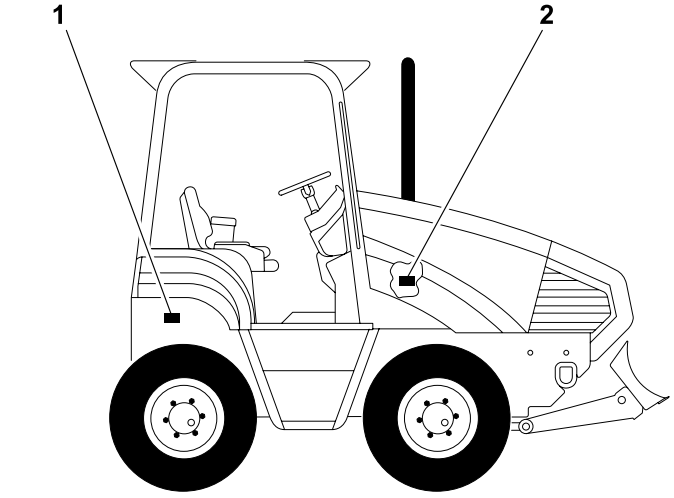
SUPPORT

SERIAL NUMBER RECORD

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



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Date of Manufacture:	
Date of Purchase:	
Tractor Serial Number:	
Front Attachment Serial Number:	
Rear Attachment Serial Number:	
Trailer Serial Number:	
Engine Serial Number:	

SUPPORT PROCEDURE

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

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

Return damaged parts to dealer for inspection and warranty consideration.

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

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.

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. 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.

RT115 Tier 2

Operator's Manual

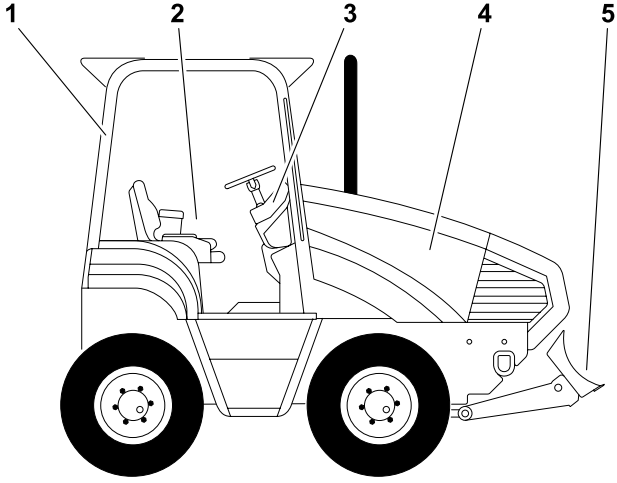
Issue Number 1.1/OP-12/03

Part Number 054-116

CONTENTS

OVERVIEW

The RT115 Tier 2 tractor is designed for installation of service lines. It can be fitted with a trencher, vibratory plow, saw, backhoe or combo plow/trencher attachment. Optional enclosed cab, work lights, air conditioning, cruise control, rear and coordinated steering, drilling attachment, and reel carriers are also available. All rear-mounted attachments feature a new side plate frame mounting system.



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1. Rollover Protective Structure
2. Operator station
3. Control console
4. Engine compartment
5. Backfill blade

The H910 trencher for the RT115 Tier 2 tractor cuts a trench with maximum depth of 94 in (2.4 m). Maximum trench width for the H910 is 24 in (610 mm).

The H911 trencher for the RT115 Tier 2 tractor cuts a trench with maximum depth of 94 in (2.4 m). Maximum trench width for the H911 is 24 in (610 mm). Hydraulic traverse on the H911 allows the trencher to move across the full width of the tractor.

The H932 plow for the RT115 Tier 2 tractor has a cover depth of 36 in (915 mm). The H932 is capable of pulling 3 inch (80 mm) material and feeding 2 inch (50 mm) material.

The H952 combo units for the RT115 Tier 2 tractor combine trencher and plow. The H952 trenches to a maximum depth of 70 in (1.8 m) with trench widths of 6 to 12 in (150 to 305 mm). Cover depth is the same as for the standard plows.

The H1140 for the RT115 Tier 2 tractor is a centerline saw having a maximum trench depth of 40 in (990 mm) with trench widths of 4.5, 6, and 9 in (115, 150, and 230 mm) respectively.

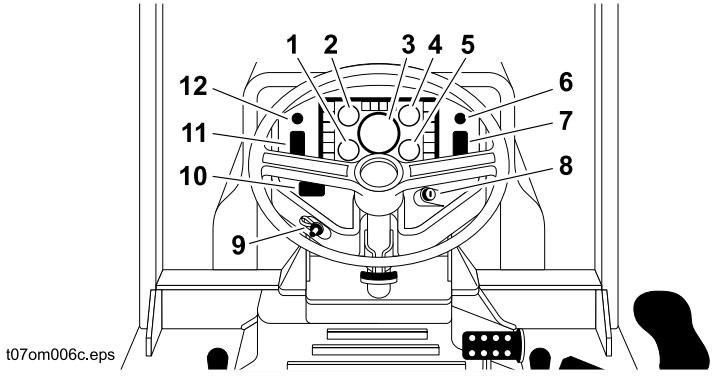
Two backhoes are available, the A720 with 91 inch (2. m) digging depth, and the A920 with 109 inch (2.7 m) digging depth. Both backhoes feature bucket widths of 12 to 24 in (305 to 610 mm).

Finally, the RC115 reel carrier is designed to carry 2500 lb (1130 kg) reels. Maximum reel diameter is 84 in (2.1 m).

For the purposes of this manual, we define tractor as a self-propelled wheeled machine, having rear- and/or front-mounted equipment, primarily designed to produce a trench in a continuous operation, through motion of the machine; the attachment can be a digging chain, wheel, plow blade, or similar item.

CONTROLS

CONTROL CONSOLE OVERVIEW

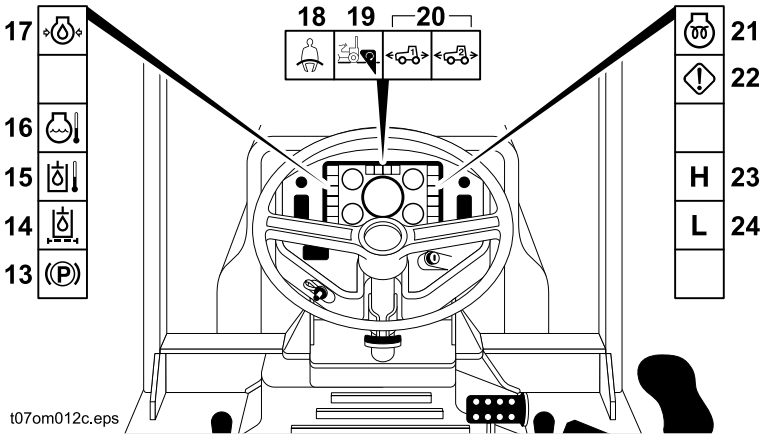


1. Fuel gauge
2. Voltmeter
3. Tachometer/hourmeter
4. Coolant temperature gauge
5. Engine oil pressure gauge
6. Horn
7. Drilling attachment control*
8. Ignition switch
9. Auxiliary power outlet
10. Hydraulic motor control
11. Reel carrier control**
12. Shutdown override control

*See **DRILLING ATTACHMENT** for description of this control.

See **PLOW ATTACHMENT for description of this control.

CONTROL CONSOLE OVERVIEW

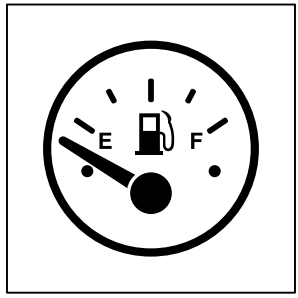


13. Parking brake indicator
14. Hydraulic filter restriction indicator
15. Hydraulic fluid temperature indicator
16. Coolant temperature indicator
17. Engine oil pressure indicator
18. Operator presence indicator
19. Attachment speed/ direction indicator
20. Ground drive indicators
21. Cold start wait indicator
22. Operator alert indicator
23. High speed indicator
24. Low speed indicator

CONTROL CONSOLE DESCRIPTIONS

Fuel Gauge

This gauge indicates fuel level in tank. Use only #2 diesel fuel.



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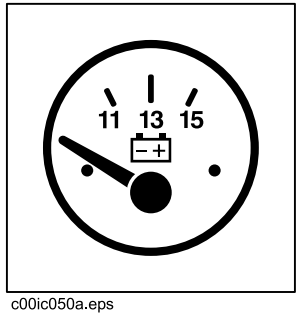
Voltmeter

This gauge displays electric system voltage. Reading should show 12 to 15 volts with engine running. If not, stop engine and investigate.



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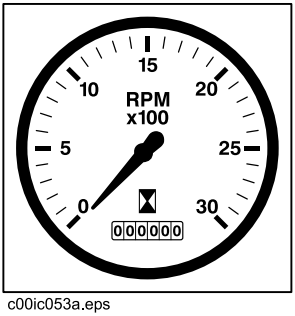
Tachometer/Hourmeter

This gauge displays engine rpm and records engine operating time. Use to schedule tractor service.



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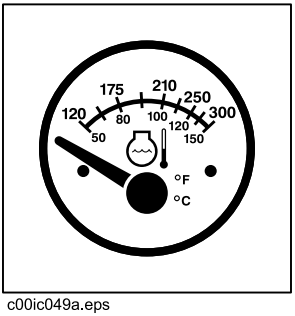
Coolant Temperature Gauge

This gauge displays cooling system coolant temperature. Normal coolant temperature is 180°-220° F (82°-104° C).

Coolant temperature indicator will light and alarm will sound if coolant temperature is high.



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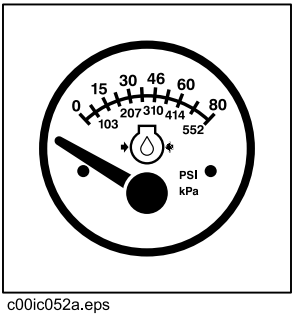
If temperature is high:

- Turn off engine and let cool.
- Check cooling system for low fluid level, seal damage, or leaks.

Engine Oil Pressure Gauge



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This gauge shows oil pressure. Normal operating pressure is 15-50 psi (105-345 kPa).

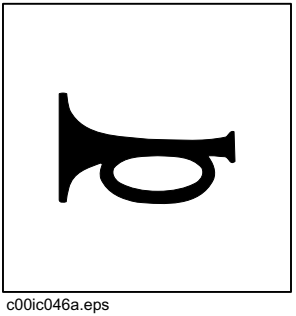
Engine oil pressure indicator will light and alarm will sound if engine oil pressure is low.

If pressure is low:

- Check oil level.
- If pressure is still low, consult *Engine Manual*.

Horn

Press button to sound horn.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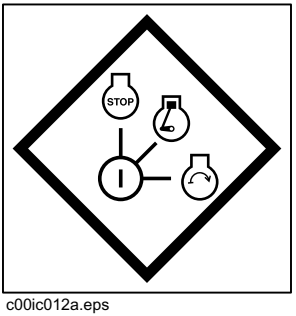
Ignition Switch



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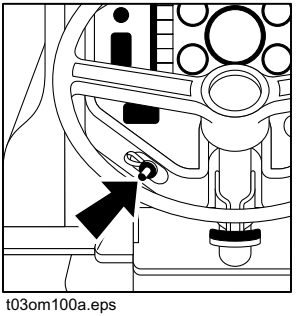
This three-position switch starts or stops engine.

- Insert key and turn all the way clockwise to start engine.
- Release when engine starts.
- Key will return to on position.
- Turn counterclockwise to stop engine.

If engine does not start on first attempt, check that all interlock requirements have been met, return switch to stop position, and try again.

Auxiliary Power Outlet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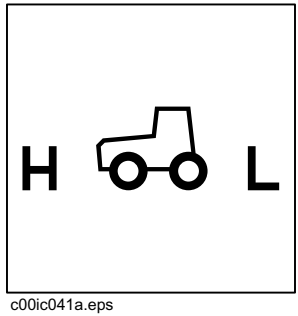
This outlet can be used to provide power for other equipment.

Power output is 12 volts, 5 amps.

Hydraulic Motor Control



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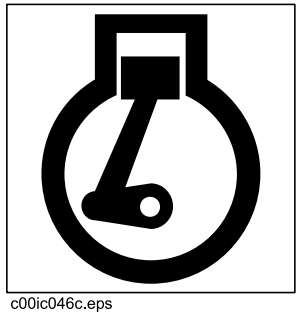
This switch allows operator to select high or low hydraulic motor speed.

- Press left to select high speed. High speed indicator will light.
- Press right to select low speed. Low speed indicator will light.

Shutdown Override Control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This control allows a tempoary override of engine shutdown.

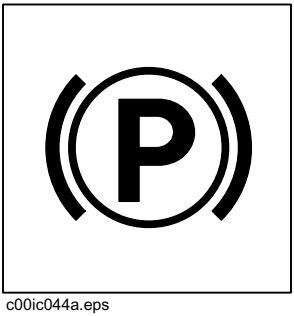
- Press to delay engine shut down for 30 seconds after cycling ignition switch to OFF.
- After 30 seconds, engine will again shut down unless fault condition has been cleared on diagnostic gauge.

IMPORTANT: For more information about the diagnostic system and trouble codes see "Tier 2 System Overview" in **SERVICE.**

Parking Brake Indicator

This indicator lights when parking brake is engaged.

Tractor will not move when parking brake is engaged.



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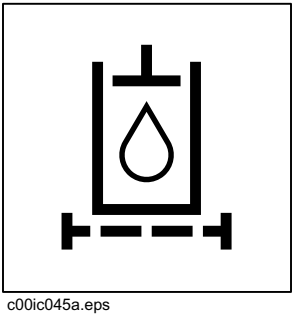
Hydraulic Filter Restriction Indicator

This indicator lights when hydraulic filter is restricted.

Will also light in cold weather. Run tractor at low engine rpm until hyraulic fluid warms.

Indicator will turn off after hydraulic fluid warms.

Change filter when indicator lights.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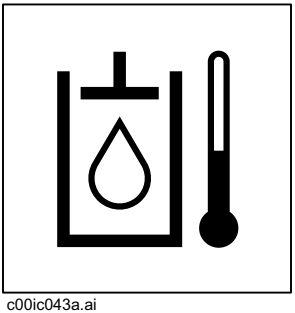
Hydraulic Fluid Temperature Indicator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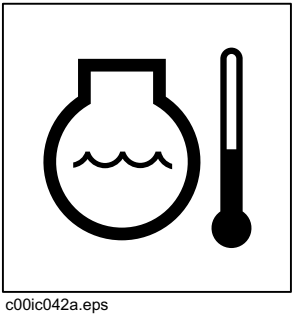
This indicator lights and alarm sounds if hydraulic fluid overheats.

If temperature is high:

- Turn off engine and let cool.
- Check hydraulic fluid level.
- Check front of hydraulic fluid cooler for debris.

Coolant Temperature Indicator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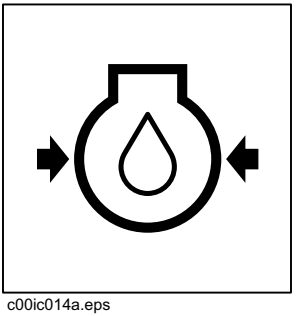
This indicator lights and alarm sounds if cooling system coolant overheats.

If temperature is high:

- Turn off engine and let cool.
- Check cooling system for low fluid level, dirty radiator, or leaks.

Engine Oil Pressure Indicator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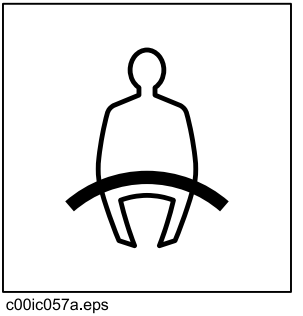
This indicator lights and alarm sounds when oil pressure is low. Light will come on briefly when engine is started.

If light remains on:

- Turn off engine.
- Check oil level.
- If pressure is still low, consult *Engine Manual***.**

Operator Presence Indicator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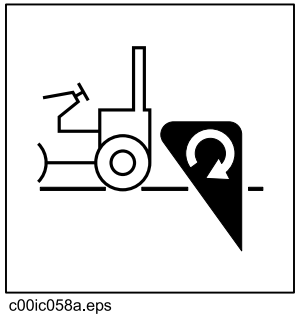
This indicator lights when operator is in seat. This indicator is part of the start interlock system.

IMPORTANT: All four start interlock indicators must be on to start engine.

Attachment Speed/Direction Indicator

This indicator lights when attachment speed/direction control is in neutral. This indicator is part of the start interlock system.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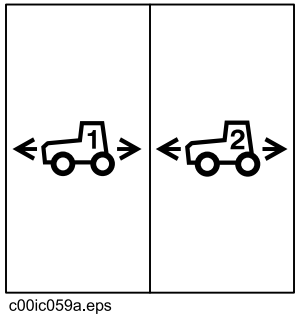
IMPORTANT: All four start interlock indicators must be on to start engine.

Ground Drive Indicators

These indicators light when ground drive control is in neutral. These indicators are part of the start interlock system.



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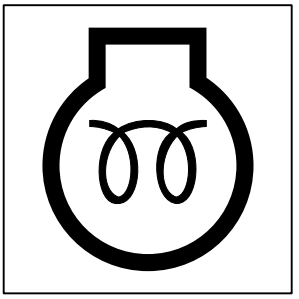
Note: Both indicators are on at the same time.

Cold Start Wait Indicator

This indicator lights when intake air pre-heater is operating.

If lamp is on, wait until lamp goes out before starting engine.



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IMPORTANT:

- If ignition key is turned to START before wait lamp goes out, the system is disabled and must be reset.
- Turn ignition key to OFF, then to RUN to reset.

Operator Alert Indicator


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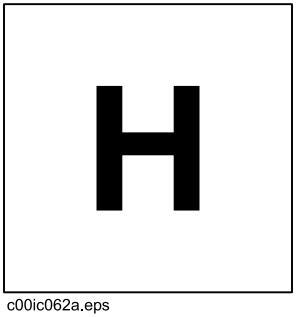
This indicator alerts operator to Tier 2 engine fault conditions.

- Light flashes when a "warning" fault is present.
- Light is steady when "engine shutdown" fault is present.

IMPORTANT: For more information about the diagnostic system and trouble codes see "Tier 2 System Overview" in **SERVICE**.

High Speed Indicator



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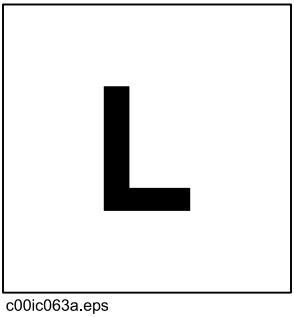
This indicator lights when hydraulic motor is in high speed.

Low Speed Indicator

This indicator lights when hydraulic motor is in low speed.



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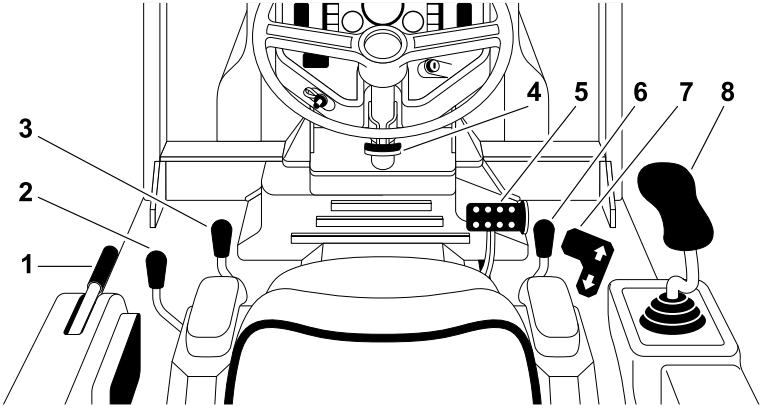
DRIVE POSITION OVERVIEW



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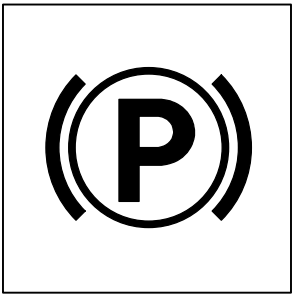
1. Parking brake
2. Gearbox control
3. Attachment speed/ direction control
4. Steering wheel column tilt control
5. Service brake
6. Ground drive hand control
7. Ground drive foot control
8. Backfill blade control

DRIVE POSITION DESCRIPTIONS

Parking Brake (orange)

This lever controls parking brake.

- Push to release.
- Pull to set.



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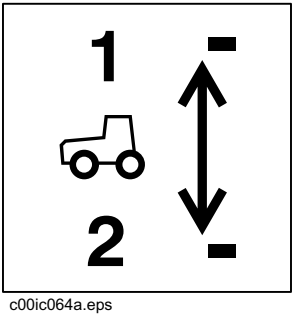
Gearbox Control (yellow)

This lever allows operator to select high or low gearbox setting.

- Move forward to 1 to select low.
- Move back to 2 to select high.



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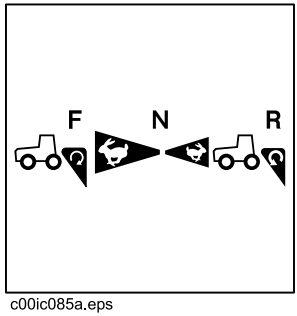
IMPORTANT: Stop tractor before changing gearbox settings.

Attachment Speed/Direction Control (yellow)



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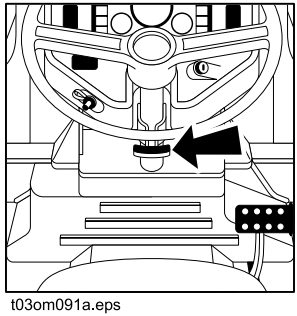
This lever controls rear attachment speed and direction.

- Push to rotate forward or to start plow vibrator box.
- Pull to rotate backward.
- To go faster in either direction, move control farther from neutral position.
- To stop, move control to neutral position.

Steering Wheel Column Tilt Control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This lever controls the tilt of steering wheel column.

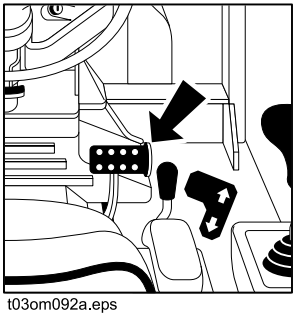
- Pull to adjust steering wheel column tilt.
- Release to secure steering wheel column tilt.

IMPORTANT: Tilt steering wheel column up before pivoting operator's seat.

Service Brake

This pedal stops tractor.

- Press to stop tractor.
- Release to move tractor.



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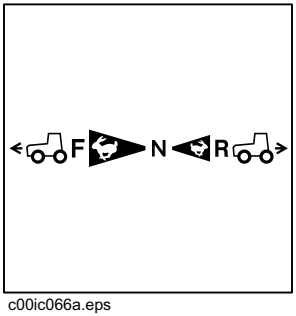
Ground Drive Hand Control (orange)

This lever controls unit speed and direction.

- Push to go forward.
- Pull to go backward.
- To go faster in either direction, move farther from neutral.
- To stop, return to neutral.



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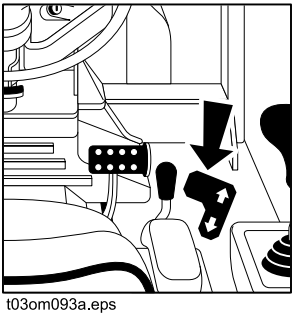
Ground Drive Foot Control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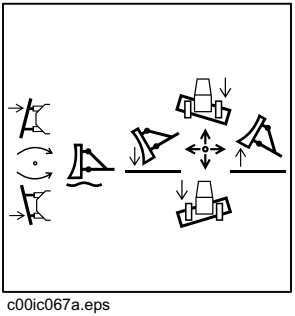
This pedal controls forward or backward tractor movement.

- Press top to increase forward speed.
- Press bottom increase reverse speed.
- Release to reduce speed in either direction.

Backfill Blade Control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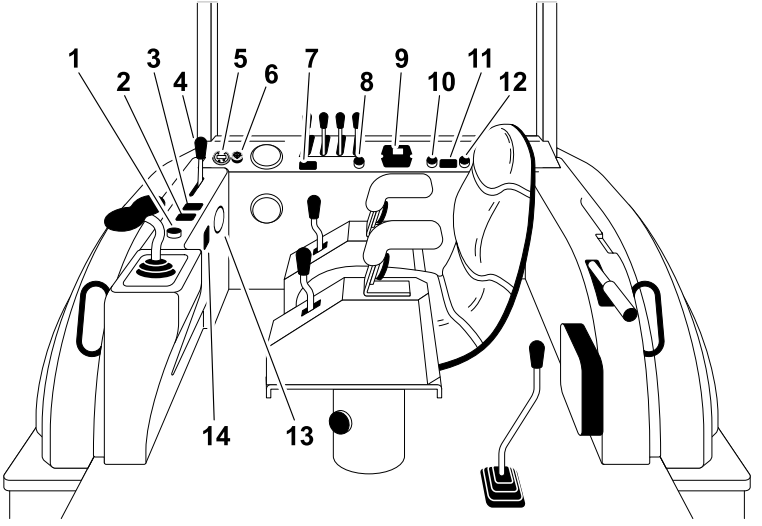
This lever raises, lowers, tilts and angles backfill blade.

- Move forward to lower blade.
- Move forward to end to float.
- Move backward to raise blade.
- Move right to tilt right side of blade down.
- Move left to tilt left side of blade down.
- Twist left to angle blade left.
- Twist right to angle blade right.

WORK POSITION OVERVIEW



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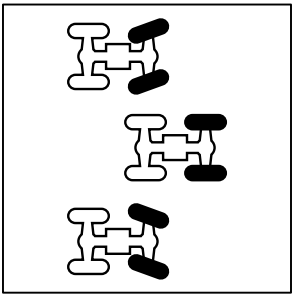
1. Rear steer adjustment selector*
2. Steer select control*
3. Frame tilt control*
4. Throttle
5. Diagnostic gauge
6. Diagnostic connector
7. Cruise control selector*
8. Cruise control selector*
9. Trench Depth Meter*
10. Fan speed control selector*
11. Air conditioning control*
12. Climate control selector*
13. Auxiliary circuit pressure gauge
14. Axle lock control

*optional

WORK POSITION DESCRIPTIONS

Rear Steer Adjustment Selector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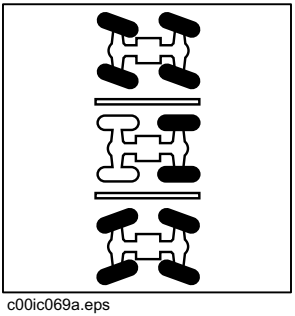
This optional knob turns rear tires to right or left. Arrow indicates direction of tires.

- Turn knob counterclockwise to turn wheels to left.
- Center knob to turn wheels straight.
- Turn knob clockwise to turn wheels to right.

IMPORTANT: Steer select control must be in the center position for rear steer to work.

Steer Select Control


c00ic069a.eps

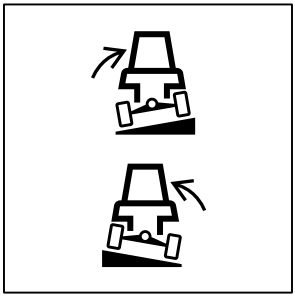
This optional switch selects between crab, rear, and coordinated steering.

- Press top to select crab steering.
- Move switch to center to select rear steering.
- Press bottom to select coordinated steering.

Frame Tilt Control

This optional switch tilts frame left or right.

- Press right side to tilt right.
- Press left side to tilt left.

