

PR100

Operator's Manual



Overview



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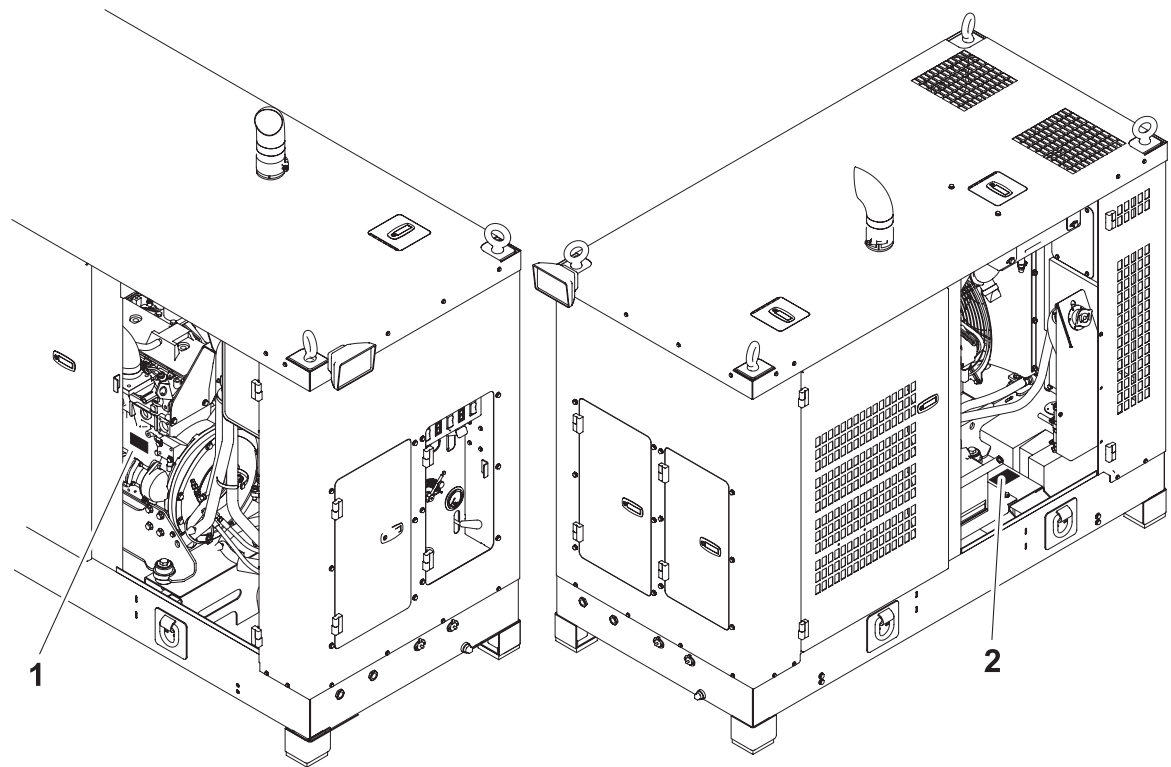
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Serial Number Location

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



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Date of manufacture	
Date of purchase	
Power pack serial number	
Engine serial number	

Intended Use



Ditch Witch pipe bursters are intended for the replacement of buried pipes and conduits. The PR100 produces 200,000 lb (91 t) of pullback force. A power pack provides hydraulic power to run the pipe bursting unit.

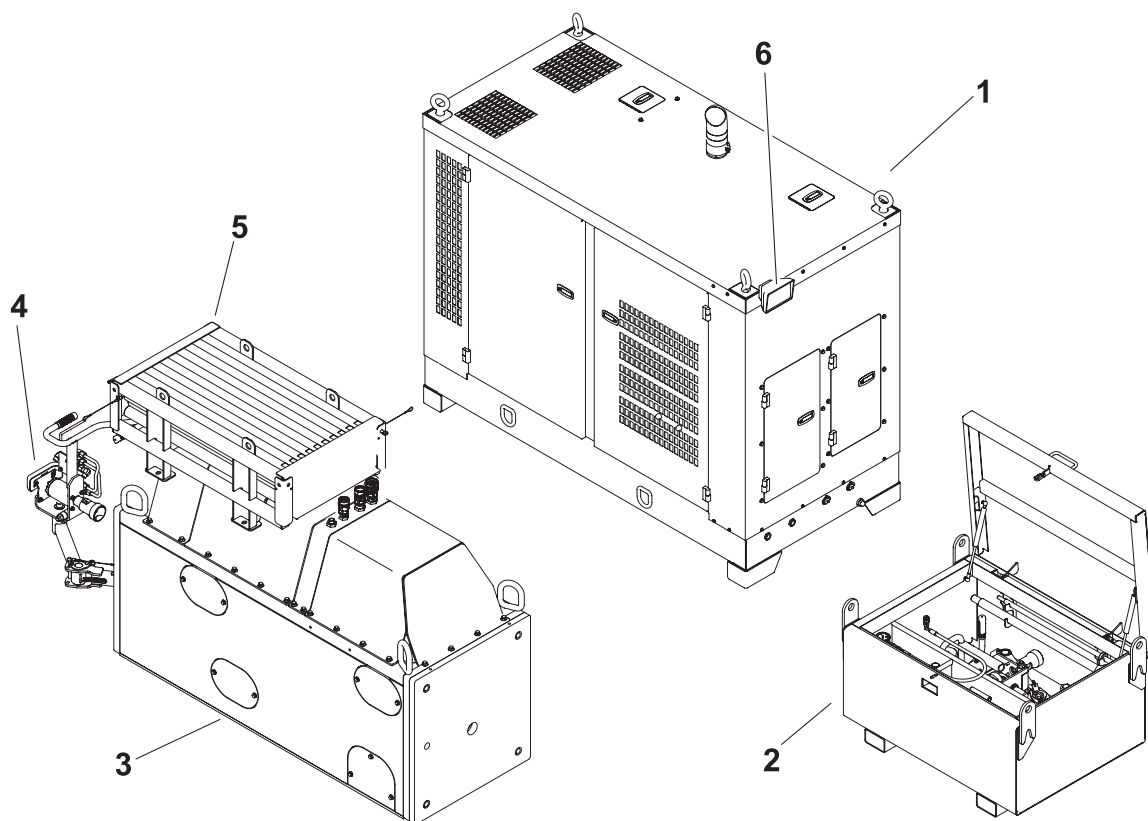
The unit is designed for operation in temperatures typically experienced in earth moving and construction work environments. Provisions may be required to operate in extreme temperatures. Contact your Ditch Witch dealer. Use in any other way is considered contrary to the intended use.

Ditch Witch pipe bursters and power packs 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



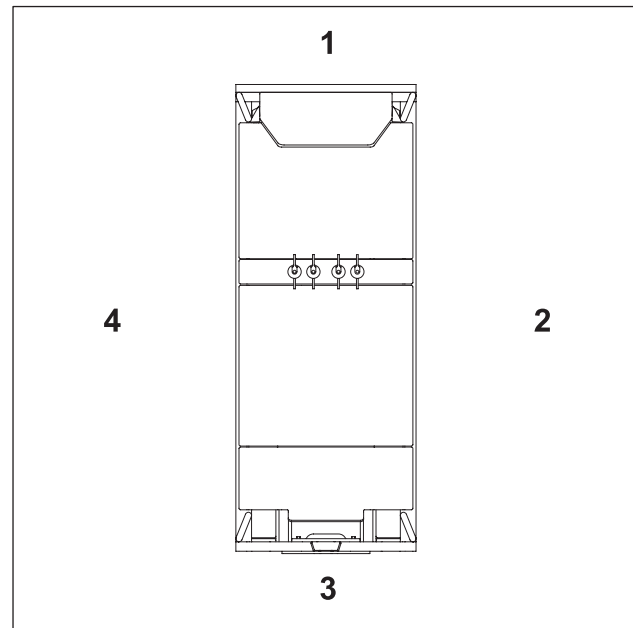
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- | | |
|------------------|---------------------------------|
| 1. Power pack | 4. Assisted makeup device (AMD) |
| 2. Tool kit | 5. Rod box |
| 3. Bursting unit | 6. Work light |

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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About This Manual

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

Bulleted Lists

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

Numbered Lists

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

Foreword



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

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

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

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

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

Thank you for buying and using Ditch Witch equipment.

**PR100
Operator's Manual**

Issue number 1.0/OM/10/09

Part number 053-1392

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Service Record

a record of major service performed on the machine

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Safety

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Guidelines

Follow these guidelines before operating any jobsite equipment:

- Complete proper training and read operator's manual before using equipment.
- Contact your local One-Call (811 in USA) or the One-Call referral number (888-258-0808 in USA and Canada) to have underground utilities located before digging. Also contact any utilities that do not participate in the One-Call service.
- 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.
- Replace missing or damaged safety shields and safety signs.
- Use equipment carefully. Stop operation and investigate anything that does not look or feel right.
- Do not operate unit where flammable gas is present.
- Contact your Ditch Witch dealer if you have any question about operation, maintenance, or equipment use.

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.



indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



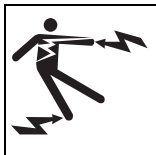
indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

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

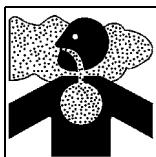
NOTICE can keep you from doing something that might damage the machine or someone's property. It can also alert you against unsafe practices.

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

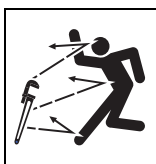
Safety Alerts

**⚠ DANGER**

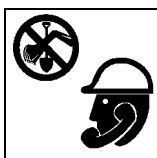
Electric shock. Contacting electric lines will cause death or serious injury. Know location of lines and stay away.

**⚠ DANGER**

Deadly gases. Lack of oxygen or presence of gas will cause sickness or death. Provide ventilation.

**⚠ DANGER**

Moving tools will kill or injure. Never use wrenches or tools on moving rods and bursting unit components when unit is operating.

**⚠ WARNING**

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

**⚠ WARNING**

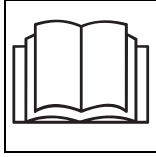
Crushing weight could cause death or serious injury. Use proper procedures and equipment or stay away.

**⚠ WARNING**

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

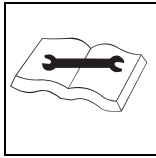
**⚠ DANGER**

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



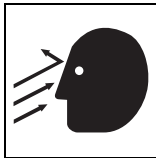
⚠ WARNING

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



⚠ 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.



⚠ WARNING

Looking into fiber optic cable could result in permanent vision damage. Do not look into ends of fiber optic or unidentified cable.



⚠ WARNING

Fluid or air pressure could pierce skin and cause injury or death. Stay away.



⚠ WARNING

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



⚠ WARNING

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



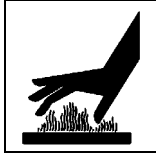
⚠ WARNING

Hot pressurized cooling system fluid could cause serious burns. Allow to cool before servicing.



**⚠ CAUTION**

Flying objects may cause injury. Wear hard hat and safety glasses.

**⚠ CAUTION**

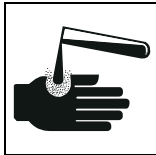
Hot parts may cause burns. Do not touch until cool.

**⚠ CAUTION**

Exposure to high noise levels may cause hearing loss. Wear hearing protection.

**⚠ CAUTION**

Fall possible. Slips or trips may result in injury. Keep area clean.

**⚠ CAUTION**

Battery acid may cause burns. Avoid contact.

**⚠ CAUTION**

Improper handling or use of chemicals may result in illness, injury, or equipment damage. Follow instructions on labels and in material safety data sheets (MSDS).

Emergency Procedures

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

EMERGENCY SHUTDOWN - Turn ignition switch to stop position or push remote engine stop button.



Electric Strike Description

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 **in pit**, DO NOT MOVE and DO NOT TOUCH ANYTHING. Remain in pit and take the following actions. The order and degree of action will depend upon the situation.

- Warn people nearby that an electric strike has occurred. Instruct them to leave the area and contact utility.
- Contact utility company to shut off power.
- Do not leave pit until given permission by utility company.

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

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

If you suspect an electric line has been damaged and you are **on other piece of equipment**, DO NOT MOVE. Remain on truck or trailer and take the following actions. The order and degree of action will depend on the situation.

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

If you suspect an electric line has been damaged and you are **off other piece of equipment**, DO NOT TOUCH EQUIPMENT. Take the following actions. The order and degree of action will depend on the situation.

- LEAVE AREA.
- Contact utility company to shut off power.
- Do not return to area or allow anyone into area until given permission by utility company.

If a Gas Line is Damaged

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

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



If a Fiber Optic Cable is Damaged

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

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) 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.

Controls

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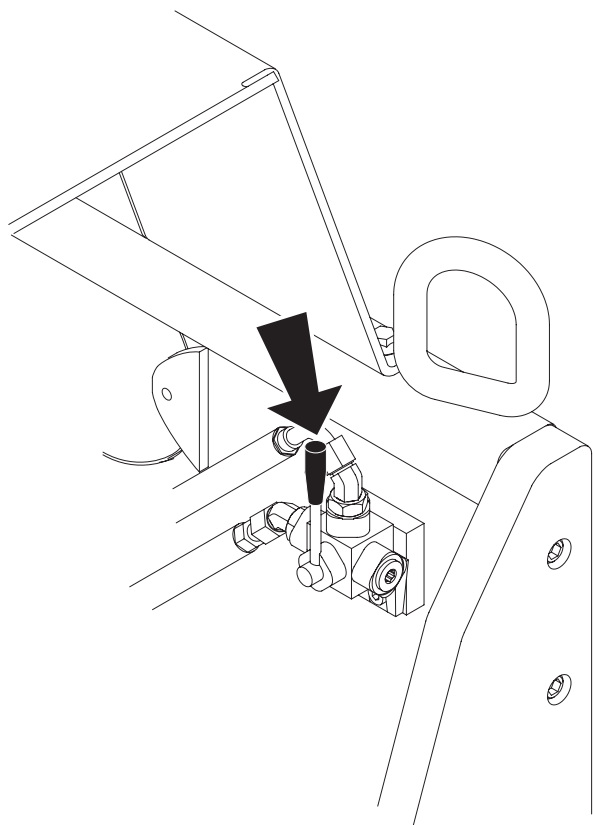
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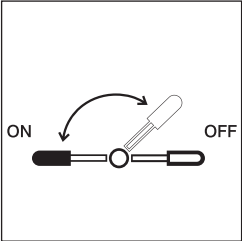


Bursting Unit

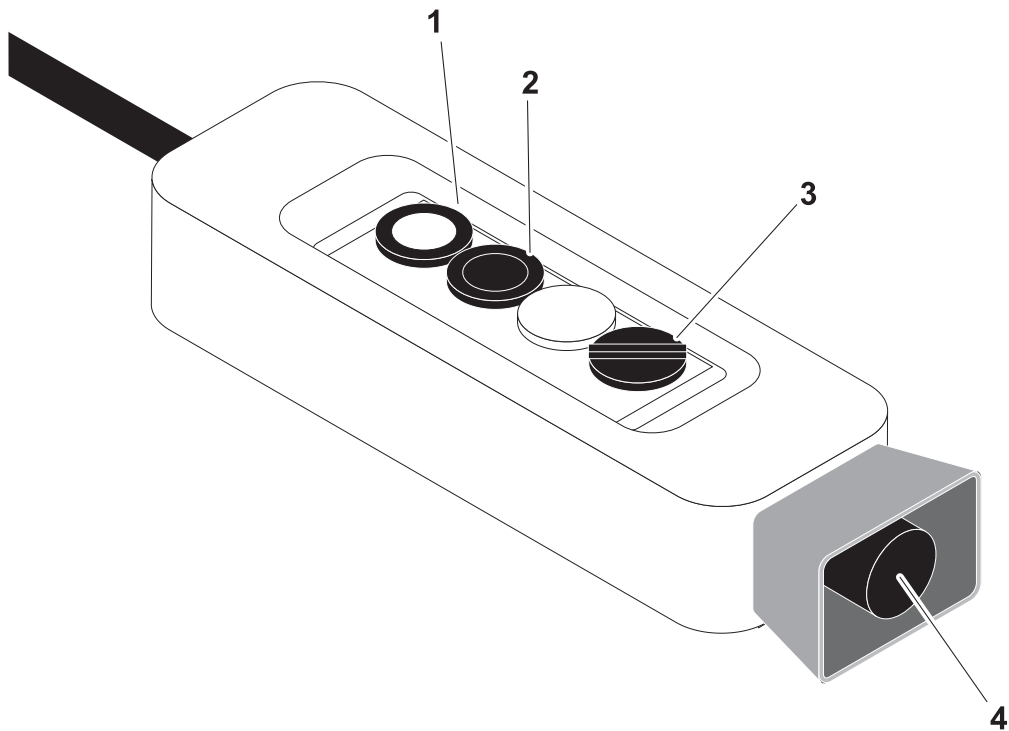


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Automatic front clamp control

Item	Description	Notes
Automatic front clamp control  c00ic570h.eps	To enable automatic front clamp operation, push. To disable, pull.	IMPORTANT: Use in pull mode. • Enable when pulling pipe. • Disable when pushing.

Remote Controller



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1. Work button (white)

2. Return button (black)
3. Mode selector switch

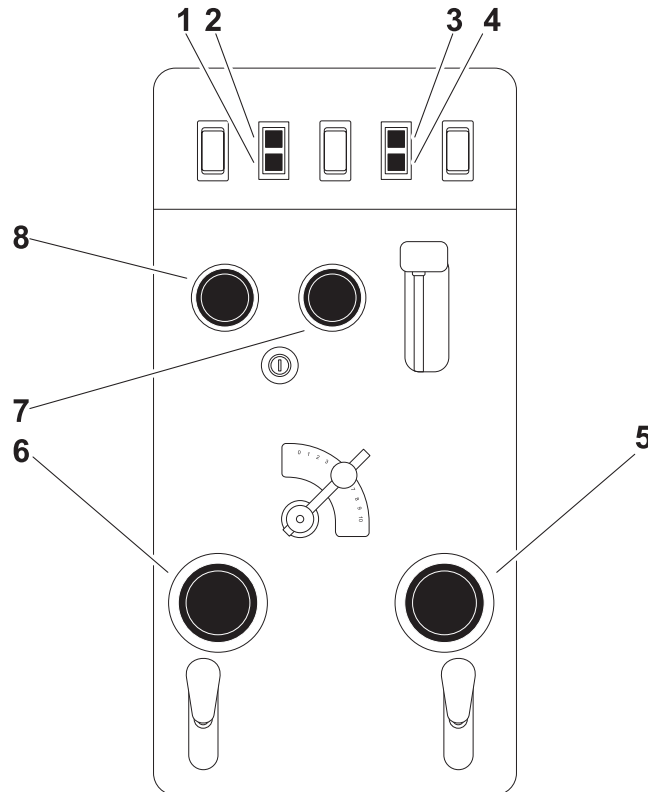
4. Remote stop switch

Item	Description	Notes
1. Work button (white)	With mode selector in push mode, push and hold to push rod into existing pipe. With mode selector in pull mode, push and hold to pull new pipe.	

