

C12x/C16x/C24x/C30x

Operator's Manual



Overview

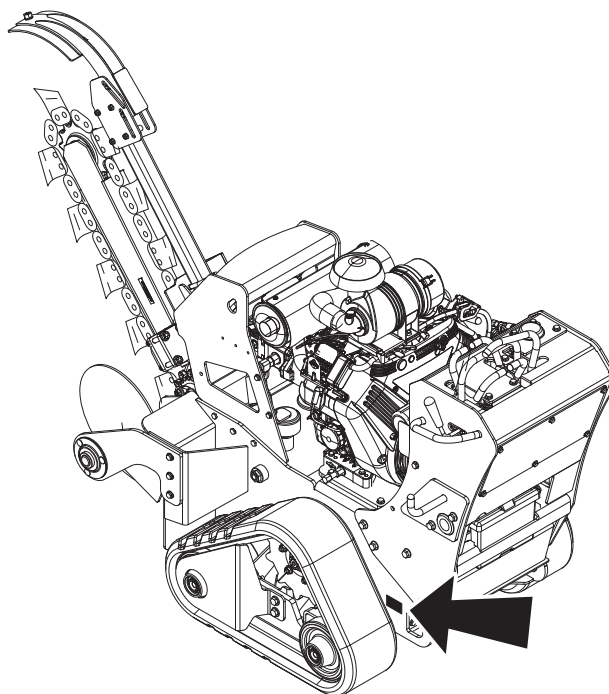


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Serial Number Location

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 C12x, C16x, C24x and C30x pedestrian trenchers are designed to install buried cable and pipe. The maximum trenching depth is 24" (610 mm) for C12x, 36" (915 mm) for C16x and C24x, and 48" (1220 mm) for C30x. The maximum trenching width is 6" (200 mm).

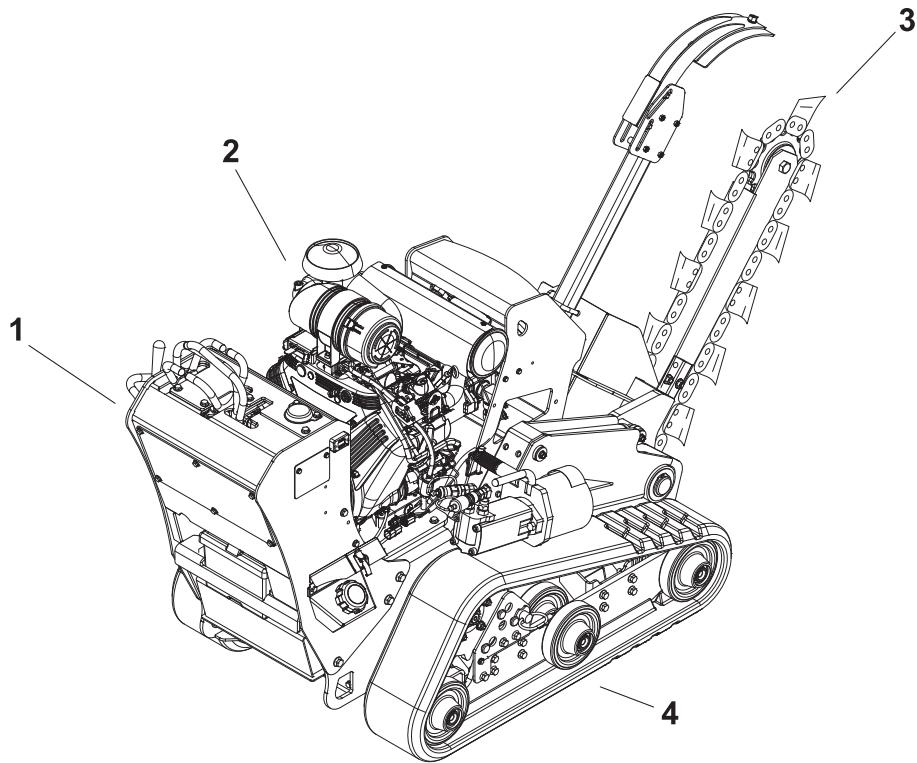
These units are intended for operation in ambient temperatures from 20° to 115°F (-7° to 46°C). Contact your Ditch Witch® dealer for provisions required for operating in extreme temperatures. Use in any other way is considered contrary to the intended use.

C12x, C16x, C24x and C30x 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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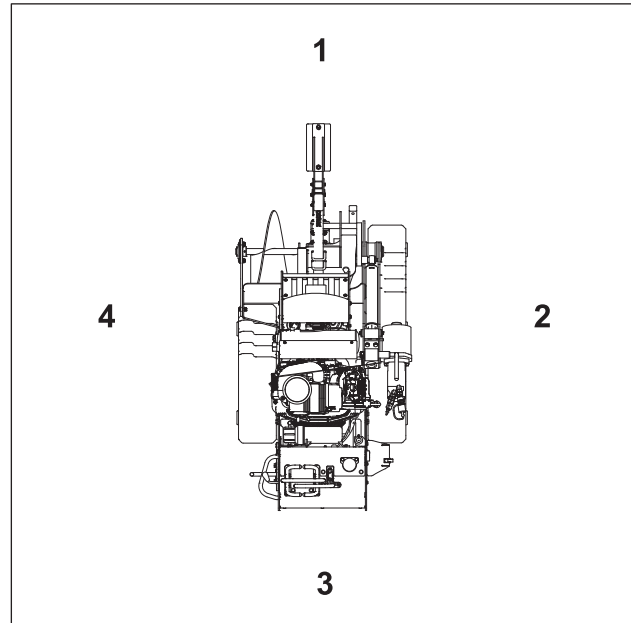
- 1. Control console
- 2. Engine

- 3. Digging boom and chain
- 4. Tracks

Operator Orientation

IMPORTANT: Top view of unit is shown.

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

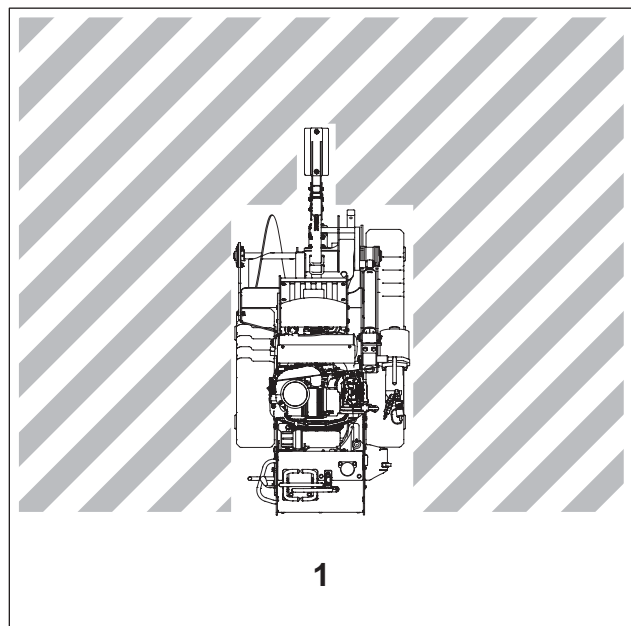


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Operating Area

IMPORTANT: Top view of unit is shown.

Operator should stand only in the location marked by number 1.



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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.



**C12x/C16x/C24x/C30x
Operator's Manual**

Issue number 2.0/OM-11/17

Part number 053-2869

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

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Safety

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Guidelines



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

Follow these guidelines before operating any jobsite equipment:

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

California Proposition 65 Warning

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

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

Emergency Procedures



WARNING

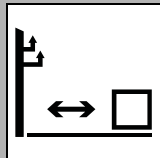
Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment.



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

EMERGENCY SHUTDOWN - Release all controls and stop engine.

Electric Strike Description



DANGER

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

When working near electric cables, remember the following:

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

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

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

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

If an Electric Line is Damaged

If you suspect an electric line has been damaged and you are **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. 275-419 (2P)



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

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

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

If a Fiber Optic Cable is Damaged

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

If Machine Catches on Fire

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


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


Safety Alert Classifications


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



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

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

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

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

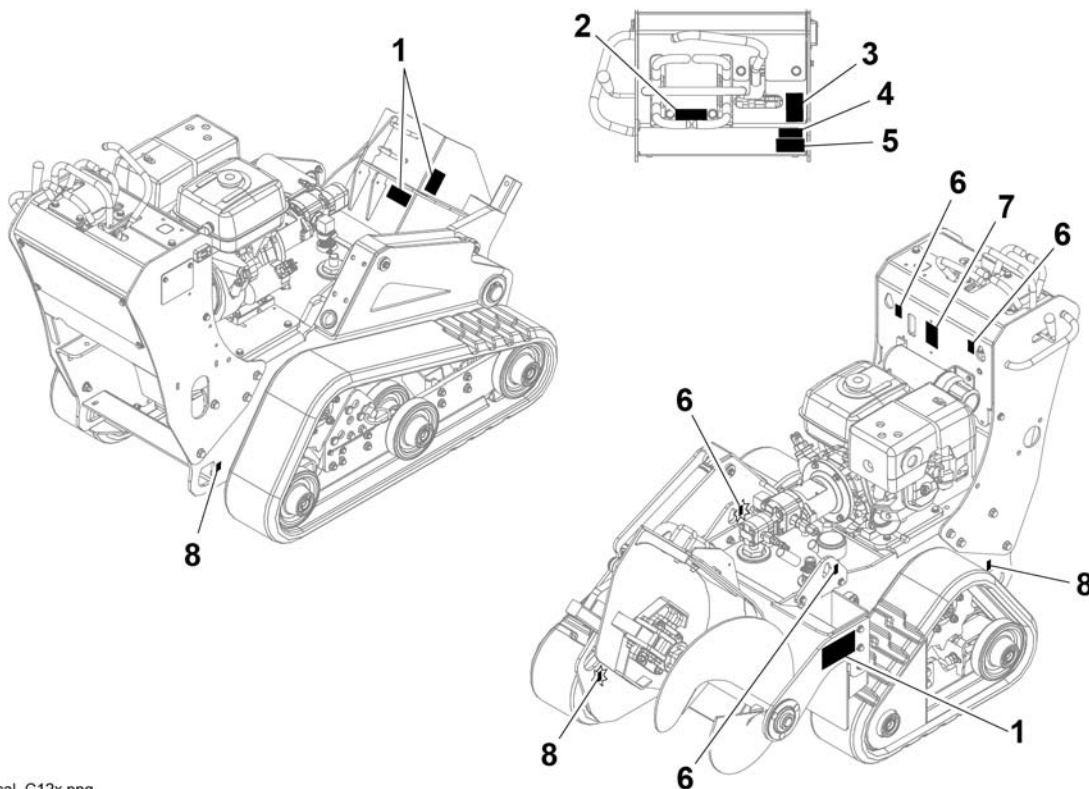
Watch for two other words: **NOTICE** and **IMPORTANT**.

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

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

Machine Safety Alerts

C12x



Decal_C12x.png

1		<p>⚠ DANGER Moving digging teeth. Contact will cause death or serious injury. Stay away. 270-1156, 274-002</p>
2		<p>⚠ CAUTION Tip over possible. When loading/unloading run at low idle and keep boom low. 270-7596</p>
3		<p>⚠ CAUTION Exposure to high noise levels may cause hearing loss. Wear hearing protection. 700-009 (2-P)</p>

4



⚠ WARNING Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment. 274-050; 274-724 (2P), 700-133

5



⚠ WARNING Misuse of machine can cause death or serious injury. Read and understand operator's manual and all other safety instructions before use. 273-475

6



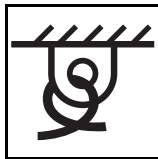
Lift point. See Transport chapter for more information. 274-442

7



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

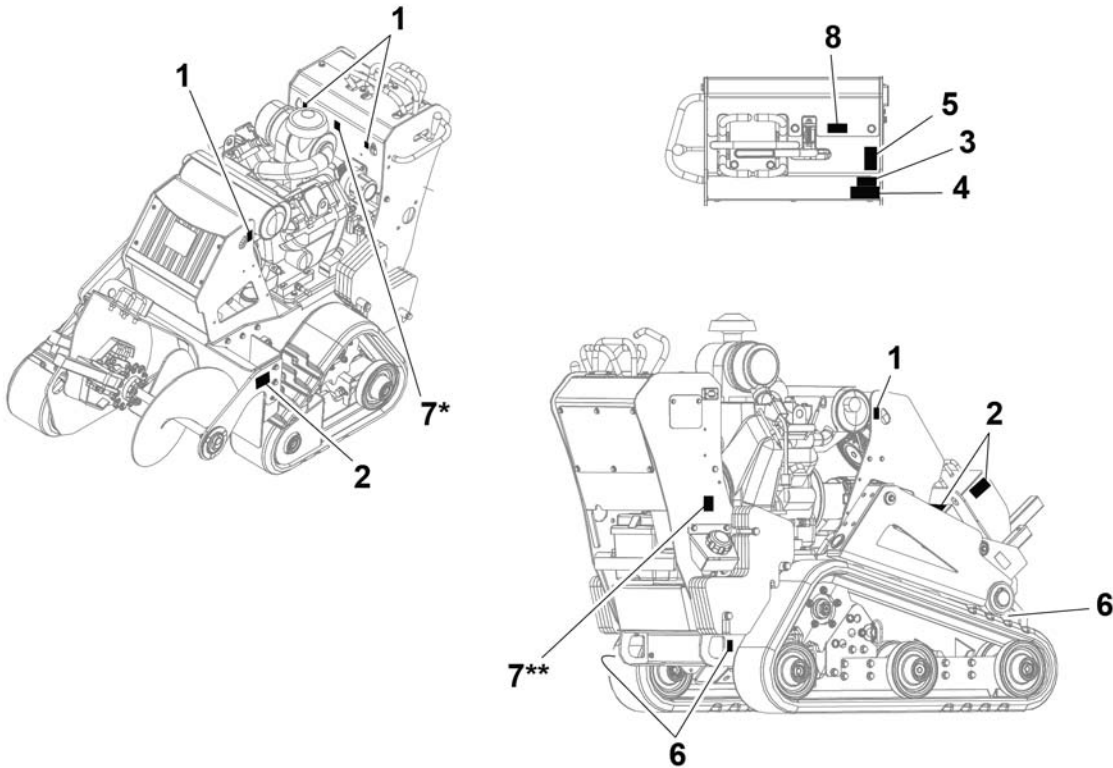
8



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



C16x/C24x/C30x



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

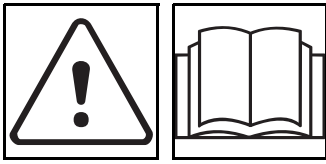


⚠ DANGER Moving digging teeth. Contact will cause death or serious injury. Stay away. 270-1156, 274-002



⚠ WARNING Jobsite hazards could cause death or serious injury. Use correct equipment and work methods. Use and maintain proper safety equipment. 274-050; 274-724 (2P), 700-133

4



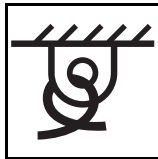
⚠ WARNING Misuse of machine can cause death or serious injury. Read and understand operator's manual and all other safety instructions before use. 273-475

5



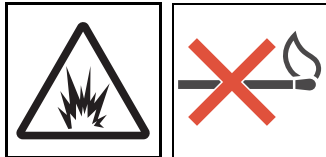
⚠ CAUTION Exposure to high noise levels may cause hearing loss. Wear hearing protection. 700-009 (2-P)

6



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

7



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

8



⚠ CAUTION Tip over possible. When loading/unloading run at low idle and keep boom low. 270-7596

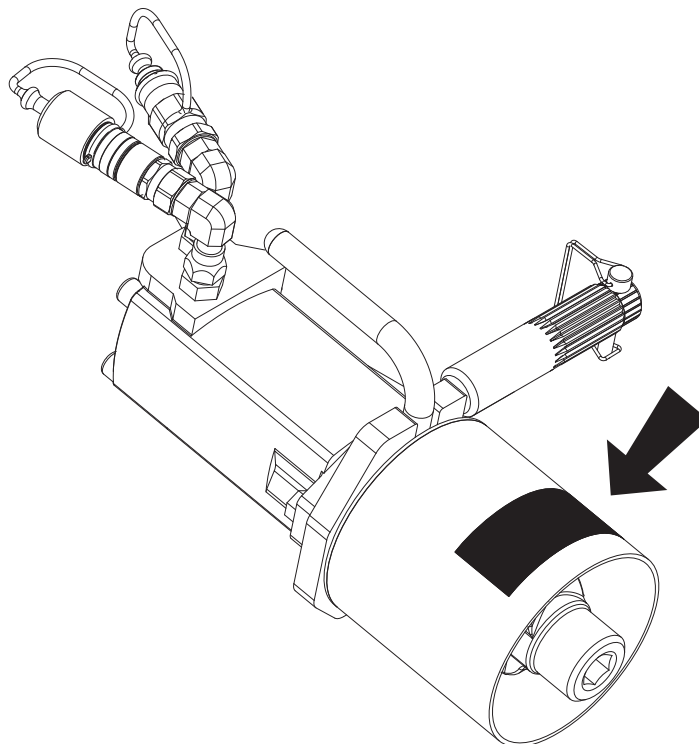
* C16x

** C24x, C30x

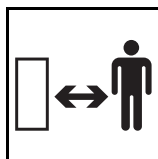


Attachment Safety Alerts

Roto Witch[®] Drilling Attachment



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⚠ DANGER

Rotating shaft will kill or seriously injure. Stay away.