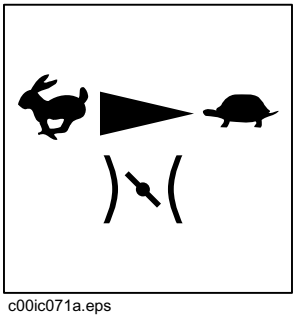


c00ic070a.eps

Throttle (orange)

This lever controls engine speed.

- Move left to increase speed.
- Move right to reduce speed.



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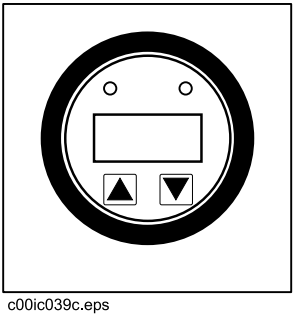
Diagnostic Gauge

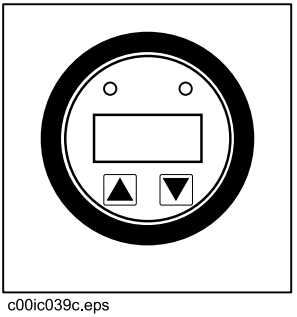

c00ic039c.eps

This gauge displays Tier 2 engine data parameters and diagnostic trouble codes.

The two types of trouble codes are:

- SRVCCODE - an active code indicating that a fault is occurring now.
- STORCODE - indicates a fault has previously occurred and is stored in memory.

To display codes:


c00ic039c.eps

1. Press the up or down arrow to scroll through the gauge parameters until SRVCCODE or STORCODE is displayed.
2. Press and hold the up and down arrows at the same time. A two-line code will display.
3. Press the up or down arrow to scroll through all active or stored codes.

IMPORTANT: For more information about the diagnostic system and trouble codes procedures see "Troubleshooting" in the Repair Guide.

To clear active (SRVCCODE) codes:

1. Turn ignition switch off.
2. Turn ignition switch back on.

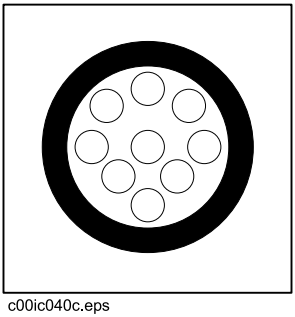
To clear stored (STORCODE) codes:

1. Turn ignition switch on, engine off.
2. Press and hold the up and down arrows at the same time until display reads ********** (approximately 8 seconds).
3. Immediately press and hold the down arrow until the display reads **Send DM3**.
4. Turn ignition switch to STOP, then back on.

IMPORTANT: For more information about the diagnostic system and trouble codes see "Tier 2 System Overview" in **SERVICE**.

Diagnostic Connector

This connector allows manual reading of diagnostic codes.



c00ic040c.eps

IMPORTANT: For more information about the diagnostic system and trouble codes see "Tier 2 System Overview" in **SERVICE**.

Cruise Control Selector

This optional switch activates the cruise control feature.

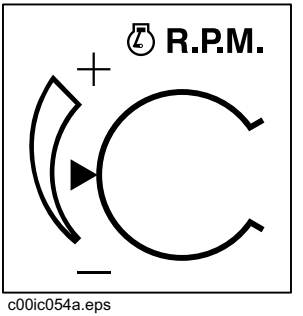
- Press right to turn on.
- Press left to turn off.

Only select cruise control when:

- Gearbox control is in low.
- Hydraulic motor switch is set at low.
- Ground drive is in neutral.

c00ic055a.eps

Cruise Control RPM Selector

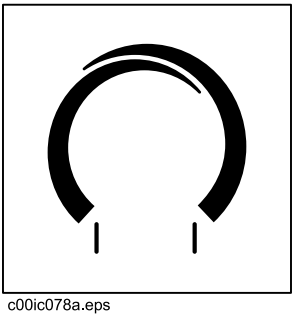


c00ic054a.eps

This optional control adjusts engine rpm.

- Turn knob clockwise to increase engine rpm. This typically decreases ground speed.
- Turn knob counterclockwise to decrease engine rpm. This typically increases ground speed.

Climate Control Selector


c00ic078a.eps

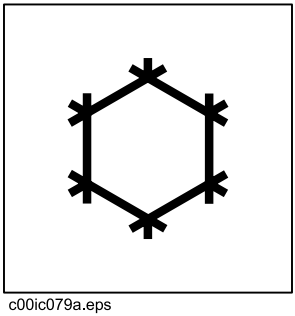
This optional knob selects cab air conditioning or heat temperature.

- Turn knob clockwise to increase heater temperature.
- Turn knob counterclockwise to lower air conditioning temperature.

Air Conditioning Control

This optional switch activates cab air conditioning.

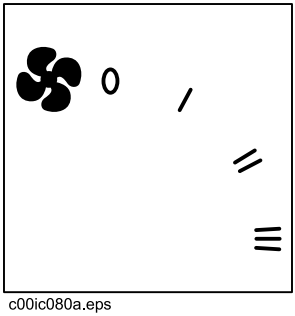
- Press top to turn air conditioning on.
- Press bottom to turn air conditioning off.


c00ic079a.eps

Climate Control Fan Speed Selector

This optional knob controls fan speed when air conditioning is on.

- Turn knob clockwise for high speed.
- Turn knob counterclockwise for low speed.



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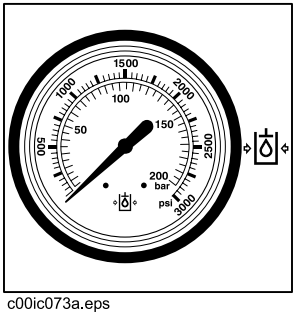
Auxiliary Circuit Pressure Gauge

This gauge displays auxiliary system pressure. Maximum operating pressure is 2500 psi (172 bar).



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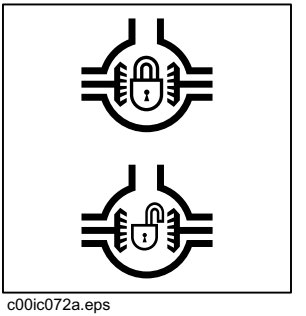
Axle Lock Control

This switch locks rear axle.

- Press top to lock axle.
- Press bottom to unlock axle.



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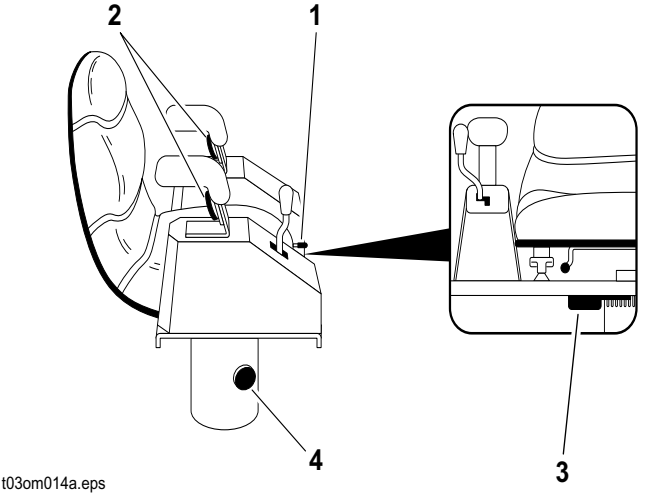
IMPORTANT: After pressing switch to unlock axle, move tractor 6’ (2 m) in reverse to unlock.

SEAT ADJUSTMENT OVERVIEW



1. Seat slide control
2. Armrest adjustment control
3. Seat pivot control
4. Seat height adjustment lock (located on opposite side)

SEAT ADJUSTMENT DESCRIPTIONS

Seat Slide Control

This control slides operator's seat forward or backward.

Armrest Adjustment Control

These controls raise and lower armrests.

To adjust:

- Remove knob.
- Adjust armrest to desired position.
- Replace knob.

Seat Pivot Control

This control allows operator's seat to be turned to a range of 0 to 90 degrees.

- Pull to pivot seat to the right into work position.
- Release to lock in position.
- Swing operator's seat to the left to return to drive position.

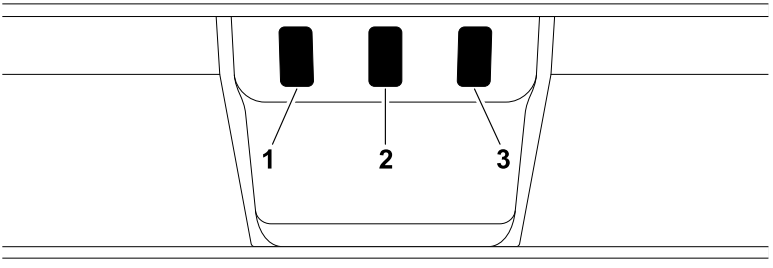
IMPORTANT: Drive tractor with operator's seat facing front. Operate rear attachments with seat pivoted to work position.

Seat Height Adjustment Lock

This control locks seat height.

- Rotate clockwise to lock seat height.
- Rotate counterclockwise to unlock seat height.

OVERHEAD CONSOLE OVERVIEW



t03om095a.eps

1. Windshield wiper switch*
2. Warning flasher switch*
3. Light switch*

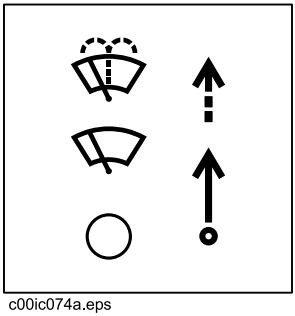
*optional

OVERHEAD CONSOLE DESCRIPTIONS

Windshield Wiper Switch

This optional switch controls windshield wipers.

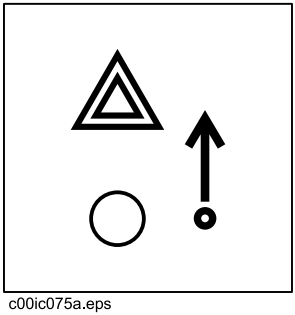
- Press top to turn on.
- Press top to end to wash windshield.
- Press bottom to turn off.


c00ic074a.eps

Warning Flasher Switch

This optional switch controls warning flashers.

- Press top to turn on.
- Press bottom to turn off.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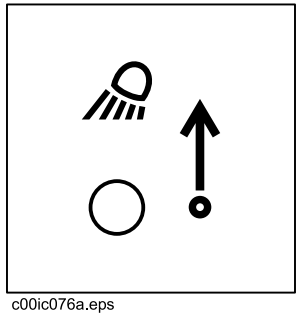
Light Switch

This optional switch controls lights.

- Press top to turn on.
- Press bottom to turn off.



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SAFETY

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.

ACCESSORIES

Fire Extinguisher

If required, a fire extinguisher should be mounted 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.

Lighting Kit

If you need additional light, plug lighting kit into provided outlet. Contact your Ditch Witch dealer for further information.

UNDERGROUND HAZARDS

Striking underground hazards can cause explosion, electrocution, fire, and exposure to hazardous materials.

Hazards include:

- Electric lines
- Natural gas lines
- Fiber optic cables
- Water lines
- Sewer lines
- Pipes carrying other chemicals, liquids, or gases
- Storage tanks

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.

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.
- 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.

JOBSITE CLASSIFICATION

Inspecting 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.

Selecting a Classification

Jobsites are classified according to underground hazards present.

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

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

Applying 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.

SAFETY ALERT CLASSIFICATIONS

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

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

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

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

⚠ CAUTION 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.

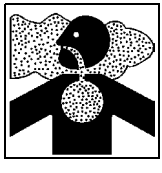
IMPORTANT can help you do a better job or make your job easier in some way.

SAFETY ALERTS

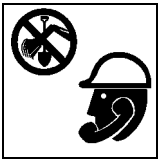
⚠ DANGER Moving digging teeth will kill you or cut off arm or leg. Stay away.

⚠ 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.

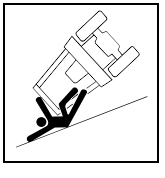



⚠WARNING Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.


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

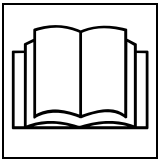

⚠WARNING Moving parts could cut off hand or foot. Stay away.

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

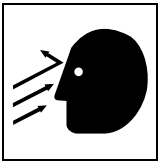


⚠WARNING Rollover possible. If machine rolls over, you could be thrown from seat and killed or crushed. Wear seat belt.

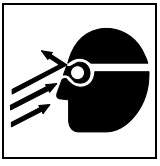
⚠WARNING Explosion possible. Serious injury or equipment damage could occur. Follow directions carefully.



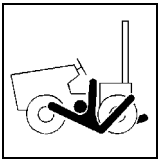
⚠WARNING Incorrect procedures could result in death, injury, or property damage. Learn to use equipment correctly.



⚠WARNING 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.

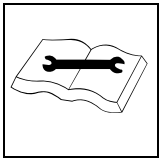


⚠WARNING Runaway possible. Machine could run over you or others. Learn how to use all controls. Start and operate only from operator's position.

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

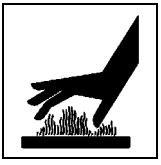
⚠ WARNING Moving traffic - hazardous situation. Death or serious injury could result. Avoid moving vehicles, wear high visibility clothing, post appropriate warning signs.

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



⚠ 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.

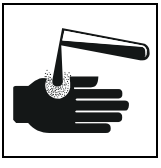
⚠ CAUTION Flying objects may cause injury. Wear hard hat and safety glasses.



⚠ 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).

TRACTOR

DAILY INSPECTION

For safe and efficient use of your machine, do the following before each day's work.

- Check general appearance of tractor and attachments. Look for loose, worn, or damaged parts and fluid leaks.
- Check condition of all wear items such as brake pads and disc, fan belts and light bulbs. Check condition of attachment wear items.
- Check fuel level.
- Check that all signs, guards, and shields are in place and readable.

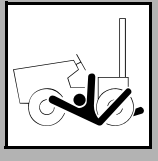
Service machine according to schedules in **SERVICE** and in engine manufacturer's guide.

START UP

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

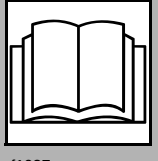
WARNING Explosion possible. Serious injury or equipment damage could occur. Follow directions carefully.

NOTICE: Do not use ether as a starting aid on this engine. Ether may damage engine and cause explosion.



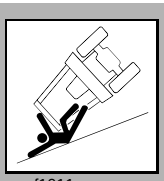
sf1008

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



sf1027

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


sf1011

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

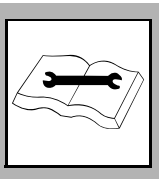
NOTICE:

- 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.

1. Fasten and adjust seatbelt.
2. Check that ground drive control and attachment speed/ direction control are in neutral.
3. Move throttle to idle.
4. Check that parking brake is engaged.

5. Turn ignition switch to start tractor. Warning alarm will sound. Indicators will light.

If engine does not crank, check start interlock display. See **CONTROLS** for start interlock information. If engine turns but does not start within 10 seconds, allow starter to cool before trying to start again.



sf1020

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 **CONTROLS** for start interlock information.

6. Run engine at half-throttle or less for five minutes before operating tractor.

   During warm-up, check that all controls work properly.

OPERATION

EMERGENCY SHUTDOWN: Turn ignition switch to STOP.

1. Turn on lights and warning flasher, as needed.
2. Tilt steering wheel column down.
3. Raise backfill blade and all attachments.
4. Release parking brake and verify parking brake indicator is off.
5. Move gearbox control to 2 (high).
6. Adjust throttle.
7. Move ground drive control to forward or reverse.

sf1001

⚠ 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.

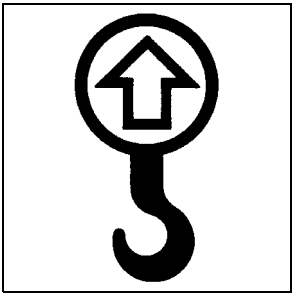
SHUTDOWN

1. When job is complete, move ground drive control to neutral.
2. Tilt steering wheel column up.
3. Engage parking brake and verify parking brake indicator is on.
4. Lower all attachments to ground.
5. Move throttle to idle for 3 minutes to cool.
6. Turn ignition switch to STOP. If leaving machine unattended, remove key.
7. For maintenance or long-term storage, turn battery disconnect switch to disconnect position.

NOTICE: To prevent damage to turbocharger, do not shut down engine at full throttle or under load. Should engine die, immediately remove load and restart engine.

TRANSPORTATION

LIFT

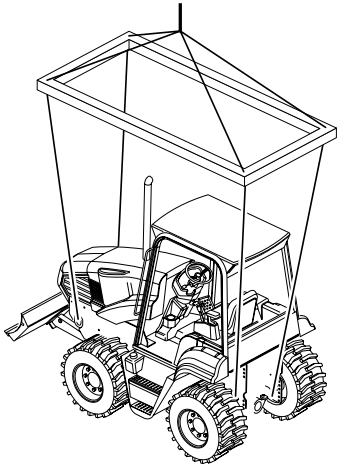


Lifting Points

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

Tractor

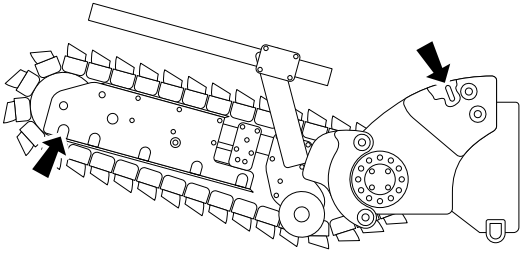
Before lifting, check **SPECIFICATIONS**. Use a hoist capable of supporting equipment's size and weight. Do not attempt to lift tractor with attachments installed.



t03om016a.eps

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

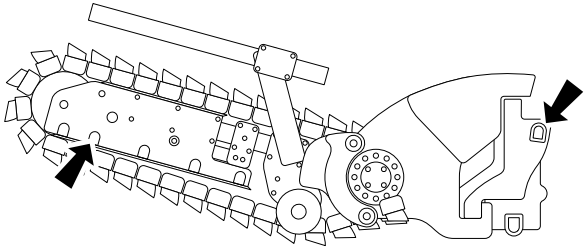
Centerline Trencher



t03om082a.eps

Before lifting, check **SPECIFICATIONS**. Use a hoist capable of supporting equipment's size and weight.

Traversing Trencher



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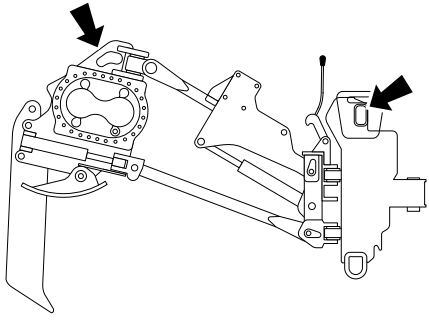
Before lifting, check **SPECIFICATIONS**. Use a hoist capable of supporting equipment's size and weight.

Plow



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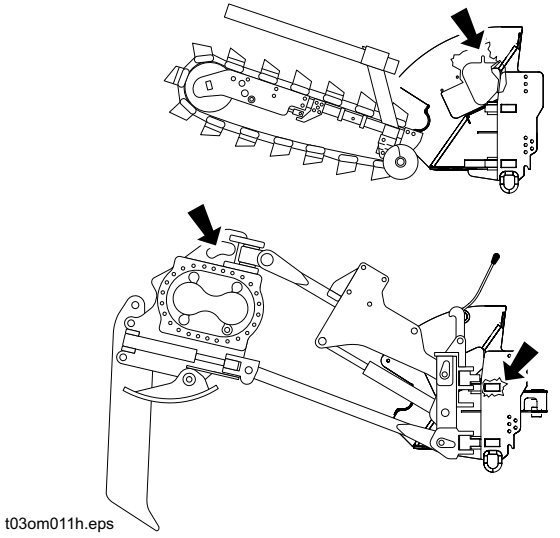
Before lifting, check **SPECIFICATIONS**. Use a hoist capable of supporting equipment's size and weight.

Combo



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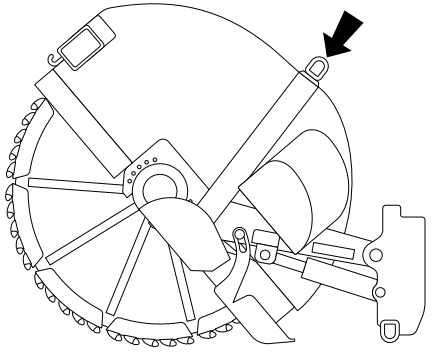
Before lifting, check **SPECIFICATIONS**. Use a hoist capable of supporting equipment's size and weight.

Saw



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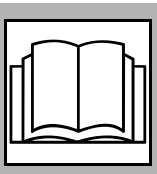
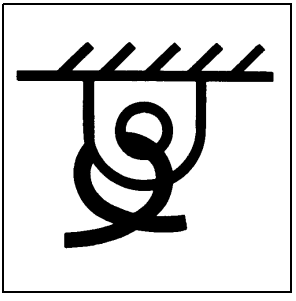
Before lifting, check **SPECIFICATIONS**. Use a hoist capable of supporting equipment's size and weight.

TIEDOWN



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

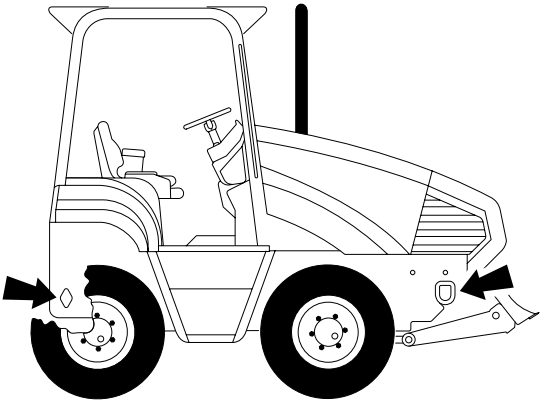
Tiedown Points



Tiedown points are identified by tiedown decals. Securing unit to trailer at any other points may be unsafe and can damage machinery.

Tractor

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



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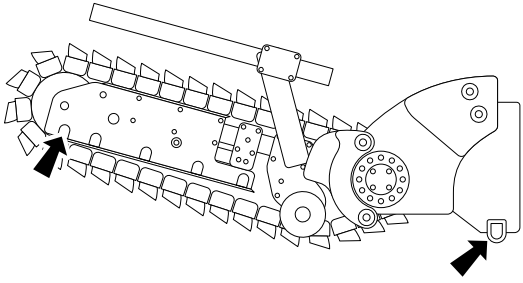
Centerline Trencher



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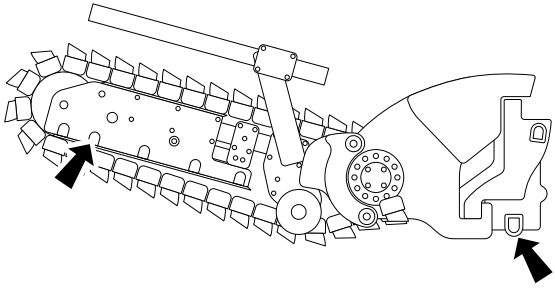
Lower trencher to trailer and tie down at attachment frame and through boom.

Traversing Trencher

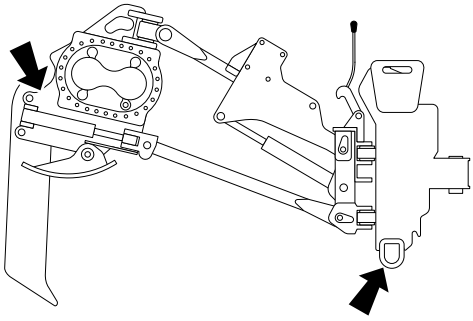


t03om089a.eps

Lower trencher to trailer and tie down at attachment frame and through boom.

IMPORTANT: If trencher is equipped with a trench cleaner, ensure that trench cleaner shoe is fully up and extra bolt (found in operator's manual compartment) is installed in appropriate hole for additional support.

Plow



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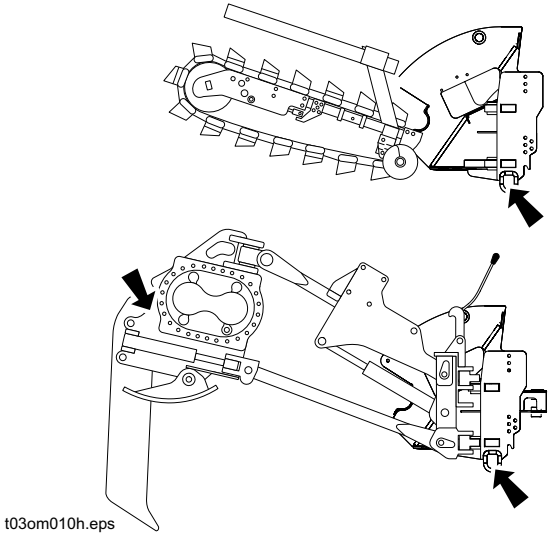
Lower plow to trailer and tie down at attachment frame and vibrator box.

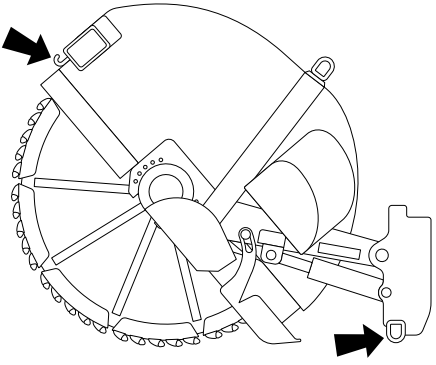
NOTICE: Unsecured plow can swing outside the trailer and become a traffic hazard. Lower plow and chain to trailer before hauling.

Combo



Lower trencher and plow to trailer and tie down at attachment frame and plow vibrator box.

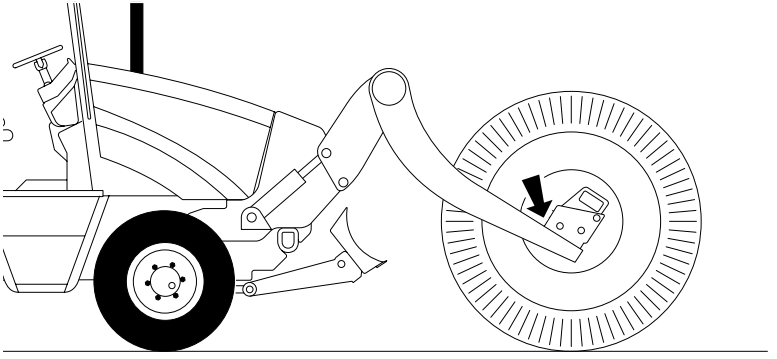
Saw



t03om085a.eps

Lower saw to trailer and tie down at attachment frame and at hook on rear of saw.

Reel Carrier



t03om104a.eps

Lower reel carrier to trailer and tie down at attachment arms.

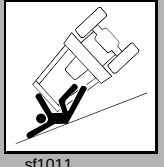
HAUL

sf1014

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

NOTICE:

- Read trailer operator's manual before loading or transporting your machine. Incorrectly loaded machine can slip or cause trailer sway.
- Park, load, and unload trailer on a level part of jobsite.Check that unit and trailer do not exceed size or weight regulations.



sf1011

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

Loading

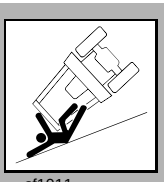
1. Fasten and adjust seatbelt.
2. Tilt steering wheel column down.
3. Start tractor. See **TRACTOR** for proper start-up procedures.
4. Raise attachments, but keep them low.
5. Move attachments to center position and check that they are not in float.
6. Release parking brake and verify parking brake indicator is off.

7. Move hydraulic motor switch to low.
8. Move gearbox control to 1 (low).
9. Slowly drive tractor onto trailer until tie-down position is reached.
10. Engage parking brake and verify that parking brake indicator is on.
11. Lower attachments to trailer bed and turn tractor off. See **TRACTOR** for proper shutdown procedures.
12. Chain tractor and attachments to trailer using tie-downs.