Item	Description	Notes
2. Return button (black)	With mode selector in push mode, push and hold to return carriage to back of unit. Jaws close when button is released. With mode selector in pull mode, push and hold to return carriage to front of unit. Jaws close when button is released.	
3. Mode selector switch	To enter pull mode, move left. To enter push mode, move right.	
4. Remote stop switch	Push to stop power unit engine.	Under normal conditions, use the key switch on power pack to stop engine.

Power Pack

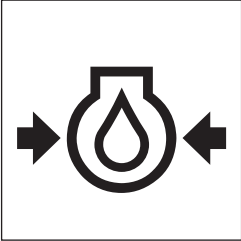
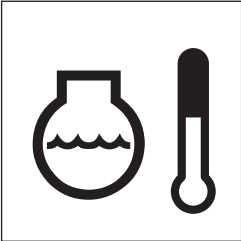
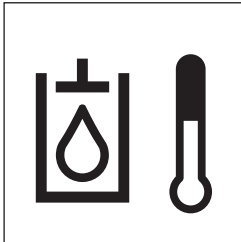
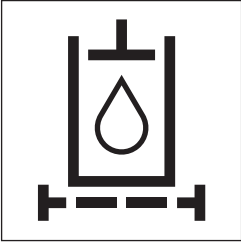
Gauges and Indicators

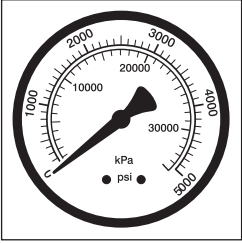
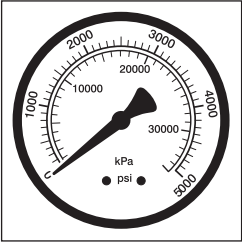
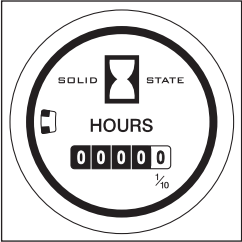
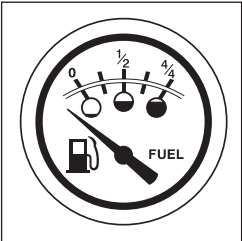


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- | | |
|---|-----------------------------|
| 1. Engine oil pressure indicator | 5. Pull/push pressure gauge |
| 2. Engine coolant temperature indicator | 6. Clamp pressure gauge |
| 3. Hydraulic fluid temperature indicator | 7. Hourmeter |
| 4. Hydraulic filter restriction indicator | 8. Fuel gauge |

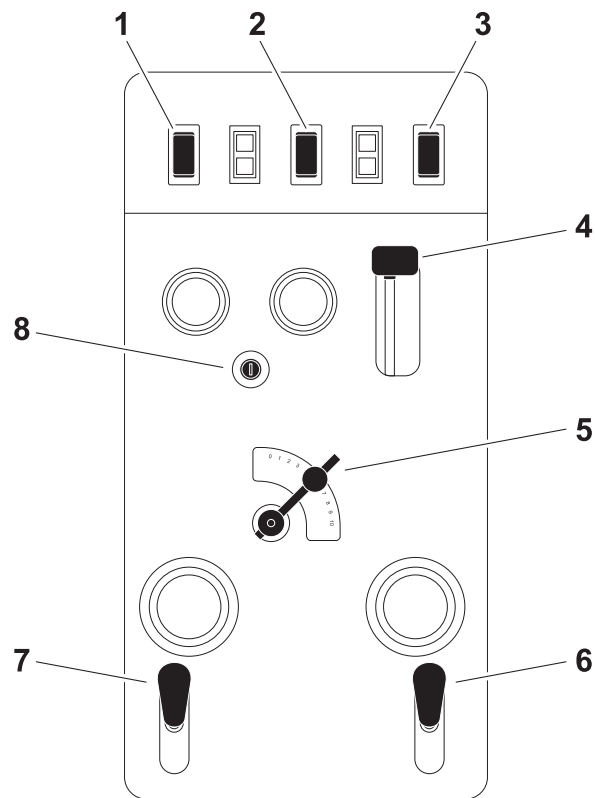


Item	Description	Notes
1. Engine oil pressure indicator  c00ic119h.eps	Lights briefly when engine is started. Remains on when engine oil pressure is low.	Engine will stop. 1. Check oil level. 2. Check for leaks before starting engine.
3. Engine temperature indicator  c00ic120h.eps	Lights if engine coolant overheats.	Engine will stop. 1. Let engine cool. 2. Check coolant level.
3. Hydraulic fluid temperature indicator  c00ic023h.eps	Lights if hydraulic fluid is above 215°F (102°C).	• Turn off engine and let cool. • Check hydraulic fluid level.
4. Hydraulic filter restriction indicator  c00ic578h.eps	Lights if hydraulic filter becomes clogged.	Change hydraulic filters.

Item	Description	Notes
5. Push/pull pressure gauge  c00ic579h.eps	Displays hydraulic pressure at horizontal cylinders.	Full load reading should be 3700 psi (255 bar).
6. Clamp pressure gauge  c00ic579h.eps	Displays hydraulic pressure for clamp cylinders.	Full load reading should be 2200 psi (152 bar).
7. Hourmeter  c00ic259h.eps	Displays engine operating time.	Use these times to schedule service.
8. Fuel gauge  c00ic018h.eps	Displays fuel level in tank.	



Controls



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1. Work light switch

2. Cold start switch

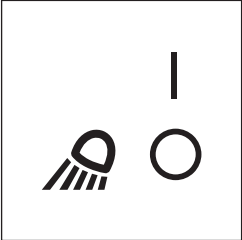
3. Remote enable switch

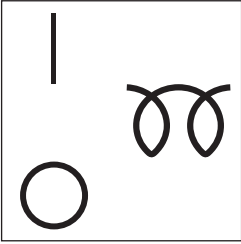
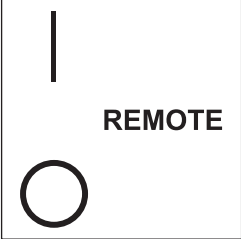
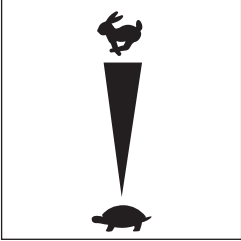
4. Throttle control
5. Hydraulic flow control (for AMD)

6. Bursting unit manual control

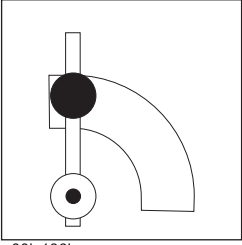
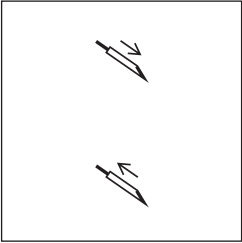
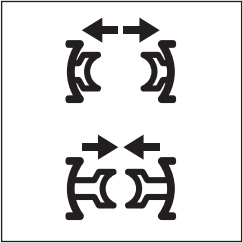
7. Clamp control

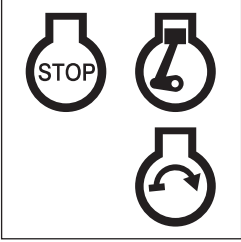
8. Ignition switch

Item	Description	Notes
1. Work light switch  c00ic258h.eps	To turn on, press top. To turn off, press bottom.	Operates work light and panel light.

Item	Description	Notes
2. Cold start switch  c00ic530h.eps	To start cold engine when temperature is between 32°F (0°C) and 50°F (10°C): • Turn ignition switch to on position. • Set throttle at low idle. • Press and hold switch for 12 seconds, then release. • Turn ignition switch to start position. To start cold engine when temperature is below 32°F (0°C): • Turn ignition switch to on position. • Set throttle at low idle. • Press and hold switch for 20 seconds, then release. • Turn ignition switch to start position.	NOTICE: • Do not press and hold cold start switch for more than 25 seconds. • Do not use ether or starting fluid. Explosion possible. Serious injury and equipment damage could result.
3. Remote enable switch  c00ic573h.eps	Enables use of remote controller. Green is ON. Red is OFF.	NOTICE: Ensure switch is in OFF position when starting power pack.
4. Throttle control  c00ic571h.eps	To increase engine speed, push up. To decrease engine speed, pull down.	

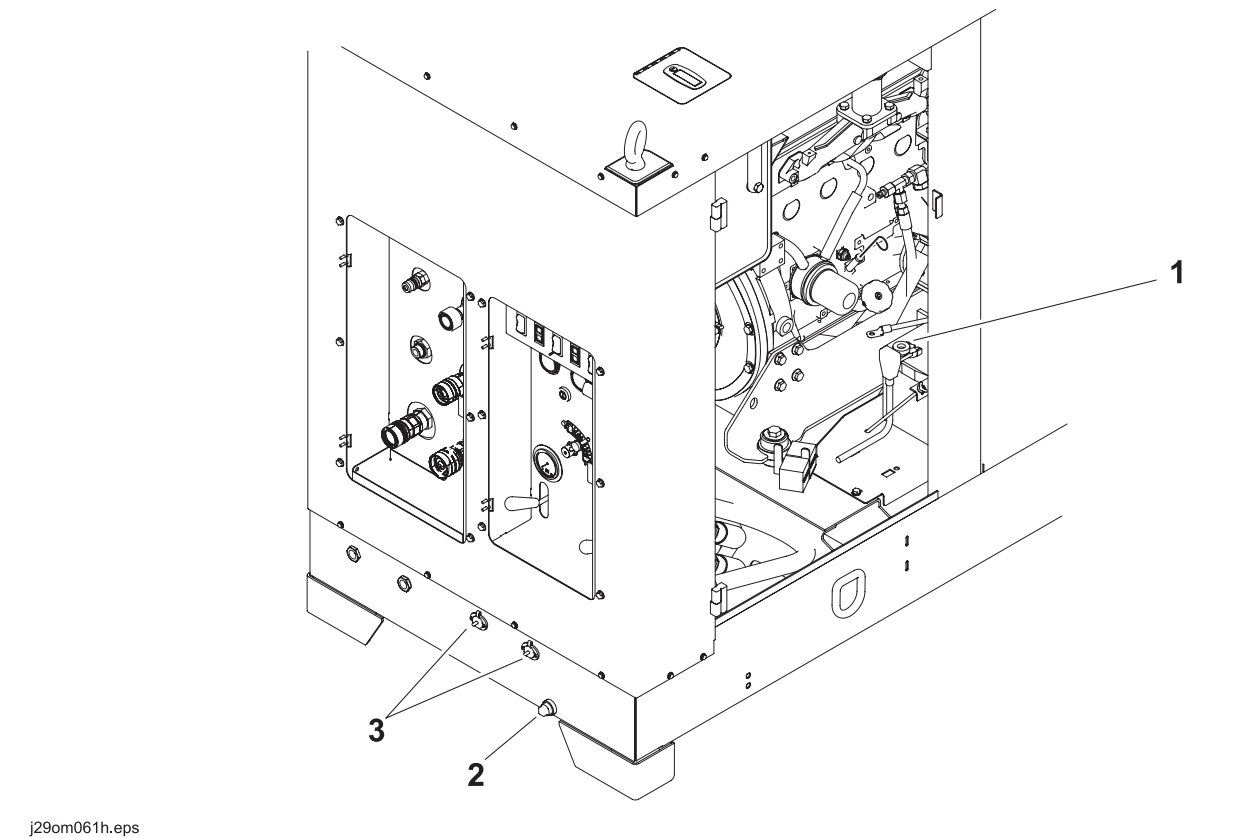


Item	Description	Notes
5. Hydraulic flow control (for AMD)  c00ic136h.eps	To increase hydraulic flow to assisted makeup device (AMD), move handle toward horizontal position. To decrease hydraulic flow to assisted makeup device, move handle toward vertical position.	Maximum output is 7.2 gpm (27.2 L/min) at 2500 psi (172 bar). IMPORTANT: - Stop flow before connecting or disconnecting hydraulic tools. - Leave flow at 0 when not in use and when hoses are not connected.
6. Bursting unit manual control  c00ic572h.eps	To return carriage to back of bursting unit or to pull new product through pipe, pull. To return carriage to front of bursting unit or to push rod into pipe, push.	Use in sequence with rear clamp manual control to push and pull rods from power pack control station. Push sequence: - push clamp manual control - push bursting unit manual control - pull clamp control - pull bursting unit control Pull sequence: - push clamp manual control - pull bursting unit control - pull clamp control - push bursting unit manual control
7. Clamp control  c00ic033h.eps	To close clamp, push. To open clamp, pull.	Use in sequence with bursting unit manual control to push and pull rods. See "Bursting unit manual control" for sequence.

Item	Description	Notes
8. Ignition switch  c00ic065h.eps	To start engine, insert key and turn clockwise. To stop engine, turn key counterclockwise.	IMPORTANT: If unit won't start, ensure all emergency stop switches are disengaged.

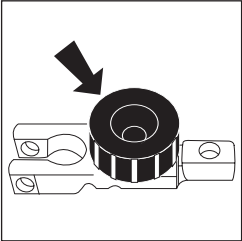


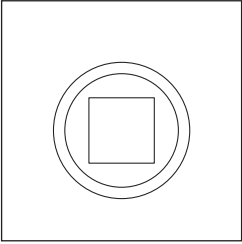
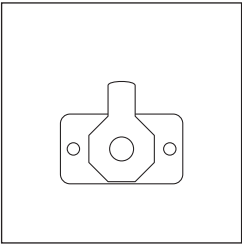
Miscellaneous



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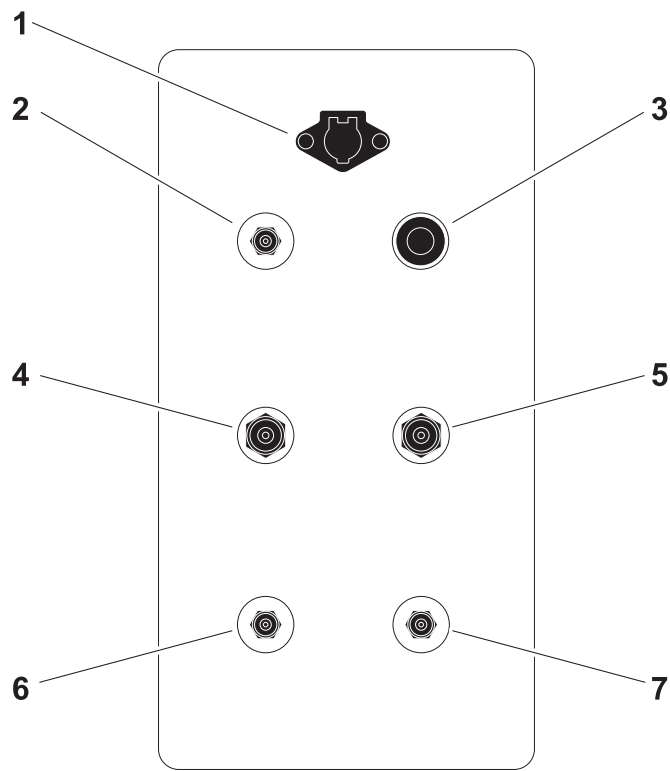
1. Battery disconnect switch
2. Pan drain
3. Auxiliary electrical outlets

Item	Description	Notes
1. Battery disconnect switch  c00ic143h.eps	To disconnect battery, turn counterclockwise. To connect, turn clockwise.	IMPORTANT: Use battery disconnect switch when servicing, welding, and during long-term storage.

Item	Description	Notes
2. Pan drain  c00ic141h.eps	To drain spilled fluid from power pack: - Remove plug. - Replace plug when drain pan is empty.	
3. Auxiliary electrical outlets  c00ic140h.eps	To operate work lights or other 12V devices, plug into outlet.	Outlet has power only when ignition switch is on.



Connector Panel



j29om055h.eps

1.

Electrical connector for remote controller
2.

Hydraulic return connector
3.

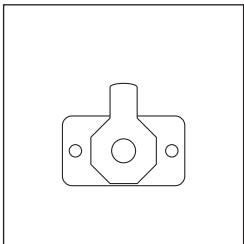
Hydraulic supply connector
4.

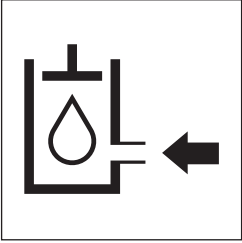
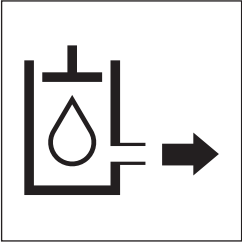
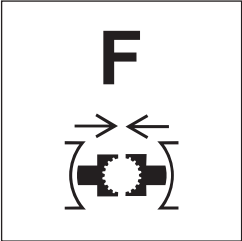
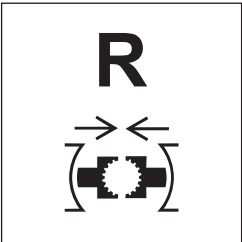
Front clamp closed connector
5.

Rear clamp closed connector
6.

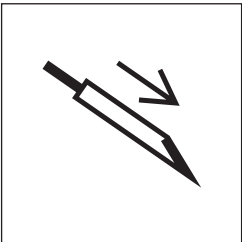
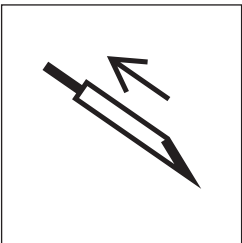
Push pressure connector
7.

Pull pressure connector

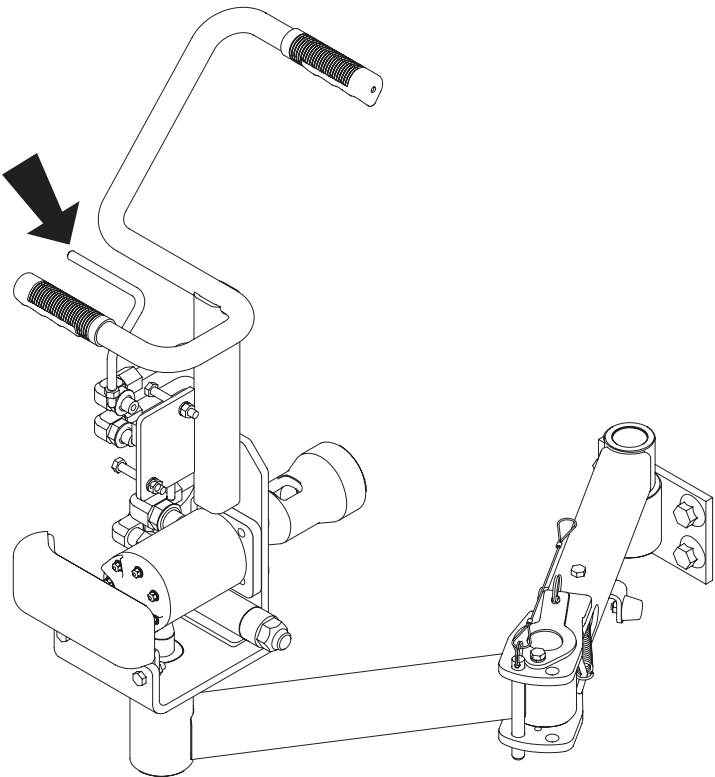
Item	Description	Notes
1. Electrical connector  c00ic140h.eps	Provides 12VDC electrical power for remote controller.	

