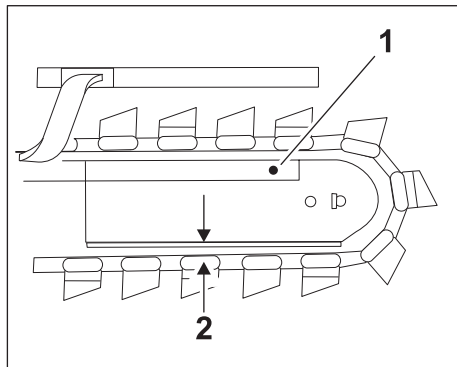
Roller Boom with Adjusting Screw



t15om050h.eps

With boom horizontal, measure distance from bottom of boom to chain. When properly adjusted, distance should be 1.5-2" (40-50 mm). Adjust tension by tightening or loosening adjustment screw (1) and jam nut (2).

Roller Boom with Grease Cylinder



t15om057h.eps

With boom horizontal, measure distance from bottom of boom to chain (2). When properly adjusted, distance should be 1.5-2.0" (40-50 mm).



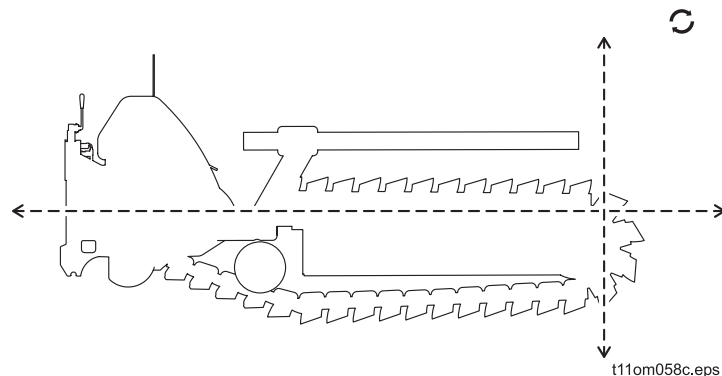
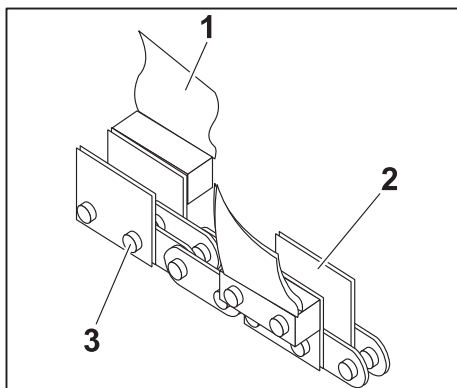
WARNING

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

NOTICE: 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.

To tighten chain, remove plug and pump MPG into cylinder (1). To relieve chain tension, loosen plug on grease cylinder.

Replace Digging Chain



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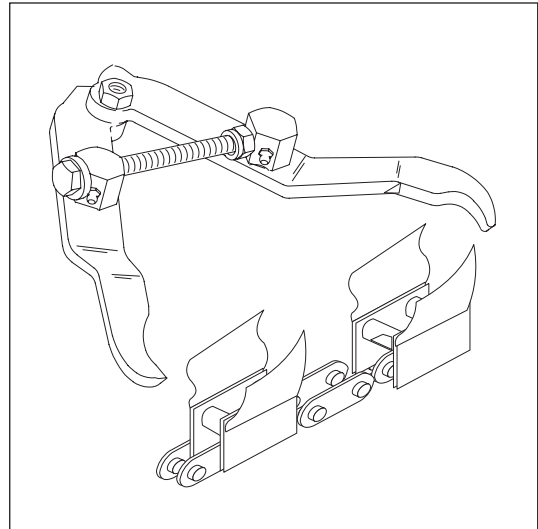
Visually check digging chains for wear on rollers and sidebars (2). Check pins (3) and bushing wear by measuring distance between chain pins and comparing it with a new chain. Also check digging teeth (1).

IMPORTANT: Replace sprockets when a new chain is installed.



