

RT125

Operator's Manual



Issue 2.1
Original Instruction

053-2942

Overview



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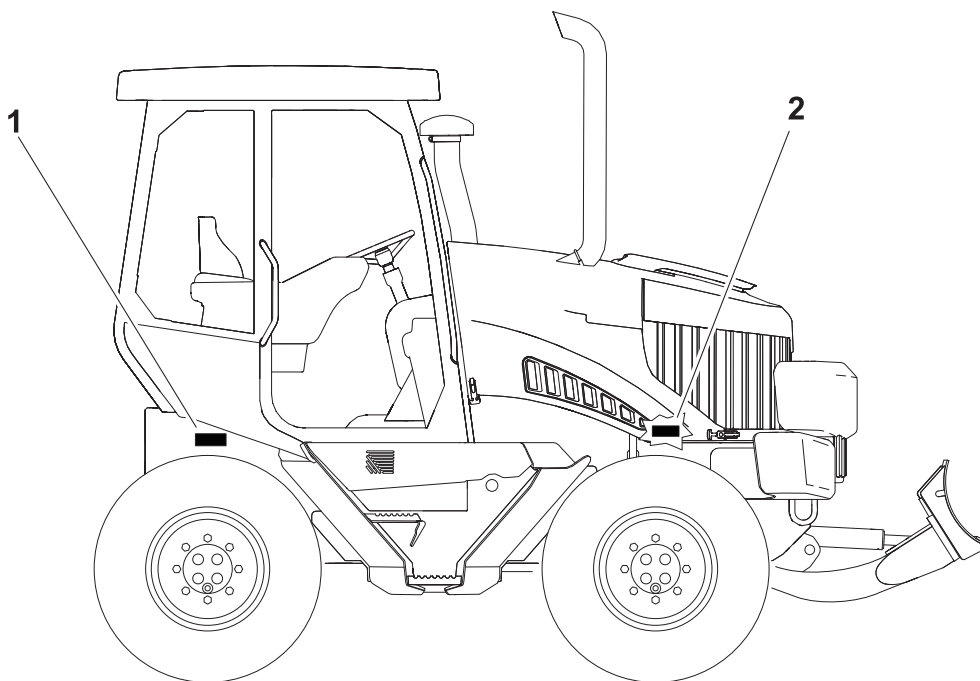
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Serial Number Location

Record serial numbers and date of purchase in spaces provided. RT125 (1) and engine serial numbers (2) are located as shown.



t50om001h.eps

Date of manufacture	
Date of purchase	
RT125 serial number	
Front attachment serial number	
Rear attachment serial number	
Trailer serial number	
Engine serial number	

Intended Use



The RT125 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
BH120 backhoe	24" (610 mm)	105" (2.7 m)
CT120H trencher	24" (610 mm)	93" (2.36 m)
ST120H trencher	24" (610 mm)	90" (2.29 m)
PT120H combo	n/a	70" (1.78 m)
RC30 reel carrier	84" (2.13 m) reel dia	n/a
RS40 saw	103" (1.03 m)	40.5" (1.03 m)
VP120H plow	3" (80 mm)	40" (1.074 m)

*The attachments listed are not all inclusive. Contact your Ditch Witch dealer for more information.

This unit is designed for operation in ambient temperatures from -20° to 117° F (-29 to 47°C). Contact your Ditch Witch dealer for provisions required for operating in extreme temperatures. Use in any other way is considered contrary to the intended use.

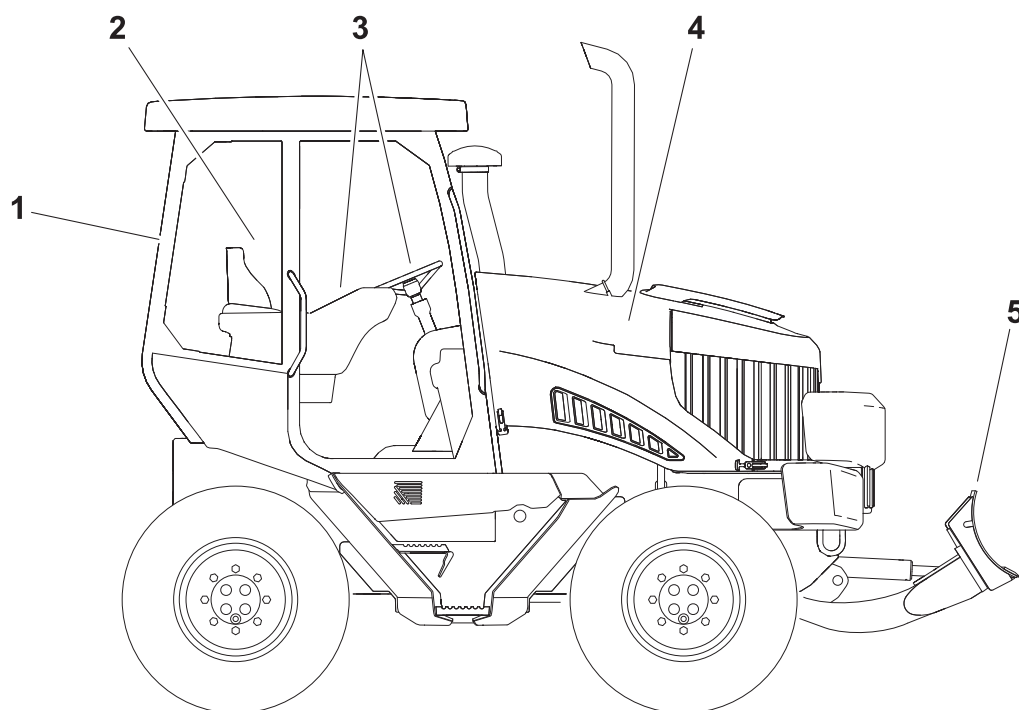
The RT125 should be used with genuine Ditch Witch chain, teeth, and sprockets. It should be operated, serviced, and repaired only by persons familiar with their particular characteristics and acquainted with the relevant safety procedures.

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.

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.

Unit Components



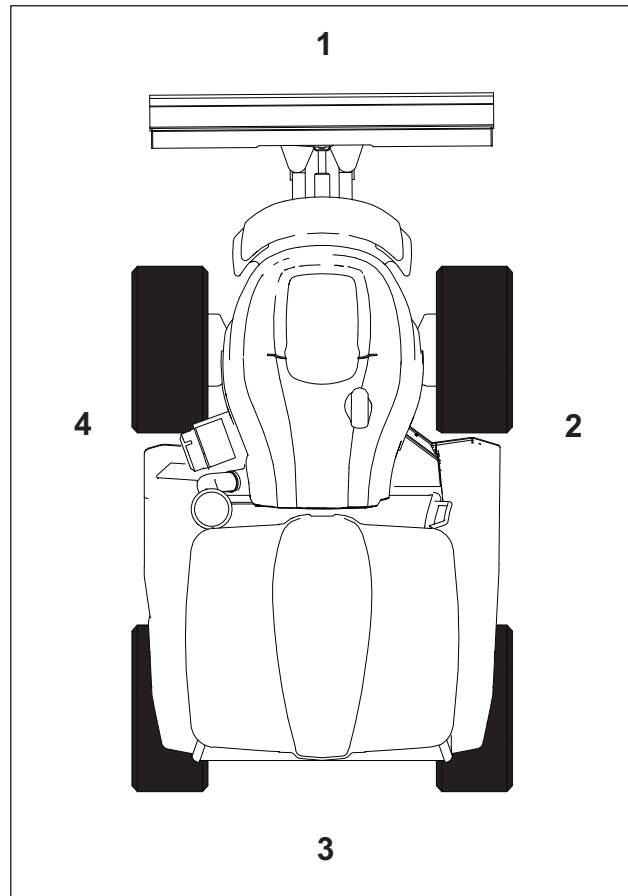
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- | | |
|---|------------------------------|
| 1. Rollover Protective Structure (ROPS) | 4. Engine compartment |
| 2. Operator station | 5. Backfill blade (optional) |
| 3. Control consoles | |

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.



RT125 T4 Operator's Manual

Issue number 2.1/OM-06/17

Part number 053-2942

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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



When you see this safety alert sign, carefully read and follow all instructions. **YOUR SAFETY IS AT STAKE.** Read this entire section before using your equipment.

Follow these guidelines before operating any jobsite equipment:

- Complete proper training and read operator's manual before using equipment.
- Mark proposed path with white paint and have underground utilities located before working. In the US or Canada, call 811 (US) or 888-258-0808 (US and Canada). Also contact any local utilities that do not participate in the One-Call service. In countries that do not have a One-Call service, contact all local utility companies to have underground utilities located.
- Classify jobsite based on its hazards and use correct tools and machinery, safety equipment, and work methods for jobsite.
- Mark jobsite clearly and keep spectators away.
- 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. Safety Data Sheets (SDS) are available at www.ditchwitch.com/support.
- Fully inspect equipment before operating. Repair or replace any worn or damaged parts. Replace missing or damaged safety shields and safety 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 machine 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 may contain 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

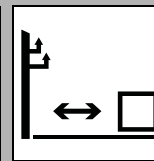
Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.



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 will cause death or serious injury. Stay away. 274-049

When working near electric cables, remember the following:

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

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

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

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

If an Electric Line is Damaged

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

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

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

- LEAVE AREA. The ground surface may be electrified, so take small steps with feet close together to reduce the hazard of being shocked from one foot to the other. For more information, contact your Ditch Witch® dealer.
- Contact utility company to shut off power.
- Do not return to jobsite or allow anyone into area until given permission by utility company.

If a Gas Line is Damaged



⚠ 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 orders 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.

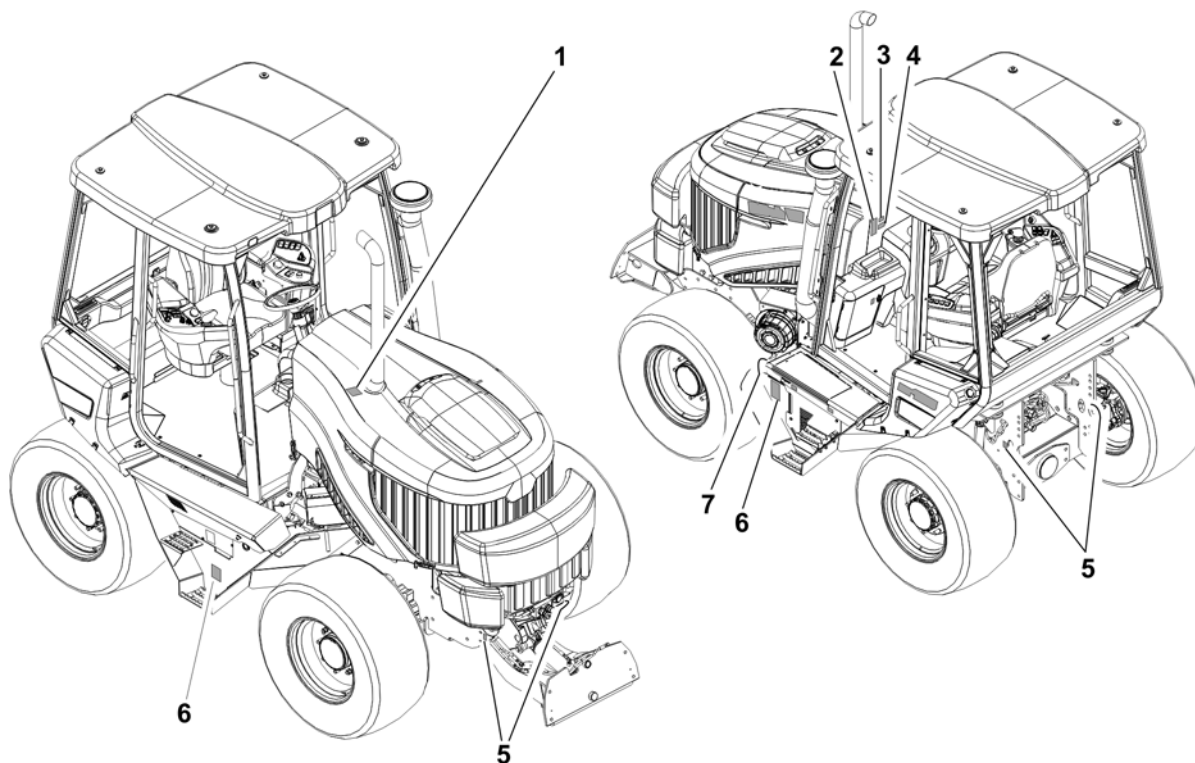
 **CAUTION** indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

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

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

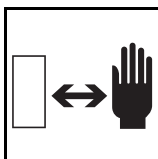
IMPORTANT can help you do a better job or make your job easier in some way.

Machine Safety Alerts



Decal_RT125

1



CAUTION

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

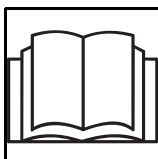
2



WARNING

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

3



WARNING

Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

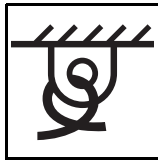
4



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); 700-133

5



Tiedown location. See Transport chapter for more information.
274-318

6



⚠ WARNING Fall possible. Riders can fall from machine and be injured or killed. Single operator only. 275-185

7

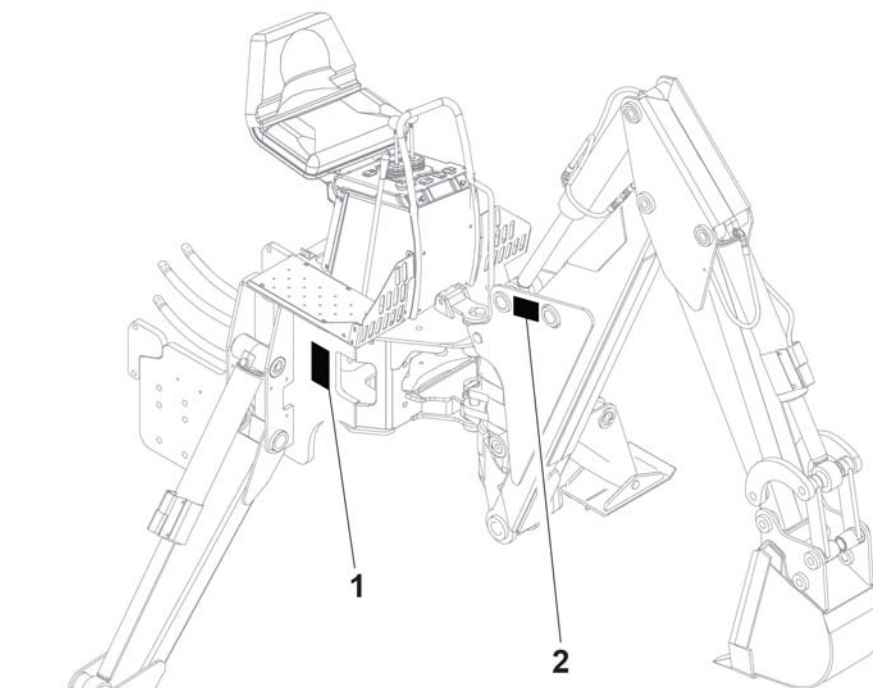


⚠ WARNING Fire or explosion possible. Do not use starter fluid.
273-459 (2P), 274-206 (2P), 700-206 (2P)



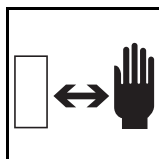
Attachment Safety Alerts

BH120



Decal_BH120.png

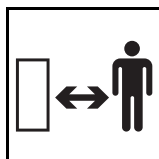
1



WARNING

Moving parts could cut off hand or foot. Stay away.
275-184, 273-437,

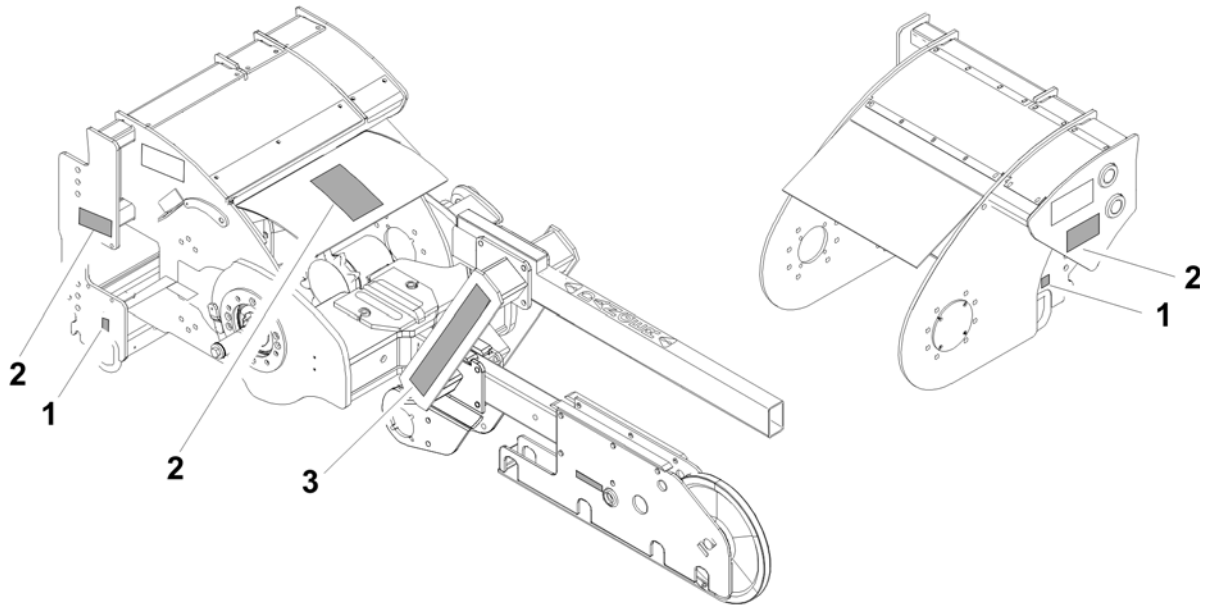
2



WARNING

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

CT120H



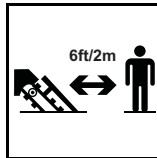
Decal_CT120Hb.png

1



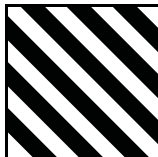
Tiedown location. See Transport chapter for more information.
 274-318

2



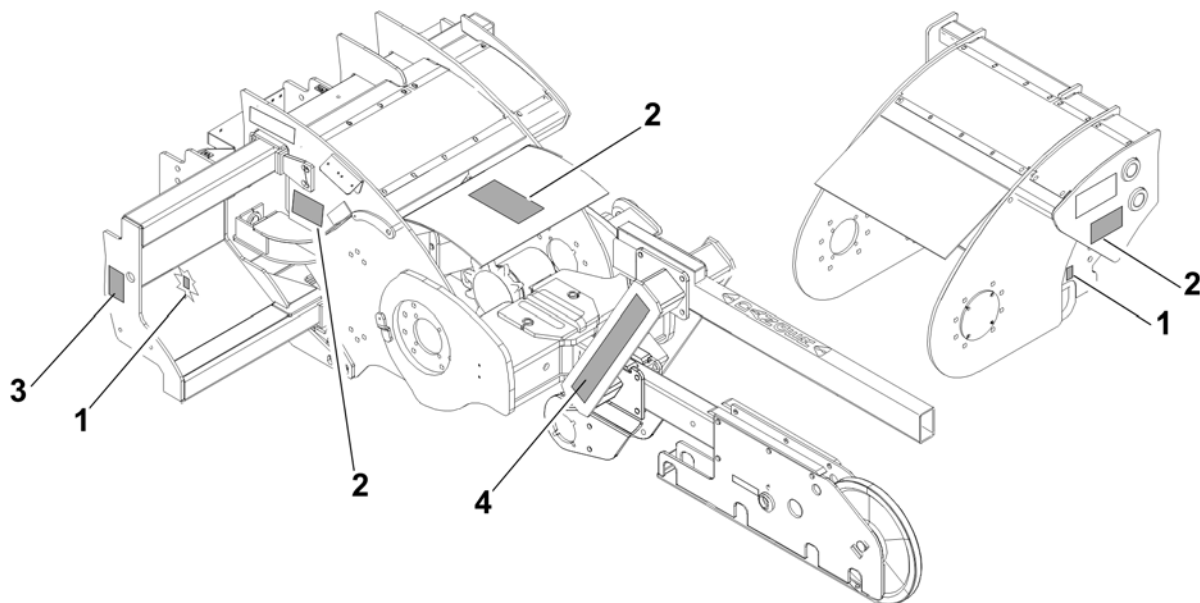
⚠ DANGER Moving digging teeth can kill. Trench cave-in can cause you to fall. Stay away. 275-097, 270-6900

3



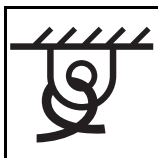
DANGER stripe decal. See Parts Manual for replacement part numbers.

ST120H



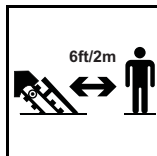
Decal_ST120Hb.png

1



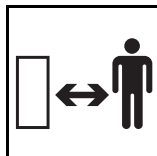
Tiedown location. See Transport chapter for more information.
274-318

2



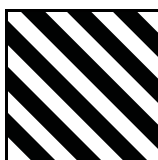
⚠ DANGER Moving digging teeth can kill. Trench cave-in can cause you to fall. Stay away. 275-097, 274-002

3



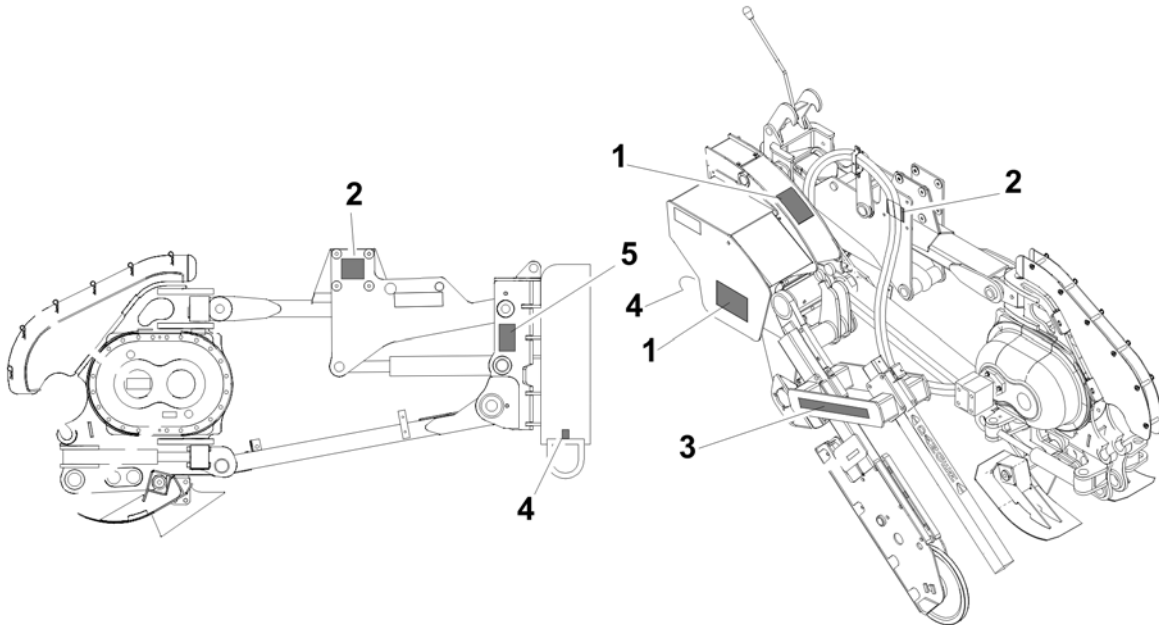
⚠ WARNING Moving parts could cut off hand or foot. Stay away.
275-184, 273-546

4



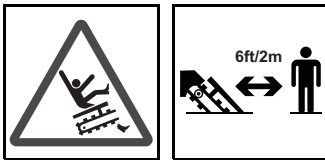
DANGER stripe decal. See Parts Manual for replacement part numbers.

PT120H



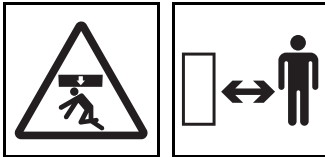
Decal_PT120Hb.png

1



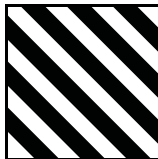
⚠ DANGER Moving digging teeth can kill. Trench cave-in can cause you to fall. Stay away. 275-097, 274-002

2



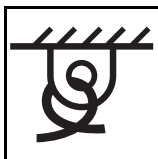
⚠ WARNING Crushing weight could cause death or serious injury. Stay away. 275-326, 701-326

3



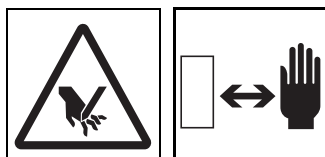
DANGER stripe decal. See Parts Manual for replacement part numbers.

4



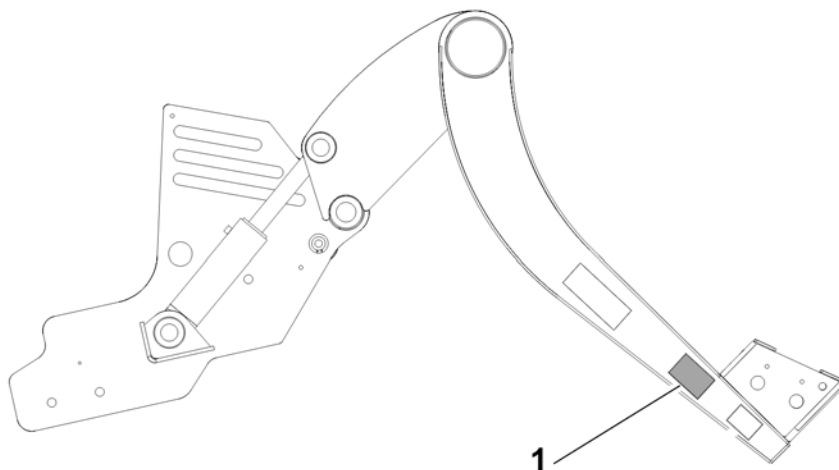
Tiedown location. See Transport chapter for more information. 274-318

5



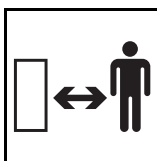
⚠ WARNING Moving parts could cut off hand. Keep hands away. 275-184

RC30



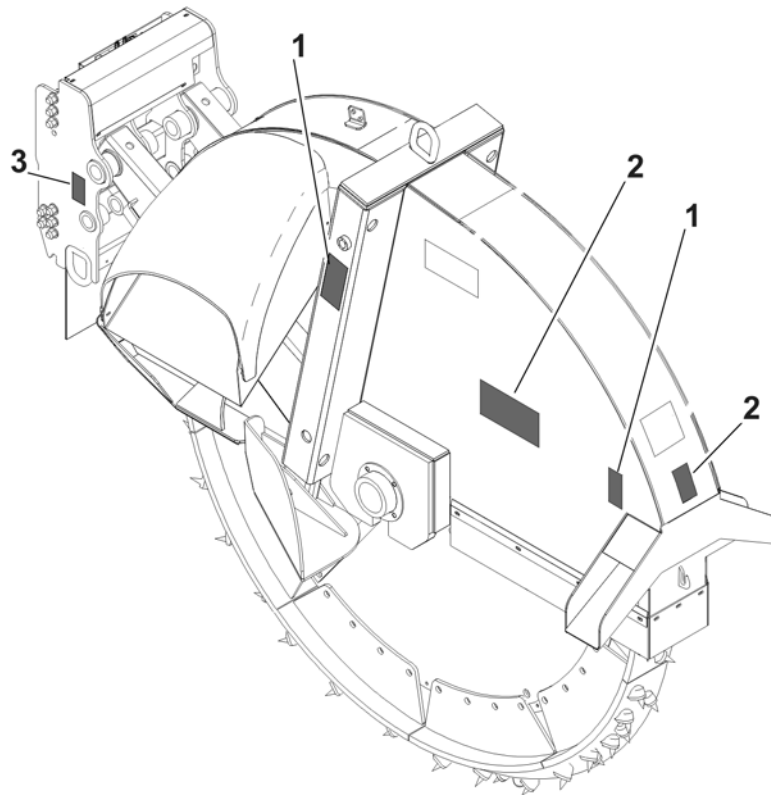
Decal_RC30b.png

1



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

RS40



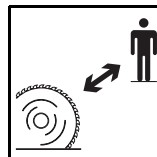
Decal_RS40b.png

1



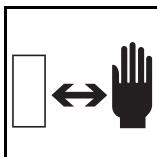
CAUTION Flying objects thrown by machine may strike people. Wear safety glasses and hard hat. 275-193

2



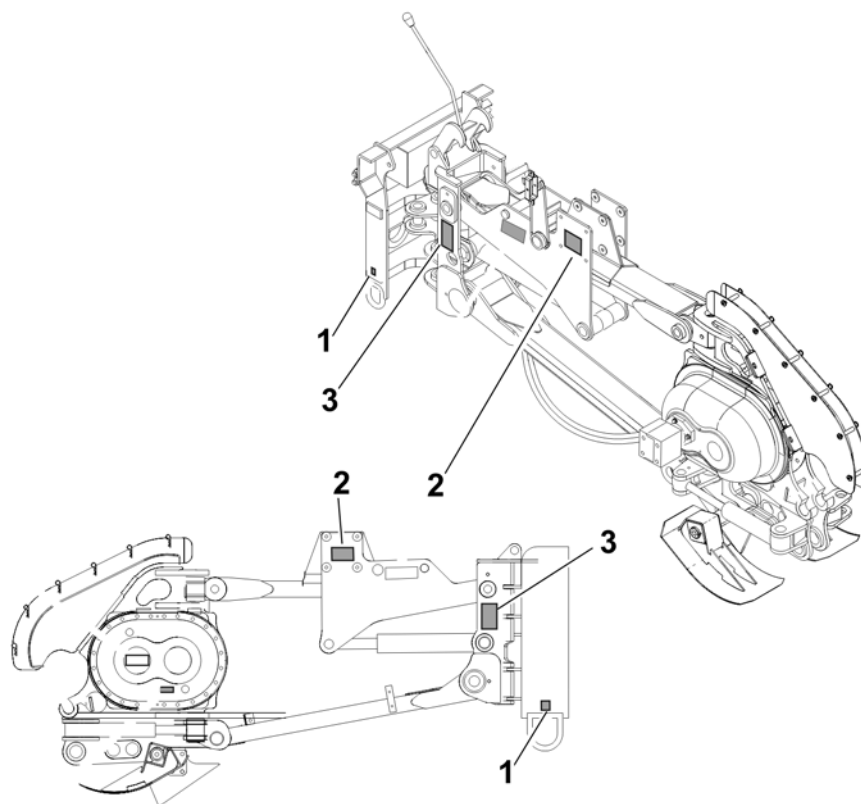
DANGER Moving digging teeth will cause serious injury or death. Stay away. 275-443, 275-103

3



WARNING Moving parts could cut off hand or foot. Stay away. 275-184, 273-437,

VP120H



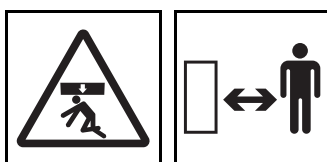
Decal_VB120Hb.png

1



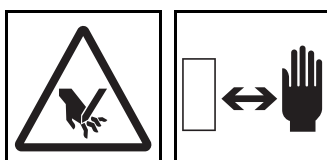
Tiedown location. See Transport chapter for more information.
274-318

2



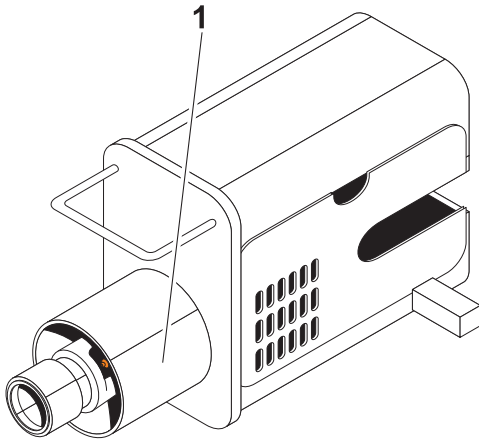
⚠ WARNING Crushing weight could cause death or serious injury. Stay away. 275-326, 701-326

3

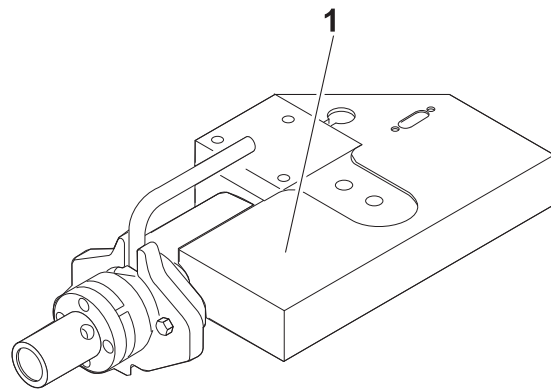


⚠ WARNING Moving parts could cut off hand or foot. Stay away.
275-184, 273-437,

RWIII/RWIV



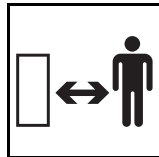
Decal_RW_III



Decal_RW_IV



1



⚠ DANGER
away. 275-197

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

Controls

Chapter Contents

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- Suspension Seat (Optional) 55

Cab Controls (Optional) 57

Plow Controls 57

Plow Controls 60

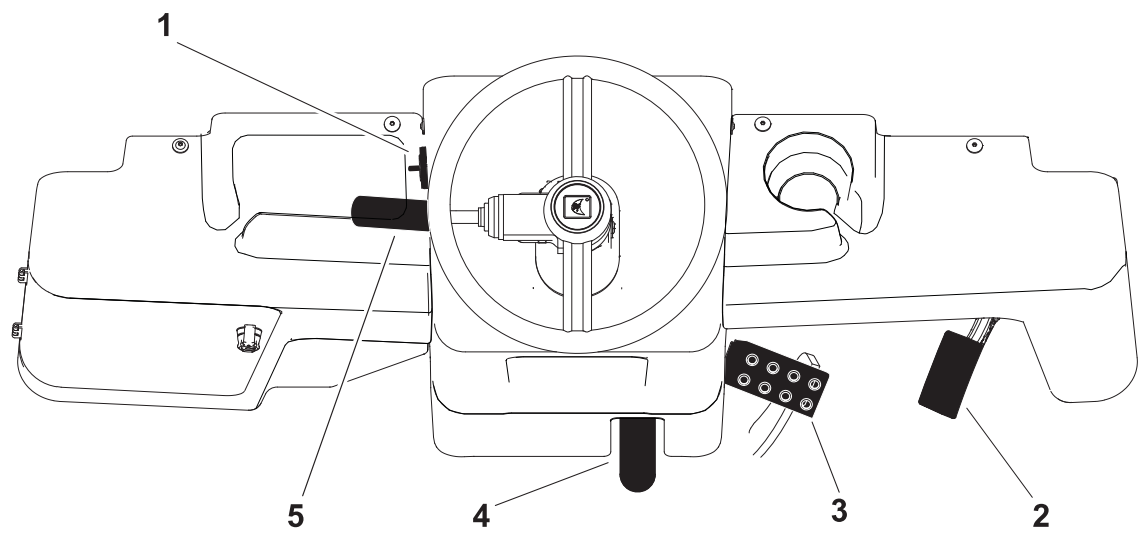
Backhoe Console 62

Drill Controls 67

Battery Disconnect 68



Center Console



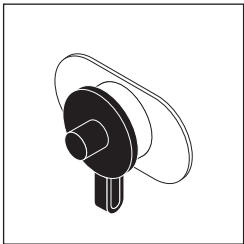
t50om040h.eps

1. Auxiliary outlet

2. Ground drive foot control

3. Brake pedal
4. Steering column tilt control

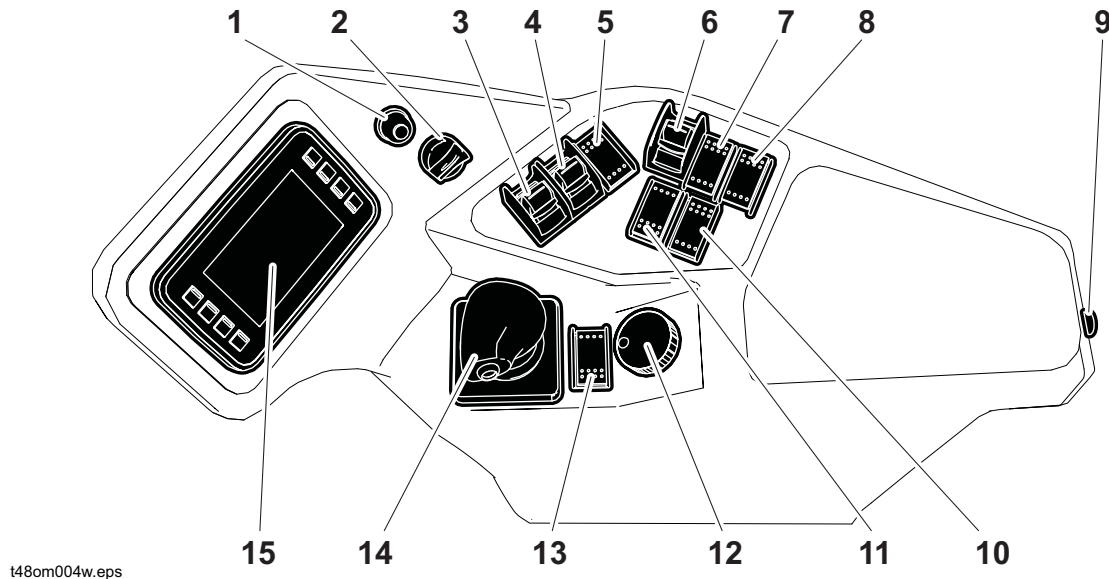
5. Ground drive direction/speed control

Item	Description	Notes
1. Auxiliary outlet  c00ic179h.eps	Provides power for other equipment.	Power output is 12V, 10A.

Item	Description	Notes
2. Ground drive foot control	To move tractor, push pedal down. To increase speed in either direction, push pedal farther from neutral position. To reduce speed in either direction, release pedal slightly. To stop, release pedal.	To function, ground drive direction control must be in forward or reverse. See "Ground drive direction/speed control" on page 31. Pedal should automatically return to neutral when released.
3. Brake pedal	To stop tractor, press.	
4. Steering column tilt control	To adjust tilt, depress lever. To secure steering column in position, release.	
5. Ground drive direction/speed control c00ic161w.eps c00ic734h.eps	To move tractor forward, move lever to the upper position. To put tractor in neutral, move lever to the center position. To move tractor in reverse, move lever to the lower position. To select High (2) or Low (1), rotate knob to appropriate position.	Must be in forward or reverse position for ground drive foot control to function. See "Ground drive foot control" on page 31. Display indicates forward, neutral, or reverse selection. Screen icon displays High or Low selection.

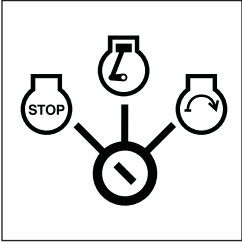
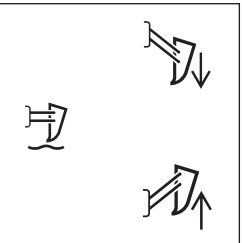
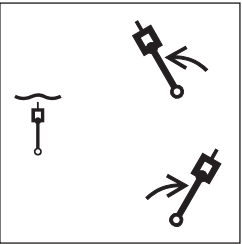
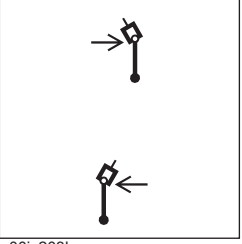


Right Console

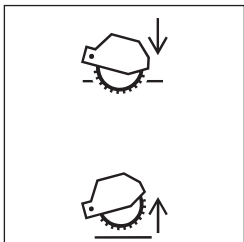
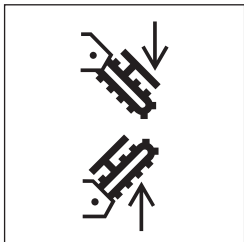
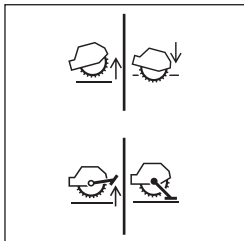
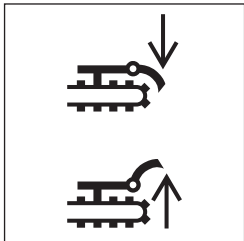
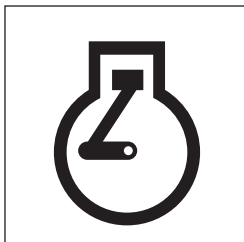


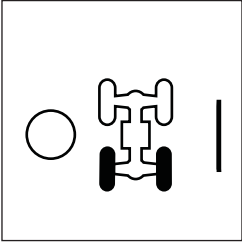
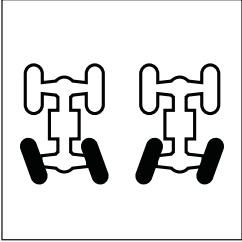
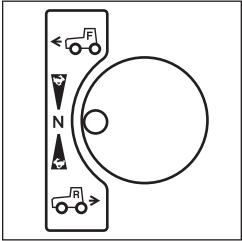
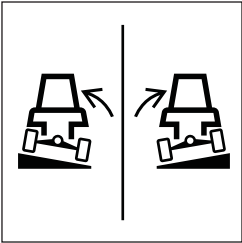
- | | |
|-----------------------------------|--|
| 1. Horn button | 9. Start override button |
| 2. Ignition switch | 10. Rear steer mode selector switch |
| 3. Plow lift control | 11. Rear steer adjustment switch* |
| 4. Plow swing control | 12. Ground drive speed hand control |
| 5. Plow blade steer control | 13. Frame tilt control* |
| 6. Saw lift/Trencher lift control | 14. Reel winder/Backfill blade control |
| 7. Saw stabilizer control | 15. Graphic display |
| 8. Trench cleaner lift control* | |
- *Optional

Item	Description	Notes
1. Horn button  c00ic044h.eps	To sound horn, press.	

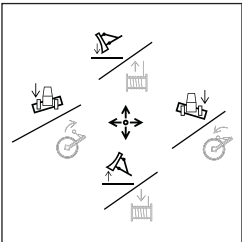
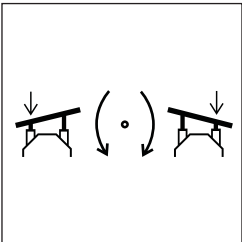
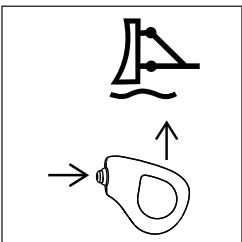
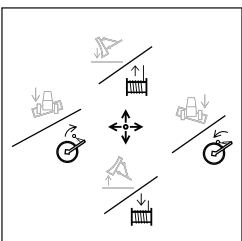
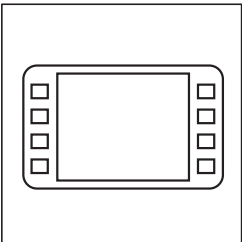
Item	Description	Notes
2. Ignition switch  c00ic137w.eps	To start engine, insert key and turn clockwise. To stop engine, turn counterclockwise.	
3. Plow lift control  c00ic204h.eps	To lower, move forward. To raise, pull back. To float, push switch all the way forward until it latches.	NOTICE: • If soil conditions allow, operate in float position. • Lower plow into ground before moving control to float position. • Do not raise plow with plow swing in float position.
4. Plow swing control  c00ic202h.eps	To swing right, move forward. To swing left, pull back. To float, push switch all the way forward until it latches.	NOTICE: • If soil conditions allow, operate in float position. • Lower plow into ground before moving control to float position.
5. Plow blade steer control  c00ic203h.eps	To steer right, move forward. To steer left, pull back.	



Item	Description	Notes
6. Saw lift/Trencher lift control  c00ic209h.eps  c00ic200h.eps	To lower, move forward. To raise, pull back. To lower, move forward. To raise, pull back.	
7. Saw stabilizer control  c00ic153w.eps	To lower, move forward. To raise, pull back.	
8. Trench cleaner lift control  c00ic199h.eps	To lower, move forward. To raise, pull back.	
9. Start override button  c00ic024w.eps	To engage start override, press and hold.	IMPORTANT: Override starts interlock functions, allowing operator to start tractor for a short period of time to move from a potentially dangerous position.

