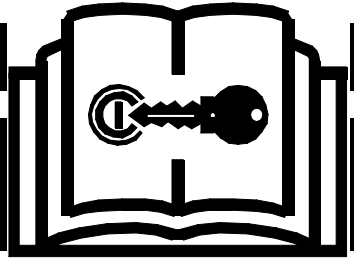
HAMMERHEAD

HydroBurst™ Models

HB175, HB125,
HB100, HB80,
HB5058, HB3038



Operator's and Maintenance Manual

HB125_06_08
Serial No. 10000 and up
Order No. OM1251

INTRODUCTION

This manual explains the proper operation of your machine. Study and understand these instructions thoroughly before operating or maintaining the machine. Failure to do so could result in personal injury or equipment damage. Consult your HammerHead dealer if you do not understand the instructions in this manual, or need additional information.

The instructions, illustrations, and specifications in this manual are based on the latest information available at time of publication. Your machine may have product improvements and features not yet contained in this manual.

Earth Tool Company LLC reserves the right to make changes at any time without notice or obligation.

Operation and maintenance instructions are included in the Operator's Manual provided with the machine. Store the manual in an easily accessible location for future reference when not in use.

Additional copies of the manuals are available from your dealer. Use the reorder number on the front cover to order additional manuals.

Earth Tool Company LLC
1300 Capitol Drive
Oconomowoc, Wisconsin 53066 USA

HydroBurst

PATENTS

This machine may be covered by one or more of the following patents:

US 5,025,868	US 5,199,151	US 5,487,430	US 5,317,953	US 5,465,797
US 5,440,797	US 5,494,116	US 5,505,270	US 5,603,383	US 5,651,639
US 5,687,803	US 5,782,311	US 6,148,935	US 6,171,026 B1	US 6,260,634 B1
US 6,261,027 B1	US 6,263,983 B1	US 6,269,889 B1	US 6,273,201 B1	US 6,283,229 B1
US 6,302,410 B1	US 6,299,382 B1	US 5,337,837	US 6,321,858 B1	US 6,390,207 B2
US 6,371,223 B2	US 6,390,087 B1			

(Other U.S. and foreign patents pending.)

HAMMERHEAD EQUIPMENT LIMITED WARRANTY

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 servise 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 hereunder 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 Oconomowoc, Wisconsin. No part shall be returned without prior written authorization from ETC, and this warranty does not obligate ETC to bear any transportation 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 servises or replacement of normal servise 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 products 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

Oconomowoc, Wisconsin

HydroBurst

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TABLE OF CONTENTS

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Receiving and Delivery Report

DEALER PREP

Check or perform the following:

___ Check machine for shortage or damage in transit.

Hydraulics

___ Check the level of the hydraulic fluid.

___ Check all hydraulic components for leaks or damage.

___ Check condition and location of protective sleeves on hydraulic hoses.

General

___ Check all shields for installation and condition.

___ Check the machine for proper lubrication.

___ Check the condition of all decals.

___ Check all phases of operation.

___ Complete “Dealer/Customer Information”, *page ii*.

___ Complete “Identification Numbers - Record”, *page iii*.

DEALER/CUSTOMER INFORMATION

dealer	owner
address	address
city	city
state / province	state / province
zip / postal code	zip / postal code
country	country

