

RT80

Tier 4

Operator's Manual



CE

Issue 1.0

053-2845

ORIGINAL INSTRUCTION

Overview

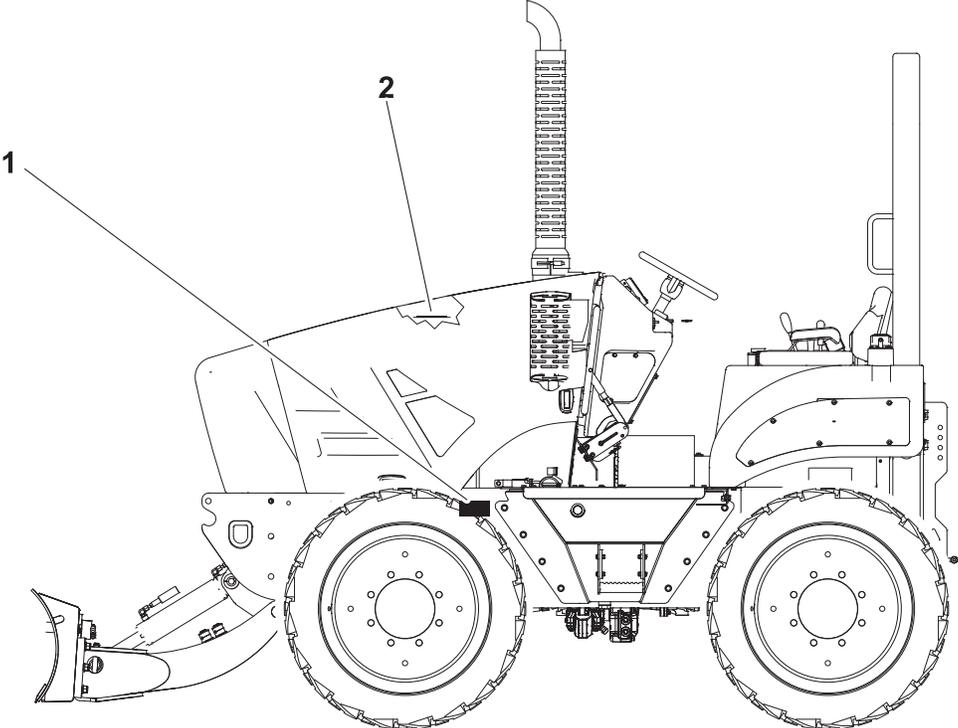


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Serial Number Location

Record serial numbers and date of purchase in spaces provided. RT80 (1) and engine serial numbers (2) are located as shown.



t45om001h.eps

Date of manufacture	
Date of purchase	
RT80 serial number	
Front attachment serial number	
Rear attachment serial number	
Trailer serial number	
Engine serial number	

Intended Use



The RT80 is a riding trencher designed to install buried service lines of various sizes using a variety of Ditch Witch® attachments.

Attachment	Max. width/diameter	Max. depth
H810 trencher	24" (610 mm)	93" (2.4 m)
H813 trencher	12" (305 mm)	52.4" (1.3 m)
H832 plow	n/a	36" (915 mm)
RC80 reel carrier	84" (2.1 m) reel diameter	n/a
H853 combo	12" (305 mm)	63" (1.6 m)
A820 backhoe	18" (460 mm) bucket	88.3" (2.2 m)
MT12 microtrencher	0.75-1.25 in (19-32 mm)	6-12.5 in (165-318 mm)
HD630 saw	See manufacturer's specifications	

This unit is designed for operation in temperatures typically experienced in earth moving and construction work environments. Provisions may be required to operate in extreme temperatures. Contact your Ditch Witch dealer. Use in any other way is considered contrary to the intended use.

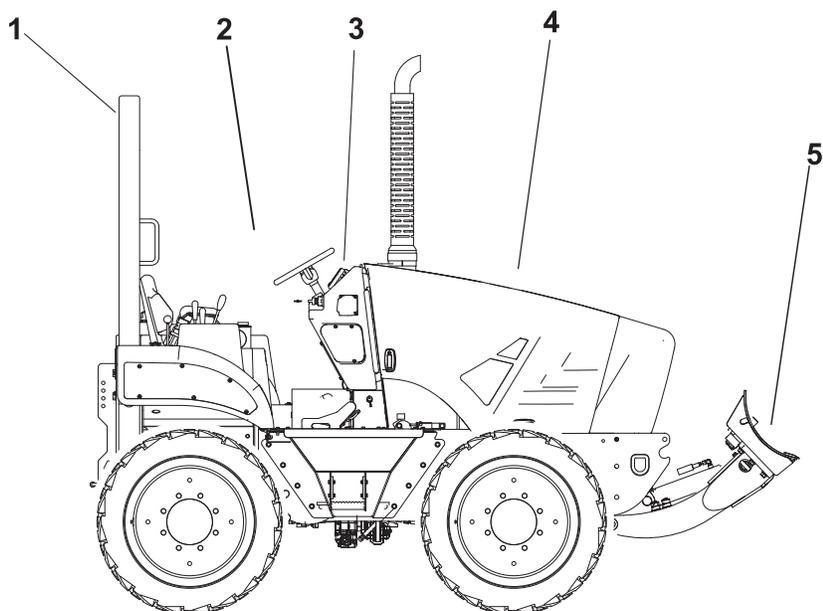
The RT80 should be used with genuine Ditch Witch chain, teeth, and sprockets. It should be operated, serviced, and repaired only by persons familiar with their particular characteristics and acquainted with the relevant safety procedures.

Equipment Modification

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

The protection offered by the Rollover Protective System (ROPS) will be impaired if it has been subjected to any modification, structural damage, or has been involved in an overturn accident. The ROPS must be replaced after a roll-over.

Unit Components



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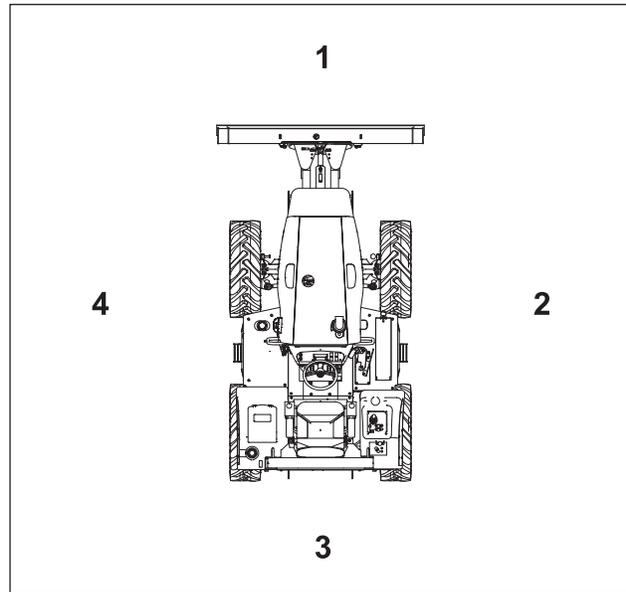
- | | |
|---|------------------------------|
| 1. Rollover Protective Structure (ROPS) | 4. Engine compartment |
| 2. Operator station | 5. Backfill blade (optional) |
| 3. Control console | |

NOTICE: The protection offered by the Rollover Protective System (ROPS) will be impaired if it has been subjected to any modification, structural damage, or has been involved in an overturn accident. The ROPS must be replaced after a roll-over.

Operator Orientation

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

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



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About This Manual

This manual contains information for the proper use of this machine. See **Operation Overview** for basic operating procedures. Cross references such as "See page 50" will direct you to detailed procedures.

Bulleted Lists

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

Numbered Lists

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

Foreword



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

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

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

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

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

Thank you for buying and using Ditch Witch equipment.

RT80
with Tier 4 engine
Operator's Manual

Issue number 1.0/OM-9/15
Part number 053-2845

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

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Safety

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Guidelines

Follow these guidelines before operating any jobsite equipment:

- Complete proper training and read operator's manual before using equipment.
- Contact your local One-Call (811 in USA) or the One-Call referral number (888-258-0808 in USA and Canada) to have underground utilities located before digging. Also contact any utilities that do not participate in the One-Call service. Mark proposed path with white paint prior to contacting One-Call or utilities.
- Classify jobsite based on its hazards and use correct tools and machinery, safety equipment, and work methods for jobsite.
- Mark jobsite clearly and keep spectators away.
- Wear personal protective equipment.
- Review jobsite hazards, safety and emergency procedures, and individual responsibilities with all personnel before work begins. Safety videos are available from your Ditch Witch® dealer or at www.ditchwitch.com/safe.
- Fully inspect equipment before operating. Repair or replace any worn or damaged parts. Replace missing or damaged safety shields and safety signs. Contact your Ditch Witch dealer for assistance.
- Use equipment carefully. Stop operation and investigate anything that does not look or feel right.
- Do not operate unit where flammable gas may be present.
- Only operate equipment in well-ventilated areas.
- Contact your Ditch Witch dealer if you have any question about operation, maintenance, or equipment use.
- Complete the equipment checklist located at www.ditchwitch.com/safe.

California Proposition 65 Warning

This product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

- battery posts, terminals and related accessories
- engine exhaust
- ethylene glycol

Emergency Procedures



WARNING

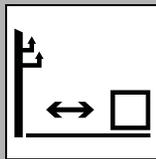
Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.



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

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

Electric Strike Description



DANGER

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

When working near electric cables, remember the following:

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

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

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

If any of these occur, or if strike alarm sounds or flashes, 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 drilling unit or bonded equipment**, DO NOT MOVE. Remain on drilling machine and take the following actions. The order and degree of action will depend on the situation.

- Warn people nearby that an electric strike has occurred.
- Have someone contact electric company.
- Reverse drilling direction and try to break contact. Do not touch drill pipe with hands or hand-held tools.
- Press electric strike system self test button.
 - If alarm sounds again, stay where you are and wait for electric company to shut off power.
 - If alarm does not sound and there is no other indication of a strike, wait at least one full minute before moving away from equipment. Utility might use automatic reclosers which will restart current flow. If alarm sounds again while waiting, stay where you are until electric company shuts off power.
 - If alarm does not sound but all lights in strike indicator are on, assume strike is continuing and stay where you are until electric company shuts off power.
- Do not resume drilling or allow anyone into area until given permission by electric company.

If you suspect an electric line has been damaged and you are **off drilling unit or bonded equipment**, DO NOT TOUCH ANY EQUIPMENT connected to drilling unit. Take the following actions. The order and degree of action will depend on the situation.

- Stay where you are unless you are wearing electric insulating boots. If you leave, do not return to area or allow anyone into area until given permission by electric company.

If a Gas Line is Damaged



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



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

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

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

If a Fiber Optic Cable is Damaged

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

If Machine Catches on Fire

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

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

Safety Alert Classifications

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



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

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

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

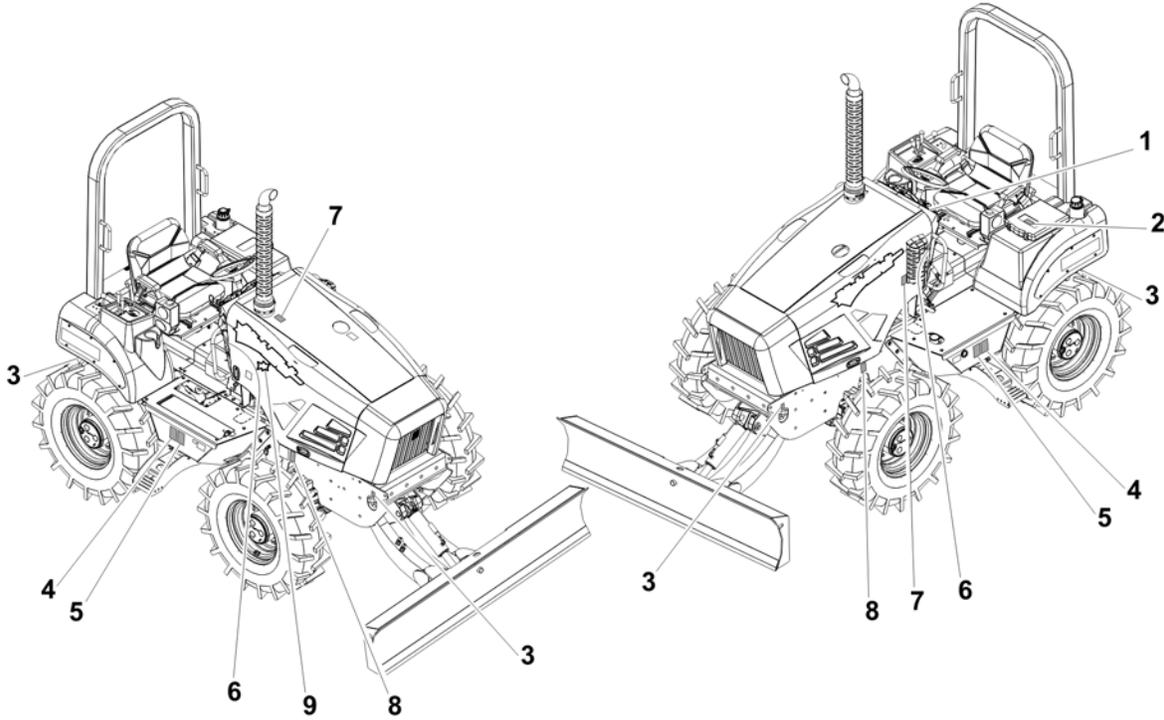
 **CAUTION** indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

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

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

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

Machine Safety Alerts



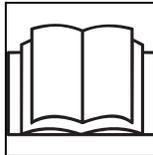
Decal_RT80T4.png

1



WARNING Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment. 274-050; 274-724 (2P)

2



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

3



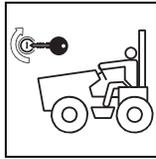
Tiedown location. See Transport chapter for more information.

4



WARNING Rollover could kill or crush. Wear seat belt. 275-303

5



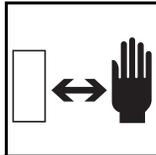
WARNING Runaway possible. Start from operator's position only. 275-070

6



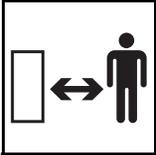
WARNING Fall possible. Riders can be injured or killed. Single operator only. 273-487

7



CAUTION Hot parts may cause burns. Do not touch until cool or wear gloves. 275-355 (2-P), 273-423 (2-P)

8



WARNING Moving parts could cut off hand or foot. Stay away. 275-184, 273-546

9

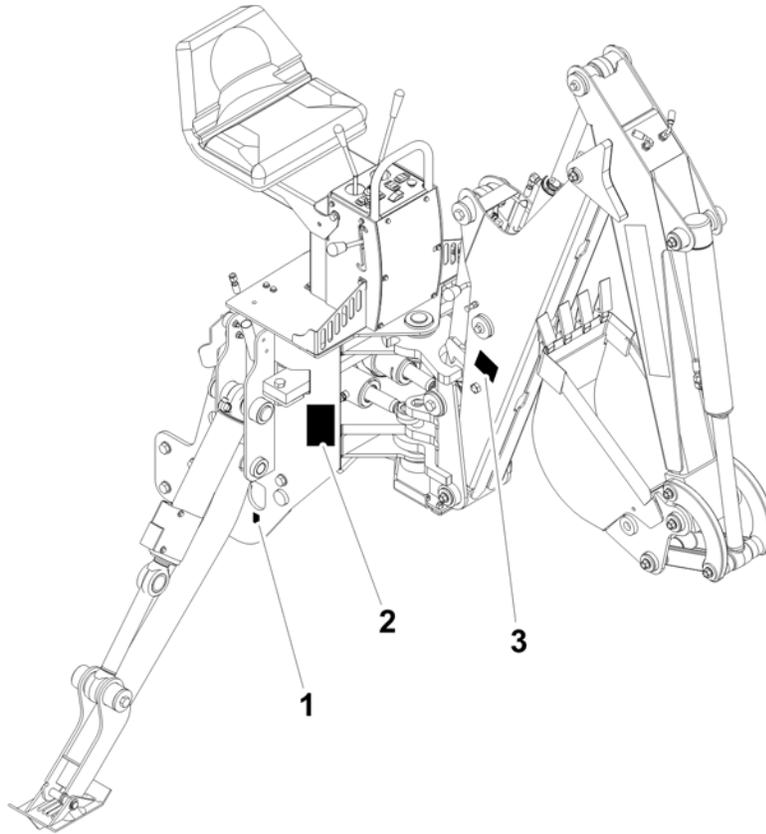


WARNING Fire or explosion possible. Do not use starter fluid. 273-459 (2P), 274-206 (2P), 700-206 (2P)



Attachment Safety Alerts

A820 T4



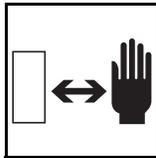
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1



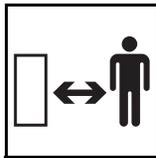
Tiedown location. See Transport chapter for more information.

2



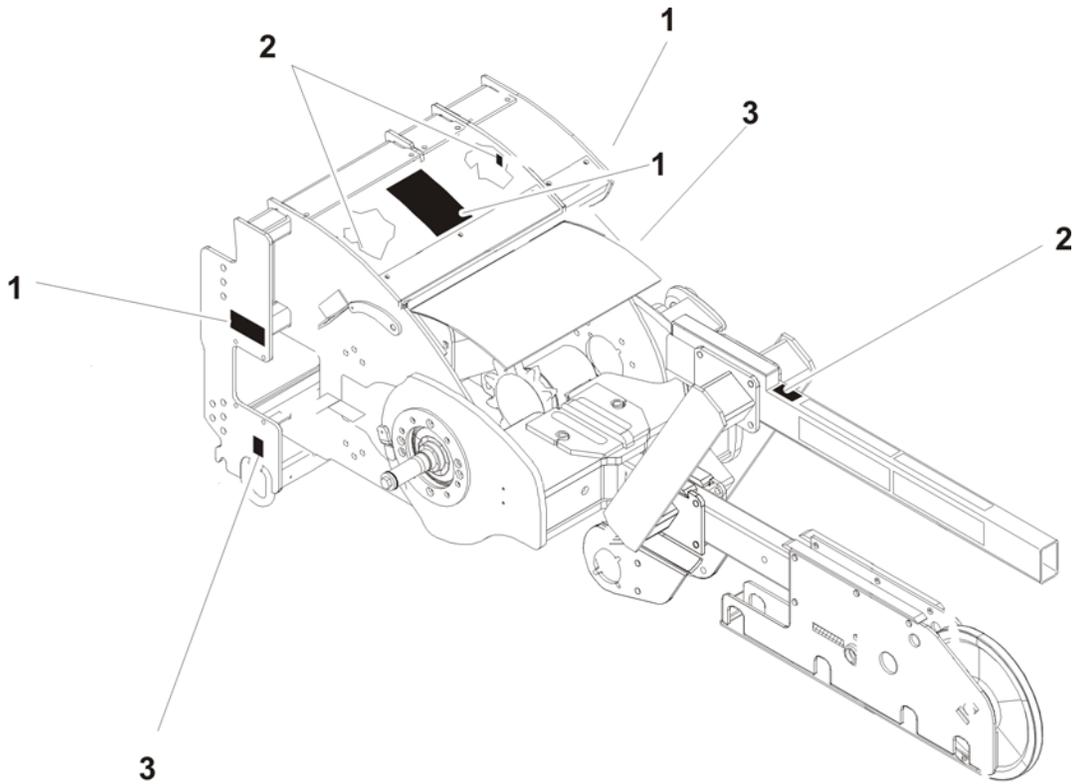
⚠ WARNING Moving parts could cut off hand or foot. Stay away.

3



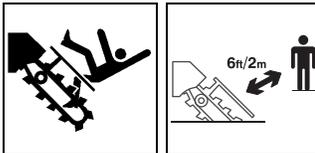
⚠ WARNING Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.

H810



Decal_H810_3D.eps

1



⚠ DANGER Moving digging teeth will cause death or serious injury. Trench cave-in can cause you to fall. Stay away.

2



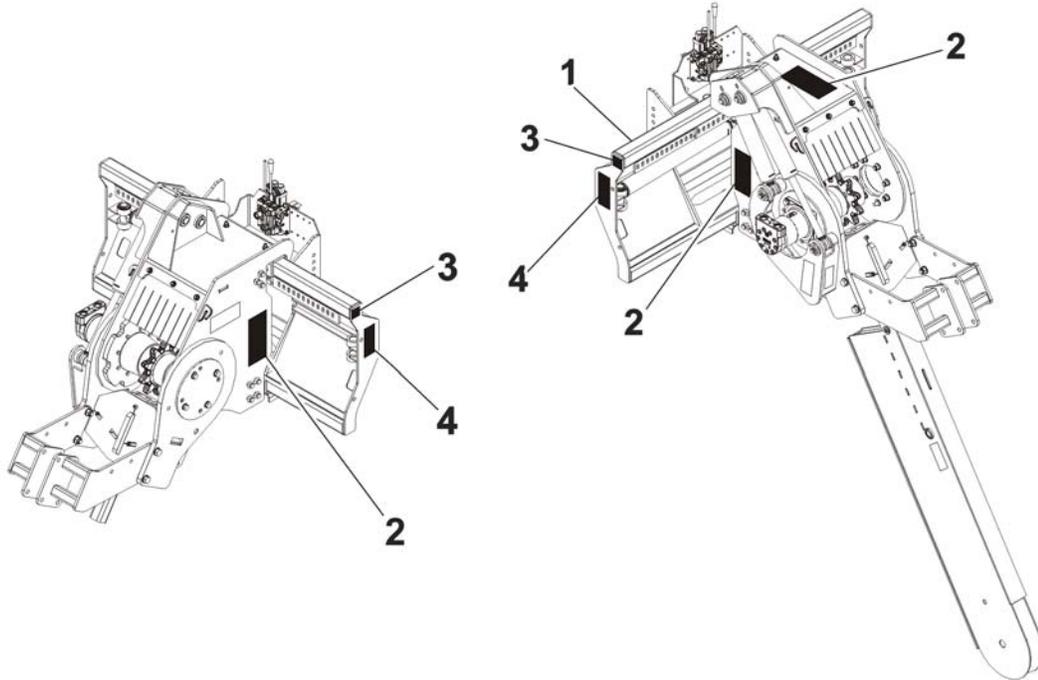
Lift point. See Transport chapter for more information.

3



Tiedown location. See Transport chapter for more information.

H813

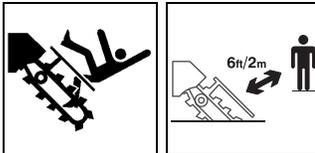


1



Tiedown location. See Transport chapter for more information.

2



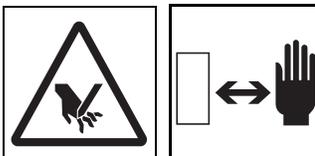
⚠ DANGER Moving digging teeth will cause death or serious injury. Trench cave-in can cause you to fall. Stay away.

3



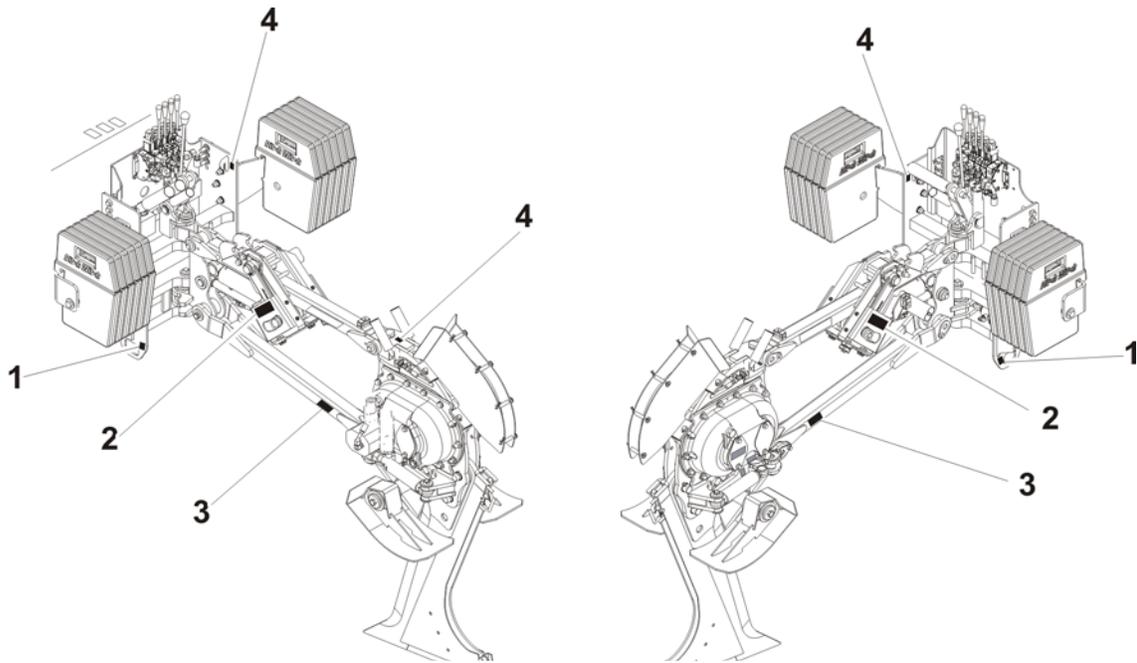
Lift point. See Transport chapter for more information.

4



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

H832

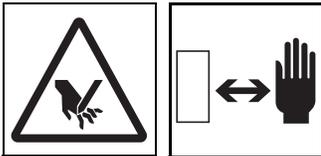


1



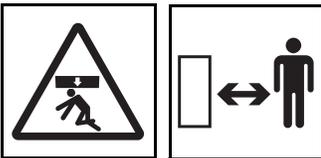
Tiedown location. See Transport chapter for more information.

2



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

3



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

4



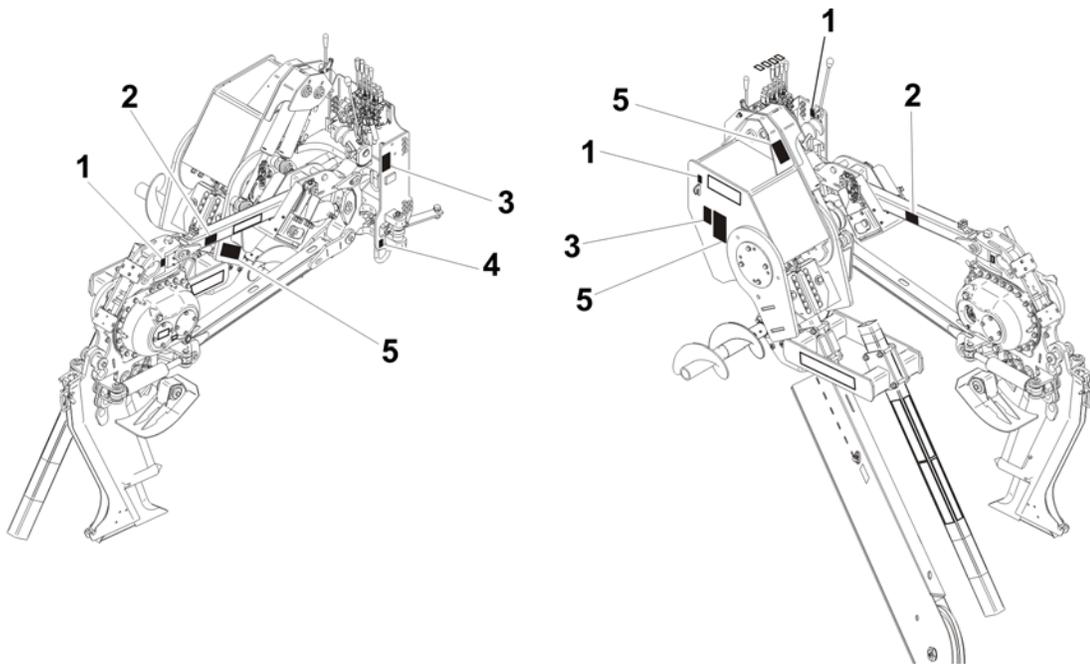
Lift point. See Transport chapter for more information.

5



Tiedown location. See Transport chapter for more information.

H853

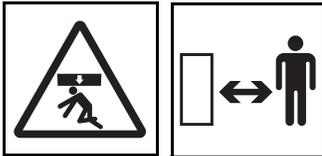


1



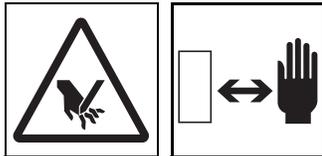
Lift point. See Transport chapter for more information.

2



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

3



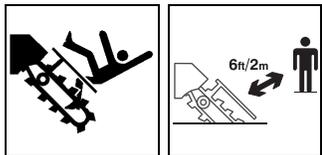
WARNING Moving parts could cut off hand or foot. Stay away.

4



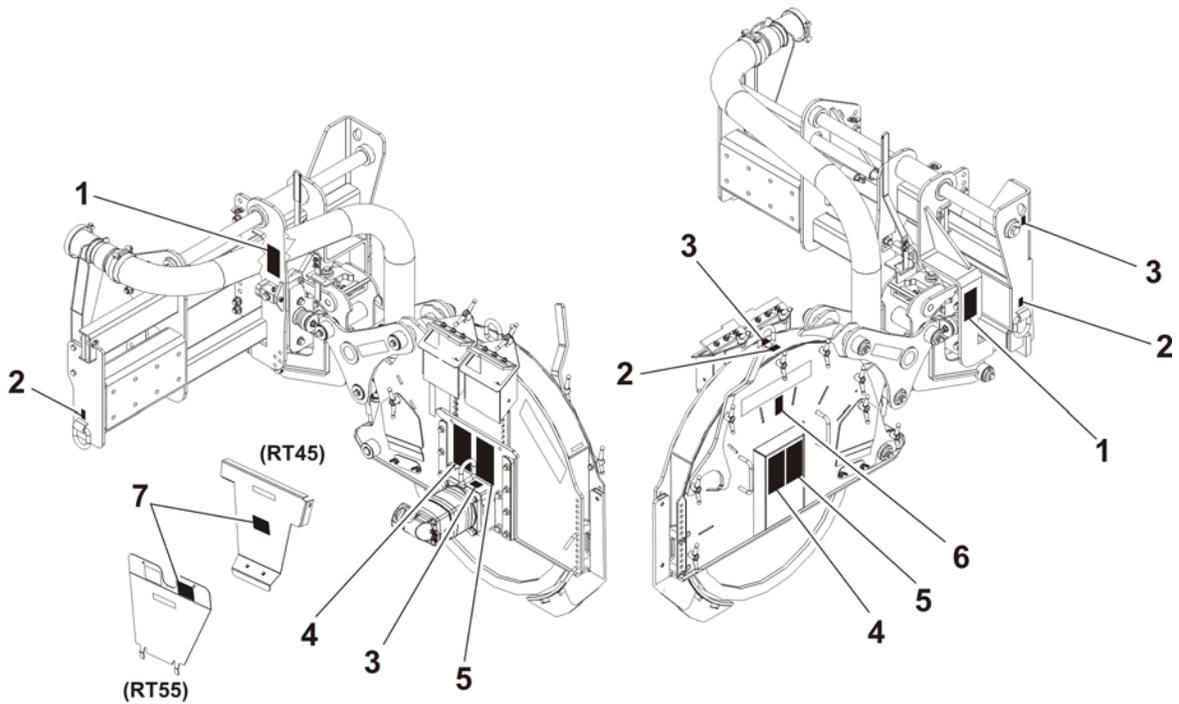
Tiedown location. See Transport chapter for more information.

5

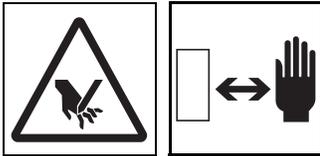


DANGER Moving digging teeth will cause death or serious injury. Trench cave-in can cause you to fall. Stay away.

MT12



1



WARNING

Moving parts could cut off hand. Keep hands away.

275-184

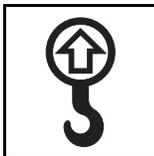
2



Tiedown location. See Transport chapter for more information.

274-318

3



Lift point. See Transport chapter for more information.

274-442

4

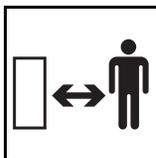


CAUTION

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

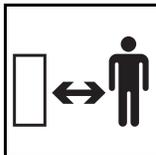
275-193

5



⚠ DANGER Moving digging teeth will cause serious injury or death. Stay away. 275-443

6



⚠ CAUTION Hot parts may cause burns. Do not touch until cool or wear gloves. 275-355 (2-P)

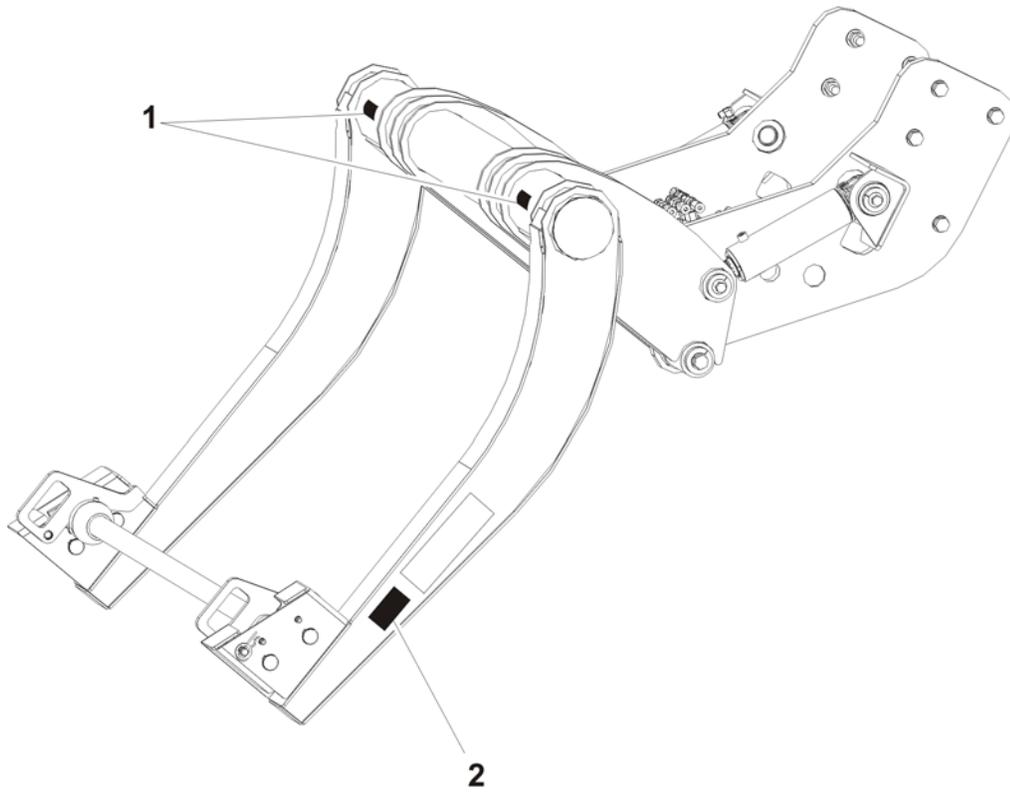
7



⚠ WARNING Fall possible. Riders can fall from machine and be injured or killed. Only operator is allowed on machine. 273-487

IMPORTANT: Not used on RT80 units.

RC80



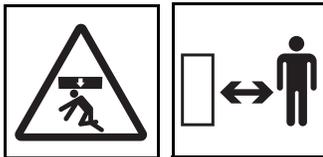
Decal RC80 3D

1



Lift point. See Transport chapter for more information.

2



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

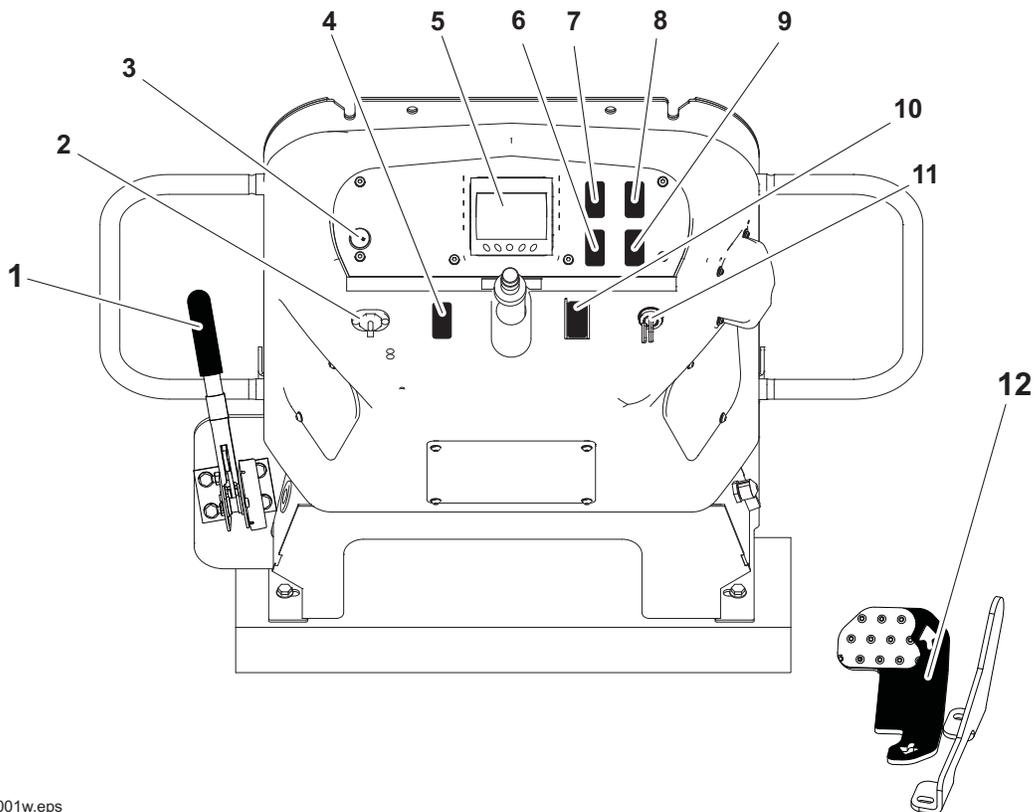
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Center Console

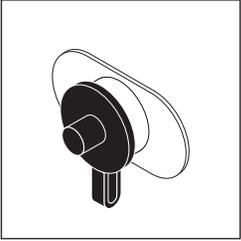
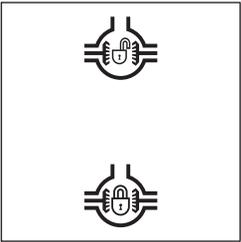
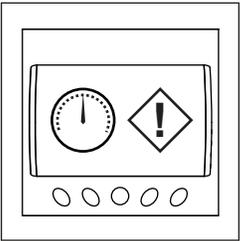
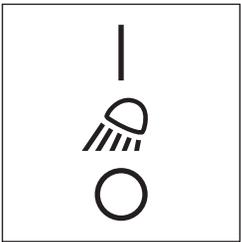


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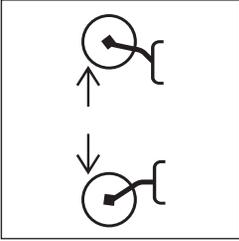
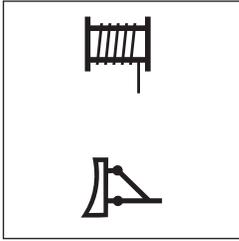
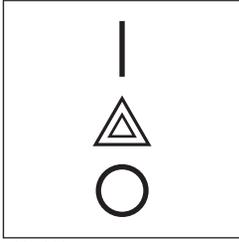
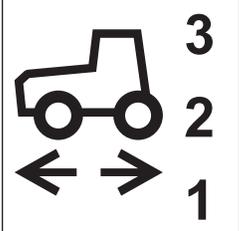
- | | |
|---------------------------|--------------------------------------|
| 1. Parking brake control | 7. Reel carrier switch* |
| 2. Auxiliary power outlet | 8. Reel winder mode selector switch* |
| 3. Horn switch | 9. Flasher switch* |
| 4. Axle lock switch | 10. Ground drive speed switch |
| 5. Graphic display | 11. Ignition key switch |
| 6. Work light switch* | 12. Ground drive foot control |

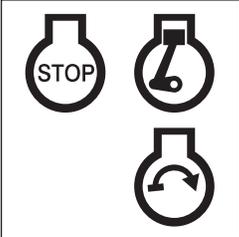
* option

Item	Description	Notes
1. Parking brake control	To set brake, push handle down. To release brake, pull handle up.	Engaged parking brake disables ground drive.

