C12/C14/C16

Operator's Manual

CE

Issue 1.0
Original Instruction

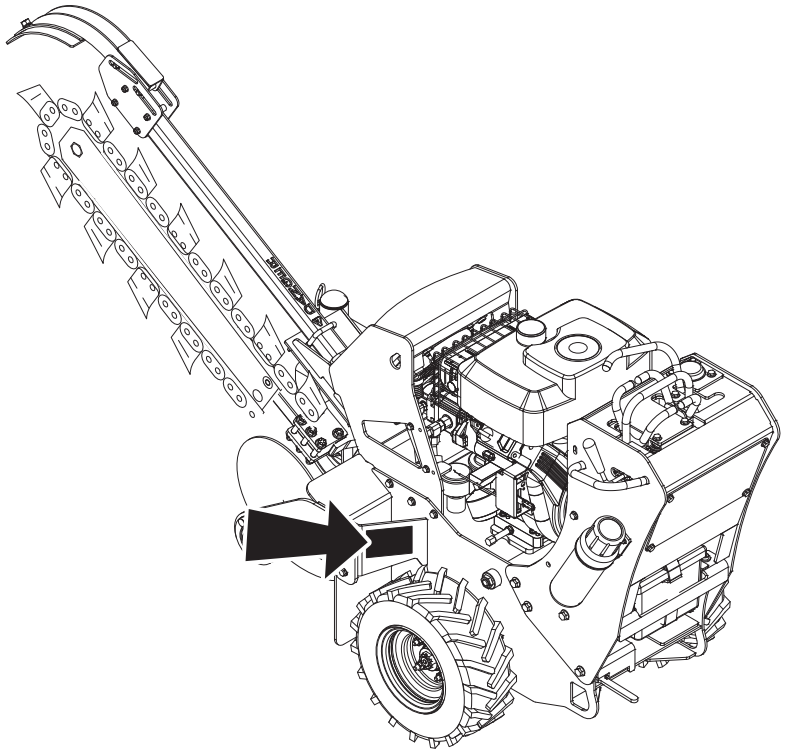
053-2868

Overview

Chapter Contents

Serial Number Location

Record serial numbers and date of purchase in spaces provided. Trencher serial number is located as shown.



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Item	
date of manufacture	
date of purchase	
trencher serial number	
trailer serial number	
engine serial number	

Intended Use

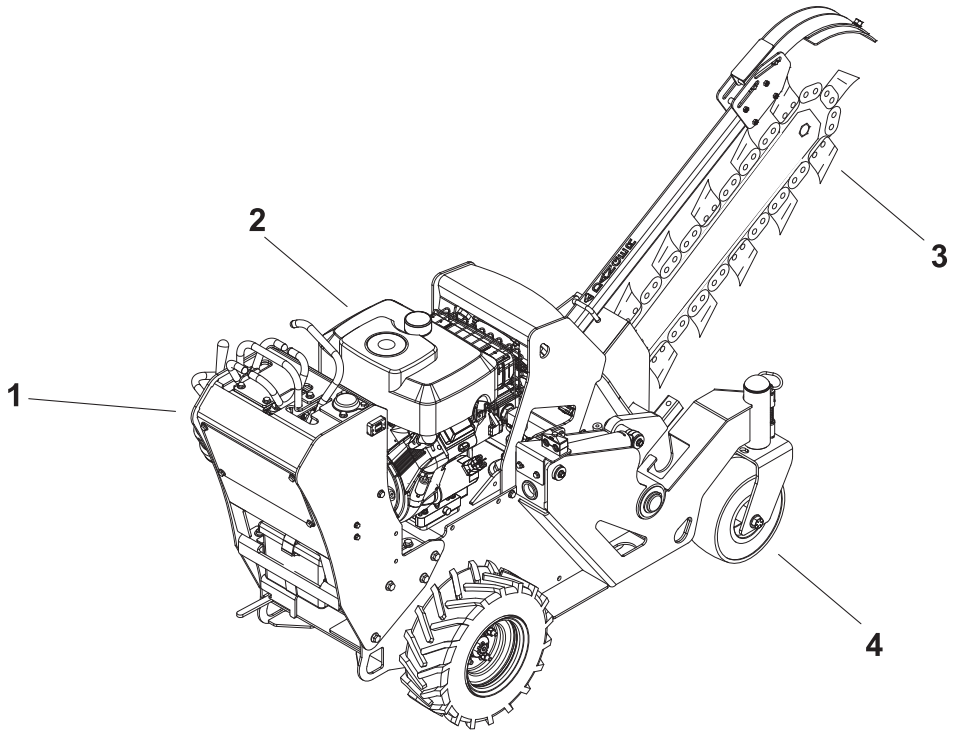
The C12, C14 and C16 pedestrian trenchers are designed to install buried cable and pipe. The maximum trenching depth is 30" (762 mm). The maximum trenching width is 6" (200 mm). These units are intended for operation in ambient temperatures from 20° to 115°F (-7° to 46°C). Use in any other way is considered contrary to the intended use.

C12, C14 and C16 units should be used with genuine Ditch Witch® chain, teeth, and sprockets. They 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.

Unit Components



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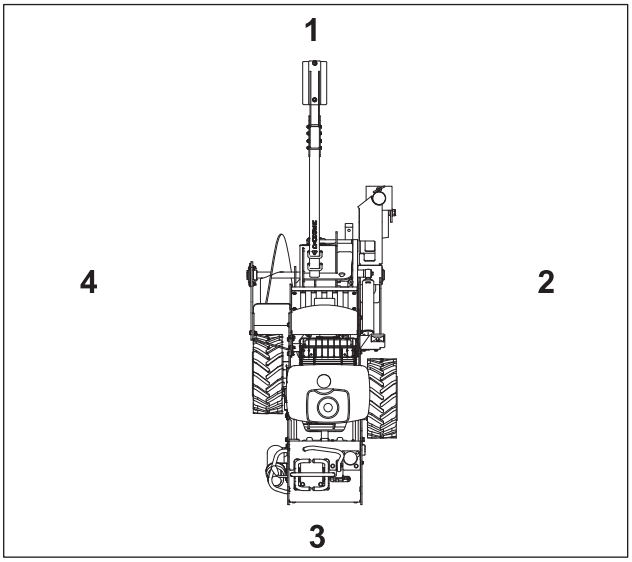
1. Control console
2. Engine
3. Digging boom and chain
4. Pivot trail wheel

Operator Orientation

1. Front of unit
2. Right side of unit
3. Rear of unit
4. Left side of unit



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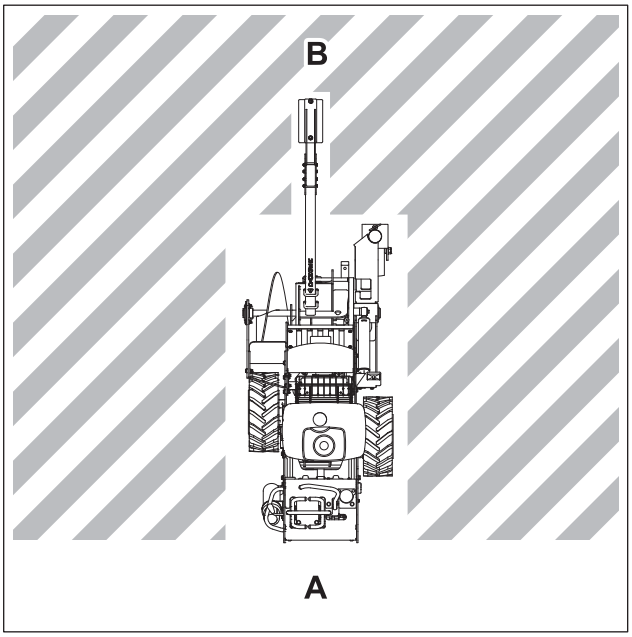
Operating Area

The operating area (A) is at the rear of the machine, behind the control console.

Any other area less than 6 ft (2 m) from the machine is a danger area (B). Stay away.



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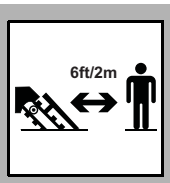


DANGER Moving digging teeth can kill. Trench cave-in can cause you to fall. Stay away.

To help avoid injury:

- Before you start machine, tell all personnel to go from danger area (B).
- If someone enters danger area (B) during operation, use emergency shutdown.

About This Manual

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

C12/C14/C16
Operator's Manual

Issue number 1.0/OM-03/16
Part number 053-2868

Contents

Safety

Chapter Contents

Guidelines

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.
- Fully inspect equipment before operating. Repair or replace any worn or damaged parts. Replace missing or damaged safety shields and safety signs. Contact your Ditch Witch dealer for assistance.
- Use equipment carefully. Stop operation and investigate anything that does not look or feel right.
- Do not operate unit where flammable gas may be present.
- Only operate equipment in well-ventilated areas.
- Contact your Ditch Witch dealer if you have any question about operation, maintenance, or equipment use.
- Complete the equipment checklist located at www.ditchwitch.com/safe.

California Proposition 65 Warning

This product 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

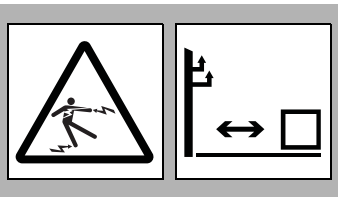
Emergency Procedures

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: Release controls and turn ignition switch to OFF position.

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


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

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.

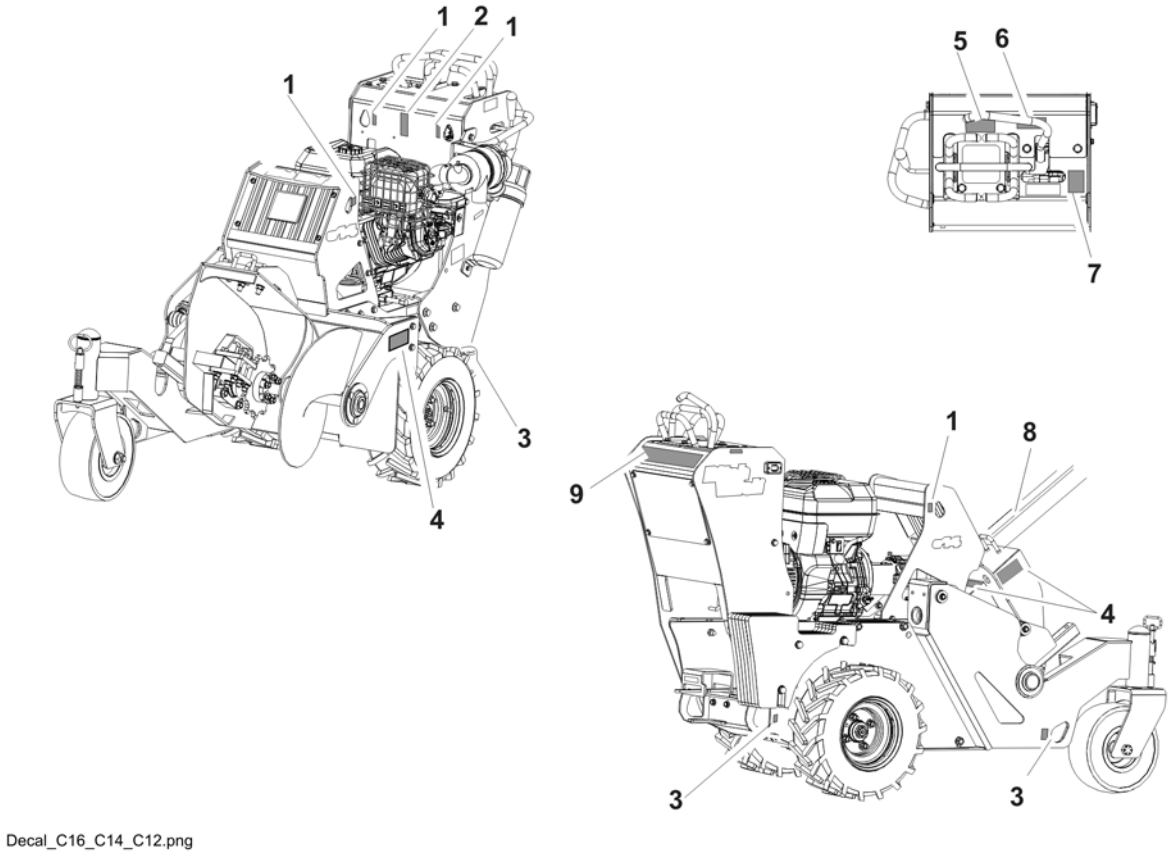
CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

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

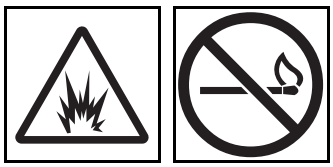
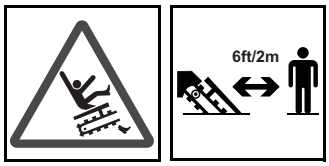
NOTICE indicates information considered important, but not hazard-related (e.g., messages relating to property damage).

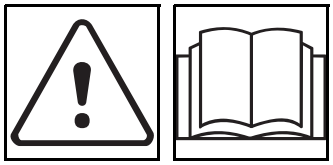
IMPORTANT can help you do a better job or make your job easier in some way.

Machine Safety Alerts



Decal_C16_C14_C12.png

1		Lift point. See Transport chapter for more information. 274-442
2		**WARNING** Fire or explosion possible. Fumes could ignite and cause burns. No smoking, no flame, no spark. 275-419
3		Tiedown location. See Transport chapter for more information. 274-318
4		**DANGER** Moving digging teeth can kill. Trench cave-in can cause you to fall. Stay away. 270-6900

5		**WARNING** Read operator's manual. Follow safety rules and know how to use all controls. Your safety is at stake. 273-475
6		**WARNING** Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment. 700-133
7		**CAUTION** Exposure to high noise levels may cause hearing loss. Wear hearing protection. 700-009
8		**DANGER** Moving digging teeth can kill. Trench cave-in can cause you to fall. Stay away.
9		**CAUTION** Tip over possible. When loading/unloading run at low idle and keep boom low. 270-6705 (C12/C14) / 270-6706 (C16)

Operation Overview

Chapter Contents

Plan

1. Gather information about jobsite. See page 35.
2. Inspect jobsite. See page 36.
3. Classify jobsite. See page 37.
4. Select best chain type and tooth pattern for your application. See page 61.
5. Consider optional equipment, if necessary. See page 63.
6. Check supplies. See page 40.
7. Prepare equipment. See page 40.
8. Load unit onto trailer. See page 50.

Trench

1. Unload unit from trailer. See page 53.
2. Leave optional backfill blade, if equipped, in stowed position with digging boom low to ground. See page 64.
3. Start unit. See page 43.
4. Drive to starting point of trench. See page 44.
5. Dig the trench. See page 54.
6. Shut down unit. See page 46.

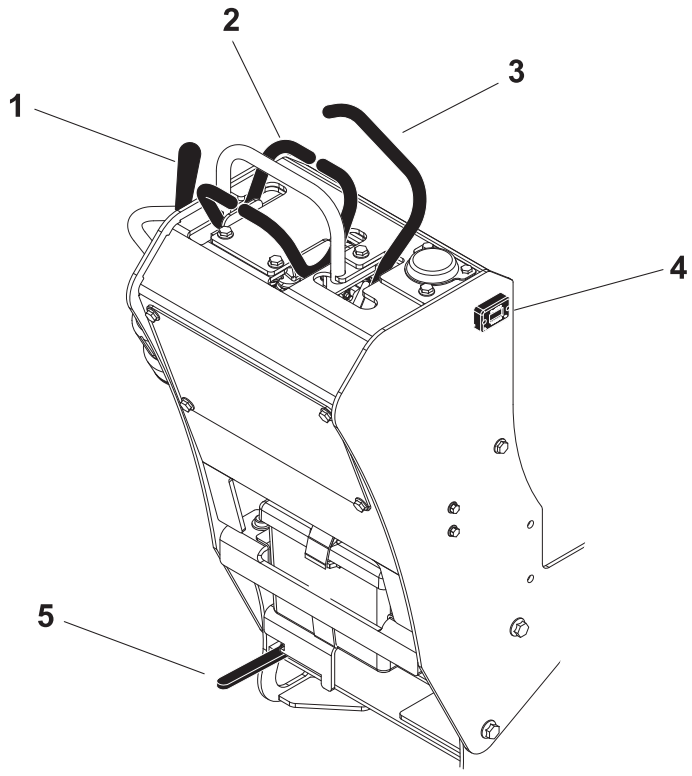
Leave Jobsite

1. Restore the jobsite. See page 67.
2. Rinse unit and stow tools. See page 67.
3. Load unit onto trailer. See page 50.

Controls

Chapter Contents

Control Console



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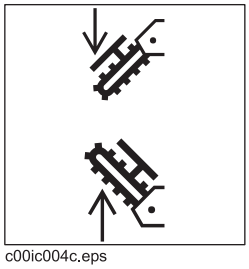
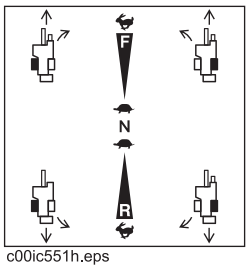
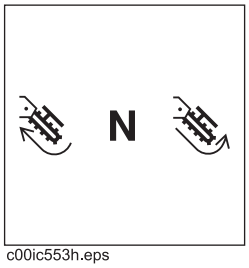
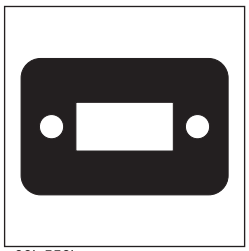
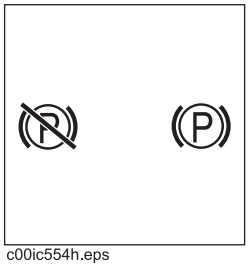
1. Boom lift control (green)
2. Speed/direction controls
3. Digging chain control
4. Hourmeter/tachometer
5. Parking brake lever

Item	Description	Notes
1. Boom lift control (green)  c00ic004c.eps	To lower boom, push. To raise boom, pull.	