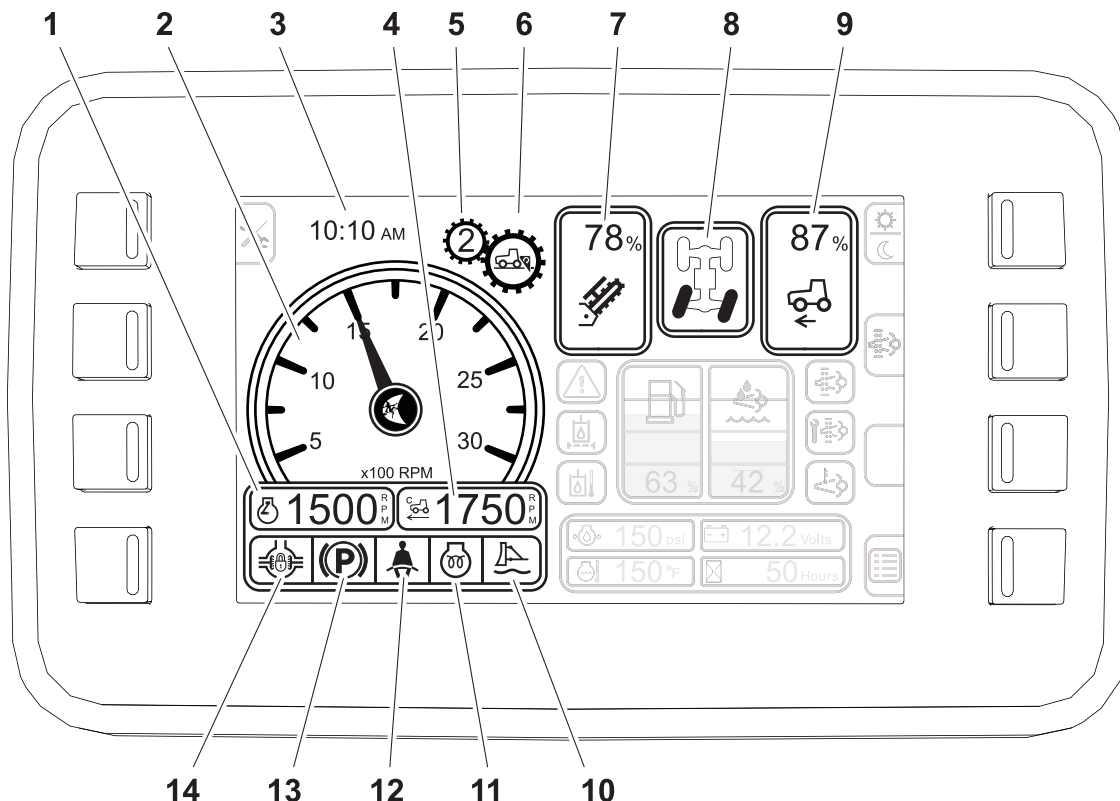
Item	Description	Notes
10. Rear steer mode selector switch  c00ic146w.eps	To engage rear steer, press left. To center wheels, press right.	
11. Rear steer adjustment switch  c00ic145w.eps	To move rear wheels left, press and hold left. To move rear wheels right, press and hold right. To stop wheel movement, release switch.	NOTICE: Visually verify wheel position.
12. Ground drive speed hand control  c00ic157w.eps	To go faster in either direction, move farther from neutral. To stop, return to center.	NOTICE: Control does not automatically return to neutral. IMPORTANT: This control is disabled in High gear.
13. Frame tilt control  c00ic140w.eps	To tilt left, press left. To tilt right, press right.	IMPORTANT: Use frame tilt to improve comfort while operating machine on slope. See "Safe Slope Operation" on page 84.



Item	Description	Notes
14. Reel winder/Backfill blade control  c00ic141w.eps  c00ic144w.eps  c00ic143w.eps  c00ic150w.eps	Backfill blade mode: - To lower, move forward. - To raise, move backward. - To tilt right side down, move right. - To tilt left side down, move left. - To angle blade to the right, twist right. - To angle blade to the left, twist left. - To float, move forward to end, press button, and release handle. - To remove from float, move back. Reel winder mode: - To spool product off, move forward. - To spool product on, move backward. - To move wheel to spool, move right. - To move wheel away from spool, move left.	Display indicates float position.
15. Graphic display  c00ic152w.eps	Displays graphic symbols for indicators and conditions.	See more information in "Graphic Display" on page 37.

Graphic Display

Gauges and Indicators



t50om042h.eps

- | | |
|---|-------------------------------------|
| 1. Tachometer | 8. Rear steer indicator |
| 2. Engine speed display (rpm) | 9. Ground drive direction indicator |
| 3. Real time clock | 10. Backfill blade float indicator |
| 4. Cruise control set speed display (rpm) | 11. Cold start wait indicator |
| 5. Ground drive speed indicator | 12. Operator presence indicator |
| 6. Gearbox indicator | 13. Parking brake indicator |
| 7. Attachment drive indicator | 14. Axle lock indicator |

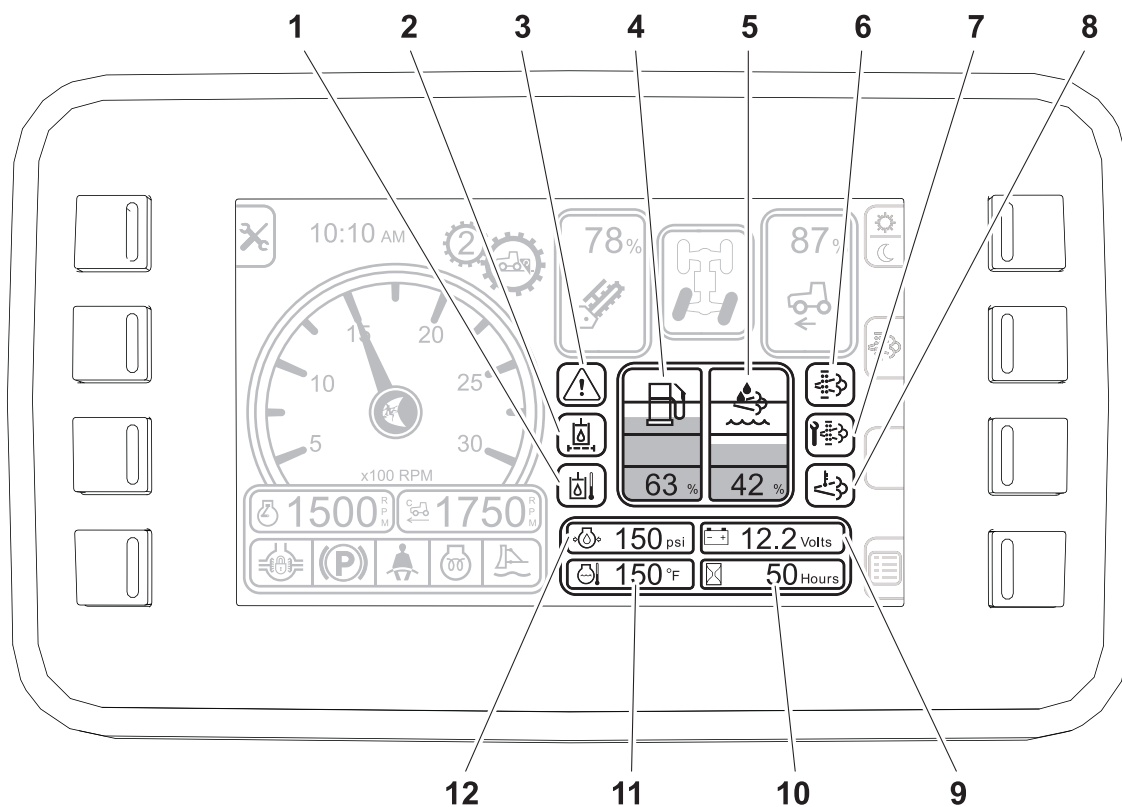
Item	Description	Notes
1. Tachometer	Displays engine speed.	
2. Engine speed display (rpm)	Displays numeric value for engine speed.	
		

Item	Description	Notes
3. Real time clock	Displays time.	
4. Cruise control set speed display (rpm) 	Displays numeric value for speed if cruise control is set.	Only shown when cruise selector switch is ON. See "Cruise control selector switch" on page 50.
5. Ground drive speed indicator 	Indicates whether ground drive is in High (2) or Low (1).	
6. Gearbox indicator 	Indicates whether gearbox is in high or low.	IMPORTANT: • Gearbox must be in high to drive. • Gearbox must be in low to dig. • "--" indicates no information has been received from the controller.
7. Attachment drive indicator 	Lights when an attachment is in use and displays numeric value of attachment drive percentage.	
8. Rear steer indicator 	Lights when rear steer is in use.	IMPORTANT: Icon displays direction of wheels.
9. Ground drive direction indicator 	Indicates whether tractor is in forward, reverse, or neutral.	Part of the start interlock system.
10. Backfill blade float indicator 	Lights when backfill blade is in float.	
11. Cold start wait indicator 	Lights when cold start aids are active. Wait until light goes off before starting engine.	
12. Operator presence indicator 	Lights when operator is in seat.	Part of the start interlock system.

Item	Description	Notes
13. Parking brake indicator 	Lights when parking brake is set.	
14. Axle lock indicator 	Lights when axle lock is set.	



Gauges and Indicators



t50om043h.eps

- | | |
|--|--|
| 1. Hydraulic fluid temperature indicator | 7. Aftertreatment service indicator |
| 2. Hydraulic fluid filter indicator | 8. High exhaust temperature indicator |
| 3. Engine caution/stop indicator | 9. Voltmeter display |
| 4. Fuel gauge | 10. Hourmeter |
| 5. DEF indicator/tank level percentage | 11. Engine coolant temperature indicator/numeric display |
| 6. Exhaust cleaning indicator | 12. Engine oil pressure indicator/numeric display |

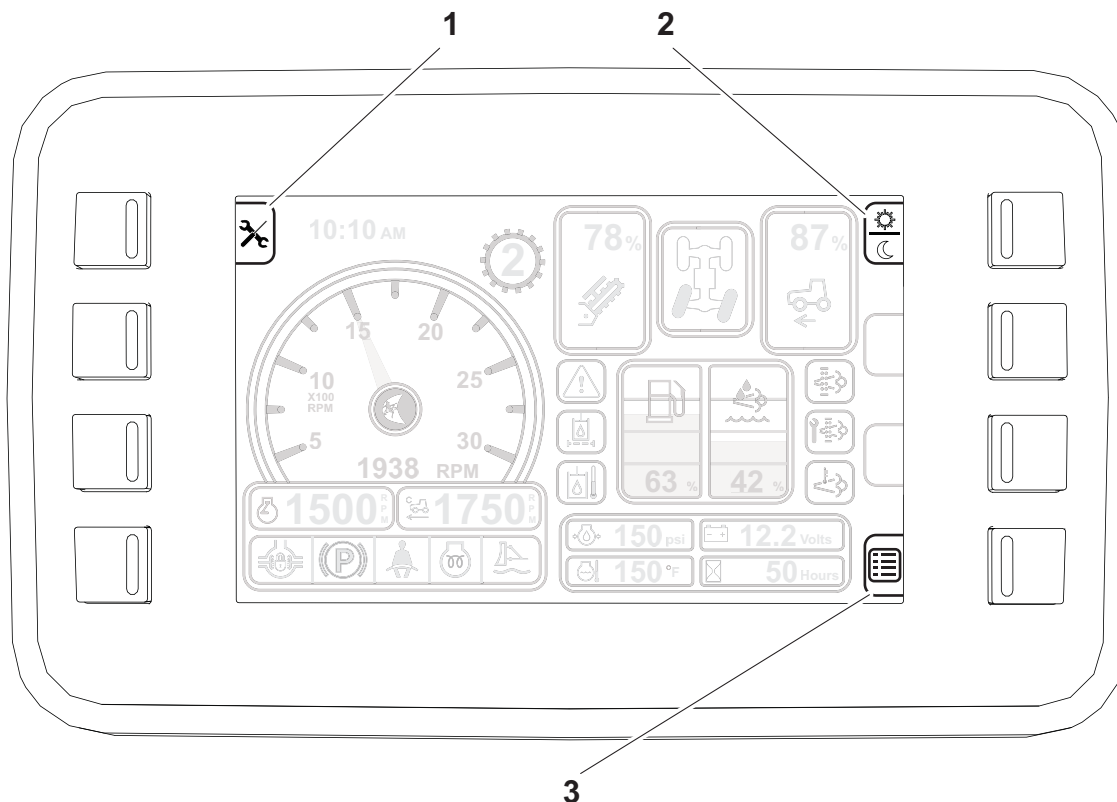
Item	Description	Notes
1. Hydraulic fluid temperature indicator 	Lights when hydraulic fluid temperature is too high.	NOTICE: Engine stop indicator will light when hydraulic fluid temperature is too high. See "Engine caution/stop indicator" on page 41.

Item	Description	Notes
2. Hydraulic fluid filter indicator 	Lights when hydraulic filter is restricted.	NOTICE: Engine caution indicator will light when hydraulic fluid filter needs attention. See "Engine caution/stop indicator" on page 41.
3. Engine caution/stop indicator 	Lights yellow when engine needs attention. Lights red when operator needs to stop engine.	
4. Fuel gauge 	Displays amount of fuel remaining in tank.	See "Approved Fuel" on page 155.
5. DEF indicator/tank level percentage 	Displays amount of diesel exhaust fluid (DEF) remaining in tank.	IMPORTANT: Icon changes color and/or flashes to indicate DEF level. Read pop up messages for more information.
6. Exhaust cleaning indicator 	Indicates that a system cleaning is needed.	IMPORTANT: Icon changes color and/or flashes to indicate exhaust cleaning need. Read pop up messages for more information. See "Diesel Exhaust Fluid (DEF)" on page 156.
7. Aftertreatment service indicator 	Indicates when aftertreatment system needs to be serviced.	NOTICE: Contact an authorized Deutz® service technician.
8. High exhaust temperature indicator 	Lights when exhaust temperatures are high.	NOTICE: May light when exhaust cleaning is occurring.
9. Voltmeter display 	Displays machine voltage.	
10. Hourmeter	Displays number of hours engine has been running.	



Item	Description	Notes
11. Engine coolant temperature indicator/ numeric display 	Displays engine coolant temperature.	Normal coolant temperature is 187°-230° F (86°-107° C).
12. Engine oil pressure indicator/numeric display 	Displays engine oil pressure.	Minimum pressure for warm engine at full throttle is 32 psi (2.25 bar).

Buttons

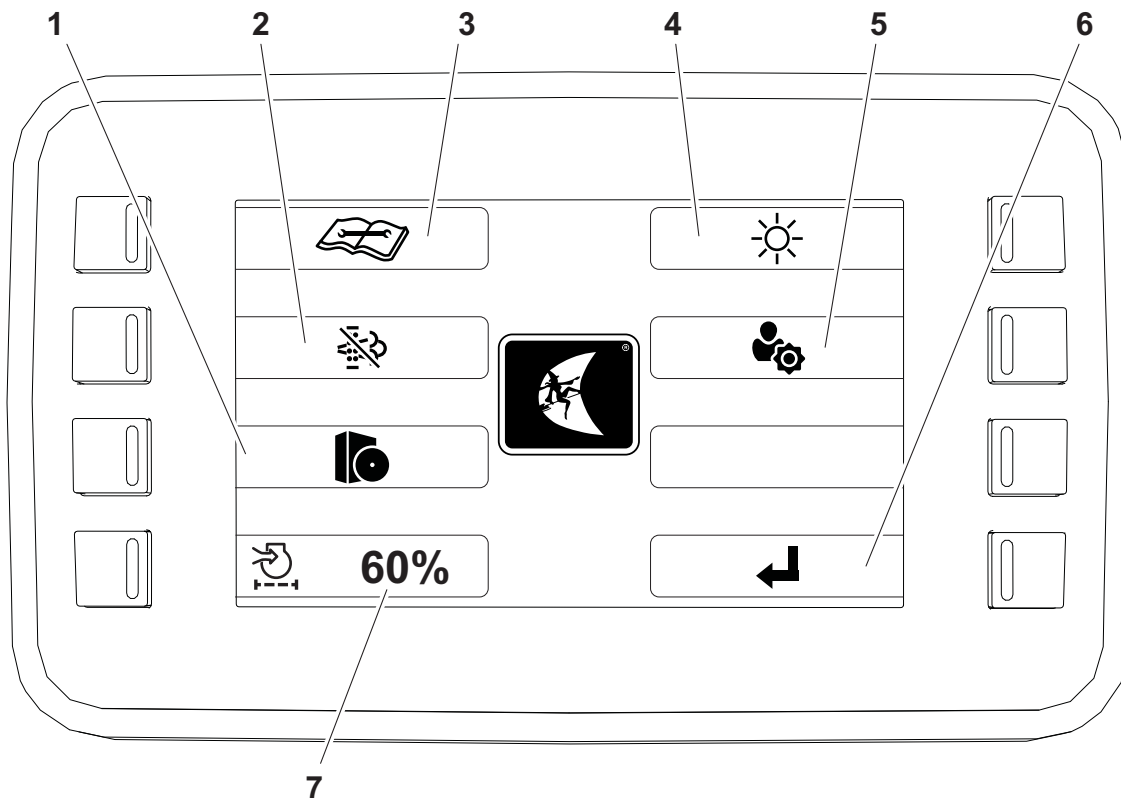


t48om052w.eps

1. Hide/Recall engine diagnostics key
2. Day/Night mode key
3. Main menu key

Item	Description	Notes
1. Hide/Recall engine diagnostics key 	When diagnostic message appears, press button twice to hide. Press button twice to recall message.	
2. Day/Night mode key 	Press from main screen to toggle between day and night modes.	
3. Main menu key 	Press from main screen (gauges) to select main menu.	

Main Menu



t48om058w.eps

- | | |
|---|-------------------------------------|
| 1. System settings key | 5. User settings key |
| 2. Exhaust cleaning activation key | 6. Return key |
| 3. Machine diagnostics code display key | 7. Air filter restriction indicator |
| 4. Brightness control display key | |

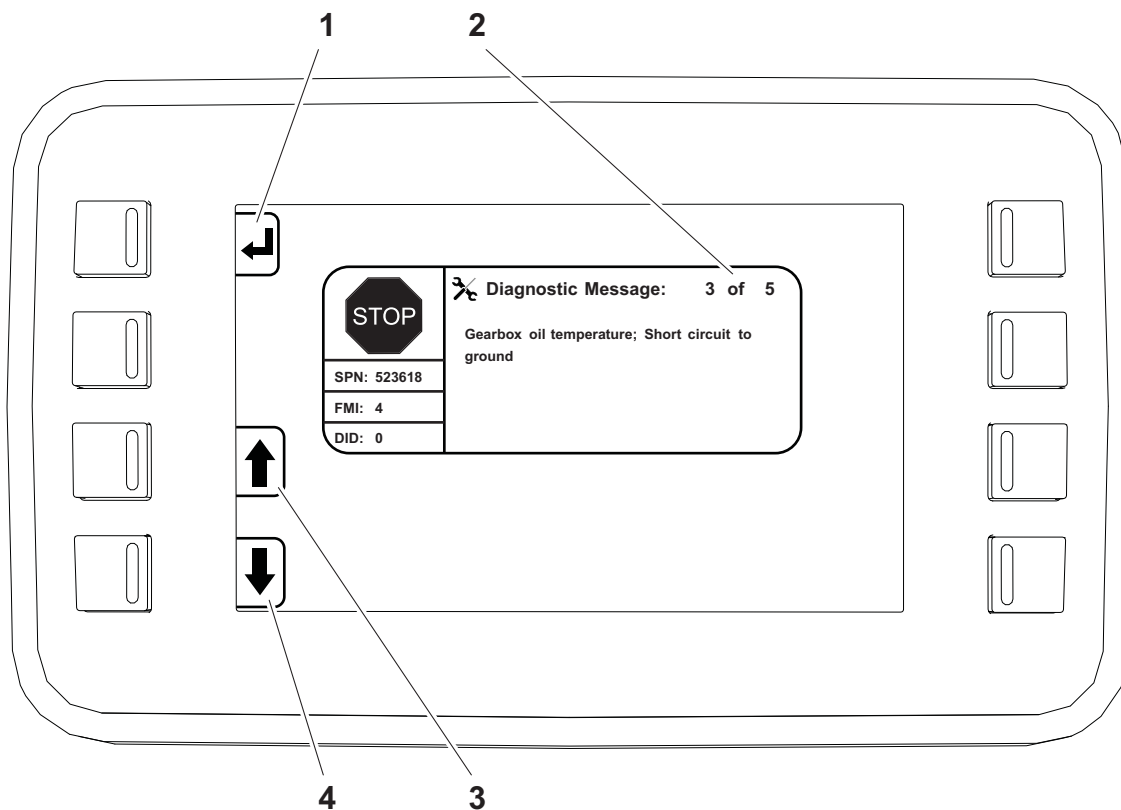
Press the center soft key to display the main menu screen, which has icons for other functions. Soft keys below on screen icons allow the operator to toggle between various screens and functions.

Item	Description	Notes
1. System settings key	Press to display software version.	
2. Exhaust cleaning activation key	Press to activate exhaust cleaning.	
3. Machine diagnostics code display key	Press to display interlock icons and machine diagnostic codes, if any.	Note: If diagnostic codes are displayed, contact your Ditch Witch® dealer.

Item	Description	Notes
4. Brightness control display key	Press to change the brightness of the display screen.	Minimum brightness is 10%. Maximum brightness is 100%.
5. User settings key	Press to customize settings.	Real time clock setting, unit setting, and language can be changed in this screen.
6. Return key	Press to return to main screen (gauges).	
7. Air filter restriction indicator	Displays percentage of air filter left unrestricted. For best results, replace filter after pop-up message appears.	Access through main menu screen.



Diagnostic Messages



t48om048w.eps

- | | |
|--|-------------------------------|
| 1. Hide/Recall key | 3. Next error message key |
| 2. Diagnostics error message information display | 4. Previous error message key |

Item	Description	Notes
1. Hide/Recall key	Press to hide/recall active error codes.	
2. Diagnostics error message information display	Displays detailed information about the error code.	
3. Next error message key	Press to display next active error message in list.	
4. Previous error message key	Press to display previous error message in list.	

Display Pop-Up Messages

Machine display will automatically display pop-up messages for start interlock and exhaust cleaning systems when needed. Display screen will return to normal once conditions are met.

Start Interlock

For machine to start, operator must be in seat and ground drive direction control must be in neutral. If one or more of these conditions is not met, a pop-up message will appear with applicable information about which condition is not met.

Exhaust Cleaning

A pop-up message will appear when an exhaust cleaning is needed.

NOTICE: Failure to complete the exhaust cleaning when required can cause damage to the engine.

When pop-up message appears:

1. Ensure machine is away from combustible material.
2. Set parking brake.
3. Set engine at low throttle.
4. Follow on-screen prompts to initiate exhaust cleaning.

After exhaust cleaning is initiated, another pop-up message will be displayed with the estimated time remaining until process is complete.

IMPORTANT: If exhaust cleaning cannot be initiated when pop-up message occurs, follow on-screen prompts to return to main screen (gauges). Pop-up message will return to prompt exhaust cleaning at a later time.

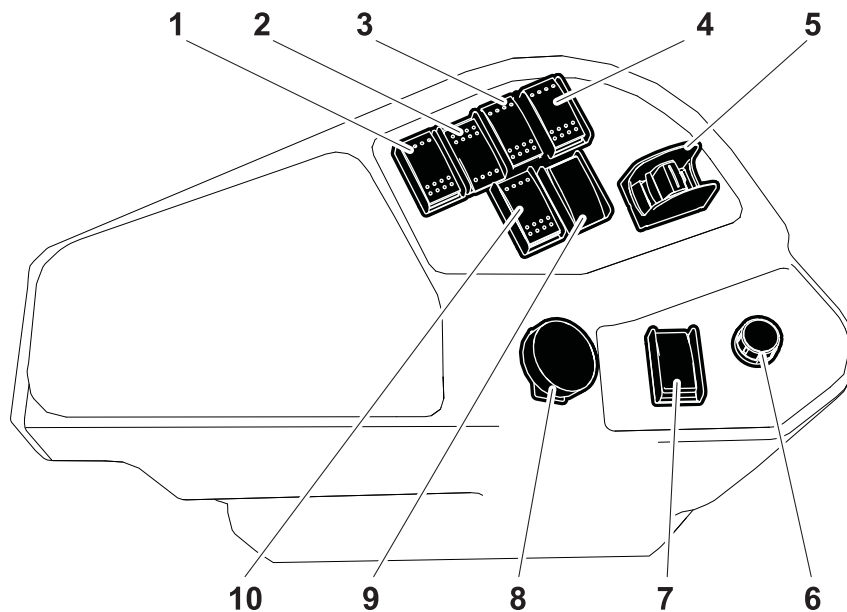
Air Filter

A pop-up message will appear when the air filter needs to be changed. See "Change Air Filter" on page 187 for more information on how to change air filter.

NOTICE: Failure to change the air filter when required can cause damage to the engine.



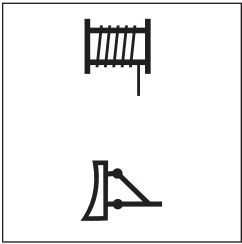
Left Console



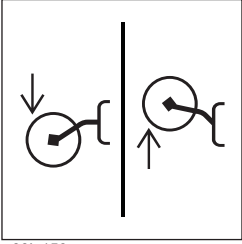
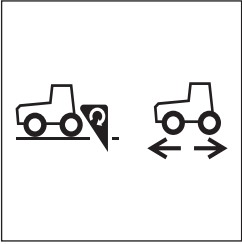
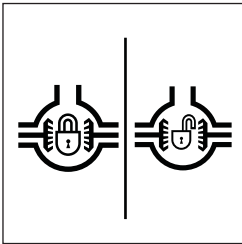
t50om044h.eps

- | | |
|--------------------------------|---|
| 1. Reel winder selector switch | 6. Cruise control speed dial control |
| 2. Reel carrier lift control | 7. Cruise control selector switch |
| 3. Gearbox shift control | 8. Attachment speed/direction control |
| 4. Axle lock switch | 9. Parking brake switch |
| 5. Throttle | 10. Combo select switch/Saw/Trench slide control* |

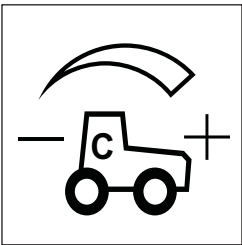
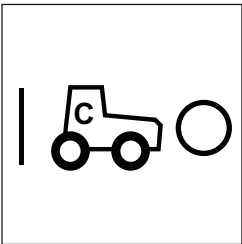
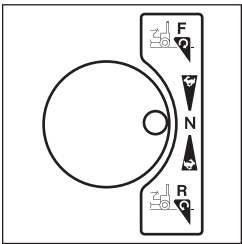
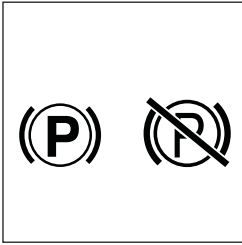
*Optional

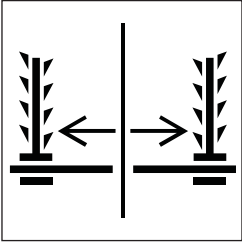
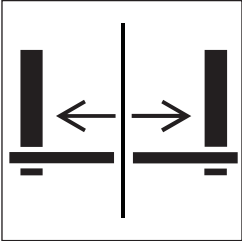
Item	Description	Notes
1. Reel winder selector switch 	To change backfill blade joystick to reel winder control mode, press top. To return to backfill blade mode, press bottom.	

c00ic642w.eps

Item	Description	Notes
2. Reel carrier lift control  c00ic159w.eps	To lower, move left. To raise, move right.	
3. Gearbox shift control  c00ic735h.eps	To put gearbox in low to dig, press left. To put gearbox in high to drive, press right.	IMPORTANT: To shift gearbox, brake pedal must be pressed and ground drive direction control must be in neutral. See "Center Console" on page 30.
4. Axle lock switch  c00ic136w.eps	To engage axle lock, press left. To disengage axle lock, press right.	NOTICE: - To engage axle lock, operator must be in seat and ground drive direction control must be in neutral. - After disengaging axle lock, drive tractor in reverse 6' (2 m) to fully disengage.
5. Throttle  c00ic133a.eps	To increase speed, move forward. To decrease speed, pull back.	

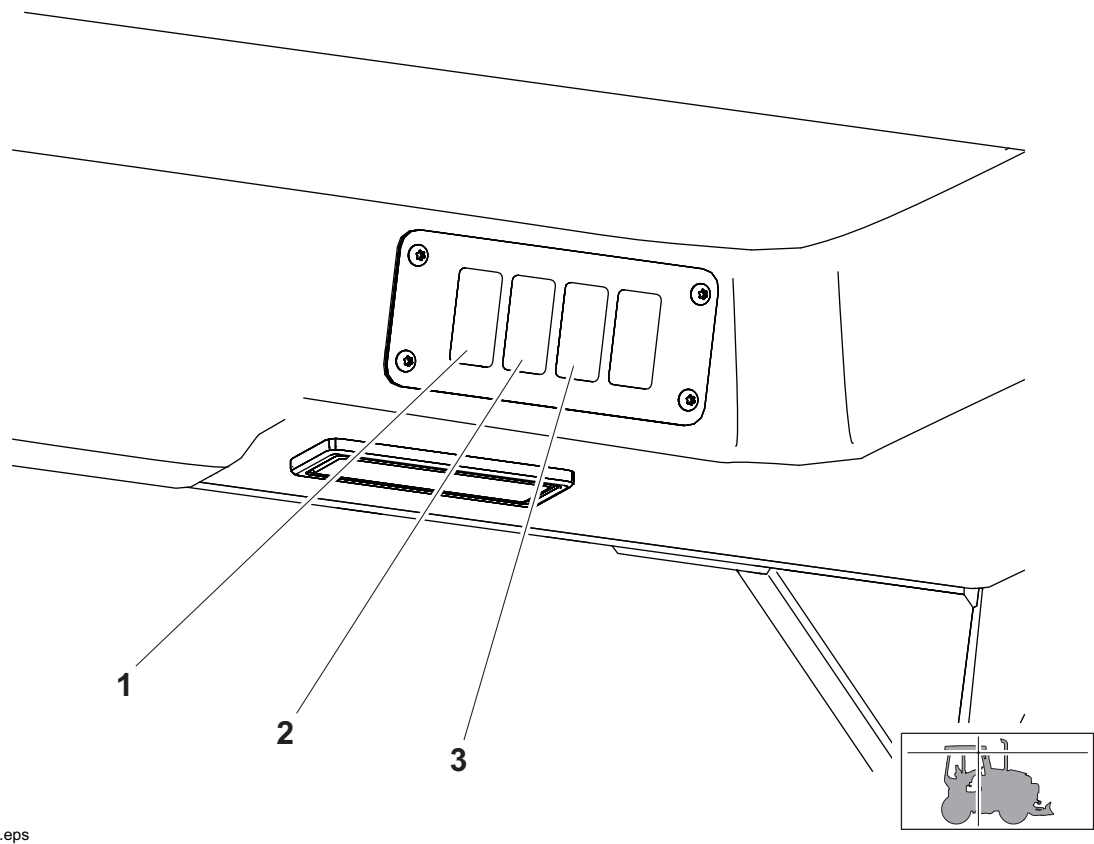


Item	Description	Notes
6. Cruise control speed dial control  c00ic138w.eps	To increase engine load while using cruise control, turn counterclockwise. To decrease engine load while using cruise control, turn clockwise.	
7. Cruise control selector switch  c00ic139w.eps	To turn on, press left. To turn off, press right.	Turn on cruise control only when: - ground drive motor control is in low - ground drive is in neutral
8. Attachment speed/direction control  c00ic158w.eps	To go faster in either direction, move farther from neutral. To stop, return to center.	NOTICE: - For control to function, ground drive direction control must be in neutral. - Control does not automatically return to neutral.
9. Parking brake indicator  c00ic147w.eps	To set parking brake, press left. To release parking brake, press right.	

Item	Description	Notes
10. Combo select switch/ Saw/Trencher slide control  c00ic154w.eps  c00ic155w.eps  c00ic160w.eps	To select combo, press. To slide trencher right, move right. To slide trencher left, move left. To slide saw right, move right. To slide saw left, move left.	

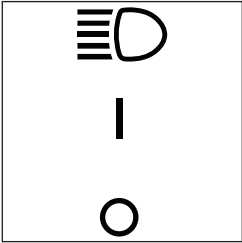


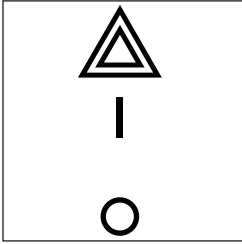
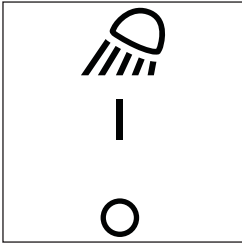
Upper Console



- 1. Running light switch*
- 2. Hazard light switch*

- 3. Work light switch*
- *Optional

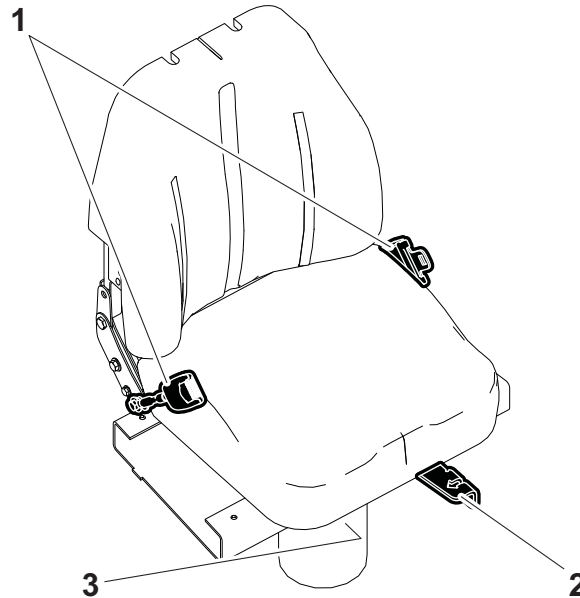
Item	Description	Notes
1. Running light switch  c00ic234w.eps	To turn on, press top. To turn off, press bottom.	Clear lights used to help make the machine more visible.

Item	Description	Notes
2. Hazard light switch  c00ic235w.eps	To turn on, press top. To turn off, press bottom.	Flashing amber lights used to help make the machine more visible.
3. Work light switch  c00ic236w.eps	To turn on, press top. To turn off, press bottom.	Work light kit may be added to assist in operation. See "Optional Equipment" on page 147.



Seat Controls

Standard Seat

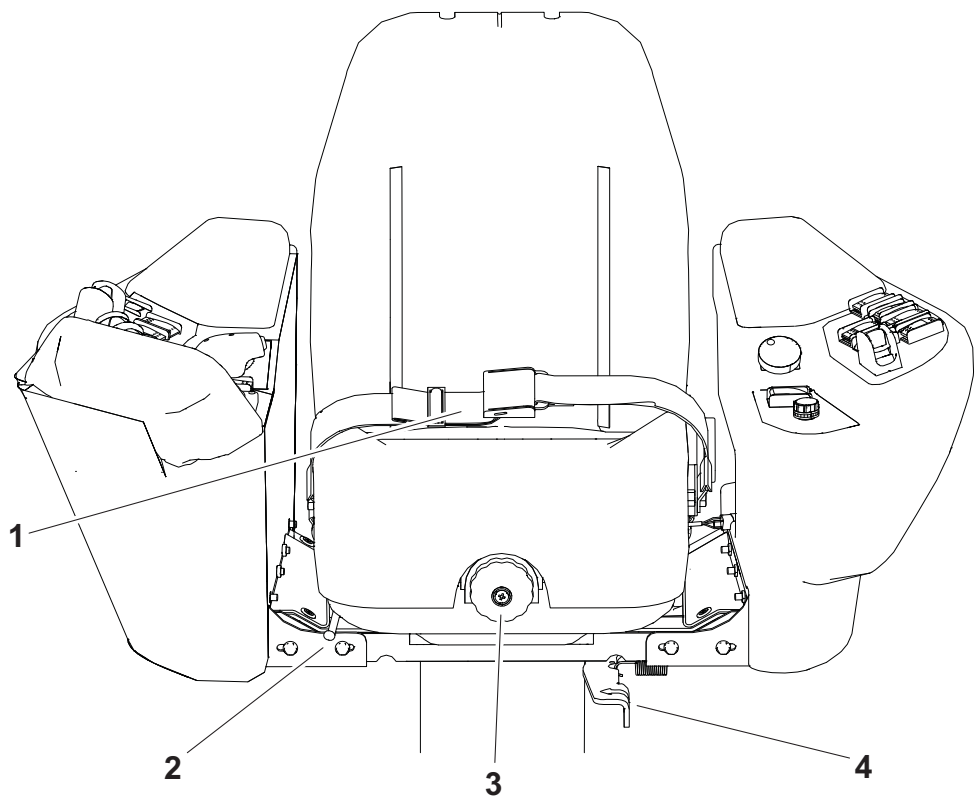


t48om006w.eps

- 1. Seat belt
- 2. Slide control
- 3. 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. Slide control	To slide seat forward or backward, pull, then adjust seat. To lock seat in place, release.	
3. Pivot control	To pivot seat, push lever in direction of arrow, rotate seat to desired position and release.	Seat pivots to the right at 0°, 5°, 60° and 90° and to the left at 30°. IMPORTANT: Drive tractor with operator's seat facing front. If desired, operate rear attachments with seat pivoted.

Suspension Seat (Optional)*



t50om007w.eps

1. Seat belt

2. Pivot control
3. Suspension control

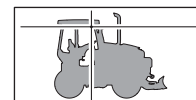
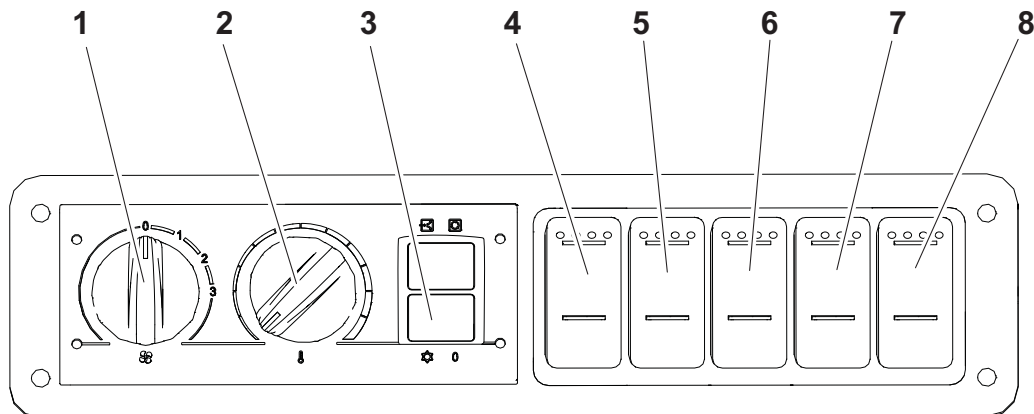
4. Slide control

Item	Description	Notes
1. Seat belt	To fasten, insert latch into buckle. Adjust until seat belt is low and tight. To release, lift top of buckle.	
2. Pivot control	To pivot seat, push lever in direction of arrow, rotate seat to desired position and release.	Seat pivots to the right at 0°, 5°, 60° and 90° and to the left at 30°. IMPORTANT: Drive tractor with operator's seat facing front. If desired, operate rear attachments with seat pivoted.
3. Suspension control	Adjust dial to approximate body weight for additional comfort.	

Item	Description	Notes
4. Slide control	To slide seat forward or backward, pull, then adjust seat.	
	To lock seat in place, release.	

*Suspension seat comes standard with saw/cab configuration.

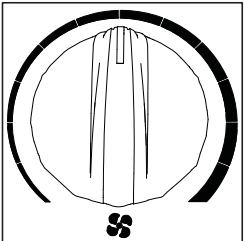
Cab Controls (Optional)

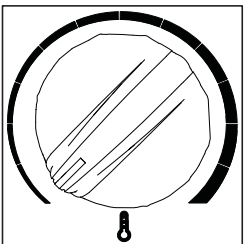
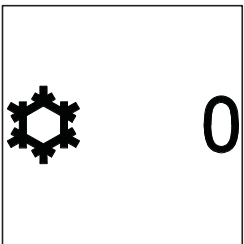
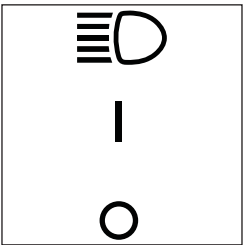
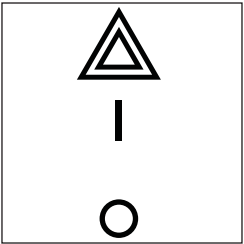


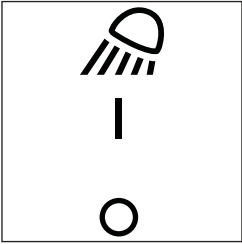
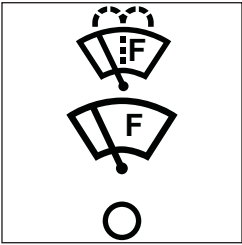
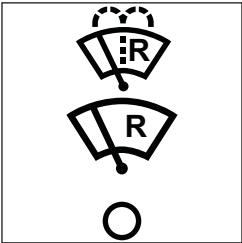
t50om001w.eps

- | | |
|-------------------------------------|------------------------|
| 1. Air conditioner fan speed dial | 5. Hazard light switch |
| 2. Air conditioner temperature dial | 6. Work light switch* |
| 3. Air conditioner on/off switch | 7. Front wiper switch |
| 4. Running light switch | 8. Rear wiper switch |

*Optional

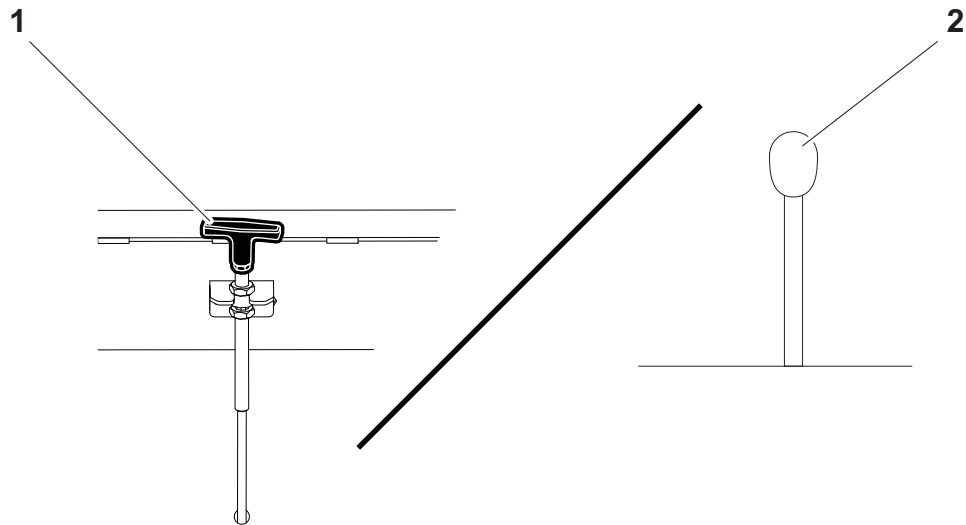
Item	Description	Notes
1. Air conditioner fan speed dial  c00ic230w.eps	To adjust fan speed, turn dial. To decrease fan speed, turn counterclockwise. To increase fan speed, turn clockwise.	

Item	Description	Notes
2. Air conditioner temperature dial  c00ic231w.eps	To adjust air temperature, turn dial. To make air colder, turn counterclockwise. To make air warmer, turn clockwise.	
3. Air conditioner on/off switch  c00ic233w.eps	To turn air conditioner on, press left. To turn air conditioner off, press right.	
4. Running light switch  c00ic234w.eps	To turn on, press top. To turn off, press bottom.	Clear lights used to help make the machine more visible.
5. Hazard light switch  c00ic235w.eps	To turn on, press top. To turn off, press bottom.	Flashing amber lights used to help make the machine more visible.

Item	Description	Notes
6. Work light switch  c00ic236w.eps	To turn on, press top. To turn off, press bottom.	Work light kit may be added to assist in operation. See "Optional Equipment" on page 147.
7. Front wiper switch  c00ic237w.eps	To turn on, press top. To turn off, press bottom. To turn on washer fluid, press and hold.	
8. Rear wiper switch  c00ic238w.eps	To turn on, press top. To turn off, press bottom. To turn on washer fluid, press and hold.	