Item	Description	Notes
<p>2. Auxiliary outlet</p>  <p>c00ic179h.eps</p>	<p>Provides power for other equipment.</p>	<p>Power output is 12V, 10A.</p>
<p>3. Horn</p>  <p>c00ic044h.eps</p>	<p>To sound horn, press.</p>	
<p>4. Axle lock switch</p>  <p>c00ic549h.eps</p>	<p>To unlock rear axle, press top.</p> <p>To lock rear axle, press bottom.</p>	<p>NOTICE: To prevent mechanical damage, stop tractor before operating axle lock switch.</p> <p>IMPORTANT: After pressing switch to unlock axle, it may be necessary to move tractor 6' (2 m) in reverse to fully unlock.</p>
<p>5. Graphic display</p>  <p>c00ic604w.eps</p>	<p>Displays graphic symbols for indicators and conditions previously shown with gauges.</p>	<p>See more information in "Graphic Display" on page 34.</p>
<p>6. Work light switch</p>  <p>c00ic601w.eps</p>	<p>To activate lights, press top.</p> <p>To deactivate, press bottom.</p>	<p>Optional.</p>

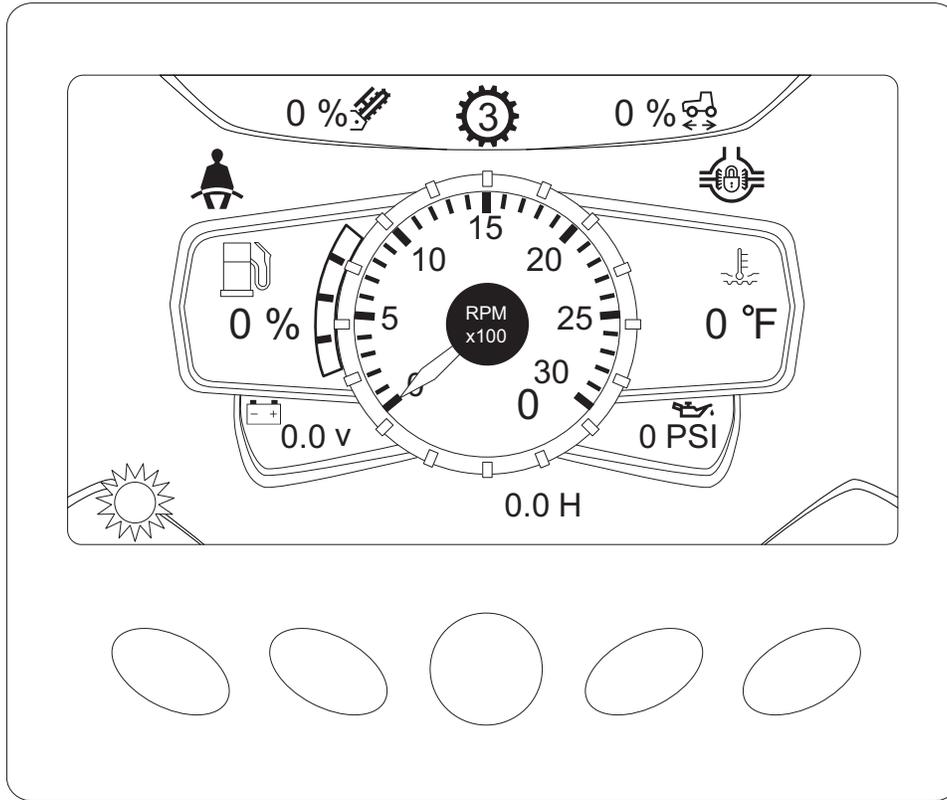


Item	Description	Notes
<p>7. Reel carrier switch</p>  <p>c00ic205h.eps</p>	<p>To raise, press top.</p> <p>To lower, press bottom.</p>	<p>Optional.</p>
<p>8. Reel winder selector switch</p>  <p>c00ic642w.eps</p>	<p>To change backfill blade joystick to reel winder control mode, press top.</p> <p>To return to backfill blade mode, press bottom.</p>	<p>Optional.</p>
<p>9. Flasher switch</p>  <p>c00ic600w.eps</p>	<p>To activate flashers, press top.</p> <p>To deactivate, press bottom.</p>	<p>Optional.</p>
<p>10. Ground drive speed switch</p>  <p>c00ic602w.eps</p>	<p>To select High (3), Medium (2) or Low (1), press appropriate switch position.</p>	<p>Screen icon displays High, Medium or Low selection.</p>

Item	Description	Notes
<p>11. Ignition switch</p>  <p>c00ic065h.eps</p>	<p>To start engine, insert key and turn clockwise.</p> <p>To stop engine, turn counterclockwise.</p>	<p>IMPORTANT: If engine does not start on first attempt, check that all interlock requirements have been met, return switch to STOP, and try again.</p>
<p>12. Ground drive foot control</p>  <p>c00ic072c.eps</p>	<p>To move tractor forward, push top of pedal.</p> <p>To move tractor backward, push bottom of pedal.</p> <p>To increase speed in either direction, push pedal farther from center.</p> <p>To reduce speed in either direction, release pedal.</p>	<p>Pedal should automatically return to neutral when released.</p>

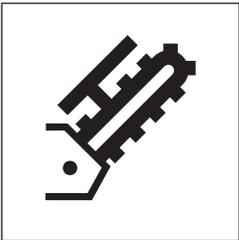


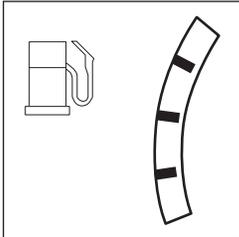
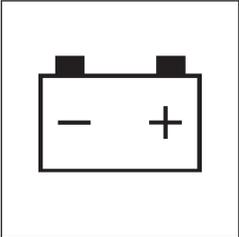
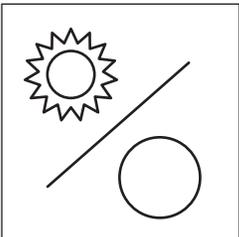
Graphic Display



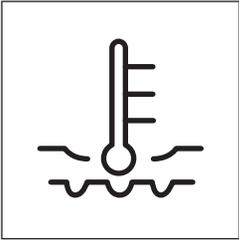
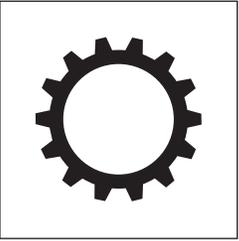
t33om091w.eps

The graphic display module shows engine RPM and has icons for other functions. Soft keys allow the operator to toggle between various screens and functions.

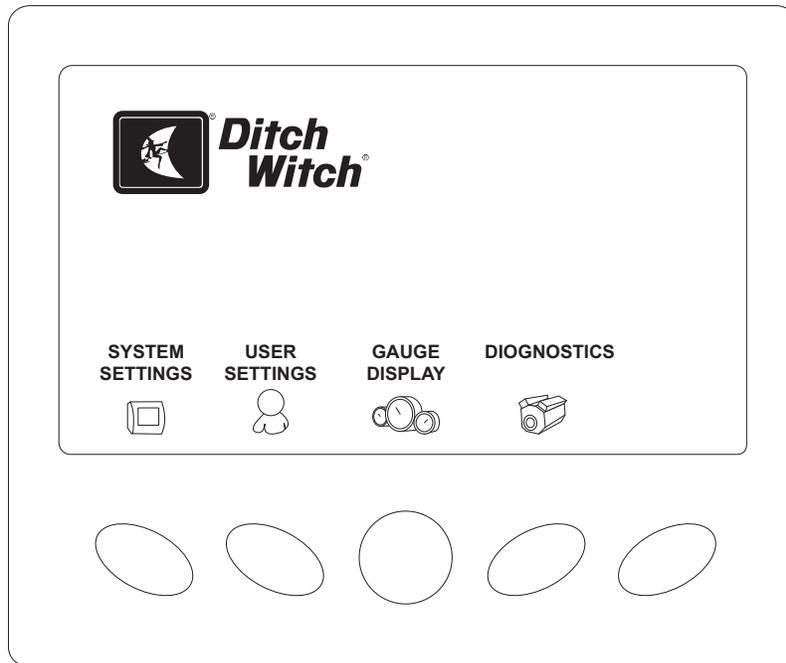
Item	Description	Notes
<p>Attachment speed</p>  <p>c00ic007w.eps</p>	<p>Displays percentage of attachment speed.</p>	

Item	Description	Notes
<p>Operator presence</p>  <p>c00ic001w.eps</p>	<p>Indicates operator presence and start interlock condition.</p>	
<p>Fuel level</p>  <p>c00ic003w.eps</p>	<p>Displays fuel level and percentage.</p>	
<p>Battery voltage</p>  <p>c00ic008w.eps</p>	<p>Displays battery voltage.</p>	
<p>Day/Night mode</p>  <p>c00ic010w.eps</p>	<p>Indicates selected mode.</p>	
<p>Engine hours</p>  <p>c00ic020w.eps</p>	<p>Displays engine hours.</p>	



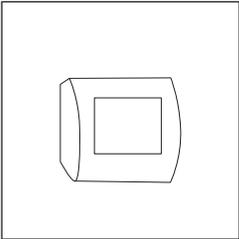
Item	Description	Notes
<p>Engine oil pressure</p>  <p>c00ic005w.eps</p>	<p>Displays engine oil pressure.</p>	
<p>Engine coolant temperature</p>  <p>c00ic004w.eps</p>	<p>Displays coolant temperature.</p>	
<p>Axle lock</p>  <p>c00ic002w.eps</p>	<p>Displays status of axle differential lock.</p>	
<p>Ground drive speed/ direction</p>  <p>c00ic006w.eps</p>	<p>Displays ground drive direction of travel, and speed as a percentage.</p>	
<p>Ground drive gear indicator</p>  <p>c00ic009w.eps</p>	<p>Displays selected gear in center of icon.</p>	

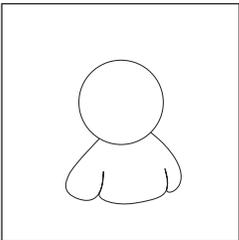
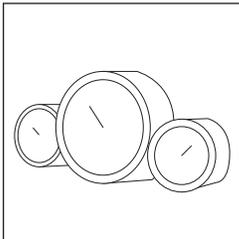
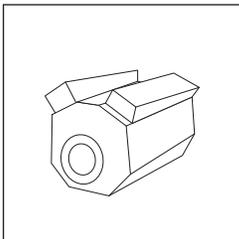
Main Menu



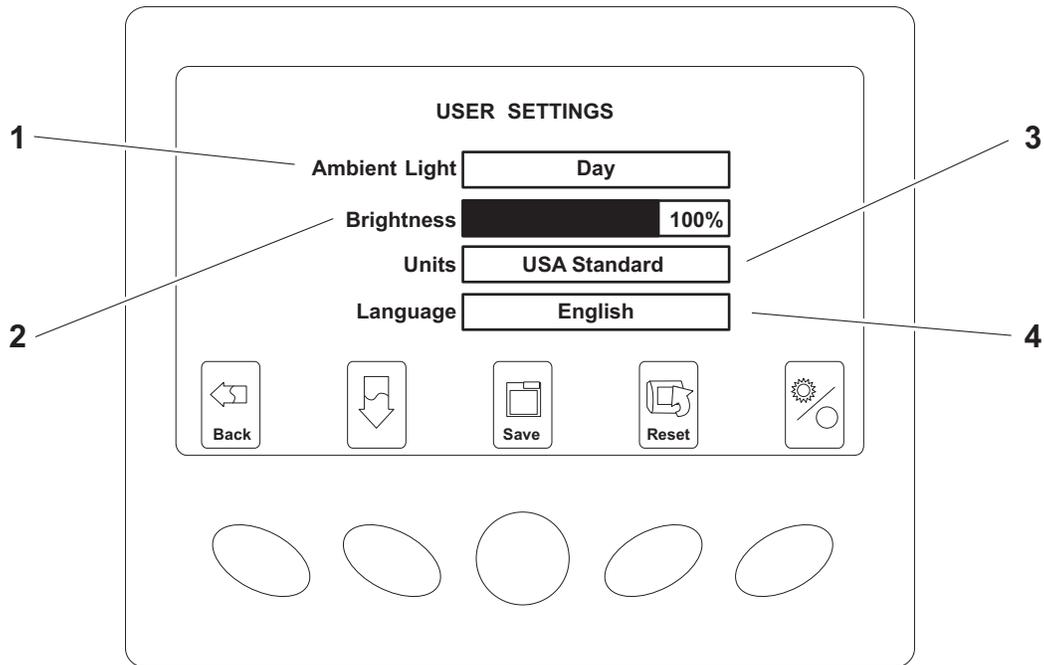
t33om093w.eps

Press center soft key to display the main menu screen, which has icons for other functions. Soft keys below on-screen icons allow the operator to toggle between various screens and functions.

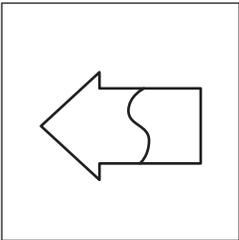
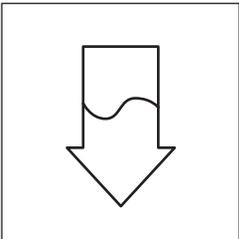
Item	Description	Notes
<p>System Settings</p>  <p>c00ic015w.eps</p>	<p>This is an information display.</p>	<p>Press soft key below back icon to return to previous screen.</p>  <p>Press center soft key to display gauge screen.</p>

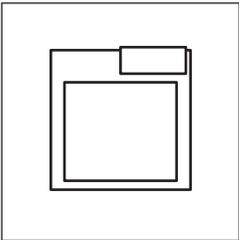
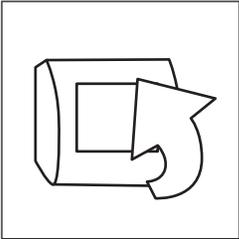
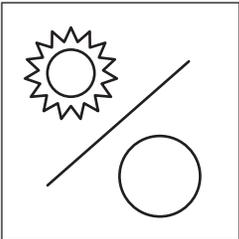
Item	Description	Notes
<p>User Settings</p>  <p>c00ic016w.eps</p>	<p>Allows operator to customize settings.</p>	
<p>Gauge Display</p>  <p>c00ic017w.eps</p>	<p>Press the soft key below this on screen icon to select.</p>	
<p>Diagnostics</p>  <p>c00ic018w.eps</p>	<p>Displays interlock icons and diagnostic codes, if any.</p> <p>Press soft key below on screen icons to return to main menu or gauge display.</p>	

User Settings

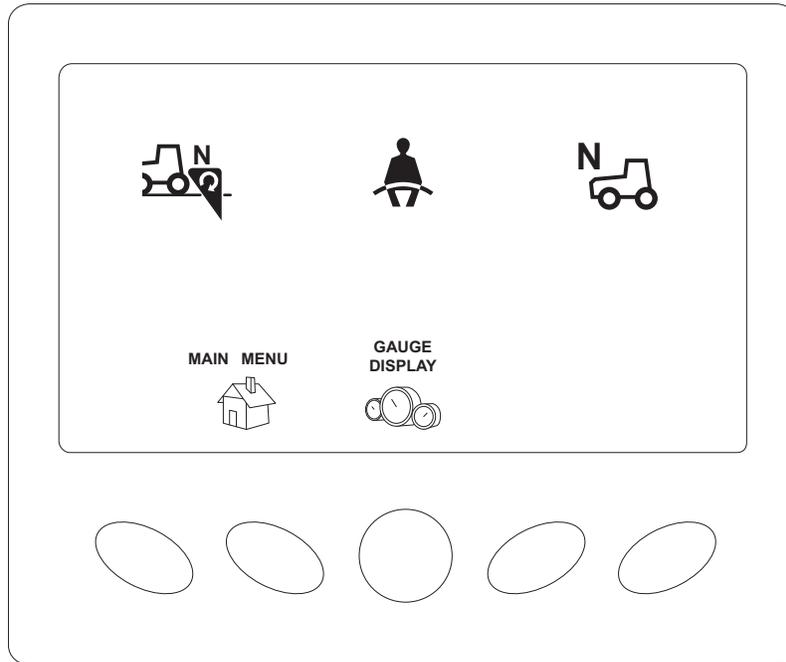


t33om092w.eps

Item	Description	Notes
<p>Back</p>  <p>c00ic011w.eps</p>	<p>Press soft key below this icon to return to previous screen.</p>	<p>Press center soft key to display gauge screen.</p>
<p>Down</p>  <p>c00ic012w.eps</p>	<p>Press soft key below this icon to toggle through selections 1-4.</p>	<p>Press center soft key to display gauge screen.</p>

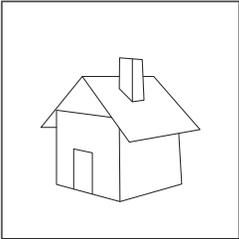
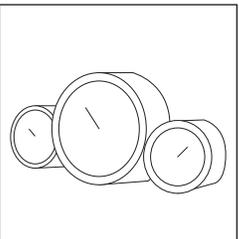
Item	Description	Notes
<p>Save</p>  <p>c00ic013w.eps</p>	<p>Press soft key below this icon to save settings.</p>	
<p>Reset</p>  <p>c00ic014w.eps</p>	<p>Press soft key below this icon to return to default settings.</p>	
<p>Day/Night</p>  <p>c00ic010w.eps</p>	<p>Press soft key below this icon to select day or night mode.</p>	

Diagnostics

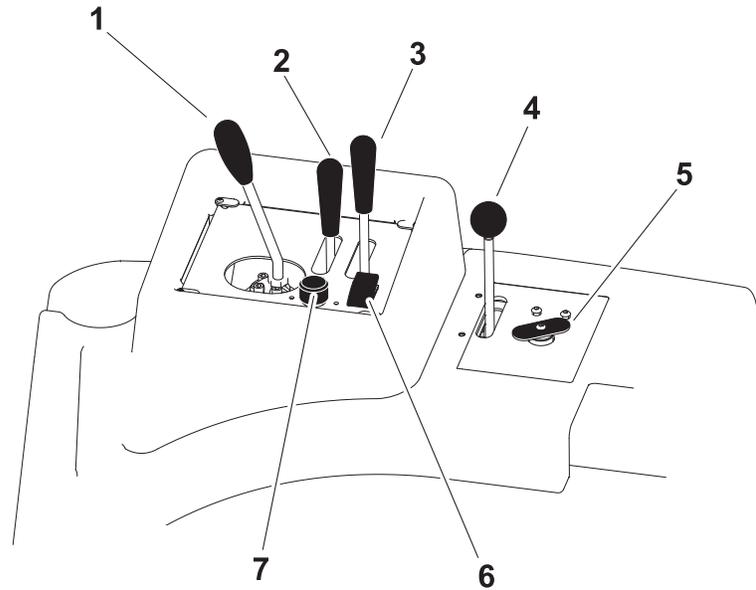


t33om095w.eps

Item	Description	Notes
<p>Attachment neutral</p>  <p>c00ic021w.eps</p>	<p>Indicates attachment controls in neutral position.</p>	
<p>Operator Presence</p>  <p>c00ic001w.eps</p>	<p>Indicates operator presence for start interlock status.</p>	

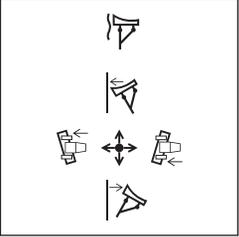
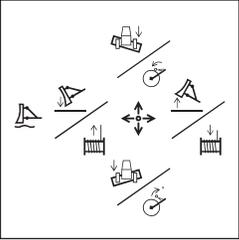
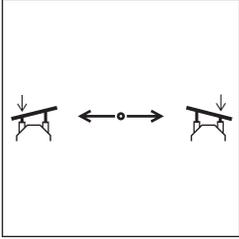
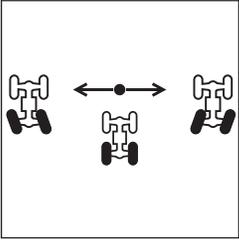
Item	Description	Notes
<p>Ground Drive Neutral</p>  <p>c00ic022w.eps</p>	<p>Indicates ground drive controls in neutral position.</p>	
<p>Main Menu</p>  <p>c00ic019w.eps</p>	<p>Press soft key below this icon to return to previous screen.</p>	<p>Press center soft key to display gauge screen.</p>
<p>Gauge Display</p>  <p>c00ic017w.eps</p>	<p>Press the soft key below this on screen icon to select.</p>	

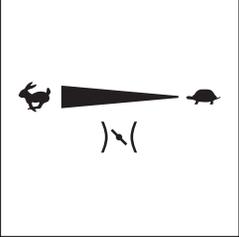
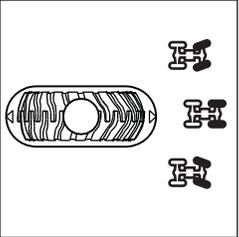
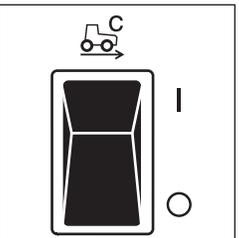
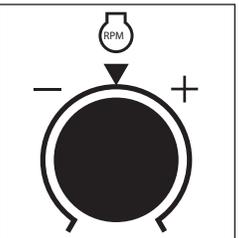
Right Console



t38om001h.eps

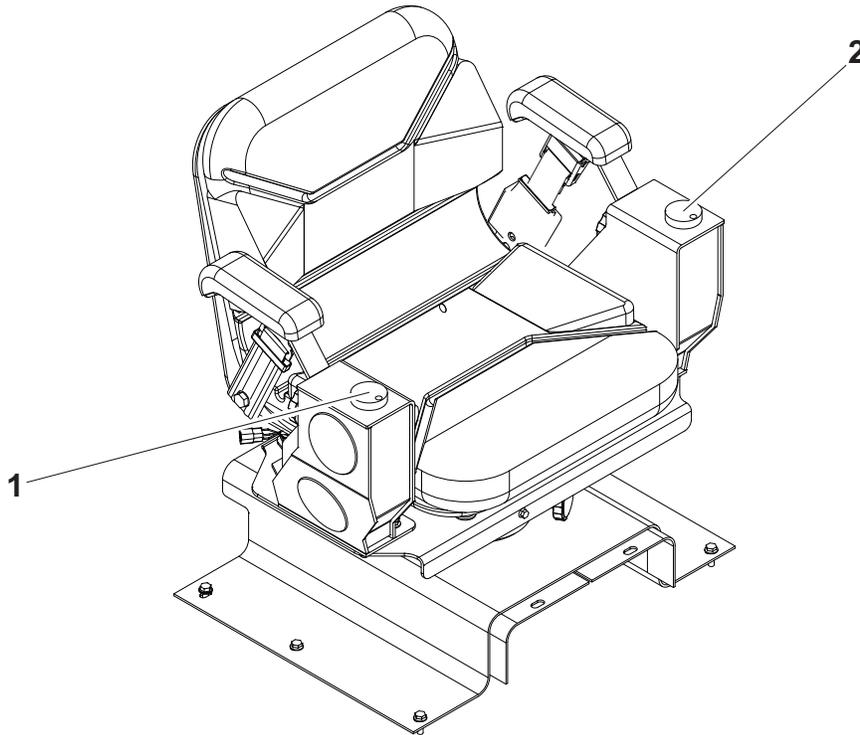
- | | |
|--|------------------------------------|
| 1. Backfill blade lift/tilt or reel winder control | 5. Rear steer indicator |
| 2. Backfill blade angle control | 6. Cruise control switch |
| 3. Rear steer control | 7. Cruise control RPM dial control |
| 4. Throttle | |

Item	Description	Notes
<p>1. Backfill blade lift/tilt function control</p>  <p>c00ic625w.eps</p> <p>Reel winder function control</p>  <p>c00ic207h.eps</p>	<p>Backfill blade mode:</p> <ul style="list-style-type: none"> • To lower, move forward. • To float, move forward to end. • To raise, move backward. • To tilt right side down, move right. • To tilt left side down, move left. <p>Reel winder mode:</p> <ul style="list-style-type: none"> • To unwind, move forward. • To wind, move backward. • To lower reel winder arm, move right. • To raise reel winder arm, move left. 	<p>Reel winder mode selector switch on center console changes function to control reel winder arm lift and winder direction.</p>
<p>2. Backfill blade angle control</p>  <p>c00ic626w.eps</p>	<p>To angle right, move right.</p> <p>To angle left, move left.</p>	
<p>3. Rear steer control</p>  <p>c00ic627w.eps</p>	<p>To move rear tires left, move left.</p> <p>To center tires, move to center position.</p> <p>To move rear tires right, move right.</p>	<p>NOTICE:</p> <ul style="list-style-type: none"> • Tires move when you move control. To stop movement, release control. • Visually verify tire position.

Item	Description	Notes
<p>4. Throttle</p>  <p>c00ic584h.eps</p>	<p>To increase speed, move left.</p> <p>To decrease speed, move right.</p>	
<p>5. Rear steer indicator</p>  <p>c00ic628w.eps</p>	<p>Displays position of rear wheels.</p>	
<p>6. Cruise control selector</p>  <p>c00ic630w.eps</p>	<p>To turn on, press top. Switch indicator and display should indicate that cruise mode is activated.</p> <p>To turn off, press top again. Switch indicator and display should indicate that cruise mode is deactivated.</p>	<p>Turn on cruise control only when:</p> <ul style="list-style-type: none"> ground drive motor control is in low (1) ground drive is in neutral <p>Hand and foot controls must be in neutral or cruise control switch input will be ignored.</p>
<p>7. Cruise control RPM dial control</p>  <p>c00ic629w.eps</p>	<p>To decrease engine load while using cruise control, turn clockwise.</p> <p>To increase engine load while using cruise control, turn counterclockwise.</p>	<p>This typically decreases engine load temporarily.</p> <p>This typically increases engine load temporarily.</p>



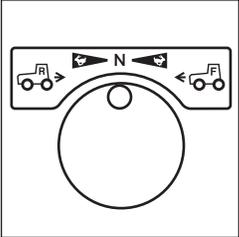
Seat Console

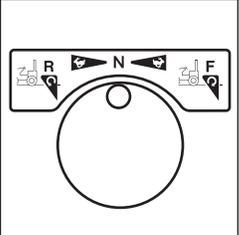


t33om002w.eps

1. Ground drive speed control

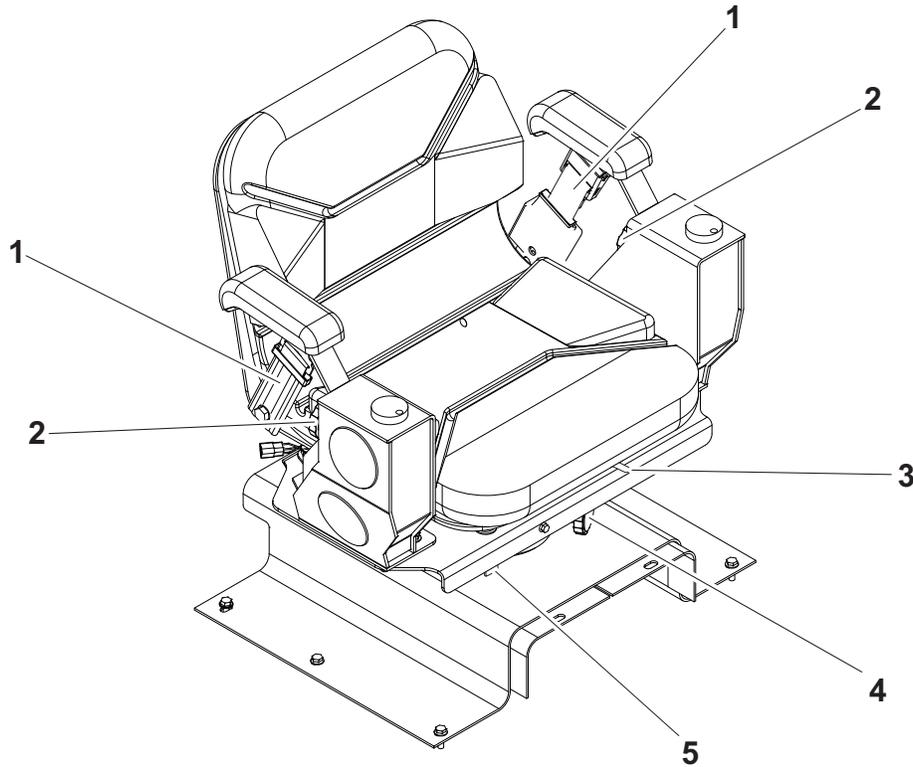
2. Attachment speed/direction control

Item	Description	Notes
<p>1. Ground drive speed control</p>  <p>c00ic631w.eps</p>	<p>To go faster in either direction, move farther from neutral.</p> <p>To stop, return to center.</p>	<p>NOTICE: Control does not automatically return to neutral.</p> <p>IMPORTANT: This control is disabled in high gear.</p>

Item	Description	Notes
<p>2. Attachment speed/ direction control</p>  <p>c00ic632w.eps</p>	<p>To go faster in either direction, move farther from neutral.</p> <p>To stop, return to center.</p>	<p>NOTICE: Control does not automatically return to neutral.</p>



Seat Deck



t33om003w.eps

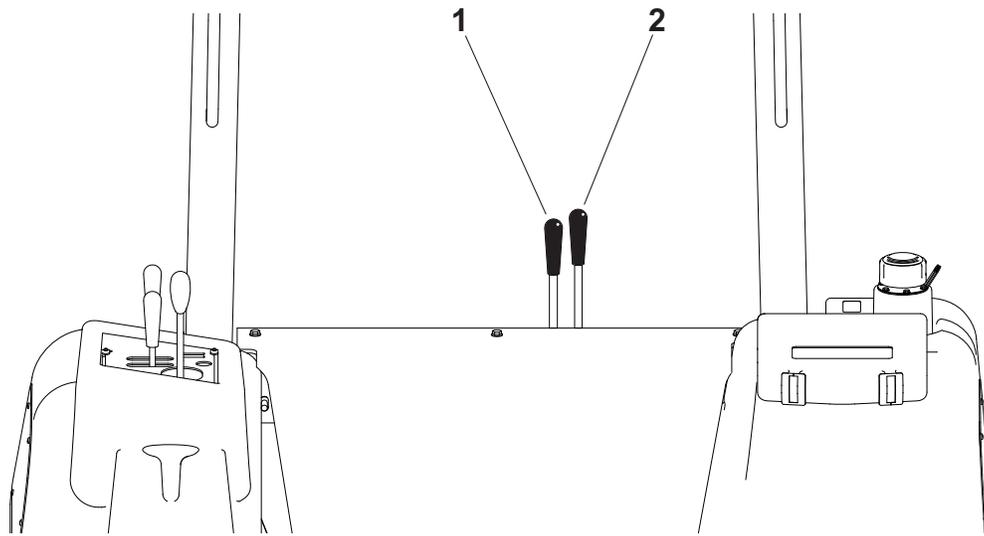
- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Seat belt 2. Armrest adjustment control 3. Seat slide control | <ol style="list-style-type: none"> 4. Seat height adjustment lock 5. Seat pivot control |
|--|---|

Item	Description	Notes
1. Seat belt	To fasten, insert latch into buckle. Adjust until seat belt is low and tight. To release, lift top of buckle.	
2. Armrest adjustment control	To raise or lower armrests: <ul style="list-style-type: none"> Remove knob. Adjust armrest to desired position. Replace knob. 	

Item	Description	Notes
<p>3. Seat slide control</p>	<p>To slide seat forward or backward, pull, then adjust seat.</p> <p>To lock seat in place, release.</p>	
<p>4. Seat height adjustment lock</p>	<p>To lock seat height, turn clockwise.</p> <p>To unlock seat height, turn counterclockwise.</p>	
<p>5. Seat pivot control</p>	<p>To pivot seat to the right, pull.</p> <p>To lock seat in position, release.</p> <p>To return seat to front-facing position, swing seat left.</p>	<p>Seat pivots only to the right and can be locked in any position from 0-90°.</p> <p>IMPORTANT: Drive tractor with operator's seat facing front. If desired, operate rear attachments with seat pivoted.</p>



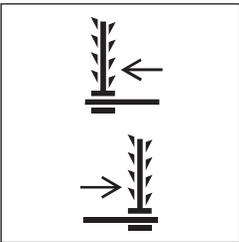
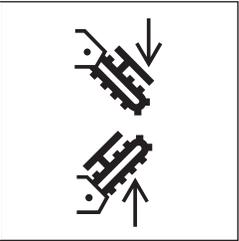
Trencher Controls



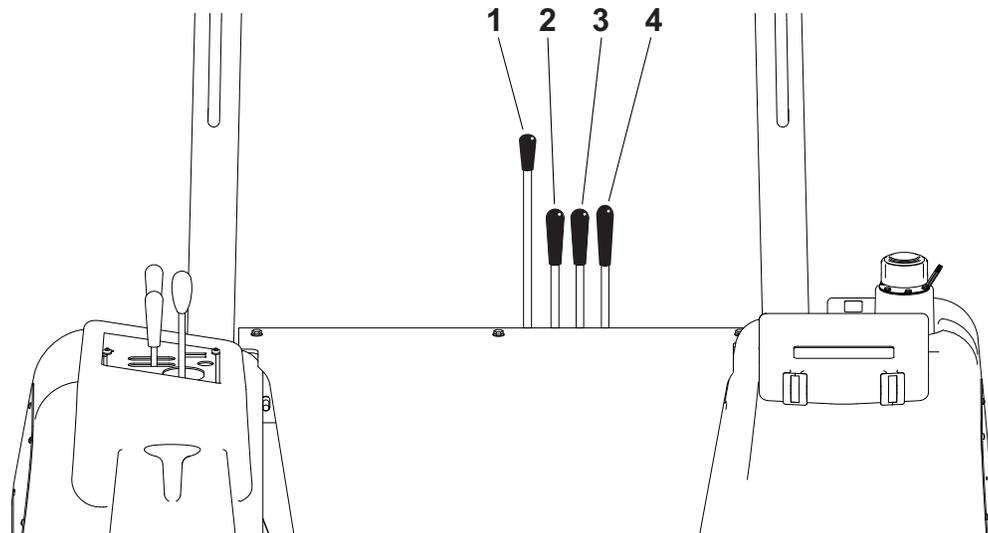
1. Trencher slide control*

2. Boom lift control

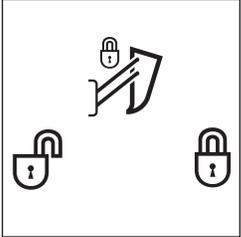
*optional

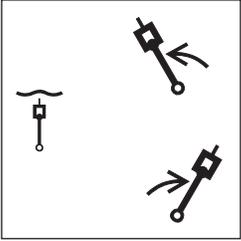
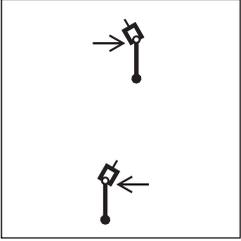
Item	Description	Notes
<p>1. Trencher slide control (H813 only)</p>  <p>c00ic198h.eps</p>	<p>To slide trencher right, push.</p> <p>To slide trencher left, pull.</p>	<p>IMPORTANT: If slide sticks:</p> <ul style="list-style-type: none"> • Lower trencher to ground. • Operate trencher slide until trencher moves slightly. • Raise trencher and slide it into position.
<p>2. Boom lift control</p>  <p>c00ic200h.eps</p>	<p>To lower, push.</p> <p>To raise, pull.</p>	

Plow Controls

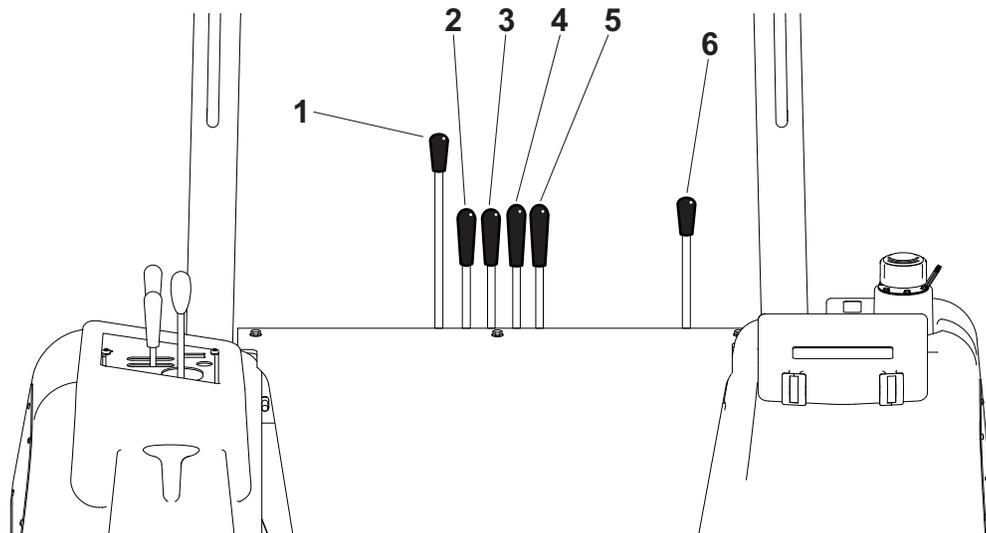


- | | |
|---------------------------|------------------------|
| 1. Plow stow lock control | 3. Blade steer control |
| 2. Plow swing control | 4. Plow lift control |

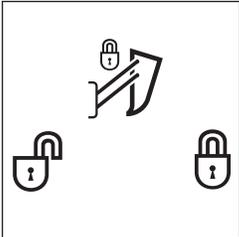
Item	Description	Notes
<p>1. Stow lock control</p>  <p><small>c00ic643w.eps</small></p>	<p>To lock:</p> <ul style="list-style-type: none"> • Raise plow fully. • Pull stow lock handle. • Lower plow slightly to engage lock. <p>To unlock:</p> <ul style="list-style-type: none"> • Raise plow slightly. • Push stow lock handle to release lock. 	<p>Use this control to lock plow in the up position.</p>

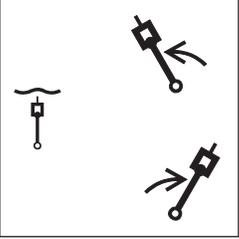
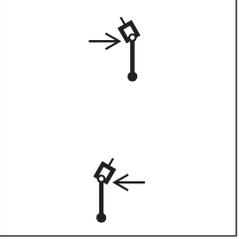
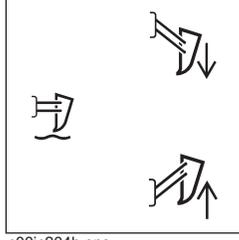
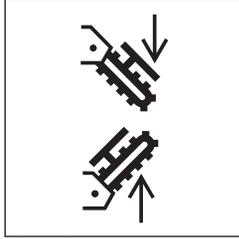
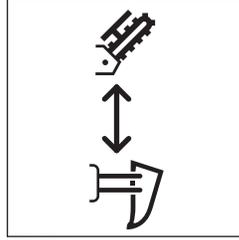
Item	Description	Notes
<p>2. Plow swing control</p>  <p>c00ic202h.eps</p>	<p>To swing left, pull.</p> <p>To swing right, push.</p> <p>To float, push to end.</p>	<p>NOTICE:</p> <ul style="list-style-type: none"> • If soil conditions allow, operate in float position. • Lower plow into ground before moving control to float position. • Do not raise plow with control in float position.
<p>3. Blade steer control</p>  <p>c00ic203h.eps</p>	<p>To steer right, push.</p> <p>To steer left, pull.</p>	
<p>4. Plow lift control</p>  <p>c00ic204h.eps</p>	<p>To raise, pull.</p> <p>To lower, push.</p> <p>To float, push to end.</p>	<p>NOTICE:</p> <ul style="list-style-type: none"> • If soil conditions allow, operate in float position. • Lower plow into ground before moving control to float position.

