

100sx

Operator's Manual



Overview



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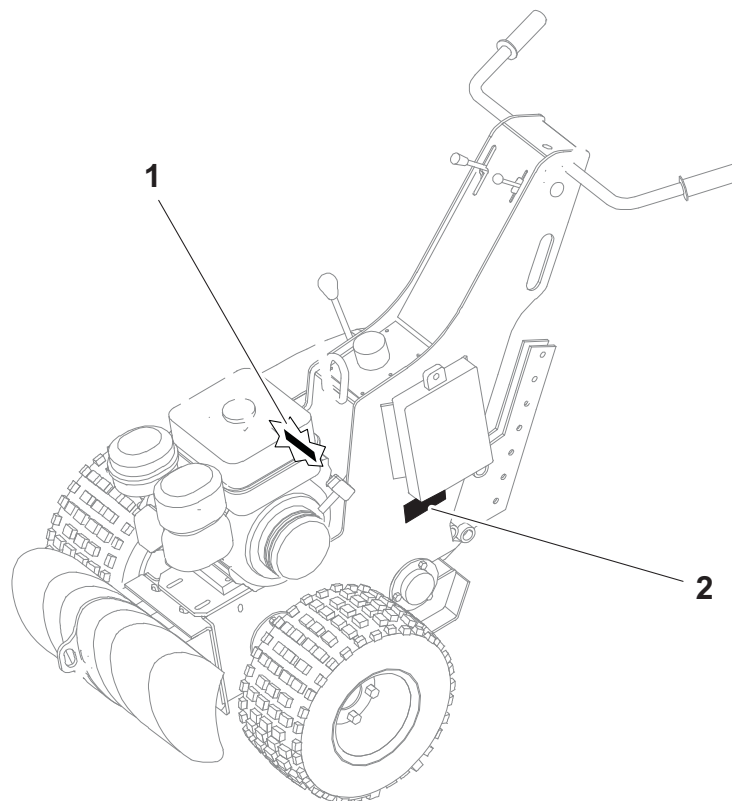
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Serial Number Location

Record serial numbers and date of purchase in the spaces provided.



t44om002w.eps

Date of manufacture	
Date of purchase	
100sx plow serial number (2)	
Engine serial number (1)	

Intended Use

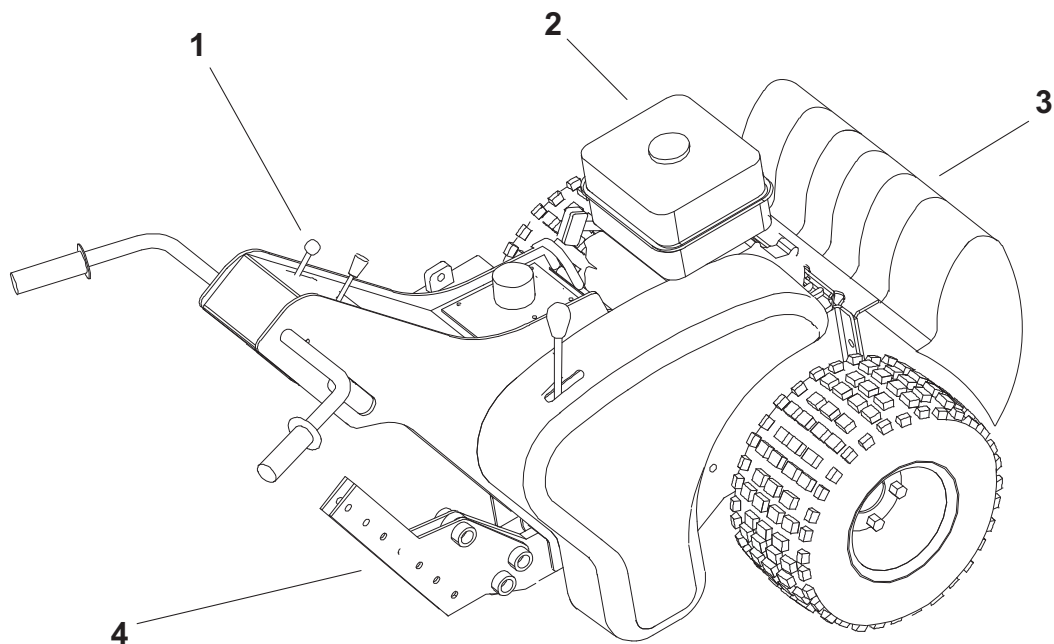


The 100SX is a self-propelled, walk-along vibratory plow. The 100SX is powered by a 13 hp (9.7 kW) Briggs & Stratton® engine and is designed to operate in a variety of soil conditions with either a pull or feed blade.

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

The 100sx should be operated, serviced, and repaired only by persons familiar with its particular characteristics and acquainted with the relevant safety procedures.

Unit Components



t44om004w.eps

1. Control panel/operator position
2. Engine

3. Weight assembly
4. Blade mount bracket

Operator Orientation

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

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

About This Manual

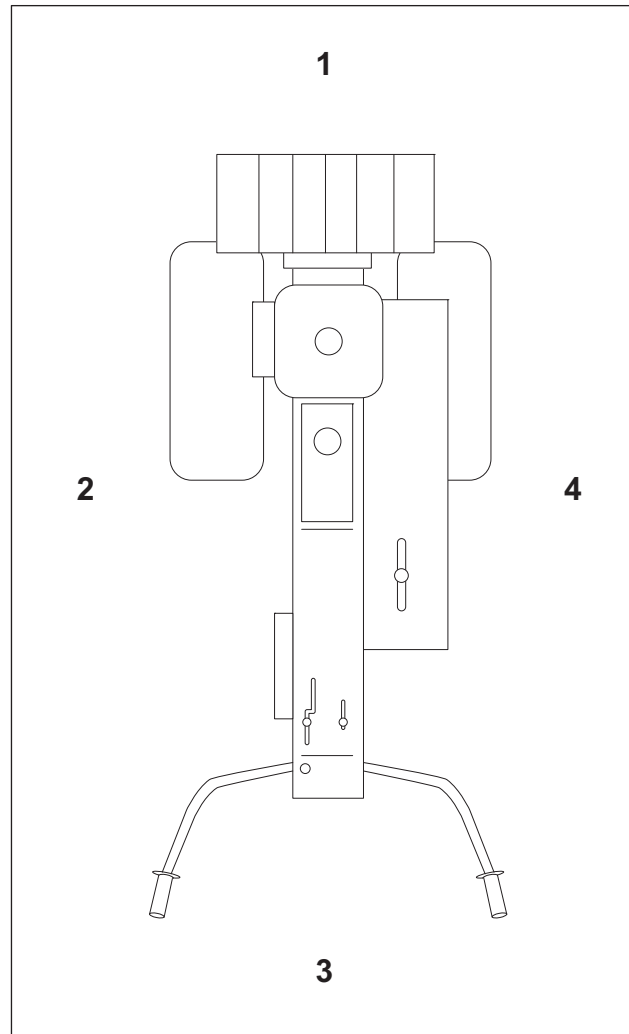
This manual contains information for the proper use of this machine. See **Operation Overview** for basic operating procedures. Cross references such as "See page 50" will direct you to detailed procedures.

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.



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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.

**100sx
Operator's Manual**

Issue number 1.0/OM-03/15

Part number 053-2815

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**Specifications**

machine specifications including weights, measurements, power ratings, and fluid capacities

71**Support**

the warranty policy for this machine, and procedures for obtaining warranty consideration and training

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a record of major service performed on the machine

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Safety

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Guidelines

Follow these guidelines before operating any jobsite equipment:

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

Emergency Procedures



⚠ WARNING

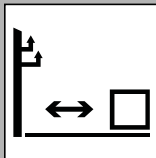
Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment. 274-050



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

EMERGENCY SHUTDOWN - Release all controls and turn ignition switch to STOP.

Electric Strike Description



⚠ DANGER

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

When working near electric cables, remember the following:

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

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

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

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

If an Electric Line is Damaged

If you suspect an electric line has been damaged and you are **near pedestrian unit**, DO NOT MOVE and do not touch unit. 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.
- Do not allow anyone into area until given permission by utility company.
- Do not allow anyone to touch equipment.