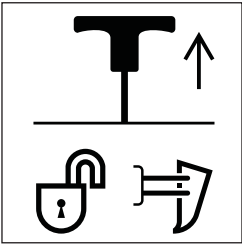
Plow Controls

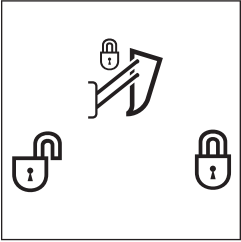


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1. Stow lock control (cab)

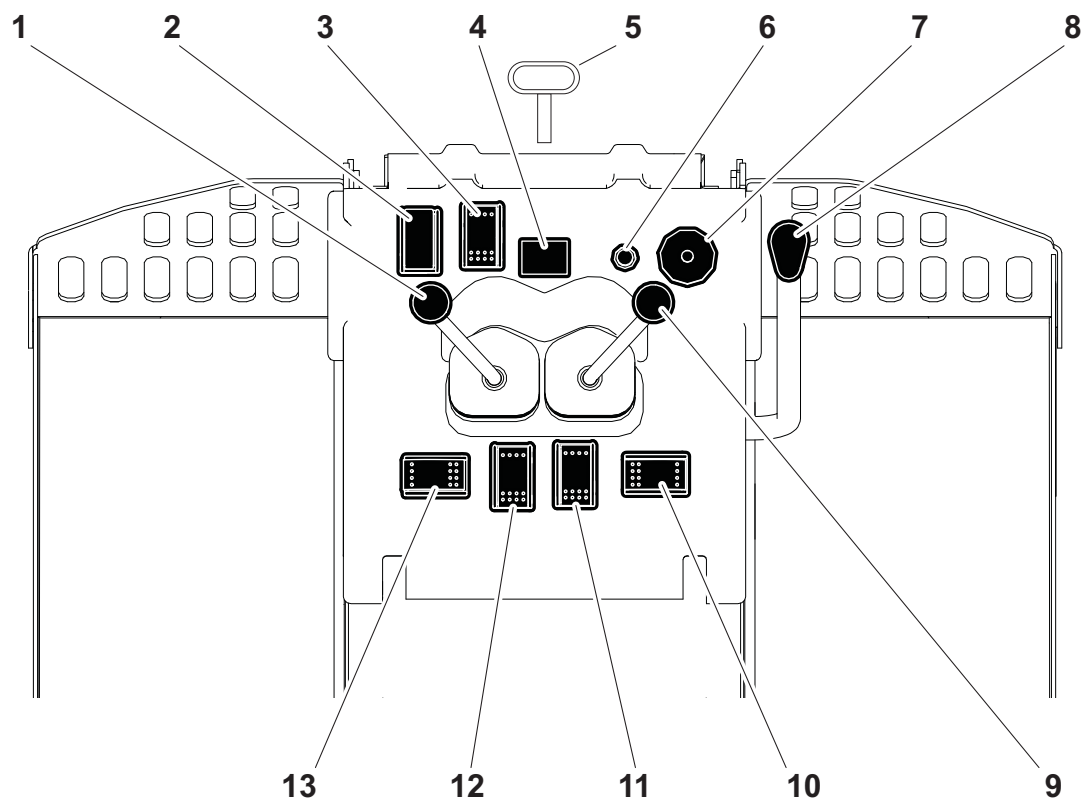
2. Stow lock control

Item	Description	Notes
1. Stow lock control (cab)  c00ic162w.eps	To lock: • Raise plow fully. • Lower plow slightly to engage lock. To unlock: • Pull on cable to release latch plow slightly.	Use this control to lock plow in the raised position.

Item	Description	Notes
2. Stow lock control  c00ic643w.eps	To lock: • Raise plow fully. • Lower plow slightly to engage lock. To unlock: • Raise plow slightly. • Push stow lock handle to release lock.	Use this control to lock plow in the raised position.



Backhoe Console

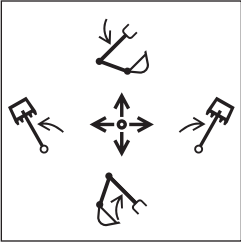
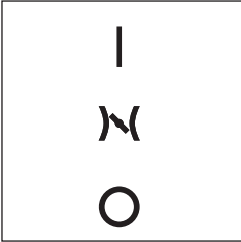
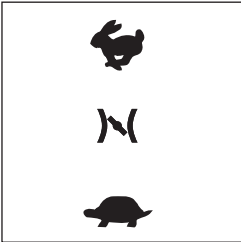
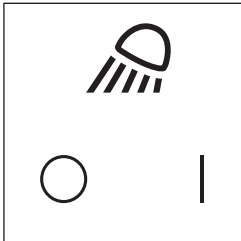


t48om057w.eps

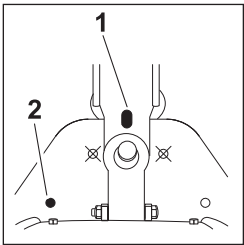
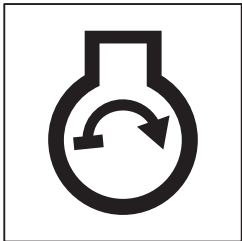
1. Boom/Swing control
2. Remote throttle enable switch
3. Remote throttle control
4. Work light switch*
5. Swing lock pin
6. Remote ignition control
7. Remote engine stop button

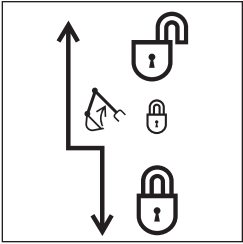
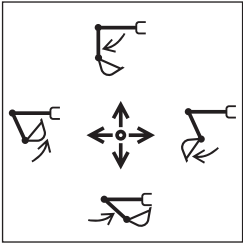
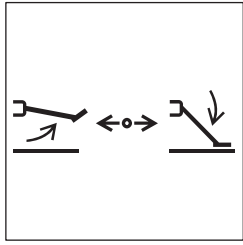
8. Stow lock control
9. Bucket/Dipper control
10. Right stabilizer control
11. Remote ground drive control
12. Remote backfill blade control*
13. Left stabilizer control

*optional

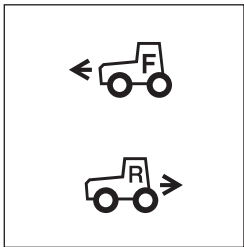
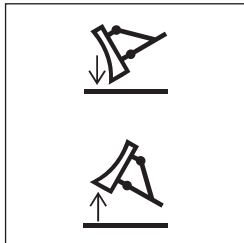
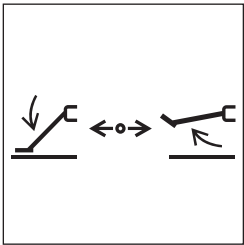
Item	Description	Notes
1. Boom/Swing control  c00ic212h.eps	To swing boom left, move left. To swing boom right, move right. To raise boom, pull. To lower boom, push.	Control can perform more than one action at a time. By "feathering" the control, operator can combine backhoe operations. NOTICE: Do not operate with backhoe in the stowed (upright) position.
2. Remote throttle enable  c00ic030w.eps	To enable remote throttle control, press top. To disable remote throttle control, press bottom.	This switch must be returned to the OFF position for normal throttle control at tractor.
3. Remote throttle control  c00ic029w.eps	To increase speed, move forward. To decrease speed, pull back.	
4. Work light switch  c00ic086c.eps	To turn on, press right. To turn off, press left.	



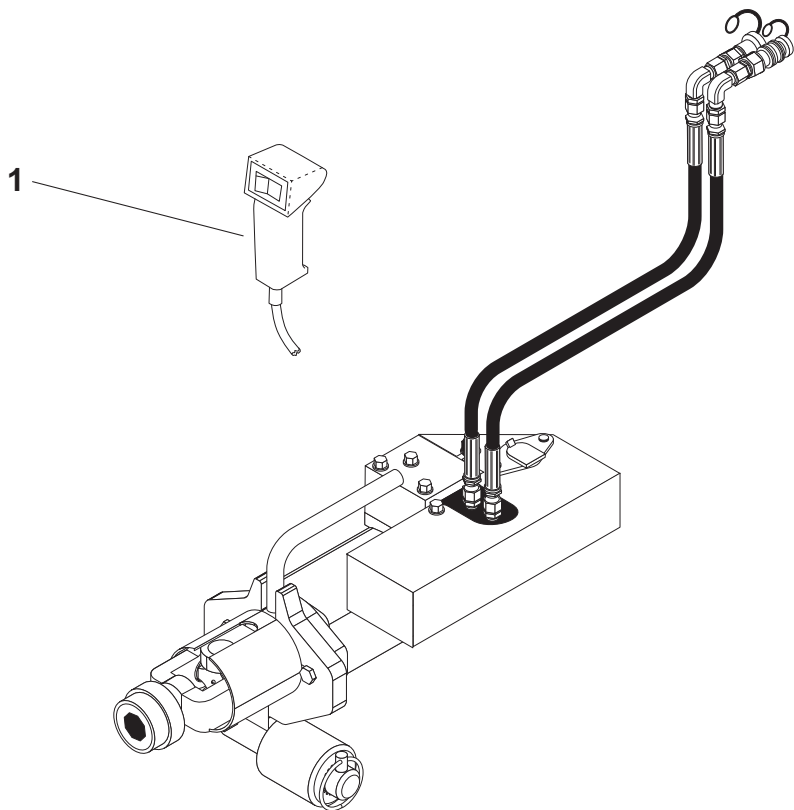
Item	Description	Notes
5. Swing lock pin  c00ic234h.eps	To lock: - Engage stow lock. See "Stow lock control" on page 65. - Insert swing lock pin into hole (1). To release: - Remove pin and store in hole (2). - Release stow lock.	NOTICE: - Always use stow lock and install swing lock pin during transport. Do not store pin in holes marked with an "X." Backhoe could swing and destroy pin.
6. Remote ignition control  c00ic056t.eps	To start engine, press.	
7. Remote engine stop button  c00ic085c.eps	Press to stop engine immediately.	For normal engine shutdown, use remote ignition control. IMPORTANT: Engine will not start if remote engine stop is engaged.

Item	Description	Notes
8. Stow lock control  c00ic215h.eps	To lock: • Raise boom fully. • Pull stow lock handle. • Lower boom slightly to engage lock. • Insert swing lock pin. To unlock: • Remove swing lock pin. • Raise boom slightly. • Push stow lock handle to release lock.	NOTICE: Always use stow lock and install swing lock pin during transport.
9. Bucket/Dipper control  c00ic213h.eps	To open bucket, move right. To close bucket, move left. To move dipper in, pull. To move dipper out, push.	Control can perform more than one action at a time. By "feathering" the control, operator can combine backhoe operations.
10. Right stabilizer control  c00ic088c.eps	To lower, move right. To raise, move left.	



Item	Description	Notes
11. Remote ground drive control  c00ic216h.eps	To move tractor forward, push. To move tractor backward, pull.	NOTICE: - This control is disabled if tractor seat is occupied. - Tractor must be in low speed and ground drive direction control must be in neutral for remote ground drive to function. - Ensure that backfill blade, if equipped, and stabilizers are raised, and parking brake is released before operating this control. - Do not move more than 30' (10 m) at a time.
12. Remote backfill blade control  c00ic210h.eps	To lower, push. To raise, pull.	
13. Left stabilizer control  c00ic211h.eps	To lower, move left. To raise, move right.	

Drill Controls

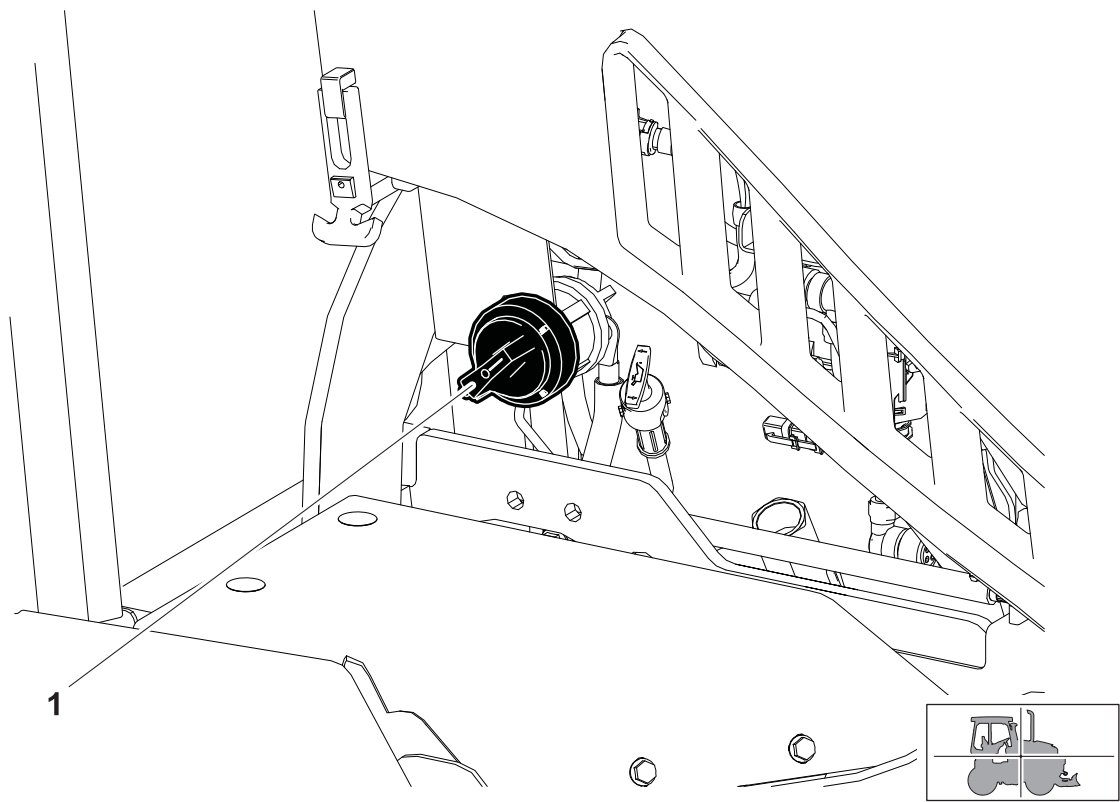


t33om063w.eps

1. Drilling attachment control

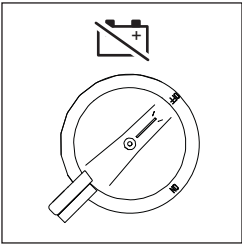
Item	Description	Notes
1. Drilling attachment control c00ic655w.eps	To rotate clockwise, press bore. To rotate counterclockwise, press reverse.	IMPORTANT: Always rotate clockwise during drilling and backreaming. Rotate counterclockwise only to dislodge a dry bore bit or reamer that has seized in the bore hole. Switch should return to neutral position when released.

Battery Disconnect



t50om003h.eps

1. Battery disconnect switch

Item	Description	Notes
1. Battery disconnect switch  c00ic156w.eps	To connect, move left. To disconnect, move right.	NOTICE: - Do not operate battery switch with engine running. - To avoid equipment damage, wait two minutes after turning engine off before disconnecting battery.

Operation Overview

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Plowing 70

Digging with Backhoe 71

Drilling 71

Sawing 71

Leaving Jobsite..... 71



Planning

1. Gather information about jobsite. See page 74.
2. Inspect jobsite. See page 75.
3. Classify jobsite. See page 76.
4. Select chain and teeth to match your soil type, if necessary. See page 145
5. Check supplies and prepare equipment. See page 78.
6. Haul equipment to jobsite. See page 94.

Trenching

1. Start unit. See page 82.
2. Position tractor and controls. See page 108.
3. Begin trenching. See page 110.
4. Engage cruise control if desired. See page 144.
5. Complete the installation. See page 112.
6. Shut down tractor. See page 85.

Plowing

1. Start unit. See page 82.
2. Position tractor and controls. See page 124.
 - offset plowing - page 128
 - coordinated plowing - page 128
 - crabbing - page 128
3. Attach product. See page 125.
4. Begin plowing. See page 127.
5. Engage cruise control if desired. See page 144.
6. Complete the installation. See page 129.
7. Shut down tractor. See page 85.

Digging with Backhoe

1. Start unit. See page 82.
2. Set stabilizers and unstow backhoe. See page 100.
3. Excavate. See page 102.
4. Stow backhoe properly. See page 104.
5. Shut down tractor. See page 85.

Drilling

1. Start unit. See page 82.
2. Dig approach trench and target trench. See page 132.
3. Assemble drill string and position tractor. See page 132.
4. Begin drilling. See page 135.
5. Use drill string guide as needed. See page 136.
6. Add rod. See page 137.
7. Backream. See page 138.
8. Shut down tractor. See page 85.
9. Disassemble joints. See page 142.



Sawing

1. Start unit. See page 82.
2. Position tractor and controls. See page 118.
3. Begin sawing. See page 119.
4. Complete the installation. See page 121.
5. Backfill the trench. See page 150.
6. Shut down tractor. See page 85.

Leaving Jobsite

1. Backfill if necessary. See page 146.
2. Rinse equipment. See page 146.
3. Stow tools. See page 146.
4. Haul equipment from jobsite. See page 90.

Prepare

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- Arrange for Traffic Control74
- Plan for Emergency Services74

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- Check Supplies78
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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

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

- In the US or Canada, call 811 (US) or 888-258-0808 (US and Canada). Also contact any local utilities that do not participate in the One-Call service.
- In countries that do not have a One-Call service, contact all local utility companies to have underground utilities located.

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

Identify Hazards

Inspect jobsite before transporting equipment. Check for the following:

- overall grade or slope
- changes in elevation such as hills or other open trenches
- obstacles such as buildings, railroad crossings, or streams
- signs of utilities on jobsite and perimeter, such as:
 - “buried utility” notices
 - utility facilities without overhead lines
 - gas or water meters
 - junction boxes
 - drop boxes
 - light poles
 - manhole covers
 - sunken ground
- traffic
- access
- soil type and condition

Have an experienced locating equipment operator sweep area within 20' (6 m) to each side of trench path to verify previously marked line and cable locations. Mark location of all buried utilities and obstructions.



Classify Jobsite



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

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. Follow U.S. Department of Labor regulations on excavating and trenching (Part 1926, Subpart P) and other similar regulations.

Electric Jobsite Precautions

Use one or both of these methods.

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

Natural Gas Jobsite Precautions

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

Check Supplies

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

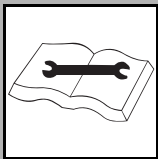
Prepare Equipment

Fluid Levels

- fuel
- hydraulic fluid
- diesel exhaust fluid
- battery charge
- engine oil

Condition and Function

- all controls



⚠ WARNING

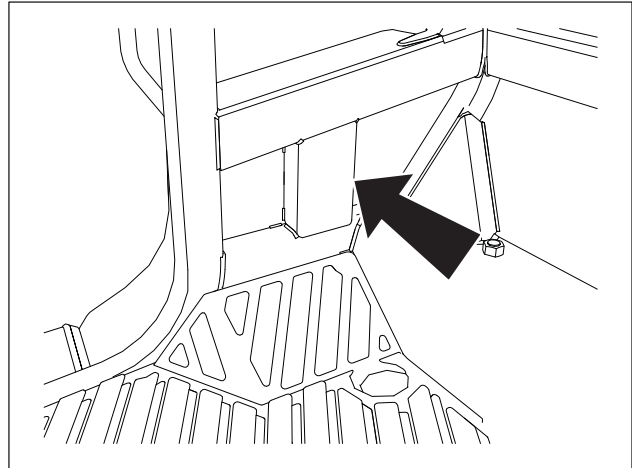
Improper control function could cause death or serious injury. If control does not work as described in instructions, stop machine and have it serviced.

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

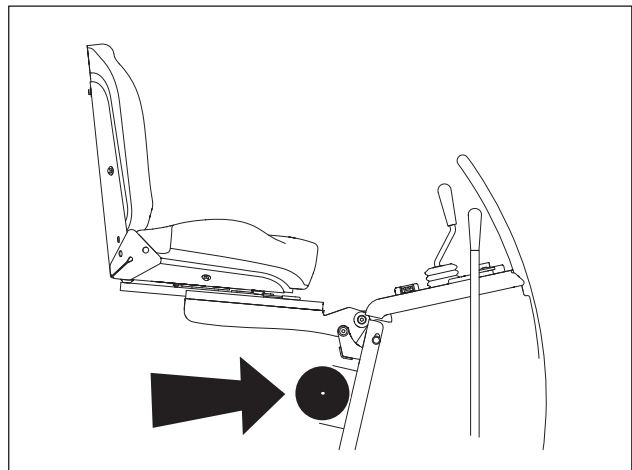
Assemble Accessories

Fire Extinguisher

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



Tractor



Backhoe_Fire_Extinguisher.eps

Backhoe

Drive

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Start Unit 82

Drive 83

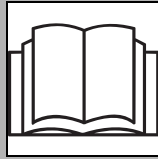
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- Safe Slope Operation84

Shut Down 85



Start Unit

Before operating tractor, read engine manufacturer's starting and operating instructions.



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

To help avoid injury: Wear hard hat, safety glasses, and other protective equipment required by job. Do not wear jewelry or loose clothing that can catch on controls.

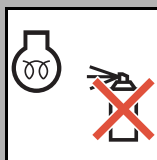


WARNING Rollover possible. If machine rolls over, you could be thrown from seat and killed or crushed. Wear seat belt. 275-303

1. Clear the area around the machine of all bystanders.
2. Fasten and adjust seat belt.
3. Check that start interlock conditions are met. See "Start Interlock" on page 47.
4. Ensure all other controls are returned to neutral.

IMPORTANT: Machine controls will not function if not returned to neutral prior to starting machine. If controls are not returned to neutral prior to starting machine, turn control off and then back on in order to function after machine is running.

5. Adjust throttle to low.
6. Verify that parking brake is set.
7. Turn ignition switch to the run position (key on, engine off). Wait for operator display to come on. Cold start wait indicator will light if necessary.



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

8. When cold start wait indicator turns off, turn ignition switch clockwise to start tractor. Warning alarm will sound. Indicators will light.
 - If engine does not start, ensure start interlock conditions are met. See "Start Interlock" on page 47 for more information.
 - If engine turns but does not start within 20 seconds, allow starter to cool one minute before trying to start again.
9. Run engine at half-throttle or less for five minutes before operating tractor. Ensure all controls function properly.

Drive

General Operation



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:

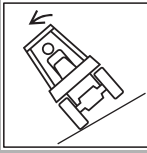
- Survey your field of vision when operating the machine.
- Drive carefully in congested areas. Know machine's clearance and turning radius.



EMERGENCY SHUTDOWN: Turn ignition switch to STOP.

1. Turn on optional lights as needed. See page 52 or page 57.
2. Raise backfill blade and all attachments.
3. Release parking brake.
4. Adjust throttle.
5. When operating in Low:
 - if using the ground drive speed control, the ground drive 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 ground drive speed control is moved out of neutral position.

Safe Slope Operation



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

To help avoid injury:

- Always operate with heavy end uphill.
- Drive cautiously 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 set parking brake.

Operating safely on a slope depends upon many factors including:

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

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

Shut Down

1. When job is complete, drive unit to level ground.
2. Move ground drive control to neutral.
3. Set parking brake and verify parking brake indicator is on.
4. Lower all unstowed attachments to ground.
5. Run engine at low throttle for three minutes to cool.
6. Turn ignition switch to STOP. If leaving machine unattended, remove key.
7. For maintenance or long-term storage, turn battery disconnect switch to disconnect position.

NOTICE: To avoid equipment damage, wait two minutes after turning engine off before disconnecting battery.



Transport

Chapter Contents

Lift 88

- Procedure 88

Tie Down 91

- Points 91
- Procedure 91

Haul 94

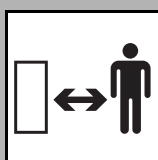
- Procedure 94

Retrieve 97

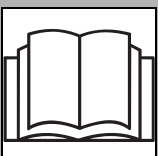
- Procedure 97



Lift

**⚠ WARNING**

Crushing weight. If load falls or moves it could kill or crush you. Stay away.

**⚠ WARNING**

Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

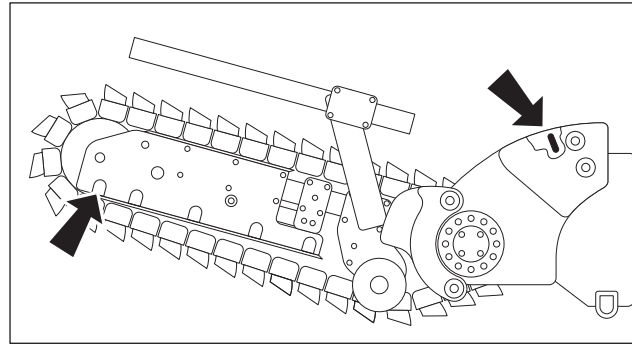
Procedure

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" on page 197 for size and weight of machine.

Centerline Trencher

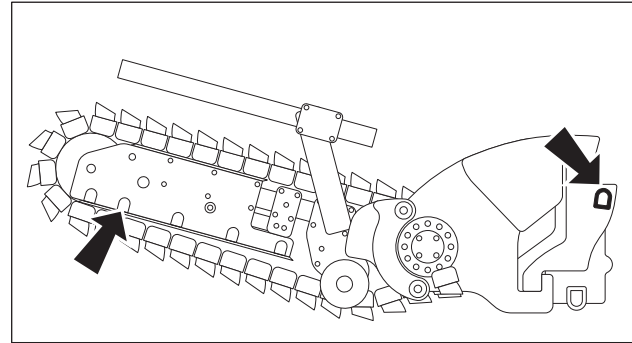
Use crane capable of supporting the equipment's size and weight. See "Specifications" on page 197 or measure and weigh equipment before lifting.



t30om012h.eps

Traversing Trencher

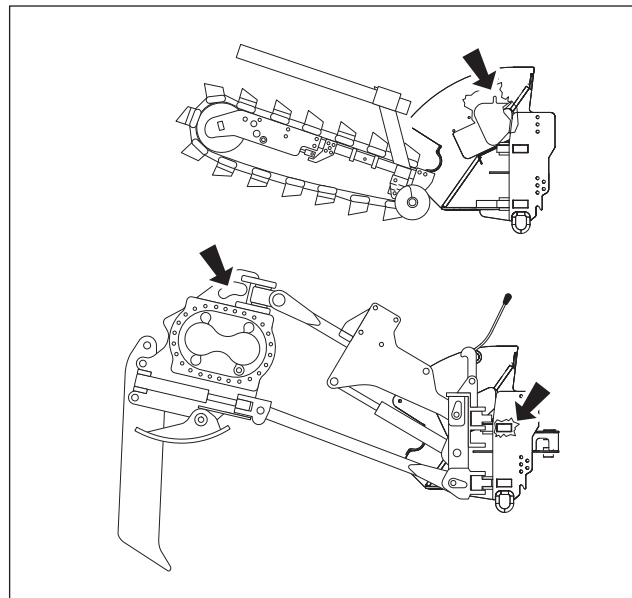
Use crane capable of supporting the equipment's size and weight. See "Specifications" on page 197 or measure and weigh equipment before lifting.



t30om013h.eps

Combo

Use crane capable of supporting the equipment's size and weight. See "Specifications" on page 197 or measure and weigh equipment before lifting.

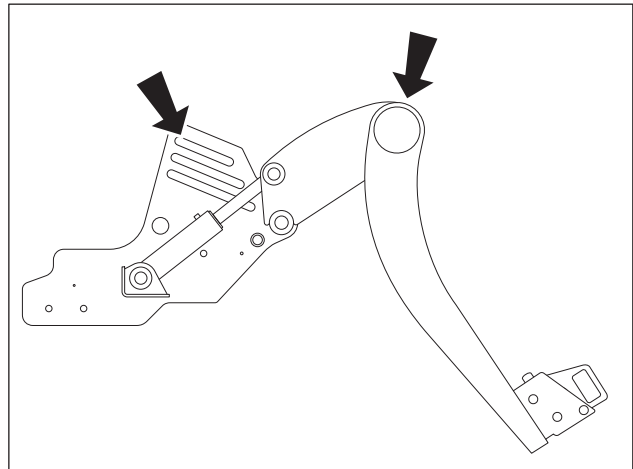


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Reel Carrier

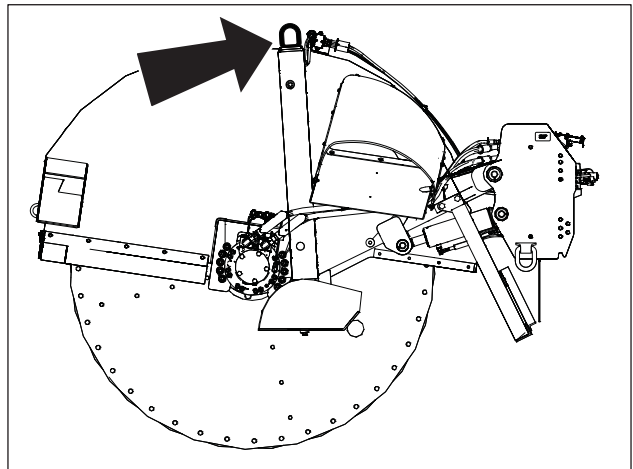
Use crane capable of supporting the equipment's size and weight. See "Specifications" on page 197 or measure and weigh equipment before lifting.



t30om021h.eps

Saw

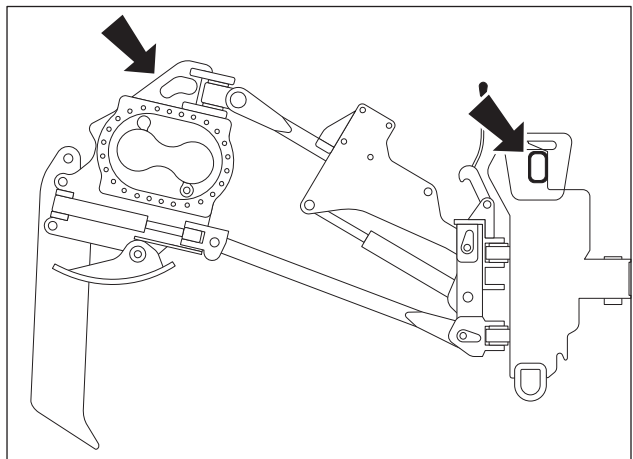
Use crane capable of supporting the equipment's size and weight. See "Specifications" on page 197 or measure and weigh equipment before lifting.



t50om005w.eps

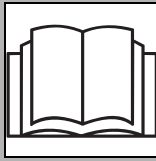
Plow

Use crane capable of supporting the equipment's size and weight. See "Specifications" on page 193 or measure and weigh equipment before lifting.



t30om014h.eps

Tie Down

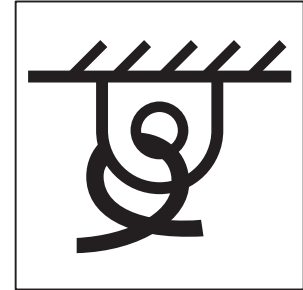


WARNING

Read operator's manual. Follow safety rules and 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. Attachment tiedown points shown are for tractor and attachment assembly.

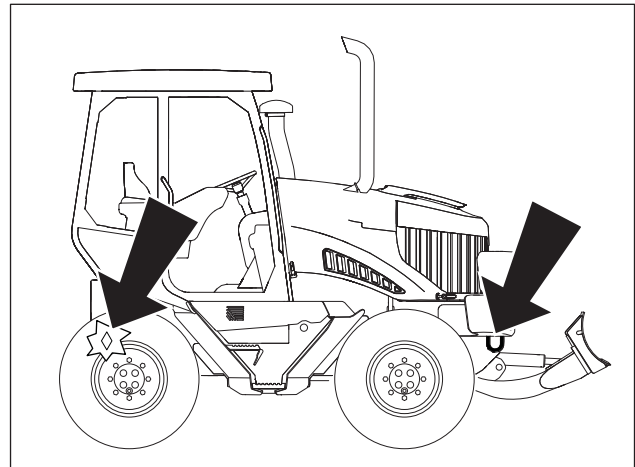


ic1320a.eps

Procedure

Tractor

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

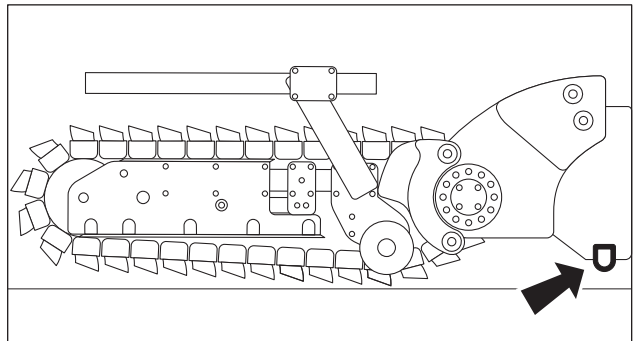


t50om004h.eps

Centerline Trencher

Lower trencher to trailer deck and chain at attachment frame. Ensure chains are tight before transporting.

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



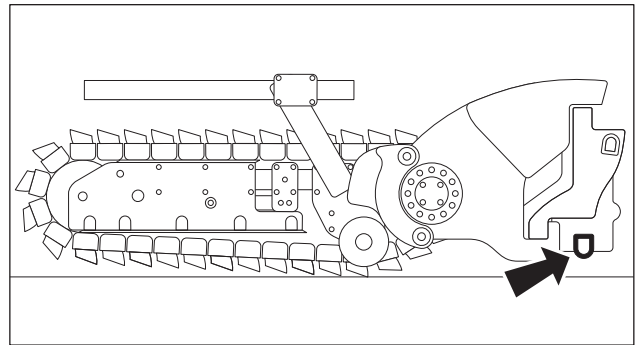
t50om009w.eps



Traversing Trencher

Lower trencher to trailer deck and chain at attachment frame. Ensure chains are tight before transporting.

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



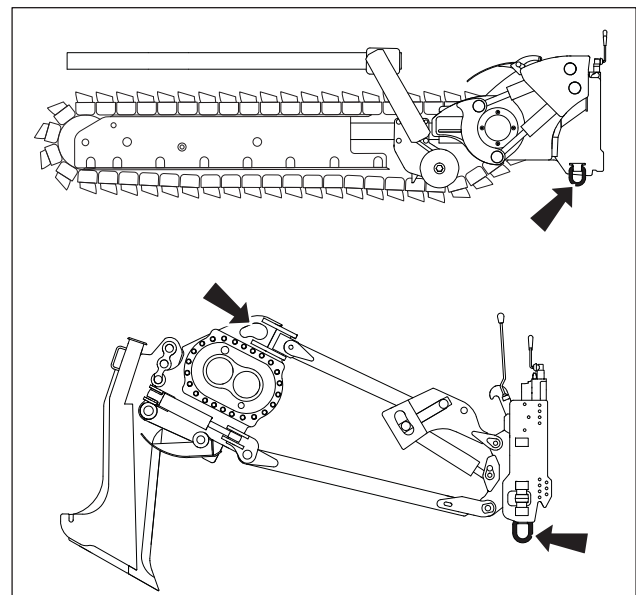
t50om010w.eps

Combo

Lower attachment to trailer deck and chain at attachment frame. Ensure chains are tight before transporting.

NOTICE:

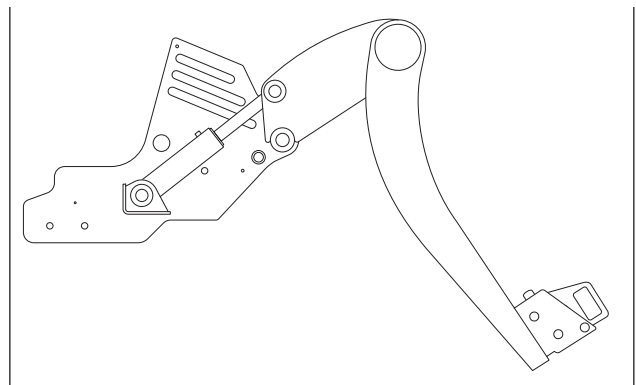
- Engage attachment stow lock and swing lock devices in addition to securing at tiedowns.
- Unsecured plow can swing outside the trailer and become a traffic hazard. Lower plow and chain to trailer deck before hauling.
- If trencher is equipped with a trench cleaner, ensure that trench cleaner shoe is fully raised and extra bolt (found in operator's manual compartment) is installed in appropriate hole for additional support.



t50om021w.eps

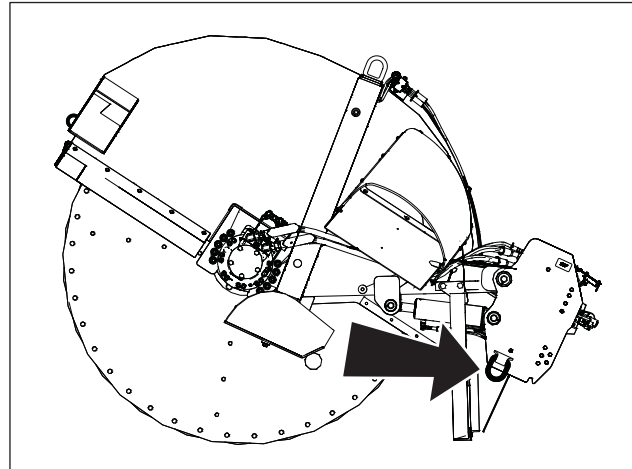
Reel Carrier

Lower reel carrier to lowest position as shown.



Saw

Lower attachment to trailer deck and chain at attachment frame. Ensure chains are tight before transporting.



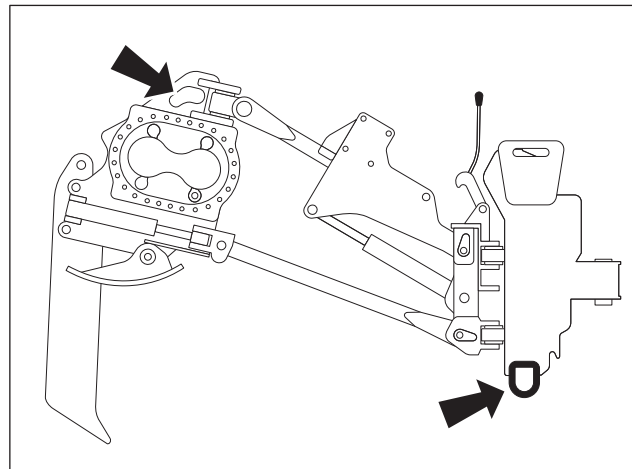
t50om006w.eps

Plow

Lower plow to trailer deck and chain at attachment frame. Ensure chains are tight before transporting.

NOTICE:

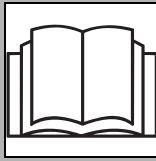
- Engage attachment stow lock and swing lock devices in addition to securing at tiedowns.
- Unsecured plow can swing outside the trailer and become a traffic hazard. Lower plow and chain to trailer deck before hauling.



t50om020w.eps



Haul

**⚠ WARNING**

Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

To help avoid injury:

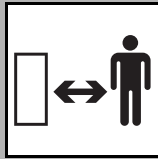
- Read trailer operator's manual before loading or transporting your machine. Incorrectly loaded machine can slip or cause trailer sway.
- Ensure that tow vehicle has proper tow capacity rating.
- Attach trailer to tow vehicle before loading or unloading.
- Park, load, and unload trailer on level ground.
- Check that unit and trailer do not exceed size or weight regulations.
- Load trailer correctly to avoid trailer sway. 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 in synchronization with tow vehicle brakes.
6. Check ramps and trailer bed for cracks.

Load



Crushing weight. If load falls or moves it could kill or crush you. 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.
- Put ground drive control into neutral. Turn off ignition. Set parking brake.

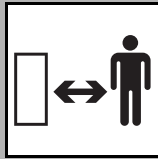


Rollover possible. If machine rolls over, you could be thrown from seat and killed or crushed. Wear seat belt. 275-303

1. Fasten and adjust seat belt with seat facing forward.
2. Tilt steering column down.
3. Start tractor. See page 82 for proper start-up procedures.
4. Raise attachments, but keep them low and centered. Check that they are not in float.
5. Release parking brake.
6. Move ground drive switch to low.
7. Slow engine to low throttle and slowly drive tractor onto trailer. See "Center Console" on page 30 for more information.
8. Position tractor on trailer deck for proper weight distribution.
9. Set parking brake and verify that parking brake indicator is on.
10. Lower attachments to trailer bed and turn tractor off. See page 85 for proper shutdown procedures.
11. Attach chains to tractor and attachments where tiedown decals are located. See page 91.



Unload



Crushing weight. If load falls or moves it could kill or crush you. Stay away.

To help avoid injury:

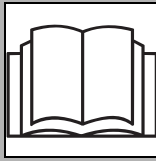
- Attach trailer to tow vehicle before loading or unloading.
- Load and unload trailer on level ground.
- Block trailer wheels.



Rollover possible. If machine rolls over, you could be thrown from seat and killed or crushed. Wear seat belt. 275-303

1. Lower trailer or ramps.
2. Set parking brake 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. Tilt steering column down.
7. Start tractor. See page 82 for proper start-up procedures.
8. Raise attachments, but keep them low and centered. Check that they are not in float.
9. Release parking brake.
10. Slow engine to low throttle and slowly back unit down trailer or ramps. See "Center Console" on page 30 for more information.

Retrieve



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

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

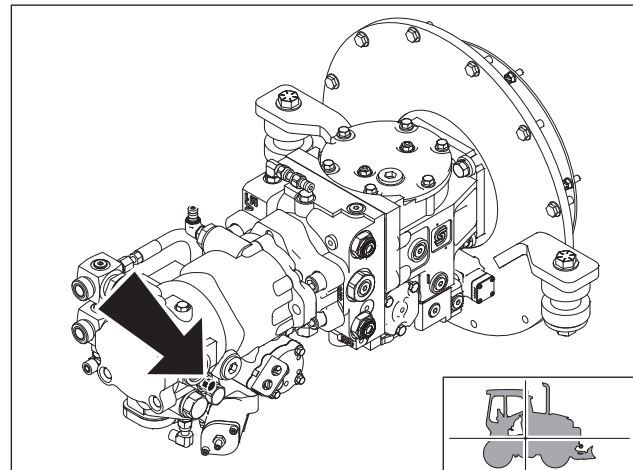
- tow for no more than 200 yd (180 m) at less than 1 mph (1.6 km/h),
- use towing chains appropriately rated for maximum towing force,
- steering will be difficult.

Procedure

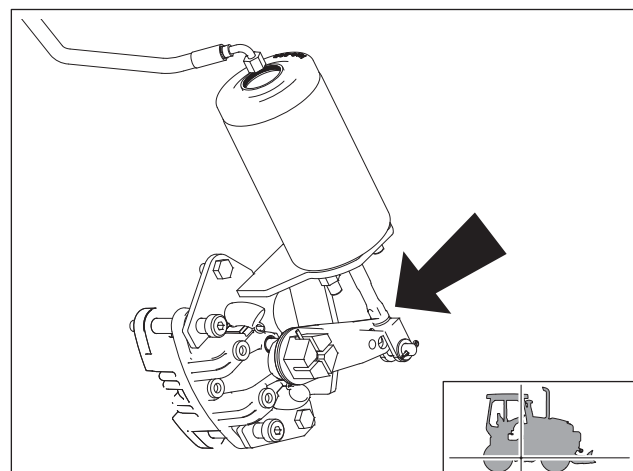
1. Set parking brake.
2. Block front and rear wheels to prevent unit from rolling.
3. Attach tow line to all available tie-down points facing towing vehicle.
4. Activate the tow valve (shown).
 - Remove floor plate.
 - Locate two hex-shaped relief valves.
 - Turn each valve (whole hex) counterclockwise three complete revolutions.

NOTICE: Do not turn tow valve more than three revolutions.

- Turn hex of brake chamber rod (shown) until parking brake is released.
 - Replace floor plate.
5. Remove blocks.
 6. Fasten seat belt and adjust seat belt.
 7. After towing, turn tow valve clockwise three complete revolutions.



t50om005h.eps



t50om047h.eps



Backhoe

Chapter Contents

Set Up. 100

- Position Tractor100
- Prepare Backhoe101

Operate 102

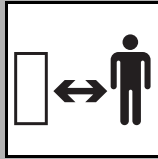
- Move Unit103

Finish Job 104



Setup

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.



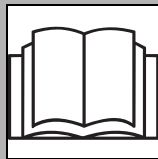
WARNING Crushing weight could cause death or serious injury. Stay away.

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.



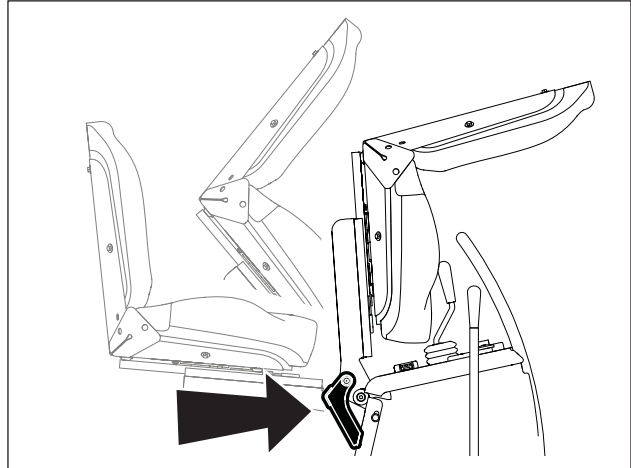
WARNING Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

Position Tractor

1. Fasten and adjust seat belt.
2. Start tractor. See page 82 for start-up procedures.
3. Drive to starting point. Move in line with planned job. See page 83 for driving procedures.
4. Ensure ground drive direction control is in neutral.
5. Move attachment speed/direction control to neutral position.
6. Move ground drive control to neutral position.
7. Set ground drive motor speed to low.
8. Lower rear attachment to 6" (150 mm) above ground.
9. Lower backfill blade, if equipped.
10. Turn ignition switch to STOP.
11. Move to backhoe operator's station.