Item	Description	Notes
2. Hydraulic return connector  c00ic529h.eps	To operate hydraulic power tools with power pack hydraulic system, connect hydraulic return hose to connector.	IMPORTANT: Connect return hose before connecting supply hose.
3. Hydraulic supply connector  c00ic528h.eps	To operate hydraulic power tools with power pack hydraulic system, connect hydraulic supply hose to connector.	IMPORTANT: Connect return hose before connecting supply hose.
4. Front clamp closed connector  c00ic576h.eps	Pressure on this hose closes front clamp.	
5. Rear clamp closed connector  c00ic577h.eps	Pressure on this hose closes rear clamp.	



Item	Description	Notes
6. Push pressure connector  c00ic574h.eps	Pressure on this hose extends horizontal cylinder.	
7. Pull pressure connector  c00ic575h.eps	Pressure on this hose retracts horizontal cylinder.	

Assisted Makeup Device (AMD)



j29om022h.eps

Rotation speed/direction control

Item	Description	Notes
Rotation speed/direction control	To thread rods faster, push handle forward. To unthread rods faster, pull handle back.	IMPORTANT: - Direction is determined from standing behind AMD. - Clamp must be closed before unthreading rod in AMD to prevent unthreading downhole.

Prepare

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- Review Job Plan 40
- Notify One-Call Services 40
- Examine Pullback Material 40
- Arrange for Traffic Control 40
- Plan for Emergency Services 40

Inspect Site 41

- Identify Hazards 42
- Select Installation and Bursting Pit Locations 43

Plan Bore Path 44

Prepare Jobsite 44

- Mark Pull Path 44
- Prepare Installation Point 45

Check Supplies and Prepare Equipment 47

- Check Supplies 47
- Prepare Equipment 48
- Assemble Accessories 48



Gather Information

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

Review Job Plan

Review blueprints or other plans and make sure you have taken enlargement during pullback into account. Check for information about existing or planned structures, elevations, or proposed work that may be taking place at the same time.

Notify One-Call Services

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

Examine Pullback Material

Ask for a sample of the new product material you will be pulling back. Check its weight and stiffness. Contact the manufacturer for bend radius information. Check that you have appropriate pullback devices.

Arrange for Traffic Control

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

Plan for Emergency Services

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

Inspect Site

Inspect jobsite before transporting equipment. Check for the following:

- changes in elevation such as hills or open trenches
- obstacles such as buildings, railroad crossings, or streams
- signs of utilities
 - “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
- depths of existing pipes



Identify Hazards

- Identify safety hazards. Follow U.S. Department of Labor regulations on excavating and trenching (Part 1926, Subpart P) and other similar regulations.
- Have an experienced locating equipment operator sweep area within 20' (6 m) to each side of burst path. Verify previously marked line and cable locations.
- Mark location of all buried utilities and obstructions.

**⚠ WARNING**

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

NOTICE:

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

Select Installation and Bursting Pit Locations

Consider the following when selecting pit locations:

Traffic

Vehicle and pedestrian traffic must be a safe distance from pulling equipment. Allow at least 10' (3 m) buffer zone around equipment.

Space

Check that starting and ending points allow enough space for installation and bursting pits.

Check that installation area has enough space for product to be installed.

Check that there is enough space to work.



Access

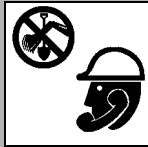
Consider shade, wind, fumes, and other site features.

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

Plan Pull Path

Plan the pull path, from entry to end, before job begins. Locate the entire route of the pipe to be replaced to ensure a straight path. Expose all crossing or parallel utilities within 18" (500 mm) of the pipe being burst. Visually verify that bursting/splitting head does not damage utility.

Prepare Jobsite

**⚠ WARNING**

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

NOTICE:

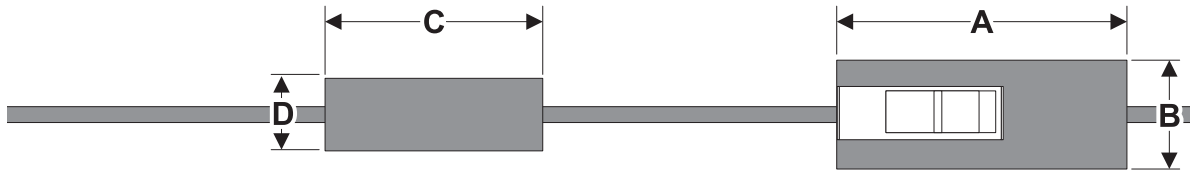
- Cutting high voltage cable can cause electrocution. Expose lines by hand before digging.
- All vegetation near operator's station must be removed. Contact with trees, shrubs, or weeds during electrical strike could result in electrocution.

Mark Pull Path

Mark your planned pull path with flags or paint.

Dig Installation and Bursting Pits

Dimensions



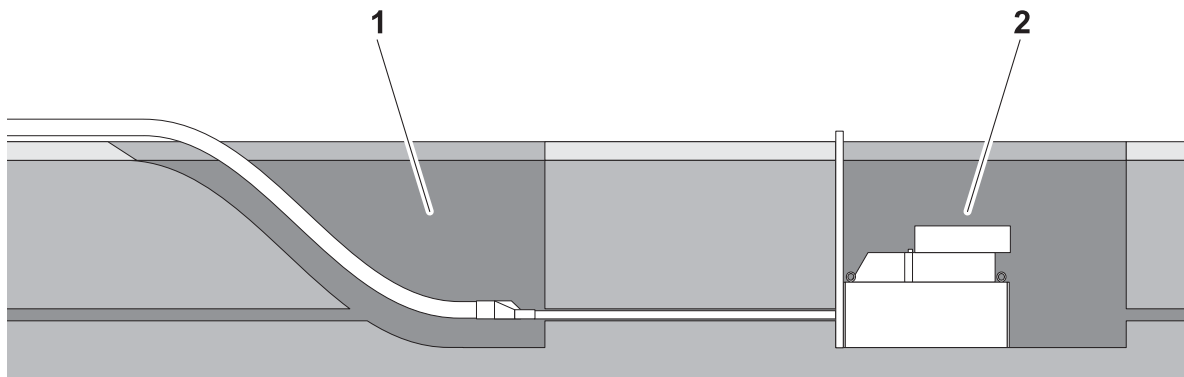
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Unit	Bursting Pit		Installation Pit *	
	Length (A) U.S. (metric)	Width (B) U.S. (metric)	Length (C) U.S. (metric)	Width (D) U.S. (metric)
PR100	12' (3.6 m)	5' (1.5 m)	10' (3 m)	3' (1 m)

* Installation pit dimensions depend on pipe depth and product being installed.



Requirements



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Installation Pit (1)

- Must be in line with existing pipe.
- Sloped back end aids new product installation. Consider new product bend radius.

Bursting Pit (2)

- Must be level to align bursting unit properly with existing pipe.
- Cover pit floor with gravel for drainage and to allow bursting unit to be level with existing pipe.
- Bottom 4" of pit wall must be square (90°) with pit floor.

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

Check Supplies and Prepare Equipment

Check Supplies

- marking flags or paint
- fuel
- keys
- cutting heads, clevis
- barrier cones and tape
- spray lubricant and penetrating oil (p/n 255-1010)
- personal protective equipment, such as hard hat and safety glasses
- notepad and pencil



Prepare Equipment

Fluid Levels

- fuel
- hydraulic fluid
- engine coolant
- battery charge
- engine oil

Condition and Function

- filters (air, oil, hydraulic)
- couplers
- pumps and motors
- hoses and valves

Assemble Accessories

Fire Extinguisher

If required, mount a fire extinguisher near the power pack 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.

Transport

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- Power Pack50
- Bursting Unit51
- Rod Box51
- Extension Cage52
- Tool Kit52

Tie Down Points and Procedure 53

- Power Pack53
- Bursting Unit54
- Rod Box54
- Extension Cage54
- Tool Kit54

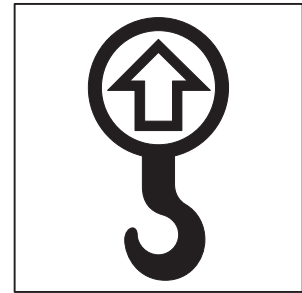


Lift Points and Procedure

**WARNING**

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

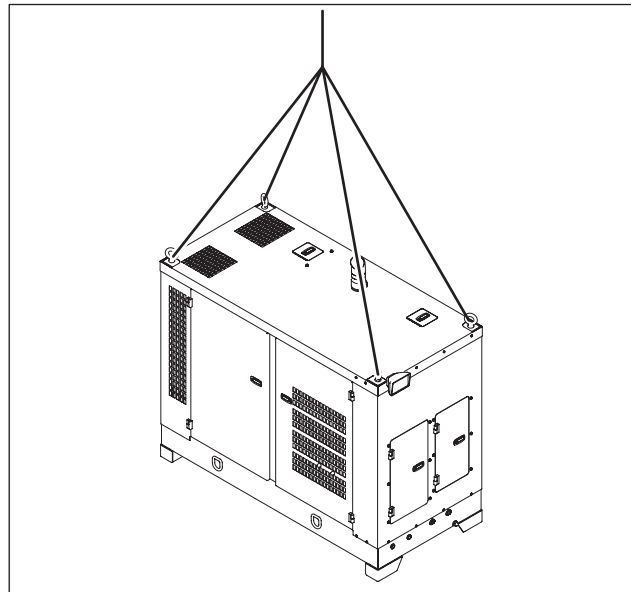
Lifting points are identified by lifting decals. Lifting at other points is unsafe and can damage machinery.



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Power Pack

Use equipment capable of supporting the power pack's size and weight. See "Specifications" on page 97 or measure and weigh equipment before lifting. Use supplied lift chains at lift points as shown.

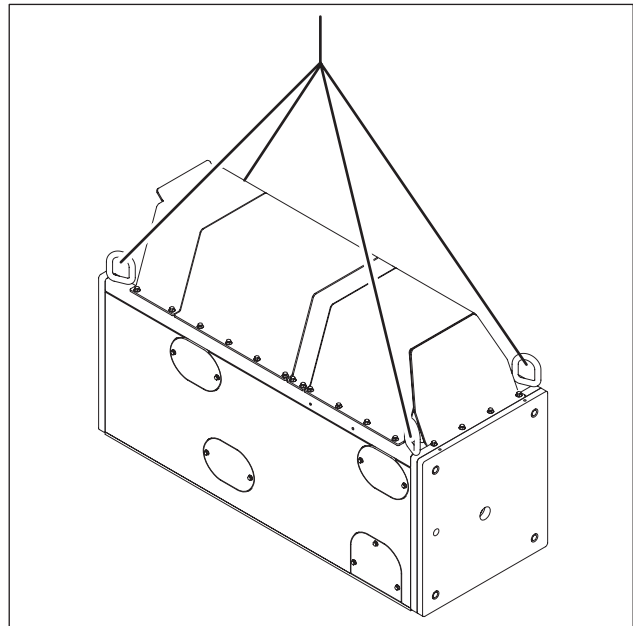


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Bursting Unit

Use equipment capable of supporting the unit's size and weight. See "Specifications" on page 97 or measure and weigh equipment before lifting. Use supplied lift chains at lift points as shown.

IMPORTANT: Do not attempt to lift rod box with bursting unit. Remove rod box before lifting.



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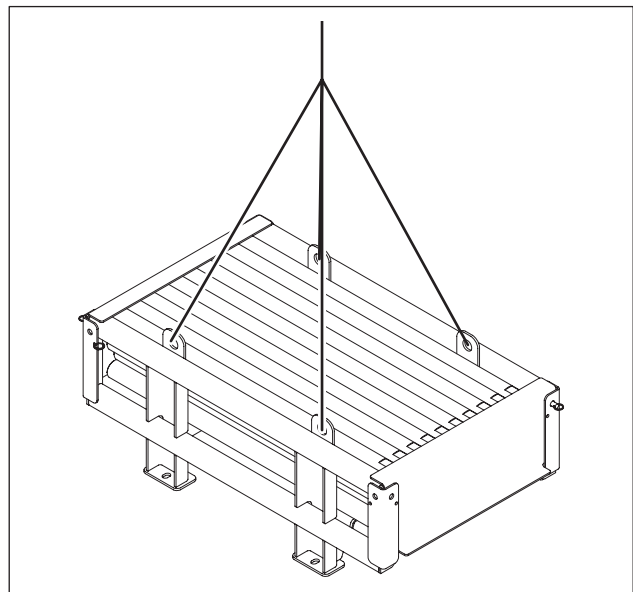


Rod Box

Use equipment capable of supporting the rod box's size and weight. Use supplied lift chains at lift points as shown.

NOTICE:

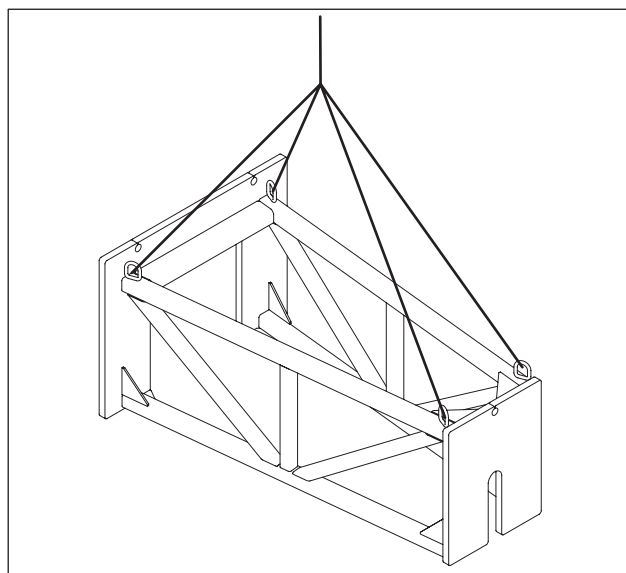
- Do not attempt to lift rod box with bursting unit. Remove rod box before lifting or transporting.
- Ensure end plate is installed and secured with pin.



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Extension Cage

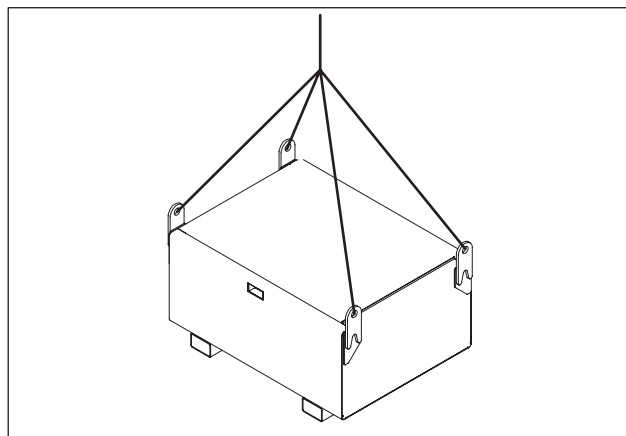
Use equipment capable of supporting the extension cage's size and weight.



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Tool Kit

Use equipment capable of supporting the tool kit size and weight.

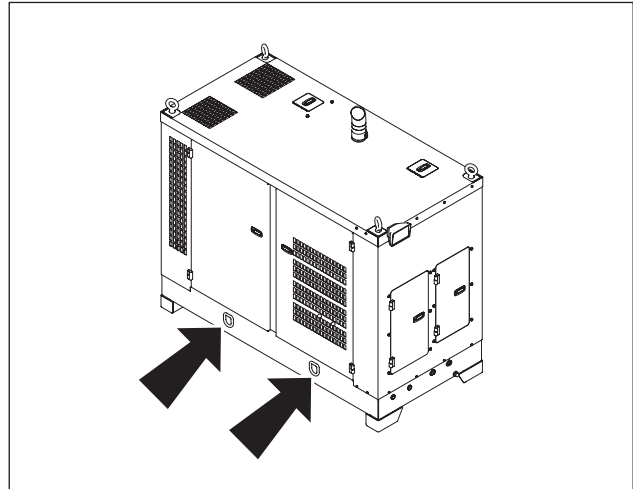


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Tie Down Points and Procedure

Power Pack

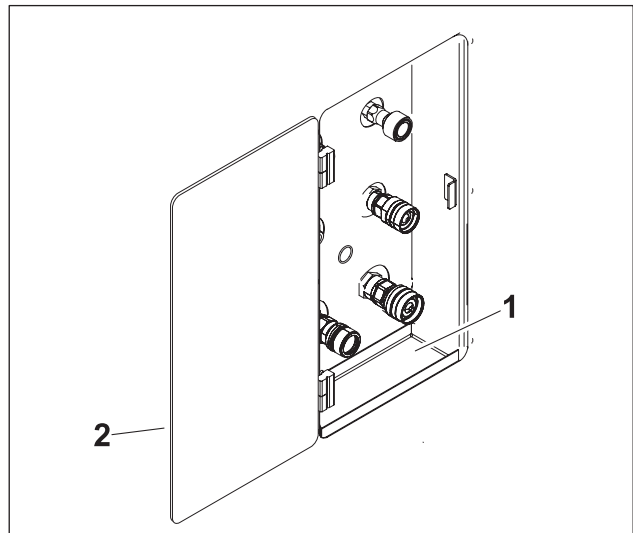
1. To tie down power pack, use D-rings shown.



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2. Ensure that drip pan (1) is installed and door (2) is closed and secure.

IMPORTANT: Ensure that drip pan under couplers is properly located inside power pack and door is secure.



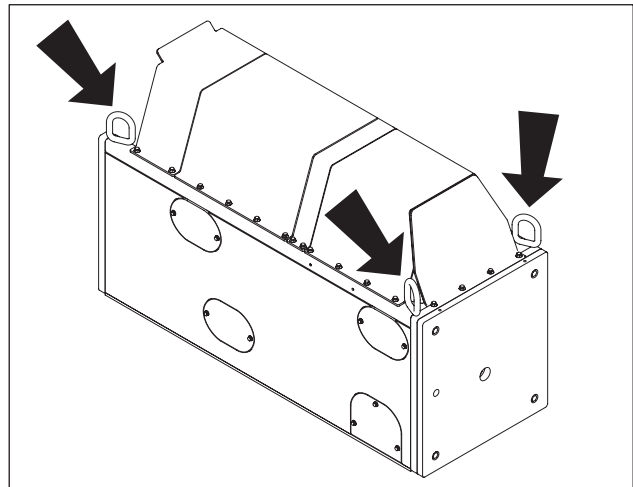
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Bursting Unit

To tie down bursting unit, use D-rings shown.