NOTICE: Check that unit does not exceed trailer size or weight regulations.

Unloading

1. Check that parking brake is engaged and verify that parking brake indicator is on.
2. Check that ground drive control is in neutral.
3. Remove tiedowns.
4. Fasten and adjust seatbelt.
5. Tilt steering wheel column down.
6. Start tractor. See **TRACTOR** for proper start-up procedures.

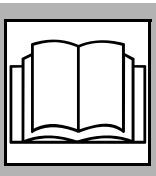

sf1011

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

NOTICE: Stability is reduced with attachment in offset position.

7. Raise attachments, but keep them low and centered.
8. Release parking brake and verify that parking brake indicator is off.
9. Slowly back tractor off trailer.

TOW



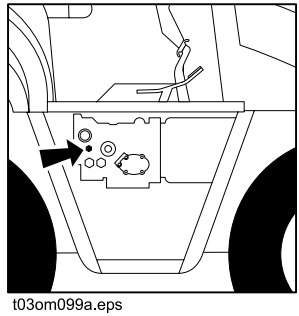
WARNING Incorrect procedures could result in death, injury, or property damage. Learn to use equipment correctly.

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

- Tow at less than 1 mph (1.6 km/h).
- Do not tow for more than 200 yd (180 m).
- Steering will be very difficult.

Procedure

1. Engage parking brake.
2. Attach tow line to all available tie-down points facing towing vehicle.
3. Block front and rear tires to prevent unit from rolling.
4. Activate the tow valve.
   - Remove floor plate.
   - Turn tow valve counterclockwise two complete times.
   - Replace floor plate.



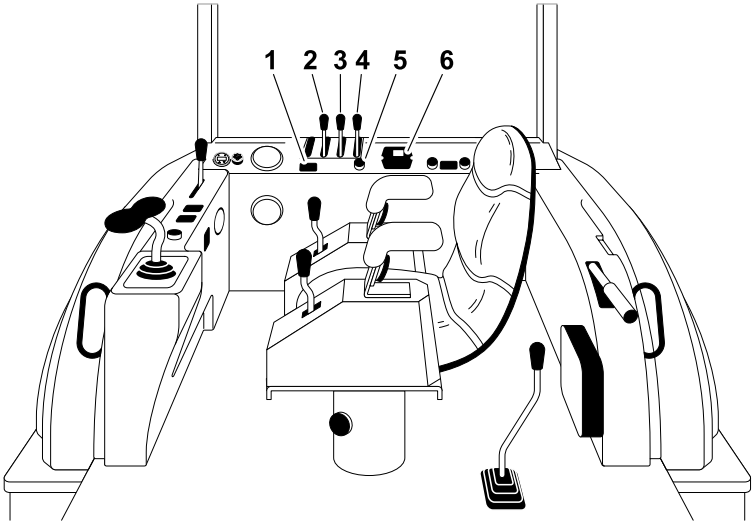
t03om099a.eps

NOTICE: Do not turn tow valve more than two times.

5. Fasten seatbelt and adjust seatbelt.
6. Remove blocks.
7. Disengage parking brake.
8. Use service brake to control unit.
9. After towing, turn tow valve clockwise two complete times.

TRENCHER ATTACHMENT

TRENCHER CONTROLS OVERVIEW



t07om013c.eps

1. Cruise control selector*
2. Trencher slide control
3. Trench cleaner lift control*
4. Boom lift control
5. Cruise control RPM control*
6. Trench Depth Meter*

*optional

TRENCHER CONTROL DESCRIPTIONS

Cruise Control Selector

c00ic055a.eps

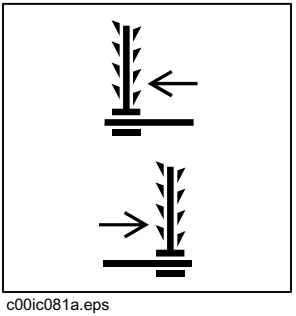
This optional switch activates the cruise control feature.

- Press right to turn on.
- Press left to turn off.

Only select cruise control when:

- gearbox control is in low
- hydraulic motor switch is set at low
- ground drive is in neutral.

Trencher Slide Control


c00ic081a.eps

This lever controls trencher slide.

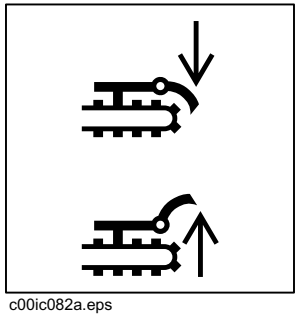
- Push to move trencher to right.
- Pull to move trencher to left.

IMPORTANT: If slide sticks, lower trencher to ground, operate trencher slide until trencher moves slightly, raise trencher, and slide it to position.

Trench Cleaner Lift Control

This optional lever raises or lowers trench cleaner.

- Push to lower
- Pull to raise.



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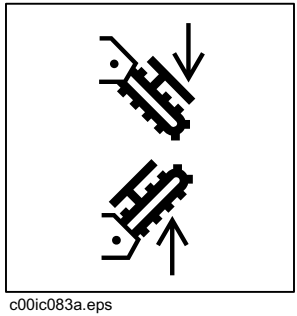
Boom Lift Control

This lever raises or lowers digging boom.

- Push to lower.
- Pull to raise.



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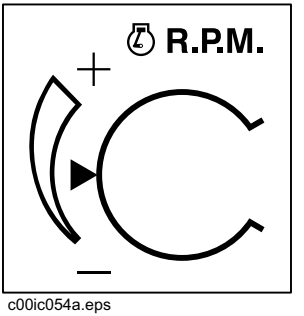
Cruise Control RPM Control



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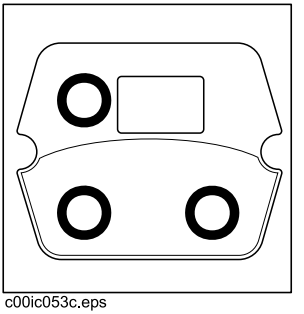
This optional control adjusts engine rpm.

- Turn clockwise to increase engine rpm. This typically decreases ground speed temporarily.
- Turn counterclockwise to decrease engine rpm. This typically increases ground speed temporarily.

Trench Depth Meter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Trench Depth Meter (TDM) is an optional electronic system for measuring and recording trench depth. TDM also displays productivity and distance while trenching. Two lines of information are displayed on the LED screen. If the system detects error conditions, diagnostic codes will be displayed on the second line.

IMPORTANT: For more information about TDM see the TDM Operator Manual (p/n 054-117).

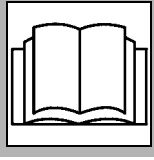
SETUP

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.

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.

1. Fasten and adjust seat belt.
2. Start tractor. See **TRACTOR** start-up procedures.
3. Drive to starting point. Move in line with planned trench. See **TRACTOR** for operating procedures.
4. Engage parking brake and verify parking brake indicator is on.
5. Move gearbox control to 1 (low).
6. Select low hydraulic motor speed.
7. Lower backfill blade.
8. Tilt steering wheel column up.
9. Swivel seat to the work position.
10. Engage axle lock.
11. Lower boom to just above ground.
12. Check that attachment speed/direction control is in neutral.
13. Check that boom is in line with planned trench.

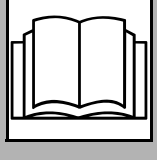
OPERATION

⚠ 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.

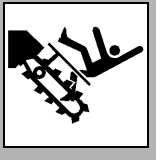


⚠ WARNING Incorrect procedures could result in death, injury, or property damage. Learn to use equipment correctly.

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 and parking brake indicator is on.
- 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.

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.

1. If necessary, adjust throttle to low idle.
2. Move attachment speed/direction control to desired speed. DIGGING CHAIN WILL MOVE.
3. Lift trench cleaner, if equipped.
4. Increase engine speed to full throttle.
5. Slowly lower digging boom to depth.
6. Raise backfill blade.
7. Release parking brake and verify parking brake indicator is off.

8. Move ground drive control to desired speed.
9. If using optional trench cleaner, return ground drive control to neutral when desired trench depth is reached. Raise boom slightly, then lower trench cleaner completely. This ensures trench cleaner will lock in place.

NOTICE:

- Do not have trench cleaner in working position when starting a trench.
- Do not back up with trench cleaner in working position.
- Do not use trench cleaner in conditions where large rocks can get between chain and cleaner.

10. Lower boom to trench depth and push ground drive control forward to trenching speed.
11. When trench is complete, move ground drive control to neutral.
12. Adjust throttle to low idle.
13. Raise boom.
14. As boom clears top of trench, move attachment speed/ direction control to neutral.
15. Swivel seat to the drive position.
16. Tilt steering wheel column down.
17. Drive a short distance away from work site.
18. Disengage axle lock by driving tractor in reverse 6’ (2 m).
19. Shut down tractor. See **TRACTOR** for proper shutdown procedures.

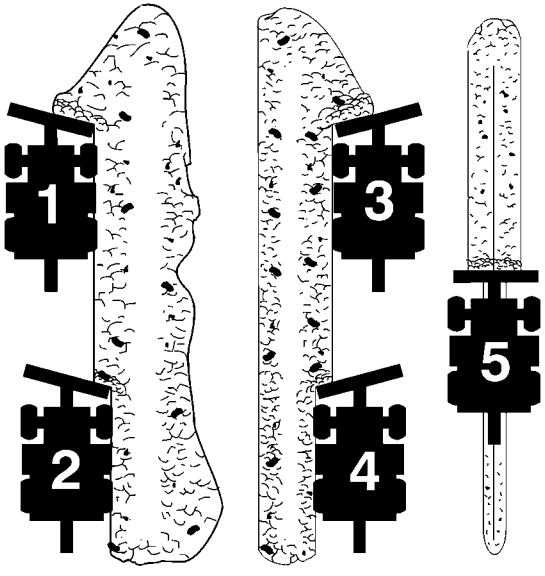
Cruise Control Operation

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.

1. Ensure ground drive control is in neutral.
2. Ensure hydraulic motor switch is in low.
3. Ensure gearbox control is in 1 (low).
4. Ensure cruise control selector is in MANUAL.
5. Ensure that all controls are set as desired.
6. Move cruise control RPM control to arrow at center.
7. Move cruise control selector to AUTO.
8. Following procedures in "Operation," begin trenching to desired depth.
9. When desired depth is reached, ensure throttle is fully open.
10. Slowly move ground drive control to full forward position.
11. Slowly adjust cruise control rpm control to match digging conditions. In harder digging conditions, higher cruise control rpm setting may improve digging performance. In easier digging conditions, lower cruise control rpm setting may increase ground drive speed. See "Operating Tips."
12. When finished digging, move ground drive control to neutral.
13. Move cruise control selector to MANUAL.
14. Allow chain to dig itself free before stopping attachment.

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 over trench.



EMERGENCY SHUTDOWN - Turn ignition switch to STOP.

OPERATING TIPS

- Avoid using badly worn teeth. When replacing teeth, maintain original pattern. Use Ditch Witch replacement teeth.
- Operate engine at full throttle when working.
- Sight along center of hood to a stake driven beyond end of trench line for straight trench.
- Use correct length boom. See your Ditch Witch dealer for more information.
- Do not make sharp turns. Lower boom to full depth when turning.
- If an object becomes lodged in chain, move attachment speed/direction control to neutral and raise boom slightly. Reverse chain direction. If object must be removed manually, turn engine off and engage parking brake.
- When cutting asphalt, start trench in soil at edge of road and use shortest possible boom at full depth.
- Always start trenching with ground drive speed set at low. If soil conditions permit optimum digging at higher ground drive speed, select high.
- Before operating booms equipped with rock chains, check bits for free rotation. Tap bits lightly with a hammer and turn by hand. If bits are stuck, remove and clean packed soil from bit block.
- Carbide bits are recommended for cutting abrasive material, such as sandstone or frozen sands, gravels or asphalts.

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.

OPTIONAL EQUIPMENT

Chain

A variety of chains, teeth, and tooth patterns are available to provide efficient digging at any jobsite. For more information, contact your Ditch Witch dealer.

Trench Cleaner

Trench cleaners remove spoils from trench floor. For more information about trench cleaners, contact your Ditch Witch dealer.

Trench Depth Meter

Trench Depth Meter (TDM) is an optional electronic system for measuring and recording trench depth. TDM also displays productivity and distance while trenching.

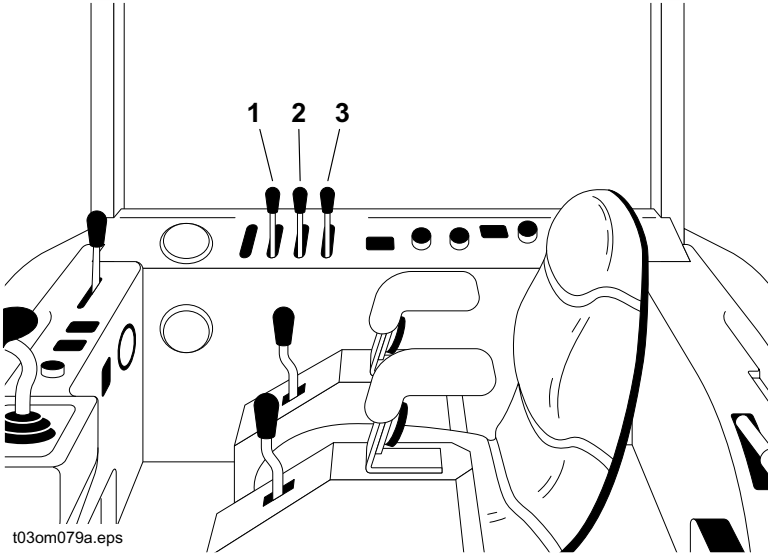
IMPORTANT: For more information about TDM see the TDM Operator Manual (p/n 054-117).

Long Auger Extensions

For conditions that require spoils to be moved farther from the trench, different augers are available. Ask your Ditch Witch dealer about the auger length best suited to your jobsite.

PLOW ATTACHMENT

PLOW CONTROLS OVERVIEW



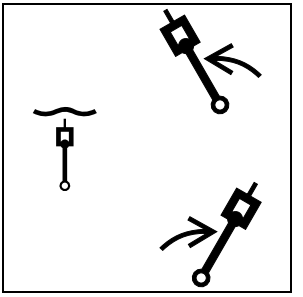
1. Plow swing control
2. Blade position control
3. Plow lift control

PLOW CONTROL DESCRIPTIONS

Plow Swing Control

This lever controls plow swing.

- Pull to swing left.
- Push to swing right.
- Push to end to float.



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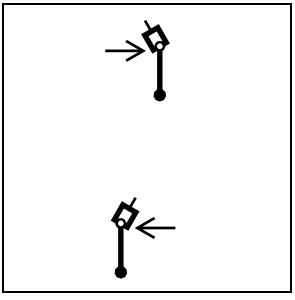
NOTICE:

- If soil conditions allow, operate in float position.
- Lower plow into ground before moving plow swing control to float position.
- Do not raise plow with plow swing contol in float position.

Blade Position

This lever controls plow blade position.

- Pull to steer right.
- Push to steer left.



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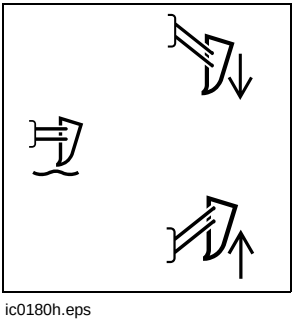
Plow Lift Control

This lever controls plow lift.

- Pull to raise plow.
- Push to lower plow.
- Push to end to float.



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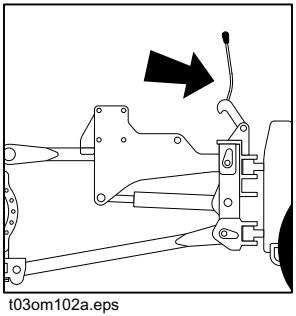
NOTICE:

- If soil conditions allow, operate in float position.
- Lower plow into ground before moving plow swing control to float position.
- Do not raise plow with plow swing contol in float position.

Plow Stow Lock

This lever locks or unlocks plow.

- Lift plow and pull lever to release.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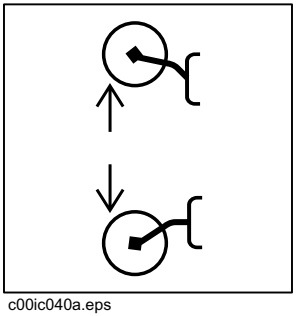
Reel Carrier Control

This optional switch controls reel carrier.

- Press top to raise.
- Press bottom to lower.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NOTICE: Operate reel carrier in the lowest position possible for improved stability and visibility. See **SPECIFICATIONS** for counterweight requirements.

SETUP

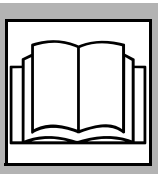
WARNING Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.

NOTICE:

- Plow will swing freely in float.
- Keep everyone at least 6’ (2 m) from machine, attachments, and their range of movement.

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

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.
- Do not operate vibrator unless plow is in ground.

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.

1. Fasten and adjust seat belt.
2. Start tractor. See **TRACTOR** for start-up procedures.
3. Drive to starting point. Move in line with planned trench. See **TRACTOR** for operating procedures.
4. Engage parking brake and verify parking brake indicator is on.
5. Lower backfill blade.
6. Lower plow to starting point of trench.

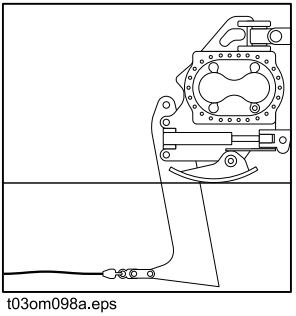
IMPORTANT: Plow blade will go into ground without starting a trench, but using one allows for full-depth starting.

7. Turn ignition switch to STOP.

8. Attach material being pulled or fed.

Pull:

- Insert material into pulling grip.
- Tape grip with duct tape.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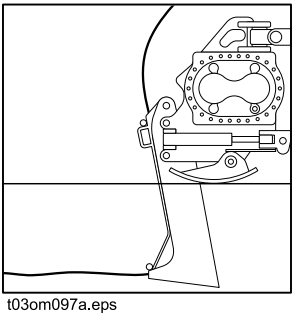
Feed:

- Remove cable guide.
- Feed cable through tube from top to bottom.
- Replace cable guide and tighten fasteners.
- Secure cable.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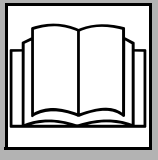
NOTICE: Keep everyone away from material being installed.

OPERATION

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

⚠ 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.
- Do not drive backward with plow in ground.

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.

1. Fasten and adjust seat belt.
2. Start tractor.
3. Adjust throttle to low idle.
4. Check that ground drive control is in neutral.
5. Release parking brake and verify parking brake indicator is off.
6. Move gearbox control to 1 (low).
7. Lower reel carrier to lowest position possible, if equipped.

NOTICE: Use extreme caution when operating reel carrier on sloped surfaces.

8. Raise backfill blade.
9. Tilt steering wheel column up.
10. Swivel seat to the work position.
11. Engage axle lock.
12. Move ground drive control forward to plowing speed and lower plow blade into ground.

NOTICE: Lower plow into ground before moving plow lift control or plow swing control to float.

13. Move plow lift control to float.
14. Move plow swing control to float.
15. Increase engine speed to full throttle.

16. Move attachment speed/direction control to full speed forward. PLOW WILL VIBRATE.
17. Reduce attachment speed to a point with the least tractor vibration and the highest ground drive speed possible without tire slippage.
18. Adjust vibrator speed if ROPS vibrates excessively.
19. When installation is complete, move plow swing to neutral.
20. With vibrator running, raise plow to ground level.

NOTICE: Do not operate vibrator when plow is out of the ground. This will cause excessive vibration resulting in rapid wear, and possible damage to the unit and product being installed.

21. Move attachment speed/direction control to neutral.
22. Swivel seat to the drive position.
23. Engage parking brake and verify parking brake indicator is on.
24. Lower backfill blade.
25. Turn ignition switch to STOP and remove product from plow.
26. Tilt steering wheel column down, start tractor and drive a short distance away from work site.
27. Disengage axle lock by driving tractor in reverse 6’ (2 m).
28. Shut down tractor. See **TRACTOR** for proper shutdown procedures.

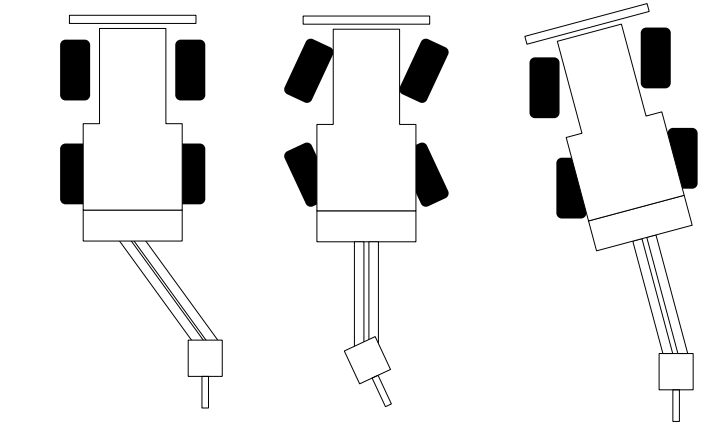
OPERATING TIPS

- If ROPS-attached cable guide is used, it should be a genuine Ditch Witch cable guide manufactured for this purpose.
- If material must be at a constant depth, dig starting and target trenches.
- Check cable for damage during plowing. Run continuity checks on electric cable and check pipe pressure. Damage can result from improper operation, incorrect blade choice, striking underground obstructions, or other conditions.
- Keep sod cutter edge sharp when plowing in areas with heavy grass cover or surface clutter.
- In some soil conditions, changing vibrator weights can improve plow performance. Contact your Ditch Witch dealer for details.

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.

Offset Plowing, Coordinated Plowing and Crabbing

Your Ditch Witch equipment allows you to plow four ways: normal plowing, offset plowing (1), coordinated plowing (2), and crabbing (3).



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NOTICE: Oversteering blade may damage blade or cable.

To offset plow:

Offset plowing can be used to plow next to a road while keeping tires on a more stable surface or in similar conditions.

1. Use plow swing to move plow to planned trench line.
2. Use blade position to position blade parallel to direction of tractor frame.

To coordinate plow:

Coordinated plowing can be used to turn a tight circle around a jobsite obstacle or in similar conditions.

1. Move steer select control to coordinated position.
2. Slowly move tractor forward.
3. Plow as normal.

IMPORTANT: When coordinate plowing, keep plow blade straight or in the same angle position as rear tires.

To crab:

Crab plowing can be used to plow along edge of jobsite or in similar conditions.

1. Move steer select control to crab position.
2. Slowly move tractor forward.
3. Plow as normal.

OPTIONAL EQUIPMENT

Blades

Several blade lengths and types are available. See your authorized Ditch Witch dealer to select the blade right for your needs.

Reel Carrier and Winder

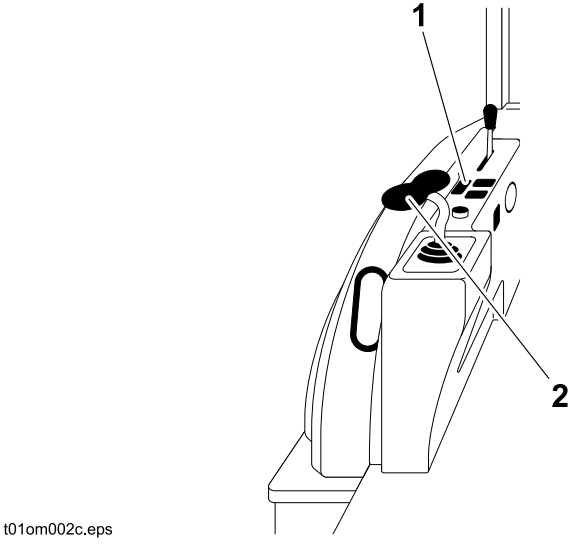
Reel carriers and winders are designed to fit your Ditch Witch equipment and speed cable installation. Contact your Ditch Witch dealer.

Toe or Bullet

Toes (feed blades) stabilize the plow for more constant depth. Bullets (pull blades) allow a larger cavity for the material being installed. To select the toe or bullet for your equipment and jobsite, contact your Ditch Witch dealer.

REEL WINDER ATTACHMENT

REEL WINDER CONTROLS OVERVIEW



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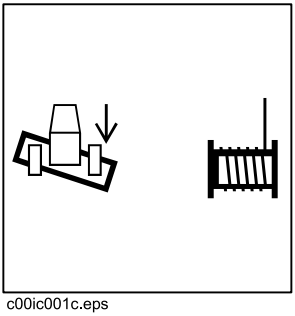
1. Reel winder selector switch
2. Reel winder control

REEL WINDER CONTROL DESCRIPTIONS

Reel Winder Selector Switch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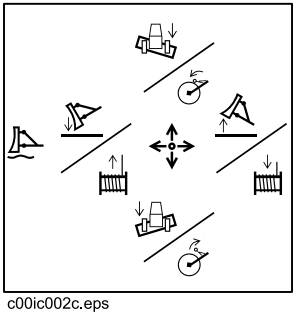
This switch selects reel winder function.

- Press right to activate reel winder controls.
- Press left to activate backfill blade controls.

Reel Winder Control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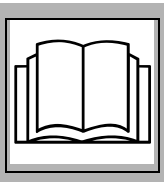
This control lowers and raises reel winder arm to engage or disengage roller tire.

This control also selects the direction the reel rotates.

- Move forward to unwind reel.
- Move backward to wind reel.
- Move right to lower reel winder arm.
- Move left to raise reel winder arm.

NOTICE: Do not continue to push lift control after tire makes contact with reel.

SETUP



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

Adjust reel winder roller to rotate desired reel:

1. Lower reel carrier.
2. Turn off engine.
3. Remove reel.

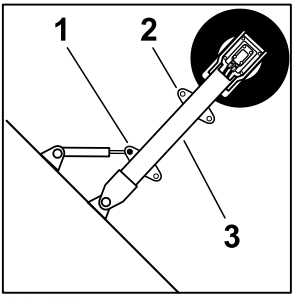
WARNING Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.

4. Remove lever arm (3).

   While supporting lever arm, remove bolt (1) that attaches hydraulic lift cylinder to lever arm.

   For 2 ft to 5 ft (61 to 152 cm) diameter reels:

   Rotate lever arm (3) back and attach cylinder rod to bottom cylinder mounting hole (1).



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   For 5 ft to 7 ft (152 to 213 cm) diameter reels:

   Rotate lever arm (3) back and attach cylinder rod to top cylinder mounting hole (2).

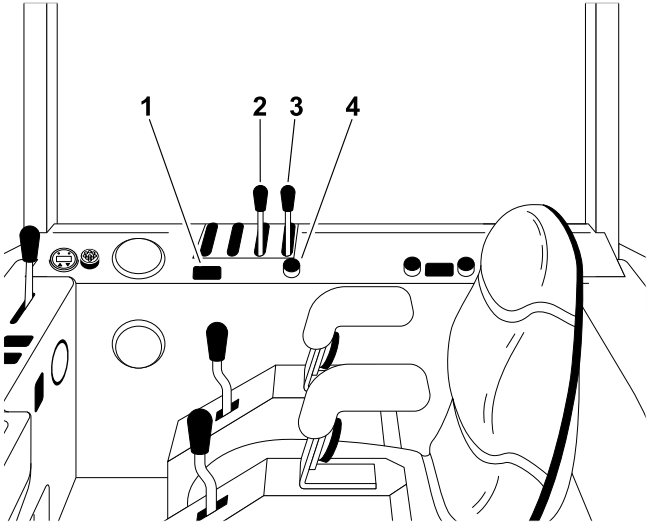
OPERATION

1. Drive to beginning of planned plow path.
2. Engage parking brake.
3. Lower backfill blade.
4. Lower plow attachment.
5. Adjust throttle.
6. Attach service line to reel.
7. Move reel winder selector switch to activate reel winder control functions.
8. Lower reel winder arm until tire meets reel flange.
9. Wind service line.
10. When finished winding, raise reel winder arm.
11. Adjust throttle.
12. Move reel winder selector switch to activate backfill blade controls.