If a Gas Line is Damaged

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

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

If a Fiber Optic Cable is Damaged

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



If Machine Catches on Fire

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

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

Safety Alert Classifications

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



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

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

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

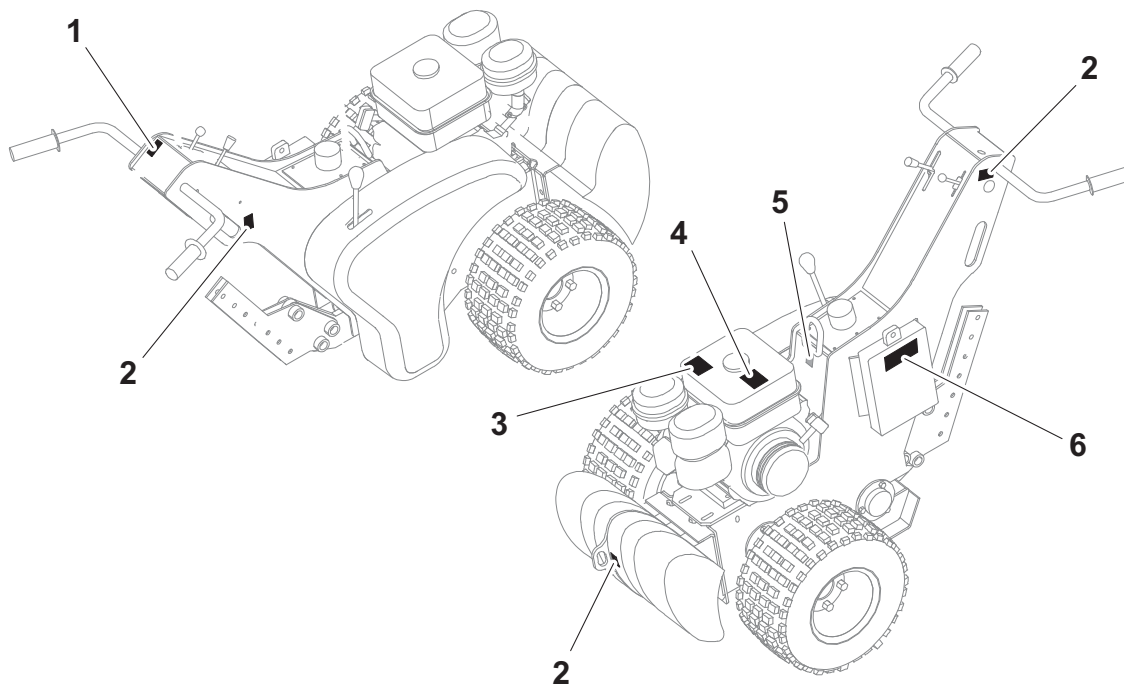
 **CAUTION** indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

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

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

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

Machine Safety Alerts



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1



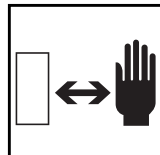
⚠ WARNING Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment. 274-050; 274-724 (2P)

2



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

3



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

4



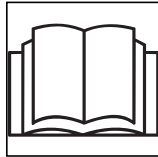
⚠ WARNING Fire or explosion possible. Fumes could ignite and cause burns. No smoking, no flame, no spark. 275-419 (2P)

5



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

6



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



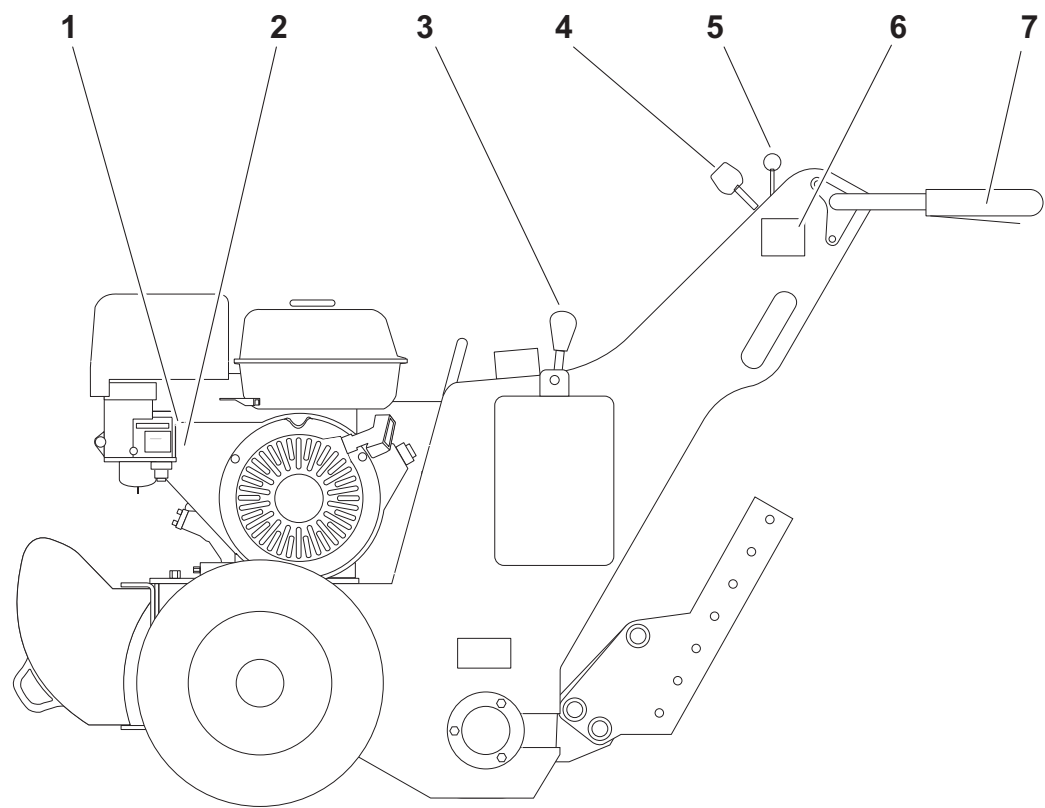
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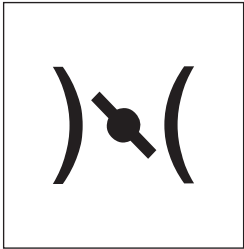


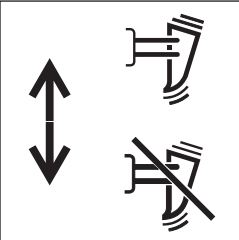
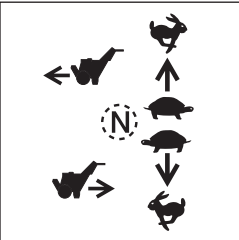
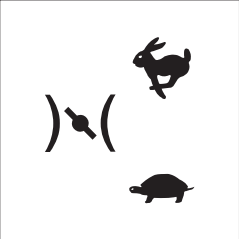
Plow



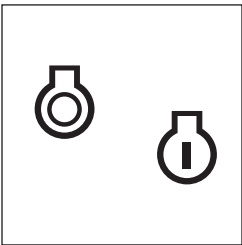
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- | | |
|----------------------------|-----------------------------|
| 1. Choke | 5. Throttle lever |
| 2. Fuel shutoff valve | 6. Ignition switch |
| 3. Plow control | 7. Operator presence switch |
| 4. Speed/direction control | |

Item	Description	Notes
1. Choke  c00ic557h.eps	Push lever forward before starting. Pull lever back after engine is running.	

Item	Description	Notes
2. Fuel shutoff valve  c00ic622w.eps	Open to allow fuel flow to engine. Close to shut off fuel flow to engine.	
3. Plow control  c00ic124w.eps	Push lever forward to engage plow vibrator. Pull lever backward to disengage plow vibrator.	
4. Speed/direction control  c00ic125w.eps	To move machine forward, move lever to forward position. To move machine backward, move lever to reverse position. To increase speed in either direction, move control farther from neutral. To stop movement, move control to neutral position.	Control automatically returns to neutral position if released in reverse position.
5. Throttle lever  c00ic243h.eps	Move lever forward to increase vibrator speed when plow is engaged. Move lever backward to decrease vibrator speed when plow is engaged.	



Item	Description	Notes
6. Ignition switch  c00ic126w.eps	Insert key and turn to ON position to enable rope start. Turn key to OFF position to stop engine.	IMPORTANT: Before starting machine: • ensure plow control is disengaged • move speed/direction control to neutral position
7. Operator presence switch	Detects when operator is present. Press and hold at least one switch before moving ground drive control or digging control out of neutral.	NOTICE: Do not wire or tape operator presence switch to handlebar or defeat interlock system in any manner. Ground drive and digging controls will not function.

Operation Overview

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Planning

1. Gather information about jobsite. See page 28.
2. Inspect jobsite. See page 29.
3. Classify jobsite. See page 30.
4. Select plow blade for your installation. See page 51
5. Check supplies and prepare equipment. See page 32.
6. Haul equipment to jobsite. See page 39.