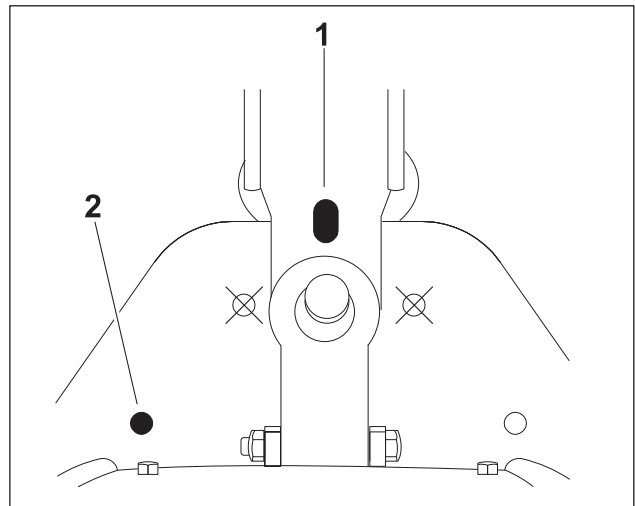
Prepare Backhoe

1. Disengage seat lock (shown) and rotate seat out of stowed position.



Backhoe_Seat_32016.eps

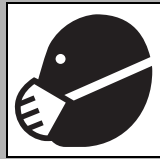
2. Remove swing lock pin from hole (1) and store in hole (2).
3. Raise boom to release tension on stow lock.
4. Release stow lock by pushing handle forward. For more information about stow lock, see page 62.



Backhoe_Setup_Swinglock.eps



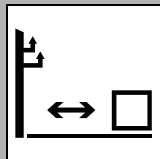
Operate

**CAUTION**

Breathing crystalline silica dust may cause lung disease. Cutting, drilling, or working materials such as concrete, sand, or rock containing quartz may result in exposure to silica dust. Use dust control methods or appropriate breathing protection when exposed to silica dust.

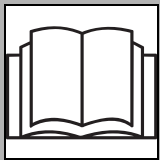
To help avoid injury:

- 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.

**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. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

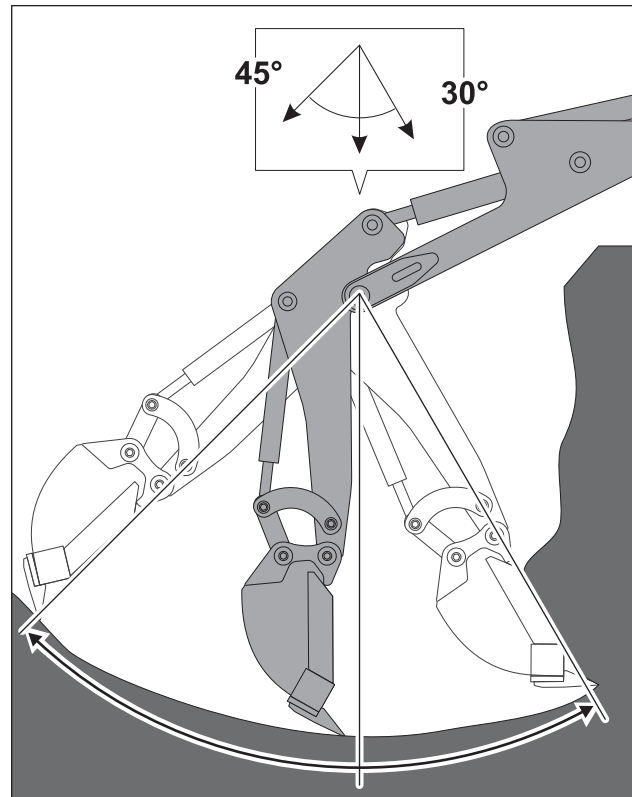
1. Clear the area around the machine of all bystanders.
2. Start tractor using remote ignition control from backhoe console. For more information about backhoe controls, see page 62.
3. Lower stabilizers until they touch the ground.
4. Adjust throttle to desired speed.

5. Use boom/swing control and bucket/dipper control to dig hole or trench. For more information about backhoe controls, see "Backhoe Console" on page 62.
 - Keep dipper and boom at right angles as much as possible for maximum power.
 - Keep bucket in line with dipper as much as possible.
 - Position bucket so teeth cut soil. As soil is cut, curl bucket under dipper.
 - Move dipper and bucket together. Increasing engine speed will not increase backhoe force.

Move Unit

NOTICE:

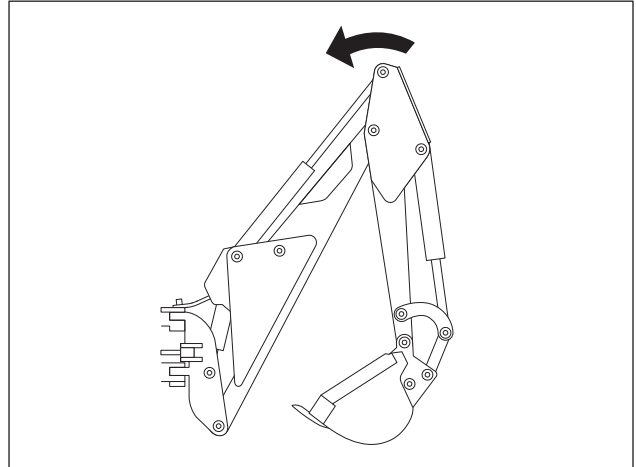
- Backhoe may obstruct the forward visibility of the operator. Machines with limited forward visibility should be driven only for short distances and with the help of a spotter.
- Only use this method to move unit less than 30' (10 m) at one time.



1. Clear the area around the machine of all bystanders.
2. Raise stabilizers enough to clear ground.
3. Ensure ground drive direction control is in neutral.
4. Switch gearbox into low.
5. Move attachment speed/direction control to neutral position.
6. Move ground drive control to neutral position.
7. Use remote ground drive switch to move unit.
8. Lower stabilizers.

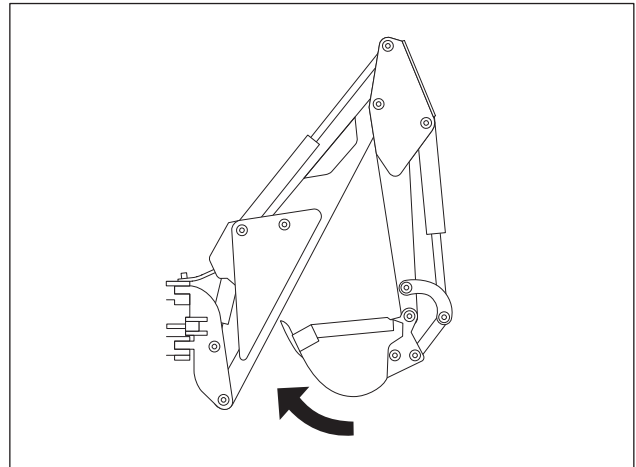
Finish Job

1. Raise stabilizers fully to engage latch.
2. Return remote throttle to low.
3. Lift boom while keeping dipper pointed at ground (shown).



Backhoe_Stow_Boom.eps

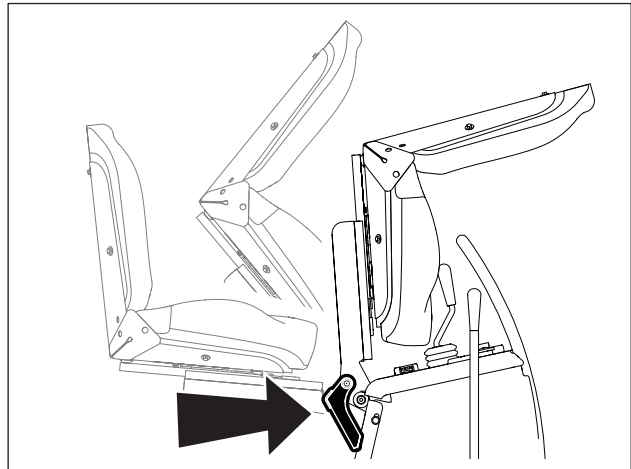
4. Curl bucket closed and move dipper fully toward boom (shown).
5. Lift boom to highest position and latch stow lock.
6. Lower boom slightly to engage lock.
7. Engage swing lock. See page 64.



Backhoe_Stow_Bucket.eps

IMPORTANT: For tractor to function once operator has returned to operator station, stabilizers must be raised, remote throttle must be set at low, and boom must be stowed and locked.

8. Rotate seat into stowed position and engage seat lock (shown).
9. Drive a short distance away from work site. See page 83 for driving procedures.
10. Shut down tractor. See page 85 for proper shutdown procedures.



Backhoe_Seat_32016.eps





Chapter Contents

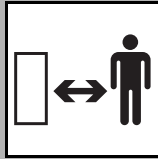
Set Up. 108

Operate 110

Finish Job 112

Set Up

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.



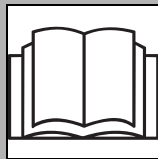
WARNING Crushing weight could cause death or serious injury. Stay away.

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.

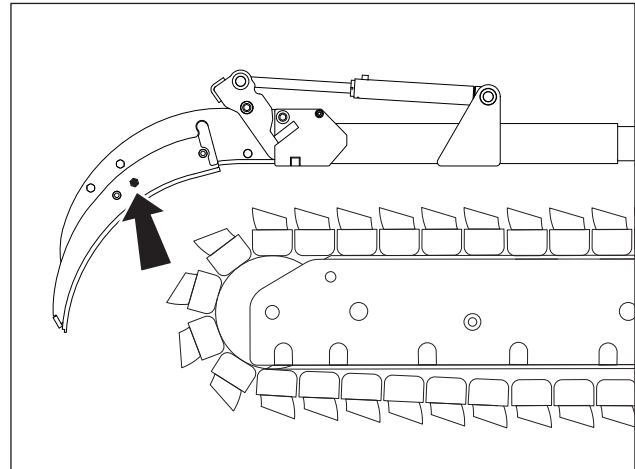


WARNING Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

1. If using optional trench cleaner, remove bolt installed for transport (shown).
2. Fasten and adjust seat belt.
3. Start tractor. See page 82 for start-up procedures.
4. Drive to starting point. Move in line with planned trench. See page 83 for driving procedures.

IMPORTANT:

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

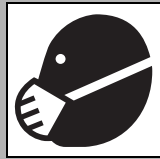


t33om080w.eps

5. Set parking brake and verify parking brake indicator is on.
6. Move ground drive switch to low.
7. Tilt steering wheel column up.
8. Turn seat to desired position.
9. Engage axle lock.
10. Lower boom to just above ground.
11. Check that attachment speed/direction control is in neutral.
12. Check that boom is in line with planned trench.
13. Lower backfill blade, if equipped, to reduce shock when trenching begins.



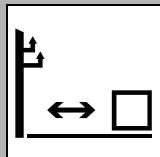
Operate

**CAUTION**

Breathing crystalline silica dust may cause lung disease. Cutting, drilling, or working materials such as concrete, sand, or rock containing quartz may result in exposure to silica dust. Use dust control methods or appropriate breathing protection when exposed to silica dust.

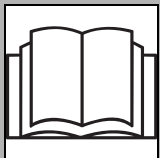
To help avoid injury:

- 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.

**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**

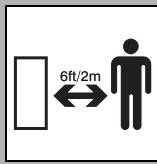
Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

**CAUTION**

Flying objects thrown by machine may strike people. Wear hard hat and safety glasses. 275-193

1. If equipped with combo, set trench/plow switch to the trench position.
2. If equipped with traversing trencher, set at desired offset position.

3. Move attachment speed/direction control to desired speed. DIGGING CHAIN WILL MOVE.



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

To help avoid injury:

- Ensure parking brake is set.
- Allow 3' (1 m) between digging teeth and obstacle. Machine might jerk when digging starts.
- Keep everyone at least 10' (3 m) from machine, attachments, and their range of movement.

4. Set throttle to full engine speed.
5. Lift trench cleaner, if equipped.
6. Slowly lower digging boom to desired trench depth.
7. Raise backfill blade, if equipped.
8. Release parking brake.
9. If using trench cleaner:
- Use ground drive foot control to move forward about 1' (30 cm), or until there is enough room for trench cleaner to enter trench.
 - Return ground drive control to neutral to stop forward movement.
 - Raise boom slightly, then fully lower trench cleaner to lock it in place.
 - Lower boom to desired trench depth.

NOTICE:

- Do not have trench cleaner in working position when starting a trench.
- Do not back up with trench cleaner in working position.

10. Move ground drive hand control to desired speed. Always start trenching with ground drive speed set at low. Increase ground drive speed only as soil conditions permit.

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.



11. Operate engine at full throttle when working.

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 set parking brake.

Finish Job

1. When trench is complete, move ground drive hand control to neutral.
2. Adjust throttle to low.
3. Raise boom.
4. As boom clears top of trench, move attachment speed/direction control to neutral.
5. If equipped with traversing trencher, return to center position.
6. Raise trench cleaner, if equipped.
7. Return seat to the drive position.
8. Tilt steering wheel column down.
9. Disengage axle lock. After disengaging axle lock, drive tractor in reverse 6' (2 m) to fully disengage.
10. Drive a short distance away from work site. See page 83 for driving procedures.
11. Shut down tractor. See page 85 for proper shutdown procedures.
12. Stow trench cleaner.

Reel Carrier

Chapter Contents

Set Up. 114

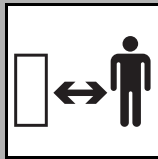
- Adjust Arbor 114
- Prepare to Plow. 115

Operate Reel Winder. 116

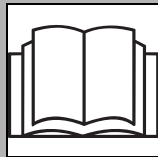
Finish Job 116



Set Up


WARNING

Crushing weight. If load falls or moves it could kill or crush you. Stay away.


WARNING

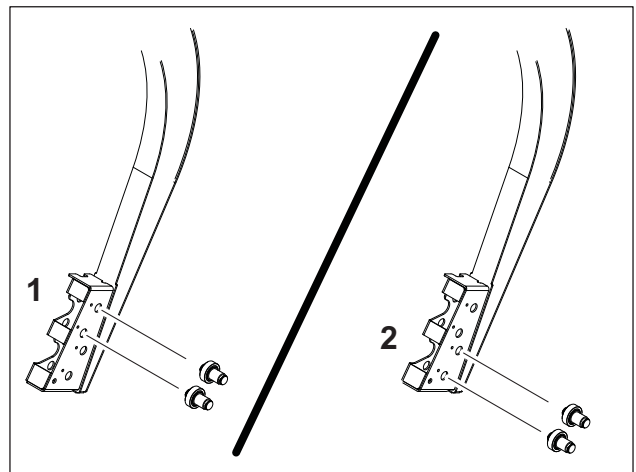
Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

Adjust Arbor

1. Lower reel carrier.
2. Choose arbor position.

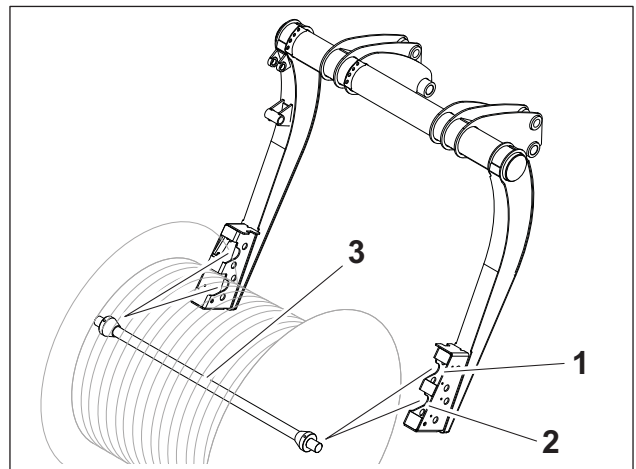
NOTICE: Arbor position is determined by weight of reel.

- Maximum weight of position 1 is 2500 lb (1131.9 kg).
- Maximum weight of position 2 is 2200 lb (997.9 kg).



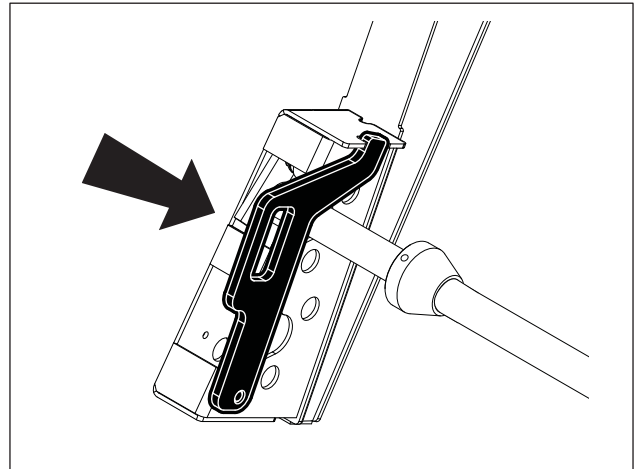
t48om055w.eps

3. Turn ignition switch to STOP.
4. Install arbor (3) into spool.
5. Secure arbor into correct position.



t48om054w.eps

6. After installing arbor, latch retainers (shown).



t48om056w.eps



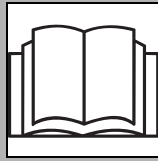
Prepare to Plow

1. Fasten and adjust seat belt.
2. Start tractor. See page 82 for start-up procedures.
3. Drive to beginning of planned plow path. See page 83 for driving procedures.

NOTICE: Large reels of conduit or cable may obstruct the forward visibility of the operator. Machines with limited forward visibility should be driven only for short distances and with the help of a spotter.

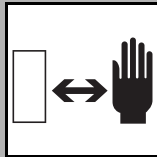
4. Set parking brake and verify parking brake indicator is on.
5. Lower backfill blade, if equipped.

Operate Reel Winder



Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

1. Lower plow attachment.
2. Turn ignition switch to STOP.
3. Attach service line to reel.



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

4. Start tractor.
5. Move reel winder selector switch to activate reel winder control functions.
6. Lower reel winder arm until track meets reel flange.
7. Wind service line.

Finish Job

1. When finished winding, raise reel winder arm.
2. Adjust throttle to low.
3. Move reel winder selector switch to activate backfill blade controls.
4. Raise backfill blade, if equipped.
5. Release parking brake.
6. Follow directions in "Plow" on page 123 to begin plowing.

Saw

Chapter Contents

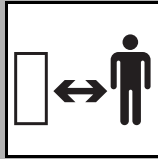
Set Up. 118

Operate 119

Finish Job 121

Set Up

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.



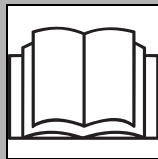
WARNING Crushing weight could cause death or serious injury. Stay away.

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.

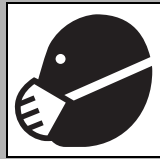
To help avoid injury: Comply with all utility notification regulations before digging or drilling.



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

1. Fasten and adjust seat belt.
2. Start tractor. See page 82 for start-up procedures.
3. Drive to starting point. Move in line with planned job. See page 79 for correct operating procedures.
4. Set parking brake and verify parking brake indicator is on.
5. Move ground drive control to low.
6. Tilt steering wheel column up.
7. Turn seat to desired position.
8. Engage axle lock.
9. Lower saw to just above ground.

Operate

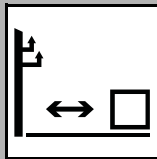


CAUTION

Breathing crystalline silica dust may cause lung disease. Cutting, drilling, or working materials such as concrete, sand, or rock containing quartz may result in exposure to silica dust. Use dust control methods or appropriate breathing protection when exposed to silica dust.

To help avoid injury:

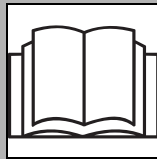
- Use water spray or other means to control dust.
- Refer to U.S. Department of Labor Occupational Safety and Health Administration guidelines to learn more about appropriate breathing protection and permissible exposure limits.



DANGER

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

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



WARNING

Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475



CAUTION

Flying objects thrown by machine may strike people. Wear hard hat and safety glasses. 275-193

1. Lower stabilizer until distance from bottom of skid shoe to bottom of saw bits equals desired trench depth.
2. If equipped with traversing saw, set at desired offset position.
3. Ensure that saw is aligned with planned trench and that wheels are pointing straight ahead.

4. Move attachment speed/direction control to desired speed. SAW WILL TURN.



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

To help avoid injury:

- Allow 3' (1 m) between digging teeth and obstacle. Machine may jerk when digging starts.
- Keep everyone at least 10' (3 m) from machine, attachments, and their range of movement.

5. Set throttle to full engine speed.
6. Lift trench cleaner, if equipped.
7. Slowly lower saw to trench depth.

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

8. Release parking brake.
9. If using trench cleaner:
 - Use ground drive foot control to move forward about 1' (30 cm), or until there is enough room for trench cleaner to enter trench.
 - Return ground drive control to neutral to stop forward movement.
 - Raise boom slightly, then fully lower trench cleaner to lock it in place.
 - Lower boom to desired trench depth.

NOTICE:

- Do not have trench cleaner in working position when starting a trench.
- Do not back up with trench cleaner in working position.

10. Move ground drive hand control to desired trenching speed. Always start trenching with ground drive speed set at low. Increase ground drive speed only as soil conditions permit.

NOTICE:

- Lower saw into softer material then move into harder or abrasive material. For example, lower saw into dirt at shoulder before cutting across road.
- Saw use is not recommended for soft, wet, or sticky soil conditions.

IMPORTANT: If a curved trench must be cut, make a series of straight cuts.

Finish Job

1. When trench is complete, move ground drive hand control to neutral.
2. Adjust throttle to low.
3. Raise saw and stabilizers.
4. As saw clears top of trench, move attachment speed/direction control to neutral.
5. If equipped with traversing saw, return to center position.
6. Raise trench cleaner, if equipped.
7. Return seat to the drive position. See "Drive" on page 83.
8. Tilt steering wheel column down.
9. Disengage axle lock. After disengaging axle lock, drive tractor in reverse 6' (2 m) to fully disengage.
10. Drive a short distance away from work site.
11. Shut down tractor. See page 85 for proper shutdown procedures.

Plow

Chapter Contents



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- Position Tractor125
- Attach Product.125
- Prepare Tractor126

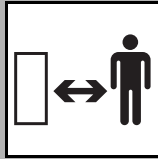
Operate 127

- Special Plowing128

Finish Job 129

Set Up

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.



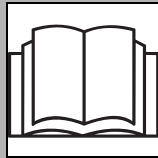
WARNING Crushing weight could cause death or serious injury. Stay away.

To help avoid injury: Keep everyone at least 10' (3 m) from machine, attachments, and their range of movement.



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

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



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

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.

Position Tractor

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

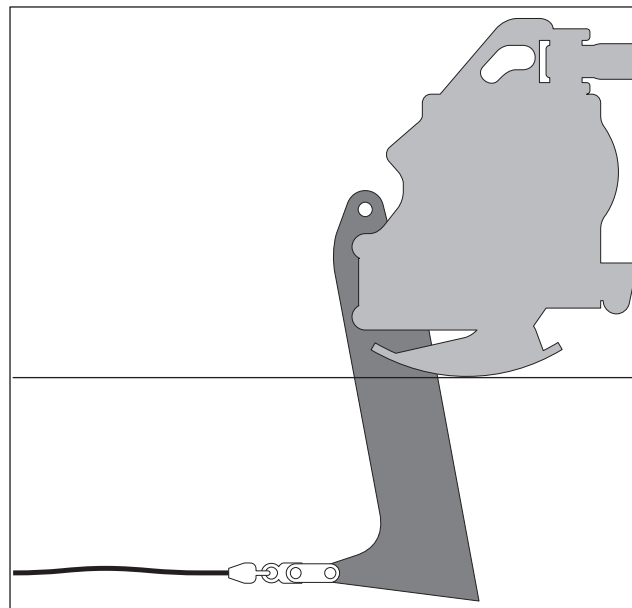
1. Fasten and adjust seat belt.
2. Start tractor. See page 82 for start-up procedures.
3. Drive to starting point. Move in line with planned trench. See "Drive" on page 83.
4. Set parking brake and verify parking brake indicator is on.
5. Lower backfill blade, if equipped.
6. If equipped with combo, set trench/plow switch to the plow position.
7. Lower plow to starting point of trench.
8. Turn ignition switch to STOP.



Attach Product

Pull Product

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



Plow_Pull.eps

Feed Product

NOTICE: Use only genuine Ditch Witch® cable guide.

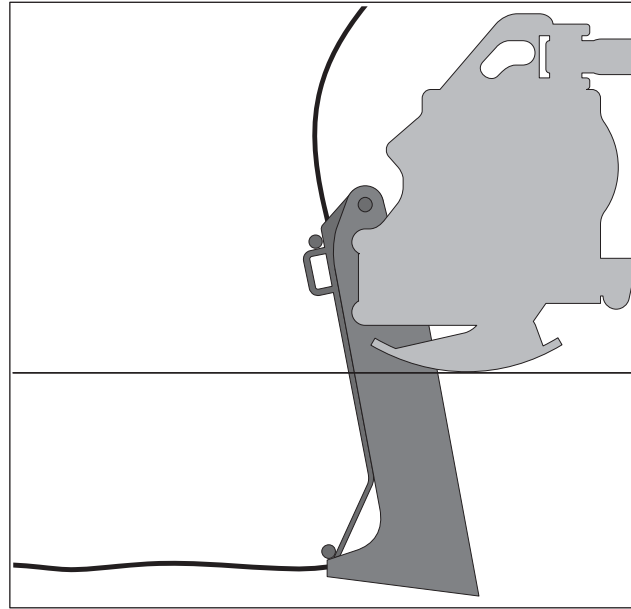
1. Remove cable guide.
2. Feed cable through tube from top to bottom.
3. Replace cable guide and tighten fasteners.
4. Secure cable.

Prepare Tractor

1. Fasten and adjust seat belt.
2. Start tractor.
3. Adjust to low throttle.
4. Release parking brake.
5. Move ground drive control to low.
6. Lower reel carrier to operating position, if equipped.

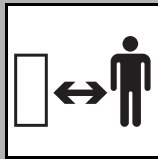
NOTICE: Use extreme caution when operating reel carrier on sloped surfaces.

7. Raise backfill blade, if equipped.
8. Tilt steering wheel column up.
9. Turn seat to desired position.
10. Engage axle lock.



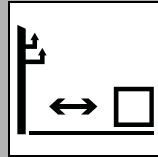
Plow_Feed.eps

Operate



WARNING

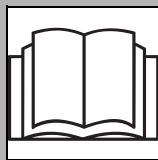
Crushing weight could cause death or serious injury. Stay away.



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. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

NOTICE: Do not drive backward with plow in the ground.

1. If equipped with combo, ensure that the trench/plow switch is in the plow position.
2. Move ground drive hand control forward to plowing speed and lower plow blade into ground.

NOTICE: Do not drive in reverse with plow blade in the ground.

3. Move plow lift control to float.
4. Move plow swing control to float.
5. Increase engine speed to full throttle.
6. Move attachment speed/direction control forward to start plow vibration. PLOW WILL VIBRATE.

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

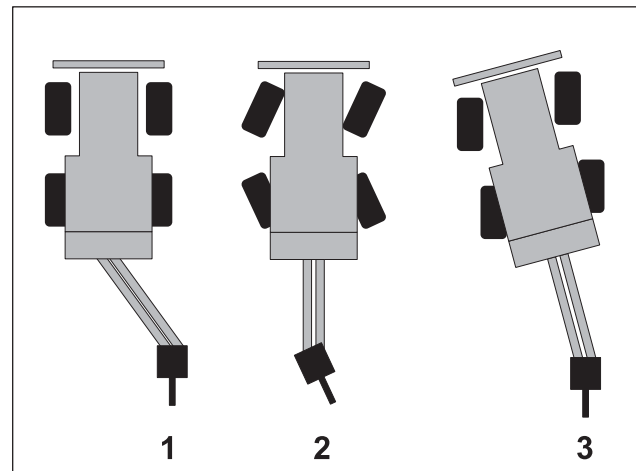
7. Reduce attachment speed to a point with the least tractor vibration and the highest ground drive speed possible without wheel slippage. Adjust vibrator speed if ROPS vibrates excessively.
8. Check cable for damage during plowing.



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 wheels 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 mode selector switch to the rear steer position.
2. Use the rear steer switch to position the wheels 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 wheels.

Crab Plow

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

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

Finish Job

1. When installation is complete, move plow swing and plow lift out of float.
2. Move ground drive hand control to neutral.
3. With vibrator running, raise plow to ground level while reducing vibrator speed.

NOTICE: Do not operate vibrator when plow is out of the ground.

4. Move attachment speed/direction control to neutral.
5. Return seat to the drive position.
6. Tilt steering wheel column down.
7. Set parking brake and verify parking brake indicator is on.
8. Lower backfill blade, if equipped.
9. Turn ignition switch to STOP and remove product from plow.
10. Turn ignition switch to ON.
11. Swing plow to center position and engage swing lock and stow lock.
12. Release parking brake.
13. Raise backfill blade, if equipped.
14. Disengage axle lock. After disengaging axle lock, drive tractor in reverse 6' (2 m) to fully disengage.
15. Drive a short distance away from work site. See "Drive" on page 83.
16. Shut down tractor. See page 85 for proper shutdown procedures.



Drill

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- Dig Target Trench133
- Install Drill String133

Operate 134

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- Remove Rod140

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- Disassemble Drill String142
- Remove Drilling Attachment142



Set Up

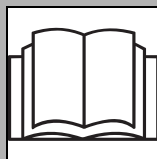
EMERGENCY SHUTDOWN - Turn ignition switch to STOP.



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.
- Set up warning barriers and keep people away from machine and jobsite.
- Do not operate drilling attachment if bore path is less than 10' (3 m) from any underground hazard.



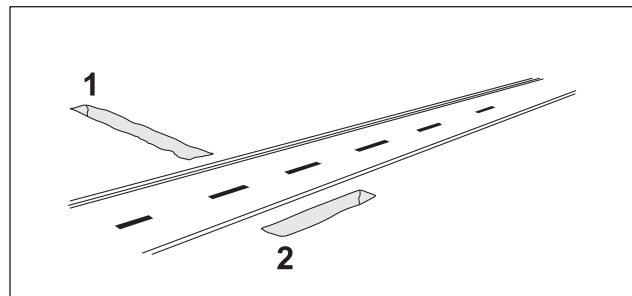
WARNING Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

Dig Approach Trench

1. Mark planned bore path and all located utility lines with flags or paint.
2. Dig an approach trench (1) along the intended bore path.

IMPORTANT: Ensure that approach trench is:

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



Drill_Attchmnt_Prep_Job.eps

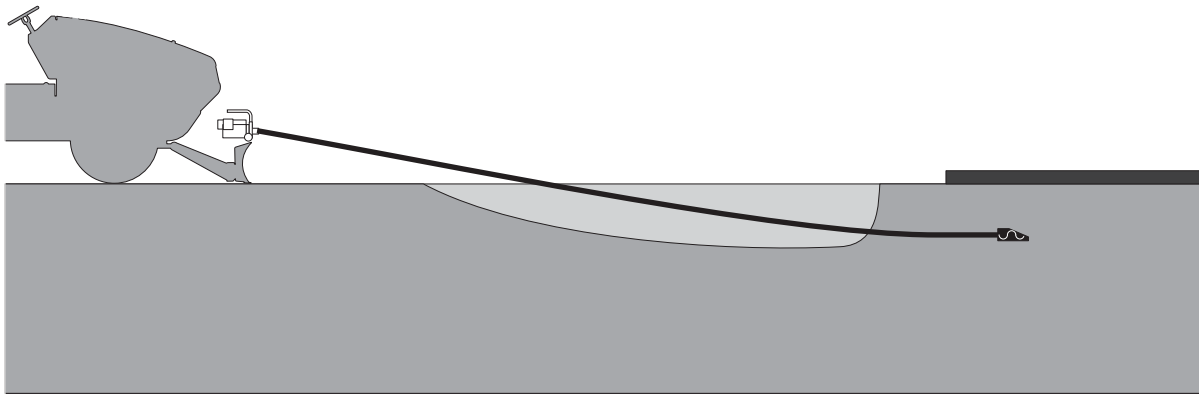
Dig Target Trench

1. Select a completion point for the bore.
2. Dig a target trench (2) **across** the intended completion point.

IMPORTANT: Ensure that target trench is:

- deep enough for drill bit to enter slightly above the trench floor, and
- long enough to allow for drift of unguided drill string. Accuracy of bore decreases with length and varies with soil conditions.

Install Drill String



DrillRod_Trencher

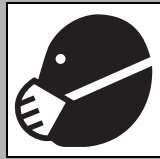
1. Assemble at least 20' (6 m), but not more than 30' (9 m), of drill rod sections.
2. Install drill bit to the cutting end of the drill string.
3. Put drill string in approach trench and align with intended bore path.

NOTICE: Incorrect installation can cause rod sections to bend.

- Ensure more than half of drill string length is inside trench.
- If necessary, remove rod sections or increase length of trench.

4. Start engine and set to low throttle. See "Start Unit" on page 82.
5. Lower boom in parallel position to ground.
6. Move machine toward approach trench. See "Drive" on page 83.
7. Shut down engine. See "Shut Down" on page 85.
8. Install drilling attachment to backfill blade.
9. Connect hydraulic lines.

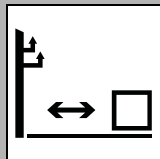
Operate

**CAUTION**

Breathing crystalline silica dust may cause lung disease. Cutting, drilling, or working materials such as concrete, sand, or rock containing quartz may result in exposure to silica dust. Use dust control methods or appropriate breathing protection when exposed to silica dust.

To help avoid injury:

- 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.

**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.

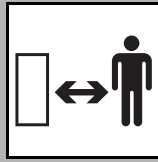
**WARNING**

Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

**CAUTION**

Flying objects thrown by machine may strike people. Wear hard hat and safety glasses. 275-193

Drill



Rotating shaft will cause death or serious injury. Stay away.

To help avoid injury:

- Keep everyone at least 10' (3 m) away from drill string and machine.
- Wear close-fitting clothing and personal protective equipment.

1. If necessary, have helper use drill string guide to align drill string as it enters the soil. See "Start Bore with Drill String Guide" on page 136.
2. Start engine and set to low throttle.
3. Operate drilling attachment controls to start clockwise rotation.
4. Slowly move machine forward while maintaining rotation. See "Drive" on page 83.
 - When length of bore is more than 5' (1.5 m), you may carefully and slowly increase speed.
 - Always use lowest speed necessary.
5. Carefully monitor progress of bore:
 - If rod section starts to bow, stop forward movement of machine and back machine slightly until rod straightens.
 - If drill string becomes blocked, rotate drill string counterclockwise.

NOTICE: Incorrect drilling will damage drilling equipment.

- Do not drill too quickly. Drilling bit will drift off course and rod sections may bow or break.
- Do not drill with bent rod section.

6. When drill bit enters target trench, stop rotation immediately.

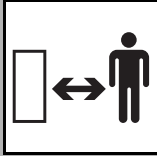
IMPORTANT: After initial bore is complete, backream to enlarge bore or pull drill string to install product.

- See "Backream" on page 138.
- See "Install Product" on page 139.



Start Bore with Drill String Guide

If necessary, have helper follow the instructions below to operate the drill string guide at start of bore.

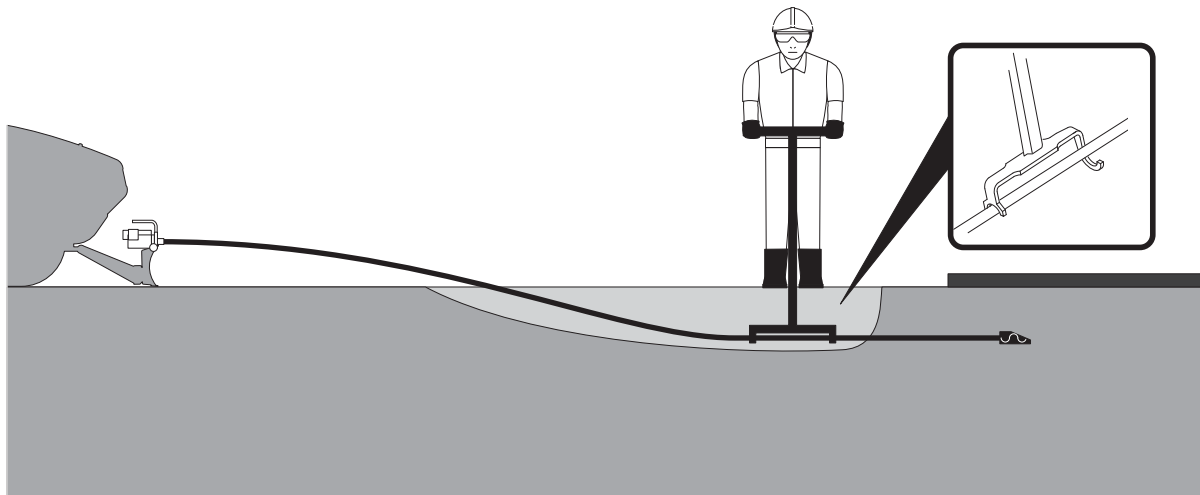


away.

Rotating shaft will cause death or serious injury. Stay

To help avoid injury:

- Use only the approved Ditch Witch® drill string guide (p/n 118-079).
- Do not straddle trench or drill string.
- Do not enter trench.
- Keep hands and feet away from drill string and drilling attachment.
- Do not use drill string guide during backreaming or when drill string is being pulled back.
- Only use drill string guide on left side of approach trench.

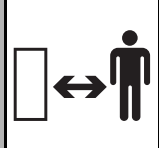


DrillRod_Trencher2

1. Stand on **left** side of approach trench.
2. Put drill string guide in correct position:
 - at least 3' (1 m) behind drill bit
 - hook side toward bore
 - cradle side toward machine
3. When drill string guide is in correct position, signal machine operator to start bore.
4. Use drill string guide to control the first 5' (1.5 m) of the bore path.
5. When length of bore is 5' (1.5 m), have machine operator stop machine.
6. When drill string has stopped, remove drill string guide and leave area.

Add Rod

If more length is needed, ask a helper to add a rod section.



⚠ DANGER Rotating shaft will cause death or serious injury. Stay away.

To help avoid injury: Only access drilling attachment with hands when engine is shut down.

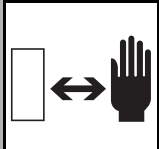
Disconnect Drill String from Drilling Attachment

1. Stop rotation of drilling attachment.
2. Operate ground drive controls to move machine in reverse 6" (15 cm) to loosen drill string in ground.
3. Shut down tractor. See page 85 for proper shutdown procedures.
4. Disconnect drill string from drilling attachment with special tool (p/n 351-272). See "Disassemble Drill String" on page 142.
5. Start tractor. See page 82 for start-up procedures.
6. Use ground drive foot control to move in reverse 1' (30 cm), about the length of a rod section.



Add Rod Section

1. Shut down tractor.
2. Have helper connect new rod section to drilling attachment.
3. Start tractor and set engine to low throttle.
4. Slowly move machine forward until new rod section and drill string are about 1' (30 cm) apart.
5. Have helper lightly hold new rod section and drill string so that they are aligned.



⚠ WARNING Pinch point. Crushing will cause serious injury.

To help avoid injury:

- Keep hands at least 6" (15 cm) from ends of rod section and drill string.
- Support rods from underneath with open palms. Do not grip rods.

6. Rotate drilling attachment to align slip latches of new rod section and drill string.
7. Move unit forward slowly. As soon as new rod section and drill string are connected, have helper move hands clear.
8. Slightly move forward until the slip latch connection is correctly latched.

Backream

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

NOTICE: Incorrect use may damage components and increase wear.

- Do not try to increase hole size too much in one pass. Make several passes using successively larger reamers.
- Keep drill string straight and aligned with drilling attachment. Sharp bends can cause rod failure.
- Never have more than 30' (9 m) of exposed rod outside the bore. Remove rods as necessary. See "Remove Rod" on page 140.

Single Pass

1. Shut down tractor. See page 85 for proper shutdown procedures.
2. Remove drill bit and install appropriate reamer.
3. Start tractor and begin clockwise rotation. See page 82 for start-up procedures.

IMPORTANT: Always rotate clockwise during backreaming. Rotate counterclockwise only if drill bit or reamer is blocked in bore.

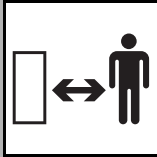
4. Slowly drive in reverse while maintaining rotation. See page 83 for proper driving procedures. When reamer exits the approach trench, stop rotation immediately.

Multiple Passes

1. Repeat steps 1-5.
2. Install drill bit.
3. Push drill string through bore. Do not rotate.
4. At final pass, install product. See "Install Product" on page 139.

Install Product

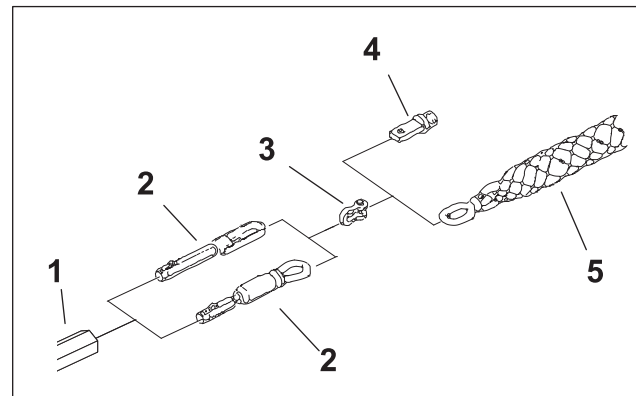
To install product, pull it through the bore after drilling or final pass of backreaming.



Rotating shaft will cause death or serious injury. Stay away.

To help avoid injury: Ensure no one is in target trench or near product being installed. If swivel malfunctions, material can rotate.

1. Install appropriate swivel (2) to drill string (1) or reamer. Ensure swivel functions correctly.
2. Use shackle (3) to attach pipe pulling adapter (4) or pulling grip (5) to swivel.
3. Attach material to pipe pulling adapter or pulling grip.
4. Set engine to low throttle.
5. Slowly drive in reverse. See page 83 for proper driving procedures.



RW_PullingTools.eps

IMPORTANT:

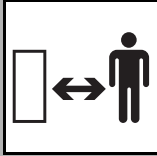
- If bore becomes blocked begin counterclockwise rotation.
- If length of rod outside the bore reaches 30' (9 m), remove rod section. See "Remove Rod" on page 140.

6. When product exits approach trench, stop machine immediately.



Remove Rod

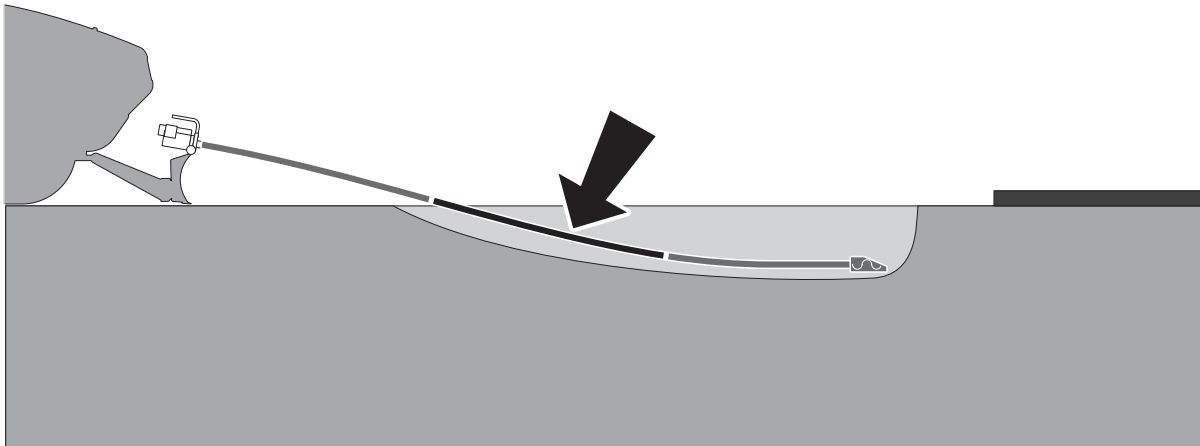
If the length of rod outside the bore reaches 30' (9 m), ask a helper to remove rod sections as needed.



Rotating shaft will cause death or serious injury. Stay away.