13. Raise backfill blade.
14. Release parking brake.
15. Follow directions in **PLOW ATTACHMENT** to begin plowing.

SAW ATTACHMENT

SAW CONTROLS OVERVIEW



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1. Cruise control selector*
2. Stabilizer lift control
3. Saw lift control
4. Cruise control RPM control*

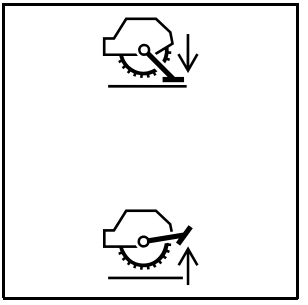
* optional

SAW CONTROL DESCRIPTIONS

Stabilizer Lift Control

This lever raises or lowers stabilizers.

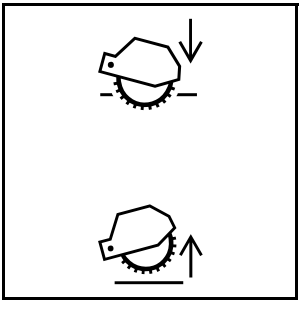
- Push to lower.
- Pull to raise.



Saw Lift Control

This lever raises or lowers saw.

- Push to lower.
- Pull to raise.



Cruise Control Selector

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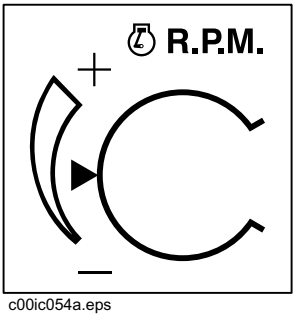
This optional switch activates the cruise control feature.

- Press right to turn on.
- Press left to turn off.

Only select cruise control when:

- gearbox control is in low
- hydraulic motor switch is set at low
- ground drive is in neutral.

Cruise Control RPM Control



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This optional control adjusts engine rpm.

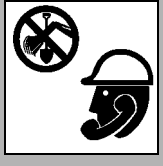
- Turn clockwise to increase engine rpm. This typically decreases ground speed.
- Turn counterclockwise to decrease engine rpm. This typically increases ground speed.

SETUP

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.

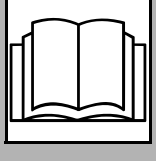
WARNING Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.

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: Know and comply with regulations covering One-Call service and utility notification before digging.



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

Before First Use and After Replacing Bits

NOTICE:

- Unless otherwise instructed, all service should be performed with tractor off.
- See weld notice at the end of this chapter.

Check bit clearance.

1. Check that all bits are properly secured.
2. Check that all bit retaining rings are secure.
3. Spin wheel by hand and listen for bits hitting diverters.
4. If bits hit diverters, repeat steps 1-3 to make sure bits are in the proper location and secured at proper depth.
5. If bits do not hit diverters:
    - Set parking brake.
    - Fasten and adjust seat belt.
    - Start tractor and adjust throttle.
    - Raise saw slightly.
    - Use attachment speed/direction control to rotate saw slowly. As it rotates, listen for clicking sounds. If clicking is present, repeat steps 1-4.

Normal Use

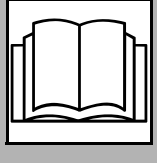
1. Fasten and adjust seat belt.
2. Start tractor. See **TRACTOR** start-up procedures.
3. Drive to starting point. Move in line with planned trench. See **TRACTOR** for operating procedures.
4. Engage parking brake and verify parking brake indicator is on.
5. Move gearbox control to 1 (low).
6. Tilt steering wheel column up.
7. Swivel seat to the work position.
8. Engage axle lock.
9. Lower saw to just above ground.
10. Lower stabilizers until distance from bottom of skid shoe to bottom of saw bits equals desired trench depth.
11. Check that saw is in line with planned trench and that tires are pointing straight ahead.

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.



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

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.

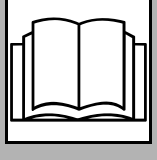
⚠ CAUTION Flying objects thrown by machine may strike people. Wear hard hat and safety glasses.

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

NOTICE:

- 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. Adjust throttle to low idle.
2. Move attachment speed/direction control to desired speed. SAW WILL TURN.
3. Slowly lower saw to trench depth.



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

NOTICE: Ensure that stabilizers are in contact with the ground while sawing. Failure to use stabilizers correctly will damage equipment.

4. Release parking brake and verify parking brake indicator is off.
5. Increase engine speed to full throttle.

6. Push ground drive control forward to trenching speed.
7. When trench is complete, adjust throttle to low idle.
8. Raise saw and stabilizers.

   As saw clears top of trench, move attachment speed/ direction control to neutral.
9. Swivel seat to the drive position.
10. Tilt steering wheel column down.
11. Drive a short distance away from work site.
12. Disengage axle lock.

    Drive tractor in reverse 6’ (2 m) while turning steering wheel left to right to fully disengage axle lock.
13. Shut down tractor. See **TRACTOR** for proper shutdown procedures.

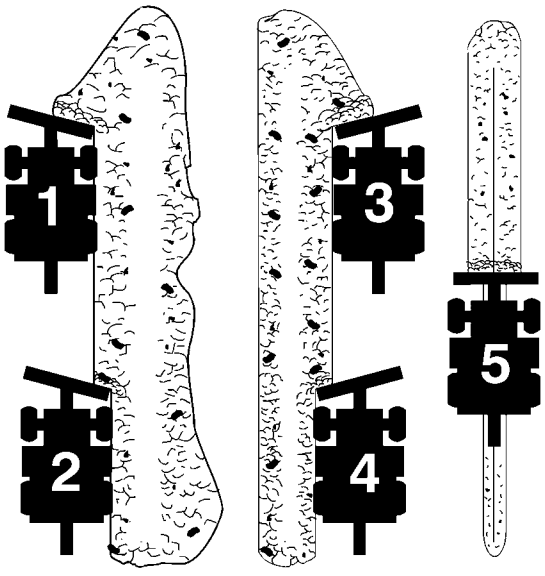
Cruise Control Operation

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.

1. Ensure ground drive control is in neutral.
2. Ensure hydraulic motor switch is in low.
3. Ensure gearbox control is in 1 (low).
4. Ensure cruise control selector is in MANUAL.
5. Ensure that all controls are set as desired.
6. Move cruise control RPM control to arrow at center.
7. Move cruise control selector to AUTO.
8. Following procedures in "Operation," begin sawing to desired depth.
9. When desired depth is reached, ensure throttle is fully open.
10. Slowly move ground drive control to full forward position.
11. Slowly adjust cruise control rpm control to match digging conditions. In harder digging conditions, higher cruise control rpm setting may improve digging performance. In easier digging conditions, lower cruise control rpm setting may increase ground drive speed. See "Operating Tips."
12. When finished digging, move ground drive control to neutral.
13. Move cruise control selector to MANUAL.
14. Allow saw to dig itself free before stopping attachment.

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 over trench.



EMERGENCY SHUTDOWN - Turn ignition switch to STOP.

OPERATING TIPS

- Work slowly and carefully.
- Wash bits and mounting blocks with high pressure water before parking unit overnight.
- Before operating saw, check bits for free rotation. Tap bits lightly with a hammer and turn by hand. If bits are stuck, remove and clean packed soil from bit block.
- For best results, use retaining clip loading and removing tool and a knock-out bar included with saw to remove and reinsert bits.
- Carbide bits are recommended for cutting abrasive material, such as sandstone or frozen sands or gravels.
- Saw use is not recommended for soft, wet, or sticky soil conditions.
- Lower saw into softer material then move into harder or abrasive material. For example, lower saw into dirt at shoulder before cutting across road.
- If a curved trench must be cut, make a series of straight cuts.

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.

OPTIONAL EQUIPMENT

Bits and Bit Holders

Using worn bits and bit holders will reduce efficiency and damage equipment. Replacement bits and bit holders are available from your Ditch Witch dealer.

Block Repair Jigs

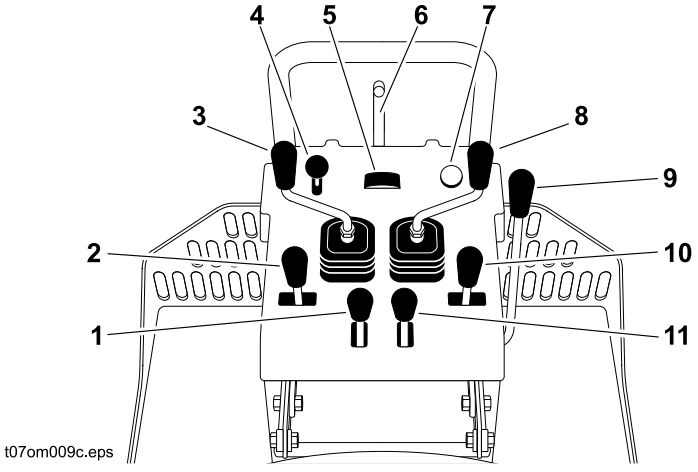
If the block or plate housing bit holder is worn or damaged, a new block can be welded to the segment. Use Block Repair Jig available from your Ditch Witch dealer and an E7018 or equivalent.

NOTICE: Welding can damage electronics.

- Welding currents can damage electronic components. Always disconnect the ECU ground connection from the frame, harness connections to the ECU, and other electronic components prior to welding on machine or attachments. Connect welder ground close to welding point and make sure no electronic components are in the ground path. We recommend that NO WELDING signs be prominently displayed on machine.
- Disconnect battery at battery disconnect switch before welding to prevent damage to battery.
- Do not turn off battery disconnect switch with engine running, or alternator and other electronic devices may be damaged.

BACKHOE ATTACHMENT

BACKHOE CONTROLS OVERVIEW



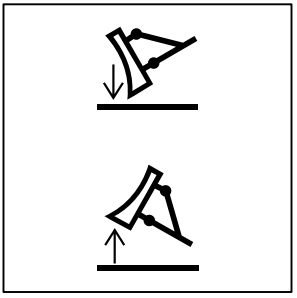
1. Remote backfill blade control
2. Left stabilizer control
3. Boom/swing control
4. Remote engine throttle control
5. Work light control
6. Swing lock pin
7. Remote engine stop switch
8. Bucket/dipper stick control
9. Stow lock control
10. Right stabilizer control
11. Remote ground drive control

BACKHOE CONTROL DESCRIPTIONS

Remote Backfill Blade Control

This control raises or lowers backfill blade.

- Pull to raise.
- Push to lower.



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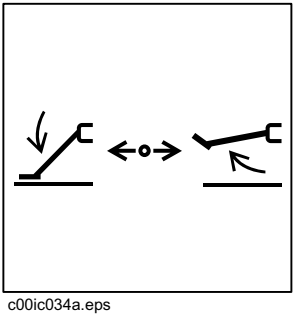
Stabilizer Controls

These controls raise or lower stabilizers.

- Pull in to raise.
- Push out to lower.



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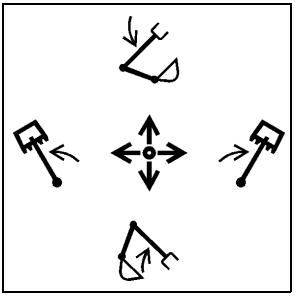
Boom/Swing Control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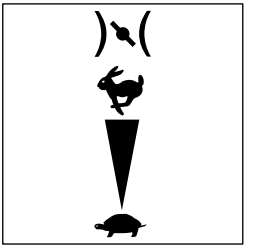
This control moves boom left or right and raises or lowers boom.

- Move left to swing left.
- Move right to swing right.
- Pull to raise.
- Push to lower.

Control can perform more than one action at a time. Using them together, operator can “feather,” or combine, backhoe operations.

NOTICE: Do not operate backhoe with control in the stowed (upright) position. Component failure could occur. Return control to stowed position when finished operating.

Remote Engine Throttle Control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This control lever adjusts engine throttle.

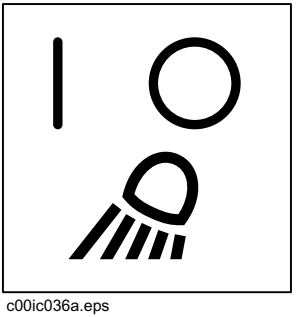
- Pull back to decrease engine speed.
- Push forward to increase engine speed.

IMPORTANT: Remote throttle will only function above throttle setting at operator station.

NOTICE: Before returning to tractor operator station:

- return remote throttle to low idle
- raise stabilizers
- stow and lock boom

Work Light Control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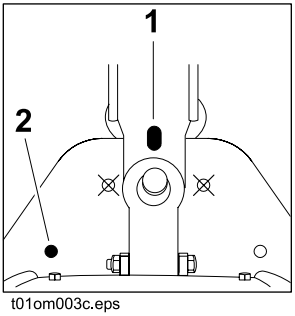
This control operates optional backhoe work lights.

Swing Lock Pin

This pin locks boom from swinging right or left during transport.

To lock:

- First engage stow lock. See “Stow Lock Control” later in this chapter.
- Insert swing lock pin into hole (1).



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To release:

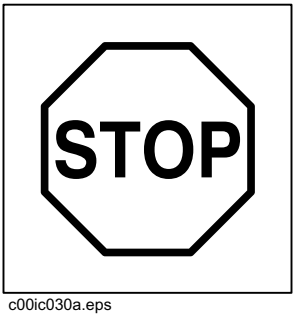
- Remove swing lock pin and store in hole (2).

> **IMPORTANT: Do not** store in holes marked with an “X.” Backhoe could swing into pin and destroy it.

- Release stow lock. See “Stow Lock Control” later in this chapter.

Remote Engine Stop Switch

This control stops machine immediately. Return to idle before using stop switch except in emergency.



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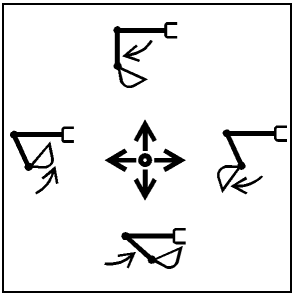
NOTICE: To prevent damage to turbocharger, do not shut down engine at full throttle or under load. Should engine die, immediately remove load and restart engine.

Bucket/Dipper Stick Control

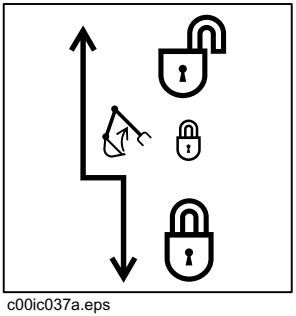
This control opens or closes bucket and moves dipper in or out.



- Move right to open bucket
- Move left to close bucket.
- Pull to move dipper in.
- Push to move dipper out.

Control can perform more than one action at a time. Using them together, operator can “feather,” or combine backhoe operations.

Stow Lock Control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This control locks boom during transport.

To lock:

- Raise boom fully.
- Pull stow lock control handle back.
- Lower boom slightly to to engage lock.
- Insert swing lock pin.

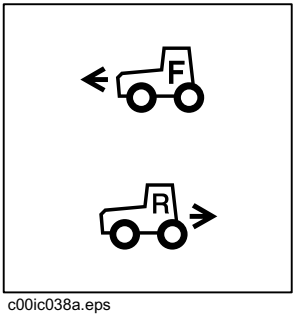
To release:

- Remove swing lock pin and store in pin holder located on left stabilizer support.
- Lift boom slightly.
- Push stow lock control handle forward to release lock.

Remote Ground Drive Control

This control is used to move machine backward or forward while in backhoe operator station.

- Push handle for forward movement.
- Pull handle for reverse movement.



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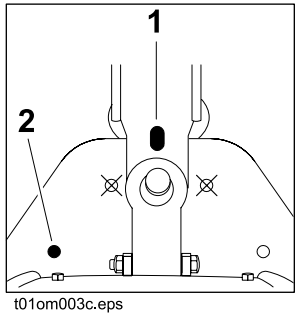
NOTICE: Do not operate remote ground drive control without raising backfill blade. Do not move more than 30’ (10 m) at a time.

SETUP

1. Move attachment speed/direction control to neutral position.
2. Apply service brake.
3. Move ground drive control to neutral position.
4. Shift gearbox control to 1 (low).
5. Lower rear attachment to 6” (150 mm) above ground.
6. Check that backfill blade is straight and lower it to ground.
7. Decrease engine speed to low throttle.
8. Move to backhoe operator’s station.
9. Lower stabilizers enough to lift front tires.
10. Remove swing lock pin from hole (1) and store in hole (2).
11. Raise boom to release tension on stow lock.
12. Release stow lock by pushing handle forward.
13. Adjust engine speed to 1/2 to 3/4 throttle for digging.



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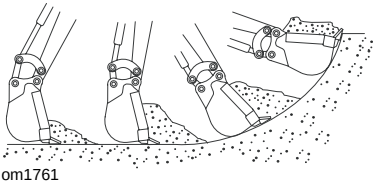
NOTICE: Engine speed affects speed of backhoe operation.

OPERATION

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

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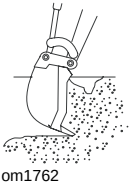

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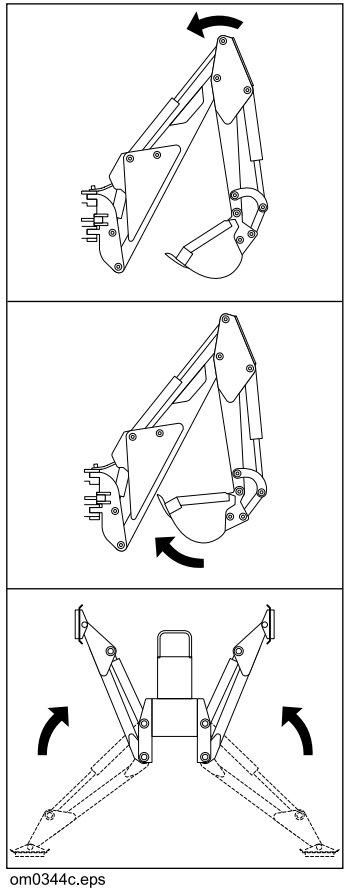
STOW

NOTICE: Before returning to tractor operator station:

- raise stabilizers
- return remote throttle to low idle
- stow and lock boom

1. When hole or trench is complete, lift boom while keeping dipper pointed at ground.
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 to engage lock.
5. Engage swing lock. See “Swing Lock Pin” earlier in this chapter.
6. Raise stabilizers.
7. Return remote throttle to low idle.



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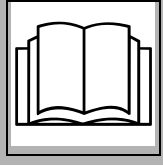
DRILLING ATTACHMENT

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

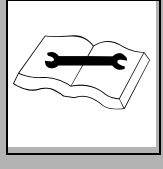
NOTICE: Keep everybody at least 10’ (3 m) away from drill pipe during operation. Do not straddle trench or drill pipe while drilling.

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.

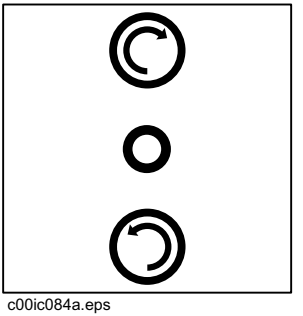


WARNING Improper control function could cause death or serious injury. If control does not work as described in instructions, stop machine and have it serviced.

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

DRILLING ATTACHMENT CONTROL DESCRIPTION

Drilling Control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This switch controls drill string rotation.

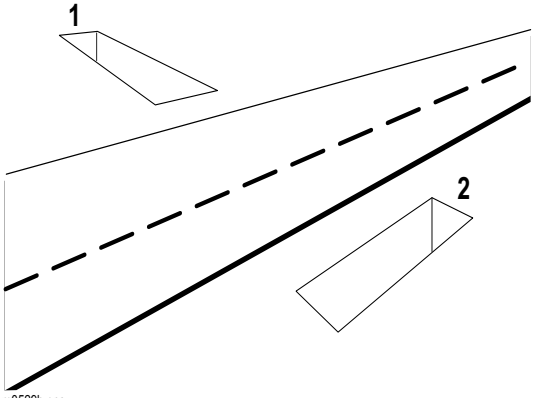
- To rotate clockwise, press top.
- To rotate counterclockwise, press bottom.

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.

IMPORTANT:

- This switch is spring-loaded and will automatically stop the drilling attachment when released.
- If using only remote handle, switch will not be mounted on dash.

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.

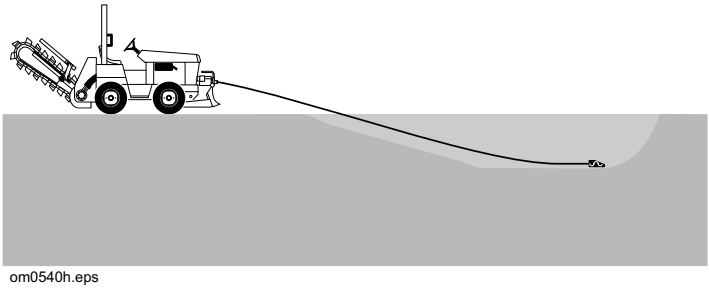
> **IMPORTANT:** The approach trench should be at least:
>
> - deep enough for pipe to lay flat and enter soil at correct angle
> - 20’ (6 m) long
> - 4" (100 mm) wide

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



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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

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:

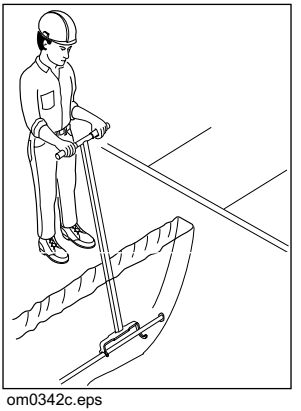
- Drilling too quickly causes bit to drift off course and may bend drill rod. After bore path is established, speed may be slightly increased.
- If drill rod starts to bend, stop forward movement of unit and back the unit slightly until rod straightens. Do not drill with bent rod.
- If drill rod hits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



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- 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.

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.

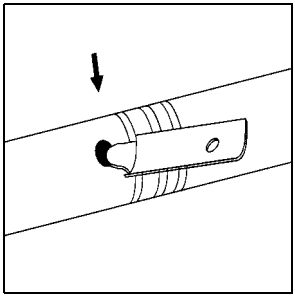
4. Slowly back up tractor while maintaining rotation.
5. When backreamer exits the bore hole, stop rotation immediately.

IMPORTANT:

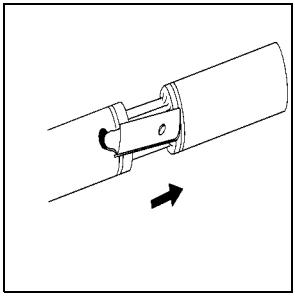
- Do not try to increase hole size too much in one pass. Several passes using successively larger reamers will save wear on machine.
- During backreaming, keep drill string straight. Sharp bends in the drill rod at the motor coupling can cause rod failure.

DISASSEMBLE JOINTS

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



2. Pull rods apart.



OPTIONAL EQUIPMENT

Drill Rod

Bent or damaged drill rod might break when being pushed. Replacement drill rod and connectors are available through your Ditch Witch dealer.

Bits and Backreamers

Bits and backreamers are available in a variety of sizes and types to match jobsite needs. Contact your Ditch Witch dealer for more information.

SERVICE

Proper lubrication and maintenance protects Ditch Witch equipment from damage and failure. In extreme conditions, service machine more frequently.

Use only recommended lubricants. Fill to capacities listed in **SPECIFICATIONS**.

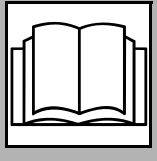
Recommended Lubricants	
DEO	John Deere Plus-50® or eqivalent multi-viscosity diesel engine oils meeting ACEA specification E4/E5. Other multi-viscosity diesel engine oils meeting API classifications CI-C4, CH-4, or ACEA E3 may be used, **but only with 250 hour change intervals**.
MPG	Multipurpose grease
EPG	Extreme pressure grease
MPL	Multipurpose gear oil (SAE 80W90) meeting API service classification GL-5
BRAKE	DOT 3 brake fluid
THF	Tractor hydraulic fluid, similar to Phillips 66 HG, Mobilfluid 423, Chevron Tractor Hydraulic Fluid, Texaco TDH Oil, or equivalent
DEAC	Diesel engine antifreeze/coolant meeting ASTM D5345 (prediluted) or D4985 (concentrate) with SCAs meeting John Deere JDM H24A2

APPROVED COOLANT

This unit was filled with John Deere Cool-Gard coolant before shipment from factory. Add only John Deere Cool-Gard (p/n 255-006) or any fully-formulated, ethylene glycol based, low-silicate, heavy-duty diesel engine coolant meeting ASTM specification D5345 (prediluted) or D4985 (concentrate) and containing supplemental coolant additives (SCAs) meeting John Deere specification JDM H24A2.

NOTICE: Do not use water or high-silicate automotive-type coolant. This will lead to engine damage or premature engine failure.

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



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

NOTICES:

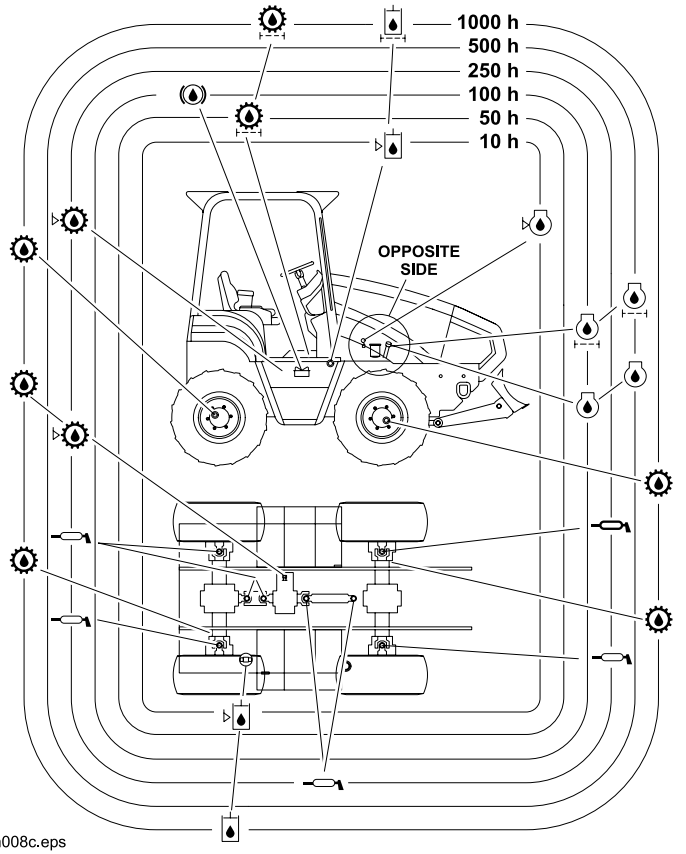
- Unless otherwise instructed, all service should be performed with engine off.
- Refer to engine manufacturer’s manual for engine maintenance instructions.
- Before servicing equipment, lower unstowed attachments to ground

Welding Precaution

NOTICE: Welding can damage electronics.

- Welding currents can damage electronic components. Always disconnect the ECU ground connection from the frame, harness connections to the ECU, and other electronic components prior to welding on machine or attachments. Connect welder ground close to welding point and make sure no electronic components are in the ground path. We recommend that NO WELDING signs be prominently displayed on machine.
- Disconnect battery at battery disconnect switch before welding to prevent damage to battery.
- Do not turn off battery disconnect switch with engine running, or alternator and other electronic devices may be damaged.