IDENTIFICATION NUMBERS - RECORD

Machine Identification Numbers HB3038 or HB5058

Model Number_____

Serial Number_____

Engine Identification Numbers PP20

Model Number_____

Serial Number_____

HydroBurst HB80 Identification Numbers

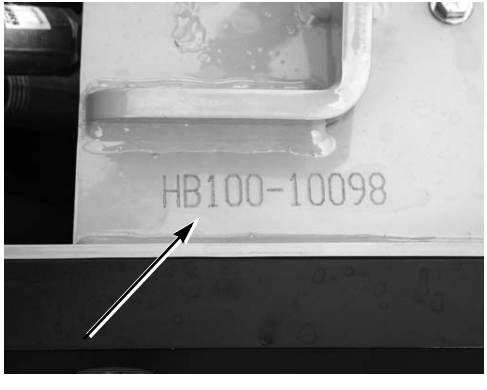
Model Number_____

Serial Number_____

HydroBurst HB100 Identification Numbers

Model Number_____

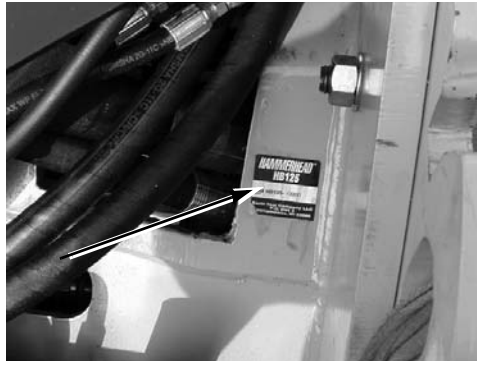
Serial Number_____



HydroBurst HB125/ HB175 Identification Numbers

Model Number_____

Serial Number_____



PowerPack 73/70 Identification Numbers

Model Number_____

Serial Number_____

DELIVERY

Check and perform the following with the customer:

HydroBurst

___ Review all sections of the *Operator's Manual.*

___ Grease or oil all lubrication points; review lubrication, decal, and maintenance intervals.

___ Ensure all requested options are installed.

___ Review HB80, HB100, HB125 or HB175 HydroBurst operation (refer to to the *Controls* section, *page 25-1* and to the *Operating the HydroBurst System* section, *page 40-1*.

Dealer Installed Options

___ Review all appropriate operation and adjustment information.

Review of Operation

___ Review and demonstrate with customer the various aspects of hydroburst operation.

- overall explanation of how the HydroBurst works
- HydroBurst safety
- preparing the HB80, HB100, HB125 or HB175 HydroBurst for operation

Section 10: Safety Messages

General safety messages appear in this Safety Messages section. Specific safety messages are located in appropriate sections of the manual where a potential hazard may occur if the instructions or procedures are not followed.

Understand Safety Alert Symbol

This is the safety alert symbol. This symbol placed on your machine or in the manual and is used to alert you to the potential for bodily injury or death.

Understand Signal Words

A signal word **"DANGER"**, **"WARNING"**, or **"CAUTION"** is used with the safety alert symbol.

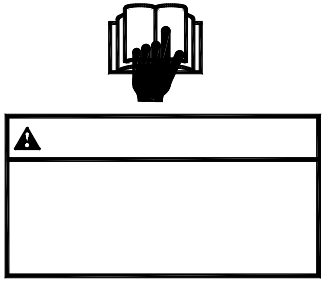
Safety signs with signal word **"DANGER"**, **"WARNING"**, or **"CAUTION"** are located near specific hazards.

DANGER — Imminent hazards which, if not avoided, will result in serious personal injury or death.

WARNING — Potential hazards or unsafe practices which, if not avoided, could result in serious personal injury or death.

CAUTION — Potential hazards or unsafe practices which, if not avoided, could result in minor personal injury or product or property damage.

READ, UNDERSTAND, AND FOLLOW INSTRUCTIONS



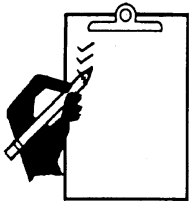
Read, understand, and follow all safety instructions and safety messages included in this manual and on decals attached to the machine. These instructions and safety messages contain important information.

Allow only responsible, properly instructed individuals to operate and servise the machine.

Failure to follow the instructions and safety messages in this manual and on the decals attached to the machine could result in serious injury or death.

Keep all safety decals and instruction decals in good condition. Replace any missing or damaged decals.

KEEP MACHINE IN GOOD CONDITION



Be sure the machine is in good operating condition and that all safety devises are installed and functioning properly.