To help avoid injury:

- Only access drill string with hands when tractor is shut down.
- Always remove second rod (as shown). Leave first rod section attached to drilling attachment.



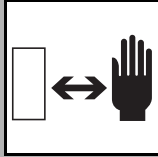
DrillRod_RemoveRod.eps

Remove Rod Section

1. Stop rotation of drilling attachment.
2. Shut down tractor. See page 85 for proper shutdown procedures.
3. Disconnect and remove appropriate rod section with special tool (p/n 351-272). See "Disassemble Drill String" on page 142.

Reconnect Drill String

1. Start tractor and set to low throttle.
2. Slowly move machine forward until attached rod section and drill string are about 1' (30 cm) apart.
3. Have helper lightly hold attached rod section and drill string so that they are aligned.



Pinch point. Crushing will cause serious injury.

To help avoid injury:

- Keep hands at least 6" (15 cm) from ends of rod section and drill string.
- Support rods from underneath with open palms. Do not grip rods.

4. Rotate drilling attachment to align slip latches of new rod section and drill string.
5. Move unit forward slowly. As soon as new rod section and drill string are connected, have helper move hands clear.
6. Slightly move forward until the slip latch connection is correctly latched.



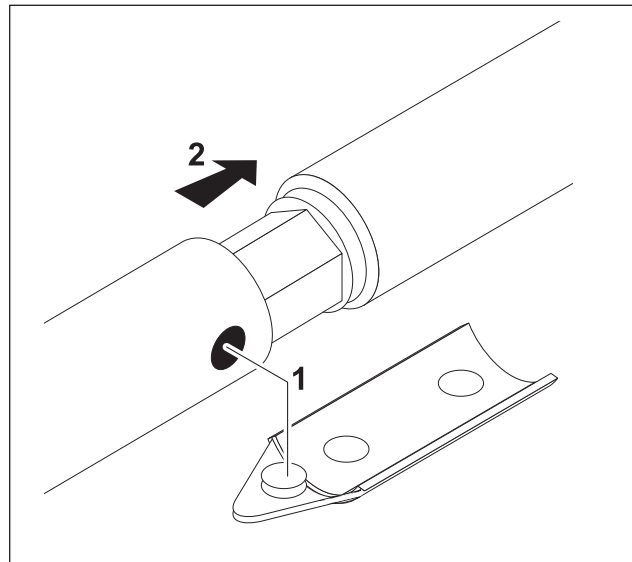
Finish Job

Disassemble Drill String

1. Shut down tractor.
2. Disconnect drill string from drilling attachment.
3. Remove drill bit.
4. Disconnect sections:
 - Press tab through hole in female side of joint (1) using special tool (p/n 351-272).
 - Pull rod sections apart (2).

Remove Drilling Attachment

1. Disconnect hydraulic hoses if necessary.
2. If desired, remove drilling attachment from backfill blade.



Drill_Attchmnt_RodJoints.eps

Systems and Equipment

Chapter Contents

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- Operate Cruise Control144

Chain, Teeth, and Sprockets 145

- Chain and Tooth Maintenance145
- Chain Types145
- Chain Selection146

Optional Equipment 147

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- BH120 Backhoe147
- CT120H/ST120H Trencher147
- VP120H Plow147
- RS40 Saw148

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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.

Operate Cruise Control

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.

Trenching

IMPORTANT: See "Left Console" on page 48 for more information about controls.

1. Set ground drive control and ground drive direction control to neutral.
2. Ensure ground drive speed control is in low.
3. Ensure cruise control is off.
4. Move cruise control speed dial control to arrow at center.
5. Turn cruise control selector switch on and ensure that cruise control indicator lights.
6. Following procedures in "Trench" on page 107, begin trenching to desired depth.
7. When desired depth is reached, set to high throttle.
8. Slowly move ground drive control forward.
9. Slowly adjust cruise control speed dial control to match digging conditions.
10. When finished trenching, move ground drive control to neutral and turn cruise control off.
11. Allow chain to dig itself free before stopping attachment.

Plowing

IMPORTANT: See "Left Console" on page 48 for more information about controls.

1. Set ground drive control to neutral.
2. Ensure ground drive speed control is in low.
3. Ensure cruise control is off.
4. Set ground drive hand control to maximum speed suitable for digging conditions.
5. Turn cruise control selector switch on and ensure that cruise control indicator lights.
6. Slowly adjust cruise control speed dial control to match digging conditions.
7. When finished trenching, move ground drive control to neutral and turn cruise control off.

Chain, Teeth, and Sprockets

Chain and Tooth Maintenance

- Always replace sprockets at the same time you replace the digging chain. Sprockets and chain are designed to work together. Replacing one without the other will cause premature wear of the new part.
- Keep digging teeth sharp. Using dull, worn teeth will decrease production and increase shock load to other trencher components. It can also cause chain stretch, which leads to premature chain wear and failure.
- Maintain the proper amount of tension on the digging chain. Overtightening will cause chain stretch and loss of machine performance. For correct tightening procedure, see page 166.
- 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.

RT125 Tractor

Equipment	Description
backup alarm	alarm sounds when tractor is in reverse
light kit	mounts to ROPS and includes work lights and hazard light
cab	enclosed, climate-controlled cab
suspension seat	adjustable self-contained suspension
isolator kit	hydraulically dampened rear mounts

BH120 Backhoe

Equipment	Description
bucket width	12-24" (305-610 mm) buckets available



CT120H/ST120H Trencher

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

VP120H Plow

Equipment	Description
blades	several blade options are available
toes	stabilize the plow for more constant depth
bullets	allow a larger cavity for the material being installed
RC30 reel carrier	designed to fit your Ditch Witch equipment and speed cable installation

RS40 Saw

Equipment	Description
cutting bit types	rotating, self-sharpening conical bit with spring retainer, or carbide cap or carbide insert available.

Counterweighting

Attachment	Counterweight required
CT120H trencher	1300 lb (590 kg) nose weight + 500 lb (227 kg) side weight required.
	BH120 backhoe + 250 lb (113 kg) TBS in each rear tire required.
ST120H trencher	1300 lb (590 kg) nose weight + 500 lb (227 kg) side weight + 150 lb (68 kg) TBS in each front tire required.
	BH120 backhoe + no additional counterweight required
PT120H combo	1300 lb (590 kg) nose weight + 500 lb (227 kg) side weight + 500 lb (227 kg) TBS in each front tire required.
	RC30 reel carrier: Contact Ditch Witch® dealership for correct counterweighting.
	BH120 backhoe: Contact Ditch Witch dealership for correct counterweighting.
RS40 saw	Contact Ditch Witch dealership for correct counterweighting.
VP120H plow	1300 lb (590 kg) nose weight required. 1000 lb (454 kg) rear counterweight and/or 500 lb (227 kg) side weight optional.
	RC30 reel carrier + 1000 lb (454 kg) rear counterweight + 500 lb (227 kg) TBS in each rear tire required.
	BH120 backhoe + 1000 lb (454 kg) rear counterweight + 500 lb (227 kg) TBS in each rear tire required.

Complete the Job

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Rinse Equipment 150

Stow Tools 150

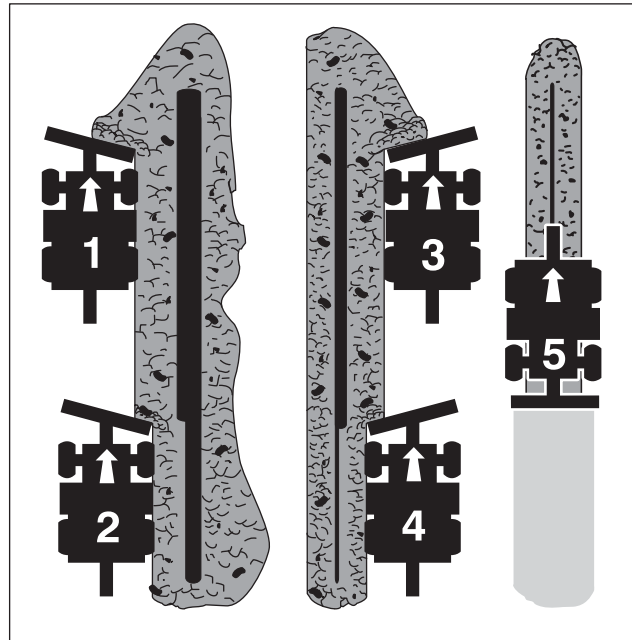


Restore Jobsite

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

Backfilling

1. Ensure the seat is facing forward or in the 60° position. See "Pivot control" on page 54.
2. Position unit at end of trench, several feet from spoils. Aim tractor at outer edge of spoils.
3. Adjust backfill blade to fit land contour.
4. Move outer edge of spoils toward trench. Take two or more passes at spoils rather than moving all spoils at once.
5. Repeat on other side of trench, if necessary.
6. 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.
- Ensure all mud and debris is rinsed from operator's station floor.
- Ensure all mud and debris is rinsed from wheels before parking unit overnight.

Stow Tools

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

Service



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- Washing Precaution152
- Changing Attachments152

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- Engine Oil Temperature Chart.154
- Approved Coolant155
- Approved Fuel.155
- Diesel Exhaust Fluid (DEF).156
- Exhaust Cleaning157

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50 Hour 171

100 Hour. 174

250 Hour 176

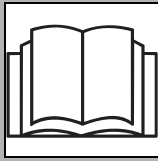
500 Hour 179

1000 Hour 182

2000 Hour. 184

As Needed 186

Service Precautions

**WARNING**

Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475

To help avoid injury:

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

Welding Precaution

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.
- Welding currents can damage electronic components. Always disconnect the ECU ground connection from the frame, harness connections to the ECU, and other electronic components prior to welding on machine or attachments. Connect welder ground close to welding point and ensure no electric components are in the ground path.

Washing Precaution

NOTICE: Water can damage electronics. When cleaning equipment, do not spray electrical components with water.

Changing Attachments

The RT125 is programmed to operate with the original attachment configuration. If you change attachments, contact your Ditch Witch® dealer to ensure the electronic programming is updated. If you change attachments without updating the electronic programming, your attachment may not function correctly.

Recommended Lubricants/Service Key

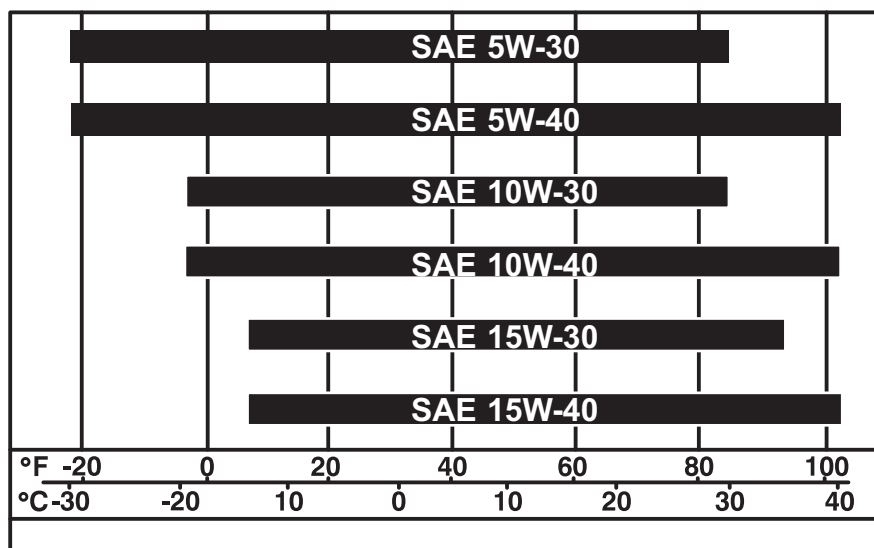


Item	Description		
 Tier 4 DEO	Diesel engine oil meeting or exceeding Deutz® specification DQC III- LA. - If oil meeting DQCIII-LA is not available, absolute minimum requirement is oil meeting API CJ-4 or ACEA E6/E9. - Engine must use low sulfated ash, phosphorous, and sulfur (low SAPS) oil. - If oils meeting only API CJ-4 or ACEA E6/E9 are used, service interval is reduced to 250 hours. - See viscosity chart. Shipped from factory with API CJ-4 DEO meeting Deutz specification DQC II-LA. Change oil initially at 250 hours.		
 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® 423, Chevron® Tractor Hydraulic Fluid, Texaco® TDH Oil, or equivalent		
 DEAC	Low silicate, nitrite free, fully formulated diesel engine antifreeze/coolant meeting Deutz specification DQC CB-14.		
	Check level of fluid or lubricant	✓	Check condition
	Filter	↻	Change, replace, adjust, service or test

Proper lubrication and maintenance protects Ditch Witch® equipment from damage and failure. Service intervals listed are for minimum requirements. In extreme conditions, service machine more frequently. Use only genuine Ditch Witch parts, filters, approved lubricants, TJC, and approved coolants to maintain warranty. Fill to capacities listed in “Specifications” on page 197.

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

IMPORTANT: Use the “Service Record” on page 221 to record all required service to your machine.

Engine Oil Temperature Chart

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Temperature range anticipated before next oil change

Approved Coolant



This unit was filled with coolant meeting Deutz® DQC CB-14 before shipment from factory. Add or replace only with coolant meeting this specification. This coolant is available, pre-diluted, from your Ditch Witch dealer as part number 255-1053. Contact your Deutz service partner for a full list of approved coolants meeting DQC CB-14. In an emergency, non-Deutz approved, heavy duty diesel engine coolant meeting ASTM D6210 may be used. Change to DQC CB-14 coolant as soon as practical.

NOTICE:

- Use only pre-diluted coolant or concentrated coolant mixed with distilled water. Do not use tap water.
- Do not use water or high-silicate automotive-type coolant. This will lead to engine damage or premature engine failure.
- Do not mix heavy-duty diesel engine coolant and automotive-type coolant. This will lead to coolant breakdown and engine damage.

Approved Fuel



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.

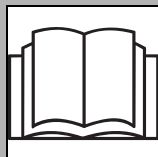
Tier 4 Engine (U.S., Canada, EU, and Japan)

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 15 ppm (15 mg/kg) sulfur content) 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.

Diesel Exhaust Fluid (DEF)



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

To help avoid injury:

- Diesel exhaust fluid is corrosive. Avoid spills. If spill occurs wipe clean immediately.
- Avoid contact with skin. If contact occurs, rinse with water immediately.
- Avoid contact with eyes. If contact occurs, seek medical help immediately.
- Avoid ingestion. If ingested, seek medical help immediately.

This engine requires diesel exhaust fluid (DEF) to meet emission regulations. Use only high quality DEF meeting ISO 22241-1 or DIN 70070 requirements. Running this engine without DEF will increase exhaust emissions and cause engine to derate. Do not dilute or contaminate DEF or substitute other fluids. Tampering with the DEF system will increase exhaust emissions and cause the engine to derate.

DEF has other common names such as Urea, AUS 32, AdBlue, NOx Reduction Agent, and Catalyst Solution.

DEF freezes at 11.3°F (-11.5°C) but the system is designed to prevent freezing during normal operation. If DEF freezes in the tank when the engine is shut down, the system will quickly thaw DEF when engine is started.

DEF has a limited shelf life. In ideal conditions, minimum expected shelf life is 18 months. At temperatures higher than 90°F (32°C), DEF will degrade more rapidly. Do not store in direct sunlight.

Storage and transfer equipment must be compatible with DEF. Most materials (especially hoses) are not compatible and will degrade and contaminate DEF. Never use contaminated DEF. Containers made of polyethylene or polypropylene are recommended.

This machine will consume DEF at a rate between 2 and 3% of diesel consumption. Many factors affect consumption rate, but a good rule of thumb is to fill the DEF tank every other time the diesel tank is filled.

Exhaust Cleaning



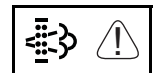
IMPORTANT: See "Exhaust Cleaning" on page 50.

This engine has a Selective Catalytic Reduction (SCR) system that uses a small amount of DEF to convert NOx emissions in the exhaust into nitrogen and water. The SCR system may require periodic cleaning.

Sensors in the engine monitor the exhaust status. When a cleaning cycle is needed, the system will create the following pop-up message: "Exhaust cleaning needed soon. Failure to clean will result in power loss. Park unit away from combustible materials, set engine to low throttle, engage parking brake, and activate cleaning process through the main menu." The exhaust cleaning icon will also flash. An operator may choose to hide and ignore this message. If so, the icon will continue to flash and the message will reappear after fifteen minutes.



If the operator continues to ignore the cleaning request, a second pop-up message will appear with the following message: "Exhaust cleaning needed. Failure to clean will result in severe power loss and engine service. Engine power reduced by 25%. Park unit away from combustible materials, set engine to low throttle, engage parking brake, and activate cleaning process through the main menu." The exhaust cleaning icon will flash and the engine caution icon will appear. An operator may choose to hide and ignore this message. If so, the icons will continue to display and the message will reappear after five minutes.



If the operator continues to ignore the cleaning request, a third pop-up message will appear with the following message: "Exhaust service required. Engine derating activated. Exhaust cleaning request ignored. Contact Deutz® service." The exhaust cleaning and the engine stop icons will flash. An operator may choose to hide and ignore this message. If so, the icons will continue to display and the message will reappear after one minute.



Once the operator starts the exhaust cleaning cycle, adjusting the throttle or releasing the parking brake will terminate the cycle. A typical cycle will take approximately 35 minutes. A pop-up message will display the remaining time in the cycle. The high exhaust temperature icon may also light.

The frequency of exhaust cleaning is dependent upon working conditions. In general, operating in hotter conditions and higher loads will lengthen the time between cleaning cycles. The engine monitors the elapsed time since the previous cleaning and will request a cleaning when that time reaches 1050 hours.



10 Hour

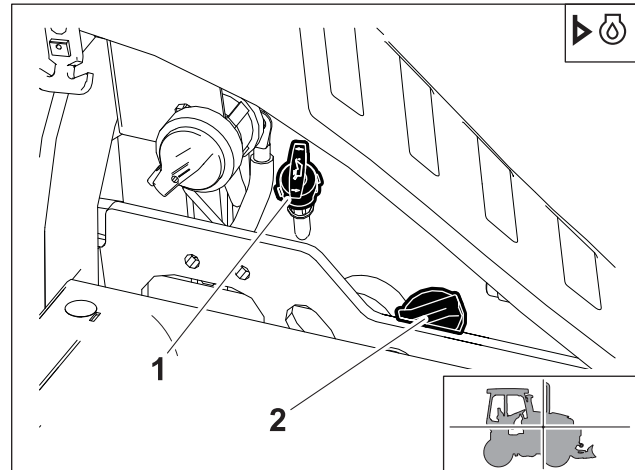
Location	Task	Notes
TRACTOR	Check engine oil level	DEO
	Check hydraulic fluid level and reservoir cap	THF
	Check hydraulic hoses	
	Check coolant level	DEAC
	Check radiator	
	Clean dust ejector valve	
	Check tire pressure and lugnuts	
TRENCHER	Lube trencher tail roller	EPG
	Lube trencher pivot stub	EPG
	Lube trencher auger bearings	EPG
	Lube trencher auger sleeve	EPG
	Check trencher auger bolts	
	Check boom mounting bolts	250 ft•lb (339 N•m)
	Check attachment mounting bolts	200 ft•lb (271 N•m)
	Check restraint bar position	
	Check trench cleaner position (if equipped)	
	Check personnel restraint bar/trench cleaner bolts	350 ft•lb (475 N•m)
	Check digging chain	
	Check digging chain tension	
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)
COMBO	Complete all service items for trencher and plow	
SAW	Check attachment mounting bolts	
	Check bits	

Tractor

Check Engine Oil Level

IMPORTANT: See "Recommended Lubricants/Service Key" on page 153.

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.

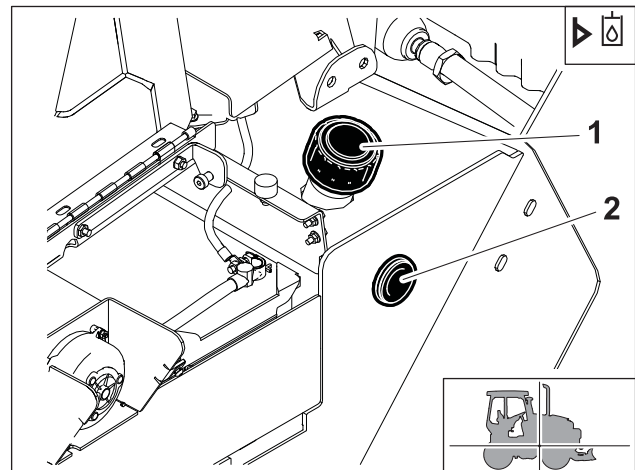


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Check Hydraulic Fluid Level and Reservoir Cap

With frame level, check fluid at sight glass (2) every 10 hours. Maintain fluid level on midway point on sight glass. Add THF at fill (1) as needed.

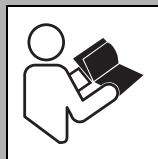
Check hydraulic reservoir cap (1) every 10 hours. Clean as needed.



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Check Hydraulic Hoses

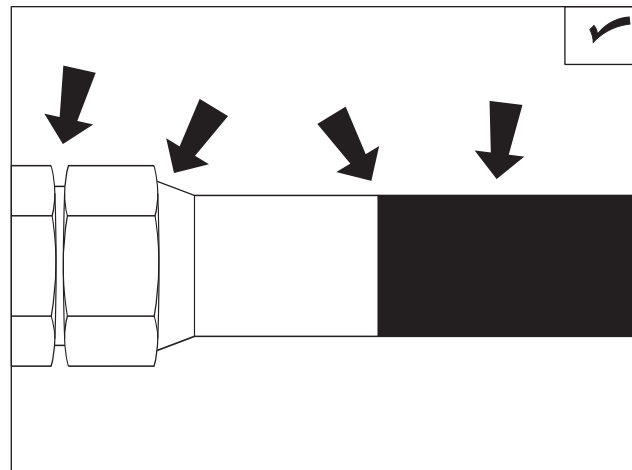


⚠ WARNING Pressurized fluid or air could pierce skin and cause severe injury. Refer to operator's manual for proper use.

To help avoid injury:

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

Check all hydraulic hoses every 10 hours.

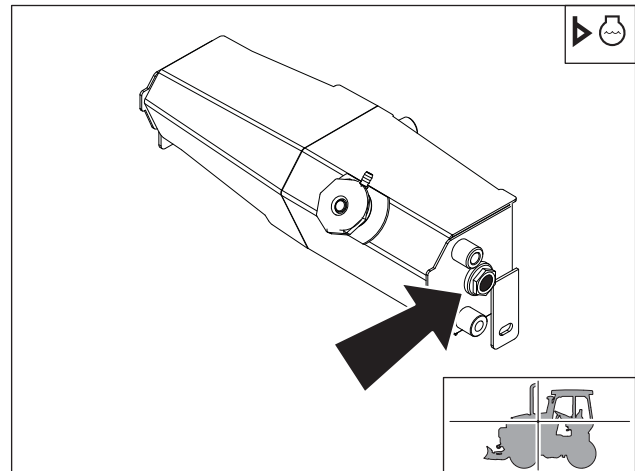


CheckHoses.eps

Check Coolant Level

Check coolant level, with engine cool and unit on level ground, at sight glass (shown) of expansion tank every 10 hours. Maintain coolant level so that coolant is visible in sight glass and no higher than bottom of fill neck. If low, add approved coolant. Do not overfill.

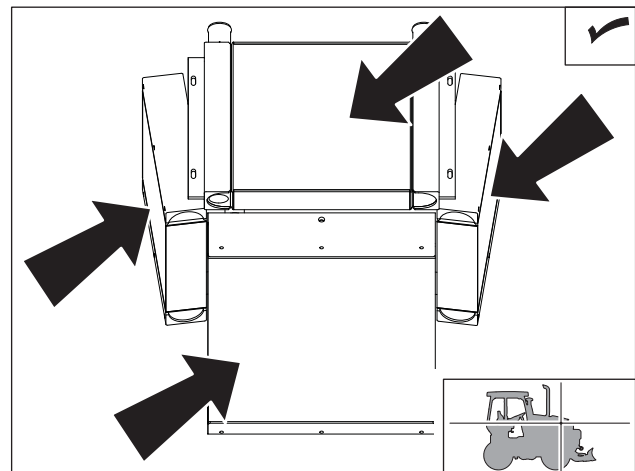
IMPORTANT: See "Approved Coolant" on page 155 for more information.



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Check Radiator

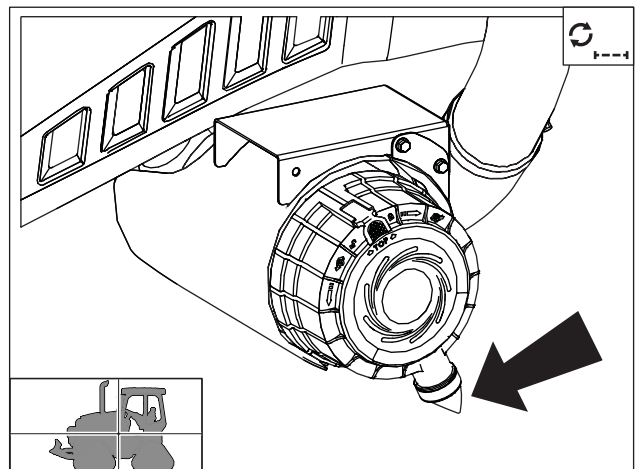
Check radiator for dirt and debris every 10 hours of operation. Clean with compressed air or spray wash as needed. See "Clean Radiator" on page 186.



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Clean Dust Ejector Valve

Check dust ejector valve (shown) every 10 hours of operation. Ensure that valve is not inverted, damaged, plugged, or cracked.



t48om070w.eps

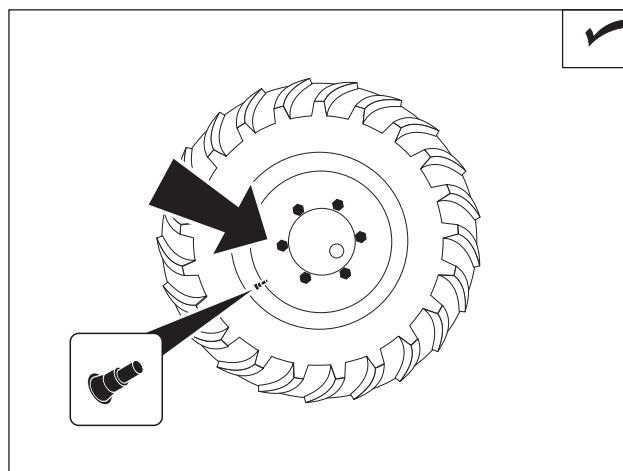


Check Tire Pressure and Lugnuts

Check tire pressure every 10 hours.

Tire option	Maximum pressure
38 x 18.00-20 16-ply	75 psi (5.2 bar)

Check tightness of wheel lugnuts (shown) every 10 hours. Tighten lugnuts to 400 ft•lb (542 N•m).

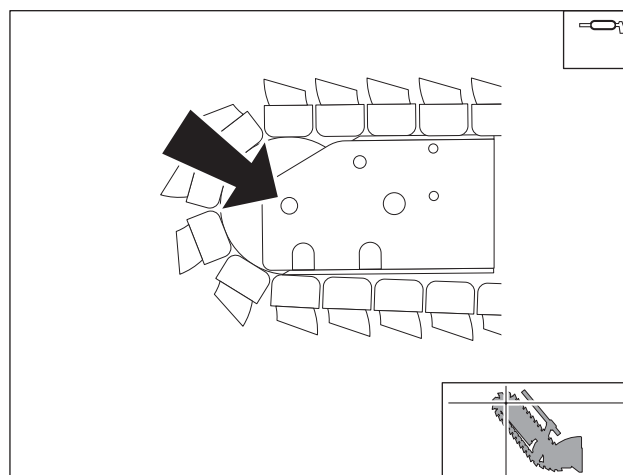


Tires_Service.eps

Trencher

Lube Trencher Tail Roller

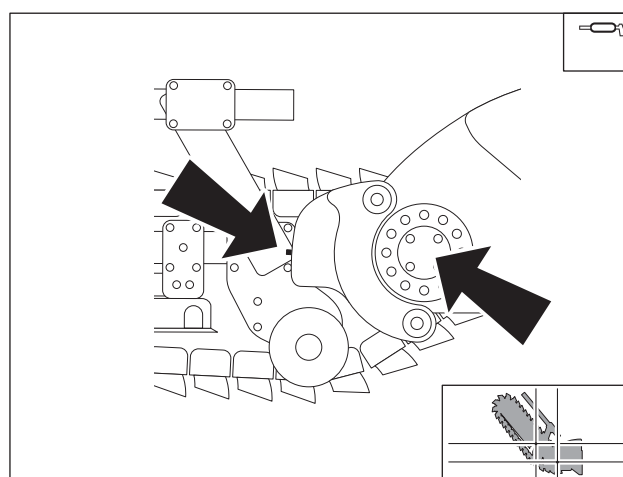
Wipe zerks clean and lube every 10 hours with EPG. Lube roller zerks on both sides of boom.



t30om049h.eps

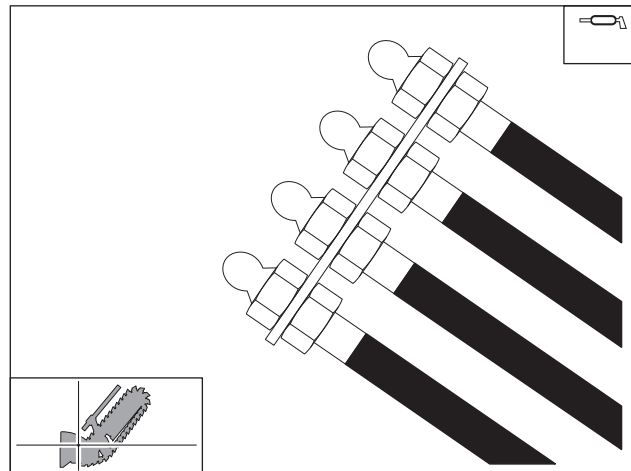
Lube Trencher Pivot Stub

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



t30om050h.eps

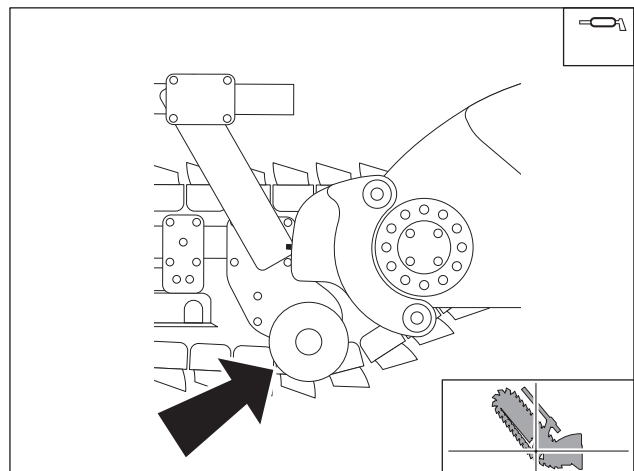
Wipe four zerks located on left of trencher pivot clean and lube every 10 hours with EPG.



t30om051h.eps

Lube Trencher Auger Bearings

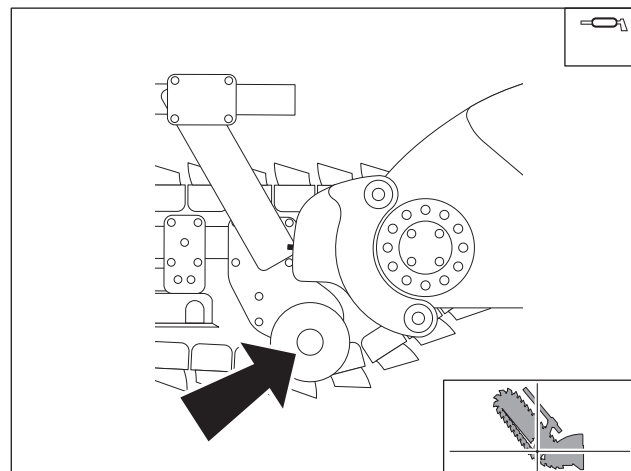
Lube two auger bearing zerks (one on each side) every 10 hours with EPG.



t30om052h.eps

Lube Trencher Auger Sleeve

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

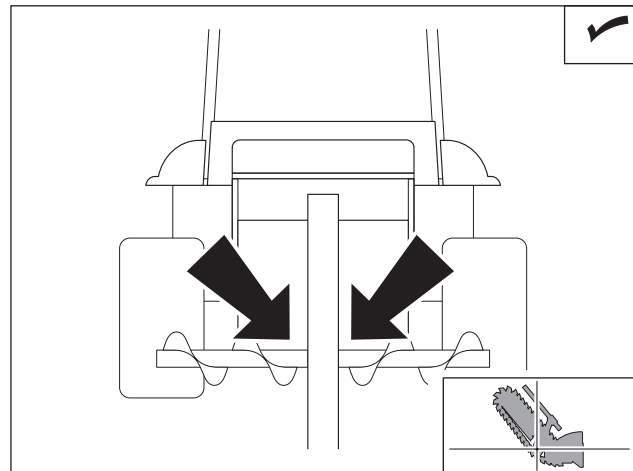


t30om053h.eps



Check Trencher Auger Bolts

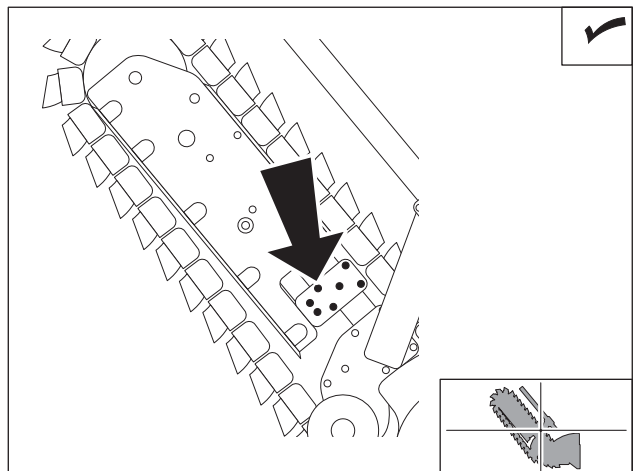
Check trencher auger bolts every 10 hours. For optimal spoils delivery, adjust augers to match terrain and digging depth.



t30om054h.eps

Check Boom Mounting Bolts

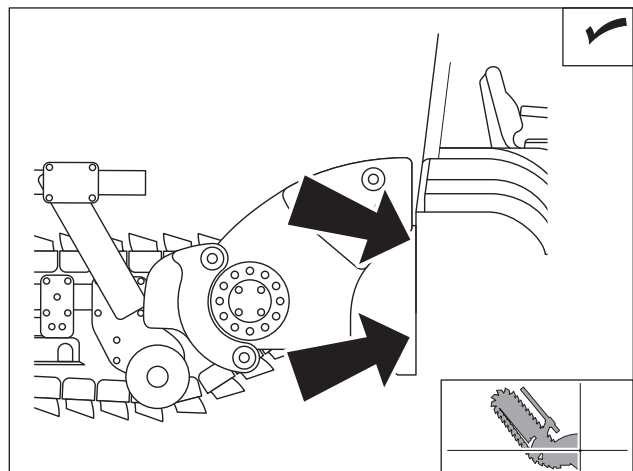
Check 14 bolts (7 on each side) every 10 hours and tighten as necessary to keep bolts and other fasteners tight. Check for looseness or wear. Check that bolts are tightened to 250 ft•lb (28 N•m).



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).

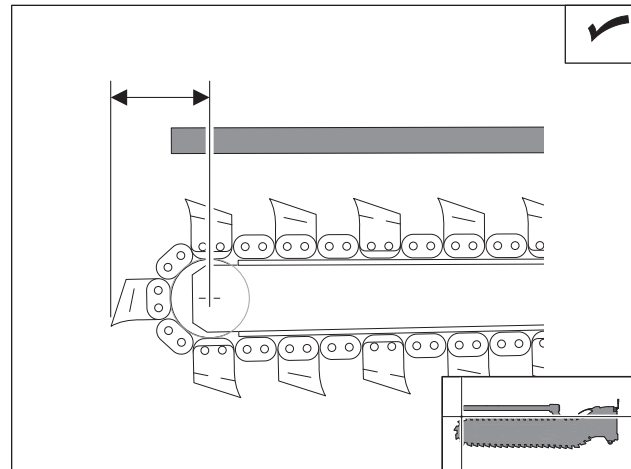


t30om057h.eps

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.

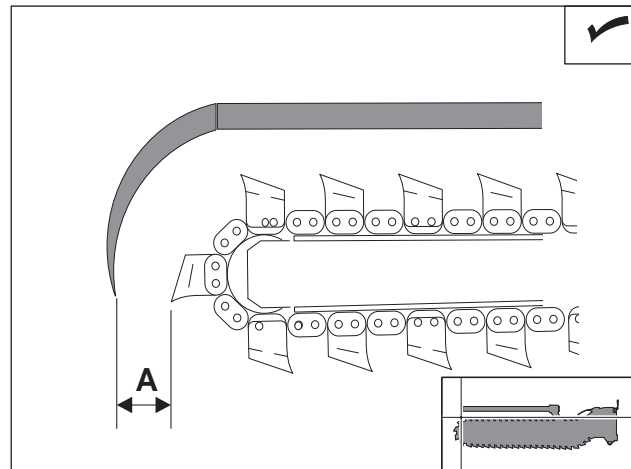
Tighten bolts as necessary to keep them tight. Bolts mounting arm to boom should be tightened to 400 ft•lb (542 N•m). Apply Loctite 271 adhesive.



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).

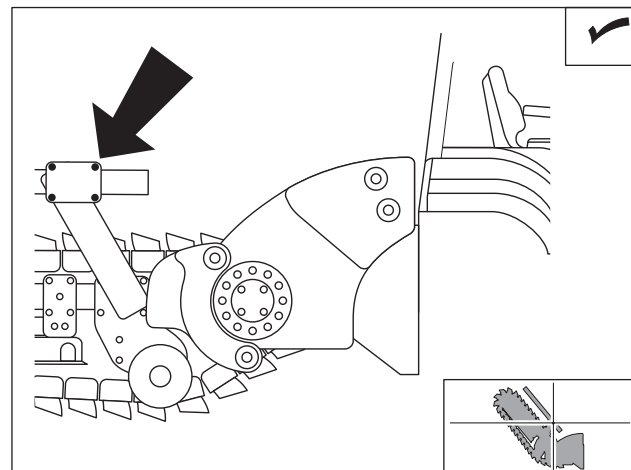
Check that bolts holding personnel restraint bar/trench cleaner to arm are tightened to 350 ft•lb (475 N•m). Apply Loctite® 271 adhesive.



Check Personnel Restraint Bar/Trench Cleaner Bolts

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

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

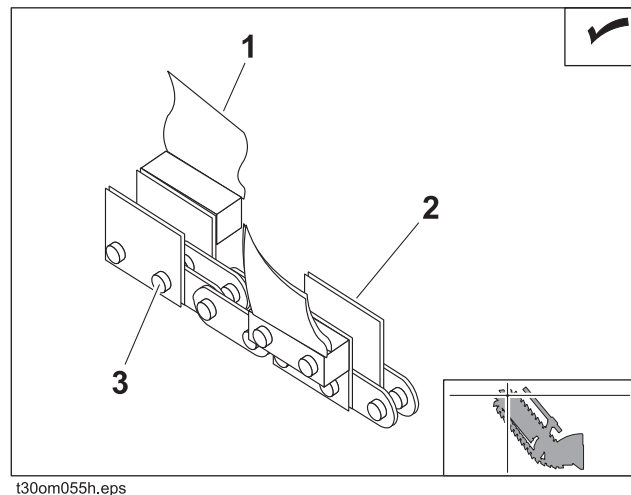


Check Digging Chain

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

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

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.



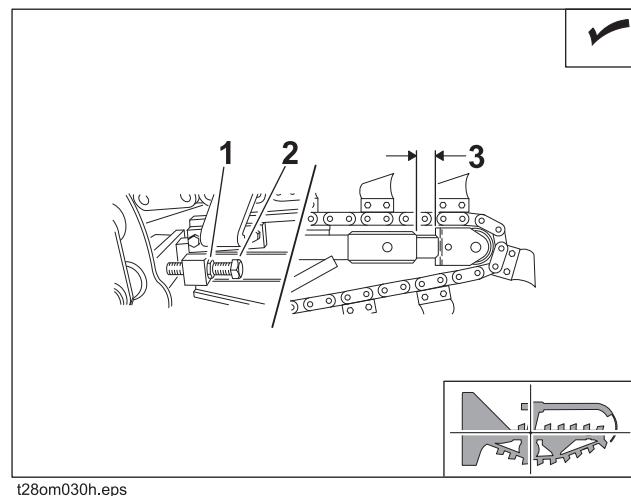
For more efficient digging, contact your Ditch Witch dealer for information about the tooth pattern best suited to your jobsite.

Check Digging Chain Tension

Check digging chain tension every 10 hours.

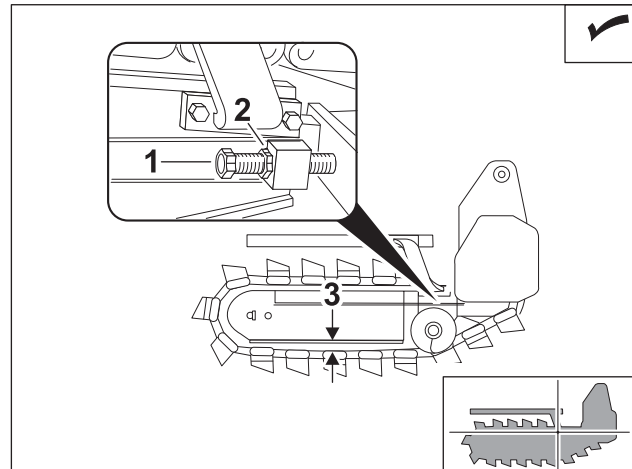
Sprocket Boom

Tension is correct when 2" (50 mm) of slide and stop (3) are exposed. Adjust tension with boom horizontal by tightening or loosening adjustment screws (2) and jam nuts (1).



Roller Boom with Adjusting Screw

With boom horizontal, measure distance from bottom of boom to chain (3). When properly adjusted, distance should be 1.5-2" (40-50 mm). Adjust tension by tightening or loosening adjustment screw (1) and jam nut (2).



t28om028h.eps

Roller Boom with Grease Cylinder

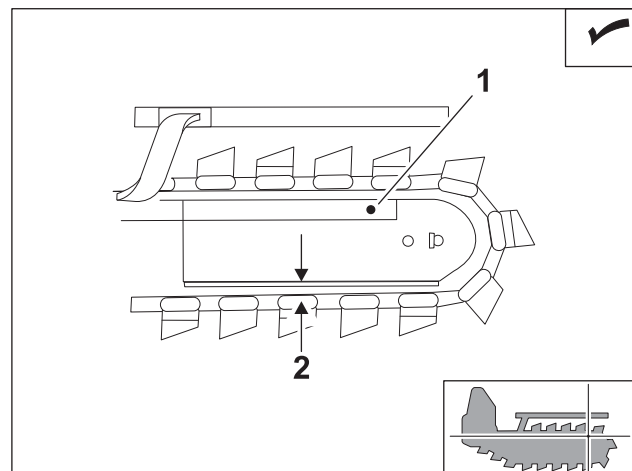
With boom horizontal, measure distance from bottom of boom to chain (2). When properly adjusted, distance should be 1.5-2.0" (40-50 mm).



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

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.



t28om029h.eps

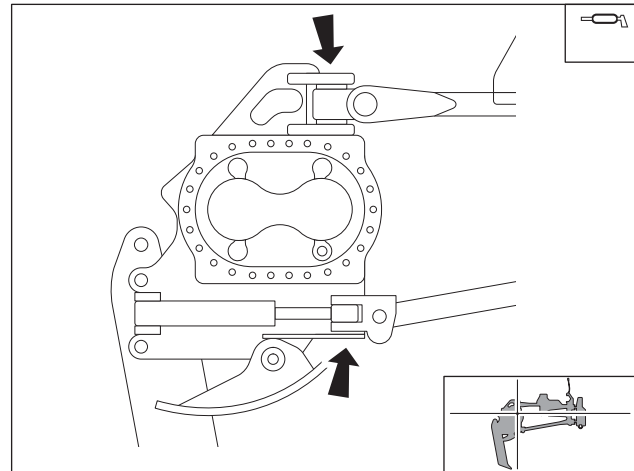
To tighten chain, remove plug and pump MPG into cylinder (1). To relieve chain tension, loosen plug on grease cylinder.