Plowing

1. Start unit. See page 34.
2. Position plow and controls. See page 45.
3. Attach product. See page 45.
4. Begin plowing. See page 46.
5. Complete the installation. See page 53.
6. Shut down plow. See page 35.

Leaving Jobsite

1. Rinse equipment. See page 54.
2. Stow tools. See page 54.
3. Haul equipment away from jobsite. See page 39.

Prepare

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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

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

Arrange for Traffic Control

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

Plan for Emergency Services

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

Inspect Site

Inspect jobsite before transporting equipment. Check for the following:

- changes in elevation such as hills or other open trenches
- obstacles such as buildings, railroad crossings, or streams
- signs of utilities (See "Inspect Jobsite" on page 30.)
- traffic
- access
- soil type and condition

Identify Hazards

Identify safety hazards and classify jobsite. See "Classify Jobsite" on page 30.



WARNING

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



To help avoid injury:

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

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

Classify Jobsite

Inspect Jobsite

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

Select a Classification

Jobsites are classified according to underground hazards present.

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

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

Apply Precautions

Once classified, precautions appropriate for jobsite must be taken.

Electric Jobsite Precautions

Use one or both of these methods.

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

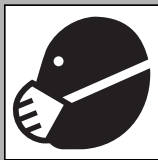
Natural Gas Jobsite Precautions

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

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



Crystalline Silica (Quartz) Dust Precautions



270-4952

Use breathing protection when exposed to silica dust.

To help avoid injury:

- Use water spray or other means to control dust.
- If workers are exposed to dust, they must wear appropriate breathing protection.

Other Jobsite Precautions

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

Check Supplies and Prepare Equipment

Supplies

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

Fluid Levels

- fuel
- hydraulic fluid
- battery charge
- engine oil

Condition and Function

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

Accessories

Fire Extinguisher

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

Drive

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Start Unit 34

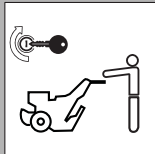
Drive 35

Shut Down 35

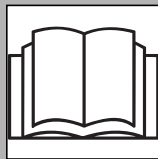


Start Unit

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



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



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

To help avoid injury:

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

1. Move all controls and switches to the neutral or disengaged position.
2. Open fuel shutoff valve.
3. Insert key into ignition switch and turn to the ON position.
4. Set throttle at low idle.
5. Choke to start cold engine.
6. Pull briskly on starter-rope handle at left side of machine.
 - If engine does not start after three pulls on rope start, turn key switch to OFF position and check for fuel blockage or ignition system problems.
7. Run engine at half-throttle or less for five minutes before operating plow. During warm-up, check that all controls work properly.
8. Return choke to open position if needed.

Drive

EMERGENCY SHUTDOWN: Turn ignition switch to STOP.

1. Remove or reposition plow blade for ground clearance.
2. Check that tires are positioned straight or in direction of intended movement.
3. Press and hold operator presence switch.
4. Move ground drive control in desired direction of travel.
5. Adjust throttle for desired speed of travel.

Shut Down

1. When job is complete, move ground drive control to neutral.

NOTICE: Machine should not be parked on a slope unless chocked, blocked, or parking brake engaged.

2. Return all controls to neutral or disengaged position.
3. Move throttle to low idle for 2-3 minutes to cool.
4. Turn ignition switch to OFF position. If leaving machine unattended, remove key.
5. Close fuel shutoff valve.



Transport

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- Procedure 38

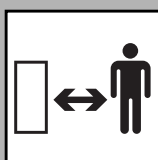
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Tie Down 40

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- Procedure 40



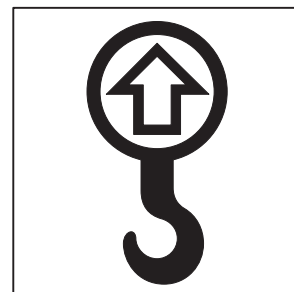
Lift



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

Points

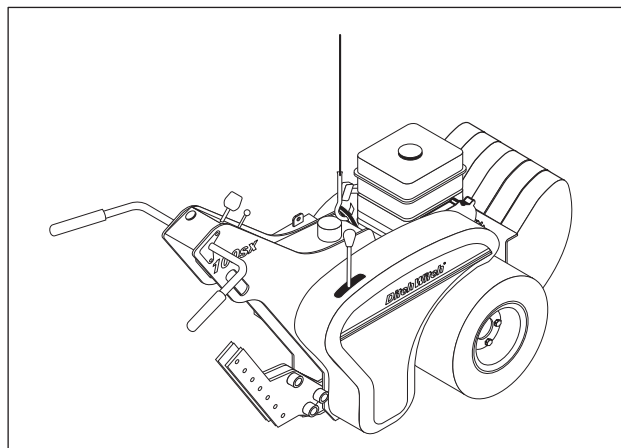
Lifting points are identified by lifting decals. Lifting at other points is unsafe and can damage machinery.



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Procedure

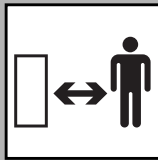
Use a crane capable of supporting the equipment's size and weight. See "100sx" on page 71. Use indicated lift points.



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Haul

Load



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

To help avoid injury:

- Load unit with engine in low idle.
- Load trailer on level ground.
- Load trailer correctly to avoid trailer swaying.
- Attach trailer to vehicle before loading or unloading.
- If loading onto a tilt-bed trailer, ensure that tilt latch is secured in the correct position.
- Ten to fifteen percent of total vehicle weight (equipment plus trailer) must be on tongue to help prevent trailer sway.

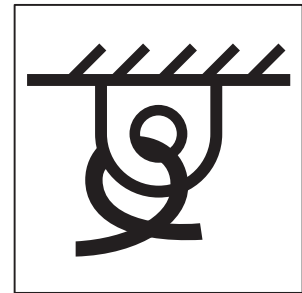
1. Start engine. See page 34 for proper start-up procedures.
2. Reposition or remove plow blade.
3. Slowly drive plow onto trailer.
4. Position plow on trailer deck for proper weight distribution.
5. Turn plow off. See page 35 for proper shutdown procedures.
6. Attach chains to plow where tie-down decals are located. See page 40.



Tie Down

Points

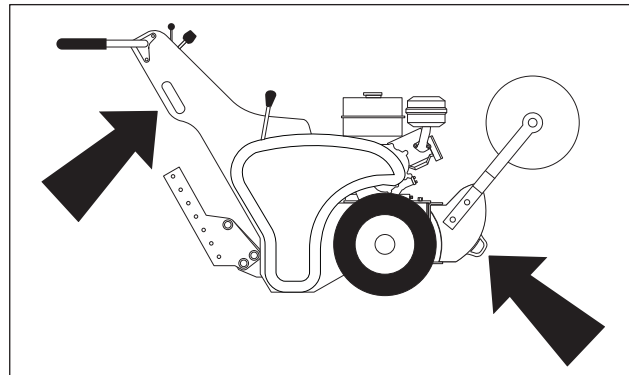
Tie-down points are identified by tie-down decals. Securing to trailer at other points is unsafe and can damage machinery.



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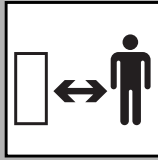
Procedure

Attach chains at front and rear tie-down points. Make sure chains are tight before transporting unit.



t44om007w.eps

Unload



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

To help avoid injury:

- Unload unit with engine in low idle.
- Unload trailer on level ground.
- Attach trailer to vehicle before loading or unloading.
- If trailer tilts, ensure that tilt latch is secured in the correct position.

1. Lower trailer or ramps.
2. Remove chains from tiedowns.
3. Start plow. See page 34 for proper start-up procedures.
4. Slowly back unit down trailer or ramps.





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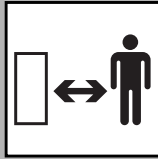
Setup 44

- Position Plow. 45
- Attach Product. 45

Operation 46

Setup

EMERGENCY SHUTDOWN - Turn ignition switch to STOP.



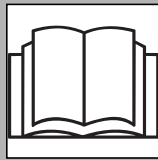
WARNING Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.

To help avoid injury: Keep everyone at least 6' (2 m) from machine, attachments, and their range of movement.



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

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



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

NOTICE:

- Choose the correct plow blade length for the desired depth of material cover. If using a vertically adjustable, multi-depth blade, select the proper installation height.
- Do not operate vibrator unless plow blade is in the ground.