NOTICE: Do not attempt to transport rod box with bursting unit. Remove rod box before transporting.



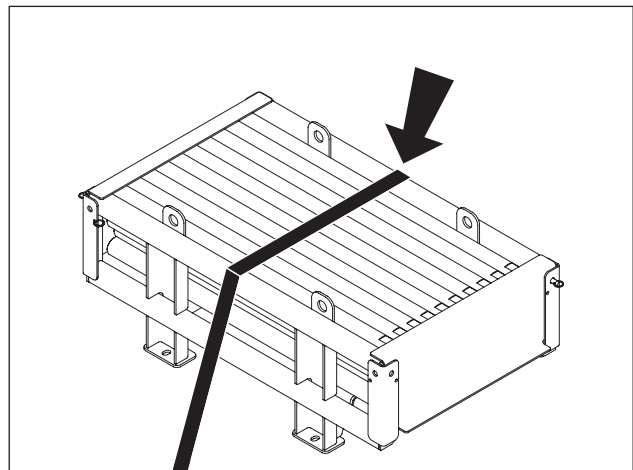
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Rod Box

To tie down rod box, use chain or strap as shown.

NOTICE:

- Remove rod box from bursting unit before transporting.
- Ensure end plate is installed and secured with pin.



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Extension Cage

Use chain or strap to tie down and secure extension cage.

Tool Kit

Use chain or strap to tie down and secure tool kit.

Burst Pipe

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Push Rods Using Remote Controller 60

Connect Bursting/Splitting Head..... 62

Pull New Product 63

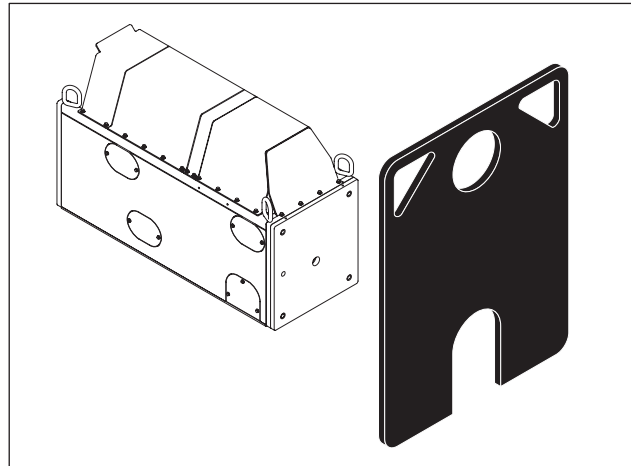


Prepare Equipment

1. Use equipment capable of safely lifting and unloading bursting unit and related equipment next to bursting pit.
2. Place gravel as a pit floor liner to establish slip-free work surface and drainage, and to establish correct depth so that rod string will be level with existing pipe.
3. Lower bursting unit into pit.

NOTICE: Ensure no personnel are in pit as equipment is lowered.

4. Slide steel plate (shown) into position as bursting unit is lowered into pit. Ensure steel plate is flush with pit wall and square (90°) with pit floor.



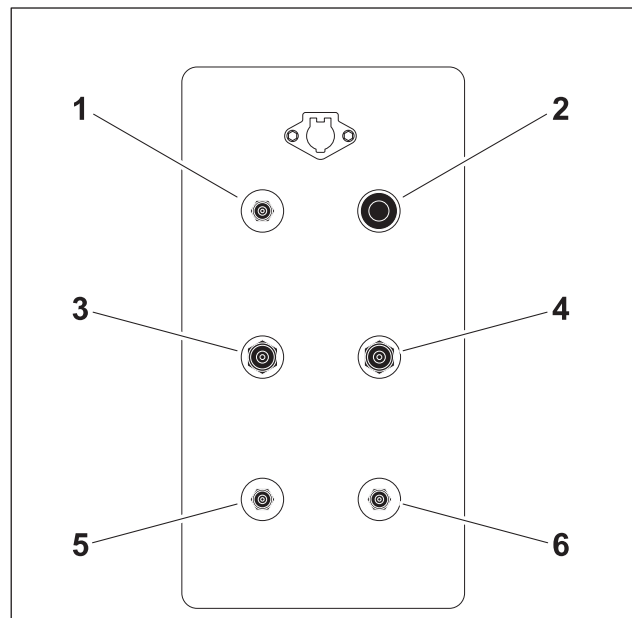
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NOTICE: Follow U.S. Department of Labor regulations on excavating and trenching (Part 1926, Subpart P) and other similar regulations.

5. Connect hydraulic hoses to power pack.
 - Hoses 3, 4, 5 and 6 are from bursting unit.
 - Hoses 1 and 2 are from optional rod makeup device.

IMPORTANT:

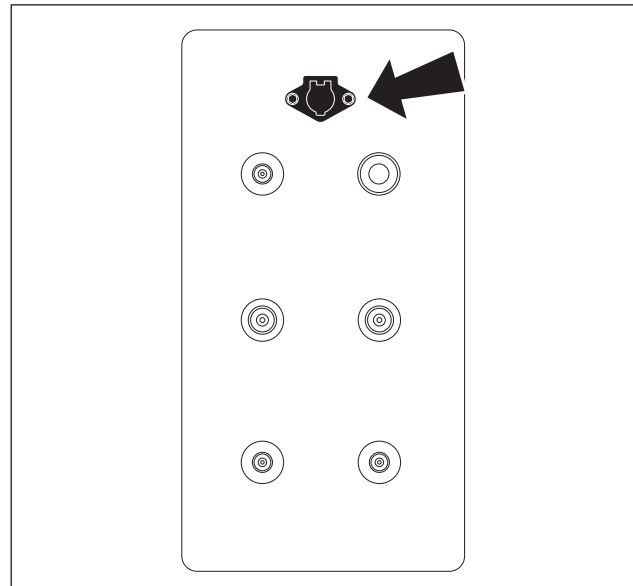
- Ensure connectors are clean before connecting hoses.
- Connect hoses before starting power pack.



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6. Connect electrical cable from remote controller to power pack.

NOTICE: Ensure that remote enable switch on power pack is in OFF position to prevent bursting unit movement when starting power pack engine.



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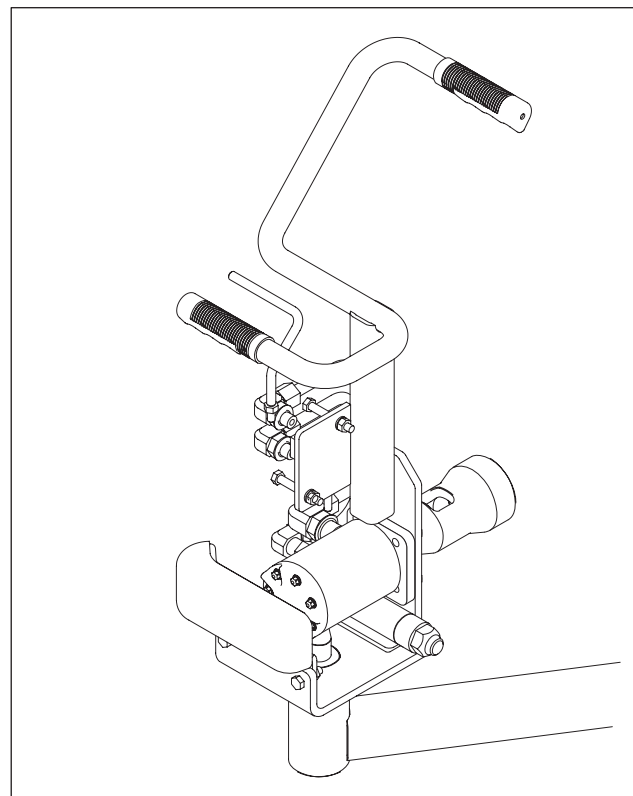
Assisted Makeup Device (AMD)

The optional assisted makeup device (AMD) is used to assist in connecting and disconnecting rods at the bursting unit.

The rotating collar on the AMD fits onto the shoulder flats on the male end of rods.

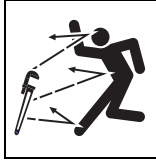
NOTICE:

- Do not hold rod while turning.
- Do not use AMD with pipe wrench to connect or disconnect rod joints.
- Move AMD away from rod string and stand clear of unit and rod string while pulling or pushing rods.



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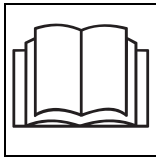


**⚠ DANGER**

Moving tools will kill or injure. Never use wrenches or tools on moving rods and bursting unit components when unit is operating.

**⚠ DANGER**

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

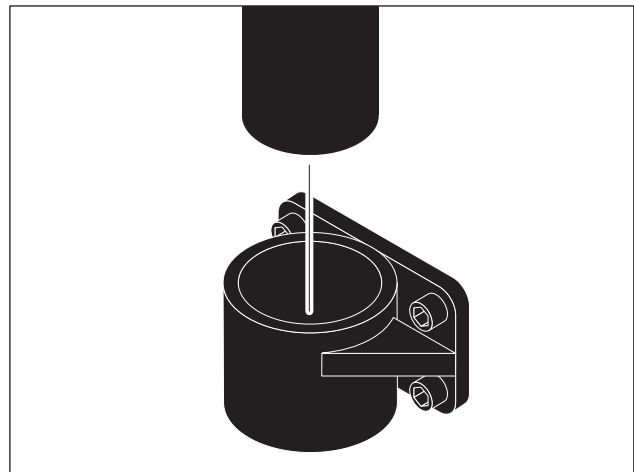
**⚠ WARNING**

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

NOTICE:

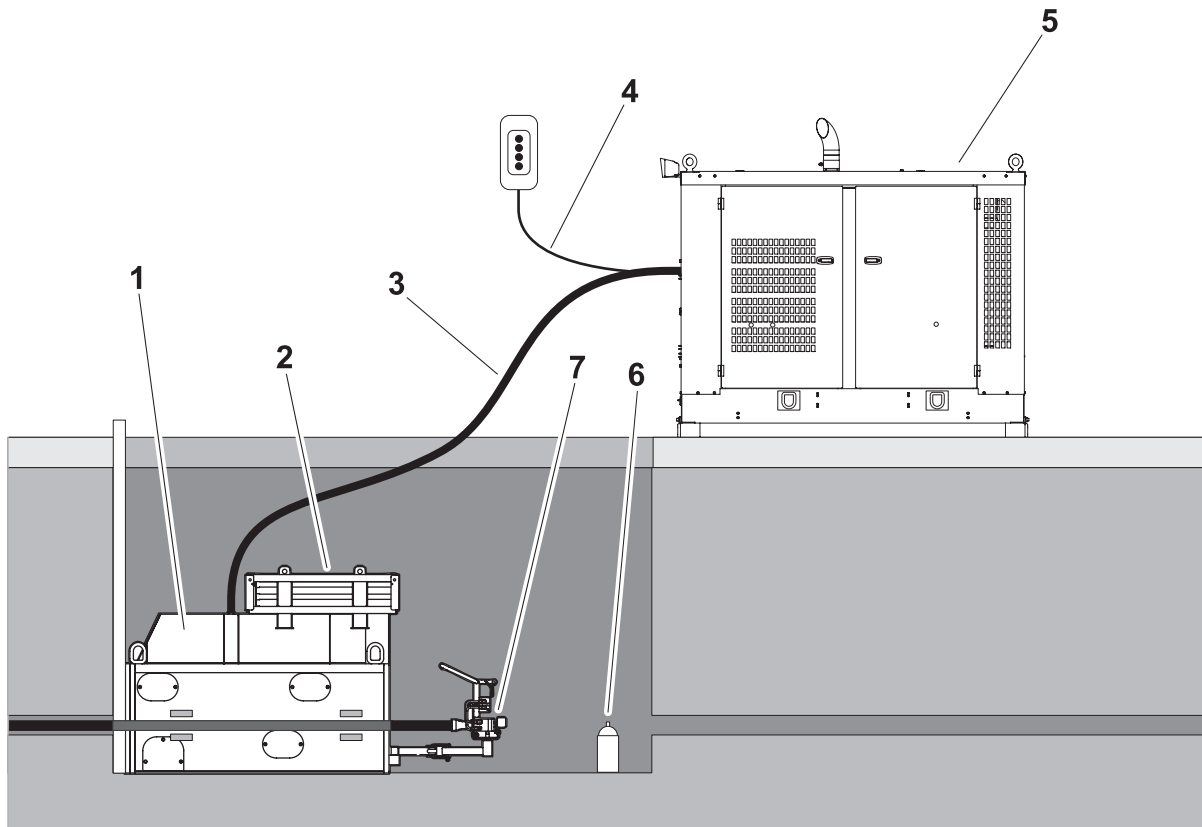
- Do not hold rod while turning.
- Do not use AMD with pipe wrench to connect or disconnect rod joints.
- Move AMD away from rod string and stand clear of unit and rod string while pulling or pushing rods.

7. Place end of optional assisted makeup device (AMD) arm into mount on rear of bursting unit. Swing AMD away from the bursting unit when not in use.



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Setup and Configuration



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Proper setup includes:

- bursting unit (1) placed in gravel-lined bursting pit with steel plate in position
- power pack (5) is positioned outside of bursting pit
- hydraulic hoses (3) are connected from power pack to bursting unit
- power pack engine is OFF
- electrical cable from remote controller (4) is connected to power pack
- remote enable switch on power pack is OFF
- optional assisted makeup device (7) is mounted to bursting unit
- rod box (2) is placed on top of bursting unit so that rods are available
- pins and end plate are removed from rod box
- spray lube (6) is available for lubricating rod threads

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

Emergency Stop Procedure

To shutdown power pack engine under normal conditions, use key switch on power pack.

To shutdown power pack using remote controller, press the remote stop switch on the end of remote controller.

Push Rods Using Remote Controller



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

NOTICE:

- Maintain 2-way communication between bursting pit and all other personnel.
- Ensure operator has good visibility of rods entering/exiting bursting unit.
- Make sure all personnel are clear of moving parts.
- Bursting unit may raise off pit floor under load. Keep hands and feet away.
- Do not attempt to use any part of body to assist rods or product entering/exiting pipe or bursting unit.
- Do not hold rods while turning.
- Do not use AMD with pipe wrench to connect or disconnect rod joints.
- Move AMD away from rod string and stand clear of unit and rod string while pulling or pushing rods.

1. Place at least one person in the bursting pit as operator.
2. Connect hydraulic hoses to bursting unit and power pack.
3. Connect remote controller to power pack and place in pit.
4. Ensure remote enable switch on power pack is in OFF position to prevent bursting unit movement when starting power pack engine.
5. Have an assistant start power pack engine.

NOTICE: To shutdown power pack when using remote controller, press the remote stop switch on the end of remote controller.

6. Have assistant push clamp control at power pack to close rear clamp on bursting unit.
7. Disable front clamp by pulling on the automatic front clamp control valve located on the bursting unit.
8. Have assistant pull clamp control at power pack to open rear clamp on bursting unit.
9. Have assistant pull bursting unit manual control at power pack to return carriage to rear of bursting unit.

10. Select pilot rod and apply spray lube to rod threads.
11. Lubricate rod threads with spray lube and connect two rods to pilot rod and tighten.

IMPORTANT: Spray threads of each rod with spray lubricant (p/n 255-1010) at every use.

12. Insert rods into bursting unit through open clamps.
13. Have assistant switch remote enable switch on power pack to ON position. This closes the rear clamp on the bursting unit automatically.

IMPORTANT: To avoid damage to rods, do not clamp on empty box (female end) of rods.

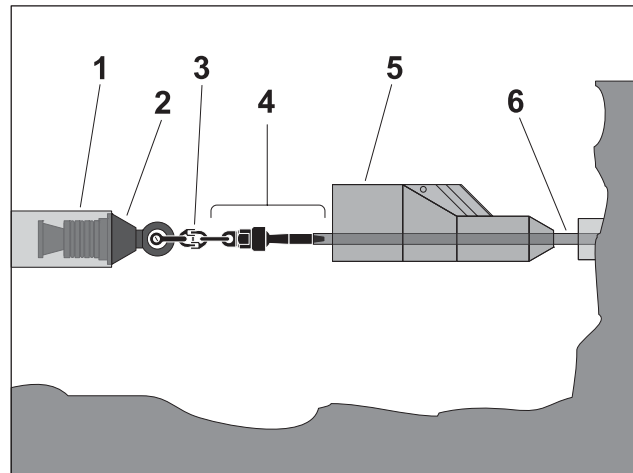
14. Turn mode selector switch on remote controller to the right for push mode.
15. Push and hold work button (white) on remote controller to push rods forward.
16. Push and hold return button (black) on remote controller to return carriage to rear of bursting unit.
17. Push and hold work button (white) on remote controller to return carriage to front of bursting unit.
18. Lubricate rod threads with spray lube and connect next rod onto rod string.
19. Swing assisted makeup device into position and place collar onto flats on male end of rod.
20. Adjust flow divider on power pack to desired speed.
21. Push assisted makeup device valve handle forward to tighten rods.
22. Swing assisted makeup device clear of rod.
23. Push and hold return button (black) on remote controller to return carriage to rear of bursting unit.
24. Push and hold work button (white) on remote controller to push rods forward.
25. Continue connecting rods together and pushing into pipe until pilot assembly enters installation pit.

IMPORTANT: Spray threads of each rod with spray lubricant (p/n 255-1010) at every use.

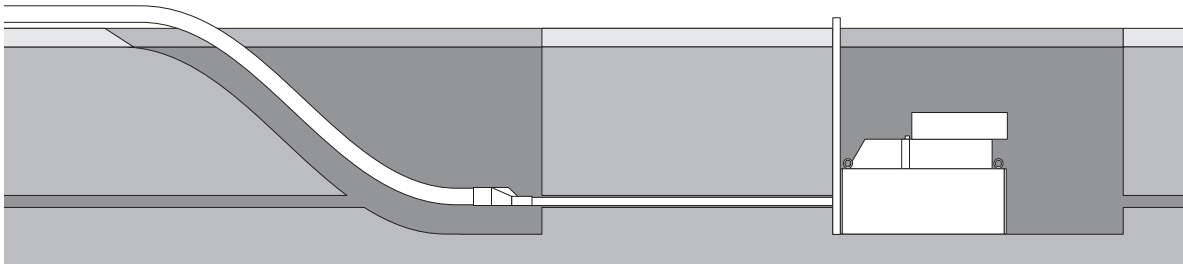


Connect Bursting/Splitting Head

1. Install bursting/splitting head (2) onto end of new product (1).
2. Remove pilot rod assembly.
3. Install bursting/splitting head (5) over rod (6) and slide forward until threads are visible.
4. Thread stop rod assembly (4) on end of rod string.
5. Connect stop rod assembly to bursting/splitting head with a shackle (3).