Plow

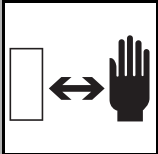
Lube Plow Pivots

Lube plow pivots every 10 hours with EPG.



t30om064h.eps

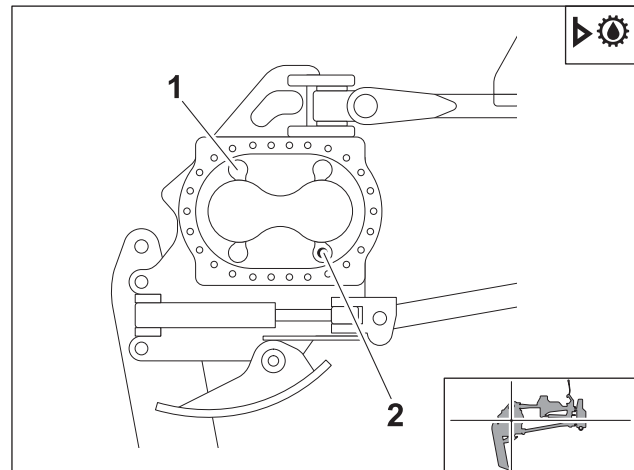
Check Plow Vibrator Oil Level

CAUTION

Hot parts may cause burns. Do not touch until cool or wear gloves.

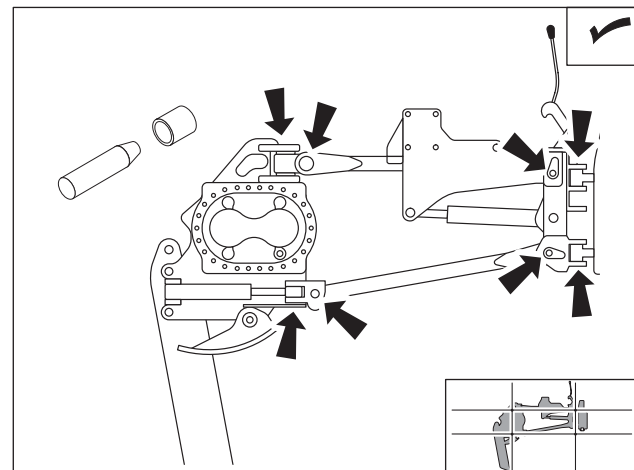
Check plow vibrator oil on each side of vibrator every 10 hours. With vibrator horizontal, oil should be halfway up sight glass (2). Add MPL as needed at fill (1).



t30om065h.eps

Check Plow Arm Pins and Bushings

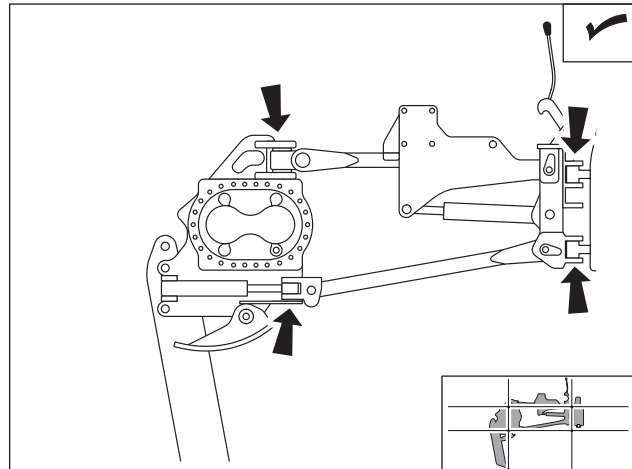
Check plow arm pins and bushings every 10 hours. Tighten as needed.



t30om067h.eps

Check Plow Connector Pivots

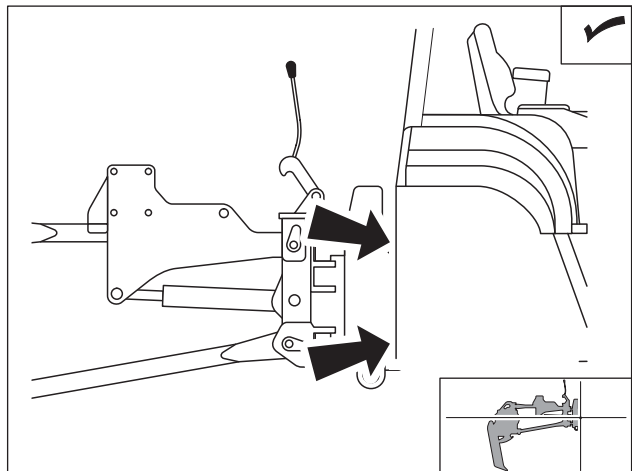
Visually check pivots every 10 hours for wear or damage.



t30om068h.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).



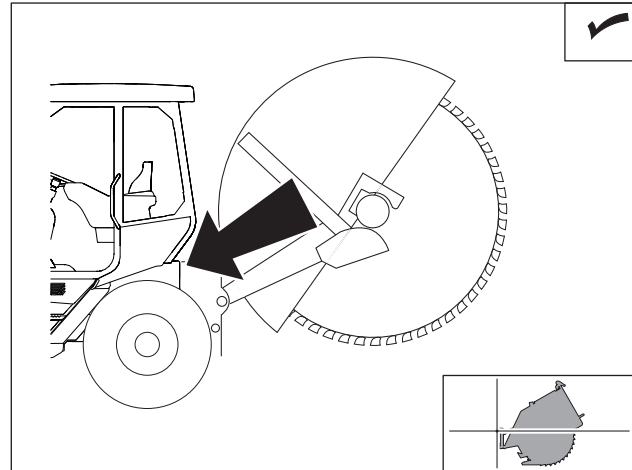
t30om069h.eps



Saw

Check Saw Mounting Bolts

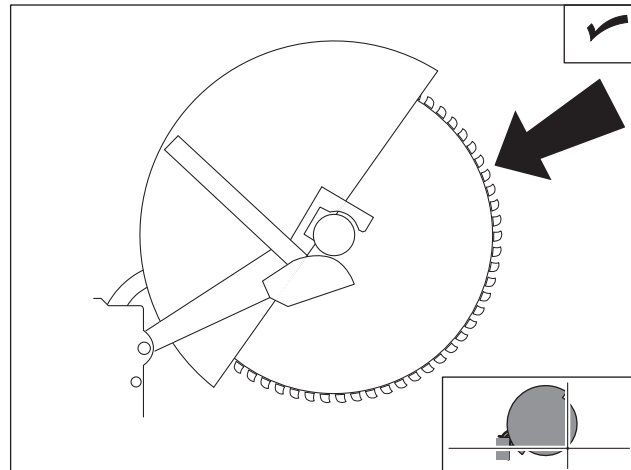
Check attachment mounting bolts every 10 hours. Tighten to 200 ft•lb (271 N•m).



t50om011h.eps

Check Bits

Check bits every 10 hours. Clean and check bits for free rotation. If bits are stuck, remove and clean packed soil from retaining ring. Replace bit when tungsten cap or insert is worn. See "Replace Bits" on page 195 for more information.



t48om062w.eps

50 Hour



Location	Task	Notes
TRACTOR	Change cab filters	
	Lube cross and bearings	Initial service, EPG
	Lube universal joints	Initial service, EPG
	Lube axle spindle pins	Initial service, EPG
TRENCHER	Check trencher gearbox oil level	MPL
PLOW	Change plow vibrator oil	Initial service, MPL
COMBO	Complete all service items for trencher and plow	

Tractor

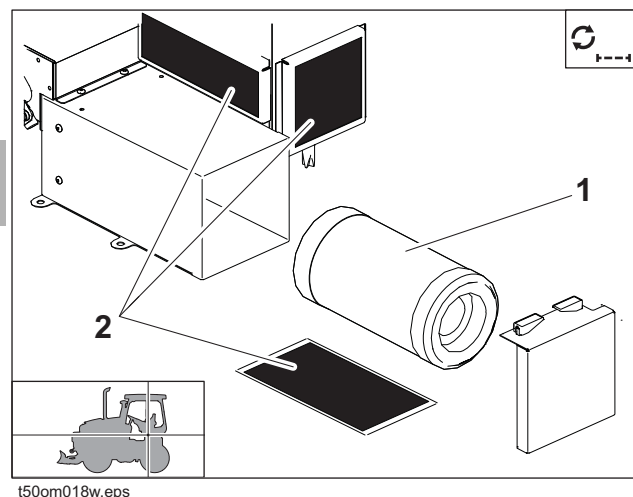
Change Cab Filters

Change cab air filters every 50 hours.

IMPORTANT: Filters may need to be changed more frequently in dusty conditions.

To change cab air filter (1):

1. Lift latches to remove door.
2. Remove filter element.
3. Empty and clean dustpan. Replace dustpan.
4. Replace filter element.
5. Replace door and secure latches.



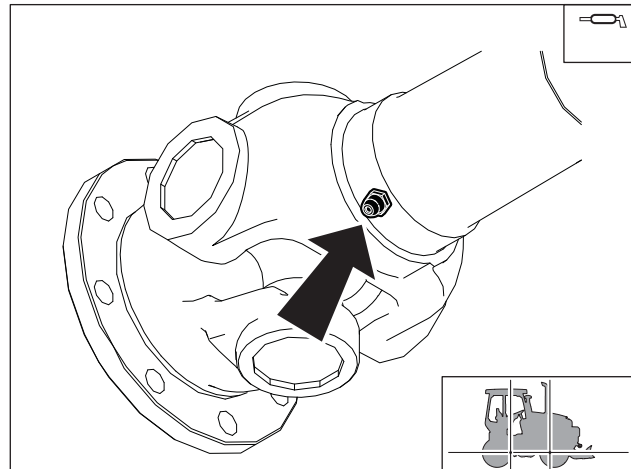
t50om018w.eps

To change recirculation filters (2):

1. Remove filters.
2. Clean with soapy water. Replace if necessary. See parts manual or contact your Ditch Witch® dealer for correct replacement filters.

Lube Cross and Bearings (Initial Service)

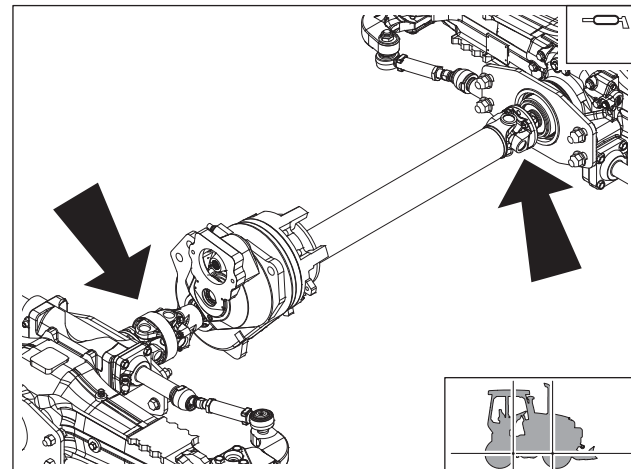
Lube cross and bearings at zerks (shown) at 50 hours initially and every 250 hours thereafter with EPG.



t50om045h.eps

Lube Universal Joints (Initial Service)

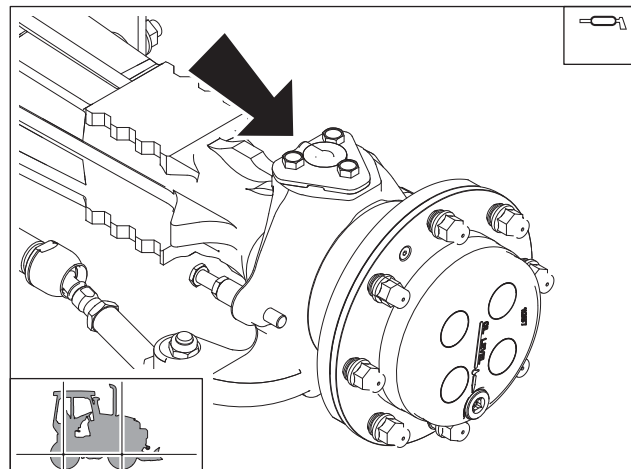
Lube universal joints (shown) at zerks at 50 hours initially and every 250 hours thereafter with EPG.



t50om012h.eps

Lube Axle Spindle Pins (Initial Service)

Lube axle spindle pins (shown) at 50 hours initially and every 250 hours thereafter with EPG.

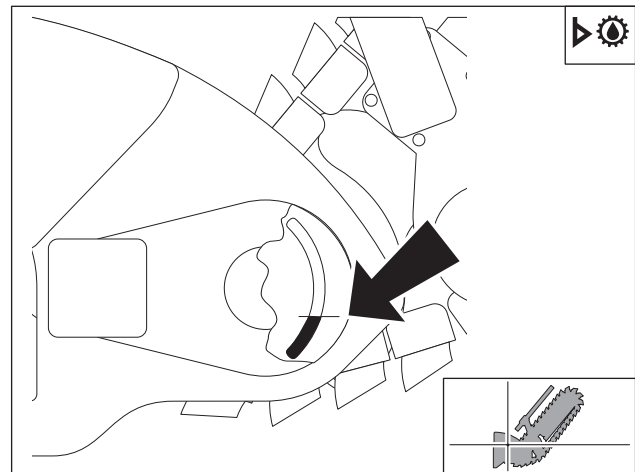


t50om014h.eps

Trencher

Check Trencher Gearbox Oil Level

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

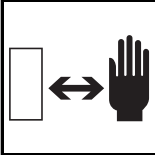


Plow

Change Plow Vibrator Oil

Change plow vibrator oil after first 50 hours of operation and every 500 hours thereafter.

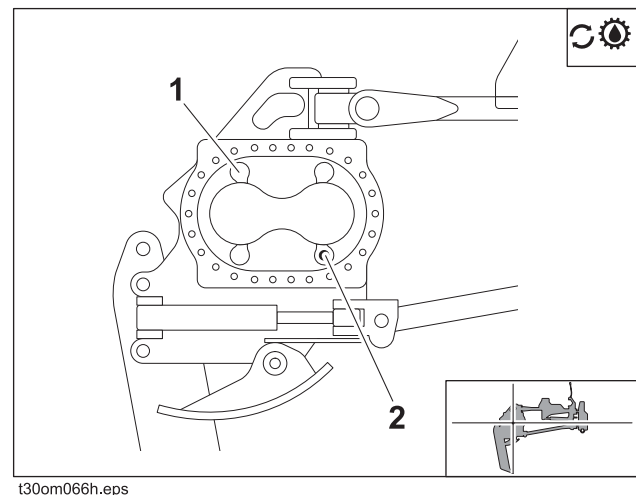
To change:



CAUTION

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

To help avoid injury: Do not drain oil from plow vibrator when hot. Let vibrator cool before removing drain plug.



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

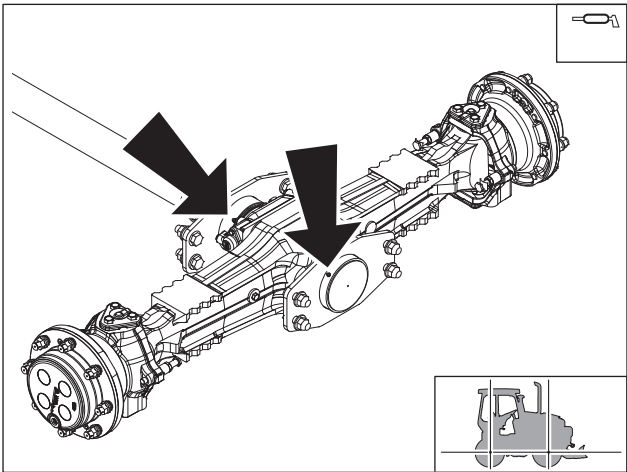
100 HOUR

Location	Task	Notes
TRACTOR	Lube axle mounts	
PLOW	Check plow shear mounts	
	Test plow connector pivots	

Tractor

Lube Axle Mounts

Lube axle mount pivots every 100 hours with EPG.



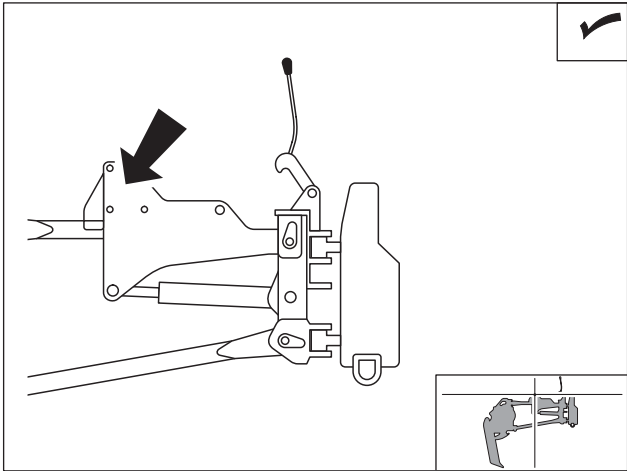
t50om010h.eps

Plow

Check Shear Mounts

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

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



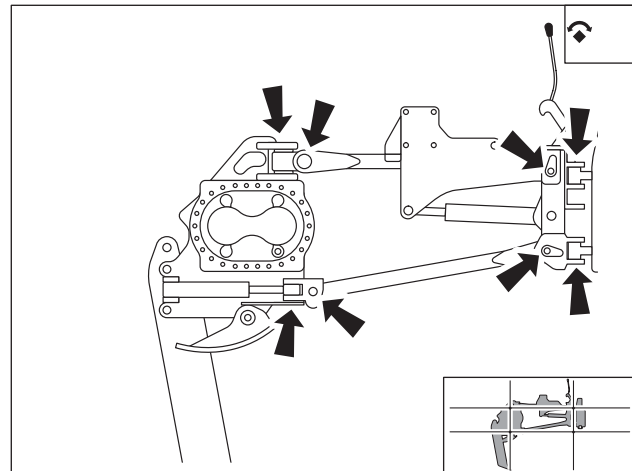
t30om070h.eps

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.



t30om071h.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.



250 Hour

Location	Task	Notes
TRACTOR	Change engine oil and filter	DEO
	Lube cross and bearings	EPG
	Lube universal joints	EPG
	Lube axle spindle pins	EPG
	Check ground drive gearbox oil level	MPL
	Check differential oil level	MPL
	Check planetary wheel ends	MPL

Tractor

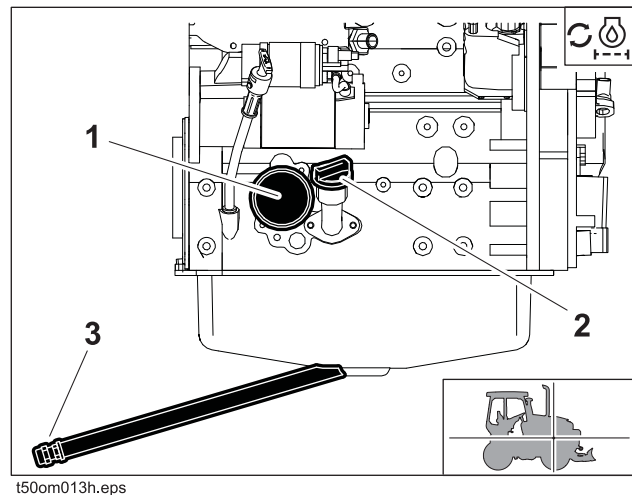
Change Engine Oil and Filter

IMPORTANT: See "Recommended Lubricants/Service Key" on page 153.

Change engine oil and filter every 250 hours.

To change:

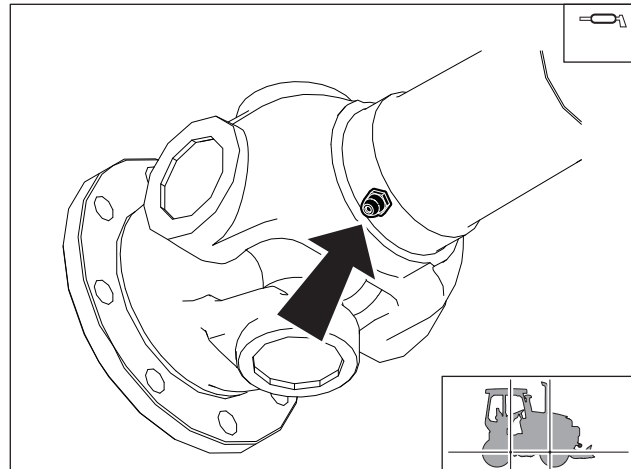
1. While oil is warm, remove drain plug (3). Drain oil and replace plug.
2. Remove filter (1) and replace with new filter each time oil is changed. Add DEO at fill neck (2) until oil level is at highest capacity on dipstick. Capacity is 8.4 qt (8 L).



t50om013h.eps

Lube Cross and Bearings

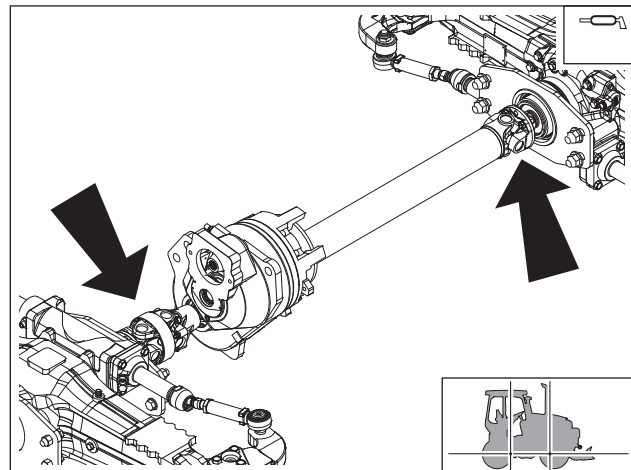
Lube cross and bearings at zerks (shown) every 250 hours with EPG.



t50om045h.eps

Lube Universal Joints

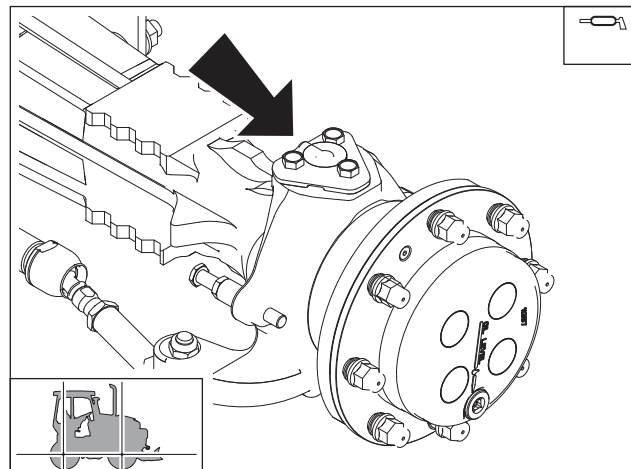
Lube universal joints (shown) at zerks every 250 hours with EPG.



t50om012h.eps

Lube Axle Spindle Pins

Lube axle spindle pins every 250 hours with EPG.

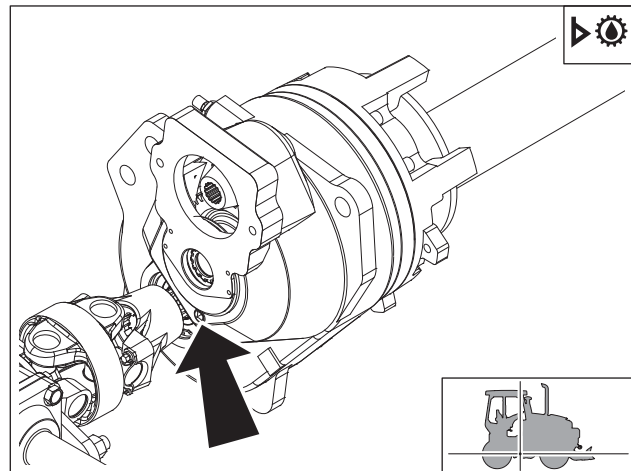


t50om014h.eps



Check Ground Drive Gearbox Oil Level

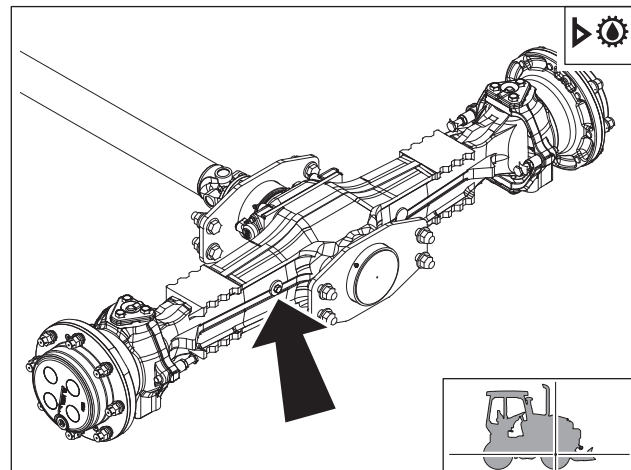
Check oil level at fill (shown) every 250 hours.
Keep level at raised horizontal line on gearbox.
Add MPL as needed.



t50om015h.eps

Check Differential Oil Level

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



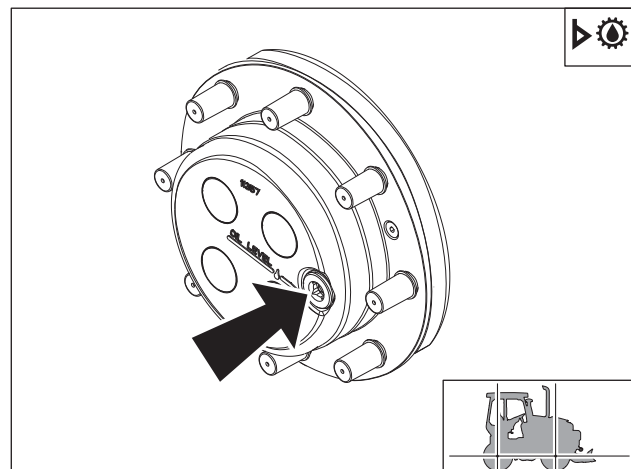
t50om016h.eps

Check Planetary Wheel End Oil Level

Check planetary wheel end oil every 250 hours.

To check:

1. Position wheel with plug at midway position as shown.
2. Ensure wheel is level.
3. Check to ensure oil is at plug level.
4. Add MPL as needed at plug opening.



t50om017h.eps

500 Hour

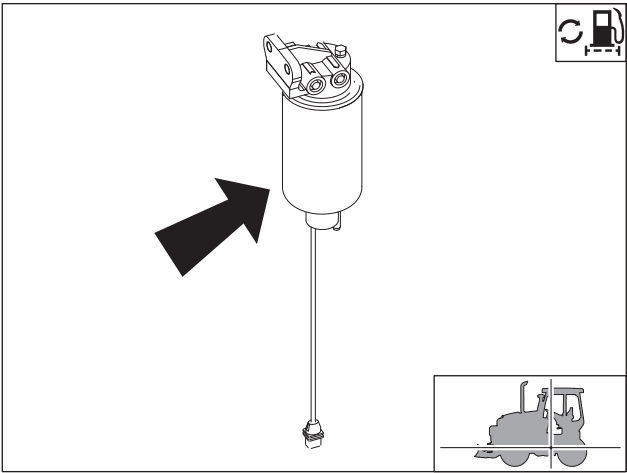


Location	Task	Notes
TRACTOR	Change primary fuel filter	
	Change secondary fuel filter	
	Change hydraulic fluid and filter	THF
	Test coolant freeze protection level	
	Change DEF filter	
PLOW	Change plow vibrator oil	MPL

Tractor

Change Primary Fuel Filter

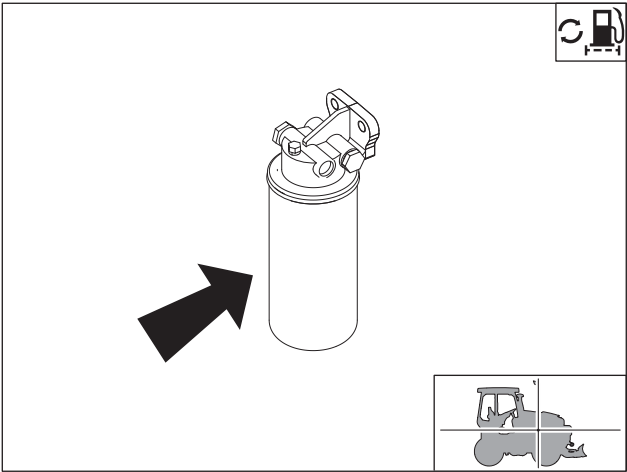
Change primary fuel filters (shown) every 500 hours.



t50om018h.eps

Change Secondary Fuel Filter

Change secondary fuel filters (shown) every 500 hours.



t50om019h.eps

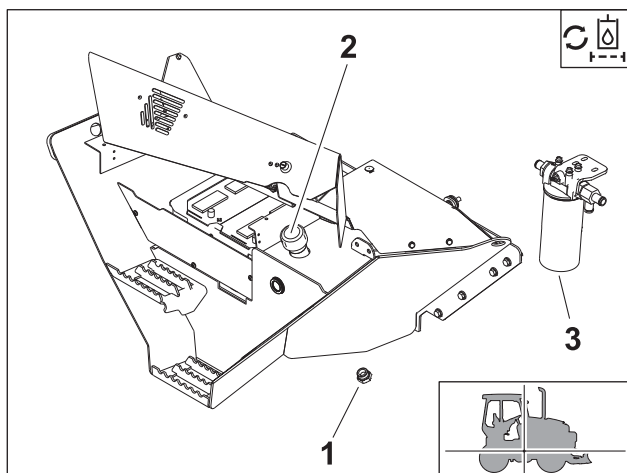
Change Hydraulic Fluid and Filter

Change hydraulic fluid and filter every 500 hours.

NOTICE: If normal operating temperature exceeds 100°F (38°C) 50% of the time, change every 250 hours.

To change:

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



t50om020h.eps

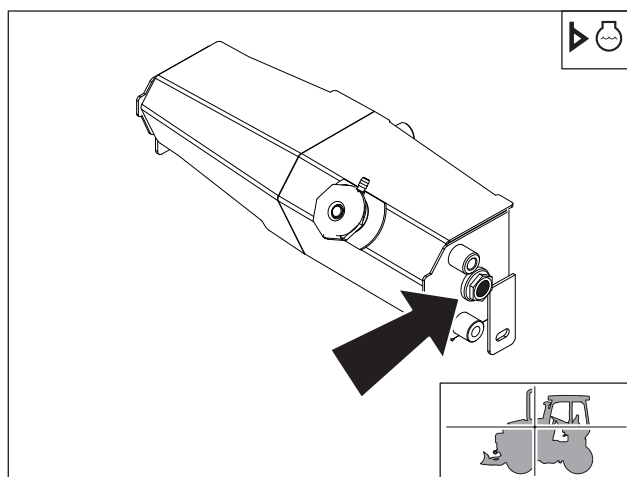
Test Coolant Freeze Protection Level

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 “Approved Coolant” on page 155 for more information.

Use pre-diluted coolant to maintain proper freeze protection.



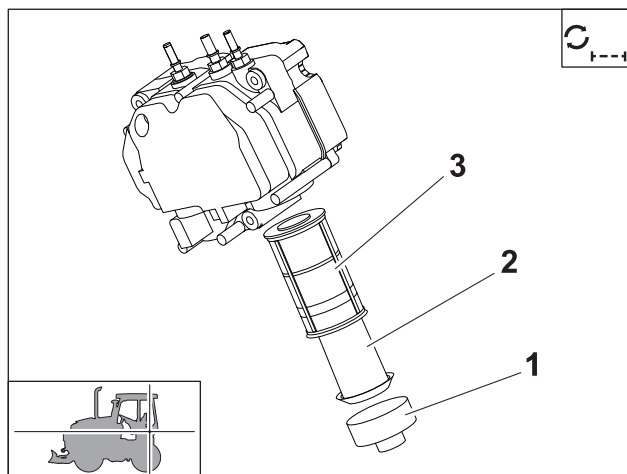
t50om008h.eps

Change DEF Filter

Change DEF filter every 500 hours.

To change:

1. Remove DEF filter cover.
2. Pull out DEF filter insert and compensation body.
3. Insert new DEF filter insert and compensation body and ensure both are seated correctly.
4. Replace cover and torque to 15-18 ft•lb (20-25 N•m).



t50om021h.eps

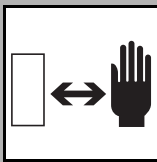
Plow

Change Plow Vibrator Oil

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

Change plow vibrator oil every 500 hours.

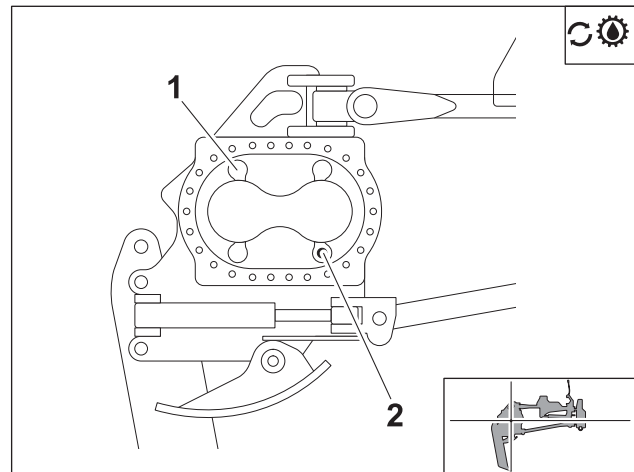
To change:



CAUTION

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

To help avoid injury: Do not drain oil from plow vibrator when hot. Let vibrator cool before removing drain plug.



t30om066h.eps

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



1000 Hour

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

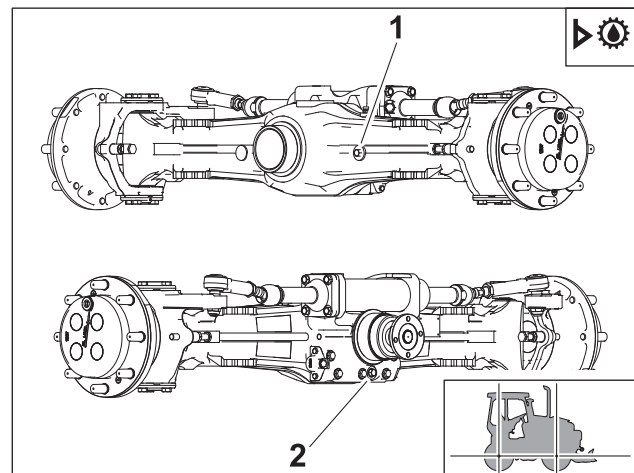
Tractor

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 until level is at fill plug (1).



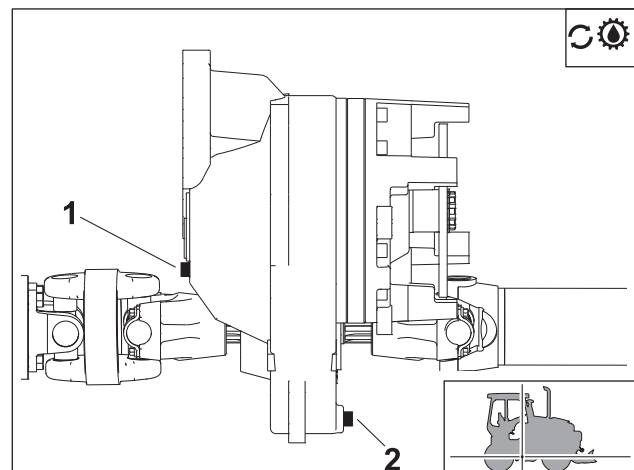
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Change Ground Drive Gearbox Oil

Change ground drive gearbox oil every 1000 hours.

To change:

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



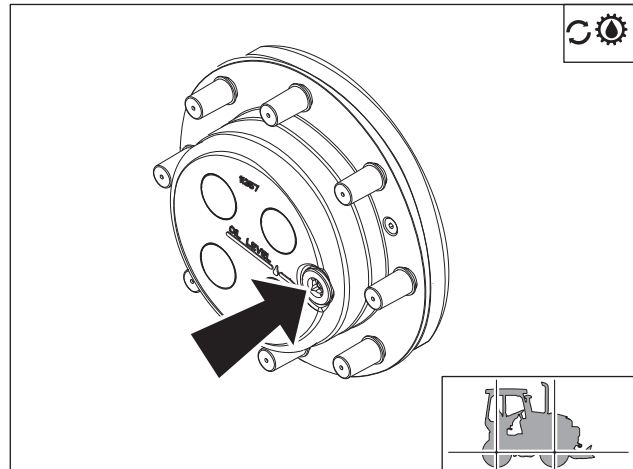
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Change Planetary Wheel End Oil

Change wheel end oil every 1000 hours.

To change:

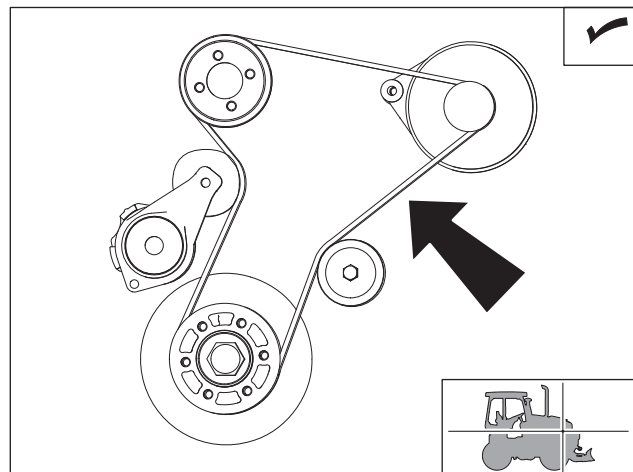
1. Position wheel with plug at bottom.
2. Remove plug.
3. Drain oil.
4. Reposition wheel with plug at midway position.
5. Add MPL until fluid level is at plug opening.
6. Replace plug.



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Check Engine Drive Belt

Check engine drive belt every 1000 hours for cracks and wear. If damaged, replace belt. See "Change Engine Drive Belt" on page 185.

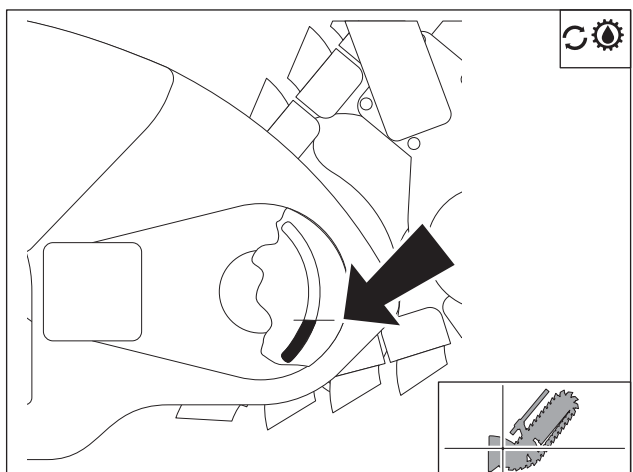


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Trencher

Change Trencher Gearbox Oil

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



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2000 Hour

Location	Task	Notes
TRACTOR	Change engine coolant	DEAC
	Inspect seatbelt	
	Change engine drive belt	

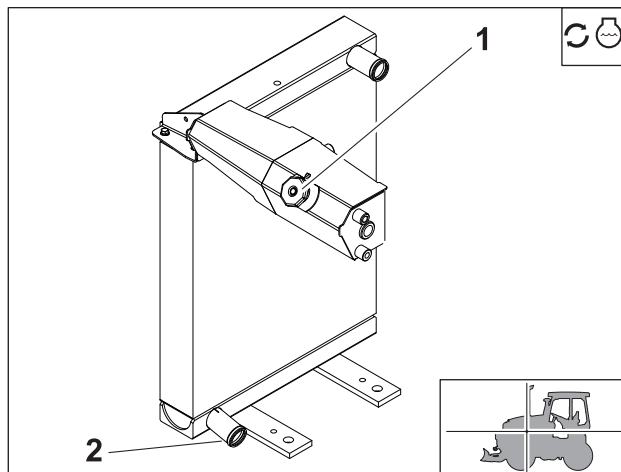
Tractor

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 "Approved Coolant" on page 155 for list of approved coolants.

Drain cooling system at drain (2) every two years or 2000 hours. Add approved coolant at fill (1) until fluid is visible in sight glass on expansion tank.



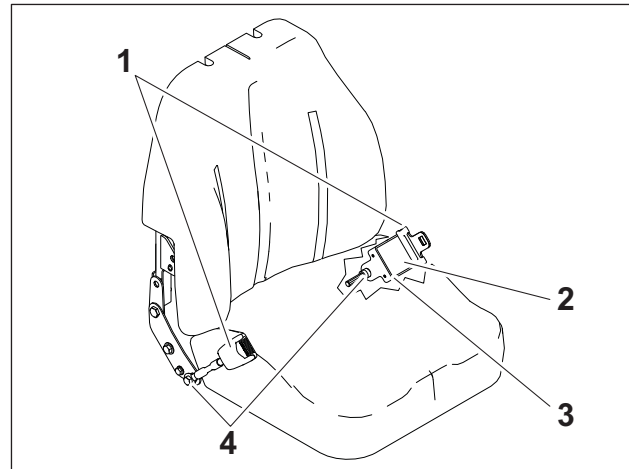
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Inspect Seat Belt

Check seat belt and mounting hardware as needed. Inspect the webbing, buckle and latch, retractor, and mounting hardware. Replace any worn or damaged components.

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.



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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

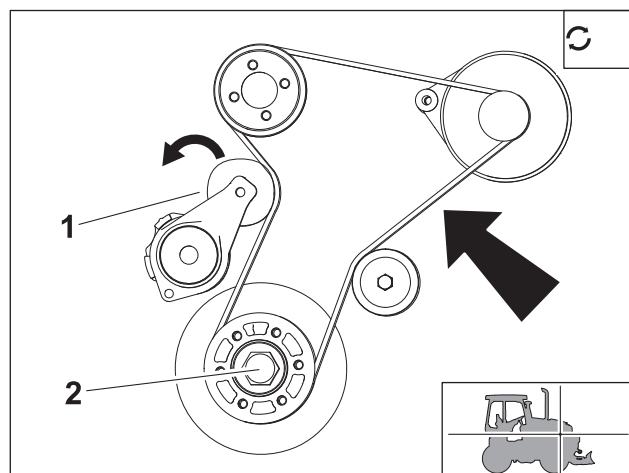
Inspect the seat belt mounting bolts (4) on both sides of the seat to ensure they are tight. Replace missing, damaged, or corroded bolts.

Change Engine Drive Belt

Change engine drive belt every 2000 hours.

To change:

1. Relieve tension on the belt (shown) by moving tension roller (1) in the direction shown until a retaining pin can be inserted into the assembly bore (2).
2. Remove belt from tension roller.
3. Remove belt completely.
4. Install new belt.
5. Holding tension roller with pin wrench, move retaining pin.
6. Remove pin wrench, allowing tension roller to fall back into place.
7. Tension belt using tension roller. Ensure belt is correctly seated.



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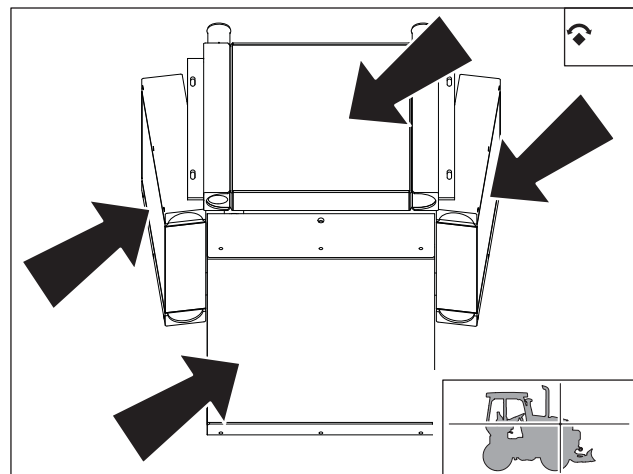
As Needed

Location	Task	Notes
TRACTOR	Clean radiator	
	Change air filter	
	Drain water separator on primary fuel filter	
	Check engine compartment	
	Check battery	
	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)
BACKHOE	Replace pins and bushings	
SAW	Replace bits	

Tractor

Clean Radiator

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



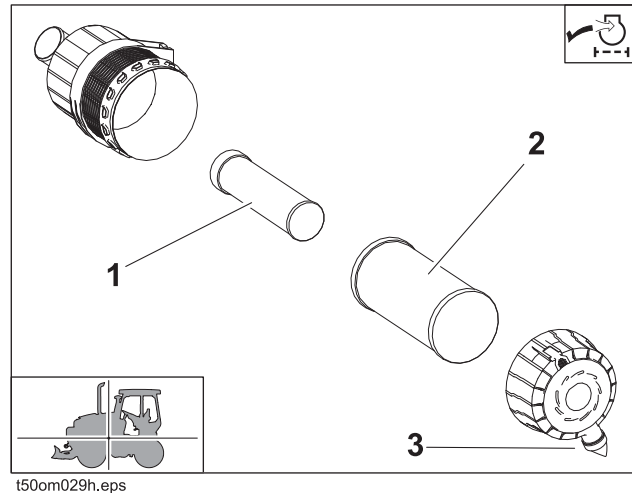
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Change Air Filter

Change air filter when pop-up message appears.

