TECHNICAL PUBLICATIONS

Operator's Manual

SLX1300

CMW

Issue 1.0
Original Instruction

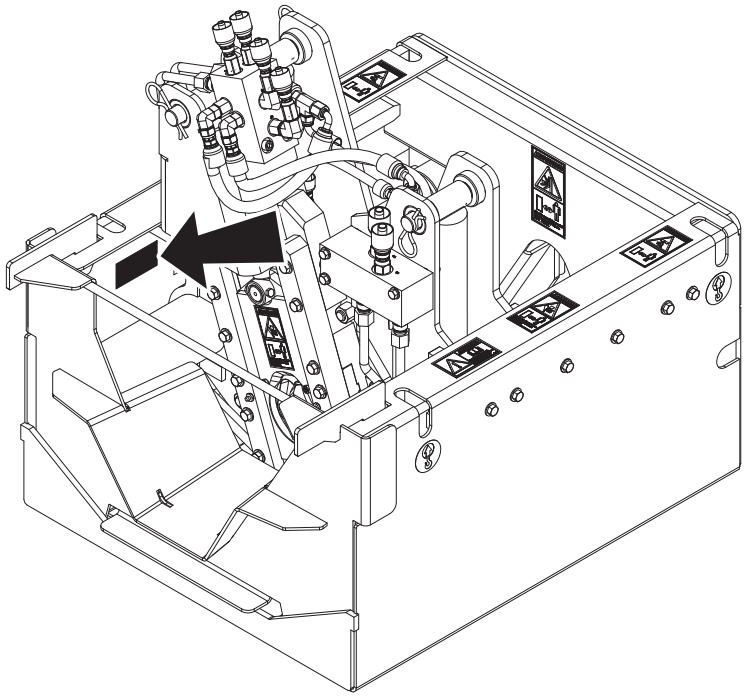
960-1300

Overview

Chapter Contents

Serial Number Location

Record serial numbers and date of purchase in spaces provided.



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Date of manufacture	
Date of purchase	

Intended Use

HammerHead® service line extractors are intended for the removal and replacement of up to 100ft (30.5m) of 0.5" (1.27 cm) to 1.25" (3.18 cm) diameter buried pipes. The SLX1300 produces 13 tons (11.79 t) of pullback force. The HammerHead PB13 provides hydraulic power to run the pipe bursting unit.

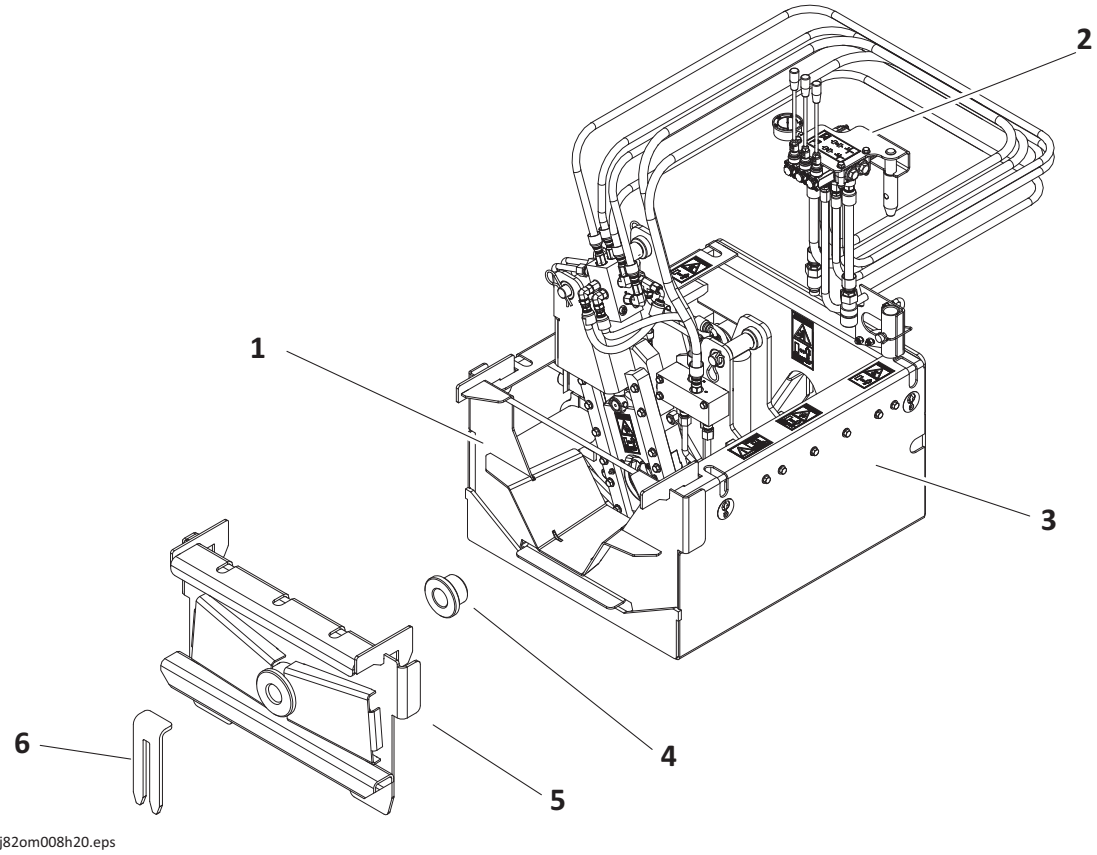
The unit is designed for operation in temperatures typically experienced in earth moving and construction work environments. Provisions may be required to operate in extreme temperatures. Contact your HammerHead dealer. Use in any other way is considered contrary to the intended use.

HammerHead service line extractors and power units 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.

Machine Components

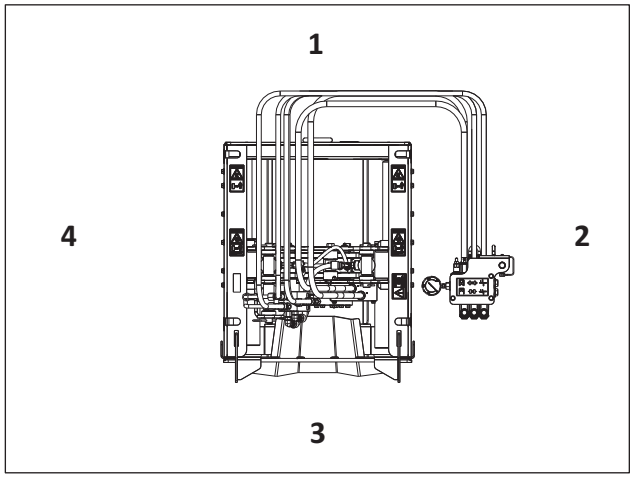


1. Drop chute
2. Control station
3. Extractor
4. Chuck pocket
5. Bungee frame
6. Chuck gate

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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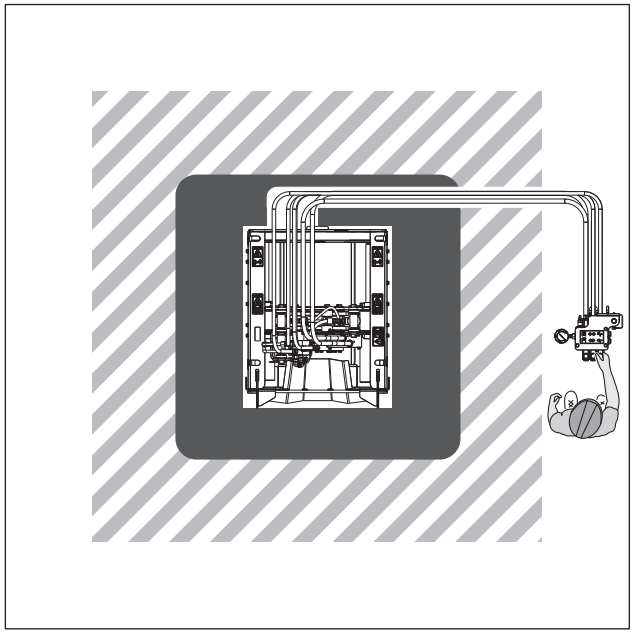
Operating Area

IMPORTANT: Top view of unit is shown.

Operator should stand only in the locations marked



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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 HammerHead® 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 HammerHead dealer. If you need assistance in locating a dealer, visit our website at **www.hammerheadtrenchless.com** or write to the following address:

HammerHead Trenchless Equipment
500 South C.P. Avenue
Lake Mills, WI 53551
USA

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

Thank you for buying and using HammerHead equipment.

SLX1300
Operator's Manual

Issue number 1.0/OM/03/20
Part number 960-1300

Contents

Safety

Chapter Contents

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 Data Sheets (SDS) are available at www.hammerheadshop.com/resources/technical-sheets/.
- Fully inspect equipment before operating. Repair or replace any worn or damaged parts. Replace missing or damaged safety shields and safety signs. Contact your HammerHead® dealer for assistance.
- Use equipment carefully. Stop operation and investigate anything that does not look or feel right.
- Do not operate unit where flammable gas may be present.
- Only operate equipment in well-ventilated areas.

Contact your HammerHead dealer if you have any question about operation, maintenance, or equipment use.

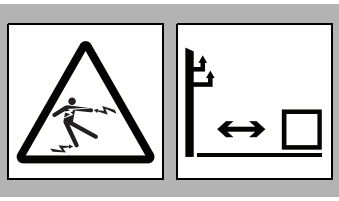
Emergency Procedures

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

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

EMERGENCY SHUTDOWN - Turn ignition switch to stop position or push remote engine stop button (if equipped).

Electric Strike Description



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

When working near electric cables, remember the following:

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

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

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

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

If an Electric Line Is Damaged

If you suspect an electric line has been damaged and you are **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.

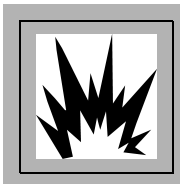
- LEAVE AREA. The ground surface may be electrified, so take small steps with feet close together to reduce the hazard of being shocked from one foot to the other.
- Contact utility company to shut off power.
- Do not return to jobsite or allow anyone into area until given permission by utility company.

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 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 return to area or allow anyone into area until given permission by utility company.

If a Gas Line is Damaged

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



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 order and degree of action will depend on the situation.