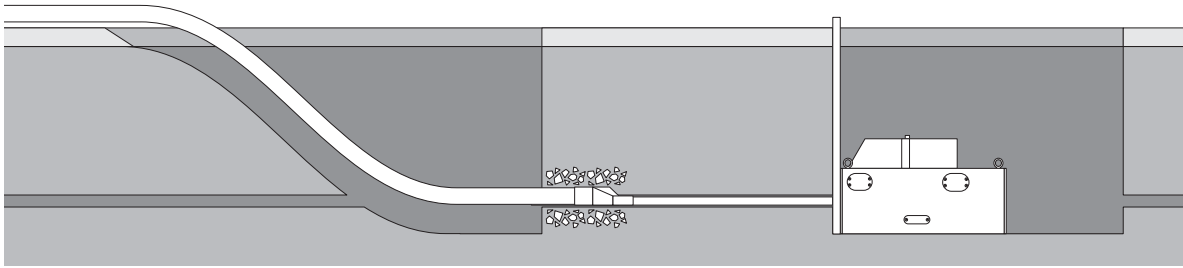


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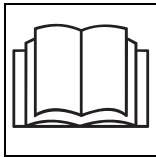


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Pull New Product



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⚠ WARNING

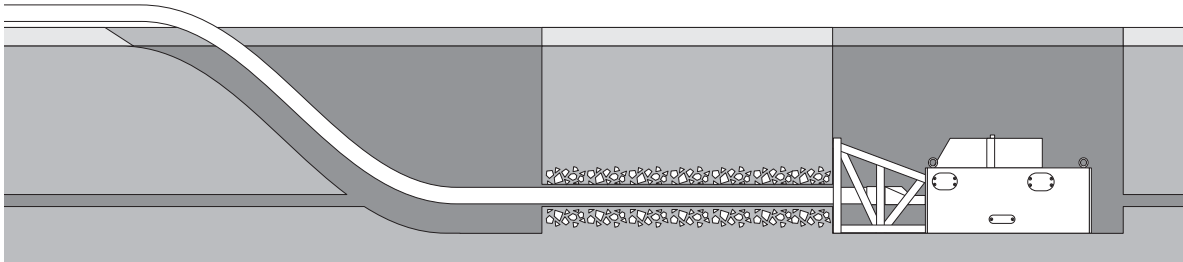
Incorrect procedures could result in death, injury, or property damage.
Learn to use equipment correctly.

NOTICE:

- Maintain 2-way communication between bursting pit and all other personnel.
- Ensure operator has good visibility of rods entering/exiting bursting unit.
- Make sure all personnel are clear of moving parts.
- Bursting unit may raise off pit floor under load. Keep hands and feet away.
- Do not attempt to use any part of body to assist rods or product entering/exiting pipe or bursting unit.
- Do not hold rods while turning.
- Do not use AMD with pipe wrench to connect or disconnect rod joints.
- Move AMD away from rod string and stand clear of unit and rod string while pulling or pushing rods.



1. Turn mode selector switch on remote controller to the left for pull mode.
2. Push and hold work button (white) on remote controller to pull back rod string.
3. Push and hold return button (black) on remote controller to return carriage to front of bursting unit. Jaws close as button is released.
4. Disconnect and place rods in rod box.
5. Continue pulling back rod string until bursting/splitting assembly reaches pit.

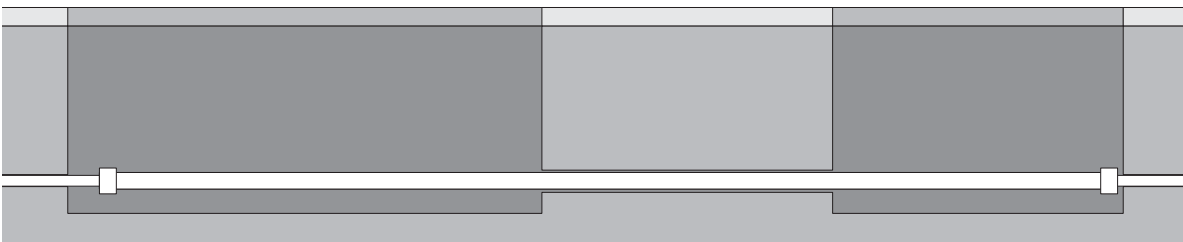


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6. Remove assisted makeup device (AMD).
7. Connect one rod onto rod in bursting unit.
8. Push bursting unit back slightly to remove steel plate.
9. Move bursting unit back in pit and position extension cage between bursting unit and existing pipe and pit wall.

IMPORTANT: Ensure extension cage is level and centered. Move bursting unit forward until it is firmly against extension cage.

10. Put bursting unit in pull mode and pull bursting/splitting system into extension cage.
11. Remove extension cage.
12. Disconnect and remove bursting/splitting system.
13. Remove bursting unit from pit.
14. Connect both ends of new product to existing pipe to complete job.



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Systems and Equipment

Chapter Contents

Bursting String 66

- Pilot Rods 66
- Bursting/Splitting Heads 67

Extension Cage 68

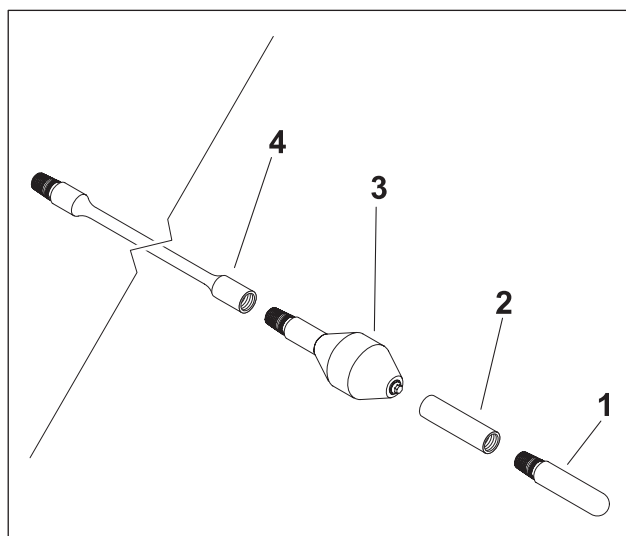
Tool Kit. 68



Bursting String

Pilot Rods

Type		Uses
1.	standard pilot rod	used in pipes without joint misalignment
2.	female-to-female adapter	used for double-bursting
3.	fiber ball pilot rod	used in pipes with considerable joint misalignment
4.	flexible pilot rod	used with standard pilot rod in pipes with curves; also used in failing pipes



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Bursting/Splitting Heads

Identification and Uses

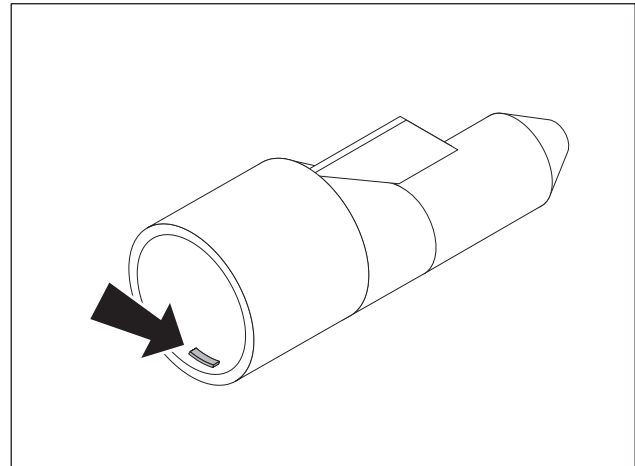
Stop rods and bursting/splitting heads are each marked with an identification number, as shown.

IMPORTANT: Ensure identification numbers on stop rod system and bursting/splitting heads match.

The standard bursting/splitting head (shown) is used for ductile iron, steel, cast iron, and reinforced concrete pipe.

A 2-blade Adapter is available for bursting/splitting PVC and HDPE pipe.

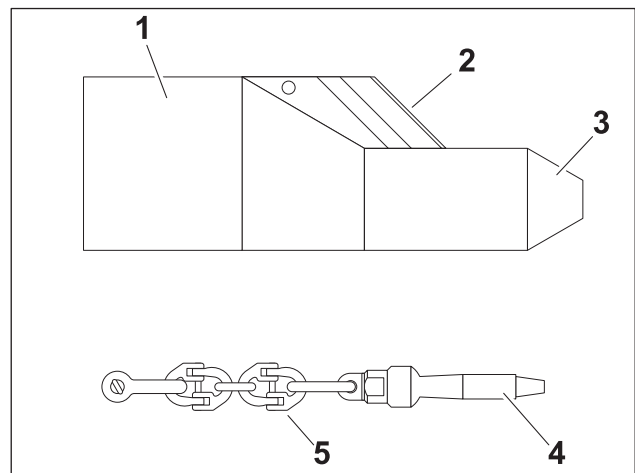
IMPORTANT: Standard bursting/splitting head is shown.



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Components

Component		Description
1.	rear of bursting/splitting head	fits OD of new product being installed
2.	knife	cuts existing pipe
3.	front of bursting/splitting head	fits inside existing pipe
4.	stop rod	connects rods in existing pipe to bursting/splitting head
5.	d-link and chain on stop rod	attaches new product to stop rod system

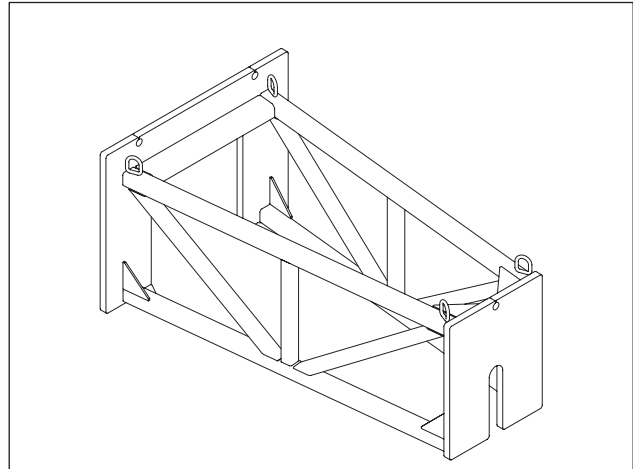


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Extension Cage

The extension cage allows room to remove the bursting/splitting assembly from the new product after it enters the installation pit.



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Tool Kit

Accessory Tool Kit:

- 7' chain set (for power pack, bursting unit)
- 3' chain set (for smaller items)
- grease gun and grease cartridges
- hand tools
- slide hammers

Note: Accessories and tools are available separately. Contact your Ditch Witch dealer.

Complete the Job



Chapter Contents

Stow Components	70
Restore Jobsite	70
Stow Tools	70

Stow Components

1. Install all covers.
2. Load components onto trailer.
3. Secure all components on trailer.

Restore Jobsite

Fill in installation, bursting and service connection pits.

Stow Tools

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

Service

Chapter Contents

Service Precautions 72

Recommended Lubricants/Service Key 73

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Each Use 75

10 Hour 78

50 Hour 81

500 Hour 84

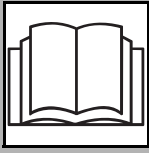
1000 Hour 86

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As Needed 88



Service Precautions

**⚠ WARNING**

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

NOTICES:

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

Welding Precaution

NOTICE: Welding can damage electronics.

- Disconnect battery to prevent damage to battery. Do not turn off battery disconnect switch with engine running, or alternator and other electronic devices may be damaged.
- Connect welder ground clamp close to welding point and make sure no electronic components are in the ground path.
- Always disconnect the Engine Control Unit ground connection from the frame, harness connections to the ECU, and other electronic components prior to welding on machine or attachments.

Washing Precaution

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

Recommended Lubricants/Service Key

Item	Description
 DEO	Diesel engine oil meeting or exceeding Cummins CES 20078, API CI-4, ACEA E-5, JAMA DH-1, or Global DHD-1. API American Petroleum Institute, ACEA European Automobile Manufacturer's Association, JAMA Japanese Automobile Manufacturer's Association. Use viscosity grade SAE 15W40 unless ambient temperatures below 5° F (-15° C) are expected. Lower viscosity oils must meet the performance specifications shown above.
 DEAC	Diesel engine antifreeze/coolant meeting ASTM D6210 (fully formulated) or D4985 (low silicate)
 MPGM	Multipurpose grease (molybdenum disulfide 5%) meeting ASTM D217 and NLGI 2
 THF	Tractor hydraulic fluid, similar to Phillips 66 HG, Mobilfluid 423, Chevron Tractor Hydraulic Fluid, Texaco TDH Oil, Shell Tellus, or equivalent
	Spray lubricant and penetrating oil (p/n 255-1010)
	Check level of fluid or lubricant
	Check condition
	Filter
	Change, replace, adjust, service or test



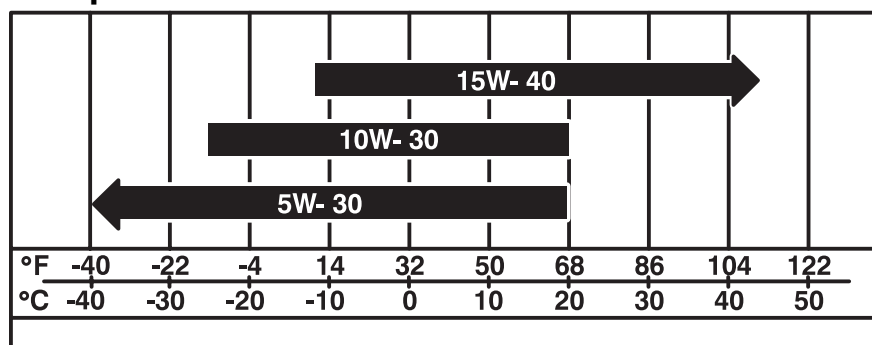
Proper lubrication and maintenance protects Ditch Witch equipment from damage and failure. Service intervals listed are for minimum requirements. In extreme conditions, service machine more frequently. Use only recommended lubricants. Fill to capacities listed in "Specifications" on page 97.

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

NOTICE:

- Use only genuine Ditch Witch parts, filters, approved lubricants, TJC, and approved coolants to maintain warranty.
- Use the "Service Record" on page 105 to record all required service to your machine.

Engine Oil Temperature Chart



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Temperature range anticipated before next oil change

See engine manual for more information about oil viscosity and operation in arctic conditions.

Approved Fuel

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

NOTICE: Biodiesel blends are not approved for use in this unit.

Fuel Sulfur Information

Fuel sulfur content should be less than 5000 ppm (0.5%).

IMPORTANT: Fuel sulfur content should be less than 5000 ppm (0.5%). Worldwide, fuel sulfur retentions vary widely. Fuel used should always comply with local regulations. If using lube oil meeting API CJ-4 (or other low SAPS equivalent) and fuel with sulfur content above 15 ppm (ULSD in the U.S.), reduce oil change interval to 250 hours.

Approved Coolant

This unit was filled with John Deere Cool-Gard coolant before shipment from factory. Add only John Deere Cool-Gard (p/n 255-006) or any fully-formulated, ethylene glycol based, low-silicate, heavy-duty diesel engine coolant meeting ASTM specification D6210 or D4985.

NOTICE:

- Do not use water or high-silicate automotive-type coolant. This will lead to engine damage or premature engine failure.
- Do not mix heavy-duty diesel engine coolant and automotive-type coolant. This will lead to coolant breakdown and engine damage.
- Use only distilled water for mixing coolants. Do not use tap water.

Each Use

Location	Task	Notes
BURSTING UNIT	Lube rear clamp pivot	MPGM
	Lube front clamp	MPGM
	Clean rod/pipe threads	before each use
	Clean jaw threads	after each use
POWER PACK	Check drip pan	after each use

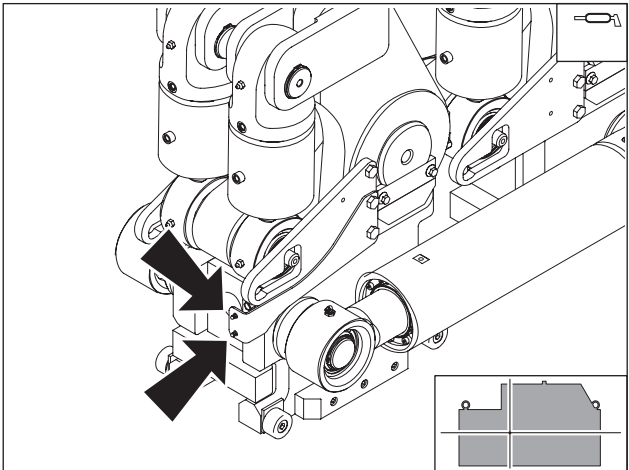


Bursting Unit

Lube Rear Clamp Pivot

Lube zerks with special MPGM before each use or every 10 hours.

IMPORTANT: Ensure jaw is up before lubing.

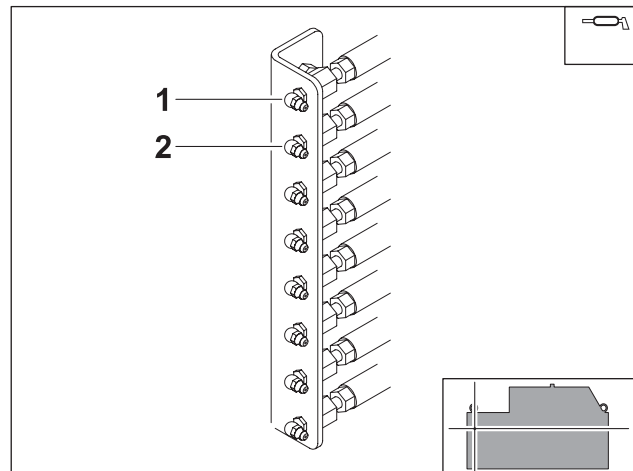


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Lube Front Clamp

Lube zerks (1, 2) with special MPGM before each use or every 10 hours.

IMPORTANT: Ensure jaw is up before lubing.

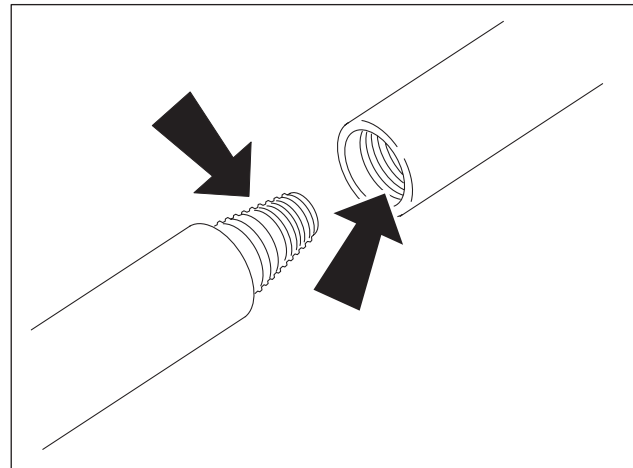


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Clean Rod/Pipe Threads

Clean rod/pipe threads before each use. Brush threads with wire brush to remove debris and lube with spray lubricant and penetrating oil.