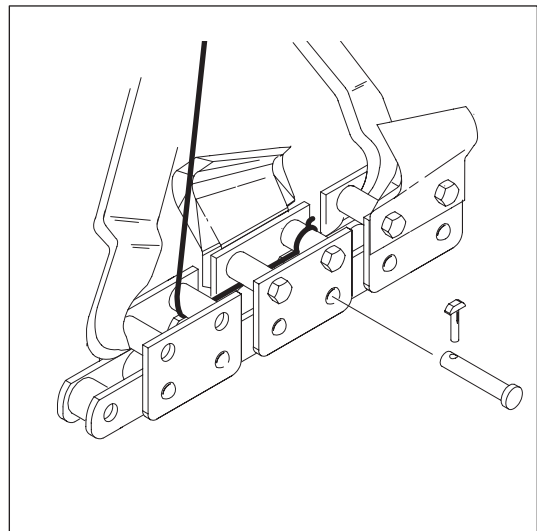
To remove chain:

1. Fasten and adjust seat belt.
2. Start tractor. See page 48 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. Squeeze jaws to reduce pressure on connector pin.
Sprocket booms: Lock rear idler sprocket.



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8. Loop cable through links nearest connector pin.



t12om090h.eps





WARNING

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

NOTICE: 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.

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



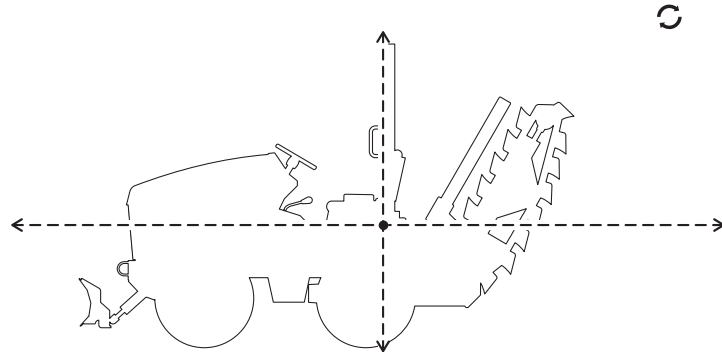
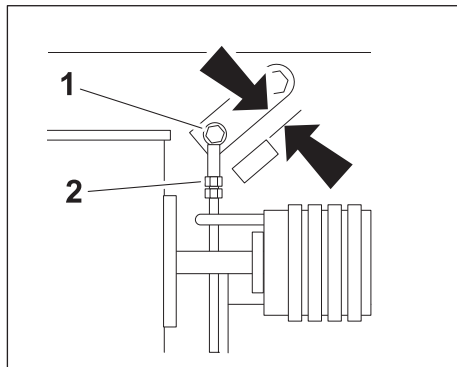
WARNING

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

11. Unclamp links. Slowly release cable and lower chain to ground.
12. 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 seat belt.
3. Start tractor. See page 48 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.

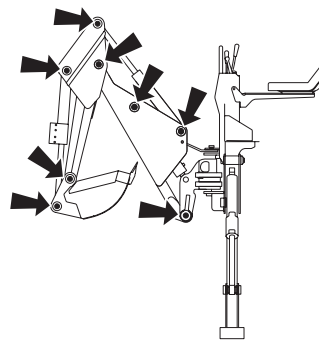
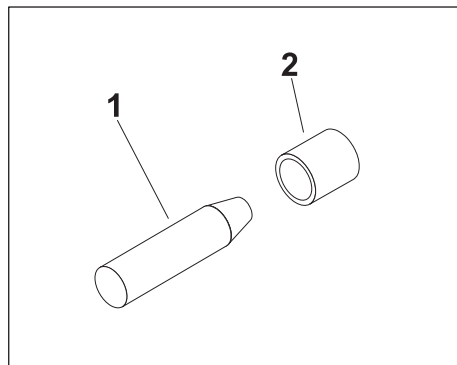
Adjust Digging Chain Control

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Adjust digging chain control as needed.

To adjust

1. Engage digging chain control.
2. Loosen jam nut (2) on upper end of link rod.
3. Remove locknut, washer, and bolt (1) holding link rod to control pin ear.
4. Turn rod end counterclockwise to increase gap or clockwise to decrease gap to 1/2" (13 mm).
5. Reinstall all parts and tighten locknut (2) under rod.