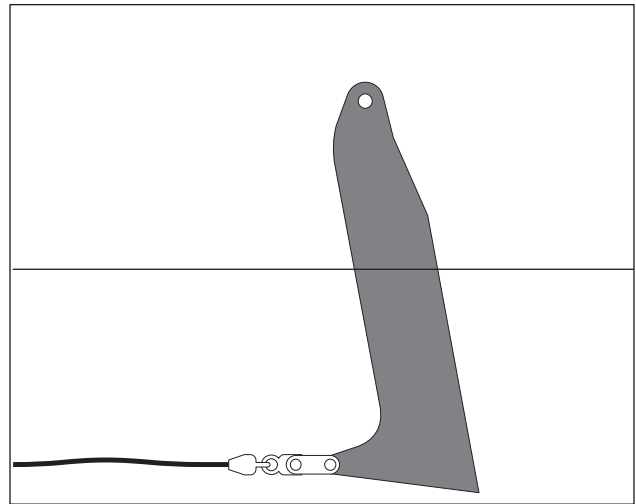
Position Plow

1. Start plow. See page 34 for start-up procedures.
2. Drive to starting point. Move in line with planned path. See page 35 for operating procedures.
3. Lower plow blade to starting point of path.
4. Turn ignition switch to OFF.

Attach Product

To Pull Product

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

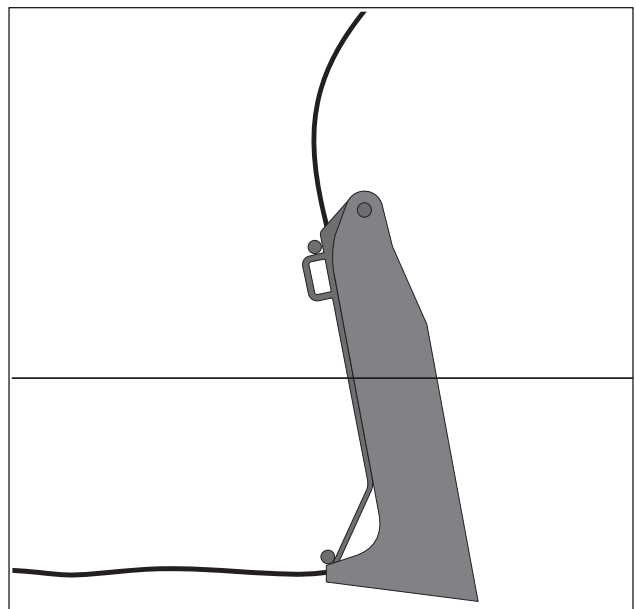


Plow_Pull_nobox.eps

To Feed Product

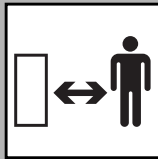
1. Remove cable guide.
2. Feed cable through tube from top to bottom.
3. Replace cable guide and tighten fasteners.
4. Secure cable.

NOTICE: Keep everyone away from material being installed.

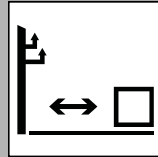


Plow_Feed_nobox.eps

Operation

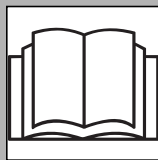


⚠ WARNING Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.



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

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



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

NOTICE:

- Do NOT plow with the blade partially raised. Only operate the plow with blade fully in the ground.
- Do NOT move ground drive control to reverse with the blade in the ground.

Start Plowing

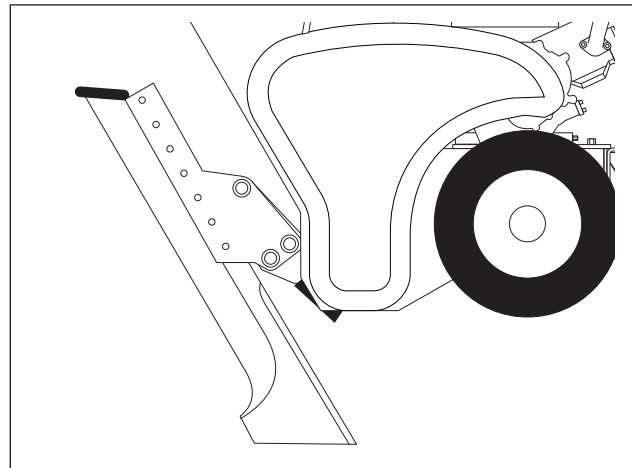


1. Start unit. (See "Start Unit" on page 34.)
2. Adjust throttle to low idle.
3. Check that ground drive control is in neutral.
4. Move ground drive control forward to a slow speed and lower plow blade until it begins to break the soil.
5. Move the plow vibrator control to the ON position. PLOW WILL VIBRATE.

NOTICE:

- Move slowly while lowering the plow blade into the ground.
- Do NOT move ground drive control to reverse with the blade in the ground.
- Do NOT plow with the blade partially raised.

6. Lower the plow blade into the ground to full depth.
7. Increase engine speed to a point with the least plow vibration and the highest ground drive speed possible without tire slippage.
8. Check cable for damage during plowing. Run continuity checks on electric cable and check pipe pressure. Damage can result from improper operation, incorrect blade choice, striking underground obstructions, or other conditions.



t44om006w.eps

Finish Plowing

1. When installation is complete, move ground drive control to the neutral position.
2. With vibrator running, lower throttle speed and raise plow to just below ground level.
3. Move plow vibrator control to OFF.

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

4. Raise plow out of ground.
5. Turn ignition switch to OFF and remove product from plow.
6. Start plow and drive a short distance away from work site.
7. Shut down plow. See page 35 for proper shutdown procedures.

Systems and Equipment

Optional Equipment 50

Plow Blades 51

- Blade Maintenance 51
- Blade Types 51



Optional Equipment

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

100sx Plow

Equipment	Description
plow blades and pulling grips	Choose the most efficient plow blade for your job based on your desired cover depth range, feed chute diameter, and feed chute radius, as well as your desired speed for straight plowing.
tires	16" or 18" tires are available
counterweights	required to balance unit configured with optional attachments
front reel carrier	mounted on the front of the plow

Plow Blades

Blade Maintenance

- Keep cable guide wing bolts tight. Loose cable guide bolts will break due to plow vibration.
- Keep plow feed tube free of rock and debris so that material pulls freely through tube.
- Use a speed blade only for straight or gently curving installations. Do not use speed blades for installations that require sharp turns.
- Use the plow blade most appropriate for the type of material being installed. Contact your Ditch Witch® dealer for information about the most effective blade for your jobsite conditions.

Blade Types



Type	Description
feed blade	used to "stitch" flexible material into the ground as it is fed through a chute or tube located at the back of the blade
speed blade	a thin feed-type blade used for high speed, straight plowing
pull blade	used to pull rigid or semi-rigid material into the ground through a tunnel made by a "bullet" at the bottom of the blade; a pulling grip is used to attach the material to the blade

Complete the Job

Chapter Contents

Rinse Equipment	54
Stow Tools	54



Rinse Equipment

Spray water onto equipment to remove dirt and mud.

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

Stow Tools

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

Service

Chapter Contents

Service Precautions 56

Lubrication Overview 57

Recommended Lubricants/Service Key 58

• Engine Oil Selection Chart 59

5 Hour 60

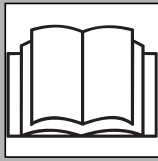
10 Hour. 61

50 Hour. 65

As Neded 68



Service Precautions

**WARNING**

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

To help avoid injury:

- Unless otherwise instructed, all service should be performed with engine off.
- Allow equipment to cool before performing service.
- Refer to engine manufacturer's manual for engine maintenance instructions.