Item	Description	Notes
2. Speed/direction controls  c00ic551h.eps	To drive straight forward, push BOTH controls slowly forward. To drive straight in reverse, pull BOTH controls slowly rearward. To turn left, move RIGHT speed/direction control for forward or reverse. To turn right, move LEFT speed/direction control for forward or reverse. To go faster in any direction, move controls farther from neutral position. To stop, release controls.	Trenching movement is always backward (toward you).
3. Digging chain control  c00ic553h.eps	To operate digging chain, pull rearward, then move to the left. To stop digging chain, push forward to neutral position. To operate digging chain in reverse, pull rearward, then move to the right.	Trenching movement is always backward (toward you). ***NOTICE:*** Operate digging chain in reverse only to dislodge a rock or other obstruction.
4. Hourmeter/tachometer  c00ic556h.eps	Displays engine operating time and engine speed.	Use engine operating times to schedule service.

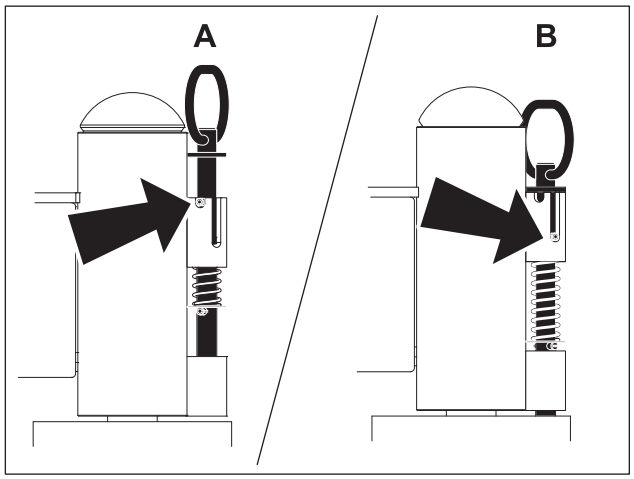
Item	Description	Notes
5. Parking brake  c00ic554h.eps	To engage parking brake, move lever to the right. To disengage parking brake, move lever left to notch.	**IMPORTANT:** • Move unit slightly to ensure parking brake is engaged. • If necessary, move unit slightly to disengage parking brake.

Trail Wheel Pin

Use the trail wheel pin to lock the trail wheel:

- to load unit on trailer
- during transport
- to unload unit from trailer
- to park on a slope

Ensure trail wheel pin is disengaged at all other times.



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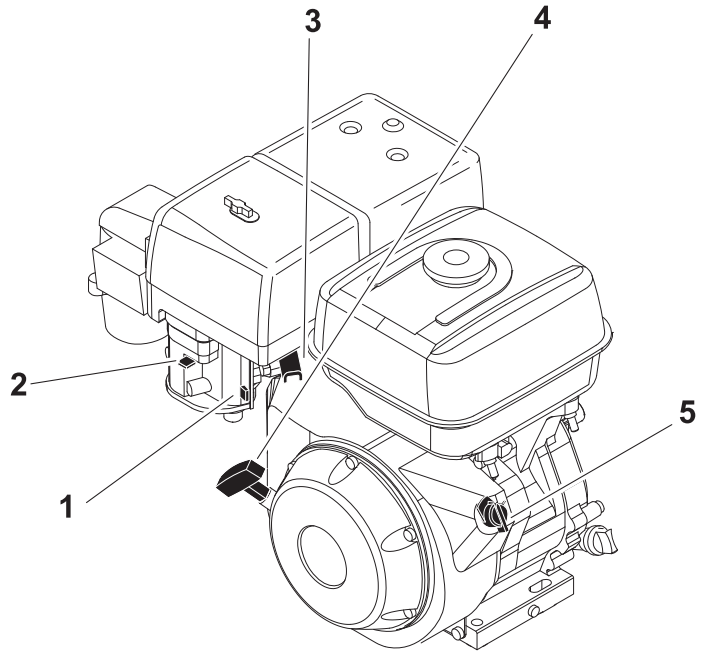
To disengage trail wheel pin in unlocked position A:

Pull pin up to notch.

To engage trail wheel pin in locked position B:

Pull trail wheel pin from notch and release in locked position.

C12 Engine Controls



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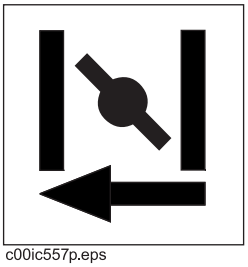
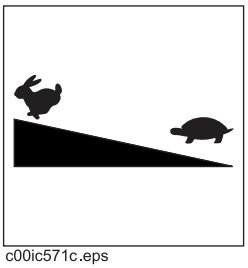
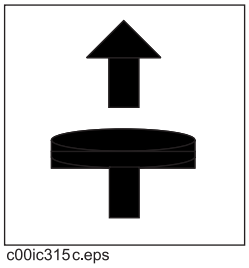
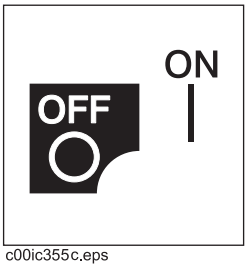
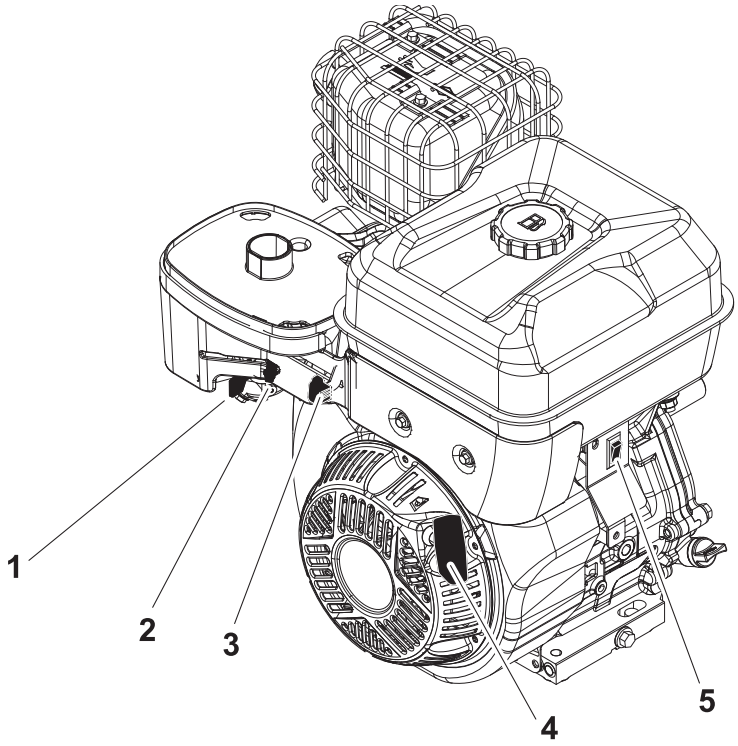
1. Fuel shut-off valve
2. Choke control
3. Throttle control
4. Starter grip
5. Ignition switch

Item	Description	Notes
1. Fuel shut-off valve  c00ic561c.eps	To close fuel shut-off valve, move lever to the left position. To open fuel shut-off valve, move lever to the right position.	Close valve: • to transport unit to or from jobsite • to park unit • if machine tips over

Item	Description	Notes
2. Choke control  c00ic557p.eps	To close choke control, move lever to the left. To open choke control, move lever to the right.	Close choke control to start a cold engine. Wait for a few seconds, then gradually open choke control as engine warms up.
3. Throttle control  c00ic571c.eps	To increase engine speed, move lever to the left. To decrease engine speed, move lever to the right.	
4. Starter grip  c00ic315c.eps	To start engine, pull starter grip lightly until resistance is felt, then pull briskly.	
5. Ignition switch  c00ic355c.eps	To enable engine startup procedure, move to ON position. To shut down engine in an emergency, move to OFF position.	

C14 Engine Controls



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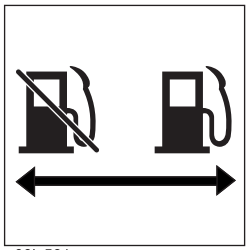
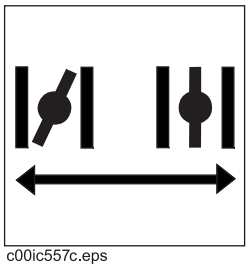
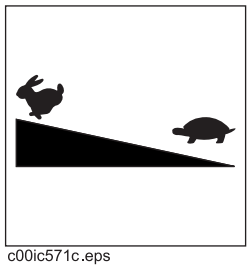
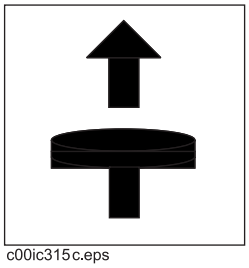
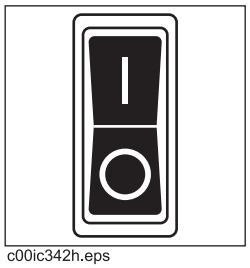
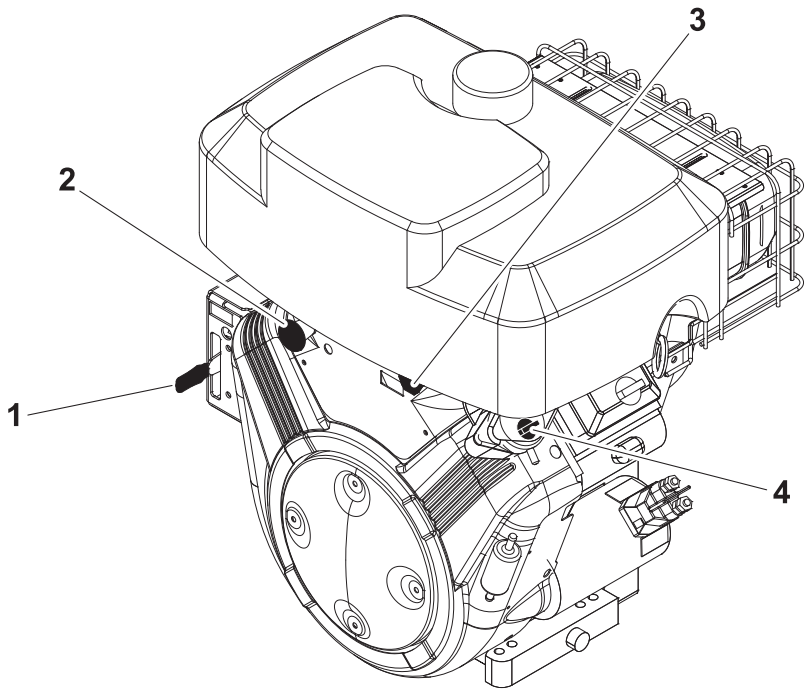
1. Fuel shut-off valve
2. Choke control
3. Throttle control
4. Starter grip
5. Ignition switch

Item	Description	Notes
1. Fuel shut-off valve  c00ic561p.eps	To close fuel shut-off valve, move lever to the left position. To open fuel shut-off valve, move lever to the right position.	Close valve: • to transport unit to or from jobsite • to park unit • if machine tips over

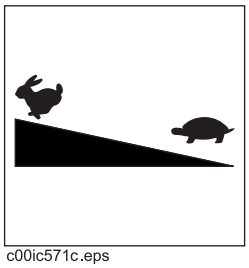
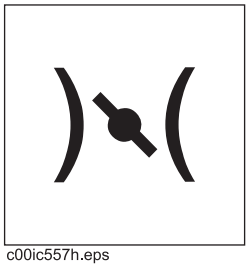
Item	Description	Notes
2. Choke control  c00ic557c.eps	To close choke control, move lever to the left. To open choke control, move lever to the right.	Close choke control to start a cold engine. Wait for a few seconds, then gradually open choke control as engine warms up.
3. Throttle control  c00ic571c.eps	To increase engine speed, move lever to the left. To decrease engine speed, move lever to the right.	
4. Starter grip  c00ic315c.eps	To start engine, pull starter grip lightly until resistance is felt, then pull briskly.	
5. Ignition switch  c00ic342h.eps	To enable engine startup procedure, move to ON position (I). To shut down engine in an emergency, move to OFF position (O).	

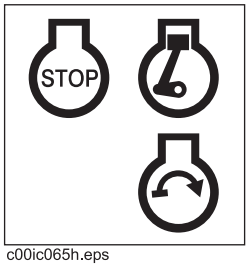
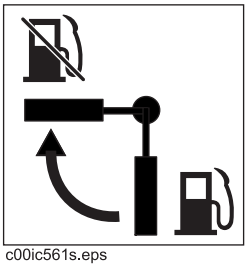
C16 Engine Controls



t47om007h.eps

1. Throttle control
2. Choke control
3. Ignition switch
4. Fuel shut-off valve

Item	Description	Notes
1. Throttle control  c00ic571c.eps	To increase engine speed, pull up. To decrease engine speed, push down.	
2. Choke control  c00ic557h.eps	To close choke valve, pull choke control. To open choke valve, push choke control.	Close valve to enrich air/fuel mixture and help start cold engine. Open choke valve after engine runs for a few seconds.

Item	Description	Notes
3. Ignition switch  c00ic065h.eps	To start engine, turn key all the way clockwise. Release key as engine starts. To stop engine, turn key counterclockwise.	
4. Fuel shut-off valve  c00ic561s.eps	To close fuel shut-off valve, move lever clockwise. To open fuel shut-off valve, move lever counterclockwise.	Close valve: • to transport unit to or from jobsite • to park unit • if machine tips over

Prepare

Chapter Contents

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 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
- water supply
- sources of locator interference (rebar, railroad tracks, etc.)

Classify Jobsite

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)

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.

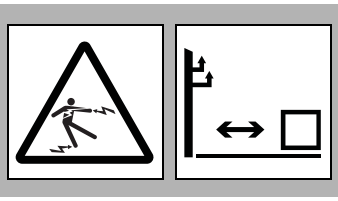
If working. . .	then classify jobsite as . . .
within 10' (3 m) of a buried electric line	electric
within 10' (3 m) of a natural gas line	natural gas
in sand or granite which is capable of producing crystalline silica (quartz) dust	crystalline silica (quartz) dust
within 10' (3 m) of any other hazard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

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

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

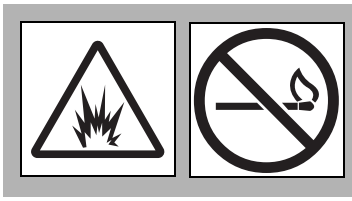


DANGER Electric shock will cause death or serious injury. Stay away. 274-049

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

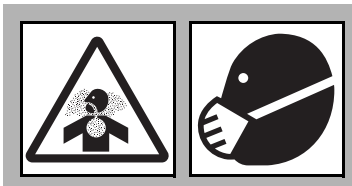


WARNING Fire or explosion possible. Fumes could ignite and cause burns. No smoking, no flame, no spark. 275-419

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



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

To help avoid injury:

- Use water spray or other appropriate 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

Check Levels

- fuel
- hydraulic fluid
- battery charge
- engine oil

Check Equipment for Condition and Function

- digging chain and teeth
- filters (air, oil, hydraulic, and fuel if equipped)
- tires and tracks
- pumps and motors
- hoses and valves
- signs, guards, and shields

Assemble Accessories

Fire Extinguisher

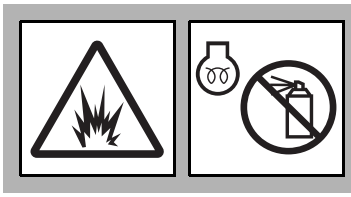
If required, mount a fire extinguisher near the power unit but away from possible points of ignition. The fire extinguisher should always be classified for both oil and electric fires. It should meet legal and regulatory requirements.

Drive

Chapter Contents

Start

Start Unit



WARNING Fire or explosion possible.

To help avoid injury: Do not use starter fluid.

C12 and C14

1. Ensure all controls are in neutral.
2. Move fuel shut-off valve to ON position.
3. If engine is cold, move choke control to CLOSED position.
4. Move throttle to 1/3 open.
5. Turn ignition switch to ON position.
6. Pull starter grip lightly until resistance is felt, then pull briskly.

NOTICE: Incorrect use may damage starter, starter grip or starter rope.

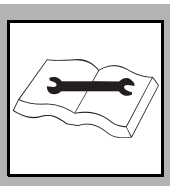
- Do not allow starter grip to snap back against engine.
- Return starter rope gently.