IMPORTANT: Spray threads of each rod with spray lubricant and penetrating oil (p/n 255-1010) at every use.



DrillPipe_Clean.eps

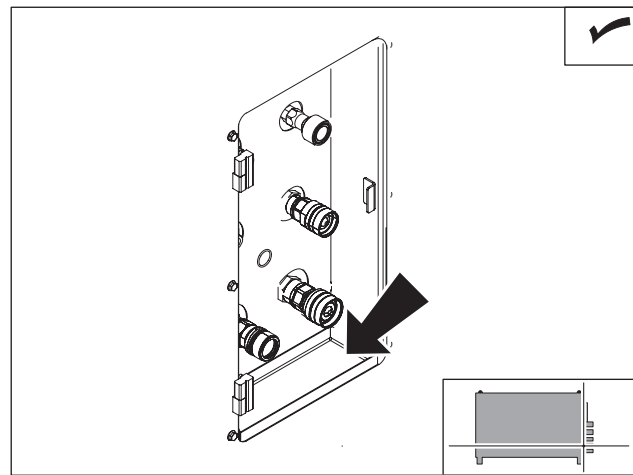
Clean Jaw Threads

Clean jaw threads with high-pressure water after each job.

Power Pack

Check Drip Pan

Check drip pan under couplers after each use.
Drain as needed.



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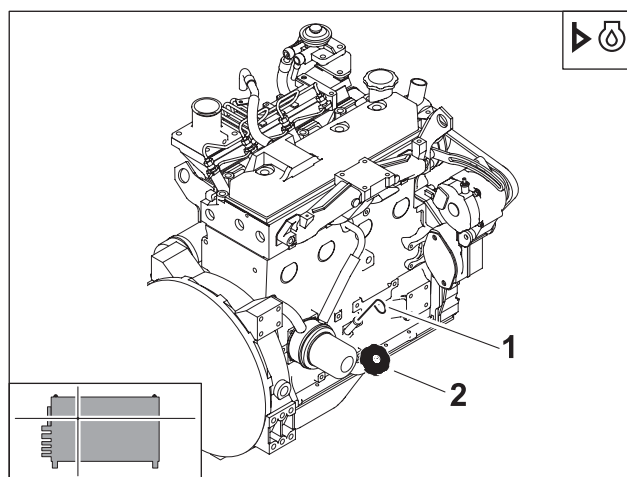
10 Hour

Location	Task	Notes
POWER PACK	Check engine oil level	DEO
	Drain fuel/water separator	
	Check engine coolant level	DEAC
	Check engine air filter service indicator	
	Check hydraulic fluid level	THF
	Check hydraulic hoses and fittings	

Power Pack

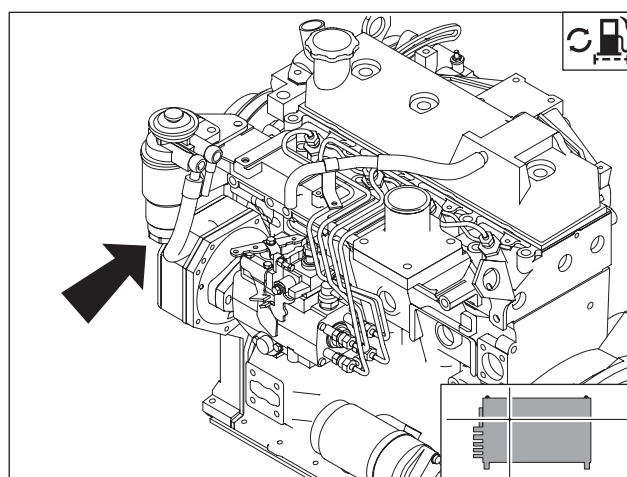
Check Engine Oil Level

Check engine oil at dipstick (1) before operation and every 10 hours thereafter. Check with unit on level surface and at least 15 minutes after stopping engine. Add DEO at fill (2) as necessary to keep oil level at highest line on dipstick.



Drain Fuel/Water Separator

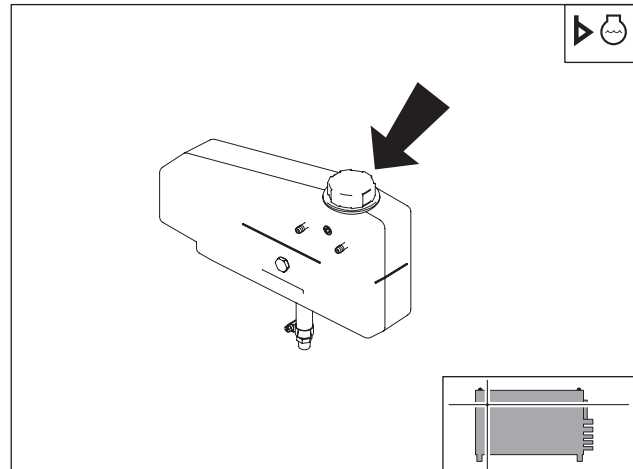
Drain water out of filter every 10 hours. To drain, place loose end of drain hose into approved container. Turn valve on bottom of filter counterclockwise 4 turns until water flows out of drain hose. When fuel comes out, turn valve clockwise to close.



Check Engine Coolant Level

Check coolant level, with engine cool, every 10 hours. Maintain coolant level to mark on reservoir. If low, add approved coolant.

IMPORTANT: See "Approved Coolant" on page 74 for information on approved coolants.



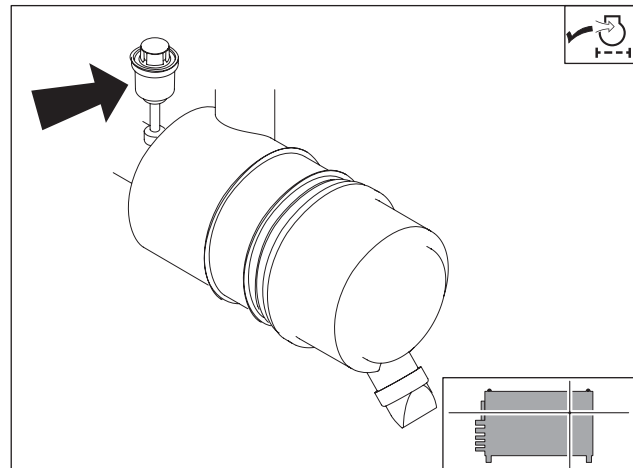
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Check Engine Air Filter Service Indicator

Check air filter service indicator every 10 hours. Change air filter elements when air filter restriction indicator reaches the red zone. See "Change Air Filter" on page 96.

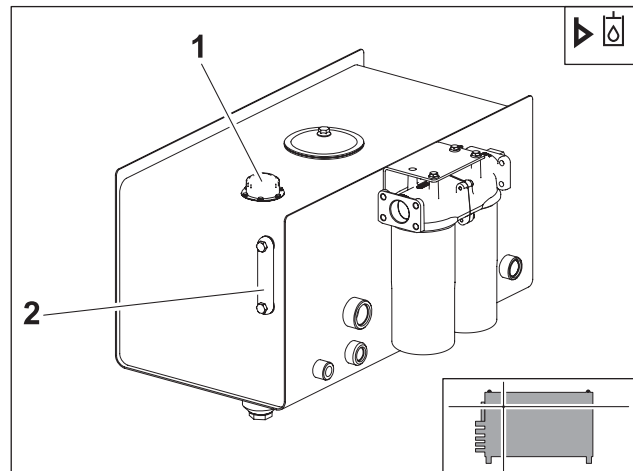
NOTICE: Only open the air filter canister when air restriction is indicated. Change the elements. Do not attempt to clean them.



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Check Hydraulic Fluid Level

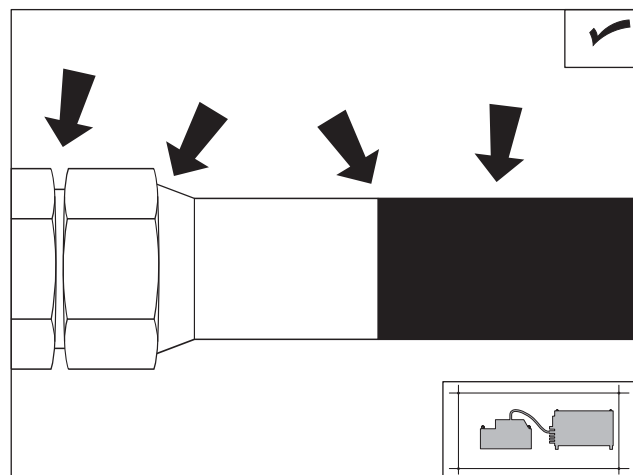
Check hydraulic fluid level every 10 hours. Maintain fluid level two-thirds point up sight glass (2), when engine is off, fluid is cool, and thrust cylinders are retracted (if connected to pull box). Add THF at hydraulic fluid fill (1).



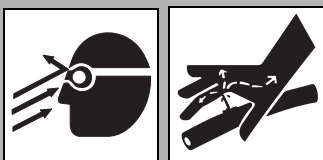
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Check Hydraulic Hoses

Check hydraulic hoses for leaks every 10 hours.



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WARNING

Pressurized fluid or air could pierce skin and cause injury or death. Stay away.

NOTICE: Escaping pressurized fluid can cause injury or pierce skin and poison.

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

50 Hour

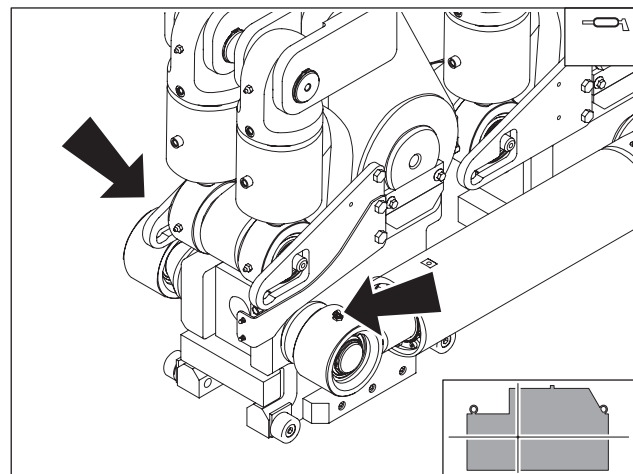
Location	Task	Notes
BURSTING UNIT	Lube push/pull cylinder rear pins	MPGM
	Lube push/pull cylinder front pins	MPGM
	Lube front clamp cylinder pins	MPGM
	Lube rear clamp cylinder pins	MPGM
POWER PACK	Check radiator	
	Change engine oil and filter	Initial service



Bursting Unit

Lube Push/Pull Cylinder Rear Pins

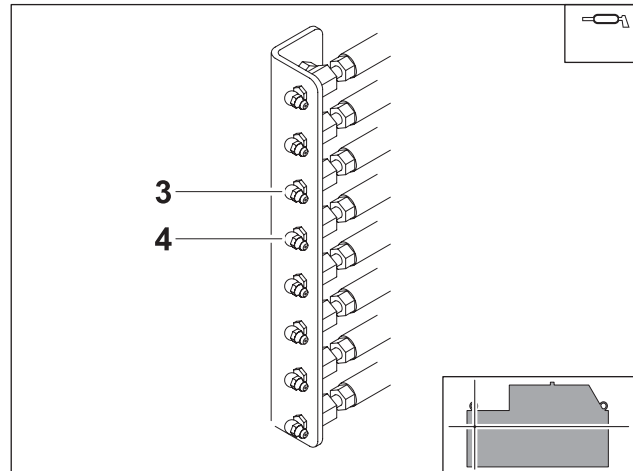
Lube zerks with special MPGM every 50 hours.



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Lube Push/Pull Cylinder Front Pins

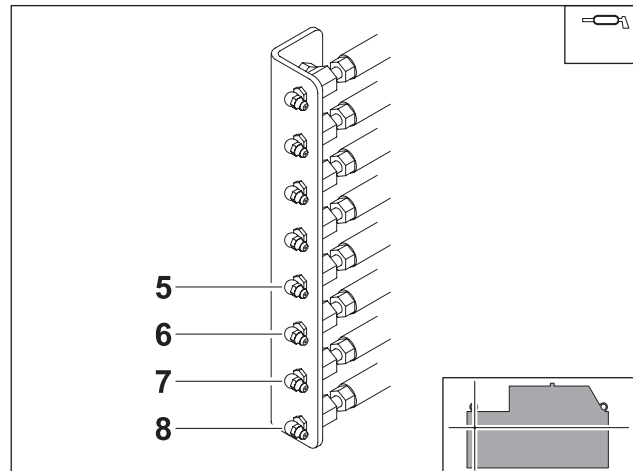
Lube zerks (3, 4) with MPG every 50 hours.



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Lube Front Clamp Cylinder Pins

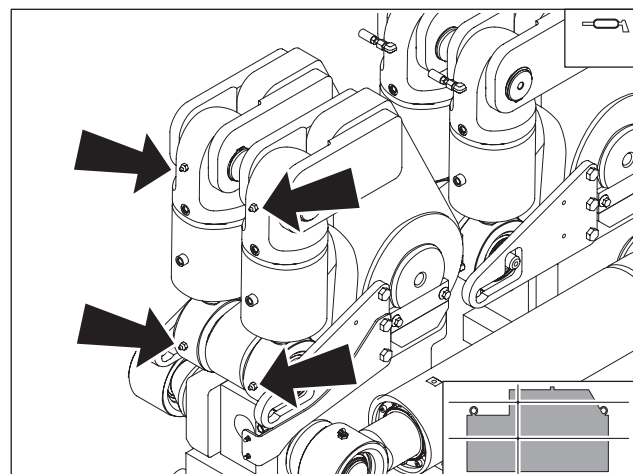
Lube zerks (5, 6, 7, 8) with special MPGM every 50 hours.



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Lube Rear Clamp Cylinder Pins

Lube zerks with special MPGM before every 50 hours.



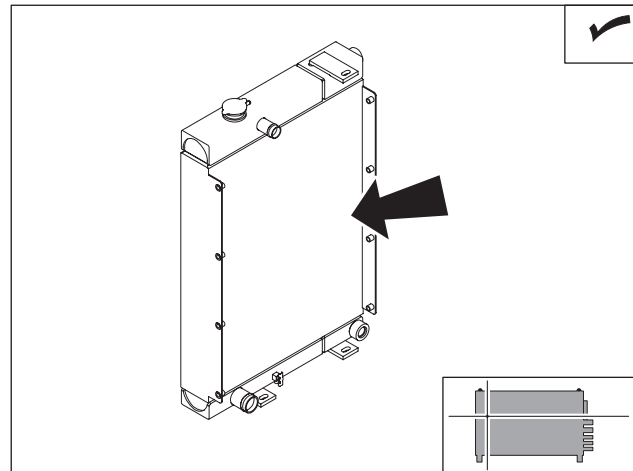
J29om045.eps

Power Pack

Check Radiator

Check radiator fins for dirt, grass, and other foreign matter every 50 hours. Check more often if operating in dusty or grassy conditions. Clean as needed.

IMPORTANT: Be careful not to damage fins with high pressure air or water.



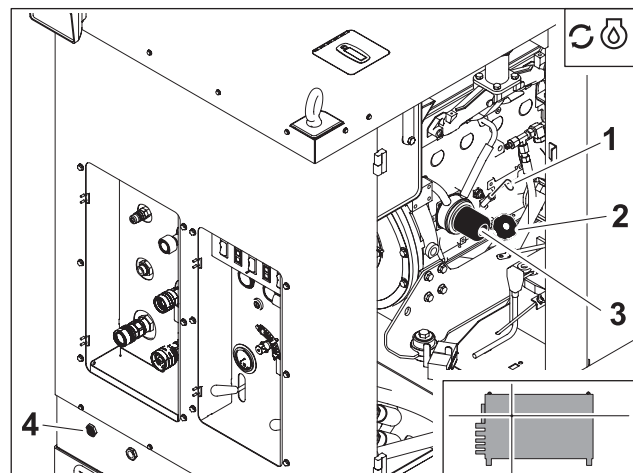
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Change Engine Oil & Filter (Initial Service)

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

1. Drain crankcase through drain (1) while oil is warm.
2. Replace filter (2) each time oil is changed.
3. Refill with 9 qt (8.5 L) DEO at fill neck (3).



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500 Hour

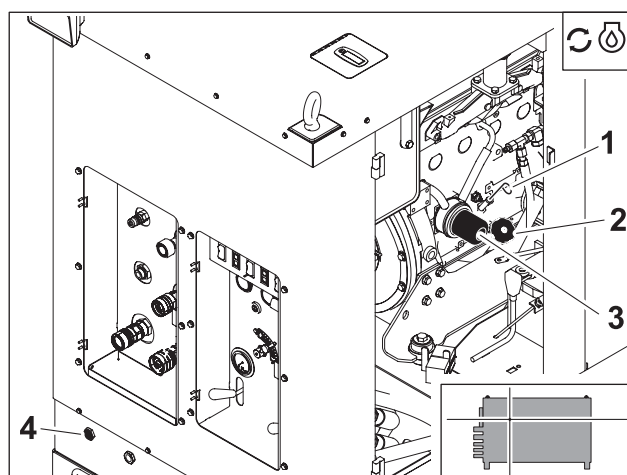
Location	Task	Notes
POWER PACK	Change engine oil and filter	DEO
	Change fuel filter	
	Change hydraulic filters	

Power Pack

Change Engine Oil and Filter

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

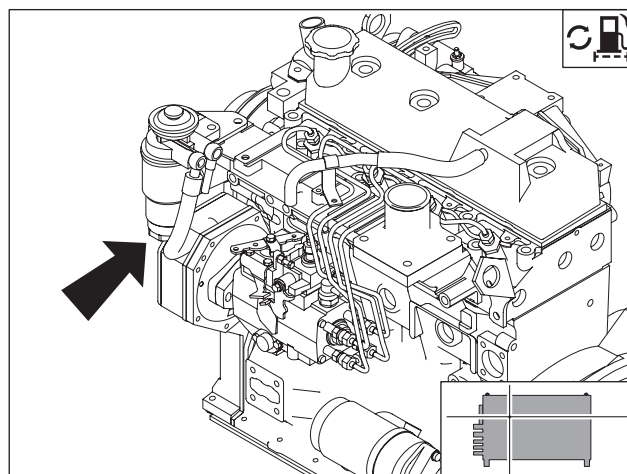
1. Drain crankcase through drain (1) while oil is warm.
2. Replace filter (2) each time oil is changed.
3. Refill with 9 qt (8.5 L) DEO at fill neck (3).