To change:

1. Remove air filter cover and remove primary (1) and secondary (2) elements.
2. Wipe inside of housing and wash cover.
3. Clean dust ejector valve (3).
4. Insert new secondary element and ensure it is seated correctly.
5. Insert new primary element.
6. Replace cover. If cover does not fit, element is not properly locked into housing. Remove cover and primary element and repeat step 4.



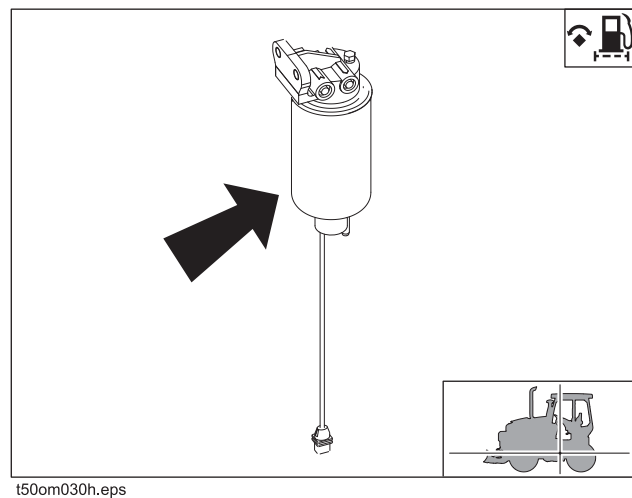
NOTICE: Only open the air filter canister when pop-up message appears. Change the elements. Do not attempt to clean them.

- Improperly installed primary element can lead to premature engine failure.
- Compressed air or water may damage filter elements.
- Tapping filter elements to loosen dirt may damage the elements.

Drain Water Separator on Primary Fuel Filter

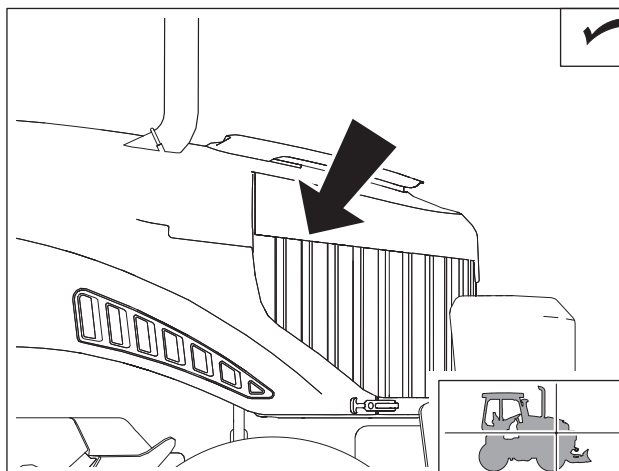
Drain water separators on primary fuel filter as needed. WIF (water in fuel) indicator will indicate need.

Drain at plug as needed until water is removed and fuel runs from drain.



Check Engine Compartment

Check engine compartment for debris as needed. Do not use water or compressed air to remove debris from engine compartment. Check more often if operating in large brush, grassy conditions or being stored.



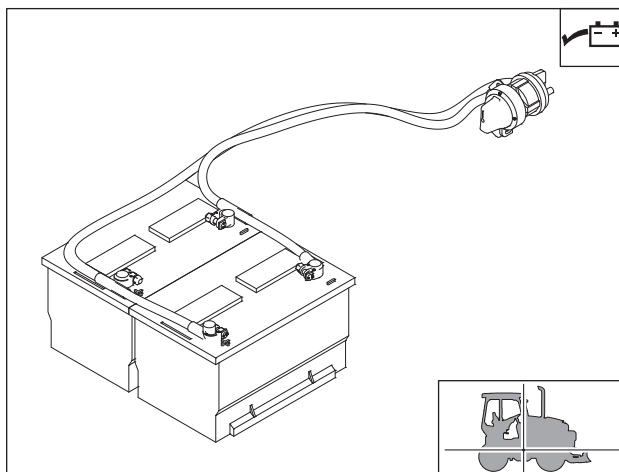
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Check Battery

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

To clean:

1. Turn battery disconnect switch, if equipped, to the off position.
2. Ensure that no ignition sources are near batteries.
3. Loosen and remove battery cable clamps carefully, **negative (-)** cable first.
4. Clean cable clamps and terminals to remove dull glaze.
5. Check for signs of internal corrosion in cables.
6. 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.



t50om032h.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.

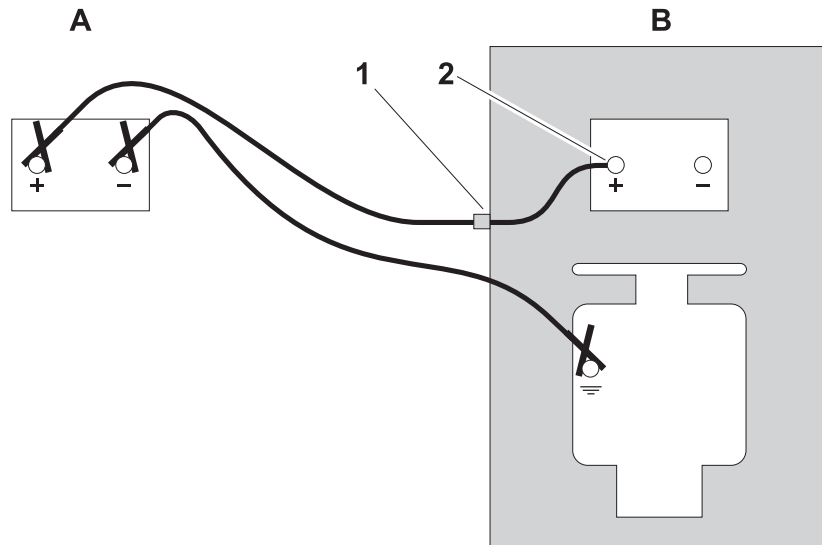
Before You Start

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 jumper cables capable of carrying high currents (400 amps or more). Cheap cables may not allow enough current flow to charge a dead/discharged battery.

Read all steps thoroughly and review illustration before performing procedure.

Charging Procedure (Engine Off)

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



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

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

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

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

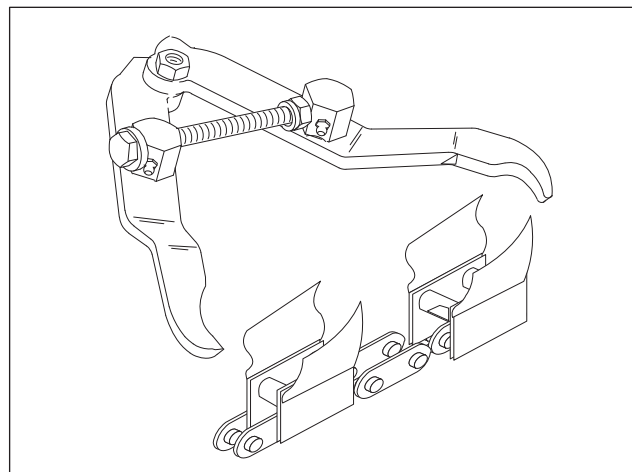
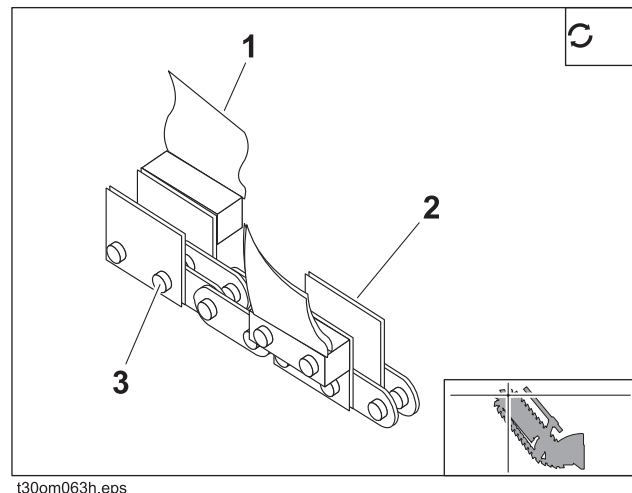
Replace Digging Chain

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.

NOTICE: 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. Set 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.



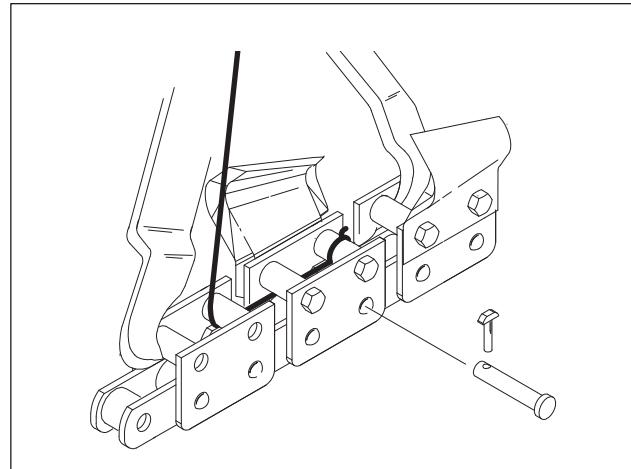
8. Loop cable through links nearest connector pin.



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

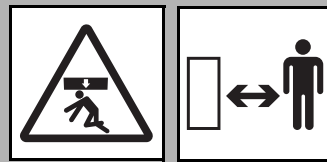
To help avoid injury:

- 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.



Digging_Chain_Remove_02.eps

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



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

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

To install chain:

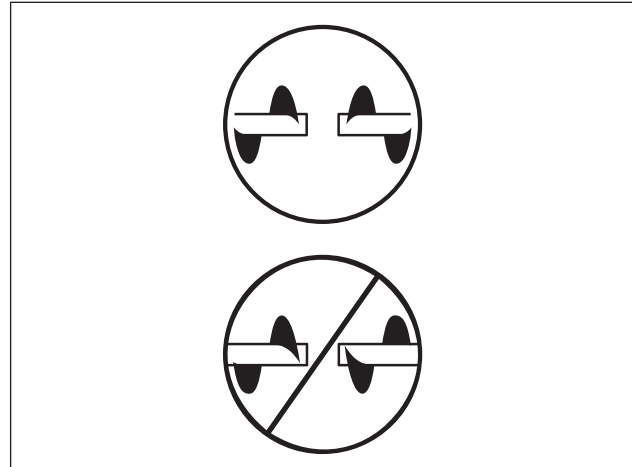
1. Lay chain on ground with teeth down and pointed toward unit.
2. Fasten and adjust seat belt.
3. Start tractor. See page 78 for start-up procedures.
4. Release parking brake.
5. Move ground drive control to reverse.
6. Back unit up until chain extends past head shaft about 1' (305 mm).
7. Move ground drive control to neutral.
8. Lower backfill blade, if equipped, to ground.
9. Lower boom to horizontal position.
10. Set parking brake and verify parking brake indicator is on.
11. Turn ignition switch to STOP.
12. Pull rear end of chain over and about 10" (260 mm) past tail roller.
13. Use hoist to pull front end of chain over head shaft sprocket.
14. Move chain down boom until chain connector pin and lock key can be installed. Install connector pin and lock key.
15. Tighten chain by pumping EPG into grease cylinder.

Time Augers

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

To adjust timing:

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



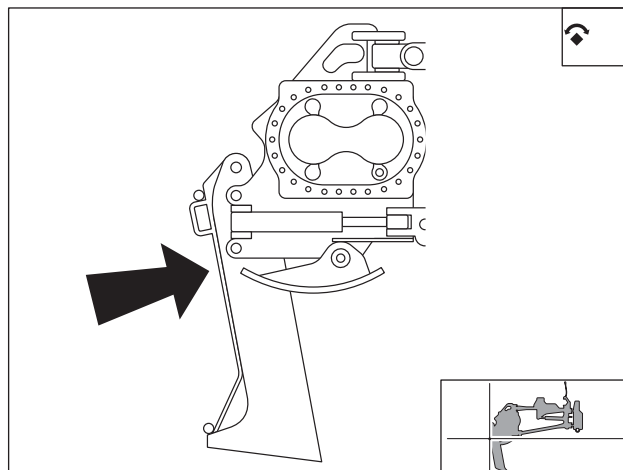
Augers_Adjust.eps



Plow

Clean Feed Tube

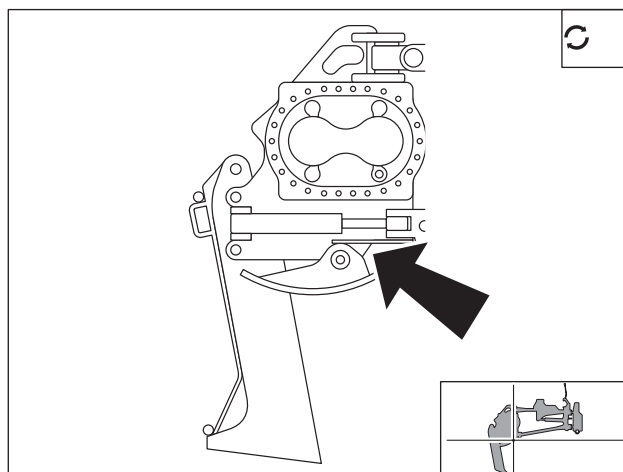
Clean feed tube as needed.



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Replace Sod Cutter and Blade

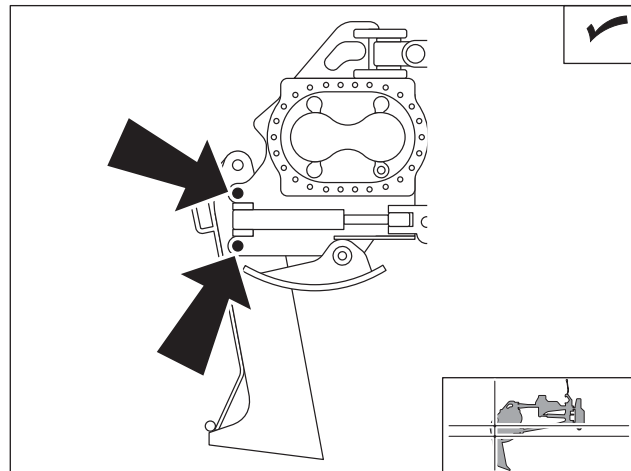
Replace worn sod cutter and plow blade as needed.



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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).

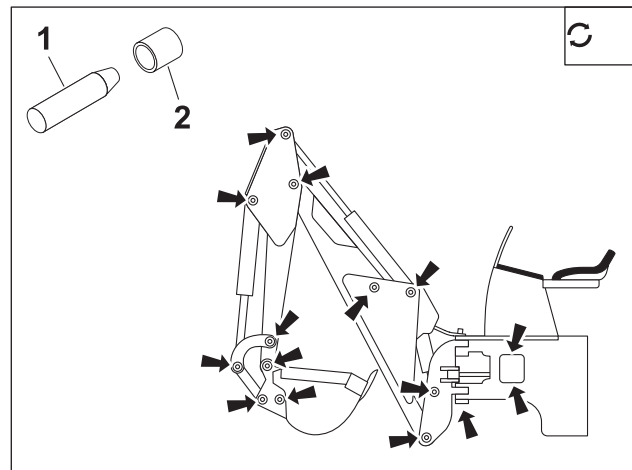


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Backhoe

Replace Pins and Bushings

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



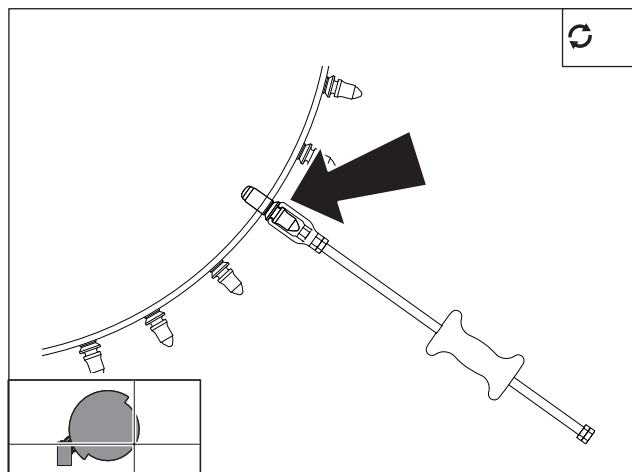
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Saw

Replace Bits

Replace bits when worn or damaged.

1. Slide bit puller tool (p/n 259-002) onto groove in bit (shown).
2. Pull back on weight on bit puller tool to remove bit.
3. Install new bit.
4. Check bit clearance. See "Check Bits" on page 170.

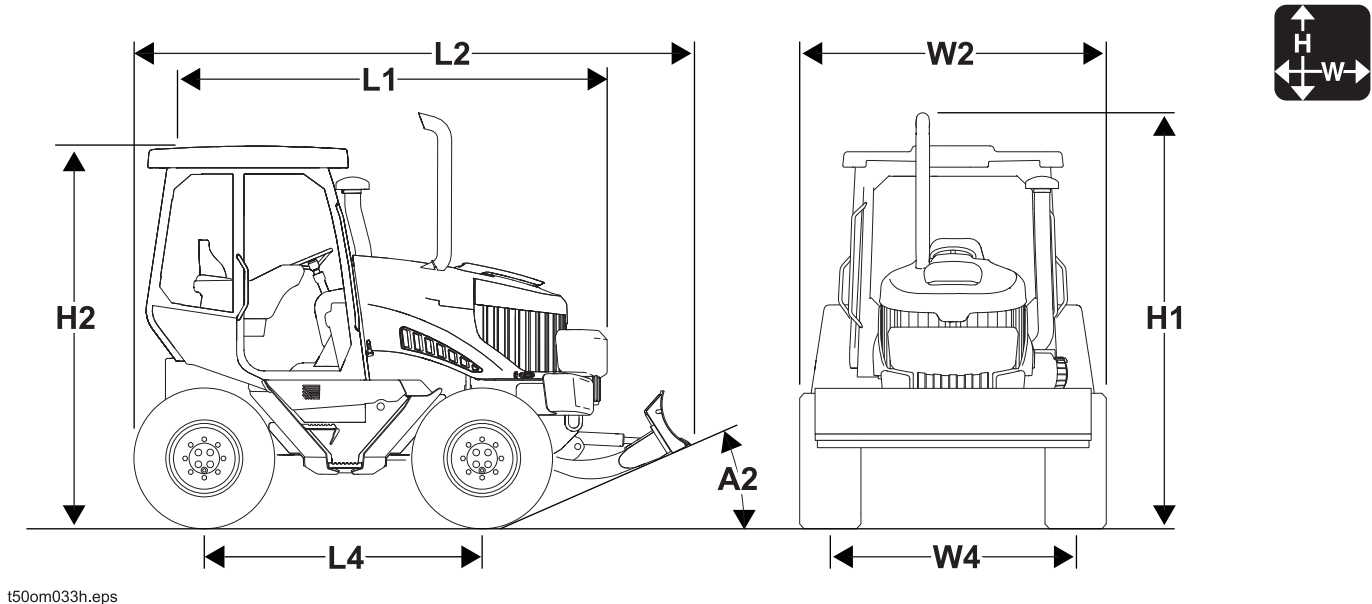


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Specifications

RT125 Tractor



Dimensions		U.S.	Metric
A2	Angle of approach	25°	25°
H1	Height	115 in	2.92 m
H2	Transport height	105 in	2.67 m
L1	Nose to rear mount length	125 in	3.18 m
L2	Length - transport	154 in	3.91 m
L4	Wheelbase	79 in	2.01 m
W2	Width	82 in	2.09 m
W4	Tread	64 in	1.63 m

General
Ditch Witch® model RT125 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	1.3 mph	2.1 km/h
	High	8.0 mph	12.87 km/h
Reverse speeds			
	Low	1.3 mph	2.1 km/h
	High	5.5 mph	8.8 km/h
Vehicle clearance circle (SAE) wall to wall with optional backfill blade			
	Front steer only	35 ft	10.7 m
	Coordinated steer	21 ft	6.4 m
Ground clearance		14 in	356 mm
Basic unit weight		9700 lb	4400 kg
Maximum allowable tractor weight		22,000 lb	9,979 kg

Backfill Blade (optional)		U.S.	Metric
Blade width		80 in	2.03 m
Blade height		17 in	430 mm
Lift height above ground		21 in	533 mm
Blade drop below ground		10 in	254 mm
Maximum swing angle (left/right)		30°	30°
Tilt angle (up/down)		12°	12°

Power Train
Ground drive: hydrostatic
Differentials: planetary front and rear with rear steering
Service brake: disc, foot-operated
Parking brake: disc, spring applied, hydraulic release
Tires: 38 x 18.00-20 NHS(TL)
Attachment drive: hydrostatic, electronically-operated speed infinitely variable from zero to maximum

Power Plant		U.S.	Metric
Engine: Deutz® Tier 4 Final TCD3.6L4 diesel, direct injection, 4 cyl. turbocharged with charge air cooling and exhaust after treatment system (EAT).			
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 J1349		121 hp	90 kW
Estimated net power per SAE J1349		113 hp	84 kW
Rated speed		2300 rpm	2300 rpm
Maximum engine tilt angles*			
	Longitudinal	30°	30°
	Lateral	30°	30°

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

Hydraulic System		U.S.	Metric
Ground drive pump capacity at 2300 rpm		27.5 gpm	104 L/min
Ground drive pump relief pressure at 2300 rpm		5300 psi	365 bar
Attachment pump capacity at 2300 rpm		45 gpm	180 L/min
Attachment pump relief pressure at 2300 rpm		6500 psi	448 bar
Auxiliary pump capacity at 2300 rpm		5.1 gpm	19.3 L/min
Auxiliary pump relief pressure at 2300 rpm		3000 psi	206 bar
Steering pump capacity at 2300 rpm		8.6 gpm	32.5 L/min
Steering pump relief pressure at 2300 rpm		3000 psi	206 bar

Fluid Capacities		U.S.	Metric
Fuel tank		38 gal	144 L
Engine oil		8.5 qt	8 L
Hydraulic reservoir		25 gal	95 L
Hydraulic system		30 gal	114 L
Cooling system		4.25 gal	16.1 L
DEF tank		2.6 gal	10 L



Battery (2 used)

Group 65, SAE res. cap 165 min., SAE cold crank @ 0° F (-18° C), 875 amp

Auxiliary power outlet - 12 volt, 10 amp

Vibration Level

Average vibration transmitted to the operator's hand and whole body during normal trenching operation is 3.48 m/s² and 2.35 m/s², respectively.*

Average vibration transmitted to the operator's hand and whole body during normal sawing operation is 18.77 m/s² and 2.13 m/s², respectively.*

Average vibration transmitted to the operator's hand and whole body during normal plowing operation is 5.98 m/s² and 0.64 m/s², respectively.*

Noise Levels

Operator ear sound pressure level is 91 dBA per ISO 6394.

Operator ear sound pressure level (with cab) is 77 dBA per ISO 6396.

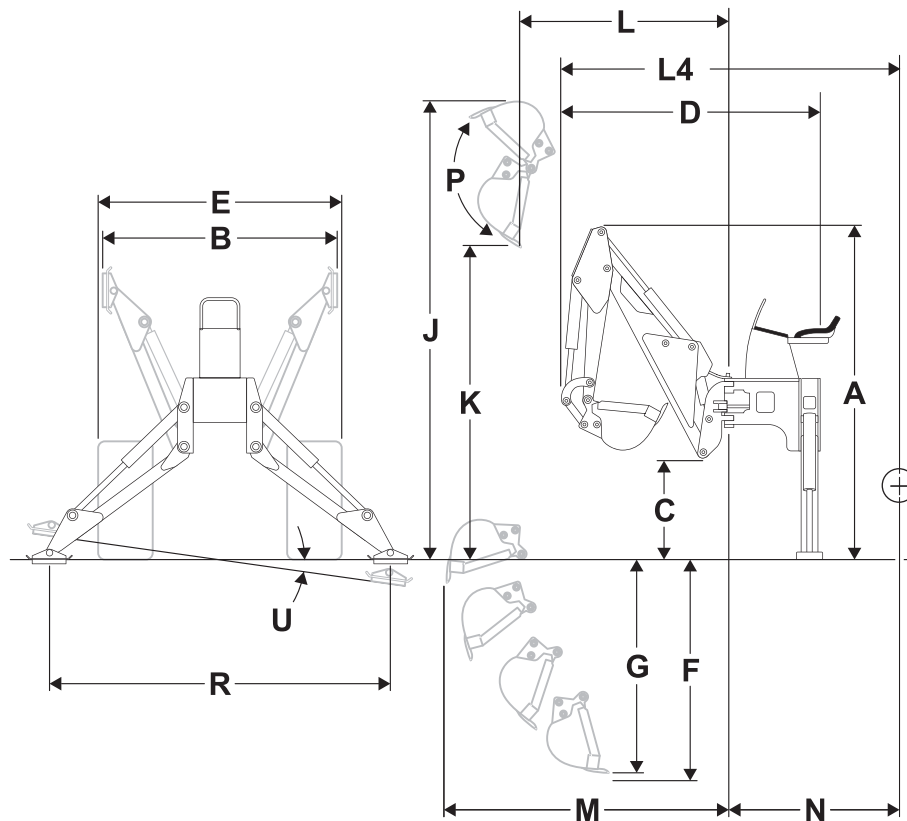
Exterior sound power level is 107 dBA per ISO 6393.

*Actual vibration levels depend on the conditions of the operation being performed.

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

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

BH120 Backhoe



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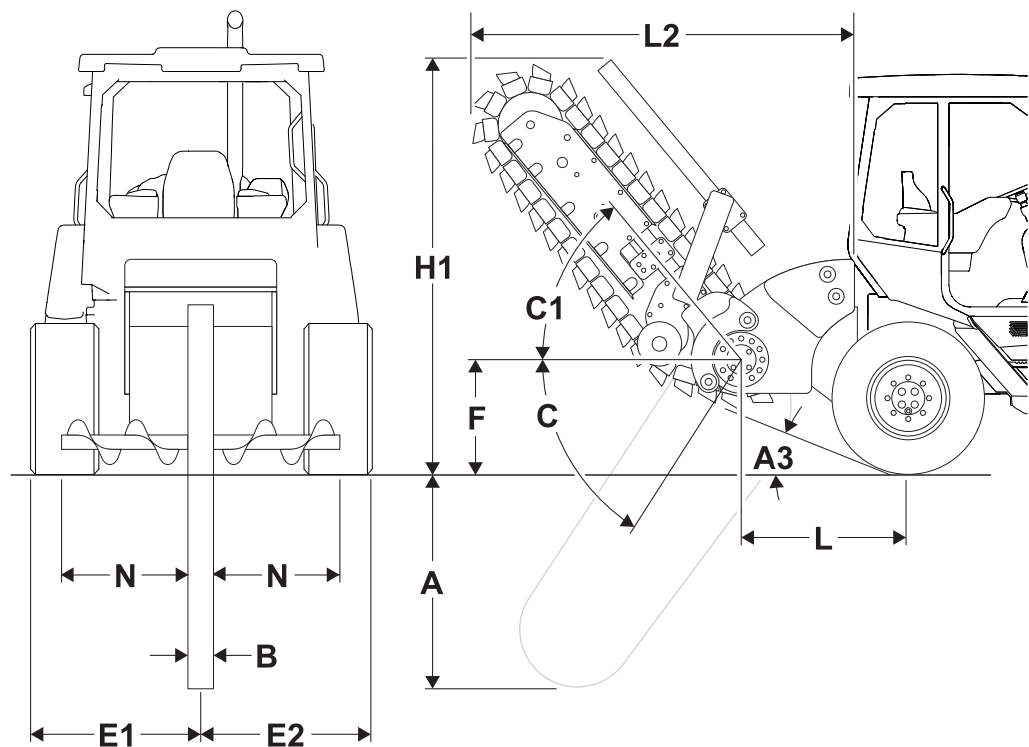
Dimensions		U.S.	Metric
A	Transport height	118 in	2.98 m
C	Ground clearance	29 in	736 mm
D	Backhoe length, stowed	117 in	2.97 m
F	Digging depth, max.	112 in	2.84 m
G	Digging depth, 2" (0.6 m) flat bottom	109 in	2.77 m
J	Operating height, fully raised	156 in	3.96 m
K	Loading height	104 in	2.64 m
L	Loading reach	78 in	1.98 m
M	Reach from swing pivot	158 in	4.01 m
N	Swing pivot to centerline axle	57 in	1.45 m
P	Bucket rotation	170°	170°
B	Stabilizer spread, transport	86 in	2.18 m

E	Backhoe or basic unit width	82 in	2.08 m
R	Stabilizer spread, operating	121 in	3.07 m
U	Leveling angle	10°	10°

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

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

CT120H Trencher

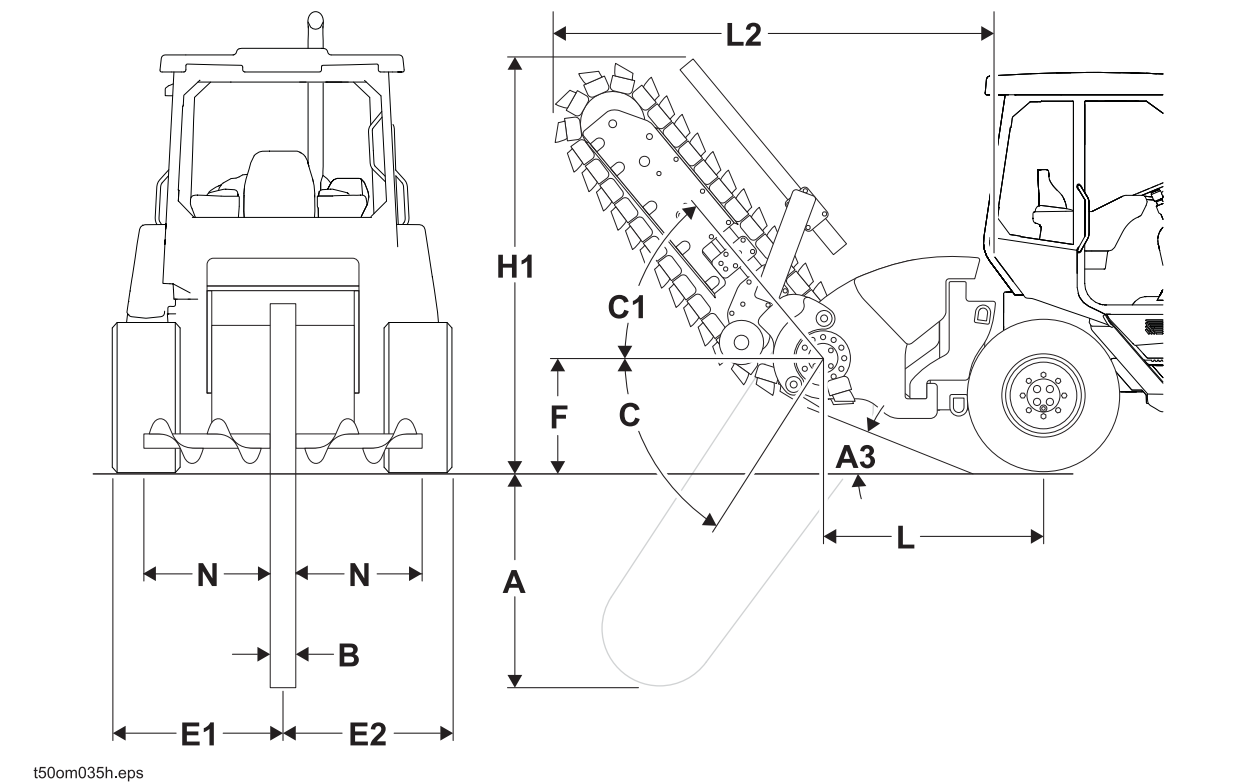


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Dimensions		U.S.	Metric
A ³	Angle of departure	24°	24°
A	Trench depth, maximum	97 in	2.46 m
B	Trench width, maximum	24 in	610 mm
C	Boom travel down	65°	65°
C ¹	Boom travel up	50°	50°
E ¹	Centerline of trench to outside edge, left	41 in	1.04 m
E ²	Centerline of trench to outside edge, right	32 in	813 mm
F	Headshaft height, digging chain	32 in	813 mm
H ¹	Transport height	124 in	3.15 m
L ²	Transport length	115 in	2.92 m
L	Headshaft overhang	43 in	1.09 m
N	Soil discharge reach	33 in	843 mm
	Attachment weight	1750 lb	794 kg

Operation		U.S.	Metric
Headshaft speeds with RT125 at 2300 engine rpm			
	Ratio low	220 rpm	220 rpm
	Ratio standard	270 rpm	270 rpm
	Ratio high (not recommended)	362 rpm	362 rpm
Digging chain speeds with RT125			
	Ratio low	628 ft/min	191.4 m/min
	Ratio standard	767 ft/min	233.7 m/min
	Ratio high (not recommended)	1032 ft/min	314.5 m/min

ST120H Trencher

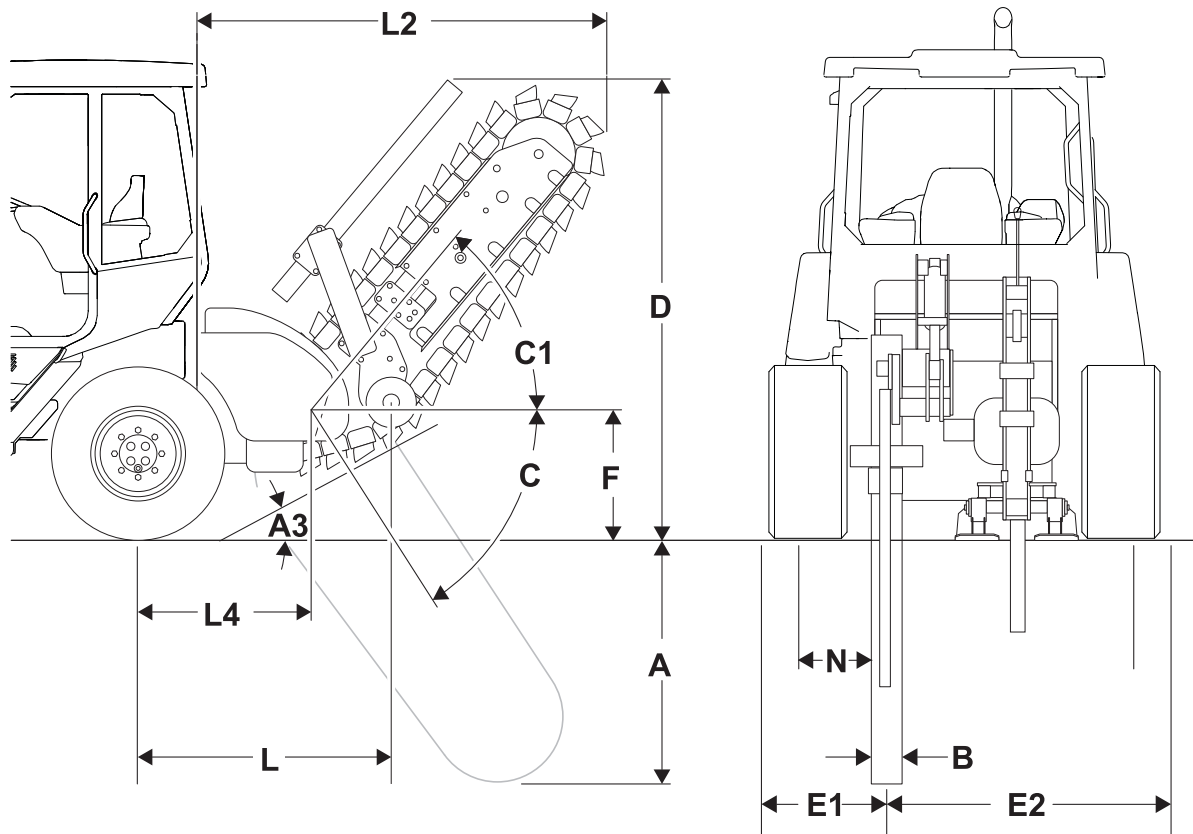


Dimensions		U.S.	Metric
A3	Angle of departure	24°	24°
A	Trench depth, maximum	94 in	2.39 m
B	Trench width, maximum	24 in	610 mm
C	Boom travel down	65°	65°
C1	Boom travel up	50°	50°
E1	Centerline of trench to outside edge, left	25 in	635 mm
E2	Centerline of trench to outside edge, right	13.5 in	342.9 mm
F	Headshaft height, digging chain	35 in	889 mm
H1	Transport height	130 in	3.30 m
L2	Transport length	126 in	3.20 m
L	Headshaft overhang	54.0 in	1.37 m
N	Soil discharge reach	33 in	838 mm
Attachment weight		2350 lb	1066 kg

Operation		U.S.	Metric
Headshaft speeds with RT125 at 2300 engine rpm			
	Ratio low	220 rpm	220 rpm
	Ratio standard	270 rpm	270 rpm
	Ratio high (not recommended)	362 rpm	362 rpm
Digging chain speeds with RT125			
	Ratio low	624 ft/min	190 m/min
	Ratio standard	767 ft/min	233 m/min
	Ratio high (not recommended)	1032 ft/min	314 m/min

PT120H Combo

Trencher



t50om036h.eps

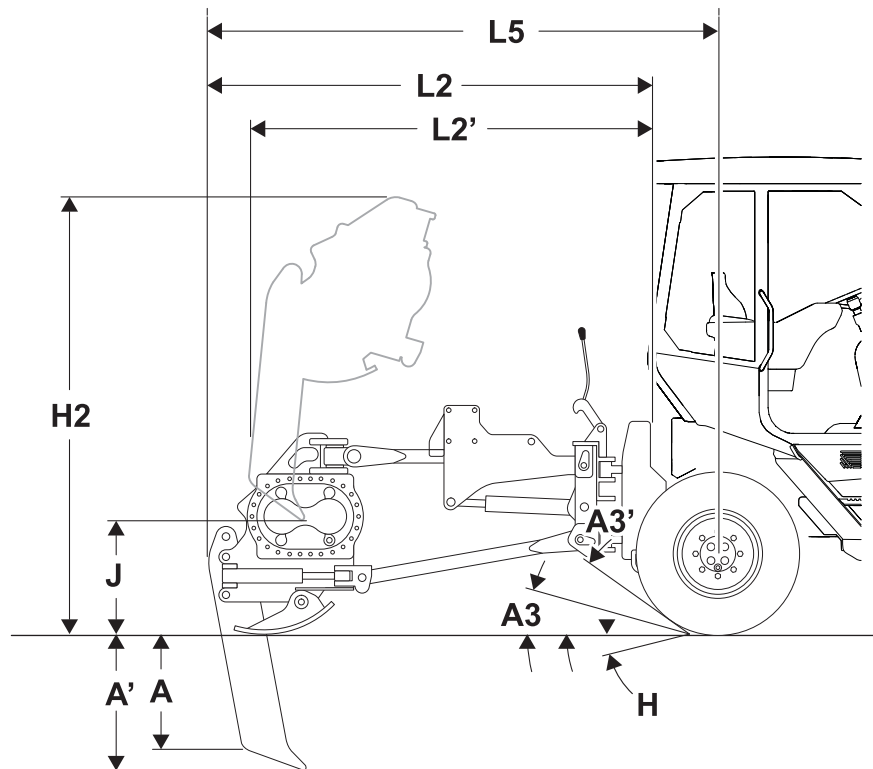
Dimensions		U.S.	Metric
A	Trench depth, maximum	70 in	1.78 m
A3	Angle of departure	22°	22°
B	Trench width	6-12 in	150-300 mm
C1	Boom travel up	44°	44°
C	Boom travel down	60°	60°
F	Headshaft height, digging chain	31 in	790 mm
L ²	Transport length (48" boom)	126 in	3.20 m
D	Transport height (48" boom)	126 in	3.20 m
E1	Center of trench to outside edge, left*	8 in	203 mm
E2	Center of trench to outside edge, right	67 in	1.70 m
N	Spoil discharge reach, minimum	19 in	480 mm

L	Headshaft overhang	40 in	1.02 m
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*Left edge of machine is defined as outside of digging chain guard

Operation		U.S.	Metric
Maximum headshaft speed at 2300 engine rpm			
	Ratio low	220 rpm	220 rpm
	Ratio standard	270 rpm	270 rpm
	Ratio high (not recommended)	362 rpm	362 rpm
Maximum digging chain speed			
	Ratio low	628 ft/min	191.4 m/min
	Ratio standard	767 ft/min	233.7 m/min
	Ratio high	1032 ft/min	314.5 m/min

Plow



t50om037h.eps



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	27°	27°
	Angle of departure, transport, 30" (760-mm) blade	22°	22°
A3'	Angle of departure, transport, no blade	30°	30°
H	Angle of depression, plow max.	10°	10°
H2	Height, transport	96 in	2.44 m
J	Blade ground clearance, 30" (760-mm) blade	29 in	737 mm
L2	Attachment length, fully lowered, no blade	103 in	2.62 m
L2'	Attachment length, fully raised, no blade	70 in	1.78 m
	Plow swing angle, left	0°	0°
	Plow swing angle, right	38°	38°
	Inclusive blade steer angle	89°	89°
	Center of plow to outside edge of machine, left	45 in	1.14 m

	Center of plow to outside edge of machine, right	37 in	931 mm
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* Suggested maximum. Plow blade used will be determined by job requirements and soil conditions.