OVERVIEW



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(DEO) diesel engine oil

(MPL) 80W90 multipurpose lubricant

(ATF) Automatic transmission fluid

(applies only to tractors equipped with powershift transmission)

Change filter

(THF) Tractor hydraulic fluid

Brake fluid

(EPG) Extreme pressure grease

Check

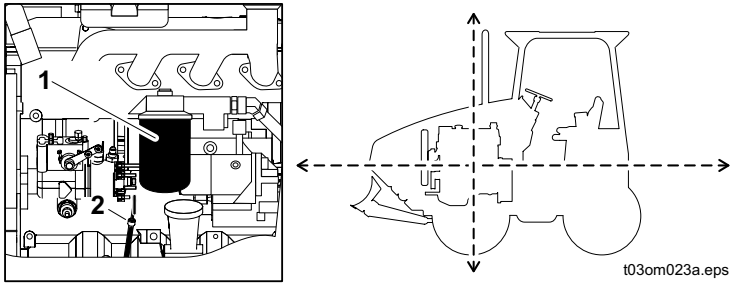
10 HOUR SERVICE

TRACTOR	Task	Note
	Check engine oil	DEO
	Check air filter indicator and clean dust trap	
	Check water separators and fuel filters	
	Check hydraulic fluid	THF
	Check hydraulic reservoir fill and strainer	
	Check hydraulic hoses	
	Check coolant level	DEAC
	Check hoses	
	Check radiator fins	
	Check tire pressure	
	Check wheel lug nuts	295 ft•lb (400 N•m)
TRENCHER	Lube trencher tail roller	EPG
	Lube trencher pivot	EPG
	Lube trencher auger bearings	EPG
	Lube trencher auger shaft	EPG
	Check trencher auger bolts	
	Check digging chain teeth and bits	
	Check digging chain	
	Check trencher boom mounting bolts	250 ft•lb (339 N•m)
	Check attachment mounting bolts	200 ft•lb (271 N•m)
	Check personnel restraint bar bolts	350 ft•lb (475 N•m)
	Check digging chain tension	

PLOW	Lube plow pivots	EPG
	Check plow vibrator oil	MPL
	Check plow arm pins and bushings	
	Check plow connector pivots	
	Check attachment mounting bolts	200 ft•lb (271 N•m)
SAW	Clean saw	
	Clean spoil chutes	
	Lube saw wheel shaft bearings	EPG
	Check saw bits	
	Check segments	
	Check segment bolts (initial)	700 ft•lb (950 N•m)
	Check attachment mounting bolts	200 ft•lb (271 N•m)

Tractor

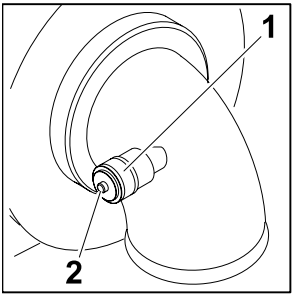
Check Engine Oil

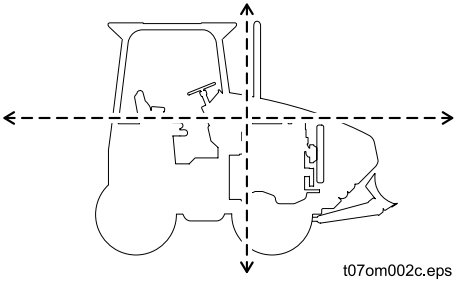


Check engine oil at dipstick (2) before operation and every 10 hours thereafter.

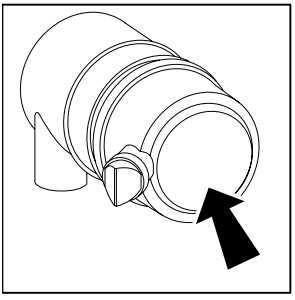
Add DEO at fill as necessary to keep oil level at highest line on dipstick.

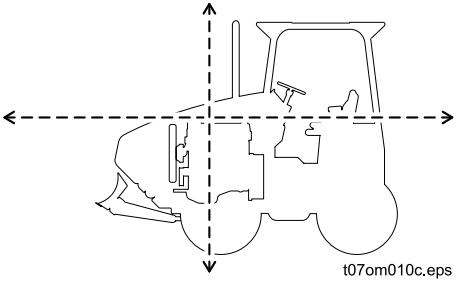
Check Air Filter Indicator and Clean Dust Trap





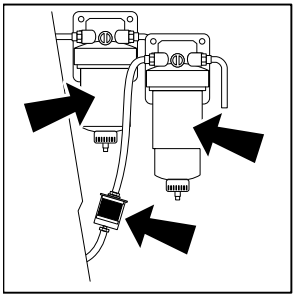
Check air filter indicator (1) and clean dust trap every 10 hours. Red band indicates filter must be changed. Push button (2) to re-set indicator.

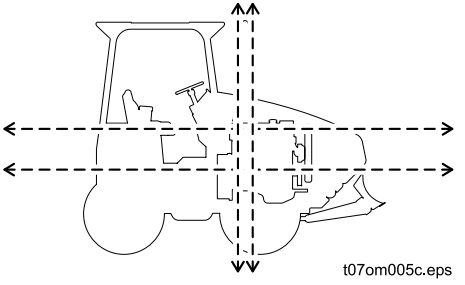




Clean dust from trap by blowing with low-pressure air every 10 hours.

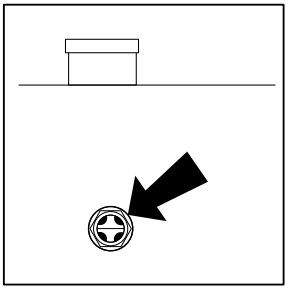
Check Water Separators and Fuel Filters

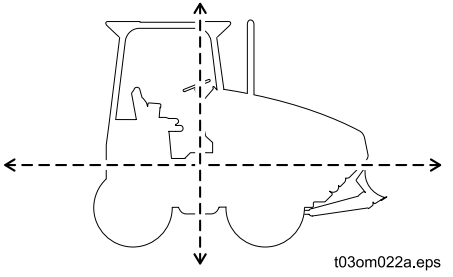




Check water separators (1) and fuel filters (2) every 10 hours. Drain at plug as needed until water is removed and fuel runs from drain.

Check Hydraulic Fluid





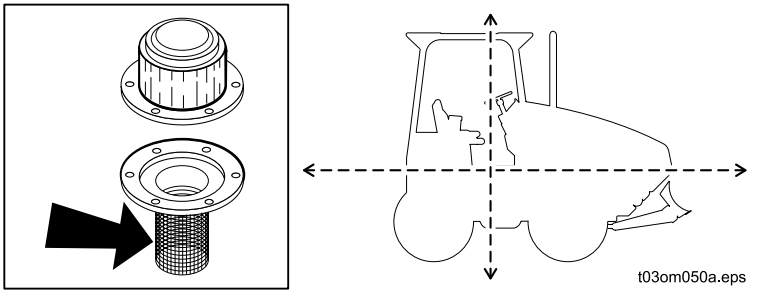
With frame level, check fluid at sight glass every 10 hours.

Add THF at fill as necessary. Fluid capacity up to sight glass is 24 gal (91 L).

Clean dust from cap by blowing with low-pressure air.

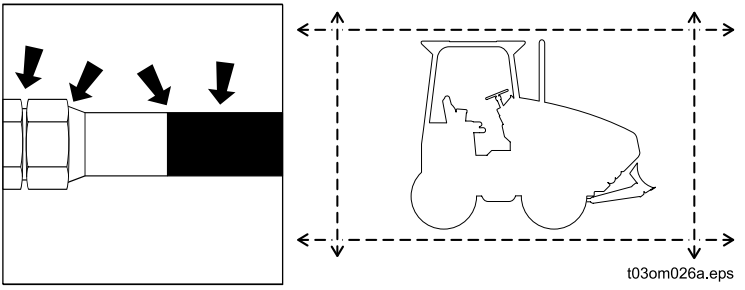
IMPORTANT: Do not open unless adding hydraulic fluid.

Check Hydraulic Reservoir Fill and Strainer



Check hydraulic reservoir fill and strainer on operator's station step every 10 hours. Wipe away any dirt or debris.

Check Hydraulic Hoses



Check all hydraulic hoses every 10 hours.

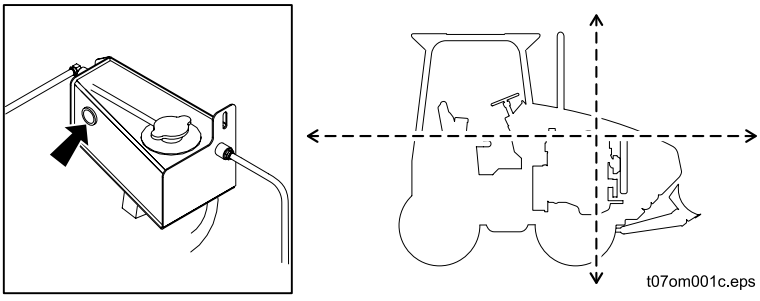
WARNING Fluid or air pressure could pierce skin and cause injury or death. Stay away.

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.

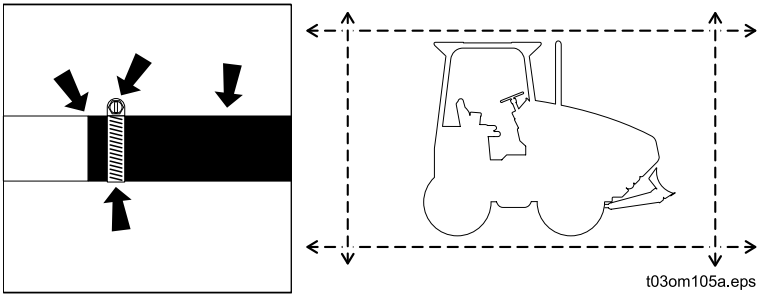
Check Coolant Level



With engine cool, check coolant level in auxiliary tank sight glass every 10 hours. Maintain level so that coolant is visible in sight glass and no higher than bottom of fill neck. If low, add approved coolant. Do not overfill.

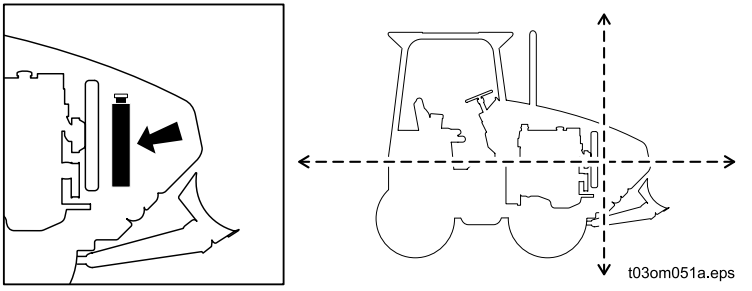
IMPORTANT: See "Approved Coolants" earlier in this chapter for information on approved coolants.

Check Hoses



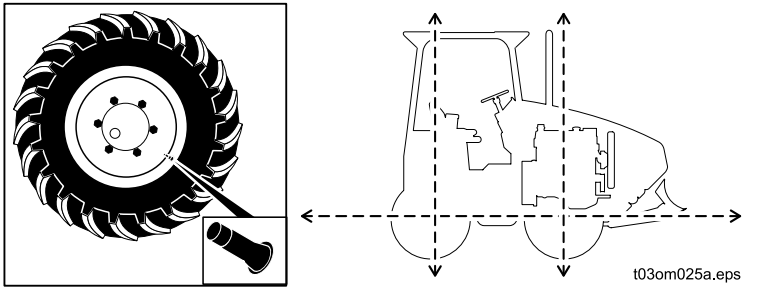
Check all hoses every 10 hours.

Check Radiator Fins



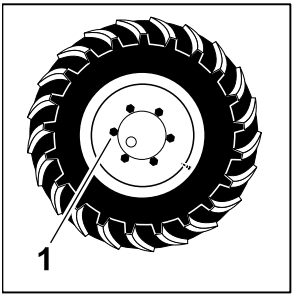
Check radiator for dirt, grass, and other foreign matter every 10 hours. Clean out with compressed air or spray wash if required. Be careful not to damage fins with high pressure air or water. Check more often if operating in dusty or grassy conditions.

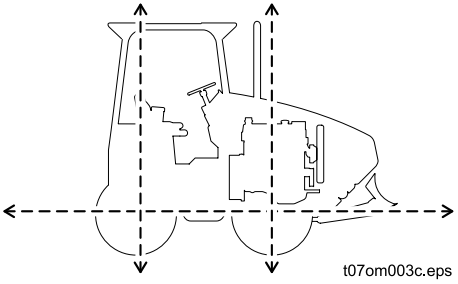
Check Tire Pressure



Check tire pressure every 10 hours. See **SPECIFICATIONS** for appropriate tire pressures.

Check Wheel Lug Nuts

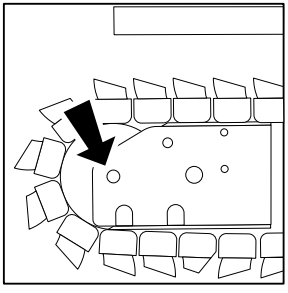


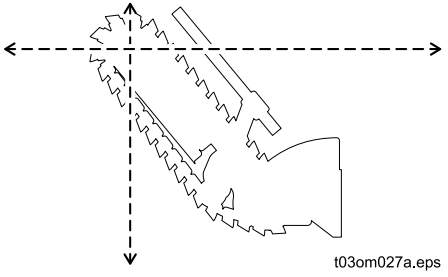


Check tightness of wheel lug nuts (1) every 10 hours. Tighten lugnuts to 295 ft•lb (400 N•m).

Trencher

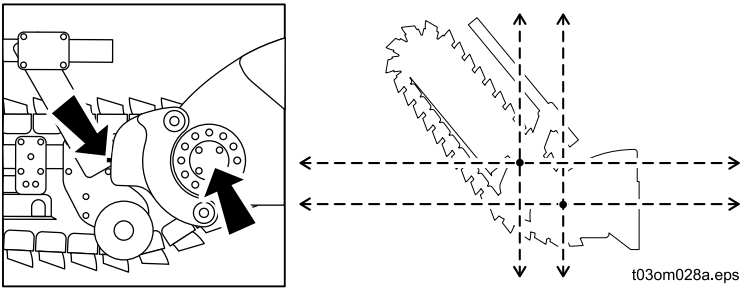
Lube Trencher Tail Roller



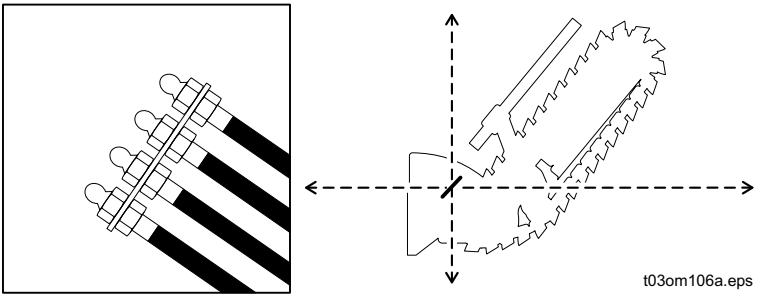


Wipe zerks clean and lube every 10 hours with EPG. Lube roller zerks on both sides of boom.

Lube Trencher Pivot

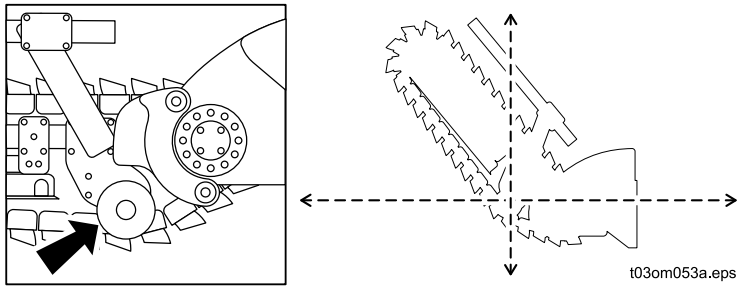


Wipe five zerks located on right of trencher pivot clean and lube every 10 hours with EPG.



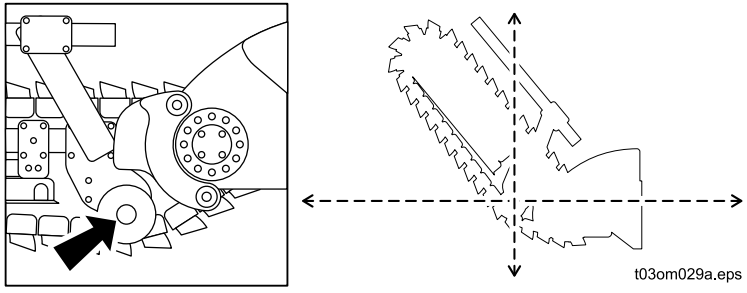
Wipe four zerks located on left of trencher pivot clean and lube every 10 hours with EPG.

Lube Trencher Auger Bearings



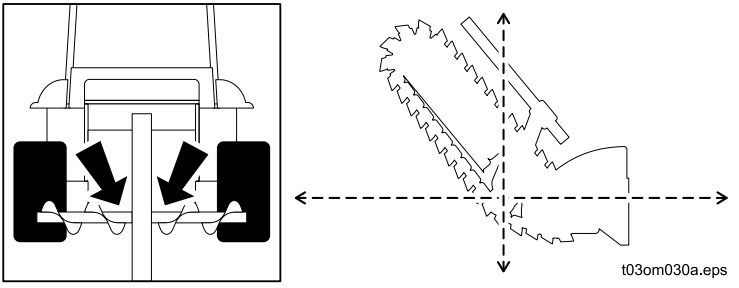
Lube two auger bearing zerks (one on each side) every 10 hours with EPG.

Lube Trencher Auger Shaft



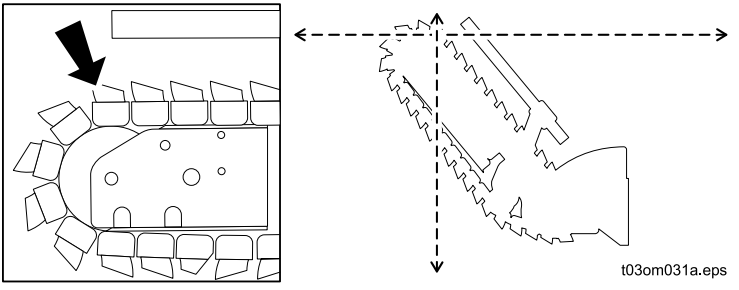
Lube four auger shaft zerks (two on each side) every 10 hours with EPG.

Check Trencher Auger Bolts



Check trencher auger bolts every 10 hours. For optimum spoils delivery, adjust augers to match terrain and digging depth.

Check Digging Chain Teeth and Bits

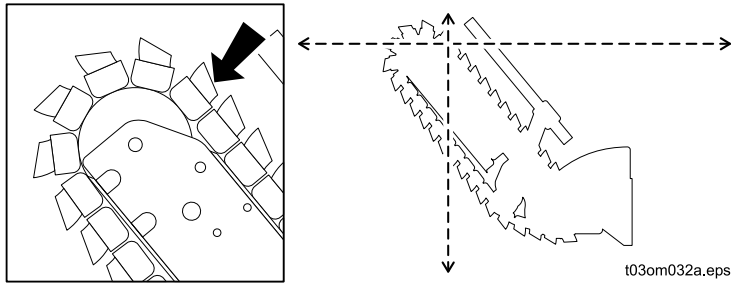


Check teeth for wear every 10 hours. Replace worn teeth, using Ditch Witch replacement parts and maintaining original tooth pattern.

For more efficient digging, contact your Ditch Witch dealer for information about the tooth pattern best suited to your jobsite.

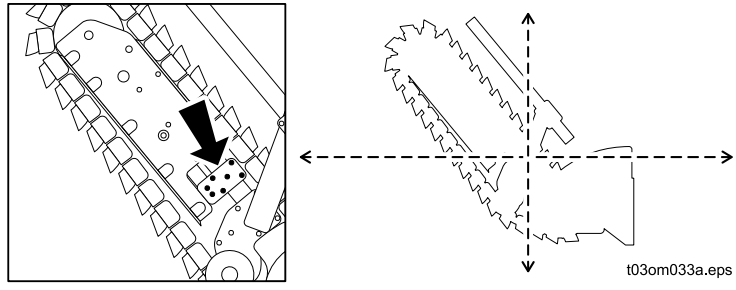
If using rock chain bits, check that bits rotate freely. Clean chain and check bits after each use. Replace bit when carbide cap or insert is worn or adapter can be damaged.

Check Digging Chain



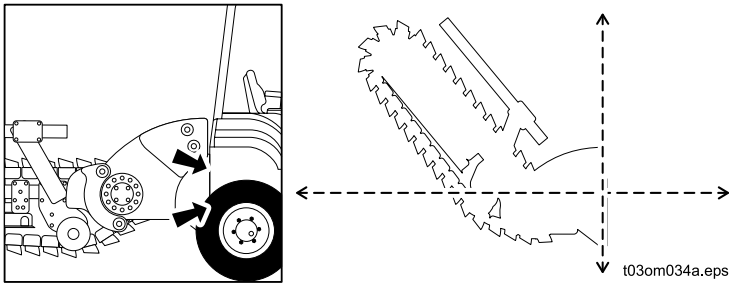
Check chain every 10 hours. Replace worn or broken chains. If sidebars are bent or loose on chain pins, chain spacers should be used to join sidebars.

Check Boom Mounting Bolts



Check 10 bolts (5 on each side) every 10 hours and torque as necessary to keep bolts and other fasteners tight. Check for looseness or wear. Check that bolts are torqued to 250 ft•lb (28 N•m).

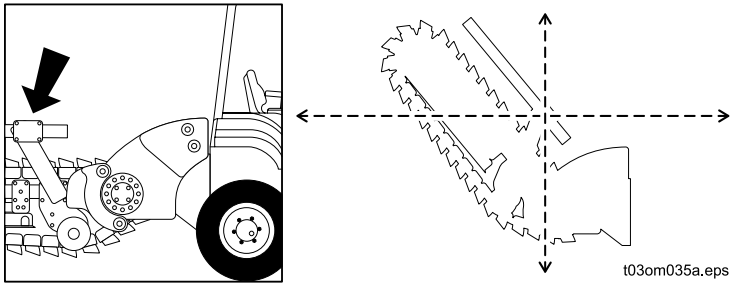
Check Attachment Mounting Bolts



Check bolts every 10 hours and torque as necessary to keep bolts and other fasteners tight. Check for looseness or wear.

Apply Loctite 271® adhesive. Check that bolts are torqued to 200 ft•lb (271 N•m).

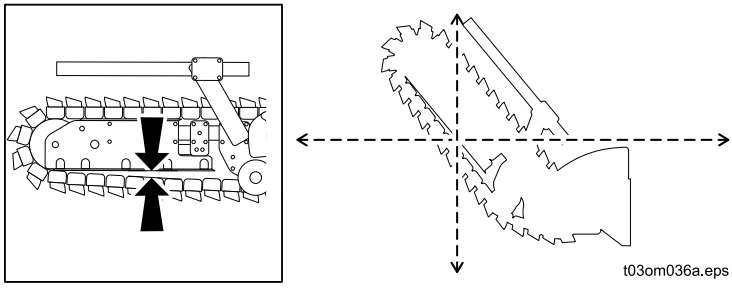
Check Personnel Restraint Bar/Trench Cleaner



Check 6 bolts that mount restraint bar/trench cleaner to arm every 10 hours and torque as necessary to keep bolts tight. Check for looseness or wear. Apply Loctite 271® adhesive.

Check that bolts holding personnel restraint bar/trench cleaner to arm are torqued to 350 ft•lb (475 N•m). Bolts mounting arm to boom should be torqued to 400 ft•lb (542 N•m).

Check Digging Chain Tension



Check digging chain tension every 10 hours. With boom horizontal, measure distance from bottom of boom to chain. When properly adjusted, distance should be 4.5 - 5.5**"** (114 - 140 mm).

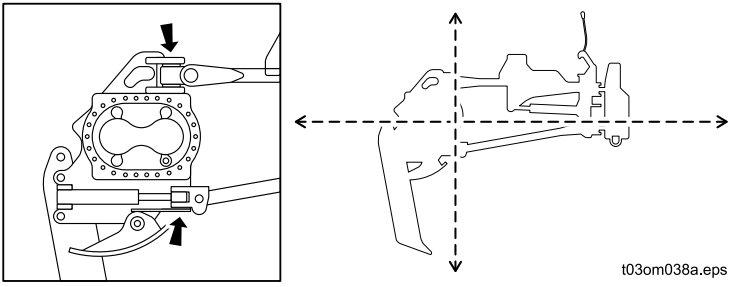
To tighten chain, loosen six bolts on trencher boom and pump EPG into cylinder. To relieve chain tension, loosen plug on grease cylinder.

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.

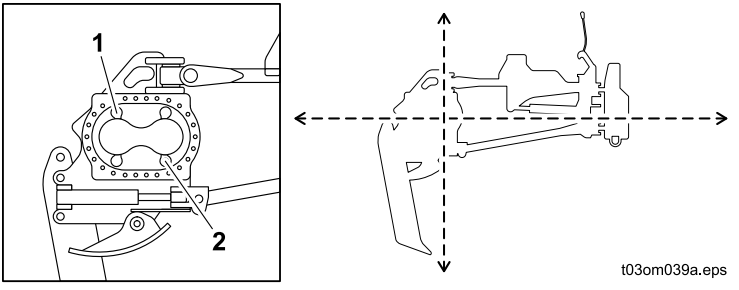
Plow

Lube Plow Pivots



Lube pivots every 10 hours with EPG.

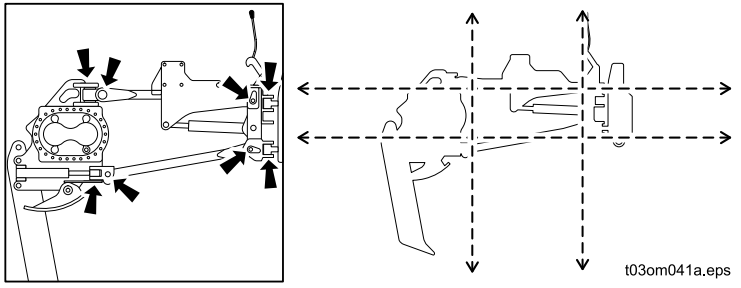
Check Plow Vibrator Oil



Check plow vibrator oil on each side of vibrator every 10 hours. With vibrator horizontal, oil should be halfway up sight glass (2). Add MPL as needed at fill (1).

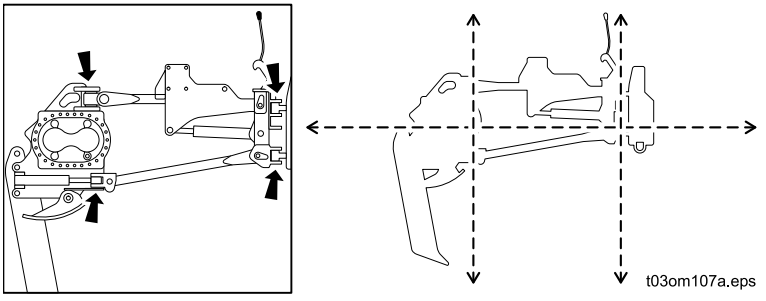
IMPORTANT: Do not add oil to plow vibrator when hot. Let plow vibrator cool before removing fill plug.

Check Plow Arm Pins and Bushings



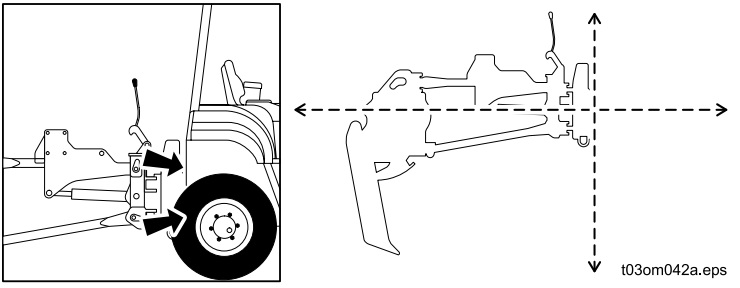
Check plow arm pins and bushings every 10 hours. Tighten as needed.