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

If a Fiber Optic Cable is Damaged

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

If Machine Catches on Fire

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

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

Safety Alert Classifications

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

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

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

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

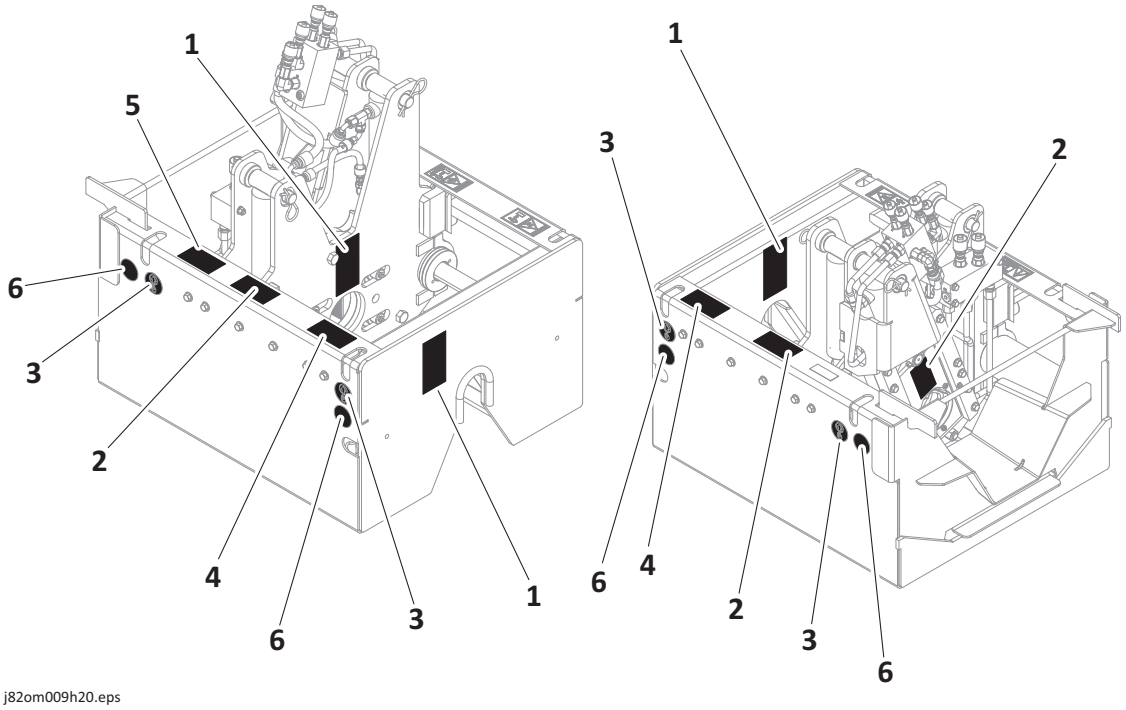
⚠ CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

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

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

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

Machine Safety Alerts



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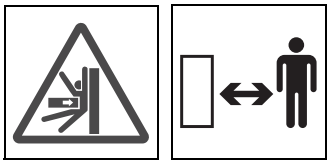
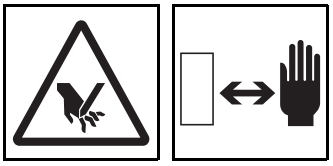
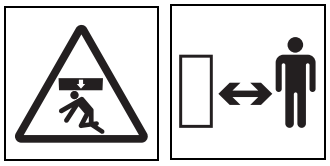
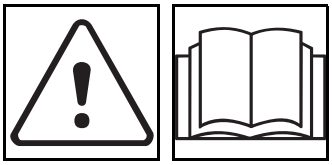
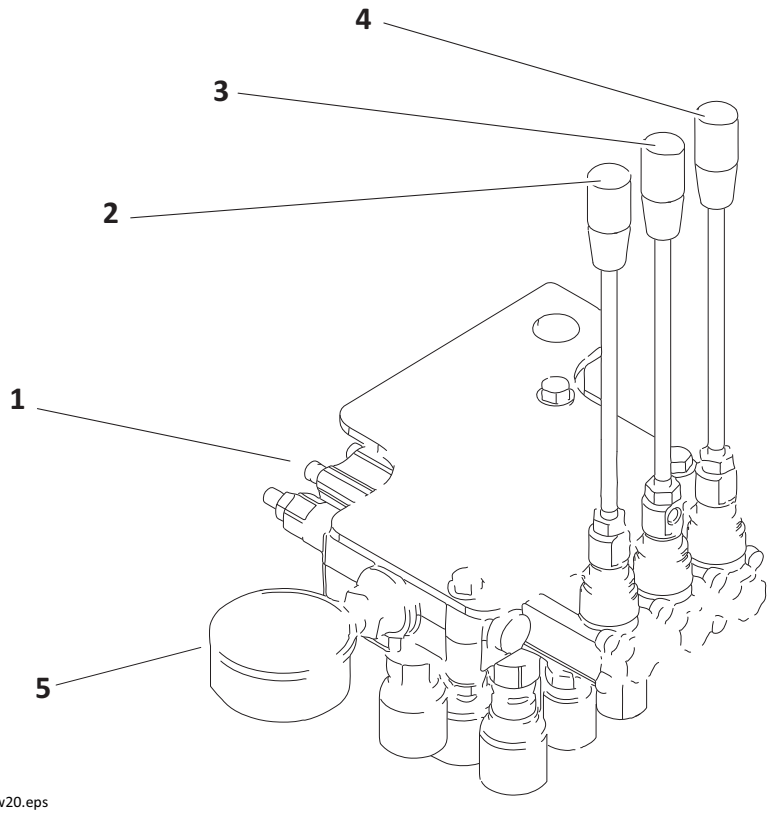
1		**WARNING** Horizontal movement. Crushing can cause death or serious injury. Read and understand operator's manual and all other safety instructions before use.
2		**WARNING** Moving parts. Contact can cause serious injury. Stay away.
3		Lift point. See Transport chapter for more information.
4		**WARNING** Lifted load. Crushing can cause death or serious injury. Stay away from lifted load and its range of movement.

5		**WARNING** Misuse of machine can cause death or serious injury. Read and understand operator's manual and all other safety instructions before use.
6		Tiedown location. See Transport chapter for more information.

Controls

Chapter Contents

Operator Station



1. Pressure control valve
2. Carriage control
3. Jaw control
4. Pipe shear control
5. Pressure gauge

Item	Description	Notes
1. Pressure control valve	To increase pressure, turn bolt counterclockwise. To decrease pressure, turn bolt clockwise.	
2. Carriage control	To move carriage back, move to  . To move carriage forward, move to  .	

Item	Description	Notes
3. Jaw control	To clamp jaws, move to  . To unclamp jaws, move to  .	
4. Pipe shear control	To close pipe shears, move to  . To open pipe shears, move to  .	
5. Pressure gauge	Displays pressure.	See "Set pressure." on page 40.

Prepare

Chapter Contents

Gather Information

Prepare Jobsite

⚠ WARNING Jobsite hazards. Exposure can cause death or serious injury. Use correct equipment and work methods. Use and maintain appropriate safety equipment.

To help avoid injury:

- Expose lines by careful hand digging or soft excavation before operating equipment. Use appropriate equipment and procedures for exposing utility lines.
- All vegetation near operator's station must be removed. Contact with trees, shrubs, or weeds during electrical strike could result in electrocution.
- Classify jobsite and follow precautions based on classification.
- Follow local regulations for digging near utilities.

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.

Select Start and End Points

Select one end to use as a starting point. Consider the following when selecting a starting point:

Slope

Equipment should be parked on a level site. Consider how slope will affect setup and operation. Assess the risks on each slope to determine if factors affecting risk create an unsafe condition for working.

Space

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

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

Check that starting and ending points allow enough space for working.

Comfort

Consider shade, wind, fumes, and other site features

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
  - – "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

Locate Utilities

Notify One-Call Services

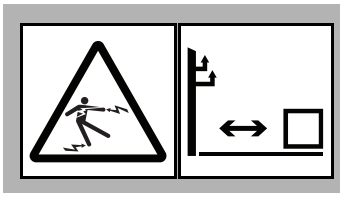
Mark proposed path with white paint and have underground utilities located before working.

- 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.

Verify Underground Utilities

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

Locate Overhead Lines



DANGER Overhead electrical lines. Contact will cause death or serious injury. Know location of lines. Stay away.

Note location and height of all overhead lines in jobsite and ensure that equipment maintains proper distance from live lines.

Classify Jobsite

Select a Classification

Jobsites are classified according to underground hazards present, not by line being installed. Jobsite may have more than one classification.

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

Classify jobsite as electric if jobsite is in question or if the possibility of unmarked electric utilities exists.

Apply Precautions

WARNING Underground utilities. Contact can cause death or serious injury. Locate and verify underground utilities before digging or drilling.

Once classified, precautions appropriate for jobsite must be taken. Follow U.S. Department of Labor regulations on excavating and trenching (Part 1926, Subpart P) and other similar regulations.

Electric Jobsite Precautions

Use one or both of these methods.

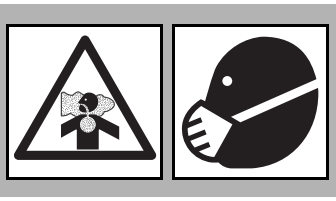
- Expose line by careful hand digging or soft excavation.
- Have service shut down while work is in progress. Have electric company test lines before returning them to service.

Natural Gas Jobsite Precautions

Position equipment upwind from gas lines and use one or both of these methods.

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

Crystalline Silica Dust Precautions



⚠ CAUTION Silica dust. Exposure can cause lung disease or cancer. Use breathing protection.

Crystalline silica dust is a naturally occurring substance found in soil, sand, concrete, granite, and quartz.

To reduce exposure when cutting, drilling, or working these materials:

- Use water spray or other means to control dust.
- Refer to U.S. Department of Labor Occupational Safety and Health Administration (OSHA) 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.

Clear objects such as landscaping fabric, cable, and wire from the work area. These objects may be underground or partially buried.

Arrange for Traffic Control

Vehicle and pedestrian traffic must be a safe distance from equipment. Evaluate jobsite and allow an appropriate buffer zone around equipment. If working near a road or other traffic area, contact local authorities about safety procedures and regulations.

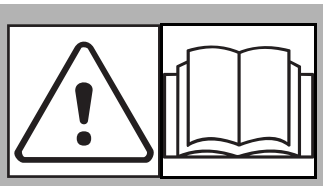
Plan Pull Path

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 in accordance with local regulations.