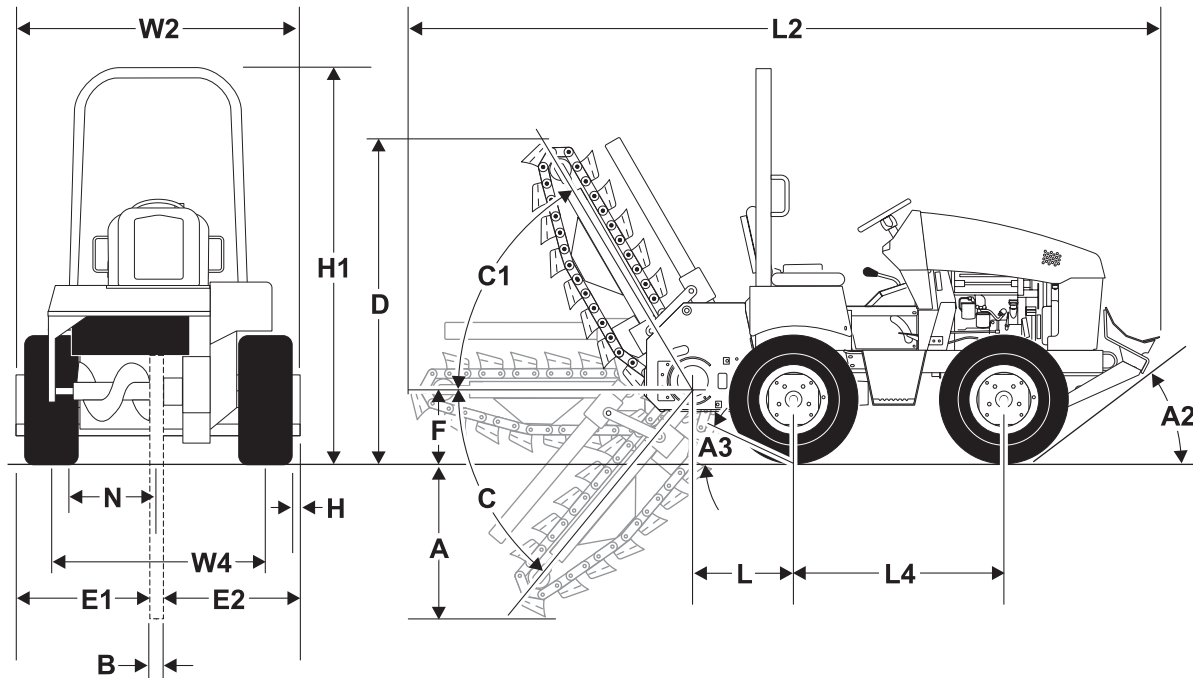
Backhoe**Replace Pins and Bushings**

t14om082h.eps

Replace pins (1) and bushings (2) when worn or damaged.

Specifications

RT36 Tractor



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Dimensions (with 26 x 12.00-12 tire)		U.S.	Metric
A	Trench depth, maximum	60 in	1.5 m
A2	Angle of approach	20°	20°
A3	Angle of departure	17°	17°
B	Trench width, maximum	16 in	410 mm
C	Boom travel, down	57°	57°
C ¹	Boom travel, up	32°	32°
D	Boom/Trench cleaner height	70 in	410 mm
E1	Centerline trench to outside edge of unit, left	31 in	790 mm
E2	Centerline trench to outside edge of unit, right	32 in	810 mm
F	Headshaft height, digging chain	15 in	380 mm
H	Overhang beyond tire	3.5 in	90 mm
H1	Operating height	86 in	2.2 m
L	Headshaft overhang	22 in	560 mm

L2	Length, transport	154 in	3.9 m
L4	Wheelbase	48 in	1.2 m
	Spoil discharge reach, minimum to maximum	17-20 in	430-510 mm
W2	Width, transport	64 in	1.6 m
W4	Tread	46 in	1.2 m

Dimensions based on unit equipped with backfill blade, 26X12.00-12 tires and 39" (991-mm) roller boom.

General

Ditch Witch model RT36 tractor, 4-wheel drive, rigid frame, ground drive through rubber tires, conventional 2-wheel power steering, centerline mechanical riding trencher

Operation		U.S.	Metric
Forward (with 26 x 12.00-12 tire), maximum			
	First gear	2.3 mph	3.7 km/h
	Second gear	3.9 mph	6.3 km/h
	Third gear	7.3 mph	11.7 km/h
Reverse, maximum		1.9 mph	3.0 km/h
Trenching speed, maximum @ full load (varies with soil conditions)		31 fpm	9.4 m/min
Forward, (with 29 x 12.50-15 tire) maximum			
	First gear	2.7 mph	4.3 km/h
	Second gear	4.5 mph	7.2 km/h
	Third gear	8.4 mph	13.5 km/h
Reverse, maximum		2.2 mph	3.5 km/h
Trenching speed, maximum @ full load (varies with soil conditions)		36 fpm	11 m/min
Digging chain speed @ 2500 rpm			
	First gear	203 fpm	62 m/min
	Second gear	324 fpm	99 m/min
	Third gear	528 fpm	161 m/min
	Reverse	150 fpm	46 m/min
Headshaft speed @ 2500 rpm			