275-197

Controls

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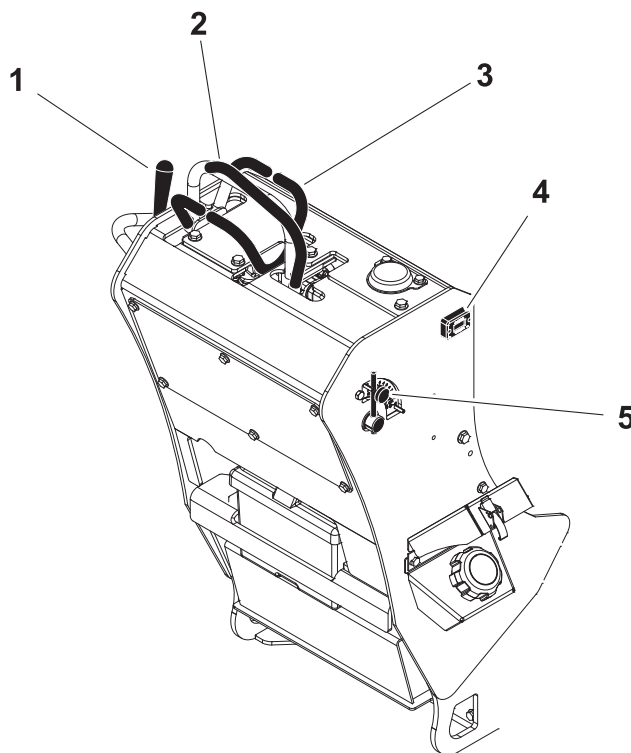
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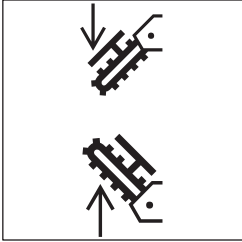


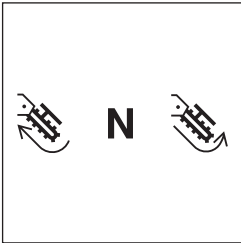
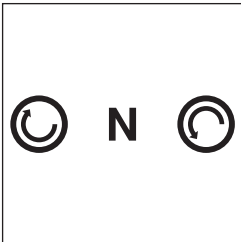
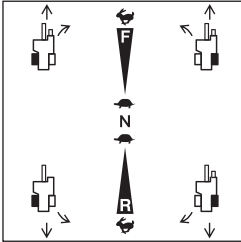
Control Console



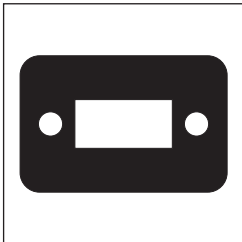
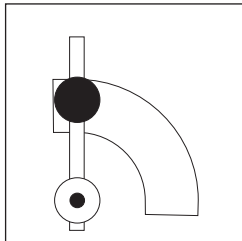
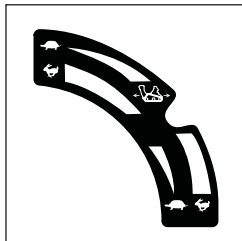
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- 1. Boom lift control
 - 2. Digging chain/Roto Witch® control
 - 3. Speed/Direction controls
 - 4. Hourmeter/Tachometer*
 - 5. Variable speed control**
- *C16x and C30x only
** C16x only

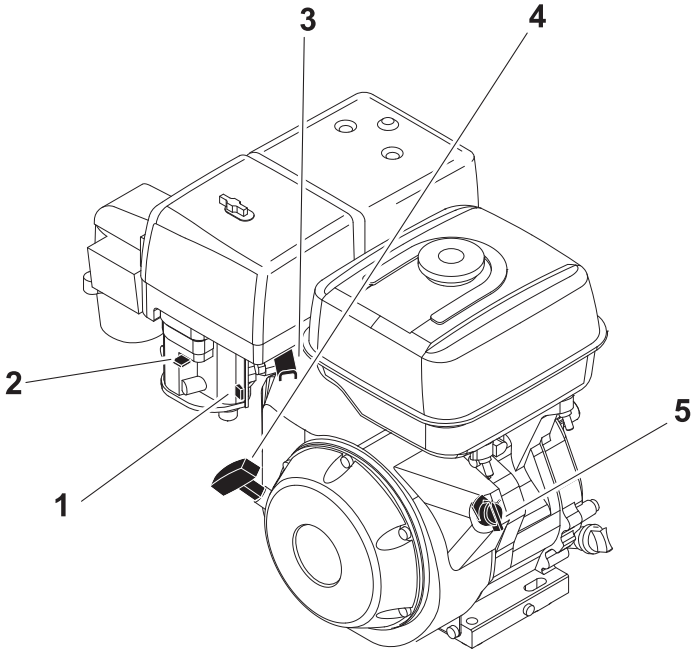
Item	Description	Notes
<p>1. Boom lift control</p>  <p>c00ic004c.eps</p>	<p>To lower boom, push.</p> <p>To raise boom, pull.</p>	

Item	Description	Notes
<p>2. Digging chain control/ Roto Witch® control</p>  <p>c00ic553h.eps</p>  <p>c00ic559h.eps</p>	<p>To start digging chain, pull rearward, then move to the left.</p> <p>To stop digging chain, return to neutral position.</p> <p>To dislodge a rock or other obstruction, pull rearward, then move to the right to reverse chain</p> <p>In drill mode:</p> <p>To drill clockwise, push down.</p> <p>To stop drill rotation, release control.</p> <p>To drill counterclockwise, pull up.</p>	<p>IMPORTANT: This control changes function when equipped with optional Roto Witch® drilling attachment.</p> <p>Trenching movement is always backward (toward you).</p> <p>NOTICE: Operate digging chain in reverse only to dislodge a rock or other obstruction.</p>
<p>3. Speed/direction controls</p>  <p>c00ic266w.eps</p>	<p>To drive straight forward, push BOTH controls slowly forward.</p> <p>To drive straight in reverse, pull BOTH controls slowly rearward.</p> <p>To turn left, move RIGHT speed/direction control for forward or reverse.</p> <p>To turn right, move LEFT speed/direction control for forward or reverse.</p> <p>To go faster in any direction, move controls farther from neutral position.</p> <p>To stop, release controls.</p>	<p>Trenching movement is always backward (toward you).</p>



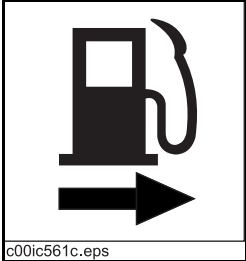
Item	Description	Notes
<p>4. Hourmeter/Tachometer</p>  <p>c00ic556h.eps</p>	<p>Displays engine operating time and engine speed.</p>	<p>Use engine operating times to schedule service.</p>
<p>5. Variable speed control</p>  <p>c00ic136h.eps</p>  <p>c00ic265w.eps</p>	<p>To increase trenching speed and decrease ground drive speed, loosen knob, move control up, then tighten knob.</p> <p>To decrease trenching speed and increase ground drive speed, loosen knob, move control down, then tighten knob.</p>	

C12x Engine Controls

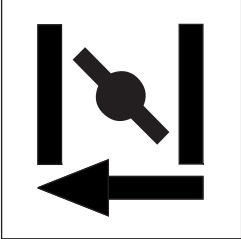
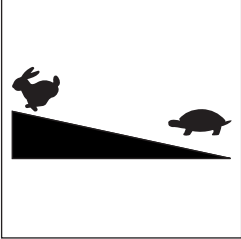
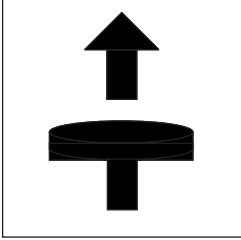
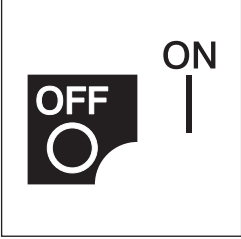


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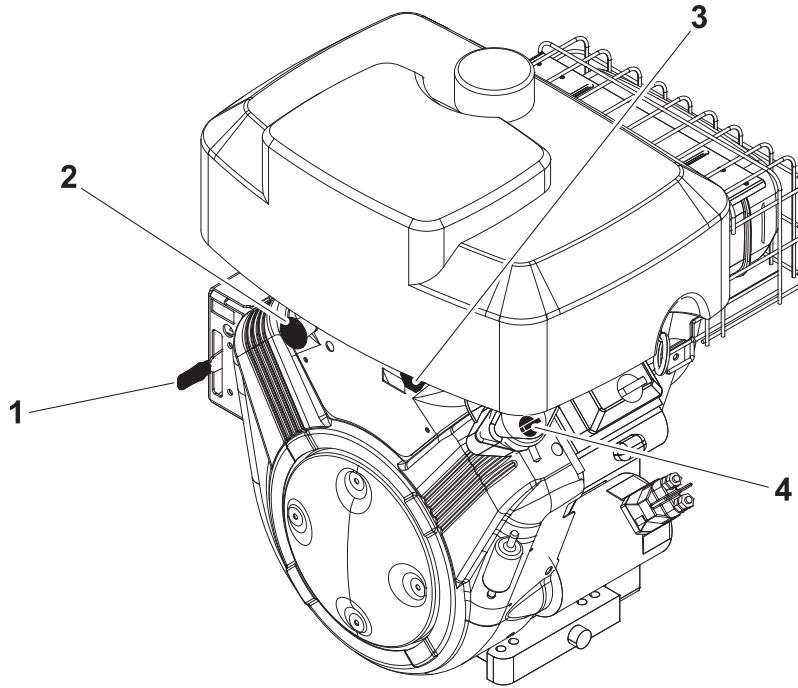
- | | |
|------------------------|--------------------|
| 1. Fuel shut-off valve | 4. Starter grip |
| 2. Choke control | 5. Ignition switch |
| 3. Throttle control | |

Item	Description	Notes
1. Fuel shut-off valve  <p>c00ic561c.eps</p>	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: <ul style="list-style-type: none"> • to transport unit to or from jobsite • to park unit • if machine tips over



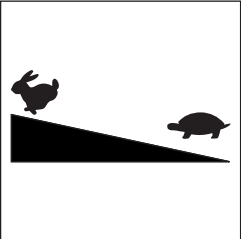
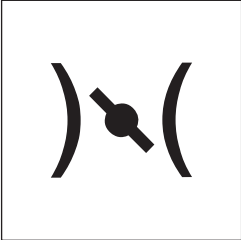
Item	Description	Notes
<p>2. Choke control</p>  <p>c00ic557p.eps</p>	<p>To close choke control, move lever to the left.</p> <p>To open choke control, move lever to the right.</p>	<p>Close choke control to help start a cold engine.</p> <p>Wait until engine warms to gradually open choke control.</p>
<p>3.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

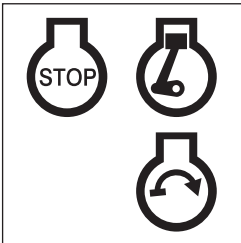
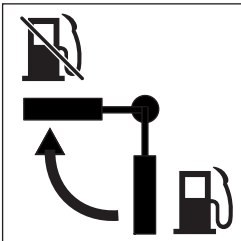
C16x Engine Controls



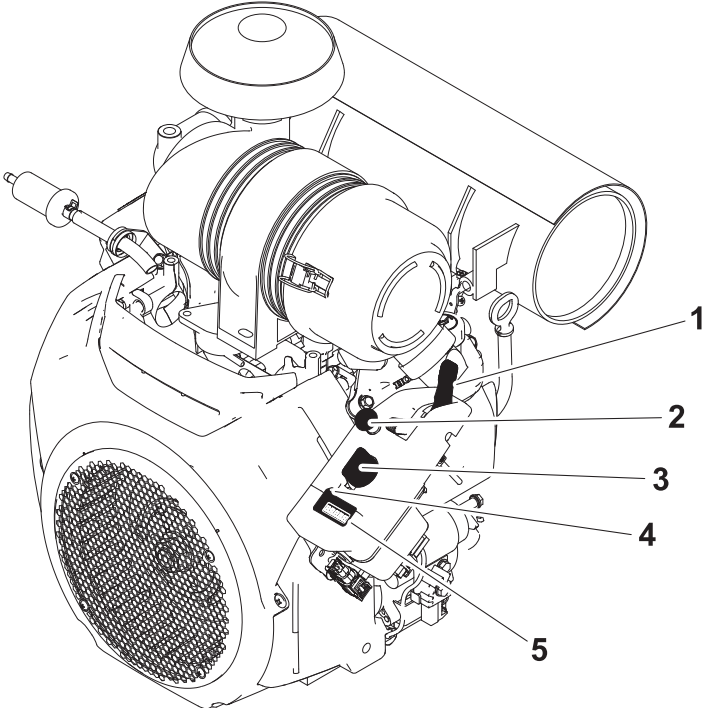
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- | | |
|---------------------|------------------------|
| 1. Throttle control | 3. Ignition switch |
| 2. Choke control | 4. Fuel shut-off valve |

Item	Description	Notes
<p>1. Throttle control</p>  <p>c00ic571c.eps</p>	<p>To increase engine speed, pull up.</p> <p>To decrease engine speed, push down.</p>	
<p>2. Choke control</p>  <p>c00ic557h.eps</p>	<p>To close choke valve, pull choke control.</p> <p>To open choke valve, push choke control.</p>	<p>Close choke control to help start a cold engine.</p> <p>Wait until engine warms to gradually open choke control.</p>

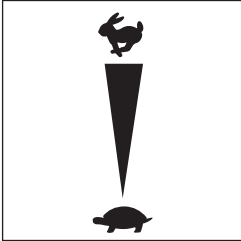
Item	Description	Notes
<p>3. Ignition switch</p>  <p>c00ic065h.eps</p>	<p>To start engine, turn key all the way clockwise. Release key as engine starts.</p> <p>To stop engine, turn key counterclockwise.</p>	
<p>4. Fuel shut-off valve</p>  <p>c00ic561s.eps</p>	<p>To close fuel shut-off valve, move lever clockwise.</p> <p>To open fuel shut-off valve, move lever counterclockwise.</p>	<p>Close valve:</p> <ul style="list-style-type: none"> • to transport unit to or from jobsite • to park unit • if machine tips over

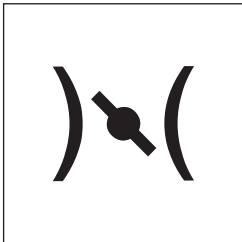
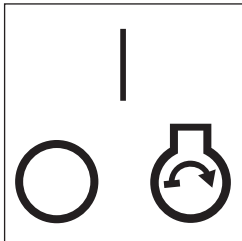
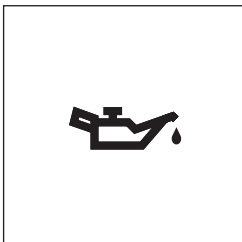
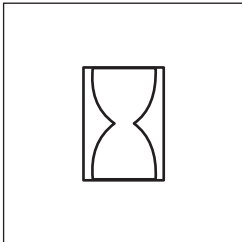
C24x Engine Controls



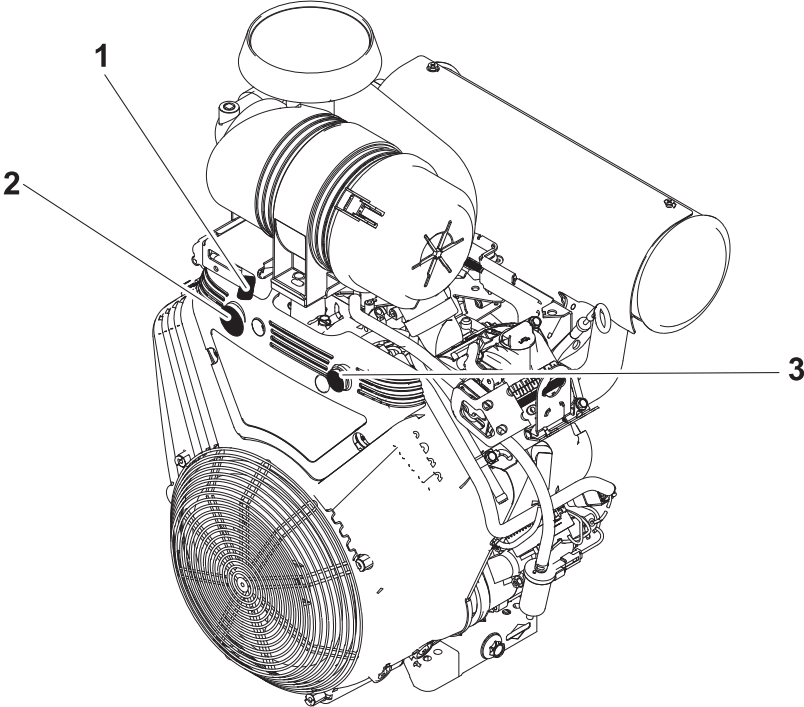
t47om008h.eps

- 1. Throttle control
- 2. Choke control
- 3. Ignition switch
- 4. Oil pressure indicator
- 5. Hourmeter

Item	Description	Notes
<p>1. Throttle control</p>  <p>c00ic571h.eps</p>	<p>To increase engine speed, push lever up.</p> <p>To decrease engine speed, push lever down.</p>	

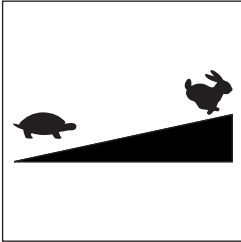
Item	Description	Notes
<p>2. Choke control</p>  <p>c00ic557h.eps</p>	<p>To close choke valve, pull choke control.</p> <p>To open choke valve, push choke control.</p>	<p>Close choke control to help start a cold engine.</p> <p>Wait until engine warms to gradually open choke control.</p>
<p>3. Ignition switch</p>  <p>c00ic587h.eps</p>	<p>To start engine, turn key all the way clockwise. Release key as engine starts.</p> <p>To stop engine, turn key counterclockwise.</p>	
<p>4. Oil pressure indicator</p>  <p>c00ic586h.eps</p>	<p>Lights when oil pressure is too low.</p>	<p>NOTICE: Engine will not start. Check level and add oil as needed.</p>
<p>5. Hourmeter</p>  <p>c00ic585h.eps</p>	<p>Displays number of hours engine has operated.</p>	

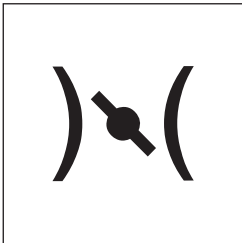
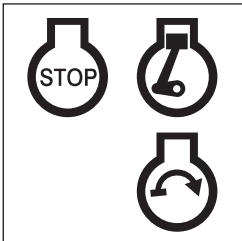
C30x Engine Controls



t47om006h.eps

- 1. Throttle control
- 2. Choke control
- 3. Ignition switch

Item	Description	Notes
<p>1. Throttle control</p>  <p>c00ic571p.eps</p>	<p>To increase engine speed, move lever to the right.</p> <p>To decrease engine speed, move lever to the left.</p>	

Item	Description	Notes
<p>2. Choke control</p>  <p>c00ic557h.eps</p>	<p>To close choke valve, pull choke control.</p> <p>To open choke valve, push choke control.</p>	<p>Close choke control to help start a cold engine.</p> <p>Wait until engine warms to gradually open choke control.</p>
<p>3. Ignition switch</p>  <p>c00ic065h.eps</p>	<p>To start engine, turn key all the way clockwise. Release key as engine starts.</p> <p>To stop engine, turn key counterclockwise.</p>	

Operation Overview

Chapter Contents

Plan 36

Trench 36

Leave Jobsite 36



Plan

1. Gather information about jobsite. See page 38.
2. Inspect jobsite. See page 39.
3. Classify jobsite. See page 40.
4. Select best chain type and tooth pattern for your application. See page 80.
5. Consider optional equipment, if necessary. See page 82.
6. Check supplies and prepare equipment. See page 43.
7. Load unit onto trailer. See page 54.

Trench

1. Unload unit from trailer. See page 57.
2. Leave optional backfill blade, if equipped, in stowed position with digging boom low to ground. See page 83.
3. Start unit. See page 46.
4. Drive to starting point of trench. See page 47.
5. Dig the trench. See page 61.
6. Shut down unit. See page 49.

Leave Jobsite

1. Restore the jobsite. See page 88.
2. Rinse unit and stow tools. See page 88.
3. Load unit onto trailer. See page 54.

Prepare

Chapter Contents

Gather Information 38

- Review Job Plan 38
- Notify One-Call Services 38
- Arrange for Traffic Control 38
- Plan for Emergency Services 38

Inspect Site 39

- Identify Hazards 39

Classify Jobsite 40

- Select a Classification 40
- Apply Precautions 41

Check Supplies and Prepare Equipment 43

- Check Supplies 43
- Prepare Equipment 43
- Assemble Accessories 43



Gather Information

A successful job begins before the bore. 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.)

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



Classify Jobsite



WARNING

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

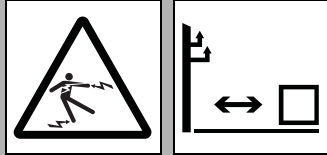
If working. . .	then classify jobsite as . . .
within 10' (3 m) of a buried electric line	electric
within 10' (3 m) of a natural gas line	natural gas
in sand or granite which is capable of producing crystalline silica (quartz) dust	crystalline silica (quartz) dust
within 10' (3 m) of any other hazard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

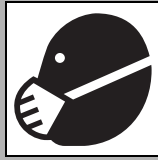


Natural Gas Jobsite Precautions

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**

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

To help avoid injury:

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

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

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

Other Jobsite Precautions

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

Check Supplies and Prepare Equipment

Check Supplies

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

Prepare Equipment

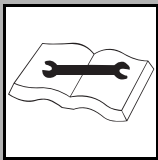
Fluid Levels

- fuel
- hydraulic fluid
- battery charge
- engine oil



Condition and Function

- all controls



⚠ WARNING

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

- digging chain and teeth
- filters (air, oil, hydraulic, and fuel if equipped)
- 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 Unit 46

Drive 47

- General Operation 47
- Safe Slope Operation 48

Shut Down 49



Start Unit

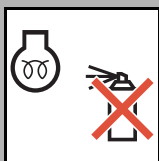
Before operating pedestrian unit, read engine manufacturer's starting and operating instructions.

**WARNING**

Misuse of machine can cause death or serious injury. Read and understand operator's manual and all other safety instructions before use.

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

1. Clear the area around the machine of all bystanders.
2. Ensure all controls are in neutral.
3. If necessary, use choke control to help start cold engine.

**WARNING**

Fire or explosion possible. Do not use starter fluid.