Examine Pullback Material

Ask for a sample of the 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.

Prepare Operator



⚠WARNING Jobsite hazards. Exposure can cause death or serious injury. Use correct equipment and work methods. Use and maintain appropriate safety equipment.

To help avoid injury:

- Wear personal protective equipment including hard hat, safety eye wear, foot protection, hearing protection, and gloves (except when near rotating equipment.
- Remove jewelry.
- Wear close-fitting, high visibility clothing.
- Have other personal protective equipment, such as insulated boots and gloves, breathing protection, and face shield, etc. available for use depending on jobsite hazards or requirements.

Follow these guidelines before operating any jobsite equipment:

- Complete proper training and read operator's manual before using equipment.
- 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.
- 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.
- Use equipment carefully. Stop operation and investigate anything that does not look or feel right.

Any time jobsite is classified as electric, extractor operator and installation pit personnel must wear protective boots, and the extractor operator must have protective gloves within reach, all meeting the following standards:

- Boots must have high tops and meet the electric hazard protection requirements of ASTM F2413 or ASTM F1117 when tested at 18,000 volts. Tuck legs of pants completely inside boots.
- Gloves must have 17,000 AC maximum use voltage, according to ASTM specification D120.
- If working around higher voltage, use gloves and boots with appropriately higher ratings.

Prepare Equipment

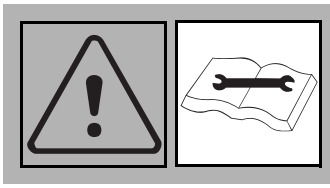
Check Supplies

- marking flags or paint
- fuel
- hydraulic oil
- extraction tooling
- pulling accessories
- guy wire accessories, if needed
- barrier cones and tape
- personal protective equipment, such as hard hat and safety glasses
- notepad and pencil
- lifting equipment and accessories
- tie-down equipment and accessories

Check Equipment

Condition and Function

- all controls



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

- couplers
- hoses and valves
- pumps and motors
- signs, guards, and shields
- jaws
- shear blade
- grease points
- carriage travel
- pressure gauge

Assemble Accessories

Fire Extinguisher

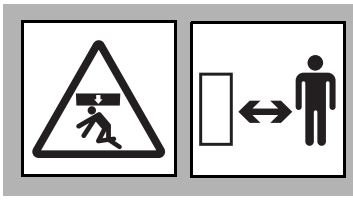
If required, mount a fire extinguisher near the power unit but away from possible points of ignition. The fire extinguisher should always be classified for both oil and electric fires. It should meet legal and regulatory requirements.

Transport

Chapter Contents

For additional precautions, see "Safety Awareness" and "Prepare" chapters.

Lift

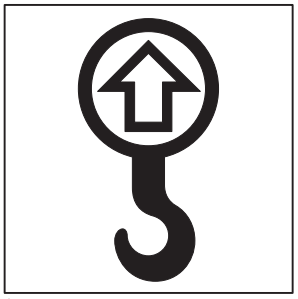


WARNING Lifted load. Crushing weight can cause death or serious injury. Stay away from lifted load and its range of movement.

To help avoid injury: Inspect lift straps

Points

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



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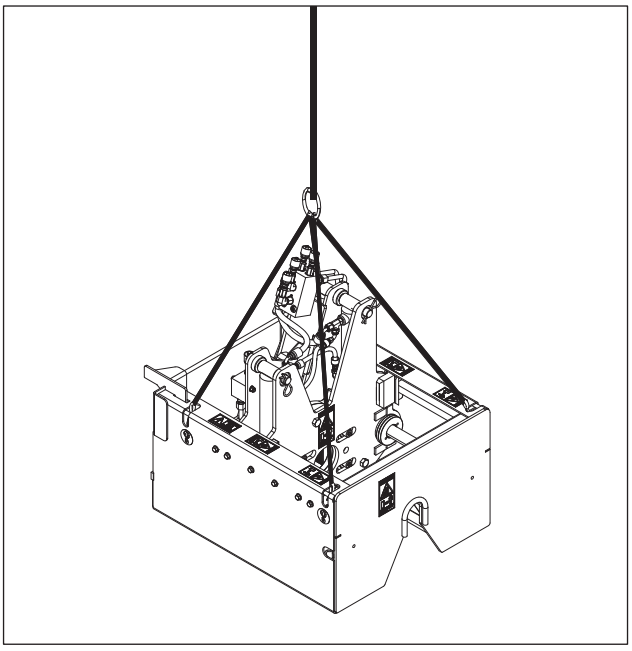
Procedure

Use equipment capable of supporting the machine's size and weight. See “Specifications” on page 59 or measure and weigh equipment before lifting.



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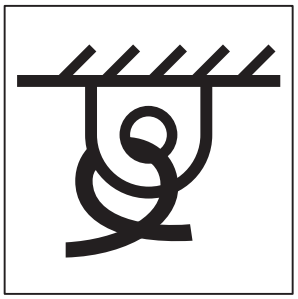
Tie Down

Points

When tying down machine, use extra caution to prevent any movement during sudden take-offs and stops.



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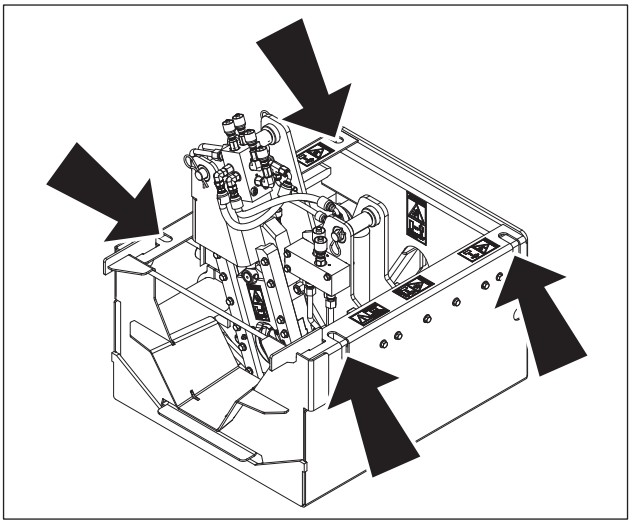
Procedure

Tie down machine at locations shown. Ensure chains are tight before transporting.



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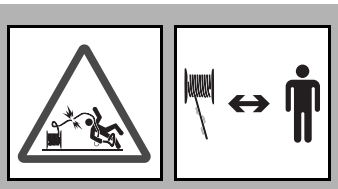
Operate

Chapter Contents

Setup and Configuration

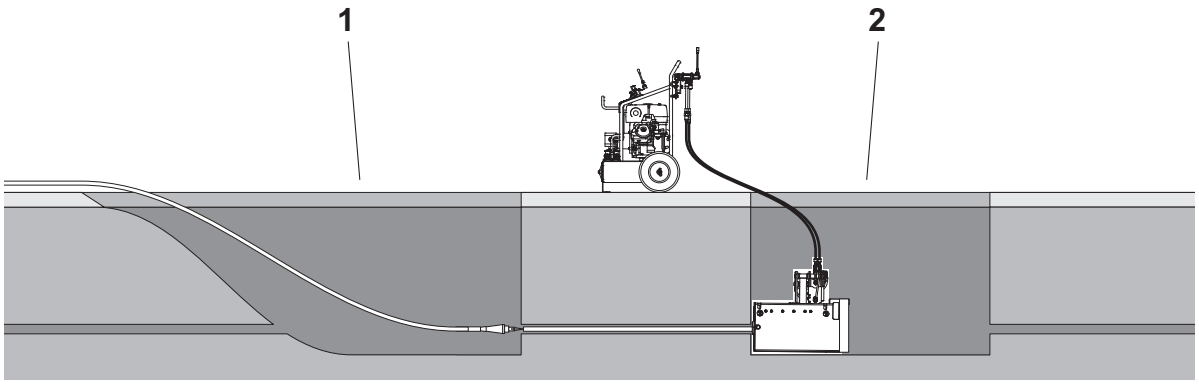


WARNING Whipping cable. Impact will cause death or serious injury. Stay away.

To help avoid injury:

- When using guy wire, ensure there is no exposed wire between extractor and pipe.
- Set up extractor as close to existing pipe as possible.

Dig Installation and Extraction Pits



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

Minimum Installation Pit Size	
Length	**Width**
3' (0.91m)*	3' (0.91m)

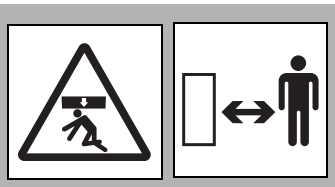
Installation Pit (1)

- Pit dimensions depend on pipe depth and product being installed.
- Must be in line with existing pipe.

Extraction Pit (2)

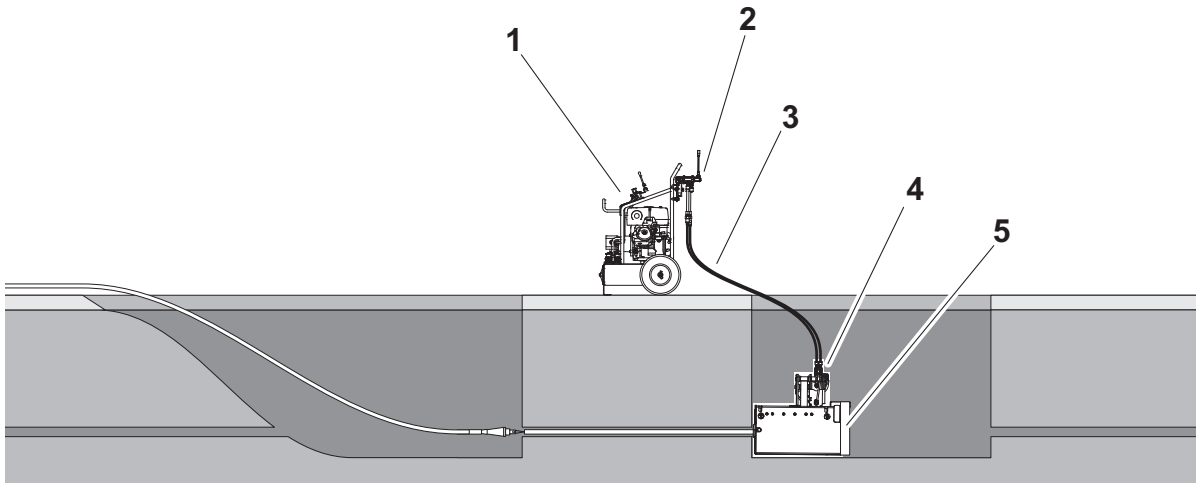
- Must be level to align properly with existing pipe.
- Bottom 20" of pit wall must be square (90°) with pit floor.