	First gear	120 rpm	120 rpm
	Second gear	192 rpm	192 rpm
	Third gear	312 rpm	312 rpm
	Reverse	88 rpm	88 rpm
Vehicle clearance circle (wall-to-wall)		27 ft	8.2 m
Operating weight (with shortest boom, 6" (152-mm) 4-pitch chain, and 175-lb (79-kg) operator)		3940 lb	1785 kg
Allowable operating weight, maximum		6500 lb	2948 kg
Operator orientation: facing front of vehicle in full view of all operations			



Backfill Blade	U.S.	Metric
Blade width	64 in	1.6 m
Blade height	13.9 in	353 mm
Lift height above ground	11.6 in	290 mm
Blade drop below ground	8 in	200 mm
Swing angle (left/right), maximum	28°	28°
Tilt angle (up/down)	11°	11°

Power		U.S.	Metric
Engine: Deutz F3L2011, diesel			
Cooling medium: integrated oil			
Injection: direct			
Number of cylinders: 3			
Displacement		142 in ³	2.3 L
Bore		3.7 in	94 mm
Stroke		4.4 in	112 mm
Engine manufacturer's net power rating (SAE J1349)		35 hp	26 kW
Rated speed		2500 rpm	2500 rpm
Maximum engine tilt angles*			
	Longitudinal	30°	30°
	Lateral	30°	30°

*Exceeding these operating angles will cause engine damage. This DOES NOT IMPLY machine is stable to maximum angle of safe engine operation.

Power Train	
Ground drive	
	Mechanical transmission: 3 forward speeds, 1 reverse speed with gear drive to axles
	Hydraulic ground drive: infinitely variable from zero to maximum forward and reverse through gear reduction to axles
Clutch: automotive, spring-loaded, foot-operated friction drive	
Service brake: disc, foot-operated	
Parking brake: disc, hand-operated	
Tires: 26 x 12.00-12 4-ply bar lug; inflate to 12 psi (83 kPa) maximum. 29 x 12.50-15 4-ply bar lug; inflate to 20 psi (138 kPa) maximum.	
Trencher drive	
	Transmission: 3 forward speeds, 1 reverse speed through shock-absorbing clutch belt drive to right angle drive to headshaft
	Clutch: automotive, spring-loaded, foot-operated friction drive

Hydraulic System	U.S.	Metric
Ground drive pump capacity at 2500 rpm	9 gpm	34 L/min
Ground drive pump relief setting	2500 psi	172 bar



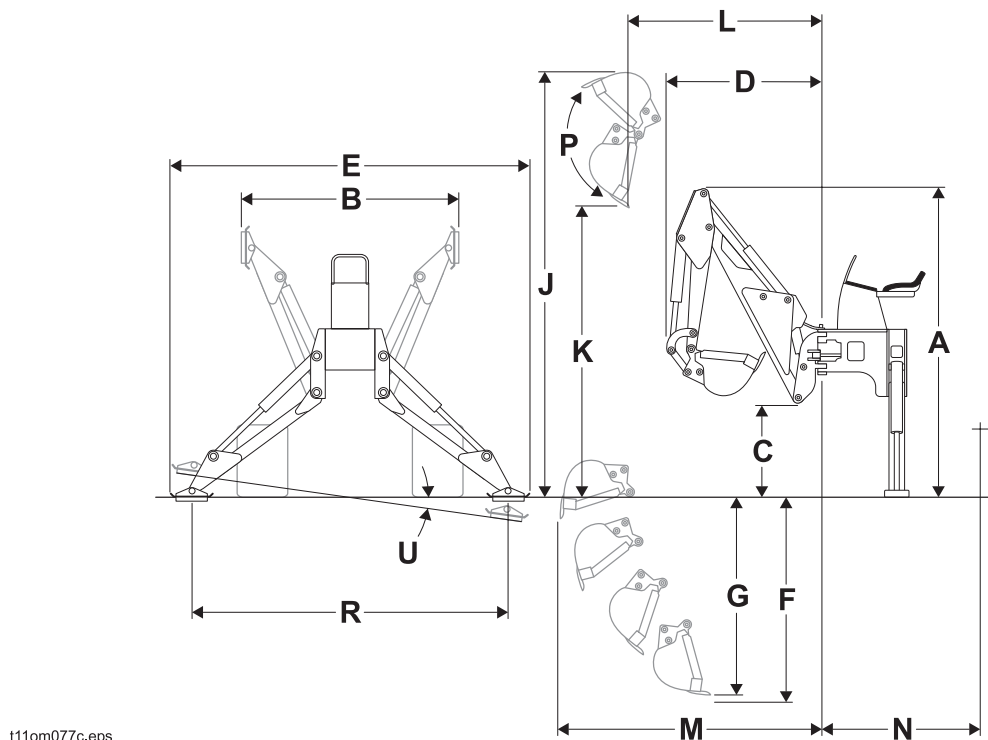
Fluid Capacities		U.S.	Metric
Fuel tank		13 gal	49 L
Engine oil		6 qt	5.7 L
Transmission		3 pt	1.4 L
Right angle drive		2.5 pt	1.2 L
Gearbox		2 qt	1.9 L
Differential			
	Dana 44	5 pt	2.4 L
	Dana 60	5.9 pt	2.8 L
Hydraulic reservoir		7.7 gal	29 L
Hydraulic system		9 gal	34 L