Combo Controls



- | | |
|---------------------------|---------------------------------|
| 1. Plow stow lock control | 4. Plow lift control |
| 2. Plow swing control | 5. Boom lift control |
| 3. Blade steer control | 6. Trench/Plow selector control |

Item	Description	Notes
<p>1. Stow lock control</p>  <p><small>c00ic643w.eps</small></p>	<p>To lock:</p> <ul style="list-style-type: none"> • Raise plow fully. • Pull stow lock handle. • Lower plow slightly to engage lock. <p>To unlock:</p> <ul style="list-style-type: none"> • Raise plow slightly. • Push stow lock handle to release lock. 	<p>Use this control to lock plow in the up position.</p>

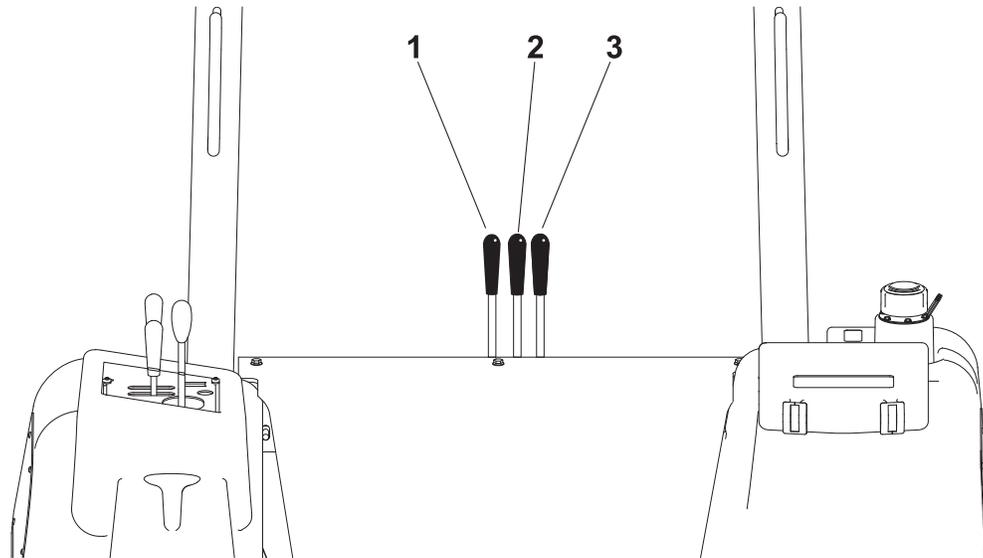
Item	Description	Notes
<p>2. Plow swing control</p>  <p>c00ic202h.eps</p>	<p>To swing left, pull.</p> <p>To swing right, push.</p> <p>To float, push to end.</p>	<p>NOTICE:</p> <ul style="list-style-type: none"> • If soil conditions allow, operate in float position. • Lower plow into ground before moving control to float position. • Do not raise plow with control in float position.
<p>3. Blade steer control</p>  <p>c00ic203h.eps</p>	<p>To steer right, push.</p> <p>To steer left, pull.</p>	
<p>4. Plow lift control</p>  <p>c00ic204h.eps</p>	<p>To raise, pull.</p> <p>To lower, push.</p> <p>To float, push to end.</p>	<p>NOTICE:</p> <ul style="list-style-type: none"> • If soil conditions allow, operate in float position. • Lower plow into ground before moving control to float position.
<p>5. Boom lift control</p>  <p>c00ic200h.eps</p>	<p>To lower, push.</p> <p>To raise, pull.</p>	
<p>6. Trench/Plow selector control</p>  <p>c00ic657w.eps</p>	<p>To trench, move forward.</p> <p>To plow, move backward.</p>	

Saw Controls

See manufacturer's information.

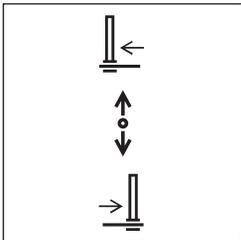
Microtrencher Controls

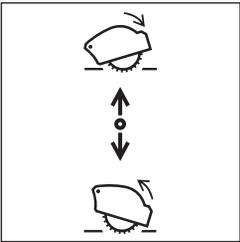
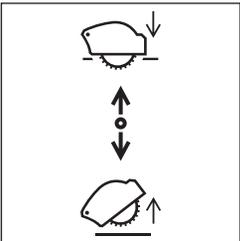
Tractor



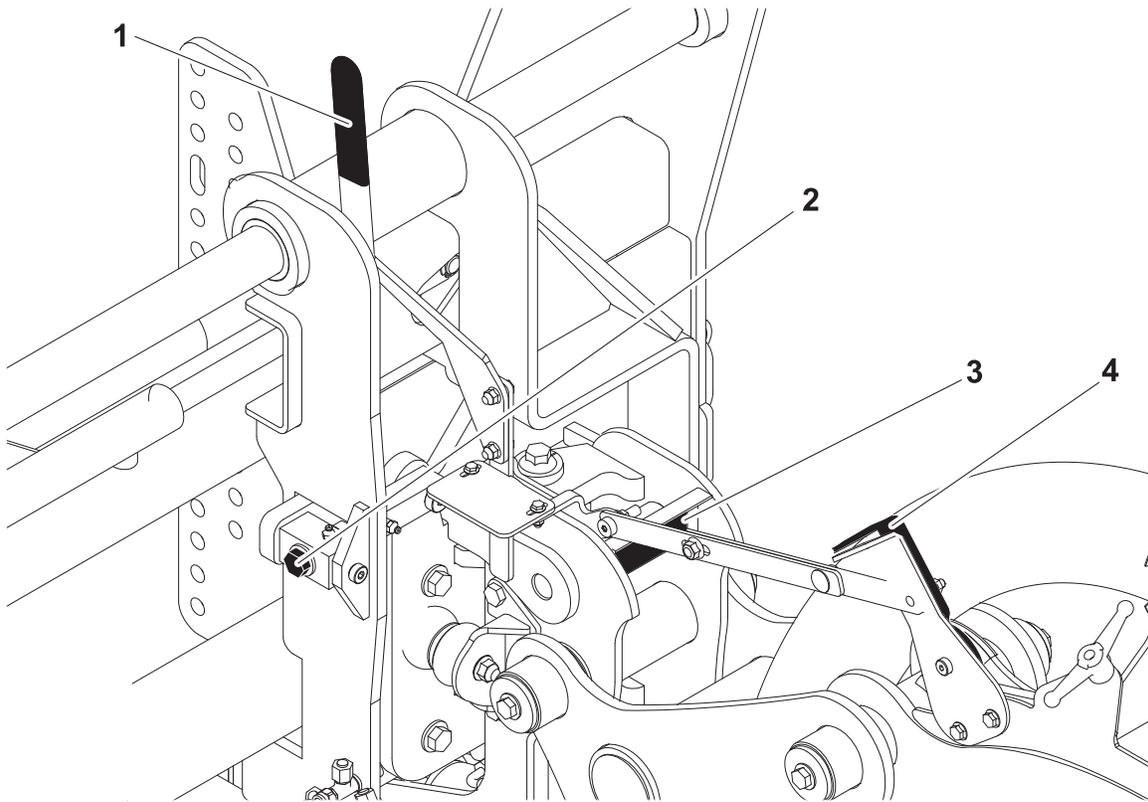
t45om038h.eps

- 1. Traverse (slide) control
- 2. Level control
- 3. Lift control

Item	Description	Notes
<p>1. Traverse (slide) control</p>  <p>c00ic594h.eps</p>	<p>To slide microtrencher right, push.</p> <p>To slide microtrencher left, pull.</p>	

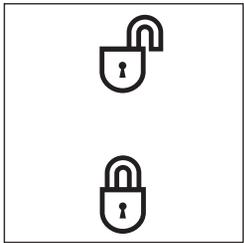
Item	Description	Notes
<p>2. Level control</p>  <p>c00ic590h.eps</p>	<p>To lower rear of microtrencher, push.</p> <p>To raise rear of microtrencher, pull.</p>	
<p>3. Lift control</p>  <p>c00ic591h.eps</p>	<p>To lower, push.</p> <p>To raise, pull.</p>	

MT12 MicroTrencher Attachment



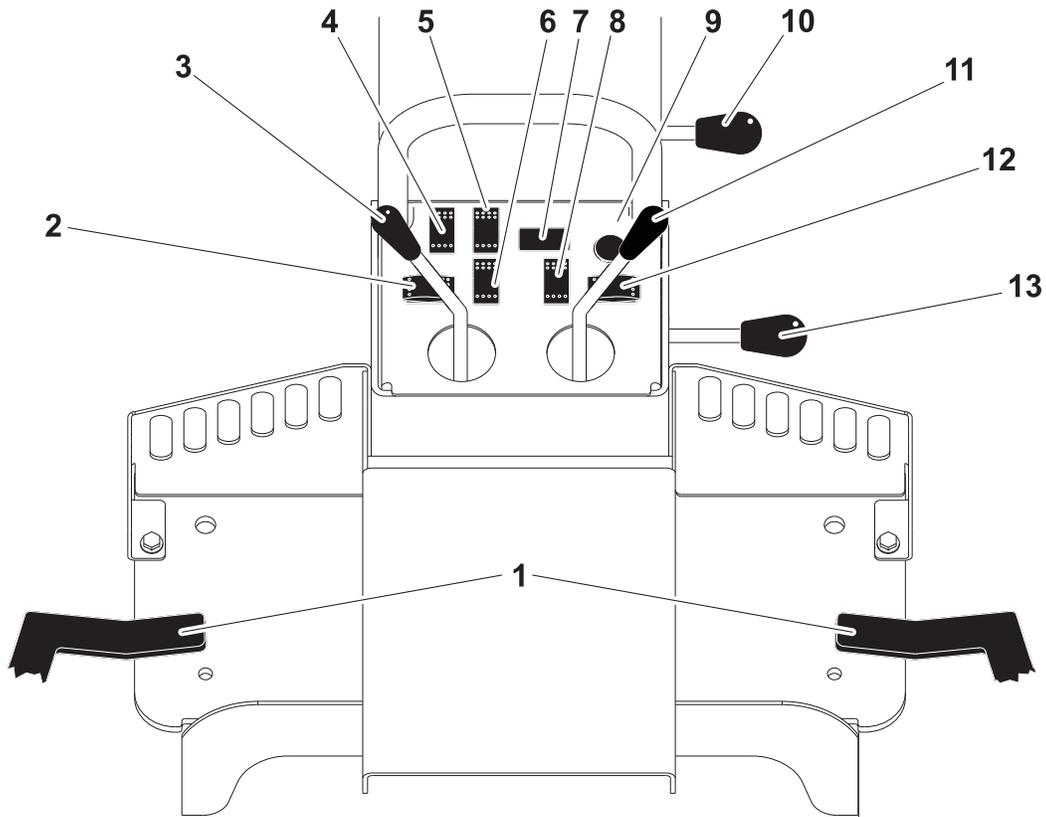
t28om064h.eps

- | | |
|---|---|
| <ul style="list-style-type: none"> 1. Swing lock handle 2. Manual tilt adjustment | <ul style="list-style-type: none"> 3. Bubble level 4. Level indicator |
|---|---|

Item	Description	Notes
<p>1. Saw swing lock handle</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">  </div> <p style="font-size: small; margin-top: 0;">c00ic592h.eps</p>	<p>To lock, move handle toward tractor.</p> <p>To unlock, move handle toward microtrencher.</p>	<p>Operate with microtrencher locked in most situations.</p>
<p>2. Manual tilt adjustment</p>	<p>Turn screw in to adjust angle left.</p> <p>Turn screw out to adjust angle right.</p>	<p>Use manual tilt adjustment and bubble level together to adjust microtrencher to match jobsite conditions.</p> <p>See "Adjust Tilt" on page 119.</p>

Item	Description	Notes
3. Bubble level	Displays left-to-right microtrencher angle.	Use manual tilt adjustment and bubble level together to adjust microtrencher to match jobsite conditions. See "Adjust Tilt" on page 119.
4. Level indicator	Indicates when base of microtrencher is level with pavement.	Use lift and level controls together to adjust microtrencher base until it is flat on pavement.

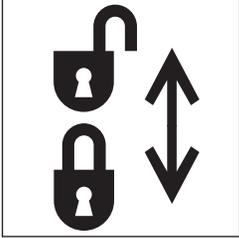
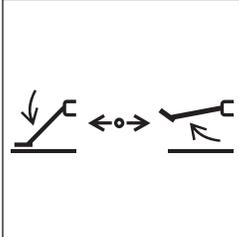
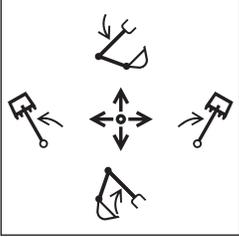
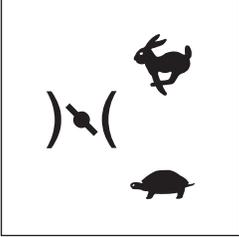
Backhoe Console

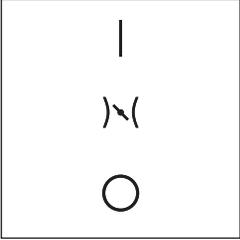
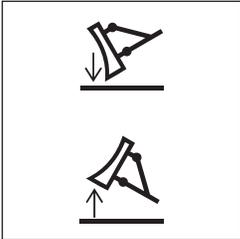
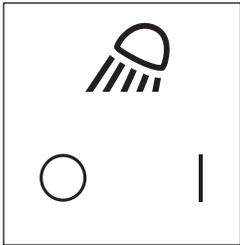
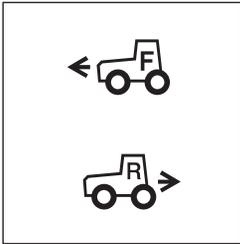


a44om001h.eps

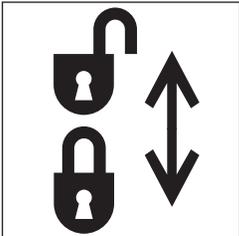
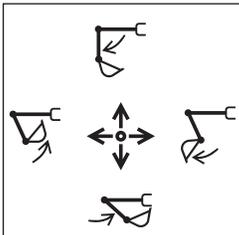
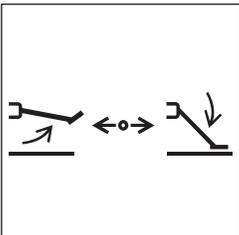
- | | |
|-----------------------------------|------------------------------|
| 1. Stabilizer lock release pedals | 8. Ground drive switch |
| 2. Left stabilizer control | 9. Remote engine stop switch |
| 3. Boom/Swing control | 10. Boom stow lock |
| 4. Remote throttle switch | 11. Bucket/dipper control |
| 5. Remote throttle power switch | 12. Right stabilizer control |
| 6. Remote backfill blade switch | 13. Swing stow lock |
| 7. Work light switch* | |

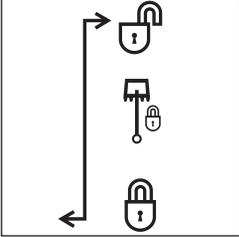
*optional

Item	Description	Notes
<p>1. Stabilizer lock</p>  <p>c00ic646w.eps</p>	<p>To release, step on pedal.</p> <p>Locks automatically as stabilizer is fully raised.</p>	
<p>2. Left stabilizer control switch</p>  <p>c00ic211h.eps</p>	<p>To lower, press left.</p> <p>To raise, press right.</p>	
<p>3. Boom/Swing control</p>  <p>c00ic212h.eps</p>	<p>To swing boom left, move left.</p> <p>To swing boom right, move right.</p> <p>To raise boom, pull.</p> <p>To lower boom, push.</p>	<p>Control can perform more than one action at a time. By "feathering" the control, operator can combine backhoe operations.</p> <p>NOTICE: Do not operate with backhoe in the stowed (upright) position.</p>
<p>4. Remote throttle switch</p>  <p>c00ic243h.eps</p>	<p>To increase engine speed, press top.</p> <p>To decrease engine speed, press bottom.</p>	

Item	Description	Notes
<p>5. Remote throttle power switch</p>  <p>c00ic652h.eps</p>	<p>To enable remote control of throttle, press top.</p> <p>To disable remote control of throttle, press bottom.</p>	
<p>6. Remote backfill blade control switch</p>  <p>c00ic210h.eps</p>	<p>To lower, press top.</p> <p>To raise, press bottom.</p>	
<p>7. Work light switch</p>  <p>c00ic086c.eps</p>	<p>To turn on, press right.</p> <p>To turn off, press left.</p>	Optional
<p>8. Remote ground drive control</p>  <p>c00ic216h.eps</p>	<p>To move tractor forward, press top.</p> <p>To move tractor backward, press bottom.</p>	<p>NOTICE:</p> <ul style="list-style-type: none"> • This control is disabled if tractor seat is occupied and ground drive hand or foot control are out of neutral. • Ground drive must be in low (1) position. • Ensure that backfill blade, if equipped, and stabilizers are raised before operating this control. • Do not move more than 30' (10 m) at a time.

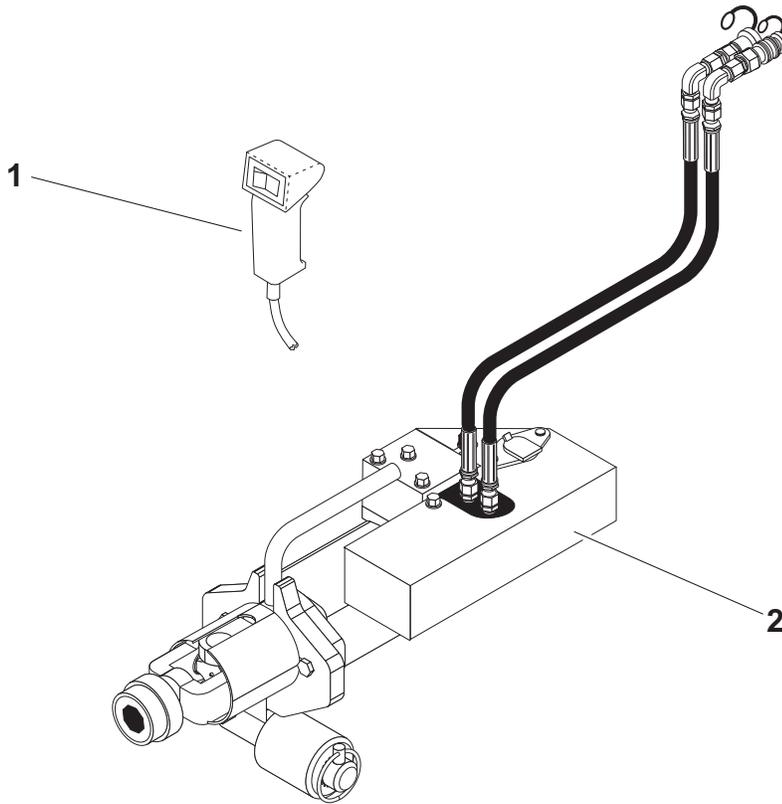


Item	Description	Notes
<p>9. Remote engine stop switch</p>  <p>c00ic085c.eps</p>	<p>To stop engine immediately, press.</p>	<p>IMPORTANT: For normal engine shutdown, use ignition switch.</p> <p>Note: This switch must be returned to the UP position to allow engine restarting.</p>
<p>10. Boom stow lock</p>  <p>c00ic646w.eps</p>	<p>To lock:</p> <ul style="list-style-type: none"> • Raise boom fully. • Pull stow lock handle. • Lower boom slightly to engage lock. <p>To unlock:</p> <ul style="list-style-type: none"> • Raise boom slightly. • Push stow lock handle to release lock. 	<p>Use this control to lock boom in the up position.</p> <p>NOTICE: Always lock boom during transport.</p>
<p>11. Bucket/dipper control</p>  <p>c00ic213h.eps</p>	<p>To open bucket, move right.</p> <p>To close bucket, move left.</p> <p>To move dipper in, pull.</p> <p>To move dipper out, push.</p>	<p>Control can perform more than one action at a time. By “feathering” the control, operator can combine backhoe operations.</p>
<p>12. Right stabilizer control switch</p>  <p>c00ic088c.eps</p>	<p>To lower, press right.</p> <p>To raise, press left.</p>	

Item	Description	Notes
<p>13. Boom swing lock</p>  <p>The diagram shows a vertical line representing the boom swing lock. At the top, there is a padlock icon with an arrow pointing right, indicating the lock is engaged. In the middle, there is a hook icon with a padlock icon below it, indicating the lock is disengaged. At the bottom, there is a padlock icon with an arrow pointing left, indicating the lock is engaged. A vertical line with arrows at both ends connects the top and bottom padlocks.</p> <p>c00ic089c.eps</p>	<p>To lock, push down and into hook.</p> <p>To unlock, pull up and into hook.</p>	<p>Backhoe can be locked in several swing positions. If lock will not engage, swing backhoe slightly left or right until lock engages.</p> <p>NOTICE: Always lock boom during transport.</p>



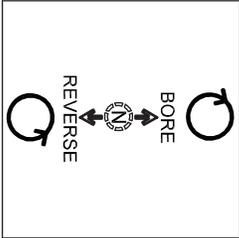
Drill Controls



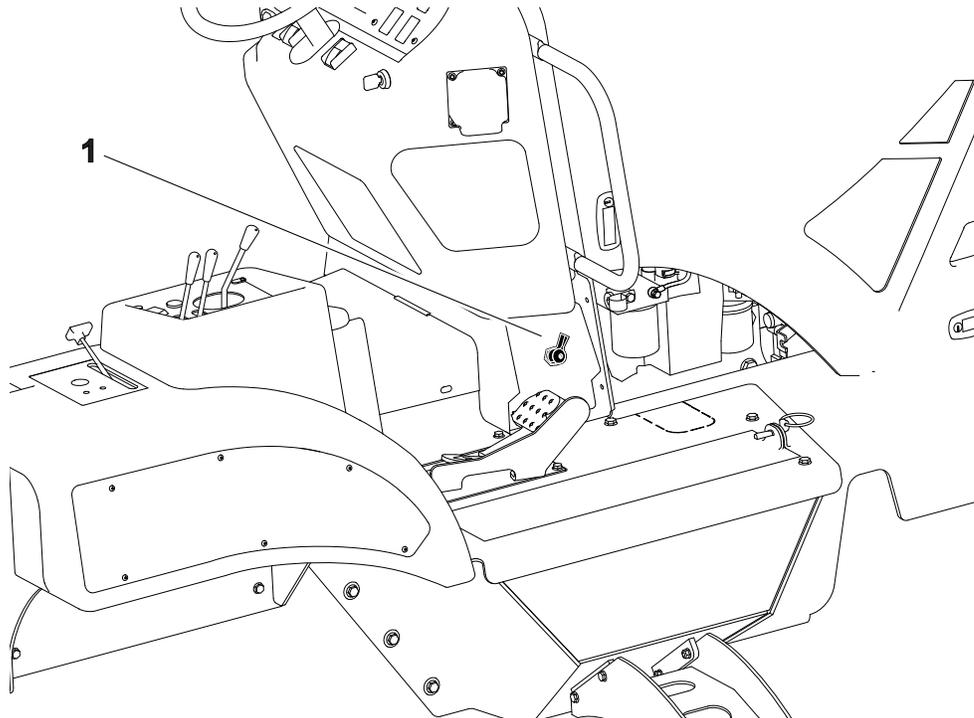
t33om063w.eps

1. Drilling attachment control

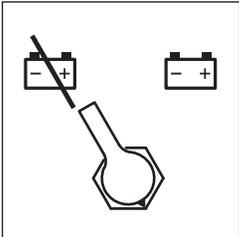
2. Drilling attachment

Item	Description	Notes
<p>1. Drilling attachment control</p>  <p>The diagram shows a central square button with a circular arrow pointing left labeled 'REVERSE' and a circular arrow pointing right labeled 'BORE'. A neutral position is indicated by a circle with an 'N' inside.</p> <p>c00ic655w.eps</p>	<p>To rotate clockwise, press bore.</p> <p>To rotate counterclockwise, press reverse.</p> <p>EMERGENCY SHUTDOWN: Release all controls and turn ignition switch to STOP.</p>	<p>IMPORTANT: Always rotate clockwise during drilling and backreaming. Rotate counterclockwise only to dislodge a dry bore bit or reamer that has seized in the bore hole.</p> <p>Switch should return to neutral position when released.</p>

Battery Disconnect



t33om012w.eps

Item	Description	Notes
<p>1. Battery disconnect switch</p>  <p>c00ic654w.eps</p>	<p>To connect, move handle to right.</p> <p>To disconnect, move handle to left.</p>	<p>NOTICE: Do not operate battery switch with engine operating.</p>

Operation Overview

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Trenching..... 68

Plowing 68

Sawing 69

Digging with Backhoe 69

Drilling 69

Leaving Jobsite..... 69



Planning

1. Gather information about jobsite. See 72.
2. Inspect jobsite. See page 73.
3. Classify jobsite. See page 74.
4. Select chain and teeth to match your soil type, if necessary. See page 143.
5. Check supplies and prepare equipment. See page 76.
6. Haul equipment to jobsite. See page 83.

Trenching

1. Start unit. See 78.
2. Position tractor and controls. See page 96.
3. Begin trenching. See page 97.
4. Engage cruise control if desired. See page 140.
5. Engage optional Trench Depth Meter, if equipped.
6. Complete the installation. See page 147.
7. Shut down tractor. See page 82.

Plowing

1. Start unit. See page 78.
2. Position tractor and controls. See page 103.
 - offset plowing - page 107
 - coordinated plowing - page 107
 - crabbing - page 107
3. Attach product. See page 103.
4. Begin plowing. See page 106.
5. Engage cruise control if desired. See page 140.
6. Complete the installation. See page 147.
7. Shut down tractor. See page 82.

Sawing

1. Start unit. See page 78.
2. Position tractor and controls. See saw manufacturer's information.
3. Begin sawing. See saw manufacturer's information.
4. Complete the installation. See page 147.
5. Backfill the trench. See page 148.
6. Shut down tractor. See page 82.

Digging with Backhoe

1. Start unit. See page 78.
2. Set stabilizers and unstow backhoe. See page 128.
3. Excavate. See page 129.
4. Stow backhoe properly. See page 130.
5. Shut down tractor. See page 82.

Drilling

1. Start unit. See page 78.
2. Dig approach trench and target trench. See page 133.
3. Assemble drill string and position tractor. See page 134.
4. Begin drilling. See page 135.
5. Use drill string guide as needed. See page 135.
6. Add rod. See page 136.
7. Backream. See page 136.
8. Shut down tractor. See page 82.
9. Disassemble joints. See page 137.



Leaving Jobsite

1. Backfill if necessary. See page 148.
2. Rinse equipment. See page 148.
3. Stow tools. See page 148.
4. Haul equipment from jobsite. See page 90.

Prepare

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- Notify One-Call Services72
- Arrange for Traffic Control72
- Plan for Emergency Services72

Inspect Site 73

- Identify Hazards73

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Check Supplies and Prepare Equipment 76

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- Accessories76



Gather Information

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

Review Job Plan

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

Notify One-Call Services

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

Arrange for Traffic Control

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

Plan for Emergency Services

Have the telephone numbers for local emergency and medical facilities on hand. Check that you will have access to a telephone.

Inspect Site

Inspect jobsite before transporting equipment. Check for the following:

- changes in elevation such as hills or other open trenches
- obstacles such as buildings, railroad crossings, or streams
- signs of utilities ("Inspect Jobsite" on page 74)
- traffic
- access
- soil type and condition

Identify Hazards

Identify safety hazards and classify jobsite. See "Classify Jobsite" on page 74.



⚠ WARNING

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

To help avoid injury:

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

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



Classify Jobsite

Inspect Jobsite

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

Select a Classification

Jobsites are classified according to underground hazards present.

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

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

Apply Precautions

Once classified, precautions appropriate for jobsite must be taken.

Electric Jobsite Precautions

Use one or both of these methods.

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

Natural Gas Jobsite Precautions

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

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



Crystalline Silica (Quartz) Dust Precautions

Crystalline silica dust is a naturally occurring substance found in soil, sand, concrete, granite, and quartz. Breathing silica dust particles while cutting, drilling, or working materials may cause lung disease or cancer. To reduce exposure:

- Use water spray or other means to control dust.
- Refer to U.S. Department of Labor Occupational Safety and Health Administration guidelines to learn more about appropriate breathing protection and permissible exposure limits.

Other Jobsite Precautions

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

Check Supplies and Prepare Equipment

Supplies

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

Fluid Levels

- fuel
- hydraulic fluid
- battery charge
- engine oil

Condition and Function

- digging chain and teeth
- brake pads and disc
- fan belts
- light bulbs
- filters (air, oil, hydraulic)
- tires
- pumps and motors
- hoses and valves
- signs, guards, and shields

Accessories

Fire Extinguisher

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

Drive

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Start Unit 78

Drive 80

Safe Slope Operation 81

Shut Down 82



Start Unit

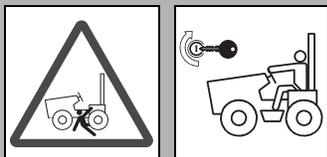
Before operating tractor, read engine manufacturer's starting and operating instructions. Follow instructions for new engine break-in.



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

To help avoid injury:

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

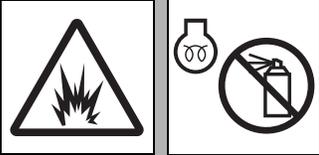


WARNING Runaway possible. Start from operator's position only. 275-070



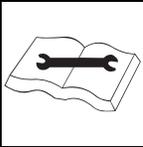
WARNING Rollover could kill or crush. Wear seat belt. 275-303

1. Fasten and adjust seat belt.
2. Check that ground drive control and attachment speed/direction control are in neutral.
3. Move throttle to idle.
4. Verify that parking brake is engaged.
5. Turn ignition switch to the run position (key on, engine off). Wait for operator display to come on.
6. When cold start wait indicator goes off, turn ignition switch all the way clockwise to start tractor.



WARNING Fire or explosion possible. Do not use starter fluid. 273-459 (2P), 274-206 (2P), 700-206 (2P)

- If engine does not crank, check start interlock display. See page 31 for start interlock information.
- If engine turns but does not start within 10 seconds, allow starter to cool before trying to start again.



WARNING Improper control function could cause death or serious injury.

To help avoid injury: Stop machine and have it serviced if control does not work as described in instructions.

IMPORTANT: Machine will not start if start interlock requirements are not met. See page 31 for start interlock information.



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

Drive



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

To help avoid injury:

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

EMERGENCY SHUTDOWN: Turn ignition switch to STOP.

General Operation

1. Turn on lights as needed.
2. Raise backfill blade and all attachments.
3. Release parking brake.
4. Adjust throttle.
5. When operating in low or medium:
 - if using the hand control, the foot control will only increase speed.
 - any opposing signal from controls causes ground drive to stop.
6. When operating in high, ground drive stops if hand control is moved out of neutral position.

Safe Slope Operation



Rollover could kill or crush. Wear seat belt.

275-303

To help avoid injury:

- Only operate equipment on slopes if absolutely necessary.
- Always operate with heavy end uphill. Keep attachments low and travel up and down the slope.
- Drive cautiously, in the lowest gear, at all times.
- Never jerk control levers. Use a steady even motion.
- Do not park unit on slope without lowering digging attachment to the ground, returning all controls to neutral position, shutting down unit, and applying parking brake.
- Assess the site to determine if the slope and conditions are conducive to a safe working environment.

Operating safely on a slope depends upon many factors including:

- Distribution of machine weight, including front loading and absence of load
- Height of load
- Saturated, even or rough ground conditions
- Potential for ground giving way causing unplanned tilt forward, reverse or sideways
- Nearness of ditches, ruts, stumps or other obstructions and sudden changes in slope
- Speed
- Turning
- Braking performance
- Operator skill



These varying factors make it impractical to specify a maximum safe operating angle in this manual. It is therefore important for the operator to be aware of these conditions and adjust operation accordingly. Maximum engine angle and braking performance are two absolute limits which must never be exceeded. These maximums are stated below since they are design limits. These design limits usually exceed the operating limits and must never be used alone to establish safe operating angle for variable conditions.

Maximum engine lubrication angle – 30°

Maximum service brake retarding force – equal to traction of both tires.

Maximum secondary brake retarding force – equal to traction of one tire.

Maximum park brake holding force – equal to traction of both tires.

Shut Down

1. When job is complete, move ground drive control to neutral.
2. Set parking brake.
3. Lower all attachments to ground.
4. Move throttle to idle for 3 minutes to cool engine.
5. Turn ignition switch to STOP. If leaving machine unattended, remove key.
6. For maintenance or long-term storage, turn battery disconnect switch, if equipped, to the disconnect position.

Transport

Chapter Contents

Lift 84

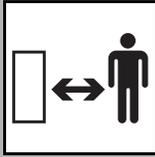
Tie Down 87

Haul 90

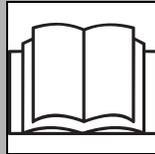
Retrieve 93



Lift



⚠ WARNING Crushing weight could cause death or serious injury. Stay away.



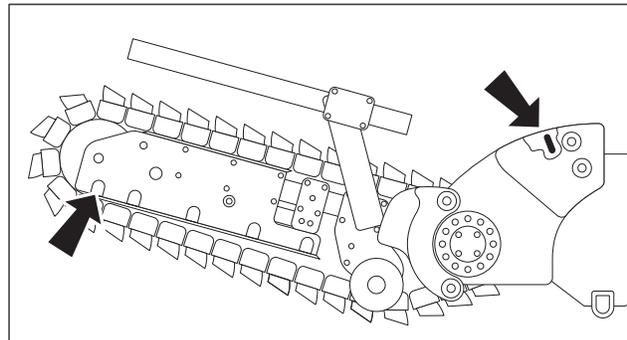
⚠ WARNING Read operator's manual. Know how to use all controls. Your safety is at stake. 273-475

Tractor

This machine is not configured for lifting. If the machine must be lifted, load machine into a container or onto a platform appropriate for lifting. See "Specifications" for weight of machine.

Centerline Trencher

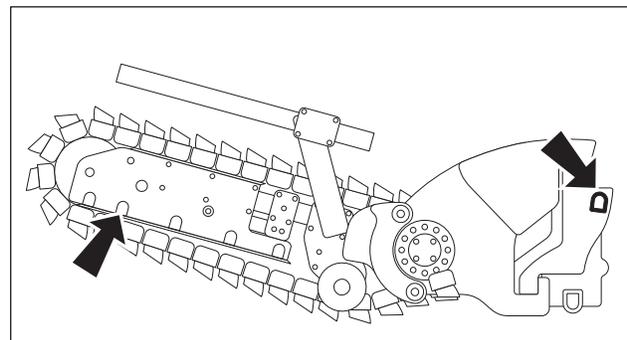
Lift points shown with arrows. Use crane capable of supporting the equipment's size and weight. See "Specifications" or measure and weigh equipment before lifting.



t30om012h.eps

Traversing Trencher

Lift points shown with arrows. Use crane capable of supporting the equipment's size and weight. See "Specifications" or measure and weigh equipment before lifting.

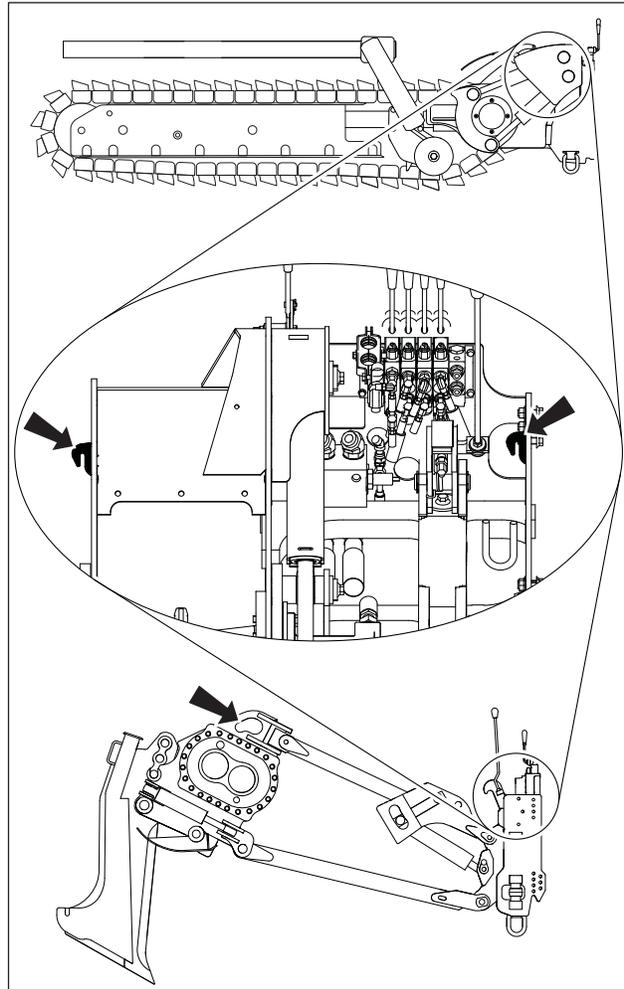


t30om013h.eps

Combo

Lift points shown with arrows. Use crane capable of supporting the equipment's size and weight. See "Specifications" or measure and weigh equipment before lifting.

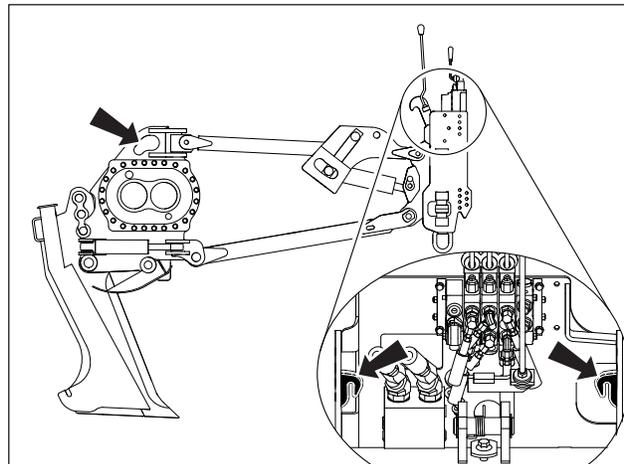
Plow linkage has some movement and may require better support in some situations.



t33om022w.eps

Plow

Lift points shown with arrows. Use crane capable of supporting the equipment's size and weight. See "Specifications" or measure and weigh equipment before lifting.