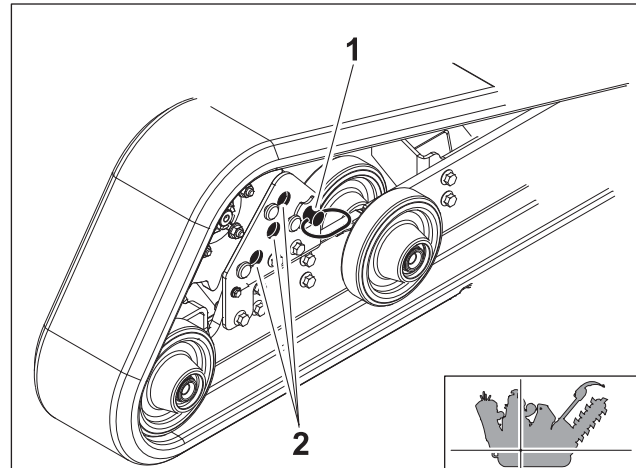
4. Start engine.
 - **C12x:** Turn ignition switch clockwise. Pull starter grip lightly until resistance is felt, then pull briskly to start engine.
 - **C16x/C24x/C30x:** Turn ignition switch clockwise to start engine.
5. Move throttle to 1/4 open.
6. Run engine at half throttle or less for five minutes before operating trencher. During warm-up, ensure all controls function properly.

Drive

EMERGENCY SHUTDOWN: Release all controls and stop engine.

General Operation

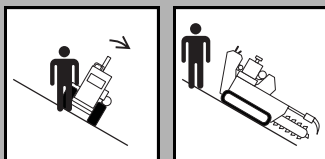
1. Remove parking pin from parking position (2) and insert it in drive position (1).
2. Pull boom control to raise digging boom.
3. Move throttle to 3/4 open.
4. Move speed/direction control in direction of preferred travel. Ground speed increases with control movement.



t47om045h.eps



Safe Slope Operation



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

To help avoid injury:

- Always operate from uphill side of machine.
- Keep digging boom low.
- Drive cautiously at all times.
- Do not drive across slopes.
- Never jerk control levers. Use a steady even motion.
- Do not park unit on a slope without lowering digging attachment to the ground, returning all controls to neutral position, shutting down unit, chocking or blocking tracks, and securing parking pin.



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 shutoff valve, if equipped.

Operating 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 maximum is stated below since it is a design limit. This design limit usually exceeds the operating limit and must never be used alone to establish safe operating angle for variable conditions.

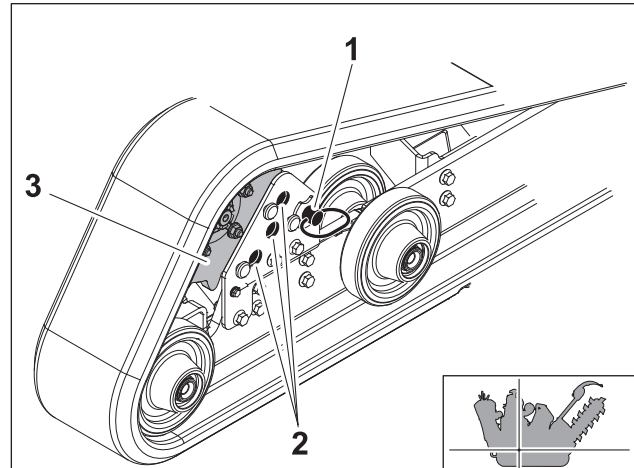
Maximum engine lubrication angle – 20°

Shut Down

1. When job is complete, drive unit to level ground.
2. Release speed/direction controls.
3. Push boom control to lower digging boom, if space allows.
4. Insert parking pin (1) in the correct parking position (2).

IMPORTANT: The stopping position of the gear (3) determines the correct parking position.

5. Run engine at low throttle for three minutes to cool.
6. Turn ignition switch to OFF position.
7. If present, close fuel shut-off valve.
8. If unit is equipped with key, remove key.



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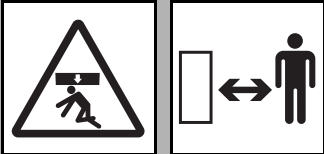
Transport

Chapter Contents

- Lift 52**
 - Points 52
 - Procedure 53
- Haul 54**
 - Load 54
 - Tie down 55
 - Unload 57
- Retrieve 58**



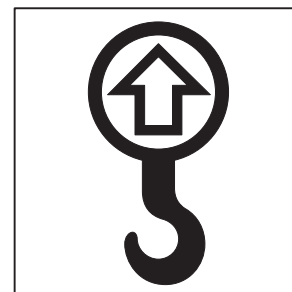
Lift



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

Points

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

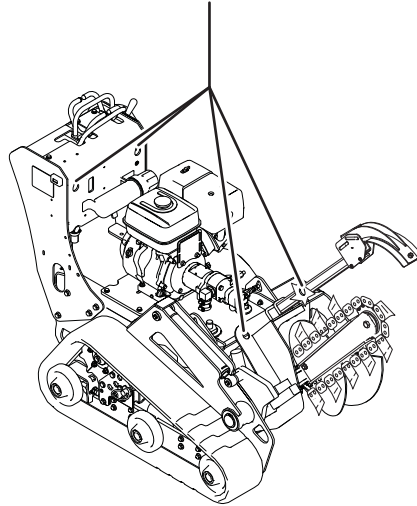


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Procedure

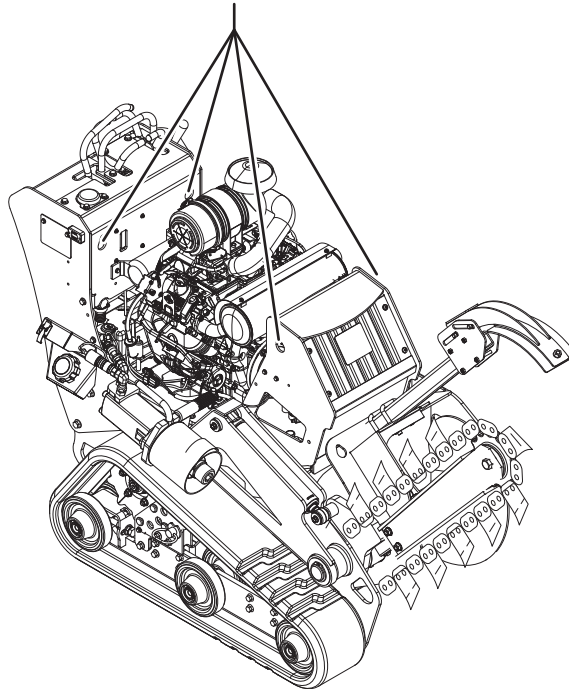
Use a hoist capable of supporting the equipment's size and weight. See "Specifications" on page 119 or measure and weigh equipment before lifting.

C12x



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C16x/C24x/C30x



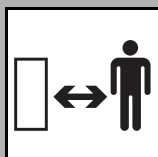
t47om009h.eps



Haul

Load

IMPORTANT: Use Ditch Witch® S2B trailer for transport. If using a different trailer, follow trailer manufacturer's transport guidelines.



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

To help avoid injury:

- Load and unload trailer on level ground.
- Incorrect loading can cause trailer swaying.
- Attach trailer to vehicle before loading or unloading.
- To help prevent trailer sway, load trailer so that ten to fifteen percent of total vehicle weight (equipment plus trailer) is on tongue.
- If loading onto tilt-bed trailer, be prepared for trailer to tilt.
- Move all controls to neutral position when stopped.

1. If equipped, put backfill blade in stowed position. See "Backfill Blade" on page 83..
2. Remove parking pin from parking position.
3. Start engine. "Start Unit" on page 46
4. Pull boom control to raise digging boom slightly.
5. Move machine to rear of trailer and align tracks with ramps and machine with center of trailer bed.

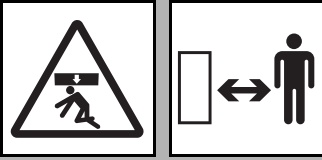
IMPORTANT: Boom should be facing ramps.

6. Set engine to low throttle.
7. Move speed/direction control slowly and push to appropriate speed.
8. Drive unit onto trailer, digging boom first, until tiedown position is reached.

NOTICE: If loading onto tilt-bed trailer, be prepared for trailer to tilt. Load trencher as far to the front of trailer as possible.

9. Push boom control to lower digging boom, if space allows.
10. Insert parking pin in parking position and shut down unit. See "Shut Down" on page 49.

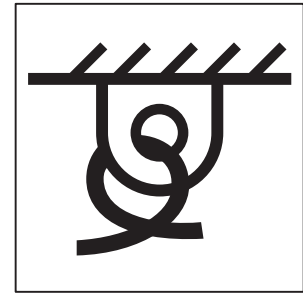
Tie Down



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

Points

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

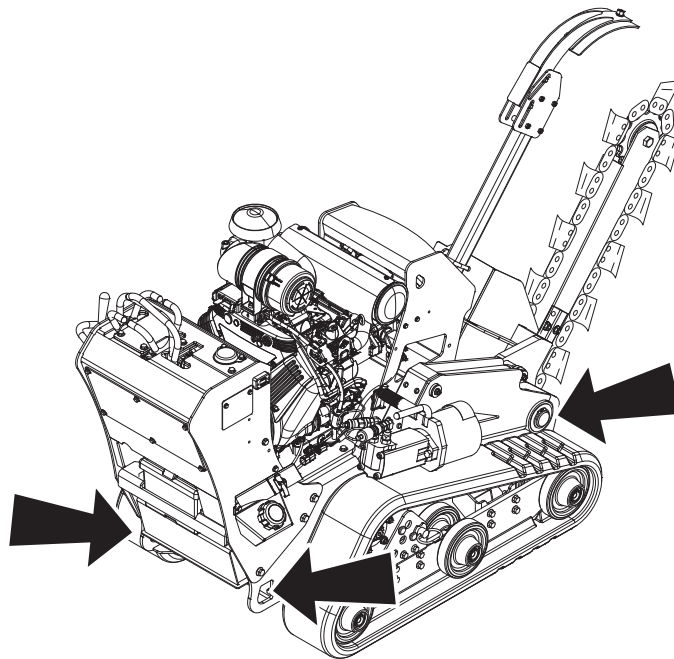


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Procedure

Without Tie-Down Kit

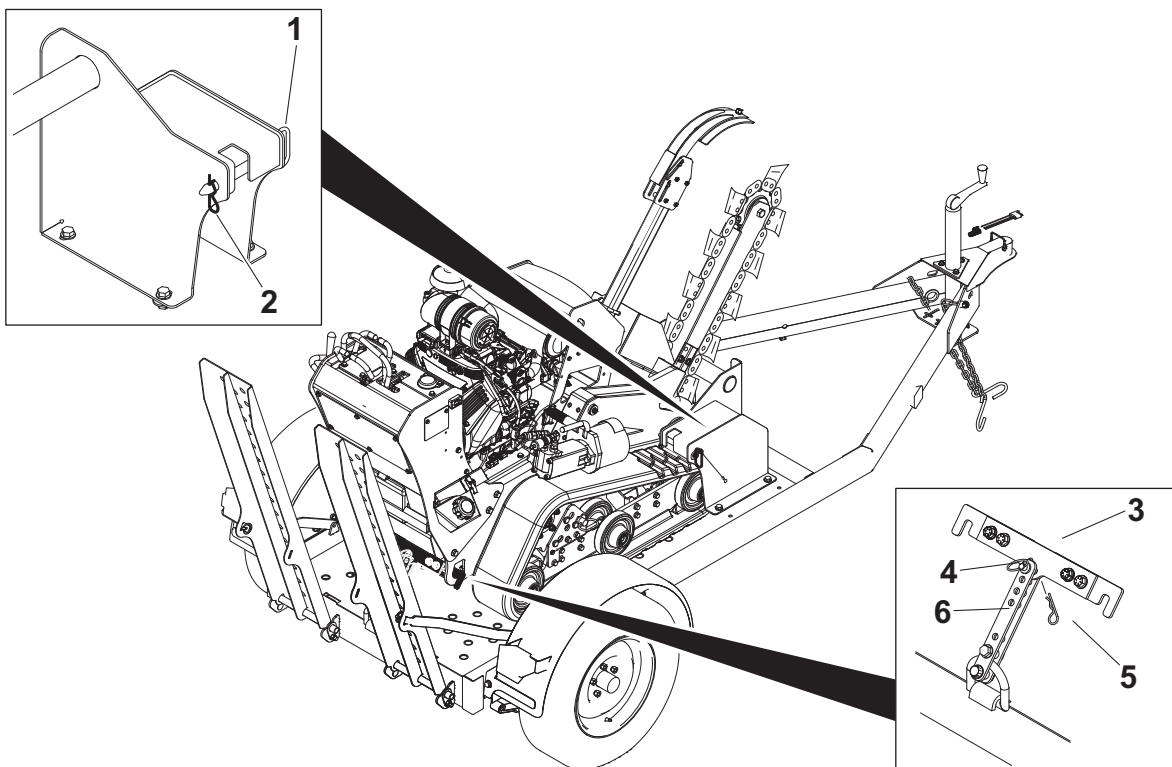
Loop tiedowns around unit at tiedown points. Ensure tiedowns are tight before transporting.



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With Tie-Down Kit on S2B Trailer



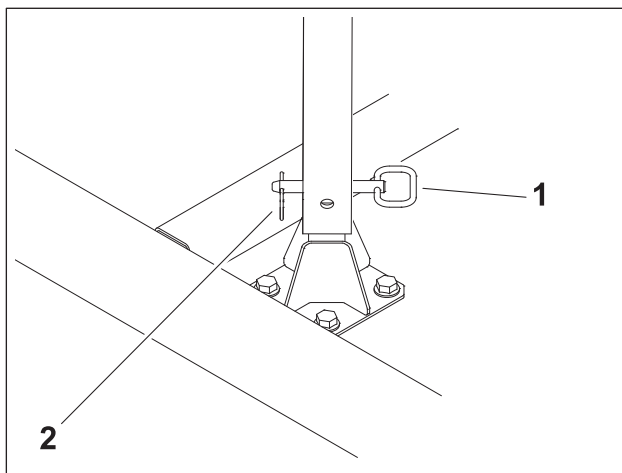
t47om039h.eps

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

Backfill Blade on S2B Trailer

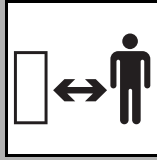
If installed, secure backfill blade on S2B trailer mounting tube with pull pin (1) and hair clip pin (2).

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



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Unload



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

To help avoid injury:

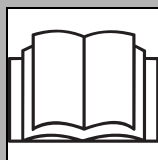
- Unload unit with engine in low idle and boom as low as possible.
- Unload trailer on level ground.
- Attach trailer to vehicle before loading or unloading.
- If trailer tilts, ensure that tilt latch is secured in the correct position.
- Clear the area around the machine of all bystanders.

1. Lower trailer or ramps.
2. Remove tiedowns.
3. If present, open fuel shut-off valve.
4. Remove parking pin from parking position.
5. Start engine. See "Start Unit" on page 46.
6. Set to low throttle.
7. Pull boom control to raise digging boom slightly.
8. Slowly back unit down trailer or ramps.

NOTICE: If unloading from tilt-bed trailer, be prepared for trailer to tilt.



Retrieve

**WARNING**

Misuse of machine can cause death or serious injury.
Read and understand operator's manual and all other safety instructions before use.

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

- tow for no more than 200 yd (180 m) at less than 1 mph (1.6 km/h),
- use towing chains appropriately rated for maximum towing force,
- attach tow line to all available tie-down points facing towing vehicle,
- steering will be difficult.

Trench



Chapter Contents

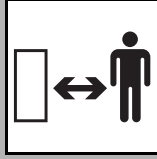
Set Up. 60

Operate 61

Finish Job 63

Set Up

EMERGENCY SHUTDOWN: Release all controls and stop engine.

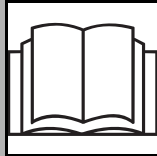


WARNING Crushing weight. If load falls or moves it could kill or crush you. Use proper procedures and equipment or stay away.



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

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

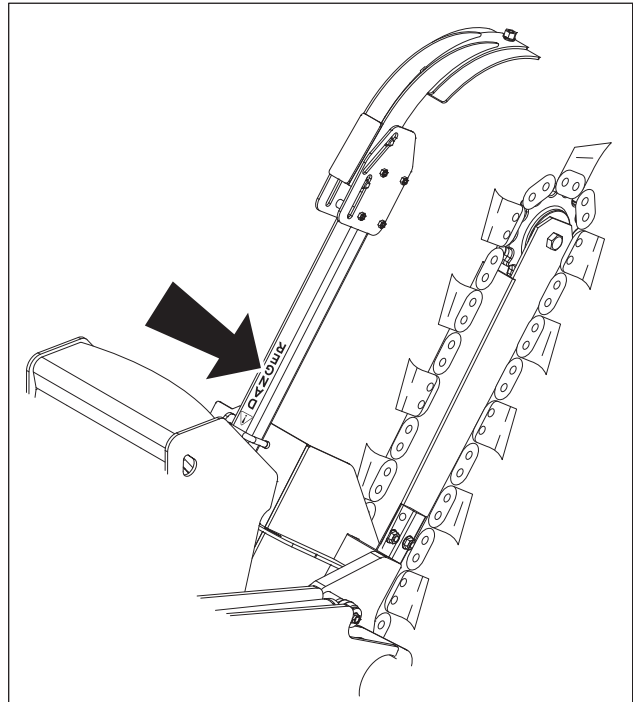


WARNING Misuse of machine can cause death or serious injury. Read and understand operator's manual and all other safety instructions before use.

1. Ensure engine is off.
2. Ensure restraint bar is installed correctly:
 - The word "Danger" must be facing up, as shown.
 - Restraint bar must be in correct position. See "Check Restraint Bar Position" on page 103.

IMPORTANT: Trench cleaner shown installed on restraint bar is optional.

3. If equipped, remove backfill blade. See "Backfill Blade" on page 83.
4. Install correct counterweight configuration. See "Counterweighting" on page 84.
5. Start unit. See "Start Unit" on page 46.
6. Drive to starting point. Move in line with planned trench. See page 47 for driving procedures.



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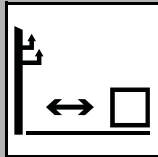
Operate



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

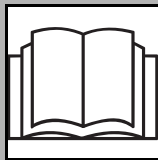
To help avoid injury:

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



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

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




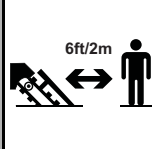
WARNING Misuse of machine can cause death or serious injury. Read and understand operator's manual and all other safety instructions before use.



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

1. Move throttle to 1/2 open.
2. Push boom control to lower digging boom to just above ground.

3. Move digging chain control to dig position. DIGGING CHAIN WILL MOVE.

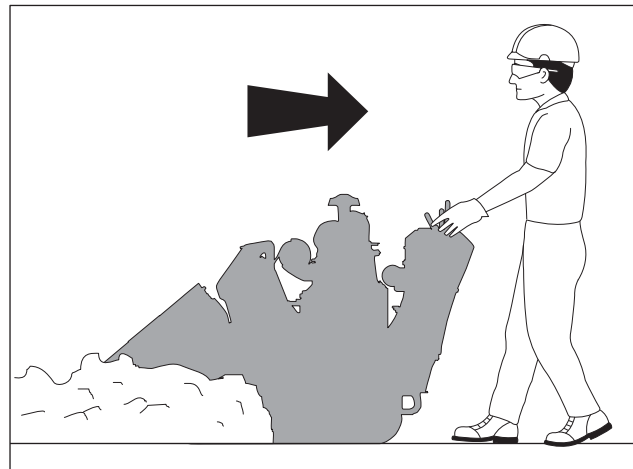
⚠ DANGER Moving digging teeth will cause death or serious injury. Stay away.