Set Up



WARNING Lifted load. Crushing weight can cause death or serious injury. Stay away from lifted load and its range of movement.

To help avoid injury: Ensure no personnel are in pit as equipment is lowered.



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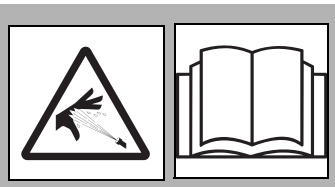
1. Control station
2. Operator station
3. Hydraulic connection hoses
4. Extractor
5. Drop chute/Bungee frame

1. Position control station outside of bursting pit at least two feet away from the edge.
2. Lower extractor into pit.
3. Connect hydraulic hoses to control station.

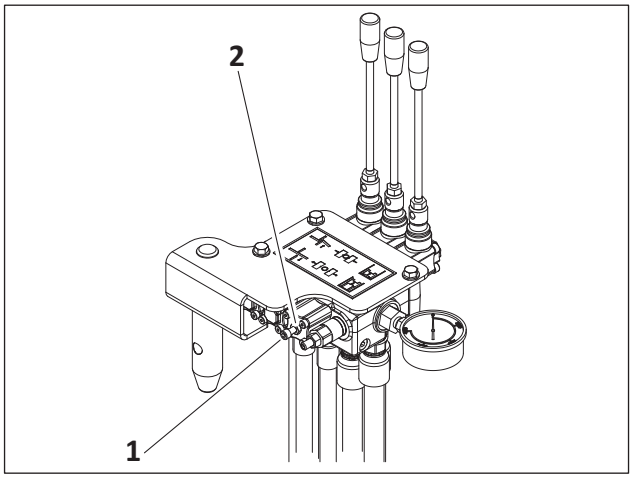


WARNING Pressurized fluid or air. Contact can cause death or serious injury. Refer to operator's manual for correct use.

To help avoid injury:

- Always connect return line first and remove last.
- Before using system, check that all connections are tight and all lines are undamaged.
- If you are injured, seek immediate medical attention from a doctor familiar with this type of injury.

4. Start control station.
5. Set pressure.
   - Move carriage to full back position.
   - Loosen nut (2).
   - To increase pressure, turn bolt (1) clockwise.
   - To decrease pressure, turn bolt counter clockwise.
   - Use following tables to determine pressure.



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ASTM A53 Grade B Schedule 40 Steel Pipe	
Pipe Diameter	**Pressure**
0.5" (1.27cm)	900psi (62.05bar)
0.75" (1.91cm)	1200psi (82.74bar)
1.0" (2.54cm)	1800psi (124.11bar)
1.25" (3.18cm)	2400psi (165.47bar)

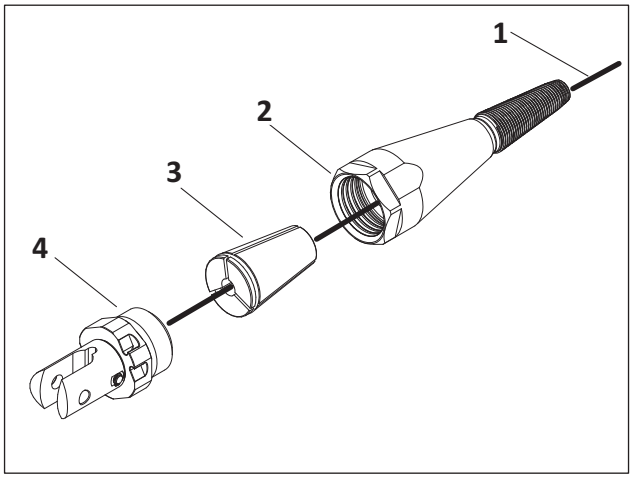
Extra High Strength 1x7 Guy-Wire	
Wire Diameter	**Pressure**
0.25" (0.cm)	600psi (42.8bar)
0.31" (0.79cm)	1100psi (75.84bar)
0.375" (0.95cm)	1500psi (103.42bar)
0.5" (1.27cm)	2700psi (186.16bar)

   - Tighten nut.
6. Move carriage back and forth 4 times.
7. Move carriage to center position.

Set Up Bungee Frame

The bungee frame is used to maintain recommended pressure on a length of pipe. See "Set pressure." on page 40.

Installation Pit



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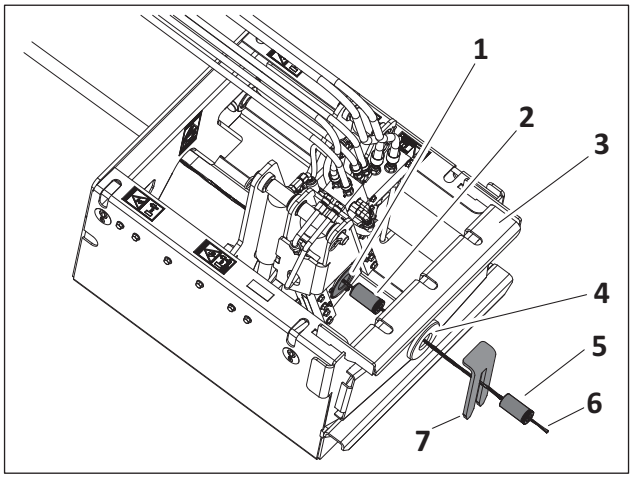
1. Push guy wire (1) through existing pipe.
2. Pass guy wire through carrot (2).
3. Apply thin coat of anti-seize to jaw assembly (3). See "Appendix" on page 65 for tooling options.
4. Install chuck jaws over guy wire. Ensure 0.25" of guy wire extends past jaws.
5. Push chuck jaws into extractor carrot.
6. Secure retention nut (4) in carrot.
7. Thread carrot into existing pipe. Tighten to 200ft•lb (271.2N•m).
8. Attach carrot to new product. See "Connect New Product" on page 43.

Extraction Pit



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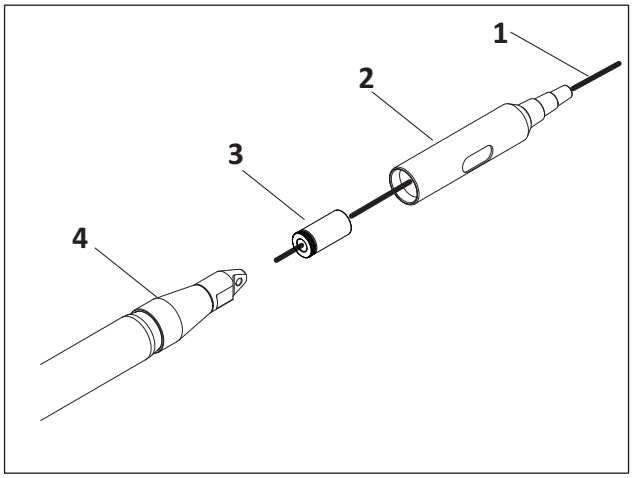
1. Ensure shears are fully open.
2. Move carriage to front of machine.
3. Shut off machine.
4. Remove drop chute (if installed).
5. Install bungee frame (3).
6. Thread guy wire (6) through jaws and shears.
7. Slide chuck pocket (1) over guy wire.
8. Install chuck pocket in shears.

NOTICE: Do not operate shears with chuck pocket installed.

9. With guy wire taut, slide chuck (2) onto wire.
10. Install chuck in pocket (1).
11. Push guy wire through bungee frame.
12. Slide chuck (5) over guy wire.
13. Install chuck gate (7).
14. Install chuck in bungee frame chuck pocket (4).

Set Up Piercing Tool



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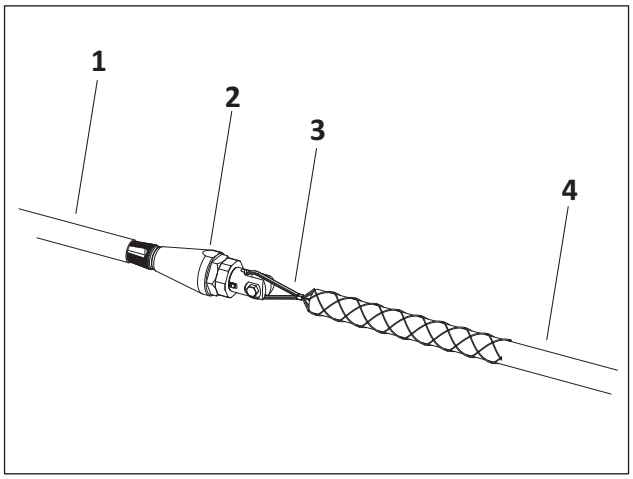
1. Set up bungee frame. See "Set Up Bungee Frame" on page 41.
2. In installation pit, push guy wire (1) through nose of extractor (2).
3. Slide chuck (3) over guy wire until chuck sets in extractor. Ensure 0.25" (0.64cm) of guy wire extends from chuck.
4. Insert extractor nose in old pipe.
5. In extraction pit, start machine.
6. Apply slight pressure to guy wire.

> ***NOTICE:*** Do not exceed recommended cable pressure. See "Set pressure." on page 40.

7. Lock piercing tool into extractor with a short burst of air. See piercing tool manual.

Connect New Product

IMPORTANT: See "Appendix" on page 65 for tooling options.



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1. If using bungee frame, push guy-wire through frame.
2. Push wire through shears and jaws.
3. Push wire through existing pipe (1) by hand.
4. In installation pit, pull wire through extraction carrot (2).
5. Install carrot in existing pipe. Tighten to 200ft•lb (271.2N•m).
6. Connect equipped pipe pulling tool (3) to extraction carrot.
7. Connect pulling tool to new pipe (4).
8. Ensure pulling tool is secure.

Break Loose

With Guy Wire

NOTICE: Do not exceed recommended cable pressure. See "Set pressure." on page 40.