C16

1. Ensure all controls are in neutral.
2. Move fuel shut-off valve to ON position.
3. If engine is cold, move choke control to CLOSED position.
4. Move throttle to 1/4 open.
5. Turn ignition switch to START position to crank engine.
6. Release key when engine starts.

IMPORTANT: If engine does not start, turn ignition switch to OFF position and check for fuel blockage or electrical system problems.

Warm up Unit

WARNING Incorrect control function can cause death or serious injury.

To help avoid injury:

If controls do not operate as given in instructions:

- Shut down machine immediately.
- Have machine repaired.

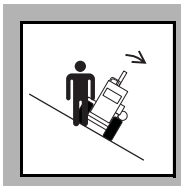
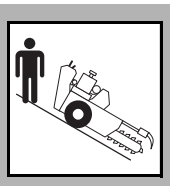
1. If choke control was moved to CLOSED position to start cold engine, gradually move it to OPEN position as engine warms up.
2. Run engine at half throttle or less for five minutes before operating trencher.
3. During warm-up, do a check of all controls. Ensure they operate correctly.

EMERGENCY SHUTDOWN: Release controls and turn ignition switch to OFF position.

Drive

1. Disengage trail wheel pin.
2. Disengage parking brake.
3. Pull boom control to raise digging boom.
4. Move throttle to 3/4 open.
5. Move speed/direction controls in direction of preferred travel. Ground speed increases with control movement.

Drive on a Slope

WARNING Machine can tip over and crush you.

To help avoid injury:

- Operate from uphill side of machine.
- Keep digging boom low.
- Drive cautiously at all times.
- Never jerk control levers. Use a steady even motion.


WARNING If the machine tips over, there is a risk of fuel leakage. Fire or explosion can cause death or serious injuries.

To help avoid injury: If the machine tips over, turn ignition switch to OFF position or close the fuel shut-off valve.

Driving safely on a slope depends upon many factors including:

- Distribution of machine weight (weight of machine may change due to configuration)
- 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
- 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 is an absolute limit which must never be exceeded. This design limit may exceed the operating limit and must never be used alone to establish safe operating angle for variable conditions.

Maximum engine lubrication angle – 20°

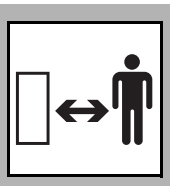
Shut Down

1. Release speed/direction controls.
2. If space is sufficient, push boom control to lower digging boom.
3. Run engine at low throttle for three minutes.
4. Turn ignition switch to OFF position.
5. Close fuel shut-off valve.
6. If unit is equipped with starter key, remove key.
7. If you park machine on a slope:
   - Engage parking brake.
   - Engage trail wheel pin in locked position.

Transport

Chapter Contents

Lift



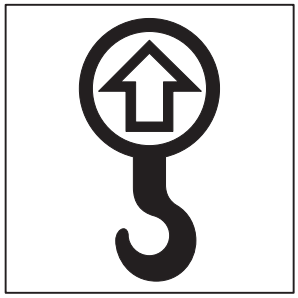
WARNING Crushing weight could cause death or serious injury. Stay away.

To help avoid injury:

- Use applicable lifting device and lifting equipment.
- Only use approved lifting points.
- Stay away from lifted load.

Lifting points

Lifting points are identified by lifting decals.



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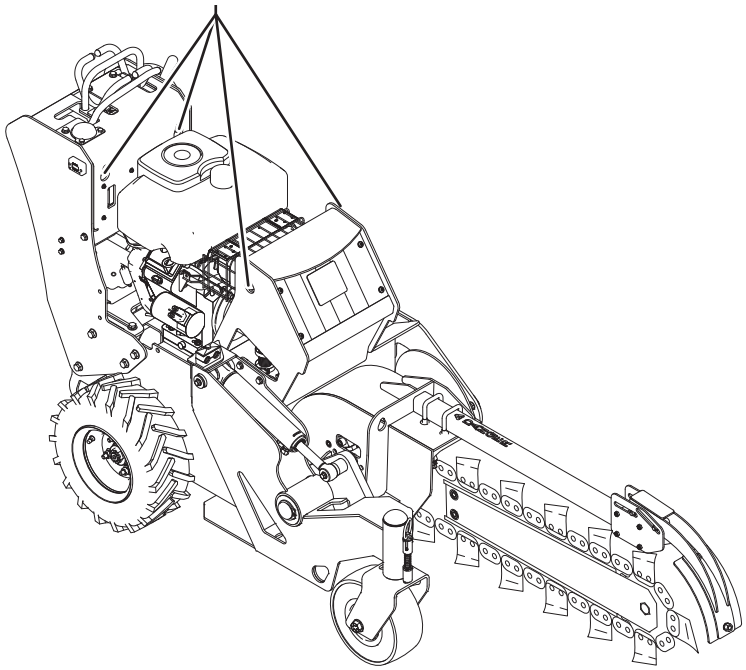
Lift

Use a hoist and lifting accessories adapted to the size and weight of the machine. See "Specifications" on page 98 or measure and weigh machine before lifting.



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1. Use approved methods to attach lifting accessories.
2. Use lifting device to carefully tension lifting slings.
3. Slowly lift machine.

Haul

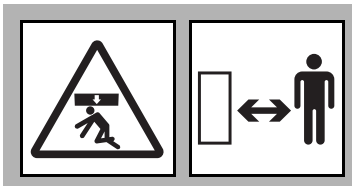
Load

IMPORTANT: Ditch Witch® S2B trailer is recommended for transport. If you use a different trailer, obey additional instructions from the manufacturer.

Prepare trailer

1. Attach trailer to vehicle.
2. Park vehicle with trailer on level and firm ground.

Load machine

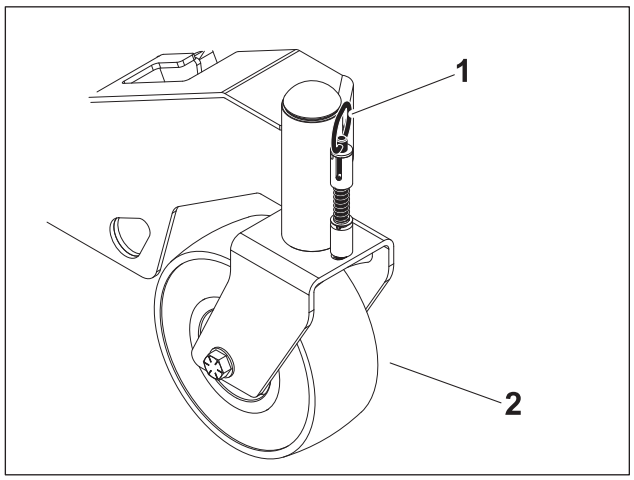


WARNING Crushing weight could cause death or serious injury. Stay away.

To help avoid injury:

- Keep boom as low as possible during loading procedure.
- Ensure ten to fifteen percent of total weight (machine plus trailer) is on tongue of trailer.

1. If equipped, put backfill blade in stowed position. See "Backfill Blade" on page 64.
2. Disengage parking brake.
3. Start engine and set to low throttle.
4. Pull boom control to slightly raise digging boom.
5. Move machine to rear of trailer. Have boom face ramps. Align tracks with ramps and machine with center of trailer bed. Ensure trail wheel (2) is in rear position. Engage trail wheel pin (1) in locked position.
6. Move speed/direction control slowly and push to appropriate speed.
7. Drive unit onto trailer, digging boom first, until tiedown position is reached.
8. If space allows, push boom control to lower digging boom onto trailer.
9. Engage parking brake and shut down unit. Close fuel shut-off valve.



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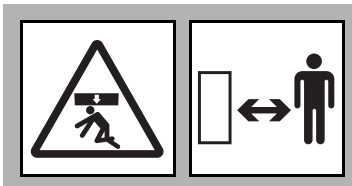
Tie Down



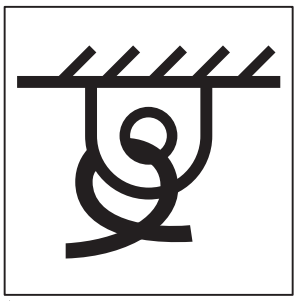
WARNING Crushing weight could cause death or serious injury. Stay away.

To help avoid injury:

- Only use approved tiedown points.
- Use applicable tiedown equipment.

Tiedown points

Tiedown points are identified by tiedown decals.



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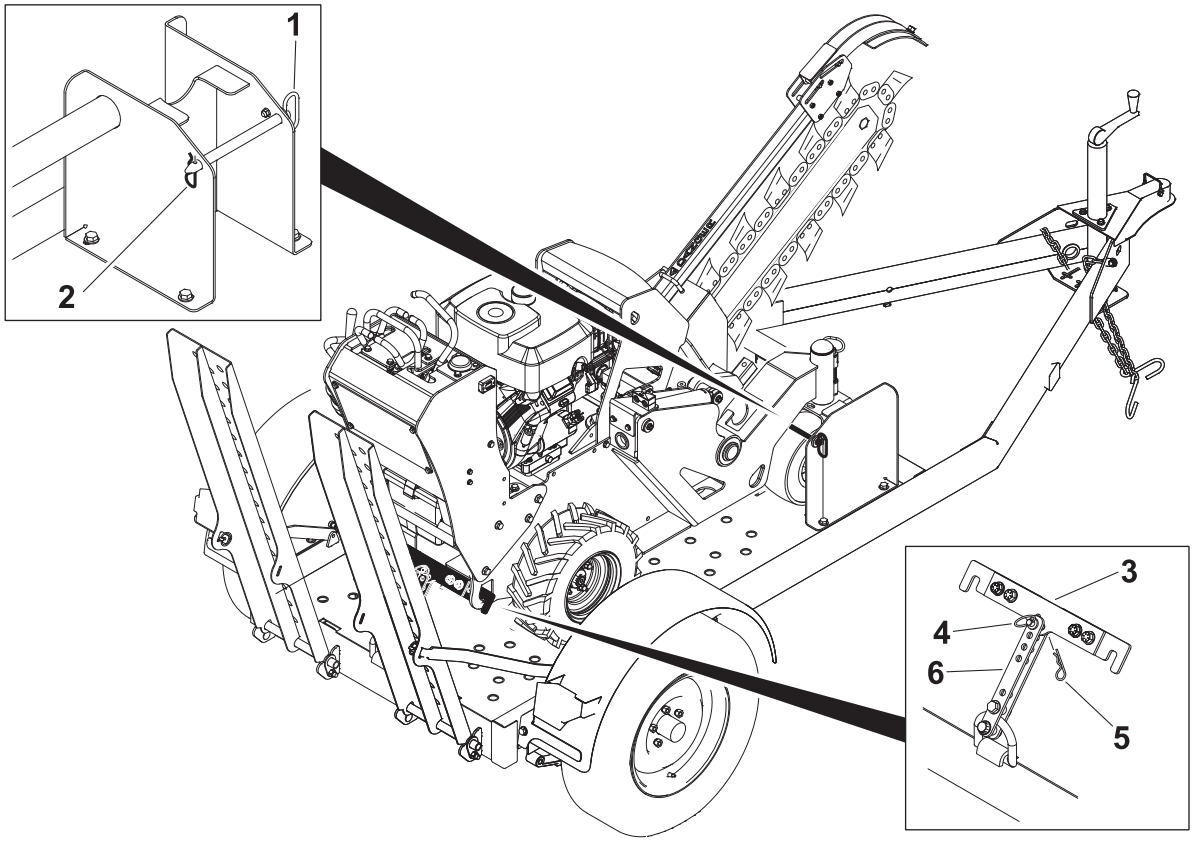
Procedure

With Tie-Down Kit on S2B Trailer



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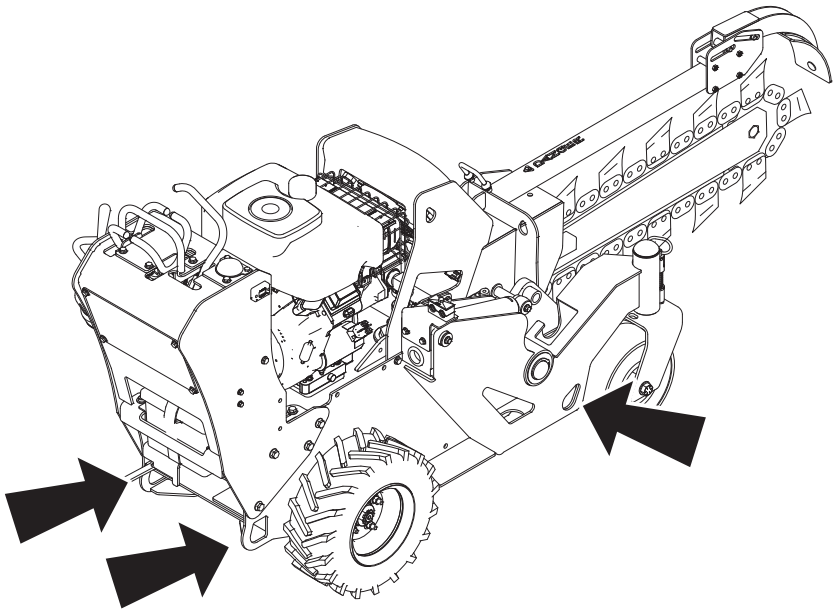
1. Install trail wheel between front tiedown plates and engage pin (1).
2. Secure pin (1) with clip pin (2).
3. Install latch plate (3) at bottom rear of machine.
4. Attach latch plate (3) to link (6) with pin (4).
5. Secure pin (4) with clip pin (5).

Without Tie-Down Kit



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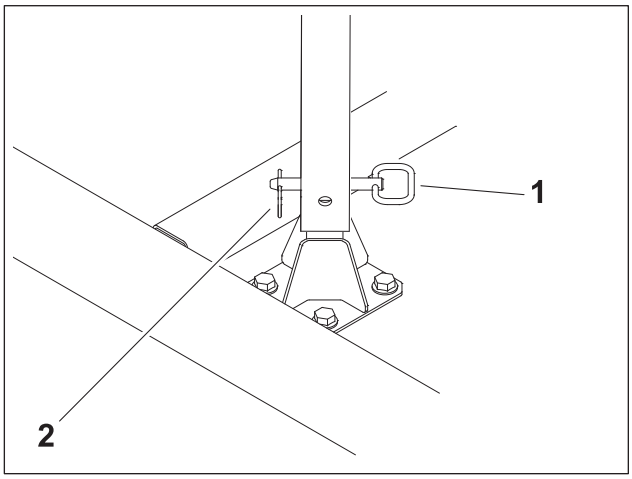
1. Loop tiedowns around unit at tie-down points.
2. Ensure tiedowns are tight before transport.

Tie backfill blade down on S2B trailer

If installed, secure backfill blade on S2B trailer mounting tube with pull pin (1) and hair clip pin (2).

IMPORTANT: Ensure backfill blade does not carry over edge of trailer.



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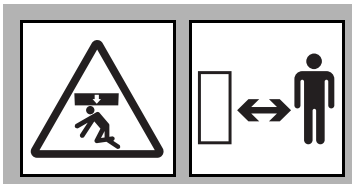
Unload

IMPORTANT: Use Ditch Witch® S2B trailer for transport. If you use a different trailer, obey additional instructions from the manufacturer.

Prepare trailer

1. Park vehicle with trailer on level and firm ground.
2. Ensure trailer is correctly attached to vehicle.

Unload machine

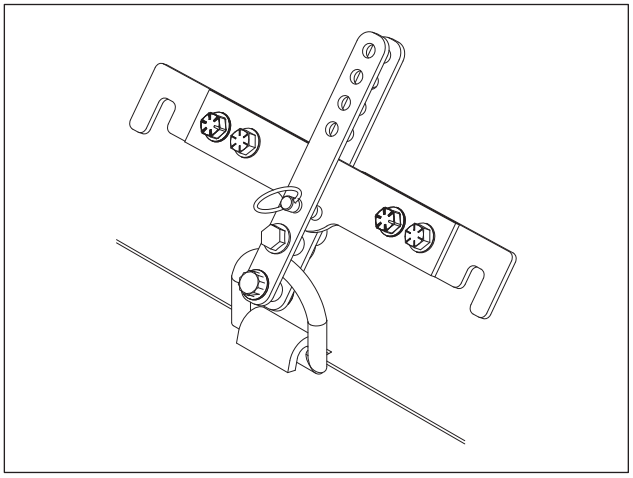


WARNING Crushing weight could cause death or serious injury. Stay away.

To help avoid injury:

- Keep all persons away from machine and trailer.
- Keep boom as low as possible during unloading procedure.

1. Lower trailer or ramps.
2. Remove tiedowns.
3. Engage trail wheel pin in locked position.
4. If present, open fuel shut-off valve.
5. Start engine and set to low throttle.
6. Pull boom control to raise digging boom, but keep it as low as possible.
7. Slowly back unit down ramps of trailer.
8. Secure latch plate in lower mounting hole, as shown.



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Retrieve

NOTICE: Machine is not approved for towing. Towing can damage components.

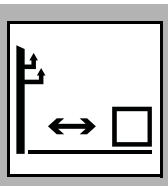
- Do not tow machine.

1. If machine becomes disabled, repair on location or use lifting procedure to retrieve machine.
2. If machine cannot be repaired or lifted, contact customer support.

Trench

Chapter Contents

Precautions

DANGER Electric shock will cause death or serious injury.