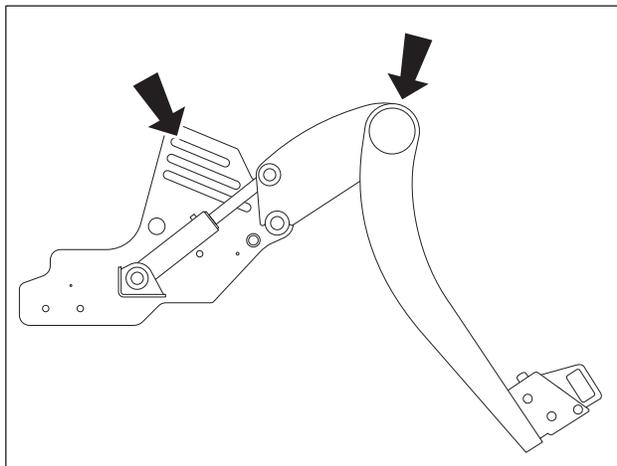


t33om018w.eps



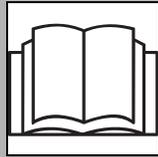
Reel Carrier

Lift points shown with arrows. Use crane capable of supporting the equipment's size and weight. See "Specifications" or measure and weigh equipment before lifting.



t30om021h.eps

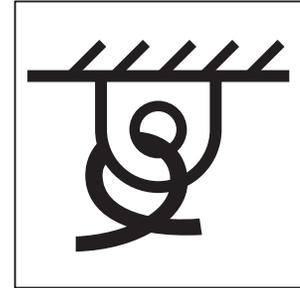
Tie Down



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

Points

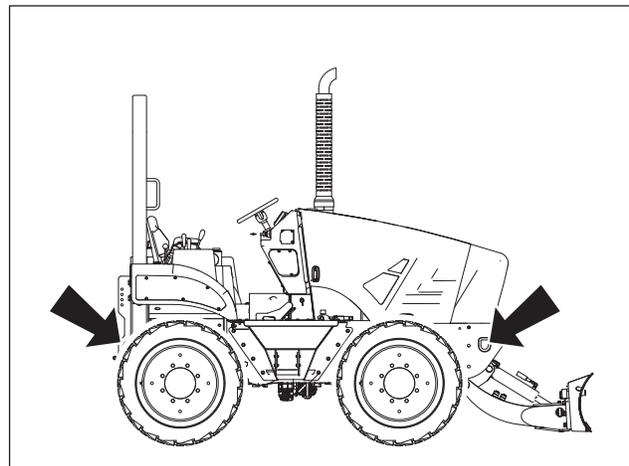
Tiedown points are identified by tiedown decals. Securing to trailer at other points is unsafe and can damage machinery.



ic1320a.eps

Tractor

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

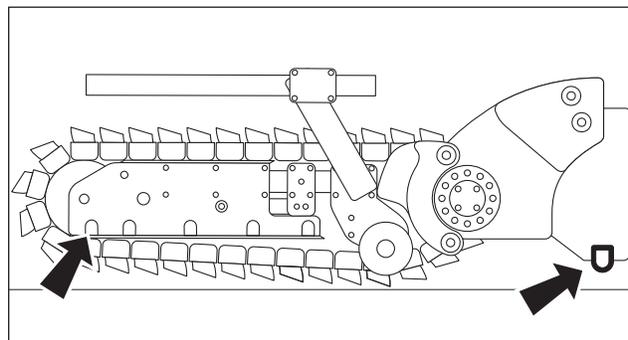


t450m003h.eps

Centerline Trencher

Lower trencher to trailer deck and chain at attachment frame and through boom. Make sure chains are tight before transporting.

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 center hole for additional support.



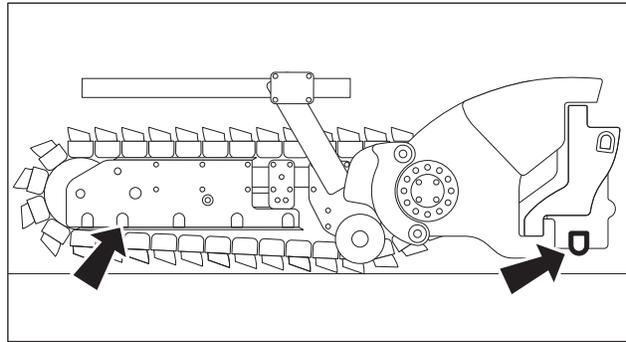
t330m087w.eps



Traversing Trencher

Lower trencher to trailer deck and chain at attachment frame and through boom. Make sure chains are tight before transporting.

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 center hole for additional support.



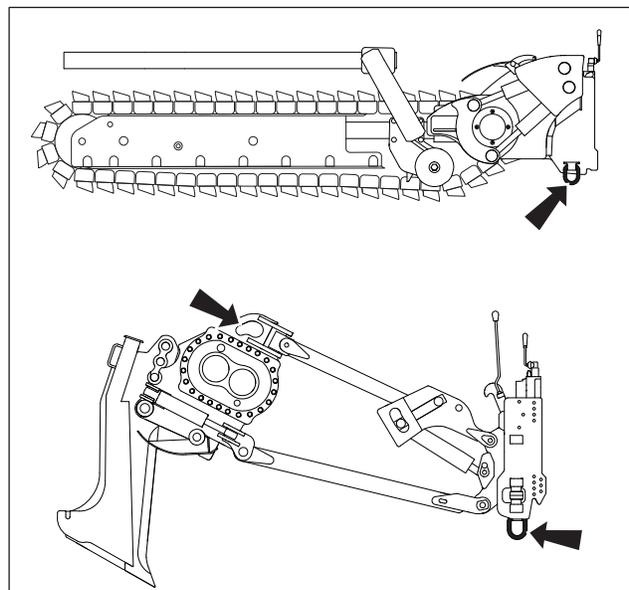
t33om088w.eps

Combo

Lower attachment to trailer deck and chain at attachment frame and vibrator box. Make sure chains are tight before transporting.

NOTICE:

- Engage attachment stow lock and swing lock devices in addition to securing at tiedowns.
- Unsecured plow can swing outside the trailer and become a traffic hazard. Lower plow and chain to trailer deck before hauling.
- 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 center hole for additional support.



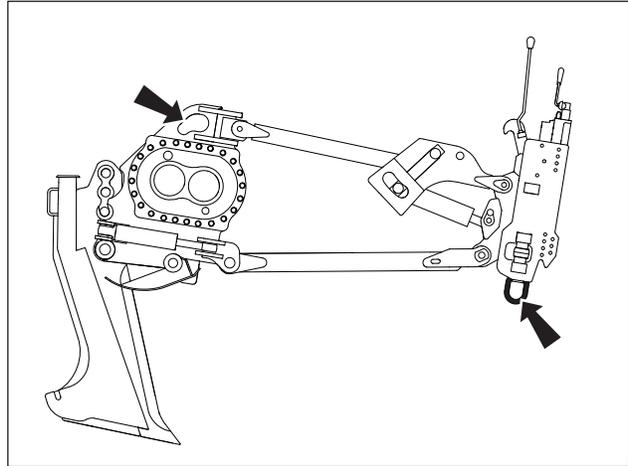
t33om027w.eps

Plow

Lower plow to trailer deck and chain at attachment frame and vibrator box. Make sure chains are tight before transporting.

NOTICE:

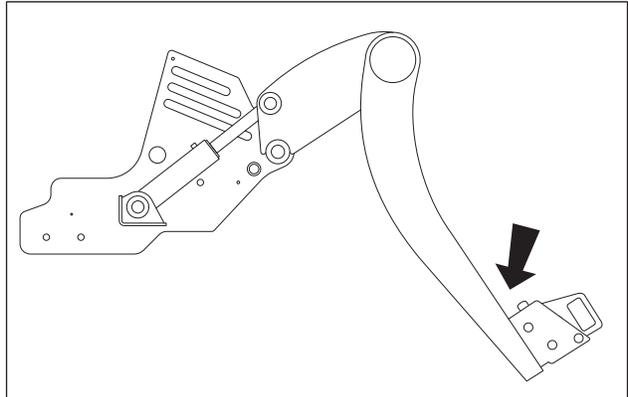
- Engage attachment stow lock and swing lock devices in addition to securing at tiedowns.
- Unsecured plow can swing outside the trailer and become a traffic hazard. Lower plow and chain to trailer deck before hauling.



t330m019w.eps

Reel Carrier

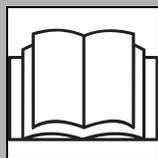
Lower reel carrier to lowest position and tie down at attachment arms. Make sure chains are tight before transporting.



t30m020h.eps



Haul



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

To help avoid injury:

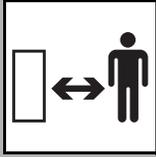
- Read trailer operator's manual before loading or transporting your machine. Incorrectly loaded machine can slip or cause trailer sway.
- Ensure that tow vehicle has proper tow capacity rating.
- Attach trailer to tow vehicle before loading or unloading.
- Park, load, and unload trailer on level ground.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

Procedure

Inspect Trailer

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

Load



WARNING

Crushing weight could cause death or serious injury. Stay away.

To help avoid injury:

- Attach trailer to tow vehicle before loading or unloading.
- Load and unload trailer on level ground.
- Block trailer wheels.



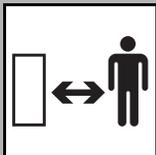
WARNING

Rollover could kill or crush. Wear seat belt.
275-303

1. Fasten and adjust seat belt.
2. Start tractor. See page 78 for proper start-up procedures.
3. Raise attachments, but keep them low and centered. Check that they are not in float.
4. Release parking brake and verify that parking brake indicator is off.
5. Move ground drive switch to low.
6. Slow engine to low throttle and slowly drive tractor onto trailer.
7. Position tractor on trailer deck for proper weight distribution.
8. Engage parking brake and verify that parking brake indicator is on.
9. Lower attachments to trailer bed and turn tractor off. See page 82 for proper shutdown procedures.
10. Attach chains to tractor and attachments where tiedown decals are located. See page 87.



Unload



WARNING Crushing weight could cause death or serious injury. Stay away.

To help avoid injury:

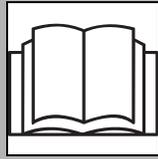
- Attach trailer to tow vehicle before loading or unloading.
- Load and unload trailer on level ground.
- Block trailer wheels.



WARNING Rollover could kill or crush. Wear seat belt.
275-303

1. Lower trailer or ramps.
2. Check that parking brake is engaged and verify that parking brake indicator is on.
3. Check that ground drive controls are in neutral.
4. Remove chains from tiedowns.
5. Fasten and adjust seat belt.
6. Start tractor. See page 78 for proper start-up procedures.
7. Raise attachments, but keep them low and centered. Check that they are not in float.
8. Release parking brake and verify that parking brake indicator is off.
9. Slow engine to low throttle and slowly back unit down trailer or ramps.

Retrieve



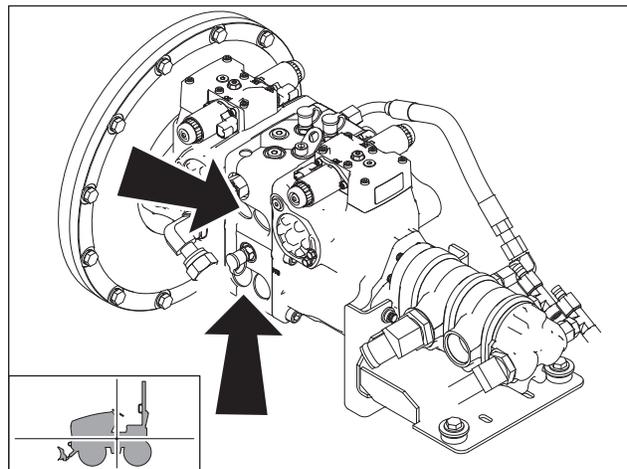
WARNING Read operator's manual. Know how to use all controls.
Your safety is at stake. 273-475

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

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

Procedure

1. Engage parking brake.
2. Block front and rear tires to prevent unit from rolling.
3. Attach tow line to all available tie-down points facing towing vehicle.
4. On left side of tractor, locate four plugs on pump housing. Thoroughly clean area around plugs.
5. Remove front two plugs (shown) with 5/16" Allen wrench. Some fluid will escape.
6. Use clean needle nose pliers to remove relief/check valves.
7. Install plugs until o-ring touches pump housing to prevent oil leakage during towing.



IMPORTANT: Keep check valves clean while towing.

8. Remove blocks.
9. Fasten seatbelt and adjust seatbelt.
10. Disengage parking brake.
11. After towing, reinstall check valves with spring end in first.

IMPORTANT: If plug does not thread in easily until the o-ring touches the pump housing, the relief/check valve might be bound in bore. Remove plug and relief/check valve and reinstall.

Trench



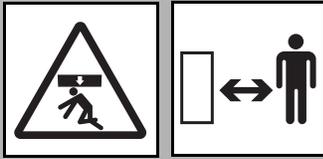
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Operation..... 97

Setup

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.



WARNING Crushing weight could cause death or serious injury. Stay away.

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



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

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

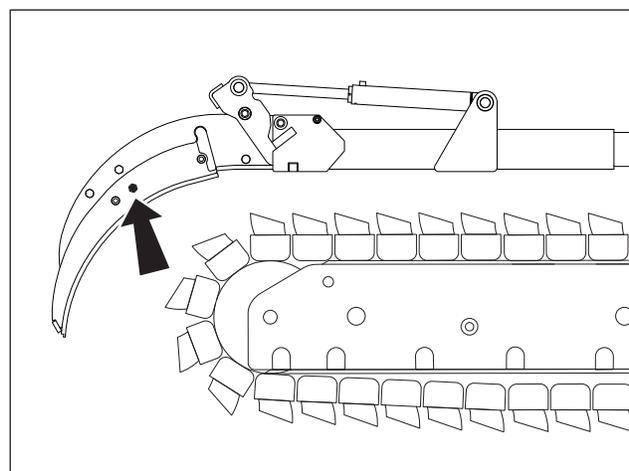


WARNING Read operator's manual. Know how to use all controls. Your safety is at stake. 273-475

Before Using Trencher

NOTICE: If trencher is equipped with trench cleaner, check to ensure that shipping bolt has been removed, as shown.

1. Fasten and adjust seat belt.
2. Start tractor. See page 78 for start-up procedures.
3. Drive to starting point. Move in line with planned trench.



t33om080w.eps

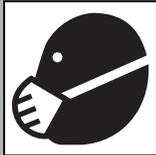


IMPORTANT:

- When cutting asphalt, start trench in soil at edge of road and use shortest possible boom at full depth.
- Sight along center of hood to a stake driven beyond end of trench line for straight trench.
- For optimal spoils delivery, adjust the auger positions forward or backward to accommodate terrain and digging depth.

4. Lower backfill blade.
5. Engage parking brake.
6. Lower boom to just above ground.
7. Check that attachment speed/direction control and ground drive controls are in neutral.
8. If equipped with combo, select trenching control position.

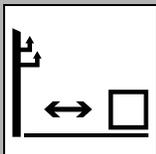
Operation



CAUTION

Use breathing protection when exposed to silica dust.

270-4952

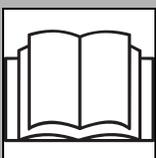


DANGER

Electric shock will cause death or serious injury. Stay

away. 274-049

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



WARNING

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

Your safety is at stake. 273-475

To help avoid injury:

- 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 safety glasses and hard hat. 275-193



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

To help avoid injury:

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

1. Lower backfill blade to reduce shock when trenching begins.
2. If necessary, adjust throttle to low idle.
3. Move attachment speed/direction control to desired speed. DIGGING CHAIN WILL MOVE.

NOTICE: Always start trenching with attachment speed set at low. If soil conditions permit optimum digging at higher speeds, select high.

4. Increase engine speed to full throttle.
5. Slowly lower digging boom to depth.
6. Raise backfill blade and release parking brake.
7. Move ground drive control to desired speed.
8. If using optional mechanical trench cleaner:
 - Stop tractor and turn ignition switch to STOP.
 - Lower trench cleaner, if equipped.
 - Restart tractor, fasten seat belt, and continue trenching.

NOTICE:

- Make sure that shipping bolt is removed before attempting to use trench cleaner.
- 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.

9. If using optional hydraulic trench cleaner:
 - Trench forward a short distance.
 - Move hydraulic control lever to lower trench cleaner, and continue trenching.
10. Push ground drive control forward to trenching speed.



NOTICE:

- Do not make sharp turns. Lower boom to full depth when turning.
 - If an object becomes lodged in chain, move attachment speed/direction control to neutral and raise boom slightly. Reverse chain direction. If object must be removed manually, turn engine off and engage parking brake.
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. Drive a short distance away from work site.
 16. Shut down tractor. See page 82 for proper shutdown procedures.
 17. Return optional trench cleaner to the stowed position.

Plow

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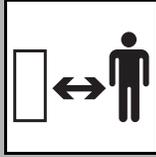
Setup 102

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Setup

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.



⚠ WARNING Crushing weight could cause death or serious injury. Stay away.

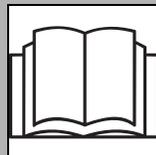
To help avoid injury: Use attachments or counterweights to make front and rear loads balance when all attachments are raised. Contact your Ditch Witch® dealer about counterweighting for your equipment.



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

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

NOTICE: Do not operate vibrator unless plow is in the ground.



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

Position Tractor

IMPORTANT: If material must be at a constant depth, dig starting and target trenches.

1. Fasten and adjust seat belt.
2. Start tractor. See page 78 for start-up procedures.
3. Drive to starting point. Move in line with planned trench.
4. Engage parking brake and verify parking brake indicator is on.
5. Lower backfill blade, if equipped.
6. If equipped with combo, select the plow control position.
7. Lower plow to starting point of trench.
8. Turn ignition switch to STOP.

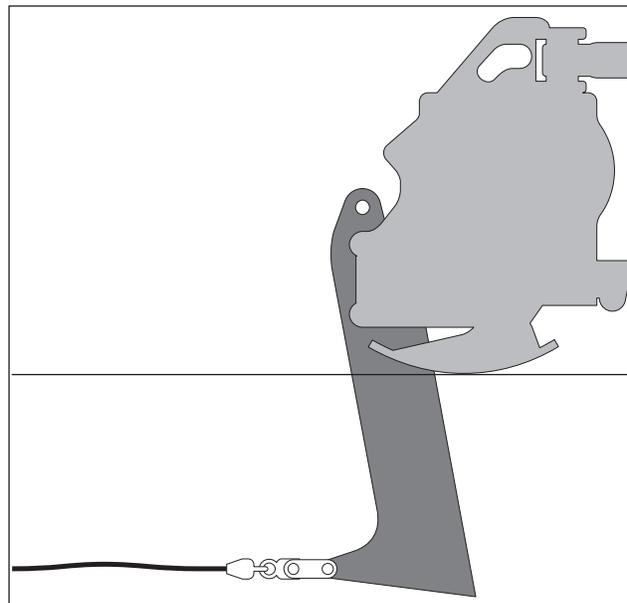


Attach Product

To Pull Product

1. Insert material into pulling grip.
2. Tape grip with duct tape.

NOTICE: Keep everyone away from material being installed.

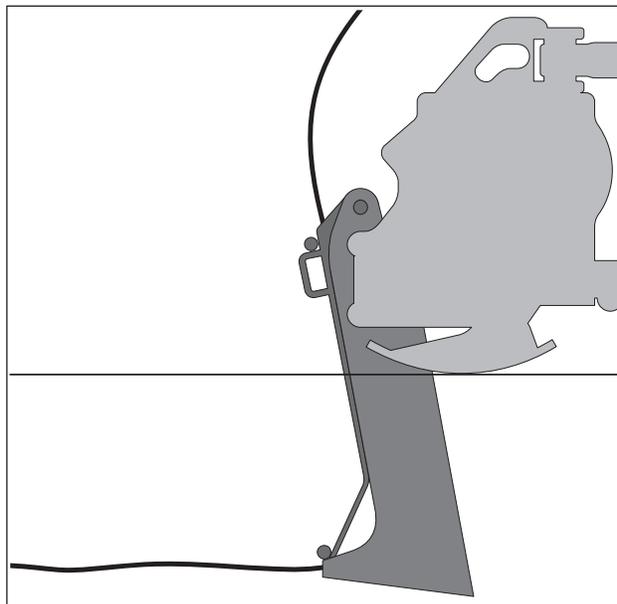


Plow_Pull.eps

To Feed Product

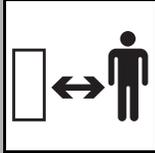
1. Remove cable guide.
2. Feed cable/markings tape through tube from top to bottom.
3. Replace cable guide and tighten fasteners.
4. Secure cable.

NOTICE: Keep everyone away from material being installed.

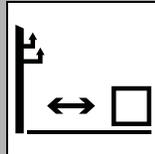


Plow_Feed.eps

Operation

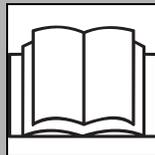


⚠ WARNING Crushing weight could cause death or serious injury. Stay away.



⚠ DANGER Electric shock will cause death or serious injury. Stay away. 274-049

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



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

To help avoid injury: Do not drive backward with plow in the ground.



Start Plowing

1. Fasten and adjust seat belt.
2. Start tractor. See page 78 for start-up procedures.
3. Adjust throttle to low idle.
4. Check that ground drive control is in neutral.
5. Lower reel carrier to lowest position possible, if equipped.

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

6. If equipped with backfill blade tilt/attachment swing valve and control, move selector to swing position.
7. If equipped with reel winder, select reel winder on function switch. Lower reel winder arm to disengage reel winder from product spool.
8. Raise backfill blade.
9. Move ground drive control to forward at plowing speed and lower plow blade into ground.

NOTICE: Do NOT move ground drive to reverse with plow blade in the ground.

10. Increase engine speed to full throttle.
11. Rotate attachment speed/direction control to attachment speed that allows the least tractor vibration at the highest ground drive possible without tire slippage. PLOW WILL VIBRATE.
12. 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.

Finish Plowing

1. When installation is complete, move ground drive control to neutral.
2. With vibrator running, lower throttle speed and raise plow to ground level.

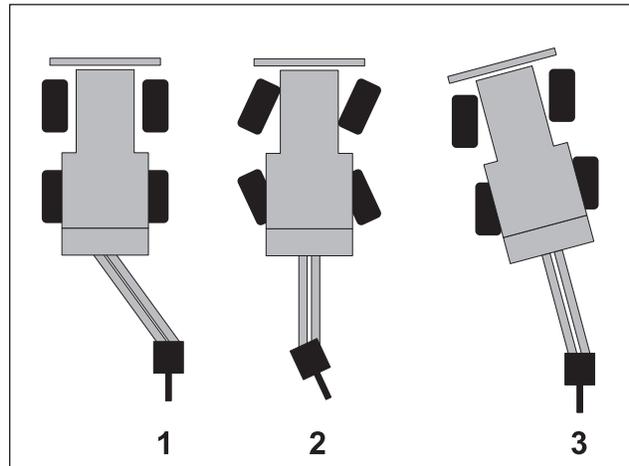
NOTICE: Do not operate vibrator when plow is out of the ground. This will cause excessive vibration resulting in rapid wear, and possible damage to the unit and product being installed.

3. Move attachment speed/direction control to neutral.
4. Engage parking brake.
5. Lower backfill blade.
6. Turn ignition switch to STOP and remove product from plow.
7. Start tractor, raise backfill blade and drive a short distance away from work site.
8. Shut down tractor. See page 82 for proper shutdown procedures.

Special Plowing

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

NOTICE: Oversteering blade may damage blade or cable.



Plowing.eps

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 steer to position blade parallel to direction of tractor frame.

Coordinated Plow

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

1. Move rear steer/center switch to the rear steer position.
2. Use the rear steer switch to position the tires as shown above (2).
3. Slowly move tractor forward.
4. Plow as normal.

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

Crab Plow

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

1. Move rear steer/center switch to the rear steer position.
2. Use the rear steer switch to position the tires as shown above (3).
3. Slowly move tractor forward.
4. Plow as normal.

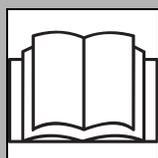
Reel Carrier

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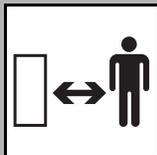
Setup



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

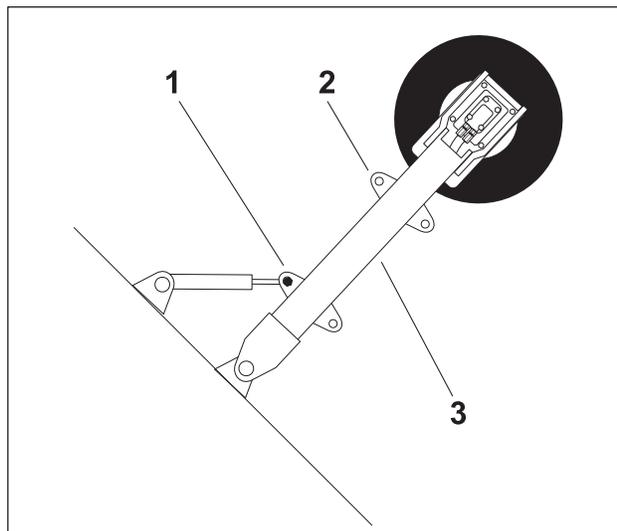
Adjust Reel Winder

1. Lower reel carrier.
2. Turn ignition switch to STOP.
3. Remove reel.



⚠ WARNING Crushing weight could cause death or serious injury. Stay away. 275-326, 701-326

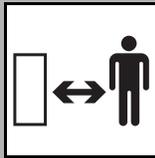
4. While supporting lever arm (3), remove bolt (1) that attaches hydraulic lift cylinder to lever arm.
5. Attach cylinder rod to the correct mounting hole for your diameter reel:
 - For 2-5' (61-152 cm) diameter reels, attach to bottom mounting hole (1).
 - For 5-7' (152-213 cm) diameter reels, attach to top mounting hole (2).



ReelWinder.eps

Operation

1. Fasten and adjust seat belt.
1. Drive to beginning of planned plow path.
2. Engage parking brake.
3. Lower backfill blade, if equipped.
4. Lower plow attachment.
5. Adjust throttle.
6. Attach service line to reel.



WARNING

275-184, 273-546

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

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, if equipped.
14. Release parking brake.
15. Follow directions in "Setup" on page 102 to begin plowing.

Saw

IMPORTANT: See saw manufacturer's information.



Microtrench

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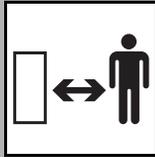
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Setup

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.



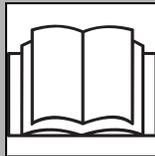
WARNING Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.

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



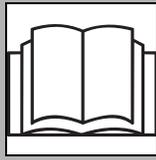
WARNING Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.

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



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

Before First Use and After Replacing Bits



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

To help avoid injury: Perform all service with **tractor off** and parking brake set, unless otherwise instructed. If attachment must be raised for service, only raise it enough to clear the ground.

Check Bit Clearance

For blades using 10 mm rotating conical bits

1. Remove blade cover.
2. Check that all bits are properly secured.
3. Check that all bit retaining pins are secure.
4. Ensure blade retaining nut is tight.
5. Turn blade by hand and make sure bits do not hit metal frame.

Note: If new bits and deflectors are installed, it is normal for bits to hit the deflectors until a portion of the deflector is worn away.

6. If bits hit frame, repeat steps 2-5 to make sure bits are in the proper location and secured at proper depth.
7. If bits do not hit frame:
 - Install blade cover.
 - Fasten and adjust seat belt.
 - Start tractor and adjust throttle.
 - Raise microtrencher slightly.
 - Use attachment speed/direction control to rotate blade slowly. Listen for clicking sounds. If clicking is present, turn off tractor and repeat steps 1-6.



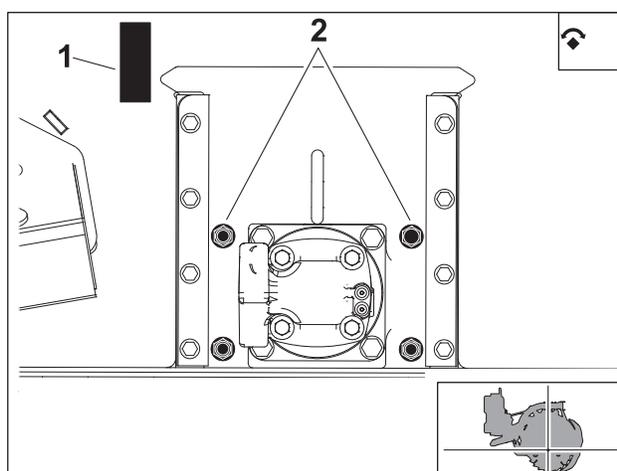
Normal Use

1. Fasten and adjust seat belt.
2. Start tractor. See page 78 for start-up procedures.
3. Raise microtrencher and drive to starting point. Move in line with planned trench. See page 80 for correct driving procedures.
4. Lower backfill blade.
5. Engage parking brake.
6. Lower microtrencher to just above ground.
7. Check that blade is in line with planned trench and that tires are pointing straight ahead.

Adjust Trench Depth

Blade

1. Shut down tractor and remove blade (see page 192.)
2. Remove 4 bolts (2).
3. Lift or lower blade motor to desired depth. Use the depth decal (1) as a guide.
4. Install bolts and tighten nuts to 200 ft-lb (271 N-m).



t28om065h.eps

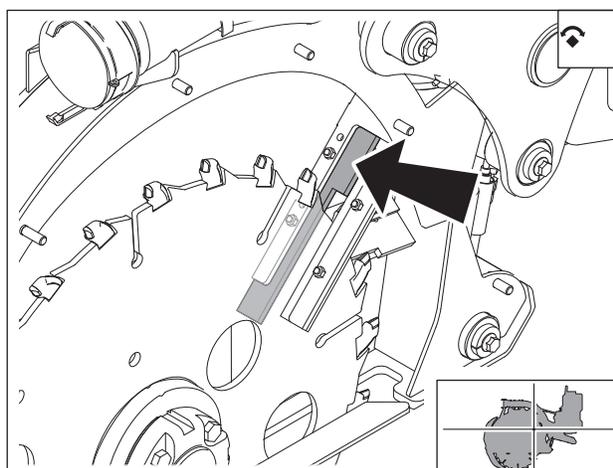
Spoils Deflector

1. Remove blade cover.
2. Remove bolts and nuts that retain the inside spoils deflector.
3. Position spoils deflector.

IMPORTANT: For best spoils removal, set the spoils deflector as close to the blade as possible.

4. Install bolts and tighten nuts firmly.

NOTICE: Overtightening nuts will distort deflector.

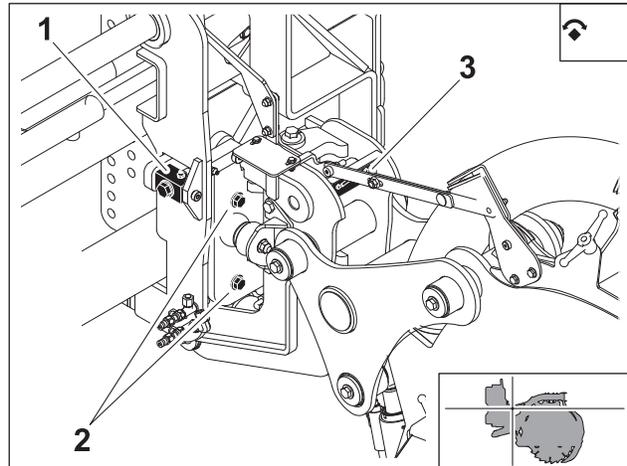


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Adjust Tilt

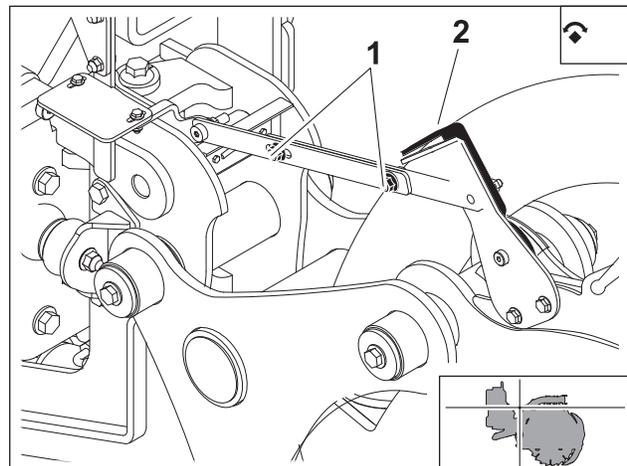
IMPORTANT: Microtrenching requires good contact between the microtrencher frame and the surface being cut. Use lift control, level control, and manual tilt to adjust microtrencher to match jobsite conditions.

1. Lower microtrencher and turn off tractor.
2. Loosen 4 clamp bolts (2, and two on other side of mount).
3. Adjust manual adjustment turn screw (1) and watch bubble level (3) until desired tilt is achieved.
4. Tighten clamp bolts.

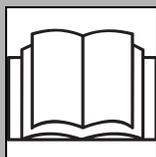


Adjust Level Indicator

1. Shut down tractor and remove blade.
2. Using lift control and level control, position base of microtrencher flat on pavement.
3. Loosen bolts (1) in adjustable link and align moving pointer (2) with fixed pointer.
4. Tighten bolts.



Prepare Spoils Removal



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

To help avoid injury: Do not operate without blade cover and chutes or chute plates installed.

The MT12 MicroTrencher is designed to operate optimally with an 800 cfm vacuum excavator unit to remove spoils. If vacuum excavator is not available, set up unit to operate without it.

With Vacuum Excavator

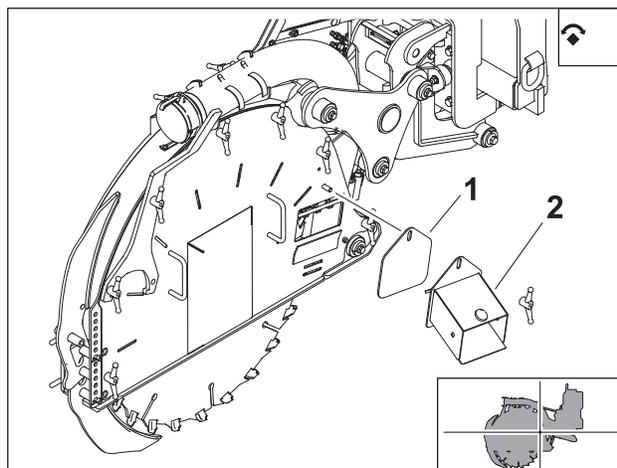
1. Connect vacuum hose on excavator to vacuum hose on tractor.
2. Operate vacuum unit at full speed for best results. Full vacuum flow to the microtrencher is necessary for best spoils removal.

IMPORTANT: Ensure that vacuum hoses are clear, vacuum filters are clean, and separator canister is empty prior to operation.

Without Vacuum Excavator

1. Cap vacuum hose on tractor.
2. Remove chute plates (1).
3. Install spoils chutes (2).

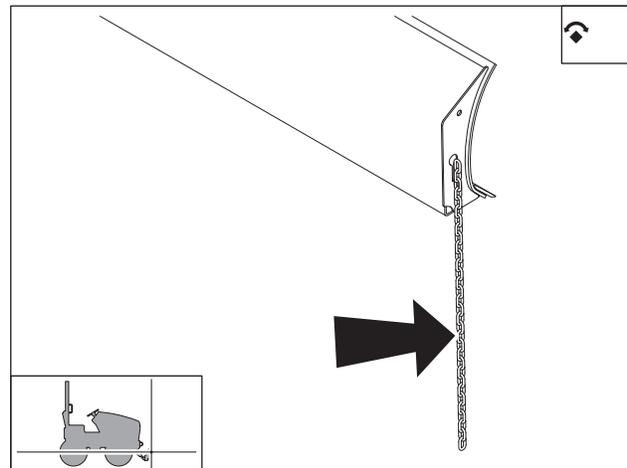
IMPORTANT: Note orientation of spoils chute as indicated by decal on chute.



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Position Alignment Guide

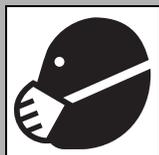
1. Mark intended trench path with paint.
2. Attach chain to backfill blade.
3. Adjust backfill blade until chain is in line with microtrencher blade.
4. Monitor chain periodically while trenching to ensure chain follows paint line during operation.
5. Remove chain from backfill blade before transporting tractor.



t28om070h.eps



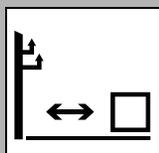
Operation



CAUTION

Use breathing protection when exposed to silica dust.

270-4952

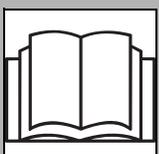


DANGER

Electric shock will cause death or serious injury. Stay away.

274-049

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



WARNING

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

Your safety is at stake. 273-475

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. 275-193

To help avoid injury:

- Never operate microtrencher without blade cover installed.
- Keep everyone away from machine.



DANGER

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

To help avoid injury:

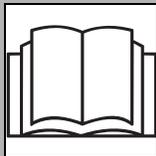
- Allow 3' (1 m) between digging teeth and obstacle. Machine might jerk when digging starts.
- Keep everyone at least 6' (2 m) from machine, attachments, and their range of movement.

IMPORTANT:

- Before operating microtrencher, check bits for free rotation. Tap bits lightly and turn by hand. If bits are stuck, remove and clean packed soil from bit block.
- Work slowly and carefully.
- Microtrencher is not recommended for soft, wet, or sticky soil conditions.

Begin Trenching

1. Adjust throttle to low idle.
2. Lower backfill blade to ground.
3. Move attachment speed/direction control to desired speed. **BLADE WILL TURN.**
4. Increase engine speed to full throttle.
5. Slowly lower microtrencher to full depth.



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



IMPORTANT:

- When possible, lower microtrencher into softer material then move into harder or abrasive material. For example, lower microtrencher into dirt at shoulder before cutting across road.
- Use attachment lift/lower control to apply downforce as needed to ensure front of frame is in contact with or slightly above the ground.

6. Raise backfill blade.
7. Release parking brake.
8. Use ground drive control to set trenching speed.

NOTICE:

- Do not attempt to trench a radius smaller than 40' (12.2 m). Serious damage to microtrencher and/or blade may result.
- Release swing lock when cutting curved trenches.

IMPORTANT:

- Ground drive speed/direction can be controlled with foot pedal or hand lever. When trenching, set ground drive speed with hand lever. Use foot pedal to temporarily adjust speed if digging conditions change for a short distance.
- If a curved trench smaller than a 40' (12.2 m) radius must be cut, make a series of straight cuts.