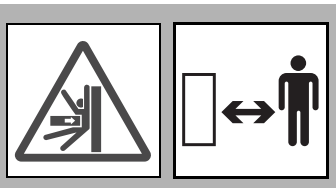
1. Install bungee frame. See "Set Up Bungee Frame" on page 41.
2. Set maximum pressure. See "Set pressure." on page 40.
3. Start machine.
4. Slowly move carriage back until appropriate pressure is reached.
5. If pressure is not reached during first pull:
   - Shut off machine.
   - Slide chuck out of bungee frame several inches.
   - Start machine.
   - Move carriage forward fully.
   - Shut off machine.
   - Install chuck in chuck pocket.
   - Install chuck gate.
   - Install chuck in bungee frame.
6. Repeat steps 1-3 as needed to break pipe loose.
7. When pipe breaks loose:
   - Move carriage backward until wire is slack between chuck and bungee frame.
   - Shut off machine.
   - Remove chuck and chuck gate from bungee frame.
   - Start machine.
   - Move carriage forward until wire is slack between chuck and pipe.
   - Shut off machine.
   - Remove chuck an chuck pocket from shears.
   - Remove bungee frame.
   - Install drop chute.
   - In installation pit, if you wish to salvage guy wire, remove wire from carrot.
   - Remove wire from pipe and store.
8. Pull pipe. See "With Drop Chute" on page 46.

With Guy Wire and Piercing Tool

1. Install bungee frame. See "Set Up Bungee Frame" on page 41.
2. Install extraction assembly in installation pit.
3. Start air compressor.
4. Lock piercing tool into rear taper of extractor with short burst of air. See piercing tool manual.
5. Set maximum pressure. See "Set pressure." on page 40.
6. Start machine.
7. Slowly move carriage back until appropriate pressure is reached.
8. If pressure is not reached during first pull:
   - Shut off machine.
   - Secure chuck gate and chuck in bungee frame.
   - Start machine.
   - Move carriage forward fully.
   - Shut off machine.
   - Install chuck pocket and chuck in shear.
   - Start machine.
   - Slowly move carriage back until maximum pressure is reached.
9. Start piercing tool at low power, increasing every 10 seconds if pipe does not loosen.
10. When carriage moves and hydraulic pressure drops, immediately shut off piercing tool and stop carriage movement.
    - Move carriage backward so wire is slack between chuck and bungee frame.
    - Shut off machine.
    - Remove chuck from bungee frame.
    - Start machine.
    - Move carriage froward until wire is slack between chuck and pipe.
    - Shut off machine.
    - Remove chuck and chuck pocket from shears.
    - Remove bungee frame.
    - Install drop chute.
    - In installation pit, remove guy wire from extractor and store.
11. Start air compressor.
12. Unlock piercing tool from extractor.
13. Shut off air compressor.
14. Remove piercing tool and extractor from pit.
15. Install carrot assembly. See "Connect New Product" on page 43.
16. Pull pipe. See "With Drop Chute" on page 46.

Pull Pipe

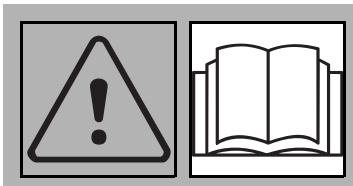
EMERGENCY SHUTDOWN: Shut down engine. Follow procedures in power pack manual.



WARNING Horizontal movement. Crushing can cause death or serious injury. Read and understand operator's manual and all other safety instructions before use.

To help avoid injury:

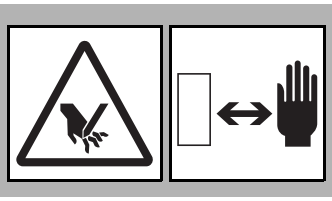
- Secure machine using proper cribbing and blocking devices in all directions during pullback.
- Ensure personnel are clear of installation pit during operation.



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:

- Maintain 2-way communication between extraction pit and all other personnel.
- Ensure operator has good visibility of pipe entering extractor.
- Machine may raise off pit floor under load. Keep hands and feet away.



WARNING Moving parts. Contact can cause serious injury. Stay away.

With Drop Chute

NOTICE: Do not exceed recommended cable pressure. See "Set pressure." on page 40.

1. Start control station.
2. Open shears and jaws.
3. Move carriage forward fully.
4. Clamp jaws on pipe.
5. Move carriage back slowly to loosen pipe.
6. Unclamp jaws.
7. Repeat steps 3-6 until pipe extends through shears.

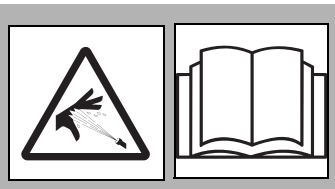
8. With jaws unclamped, close shears.
9. Repeat steps 2-8 until carrot assembly is visible in front of machine.

> ***NOTICE:*** Do not clamp jaws on carrot threads.

Complete the Job

Chapter Contents

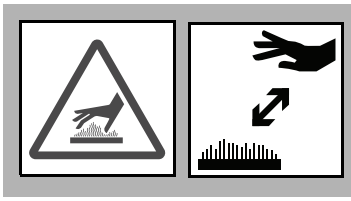
Disconnect Hoses



⚠ WARNING Pressurized fluid or air. Injection can cause death or serious injury. Refer to operator's manual for correct use.

To help avoid injury:

- Before disconnecting a hydraulic line, turn engine off and operate all controls to relieve pressure.
- Always connect return line first and remove last.
- If you are injured, seek immediate medical attention from a doctor familiar with this type of injury.



⚠ CAUTION Hot parts. Contact can cause burns. Only touch when cool or wear gloves.

Restore Jobsite

Fill in installation and extraction pits.

Stow Tools

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

Service

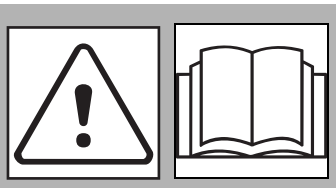
Chapter Contents

Service Precautions

⚠WARNING Jobsite hazards. Exposure can cause death or serious injury. Use correct equipment and work methods. Use and maintain appropriate safety equipment.

To help avoid injury:

- Wear personal protective equipment including hard hat, safety eye wear, foot protection, hearing protection, and gloves (except when near rotating equipment).
- Remove jewelry.
- Wear close-fitting, high visibility clothing.
- Have other personal protective equipment, such as insulated boots and gloves, breathing protection, and face shield, etc. available for use depending on jobsite hazards or requirements.



⚠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 machine off and cool.
- Open pipe shears and jaws before servicing equipment.
- Move carriage to center before servicing equipment.
- Operate controls to relieve machine pressure before servicing equipment.
- Unless otherwise instructed, all service should be performed with machine on level surface.
- Refer to US Occupational Safety and Health Administration (OSHA) guidelines for appropriate lockout-tagout procedures.

Recommended Lubricants/Service Key

Item	Description
EPRG	Extreme-Pressure Grease - high temperature red D4950-07 LB-GC
MGA	Moly grade anti-seize

Proper lubrication and maintenance protects HammerHead® equipment from damage and failure. Service intervals listed are minimum requirements. In extreme conditions, service machine more frequently. Use only recommended lubricants.

NOTICE:

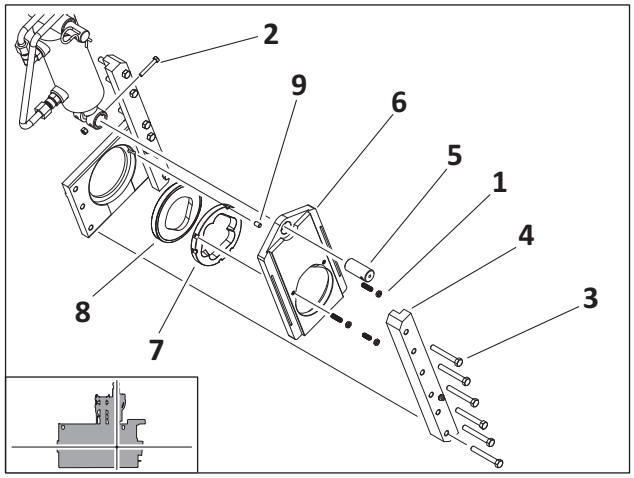
- Use only genuine HammerHead parts and approved lubricants to maintain warranty.
- Use the "Service Record" on page 63 to record all required service to your machine.

Each Use

Tasks	Notes
Check pipe shears	before each use
Inspect zerks	before each use

Check Pipe Shears

Check pipe shears (8, 7) for wear before each use. If moving blade (7) is worn, rotate.



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NOTICE: Ensure blade is properly aligned.

To rotate:

1. Loosen jam nuts and remove three set screws (1).
2. Remove one hex bolt (2).
3. Remove six hex bolts (3) and retaining rail (4).
4. Remove shear blade pin (5).
5. Remove moving blade mount (6).
6. Remove moving blade (7).
7. Remove pin (9) from stationary blade (8).
8. Remove stationary blade.
9. Clean all components.
10. Inspect shears for damage. If damaged, replace.

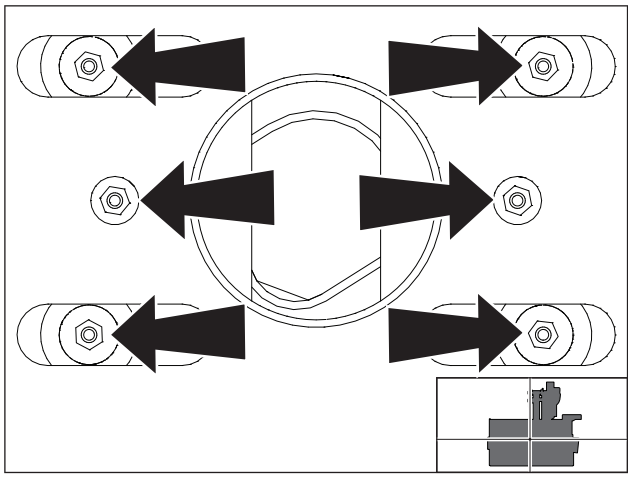
To reinstall:

1. Align pin with rear blade mount.
2. Align stationary blade with pin.
3. Install stationary blade.
4. Ensure stationary blade is flush with stationary blade mount. If blade is not flush, clean thoroughly and mount.
5. Lube stationary blade and stationary blade mount with MGA.
6. Install moving blade so new point is positioned at top of mount.
7. Ensure moving blade is flush with mount. If blade is not flush, clean thoroughly and mount .
8. Lube moving blade and moving blade mount with MGA.
9. Secure moving blade with shear blade pin and hex bolt.
10. Mount retaining rail.