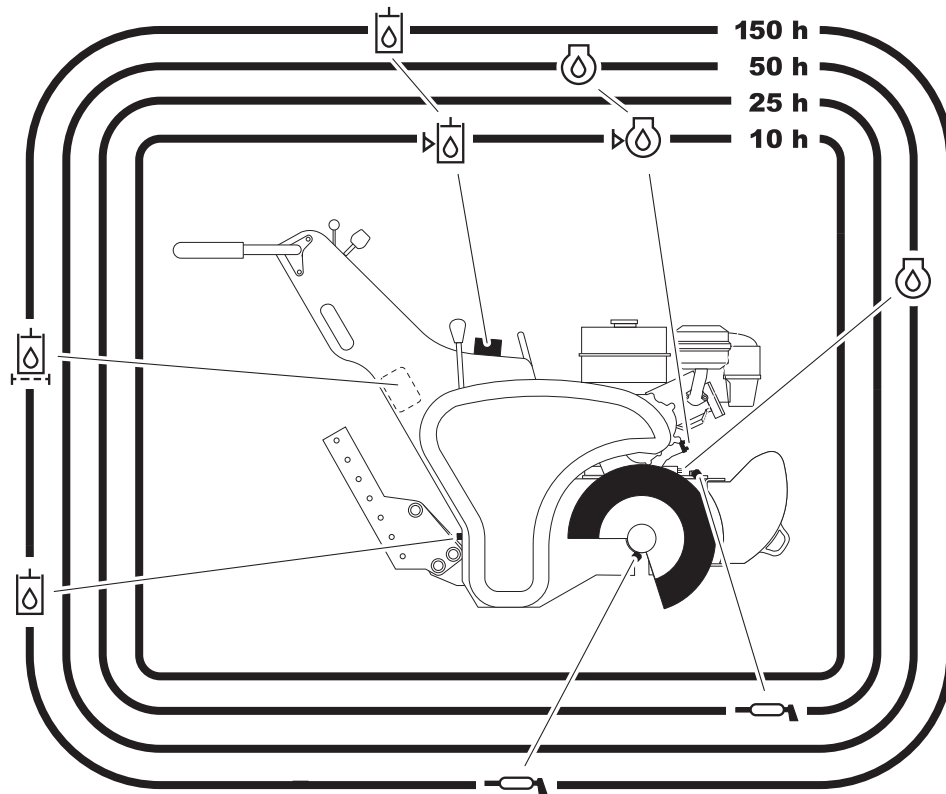
Cleaning Precaution

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

Welding Precaution

NOTICE: Welding can damage electronics. Welding currents can damage electronic components. Connect welder ground close to welding point and make sure no electronic components are in the ground path.

Lubrication Overview



t44om011w.eps

Recommended Lubricants/Service Key

Item	Description
 GEO	Gasoline engine oil meeting API service classification SL or higher and SAE viscosity recommended by engine manufacturer
 MPG	Multipurpose grease meeting ASTM D217 and NLGI 5
 MPL	Multipurpose gear oil meeting API service classification GL-5 (SAE 80W90)
 THF	Tractor hydraulic fluid, similar to Phillips 66 [®] HG, Mobilfluid [®] 423, Chevron [®] Tractor Hydraulic Fluid, Texaco [®] TDH Oil, or equivalent
	Check level of fluid or lubricant
	Check condition
	Filter
	Change, replace, adjust, service, or test

Proper lubrication and maintenance protects Ditch Witch[®] equipment from damage and failure. Service intervals listed are for minimum requirements. In extreme conditions, service machine more frequently. Use only recommended lubricants. Fill to capacities listed in See "Specifications" on page 71.

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

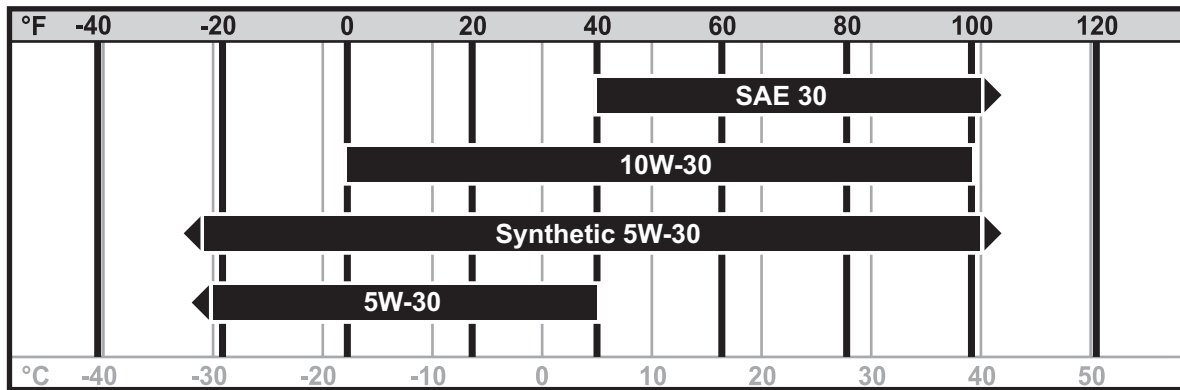
NOTICE:

- Use only genuine Ditch Witch parts, filters, and approved lubricants to maintain warranty.
- Use the "Service Record" on page 79 to record all required service to your machine.

Approved Fuel

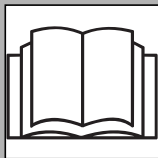
This engine is designed to run on unleaded gasoline and up to 10 percent volume ethanol (E10). Use only high quality fuel meeting ASTM D4814 or equivalent. Do not use gasoline blended with methyl alcohol.

Engine Oil Selection Chart



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



WARNING

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

To help avoid injury:

- Unless otherwise instructed, all service should be performed with engine off.
- Refer to engine manufacturer's manual for engine maintenance instructions.



5 Hour

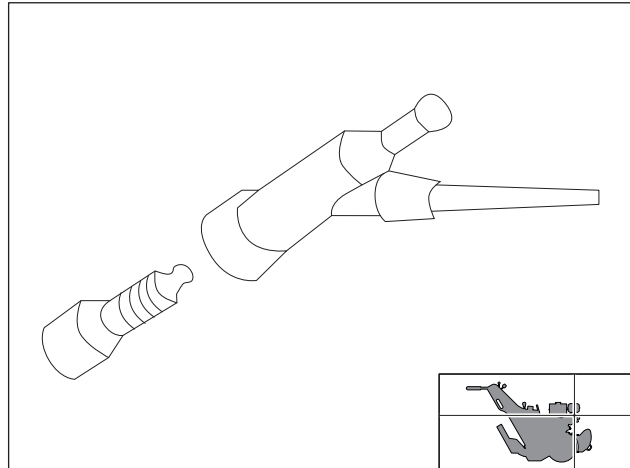
Location	Task	Notes
	Change engine oil	initial service, GEO

Change Engine Oil

Change engine oil after 5 hours initially. Ensure unit is level and engine oil is warm.

To drain:

1. Disconnect spark plug wire and keep away from spark plug (shown).

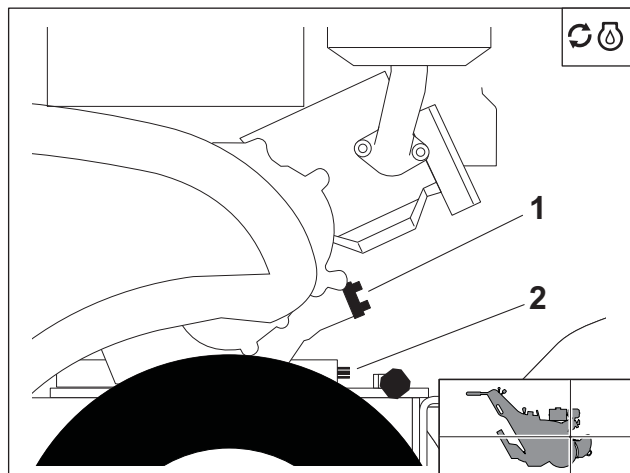


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2. Remove oil drain plug (2). Drain oil into an approved receptacle.
3. After oil has drained, install and tighten oil drain plug.

To fill:

1. Clean oil fill area of any debris or dirt.
2. Remove dipstick (1) and wipe with clean cloth.
3. Slowly pour oil into engine oil fill (1). Fill to point of overflowing.
4. Insert dipstick.



t44om012w.eps

IMPORTANT: Do not turn or tighten dipstick.

5. Remove dipstick and check to ensure engine oil level is at the top of full indicator on dipstick.
6. Reconnect spark plug and install and tighten dipstick.

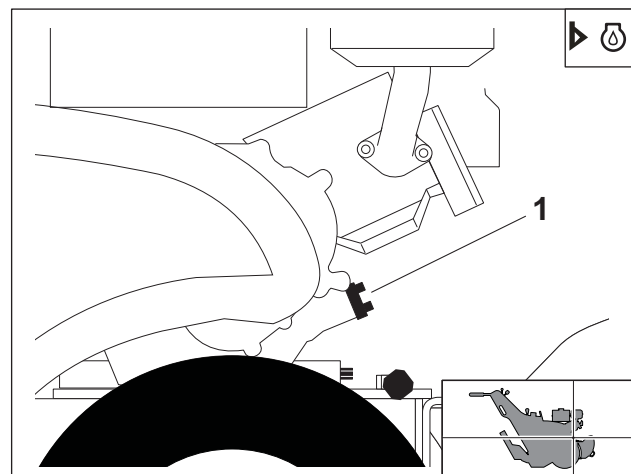
10 Hour

Location	Task	Notes
	Check engine oil level	GEO
	Clean air filter	
	Check hydraulic fluid level	THF
	Check tire pressure	
	Check hydraulic hoses	

Check Engine Oil Level

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

IMPORTANT: See page 58 for GEO specifications.