To help avoid injury:

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

4. Set throttle to full engine speed.
5. Slowly lower digging boom to desired trench depth.
6. If using trench cleaner,
 - Move backward about 1' (30 cm), or until there is enough room for trench cleaner to enter trench.
 - Return control to neutral to stop forward movement.
 - Raise boom slightly, then fully lower trench cleaner to lock it into place.
 - Lower boom to desired trench depth.
7. Slowly move speed/direction control to desired speed. Always start trenching with speed set at low. Increase ground drive speed only as soil conditions permit.

IMPORTANT: Trenching movement is toward you.



t47om011h.eps

8. Operate engine at full throttle when working.

NOTICE:

- Do not make sharp turns. Lower boom to full depth when turning.
- If an object becomes lodged in chain, release speed/direction controls, move digging chain control to neutral, and raise boom slightly. Reverse chain direction. If an object must be removed manually, turn engine off and insert parking pin.



Finish Job

1. When trench is complete, release speed/direction controls.
2. Move throttle to 1/2 open.
3. Raise boom.
4. Release digging chain control.
5. Raise trench cleaner, if equipped.
6. Install backfill blade and backfill, if desired.
7. Drive a short distance away from work site. See page 47 for driving procedures.
8. Shut down machine. See "Shut Down" page 47.
9. Stow trench cleaner, if needed.

Drill



Chapter Contents

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 - Disassemble Drill String77
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Set Up

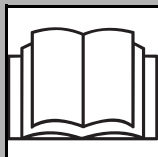
EMERGENCY SHUTDOWN: Release all controls and stop engine.



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

To help avoid injury:

- Comply with all utility notification regulations before digging or drilling.
- Set up warning barriers and keep people away from machine and jobsite.
- Do not operate drilling attachment if bore path is less than 10' (3 m) from any underground hazard.



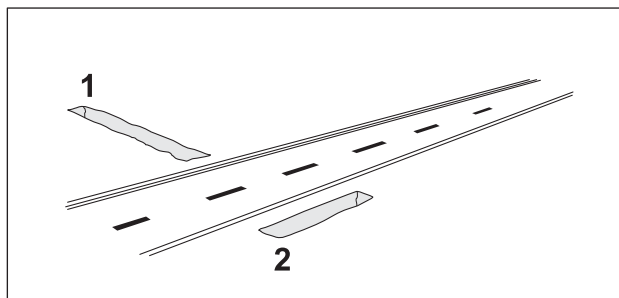
WARNING Misuse of machine can cause death or serious injury. Read and understand operator's manual and all other safety instructions before use.

Dig Approach Trench

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

IMPORTANT: Ensure that approach trench is:

- deep enough for pipe to lay flat and enter soil at correct angle,
- at least 20' (6 m) long, and
- at least 4" (10 cm) wide.



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Dig Target Trench

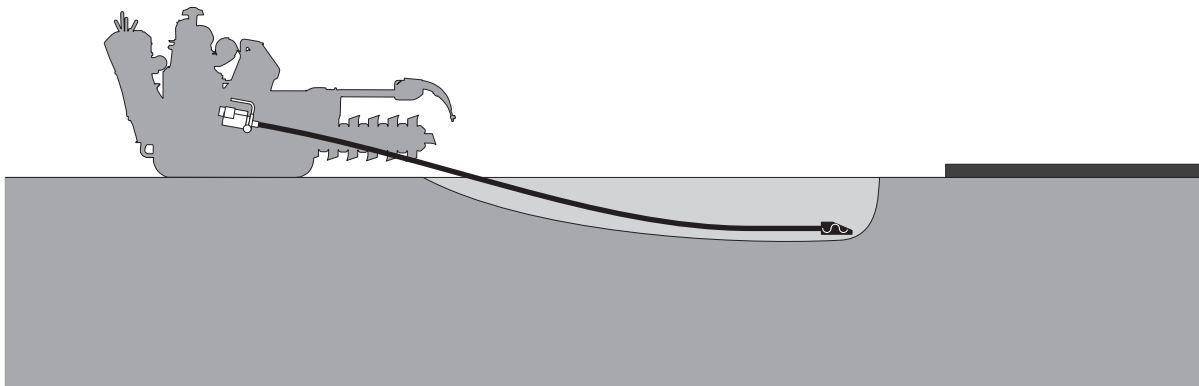
1. Select a completion point for the bore.
2. Dig a target trench (2) **across** the intended completion point.

IMPORTANT: Ensure that target trench is:

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



Install Drill String



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

NOTICE: Incorrect installation can cause rod sections to bend.

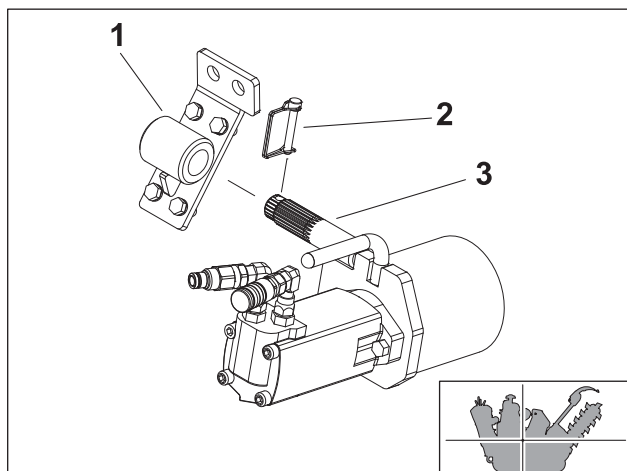
- Ensure more than half of drill string length is inside trench.
- If necessary, remove rod sections or increase length of trench.

4. Start engine and set to low throttle. See "Start Unit" on page 46.
5. Lower boom in parallel position to ground.
6. Move machine toward approach trench. See "Drive" on page 47.
7. Shut down engine. See "Shut Down" on page 49.

Install Drilling Attachment

The operating position of the Roto Witch® drilling attachment is on the right side of the machine.

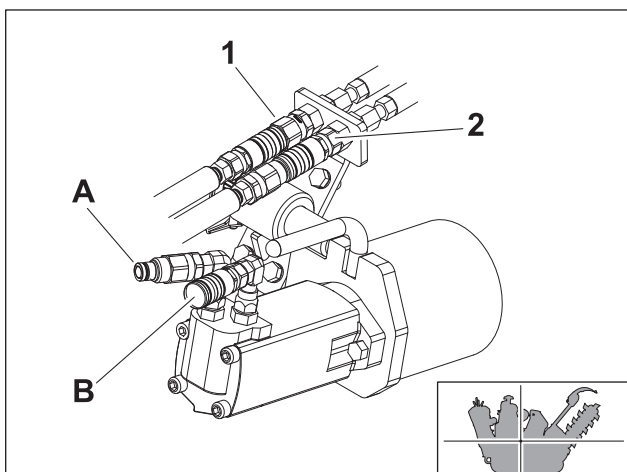
1. Ensure engine is shut down.
2. Remove attachment from storage position. For storage position, see "Remove Drilling Attachment" on page 77.
3. Fully insert mount pin (3) in cylinder of attachment plate (1), aligning drilling attachment with drill string.
4. Secure the assembly with pin (2).
5. Use slip latch to attach drill string to drilling attachment.



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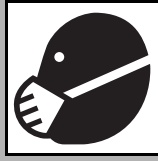
Connect Hydraulic Lines

1. Remove dust covers from connectors (A) and (B).
2. Disconnect hydraulic connector (1) and connect with connector (A).
3. Disconnect hydraulic connector (2) and connect with connector (B).



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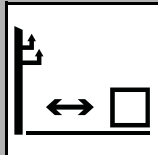
Operate



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

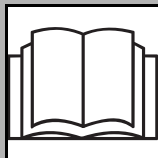
To help avoid injury:

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



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

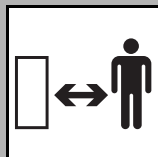
To help avoid injury: Expose lines by hand before digging. Cutting high voltage cable can cause electrocution.



WARNING Misuse of machine can cause death or serious injury. Read and understand operator's manual and all other safety instructions before use.



Drill



Rotating shaft will kill or seriously injure. Stay away.

To help avoid injury:

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

1. If necessary, have helper use drill string guide to align drill string as it enters the soil. See "Start Bore with Drill String Guide" on page 71.
2. Start engine and set to low throttle. See "Start Unit" on page 46.
3. Operate drilling attachment controls to start clockwise rotation.
4. Slowly move machine forward while maintaining rotation. See "Drive" on page 47.
 - When length of bore is more than 5' (1.5 m), you may carefully and slowly increase speed.
 - Always use lowest speed necessary.
5. Carefully monitor progress of bore:
 - If rod section starts to bow, stop forward movement of machine and back machine slightly until rod straightens.
 - If drill string becomes blocked, rotate drill string counterclockwise to back up slightly.

NOTICE: Incorrect drilling will damage drilling equipment.

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

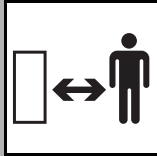
6. When drill bit enters target trench, stop rotation immediately.

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

- See "Backream" on page 73.
- See "Install Product" on page 74.

Start Bore with Drill String Guide

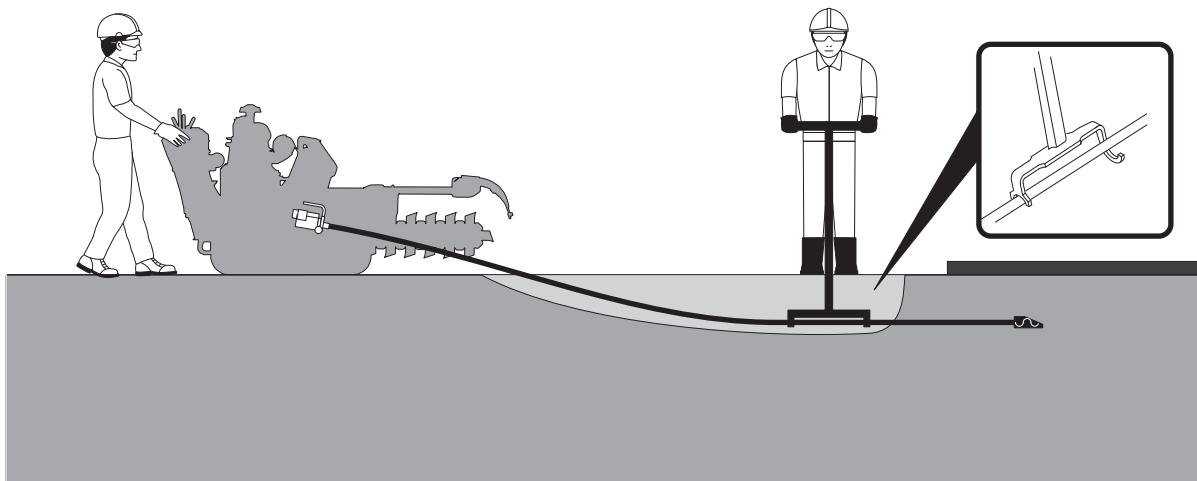
If necessary, have helper to follow the instructions below to operate the drill string guide at start of bore.



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

To help avoid injury:

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




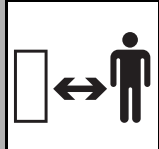
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1. Stand on **left** side of approach trench.
2. Put drill string guide in correct position:
 - at least 3' (1 m) behind drill bit
 - hook side toward bore
 - cradle side toward machine
3. When drill string guide is in correct position, signal machine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



Add Rod

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

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


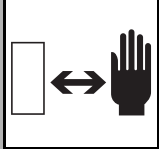
To help avoid injury: Only access drilling attachment with hands when engine is shut down.

Disconnect Drill String from Drilling Attachment

1. Stop rotation of drilling attachment.
2. Operate ground drive controls to move machine in reverse 6" (15 cm) to loosen drill string in ground.
3. Shut down engine. See "Shut Down" on page 49.
4. Disconnect drill string from drilling attachment with applicable special tool (p/n 351-272). See "Disassemble Drill String" on page 77.
5. Start engine. See "Start Unit" on page 46.
6. Operate ground drive controls to move unit in reverse 1' (30 cm), about the length of a rod section.

Add Rod Section

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

⚠ WARNING Pinch point. Crushing will cause serious injury.

To help avoid injury:

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

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

Backream

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

NOTICE: Incorrect use may damage components and increase wear.

- Do not try to increase hole size too much in one pass. Make several passes using successively larger reamers.
- Keep drill string straight and aligned with drilling attachment. Sharp bends can cause rod failure.
- Never have more than 30' (9 m) of exposed rod outside the bore. Remove rods as necessary. See "Remove Rod" on page 75.



Single pass

1. Shut down engine. See "Shut Down" on page 49.
2. Remove drill bit and install appropriate reamer.
3. Start engine and begin clockwise rotation. See "Start Unit" on page 46.

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

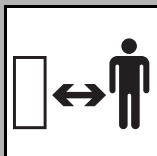
4. Slowly drive in reverse while maintaining rotation. See "Drive" on page 47. When reamer exits the approach trench, stop rotation immediately.

Multiple passes

1. Repeat steps 1-5.
2. Install drill bit.
3. Push drill string through bore. Do not rotate.
4. At final pass, install product. See "Install Product" on page 74.

Install Product

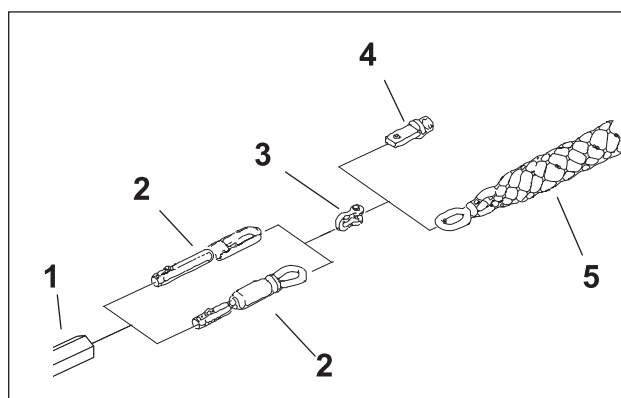
To install product, pull it through the bore after drilling or at final pass of backreaming.



⚠ DANGER Rotating shaft will cause death or seriously injure. Stay away.

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

1. Remove drill bit and attach appropriate swivel (2) to drill string (1) or reamer. Ensure swivel functions correctly.
2. Use shackle (3) to attach pipe pulling adapter (4) or pulling grip (5) to swivel.
3. Attach material to pipe pulling adapter or pulling grip.
4. Set engine to low throttle.
5. Slowly drive in reverse. See "Drive" on page 47.



RW_PullingTools.eps

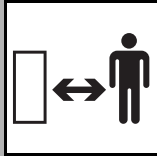
IMPORTANT:

- If bore becomes blocked begin counterclockwise rotation.
- If length of rod outside the bore reaches 30' (9 m), remove rod section. See "Remove Rod" on page 75.

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

Remove Rod

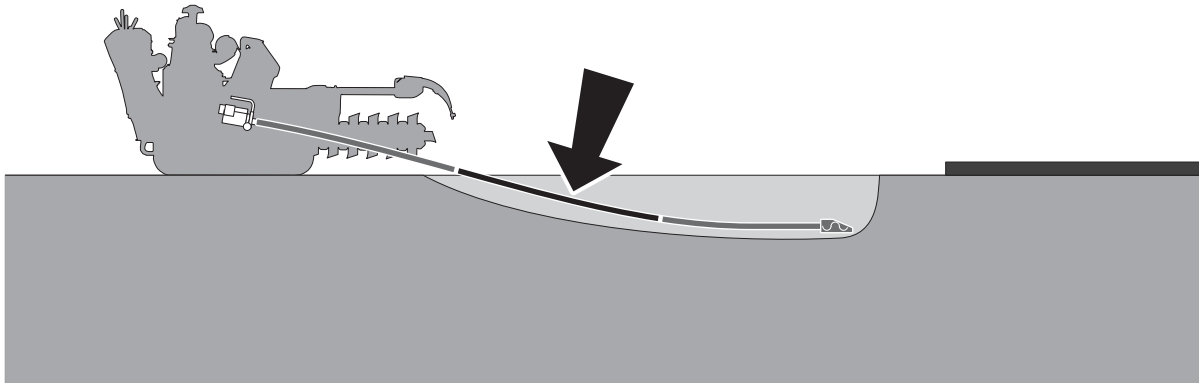
If the length of rod outside the bore reaches 30' (9 m), ask a helper to remove rod sections as needed.



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

To help avoid injury:

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



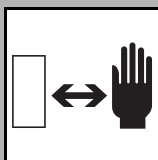
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Remove Rod Section

1. Stop rotation of drilling attachment.
2. Shut down engine. See "Shut Down" on page 49.
3. Disconnect and remove appropriate rod section with special tool (p/n 351-272). See "Disassemble Drill String" on page 77.

Reconnect Drill String

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



WARNING Pinch point. Crushing will cause serious injury.

To help avoid injury:

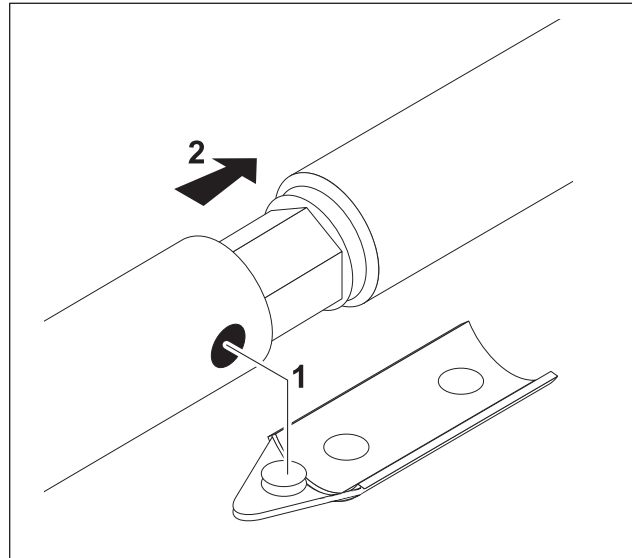
- Keep hands at least 6" (15 cm) from ends of rod section and drill string.
- Support rods from underneath with open palms. Do not grip rods.

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

Finish Job

Disassemble Drill String

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

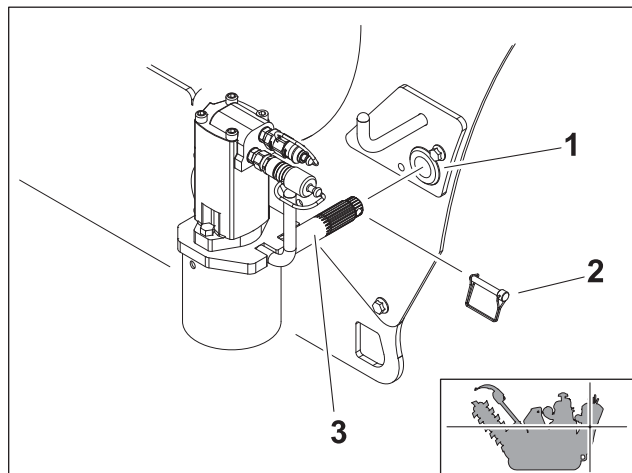


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Remove Drilling Attachment

When not in use, install the Roto Witch[®] drilling attachment in storage position on left side of console.

1. Ensure engine is shut down.
2. Disconnect hydraulic lines.
3. Install dust covers on hydraulic connectors of drilling attachment.
4. Insert mount pin (3) in bore of console (1).
5. Secure the assembly with pin (2).



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Systems and Equipment

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- Chain and Tooth Maintenance80
- Chain Types80
- Chain Selection81

Optional Equipment 82

- Backfill blade83
- Drilling Attachment83

Counterweighting 84



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. See "Counterweighting" on page 84.