To help avoid injury:

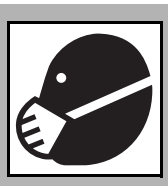
- Know location of electrical lines and stay away.
- Carefully expose lines by hand before digging.


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


WARNING Jobsite hazards could cause death or serious injury.

To help avoid injury:

- Comply with all utility notification regulations before digging or drilling.
- Notify companies that do not subscribe to One-Call.
- Set up warning barriers and keep people away from machine and jobsite.

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

To help avoid injury:

- Use water spray or other appropriate 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.

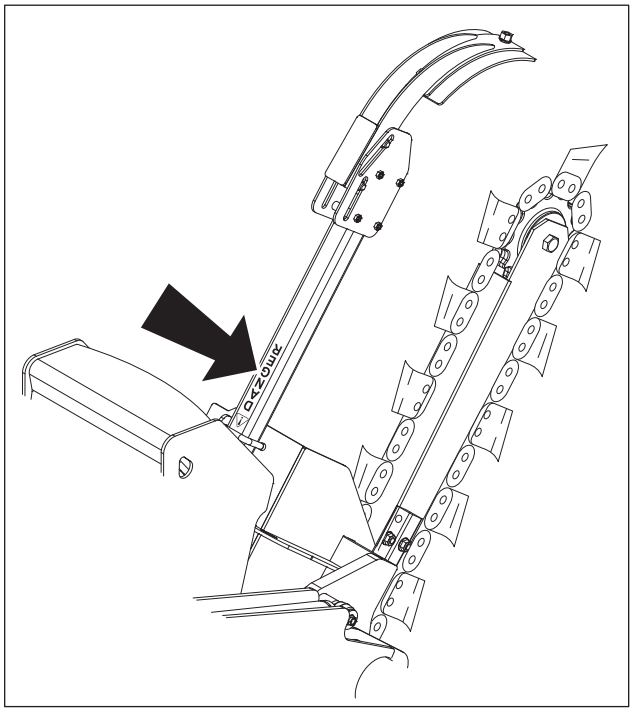

CAUTION Flying objects thrown by machine may strike people.

To help avoid injury: Wear hard hat and safety glasses.

Set Up

1. Ensure all preparatory tasks have been done correctly. See "Prepare" on page 34.
2. Ensure engine is shut down.
3. Ensure restraint bar is installed correctly:
   - Danger word must be facing up, as shown.
   - Restraint bar must be in correct position. See "Check Digging Chain" on page 80.

   IMPORTANT: Trench cleaner shown installed on restraint bar is optional.
4. If equipped, remove backfill blade. See "Backfill Blade" on page 64.
5. Install correct counterweight configuration. See "Counterweights" on page 65.
6. Ensure trail wheel pin is disengaged.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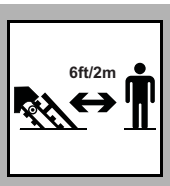
Operate

Dig Trench



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

To help avoid injury:

- Keep everyone at least 6' (2 m) from machine, digging boom, and their range of movement.
- Allow 3' (1 m) between end of chain and obstacle. Machine may move when chain starts to dig.
- Stand back from console and hold controls loosely. Digging chain on top side of boom can catch on root or rock, forcing handlebar down suddenly.

1. Start engine. See "Start Unit" on page 43.
2. Drive machine to starting point. Move in line with planned trench.
3. Move throttle to half open.
4. Push boom control to lower digging boom to just above ground.
5. To operate digging chain, pull digging chain control rearward, then move to the left.
   - DIGGING CHAIN WILL MOVE.
   - Trenching movement is toward you.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EMERGENCY STOP: Release controls and turn ignition switch to OFF position.

6. Increase engine speed to full throttle.
7. Slowly push boom control to lower digging boom to desired trench depth.
8. Slowly move speed/direction controls to desired speed.

NOTICE: Incorrect use will damage machine.

- Do not make sharp turns.
- Lower boom to full depth when turning.

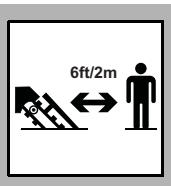
Remove Objects from Digging Chain

If object becomes lodged in chain:

1. Release speed/direction controls.
2. Move digging chain control to neutral position.
3. Slightly pull boom lift control to raise boom just out of ground.
4. Move digging chain control to lower right position to reverse chain direction.

If object stays lodged in chain:

1. Shut down machine. See "Shut Down" on page 46.
2. Engage parking brake.

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

To help avoid injury:

- Wait until digging chain is completely stopped.

3. Carefully remove object by hand.

Finish Job

1. When trench is complete, release speed/direction controls.
2. Move throttle to half open.
3. Pull boom control to raise digging boom to top of trench.
4. Release digging chain control.
5. Install backfill blade in work position for backfilling.
6. When backfilling is completed, position blade in upright "stowed" position for transporting, keeping digging boom low to ground. See "Backfill Blade" on page 64.
7. Drive away from trench.
8. Shut down machine. See "Shut Down" on page 46.

Systems and Equipment

Chapter Contents

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.
- 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®II chain	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® II chain	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.

NOTICE: Adding or removing optional equipment changes counterweight requirement. Use applicable chart on page 65 to ensure you have the correct counterweights for your configuration.

Equipment	Description
booms	provide depth options of 18" (457 mm), 24" (610 mm) or 30" (762 mm); each length is available with an adjustment screw for tensioning the digging chain
mechanical trench cleaner	removes spoils from the trench floor
backfill blade	cover trench using machine
counterweights	provide unit balance in various configurations
10-tooth sprocket	slows digging chain speed to allow teeth time to penetrate into the ground and increase performance in rocky or extremely hard soil

Backfill Blade

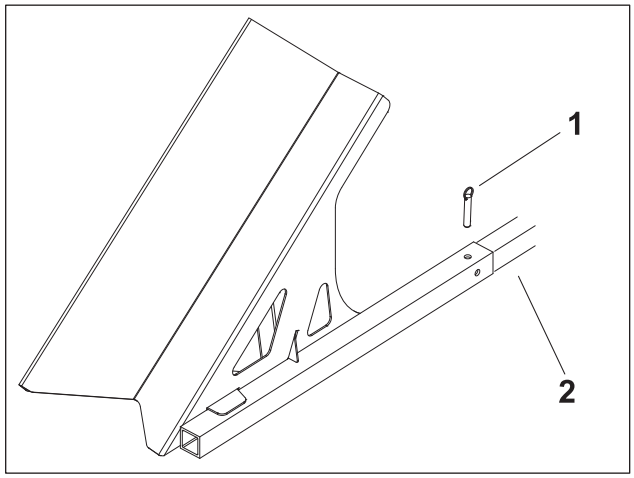
The optional backfill blade must be in position related to the job at hand.

Stowed position

Install the backfill blade in stowed position for transport and drilling.

1. Shut down engine.
2. Insert backfill blade in upright position onto mounting stub (2).
3. Secure with pin (1).

IMPORTANT: Completely remove backfill blade for trenching.



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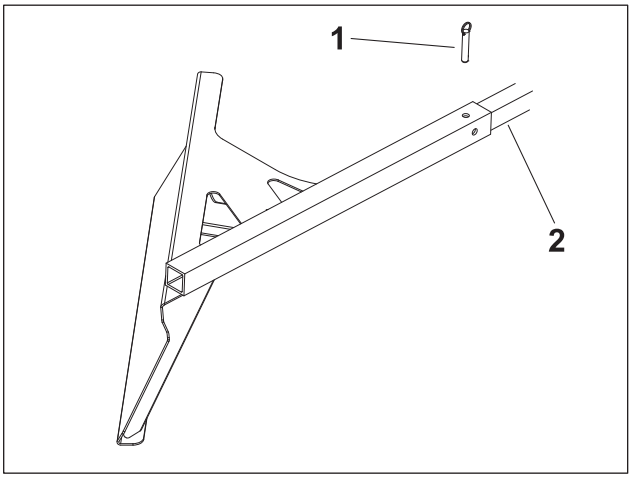
Work position

Install the backfill blade in work position for backfilling only.

1. Shut down engine.
2. Insert backfill blade in work position onto mounting stub (2).
3. Secure with pin (1).



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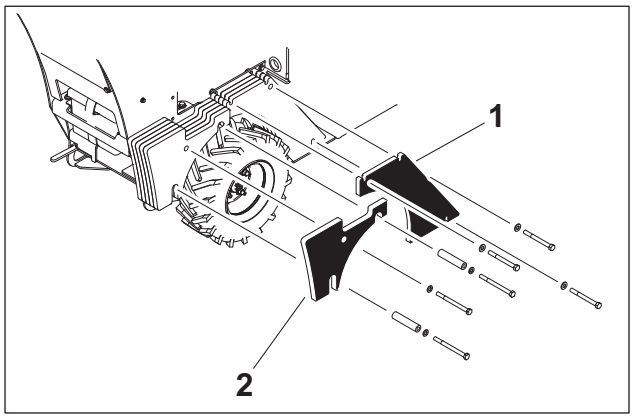
Counterweights

Select the applicable counterweight configuration to balance the machine.

IMPORTANT: Do not add more counterweights than indicated.

1. Use the chart that follow to determine the correct number of counterweights.
2. Install applicable front (1) and rear (2) counterweights.



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Counterweight configuration chart

Chain type	Boom length	Tooth type	C12 Front / Rear	C14 Front / Rear	C16 Front / Rear
19K	18 in	Duratooth® Cup	*	*	*
		Duratooth®Combos (Shark®/Alligator)	*	*	*
	24 in	Duratooth® Cup	*	*	*
		Duratooth® Combos (Shark®/Alligator)	*	*	*
	30 in	Duratooth®Cup			2 / 1
		Duratooth® Combos (Shark®/Alligator)			*
35K	24 in	Duratooth® Cup	*	*	*
		Duratooth® Combos (Shark®/Alligator)	4 / 4	*	*
		Shark® II	*	*	*
	30 in	Duratooth® Cup			4 / 5
		Duratooth® Combos (Shark®/Alligator)			4 / 5
		Shark® II (4 and 6" width)			4 / 5

* Contact product support

Complete the Job

Chapter Contents

Restore Jobsite

After product is installed, return spoils to the trench with optional backfill blade, shovels, or small earth-moving equipment. See "Backfill Blade" on page 64.

Rinse Equipment

Spray water onto equipment to remove dirt and mud.

NOTICE: Water can damage electrical components.

- Do not spray water onto electrical components.
- Wipe with dry cloth.

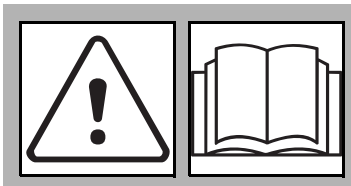
Stow Tools

Ensure all optional equipment and tools are loaded and properly secured on trailer.

Service

Chapter Contents

Precautions



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

To help avoid injury:

- Unless otherwise instructed, do all service tasks 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 before welding to prevent damage to battery.
- Connect welder ground clamp close to welding point and ensure no electronic components are in the ground path.

Cleaning Precaution

NOTICE: Water can damage electrical components.

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

Recommended Lubricants/Service Key

Item	Description
DEO	Diesel engine oil meeting API service classification CF-4 or E1-96 and SAE viscosity recommended by engine manufacturer (SAE15W40)
GEO	Gasoline engine oil meeting or exceeding API SJ. See oil temperature chart for recommended viscosity grade for each model.
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 genuine Ditch Witch parts, filters, approved lubricants, TJC, and approved coolants to maintain warranty. Fill to capacities listed in "Specifications" on page 98.

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

IMPORTANT: Use the "Service Record" on page 112 to record all required service to your machine.

Approved fuel

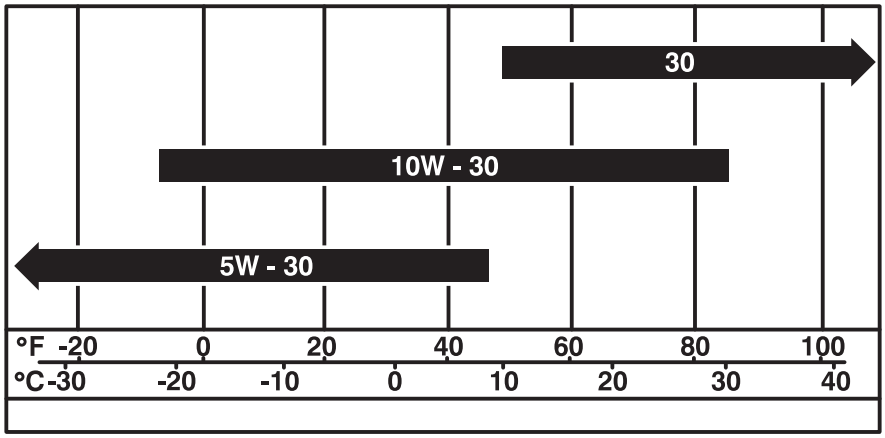
NOTICE: Incorrect fuel will damage the engine.

- Only use approved fuel.

For correct fuel specifications, see your engine manual.

Engine Oil Temperature Chart

C12 Honda GX390®



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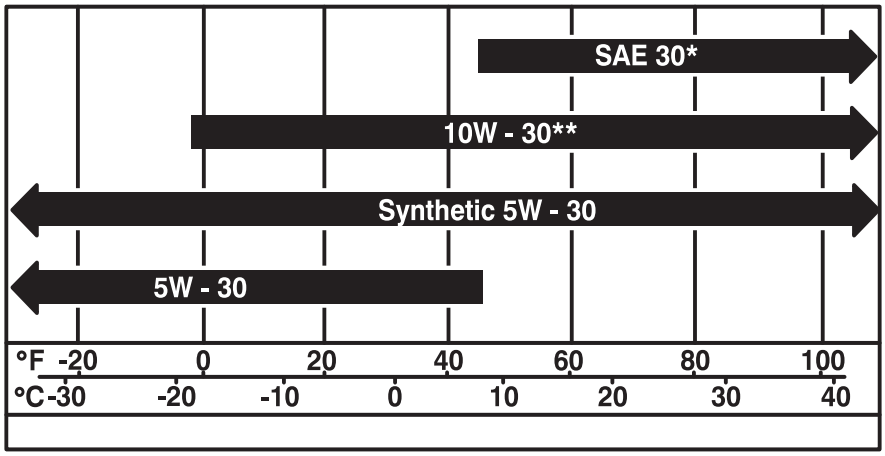
Temperature range anticipated before next oil change

C14 and C16 Briggs & Stratton®



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Temperature range anticipated before next oil change

*Below 40°F (4°C) the use of SAE 30 will result in hard starting.

** Above 80°F (27°C) the use of 10W30 may cause increased oil consumption. Check oil level more frequently.

Each Use

Location	Task	Notes
Engine	Clean exterior surfaces with wet cloth	
	Check fuel level and refuel	
	Check starter rope and starter grip	C12, C14
	Check engine oil level	GEO
	Check air filter elements	
Trencher	Check hydraulic fluid level	THF
	Check hydraulic fluid cooler	C16
	Check hydraulic hoses	
	Check lug nut torque	65 ft•lb (88 N•m)
	Check parking brake operation	

Check Fuel Level and Refuel

WARNING Fuel and its vapors are extremely flammable. Fire or explosion can cause death or serious injury.

To help avoid injury:

- Keep heat, sparks, flames and other ignition sources away.
- Refuel only outdoors.
- Wipe up spilled fuel immediately.

Check Fuel Level

1. Park engine on level and firm ground.
2. Shut down engine and let cool for 2 minutes.
3. Remove fuel tank cap.
4. Check fuel level. If low, refuel.

Refuel

1. Add fuel to the bottom of the fuel tank neck.
   Do not overfill.
2. Tighten fuel tank cap to the stop.

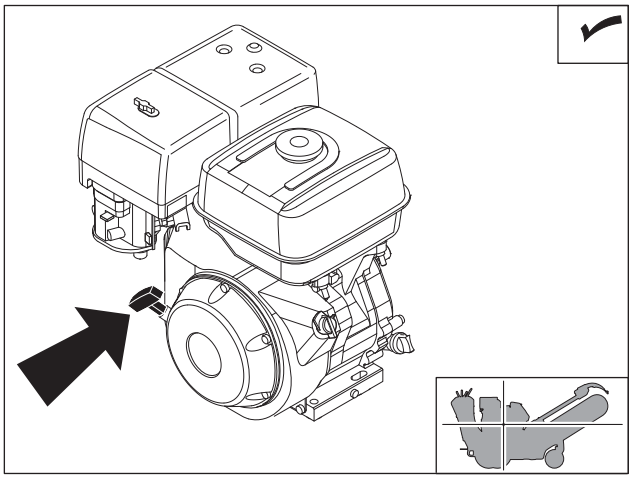
Check Starter Rope and Starter Grip

C12: Honda® GX390

Check starter rope and starter grip for condition before each use.

If worn or damaged:

- Do not start unit.
- Contact your Ditch Witch® dealer and replace damaged parts.