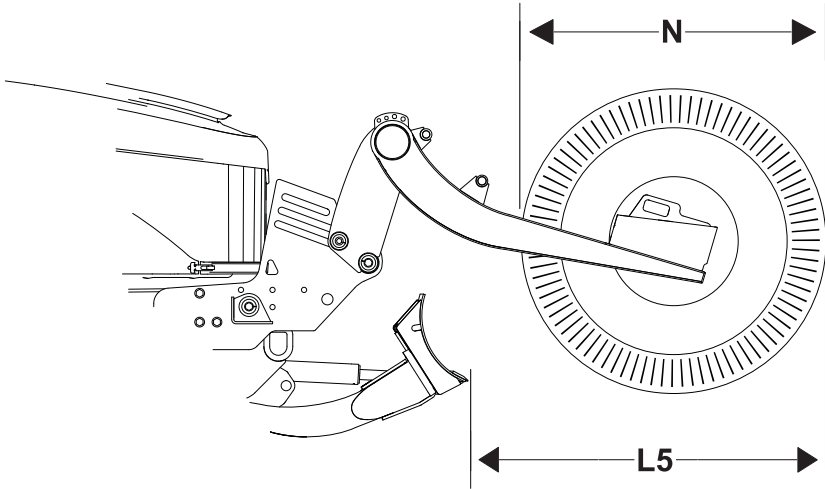
Operational	U.S.	Metric
Plow vibrator force @ 1800 rpm	35,215 lb	157 kN

Maximum material diameter

	Pulled	3 in	76 mm
	Fed	2 in	51 mm

General	U.S.	Metric
Attachment weight without boom, chain, or plow blade	3065 lb	1390 kg

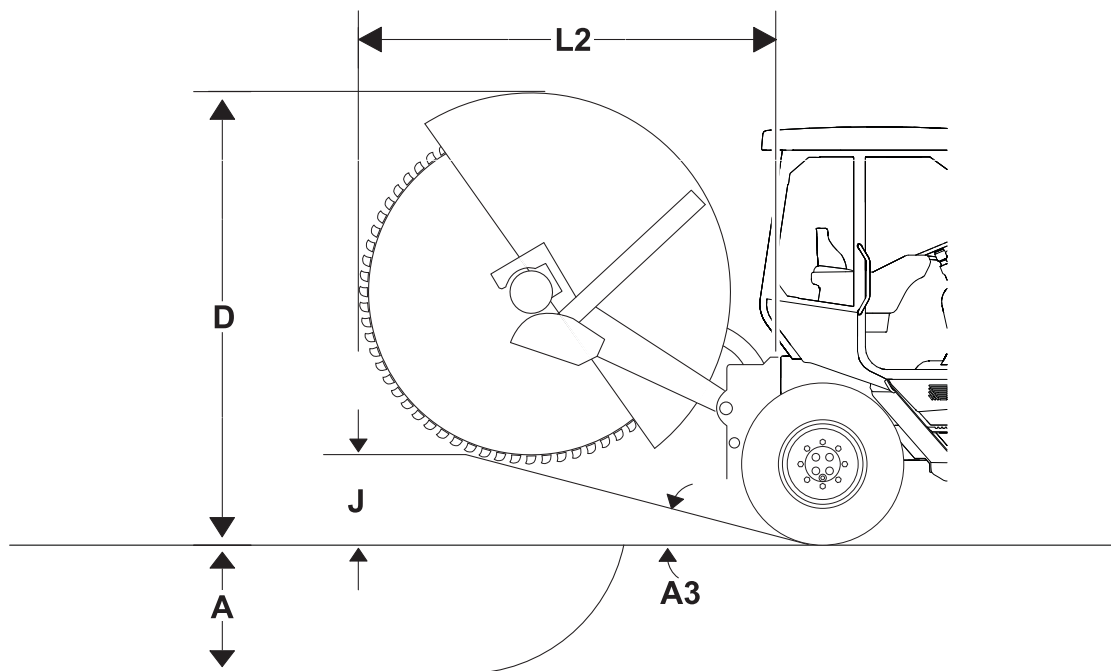
RC30 Reel Carrier



t50om038h.eps

Dimensions		U.S.	Metric
L5	Distance from backfill blade to outside edge of reel carrier with maximum diameter reel.	90 in	2.29 m
N	Maximum reel diameter	96 in	2.44 m
	Internal width	54 in	1.37 m
	Capacity	2500 lb	1134 kg

RS40 Saw

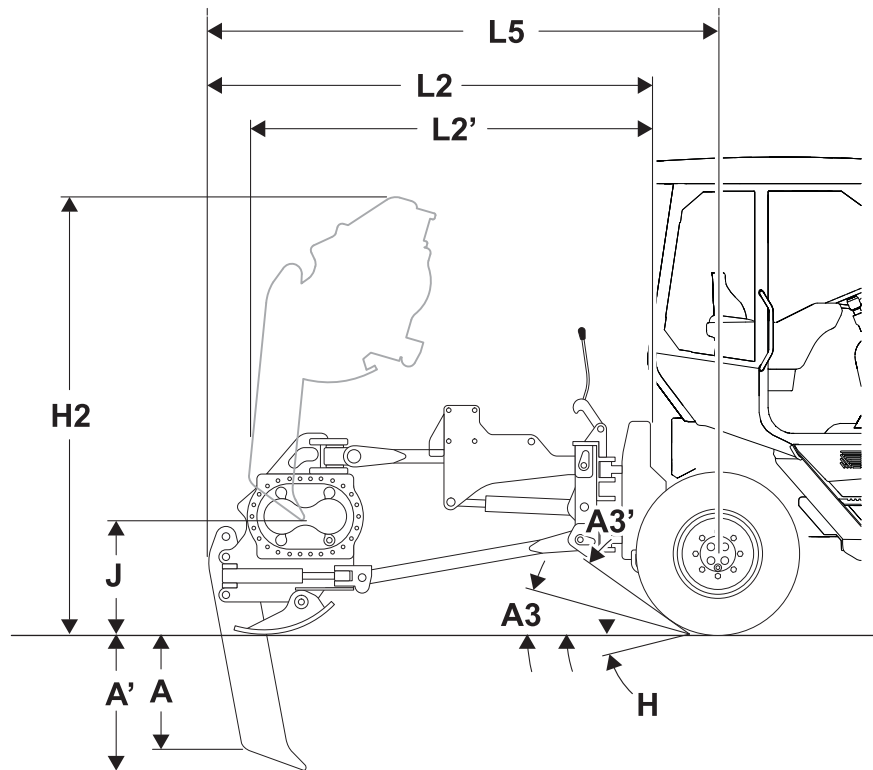


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Dimensions		U.S.	Metric
A	Trench depth	40 in	1.02 m
	Trench width	4.5, 6, 8 in	115,150, 203 mm
D	Transport height - attachment	130 in	3.3.m
	Height - wheel on ground	102 in	2.6 m
L2'	Overall length - wheel on ground	122 in	3.10 m
J	Ground clearance at wheel	27 in	700 mm
A3	Angle of departure	19°	19°
	Attachment weight	5900 lb	2675 kg

Operational		U.S.	Metric
Maximum breakover angle at full depth		17°	17°
Quantity of cutting teeth on wheel			
	4.5" (114.3 mm)	70	70
	6" (152.4 mm)	80	80
	9" (228.6 mm)	110	110

VP120H Plow



t50om037h.eps



Dimensions		U.S.	Metric
A	Cover depth*	36 in	914 mm
A'	Penetration*	36 in	914 mm
A3'	Angle of departure, transport, no blade	47.5°	47.5°
A3	Angle of departure, transport, 24" (610-mm) blade	30°	30°
	Angle of departure, transport, 30" (760-mm) blade	24°	24°
H	Angle of depression, plow max.	25°	25°
H2	Height transport	93 in	2.36 m
J	Blade ground clearance, 30" (760-mm) blade	24 in	610 mm
L2	Attachment length, fully lowered, no blade	97 in	2.46 m
L2'	Attachment length, fully raised, no blade	78 in	1.98 m
	Plow swing angle	43°	43°
	Inclusive blade steer angle	89°	89°
	Center of plow to outside edge of machine, left	43.5 in	1.11 m

	Center of plow to outside edge of machine, right	45.5 in	1.16 m
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*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	76 mm
	Fed	2 in	51 mm

General	U.S.	Metric
Attachment weight, without plow blade	2600 lb	1180 kg

Declaration of Conformity Information

Countries in the European Union should have received a Declaration of Conformity (DOC) with this machine similar to the example below.



The Charles Machine Works, Inc.
PO Box 66
1959 West Fir Avenue
Perry, Oklahoma, USA 73077-0066
Phone: 580 572 3784
FAX: 580 572 3525

Declares that the product:

Model: **Ditch Witch® XXXX**
Type: **(machine type)**
Engine Power: **xxx kW**
Serial Number: **CMWXXXXXXXXXXXXXX**

Conforms to the requirements of:

2006/42/EC Machinery Directive
2004/108/EC Electromagnetic Compatibility Directive
2000/14/EC Noise Emission Directive

Measured sound power level (Annex V): **xxx dBA**
Guaranteed sound power level (Annex V): **xxx dBA**

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

The manufacturer's European representative is:

Ditch Witch Barcelona
International Underground Systems, S.L.
C/EL PLA, 130 * Poligon Industrial El Pla
08980 Sant Feliu De Llobregat * Spain
Phone: +34 93 632 7344
FAX: +34 93 632 7343

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 Ditch Witch factory that fail due to a defect in material or workmanship within one (1) year of first commercial use. Free labor will be provided at any authorized Ditch Witch dealership for installation of parts under this warranty during the first year following "initial commercial" use of the serial-numbered Ditch Witch equipment on which it is installed. The customer is responsible for transporting their equipment to an authorized Ditch Witch dealership for all warranty work.

Exclusions from Product Warranty

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

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

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

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

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

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

For information regarding this limited warranty, contact the DWPS department, P.O. Box 66, Perry, OK 73077-0066, or contact your local dealer.

**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.

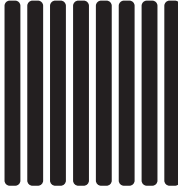
This will enable you to receive updates on this equipment as well as information on new products of interest.

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**



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Ditch Witch
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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.

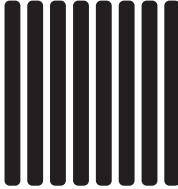
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BUSINESS REPLY MAIL

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**



Ditch Witch® Registration Card

Please Type or Print All Information

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

Ditch Witch® Registration Card

Please Type or Print All Information

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

Service Record

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Appendix



Chapter Contents

Engine Diagnostic Codes

SPN	FMI	Deutz Fault Code	Deutz® Detailed Description
29	3	932	Hand throttle error: short circuit to battery on idle validation switch or sensor error
29	4	937	Hand throttle error: short circuit to ground on idle validation switch or sensor error
29	2	978	Plausibility error between sensor and idle switch: acceleration pedal detection In case of Hand Throttle with Low Idle Switch: it is the plausibility check between hand throttle and idle switch.
51	5	1921	Intake throttle valve position; actuator disconnected.
51	6	1922	Intake throttle valve position: current above normal or short circuit to ground
51	3	1924	Intake throttle valve position: short circuit to battery
51	4	1926	Intake throttle valve position: short circuit to ground
51	7	1931	Intake throttle valve position: not responding or out of adjustment.
91	3	935	Sensor error accelerator pedal: signal range check high
91	4	940	Sensor error accelerator pedal: signal is below the range
91	11	976	Fuel delivery pressure low
94	3	472	Sensor error low fuel pressure; signal range check high
94	4	473	Sensor error low fuel pressure; signal range check low
94	1	474	Fuel delivery pressure low
97	3	464	Sensor error water in fuel: signal range check high
97	4	465	Water in fuel indicator: voltage is out of range low
97	12	1157	Water level in fuel prefilter above maximum value
100	3	732	Sensor error oil pressure: signal range check high
100	4	733	Sensor error oil pressure sensor: signal range check low
100	0	734	Engine oil pressure high
100	1	736	Engine oil pressure low
102	2	88	Intake manifold pressure: signal is not valid
102	1	774	Pressure downstream charge air cooler: pressure below lower physical threshold
102	3	776	Pressure downstream charge air cooler: short circuit to battery or open load
102	4	777	Pressure downstream charge air cooler: short circuit to ground
105	1	992	Charged air cooler down stream temperature: temperature below lower physical threshold
105	3	994	Intake manifold temperature: short circuit to battery
105	4	995	Intake manifold temperature: short circuit to ground
105	0	996	Intake manifold temperature high
105	11	998	Diagnostic fault check for charged air cooler downstream temperature sensor
107	3	750	Sensor error airfilter differential pressure: short circuit to battery
107	0	751	Air filter restriction high
108	11	411	DFC for CAN message
108	3	412	Sensor error ambient air pressure: signal range check high
108	4	413	Sensor error ambient air pressure: signal range check low
110	0	92	Engine coolant temperature high: most severe: derate started
110	1	93	Physical range check low for coolant temperature
110	3	96	Engine coolant temperature: short circuit to battery
110	4	97	Engine coolant temperature: short circuit to ground
110	15	98	Engine coolant temperature high: least severe
110	16	99	Engine coolant temperature high: moderately severe
111	1	101	Coolant level too low
132	11	1	Air flow sensor load correction factor exceeding the maximum drift limit: plausibility error
157	3	877	Injector rail pressure: short circuit to battery
157	4	878	Injector rail pressure: short circuit to ground
164	2	1381	Rail pressure safety function is not executed correctly
168	3	45	Battery voltage: sensor short circuit to battery
168	4	46	Battery voltage: sensor short circuit to ground
168	2	47	High battery voltage: shot off threshold exceeded
168	0	1180	Battery voltage is out of the target range (too high)
168	1	1181	Battery voltage is out of the target range (too low)
171	0	415	Environment temperature sensor: temperature above upper physical threshold
171	1	416	Physical range check low for environment temperature
171	3	417	Sensor error SCR-System environment temperature; DPF-System air inlet temperature: signal range check high
171	4	418	Sensor error SCR-System environment temperature; DPF-System air inlet temperature: signal range check low
172	2	9	Intake air temperature sensor: signal is not valid
172	3	981	Air flow temperature sensor: short circuit to battery or open load
172	4	982	Air flow temperature sensor: short circuit to ground
172	1	1183	Air inlet filter sensor out of physical range check
172	0	1425	Air temperature within air filter box above maximum physical value
175	3	743	Sensor error oil temperature: signal range check high
175	4	744	Sensor error oil temperature: signal range check low
175	0	745	High oil temperature: warning threshold exceeded
175	2	1171	Customer oil temperature signal is not valid
190	0	388	Engine speed above warning threshold: overspeed detection in component engine protection
190	11	390	Engine speed above warning threshold (FOC-Level 2)
190	14	391	Engine speed target range exceeded: overrun mode
190	8	419	Camshaft speed: signal is not valid
190	12	420	Speed sensor: no signal
190	2	421	Speed sensor of crankshaft and camshaft: signals are out of phase
411	0	791	Delta pressure across venturi in EGR line above physical high limit
411	1	792	Delta pressure across venturi in EGR line below physical low limit
411	11	793	Plausibility check fault for deviation of desired and actual EGR-mass flow: where the latter is calculated out of EGR delta pressure sensor.
411	3	795	Sensor error differential pressure Venturiunit (EGR): signal range check low
411	4	796	Sensor error differential pressure Venturiunit (EGR): signal range check high
412	3	1007	Electrical error EGR cooler downstream temperature: signal range check high
412	4	1008	Electrical error EGR cooler downstream temperature: signal range check low
520	9	306	Timeout error of CAN-receive-frame TSC1TR
624	5	969	SVS lamp: open load
624	12	970	Temperature too high for power stage of SVS lamp

624	3	971	Short circuit to battery on SVS lamp
624	4	972	Short circuit to ground on SVS lamp
630	12	376	Access error EEPROM memory
639	14	84	CAN-bus 0 "BusOff"-status
651	5	568	Injector 1 (in firing order): interruption of electric connection
651	3	580	Injector 1 (in firing order): short circuit
652	5	569	Injector 2 (in firing order): interruption of electric connection
652	3	581	Injector 2 (in firing order): short circuit
653	5	570	Injector 3 (in firing order): interruption of electric connection
653	3	582	Injector 3 (in firing order): short circuit
654	5	571	Injector 4 (in firing order): interruption of electric connection
654	3	583	Injector 4 (in firing order): short circuit
676	11	543	Cold start aid relay error
677	5	958	No load error starter relay
677	12	959	Over load ECU power stage for starter (overtemp.)
677	3	960	Starter relay: short circuit to battery
677	4	961	Starter relay: short circuit to ground
729	5	545	Intake air heater relay disconnected
729	12	547	Cold start aid relay: over temperature error
729	3	549	Intake air heater device: short circuit to battery
729	4	551	Air intake heater: short circuit to ground error for powerstage on CI945
898	9	305	Timeout error of CAN-receive-frame TSC1TE: setpoint
975	5	455	Fan actuator (PWM output): open load
975	3	457	Fan actuator (PWM output): short circuit to battery
975	4	458	Fan actuator (PWM output): short circuit to ground
1079	13	946	Failure of sensor supply voltage 1
1080	13	947	Failure of sensor supply voltage 2
1109	2	121	Engine off request ignored
1136	0	1398	Physical range check high for ECU temperature
1176	0	847	Pressure sensor upstream turbine: physical range check high
1176	1	848	Pressure sensor upstream turbine: physical range check low
1176	3	849	Pressure sensor upstream turbine: signal range check (SRC) high
1176	4	850	Pressure sensor upstream turbine: signal range check (SRC) low
1176	2	1528	Pressure sensor upstream turbine: plausibility error
1180	3	1067	Turbocharger turbine intake temperature: short circuit to battery
1180	4	1068	Turbocharger turbine intake temperature: short circuit to ground
1188	11	1412	Wastegate actuator: signal error or temperature too high
1188	7	1788	Turbocharger wastegate: not responding or out of adjustment
1188	2	1789	Turbocharger wastegate: CAN error
1188	13	1790	Turbocharger wastegate: calibration error
1188	12	1791	Turbocharger wastegate: internal electrical error
1188	6	1793	Turbocharger wastegate: current above maximum threshold
1188	3	1794	Turbocharger wastegate: supply voltage above maximum threshold
1188	4	1795	Turbocharger wastegate: supply voltage below minimum threshold
1188	0	1799	Turbocharger wastegate: temperature critical high
1231	14	85	CAN-Bus 1 "BusOff"-status
1235	14	82	CAN-Bus 2 "BusOff"-status
1237	2	747	Override switch; plausibility error.
1322	12	610	Too many recognized misfires in more than one cylinder
1323	12	604	Too many recognized misfires in cylinder 1 (in firing order)
1324	12	605	Too many recognized misfires in cylinder 2 (in firing order)
1325	12	606	Too many recognized misfires in cylinder 3 (in firing order)
1326	12	607	Too many recognized misfires in cylinder 4 (in firing order)
1327	12	608	Too many recognized misfires in cylinder 5 (in firing order)
1328	12	609	Too many recognized misfires in cylinder 6 (in firing order)
1639	12	459	Fan speed sensor: electrical error or signal disturbed
1639	0	460	Sensor error fan speed: signal range check high
1639	1	461	Sensor error fan speed: signal range check low
1761	0	1593	DEF tank: DEF level above upper physical threshold
1761	1	1594	DEF level low
1761	2	1869	DEF tank level: plausibility error
1761	14	1880	DEF tank: DEF level below warning threshold
2659	0	1524	Exhaust gas recirculation AGS sensor: sensed exhaust mass value above maximum physical value
2659	1	1525	Exhaust gas recirculation AGS sensor: sensed exhaust mass flow too low
2659	12	1526	Exhaust gas recirculation AGS sensor: invalid signal
2659	2	1527	Exhaust gas recirculation AGS sensor: temperature signal is not valid
2791	7	1752	EGR actuator: mechanical failure
2791	2	1753	EGR actuator: CAN error
2791	13	1754	EGR actuator: calibration error
2791	12	1755	EGR Actuator: electrical failure
2791	6	1757	EGR actuator current is above maximum threshold
2791	3	1758	EGR actuator supply voltage is above the maximum threshold
2791	4	1759	EGR actuator supply voltage is below minimum threshold
2791	16	1762	EGR actuator: temperature high
2791	0	1763	EGR actuator: temperature critical high
2797	4	1339	Injector diagnostic: short circuit to ground cylinder bank 0
2798	4	1340	Injector diagnostic: short circuit to ground cylinder bank 1
3031	0	1135	DEF temperature high
3031	1	1136	DEF temperature low
3224	2	127	DLC error of CAN-receive-frame AT1IG1: NOX sensor (SCR-system upstream cat; DPF-system downstream cat): length of frame incorrect
3224	9	130	SCR intake NOx sensor: abnormal update rate
3224	1	889	SCR intake NOx sensor: signal is not valid
3234	9	137	Timeout error of CAN-receive-frame AT1OG1: NOX sensor (SCR-system downstream cat; DPF-system downstream cat)
3234	2	138	DLC error of CAN-receive-frame AT1O1Vol NOX

3234	11	887	SCR outlet NOx sensor: signal is not valid
3241	0	905	Sensor SCR catalyst upstream temperature too high: plausibility error
3248	4	1047	Sensor error particle filter downstream temperature: signal range check low
3361	7	908	Dosing valve blocked
3361	6	1075	DEF dosing valve: power at the end of injection too high
3361	3	1077	DEF dosing valve: short circuit to battery
3361	4	1079	DEF dosing valve: short circuit to ground
3519	12	1895	DEF tank temperature: temperature too high
3519	3	1898	DEF quality sensor: internal temperature sensor short circuit to battery or open load
3519	4	1899	DEF quality sensor: internal temperature sensor short circuit to ground
3519	13	1908	Temperature at UQS invalid
3520	3	1896	DEF quality sensor: short circuit to battery or open load
3520	4	1897	DEF quality sensor: short circuit to ground
3520	2	1904	DEF quality sensor: bad DEF quality detected or no DEF measuring possible
3520	8	1905	DEF quality sensor: measurement conditions not fulfilled
3520	13	1907	DEF quality at UQS invalid
3532	3	943	DEF tank level or DEF quality sensor: short circuit to battery.
3532	4	945	DEF tank level or DEF quality sensor: short circuit to ground.
3699	2	1617	Aftertreatment pressure sensor or temperature sensor: signal is not valid
3699	0	1635	Maximum standstill time reached: oil exchange request ignored
3711	12	1455	Temperature during stand-still main phase too low or too high
3936	14	1917	Standstill request ignored too long
4243	11	1089	SCR system heater errors
4334	0	1122	DEF dosing pressure high
4334	1	1123	DEF dosing pressure low
4334	2	1866	DEF supply module pressure: plausibility error
4341	5	1086	DEF heater relay DEF supplyline side: open load
4341	3	1104	DEF-heater DEF supplyline: short circuit to battery
4341	4	1105	DEF-heater DEF supply line: short circuit to ground
4343	11	893	DEF dosing pressure: signal is not valid
4343	5	1083	DEF pressure line heater relay disconnected
4343	3	1096	DEF pressure line heater relay: short circuit to ground
4343	4	1097	DEF heater DEF pressureline: short circuit to ground
4345	11	892	DEF return pressure: signal is not valid
4345	5	1090	DEF heater relay DEF returnline side: open load
4345	3	1092	DEF heater DEF returnline: short circuit to battery
4345	4	1093	DEF heater DEF returnline: short circuit to ground
4360	0	1069	SCR intake gas temperature high
4360	1	1070	SCR intake gas temperature low
4360	2	1865	Exhaust temperature sensor upstream SCR: plausibility error
4361	3	1072	SCR intake gas temperature: short circuit to battery
4361	4	1073	SCR intake gas temperature: short circuit to ground
4365	0	903	DEF tank temperature too high
4365	2	1137	Signal error for CAN message
4365	3	1914	DEF quality and temperature sensor: short circuit to battery or disconnected
4365	4	1915	DEF quality and temperature sensor: short circuit to ground
4366	5	1110	DEF heater relay or valve: short circuit or disconnected
4366	3	1112	DEF Tank heating valve: short circuit to battery
4366	4	1113	DEF Tank heating valve: short circuit to ground
4374	13	894	Pressure stabilization error dosing valve (SCR)
4375	5	1118	DEF supply pump disconnected
4375	3	1120	DEF supply pump: short circuit to battery
4375	4	1121	DEF supply pump: short circuit to ground
4376	3	1131	DEF reversing valve: short circuit to battery
4376	4	1132	DEF reversing valve: short circuit to ground
4376	5	1490	DEF reversing valve disconnected
4376	12	1491	DEF reverting valve: over temperature
4765	0	1039	Diesel oxidation catalyst intake gas temperature high
4766	0	1029	Diesel oxidation catalyst outlet gas temperature high
4768	2	1036	Diesel oxidation catalyst intake gas temperature: signal is not valid
4768	3	1044	Diesel oxidation catalyst intake gas temperature: short circuit to battery
4768	4	1045	Diesel oxidation catalyst intake gas temperature: short circuit to ground
4769	2	1026	Diesel oxidation catalyst outlet gas temperature: signal is not valid
4769	3	1034	Diesel oxidation catalyst outlet gas temperature: short circuit to battery
4769	4	1035	Diesel oxidation catalyst outlet gas temperature: short circuit to ground
5763	7	1016	Throttle position sensor: signal error
5763	6	1022	Throttle position sensor: current above normal or short circuit to ground
5763	5	1023	Throttle position sensor: disconnected
5763	4	1025	Throttle position sensor short circuit to ground
5763	3	1226	Throttle position sensor: short circuit to battery
5763	11	1231	Power stage overtemperature due to high current
5763	0	1423	Throttle sensor error
5763	1	1424	Throttle sensor error
520521	5	1015	EGR actuator: disconnected
523008	1	648	Manipulation control was triggered
523008	2	649	Timeout error in manipulation control
523009	9	825	The pressure relief valve (PRV) has reached the number of allowed activations
523009	10	833	Open time of pressure relief valve (PRV) for wear out monitoring had exceeded
523090	2	362	Engine brake pre-selection switch: plausibility error
523212	9	171	Timeout error of CAN-receive-frame ComEngPrt
523216	9	198	Timeout error of CAN-receive-frame PrHtEnCmd: pre-heat command: engine command
523240	9	179	Timeout CAN-message FunModCtl: function mode control
523330	14	919	Immobilizer status: fuel blocked
523350	4	565	Short circuit injector cylinder bank 1

523352	4	566	Short circuit injector cylinder bank 2
523354	12	567	Injector high current output defect
523450	4	839	Short circuit to ground on multiple stage switch constant speed
523470	2	827	Pressure relief valve (PRV) forced to open: performed by pressure increase
523470	12	828	Pressure relief valve (PRV) forced to open: shutoff conditions
523470	14	830	Pressure relief valve (PRV) is open
523470	11	831	Rail pressure out of tolerance range
523470	7	876	Maximum rail pressure exceeded (PRV)
523550	12	980	Starter switch engaged too long
523601	13	948	Sensor supply voltage 3 error
523602	0	462	High fan speed: warning threshold exceeded
523603	9	126	Timeout error of CAN-receive frame AMB: ambient temperature sensor
523612	3	644	Reported over-voltage of supply
523612	4	646	Reported under-voltage of supply
523612	12	717	Engine ECU reported internal software error
523612	14	973	Software reset engine ECU
523613	1	861	Minimum rail pressure exceeded (metering unit)
523613	0	862	Rail pressure metering unit: maximum rail pressure exceeded
523613	2	864	Rail pressure metering unit: setpoint of metering unit in overrun mode is not valid
523615	5	592	Open load of metering unit
523615	12	593	Temperature too high for power stage of fuel metering unit
523615	3	596	Short circuit to battery metering unit
523615	4	597	Short circuit to ground metering unit
523618	3	486	Gearbox oil temperature: short circuit to battery or broken harness
523618	4	487	Gearbox oil temperature: short circuit to ground
523619	2	488	SCR inlet temperature: signal is invalid
523632	16	897	Pump pressure SCR metering unit too high
523632	18	898	Pump pressure SCR during metering too low
523632	0	899	Pressure overload at SCR-System
523632	1	900	Error pressure build-up SCR
523632	11	1117	Pump motor not available for actuation
523632	3	1127	DEF supply pump pressure: short circuit to battery
523632	4	1128	DEF supply pump pressure: short circuit to ground
523633	11	883	Nox conversion rate insufficient: (SCR-catalyst defect: bad DEF quality)
523698	11	122	Shutoff request from supervisory monitoring
523704	12	167	Timeout error of CAN-transmit-frame EEC3
523717	12	125	Timeout error of CAN-transmit-frame AmbCon: weather environments
523718	5	1098	SCR main relay (primary side): open load
523718	12	1099	SCR main relay (primary side): powerstage over temperature
523718	3	1100	SCR main relay (primary side): short circuit to battery
523718	4	1101	SCR main relay (primary side): short circuit to ground
523719	5	1087	SCR heater relay DEF supply modul secondary side: open load
523719	5	1106	SCR heater relay DEF supplymodule primary side: open load
523719	3	1108	SCR heater DEF supplymodule: short circuit to battery
523719	4	1109	SCR heater DEF supplymodule: short circuit to ground
523720	2	914	DEF supply pump temperature: signal is not valid
523720	8	925	DEF supply pump heater temperature: abnormal frequency pulse width
523721	2	917	DEF supply pump temperature sensor: signal is not valid
523721	11	927	DEF supply pump temperature measurement not available
523721	8	930	DEF supply module temperature: duty cycle in failure range
523722	8	928	Urea supply module PWM signal: period outside valid range
523722	8	929	Detect faulty PWM signal from supply module
523776	9	291	Timeout error of CAN-receive-frame TSC1TE - active
523777	9	292	Passive timeout error of CAN-receive-frame TSC1TE: setpoint
523788	12	299	Timeout error of CAN-transmit-frame TrbCH: status wastegate
523788	0	1300	Timeout error of CAN-receive-frame ComTrbChActr: wastegate
523793	9	202	Timeout error of CAN-receive-frame UAA10: AGS sensor service message
523794	9	203	Timeout error of CAN-receive-frame UAA11: AGS sensor data
523803	9	212	Timeout error of CAN receive message RxEngPres: status burner air pump
523858	12	313	Timeout error of CAN-transmit-frame UAA11
523895	13	559	Check of missing injector adjustment value programming (IMA) injector 1 (in firing order)
523896	13	560	check of missing injector adjustment value programming (IMA) injector 2 (in firing order)
523897	13	561	check of missing injector adjustment value programming (IMA) injector 3 (in firing order)
523898	13	562	check of missing injector adjustment value programming (IMA) injector 4 (in firing order)
523906	5	834	Electrical fuel pre - supply pump: open load
523906	12	835	Electrical fuel pre - supply pump: ECU powerstage over temperature
523906	3	836	Electrical fuel pre - supply pump: short circuit to battery
523906	4	837	Electrical fuel pre - supply pump: short circuit to ground
523912	4	73	Intake throttle valve error: disconnected, short circuit to ground or battery, blocked valve, or incorrect control signal
523913	3	74	Voltage of glow plug control diagnostic line too high
523913	4	75	Voltage of glow plug control diagnostic line too low
523914	5	76	Glow plug control disconnected
523914	12	77	Glow plug control: powerstage over temperature
523914	3	78	Glow plug control: short circuit to battery
523914	4	79	Glow plug control: short circuit to ground
523915	0	500	HCI dosing valve (DV1): overcurrent at the end of the injection phase
523915	12	501	HCI dosing valve (DV1): powerstage over temperature
523915	3	503	Short circuit to battery on a power stage of HCI dosing valve (DV1)
523915	4	504	Short circuit to ground on a power stage of HCI dosing valve (DV1)
523915	11	505	Short circuit in the high side power stage of HCI dosing valve (DV1)
523915	7	1257	HCI dosing valve (DV1): blocked open
523916	2	506	Fuel pressure sensor after HCI dosing valve (DV 1): signal is not valid
523916	0	508	HCI dosing valve (DV1) pressure value downstream out of target range: too high
523916	1	511	HCI dosing valve (DV1) pressure value downstream out of target range: too low

523916	3	514	Sensor error HCl dosing valve (DV1) downstream pressure: short circuit to battery
523916	4	515	Sensor error HCl dosing valve (DV1) downstream pressure: short circuit to ground
523917	3	524	Sensor error DV1 & DV2 upstream pressure: short circuit to battery
523917	4	525	Sensor error DV1 & DV2 upstream pressure: short circuit to ground
523918	3	534	Temperature sensor voltage upstream DV1 & DV2 too high
523918	4	535	Temperature sensor voltage upstream DV1 & DV2 too low
523924	3	37	UB2: short circuit to battery error of actuator relay 2
523924	4	42	UB2: short circuit to ground actuator relays 2
523925	3	38	UB3: short circuit to battery error of actuator relay 3
523925	4	43	UB3: short circuit to ground actuator relays 3
523926	4	44	UB4: short circuit to ground aktuator relays 4
523927	3	40	UB5: short circuit to battery error of actuator relay 5 (UB6) SCR-heater/rev.valve
523935	12	168	Timeout error of CAN-receive-frame EEC3VOL1, EEC3VOL2
523936	12	169	Timeout error of CAN-transmit-frame EEC3VOL2: engine send messages
523938	9	133	Timeout error (BAM to packet) for CAN-receive-frame AT1IGCVol1
523939	9	134	Broadcast Announce Message of the calibration message of the upstream catalytic NOx sensor has failed
523940	9	135	Timeout error (PCK2PCK) for CAN-receive-frame AT1IGCVol1
523941	9	140	Timeout error (BAM to packet) for CAN-receive-frame AT1OGCVol2
523942	9	141	Calibration message 1 of the after catalyst NOx sensor has failed
523943	9	142	Timeout Error (PCK2PCK) for CAN-receive-frame AT1OGCVol2
523946	0	1158	Zerofuel calibration injector 1 (in firing order): maximum value exceeded
523946	1	1164	Zerofuel calibration injector 1 (in firing order): minimum value exceeded
523947	0	1159	Zerofuel calibration injector 2 (in firing order): maximum value exceeded
523947	1	1165	Zerofuel calibration injector 2 (in firing order): minimum value exceeded
523948	0	1160	Zerofuel calibration injector 3 (in firing order): maximum value exceeded
523948	1	1166	Zerofuel calibration injector 3 (in firing order): minimum value exceeded
523949	0	1161	Zerofuel calibration injector 4 (in firing order): maximum value exceeded
523949	1	1167	Zerofuel calibration injector 4 (in firing order): minimum value exceeded
523960	0	1011	Physical range check high for EGR cooler downstream temperature
523960	1	1012	Physical range check low for EGR cooler downstream temperature
523960	0	1458	High exhaust gas temperature EGR cooler downstream: warning threshold exceeded
523973	14	1173	SCR tamper detection: derating timer below limit 1
523974	14	1174	SCR tamper detection: derating timer below limit 2
523975	14	1175	DEF quality: derating timer below limit 1
523976	14	1176	DEF quality: derating timer below limit 2
523977	14	1177	DEF tank level: derating timer below limit 1
523978	14	1178	DEF tank level: derating timer below limit 2
523981	11	918	SCR plausibility, OBD and diagnosis: stuck in range check of DEF tank temperature sensor: DEF-tank without heating function (heating phase)
523982	0	360	Powerstage diagnosis disabled: high battery voltage
523982	1	361	Powerstage diagnosis disabled: low battery voltage
523984	3	1239	UB6: short circuit to battery error of actuator relay 5
523986	4	1241	Relais SCR-heater: short circuit to ground (highside contro side)
523987	4	1242	UB6: short circuit to ground actuator relay 5
523995	13	1324	Check of missing injector adjustment value programming (IMA) injector 7 (in firing order)
523996	13	1325	Check of missing injector adjustment value programming (IMA) injector 8 (in firing order)
523997	4	1326	Injector cylinder bank 1 slave: short circuit
523998	4	1327	Injector cylinder bank 2 slave: short circuit
523999	12	1328	Injector powerstage output slave defect
524000	5	1329	Injector 7 (in firing order): interruption of electric connection
524000	3	1333	Injector 7 (in firing order): short circuit
524001	5	1330	Injector 8 (in firing order): interruption of electric connection
524001	3	1334	Injector 8 (in firing order): short circuit
524014	1	1254	Air inlet EPV - pressure too low Air pressure glow plug flush line: below limit
524016	11	1258	Burner control: HFM - electrical fault HFM sensor: electrical fault
524016	2	1259	Burner control: HFM - amount of air is not plausible to pump speed
524019	11	1247	Burner control: air lines blocked Air pump: air lines blocked
524024	11	1302	Deviation of the exhaust gas temperature setpoint to actual value downstream (DOC) too high
524025	14	805	Particulate filter regeneration Regeneration after time X is not successful (The error occurs when the regeneration times (3x) over the max. has been aborted allowed recovery time)
524025	5	1481	DPF system: operating voltage error
524025	14	1882	The standstill-regeneration mode time exceeds the long-limit Vehicle was too long or too often in standstill mode: make oil change and reset counter
524025	14	1883	The standstill-regeneration mode time exceeds the short-limit Vehicle was too long or too often within a short time in standstill mode: make oil change and reset counter
524028	2	1431	CAN message PROEGRActr: plausibility error
524029	2	1432	Timeout error of CAN-receive-frame ComEGRActr: exhaust gas recirculation positioner
524030	7	1440	EGR actuator: internal error
524031	13	1441	EGR actuator: calibration error
524032	2	1442	EGR actuator: status message "EGR Cust" is missing
524033	7	1443	EGR actuator: due to overload in save mode
524034	5	1436	Disc separator: open load
524034	12	1437	Disc separator: powerstage over temperature
524034	4	1439	Disc separator: short circuit to ground
524036	12	1342	Injector diagnostics slave: time out error in the SPI communication
524038	9	1285	Timeout error of CAN-receive-frame ComMS_Sys2TO (error memory slave): master-slave internal CAN message
524039	9	1286	Timeout error of CAN-receive-frame ComMS_Sys2TO (error memory slave): master-slave internal CAN message
524040	9	1287	Timeout error of CAN-receive-frame ComMS_Sys3TO (error memory slave): master-slave internal CAN message
524041	9	1288	Timeout error of CAN-receive-frame ComMS_Sys4TO (error memory slave): master-slave internal CAN message
524042	9	1289	Timeout error of CAN-receive-frame ComMS_Sys5TO (error memory slave): master-slave internal CAN message
524043	9	1290	Timeout error of CAN-receive-frame ComMS_Sys6TO (error memory slave): master-slave internal CAN message

524044	9	1482	CAN message ComMS_Sys7 not received from slave
524045	9	1291	Master slave: error of message counter CAN receive message ComMSMoFOvR; ComMSMoFOvR1C
524046	9	1292	Master-slave CAN: error checksum of CAN-receive message
524047	9	1293	Master-slave CAN: error of message length of CAN receive message ComMSMoFOvR; ComMSMoFOvR1DLC
524048	9	1294	Timeout error CAN message ComMSMoFOvR1TO error memory slave
524050	11	1434	CAN: not used
524051	11	1435	CAN: not used
524052	11	1485	Master ECU and slave ECU data sets or software are not identical
524057	2	1505	Fuel low pressure pump: error pressure build up
524063	5	1555	DEF return line heater: disconnected
524063	3	1558	SCR heater mainrelay: short circuit to battery
524063	4	1559	SCR heater main relay load side (K31) on heating valve (Y31): short cut to ground
524063	12	1647	DEF tank: thawing time too long
524065	0	1565	Pressure sensor upstream SCR-CAT: pressure above upper physical threshold
524065	1	1566	Pressure sensor upstream SCR-CAT: pressure below lower physical threshold
524065	3	1569	Pressure sensor upstream SCR-CAT: short circuit battery or open load
524065	4	1570	Pressure sensor upstream SCR-CAT: short circuit ground
524065	2	1598	Pressure sensor upstream SCR-CAT: plausibility error
524067	0	1581	DEF supply module: heater temperature above upper physical threshold
524067	1	1582	DEF supply module: heater temperature below lower physical threshold
524067	2	1867	Supply module heater temperature: plausibility error
524068	2	1484	Master ECU and slave ECU have been identified as the same types
524069	9	1345	Timeout error of CAN-receive-frame MSMon_FidFCCTO; master-slave CAN communication faulty
524070	2	1529	(Upstream NOx-sensor) diagnostic fault check for invalid upstream NOx value (sensor self diagnostic DFC set by Deutz-SW) NOx-sensor before SCR-Cat: invalid upstream NOx value
524071	2	1530	(Downstream NOx-sensor) Diagnostic Fault Check for invalid downstream lambda value (sensor self diagnostic DFC set by Deutz-SW)
524072	2	1531	(Upstream NOx-sensor) diagnostic fault check for invalid upstream lambda value (sensor self diagnostic DFC set by Deutz-SW)
524073	2	1532	(Downstream NOx-sensor) diagnostic fault check for invalid downstream NOx value (sensor self diagnostic DFC set by Deutz-SW)
524074	9	1533	NOx sensor downstream SCR-CAT: sensor internally open load
524074	2	1860	NOx-sensor after SCR-Cat: Nox-sensor dew point problem or plausibility problem
524075	11	1534	Nox sensor downstream SCR-CAT: sensor internally short circuit
524076	9	1535	NOx sensor upstream SCR-CAT: sensor internally open line
524076	2	1861	NOx-Sensor before SCR-Cat: Nox-sensor dew point problem or plausibility problem
524077	11	1536	NOx sensor upstream SCR-CAT: sensor internally short circuit
524078	9	1537	NOx sensor downstream SCR-CAT: lambda value above upper physical threshold
524079	9	1538	NOx sensor downstream SCR-CAT: lambda value below lower physical threshold
524080	9	1539	NOx sensor upstream SCR-CAT: lambda value above upper physical threshold
524081	9	1540	NOx sensor upstream SCR-CAT: lambda value below lower physical threshold
524082	9	1541	(Downstream NOx-sensor) diagnostic fault check for downstream NOx value over maximum limit (DFC set by Deutz-SW)
524083	9	1542	NOx-sensor downstream SCR-CAT: NOx value below minimum value
524084	9	1543	NOx-sensor upstream SCR-CAT: NOx value above maximum value
524085	9	1544	NOx sensor upstream SCR-CAT: NOx value below lower physical threshold
524087	5	1619	DEF error lamp: open load
524087	12	1620	DEF error lamp: temperatur over limit
524087	3	1621	DEF error lamp: short circuit battery
524087	4	1622	DEF error lamp: short circuit ground
524096	14	1658	Control of the SCR system: if the start stop counter (EPA-counter) exceeds the threshold SCRctl_ctEngStrtStopThresh_C this counter will increment only once in each driving cycle in case of an SCR error. If the counter reaches the threshold: the DFC will be set to inhibit the engine start. Engine will not be started because of EPA-counter
524097	9	1663	Timeout error of CAN-transmit-frame DPFBrnAirPmpCtl
524098	9	1664	Timeout error of CAN-transmit-frame ComDPFBrnPT
524099	9	1665	Timeout error of CAN-transmit-frame ComDPFC1
524100	9	1666	Timeout error of CAN-transmit-frame ComDPFHisDat
524101	9	1667	Timeout error of CAN-transmit-frame ComDPFTstMon
524102	9	1674	Timeout error of CAN-receive-frame ComRxDPFBrnAirPmpCtl
524103	9	1675	Timeout error of CAN-receive-frame ComRxDPFBrnAirPmp
524104	9	1676	Timeout error of CAN-receive-frame ComRxDPFCTl
524105	9	1668	Timeout error of CAN-transmit-frame ComEGRMsFlw
524106	9	1677	Timeout error of CAN-receive-frame ComRxEGRMsFlw1
524107	9	1678	Timeout error of CAN-receive-frame ComRxEGRMsFlw2
524108	9	1669	Timeout error of CAN-transmit-frame ComEGRTVActr
524109	9	1679	Timeout error of CAN-receive-frame ComRxEGRTVActr
524111	9	1680	Timeout error of CAN-receive-frame ComRxETVActr
524112	9	1671	Timeout ComIntake throttle valve Actr
524113	9	1681	Timeout error of CAN-receive-frame ComRxITVActr
524114	9	1659	Timeout error of CAN-transmit-frame A1DOC
524115	9	1660	Timeout error of CAN-transmit-frame AT1S
524116	9	1661	Timeout error of CAN-transmit-frame SCR2
524117	9	1662	Timeout error of CAN-transmit-frame SCR3
524118	9	1672	Timeout error of CAN-receive-frame ComRxCM1
524119	9	1673	Timeout error of CAN-receive-frame ComRxCustSCR3
524120	9	1682	Timeout error of CAN-receive-frame ComRxSCRHTDiag
524121	9	1683	Timeout error of CAN-receive-frame ComRxTrbChActr
524122	9	1684	Timeout error of CAN-receive-frame ComRxUQSens
524123	9	1685	Timeout error of CAN-receive-frame ComSCRHTCtl
524124	9	1686	Timeout error of CAN-receive-frame ComTxAT1IMG
524125	9	1687	Timeout error of CAN-receive-frame ComTxTrbChActr
524132	2	1630	Fuel low pressure upstream: fuel low pressure pump not plausible
524132	0	1632	Fuel low pressure upstream fuel low pressure pump: pressure above maximum shut off threshold
524132	1	1633	Fuel low pressure upstream fuel low pressure pump: pressure below minimum shut off threshold
524133	2	1698	HMI system: set if restore button blocked
524134	0	1699	DPF: ash load exceeds the shutoff threshold
524135	0	1701	DPF: soot load exceeds the shutoff threshold
524135	14	1702	DPF: soot load exceeds the service request threshold

524141	7	1827	DEF dosing valve: dosing valve blocked
524147	13	1639	SCR System: pressure build up not possible
524147	7	1858	SCR-system: reverting valve blocked
524149	2	1597	Pressure downstream turbine: plausibility error
524152	2	1874	DEF quality sensor: timeout CAN message
524153	2	1875	DEF tank level & DEF tank temperature via CAN bus: timeout of CAN message
524156	9	1705	Timeout error of CAN-receive-frame ComRxEBC2
524175	0	1859	SCR-CAT: Nox emissions above maximum threshold
524177	7	1863	SCR System: DEF suction line blocked
524178	7	1864	SCR System: DEF pressure out of range
524189	9	1889	Master-slave CAN disturbed
524190	14	1891	Inducement level 1 activ
524191	14	1892	Inducement level 2 activ
524193	8	1893	The standstill-regeneration mode time exceeds the long limit threshold Vehicle was too long or too often in standstill mode
524194	8	1894	The standstill-regeneration mode time exceeds the short-limit Vehicle was too long or too often within a short time in standstill mode
524195	14	1900	Standstill request due to crystallisation ignored too long
524196	13	1901	Variant handling: address error
524196	2	1902	Variant handling: synchronisation error
524197	7	1906	DEF backflow line is blocked
524198	11	1939	Inducement HW failure master
524199	11	1940	Inducement SCR tamp master
524200	11	1941	Inducement DEF qty master
524201	11	1942	DEF level error master
524202	11	1943	DEF temp. error master
524203	11	1944	DEF level replace master
524204	11	1945	SCR system afterrun master
524205	11	1946	Switch off SCR system master
524206	11	1947	Disable SCR dosing master
524207	11	1948	INH EAT regeneration master
524208	11	1949	Power reduction 1 master
524209	11	1950	Power reduction 2 master
524210	11	1951	DEF CONC replace master
524211	11	1952	DEF quality error master
524212	11	1953	DEF sensor diag. off master
524213	11	1954	DEF sens temp. replace master
524230	11	1971	Inducement HW failure slave
524231	11	1972	Inducement SCR tamp. slave
524232	11	1973	Inducement DEF qty slave
524233	11	1974	DEF level error slave
524234	11	1975	DEF temp. error slave
524235	11	1976	DEF level replace slave
524236	11	1977	SCR system afterrun slave
524237	11	1978	Switch off SCR system slave
524238	11	1979	Disable SCR dosing slave
524239	11	1980	INH EAT regeneration slave
524240	11	1981	Power reduction 1 slave
524241	11	1982	Power reduction 2 slave
524242	11	1983	DEF CONC replace slave
524243	11	1984	DEF quality error slave
524244	11	1985	DEF sensor diag. off slave
524245	11	1986	DEF sens temp. replace slave