Equipment	Description
booms	provide depth options of 18" (457mm), 24" (610 mm), 30" (760 mm), 36" (915 mm) or 48" (1220 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
drilling attachment	drill under sidewalks and driveways
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

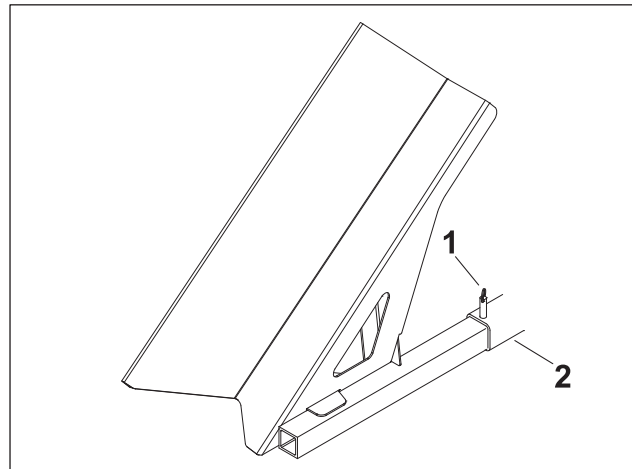
Backfill Blade

The optional backfill blade can be used to return spoils to the trench.

Stowed position

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

1. Shut down engine. See "Shut Down" on page 49.
2. Insert backfill blade in upright position onto mounting stub (2).
3. Secure with pin (1).



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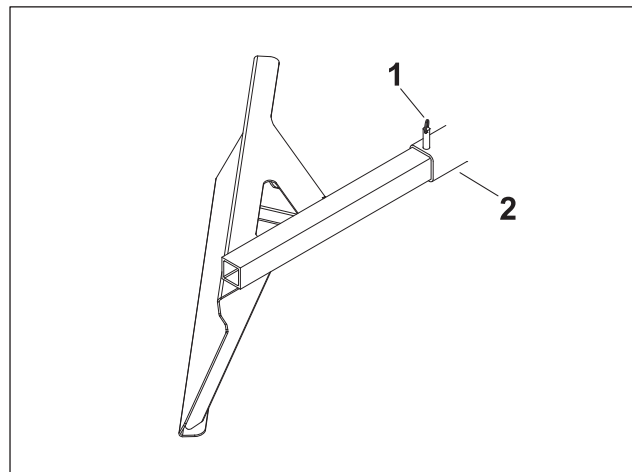


NOTICE: Completely remove backfill blade for trenching.

Work position

Install the backfill blade in work position for backfilling only.

1. Shut down engine. See "Shut Down" on page 49.
2. Insert backfill blade in work position onto mounting stub (2).
3. Secure with pin (1).



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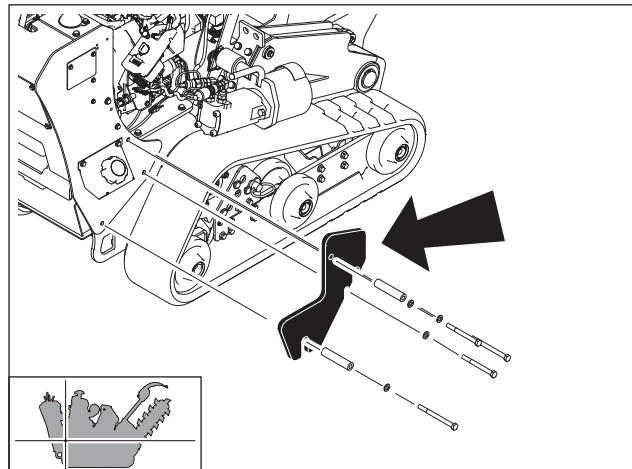
Drilling Attachment

The optional Roto Witch[®] drilling attachment can be used to drill under obstructions such as sidewalks and driveways. For operational information, see "Drill" on page 65.

Counterweighting

Use counterweight charts to determine the correct number of counterweights. Install appropriate counterweight configuration on console as shown.

IMPORTANT: Do not add more counterweights than indicated.



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C12x

No counterweights are needed for the C12x.

C16x and C24x

Tool type	Boom length	Tooth type	Number of counterweights
19K Chain	18 in	Duratooth [®] Cup	0
		Duratooth [®] Combos (Shark [®] /Alligator)	0
	24 in	Duratooth [®]	0
		Duratooth [®] Combos (Shark [®] /Alligator)	0
	30 in	Duratooth [®]	0
		Duratooth [®] Combos (Shark [®] /Alligator)	0
	36 in	Duratooth [®]	0
		Duratooth [®] Combos (Shark [®] /Alligator)	0
35K Chain	24 in	Duratooth [®] Cup	0
		Duratooth [®] Combos (Shark [®] /Alligator)	0
		Shark [®] II	0
	30 in	Duratooth [®] Cup	0
		Duratooth [®] Combos (Shark [®] /Alligator)	0
		Shark [®] II	0
	36 in	Duratooth [®] Cup	0
		Duratooth [®] Combos (Shark [®] /Alligator)	0
		Shark [®] II (4 and 6" width)	8 (4 left, 4 right)
Drilling attachment	-	-	0



C30x

Tool type	Boom length	Tooth type	Number of counterweights
19K Chain	18 in	Duratooth [®] Cup	0
		Duratooth [®] Combos (Shark [®] /Alligator)	0
	24 in	Duratooth [®]	0
		Duratooth [®] Combos (Shark [®] /Alligator)	0
	30 in	Duratooth [®]	0
		Duratooth [®] Combos (Shark [®] /Alligator)	0
	36 in	Duratooth [®]	0
		Duratooth [®] Combos (Shark [®] /Alligator)	0
35K Chain	24 in	Duratooth [®] Cup	0
		Duratooth [®] Combos (Shark [®] /Alligator)	0
		Shark [®] II	0
	30 in	Duratooth [®] Cup	0
		Duratooth [®] Combos (Shark [®] /Alligator)	0
		Shark [®] II	0
	36 in	Duratooth [®] Cup	0
		Duratooth [®] Combos (Shark [®] /Alligator)	0
		Shark [®] II (4 and 6" width)	8 (4 left, 4 right)
	48 in	Duratooth [®] Cup	9 (4 left, 5 right)
		Duratooth [®] Combos (Shark [®] /Alligator)	9 (4 left, 5 right)
		Shark [®] II (4 and 6" width)	12 (6 left, 6 right)
Drilling attachment	-	-	0

Complete the Job

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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 83.

Rinse Equipment

Spray water onto equipment to remove dirt and mud.

NOTICE:

- Do not spray water onto operator's console. Electrical components could be damaged. Wipe down instead.
- Ensure all mud and debris are rinsed from tracks before parking overnight.

Stow Tools

Ensure all bits, pullback devices, and other tools are loaded and properly secured on trailer.

Service

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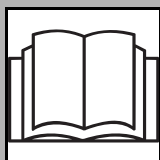
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Precautions

**WARNING**

Misuse of machine can cause death or serious injury. Read and understand operator's manual and all other safety instructions before use.

To help avoid injury:

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

Washing Precaution

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

Recommended Lubricants/Service Key

Item	Description		
 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® PowerTran Fluid, Mobilfluid® 423, Chevron® Tractor Hydraulic Fluid, Texaco® TDH Oil, or equivalent		
	Check level of fluid or lubricant		
	Filter		Check condition
	Adjust, service or test		Change or replace



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 119.

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

IMPORTANT: Use the “Service Record” on page 137 to record all required service to your machine.

Approved fuel

NOTICE: Incorrect fuel will damage the engine. Only use approved fuel.

This engine is designed to run on unleaded gasoline. Use only high quality fuel meeting ASTM D4814, EN228, or equivalent. Ethanol blends up to 10% (E10) are approved for use in this unit.

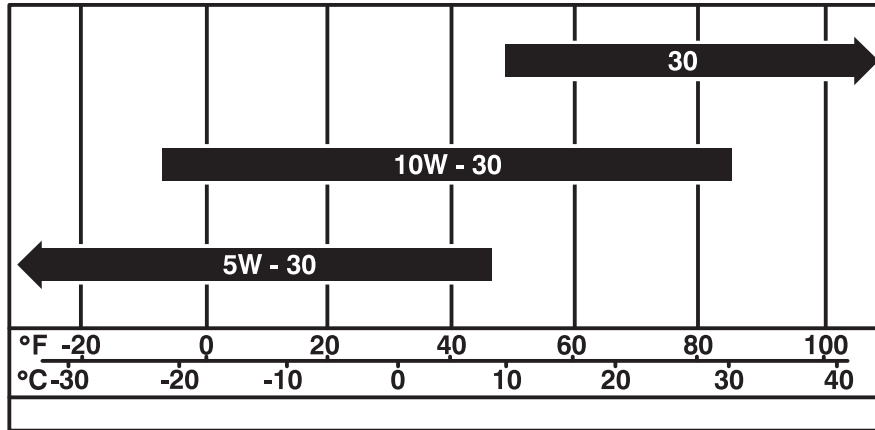
Minimum octane rating:

- 87 pump octane number [(R+M)/2]
- 91 research octane number (RON)

At altitudes above 5000' (1524 m) lower octane fuels may be acceptable. Carburetors may also require adjustment. Consult engine operator's manual, Ditch Witch dealer, or authorized engine servicing dealer for more information.

Engine Oil Temperature Chart

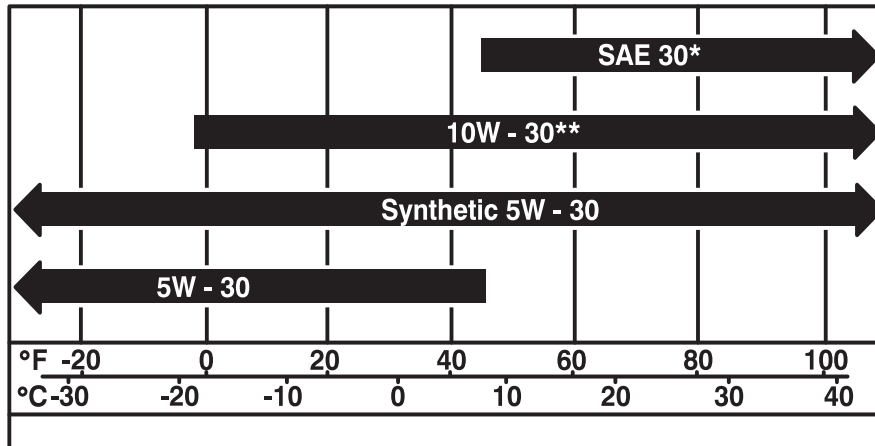
C12x Honda GX390®



Temperature range anticipated before next oil change

t27om060h.eps

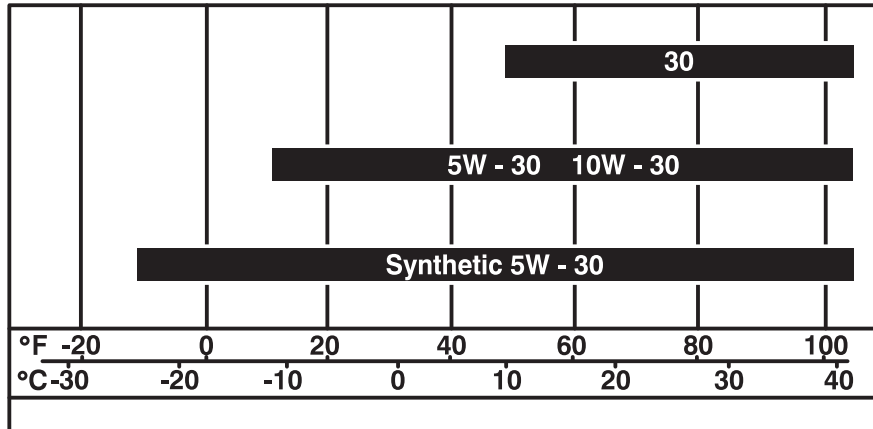
C16x and C30x Briggs & Stratton®



Temperature range anticipated before next oil change

t27om036h.eps

C24x Honda GX690[®]



t27om054h.eps

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 10W/30 may cause increased oil consumption. Check oil level more frequently.



Each Use

Location	Task	Notes
ENGINE	Check starter rope and starter grip	C12x
	Check engine oil level	GEO
	Check air filter elements	
	Clean dust ejector valve	C24x, C30x
TRENCHER	Check hydraulic fluid level and reservoir cap	THF
	Check hydraulic fluid cooler	
	Check hydraulic hoses	
	Check track lug nuts	65 ft•lb (88 N•m)
	Check parking pin	

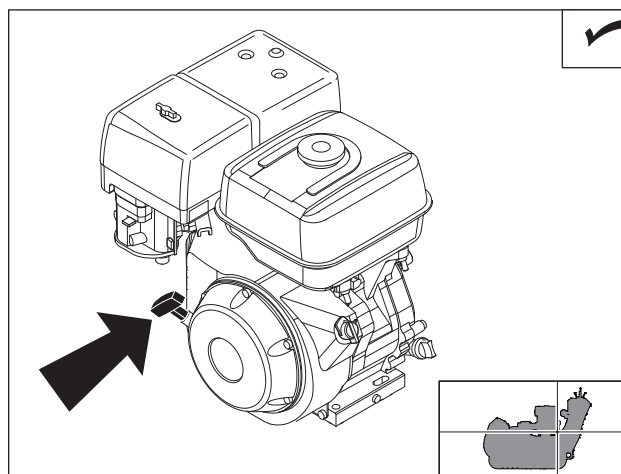
Engine

Check Starter Rope and Starter Grip

C12x

Check starter rope and starter grip for wear or damage before each use.

NOTICE: Do not start unit if worn or damaged. Contact your Ditch Witch® dealer for replacement parts.



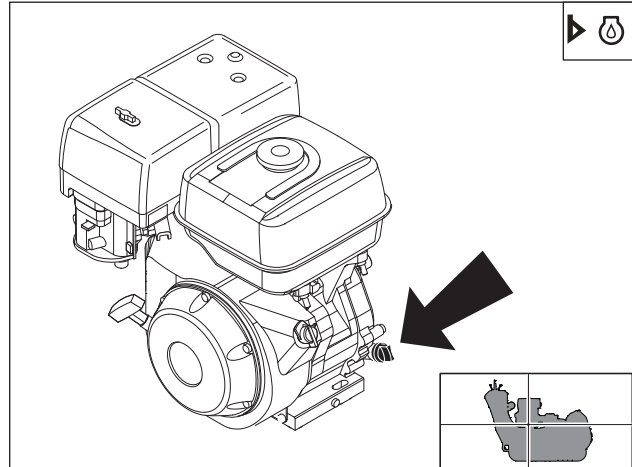
t57om004w.eps

Check Engine Oil Level

IMPORTANT: "Recommended Lubricants/Service Key" on page 91

C12x

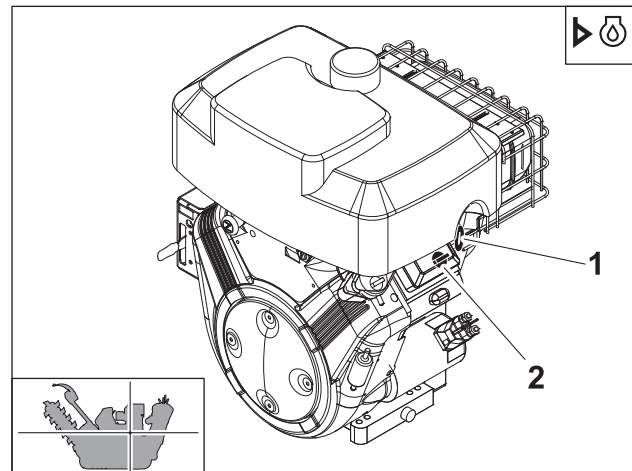
Check engine oil at dipstick (shown) before each use. Add GEO at fill as necessary to keep oil level at highest line on dipstick.



t57om006w.eps

C16x

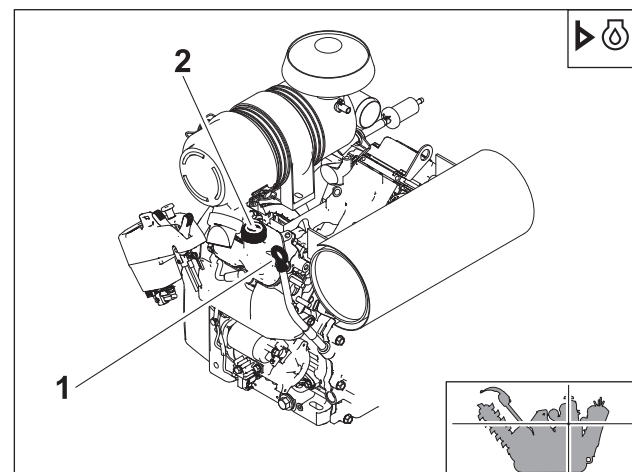
Check engine oil at dipstick (1) before each use. Add GEO at fill (2) as necessary to keep oil level at highest line on dipstick.



t47om015h.eps

C24x

Check engine oil at dipstick (1) before each use. Add GEO at fill (2) as necessary to keep oil level at highest line on dipstick.

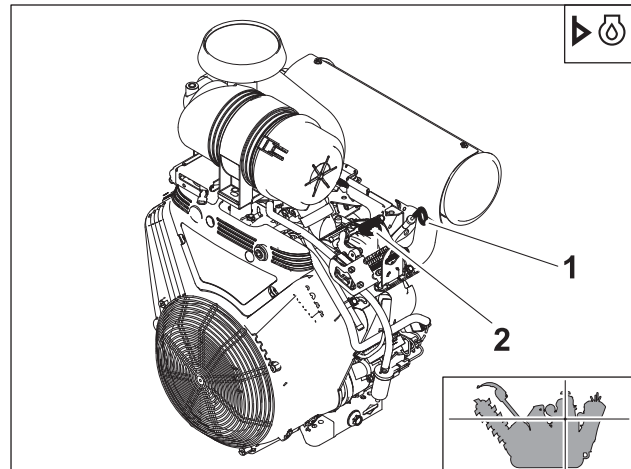


t47om016h.eps



C30x

Check engine oil at dipstick (1) before each use. Add GEO at fill (2) as necessary to keep oil level at highest line on dipstick.



t47om017h.eps

Check Air Filter

NOTICE: Change the elements. Do not attempt to clean them.

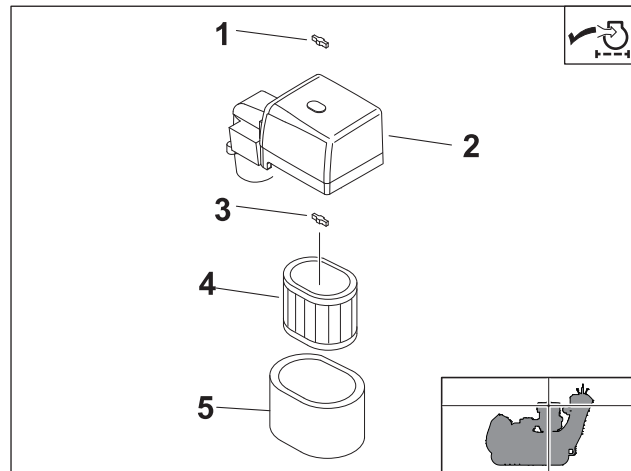
- Compressed air or water may damage filter elements.
- Tapping filter elements to loosen dirt may damage the elements.

C12x

Check air filter elements before each use.

To check:

1. Remove wing nut (1) to remove air filter cover (2).
2. Remove wing nut (3) to remove primary (4) and secondary (2) filter elements.
3. Wipe inside of housing and wash cover.
4. Inspect elements. Replace if needed.
5. Insert secondary element and ensure it is seated correctly.
6. Insert primary element.
7. Replace wing nut.
8. Replace cover and secure with wing nut. If cover does not fit, element is not properly locked into housing. Remove cover and primary element and repeat step 6.



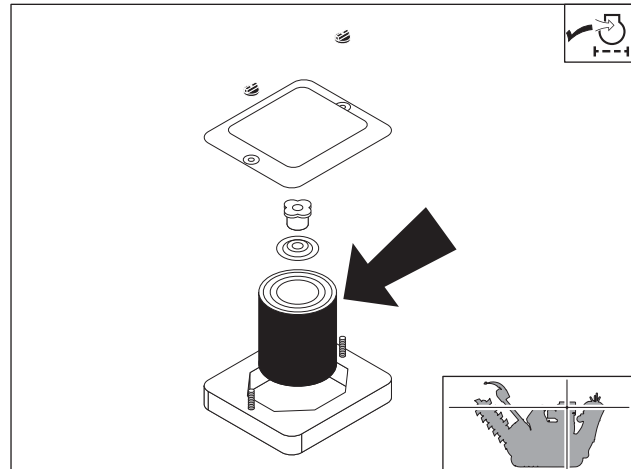
t57om010w.eps

C16x

Check air filter element before each use.