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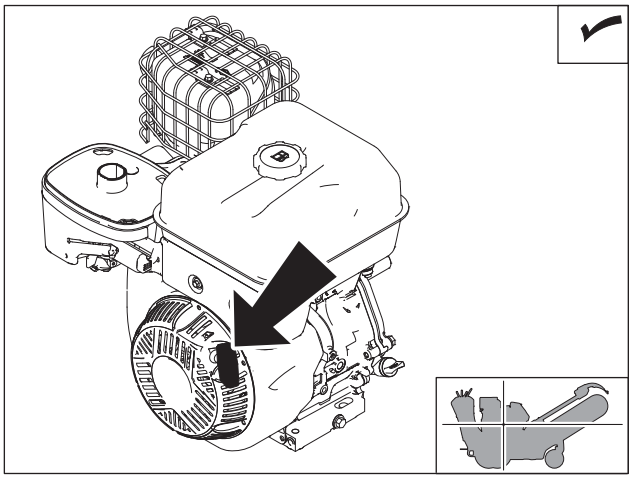
C14: Briggs & Stratton® XR2100

Check starter rope and starter grip for condition before each use.

If worn or damaged:

- Do not start unit.
- Contact your Ditch Witch® dealer and replace damaged parts.



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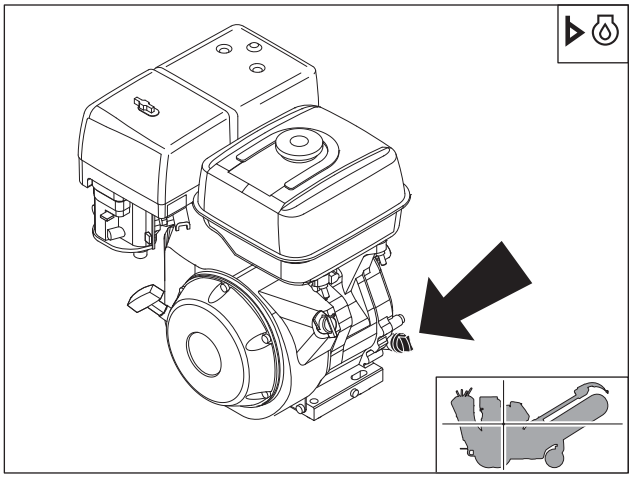
Check Engine Oil Level

C12: Honda® GX390

Check engine oil before each use.

1. Check engine oil at dipstick.
2. If low, add GEO at oil fill until oil level is at FULL mark on dipstick.

IMPORTANT: For more information on engine oil, see "Recommended Lubricants/Service Key" on page 70 or see engine manual.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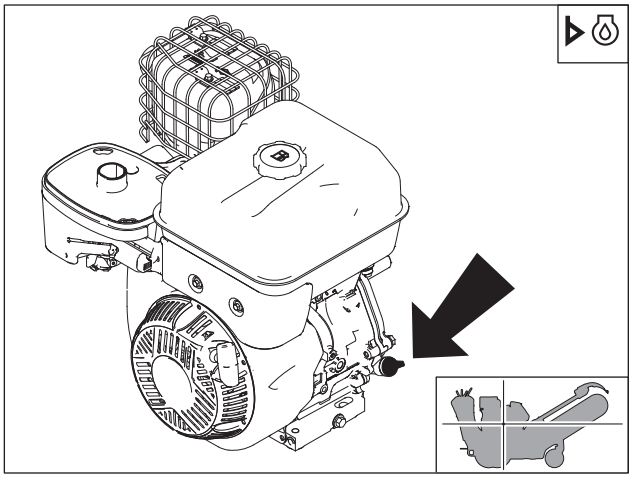
C14: Briggs & Stratton® XR2100

Check engine oil before each use.

1. Check engine oil at dipstick.
2. If low, add GEO at oil fill until oil level is at FULL mark on dipstick.

IMPORTANT: For more information on engine oil, see "Recommended Lubricants/Service Key" on page 70 or see engine manual.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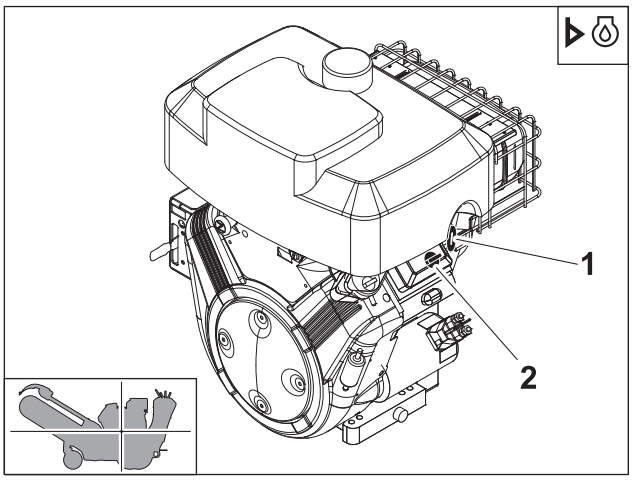
C16x: Briggs & Stratton® Vanguard™ 16 HP

Check engine oil before each use.

1. Check engine oil at dipstick (1).
2. If low, add GEO at oil fill (2) until oil level is at FULL mark on dipstick.

IMPORTANT: For more information on engine oil, see "Recommended Lubricants/Service Key" on page 70 or see engine manual.



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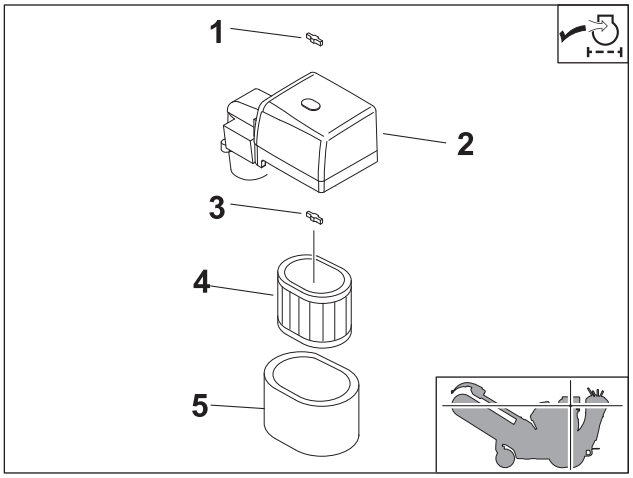
Check Air Filter Elements

C12



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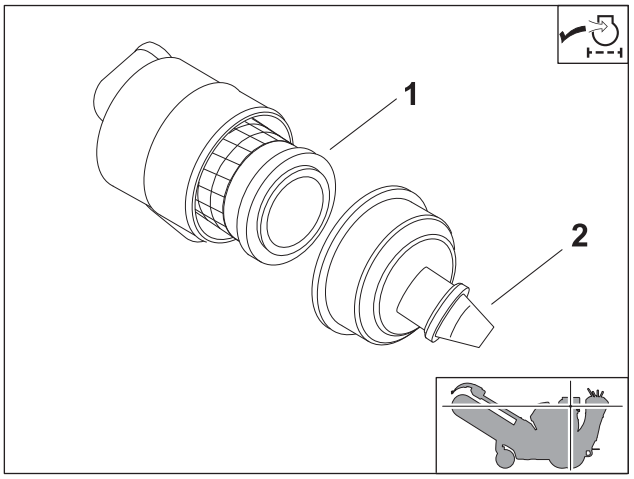
Check air filter elements before each use.

1. Remove wing nut (1) and air filter cover (2).
2. Remove wing nut (3) and air filter elements (4) and (5).
3. Check elements. Replace if dirty or damaged.

NOTICE: Cleaning can damage filter elements.

- Do not tap filter elements to loosen dirt.
- Do not use compressed air or water.
- Replace filter elements.

C14



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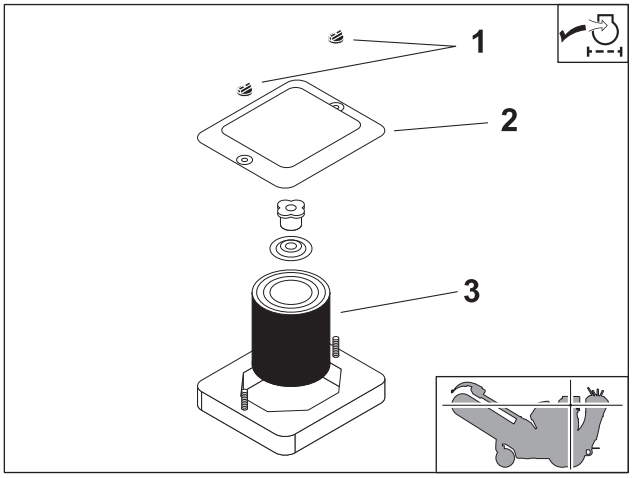
Check air filter element before each use.

1. Press dust ejector valve (2) to release dust.
2. Remove cover and check air filter element (1). Replace if dirty or damaged.

NOTICE: Cleaning can damage filter element.

- Do not tap filter element to loosen dirt.
- Do not use compressed air or water.
- Replace filter element.

C16



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Check air filter element before each use.

1. Remove wing nuts (1) and cover (2).
2. Remove and check air filter element (3). Replace if dirty or damaged.

NOTICE: Cleaning can damage filter element.

- Do not tap filter element to loosen dirt.
- Do not use compressed air or water.
- Replace filter element.

Check Hydraulic Fluid Level

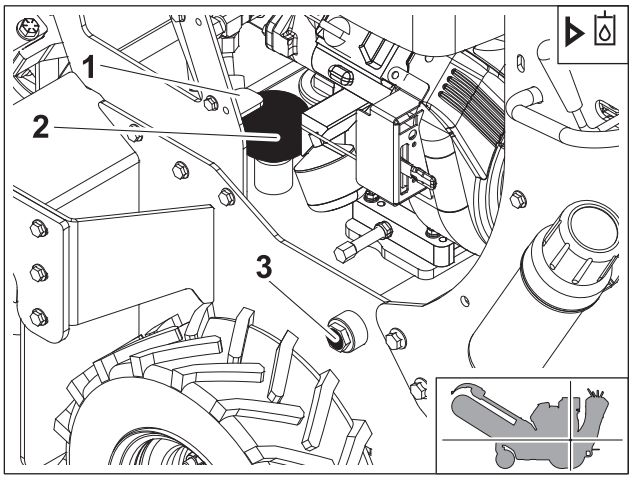
Check hydraulic fluid level before each use.

WARNING Contents under pressure. Relieve pressure before opening. Death or injury could occur.

To help avoid injury:

- Wear gloves and safety glasses.
- Wait until cool to decrease pressure in hydraulic reservoir.
- To release remaining pressure, slowly open hydraulic reservoir.

1. Ensure digging boom is fully raised.
2. Check hydraulic fluid at sight glass (3).
3. If hydraulic fluid level is low:
   - Blow cap (2) with low pressure air to remove dust.
   - If present, remove lock-stop (1) with bolts and screws.
   - Open cap (2).
   - Add applicable fluid until fluid level is at mid-level in sight glass (3).



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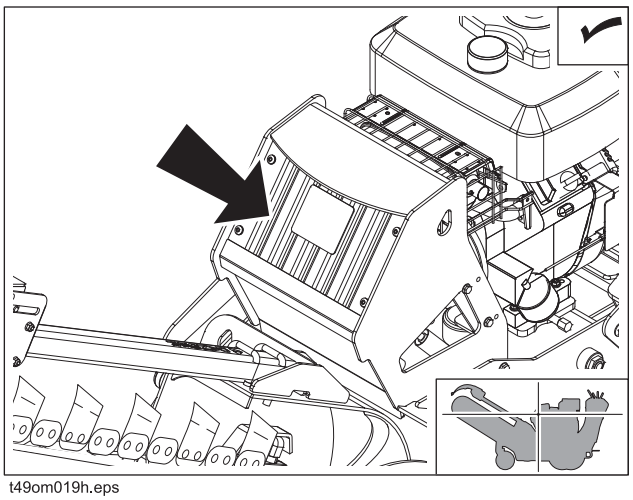
Check Hydraulic Fluid Cooler

C16

Check hydraulic fluid cooler before each use.

1. Check hydraulic fluid cooler.
2. If dirty, blow with low pressure air. For extensive cleaning, remove grill.



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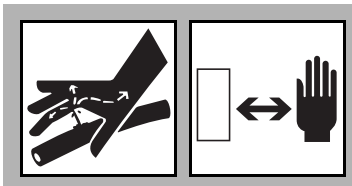
Check Hydraulic Hoses

Check hydraulic hoses for leaks and hydraulic connections for tightness before each use and every 10 hours. Replace any damaged part.



WARNING Fluid under pressure can pierce skin and cause death or serious injury.

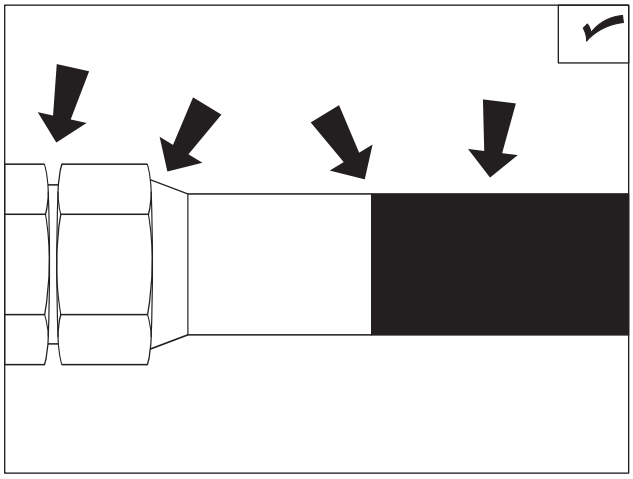
To help avoid injury:

- Do not use hands to search for leaks. Use a piece of cardboard or wood.
- Wear the necessary personal protective equipment, including gloves and safety glasses.

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

To replace parts from the hydraulic system:

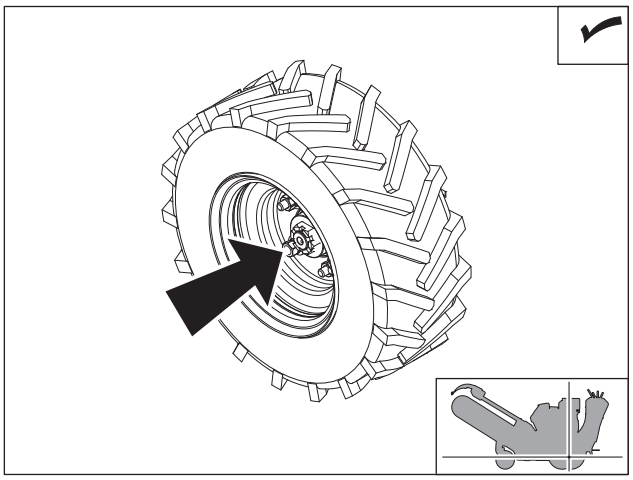
1. Turn engine off.
2. To release pressure, operate all controls.
3. If there is a raised component, lower, block or support with a hoist.
4. Cover connection with heavy cloth.
5. To release remaining pressure, loosen connector nut slightly.
6. Use appropriate container to collect all fluid.
7. Replace the damaged part.
8. Reconnect to the correct torque.



CheckHoses.eps

Check Lug Nut Torque

Check lug nut torque before each use. Tighten to 65 ft•lb (88 N•m).



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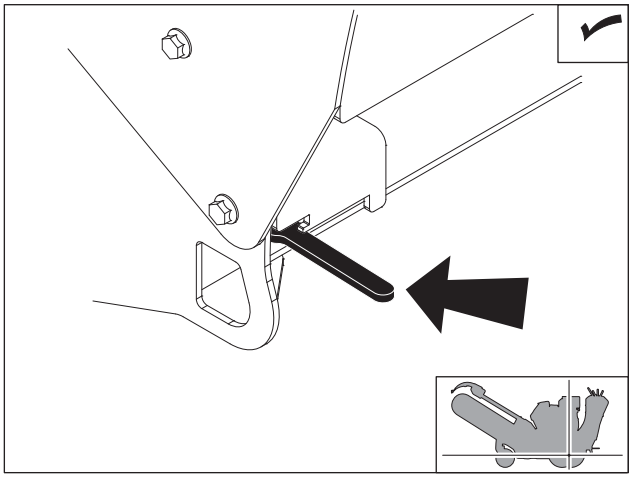
Check Parking Brake

Check parking brake operation before each use.

1. To engage parking brake, move lever to the right.
2. Move unit slightly to ensure parking brake operates correctly.
3. To disengage parking brake, move lever left to notch.

IMPORTANT: If lever is blocked, move unit slightly.



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5 Hour Service

Location	Task	Notes
Engine	Change engine oil	Initial, C14, C16, GEO

Change Engine Oil

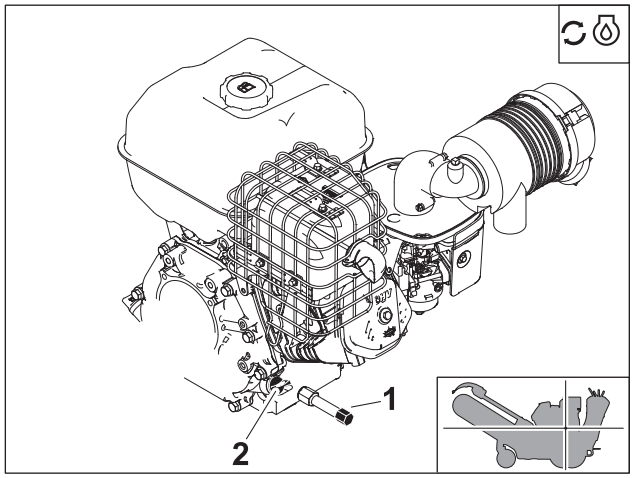
C14: Briggs & Stratton® XR2100

Change engine oil after the first 5 hours of operation and every 100 hours thereafter.