Stop Trenching

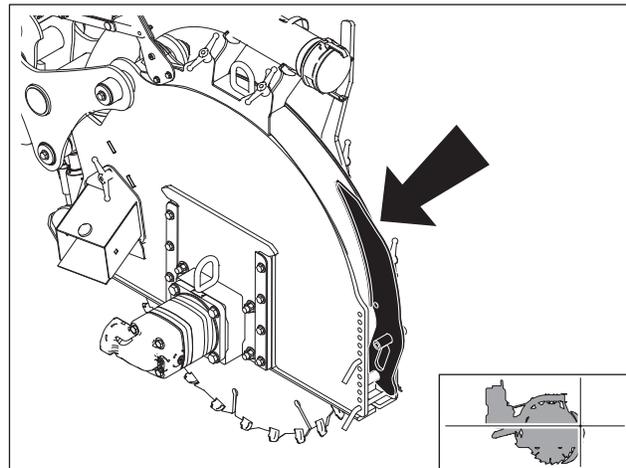
1. When trench is complete, move ground drive control to neutral and adjust throttle to low idle.
2. Raise microtrencher.
3. As blade clears top of trench, move attachment speed/direction control to neutral.
4. Drive a short distance away from work site.
5. Shut down tractor. See page 82 for correct shutdown procedures.
6. Wash bits and mounting blocks with high pressure water before parking unit overnight.

Using a Trench Cleaner

Use the correct trench cleaner for your blade. Two trench cleaners are available: one for blades 1" (25 mm) or less and one for blades wider than 1" (25 mm).

NOTICE: Do not start trench with trench cleaner in place.

1. Start trench and move forward a short distance.
2. Move ground drive to neutral and engage parking brake.
3. Raise microtrencher and stop rotation.
4. Remove trench cleaner from stowed position (shown).

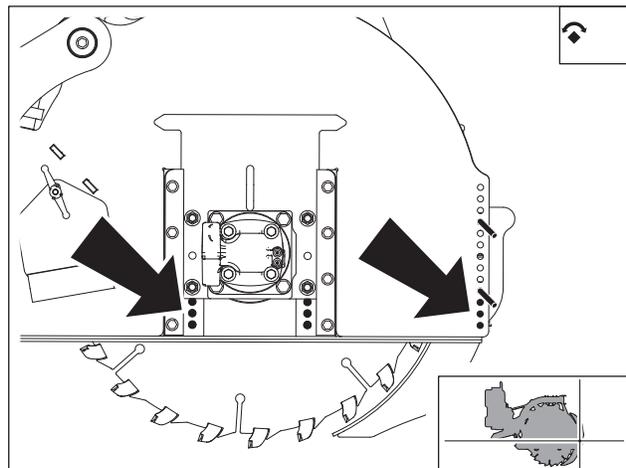


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5. Set trench cleaner to desired depth by matching number of holes below trench cleaner mounting pin to number of holes below blade motor, as shown. Trench cleaner should be close to, but not touching, blade.

NOTICE: Operating microtrencher with trench cleaner in the wrong position can damage trench cleaner or blade.

6. Start blade rotation and slowly lower microtrencher into trench to continue trenching.
7. When finished, stop trenching and return trench cleaner to stowed position.



t28om071h.eps



Backhoe

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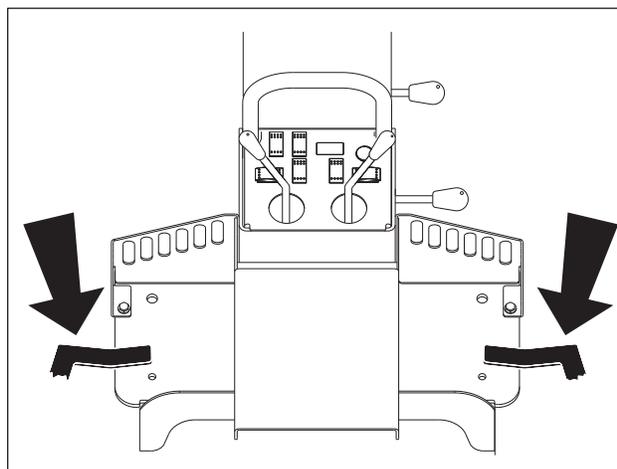
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Setup

1. Move ground drive control to neutral position.
2. Press service brake.
3. Shift gearbox control to 1 (low).
4. Lower rear attachment to 6" (150 mm) above ground.
5. Check that backfill blade is straight and lower it to ground.
6. Decrease engine speed to low throttle.
7. Move to backhoe operator's station.
8. Press stabilizer lock pedals (shown) to release stabilizers.
9. Lower stabilizers enough to lift front tires.

IMPORTANT: For more information about stabilizer controls, see page 56.



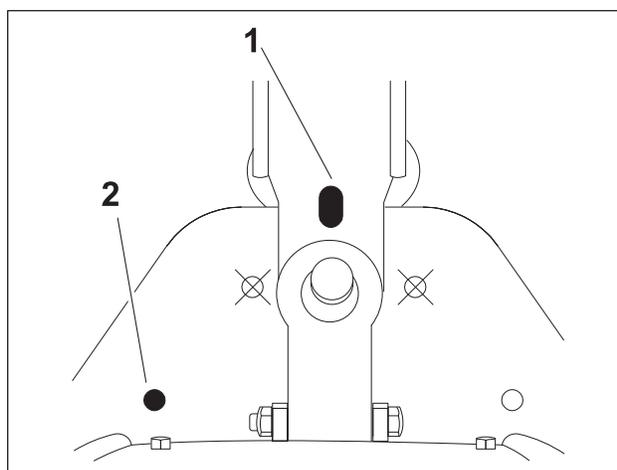
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10. Remove swing lock pin from hole (1) and store in hole (2).
11. Raise boom to release tension on stow lock.
12. Release stow lock by pushing handle forward.

IMPORTANT: For more information about stow lock, see page 56.

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

NOTICE: Engine speed affects speed of backhoe operation.



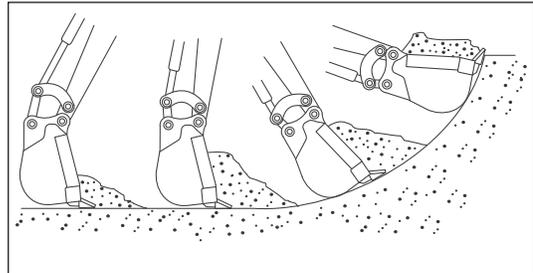
a44om003h.eps

Operation

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

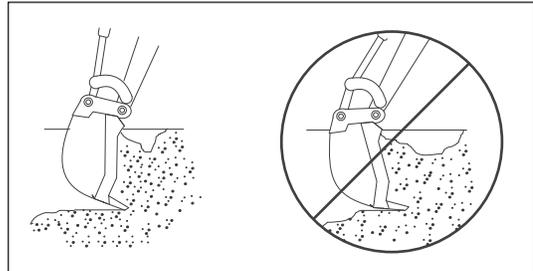
IMPORTANT: For more information about backhoe controls, see page 56.

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



om907c.eps

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



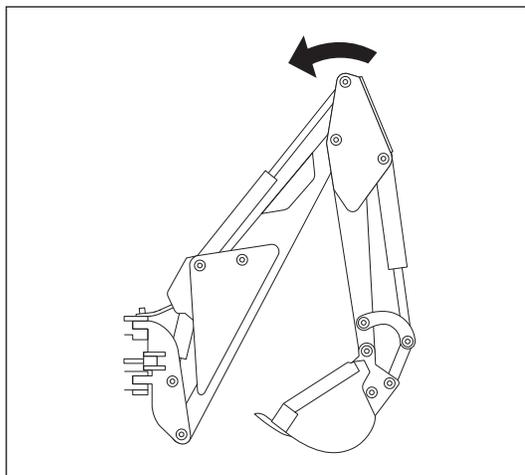
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Stowing

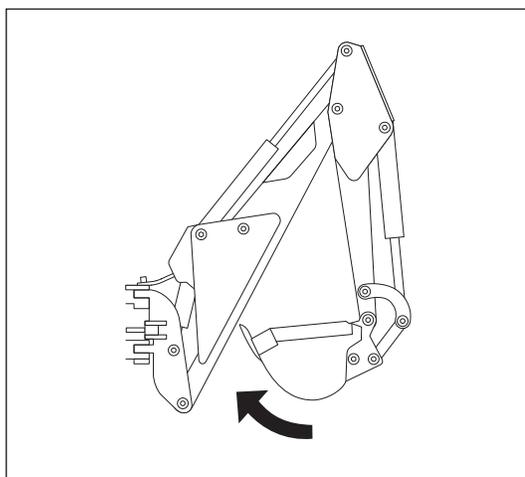
NOTICE: Before returning to tractor operator station, raise stabilizers, return remote throttle to low idle, and stow and lock boom.

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



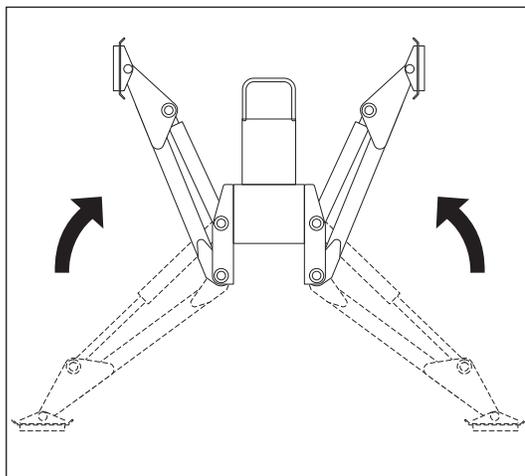
om909c.eps

2. Curl bucket closed and move dipper fully toward boom.
3. Lift boom to highest position and latch stow lock.
4. Lower boom slightly to engage lock.
5. Engage swing lock. See page 128.



om910c.eps

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



om911c.eps

Drill

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- Approach Trench (1)133
- Target Trench (2).133
- Drill Pipe and Equipment.134

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- Using Drill String Guide.135

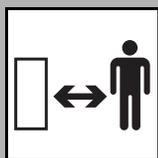
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Drilling Attachment



⚠ DANGER

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

To help avoid injury:

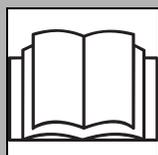
- Do not straddle trench or drill pipe while drilling. Keep everybody at least 10' (3 m) away from drill pipe during operation.
- Keep all persons away from material being installed. If swivel malfunctions, material being installed can rotate.
- Use a guide to align drill rod when starting a bore. Guides are available from your Ditch Witch® dealership.



⚠ WARNING

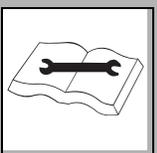
Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.

To help avoid injury: Set up warning barriers and keep people away from equipment and jobsite while drilling.



⚠ WARNING

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



⚠ 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.

To help avoid injury:

- Do not alter controls. Improper control function can cause serious injury.
- Do not tape or tie down switch or lever.
- Stop drilling and turn off power supply if releasing control does not stop turning shaft. Have unit repaired.

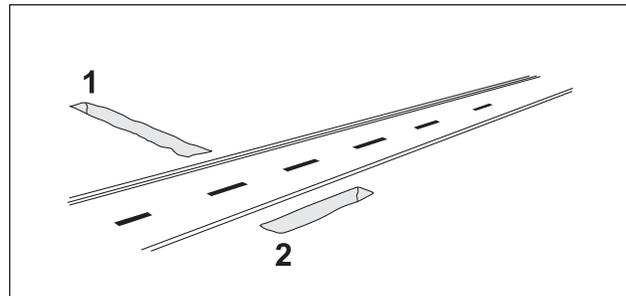
Prepare Jobsite and Equipment

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



Drill_Attchmnt_Prep_Job.eps

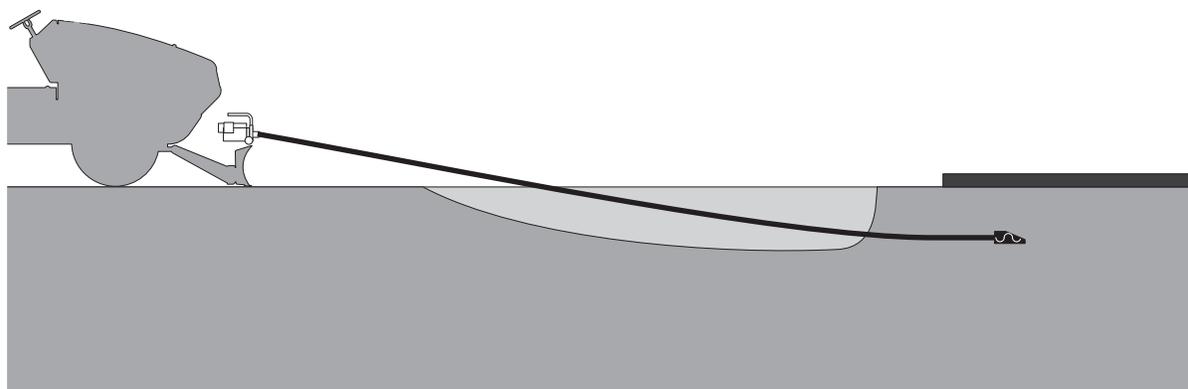
Target Trench (2)

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



DrillRod_Trencher

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

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

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

Drill

IMPORTANT: For location and description of drilling controls see "Drill Controls" on page 64.

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

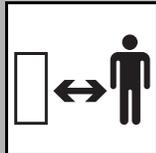
1. Start tractor's engine and begin clockwise (forward) rotation.
2. Slowly advance tractor while maintaining clockwise rotation.

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

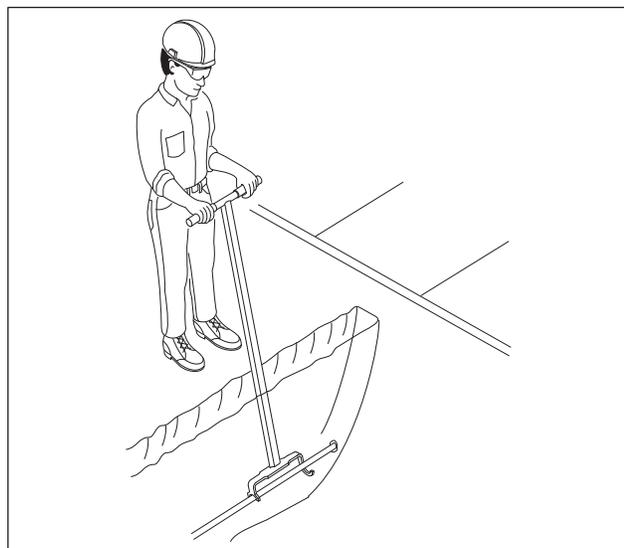


DANGER Turning shaft will kill you or crush arm or leg. Stay away.

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

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

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



DrillStringGuide.eps

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 seized in the bore hole.

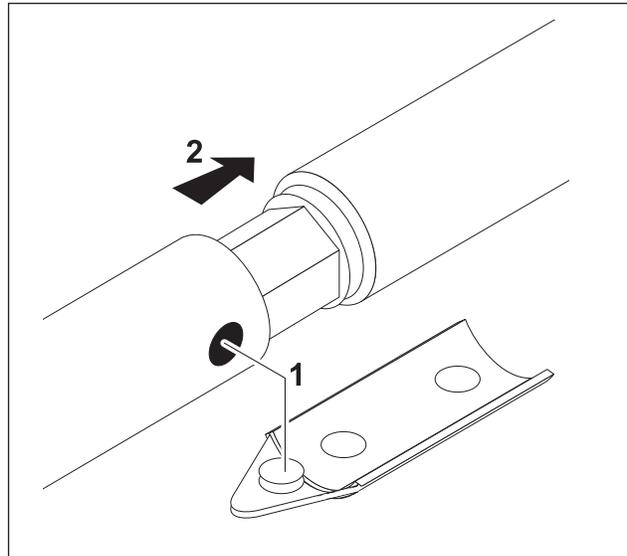
4. Slowly back up tractor while maintaining rotation.
5. When backreamer exits the bore hole, stop rotation immediately.

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.



Drill_Attchmnt_RodJoints.eps



Systems and Equipment

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- H810/H813 Trencher144
- H832 Plow144
- H853 Combo145
- RC80 Reel Carrier145
- MT12 Microtrencher145
- HD630 Saw145

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Cruise Control

Cruise control is a standard feature that allows the unit to automatically adjust ground drive speed according to digging conditions. In easier soil conditions, the ground drive speed will increase. When the unit encounters difficult soil conditions, the ground drive speed will decrease. The unit does this by adjusting ground drive pump output to maintain a preset engine speed.

Operate Cruise Control

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.

Plowing

1. Following procedures in "Setup" on page 102, begin plowing to desired depth.
2. Set the following controls:
 - ground drive controls to neutral
 - ground drive switch to low
 - ensure cruise control is off
 - adjust engine to maximum throttle
 - all other controls set as desired
3. Press cruise control switch once and ensure that cruise control switch indicator lights. Icon will also be shown on graphic display.
4. Set ground drive hand control to maximum speed suitable for digging conditions.
5. Use RPM dial control to select optimum engine speed for digging conditions.
6. When finished plowing, move ground drive control to neutral and press cruise control switch again to turn off cruise control.

Trenching

1. Following procedures on "Setup" on page 96, begin trenching to desired depth.
2. When desired depth is reached, ensure throttle is fully open.
3. Set the following controls:
 - ground drive controls to neutral
 - ground drive switch to low
 - ensure cruise control is off
 - all other controls set as desired
4. Move cruise control RPM control to arrow at center.
5. Press cruise control switch once and ensure that cruise control switch indicator lights. Icon will also be shown on graphic display.
6. Slowly move ground drive control forward to the maximum speed suitable for digging conditions. This setting will limit the maximum ground drive speed to the position of the hand control.
7. Slowly adjust cruise control RPM control to match digging conditions.

IMPORTANT:

- 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.

8. When finished trenching, move ground drive control to neutral and press cruise control switch again to turn off cruise control.
9. Allow chain to dig itself free before stopping attachment.



Chain, Teeth, and Sprockets

Chain and Tooth Maintenance

- Always replace sprockets at the same time you replace the digging chain. Sprockets and chain are designed to work together. Replacing one without the other will cause premature wear of the new part.
- Keep digging teeth sharp. Using dull, worn teeth will decrease production and increase shock load to other trencher components. It can also cause chain stretch, which leads to premature chain wear and failure.
- Maintain the proper amount of tension on the digging chain. Overtightening will cause chain stretch and loss of machine performance. For correct tightening procedure, see "Check Digging Chain Tension" on page 162.
- Use the tooth pattern most appropriate for your digging conditions. If you move to a different soil type, contact your Ditch Witch® dealer for information about the most effective chain type and tooth pattern.

Chain Types

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

Chain Selection

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

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

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



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

Optional Equipment

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

RT80 Tractor

Equipment	Description
4 post ROPS	adds to standard 2 post ROPS
GPS	allows tracking of position
backup alarm	sounds when ground drive control is in reverse
flasher light kit	mounts to ROPS
work light kit	mounts to ROPS

H810/H813 Trencher

Equipment	Description
booms	several boom length options are available
hydraulic trench cleaner	removes spoils from the trench floor
mechanical trench cleaner	
long auger extensions	for conditions that require spoils to be moved farther from the trench

H832 Plow

Equipment	Description
blades	several blade options are available
tape dispenser	for marking tapes
reel carrier	designed to fit your Ditch Witch equipment and speed cable installation
reel winder	rotates reel carrier spool
cable guides	designed to fit your Ditch Witch equipment and speed cable installation

H853 Combo

Equipment	Description
blades	several blade options are available
reel carrier	designed to fit your Ditch Witch® equipment and speed cable installation
tape dispenser	for marking tapes
mechanical trench cleaner	removes spoils from the trench floor

RC80 Reel Carrier

Equipment	Description
reel winder	rotates reel carrier spool

MT12 Microtrencher

Equipment	Description
bits and bit holders	replace as needed to increase efficiency and keep from damaging machine
blades	provides options for cutting trenches 0.75" (19 mm), 0.95" (24 mm), or 1.25" (32 mm) wide
vacuum kit	use to connect vacuum hose on trencher to hose on vacuum excavation unit; includes hose guides that mount to side of tractor



HD630 Saw

See manufacturer's information.

Counterweighting

Attachment	Counterweight required
H853 combo	front weights x 15 required or A820 backhoe attachment
H832 plow	front weights x 15 required or A820 backhoe attachment with optional rear weights x 12
RC80 reel carrier	not approved for use with H810 or HD630 optional rear weights x 12 with H832
H810/H813 trencher	front weights x 15 optional or A820 backhoe attachment
MT12 MicroTrencher	contact Ditch Witch dealer for correct counterweighting
HD630 saw	front weights x 15 required

Counterweights are 110 lb (50 kg) each.

Complete the Job

Chapter Contents

Restore Jobsite 148

- Backfilling 148

Rinse Equipment 148

Stow Tools 148

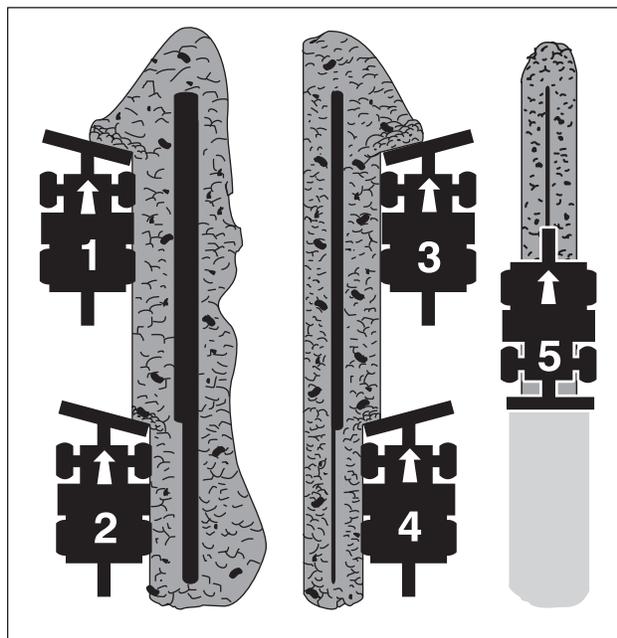


Restore Jobsite

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

Backfilling

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



Backfilling.eps

Rinse Equipment

Spray water onto equipment to remove dirt and mud.

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

Stow Tools

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

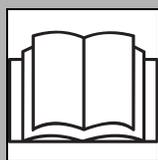
Service



Chapter Contents

- Service Precautions 150**
- Lubrication Overview 152**
- Recommended Lubricants/Service Key 152**
 - Approved Fuel153
 - Approved Coolant153
 - Engine Oil Temperature Chart.154
- 10 Hour 155**
- 100' (30.5 m) 167**
- 50 Hour 169**
- 100 Hour. 171**
- 250 Hour 173**
- 500 Hour 176**
- 1000 Hour 180**
- 2000 Hour. 182**
- As Needed 183**

Service Precautions



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

To help avoid injury:

- Perform all service with engine off unless otherwise instructed.
- Refer to engine manufacturer's manual for engine maintenance instructions.
- Lower unstowed attachments to ground before servicing equipment.

Welding

NOTICE: Welding can damage electronics.

- Disconnect battery at battery disconnect switch, if equipped, or disconnect battery cables 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.
- Connect welder ground clamp close to welding point and make sure no electronic components are in the ground path.
- Always disconnect the harness connections to the controllers and other electronic components prior to welding on machine or attachments.

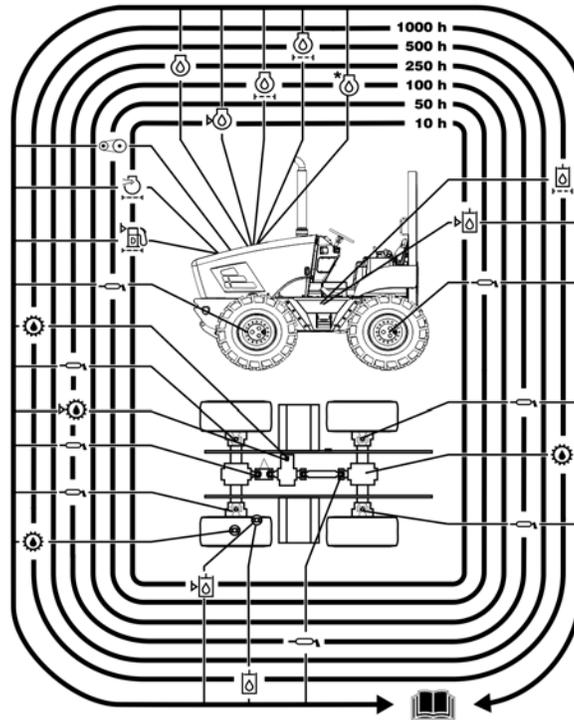
Cleaning

NOTICE: When cleaning equipment, do not spray electrical components with water.

Changing Attachments

The RT80 is programmed to operate with the original attachment configuration. If you change attachments, contact your Ditch Witch® dealer to make sure the electronic programming is updated. If you change attachments without updating the electronic programming, your attachment may not function correctly.

Lubrication Overview



t45om015h.png

Proper lubrication and maintenance protects Ditch Witch® equipment from damage and failure. Service intervals listed are for minimum requirements. In extreme conditions, service machine more frequently. Use only genuine Ditch Witch parts, filters, approved lubricants, TJC, and approved coolants to maintain warranty. Fill to capacities listed in "Specifications" on page 195.

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

IMPORTANT: Use the "Service Record" on page 219 to record all required service to your machine.

Recommended Lubricants/Service Key

Item	Description		
 DEO	Diesel engine oil meeting or exceeding Deutz [®] specification DQC III- LA. NOTICE: Shipped from factory with API CJ-4 DEO meeting Deutz specification DQC II- LA. Change oil initially at 250 hours. <ul style="list-style-type: none"> • Engine must use low sulfated ash, phosphorous, and sulfur (low SAPS) oil. • See viscosity chart. If oils meeting only API CJ-4 or ACEA E6/E9 are used, service interval is reduced to 250 hours.		
 DEAC	Low silicate, fully formulated diesel engine antifreeze/coolant meeting ASTM D6210.		
 MPG	Multipurpose grease. Use polyurea based NLGI GC-LB Grade 1.5 or lithium based NLGI GC-LB Grade 2.		
 EPG	Extreme pressure grease. Use polyurea based NLGI GC-LB Grade 1.5 or lithium based NLGI GC-LB Grade 2, with extreme pressure additives.		
 MPL	Multipurpose gear oil meeting API service classification GL-5 (SAE 80W90)		
 THF	Tractor hydraulic fluid, similar to Phillips 66 [®] HG, Mobilfluid [®] 424, Chevron [®] Tractor Hydraulic Fluid, Texaco [®] TDH Oil, or equivalent		
	Check level of fluid or lubricant		Check condition
	Filter		Change, replace, adjust, service or test

Approved Fuel

U.S., Canada, EU, and Japan



WARNING

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

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

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

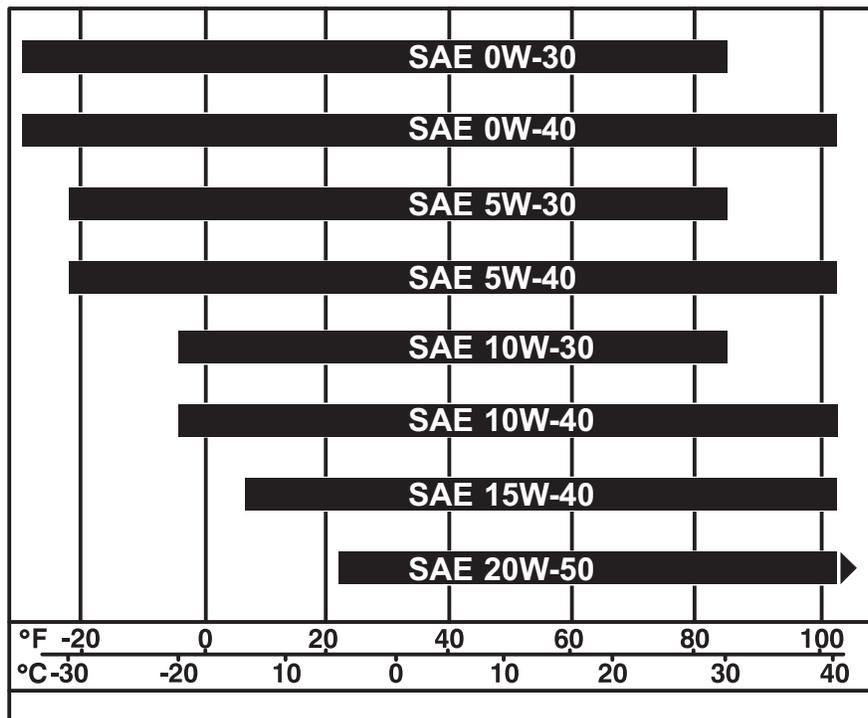
Biodiesel blends up to 5% (B5) are approved for use in this unit. The fuel used must meet the specifications for diesel fuel shown above. In certain markets, higher blends may be used if certain steps are taken. Extra attention is needed when using biodiesel, especially when operating in cold weather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

Approved Coolant

This unit was filled with John Deere® Cool-Gard® II coolant before shipment from factory. Add only John Deere Cool-Gard II (p/n 255-006) or any fully-formulated, low-silicate, ethylene glycol based, heavy-duty engine coolant meeting ASTM specification D6210 (fully formulated).

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

Engine Oil Temperature Chart



t37om047w.eps

Temperature range anticipated before next oil change

To help avoid injury:

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

10 Hour



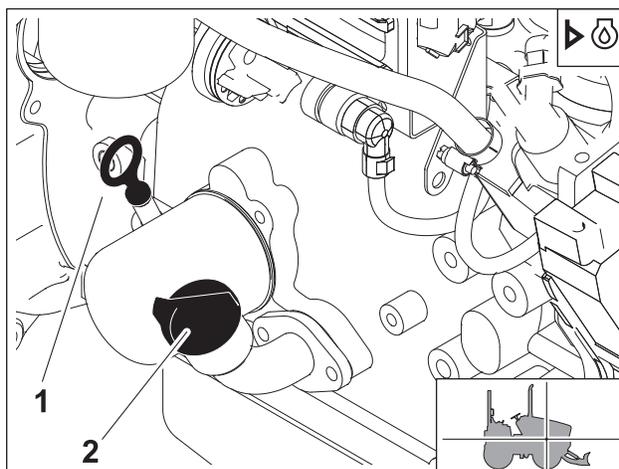
Location	Task	Notes
TRACTOR	Check engine oil level	DEO
	Check air filter	
	Check coolant level	DEAC
	Check water separator and fuel filter	
	Check hydraulic fluid level	THF
	Check hydraulic hoses	
	Check radiator/oil cooler	
	Check tires	
TRENCHER	Lube trencher tail roller	EPG
	Lube trencher pivot and headshaft	EPG
	Lube trencher auger bearings	EPG
	Lube trencher auger shaft	EPG
	Check trencher auger bolts	
	Check digging chain teeth and bits	
	Check digging chain tension	
	Check boom mounting bolts	250 ft•lb (339 N•m)
	Check attachment mounting bolts	200 ft•lb (271 N•m)
	Check restraint bar position	400 ft•lb (542 N•m)
	Check trench cleaner position	optional. 350 ft•lb (475 N•m)
PLOW	Lube plow pivots	EPG
	Check plow vibrator oil level	MPL
	Check plow arm pins and bushings	
	Check plow connector pivots	
	Check attachment mounting bolts	200 ft•lb (271 N•m)
MICRO-TRENCHER	Inspect slide plates on traverse frame	
	Inspect deflectors	
	Check vacuum hoses	
	Check attachment mounting bolts	200 ft•lb (271 N•m)

Tractor

Check Engine Oil Level

Check engine oil at dipstick (1) before operation and every 10 hours thereafter. Add DEO at fill (2) as necessary to keep oil level at highest line on dipstick.

IMPORTANT: If adding oil before the initial oil change at 250 hours, add only SAE 10W30. After 250 hours, see page 152 for DEO specifications.



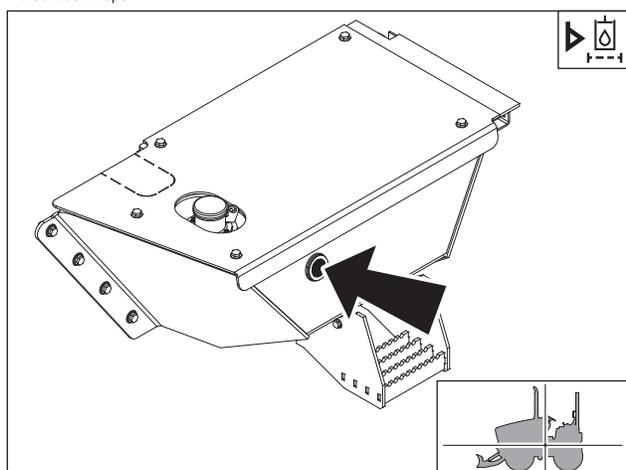
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Check Hydraulic Fluid Level

With tractor level, check fluid at sight glass (1) every 10 hours. Add THF at fill (2) as necessary. Fluid level should be halfway up sight glass.

IMPORTANT:

- Tank may be under pressure. Fill cap includes a 3 psi check valve. Open cap slowly.
- Do not open unless adding hydraulic fluid.

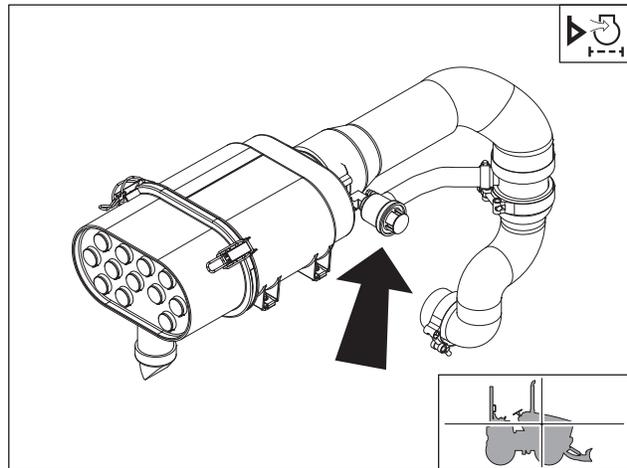


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Check Air Filter

Check air filter restriction indicator (shown) and clean dust trap every 10 hours. Change filters when restriction indicator reaches red zone. Do not attempt to clean filters.

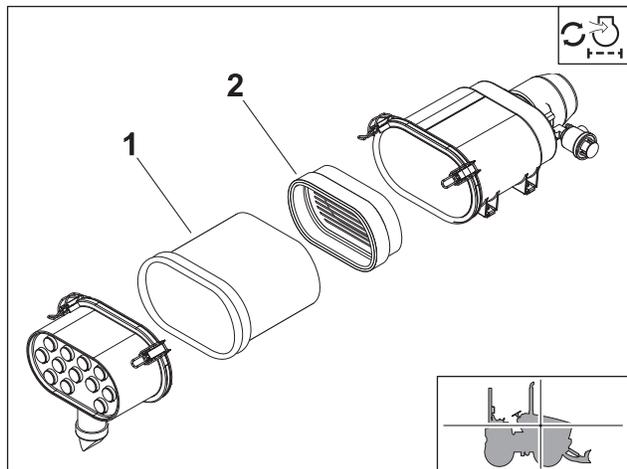
NOTICE: Only open the air filter canister when air restriction is indicated.



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To change:

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

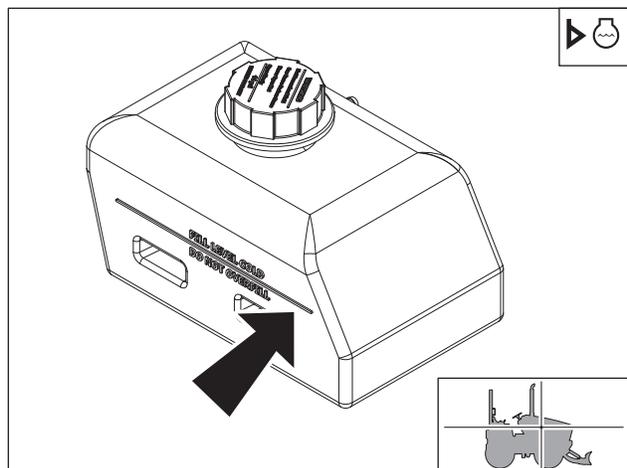


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Check Coolant Level

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

IMPORTANT: See page 153 for information on approved coolants.

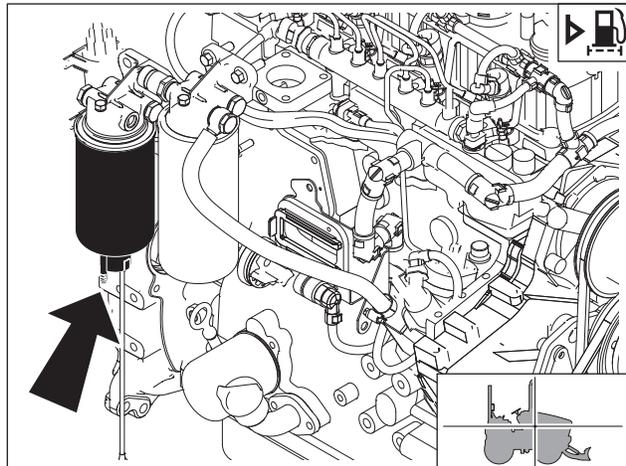


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Check Fuel Filter Water Separator

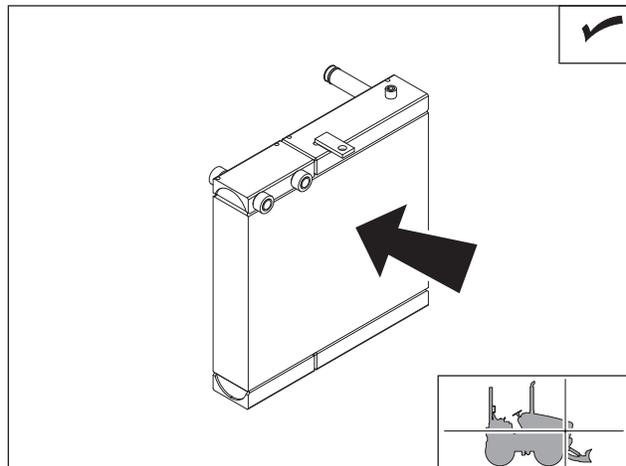
Check water separator every 10 hours. Drain at plug (shown) as needed until water is removed and fuel runs from drain.



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Check Radiator/Oil Cooler

Check radiator/oil cooler for dirt, grass, and other debris every 10 hours. Clean with compressed air or spray wash as needed. Be careful not to damage fins with high pressure air or water. Check more often if operating in dusty or grassy conditions.

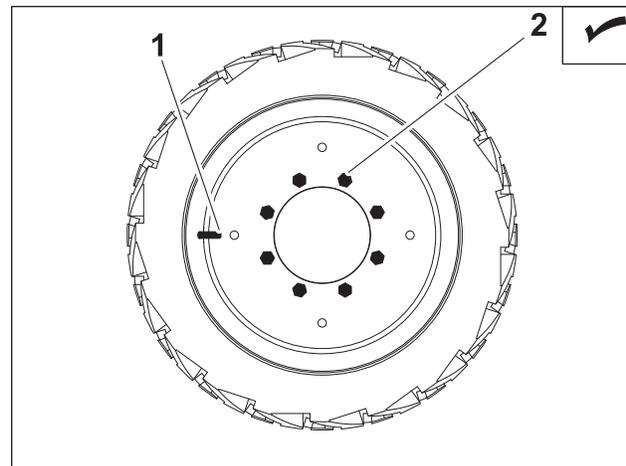


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Check Tires

Check tire pressure (1) every 10 hours. Inflate 75 psi (5 bar).

Tighten lugnuts (2) to 150 ft•lb (120 N•m).