Check Plow Connector Pivots



Visually check pivots every 10 hours for wear or damage.

Check Attachment Mounting Bolts



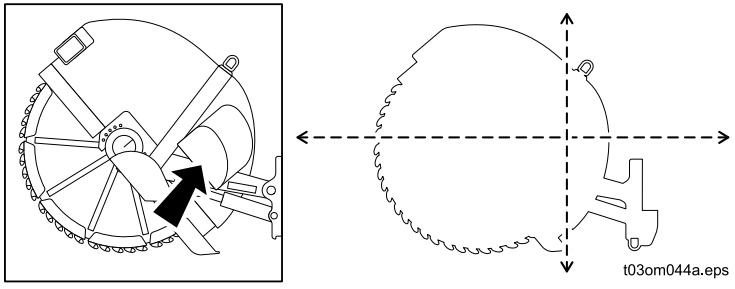
Check mounting bolts every 10 hours and torque as necessary to keep bolts and other fasteners tight. Check for looseness or wear. Apply Loctite 271® adhesive. Check that bolts are torqued to 200 ft•lb (271 N•m).

Saw

Clean Saw

Clean saw after each use. After using saw, clean tractor before performing routine lubrication and maintenance. Wash bits and mounting blocks with high pressure water.

Clean Spoil Chutes

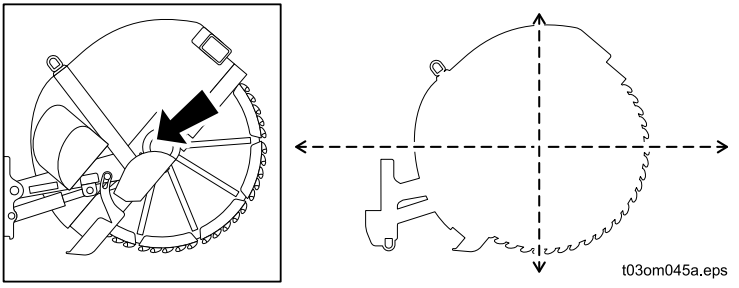


Clean spoil chutes after each use.

To clean:

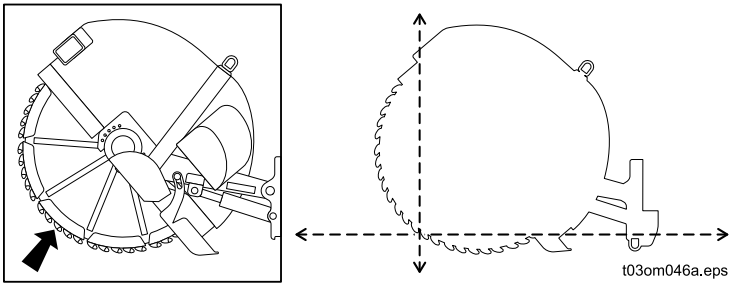
- Lower wheel to ground.
- Turn engine off.
- Clean out chute.
- Move away from saw before starting engine.

Lube Saw Wheel Shaft Bearings



Lube saw wheel shaft bearings every 10 hours with EPG.

Check Saw Bits

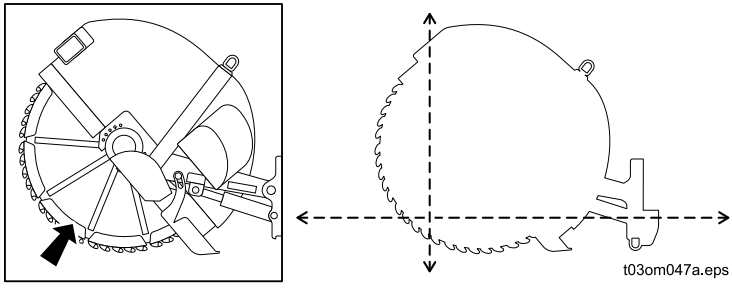


Check that saw bits rotate freely. Clean and check bits after each use. If bits are stuck, remove and clean packed soil from retaining ring.

Replace bit when carbide cap or insert is worn or adapter can be damaged.

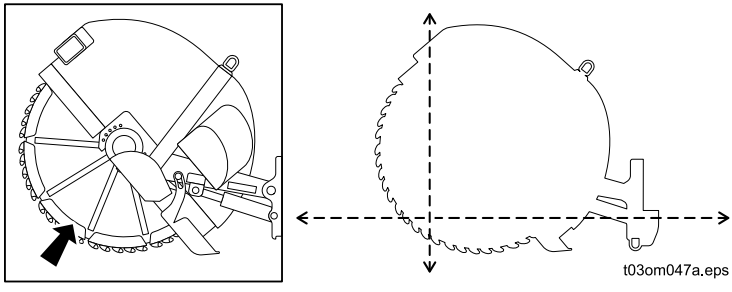
NOTICE: See welding notice at beginning of this chapter.

Check Segments



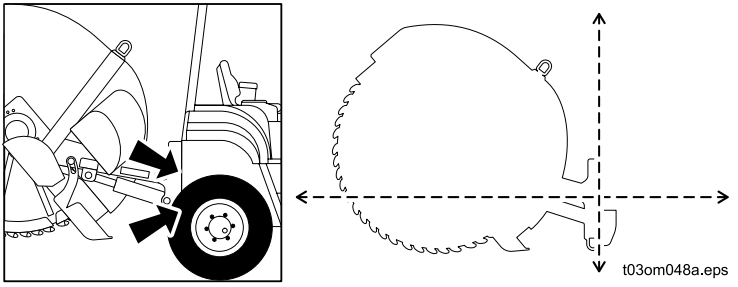
Check saw segments every 10 hours. Replace as needed.

Check Segment Bolts



Check segment bolts after first 10 hours of operation and then as needed. Torque to 700 ft•lb (950 N•m).

Check Attachment Mounting Bolts



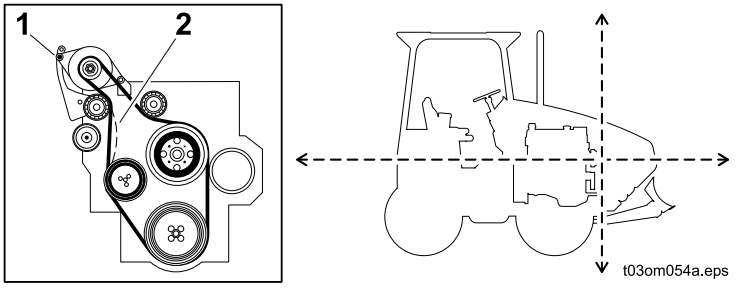
Check mounting bolts every 10 hours and tighten as necessary. Check for looseness or wear. Apply Loctite® 271 adhesive. Check that bolts are torqued to 200 ft•lb (271 N•m).

50 HOUR SERVICE

	Task	Note
TRACTOR	Check drive belt	
	Check hydraulic reservoir breather	
	Check fuel tank breather	
	Check cab air filter	
TRENCHER	Check trencher gearbox oil	MPL
PLOW	Change plow vibrator oil (initial)	MPL
SAW	Lube saw lift arm pivot	EPG

Tractor

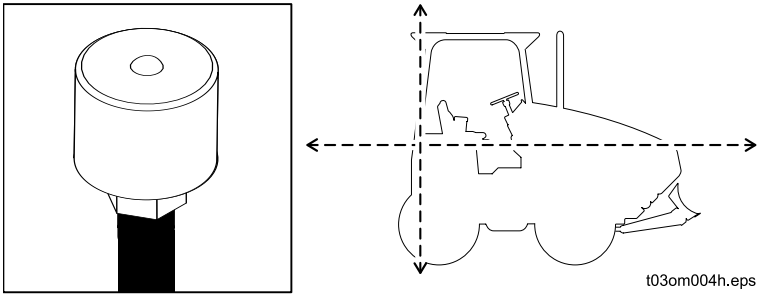
Check Drive Belt



Check belt every 50 hours for damage or wear. Replace worn belt.

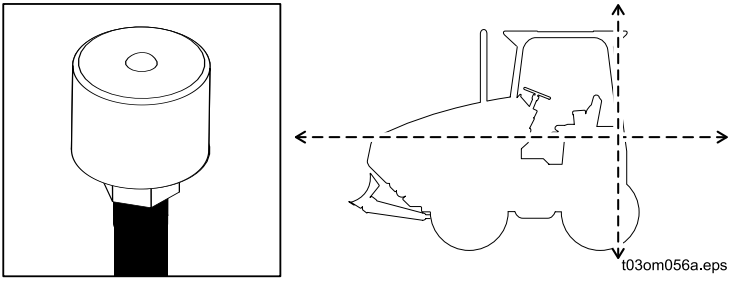
Belt is properly tensioned when long span (2) moves about 1/2" (13 mm) when pushed. If needed, loosen alternator bolts (1) and adjust idler pulley.

Check Hydraulic Reservoir Breather



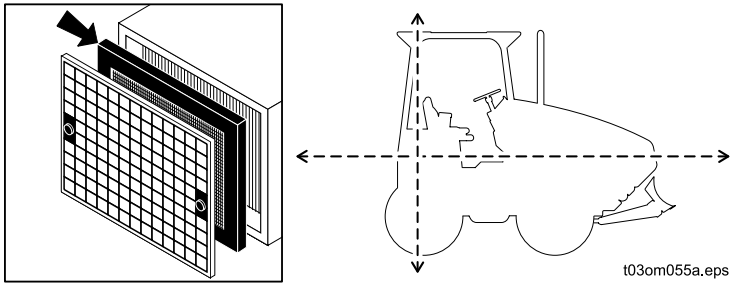
Check hydraulic reservoir breather every 50 hours. Ensure breather is not clogged. Remove dust around breather as needed by blowing with low-pressure air. When breather element becomes clogged, remove and clean or replace.

Check Fuel Tank Breather



Check fuel tank breather every 50 hours. Ensure breather is not clogged. Remove dust around breather as needed by blowing with low pressure air. When breather element becomes clogged, remove and clean or replace.

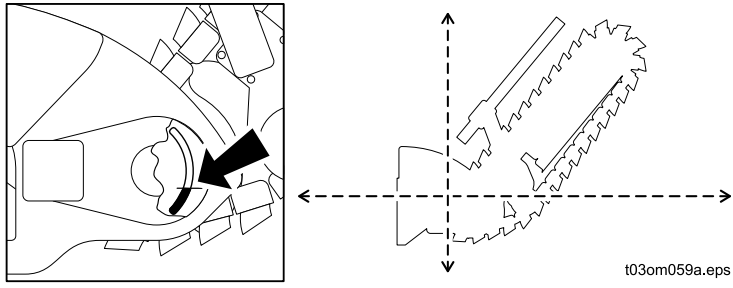
Check Cab Air Filter



Check filter every 50 hours for wear or holes. Check more often if working in dusty conditions.

Trencher

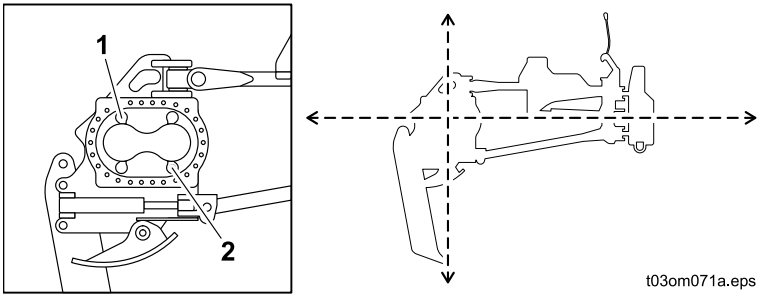
Check Trencher Gearbox Oil



Check oil at sight tube every 50 hours. Keep oil level at horizontal line on housing. If necessary, add MPL at fill plug.

Plow

Change Plow Vibrator Oil



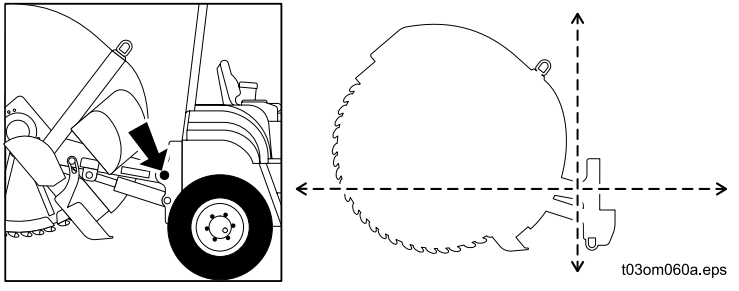
Change plow vibrator oil after first 50 hours of operation.

Drain oil at drain plug (2). Replace plug and move plow vibrator to horizontal position. Fill with MPL at fill (1) until oil is halfway up sight glass (2). Refill capacity is 4 qt (3.8 L).

IMPORTANT: Do not drain oil from plow vibrator when hot. Let plow vibrator cool before removing drain plug.

Saw

Lube Saw Lift Arm Pivot



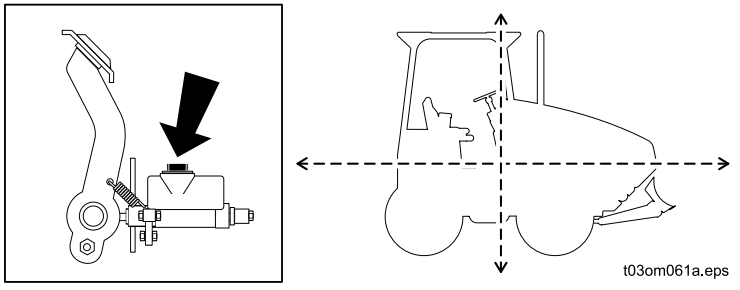
Wipe zerks clean and lube saw lift arm pivots every 50 hours with EPG.

100 HOUR SERVICE

	Task	Note
TRACTOR	Check brake fluid	BRAKE
	Change engine oil and filter (initial)	DEO
PLOW	Check shear mounts	
	Test plow connector pivots	

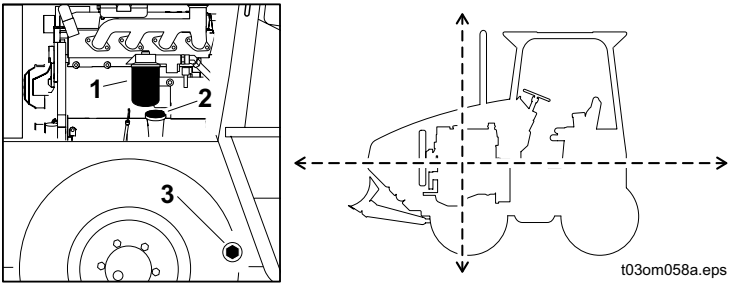
Tractor

Check Brake Fluid



Check brake fluid every 100 hours of operation. Check brake fluid more frequently if working in dusty conditions. Refill with DOT 3 brake fluid.

Change Engine Oil and Filter (Initial)



Change engine oil and filter after first 100 hours of operation.

To change:

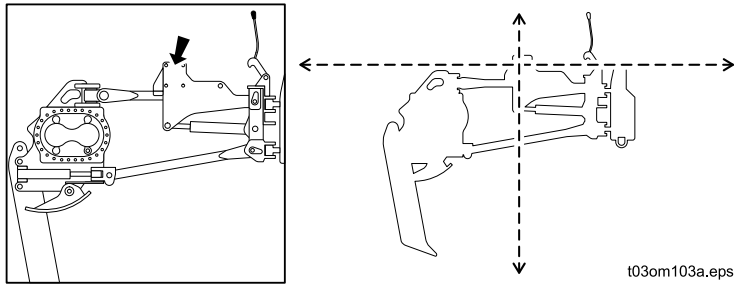
- While oil is warm, remove drain plug (3). Drain oil and replace plug.
- Remove filter (1) and replace with new filter each time oil is changed. Refill with DEO at fill neck (2).

NOTICE:

- Regular oil change interval is 500 hours only if using John Deere Plus-50® or ACEA E4/E5.
- Oil change interval is 250 hours when using alternative oils meeting API service classifications CI-4, CH-4, or ACEA E3.
- See "Recommended Lubricants" for more information about DEO specifications.

Plow

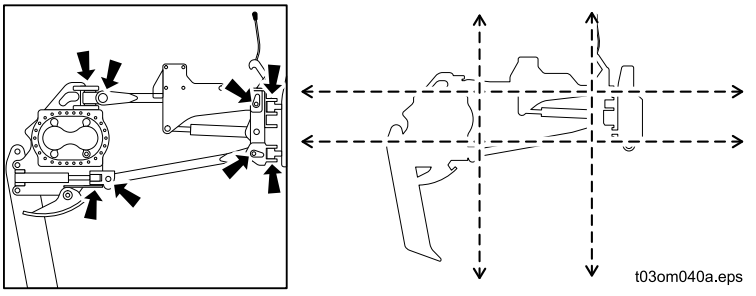
Check Shear Mounts



Check shear mounts for wear every 100 hours. Replace as needed.

IMPORTANT: When replacing shear mounts, it is important to compress the shear mounts with the washers to prevent the shear mount from tearing.

Test Plow Connector Pivots



Test upper and lower connector pivots every 100 hours.

To test upper pivot:

- Lower plow to ground.
- Use plow lift control to put hydraulic load on pivot joints. Do not raise plow.
- As hydraulic load is applied and released, visually check joints for motion. If motion is observed, contact your Ditch Witch dealer.

To test lower pivot:

- Lower plow to ground.
- Use hydraulic jack to place load on lower arm.
- As hydraulic load is applied and released, visually check joints for motion. If motion is observed, contact your Ditch Witch dealer.

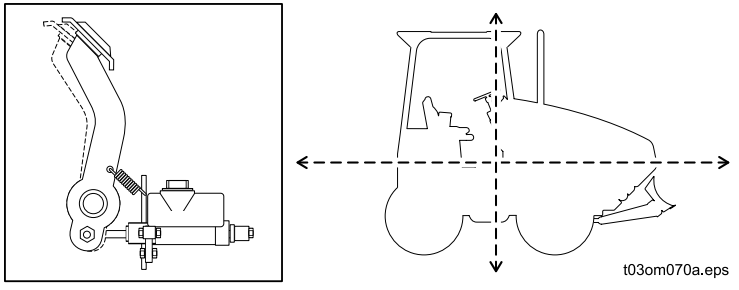
IMPORTANT: Lower plow blade to ground and visually inspect bushings and joints. Replace bushings if there is excessive motion.

250 HOUR SERVICE

	Task	Note
TRACTOR	Adjust service brake	
	Lube driveshaft U-joints	EPG
	Lube axle spindle pins	EPG
	Check ground drive gearbox oil	MPL
	Check differential oil	MPL
	Lube planetary wheel ends	MPL
	Check ROPS shock mounts	
	Change cab air filter	

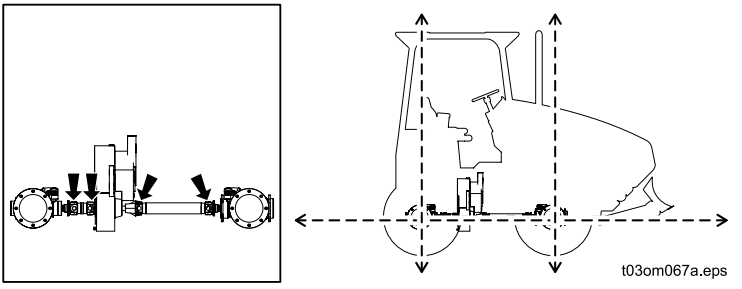
Tractor

Adjust Service Brake



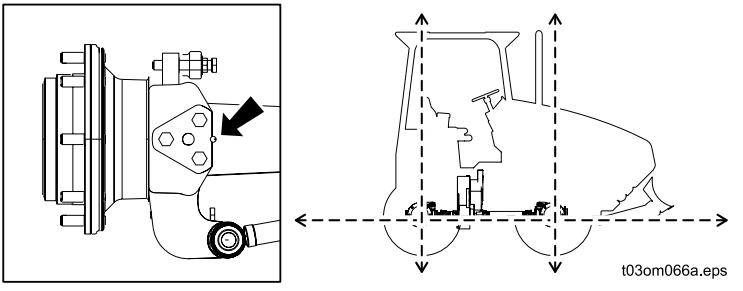
Adjust service brake after 250 hours of operation. When properly adjusted, there is 1/4-1/2" (6-13 mm) free play in pedal.

Lube Driveshaft U-joints



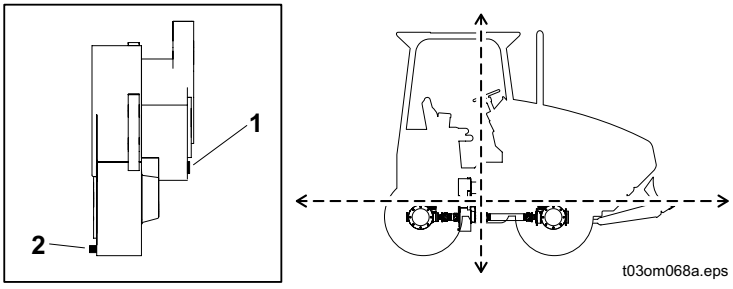
Lube driveshaft U-joints every 250 hours with 3-4 shots of EPG.

Lube Axle Spindle Pins



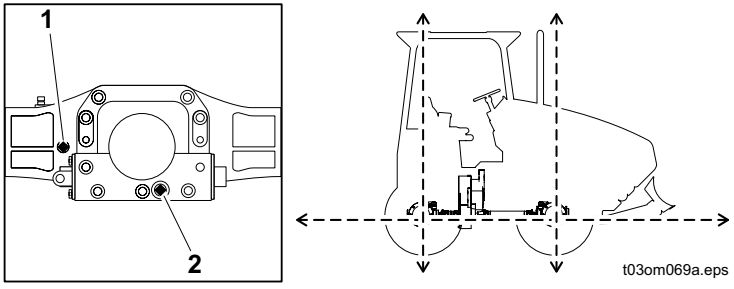
Lube axle spindle pins every 250 hours with 3-4 shots of EPG.

Check Ground Drive Gearbox Oil



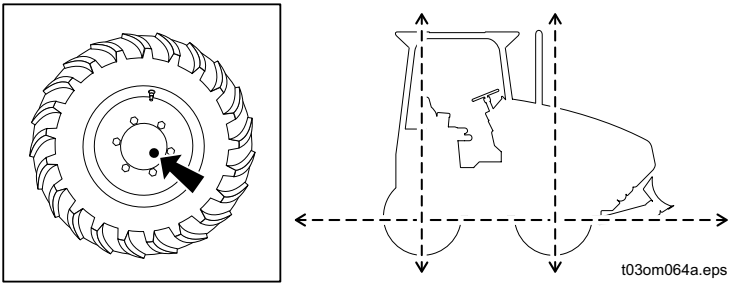
Check oil level at fill (1) every 250 hours. Keep level at raised horizontal line on gearbox. Add MPL as needed.

Check Differential Oil



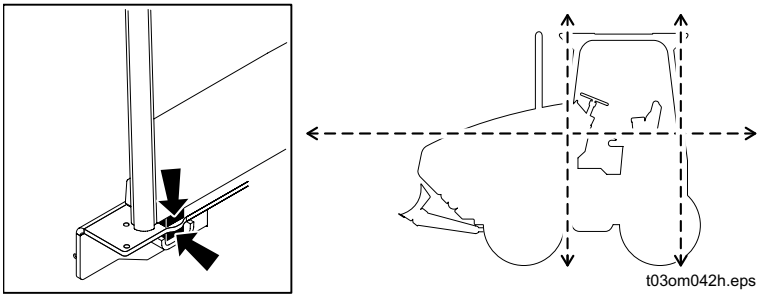
Check oil level at fill (1) every 250 hours. Add MPL as needed.

Lube Planetary Wheel Ends



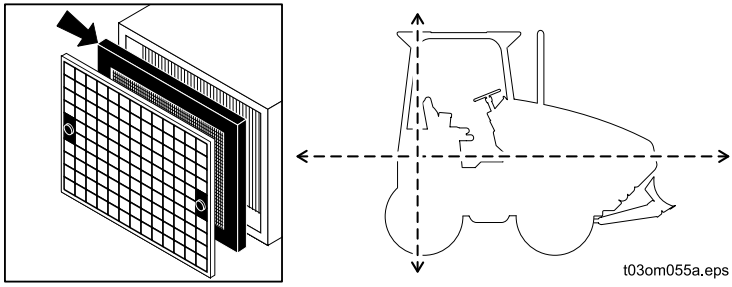
Check oil level in planetary wheel ends every 250 hours. Add MPL as needed.

Check ROPS Shock Mounts



Check ROPS shock mounts for wear or damage every 250 hours. Ensure that isolator irons do not make contact with frame. Replace if necessary.

Change Cab Air Filter



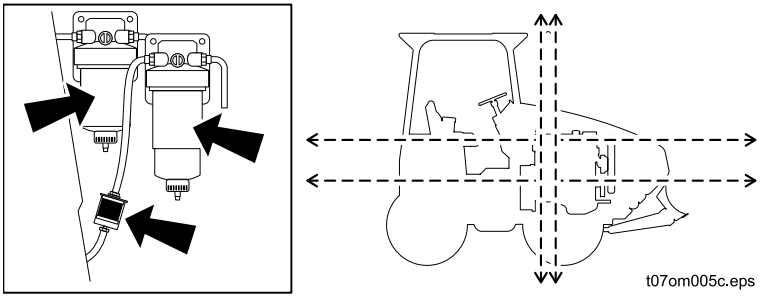
Change filter every 250 hours. Change more often if working in dusty conditions.

500 HOUR SERVICE

	Task	Note
TRACTOR	Change fuel filters	
	Change engine oil and filter	DEO
	Change hydraulic fluid and filter	THF
	Check radiator SCA level	
PLOW	Change plow vibrator oil	MPL
COMBO	Adjust headshaft bearing	

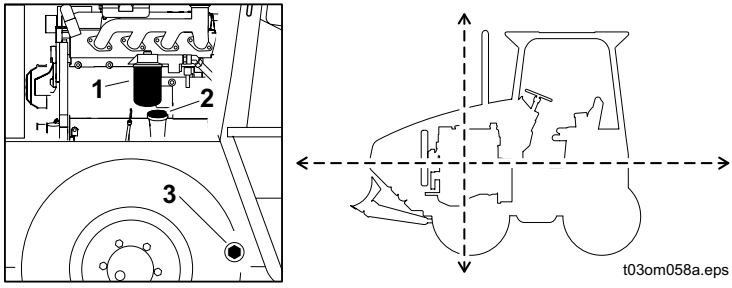
Tractor

Change Fuel Filters



Change fuel filters (shown) every 500 hours.

Change Engine Oil and Filter



Regular engine oil and filter change interval is 500 hours only if using John Deere Plus-50® or ACEA E4/E5.

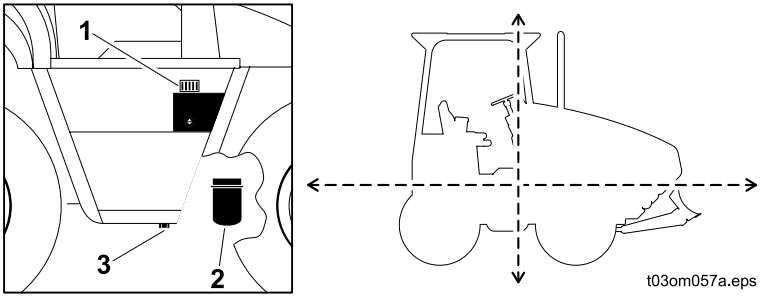
To change:

- While oil is warm, remove drain plug (3). Drain oil and replace plug.
- Remove filter (1) and replace with new filter each time oil is changed. Refill with DEO at fill neck (2).