11. Secure with hex bolts. Torque to 35ft•lb (47.45N•m).
12. Ensure threaded holes of moving blade mount align with shear blade holes. Bottom hole will not align with shear blade hole.
13. Insert 1" (2.54cm) set screws in top two holes.
14. Insert 0.75" (1.91cm) set screw in bottom hole.
15. Tighten set screws to 2in•lb (2.71N•m).
16. Install three jam nuts. Torque to 20ft•lb (27.12N•m).
17. Grease zerks.
18. Start machine.
19. Test all functions without pipe or cable.
20. Inspect blade for movement.

Inspect Zerks

Inspect zerks before each use. Lube every 10 hours.



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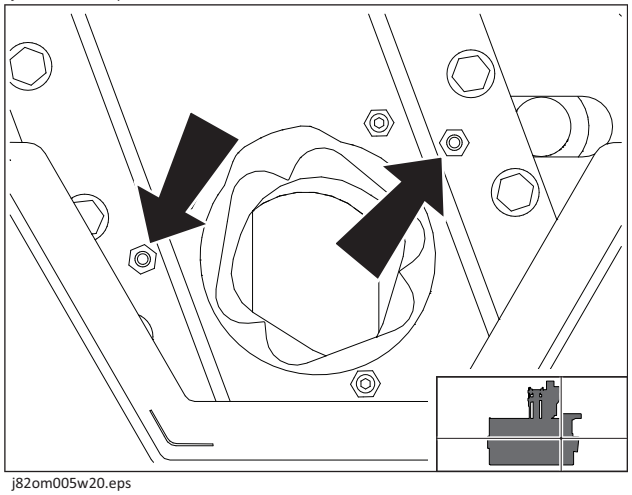

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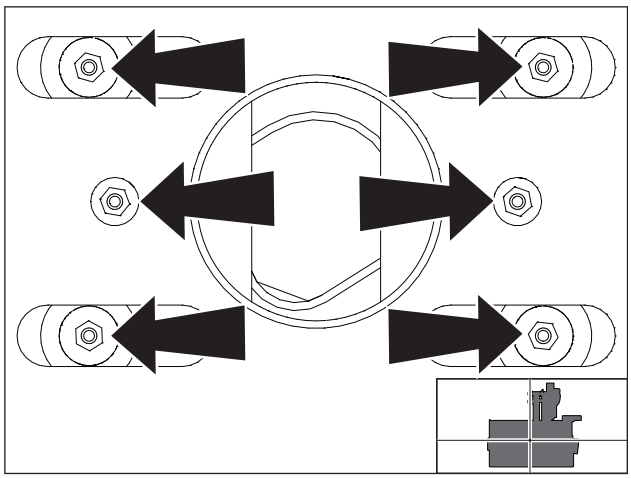
10 Hour

Task	Notes
Lube jaw zerks	
Lube cam roller zerks	

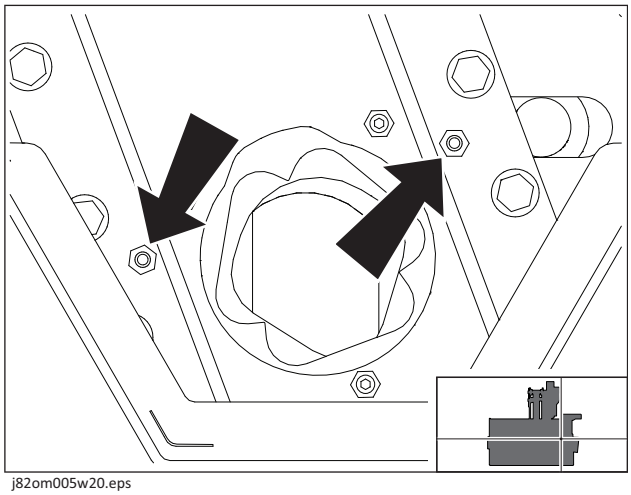
Lube Jaw Zerks

Lube jaw zerks (shown) with EPRG every 10 hours.



Lube Cam Roller Zerks

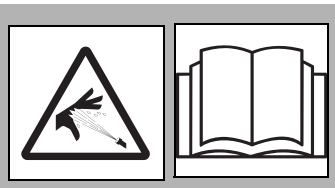
Lube guide rail zerks (shown) with EPRG every 10 hours.



50 Hour

Task	Notes
Check hydraulic hoses	

Check Hydraulic Hoses

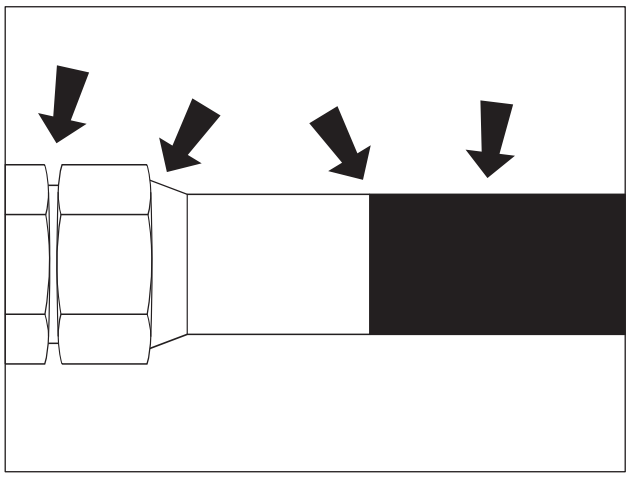


WARNING Pressurized fluid or air. Injection can cause death or serious injury. Refer to operator's manual for correct use.

To help avoid injury:

- Use a piece of cardboard or wood, rather than hands, to search for leaks.
- Before disconnecting a hydraulic line, turn engine off and operate all controls to relieve pressure.
- 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.
- If you are injured, seek immediate medical attention from a doctor familiar with this type of injury.

Check hydraulic hoses for leaks.



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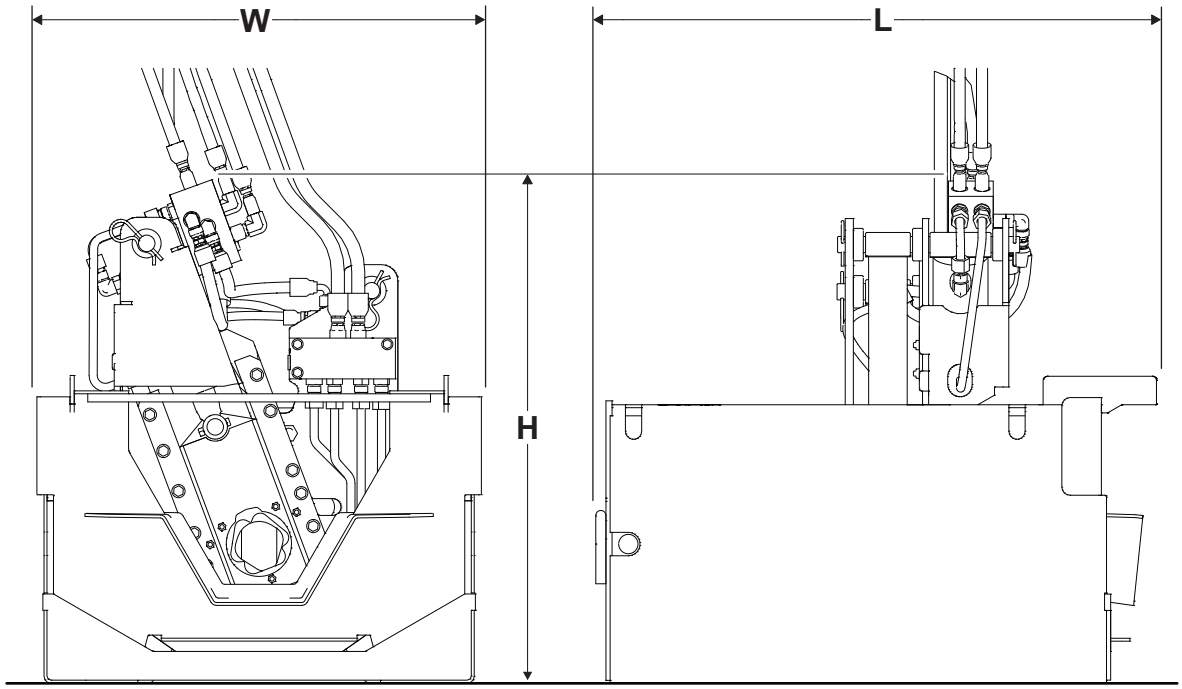
Specifications



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Dimensions	U.S.	Metric
L, length	29in	0.74m
W, width	26.3in	0.67m
H, height	35.5in	0.9m
Weight, mass	664lb	301 kg

Operational	U.S.	Metric
Pulling force at 3000psi (206.84bar)	13.3ton	12tonne
Line speed, max at 6gpm (23lpm)	7fpm	2.13mpm
Hydraulic fluid requirements		
Fluid must meet ISO 046.		
Cleanliness level must meet ISO 18/15/13.		

Support

Procedure

Notify your dealer immediately of any malfunction or failure of HammerHead® 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 HammerHead replacement or repair parts from your authorized HammerHead dealer. Use of another manufacturer's parts may void warranty consideration.

Resources

Publications

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

HammerHead Training

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

Warranty

Limited Warranty Policy

Earth Tool Company LLC, hereinafter sometimes referred to as ETC warrants each new industrial product of its own manufacture to be free from defects in material and workmanship, under normal use and service for one full year after delivery to the owner or 1000 operating hours, whichever occurs first. During the warranty period, the authorized selling HammerHead® Dealer shall furnish parts without charge for any HammerHead product that fails because of defects in material and workmanship. Warranty is void unless warranty registration card is returned within ten days from the date of purchase. This warranty and any possible liability of Earth Tool Company LLC here under is in lieu of all other warranties, express, implied, or statutory, including, but not limited to any warranties of merchantability or fitness for a particular purpose.

The parties agree that the Buyer's SOLE AND EXCLUSIVE REMEDY against ETC, whether in contract or arising out of warranties, representations, or defects shall be for the replacement or repair of defective parts as provided herein. In no event shall ETC's liability exceed the purchase price of the product. The Buyer agrees that no other remedy (including, but not limited to, incidental or consequential loss) shall be available to him. If, during the warranty period, any product becomes defective by reason of material or workmanship and Buyer immediately notifies ETC of such defect, ETC shall, at its option, supply a replacement part or request the return of the product to its plant in Lake Mills, Wisconsin. No part shall be returned without prior written authorization from ETC, and this warranty does not obligate ETC to bear any transpiration charges in connection with the repair or replacement of defective parts. Earth Tool Company LLC will not accept any charges for labor and/or parts incidental to the removal or remounting of parts repaired or replaced under this Warranty.