To check:

1. Remove wing nuts to remove cover.
2. Wipe housing and wash cover.
3. Inspect element (shown). Replace if needed.
4. Insert element and ensure it is seated correctly.
5. Replace cover and secure with wing nuts.



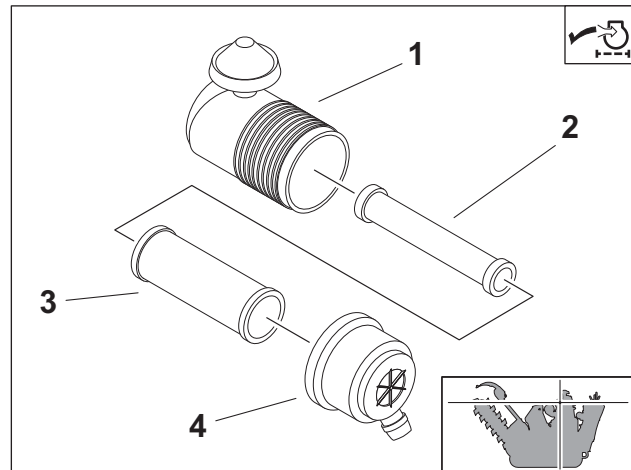
t47om018h.eps

C24x and C30x

Check air filter elements before each use.

To check:

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



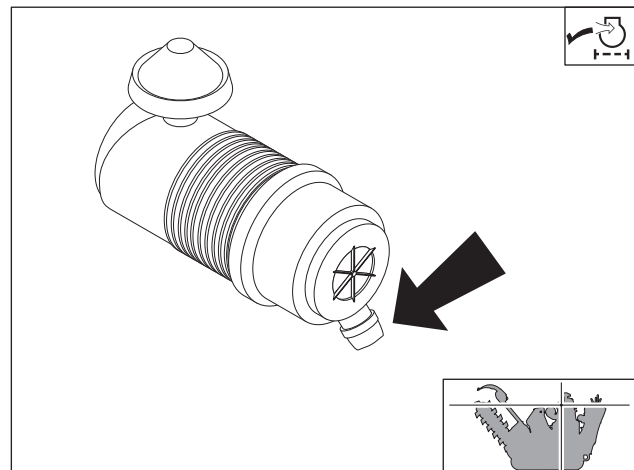
t57om014w.eps



Clean Dust Ejector Valve

C24x and C30x

Check dust ejector valve (shown) before each use. Ensure that valve is not inverted, damaged, plugged, or cracked.

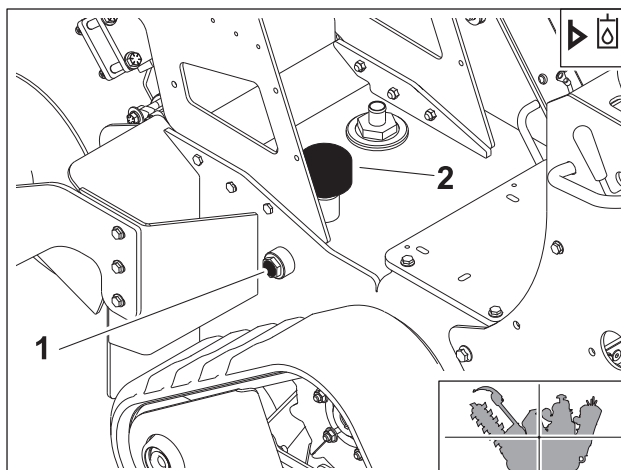


t47om037h.eps

Trencher

Check Hydraulic Fluid Level and Reservoir Cap

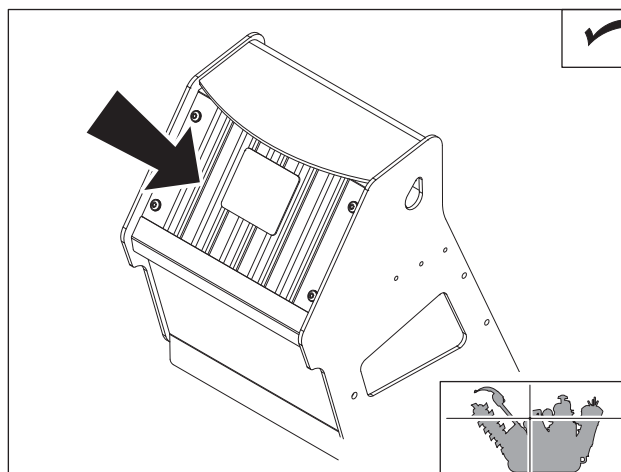
With frame level, check hydraulic fluid level at sight glass (1) before each use. Maintain level on midway point on sight glass. Add THF at fill (2) as needed.



t47om020h.eps

Check Hydraulic Fluid Cooler

Check radiator for dirt and debris before each use. Clean with compressed air or spray wash as needed. See "Clean Hydraulic Fluid Cooler" on page 112.



t47om021h.eps

Check Hydraulic Hoses



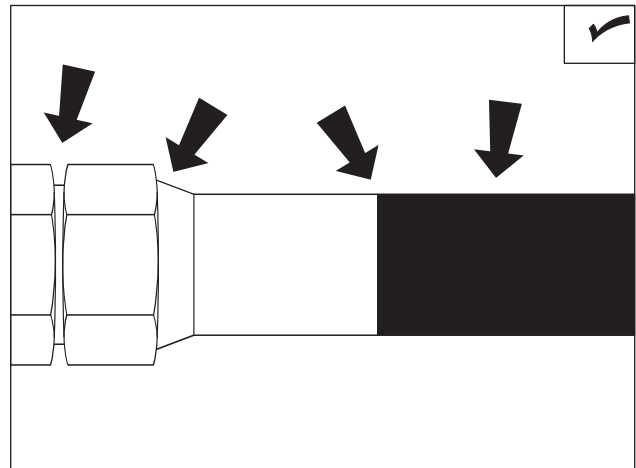
⚠ WARNING Pressurized fluid or air could pierce skin and cause severe injury. Refer to operator's manual for proper use.

To help avoid injury:

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



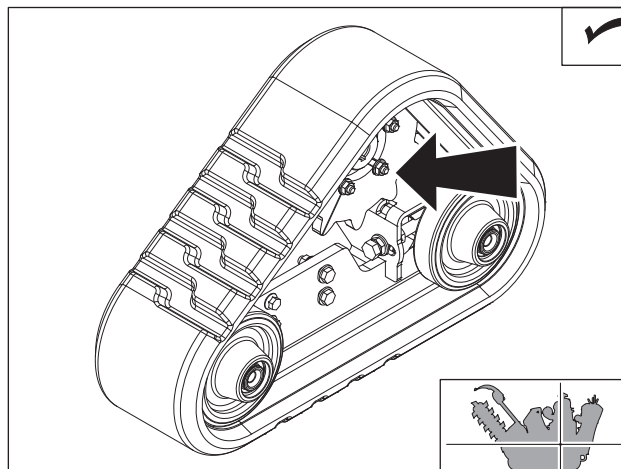
Check hydraulic hoses for leaks every 10 hours.



CheckHoses.eps

Check Track Lug Nuts

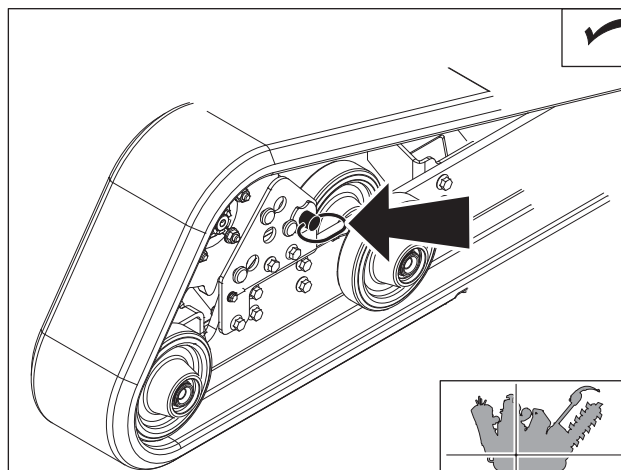
Check tightness of track lug nuts (shown) before each use. Tighten lug nuts to 65 ft•lb (88 N•m).



t47om022h.eps

Check Parking Pin

Check parking pin for wear or damage before each use.



t47om023h.eps

10 Hour

Location	Task	Notes
ENGINE	Change engine oil	Initial, C16x, C30x; GEO
TRENCHER	Check digging chain	
	Check digging chain tension	
	Check restraint bar position	
	Check trench cleaner position	

Engine

Change Engine Oil

IMPORTANT: "Recommended Lubricants/Service Key" on page 91

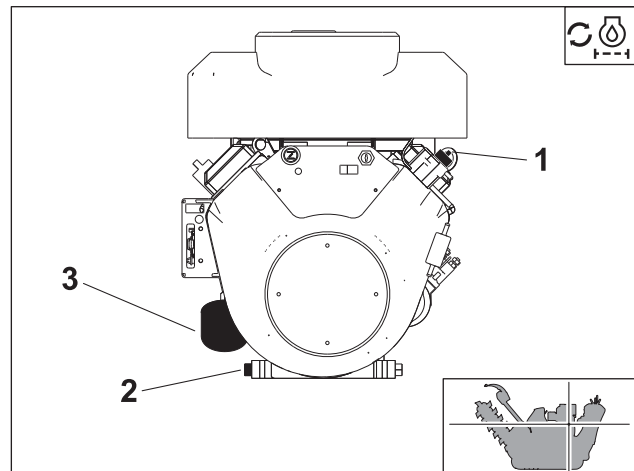


C16x

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

To change:

1. While oil is warm, remove drain plug (2). Drain oil and replace plug.
2. Remove filter (3) and replace with new filter each time oil is changed.
3. Add GEO at fill cap (1) until oil is at highest line on dipstick. Capacity is 47 oz (1.5 L).



t47om024h.eps

NOTICE: Too much oil will damage the engine. Do not overfill.

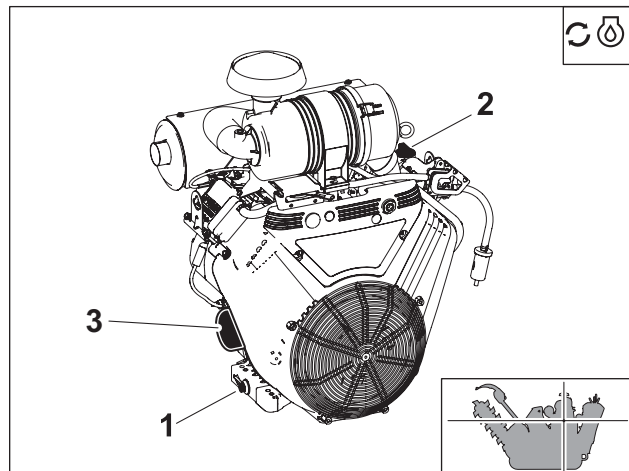
C30x

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

To change:

1. While oil is warm, remove drain plug (1). Drain oil and replace plug.
2. Remove filter (3) and replace with new filter each time oil is changed.
3. Add GEO at fill cap (2) until oil is at highest capacity on dipstick. Capacity is 78 oz (2.3 L).

NOTICE: Too much oil will damage the engine. Do not overfill.



t47om026h.eps

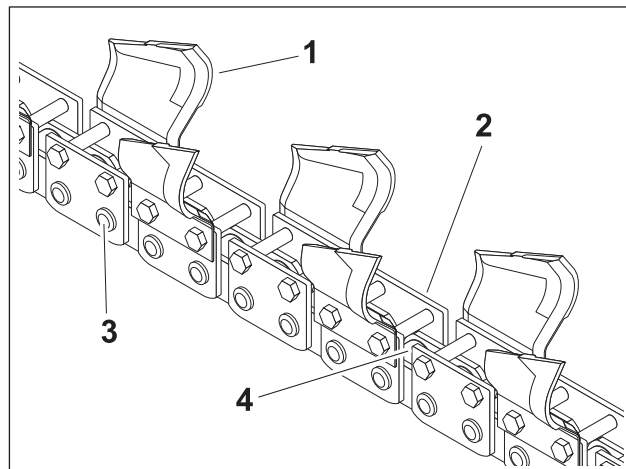
Trencher**Check Digging Chain**

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

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

Check rollers (4) for wear. If rollers are worn, replace chain and sprockets.

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



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.

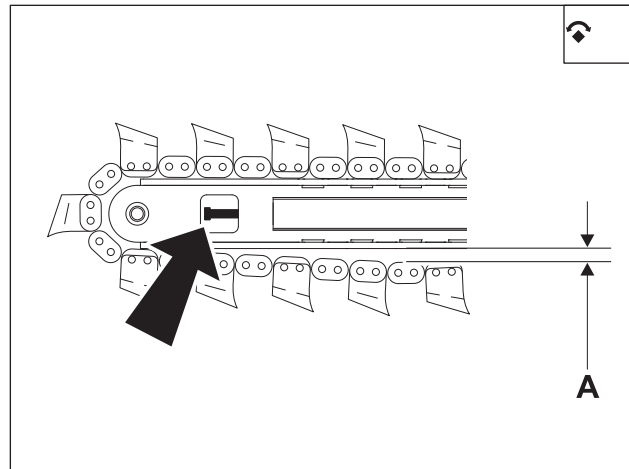
Check Digging Chain Tension

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

NOTICE: Do not overtighten chain. Overtightening will cause chain stretch, loss of machine performance, and possible premature chain failure.

To check:

1. Move boom to 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).



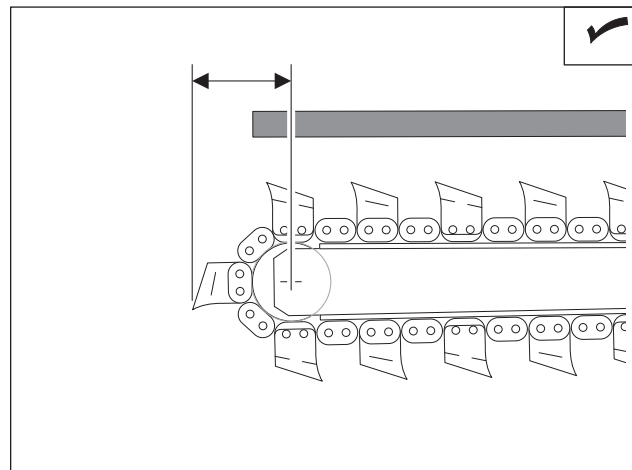
DiggingChainTension_Screw2.eps

To adjust tension with adjustment screw:

1. Loosen jam nut on adjustment screw (shown).
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.

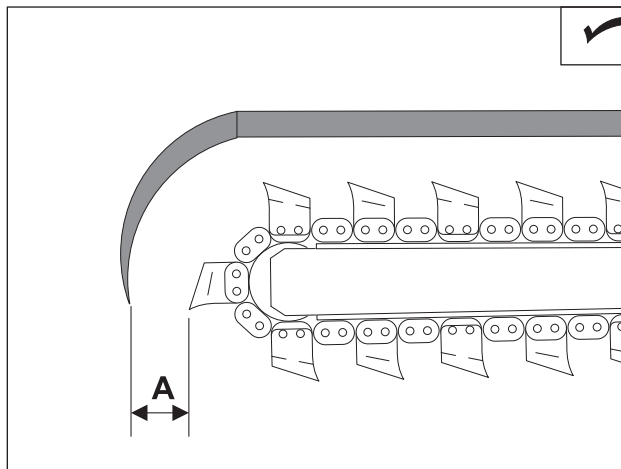


RestraintBarPosition.eps



Check Trench Cleaner Position

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



TrenchCleanerPosition.eps

20 Hour

Location	Task	Notes
ENGINE	Change engine oil	Initial, C12x, C24x; GEO

Engine

Change Engine Oil

IMPORTANT: "Recommended Lubricants/Service Key" on page 91

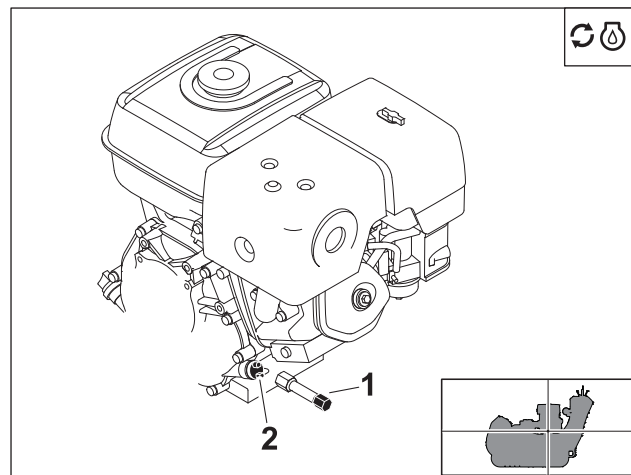
C12x

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

To change:

1. While oil is warm, remove drain plug (1). Drain oil and replace plug.
2. Add GEO at fill cap (2) until oil is at highest line on dipstick. Capacity is 47 oz (1.5 L).

NOTICE: Too much oil will damage the engine. Do not overfill.



t57om008w.eps



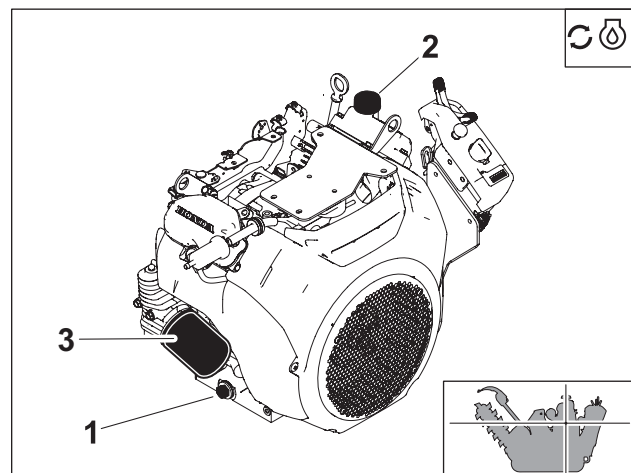
C24x

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

To change:

1. While oil is warm, remove drain plug (1). Drain oil and replace plug.
2. Remove filter (3) and replace with new filter each time oil is changed.
3. Add GEO at fill cap (1) until oil is at highest line on dipstick. Capacity is 1.8 qt (1.7 L).

NOTICE: Too much oil will damage the engine. Do not overfill.



t47om025h.eps

50 Hour

Location	Task	Notes
ENGINE	Change engine oil and filter	C16x, GEO
TRENCHER	Check boom mounting bolts	220 ft•lb (300 N•m)
	Check track tension	

Engine

Change Engine Oil and Filter

IMPORTANT: "Recommended Lubricants/Service Key" on page 91

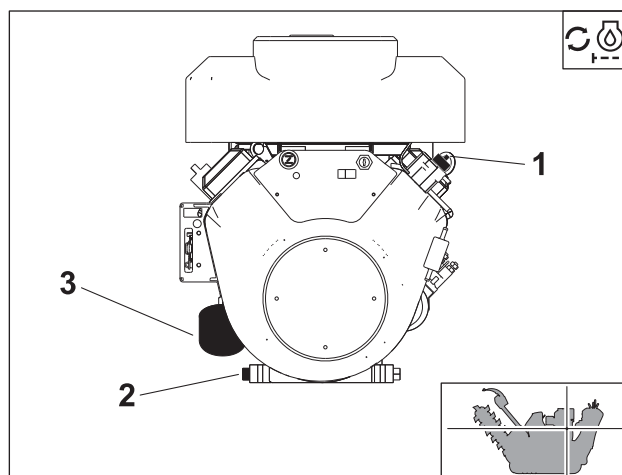
C16x

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

To change:

1. While oil is warm, remove drain plug (2). Drain oil and replace plug.
2. Remove filter (3) and replace with new filter each time oil is changed.
3. Add GEO at fill cap (1) until oil is at highest line on dipstick. Capacity is 47 oz (1.5 L).