NOTICE:

- Regular oil change interval is 500 hours only if using John Deere Plus-50® or ACEA E4/E5.
- Oil change interval is 250 hours when using alternative oils meeting API service classifications CI-4, CH-4, or ACEA E3.
- See "Recommended Lubricants" for more information about DEO specifications.

Change Hydraulic Fluid and Filter

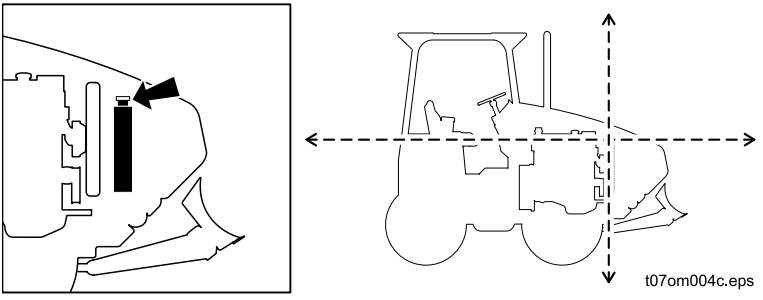


Change hydraulic fluid and filter every 500 hours. Change hydraulic fluid and filter every 250 hours if jobsite temperature exceeds 100°F (38°C) more than 50% of the time.

To change:

- Remove drain plug (3).
- Drain fluid and replace plug.
- Change filter (2).
- Refill with THF at fill (1).

Test Radiator SCA Level



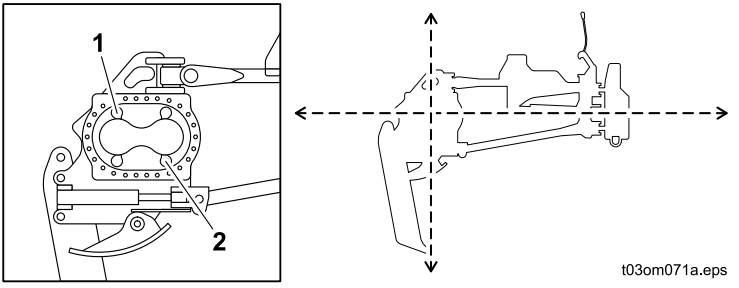
Test SCA level every 500 hours using 3-Way Heavy Duty Coolant Test Kit (p/n 256-032). If SCA levels do not fall within appropriate range, replenish with a heavy-duty coolant conditioner such as John Deere coolant conditioner (p/n 256-033).

IMPORTANT:

- Always check expiration date on 3-Way Heavy Duty Coolant Test Kit. An expired kit will not give accurate readings.
- See "Approved Coolants" earlier in this chapter for more information on approved coolants.

Plow

Change Plow Vibrator Oil



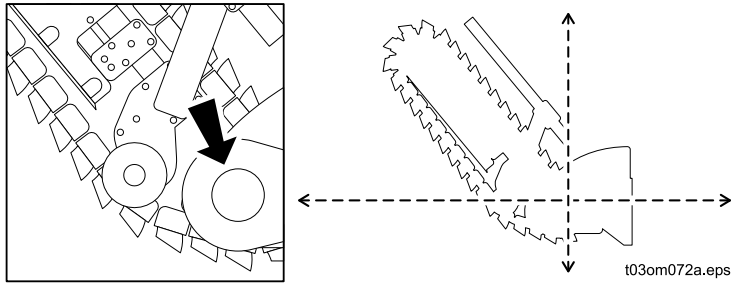
Change plow vibrator oil every 500 hours. If normal operating temperature exceeds 100° F (38° C), change plow vibrator oil every 250 hours.

Drain oil at drain plug (2). Replace plug and move plow vibrator to horizontal position. Fill with MPL at fill until oil is halfway up sight glass (2). Refill capacity is 4 qts (3.8 L).

IMPORTANT: Do not drain oil from plow vibrator when hot. Let plow vibrator cool before removing drain plug.

Combo

Adjust Headshaft Bearing



Adjust headshaft bearing every 500 hours.

To adjust:

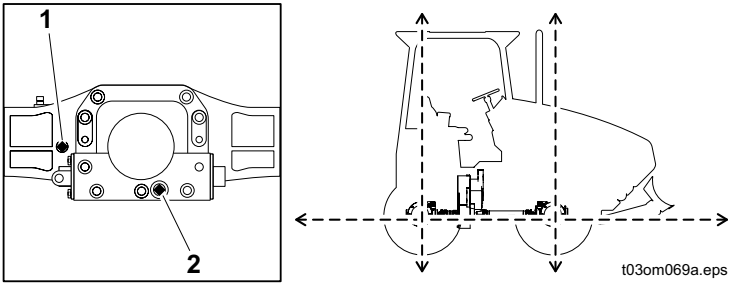
1. Remove cover. Remove bolts attaching trenching attachment motor to gearbox.
2. Remove bolt and washers in left end of headshaft.
3. Support gearbox with hoist and slide it off headshaft.
4. Install spacer (p/n 184-044) in place of gearbox while checking bearings.
5. Replace bolt on end of headshaft.
6. Remove chain from headshaft sprocket.
7. Turn chain sprocket until headshaft sprocket turns. When properly adjusted, it will take two hands and some effort. If it turns easily, remove a shim.

1000 HOUR SERVICE

	Task	Note
TRACTOR	Change differential oil	MPL
	Change ground drive gearbox oil	MPL
	Change planetary wheel end oil	MPL
	Adjust parking brake	
TRENCHER	Change trencher gearbox oil	MPL

Tractor

Change Differential Oil

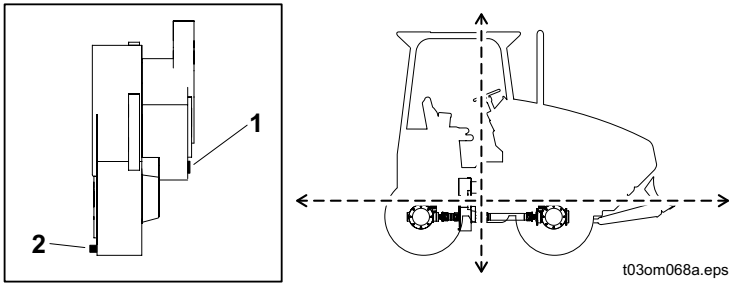


Change differential oil at drain (2) every 1000 hours.

To change:

- Remove drain plug (2).
- Drain fluid and replace plug.
- Fill with MPL at fill (1).

Change Ground Drive Gearbox Oil

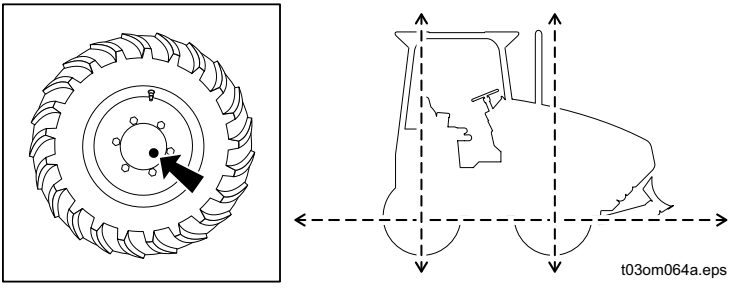


Change ground drive gearbox oil every 1000 hours.

To change:

- Remove drain plug (2).
- Drain oil and replace plug.
- Fill gearbox with MPL at fill (1).

Change Planetary Wheel End Oil

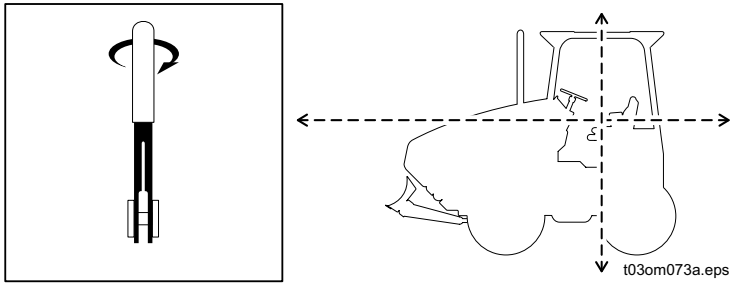


Change wheel end oil every 1000 hours.

To change:

- Position wheel with plug at bottom.
- Remove plug.
- Drain oil.
- Reposition wheel with plug at midway position.
- Fill with MPL to plug opening.
- Replace plug.

Adjust Parking Brake



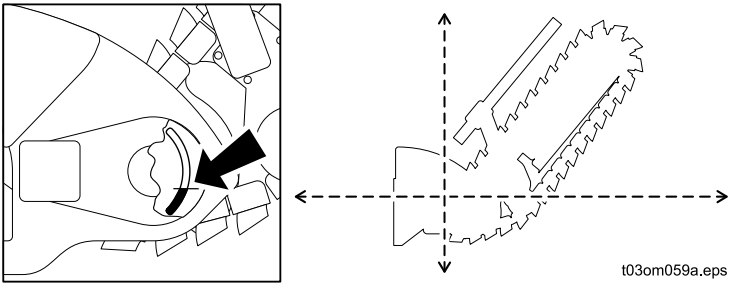
Adjust parking brake every 1000 hours.

To adjust:

1. Release parking brake.
2. Remove orange sleeve.
3. Twist lever clockwise to tighten.
4. Engage parking brake to test tension. If tension is too tight, the brake lever will not engage fully. Repeat steps 1-3 as necessary.
5. Replace orange sleeve.

Trencher

Change Trencher Gearbox Oil



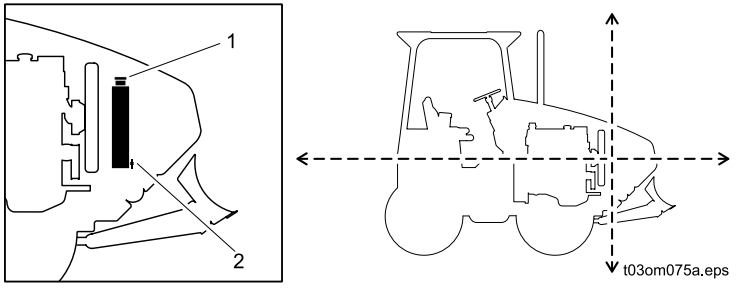
Change trencher gearbox oil every 1000 hours. Drain at plug. Replace drain plug and fill with MPL to lowest line on sight tube.

2000 HOUR SERVICE

	Task	Note
TRACTOR	Change engine coolant	if proper SCA levels are not maintained when using Cool-Gard or if using approved coolant other than Cool-Gard; see "5000 Hour Service" if proper SCA levels are maintained when using Cool-Gard

Tractor

Change Engine Coolant



If proper SCA levels are not maintained when using Cool-Gard or if using approved coolant other than Cool-Gard, drain cooling system at drain (2) every two years or 2000 hours. Refill at fill (1) with approved coolant.

NOTICE:

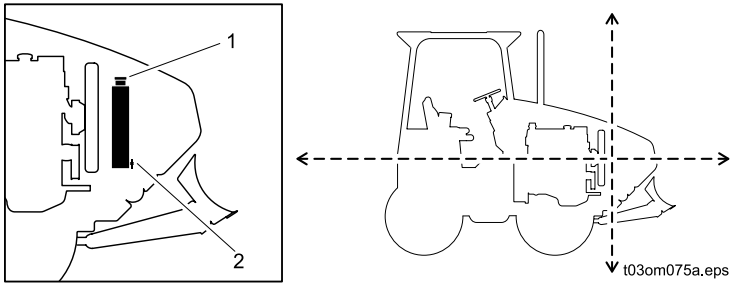
- Coolant change interval depends on coolant used and whether SCA levels are properly maintained. Read note above carefully to ensure coolant is changed at the correct interval.
- The use of non-approved coolant may lead to engine damage or premature engine failure and will void engine warranty.
- See "Approved Coolants" earlier in this chapter for list of approved coolants.

5000 HOUR SERVICE

	Task	Note
TRACTOR	Change engine coolant	if proper SCA levels are maintained when using Cool-Gard; see "2000 Hour Service" if proper SCA levels are not maintained when using Cool-Gard or if using approved coolant other than Cool-Gard

Tractor

Change Engine Coolant



If using Cool-Gard with properly maintained SCA levels, drain cooling system at drain (2) every five years or 5000 hours. Refill with Cool-Gard coolant (p/n 255-006).

NOTICE:

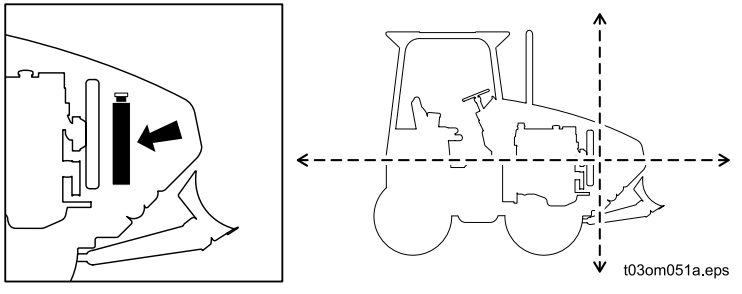
- Coolant change interval depends on coolant used and whether SCA levels are properly maintained. Read note above carefully to ensure coolant is changed at the correct interval.
- The use of non-approved coolant may lead to engine damage or premature engine failure and will void engine warranty.
- See "Approved Coolants" earlier in this chapter for list of approved coolants.

AS NEEDED

	Task	Note
TRACTOR	Clean radiator fins	
TRENCHER	Replace digging chain	
PLOW	Clean feed tube	
	Replace sod cutter and blade	
	Check plow blade bolts	210 ft•lb (285 N•m)
SAW	Replace saw bits	
	Replace saw segments	
	Check saw segment bolts	700 ft•lb (950 N•m)
	Hard surface saw segments and wear bars	
BACKHOE	Replace pins and bushings	

Tractor

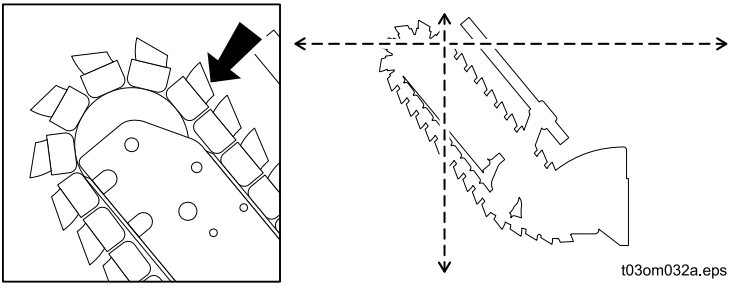
Clean Radiator Fins



Clean out radiator fins with compressed air or spray wash if required. Be careful not to damage fins with high-pressure air or water. Check more often if operating in dusty or grassy conditions.

Trencher

Replace Digging Chain



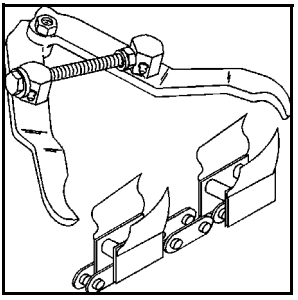
Visually check digging chains for wear on rollers and sidebars. Check pins and bushing wear by measuring distance between chain pins and comparing it with a new chain.

Replace sprockets when a new chain is installed.

To remove chain:

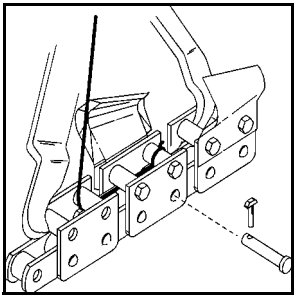
1. Fasten and adjust seatbelt.
2. Start tractor. See **TRACTOR** for proper start-up procedures.
3. Move attachment direction/speed control until digging chain connector pin is on top of boom.
4. Lower boom to ground.
5. Engage parking brake and verify parking brake indicator is on.
6. Turn ignition switch to STOP.

7. Secure chain by clamping links on either side of connector pin with chain jaws. Squeeze jaws to reduce pressure on connector pin.



om1752x

8. Loop cable through links nearest connector pin.

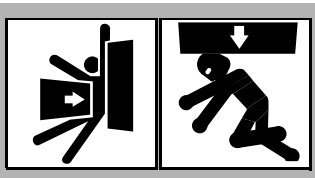


om1744x

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 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.
2. Fasten and adjust seatbelt.
3. Start tractor. See **TRACTOR** for start-up procedures.
4. Disenage parking brake and verify parking brake indicator is off.
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 and verify parking brake indicator is on.
11. Turn ignition switch to STOP.
12. Pull rear end of chain over and about 10" (260 mm) past tail roller.
13. Use hoist to pull front end of chain over head shaft sprocket.
14. Move chain down boom until chain connector pin and lock key can be installed. Install connector pin and lock key.

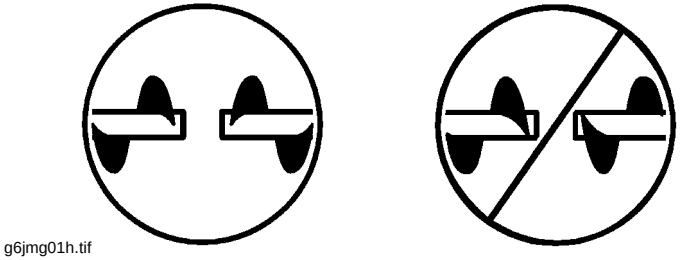
15. Tighten chain by pumping EPG into grease cylinder.

Time Augers

Ensure that augers are balanced, as shown. If auger timing is off, unit will bounce from side to side even in normal digging conditions.

To adjust timing:

- Remove bolts holding augers to auger shaft and rotate either auger as needed until augers are balanced.
- Reinstall bolts and tighten securely.



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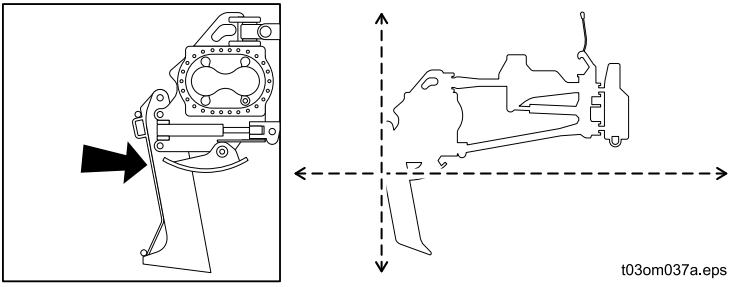
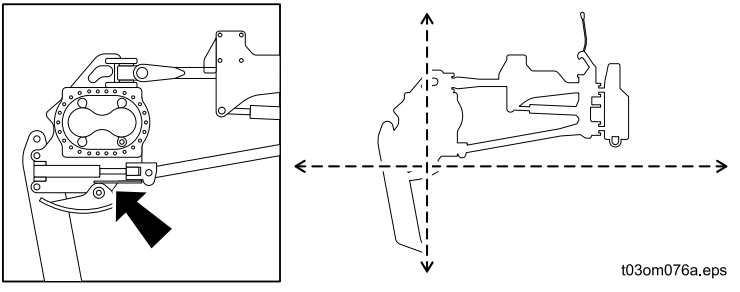
Plow

Clean Feed Tube



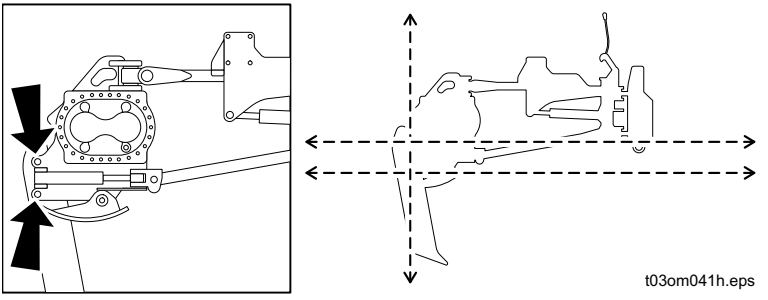
Clean feed tube as needed.

Replace Sod Cutter and Blade



Replace worn sod cutter and plow blade as needed.

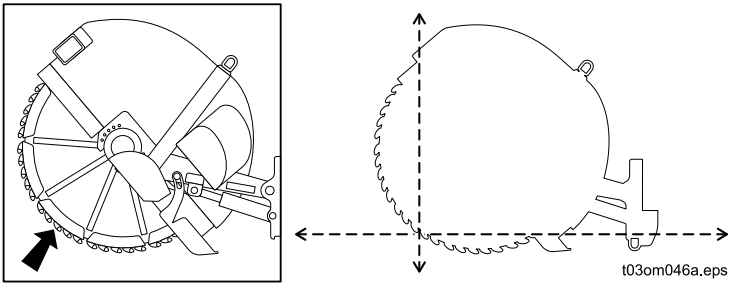
Check Plow Blade Bolts



Check plow blade bolts as needed. If loose, use Loctite® 242 (blue) and torque bolts to 210 ft•lb (285 N•m).

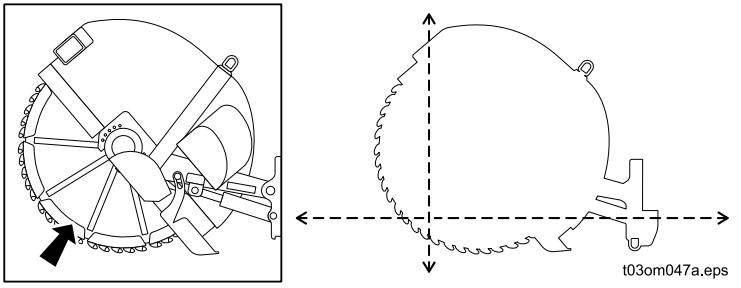
Saw

Replace Saw Bits



Replace bit when carbide cap or insert is worn or adapter can be damaged.

Replace Saw Segments



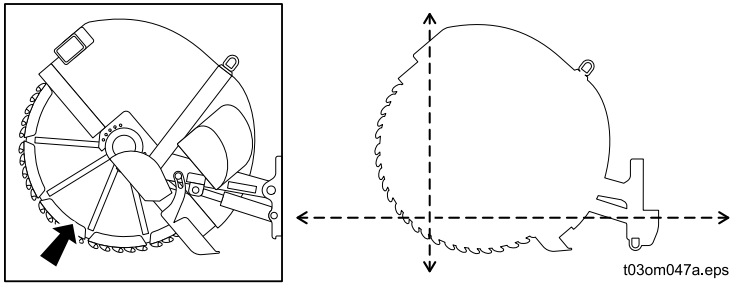
Replace worn segments as needed.

To repair, clamp jig to block and weld block to the segment with E7018 or equivalent.

NOTICE: Welding can damage electronics.

- Welding currents can damage electronic components. Always disconnect the ECU ground connection from the frame, harness connections to the ECU, and other electronic components prior to welding on machine or attachments. Connect welder ground close to welding point and make sure no electronic components are in the ground path. We recommend that NO WELDING signs be prominently displayed on machine.
- Disconnect battery at battery disconnect switch before welding to prevent damage to battery.
- Do not turn off battery disconnect switch with engine running, or alternator and other electronic devices may be damaged.

Check Saw Segment Bolts



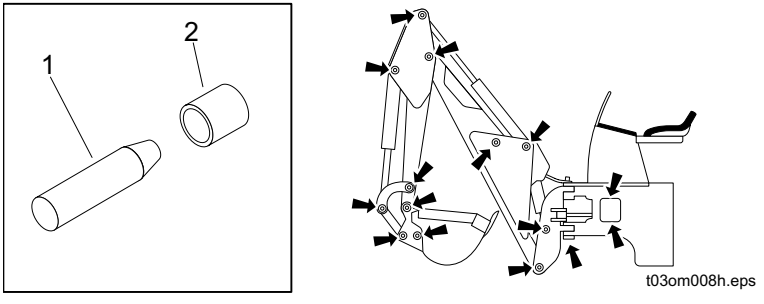
Check segment bolts after first 10 hours of operation and then as needed. Torque to 700 ft•lb (950 N•m).

Hard Surface Saw Segments and Wear Bars

Hard surface saw segments and wear bars before hard surfacing wears away to protect the life of the part.

Backhoe

Replace Pins and Bushings



Replace pins and bushings when worn or damaged.

TIER 2 SERVICE OVERVIEW

Tier 2 is a computer-controlled fuel management system. A variety of sensors send input data to an ECU (Electronic Control Unit) that compares inputs with pre-programed memory and sends output voltage to a variety of actuators to adjust and operate the engine within specified parameters.

The system is self-diagnostic with stored trouble codes displayed on a diagnostic gauge or read directly from a diagnostic connector. For more information about the diagnostic system and trouble codes see "Troubleshooting" in the repair guide.

An operator alert indicator tells the operator when warning faults or engine shutdown faults develop. Warning faults occur when engine sensors indicate moderate trouble with coolant temperature, oil pressure, charge air temperature, or fuel temperature. Warning faults cause the operator alert indicator to flash, and the engine will begin a slow power derate. In some situations an alarm may also sound. A trouble code is stored in the ECU. If the fault corrects itself, the engine will gradually return to normal power. The alert indicator will continue to flash until the trouble goes away, but a trouble code will remain stored.

Engine shutdown will occur due to severe faults in engine coolant temperature, oil pressure, or fuel temperature. Before shutdown, the operator alert indicator will light continuously and the engine will begin a rapid power derate. If the fault does not improve in 30 seconds the engine will shut down.

Diagnostic Codes

To read a step-by-step troubleshooting sequence for each code, see repair guide.