1. Drain at plug (1) while oil is still warm.
2. Replace plug.
3. Slowly add GEO at fill (2).

NOTICE: Engine oil capacity is 37 oz (1.09 L). Too much oil will damage the engine.

- Do not overfill.



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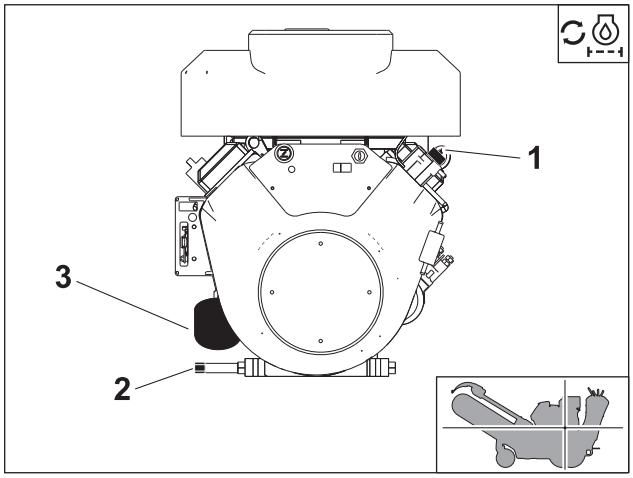
C16: Briggs & Stratton® Vanguard™ 16 HP

Change engine oil and filter after the first 5 hours of operation and every 50 hours thereafter.

1. Drain at plug (2) while oil is still warm.
2. Replace plug.
3. Change oil filter (3).
4. Slowly add GEO at fill cap (1) until level rises to FULL mark on dipstick.
5. Tighten fill cap (1).

NOTICE: Engine oil capacity is 47 oz (1.47 L). Too much oil will damage the engine.

- Do not overfill.



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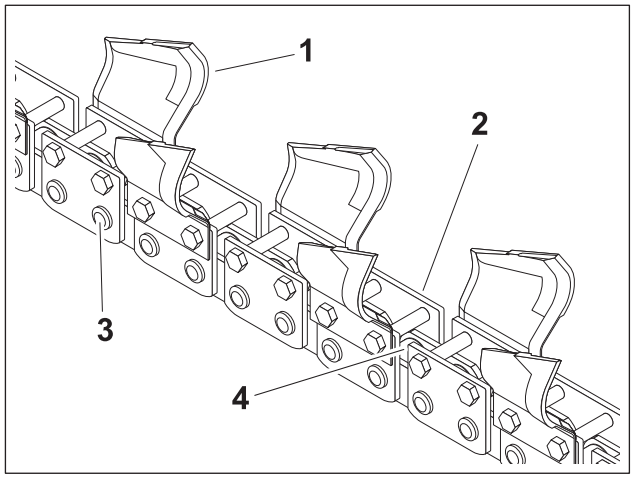
10 Hour Service

Location	Task	Notes
Trencher	Check digging chain	
	Check digging chain tension	
	Check restraint bar position	
	Check trench cleaner position	

Check Digging Chain

Check digging chain for wear every 10 hours. Primary wear occurs at rollers (4). Secondary wear occurs at sidebars (2).

1. Check rollers (4) for wear. If rollers (4) are worn, replace chain and sprockets.
2. Check sidebars (2) for sliding wear. If sidebars are bent or loose on chain pins (3), use chain spacers to join sidebars.
3. Check digging teeth (1) for wear. Replace worn digging teeth with original Ditch Witch® replacement parts. Maintain original tooth pattern.
   If you use rock chain bits:
   - Clean chain and check that bits rotate freely after each use.
   - Replace bit when carbide cap or insert is worn to prevent damage to adapter.



Digging_Chain_Check.eps

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

Check Digging Chain Tension

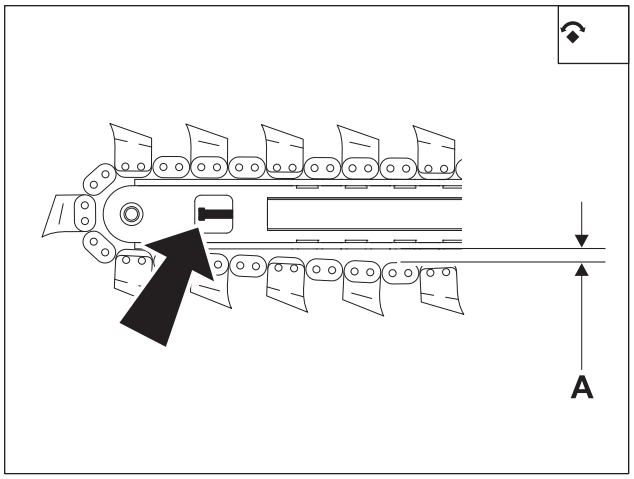
Check digging chain tension every 10 hours and adjust as needed.

NOTICE: Overtightening will cause chain stretch, loss of machine performance, and possible premature chain failure.

- Use correct chain tension.

Check tension

1. Move boom in horizontal position.
2. Measure distance A from bottom of boom to chain:
   - When 35K chain is correctly tensioned, distance A is 1.5-2.0" (38-51 mm).
   - When 19K chain is correctly tensioned, distance A is 1-1.5" (25-38 mm).



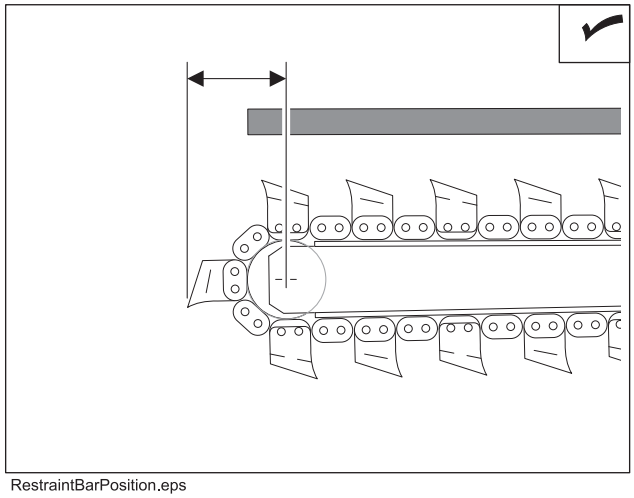
DiggingChainTension_Screw2.eps

Adjust tension with adjustment screw

1. Loosen jam nut on adjustment screw.
2. To tighten digging chain, turn adjustment screw clockwise. To loosen digging chain, turn counterclockwise.
3. When proper tension is reached, tighten jam nut.

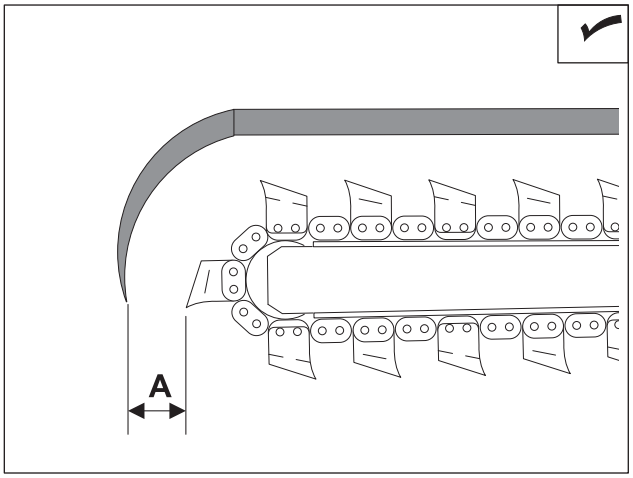
Check Restraint Bar Position

Check restraint bar position every 10 hours and after each adjustment or replacement of the digging chain. The restraint bar is correctly positioned when the end of bar extends between the center of the tail roller/sprocket and the end of the digging chain.


RestraintBarPosition.eps

Check Trench Cleaner Position

Check trench cleaner position every 10 hours and after each adjustment or replacement of the digging chain. The trench cleaner is correctly positioned when there is 3-4 in (76-102 mm) between the digging teeth and the inside of the trench cleaner shoe (A).



TrenchCleanerPosition.eps

20 Hour Service

Location	Task	Notes
Engine	Change engine oil	Initial, C12, GEO

Change Engine Oil

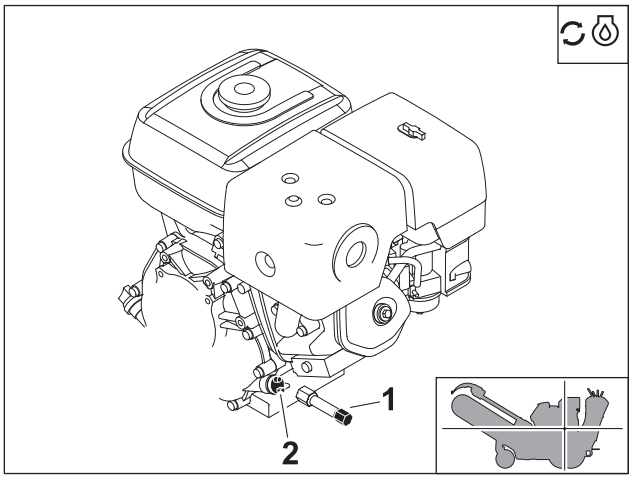
C12: Honda® GX390

Change engine oil and filter after the first 20 hours of operation and every 100 hours thereafter.

1. Drain at plug (2) while oil is still warm.
2. Replace plug.
3. Slowly add GEO at fill cap (1) until level rises to FULL mark on dipstick.
4. Tighten fill cap.

NOTICE: Engine oil capacity is 1.2 qt (1.14 L). Too much oil will damage the engine.

- Do not overfill.



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50 Hour Service

Location	Task	Notes
Engine	Change engine oil and filter	C16, GEO
	Check muffler and spark arrester	C14, C16
Trencher	Check boom mounting bolts	220 ft•lb (300 N•m)

Change Engine Oil and Filter

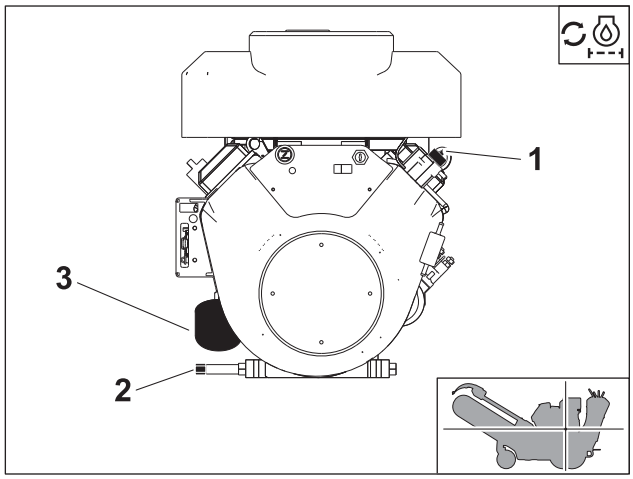
C16: Briggs & Stratton® Vanguard™ 16 HP

Change engine oil and filter every 50 hours.

1. Drain at plug (2) while oil is still warm.
2. Replace plug.
3. Change oil filter (3).
4. Slowly add GEO at fill cap (1) until level rises to FULL mark on dipstick.
5. Tighten fill cap.

NOTICE: Engine oil capacity is 47 oz (1.47 L). Too much oil will damage the engine.

- Do not overfill.



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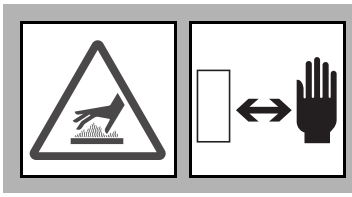
Check Muffler and Spark Arrester



CAUTION Hot parts may cause burns.

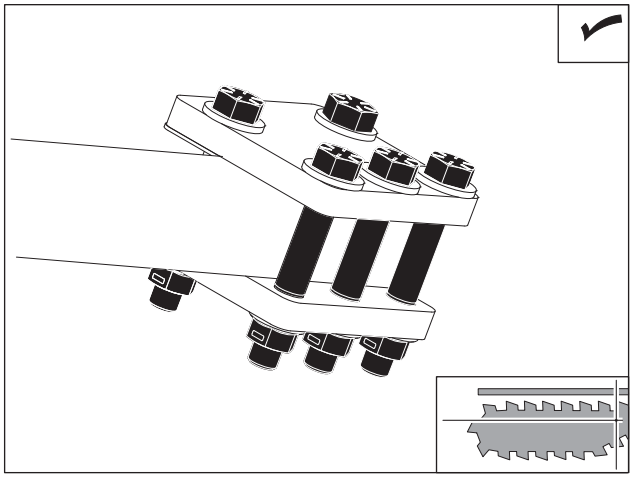
To help avoid injury: Do not touch until cool or wear gloves.

1. Remove debris and dust from muffler and spark arrester.
2. Check muffler for cracks or other damage.
3. If installed, remove spark arrester and check for damage or carbon blockage.
4. Replace any damaged part.

Check Boom Mounting Bolts

Check boom mounting bolts every 10 hours.

1. Check bolts for wear. Replace if worn or damaged.
2. Check torque and ensure bolts are tightened to 220 ft•lb (300 N•m).



BoomBolts_Check.eps

100 Hour Service

Location	Task	Notes
Engine	Change engine oil and filter	C12, C14, GEO
	Change air filter elements	
	Check spark plug	
	Clean sediment cup	C12
	Clean fuel tank and filter	C12

Change Engine Oil and Filter

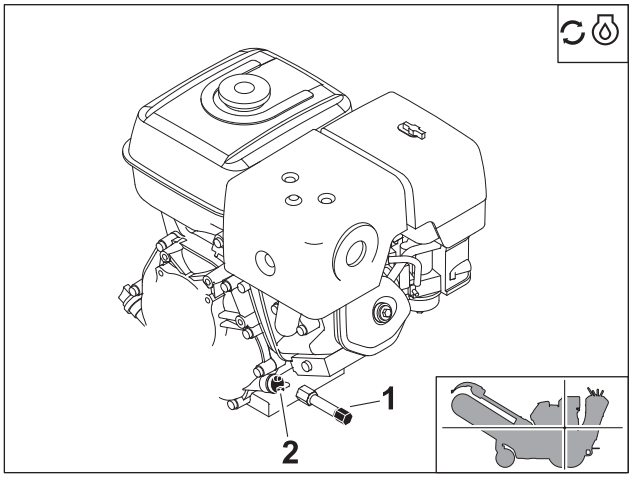
C12: Honda® GX390

Change engine oil and filter every 100 hours.

1. Drain at plug (2) while oil is still warm.
2. Replace plug.
3. Slowly add GEO at fill cap (1) until level rises to FULL mark on dipstick.
4. Tighten fill cap.

NOTICE: Engine oil capacity is 1.2 qt (1.14 L). Too much oil will damage the engine.

- Do not overfill.



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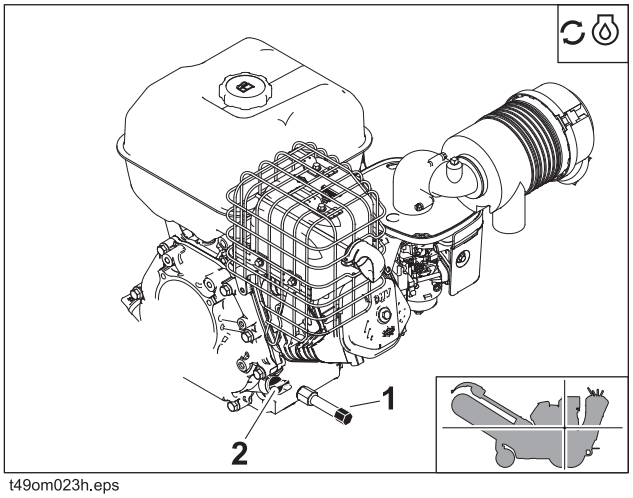
C14: Briggs & Stratton® XR2100

Change engine oil every 100 hours.

1. Drain at plug (1) while oil is still warm.
2. Replace plug.
3. Slowly add GEO at fill (2).

NOTICE: Engine oil capacity is 37 oz (1.09 L). Too much oil will damage the engine.

- Do not overfill.



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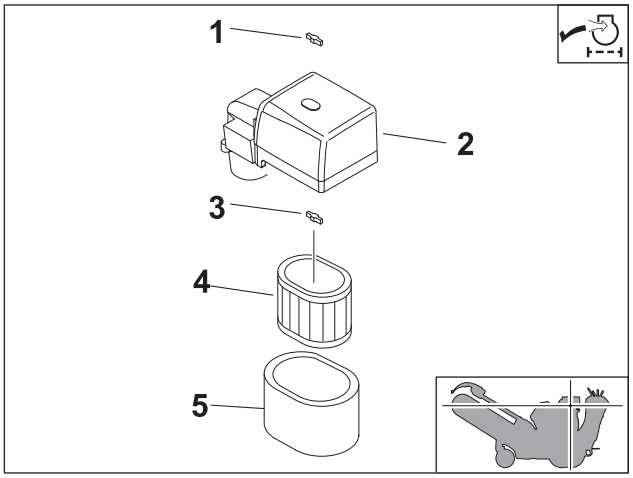
Change Air Filter Elements

C12



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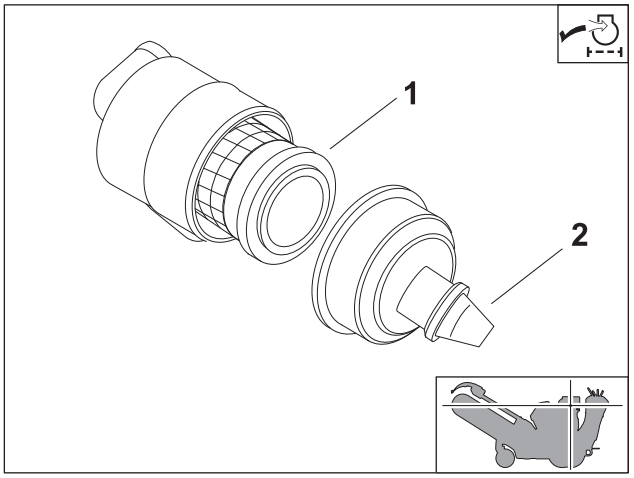
Change air filter elements every 100 hours.