This Warranty shall not apply to any part or product which shall have been installed or operated in a manner not recommended by ETC nor to any part or product which shall have been neglected, or used in any way which, in ETC's opinion, adversely affects its performance; nor negligence of proper maintenance or other negligence, fire or other accident; nor with respect to wear items; nor if the unit has been repaired or altered outside of an ETC authorized dealership in a manner of which, in the sole judgment of ETC affects its performance, stability or reliability; nor with respect to batteries which are covered under a separate adjustment warranty; nor to any product in which parts not manufactured or approved by ETC have been used, nor to normal maintenance services or replacement of normal service items. Equipment and accessories not of our manufacture are warranted only to the extent of the original Manufacturer's Warranty and subject to their allowance to us, if found defective by them. ETC reserves the right to modify, alter, and improve any product or parts without incurring any obligation to replace any product or parts previously sold with such modified, altered, or improved product or part. No person is authorized to give any other Warranty, or to assume any additional obligation on ETC's behalf unless made in writing, and signed by an officer of ETC.

EARTH TOOL COMPANY LLC

Lake Mills, Wisconsin

Service Record

Service Performed	Date	Hours

Service Performed	Date	Hours

Appendix

Chapter Contents

Tooling Matrix

REV: A

SLX1300 Tooling Matrix
1/2" Thru 1-1/4" Existing Pipe
Installing 1/2" Thru 2" Copper or PE Product Pipe

EXISTING PIPE		PRODUCT PIPE			JAW ASSEMBLY				TOOLING			PRODUCT PIPE PULLER					
NOMINAL SIZE(in)	MINIMUM ID(in)	NOMINAL SIZE(in)	MAXIMUM OD(in)	EXPANDER OD (in)	ø1/4" CABLE	ø5/16" CABLE	ø3/8" CABLE	ø1/2" CABLE	CARROT ASSEMBLY	EXTRACTOR ASSY	PIERCING TOOL	SLEEVED (OPTION A)	PIPE GRIP (OPTION B)	CARROT (OPTION C)	BEACON ASSEMBLY	BREAKAWAY PIN KIT	BREAKAWAY FORCE +/- 10% (LBS)
.5 CTS	0.53	.5 CTS	0.63	1.75	912-5512	912-5503	-	-	-	912-6986	-	-	912-5578	901-0102	912-5665	-	-
.5 CTS	0.53	.5 IPS	0.84	1.75	912-5512	912-5503	-	-	-	912-6986	-	-	912-5579	901-0102	912-5665	-	-
.5 CTS	0.53	.75 CTS	0.88	1.75	912-5512	912-5503	-	-	-	912-6986	-	-	912-5579	901-0102	912-5665	-	-
.5 CTS	0.53	.75 IPS	1.05	1.75	912-5512	912-5503	-	-	-	912-6986	-	-	912-5580	901-0102	912-5665	-	-
.5 CTS	0.53	1 CTS	1.12	1.75	912-5512	912-5503	-	-	-	912-6986	-	-	912-5580	901-0102	912-5665	-	-
.5 CTS	0.53	1 IPS	1.32	1.75	912-5512	912-5503	-	-	-	912-6986	-	902-2100	912-5580	901-0102	912-5665	-	-
.5 IPS	0.63	.5 CTS	0.63	1.75	912-5512	912-5503	-	-	-	912-6986	-	-	912-5578	901-0102	912-5665	-	-
.5 IPS	0.63	.5 IPS	0.84	1.75	912-5512	912-5503	-	-	-	912-6986	-	-	912-5579	901-0102	912-5665	-	-
.5 IPS	0.63	.75 CTS	0.88	1.75	912-5512	912-5503	-	-	-	912-6986	-	-	912-5579	901-0102	912-5665	-	-
.5 IPS	0.63	.75 IPS	1.05	1.75	912-5512	912-5503	-	-	-	912-6986	-	-	912-5580	901-0102	912-5665	-	-
.5 IPS	0.63	1 CTS	1.12	1.75	912-5512	912-5503	-	-	-	912-6986	-	-	912-5580	901-0102	912-5665	-	-
.5 IPS	0.63	1 IPS	1.32	1.75	912-5512	912-5503	-	-	-	912-6986	-	902-2100	912-5580	901-0102	912-5665	-	-
.75 CTS	0.75	.75 CTS	0.88	2.25	-	912-5503	912-5552	-	912-6984	912-6974*	25222-1*	-	912-5579	901-0102	912-5665	-	-
.75 CTS	0.75	.75 IPS	1.05	2.25	-	912-5503	912-5552	-	912-6984	912-6974*	25222-1*	-	912-5580	901-0102	912-5665	-	-
.75 CTS	0.75	1 CTS	1.12	2.25	-	912-5503	912-5552	-	912-6984	912-6974*	25222-1*	-	912-5580	901-0102	912-5665	-	-
.75 CTS	0.75	1 IPS	1.32	2.25	-	912-5503	912-5552	-	912-6984	912-6974*	25222-1*	902-2100	912-5580	901-0102	912-5665	-	-
.75 CTS	0.75	1.25 CTS	1.38	2.25	-	912-5503	912-5552	-	912-6984	912-6974*	25222-1*	-	912-5580	901-0122	912-5665	-	-
.75 CTS	0.75	1.25 IPS	1.66	2.25	-	912-5503	912-5552	-	912-6984	912-6974*	25222-1*	902-2200	912-5581	901-0122	912-5665	-	-
.75 IPS	0.82	.75 CTS	0.88	2.25	-	912-5503	912-5552	-	912-6984	912-6974*	25222-1*	-	912-5579	901-0102	912-5665	-	-
.75 IPS	0.82	.75 IPS	1.05	2.25	-	912-5503	912-5552	-	912-6984	912-6974*	25222-1*	-	912-5580	901-0102	912-5665	-	-
.75 IPS	0.82	1 CTS	1.12	2.25	-	912-5503	912-5552	-	912-6984	912-6974*	25222-1*	-	912-5580	901-0102	912-5665	-	-
.75 IPS	0.82	1 IPS	1.32	2.25	-	912-5503	912-5552	-	912-6984	912-6974*	25222-1*	902-2100	912-5580	901-0102	912-5665	-	-
.75 IPS	0.82	1.25 CTS	1.38	2.25	-	912-5503	912-5552	-	912-6984	912-6974*	25222-1*	-	912-5580	901-0122	912-5665	-	-
.75 IPS	0.82	1.25 IPS	1.66	2.25	-	912-5503	912-5552	-	912-6984	912-6974*	25222-1*	902-2200	912-5581	901-0122	912-5665	-	-
1 CTS	1.00	1 CTS	1.12	2.50	-	912-5503	912-5552	-	912-6985	912-6974*	25222-1*	-	912-5580	901-0102	912-5665	-	-
1 CTS	1.00	1 IPS	1.32	2.50	-	912-5503	912-5552	-	912-6985	912-6974*	25222-1*	902-2100	912-5580	901-0102	912-5665	-	-
1 CTS	1.00	1.25 CTS	1.38	2.50	-	912-5503	912-5552	-	912-6985	912-6974*	25222-1*	-	912-5580	901-0122	912-5665	-	-
1 CTS	1.00	1.25 IPS	1.66	2.50	-	912-5503	912-5552	-	912-6985	912-6974*	25222-1*	902-2200	912-5581	901-0122	912-5665	-	-
1 CTS	1.00	1.5 CTS	1.63	2.50	-	912-5503	912-5552	-	912-6985	912-6974*	25222-1*	-	912-5581	901-0150	912-5665	-	-
1 CTS	1.00	1.5 IPS	1.90	2.50	-	912-5503	912-5552	-	912-6985	912-6974*	25222-1*	902-2300	912-5581	901-0150	912-5665	-	-

EXISTING PIPE		PRODUCT PIPE			JAW ASSEMBLY				TOOLING			PRODUCT PIPE PULLER					
NOMINAL SIZE(in)	MINIMUM ID(in)	NOMINAL SIZE(in)	MAXIMUM OD(in)	EXPANDER OD (in)	ø1/4" CABLE	ø5/16" CABLE	ø3/8" CABLE	ø1/2" CABLE	CARROT ASSEMBLY	EXTRACTOR ASSY	PIERCING TOOL	SLEEVED (OPTION A)	PIPE GRIP (OPTION B)	CARROT (OPTION C)	BEACON ASSEMBLY	BREAKAWAY PIN KIT	BREAKAWAY FORCE +/- 10% (LBS)
1 IPS	1.05	1 CTS	1.12	2.50	-	912-5503	912-5552		912-6985	912-6974*	25222-1*	-	912-5580	901-0102	912-5665	-	-
1 IPS	1.05	1 IPS	1.32	2.50	-	912-5503	912-5552		912-6985	912-6974*	25222-1*	902-2100	912-5580	901-0102	912-5665	-	-
1 IPS	1.05	1.25 CTS	1.38	2.50	-	912-5503	912-5552		912-6985	912-6974*	25222-1*	-	912-5580	901-0122	912-5665	-	-
1 IPS	1.05	1.25 IPS	1.66	2.50	-	912-5503	912-5552		912-6985	912-6974*	25222-1*	902-2200	912-5581	901-0122	912-5665	-	-
1 IPS	1.05	1.5 CTS	1.63	2.50	-	912-5503	912-5552	-	912-6985	912-6974*	25222-1*	-	912-5581	901-0150	912-5665	-	-
1 IPS	1.05	1.5 IPS	1.90	2.50	-	912-5503	912-5552	-	912-6985	912-6974*	25222-1*	902-2300	912-5581	901-0150	912-5665	-	-
1.25 CTS	1.24	1.25 CTS	1.38	3.25	-	-	-	912-5553	912-6983	912-6974*	25222-1*	-	912-5580	901-0122	912-5665	-	-
1.25 CTS	1.24	1.25 IPS	1.66	3.25	-	-	-	912-5553	912-6983	912-6974*	25222-1*	902-2200	912-5581	901-0122	912-5665	-	-
1.25 CTS	1.24	1.5 CTS	1.63	3.25	-	-	-	912-5553	912-6983	912-6974*	25222-1*	-	912-5581	901-0150	912-5665	-	-
1.25 CTS	1.24	1.5 IPS	1.90	3.25	-	-	-	912-5553	912-6983	912-6974*	25222-1*	902-2200	912-5581	901-0150	912-5665	-	-
1.25 CTS	1.24	2.0 CTS	2.13	3.25	-	-	-	912-5553	912-6983	912-6974*	25222-1*	-	912-5582	901-0202	912-5665	912-5689	1500
1.25 CTS	1.24	2.0 IPS	2.38	3.25	-	-	-	912-5553	912-6983	912-6974*	25222-1*	902-2400	912-5582	901-0202	912-5665	912-5689	1500
1.25 IPS	1.38	1.25 CTS	1.38	3.25	-	-	-	912-5553	912-6983	912-6974*	25222-1*	-	912-5580	901-0122	912-5665	-	-
1.25 IPS	1.38	1.25 IPS	1.66	3.25	-	-	-	912-5553	912-6983	912-6974*	25222-1*	902-2200	912-5581	901-0122	912-5665	-	-
1.25 IPS	1.38	1.5 CTS	1.63	3.25	-	-	-	912-5553	912-6983	912-6974*	25222-1*	-	912-5581	901-0150	912-5665	-	-
1.25 IPS	1.38	1.5 IPS	1.90	3.25	-	-	-	912-5553	912-6983	912-6974*	25222-1*	902-2200	912-5581	901-0150	912-5665	-	-
1.25 IPS	1.38	2.0 CTS	2.13	3.25	-	-	-	912-5553	912-6983	912-6974*	25222-1*	-	912-5582	901-0202	912-5665	912-5689	1500
1.25 IPS	1.38	2.0 IPS	2.38	3.25	-	-	-	912-5553	912-6983	912-6974*	25222-1*	902-2400	912-5582	901-0202	912-5665	912-5689	1500