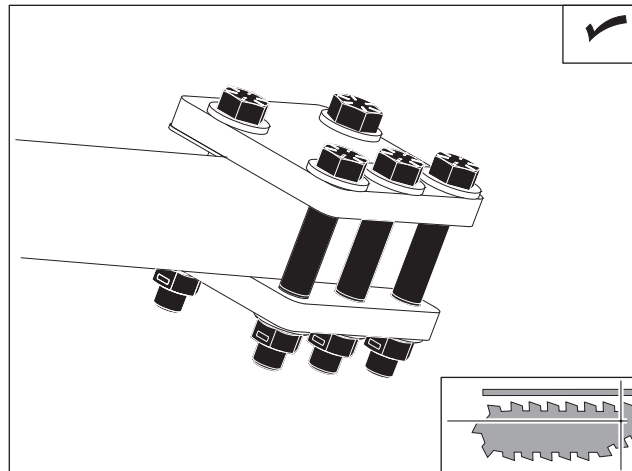
NOTICE: Too much oil will damage the engine. Do not overfill.



t47om024h.eps

Check Boom Mounting Bolts

Check boom mounting bolts every 10 hours and tighten as necessary. Ensure bolts are tightened to 220 ft•lb (300 N•m).



BoomBolts_Check.eps

Check Track Tension

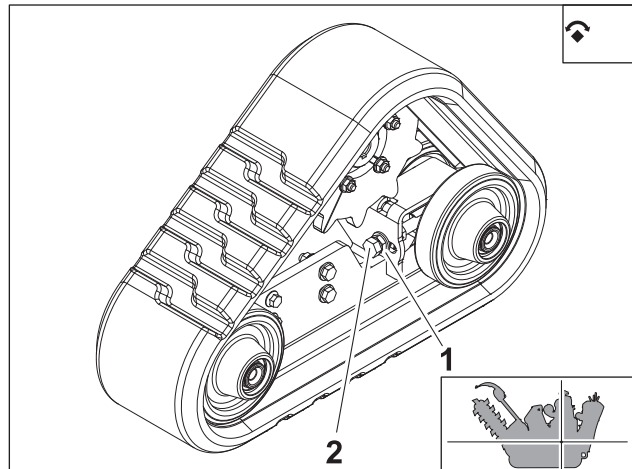
Check track tension every 50 hours and adjust as needed.

To check:

Lay straight edge on top of track, spanning from sprocket to front idler roller. Track is correctly tensioned when measurement between track and straight edge is 1/4" (6 mm).

To adjust:

1. Park machine on smooth, flat surface.
2. Tighten bolt (2):
 - Loosen jam nut (1).
 - Turn bolt (2) counterclockwise until distance between track and straight edge is 1/4" (6 mm).
 - Tighten jam nut (1).
3. Drive forward one track length and check track tension again.



t47om032h.eps



100 Hour

Location	Task	Notes
ENGINE	Change engine oil and filter	C12x, C24x, C30x; GEO
	Change air filter elements	

Engine

Change Engine Oil

IMPORTANT: "Recommended Lubricants/Service Key" on page 91

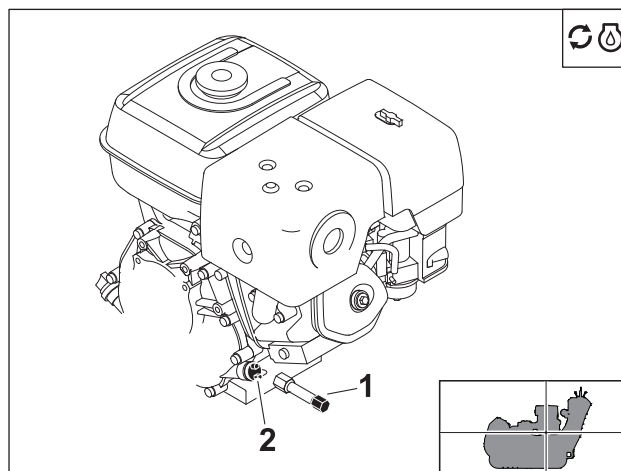
C12x

Change engine oil every 100 hours.

To change:

1. While oil is warm, remove drain plug (1). Drain oil and replace plug.
2. Add GEO at fill cap (2) until oil is at highest line on dipstick. Capacity is 47 oz (1.5 L).

NOTICE: Too much oil will damage the engine. Do not overfill.



t57om008w.eps

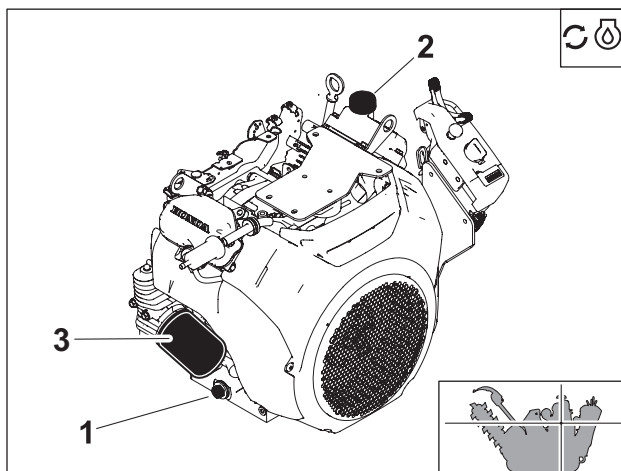
C24x

Change engine oil and filter every 100 hours.

To change:

1. While oil is warm, remove drain plug (1). Drain oil and replace plug.
2. Remove filter (3) and replace with new filter each time oil is changed.
3. Add GEO at fill cap (1) until oil is at highest line on dipstick. Capacity is 1.8 qt (1.7 L).

NOTICE: Too much oil will damage the engine. Do not overfill.



t47om025h.eps

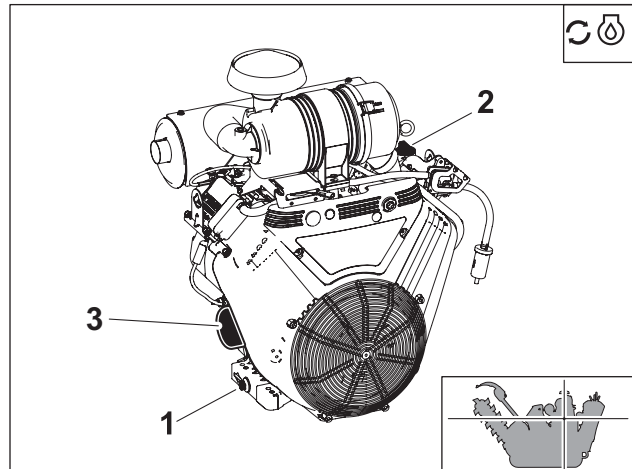
C30x

Change engine oil and filter every 100 hours.

To change:

1. While oil is warm, remove drain plug (1). Drain oil and replace plug.
2. Remove filter (3) and replace with new filter each time oil is changed.
3. Add GEO at fill cap (2) until oil is at highest line on dipstick. Capacity is 78 oz (2.3 L).

NOTICE: Too much oil will damage the engine. Do not overfill.



t47om026h.eps

Change Air Filter Elements

NOTICE: Change the elements. Do not attempt to clean them.

- Compressed air or water may damage filter elements.
- Tapping filter elements to loosen dirt may damage the elements.

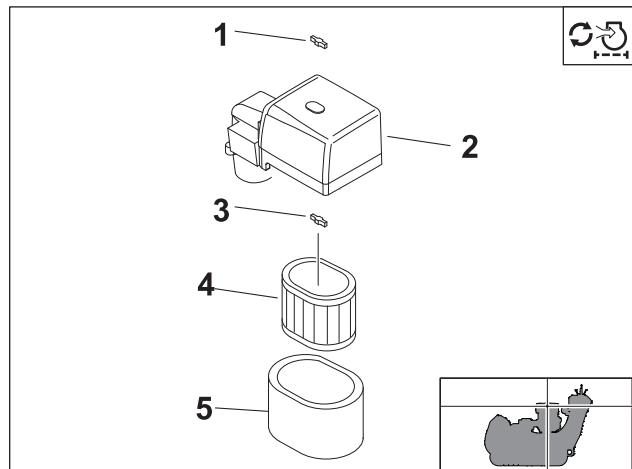


C12x

Change air filter every 100 hours.

To change:

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



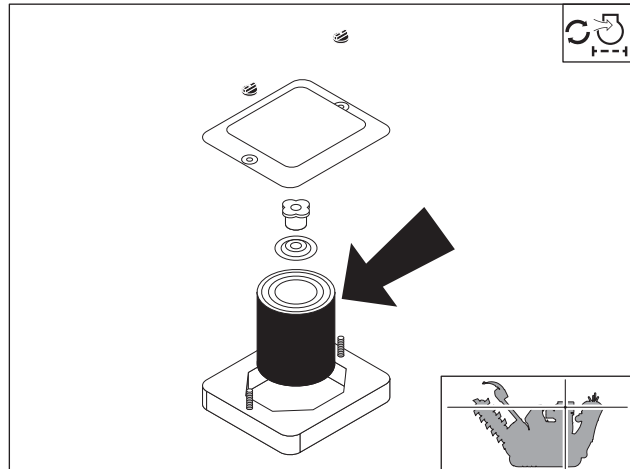
t57om012w.eps

C16x

Change air filter every 100 hours.

To change:

1. Remove wing nuts to remove cover.
2. Wipe housing and wash cover.
3. Insert new element (shown) and ensure it is seated correctly.
4. Replace cover and secure with wing nuts.



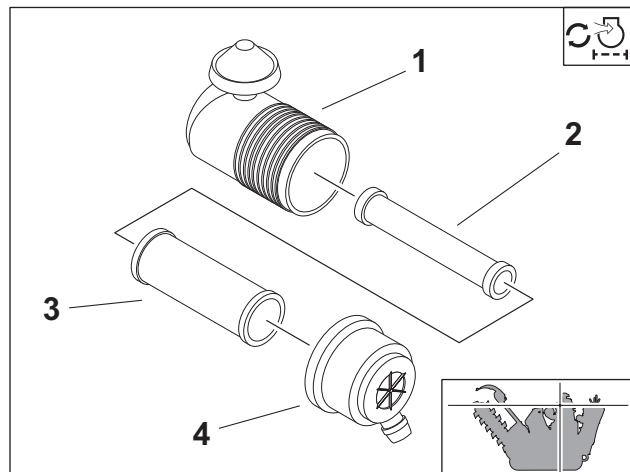
t47om029h.eps

C24x and C30x

Change air filter every 100 hours.

To change:

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



t47om030h.eps

500 Hour

Location	Task	Notes
TRENCHER	Change hydraulic fluid and filter	THF

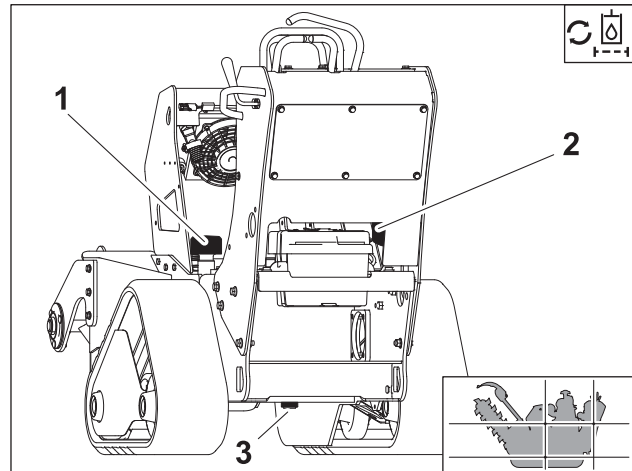
Trencher

Change Hydraulic Fluid and Filter

Change hydraulic fluid and filter every 500 hours.

To change:

1. Remove drain plug (1).
2. Drain fluid and replace plug.
3. Remove and clean strainer.
4. Install strainer.
5. Change filter (2).
6. Add THF at fill (3) until correct level on sight glass is reached.



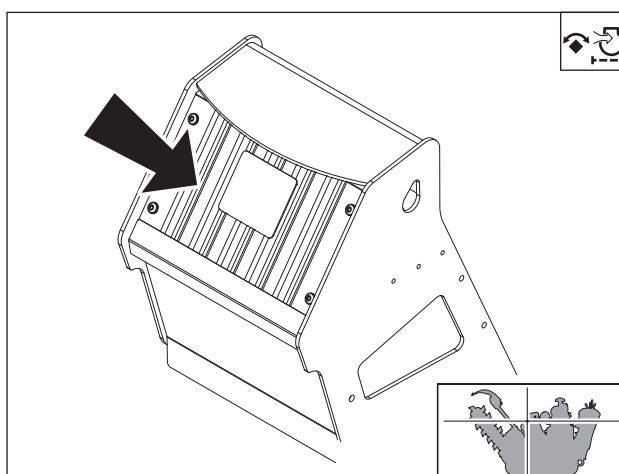
As Needed

Location	Task	Notes
TRENCHER	Clean hydraulic fluid cooler	
	Replace digging chain	
	Check battery	
	Charge battery	

Trencher

Clean Hydraulic Fluid Cooler

Clean hydraulic fluid cooler with compressed air or spray wash if required. Be careful not to damage fins with high-pressure air or water.

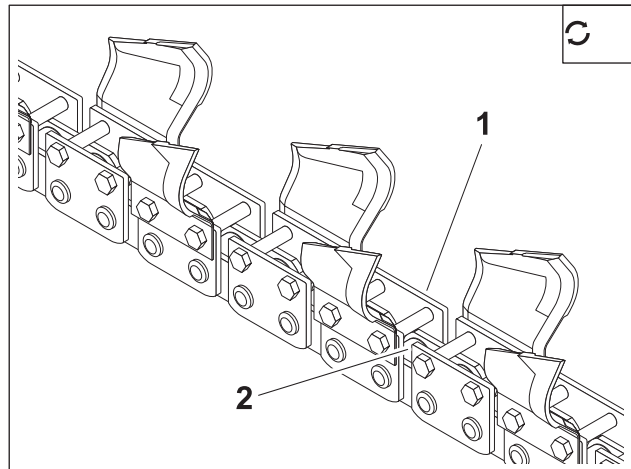


t57om015w.eps

Replace Digging Chain

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

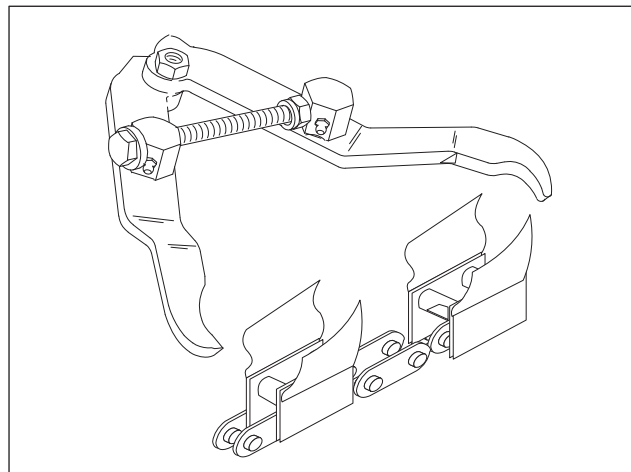
IMPORTANT: Replace sprockets when a new chain is installed.



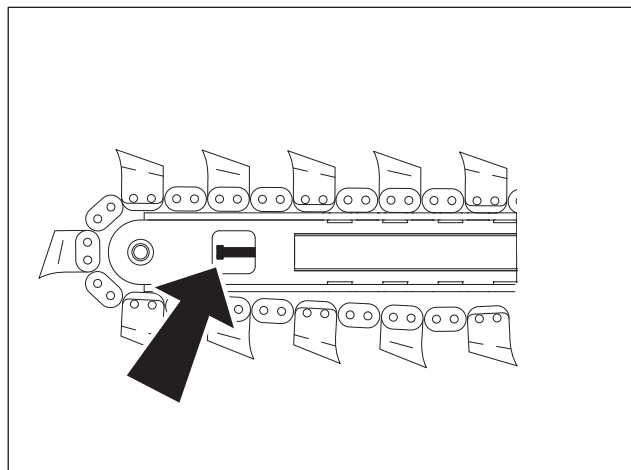
Digging_Chain_Replace.eps

To remove chain:

1. Start engine. See "Start Unit" on page 46.
2. Move digging chain control until digging chain connector pin is on top of boom.
3. Lower boom to ground.
4. Insert parking pin in the correct parking position.
5. Turn ignition off.
6. Secure chain by clamping links on either side of connector pin with chain jaw. Squeeze jaws to reduce pressure on connector pin (shown).
7. Turn tension adjustment screw (shown) counterclockwise to loosen digging chain.





Digging_Chain_Remove_01.eps



Digging_Chain_Remove_TensionScrew.eps

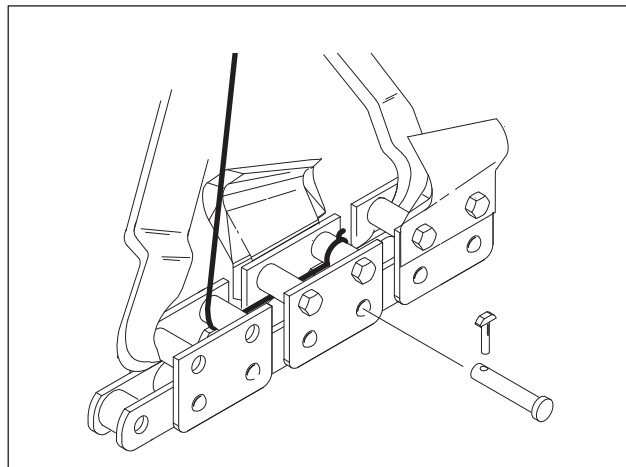
8. Loop cable through links nearest connector pin.

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

To help avoid injury:

- Service digging boom grease cylinder only while standing on opposite side of the boom.
- Wear gloves and safety glasses, and cover fitting with cloth when relieving pressure in cylinder.



Digging_Chain_Remove_02.eps

9. Loosen plug on grease cylinder or turn tension bolts counterclockwise to relieve chain tension.
10. Stand clear of chain and remove lock key from connector pin. Drive connector pin out of link.
11. Unclamp links. Slowly release cable and lower chain to ground with teeth facing down.

To install chain:

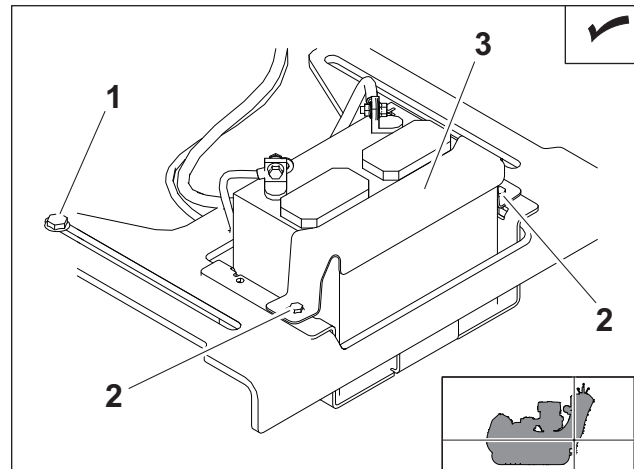
1. Lay chain on ground with teeth down and pointed toward unit.
2. Start engine.
3. Remove parking pin from parking position.
4. Move unit backward until chain extends past head shaft about 1' (305 mm).
5. Move ground drive control to neutral.
6. Lower boom to horizontal position.
7. Insert parking pin in the correct parking position.
8. Turn ignition switch to off position.
9. Pull rear end of chain over tail roller or sprocket by about 10" (260 mm).
10. Move chain down boom until chain connector pin and lock key can be installed. Install connector pin and lock key.
11. Turn tension adjustment screw clockwise to tighten digging chain.