Visually inspect the machine daily before starting the machine.

Make no modifications to your equipment unless specifically recommended or requested by Earth Tool Company LLC.

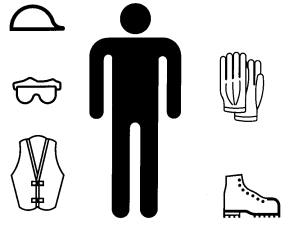
REPORTING SAFETY DEFECTS

If you believe that your vehicle has a defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying Earth Tool Co. LLC.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer or Earth Tool Co. LLC.

To contact NHTSA, you may either call the Auto Safety Hot line toll-free at 1-800-424-9393 (or 366-0123 in Washington, D.C. area) or write to: NHTSA, U.S. Department of Transportation, Washington, D.C. 20590. You can also obtain other information about motor vehicle safety from the Hot line.

PERSONAL PROTECTIVE EQUIPMENT



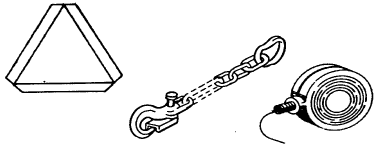
Operating this machine will require you to wear personal protective equipment. Wear close-fitting clothing and confine long hair.

Avoid wearing jewelry, such as rings, wrist watches, necklaces, or bracelets.

Always wear:

- safety glasses
- work shoes
- hard hat
- leather gloves when handling wire rope
- high visibility clothing when working near traffic

TRANSPORTING THE MACHINE



To reduce risk of injury or loss of vehicle control, refer to the ""Specifications", *page 60-1*" section before towing the machine.

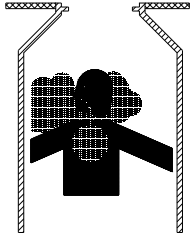
Use good judgement and obey all applicable laws governing road use.

KEEP SPECTATORS AWAY FROM MACHINE

Keep all spectators and other workers away from the machine and work area while in operation.

CONFINED SPACE REGULATIONS

Do not work in a confined space, such as a sewer, until requirements are met to ensure a hazard free environment. Specific requirements for confined space entry are available from federal and state O.S.H.A. offices.



WORK IN VENTILATED AREA

Exhaust fumes can be fatal.

If operating the machine in an enclosed area, remove the exhaust fumes with an exhaust pipe extension to the outside.

HANDLE FUEL SAFELY

Fuel and fumes can catch fire or explode and cause serious injury from burns.

Shut off engine before refueling. No smoking. No flame.

AVOID HIGH PRESSURE LEAKS

Pressurized fluid can penetrate body tissue and result in serious injury or death. Leaks can be invisible. Relieve pressure before working on system. When searching for a leak, use an object like cardboard - not your hand. Fluid injected under the skin must be removed immediately by a surgeon familiar with this type of injury.

CLEAN FLAMMABLE MATERIALS FROM MACHINE

Prevent fires by keeping engine compartment, battery, hydraulic lines, fuel tank and operator's station clean of accumulated trash, grease, and debris.

AVOID COOLANT BURNS

Hot fluid under pressure can erupt and scald if opened.

Allow to cool before opening.

AVOID BATTERY EXPLOSION

Battery fumes are flammable and can explode. Keep all burning materials away from battery. Do not smoke. Tools and cable clamps can make sparks. Shield eyes and face from battery.

AVOID BATTERY BURNS

Battery contains sulfuric acid which can cause severe burns. Avoid contact with eyes, skin, and clothing.

In case of acid contact:

External: Flush with plenty of water. If eyes have been exposed, flush with water for 15 minutes and get prompt medical attention.

Internal: Drink large quantities of water or milk, follow with milk of magnesia, beaten egg, or vegetable oil. Call a physician immediately.

USE SHUTDOWN PROCEDURE

For your safety and the safety of others, the *Starting Procedure*, page *26-1* must be followed before servicing, cleaning, repairing, inspecting, lubricating, fueling, or transporting the machine.