J29om032h.eps

Change Fuel Filter

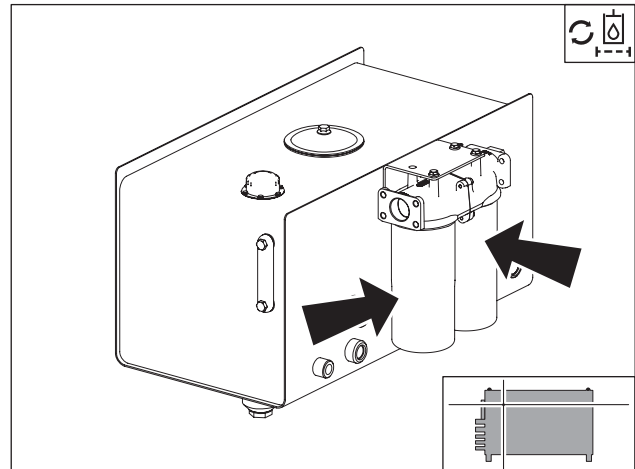
Replace fuel filter every 500 hours for normal service. See parts manual or contact your Ditch Witch dealer for correct replacement filter.



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Change Hydraulic Filters

Change hydraulic filters every 500 hours or when filter restriction indicator is on.



J29om037h.eps



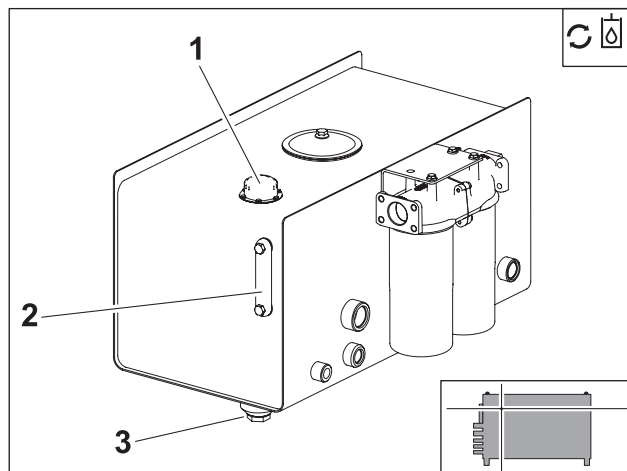
1000 Hour

Location	Task	Notes
POWER PACK	Change hydraulic fluid	THF

Power Pack

Change Hydraulic Fluid

Change hydraulic fluid and filter every 1000 hours for normal service. Drain hydraulic fluid (3), change filter, and add THF at hydraulic fluid fill (1). Fill until level is two-thirds up sight glass (2) with thrust cylinders retracted (if connected to pull box). Capacity is approximately 30 gal (114 L).



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2000 Hour

Location	Task	Notes
POWER PACK	Change engine coolant	DEAC



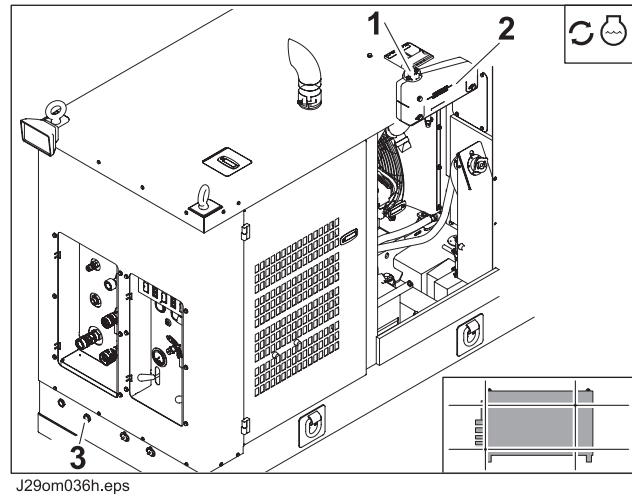
Power Pack

Change Engine Coolant

Drain cooling system at drain (3) every two years or 2000 hours. Add coolant at fill (1). Fill to mark on reservoir (2.) Capacity is approximately 3.7 gal (14.0 L).

NOTICE:

- The use of non-approved coolant may lead to engine damage or premature engine failure and will void engine warranty.
- See See "Approved Fuel" on page 74. for list of approved coolants.



J29om036h.eps

Coolant Fill Procedure

To fill:

1. Add coolant at radiator fill until full.
2. Add coolant at expansion tank (1) until level reaches line (2).
3. Operate engine for several minutes until it reaches normal operating temperature of 195°F (90°C).
4. Stop engine and allow to cool.
5. Repeat steps until coolant level is correct.

As Needed

Location	Task	Notes
BURSTING UNIT	Repair jaw threads	
POWER PACK	Change air filter	
	Adjust fan belt tension	

Bursting Unit

Repair Jaw Threads

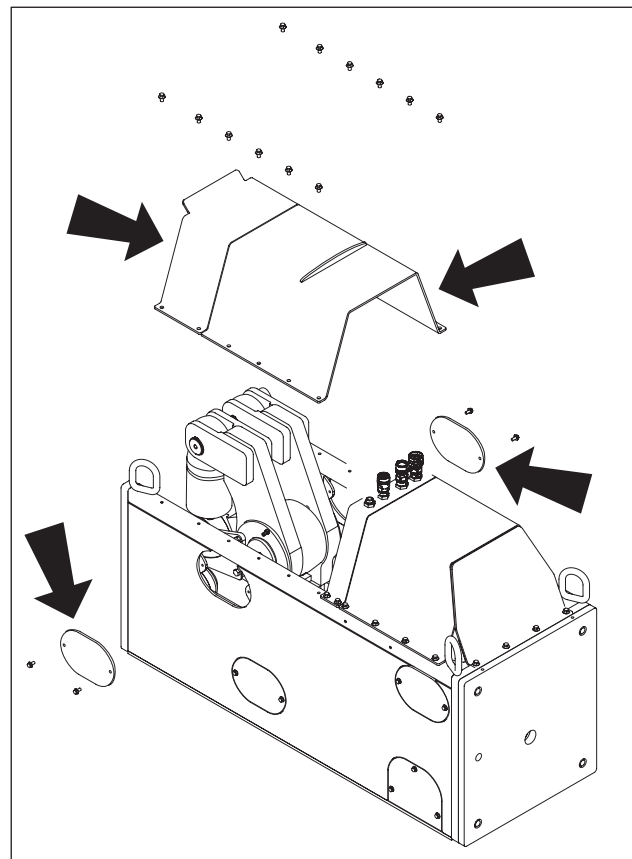
Maintenance and service procedures will extend the life of jaws.

Dirt and mud should be cleaned from jaws. Use a sharp screwdriver to remove mud.

Grinding will be necessary to restore threads as they wear. Thread sharpness is important for proper gripping.

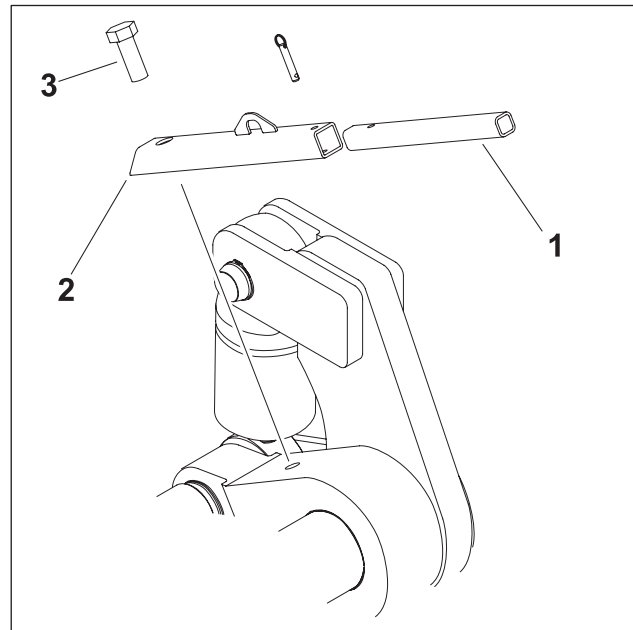
Remove Jaws

1. Fully extend thrust cylinders until large pivot pin is aligned with frame opening.
2. Remove top covers and side covers (shown).
3. Fully retract clamping cylinders.
4. Turn unit off.



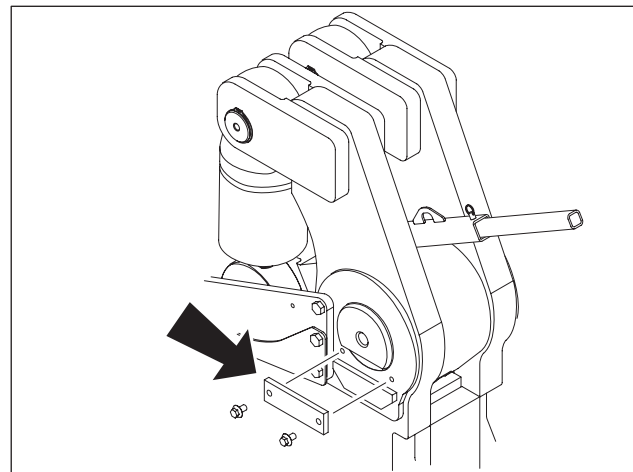
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5. Attach extension arm (1) to jaw service tool (2).
6. Position jaw service tool over clamp arm and secure with screw (3).



J29om002h.eps

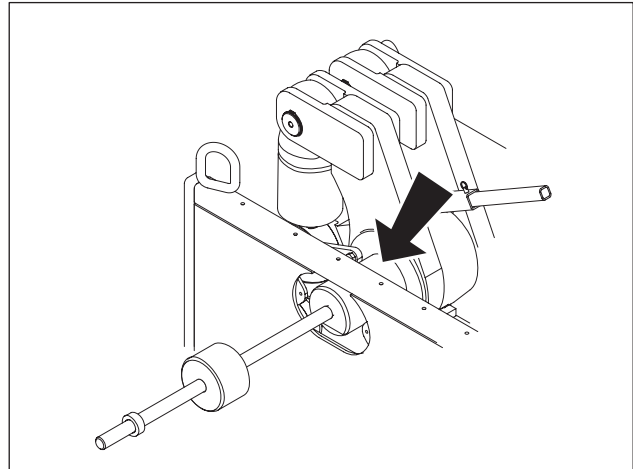
7. Remove large pivot pin retaining strap. For rear jaw set, remove retaining bar on right side of unit. For front jaw set, remove retaining bar on left side of unit.



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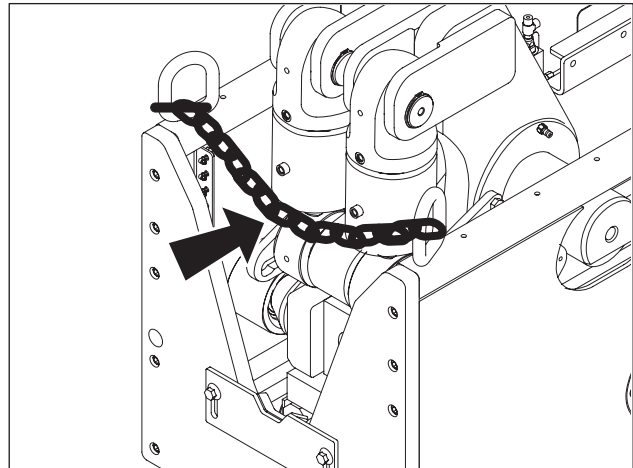


8. Thread large slide hammer into pivot pin bolt hole.
9. Pull pin clear of bore about 9-3/4" (248 mm) but not all the way out, as shown.
10. Remove slide hammer.
11. Fully extend clamp cylinders.



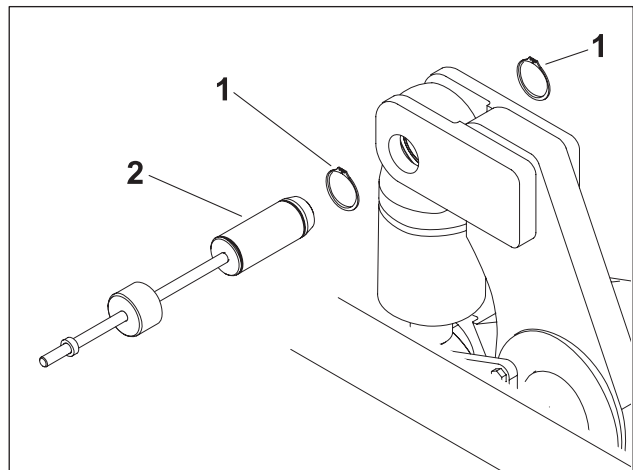
J29om004h.eps

12. Support clamp cylinders as shown, using chain.



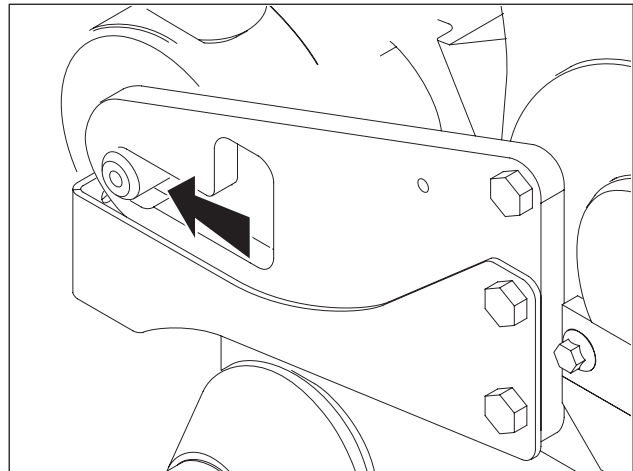
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13. Thread small slide hammer into clamp cylinder pin (2).
14. Remove hose strap on side of unit to release hoses for clearance.
15. Remove inside snap ring (1).
16. Use slide hammer to remove cylinder pin completely.
17. Repeat for other cylinder.



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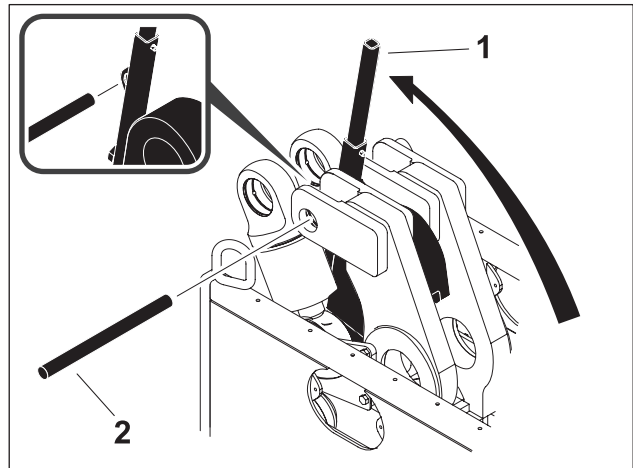
18. Ensure that pin is at end of travel in guide plate slot, as shown.



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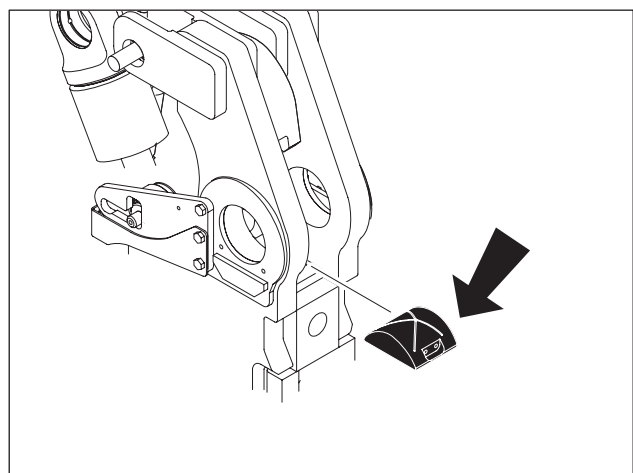


19. Rotate jaw service lever (1) upward.
20. Install prop rod (2) into pin hole and through jaw service lever, as shown.



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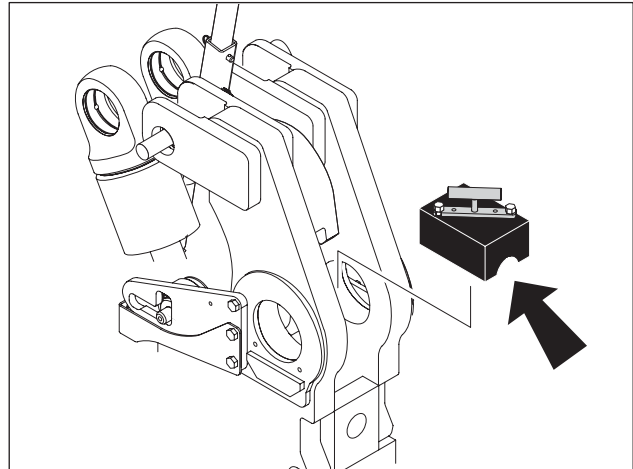
21. Move pivot (shown) downward until it can be removed and placed to one side for clearance during procedure. Do not remove hoses.



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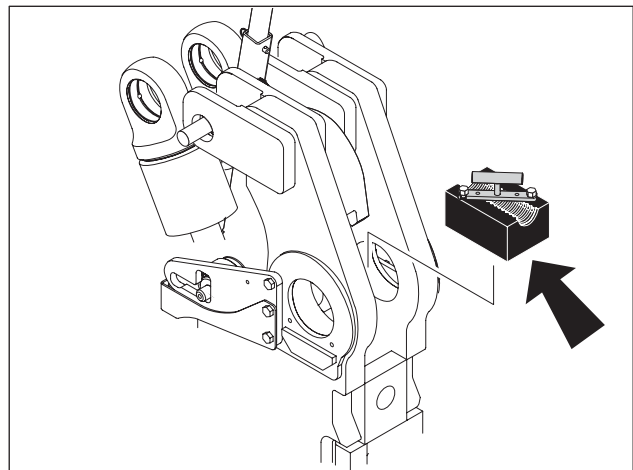
22. Clean grease from bolt holes and install bolts into top jaw, three to four turns.
23. Engage jaw extraction tool (shown) on bolts.
24. Lift out top jaw.

IMPORTANT: Be careful to not lose springs between jaws.



J29om011h.eps

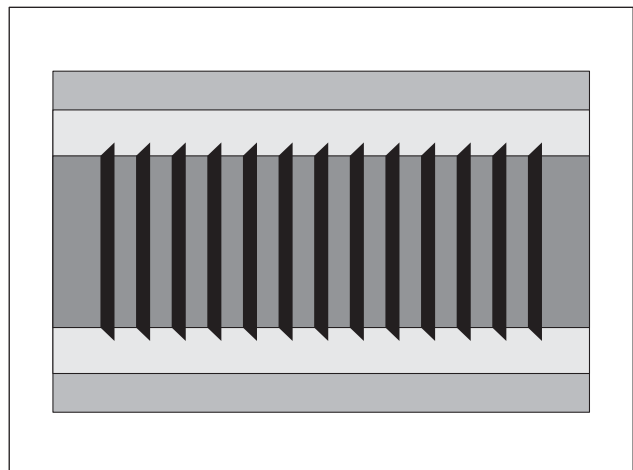
25. Repeat process using jaw extraction tool to remove lower jaw, as shown.