1. Remove wing nut (1), air filter cover (2) and wing nut (3).
2. Remove and replace air filter elements (4) and (5).
3. Tighten wing nut (3).
4. Install air filter cover (2) and tighten wing nut (1).

NOTICE: Cleaning can damage filter elements.

- Do not tap filter elements to loosen dirt.
- Do not use compressed air or water.
- Replace filter elements.

C14



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Change air filter element every 100 hours.

1. Press dust ejector valve (2) to release dust.
2. Remove cover.
3. Remove and replace and air filter element (1).
4. Install cover.

NOTICE: Cleaning can damage filter element.

- Do not tap filter element to loosen dirt.
- Do not use compressed air or water.
- Replace filter element.

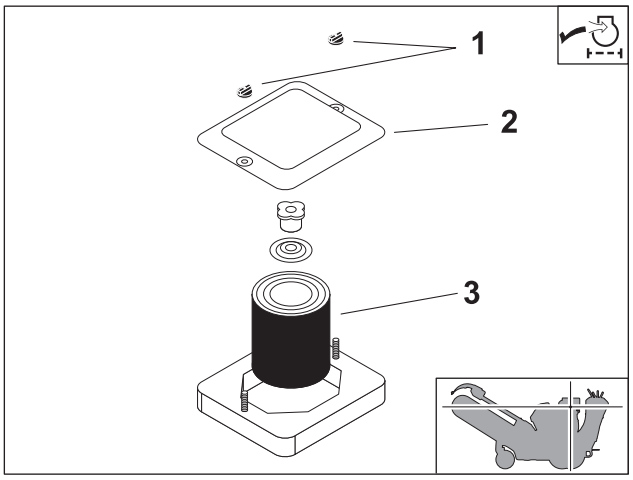
C16

Change air filter element every 100 hours.

1. Remove wing nuts (1) and cover (2).
2. Remove and replace air filter element (3).

NOTICE: Cleaning can damage filter element.

- Do not tap filter element to loosen dirt.
- Do not use compressed air or water.
- Replace filter element.



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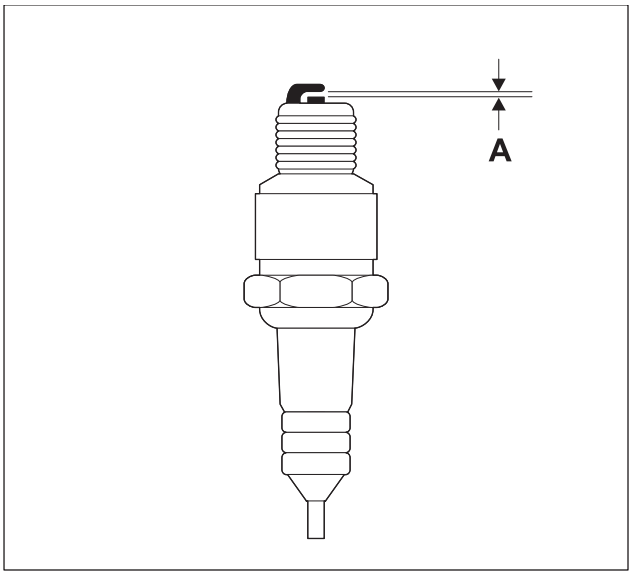
Check Spark Plug

Check spark plug gap every 100 hours. Correct spark plug gap (A) is 0.030" (0.76 mm).

See engine manual for specific procedure and recommended replacement spark plugs.



SparkPlug.eps

Clean Sediment Cup

C12

Clean sediment cup every 100 hours.

See engine manual for specific procedure.

Clean Fuel Tank and Filter

C12

Contact your local Honda® dealer to clean the fuel tank and fuel filter every 100 hours.

250 Hour Service

Location	Task	Notes
Engine	Check idle speed	C12
Trencher	Adjust valve train	

Check Idle Speed

Contact your local Honda® dealer to check and adjust the idle speed every 250 hours.

Adjust Valve

Contact your local Honda® / Briggs & Stratton® dealer to adjust the valve train every 250 hours.

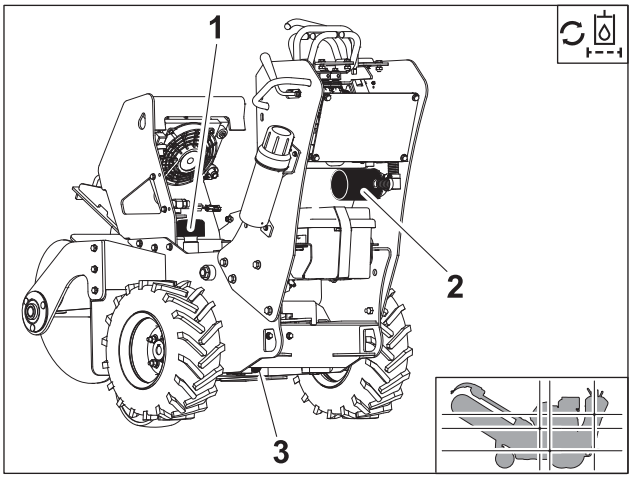
500 Hour Service

Location	Task	Notes
Trencher	Change hydraulic fluid and filter	THF

Change Hydraulic Fluid and Filter

Change hydraulic fluid and filter every 500 hours.

1. Place an appropriate container below hydraulic drain (3).
2. To drain fluid: remove drain plug (3).
3. Remove and clean strainer.
4. Install strainer.
5. Change filter (2).
6. To fill hydraulic reservoir, add fluid at fill cap (1) until correct level on sight glass is reached.



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As Needed

Location	Task	Notes
Trencher	Check battery	
	Replace digging chain	

Check Battery

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

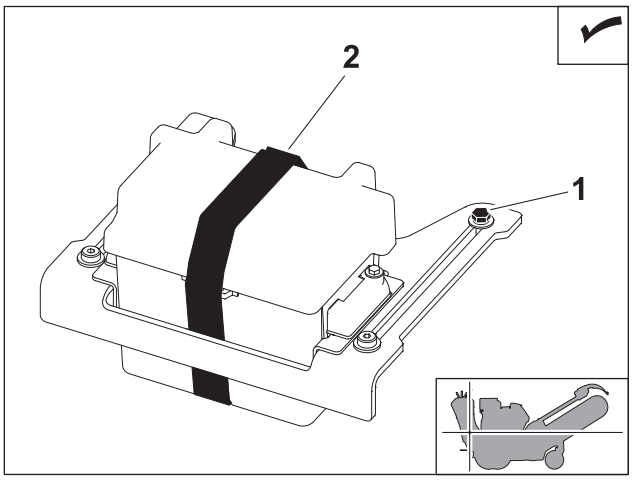
WARNING Explosion possible. Serious injury or equipment damage could occur.

To help avoid injury:

- Keep heat, sparks, flames and other ignition sources away.
- Connect and disconnect battery cables in the correct order.
- Do not short across battery terminals for any reason.

Access battery

1. Remove screw (1).
2. Pull battery tray out.
3. Remove battery strap (2) and battery cover.



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Clean battery

1. Carefully loosen and remove battery cable clamps, negative **(-)** cable first.
2. Clean cable clamps and terminals to remove dull glaze.
3. Check cables for internal corrosion.
4. Check battery fixing bolts for tightness.

Stow battery

1. Connect battery cable clamps, positive **(+)** cable first.
2. Install battery cover and strap (2).
3. Push battery tray back in storage position.
4. Tighten screw (1).

Jump Start Battery


WARNING Explosion possible. Serious injury or equipment damage could occur.

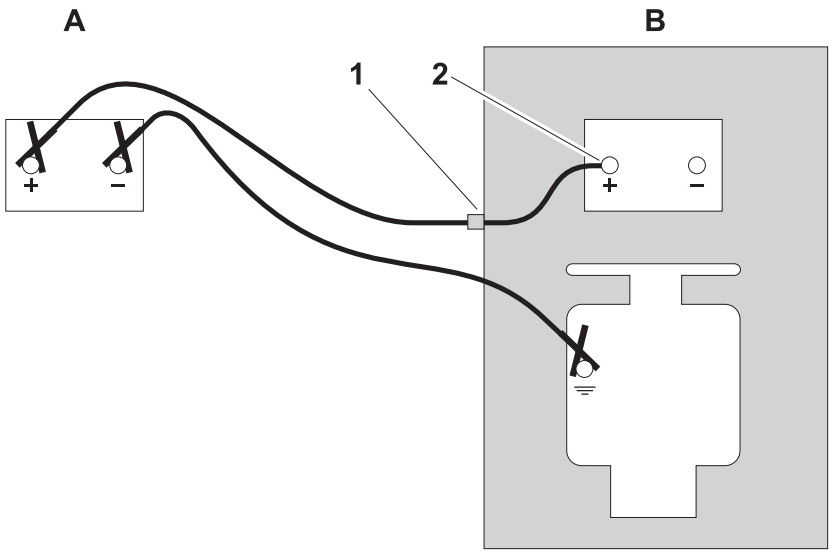
To help avoid injury:

- Wear the necessary personal protective equipment, including sufficiently insulated gloves and safety glasses.
- Keep sparks, fire and other ignition sources away.
- Do not charge a battery that is leaking, bulging, heavily corroded, frozen, or otherwise damaged.
- Use a single 12V maximum source for charging. Do not connect to rapid chargers or dual batteries.
- NEVER short-circuit battery terminals for any reason or strike battery posts or cable terminals.
- NEVER lean over battery when making connections.
- Do not allow vehicles to touch when charging.
- Do not allow battery clamps to touch.

NOTICE: Electrical surge hazard.
Electronic components can be damaged during jump start procedure.

- Replace battery as an alternative to jump start procedure.
- If jump start is necessary: use quality large diameter booster cables capable of carrying high currents (400 amps or more).

Set up and Check



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CAUTION Acid in battery is corrosive. Contact with skin will cause burns.

To help avoid injury:

- Avoid contact with battery fluid.
- Wear applicable safety glasses and gloves.
- See Material Safety Data Sheet (MSDS) for additional information.

1. Park service vehicle close to disabled equipment but do not allow vehicles to touch.
2. Engage parking brake in both vehicles.
3. Turn the ignition switch to the OFF position in both vehicles, and turn off all electrical loads. Disconnect the machine controller.
4. Inspect disabled battery (B) for signs of cracking, bulging, leaking, or other damage. If battery is damaged in any way, do not jump start. Replace battery.
5. Check for loose or corroded battery cable connections.
6. Carefully clean terminals and posts.

Connect Batteries

1. Connect red positive (+) cable clamp to positive (+) post (2) of disabled battery.

IMPORTANT: Some machines have an external positive terminal (1). In that case, connect positive clamp to external terminal.

2. Connect other red positive (+) cable clamp to positive (+) post of service vehicle battery.
3. Connect black negative (-) cable clamp to negative (-) post of service vehicle battery.
4. Connect other black negative (-) cable clamp to engine or frame ground on disabled equipment, at least 12" (305 mm) from disabled battery.

Charge Disabled Battery

1. Operate service vehicle engine at 1500-2000 rpm for a few minutes.
2. Stop engine in service vehicle.

Disconnect Batteries

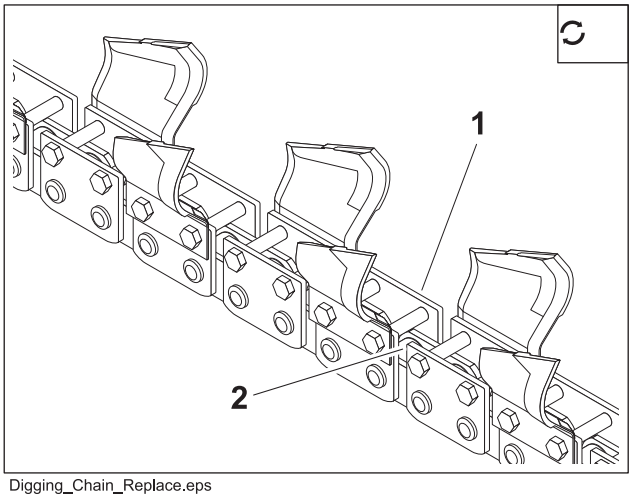
1. Remove black negative (-) clamp from negative post of service vehicle battery.
2. Remove black negative (-) clamp from engine or frame ground of disabled machine.
3. Remove red positive (+) clamp from positive post of service vehicle battery.
4. Remove red positive (+) clamp from external positive terminal (1) or internal positive post (2) of disabled battery.
5. Reconnect machine controller and try to start disabled machine.
6. If disabled machine does not start, replace battery.

Replace Digging Chain

Replace digging chain and sprocket when rollers (2) or sidebars (1) are worn.

IMPORTANT: Always replace sprockets at the same time you replace the digging chain. Replacing one without the other will cause premature wear of the new part

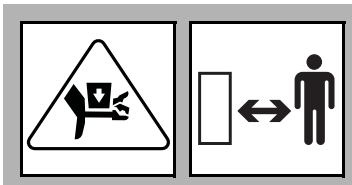
You must have the help of one more person for this procedure.



Digging_Chain_Replace.eps

Remove Chain

1. Start engine. See "Start Unit" on page 43.
2. Operate digging chain control until digging chain connector pin is on top of boom.
3. Operate boom lift control to lower boom to ground.
4. Engage parking brake.
5. Shut down machine. See "Shut Down" on page 46.
6. Secure chain:
   - Use chain jaws to clamp links on either side of connector pin.
   - Tighten jaws to reduce pressure on connector pin.
7. Turn tension adjustment screw counterclockwise to loosen digging chain.
8. Loop cable through links nearest connector pin, tail sprocket side.

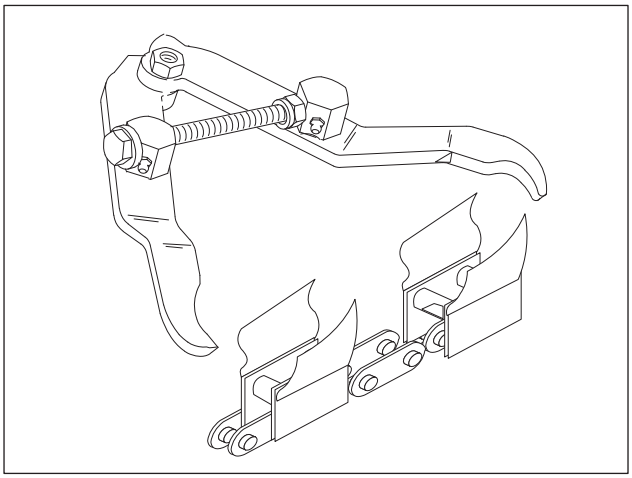


WARNING Disconnected digging chain will fall to the ground if no tension is applied. Crushing weight and sharp edges could cause serious injury.

To help avoid injury:

- Keep hands and feet away from chain and front of boom.
- Have helper apply tension to cable.

9. As helper continues to hold cable:
   - Remove lock key from connector pin and drive connector pin out of link.
   - Remove chain jaws.
10. Move away from chain and have helper slowly release cable to lower chain to ground.
11. Lay chain on ground with teeth down.