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Check Hydraulic Hoses



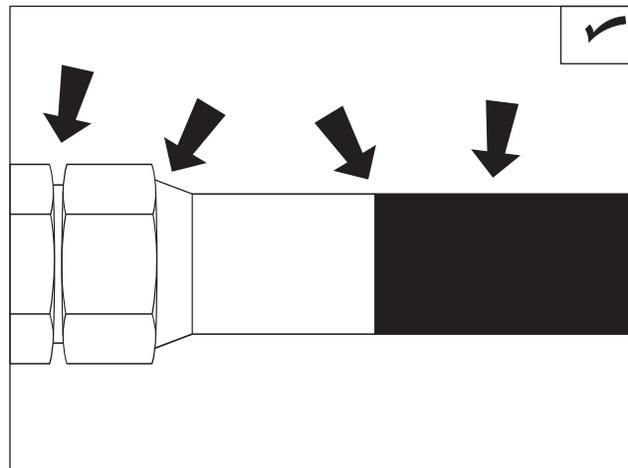
⚠ WARNING Pressurized fluid or air could pierce skin and cause severe injury. Refer to operator's manual for proper use. 270-6035

To help avoid injury:

- Before disconnecting a hydraulic line, turn engine off and operate all controls to relieve pressure. Lower, block, or support any raised component with a hoist. Cover connection with heavy cloth and loosen connector nut slightly to relieve residual pressure. Catch all fluid in a container.
- Before using system, check that all connections are tight and all lines are undamaged.
- Use a piece of cardboard or wood, rather than hands, to search for leaks.
- Wear protective clothing, including gloves and eye protection.

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

Check all hydraulic hoses every 10 hours.

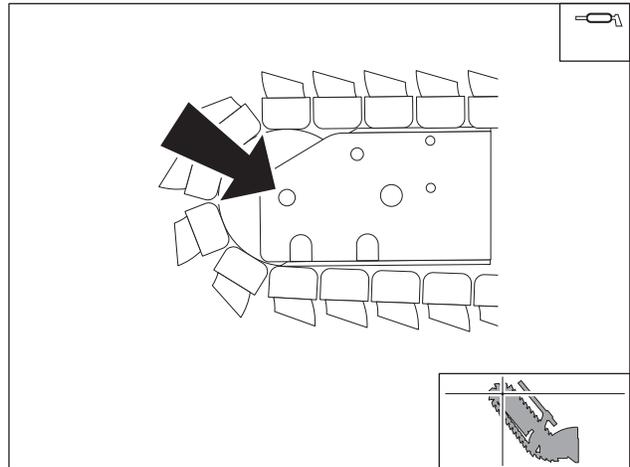


CheckHoses.eps

Trencher

Lube Trencher Tail Roller

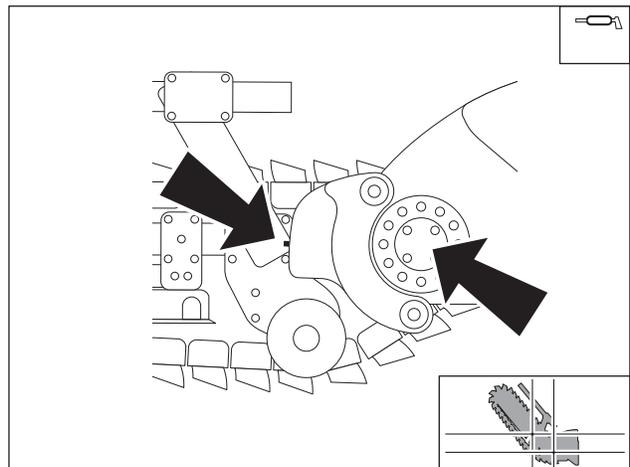
Wipe zerks clean and lube every 10 hours with EPG. Lube roller zerks on both sides of boom.



t30om049h.eps

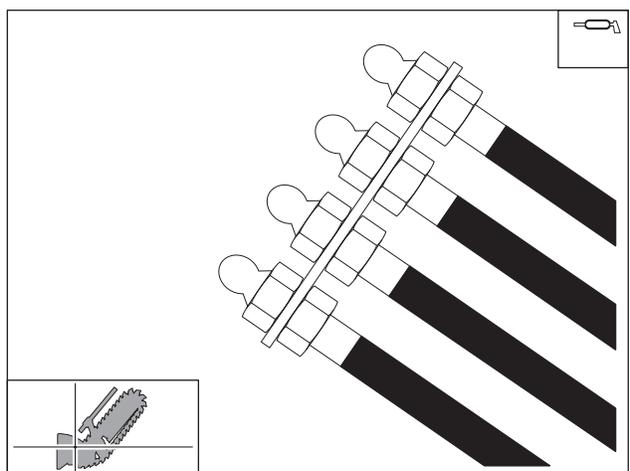
Lube Trencher Pivot

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



t30om050h.eps

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

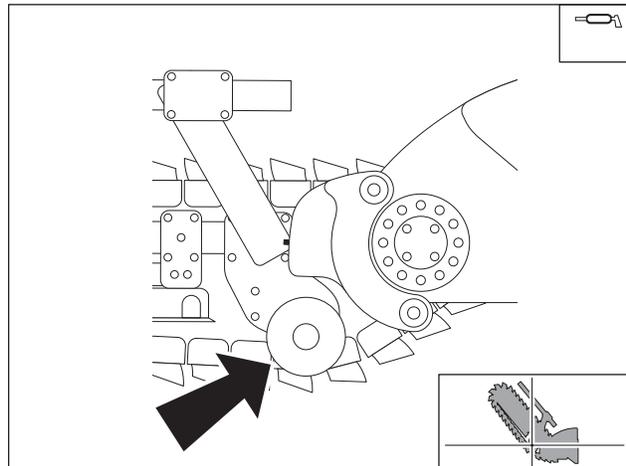


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Lube Trencher Auger Bearings

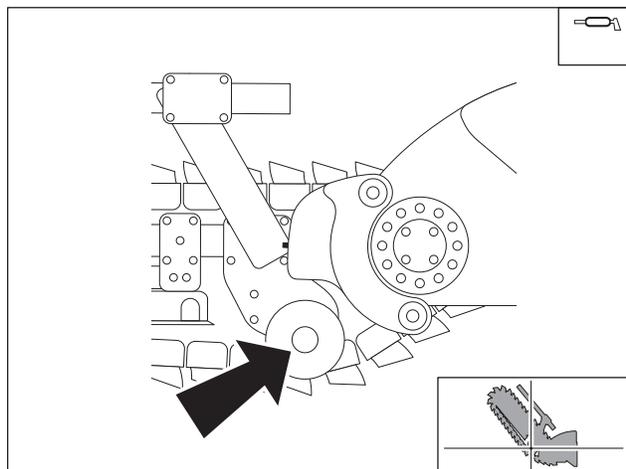
Lube two auger bearing zerks (one on each side) every 10 hours with EPG.



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Lube Trencher Auger Shaft

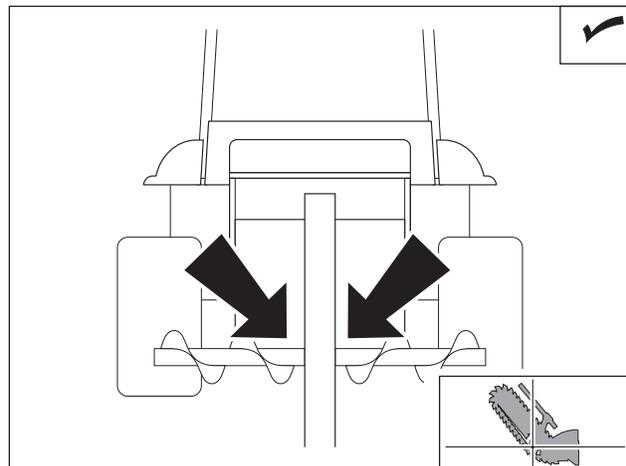
Lube four auger shaft zerks (two on each side) every 10 hours with EPG.



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Check Trencher Auger Bolts

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



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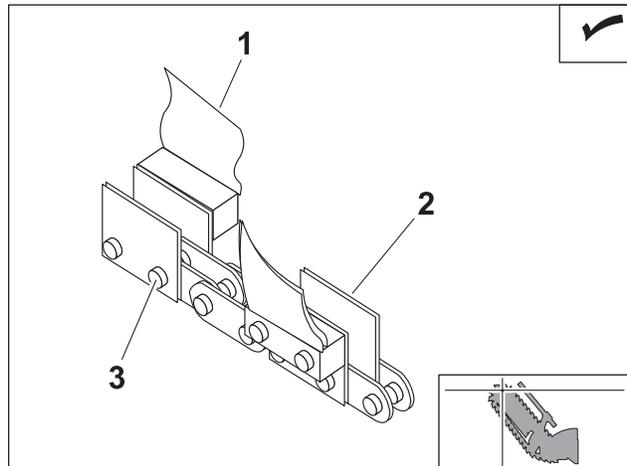
Check Digging Chain Teeth and Bits

Check teeth (1) 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.

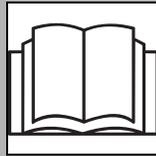
If using rock chain bits, check that bits rotate freely. Clean chain and check bits after each use. Replace bit when carbide cap or insert is worn or adapter can be damaged.

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



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Check Digging Chain Tension



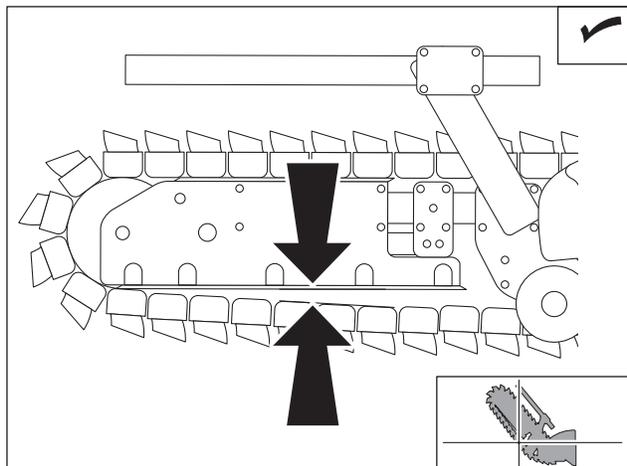
WARNING

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

To help avoid injury: 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.

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).

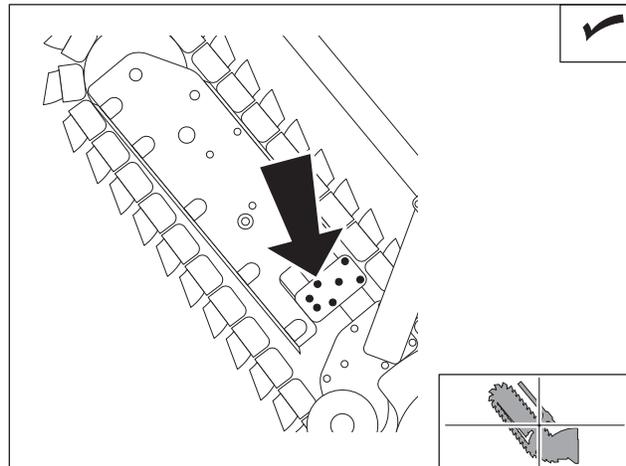
To tighten chain, loosen six bolts on trencher boom and pump EPG into cylinder. To relieve chain tension, loosen plug on grease cylinder.



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Check Boom Mounting Bolts

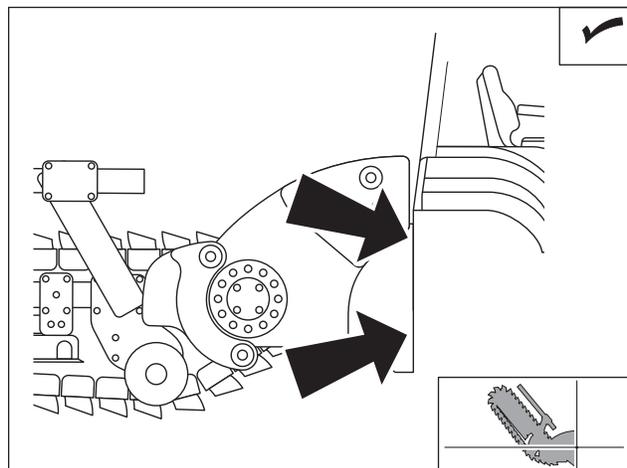
Check 14 bolts (7 on each side) every 10 hours and tightened as necessary to keep bolts and other fasteners tight. Check for looseness or wear. Check that bolts are tightened to 250 ft•lb (28 N•m).



t30om056h.eps

Check Attachment Mounting Bolts

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

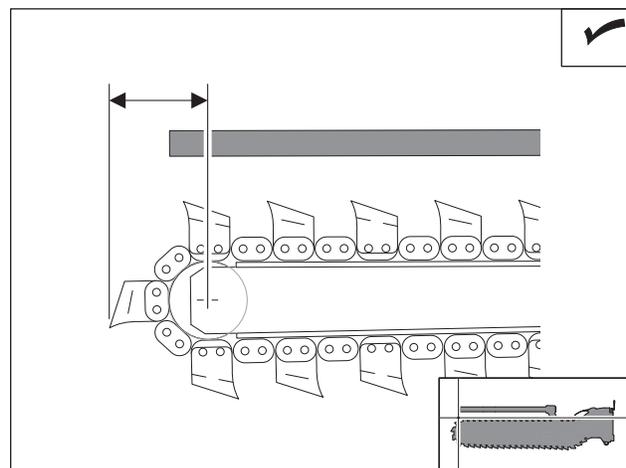


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Check Restraint Bar Position

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

Tighten bolts as necessary to keep them tight. Bolts mounting arm to boom should be tightened to 400 ft•lb (542 N•m). Apply Loctite 271 adhesive.



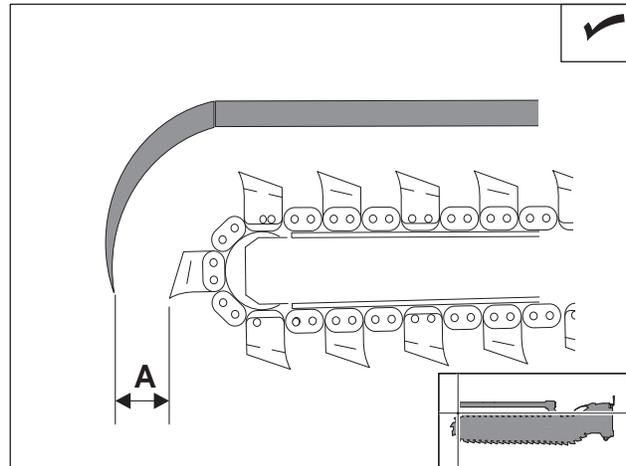
t33om89w.eps



Check Trench Cleaner Position

Check trench cleaner position (if equipped) every 10 hours, or anytime the digging chain is adjusted or replaced. The trench cleaner is properly positioned when there is 3-4 in (76-102 mm) between the digging teeth and the inside of the trench cleaner shoe (A).

Check that bolts holding personnel restraint bar/ trench cleaner to arm are tightened to 350 ft•lb (475 N•m). Apply Loctite® 271 adhesive.

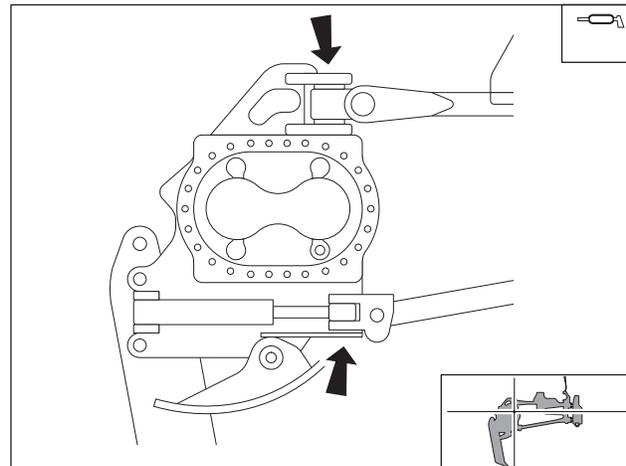


t330m90w.eps

Plow

Lube Plow Pivots

Lube pivots every 10 hours with EPG.

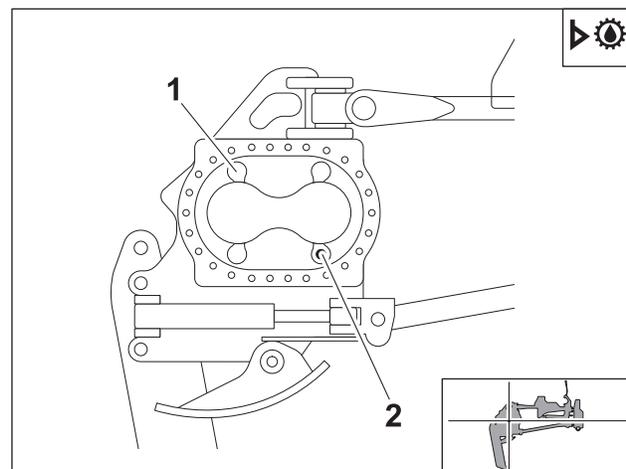


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Check Plow Vibrator Oil Level

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).

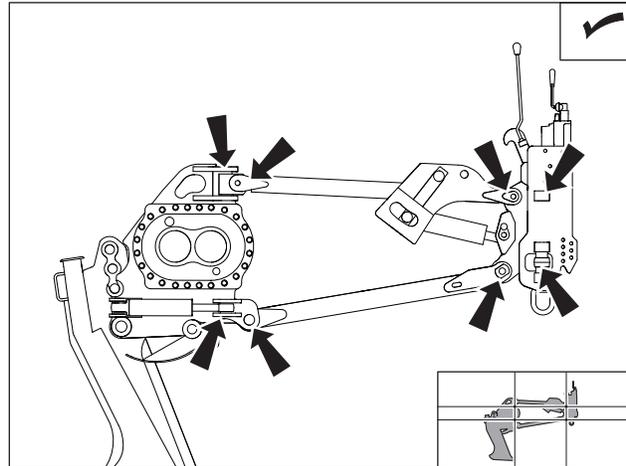
IMPORTANT: Do not add oil to plow vibrator when hot. Let plow vibrator cool before removing fill plug.



t300m065h.eps

Check Plow Arm Pins and Bushings

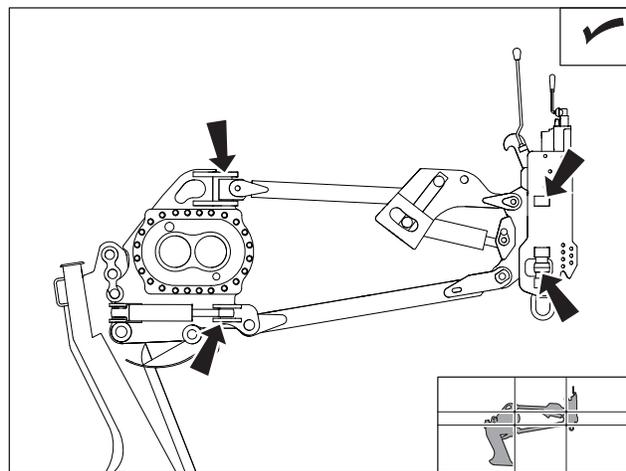
Check plow arm pins and bushings every 10 hours. Tighten as needed.



t33om024w.eps

Check Plow Connector Pivots

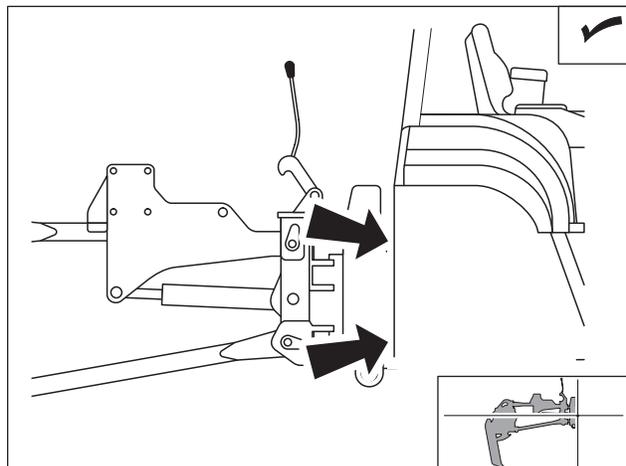
Visually check pivots every 10 hours for wear or damage.



t33om025w.eps

Check Attachment Mounting Bolts

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



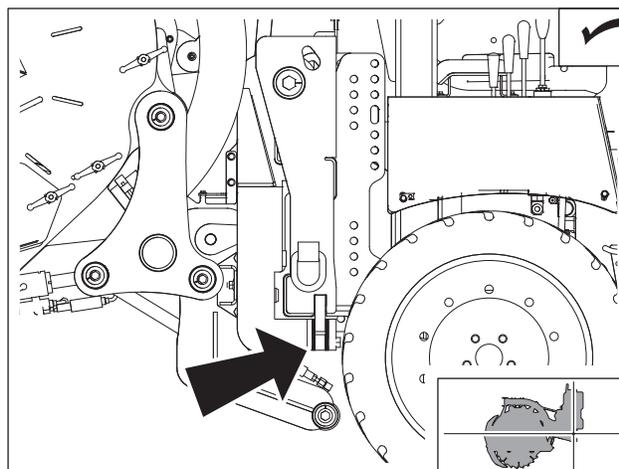
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Microtrencher

Inspect Slide Plate

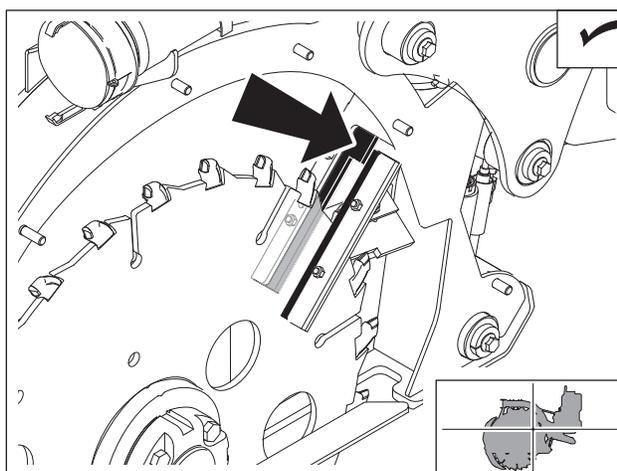
Inspect side plate for wear every 10 hours.
Replace as needed.



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Inspect Spoils Deflectors

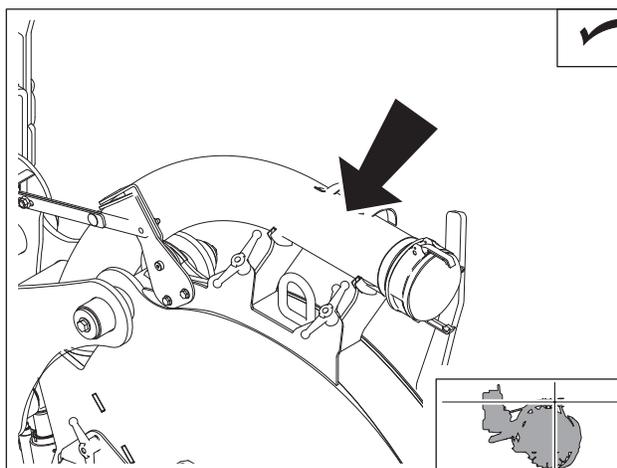
If not using a vacuum system for spoils removal, inspect spoils deflectors inside microtrencher frame every 10 hours. Clean vacuum chute and replace deflectors as needed.



t28om074h.eps

Check Trencher Vacuum Hoses

If using a vacuum system for spoils removal, check inside of hoses for caked spoils every 10 hours. Clean as needed.



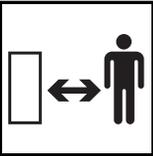
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100' (30.5 m)



Inspect Microtrencher Blade and Bits

Remove blade cover and inspect blade and bits for wear every 100' (30.5 m), or when performance declines.



CAUTION Hot parts may cause burns. Do not touch until cool or wear gloves. 275-355 (2-P)

To help avoid injury: Do not touch blade and bits after trenching until they have cooled.

Fixed Bits

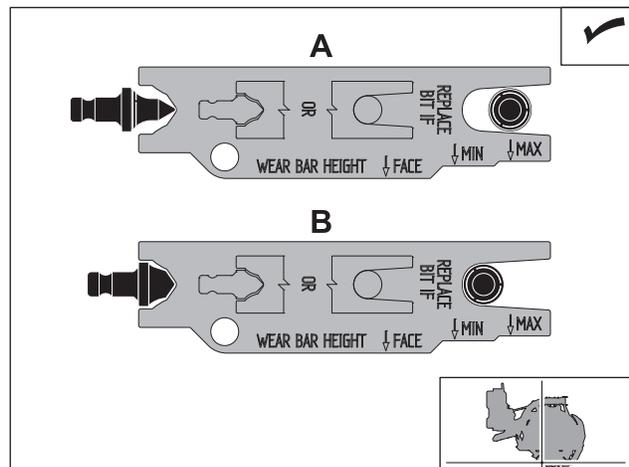
Replace blade when bits are worn. See "Change Blade" on page 192.

Rotating Conical Bits

- Check that all bits are rotating freely in bit blocks. If bits are stuck, tap with a brass or rubber mallet.
- Use gauge (shown, p/n 301-1507) to check bit condition. Replace bits when carbide components become dull or excessively worn. Always replace bits and roll pins in complete sets. Do not mix old and new bits. Always use new roll pins.

A: Bits okay.

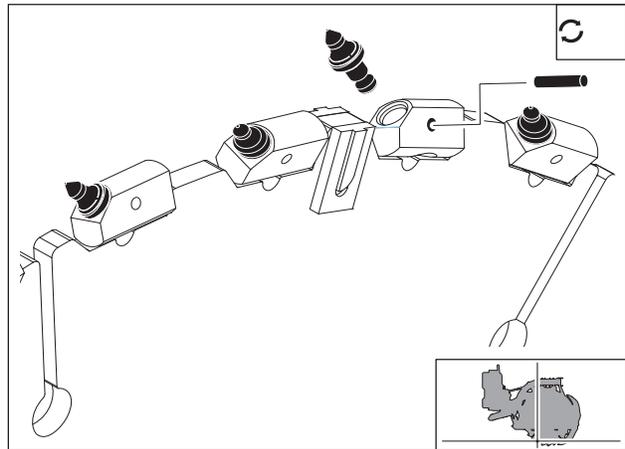
B: Replace bits if outer diameter or length is excessively worn as indicated by gauge.



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To replace bits:

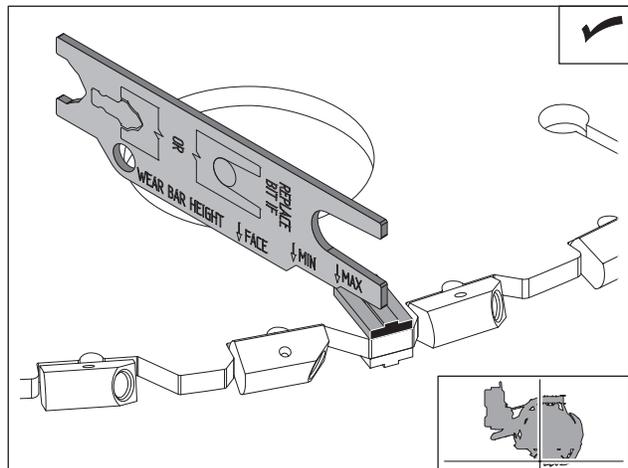
1. Drive out roll pin and remove old bit.
2. Install new bit into holder and drive in new roll pin.



t28om080h.eps

Wear Bars / Hard-Surface Material

Use gauge (shown, p/n 301-1507) to check thickness of wear bars/hard-surface material on blade. Replace wear bars/hard-surface material as needed to protect bit holders.



t28om082h.eps



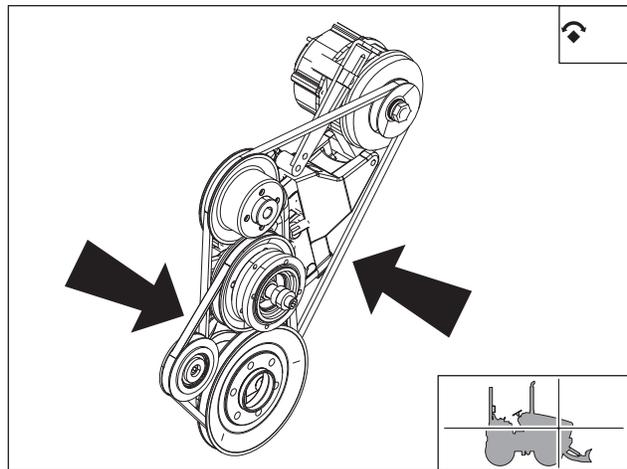
50 Hour

Location	Task	Notes
TRACTOR	Check drive belts	
TRENCHER	Check trencher gearbox oil level	MPL
PLOW	Change plow vibrator oil (initial)	MPL
	Check plow lift cylinder pins and bumpers	

Tractor

Check Drive Belts

Check belts every 50 hours for damage or wear. Replace worn belt. Adjust tension as needed. See engine manual for procedure and tension measurement.

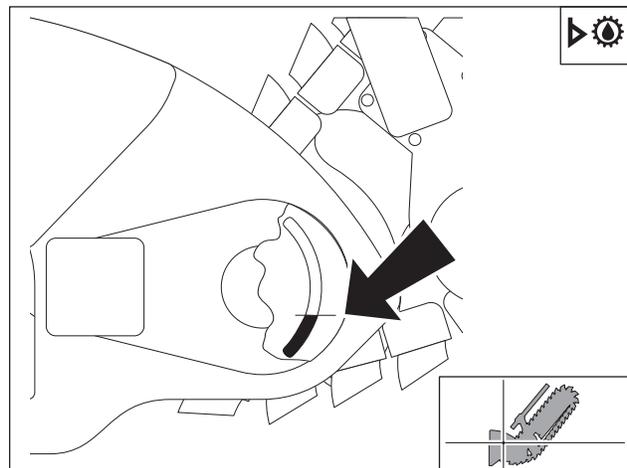


t45om011h.eps

Trencher

Check Trencher Gearbox Oil Level

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



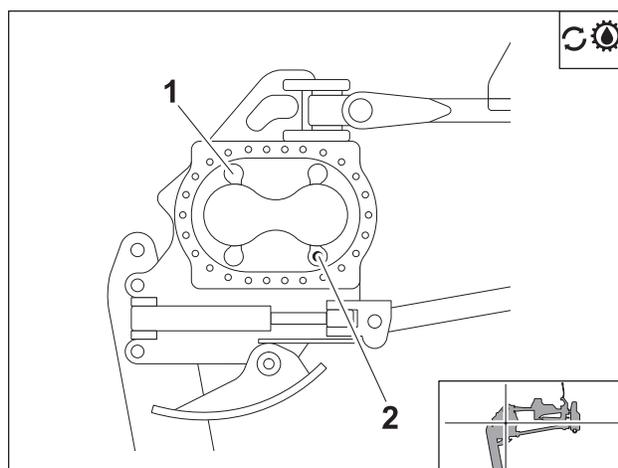
t30om060h.eps

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. Add 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.

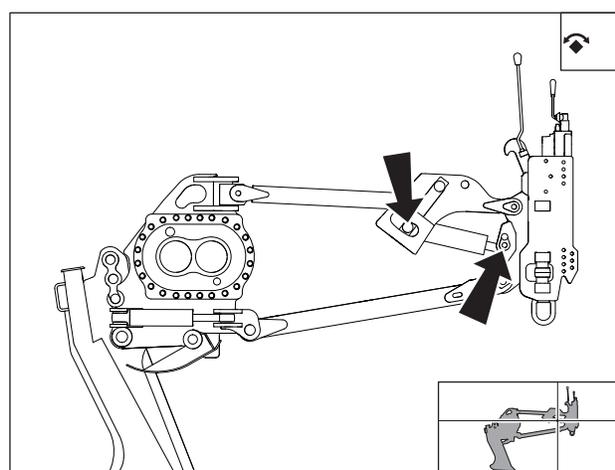


t30m066h.eps

Check Plow Lift Cylinder Pins and Bumpers

Check plow lift cylinder pins and bumpers every 50 hours.

Replace as needed.



t33m079w.eps

100 Hour



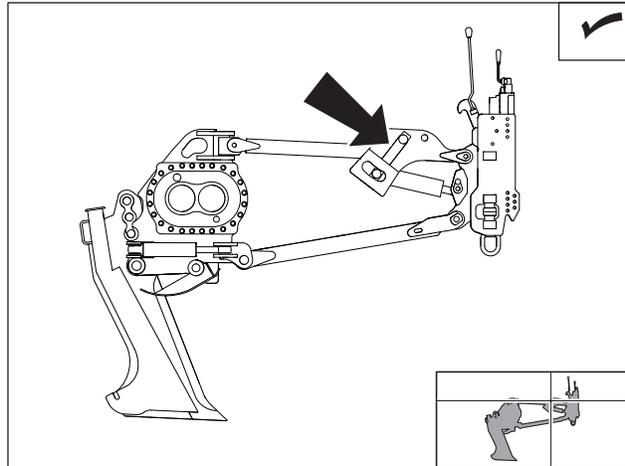
Location	Task	Notes
PLOW	Check plow shear mounts	
	Test plow connector pivots	
MICRO-TRENCHER	Lube manual tilt adjustment.	MPG

Plow

Check Shear Mounts

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

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



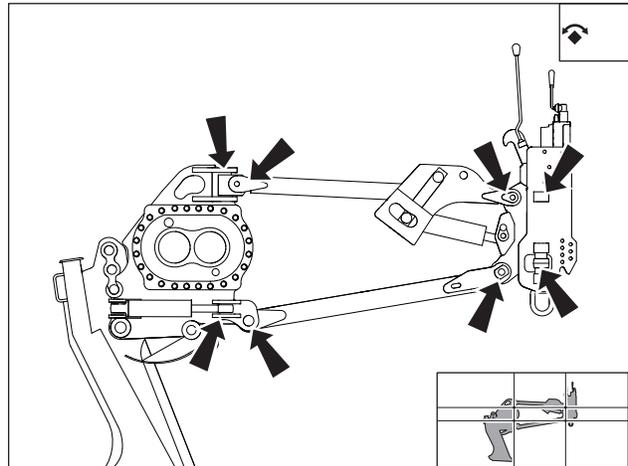
t33om054w.eps

Test Plow Connector Pivots

Test upper and lower connector pivots every 100 hours.

To test upper pivot:

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



t33om028w.eps

To test lower pivot:

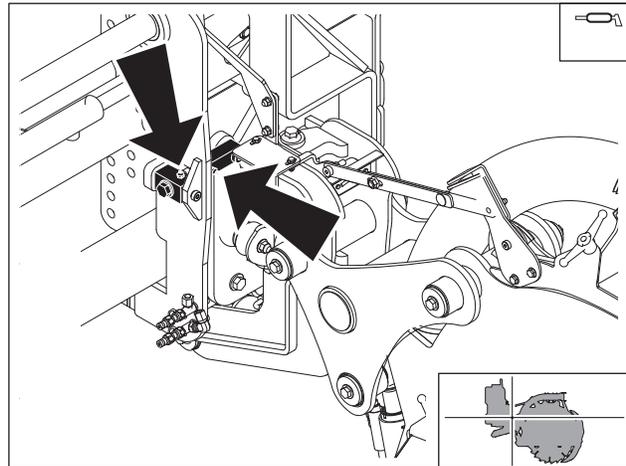
1. Lower plow to ground.
2. Use hydraulic jack to place load on lower arm.
3. As hydraulic load is applied and released, visually check joints for motion. If motion is observed, contact your Ditch Witch dealer.

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

Microtrencher

Lube Manual Tilt Adjustment

Lube two zerks on manual tilt adjustment with MPG every 100 hours.



t28om076h.eps



250 Hour

Location	Task	Notes
TRACTOR	Change engine oil and filter	initial
	Lube driveshaft U-joints	EPG
	Lube axle spindle pins	EPG
	Check ground drive gearbox oil level	MPL
	Check differential oil level	MPL
	Check planetary wheel end oil level	MPL

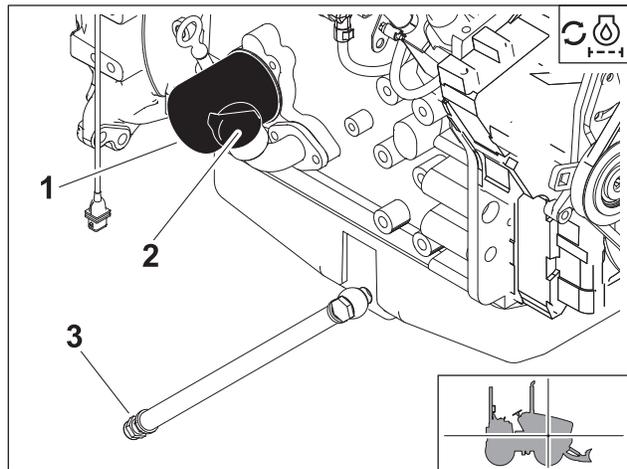
Tractor

Change Engine Oil and Filter (initial)

Change engine oil and filter after 250 hours.