Battery
Group 26/26R/70, SAE reserve capacity 85 min., SAE cold crank @ 0° F (-18° C), 700 amp

Noise Levels
Operator 89 dBA sound pressure per ISO 6394
Exterior 104 dBA sound power per ISO 6393.

Specifications are called out according to SAE recommended procedures. 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 described.

A322 Backhoe



t11om077c.eps

Dimensions		U.S.	Metric
A	Transport height	80.5 in	2.0 m
C	Ground clearance	23 in	584 mm
D	Backhoe length, stowed	60 in	1.5 m
F	Digging depth, maximum	72 in	1.8 m
G	Digging depth, 2' (0.6 m) flat bottom	66 in	1.7 m
J	Operating height, fully raised	97 in	2.5 m
K	Loading height	46 in	1.2 m
L	Loading reach	55 in	1.4 m
M	Reach from swing pivot	102 in	2.6 m
N	Swing pivot to centerline axle	32 in	813 mm
P	Bucket rotation	132°	132°
B	Stabilizer spread, transport	64 in	1.6 m
E	Backhoe or basic unit width	57 in	1.5 m
R	Stabilizer spread, operating	104 in	2.6 m
U	Leveling angle	10°	10°

General		U.S.	Metric
Bucket			
	Width	12 in	305 mm
	Capacity	1.1 ft ³	0.03 m ³
Backhoe weight with bucket		1125 lb	511 kg
Lift capacity, boom over end and swing arc, SAE*			
	@ 48" (1.2 m)	957 lb	434 kg
	@ ground level	1044 lb	474 kg
	@ 72" (1.8 m)	783 lb	355 kg
Lift capacity, dipperstick over end and swing arc, SAE*			
	@ 48" (1.2 m)	1784 lb	809 kg
	@ 72" (1.8 m)	1500 lb	681 kg
Swing arc		160°	160°
Digging force			
	Using bucket cylinder	5340 lb	23.8 kN
	Using dipperstick cylinder	4050 lb	18 kN

*Lift capacities are for a stationary machine supported by stabilizers.



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 Parts Limited Warranty Policy

Subject to the limitations 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 (Exception: 2 years for all SK500 attachments). 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.

Exclusions from Product Warranty

- Wear-related failure of parts subject to ground contact including, but not limited to, digging teeth, digging chains, sprockets, backhoe buckets, plow blades, drill pipe, drill bits, backreamers, and swivels.
- 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: 1/03

**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.

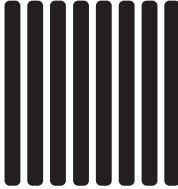
This will enable you to receive updates on this equipment as well as information on new products of interest.

Thanks for using Ditch Witch equipment.

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



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



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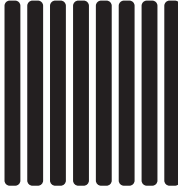
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**The Charles Machine Works, Inc.
P.O. Box 66
Perry, Oklahoma 73077-9989**



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

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Attention		
Street Address or P.O. Box		
City	County	
State	Zip	Nation
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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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