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Clean Air Filter

Check air filter every 10 hours.

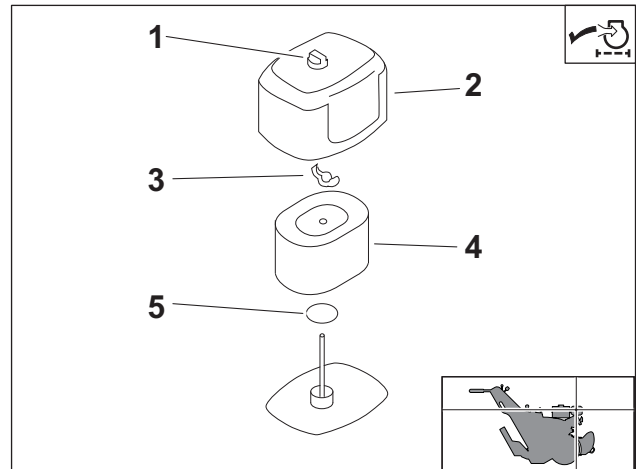
NOTICE: Compressed air or water may damage filter elements.

To clean:

1. Remove air filter cover (2) by removing fastener (1).
2. Remove fastener (3) and filter (4).
3. Remove pre-cleaner (if equipped) from the filter. To loosen debris, gently tap filter on a hard surface. If filter is excessively dirty, replace with a new filter.
4. Wash pre-cleaner in liquid detergent with water. Allow pre-cleaner to thoroughly air dry.

IMPORTANT: Do not oil pre-cleaner.

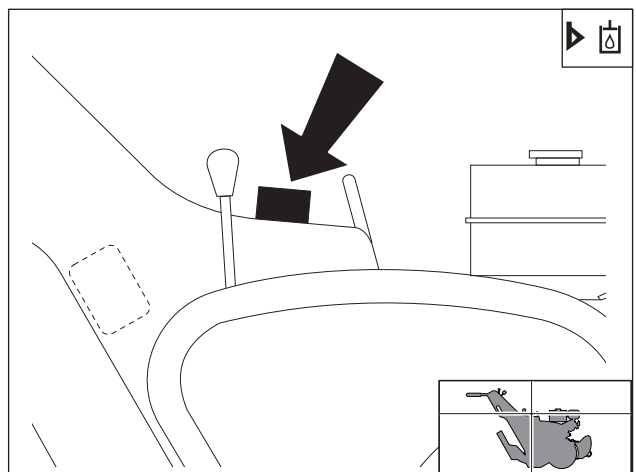
5. Assemble pre-cleaner to filter.
6. Install seal washer (5) filter, and pre-cleaner into the base.
7. Install cover and secure.



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Check Hydraulic Fluid Level

Check fluid at sight glass every 10 hours. Fluid should be halfway up sight glass. Add THF at fill (shown) as necessary. Do not overfill.

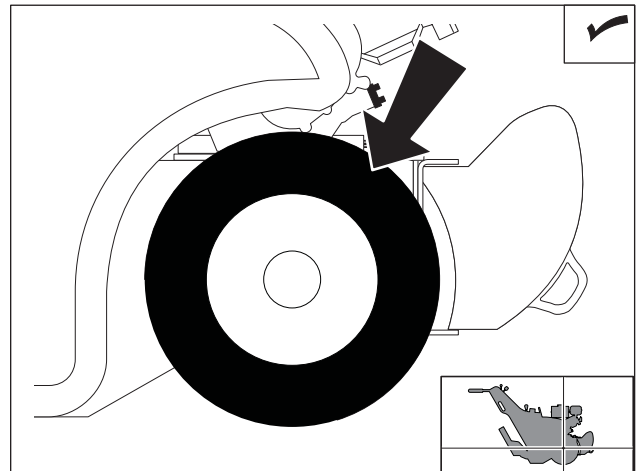


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Check Tire Pressures

Check tire pressure before each use.

Tire option	Max. pressure
16 x 6.5-8 4-ply bar lug	28 psi (1.9 bar)
18 x 11.00-8 3-ply knob	10 psi (0.69 bar)



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Check Hydraulic Hoses

**⚠ WARNING**

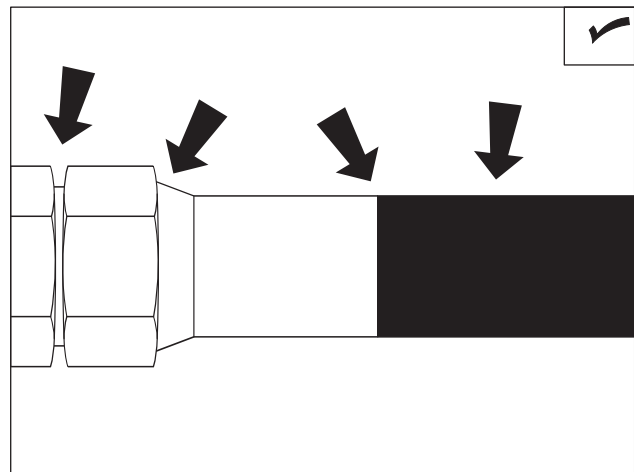
Fluid or air pressure could pierce skin and cause injury or death. Stay away. Escaping pressurized fluid can cause injury or pierce skin and poison.

To help avoid injury:

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

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

Check hydraulic hoses for leaks every 10 hours.



CheckHoses.eps

50 Hour

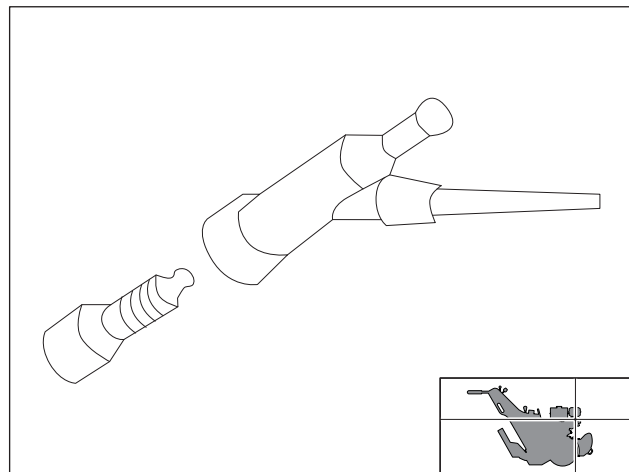
Location	Task	Notes
	Change engine oil and filter	GEO, 5.5 qt (5.2 L)
	Change hydraulic fluid and filters	
	Change spark plug	
	Change air filter	

Change Engine Oil

Change engine oil every 50 hours or annually, whichever occurs first. Ensure unit is level and engine oil is warm.

To drain:

1. Disconnect spark plug wire and keep away from spark plug (shown).

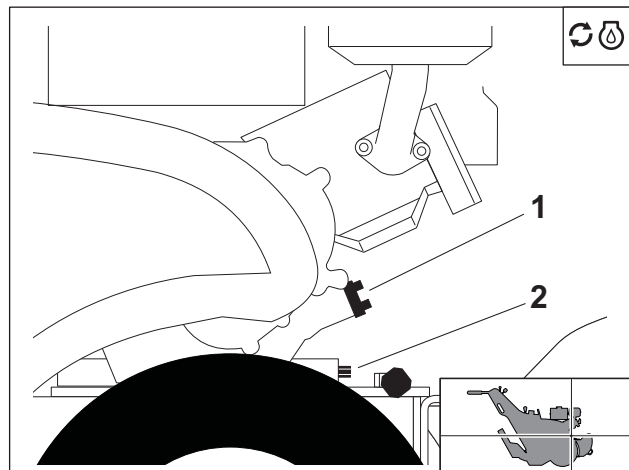


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2. Remove oil drain plug (2). Drain oil into an approved receptacle.
3. After oil has drained, install and tighten oil drain plug.

To fill:

1. Clean oil fill area of any debris or dirt.
2. Remove dipstick (1) and wipe with clean cloth.
3. Slowly pour oil into engine oil fill (1). Fill to point of overflowing.
4. Insert dipstick.



t44om012w.eps

IMPORTANT: Do not turn or tighten dipstick.

5. Remove dipstick and check to ensure engine oil level is at the top of full indicator on dipstick.
6. Reconnect spark plug and install and tighten dipstick.