Two-line diagnostic code	Definition	Possible cause
SPN 28, FMI 3	attachment throttle input high	throttle sensor (E2)
SPN 28, FMI 4	attachment throttle input low	throttle sensor (E2)
SPN 29, FMI 3	primary throttle input high	throttle sensor (E2)
SPN 28, FMI 4	primary throttle input low	throttle sensor (E2)
SPN 100, FMI 1	engine oil pressure extremely low	oil pressure sensor (R1)
SPN 100, FMI 3	engine oil pressure input voltage high	oil pressure sensor (R1)
SPN 100, FMI 4	engine oil pressure input voltage low	oil pressure sensor (R1)
SPN 100, FMI 18	engine oil pressure moderately low	oil pressure sensor (R1)
SPN 105, FMI 3	manifold air temp input voltage high	manifold air temp sensor (R2)
SPN 105, FMI 4	manifold air temp input voltage low	manifold air temp sensor (R2)
SPN 105, FMI 16	manifold air temp moderately high	manifold air temp sensor (R2)

Two-line diagnostic code	Definition	Possible cause
SPN 110, FMI 0	engine coolant temp extremely high	coolant temp sensor (R3)
SPN 110, FMI 3	engine coolant temp input voltage high	coolant temp sensor (R3)
SPN 110, FMI 4	engine coolant temp input voltage low	coolant temp sensor (R3)
SPN 110, FMI 15	engine coolant temp high least severe	coolant temp sensor (R3)
SPN 110, FMI 16	engine coolant temp moderately high	coolant temp sensor (R3)
SPN 158, FMI 17	ECU power down error	ignition switch (S2), ignition circuit
SPN 174, FMI 3	fuel temperature input voltage high	fuel temperature sensor (R4)
SPN 174, FMI 4	fuel temperature input voltage low	fuel temperature sensor (R4)
SPN 174, FMI 16	fuel temperature moderately high	fuel temperature sensor (R4)
SPN 190, FMI 0	engine overspeed extreme	crank position sensor (MT1)
SPN 190, FMI 16	engine overspeed moderate	crank position sensor (MT1)

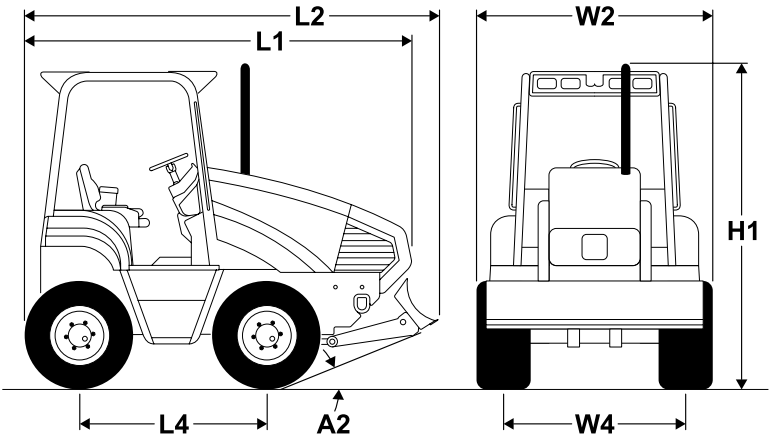
Two-line diagnostic code	Definition	Possible cause
SPN 620, FMI 3	sensor supply voltage high	wire 17 BLU/ GRN, ECU (U1)
SPN 620, FMI 4	sensor supply voltage low	wire 17 BLU/ GRN, ECU (U1)
SPN 627, FMI 4	ECU battery power missing	ECU (U1), batteries (BT1, BT2), primary power fuse (F1)
SPN 629, FMI 13	ECU error	ECU (U1)
SPN 637, FMI 2	crankshaft position input noise	crank position sensor (MT1), timing wheel
SPN 637, FMI 10	crankshaft position input pattern error	crank position sensor (MT1), timing wheel
SPN 639, FMI 13	CAN error	ECU (U1), diagnostic gauge (M1), wiring connections
SPN 1076, FMI 0	pump control valve closure too long	fuel control solenoid (L2), injection pump

Two-line diagnostic code	Definition	Possible cause
SPN 1076, FMI 1	pump control valve closure too short	fuel control solenoid (L2), injection pump, battery charge
SPN 1076, FMI 3	pump solenoid current high	wiring, injection pump
SPN 1076, FMI 5	pump solenoid circuit open	ECU (U1), wiring
SPN 1076, FMI 6	pump solenoid circuit severly shorted	wiring, injection pump
SPN 1076, FMI 7	pump control valve closure not detected	injection pump
SPN 1076, FMI 10	pump solenoid circuit moderately shorted	wiring, injection pump
SPN 1079, FMI 3	sensor supply voltage high	wire 17 BLU/ GRN, ECU (U1)
SPN 1079, FMI 4	sensor supply voltage low	ECU (U1), wiring
SPN 1109, FMI 31	engine shutdown warning	various
SPN 1110, FMI 31	engine shutdown	various
SPN 1569, FMI 31	fuel derate	various
SPN 2000, FMI 6	internal ECU failure	ECU (U1)

Two-line diagnostic code	Definition	Possible cause
SPN 2000, FMI 13	security violation	ECU (U1) programming

SPECIFICATIONS

RT115 TIER 2 TRACTOR



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Dimensions		U.S.	Metric
A^2	Angle of approach	25°	25°
H^1	Height	111 in	2.8 m
L^1	Nose to rear mount length	128 in	3.2 m
L^2	Length - transport	148 in	3.7 m
L^4	Wheelbase	73 in	1.8 m
W^2	Width	82 in	2.1 m
W^4	Tread	64 in	1.6 m

General
Ditch Witch model RT115 tractor, 4-wheel drive, rigid frame, hydrostatic ground drive through rubber tires, 4-wheel steering, hydrostatic attachment drive, riding unit.

Operation		U.S.	Metric
Forward speeds			
	Low/Low	0.6 mph	0.9 km/h
	Low/High	1.3 mph	2.0 km/h
	High/Low	4.4 mph	7.0 km/h
	High/High	9.4 mph	15.1 km/h
Reverse speeds			
	Low/Low	0.3 mph	0.5 km/h
	Low/High	0.7 mph	1.2 km/h
	High/Low	2.9 mph	4.7 km/h
	High/High	6.2 mph	9.9 km/h
Vehicle clearance circle (SAE) wall to wall with backfill blade			
	Front steer only	31 ft	9 m
	Coordinated steer	21 ft	6 m
Ground clearance		14 in	355 mm
Basic unit weight		7980 lb	3620 kg
Maximum allowable tractor weight		18,100 lb	8210 kg
Front counterweight		2100 lb	950 kg

Backfill Blade	U.S.	Metric
Blade width	80 in	2.0 m
Blade height	17 in	430 mm
Lift height above ground	21 in	530 mm
Blade drop below ground	11 in	280 mm
Maximum swing angle (left/right)	30°	30°
Tilt angle (up/down)	24°	24°

Power Plant		U.S.	Metric
Engine: John Deere 4045TF275, turbocharged, diesel			
Displacement		276 in^3	4.5 L
Bore		4.19 in	106 mm
Stroke		5.00 in	127 mm
Engine manufacturer's gross power rating (per SAE J1995)		115 hp	86 kW
Estimated Net Power rating (per SAE J1349)		100 hp	75 kW
Rated Speed		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 transmission: hydrostatic
Differentials: planetary front and rear with optional rear steering
Service brake: disc, foot operated
Parking brake: disc, hand operated
Tires: 38 x 18.00-20 14-ply bar lug flotation; inflate to 72 psi (5 bar) maximum.
Attachment drive transmission: hydrostatic, lever-operated speed infinitely variable from zero to maximum

Hydraulic System	U.S.	Metric
Ground drive pump capacity at 2500 rpm	30.4 gpm	115 L/min
Ground drive pump relief pressure at 2500 rpm	5000 psi	345 bar
Attachment pump capacity at 2500 rpm	50 gpm	189 L/min
Attachment pump relief pressure at 2500 rpm	6090 psi	420 bar
Auxiliary pump capacity at 2500 rpm	13 gpm	49 L/min
Auxiliary pump relief pressure at 2500 rpm	2500 psi	172 bar

Fluid Capacities	U.S.	Metric
Fuel tank	38 gal	144 L
Engine oil	16 qt	15 L
Hydraulic reservoir	24 gal	91 L
Hydraulic system	29 gal	110 L
Cooling system	24.7 qt	23.4 L

Battery
Group 65, SAE res. cap 165 min., SAE cold crank @ 0° F (-18° C), 875 amp
Auxiliary power outlet - 12 volt, 10 amp

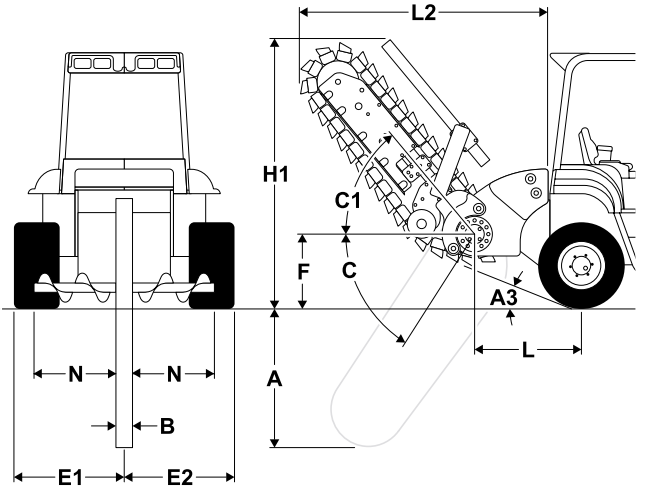
Vibration Level
Vibration transmitted to the operator’s hand/arm and whole body during normal operation does not exceed 15 and .5 meters per second squared respectively.
During normal operation, vibration level does not exceed 4.9 and 1.5 meters squared respectively.
Operator seat per ISO 7096.

Noise Levels
Operator 96 dBA sound pressure per ISO 6394
Exterior 112 dBA sound power per ISO 6393.

Unless otherwise specified, all figures are for standard equipment only.

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.

H910 TRENCHER



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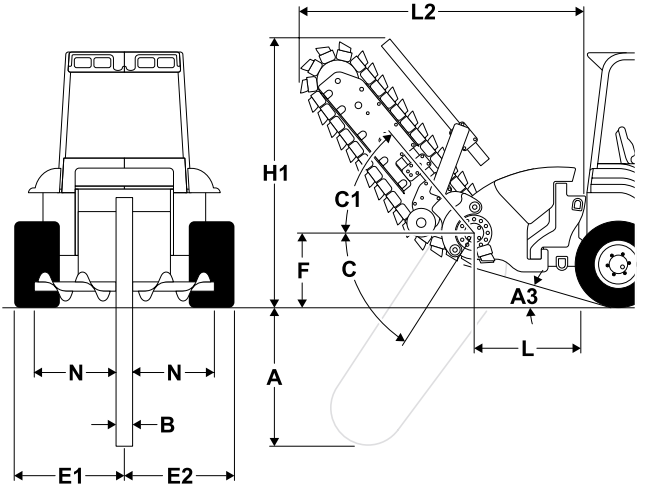
Dimensions		U.S.	Metric
A^3	Angle of departure	28°	28°
A	Trench depth, maximum	97 in	2.46 m
B	Trench width, maximum	24 in	610 mm
C	Boom travel down	65°	65°
C^1	Boom travel up	50°	50°
E^1	Centerline of trench to outside edge, left	41 in	1.0 m
E^2	Centerline of trench to outside edge, right	32 in	810 mm
F	Headshaft height, digging chain	32 in	810 mm
H^1	Transport height	124 in	3.2 m
L^2	Transport length	112 in	2.8 m
L	Headshaft overhang	40 in	1.0 m
N	Soil discharge reach	33 in	840 mm
	Attachment weight	1750 lb	794 kg

Operation		U.S.	Metric
Headshaft speeds @ 2500 engine rpm			
	Ratio low	122 rpm	122 rpm
	Ratio standard	150 rpm	150 rpm
	Ratio high	202 rpm	202 rpm
Digging chain speeds			
	Ratio low	347 ft/min	106 m/min
	Ratio standard	427 ft/min	130 m/min
	Ratio high	575 ft/min	175 m/min

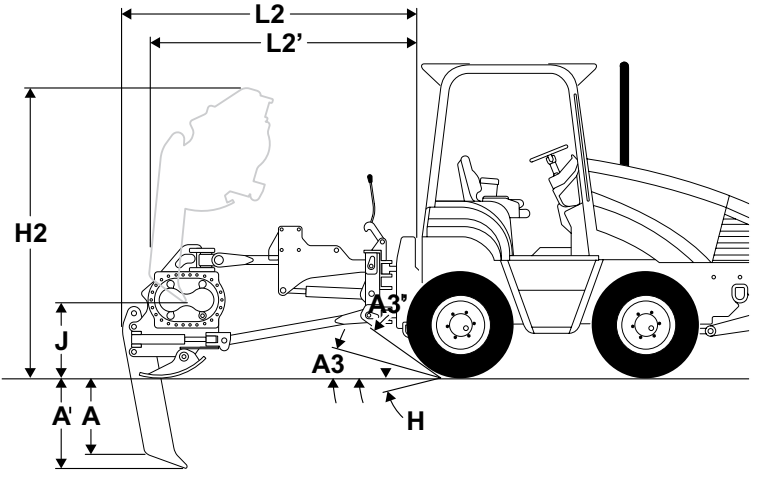
H911 TRENCHER



Dimensions		U.S.	Metric
A[3]	Angle of departure	25°	25°
A	Trench depth, maximum	94 in	2.39 m
B	Trench width, maximum	24 in	610 mm
C	Boom travel down	65°	65°
C[1]	Boom travel up	50°	50°
E[1]	Centerline of trench to outside edge, left	25 in	635 mm
E[2]	Centerline of trench to outside edge, right	13.5 in	340 mm
F	Headshaft height, digging chain	35 in	890 mm
H[1]	Transport height	126 in	3.2 m
L[2]	Transport length	126 in	3.2 m
L	Headshaft overhang	54 in	1.4 m
N	Soil discharge reach	33 in	840 mm
	Attachment weight	2350 lb	1066 kg

Operation		U.S.	Metric
Headshaft speeds @ 2500 engine rpm			
	Ratio low	122 rpm	122 rpm
	Ratio standard	150 rpm	150 rpm
	Ratio high	202 rpm	202 rpm
Digging chain speeds			
	Ratio low	347 ft/min	106 m/min
	Ratio standard	427 ft/min	130 m/min
	Ratio high	575 ft/min	175 m/min

H932 PLOW



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Dimensions		U.S.	Metric
$A^{3'}$	Angle of departure, transport, no blade	30°	30°
A^{3}	Angle of departure, transport, 24-in (610-mm) blade	27°	27°
	Angle of departure, transport, 30-in (760-mm) blade	23°	23°
H	Angle of depression, plow max.	10°	10°
H2	Height transport	96 in	2.4 m
L2	Attachment length, fully lowered, no blade	102 in	2.6 m
$L^{2'}$	Attachment length, fully raised, no blade	69 in	1.7 m
J	Blade ground clearance, 30-in (760-mm) blade	29 in	740 mm
A	Cover depth*	36 in	915 mm
A'	Penetration*	40 in	1.0 m
	Plow swing angle	43°	43°
	Inclusive blade steer angle	89°	89°
	Center of plow to outside edge of machine, left	40 in	1.0 m
	Center of plow to outside edge of machine, right	42 in	1.1 m

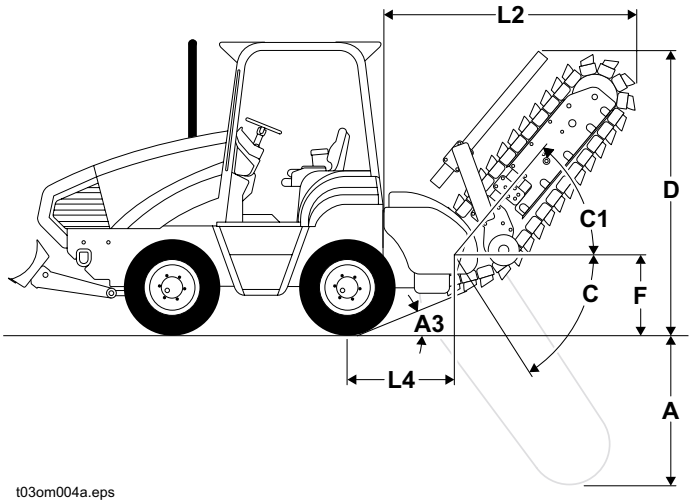
*Suggested maximum. Plow blade used will be determined by job requirements and soil conditions.

Operation		U.S.	Metric
Plow vibrator force @ 1800 rpm		35,215 lb	157 kN
Maximum material diameter			
	Pulled	3 in	80 mm
	Fed	2 in	50 mm

General	U.S.	Metric
Operating weight, without plow blade	2400 lb	1100 kg
Counterweight required. Contact your local Ditch Witch dealer for counterweight requirements.		

H952 COMBO

Trencher



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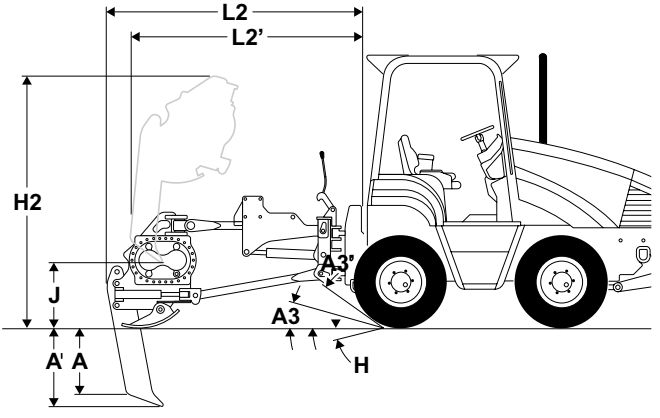
Dimensions		U.S.	Metric
A	Trench depth, maximum	70 in	1.8 m
	Trench width	6-12 in	150-305 mm
C1	Boom travel up	44°	44°
C	Boom travel down	60°	60°
F	Headshaft height, digging chain	31 in	790 mm
L[2]	Transport length	126 in	3.2 m
D	Transport height	126 in	3.2 m
A[3]	Angle of departure	22°	22°
	Center of trench to outside edge, left*	8 in	190 mm
	Center of trench to outside edge, right	67 in	1.7 m
	Spoil discharge reach minimum	19 in	480 mm
	Headshaft overhang	40 in	1.0 m

*Left edge of machine is defined as outside of digging chain guard

Operation		U.S.	Metric
Maximum headshaft speed			
	Ratio low	139 rpm	139 rpm
	Ratio standard	170 rpm	170 rpm
	Ratio high	230 rpm	230 rpm
Maximum digging chain speed			
	Ratio low	355 f/min	108 m/min
	Ratio standard	434 f/min	132 m/min
	Ratio high	587 f/min	179 m/min

Plow



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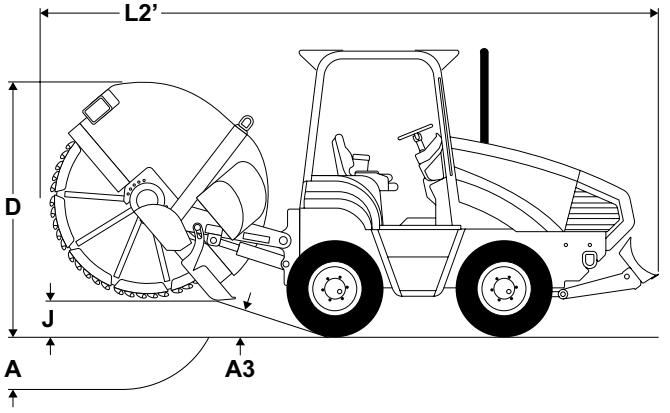
Dimensions		U.S.	Metric
$A^{3'}$	Angle of departure, transport, no blade	30°	30°
A^{3}	Angle of departure, transport, 24-in (610-mm) blade	27°	27°
	Angle of departure, transport, 30-in (760-mm) blade	22°	22°
H	Angle of depression, plow max.	10°	10°
H2	Height transport	96 in	2.4 m
L^{2}	Attachment length, fully lowered, no blade	103 in	2.6 m
$L^{2'}$	Attachment length, fully raised, no blade	70 in	1.8 m
J	Blade ground clearance, 30-in (760-mm) blade	29 in	740 mm
A	Cover depth*	36 in	915 mm
A'	Penetration*	40 in	1.0 m
	Plow swing angle, left	0°	0°
	Plow swing angle, right	38°	38°
	Inclusive blade steer angle	89°	89°
	Center of plow to outside edge of machine, left	45 in	1.1 m
	Center of plow to outside edge of machine, right	37 in	940 mm

* Suggested maximum. Plow blade used will be determined by job requirements and soil conditions.

Operation		U.S.	Metric
Plow vibrator force @ 1800 rpm		35,215 lb	156 644 kN
Maximum material diameter			
	Pulled	3 in	80 mm
	Fed	2 in	50 mm

General	U.S.	Metric
Operating weight without boom, chain, or plow blade	3065 lb	1390 kg
Counterweight required. Contact your local Ditch Witch dealer for counterweight requirements.		

H1140 SAW



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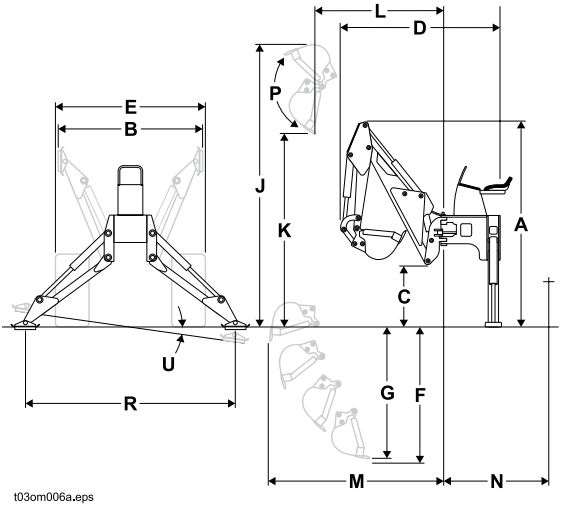
Dimensions		U.S.	Metric
A	Trench depth	40 in	1 m
	Trench width	4.5, 6 in	115, 150 mm
D	Transport height - attachment	130 in	3.3 m
	Height - wheel on ground	102 in	2.6 m
L_2'	Overall length - wheel on ground	252 in	6.4 m
J	Ground clearance at wheel	27 in	700 mm
A^3	Angle of departure	21°	21°
	Attachment weight	5900 lb	2675 kg

Operation	U.S.	Metric
Maximum breakover angle at full depth	17°	17°
Quantity of cutting teeth on wheel (4.5", 6")	70, 80	70, 80
Counterweight required. Contact your local Ditch Witch dealer for counterweight requirements.		

Power Train
Cutting bit types: Rotating, self-sharpening conical bit with spring retainer. Carbide cap or carbide insert available.
Cutter wheel type: Steel wheel with 10 bolt-on segments.
Wheel motor: 107 in^3 (1747 cc) radial piston with pair of tapered roller bearings.
Wheel shaft bearing: 3 in (76 mm) flanged cartridge double row, spherical roller bearing.
Lift provision: Two 4 in (107 mm) hydraulic cylinders.
Gauge shoes: Minimize shock, bearing load, and vibration when cutting and move spoils away from trench.
Spoil placement: Both sides approximately 12-18 in (305-457 mm) from trench.

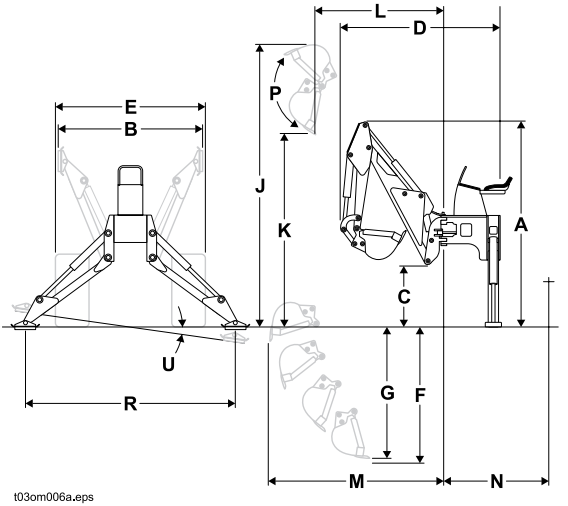
A720 BACKHOE



Dimensions		U.S.	Metric
A	Transport height	111 in	2.8 m
C	Ground clearance	27 in	690 mm
D	Backhoe length, stowed	122 in	3.1 m
F	Digging depth, max.	92 in	2.3 m
G	Digging depth, 2 ft (0.6 m) flat bottom	88 in	2.2 m
J	Operating height, fully raised	139 in	3.5 m
K	Loading height	89 in	2.3 m
L	Loading reach	76 in	1.9 m
M	Reach from swing pivot	143 in	3.6 m
N	Swing pivot to centerline axle	55 in	1.4 m
P	Bucket rotation	165°	165°
B	Stabilizer spread, transport	86 in	2.1 m
E	Backhoe or basic unit width	82 in	2.0 m
R	Stabilizer spread, operating	121 in	3.0 m
U	Leveling angle	15°	15°

General		U.S.	Metric
Bucket			
	Width	12-24 in	305-610 mm
	Capacity	1.7-3.5 ft^3	0.05-.1m^3
Backhoe weight with 18 in (686 mm) bucket		2975 lb	1350 kg
Lift capacity, boom over end and swing arc, SAE*			
	@ 48 in (1.2 m)	1050 lb	476 kg
	@ ground level	880 lb	399 kg
	@ 72 in (1.8 m)	1042 lb	473 kg
Lift capacity, dipperstick over end and swing arc, SAE*			
	@ 52 in (1.3 m)	2650 lb	1202 kg
	@ 96 in (2.4 m)	2150 lb	975 kg
Swing arc		180°	180°
Digging force			
	Using bucket cylinder	6600 lb	2994 kg
	Using dipperstick cylinder	4025 lb	1825 kg
*Lift capacities are for a stationary machine supported by stabilizers.			

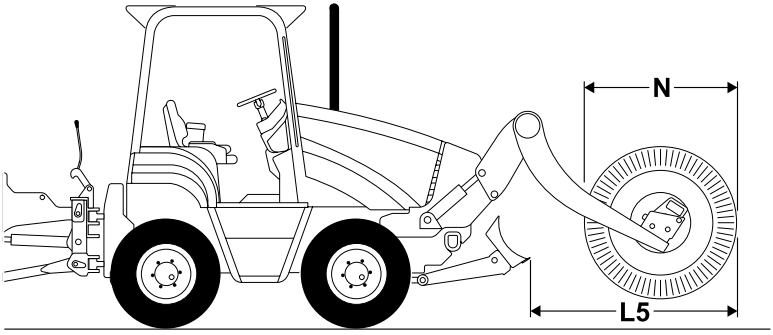
A920 BACKHOE



DIMENSIONAL		U.S.	Metric
A	Transport height	118 in	3.0 m
C	Ground clearance	29 in	740 mm
D	Backhoe length, stowed	117 in	2.9 m
F	Digging depth, max.	112 in	2.8 m
G	Digging depth, 2 ft (0.6 m) flat bottom	109 in	2.7 m
J	Operating height, fully raised	156 in	3.9 m
K	Loading height	104 in	2.6 m
L	Loading reach	78 in	1.9 m
M	Reach from swing pivot	158 in	4.0 m
N	Swing pivot to centerline axle	57 in	1.4 m
P	Bucket rotation	170°	170°
B	Stabilizer spread, transport	86 in	2.2 m
E	Backhoe or basic unit width	82 in	2.0 m
R	Stabilizer spread, operating	121 in	3.0 m
U	Leveling angle	10°	10°

General		U.S.	Metric
Bucket			
	Width	12-24 in	305-610 mm
	Capacity	1.7-3.5 ft^3	0.05-.1 m^3
Backhoe weight with 18 in (686 mm) bucket		3300 lb	1497 kg
Lift capacity, boom over end and swing arc, SAE*			
	@ 48 in (1.2 m)	1170 lb	530 kg
	@ ground level	1250 lb	567 kg
	@ 72 in (1.8 m)	1184 lb	537 kg
Lift capacity, dipperstick over end and swing arc, SAE*			
	@ 52 in (1.3 m)	3184 lb	1444 kg
	@ 96 in (2.4 m)	2242 lb	1017 kg
Swing arc		180°	180°
Digging force			
	Using bucket cylinder	6600 lb	2994 kg
	Using dipperstick cylinder	4475 lb	2030 kg
*Lift capacities are for a stationary machine supported by stabilizers.			

RC115 REEL CARRIER



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Dimensions		U.S.	Metric
L5	Distance from backfill blade to outside edge of reel carrier with maximum diameter reel	76 in	1.9 m
N	Maximum reel diameter	84 in	2.1 m
	Internal width	54 in	1.4 m
	Capacity	2500 lb	1130 kg
	Attachment weight with six 96 lb (41 kg) counterweights	1600 lb	726 kg

RC115 Counterweight Requirements				
	Reel weight	**Back axle***	**Front RC weight**	**Rear weight**
RT115 with H932 plow	0-1500 lb (0-680 kg)	800 lb (363 kg)	600 lb (272 kg)	1000 lb (454 kg)
	1500-2500 lb (680-1134 kg)	800 lb (363 kg)	0 lb (0 kg)	1000 lb (454 kg)
RT115 with H952 combo	0-1500 lb (0-680 kg)	800 lb (363 kg)	600 lb (272 kg)	0 lb (0 kg)
	1500-2500 lb (680-1134 kg)	800 lb (363 kg)	0 lb (0 kg)	0 lb (0 kg)

*Use Tire Ballast and Sealant (TBS). Counterweight requirement for front axle is 0 lb (0 kg).

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 replacements 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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Please Type or Print All Information

Purchaser's Company Name

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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