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Repair Jaw Threads

1. Use screwdriver to remove debris from threads.
2. Pressure wash threads.



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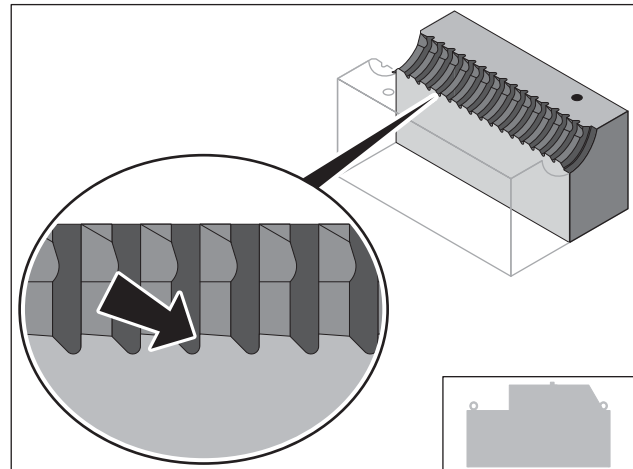
Grinding Jaw Threads

Use a standard die grinder and the abrasive disk supplied to restore threads.

NOTICE: The following procedure must be done by someone familiar with proper die grinding techniques.

Wear protective clothing to protect against metal debris created by the grinder. Wear appropriate gloves and eye protection.

Secure the work to prevent movement while grinding.



J29om069h.eps

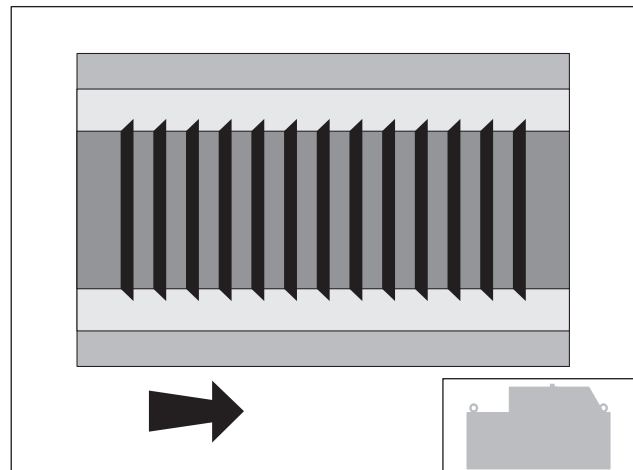
It is important to grind the threads at exactly the same angle as they were, removing very little material. Threads are made at an angle on the front side of jaws, as shown.

IMPORTANT:

- Grind only enough material from jaws to return them to the correct angle.
- It is very important to grind the threads in exactly the same way as they were.
- Sharpen up the front side of the thread.
- Even out the angled side of the thread.

Install Jaws

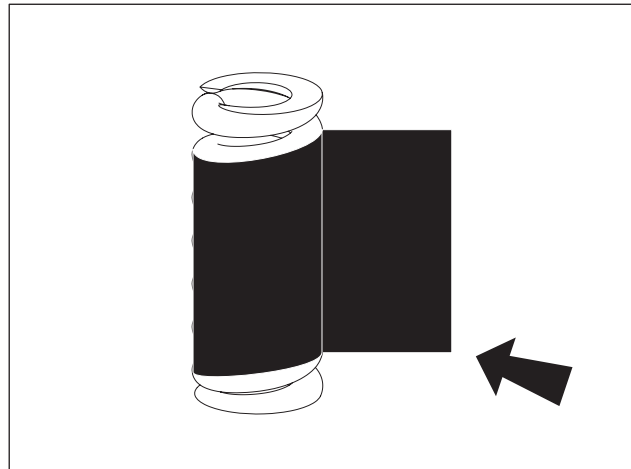
1. Lightly coat new jaws with grease on side surfaces, but not on rod grip surfaces.
2. Clean area on unit under lower jaw before reassembly.
3. Install lower jaw. Note position of jaw. Threads face rear of bursting unit, as shown.
4. Remove jaw extraction tool and bolts. Fill bolt holes with grease to prevent debris from clogging threads.



J29om014h.eps



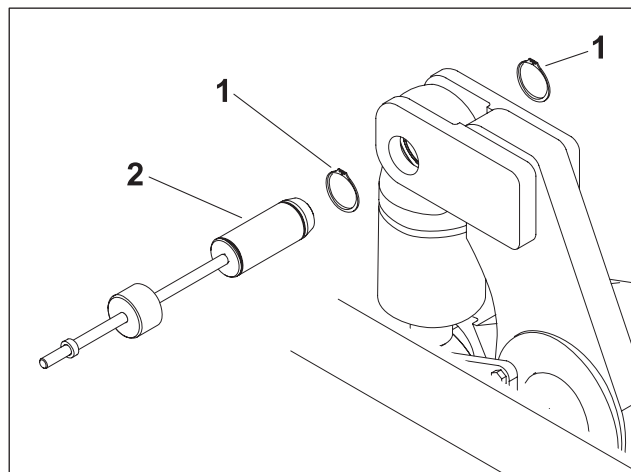
5. Apply tape to jaw springs (as shown) to hold springs in upper jaw bores during installation.
6. Install upper jaw.
7. Remove jaw extraction tool and bolts. Fill bolt holes with grease to prevent debris from clogging threads.
8. Install clamp pivot over upper jaw, positioned slightly forward.



J29om013h.eps

Install Clamping Cylinder Pins

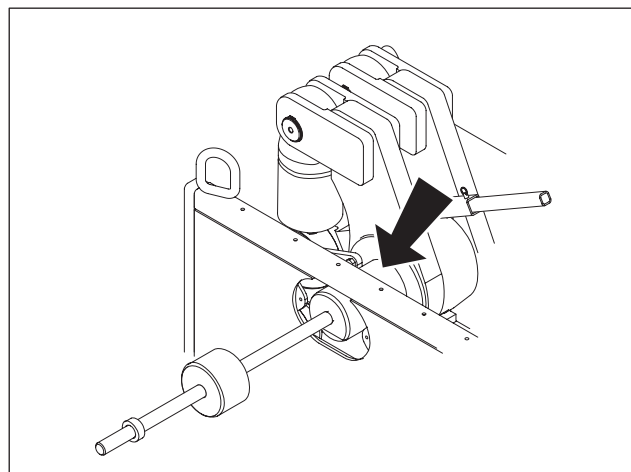
1. Reposition clamp arm as needed.
2. Align clamping cylinders pin bores. Use jaw service tool to help alignment. It may be necessary to start unit and relieve hydraulic pressure to align bores.
3. Thread small slide hammer into pin (2) and spray pin with lubricant. Align and tap pin into bore using slide hammer.
4. Install snap ring (1).
5. Remove slide hammer.
6. Repeat procedure for other pin.



J29om007h.eps

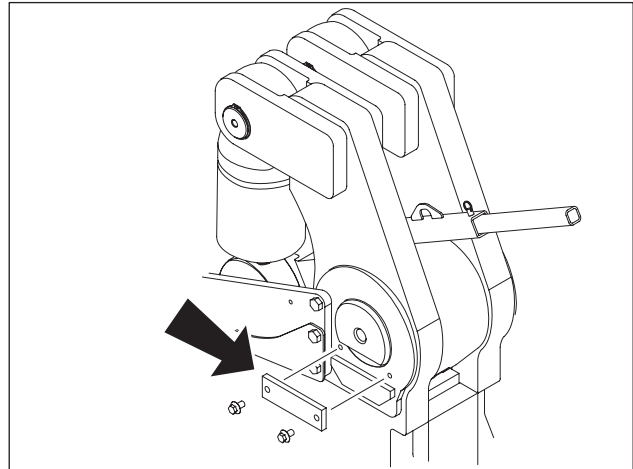
Install Large Pivot Pin

1. Thread large slide hammer into pivot pin.
2. Spray pin and bore with spray lubricant and penetrating oil.
3. Retract clamping cylinders to help align bore for pivot pin.
4. Pin should slide easily into position, tapered end first, using hand pressure only. If not, check alignment of pin with bore.



J29om004h.eps

5. Install large pivot pin retaining strap, shown.
6. Remove slide hammer.
7. Check and tighten any hydraulic hoses that may have loosened.
8. Install hose tie to secure hoses to unit frame.
9. Remove jaw service tool and guide plate tools.
10. Install covers.



J29om003h.eps



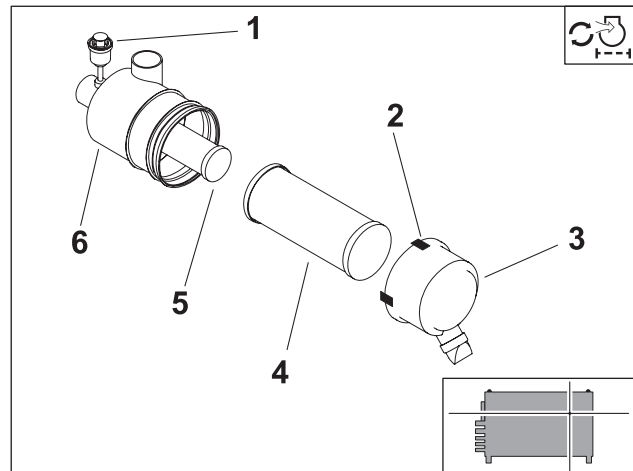
Power Pack

Change Air Filter

Change air filter element when red band on filter minder (1) is visible. Push button to re-set indicator.

To replace air filter:

1. Disengage latches (2) and remove cover (3).
2. Remove the primary (4) and secondary (5) filters from the canister (6).
3. Wipe out the canister (6) and cover (3) with a damp cloth.
4. Install the new secondary and primary filters by hand with a slight turn and firm push to seat the filters in the canister.
5. Install the cover and engage latches.
6. Reset filter minder indicator (1) by pressing the red button.

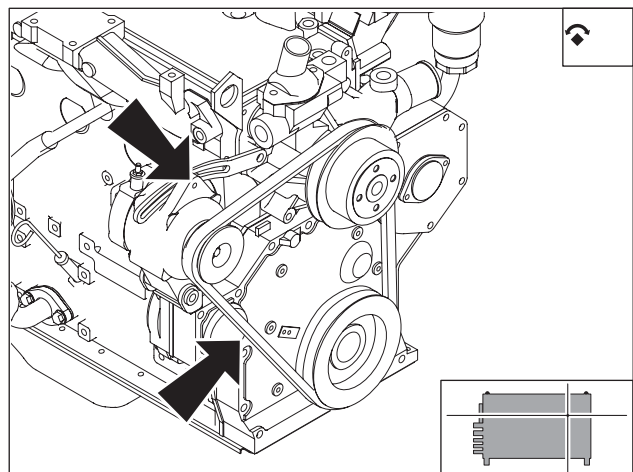


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NOTICE: If the cover contacts the filter before the cover is fully in place, remove cover and push filter element further into housing and try again. The cover should go on without extra force.

Adjust Fan Belt Tension

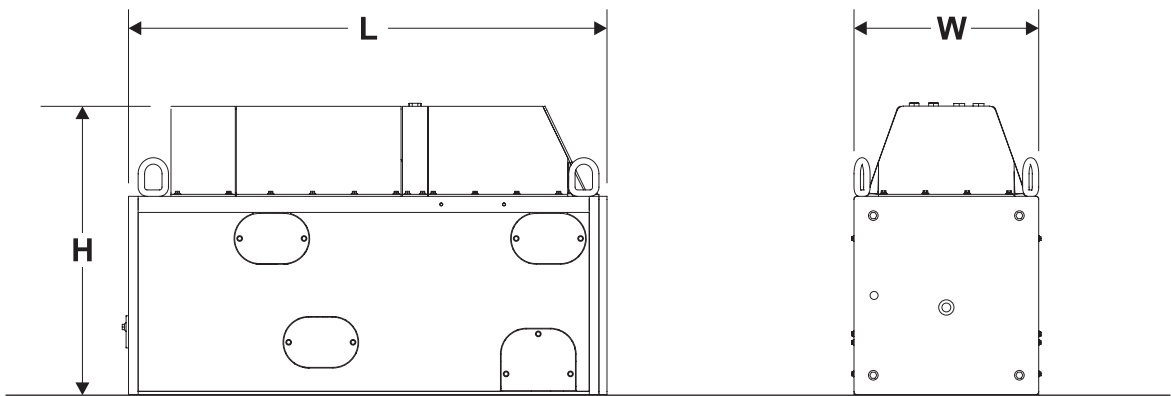
1. Turn off engine and remove key.
2. Apply moderate thumb pressure to belt between pulleys, as shown.
3. Belt is properly tensioned when deflection is about 1/4-3/8" (7-9 mm).
4. If needed, loosen alternator bolts (shown) and pull alternator out until correct tension is reached.
5. Tighten alternator bolts.



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Specifications

Bursting Unit



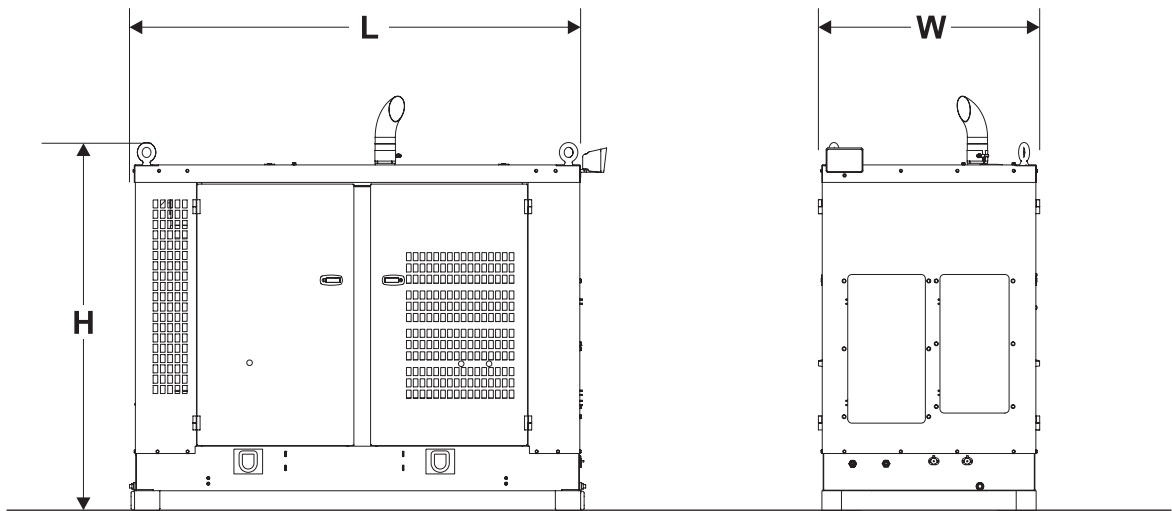
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Dimensions	U.S.	Metric
L, length	74 in	1.88 m
W, width	29 in	737 mm
H, height	45 in	1.14 m
Weight, mass	6800 lb	3084 kg

Operational	U.S.	Metric
Pullback force	200,000 lb	91 t

Rod	U.S.	Metric
Length	39.4 in	1 m
Diameter	2.0 in	50.8 mm
Weight, mass	35 lb	15.9 kg

Power Pack



j29om049h.eps

Dimensions	U.S.	Metric
L, length	80 in	2.03 m
W, width	38.5 in	980 mm
H, height	62.5 in	1.6 m
Weight, mass (dry weight, without fluids)	2600 lb	1180 kg

Power		U.S.	Metric
Engine: Cummins B3.3NA			
Fuel: diesel			
Cooling medium: liquid			
Injection: indirect			
Aspiration: natural			
Cylinders: 4			
Displacement		199 in ³	3.3 L
Bore		3.74 in	95 mm
Stroke		4.53 in	115 mm
Power			
	manufacturer's gross power rating (per SAE J1995)	60 hp	45 kW
	manufacturer's net power rating (per SAE J1349)	56 hp	41.8 kW
	rated speed	2200 rpm	2200 rpm
Emissions Compliance:		EPA Tier 4i	EU Stage 111A



Hydraulic System		U.S.	Metric
Main pump			
	Maximum flow	43.6 gpm	165 L/min
	Maximum pressure	3700 psi	255 bar
Jaw pump			
	Maximum flow	20 gpm	76 L/min
	Maximum pressure	2200 psi	152 bar

Fluid Capacities	U.S.	Metric
Fuel tank	19 gal	72 L
Hydraulic reservoir	30 gal	114 L
Engine oil, including filter	9 qt	8.5 L
Engine cooling sytem	3.7 gal	14.0 L

Battery

12V, negative ground, SAE cold crank rating @ 0°F (-18°C), 800 amps.

Noise Levels

Operator ear sound pressure level is 83 dBa per ISO 6394.

Exterior sound power level is 101 dBa per ISO 6393.

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

Support

Procedure

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

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

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

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

Resources



Publications

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

Ditch Witch Training

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

Warranty

Ditch Witch Equipment and Replacement Parts Limited Warranty Policy

Subject to the limitation and exclusions herein, free replacement parts will be provided at any authorized Ditch Witch dealership for any Ditch Witch equipment or parts manufactured by The Charles Machine Works, Inc. (CMW) that fail due to a defect in material or workmanship within one (1) year of first commercial use (Exception: 2 years for all SK5 attachments). Free labor will be provided at any authorized Ditch Witch dealership for installation of parts under this warranty during the first year following "initial commercial" use of the serial-numbered Ditch Witch equipment on which it is installed. The customer is responsible for transporting their equipment to an authorized Ditch Witch dealership for all warranty work.

Exclusions from Product Warranty

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

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

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

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

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

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

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

First version: 1/91; Latest version: 7/05

**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.

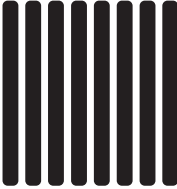
This will enable you to receive updates on this equipment as well as information on new products of interest.

Thanks for using Ditch Witch equipment.

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



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FIRST CLASS PERMIT NO 23 PERRY OKLAHOMA

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



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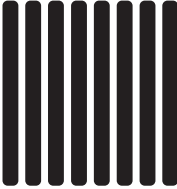
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**The Charles Machine Works, Inc.
P.O. Box 66
Perry, Oklahoma 73077-9989**



Ditch Witch® Registration Card

Please Type or Print All Information

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

Ditch Witch® Registration Card

Please Type or Print All Information

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

Service Record

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