Check Battery

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

To clean:

1. Turn battery disconnect switch, if equipped, to the off position.
2. Ensure that no ignition sources are near battery.
3. Remove screw (1).
4. Pull battery tray out.
5. Remove bolts (2) to remove battery hold-down (3).
6. Loosen and remove battery cable clamps carefully, **negative (-)** cable first.
7. Clean cable clamps and terminals to remove dull glaze.
8. Check for signs of internal corrosion in cables.
9. Connect battery cable clamps, **positive (+)** first.
10. Install battery hold-down.
11. Push tray back into storage position.
12. Loosely tighten bolts.
13. Tighten screw.
14. Turn battery disconnect, if equipped, to the on position.



t57om002w.eps



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

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

Charge Battery



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

To help avoid injury:

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

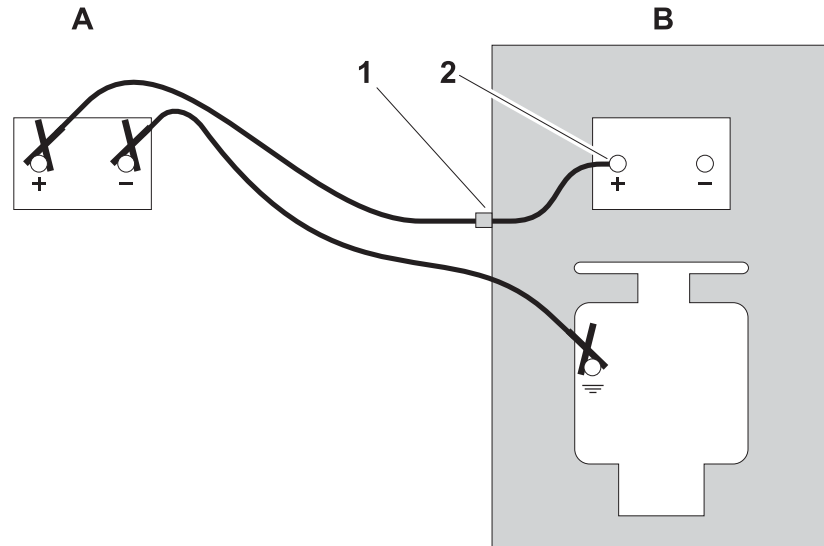
Before You Start

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

Read all steps thoroughly and review illustration before performing procedure.

Charging Procedure (Engine Off)

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



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

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

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

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

Specifications

Chapter Contents

C12x 120

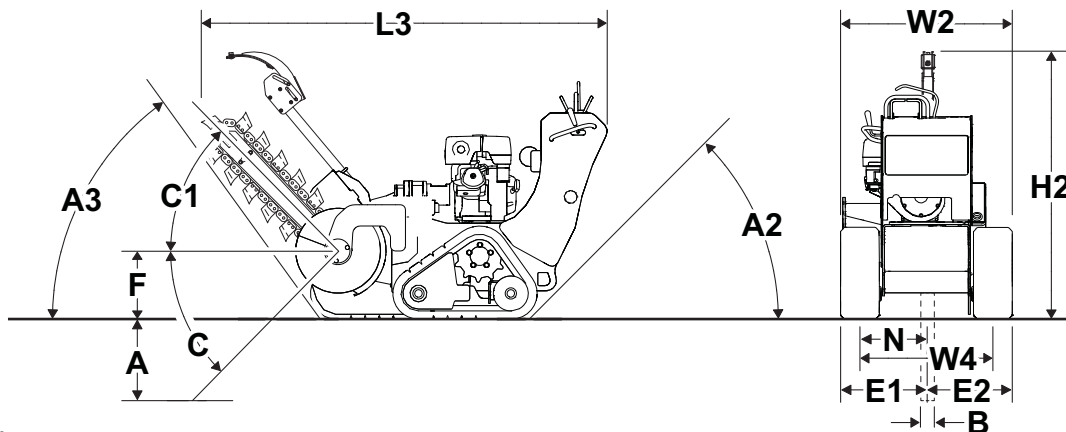
C16x 123

C24x 126

C30x 129



C12x



t57om003w.eps

Dimensions		U.S.	Metric
A	Trench depth, maximum	24 in	610 mm
B	Trench width	4 - 6 in	102 -150 mm
C	Boom travel down	63°	63°
C1	Boom travel up	60°	60°
F	Headshaft height, digging chain	13.7 in	348 mm
L3	Length, maximum	94 in	2390 mm
W2	Width	35.8 in	909 mm
H2	Height	57 in	1450 mm
W4	Tread	27 in	686 mm
A2	Angle of departure	45°	45°
E1	Centerline trench to outside edge of machine, left	17.2 in	437 mm
E2	Centerline trench to outside edge of machine, right	18.6 in	472 mm
N	Spoil discharge reach	14.1 in	358 mm
A3	Angle of approach	52°	52°

Unless otherwise noted, dimensions are based on 24" (610 mm) boom in transport position.

Operational		U.S.	Metric
Vehicle speeds			
	Maximum transit forward	120 fpm	36.6 m/min
	Maximum transit reverse	120 fpm	36.6 m/min
Digging chain speed			
	35K	253 fpm	77 m/min
Spoils handling (single, open-end auger):			
	Outer diameter	17 in	432 mm
Maximum operating weight		1360 lb	617 kg

Power		U.S.	Metric
Engine: Honda iGX390®			
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.



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

Track

Width	200 mm	200 mm
Ground pressure	3.3 psi	23 kPa

Hydraulic System	U.S.	Metric
------------------	------	--------

Dual pump total capacity @ 3600 rpm

7.5 gpm

28.4 L/min

Pump characteristics @ 3600 rpm to ground drive:

Pressure, relief valve setting	2500 psi	172 bar
Capacity	1.5 gpm	5.7 L/min

Pump characteristics @ 3600 rpm to digging drive:

Pressure, relief valve setting	3500 psi	241 bar
Capacity	6 gpm	22.7 L/min

Fluid Capacities	U.S.	Metric
------------------	------	--------

Hydraulic reservoir

11 gal

41.6 L

Hydraulic system

11.5 gal

43.5 L

Fuel tank

1.6 gal

6.05 L

Engine oil

1.2 qt

1.1 L

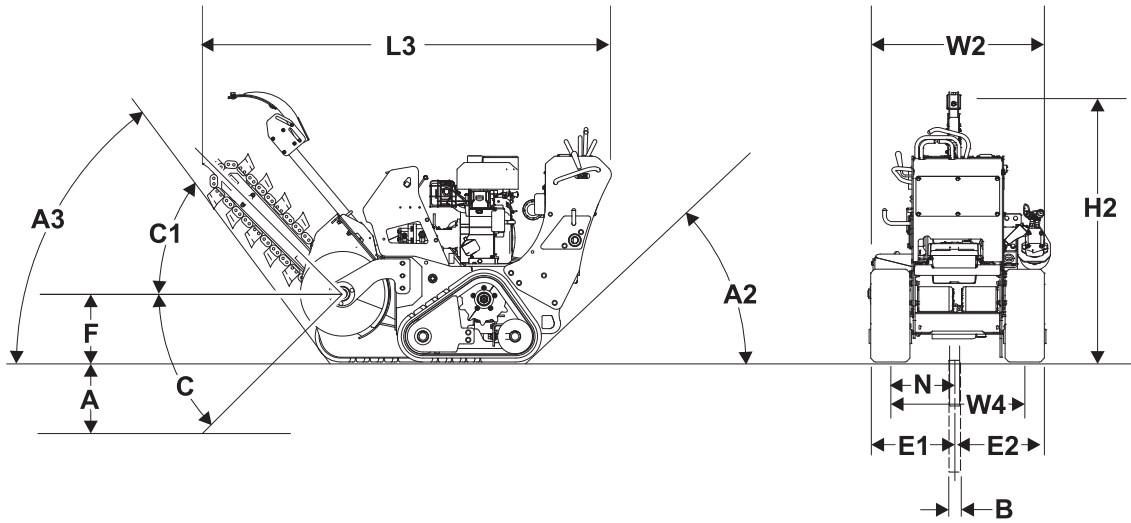
Noise Levels

This machine can generate sound levels exceeding 80 dBA. Always wear appropriate hearing protection when operating machine. Find sound power and pressure information at www.ditchwitch.com, or contact customersupport@ditchwitch.com.

Vibration Levels

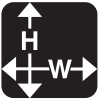
Vibration at the operator's hand during normal operation is less than 2.5 m/s²

C16x



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Dimensions		U.S.	Metric
A	Trench depth, maximum	36 in	915 mm
B	Trench width	4.3 - 6 in	110-150 mm
C	Boom travel down	63°	63°
C1	Boom travel up	60°	60°
F	Headshaft height, digging chain	13.7 in	348 mm
L3	Length, maximum	94 in	2390 mm
W2	Width	35.8 in	909 mm
H2	Height	57 in	1450 mm
W4	Tread	27 in	686 mm
A2	Angle of departure	45°	45°
E1	Centerline trench to outside edge of machine, left	17.2 in	437 mm
E2	Centerline trench to outside edge of machine, right	18.6 in	472 mm
N	Spoil discharge reach	14.1 in	358 mm
A3	Angle of approach	52°	52°



Unless otherwise noted, dimensions are based on 36" (915 mm) boom in transport position.

Operational		U.S.	Metric
Vehicle speeds			
	Maximum transit forward	120 fpm	36.6 m/min
	Maximum transit reverse	120 fpm	36.6 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		1895 lb	860 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			
Track			
	Width	200 mm	200 mm
	Ground pressure	4.5 psi	31 kPa

Hydraulic System		U.S.	Metric
Dual pump total capacity @ 3600 rpm		11.5 gpm	43.5 L/min
Pump characteristics @ 3600 rpm to ground drive:			
	Pressure, relief valve setting	2200 psi	152 bar
	Capacity	1.5 gpm	5.7 L/min
Pump characteristics @ 3600 rpm to digging drive:			
	Pressure, relief valve setting	3500 psi	241 bar
	Capacity	10 gpm	37.9 L/min



Fluid Capacities		U.S.	Metric
Hydraulic reservoir		11 gal	41.6 L
Hydraulic system		11.5 gal	43.5 L
Fuel tank		2.3 gal	6.5 L
Engine oil		47 oz	1.47 L

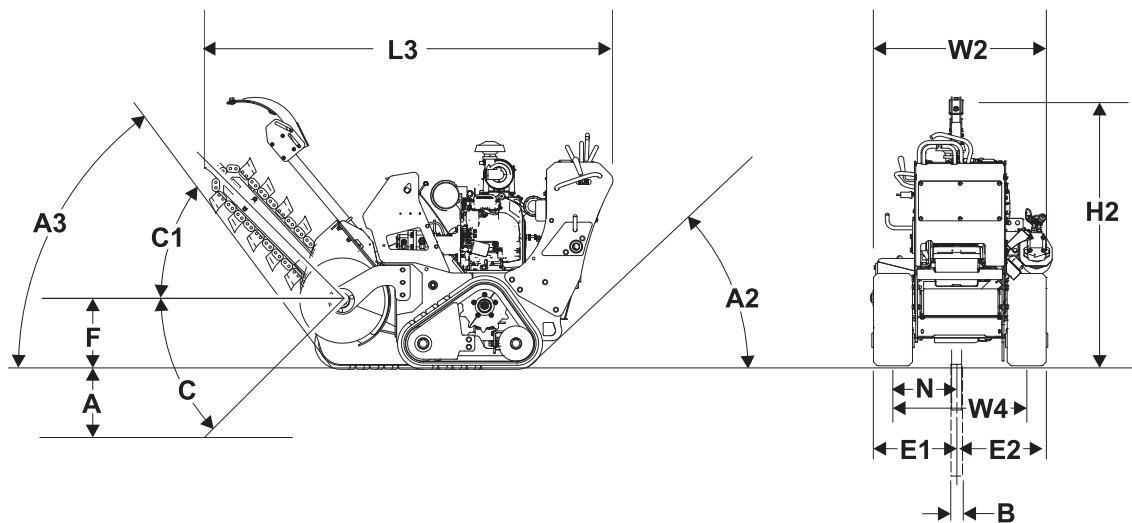
Noise Levels

This machine can generate sound levels exceeding 80 dBA. Always wear appropriate hearing protection when operating machine. Find sound power and pressure information at www.ditchwitch.com, or contact customersupport@ditchwitch.com.

Vibration Levels

Vibration at the operator's hand during normal operation is less than 2.5 m/s²

C24x



t47om035h.eps

Dimensions		U.S.	Metric
A	Trench depth, maximum	36 in	915 mm
B	Trench width	4.3 - 6 in	110-150 mm
C	Boom travel down	63°	63°
C1	Boom travel up	60°	60°
F	Headshaft height, digging chain	13.7 in	348 mm
L3	Length, maximum	94	2390 mm
W2	Width	35.8 in	909 mm
H2	Height, maximum	57 in	1450 mm
W4	Tread	27 in	686 mm
A2	Angle of departure	45°	45°
E1	Centerline trench to outside edge of machine, left	17.2 in	437 mm
E2	Centerline trench to outside edge of machine, right	18.6 in	472 mm
N	Spoil discharge reach	14.1 in	358 mm
A3	Angle of approach	52°	52°

Unless otherwise noted, dimensions are based on 36" (915 mm) boom in transport position.

Operational	U.S.	Metric
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Vehicle speeds:

	Maximum transit forward	176 fpm	53.6 m/min
	Maximum transit reverse	136 fpm	41.5 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		1915 lb	869 kg

Power	U.S.	Metric
-------	------	--------

Engine: Honda® GX690

Fuel: gasoline

Cooling medium: air

Number of cylinders: two

Displacement	42 in ³	688 cm ³
Bore	3.07 in	78 mm
Stroke	2.83 in	72 mm
Manufacturer's net power rating @ 3600 rpm (SAE J1349)	22.1 hp	16.5 kW
Rated speed	3600 rpm	3600 rpm
Fuel consumption @ 3600 rpm	1.77 gph	6.7 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			
Track			
	Width	200 mm	200 mm
	Ground pressure	4.5 psi	31 kPa

Hydraulic System		U.S.	Metric
Dual pump total capacity @ 3600 rpm		13 gpm	49.2 L/min
Pump characteristics @ 3600 rpm to ground drive:			
	Pressure, relief valve setting	2500 psi	172 bar
	Capacity	3 gpm	11.4 L/min
Pump characteristics @ 3600 rpm to digging drive:			
	Pressure, relief valve setting	3500 psi	241 bar
	Capacity	10 gpm	37.9 L/min

Fluid Capacities		U.S.	Metric
Hydraulic reservoir		11 gal	41.6 L
Hydraulic system		11.5 gal	43.5 L
Fuel tank		6 gal	22.7 L
Engine oil		1.8 qt	1.7 L

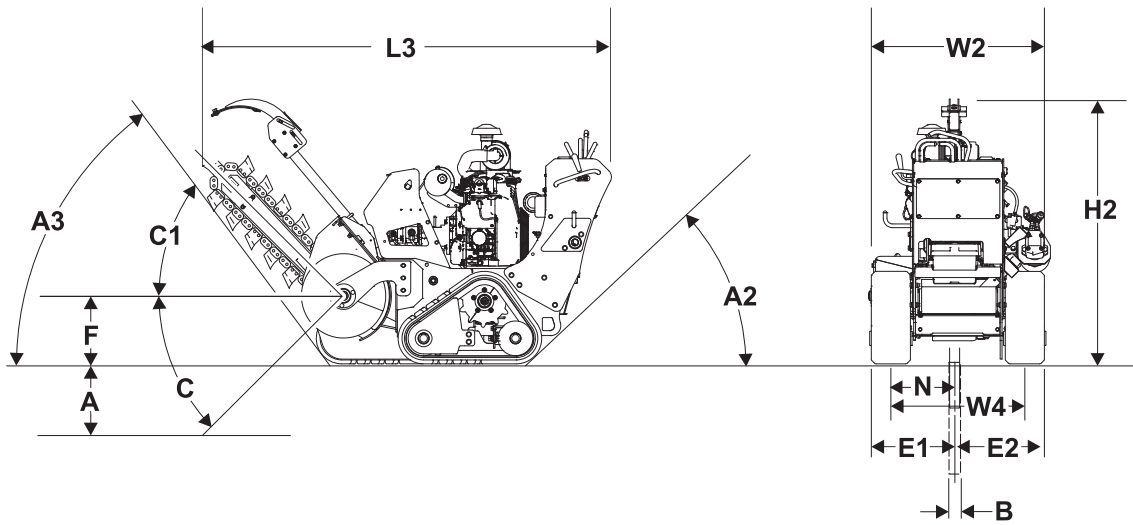
Noise Levels

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Vibration Levels

Vibration at the operator's hand during normal operation is less than 2.5 m/s²

C30x



t47om036h.eps

Dimensions		U.S.	Metric
A	Trench depth, maximum	36 in	915 mm
B	Trench width	4.3 - 6 in	110-150 mm
C	Boom travel down	63°	63°
C1	Boom travel up	60°	60°
F	Headshaft height, digging chain	13.7 in	348 mm
L3	Length	101 in	2570 mm
W2	Width	35.8 in	909 mm
H2	Height	66 in	1680 mm
W4	Tread	27 in	686 mm
A2	Angle of departure	45°	45°
E1	Centerline trench to outside edge of machine, left	17.2 in	437 mm
E2	Centerline trench to outside edge of machine, right	18.6 in	472 mm
N	Spoil discharge reach	14.1 in	358 mm
A3	Angle of approach	51°	51°



Unless otherwise noted, dimensions are based on 48" (1220 mm) boom in transport position.

Operational		U.S.	Metric
Vehicle speeds			
	Maximum transit forward	176 fpm	53.6 m/min
	Maximum transit reverse	136 fpm	41.5 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		2100 lb	953 kg

Power		U.S.	Metric
Engine: Briggs & Stratton® Vanguard™ 31.0 Big Block V-Twin Horizontal Shaft			
Fuel: gasoline			
Cooling medium: air			
Number of cylinders: two			
Displacement		54.68 in ³	896 cm ³
Bore		3.37 in	86 mm
Stroke		3.07 in	78 mm
Manufacturer's net power rating @ 3600 rpm (SAE J1940)		31 hp	23.1 kW
Rated speed		3600 rpm	3600 rpm
Fuel consumption		2.49 gph	9.4 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			
Track			
	Width	200 mm	200 mm
	Ground pressure	5 psi	34.5 kPa

Hydraulic System		U.S.	Metric
Dual pump total capacity @ 3600 rpm		13 gpm	49.2 L/min
Pump characteristics @ 3600 rpm to ground drive:			
	Pressure, relief valve setting	2500 psi	172 bar
	Capacity	3 gpm	11.4 L/min
Pump characteristics @ 3600 rpm to digging drive:			
	Pressure, relief valve setting	3500 psi	241 bar
	Capacity	10 gpm	37.9 L/min

Fluid Capacities		U.S.	Metric
Hydraulic reservoir		11 gal	41.6 L
Hydraulic system		11.5 gal	43.5 L
Fuel tank		6 gal	22.7 L
Engine oil		78 oz	2.3 L

Noise Levels

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Vibration Levels

Vibration at the operator's hand during normal operation is less than 2.5 m/s²



Support

Procedure

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

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

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

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

Resources

Publications

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



Ditch Witch® Training

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

Warranty

Ditch Witch® Equipment and Replacement Parts Limited Warranty Policy

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

Exclusions from Product Warranty

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

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

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

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

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

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

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

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

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

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

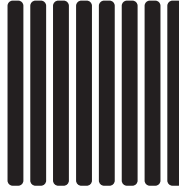
This will enable you to receive updates on this equipment as well as information on new products of interest.

Thanks for using Ditch Witch equipment.

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



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 23 PERRY OKLAHOMA

POSTAGE WILL BE PAID BY

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



**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.

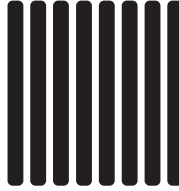
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IN THE
UNITED STATES



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**



Ditch Witch® Registration Card

Please Type or Print All Information

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

Ditch Witch® Registration Card

Please Type or Print All Information

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