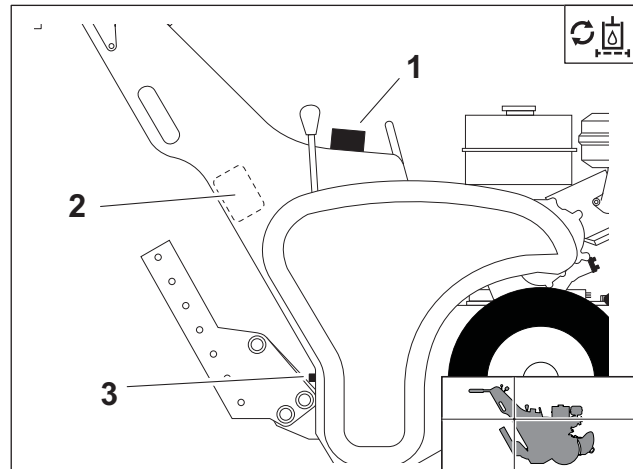


Change Hydraulic Fluid and Filters

Change hydraulic fluid and filters every 50 hours or annually, whichever occurs first.

To change hydraulic fluid:

1. With fluid warm, remove drain plug (3), located at bottom of reservoir.
2. Drain fluid and replace plug.
3. Replace filter (2).
4. Fill through fill cap (1) to center of reservoir sight glass with THF. Reservoir capacity is 3.5 gal (13.2 L).



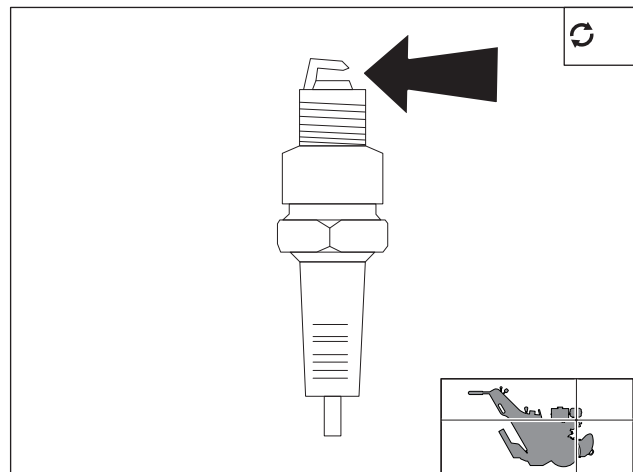
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Change Spark Plug

Change spark plugs every 50 hours or annually, whichever occurs first.

To change spark plug:

1. Disconnect the ignition coil.
2. Remove the spark plug.
3. Use a feeler gauge to set gap (shown) on new spark plug to 0.028-0.031 in (0.70-0.80 mm)
4. Install new spark plug.



t440m019w.eps

IMPORTANT: When reassembling, install the ignition coil inside the spark plug terminal firmly. Make sure that the wiring and the ignition coil are correctly connected.

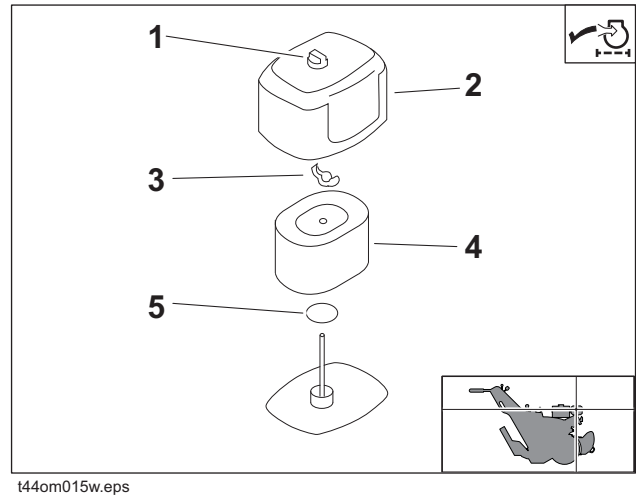
Change Air Filter

Change air filter every 50 hours or annually, whichever occurs first.

NOTICE: Compressed air or water may damage filter elements.

To change:

1. Remove air filter cover (2) by removing fastener (1).
2. Remove fastener (3) and filter (4).
3. Remove pre-cleaner (if equipped) from the filter.
4. Replace air filter and pre-cleaner.
5. Assemble pre-cleaner to filter.
6. Install seal washer (5) filter, and pre-cleaner into the base.
7. Install cover and secure.



As Needed

Location	Task	Notes
	Refuel	
	Check wheel lug nut torque	88-95 ft•lb (108-129 N•m)
	Clean plow blade feed tube	
	Check plow arm pins and bushings	
	Check plow attachment mounting bolts	
	Replace plow blade	
REEL CARRIER	Check reel carrier arms and cable guides	

Refuel

**WARNING**

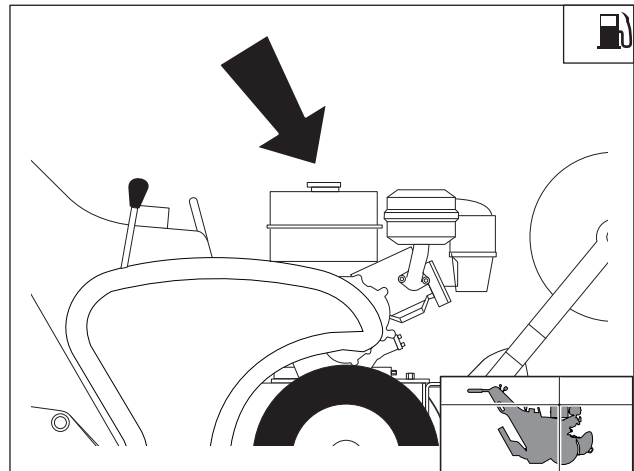
Explosion possible. Serious injury or equipment damage could occur. Follow directions carefully.

To help avoid injury, observe the following precautions while refueling.

- Do not refuel with the engine running.
- Touch an unpainted metal surface to discharge any static electricity. Sparks resulting from static electricity can cause fuel vapors to ignite while refueling.
- Always hold the grips on the fuel tank cap and turn it slowly to remove it. A whooshing sound may be heard when the fuel tank is loosened. Wait until the sound cannot be heard before fully removing the cap. In hot weather, pressurized fuel may spray out the filler neck and cause injury.
- Do not allow anyone that has not discharged static electricity from their body to come close to an open fuel tank.
- Do not inhale vaporized fuel. Fuel contains substances that are harmful if inhaled.
- Do not smoke while refueling the unit. Doing so may cause the fuel to ignite and cause a fire.
- Do not return to the vehicle or touch any person that is statically charged. This may cause static electricity to build up, resulting in a possible ignition hazard.
- Securely insert the fuel nozzle into the fuel filler neck. If fuel is added with the nozzle slightly lifted away from the fuel filler neck, the automatic shutoff function may not operate, resulting in fuel overflowing from the tank.
- Do not spill fuel during refilling. Doing so may damage the unit, such as causing the exhaust system to operate abnormally or damaging fuel system components or the unit's painted surface.

Refuel unit as needed. To refuel:

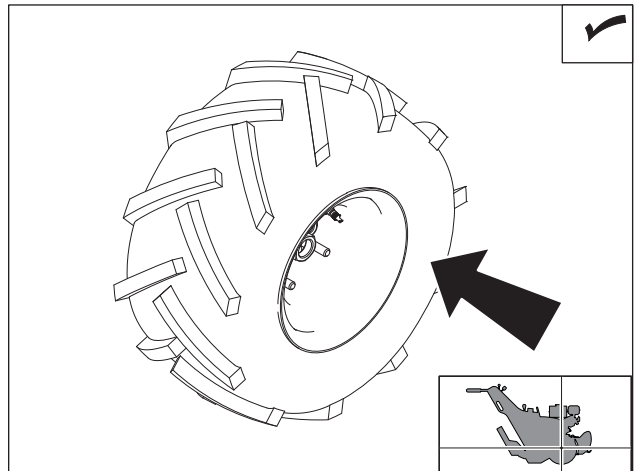
1. Turn engine switch off and let the engine cool for 3-5 min.
2. Open fuel cap (shown).
3. Insert fuel nozzle and add fuel.
4. Install fuel cap.



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Check Wheel Lug Nut Torque

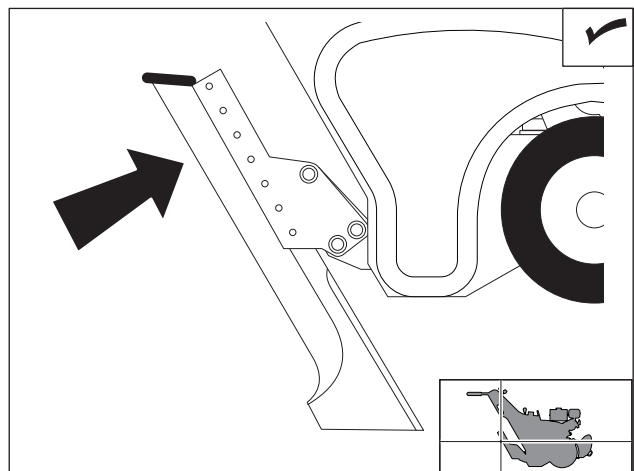
Check wheel lug nut torque before each use.
Tighten to 88-95 ft•lb (108-129 N•m).