To change:

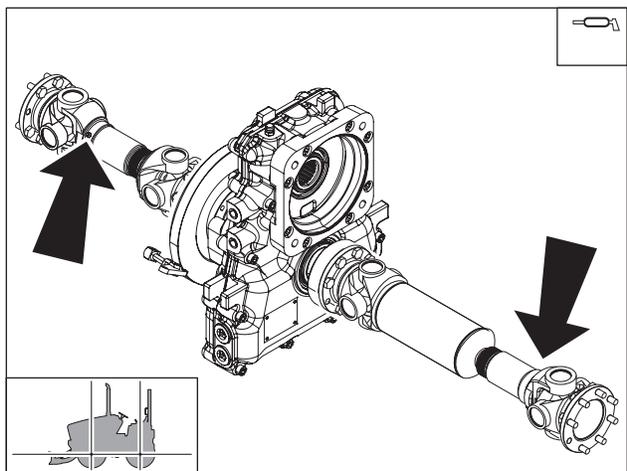
1. While oil is warm, drain oil at drain hose (3).
2. Remove filter (1) and replace with new filter each time oil is changed. Add DEO at fill (2).



t45om008h.eps

Lube Driveshaft U-joints

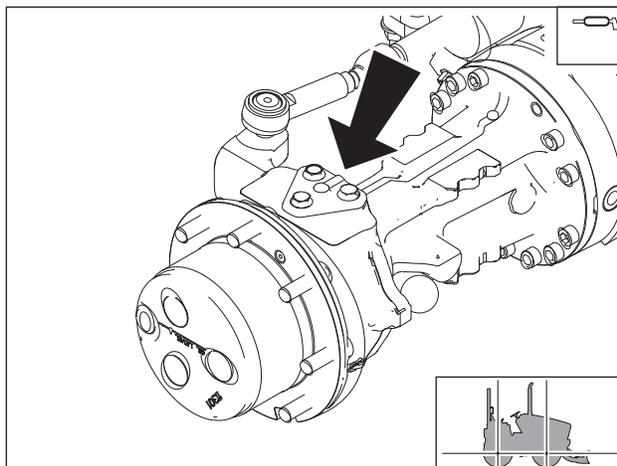
Lube driveshaft U-joints every 250 hours with 3-4 shots of EPG.



t45om018h.eps

Lube Axle Spindle Pins

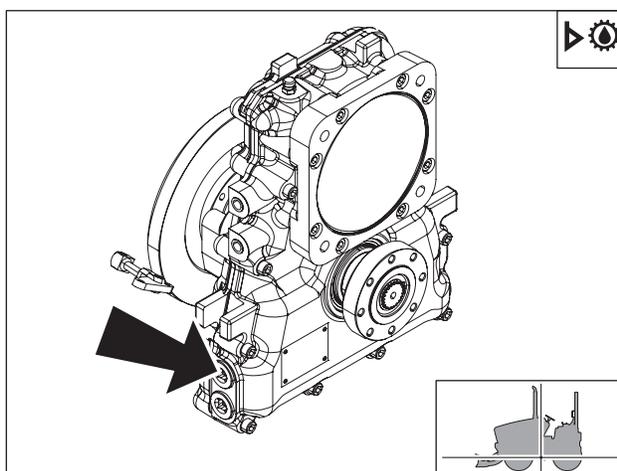
Lube axle spindle pins every 250 hours with 3-4 shots of EPG.



t45om025h.eps

Check Ground Drive Gearbox Oil Level

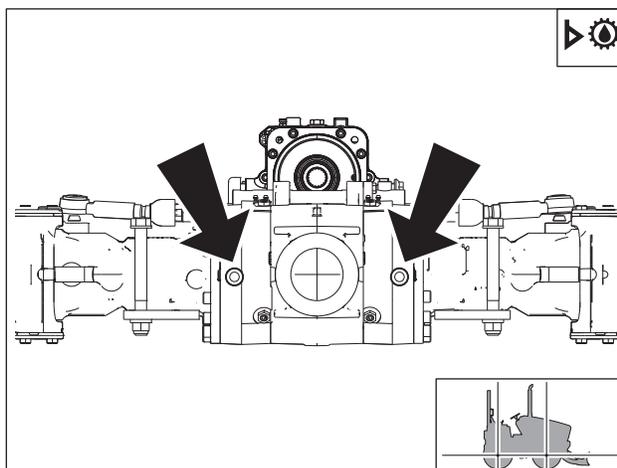
Check oil level at fill (shown) every 250 hours. Keep level at raised horizontal line on gearbox. Add MPL as needed.



t45om019h.eps

Check Differential Oil Level

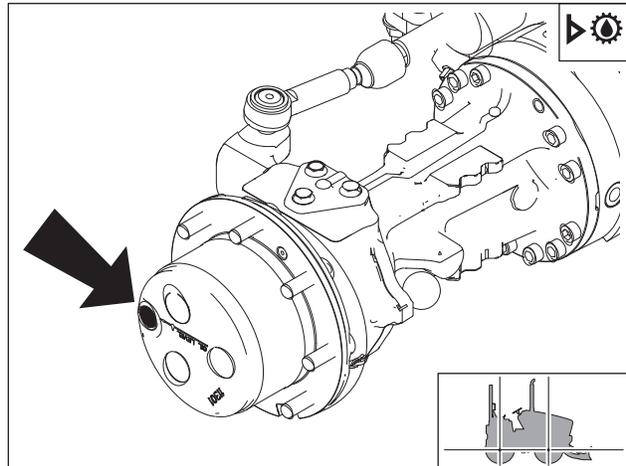
Check oil level at fill (shown) every 250 hours. Add MPL as needed.



t45om027h.eps

Check Planetary Wheel End Oil Level

Remove tire to check oil level in planetary wheel ends every 250 hours. Add MPL as needed.



t45m028h.eps



500 Hour

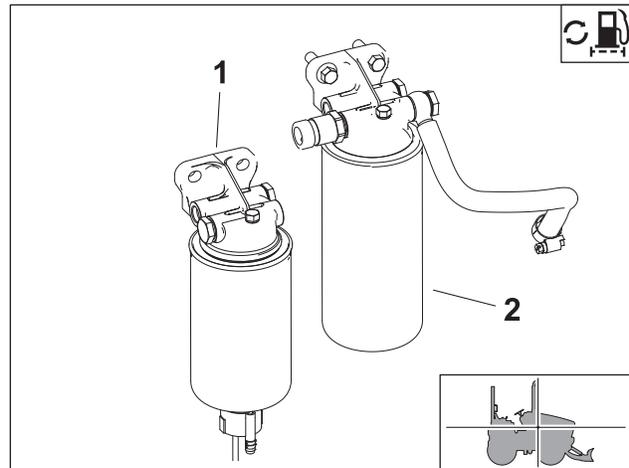
Location	Task	Notes
TRACTOR	Change fuel filters	
	Change engine oil and filter	DEO, ONLY if using motor oil meeting Deutz specifications DQCIII-LA.
	Change hydraulic fluid and filter	THF
	Test coolant freeze protection level	
PLOW	Change plow vibrator oil	MPL
TRENCHER	Adjust headshaft bearings	

Tractor

Change Fuel Filters

Change fuel filters (1, 2) every 500 hours.

IMPORTANT: Do not prefill filters with diesel. Use hand pump to prime.



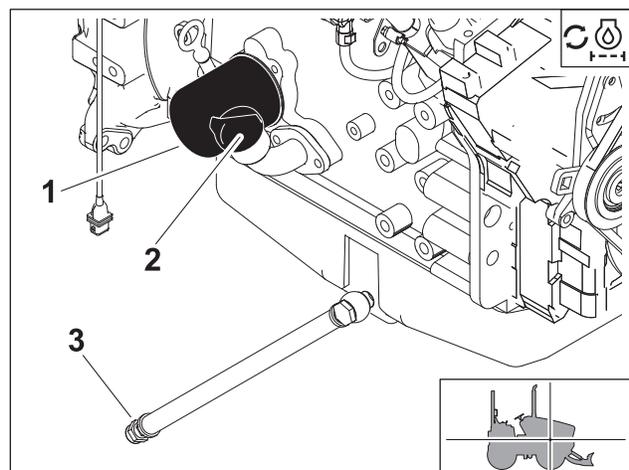
t45om012h.eps

Change Engine Oil and Filter (with certain oil)

Change engine oil and filter every 500 hours ONLY if using motor oil meeting Deutz specifications DQC III-LA.

To change:

1. While oil is warm, drain oil at drain hose (3).
2. Remove filter (1) and replace with new filter each time oil is changed. Add DEO at fill (2).



t45om008h.eps

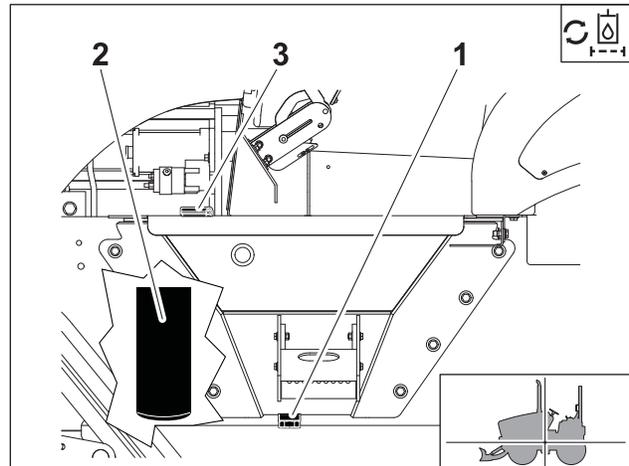
Change Hydraulic Fluid and Filter

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:

1. Remove drain plug (1).
2. Drain fluid and replace plug.
3. Change filter (2).
4. Add THF at fill (3).



t45om020h.eps

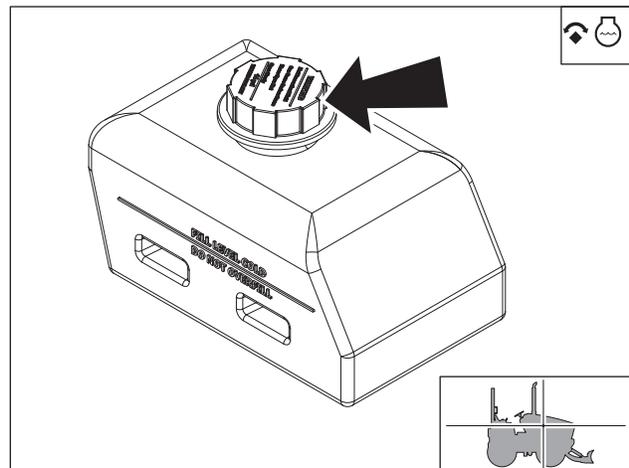
Test Coolant Freeze Protection Level

With engine cool, test coolant freeze protection level using a hydrometer or refractometer. Recommended freeze protection level is -34°F (-37°C). Adjust as needed.

If colder temperatures are expected, consult your Ditch Witch® dealer or coolant supplier.

IMPORTANT: See page 153 for information on approved coolants.

Use pre-diluted coolant to maintain proper freeze protection.



t45om009h.eps



Plow

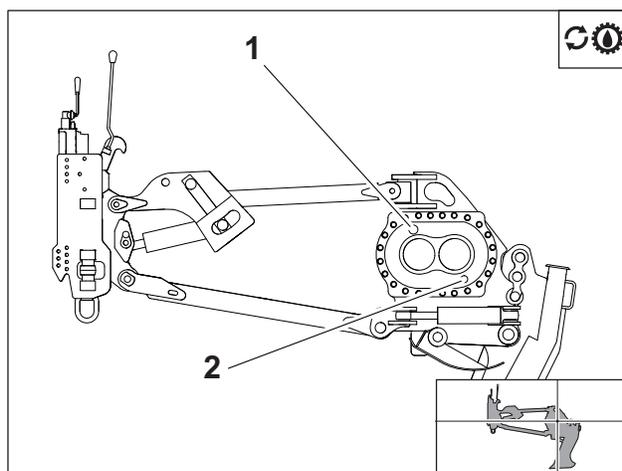
Change Plow Vibrator Oil

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

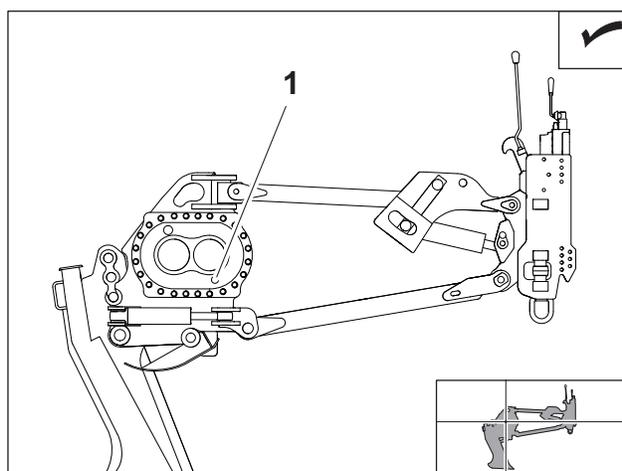
Drain oil at drain plug (2). Replace plug and move plow vibrator to horizontal position. Add MPL at fill (1).

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

Add oil until level is at halfway point on sight glass (1). Refill capacity is 4 qt (3.8 L).



t33om078w.eps



t33om077w.eps

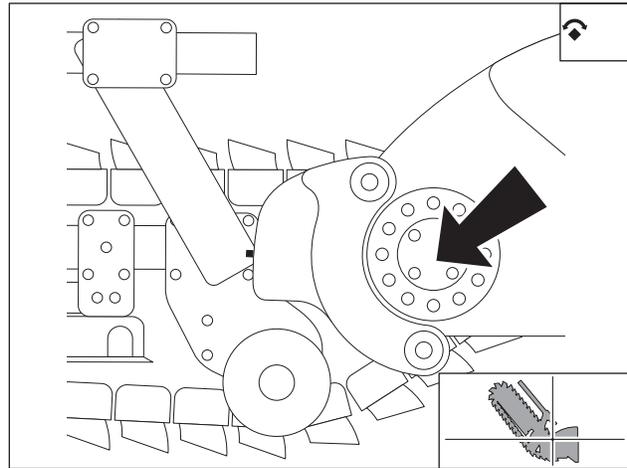
Trencher

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

Location	Task	Notes
TRACTOR	Change differential oil	MPL
	Change ground drive gearbox oil	MPL
	Change planetary wheel end oil	MPL
TRENCHER	Change trencher gearbox oil	MPL

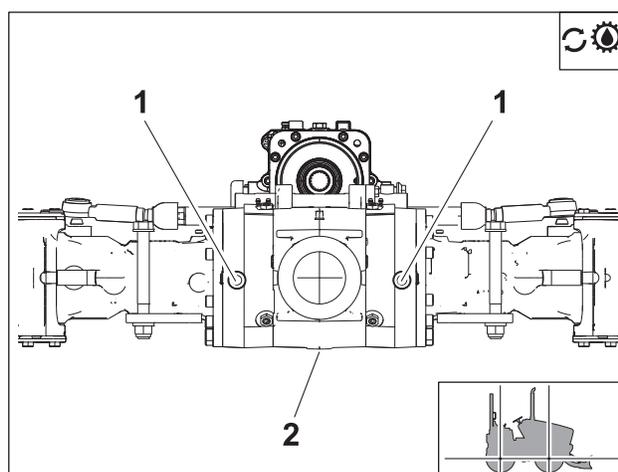
Tractor

Change Differential Oil

Change differential oil every 1000 hours.

To change:

1. Remove drain plug (2).
2. Drain fluid and replace plug.
3. Add MPL at fill (1).



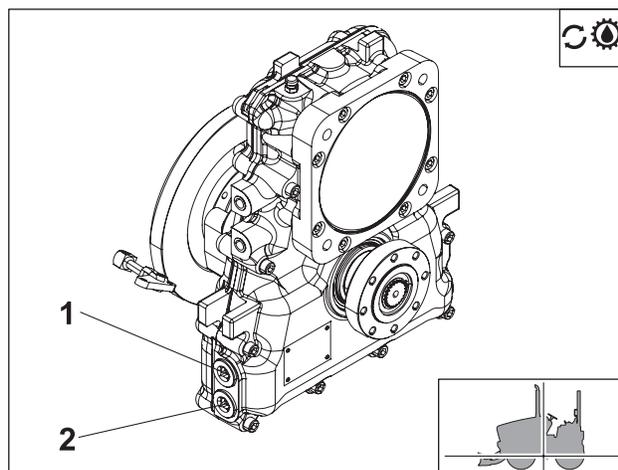
t45om029h.eps

Change Ground Drive Gearbox Oil

Change ground drive gearbox oil every 1000 hours.

To change:

1. Remove drain plug (2).
2. Drain oil and replace plug.
3. Add MPL at fill (1).



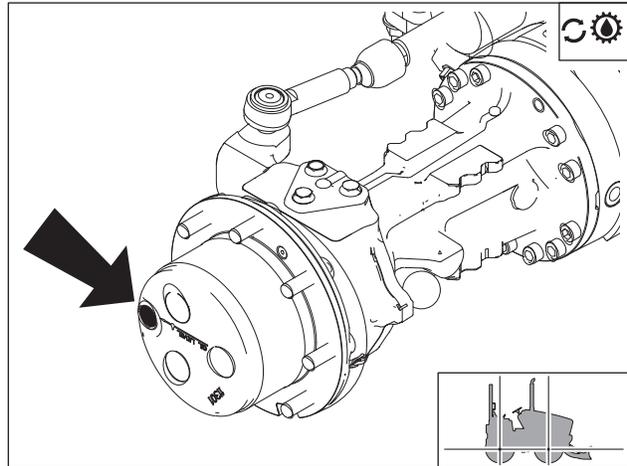
t45om021h.eps

Change Planetary Wheel End Oil

Change wheel end oil every 1000 hours.

To change:

1. Position wheel with plug at bottom.
2. Remove plug.
3. Drain oil.
4. Reposition wheel with plug at midway position.
5. Add MPL until level is at plug opening.
6. Replace plug.



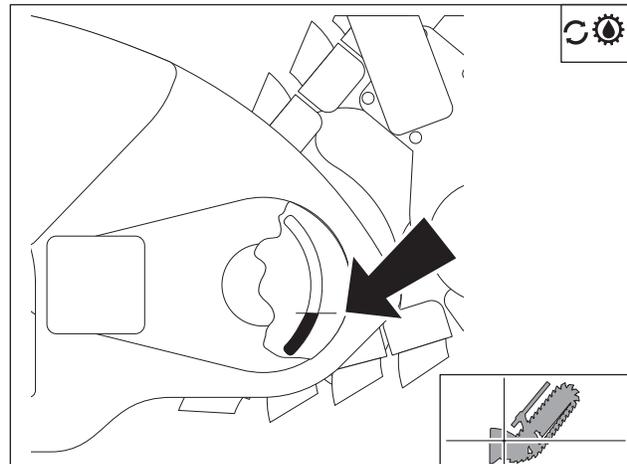
t45om030h.eps



Trencher

Change Trencher Gearbox Oil

Change trencher gearbox oil every 1000 hours. Drain at plug. Replace drain plug and add MPL until level is at lowest line on sight tube (shown).



t30om061h.eps

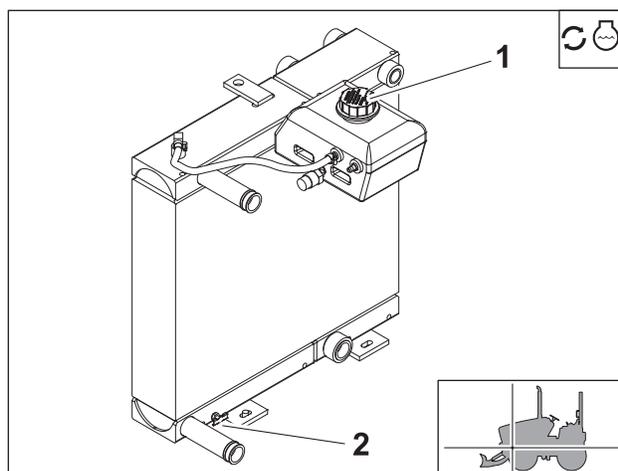
2000 Hour

Change Engine Coolant

NOTICE:

- The use of non-approved coolant may lead to engine damage or premature engine failure and will void engine warranty.
- See page 153 for list of approved coolants.

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



t45m010h.eps

As Needed



Location	Task	Notes
TRACTOR	Adjust parking brake	
	Clean radiator fins	
	Check seatbelt and seatbelt mounting hardware	
	Check batteries	
	Jump start unit/ charge battery	
TRENCHER	Replace digging chain	
PLOW	Clean feed tube	
	Replace sod cutter and blade	
	Check plow blade bolts	210 ft•lb (285 N•m)
MICRO-TRENCHER	Change blade	
	Bleed level cylinder	
	Change spoils deflector	
BACKHOE	Replace pins and bushings	

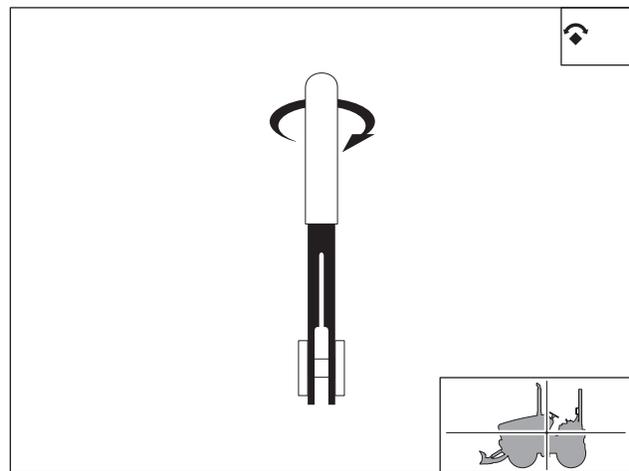
Tractor

Adjust Parking Brake

Adjust parking brake as needed.

To adjust:

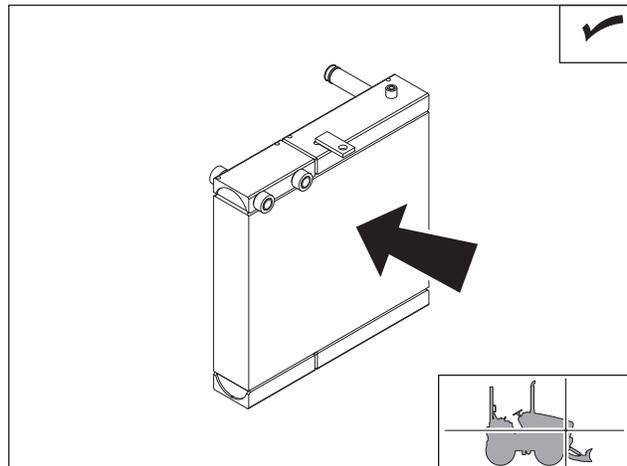
1. Release parking brake.
2. Remove orange sleeve.
3. Twist lever clockwise to tighten.
4. Engage parking brake to test tension. If tension is too tight, the brake lever will not engage fully. Repeat steps 1-3 as necessary.
5. Replace orange sleeve.



t45om022h.eps

Check Radiator/Oil Cooler

Check radiator/oil cooler for dirt, grass, and other debris as needed. Clean with compressed air or spray wash as needed. Be careful not to damage fins with high pressure air or water. Check more often if operating in dusty or grassy conditions.



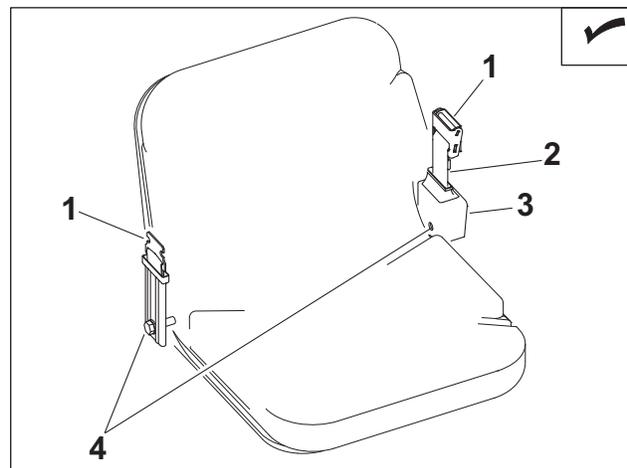
t45om017h.eps

Inspect Seat Belt

Check seat belt and mounting hardware as needed. Inspect the webbing, buckle and latch, retractor, and mounting hardware.

Buckle and Latch

Check that the buckle and latch (1) are not broken or corroded. When inserting the latch into the buckle, the latch should insert smoothly until an audible click is heard. Latch should not release when the seat belt is tugged.



SeatBelt.eps

Webbing

Inspect seat belt webbing (2) to ensure that it is not cut, frayed or showing signs of extreme or unusual wear. Check the area near the buckle and latch and anywhere the seat belt has contact with equipment or seat.

Retractor

Check that the retractor (3) operates smoothly when the belt is pulled and released. Retractor should spool belt without locking.

Mounting Hardware

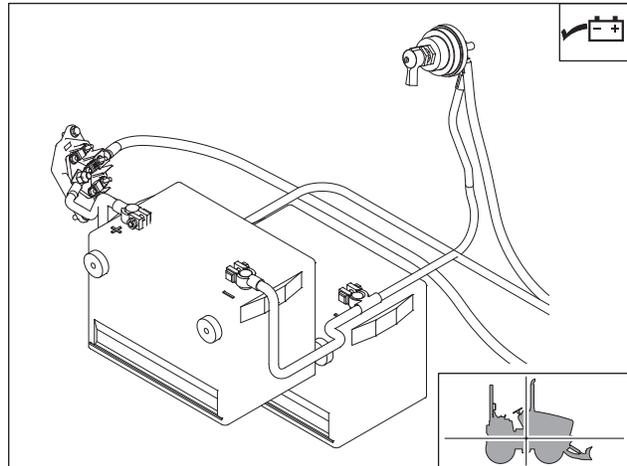
Inspect the seat belt mounting bolts (4) on both sides of the seat to ensure they are tight. Replace missing, damaged, or corroded bolts.

Check Batteries

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

To clean:

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



t45om023h.eps



WARNING

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

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

Charge Battery



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

To help avoid injury:

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

Before You Start

Electronic components can be easily damaged by electrical surges. Jump starting can damage electronics and electrical systems, and is not recommended. Try to charge the battery instead. Use quality large diameter booster cables capable of carrying high currents (400 amps or more). Cheap cables may not allow enough current flow to charge a dead/discharged battery.

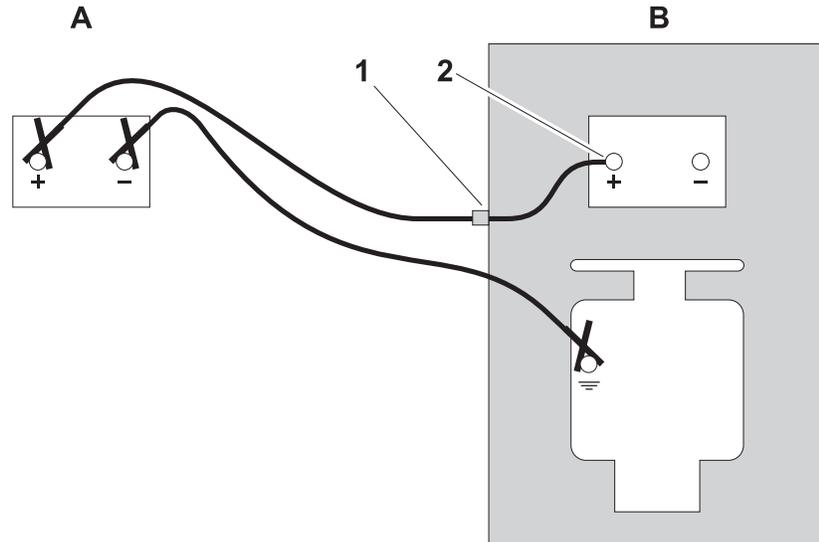
IMPORTANT: Some equipment may have a positive booster cable terminal located externally. If so equipped, use this terminal instead of connecting directly to battery.

Read all steps thoroughly and review illustration before performing procedure.

Charging Procedure (Engine Off)



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



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

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

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

If the disabled vehicle did not start, check for loose or corroded battery cable connections. Poor connections will prevent current from charging the failed battery. Clean terminals and posts if necessary and repeat steps above.

Trencher

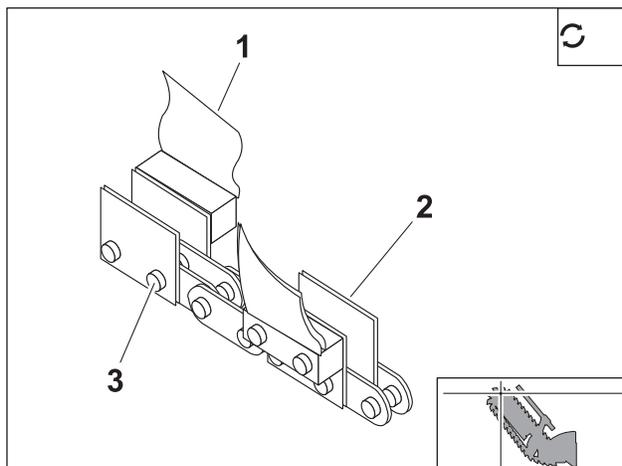
Replace Digging Chain

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

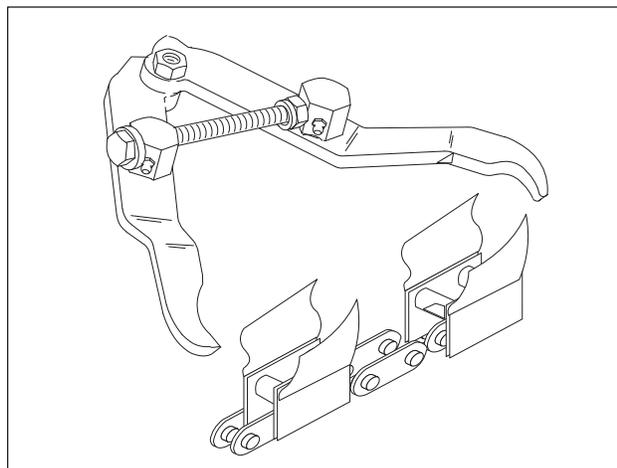
IMPORTANT: Replace sprockets when a new chain is installed.

To remove chain:

1. Fasten and adjust seat belt.
2. Start tractor. See page 78 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.

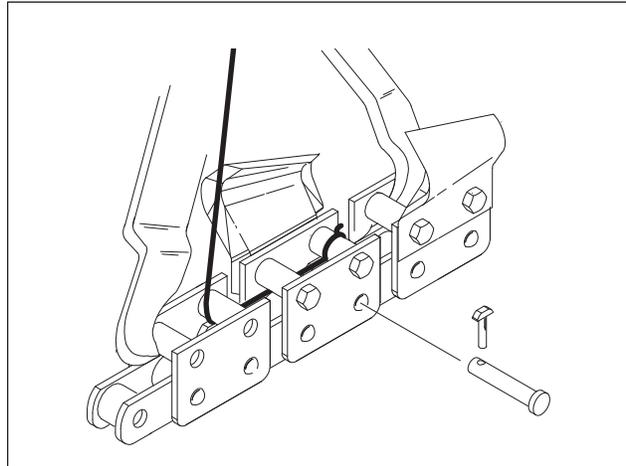


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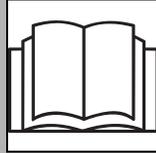


Digging_Chain_Remove_01.eps

8. Loop cable through links nearest connector pin.



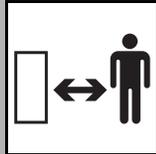
Digging_Chain_Remove_02.eps



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

To help avoid injury: 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. Stay away.

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

To install chain:

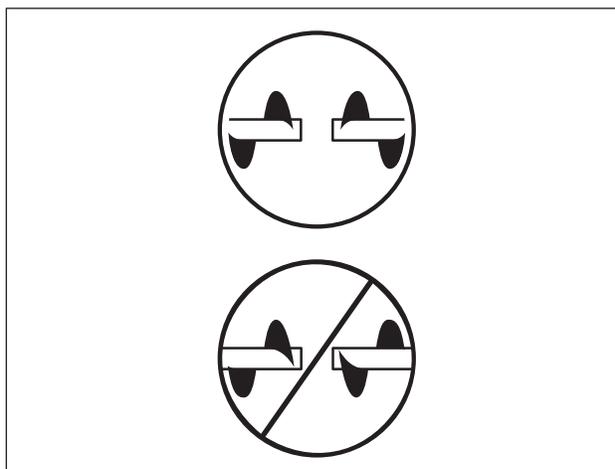
1. Lay chain on ground with teeth down and pointed toward unit.
2. Fasten and adjust seatbelt.
3. Start tractor. See page 74 for start-up procedures.
4. Disengage parking brake and verify parking brake indicator is off.
5. Move ground drive control to reverse.
6. Back unit up until chain extends past head shaft about 1' (305 mm).
7. Move ground drive control to neutral.
8. Lower backfill blade, if equipped, 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.
16. Check restraint bar (page 163) and trench cleaner (page 164) positions anytime digging chain is adjusted or changed.

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:

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



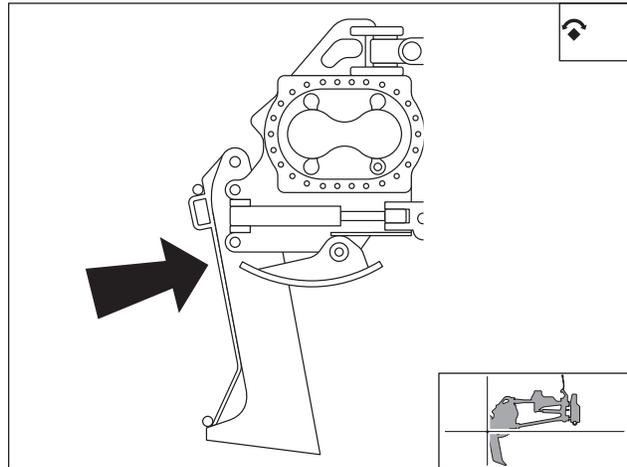
Augers_Adjust.eps



Plow

Clean Feed Tube

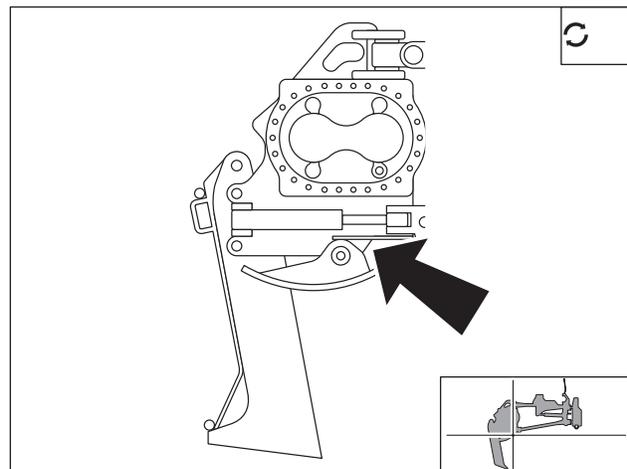
Clean feed tube as needed.



t30om072h.eps

Replace Sod Cutter and Blade

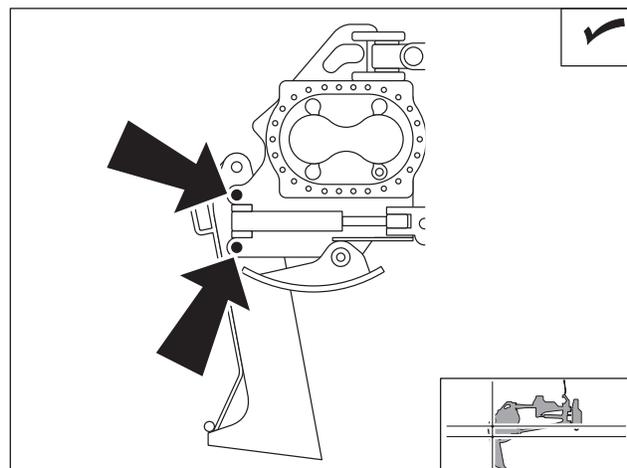
Replace worn sod cutter and plow blade as needed.



t30om073h.eps

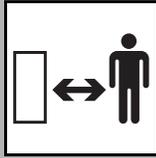
Check Plow Blade Bolts

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



t30om074h.eps

Microtrencher

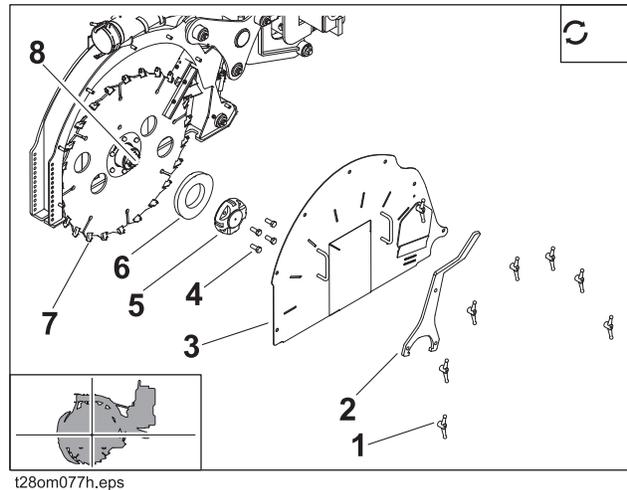


CAUTION Hot parts may cause burns. Do not touch until cool or wear gloves. 275-355 (2-P)

IMPORTANT: Blade and bits will be hot after trenching.

Change Blade

1. Start tractor, position microtrencher slightly above ground, then shut down tractor.
2. Remove 7 wingnuts (1), spanner wrench (2), and cover (3).
3. Loosen clamp bolts (4) and use spanner wrench (2) to remove large nut (5). (Insert a prybar through cutout in blade to keep blade from turning.)
4. Remove spacer (6) and blade (7).
5. Clean threads on hub (8) and nut (6). If needed, apply a dry lubricant such as graphite or silicone to threads.



NOTICE:

- Do not use petroleum-based lubricant which can attract and hold dust and grit in threads.
- Do not tighten large nut when blade has contact with ground. Blade may not be straight.

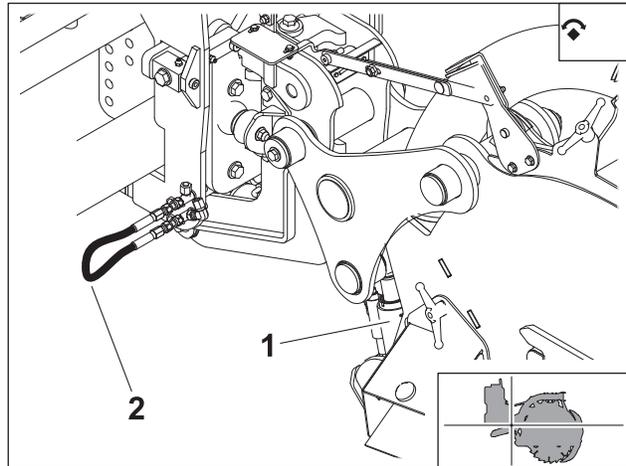
6. Install new blade (note direction of rotation), spacer (6), and large nut (5).
7. Use spanner wrench to fully tighten large nut (5).
8. Tighten clamp bolts (4) to 100-120 ft-lb (135-160 N-m).
9. Loosen clamp bolts (4) and repeat steps 7 and 8.
10. Install cover, spanner wrench, and wingnuts.

Bleed Level Cylinder

Bleed air from level cylinder whenever the hydraulic hoses have been disconnected, or when excessive bounce is noticed.

To bleed cylinder:

1. Remove blade (see page 192).
2. Start tractor.
3. Use level control to fully retract level cylinder (1) until it is vertical.
4. Use lift control to lower rear of microtrencher to just above the ground.
5. Shut down tractor and operate controls to relieve residual pressure in the level cylinder circuit.
6. Connect jumper hose (2, p/n 350-2479) to test ports on left side of microtrencher.
7. Start tractor and set throttle to low speed.
8. Push level control to slowly extend cylinder to full length. Hold lever at full range for 10 seconds. Air trapped at top of cylinder will return to tank.
9. Pull control lever to slowly retract cylinder. Hold lever for 10 seconds. Air trapped at bottom of cylinder will return to tank.
10. Repeat steps 7 and 8.
11. Shutdown tractor and remove jumper hose.



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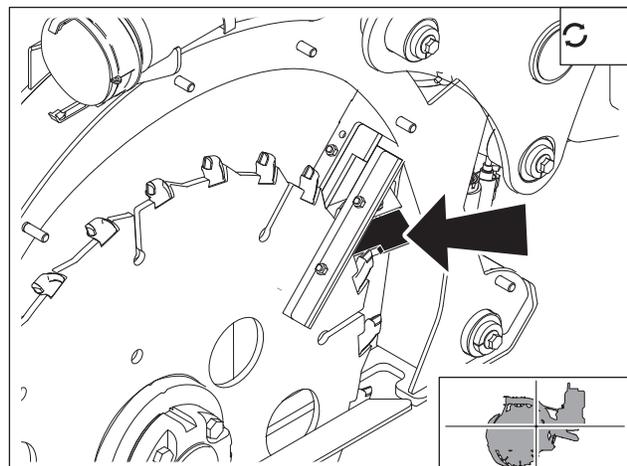


Change Spoils Deflector

If not using vacuum system for spoils removal, change spoils deflectors when excessive spoils are left inside trench. Deflector is most effective when it fits next to the blade.

To change:

1. Remove cover.
2. Replace all old spoils deflectors on saw frame, cover, and spoils chutes, noting orientation on decal on spoils chute.
3. Install cover.