*OPTIONAL:USED TO INITIATE PIPE MOVEMENT-CARROT ASSEMBLY USED FOR INSTALLATION

EXISTING PIPE PRODUCT TYPES
IPS SCHEDULE 40 STEEL

REV: A

SLX1300 Pre-Stress Cable Option
1/2" Thru 1-1/4" Existing
Installing 1/2" Thru 2" Copper or PE Product Pipe

EXISTING PIPE		PRODUCT PIPE			CABLE, EHS 7 STRAND X 120' LONG				CHUCK ASSEMBLY					
NOMINAL SIZE(in)	MINIMUM ID(in)	NOMINAL SIZE(in)	MAXIMUM OD(in)	EXPANDER OD (in)	ø1/4" CABLE	ø5/16" CABLE	ø3/8" CABLE	ø1/2" CABLE	ø1/4" CABLE	ø5/16" CABLE	ø3/8" CABLE	ø1/2" CABLE	TENSIONING BACK PLATE	CHUCK POCKET
.5 CTS	0.53	.5 CTS	0.63	1.75	912-6997	912-6996	-	-	912-6992	912-6993	-	-	912-6933	912-6998
.5 CTS	0.53	.5 IPS	0.84	1.75	912-6997	912-6996	-	-	912-6992	912-6993	-	-	912-6933	912-6998
.5 CTS	0.53	.75 CTS	0.88	1.75	912-6997	912-6996	-	-	912-6992	912-6993	-	-	912-6933	912-6998
.5 CTS	0.53	.75 IPS	1.05	1.75	912-6997	912-6996	-	-	912-6992	912-6993	-	-	912-6933	912-6998
.5 CTS	0.53	1 CTS	1.12	1.75	912-6997	912-6996	-	-	912-6992	912-6993	-	-	912-6933	912-6998
.5 CTS	0.53	1 IPS	1.32	1.75	912-6997	912-6996	-	-	912-6992	912-6993	-	-	912-6933	912-6998
.5 IPS	0.63	.5 CTS	0.63	1.75	912-6997	912-6996	-	-	912-6992	912-6993	-	-	912-6933	912-6998
.5 IPS	0.63	.5 IPS	0.84	1.75	912-6997	912-6996	-	-	912-6992	912-6993	-	-	912-6933	912-6998
.5 IPS	0.63	.75 CTS	0.88	1.75	912-6997	912-6996	-	-	912-6992	912-6993	-	-	912-6933	912-6998
.5 IPS	0.63	.75 IPS	1.05	1.75	912-6997	912-6996	-	-	912-6992	912-6993	-	-	912-6933	912-6998
.5 IPS	0.63	1 CTS	1.12	1.75	912-6997	912-6996	-	-	912-6992	912-6993	-	-	912-6933	912-6998
.5 IPS	0.63	1 IPS	1.32	1.75	912-6997	912-6996	-	-	912-6992	912-6993	-	-	912-6933	912-6998
.75 CTS	0.75	.75 CTS	0.88	2.25	-	912-6996	912-6995	-	-	912-6993	912-6991	-	912-6933	912-6998
.75 CTS	0.75	.75 IPS	1.05	2.25	-	912-6996	912-6995	-	-	912-6993	912-6991	-	912-6933	912-6998
.75 CTS	0.75	1 CTS	1.12	2.25	-	912-6996	912-6995	-	-	912-6993	912-6991	-	912-6933	912-6998
.75 CTS	0.75	1 IPS	1.32	2.25	-	912-6996	912-6995	-	-	912-6993	912-6991	-	912-6933	912-6998
.75 CTS	0.75	1.25 CTS	1.38	2.25	-	912-6996	912-6995	-	-	912-6993	912-6991	-	912-6933	912-6998
.75 CTS	0.75	1.25 IPS	1.66	2.25	-	912-6996	912-6995	-	-	912-6993	912-6991	-	912-6933	912-6998
.75 IPS	0.82	.75 CTS	0.88	2.25	-	912-6996	912-6995	-	-	912-6993	912-6991	-	912-6933	912-6998
.75 IPS	0.82	.75 IPS	1.05	2.25	-	912-6996	912-6995	-	-	912-6993	912-6991	-	912-6933	912-6998
.75 IPS	0.82	1 CTS	1.12	2.25	-	912-6996	912-6995	-	-	912-6993	912-6991	-	912-6933	912-6998
.75 IPS	0.82	1 IPS	1.32	2.25	-	912-6996	912-6995	-	-	912-6993	912-6991	-	912-6933	912-6998
.75 IPS	0.82	1.25 CTS	1.38	2.25	-	912-6996	912-6995	-	-	912-6993	912-6991	-	912-6933	912-6998
.75 IPS	0.82	1.25 IPS	1.66	2.25	-	912-6996	912-6995	-	-	912-6993	912-6991	-	912-6933	912-6998
1 CTS	1.00	1 CTS	1.12	2.50	-	912-6996	912-6995	-	-	912-6993	912-6991	-	912-6933	912-6998
1 CTS	1.00	1 IPS	1.32	2.50	-	912-6996	912-6995	-	-	912-6993	912-6991	-	912-6933	912-6998
1 CTS	1.00	1.25 CTS	1.38	2.50	-	912-6996	912-6995	-	-	912-6993	912-6991	-	912-6933	912-6998
1 CTS	1.00	1.25 IPS	1.66	2.50	-	912-6996	912-6995	-	-	912-6993	912-6991	-	912-6933	912-6998
1 CTS	1.00	1.5 CTS	1.63	2.50	-	912-6996	912-6995	-	-	912-6993	912-6991	-	912-6933	912-6998
1 CTS	1.00	1.5 IPS	1.90	2.50	-	912-6996	912-6995	-	-	912-6993	912-6991	-	912-6933	912-6998
1 IPS	1.05	1 CTS	1.12	2.50	-	912-6996	912-6995		-	912-6993	912-6991		912-6933	912-6998
1 IPS	1.05	1 IPS	1.32	2.50	-	912-6996	912-6995		-	912-6993	912-6991		912-6933	912-6998
1 IPS	1.05	1.25 CTS	1.38	2.50	-	912-6996	912-6995		-	912-6993	912-6991		912-6933	912-6998
1 IPS	1.05	1.25 IPS	1.66	2.50	-	912-6996	912-6995		-	912-6993	912-6991		912-6933	912-6998
1 IPS	1.05	1.5 CTS	1.63	2.50	-	912-6996	912-6995	-	-	912-6993	912-6991	-	912-6933	912-6998
1 IPS	1.05	1.5 IPS	1.90	2.50	-	912-6996	912-6995	-	-	912-6993	912-6991	-	912-6933	912-6998
1.25 CTS	1.24	1.25 CTS	1.38	3.25	-	-	-	912-6994	-	-	-	912-6990	912-6933	912-6998
1.25 CTS	1.24	1.25 IPS	1.66	3.25	-	-	-	912-6994	-	-	-	912-6990	912-6933	912-6998
1.25 CTS	1.24	1.5 CTS	1.63	3.25	-	-	-	912-6994	-	-	-	912-6990	912-6933	912-6998
1.25 CTS	1.24	1.5 IPS	1.90	3.25	-	-	-	912-6994	-	-	-	912-6990	912-6933	912-6998
1.25 CTS	1.24	2.0 CTS	2.13	3.25	-	-	-	912-6994	-	-	-	912-6990	912-6933	912-6998
1.25 CTS	1.24	2.0 IPS	2.38	3.25	-	-	-	912-6994	-	-	-	912-6990	912-6933	912-6998
1.25 IPS	1.38	1.25 CTS	1.38	3.25	-	-	-	912-6994	-	-	-	912-6990	912-6933	912-6998
1.25 IPS	1.38	1.25 IPS	1.66	3.25	-	-	-	912-6994	-	-	-	912-6990	912-6933	912-6998
1.25 IPS	1.38	1.5 CTS	1.63	3.25	-	-	-	912-6994	-	-	-	912-6990	912-6933	912-6998
1.25 IPS	1.38	1.5 IPS	1.90	3.25	-	-	-	912-6994	-	-	-	912-6990	912-6933	912-6998
1.25 IPS	1.38	2.0 CTS	2.13	3.25	-	-	-	912-6994	-	-	-	912-6990	912-6933	912-6998
1.25 IPS	1.38	2.0 IPS	2.38	3.25	-	-	-	912-6994	-	-	-	912-6990	912-6933	912-6998

PRE-STRESS CABLE OPTION MUST BE USED WHEN EXTRACTING COPPER OR LEAD

EXISTING PIPE PRODUCT TYPES
IPS SCHEDULE 40 STEEL