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Clean Plow Feed Tube

Clean feed tube (shown) every 10 hours.



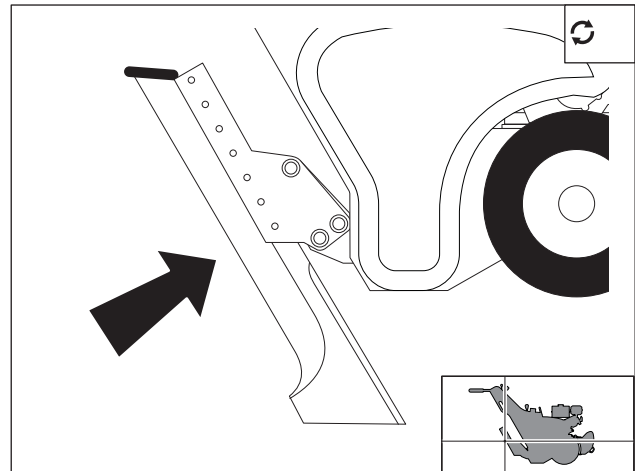
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Replace Plow Blade

Check plow blade (shown) for wear and replace as needed. Blade should be changed if:

- Plow toe edge is worn to a curve
- Side plates begin to peel
- Plow blade bends
- Plow blade is worn scratched or gouged.

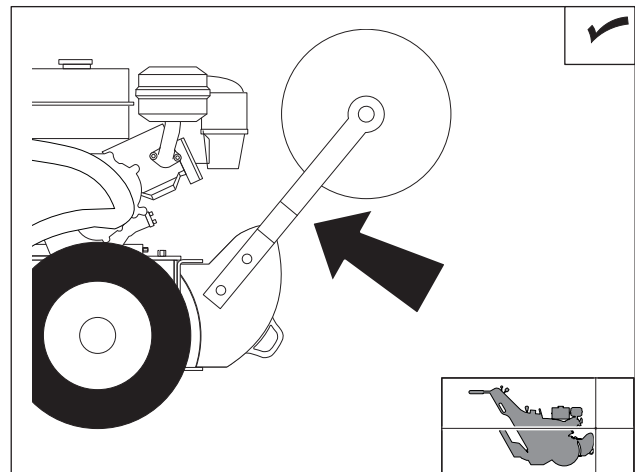


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Reel Carrier

Check Reel Carrier Arms and Cable Guides

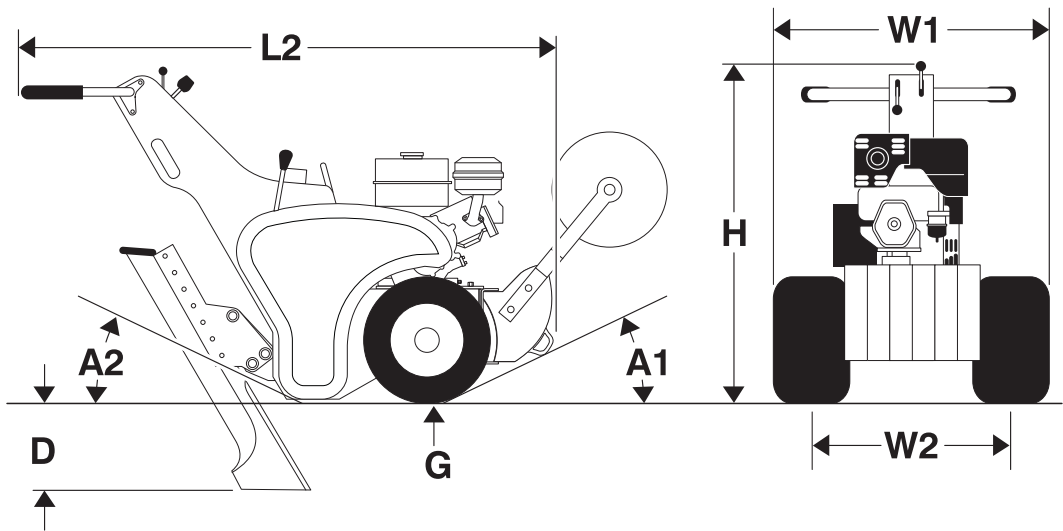
Check reel carrier arms and cable guides for damage. Replace if necessary.



t44om023w.eps

Specifications

100sx



t44om025w.eps

Dimensions *		U.S.	Metric
H1	Operating height	41 in	104 cm
A3'	Angle of departure without blade	50°	50°
L1	Maximum length without reel carrier	70 in	178 cm
L2	Maximum length with reel carrier	86.5 in	220 cm
W1	Plow vehicle width	35 in	89 cm
A'	Maximum depth	13 in	33 cm
A	Maximum cover depth	12 in	30 cm



Operation	U.S.	Metric
Maximum crowd speed		
Forward	92 fpm	28 m/min
Reverse	92 fpm	28 m/min
Vehicle clearance circle	70 in	178 cm
Plow blade sizes		
Pull blades (cover depth x mole diameter)	6-12 x .75 in	152-305 x 19 mm
Feed blades (tube diameter x cover depth (bend radius))	.375 x 6-12 (1) in	9 x 152-305 (25) mm
Operating weight	720 lb	327 kg

Power	U.S.	Metric
Engine: Briggs & Stratton® 2100 Series gasoline engine		
Cooling medium: air		
Number of cylinders: one		
Displacement	25.6 in ³	20.98 cm ³
Bore	3.54 in	90 mm
Stroke	2.6 in	66 mm
Engine manufacturer's gross power rating @ 3600 rpm	13.5 hp	10.1 kW
*Maximum governed speed as installed (no load)	3400 rpm	3400 rpm
Flywheel power @3400 rpm (full load)	10.2 hp	7.5 kW
Fuel consumption @ 3600 rpm	0.89 gph	3.4 L/h
**Maximum tilt angle	20°	20°

*All warranty is void if engine is run above maximum governed speed as installed (no load).

**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 @ 3600 rpm, relief valve setting @ 2,000 psi	2.2 gpm	8.3 L/min
Ground drive pump displacement/revolution	.223 in ³	.556 cm ³
Ground drive motor displacement/revolution	9.6 in ³	157 cm ³
Directional control valve type: open center		
Delivery capacity	10 gpm	37.8 L/min
System relief valve setting	2500 psi	172.4 bar

Fluid Capacities	U.S.	Metric
Fuel tank	1.8 gal	6.8 L
Hydraulic reservoir	3.5 gal	13.2 L

Power Train

Ground drive transmission: hydrostatic, infinitely variable forward and reverse, 3:1 chain drive from motor to axle

Tires:

16 x 6.5-8 4-ply bar lug

18 x 11.00-8 3-ply knob

Drive line system: belts and sheaves

Vibratory mechanism: eccentric shaft

Noise Levels

Operator 91 dBA sound pressure per ISO 6394

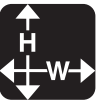
Exterior 104 dBA sound power per ISO 6393

Vibration

Average vibration transmitted to the operator's hand during normal trenching operation is 15.2 m/sec².

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.



Support

Procedure

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

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

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

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



Resources

Publications

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

Ditch Witch® Training

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

Warranty

Ditch Witch® Equipment and Replacement Parts Limited Warranty Policy

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

Exclusions from Product Warranty

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

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

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

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

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

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

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

**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.

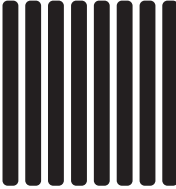
This will enable you to receive updates on this equipment as well as information on new products of interest.

Thanks for using Ditch Witch equipment.

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



NO POSTAGE
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P.O. Box 66
Perry, Oklahoma 73077-9989**



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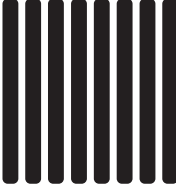
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**The Charles Machine Works, Inc.
P.O. Box 66
Perry, Oklahoma 73077-9989**



Ditch Witch® Registration Card

Please Type or Print All Information

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

Ditch Witch® Registration Card

Please Type or Print All Information

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

Service Record

[illegible]

[illegible]