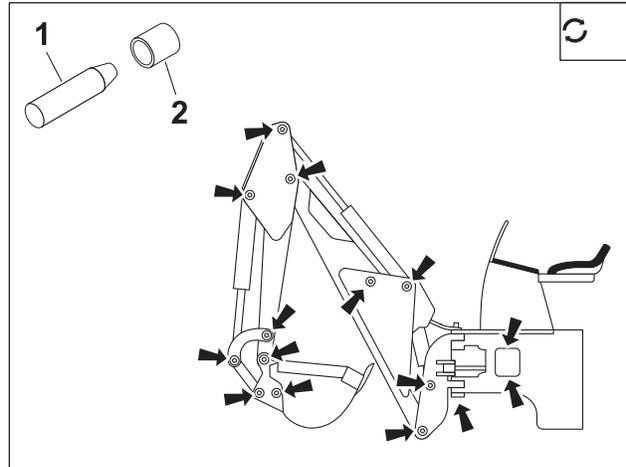


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Backhoe

Replace Pins and Bushings

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



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Specifications

Chapter Contents

RT80 Tractor 196

H810 Trencher 200

H813 Trencher 202

H832 Plow 204

H853 Combo 206

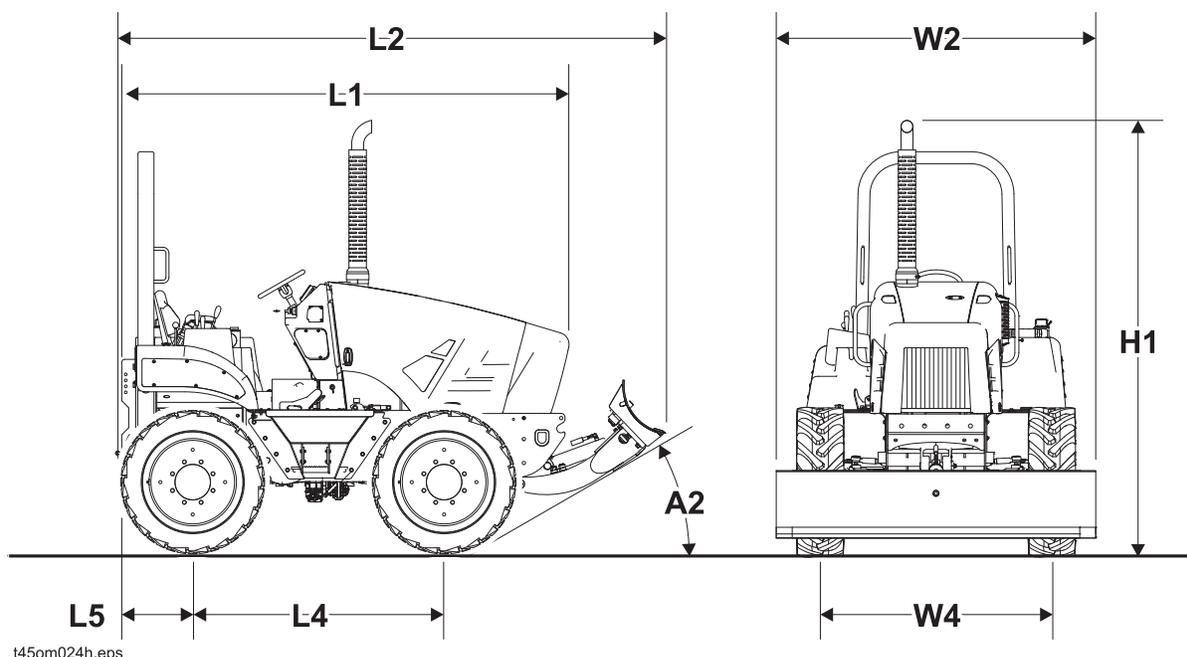
MT12 Microtrencher 210

A820 Backhoe 212

RC80 Reel Carrier 214



RT80 Tractor



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Dimensions		U.S.	Metric
A2	Angle of approach	29.2°	29.2°
H1	Height	108.5 in	2.8 m
L1	Nose to rear mount length	112.3 in	2.9 m
L2	Length - transport	139 in	3.5 m
L4	Wheelbase	63 in	1.6 m
W2	Width	71.5 in	1.8 m
W4	Tread	60 in	1.5 m
L5	Rear axle to attachment mount holes	16.8 in	427 mm

General

Ditch Witch® model RT80 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	1.8 mph	2.9 km/h
	Medium	3.7 mph	5.9 km/h
	High	6.8 mph	10.9 km/h
Reverse speeds			
	Low	1.8 mph	2.9 km/h
	Medium	3.2 mph	5.1 km/h
	High	3.4 mph	5.4 km/h
Vehicle clearance circle (SAE) wall to wall with backfill blade			
	Front steer only	32 ft	9.8 m
	Using rear steer	20.8 ft	6.3 m
Ground clearance		12 in	305 mm
Basic unit weight		7655 lb	3835 kg
Maximum allowable tractor weight (2 post ROPS)		19,100 lb	8664 kg
Maximum allowable tractor weight (4 post ROPS)		19,100 lb	8664 kg
Front counterweight		1650 lb	748 kg

Backfill Blade	U.S.	Metric
Blade width	72 in	1.8 m
Blade height	14 in	355 mm
Lift height above ground	25.2 in	640 mm
Blade drop below ground	10.9 in	277 mm
Maximum swing angle (left/right)	30°	30°
Tilt angle (up/down)	16°	16°

Power Plant	U.S.	Metric
Engine: Deutz® TD3.6L4, diesel, liquid cooled, direct injection, 4 cyl. turbocharged.		
Displacement	221 in ³	3.6 L
Bore	3.86 in	98 mm
Stroke	4.72 in	120 mm
Engine manufacturer's gross power rating per SAE J1995	74 hp	55 kW
Estimated net power per SAE J1349	70 hp	52 kW
Rated speed	2500 rpm	2500 rpm
Emissions Compliance	EPA Tier 4, EU Stage IIIB	

Power Train

Ground drive transmission: hydrostatic

Differentials: planetary front and rear with standard rear steering

Parking brake: manual lever disc brake

Tires: 24.5 x 11.75 rubber tire; 14-ply, R4 thread

Attachment drive transmission: hydrostatic, electric rotary knob, speed infinitely variable from zero to maximum

Hydraulic System	U.S.	Metric
Ground drive pump capacity at 2500 rpm	30 gpm	114 L/min
Ground drive pump relief pressure at 2500 rpm	6000 psi	414 bar
Attachment pump capacity at 2500 rpm	35 gpm	132 L/min
Attachment pump forward relief pressure at 2500 rpm	5500 psi	380 bar
Attachment pump reverse relief pressure at 2500 rpm	5500 psi	380 bar
Auxiliary pump capacity at 2500 rpm, front	7.1 gpm	27 L/min
Auxiliary pump capacity at 2500 rpm, rear	6.2 gpm	23 L/min
Auxiliary pump relief pressure at 2500 rpm	3000 psi	207 bar

Fluid Capacities	U.S.	Metric
Fuel tank	30 gal	114 L
Engine oil	8.4 qt	8 L
Hydraulic reservoir	12 gal	45 L
Hydraulic system	19 gal	72 L
Cooling system	3 gal	11.4 L

Battery (2 used)

Group 78U, SAE res. cap 110 min., SAE cold crank @ 0° F (-18° C), 800 amp

Auxiliary power outlet - 12 volt, 10 amp

Vibration Level

Average vibration transmitted to the operator's hand and whole body while plowing is 7.56 m/s² and 1.61 m/s² respectively.

Operator seat complies with ISO 7096.

Noise Levels

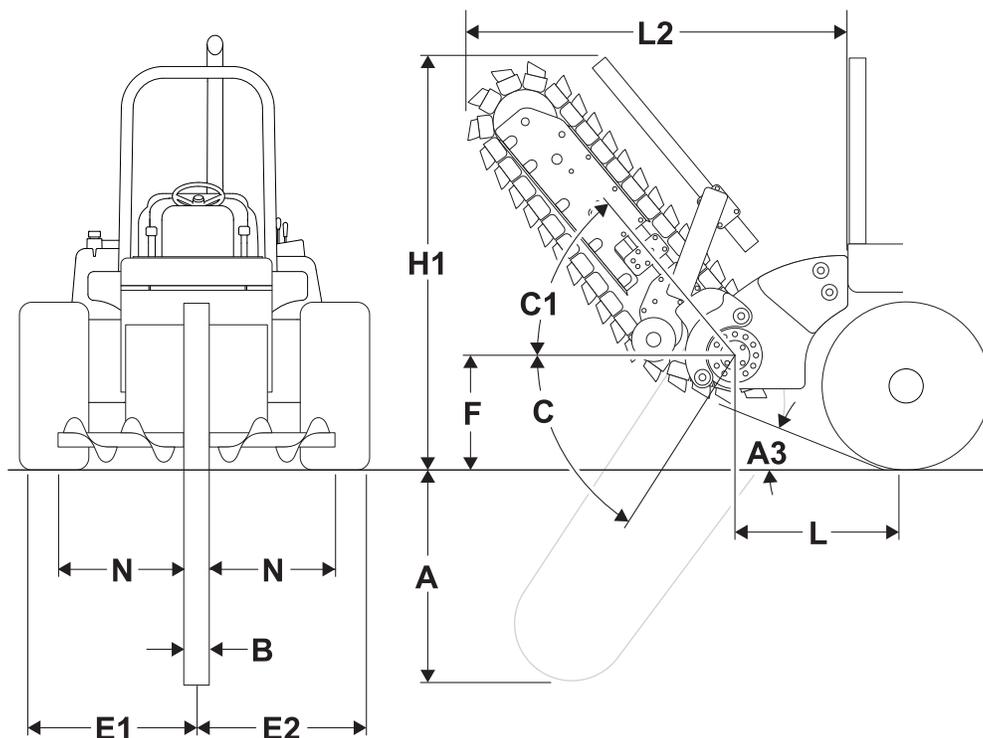
Operator ear sound pressure level is 92 dBA per ISO 6394.

Exterior sound power level is 107 dBA per ISO 6393.

Unless otherwise specified, all figures are for standard equipment only. Specifications are called out according to SAE recommended procedures. Due to selected options, delivered equipment may not necessarily match that described. Specifications are general and subject to change without notice. If exact measurements are required, equipment should be weighed and measured.



H810 Trencher



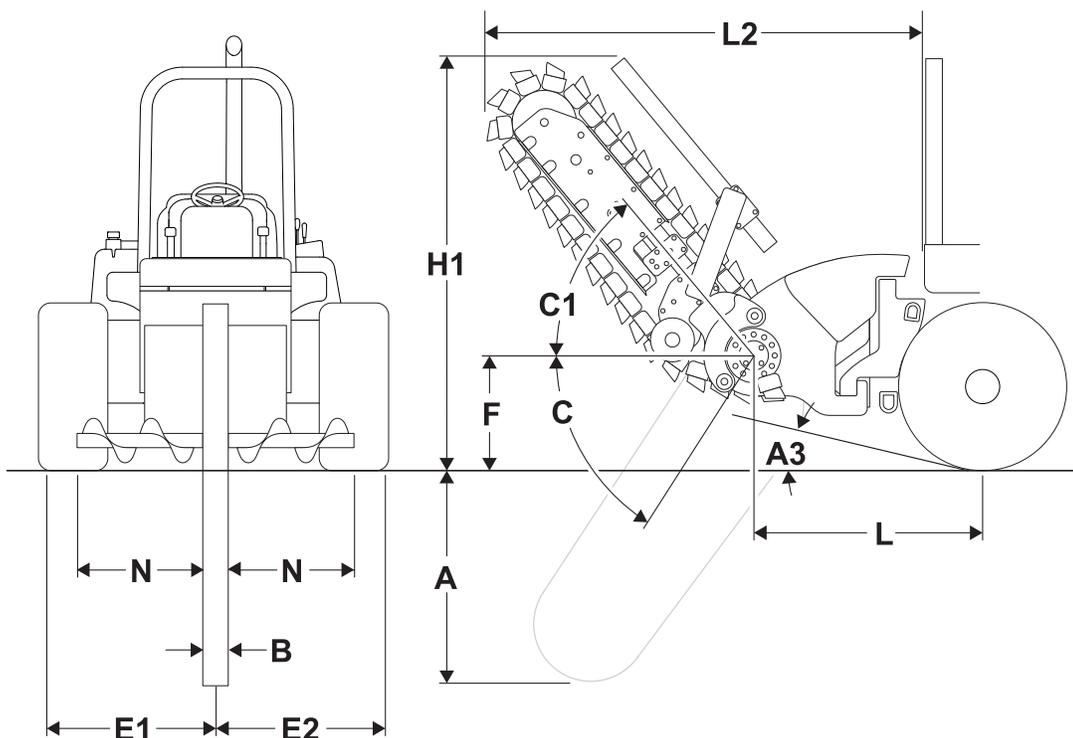
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Dimensions		U.S.	Metric
A ³	Angle of departure	28.2°	28.2°
A	Trench depth, maximum	93 in	2.4 m
B	Trench width, maximum	24 in	610 mm
C	Boom travel down	65°	65°
C ¹	Boom travel up	50°	50°
E ¹	Centerline of trench to outside edge, left	39.1 in	993 mm
E ²	Centerline of trench to outside edge, right	30.1 in	765 mm
F	Headshaft height, digging chain	42 in	1.1 m
H ¹	Transport height	134 in	3.4 m
L ²	Transport length	120 in	3.0 m
L	Headshaft overhang	46 in	1.2 m
N	Soil discharge reach	33 in	843 mm
	Attachment weight	1750 lb	794 kg

Operation	U.S.	Metric
Headshaft speeds at 2600 engine rpm		
Ratio low	170 rpm	170 rpm
Ratio standard	208 rpm	208 rpm
Ratio high (not recommended)	280 rpm	280 rpm
Digging chain speeds at 2600 engine rpm		
Ratio low	485 ft/min	148 m/min
Ratio standard	592 ft/min	180 m/min
Ratio high (not recommended)	798 ft/min	243 m/min



H813 Trencher



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Dimensions		U.S.	Metric
A3	Angle of departure	24.8°	24.8°
A	Trench depth, maximum	52.4 in	1.3 m
B	Trench width, maximum	12 in	305 mm
	Trench width, minimum	6 in	152 mm
C	Boom travel down	55°	55°
C1	Boom travel up	51°	51°
E1	Centerline of trench to outside edge, left	20.1-59.1 in	511-1501 mm
E2	Centerline of trench to outside edge, right	5.6-59.1 in	142-1501 mm
F	Headshaft height, digging chain	32.7 in	831 mm
H1	Transport height	131.6 in	3.3 m
L2	Attachment length, fully raised	93.5 in	2.4 m
	Transport length	102 in	2.6 m
L	Headshaft overhang	48 in	1.2 m

N	Soil discharge reach, short auger	17 in	430 mm
	Soil discharge reach, long auger	30 in	760 mm
	Attachment weight*	2422 lb	1099 kg

* with 4' (1.2 m) roller boom and 70K chain



Operation	U.S.	Metric
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Headshaft speeds @ 2600 engine rpm

	low speed motor	174 rpm	174 rpm
	standard speed motor	219 rpm	219 rpm
	high speed motor	275 rpm	275 rpm

Digging chain speed with 10-tooth, 3.067" (78 mm) pitch headshaft sprocket

	low speed motor	452 ft/min	168 m/min
	standard speed motor	569 ft/min	174 m/min
	high speed motor	715 ft/min	218 m/min

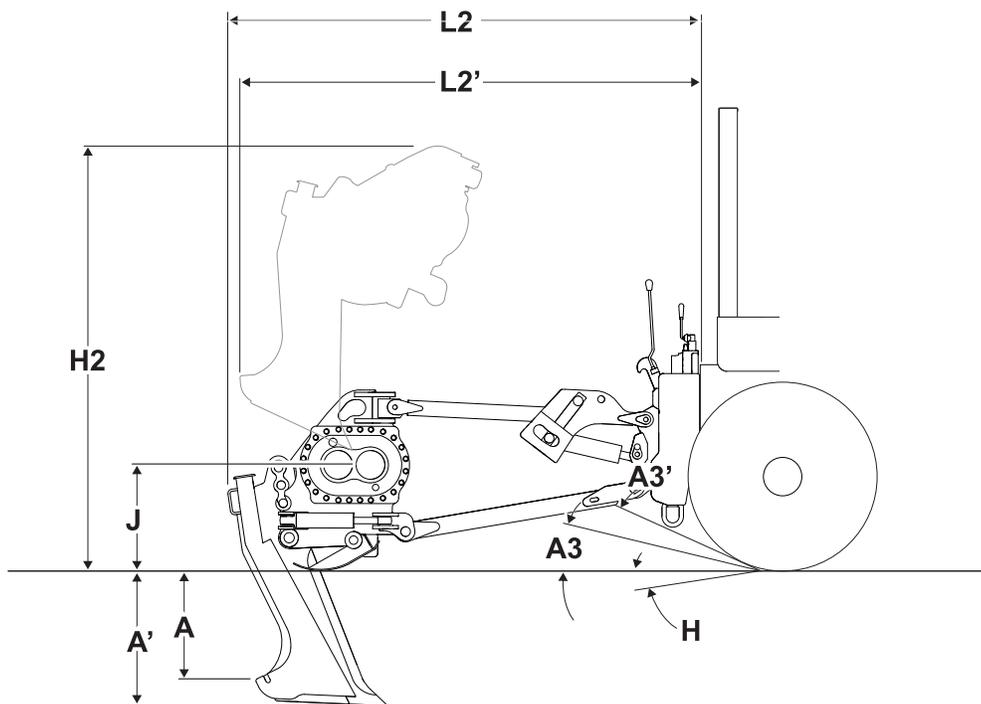
Digging chain speed with 12-tooth, 2.0" (50 mm) pitch headshaft sprocket

	low speed motor	352 ft/min	107 m/min
	standard speed motor	443 ft/min	135 m/min
	high speed motor	557 ft/min	170 m/min

Digging chain speed with 14-tooth, 2.0" (50 mm) pitch headshaft sprocket

	low speed motor	410 ft/min	125 m/min
	standard speed motor	515 ft/min	157 m/min
	high speed motor	647 ft/min	197 m/min

H832 Plow



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Dimensions		U.S.	Metric
A	Cover depth*	36 in	915 mm
A'	Penetration*	40 in	1.02 m
A3'	Angle of departure, transport, no blade	46.7°	46.7°
A3	Angle of departure, transport, 24" (610 mm) blade	25.3°	25.3°
	Angle of departure, transport, 30" (760 mm) blade	29.8°	29.8°
H	Angle of depression, plow max.	7°	7°
H2	Height transport	97 in	2.5 m
J	Blade ground clearance, 30" (760 mm) blade	33.1 in	841 mm
L2	Attachment length, fully lowered, no blade	96.7 in	2.5 m
L2'	Attachment length, fully raised, no blade	70 in	1.8 m
	Plow swing angle	85°	85°
	Inclusive blade steer angle	89°	89°
	Center of plow to outside edge of machine, left	43.7 in	1.11 m
	Center of plow to outside edge of machine, right	43.7 in	1.11 m

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

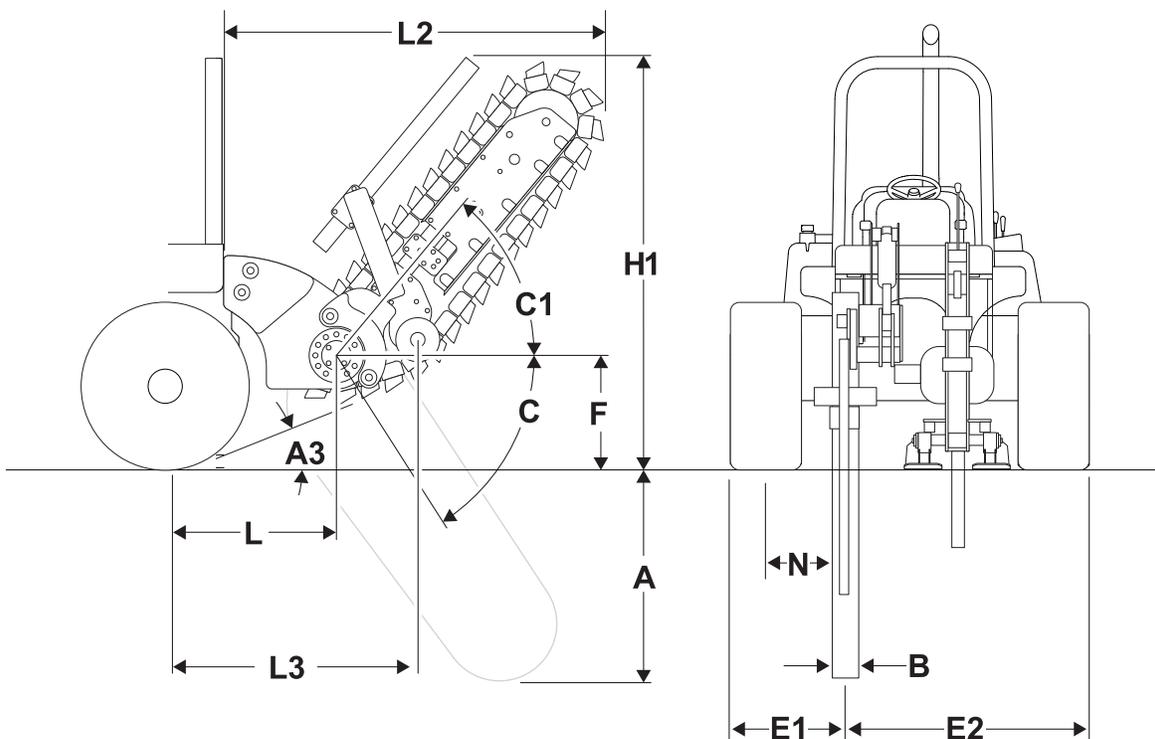
Operation		U.S.	Metric
Plow vibrator force @ 1800 rpm		35,215 lb	157 kN
Maximum material diameter			
	Pulled	3 in	80 mm
	Fed	2 in	50 mm
General		U.S.	Metric
Attachment weight, without plow blade		2000 lb	907 kg

Counterweight required. Contact your local Ditch Witch® dealer for counterweight requirements.



H853 Combo

Trencher



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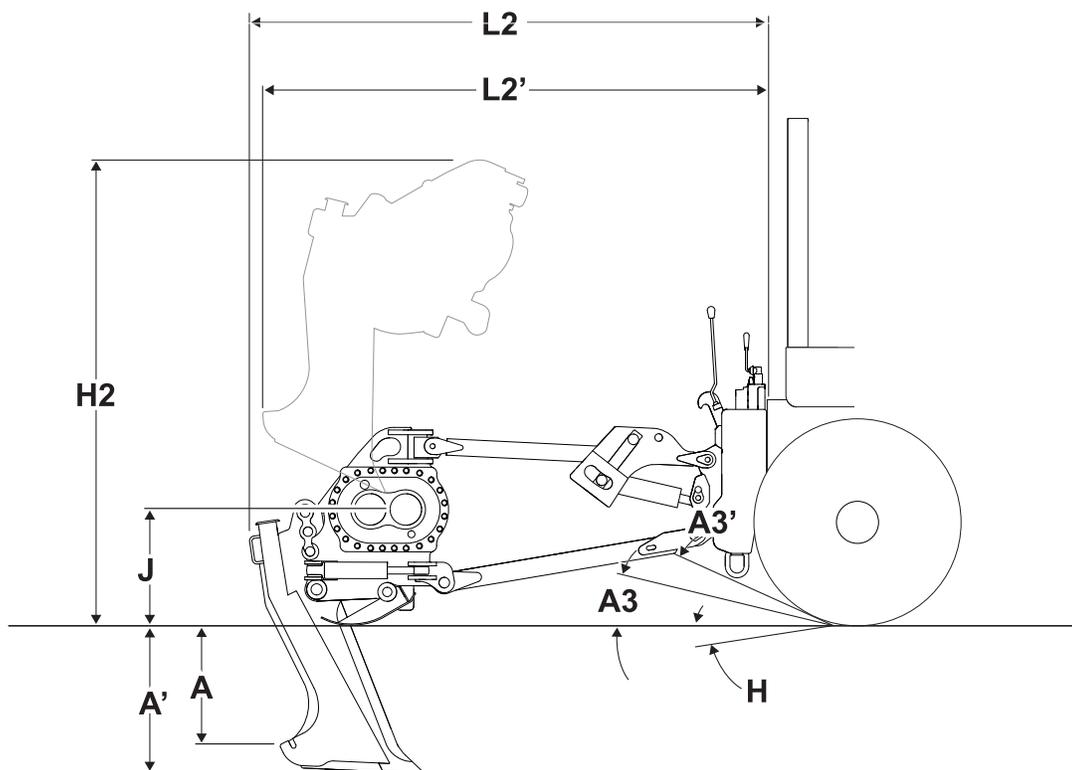
Dimensions		U.S.	Metric
A	Trench depth, maximum	63 in	1.6 m
A3	Angle of departure	27.2°	27.2°
B	Trench width	6-12 in	150-300 mm
C1	Boom travel up	49°	49°
C	Boom travel down	56°	56°
F	Headshaft height, digging chain	32.7 in	831 mm
L 2	Transport length (48" boom)	92.5 in	2.4 m
H1	Transport height (48" boom)	106 in	2.7 m
E1	Center of trench to outside edge, left*	17 in	432 mm
E2	Center of trench to outside edge, right	55.6 in	1.4 m
N	Spoil discharge reach, minimum	19 in	480 mm
L	Headshaft overhang	42.7 in	1.1 m

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

Operation		U.S.	Metric
Headshaft speeds @ 2600 engine rpm			
	low speed motor	174 rpm	174 rpm
	standard speed motor	219 rpm	219 rpm
	high speed motor	275 rpm	275 rpm
Digging chain speed with 10-tooth, 3.067" (78 mm) pitch headshaft sprocket			
	low speed motor	452 ft/min	168 m/min
	standard speed motor	569 ft/min	174 m/min
	high speed motor	715 ft/min	218 m/min
Digging chain speed with 12-tooth, 2.0" (50 mm) pitch headshaft sprocket			
	low speed motor	352 ft/min	107 m/min
	standard speed motor	443 ft/min	135 m/min
	high speed motor	557 ft/min	170 m/min
Digging chain speed with 14-tooth, 2.0" (50 mm) pitch headshaft sprocket			
	low speed motor	410 ft/min	125 m/min
	standard speed motor	515 ft/min	157 m/min
	high speed motor	647 ft/min	197 m/min



Plow



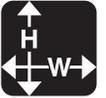
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Dimensions		U.S.	Metric
A	Cover depth*	36 in	915 mm
A'	Penetration*	40 in	1.02 m
A3	Angle of departure, transport, 24" (610-mm) blade	28°	28°
	Angle of departure, transport, 30" (760-mm) blade	23.5°	23.5°
A3'	Angle of departure, transport, no blade	44.9°	44.9°
H	Angle of depression, plow max.	7°	7°
H2	Height, transport	92 in	2.3 m
J	Blade ground clearance, 30" (760-mm) blade	25.5 in	642 mm
L2	Attachment length, fully lowered, no blade	96.7 in	2.5 m
L2'	Attachment length, fully raised, no blade	70 in	1.8 m
	Plow swing angle, left	0°	0°
	Plow swing angle, right	44°	44°
	Inclusive blade steer angle	89°	89°
	Center of plow to outside edge of machine, left	29.8 in	756 mm

	Center of plow to outside edge of machine, right	39 in	993 mm
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* Suggested maximum. Plow blade used will be determined by job requirements and soil conditions.

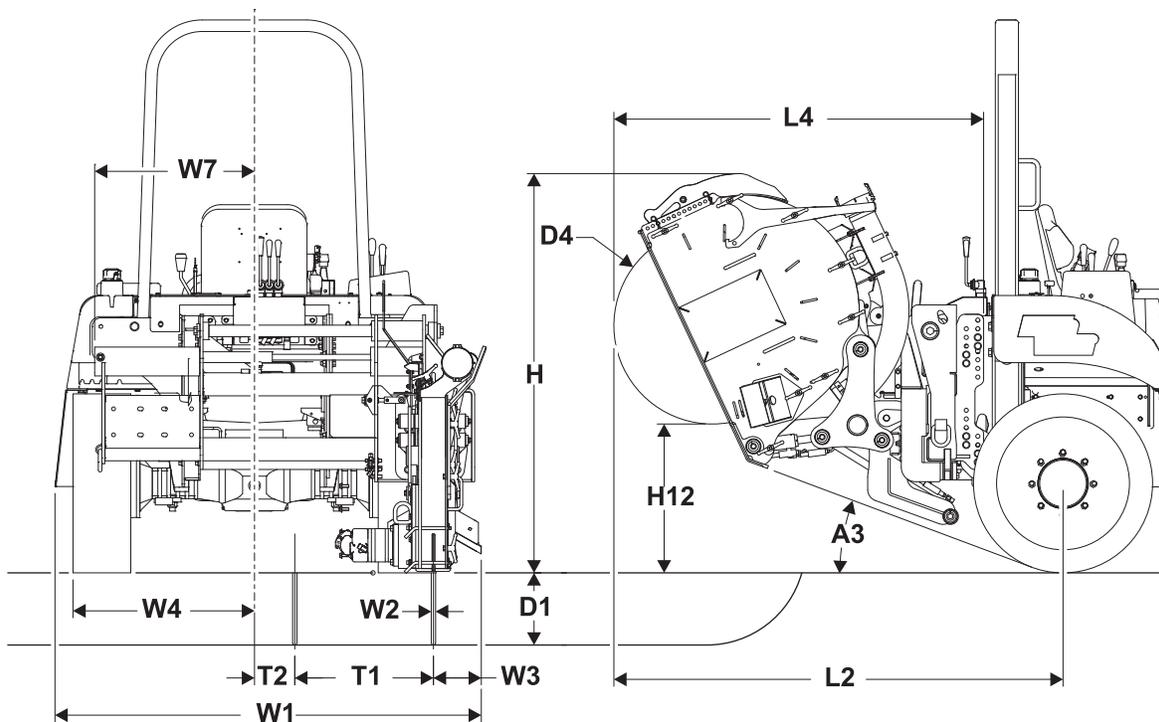
Operational		U.S.	Metric
Plow vibrator force @ 1800 rpm		35,215 lb	157 kN
Maximum material diameter			
	Pulled	3 in	80 mm
	Fed	2 in	50 mm



General		U.S.	Metric
Attachment weight without boom, chain, or plow blade		3455 lb	1567 kg

Counterweight required. Contact your local Ditch Witch[®] dealer for counterweight requirements.

MT12 Microtrencher



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Dimensions		U.S.	Metric
A3	Angle of departure	19°	19°
D1	Trench depth, 1-in (25-mm) increments	6.5-12.5 in	165-318 mm
D4	Blade diameter	34 in	864 mm
H	Attachment height, transport	68 in	1.72m
H12	Ground clearance at wheel	24 in	610 mm
L2	Length, transport, from centerline of rear axle	78 in	1.98 m
L2'	Working length, from centerline of rear axle (not shown)	84 in	2.1 m
L4	Length, transport, from front of attachment	65 in	1.65 m
T1	Saw offset distance	24 in	610 mm
T2	Centerline of saw to centerline of unit, minimum offset	7.0 in	178 mm
W1	Maximum working width	74 in	1.9 m
W2	Trench width	0.75-1.25 in	19-32 mm

W3	Spoils chute extension (same both sides)	8.5 in	216 mm
W4	Centerline of unit to outside left tire	31.5 in	800 mm
W7	Centerline of unit to end of traverse frame	27.7 in	704 mm
Width, transport		67.5 in	1.72 m
Minimum microtrenching radius*		40 ft	12 m
Attachment weight, including mount kit		1480 lb	673 kg
Microtrencher tilt adjustment		+/- 6°	+/- 6°

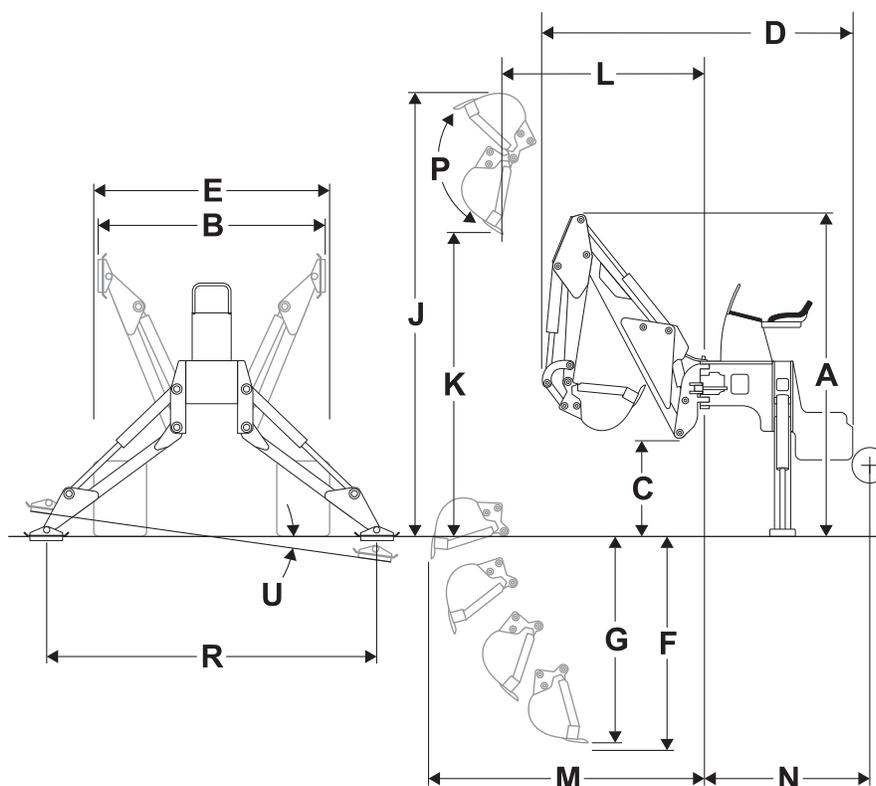
Use either 31 x 10 solid tires or 31 x 15.50-15, 8-ply tubeless bar lug tires with 200 pounds TBS per tire.



Operation	U.S.	Metric
Microtrencher motor displacement	40.55 in ³	664 cc
Blade speed, variable	0-175 rpm	0-175 rpm
Quantity of cutting teeth on saw blade (0.75 in, 0.95 in, 1.25 in)	24, 32, 32	24, 32, 32
Cutting bit types: Rotating: self-sharpening full cap conical bit with pin retainer Fixed: Shark [®] tooth carbide-tipped bits (0.75 in blade width only)		

*Minimum microtrench radius will depend on surface conditions and hardness of material being cut. Cut will be slightly wider in curved sections of the trench.

A820 Backhoe



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Dimensions		U.S.	Metric
A	Transport height	110.5 in	2.8 m
C	Ground clearance	36.6 in	929 mm
D	Backhoe length, stowed	57.2 in	1.5 m
F	Digging depth, max.	88.3 in	2.2 m
G	Digging depth, 2" (0.6 m) flat bottom	87.5 in	2.2 m
J	Operating height, fully raised	151.5 in	3.8 m
K	Loading height	93.5 in	2.4 m
L	Loading reach	56.1 in	1.4 m
M	Reach from swing pivot	142.2 in	3.6 m
N	Swing pivot to centerline axle	40.1 in	1.0 m
P	Bucket rotation	150°	150°
B	Stabilizer spread, transport	67.6 in	1.7 m

E	Backhoe or basic unit width	120 in	3.1 m
R	Stabilizer spread, operating	91.8 in	2.3 m
U	Leveling angle	6°	6°

General	U.S.	Metric
Attachment weight	2060 lb	934 kg

Bucket

	Width	12-18 in	305-460 mm
	Capacity	1.7-2.6 ft ³	0.05-.07 m ³
Backhoe weight with 12" (305 mm) bucket		2150 lb	975 kg

Lift capacity, boom over end and swing arc, SAE*

	@ 48" (1.2 m)	1140 lb	517 kg
	@ ground level	1080 lb	490 kg
	@ 72" (1.8 m)	1090 lb	494 kg

Lift capacity, dipperstick over end and swing arc, SAE*

	@ 53" (1.4 m)	1749 lb	793 kg
	@ 72" (1.8 m)	2020 lb	916 kg

Swing arc

		170°	170°
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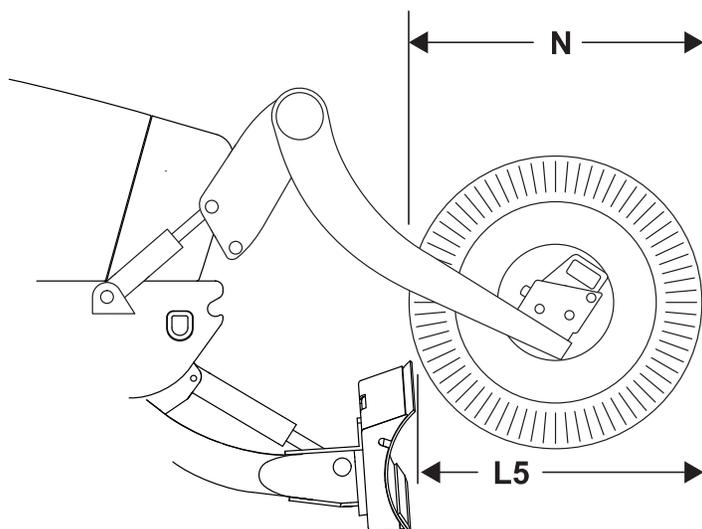
Digging force

	Using bucket cylinder	6500 lb	29 kN
	Using dipperstick cylinder	3600 lb	16 kN

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



RC80 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	73.5 in	1.9 m
N	Maximum reel diameter	84 in	2.1 m
	Internal width	54 in	1.4 m
	Capacity	2000 lb	907 kg
	Attachment weight with reel winder	1134 lb	514 kg

Support

Procedure

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

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

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

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

Resources

Publications

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



Ditch Witch Training

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

Warranty

Ditch Witch® Equipment and Replacement Parts Limited Warranty Policy

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

Exclusions from Product Warranty

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

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

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

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

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

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

For information regarding this limited warranty, contact CMW's Product Support department, P.O. Box 66, Perry, OK 73077-0066, or contact your local dealer.

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

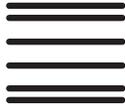
If your equipment was purchased through a Ditch Witch dealer, there is no need to read further.

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

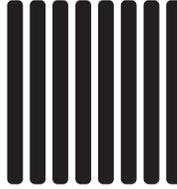
This will enable you to receive updates on this equipment as well as information on new products of interest.

Thanks for using Ditch Witch equipment.

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



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 23 PERRY OKLAHOMA

POSTAGE WILL BE PAID BY

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



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

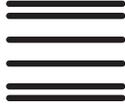
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However, if you purchased from any other source, please fill out the form on the reverse side and return it to us.

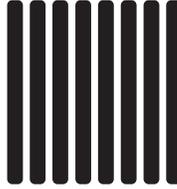
This will enable you to receive updates on this equipment as well as information on new products of interest.

Thanks for using Ditch Witch equipment.

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



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Street Address or P.O. Box

City County

State Zip Nation

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Phone Number With Area Code

Model Serial Number

Attachments/Accessories Serial Numbers

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Attachments/Accessories Serial Numbers

Name of Ditch Witch Dealership

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