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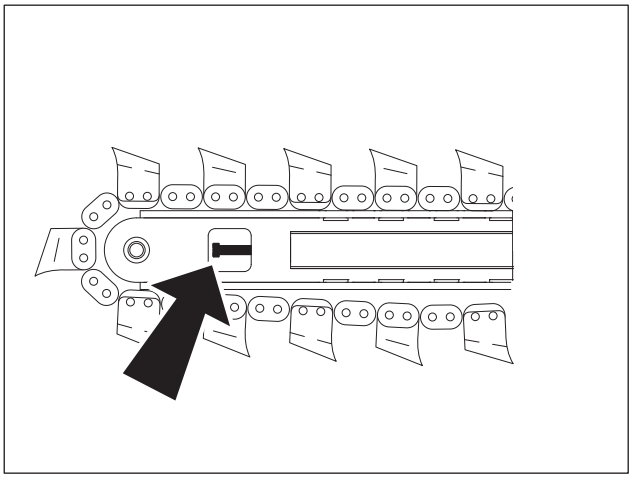
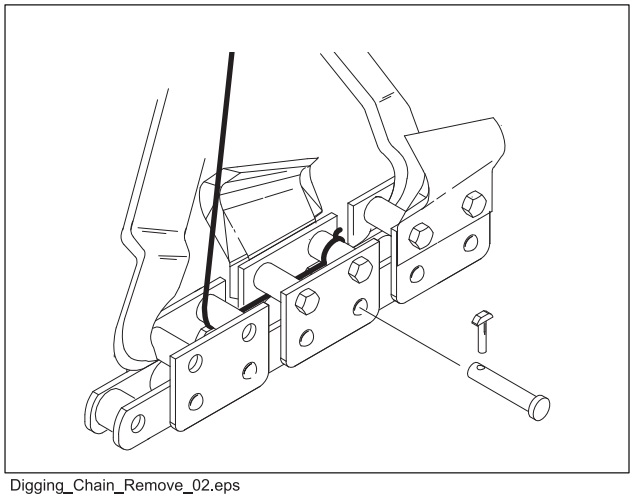


Digging_Chain_Remove_TensionScrew.eps



Digging_Chain_Remove_02.eps

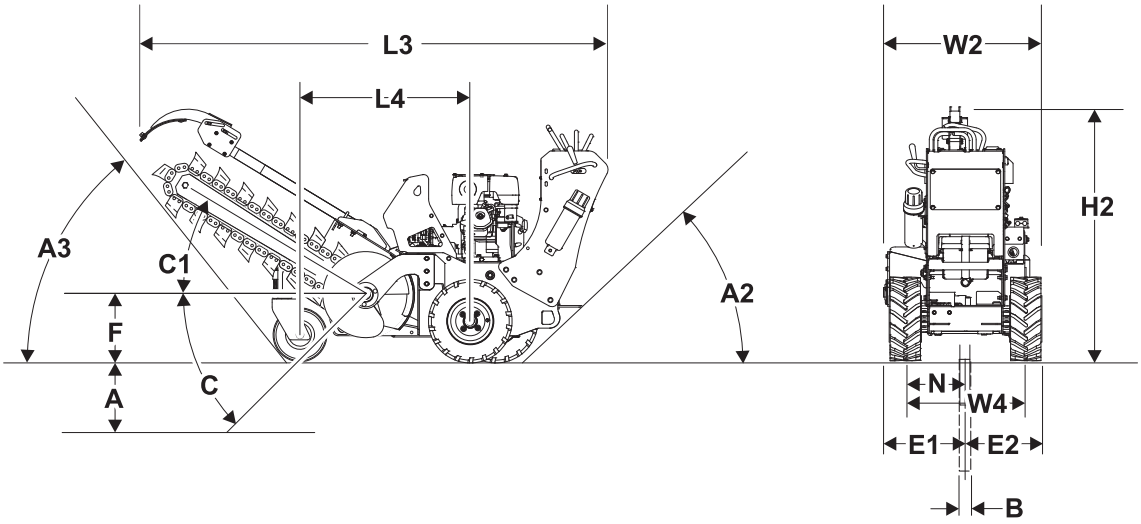
Install Chain

1. Lay chain on ground with teeth down and pointed toward unit. Loop cable through end links.
2. Start engine. See "Start Unit" on page 43.
3. Disengage parking brake.
4. Back unit up until chain extends past head shaft about 1' (305 mm).
5. Move ground drive control to neutral.
6. Lower boom to horizontal position.
7. Engage parking brake.
8. Shut down machine. See "Shut Down" on page 46.
9. Pull rear end of chain over tail roller or sprocket.
10. Pull until chain is in place on boom.
11. Move chain down boom until chain connector pin and lock key can be installed. Install connector pin and lock key.
12. Turn tension adjustment screw clockwise to tighten digging chain.

Specifications

Chapter Contents

C12



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Dimensions		U.S.	Metric
A	Trench depth, maximum	24 in	610 mm
B	Trench width	3.5 - 6 in	90-152 mm
C	Boom travel down	60°	60°
C1	Boom travel up	29°	29°
F	Headshaft height, digging chain	13.2 in	335 mm
L3	Length, maximum	88.3 in	2243 mm
W2	Width	31.5 in	800 mm
H2	Height	47.3 in	1201 mm
W4	Tread	23.8 in	605 mm
A2	Angle of departure	39°	39°
L4	Wheelbase	38.7 - 44.7 in	983-1135 mm
E1	Centerline trench to outside edge of machine, left	14 in	356 mm
E2	Centerline trench to outside edge of machine, right	17.3 in	439 mm
N	Spoil discharge reach	11.2 in	284 mm
A3	Angle of approach	46°	46°

Unless otherwise noted, dimensions are based on 18x9.50x8 tires and 24" (610 mm) boom in transport position.

Operational		U.S.	Metric
Vehicle speeds			
	Maximum transit forward	280 fpm	85.3 m/min
	Maximum transit reverse	114 fpm	34.7 m/min
Digging chain speed			
	19K	416 fpm	126.8 m/min
	35K	351 fpm	107 m/min
Spoils handling (single, open-end auger):			
	Outer diameter	17 in	432 mm
Maximum operating weight		1461 lb	664 kg

Power	U.S.	Metric
Engine: Honda GX390		
Fuel: gasoline		
Cooling medium: air		
Number of cylinders: one		
Displacement	23.7 in^3	389 cm^3
Bore	3.5 in	88 mm
Stroke	2.5 in	64 mm
Manufacturer's net power rating @ 3600 rpm (SAE J1940)	11.7 hp	8.7 kW
Rated speed	3600 rpm	3600 rpm
Fuel consumption	0.92 gph	3.5 L/h
Maximum tilt angle*	20°	20°

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

Battery
310 CA, 12V, reserve capacity 30 min

Power Train		U.S.	Metric
Hydraulic ground drive: infinitely variable from zero to maximum, speed and direction controlled with dual levers			
Digging chain drive: hydraulic direct drive, lever-operated, one speed forward and reverse			
Trencher drive: hydraulic direct drive			
Pump drive: direct drive from engine			
Spoils handling drive: mechanical, attached to and rotates with headshaft			
Tires			
	Drive: 16x6.50-8 bar lug	urethane filled	
	Trail: 11x4.00-5	solid	

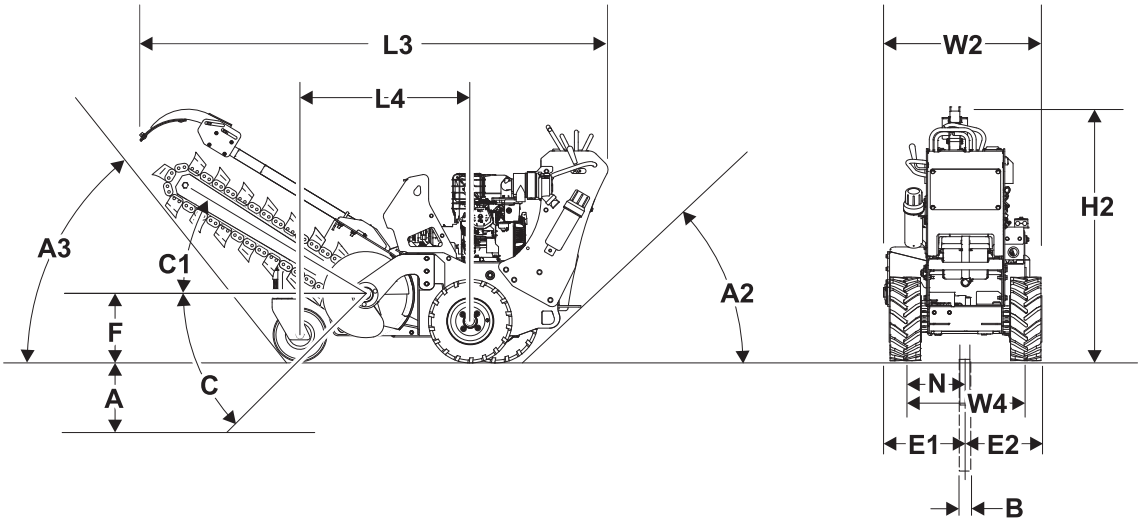
Hydraulic System		U.S.	Metric
Dual pump capacity @ 3600 rpm			
	Total	7.5 gpm	28.4 L/min
	To ground drive	1.5 gpm	5.7 L/min
	To digging drive	6 gpm	22.7 L/min

Fluid Capacities	U.S.	Metric
Hydraulic reservoir	7 gal	26.5 L
Hydraulic system	7.5 gal	28.4 L
Fuel tank	1.6 gal	6.05 L
Engine oil	1.2 qt	1.1 L

Noise Levels
Operator ear 92 dBA sound pressure per ISO 6394
Exterior 101 dBA sound power per ISO 6393

Vibration Levels
Vibration at the operator's hand during normal operation is less than 2.5 m/s^2

C14



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Dimensions		U.S.	Metric
A	Trench depth, maximum	24 in	610 mm
B	Trench width	3.5 - 6 in	90-152 mm
C	Boom travel down	60°	60°
C1	Boom travel up	29°	29°
F	Headshaft height, digging chain	13.2 in	335 mm
L3	Length, maximum	88.3 in	2243 mm
W2	Width	31.5 in	800 mm
H2	Height	47.3 in	1201 mm
W4	Tread	23.8 in	605 mm
A2	Angle of departure	39°	39°
L4	Wheelbase	38.7 - 44.7 in	983-1135 mm
E1	Centerline trench to outside edge of machine, left	14 in	356 mm
E2	Centerline trench to outside edge of machine, right	17.3 in	439 mm
N	Spoil discharge reach	11.2 in	284 mm
A3	Angle of approach	46°	46°

Unless otherwise noted, dimensions are based on 18x9.50x8 tires and 24" (610 mm) boom in transport position.

Operational		**U.S.**	**Metric**
Vehicle speeds			
	Maximum transit forward	280 fpm	85.3 m/min
	Maximum transit reverse	114 fpm	34.7 m/min
Digging chain speed			
	19K	416 fpm	126.8 m/min
	35K	351 fpm	107 m/min
Spoils handling (single, open-end auger):			
	Outer diameter	17 in	432 mm
Vehicle speeds			

Power	**U.S.**	**Metric**
Engine: Brigs & Stratton® XR2100 Professional		
Fuel: gasoline		
Cooling medium: air		
Number of cylinders: one		
Displacement	18.67 in^3	306 cm^3
Bore	3.228 in	82 mm
Stroke	2.283 in	58 mm
Manufacturer's net power rating @ 3600 rpm (SAE J1349)	13.5 hp	10.1 kW
Rated speed	3600 rpm	3600 rpm
Fuel consumption @ 3600 rpm	1.3 gph	4.9 L/h
Maximum tilt angle*	20°	20°
*Exceeding these operational angles will cause engine damage. This DOES NOT IMPLY machine is stable to maximum angle of safe engine operation.		

Battery
310 CA, 12V, reserve capacity 30 min

Power Train	U.S.	Metric
Hydraulic ground drive: infinitely variable from zero to maximum, speed and direction controlled with dual levers		
Digging chain drive: hydraulic direct drive, lever-operated, one speed forward and reverse		
Trencher drive: hydraulic direct drive		
Pump drive: direct drive from engine		
Spoils handling drive: mechanical, attached to and rotates with headshaft		
Tires (urethane filled)		
Drive: 16x6.50-8 bar lug	urethane filled	
Trail: 11x4.00-5	solid	

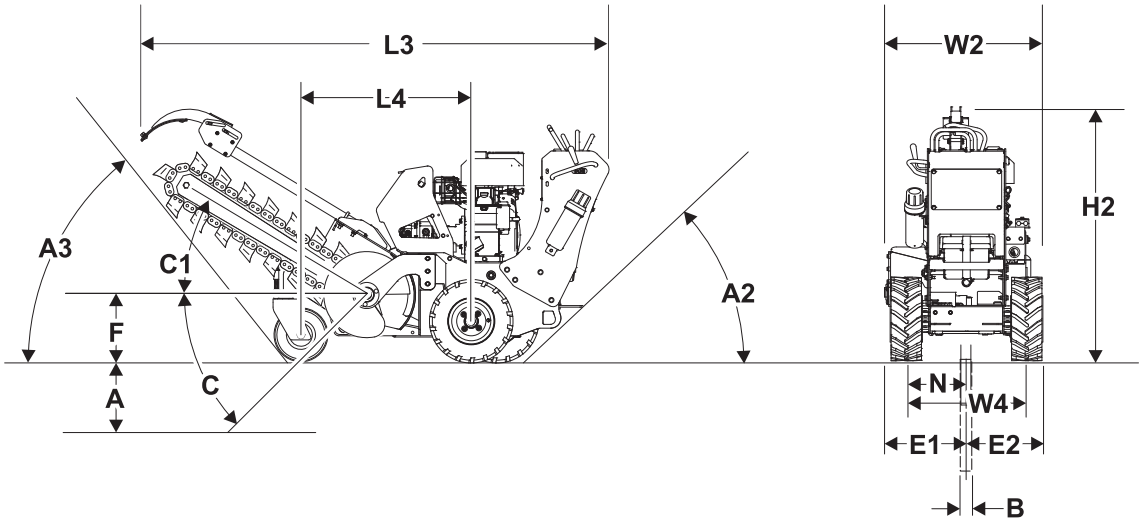
Hydraulic System	U.S.	Metric
Dual pump capacity @ 3600 rpm		
Total	7.5 gpm	28.4 L/min
To ground drive	1.5 gpm	5.7 L/min
To digging drive	6 gpm	22.7 L/min

Fluid Capacities	U.S.	Metric
Hydraulic reservoir	7 gal	26.5 L
Hydraulic system	7.5 gal	28.4 L
Fuel tank	1.7 gal	6.44 L
Engine oil	37 oz	1.09 L

Noise Levels
Operator 91 dBA sound pressure per ISO 6394
Exterior 101 dBA sound power per ISO 6393

Vibration Levels
Vibration at the operator's hand during normal operation is less than 2.5 m/s^2

C16



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Dimensions		U.S.	Metric
A	Trench depth, maximum	30 in	762 mm
B	Trench width	3.5 - 6 in	89-150 mm
C	Boom travel down	60°	60°
C1	Boom travel up	60°	60°
F	Headshaft height, digging chain	13.2 in	335 mm
L3	Length, maximum	92 in	2337 mm
W2	Width	33 in	840 mm
H2	Height, maximum	50.2 in	1275 mm
W4	Tread	23.8 in	605 mm
A2	Angle of departure	39°	39°
L4	Wheelbase	38.7 - 44.7 in	983-1135 mm
E1	Centerline trench to outside edge of machine, left	14 in	356 mm
E2	Centerline trench to outside edge of machine, right	17.3 in	440 mm
N	Spoil discharge reach	11.2 in	285 mm
A3	Angle of approach	46°	46°

Unless otherwise noted, dimensions are based on 18x9.50x8 tires and 24" (610 mm) boom in transport position.

Operational		U.S.	Metric
Vehicle speeds			
	Maximum transit forward	280 fpm	85.3 m/min
	Maximum transit reverse	125 fpm	38.1 m/min
Digging chain speed			
	19K	366 fpm	111.6 m/min
	35K	309 fpm	94.2 m/min
Spoils handling (single, open-end auger):			
	Outer diameter	17 in	432 mm
Maximum operating weight		1520 lb	689.5 kg

Power	U.S.	Metric
Engine: Briggs & Stratton® Vanguard™ 16.0 Small Block V-Twin Horizontal Shaft		
Fuel: gasoline		
Cooling medium: air		
Number of cylinders: two		
Displacement	29.23 in^3	479 cm^3
Bore	2.68 in	68 mm
Stroke	2.60 in	66 mm
Manufacturer's net power rating @ 3600 rpm (SAE J1940)	16 hp	11.9 kW
Rated speed	3600 rpm	3600 rpm
Fuel consumption	1.33 gph	5 L/h
Maximum tilt angle*	20°	20°
*Exceeding these operational angles will cause engine damage. This DOES NOT IMPLY machine is stable to maximum angle of safe engine operation.		

Battery
310 CA, 12V, reserve capacity 30 min

Power Train		U.S.	Metric
Hydraulic ground drive: infinitely variable from zero to maximum, speed and direction controlled with dual levers			
Digging chain drive: hydraulic direct drive, lever-operated, one speed forward and reverse			
Trencher drive: hydraulic direct drive			
Pump drive: direct drive from engine			
Spoils handling drive: mechanical, attached to and rotates with headshaft			
Tires			
	Drive: 16x6.50-8 bar lug	urethane filled	
	Trail: 11x4.00-5	solid	

Hydraulic System		U.S.	Metric
Dual pump capacity @ 3600 rpm			
	Total	12.5 gpm	47.3 L/min
	To ground drive	1.5 gpm	5.7 L/min
	To digging drive	11 gpm	41.6 L/min

Fluid Capacities	U.S.	Metric
Hydraulic reservoir	7 gal	26.5 L
Hydraulic system	7.5 gal	28.4 L
Fuel tank	2.3 gal	6.5 L
Engine oil	1.4 qt	1.32 L

Noise Levels
Operator 87 dBA sound pressure per ISO 6394
Exterior 97 dBA sound power per ISO 6393

Vibration Levels
Vibration at the operator's hand during normal operation is less than 2.5 m/s^2

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 replacements parts under this warranty as it deems appropriate.

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

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

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

First version: 1/91; Latest version: 11/11

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® 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

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Purchaser's Company Name

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Name of Ditch Witch Dealership

Your Signature

Service Record

Service Performed	Date	Hours

Service Performed	Date	Hours