WARNING: Failure to follow any of the preceding safety instructions, or those that follow within this manual, could result in serious injury or death. This machine is to be used only for those purposes for which it was intended, as explained in this Operator's Manual.

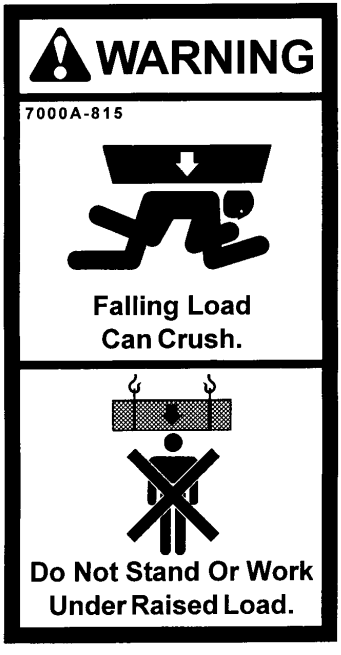
Section 15: Safety Decals

SAFETY DECAL MAINTENANCE

Safety decals located on your machine contain important and useful information that will help you operate your equipment safely.

To assure that all decals remain in place and in good condition, follow these instructions:

- Keep decals clean. Use soap and water - not mineral spirits, abrasive cleaners, or other similar cleaners that will damage the decal.
- Replace any damaged or missing decals. When attaching decals, surface temperature of the metal must be at least 40°F (5°C). The metal must be clean and dry.
- When replacing a machine component with a decal attached, replace the decal also.
- Replacement decals can be purchased from your HammerHead equipment dealer.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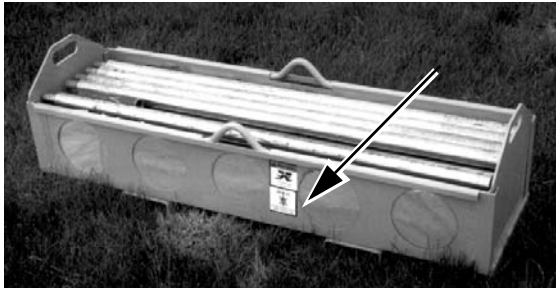
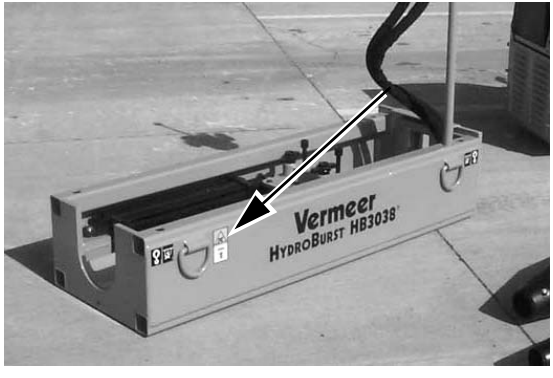
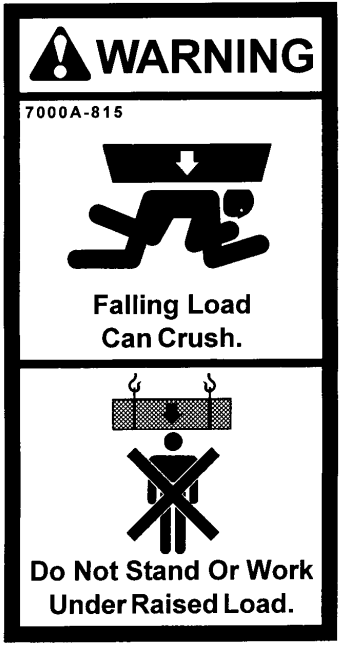
7000A-815
Falling Load
Can Crush.
Do Not Stand Or Work
Under Raised Load.




Vermeer
HydroBurst HB3038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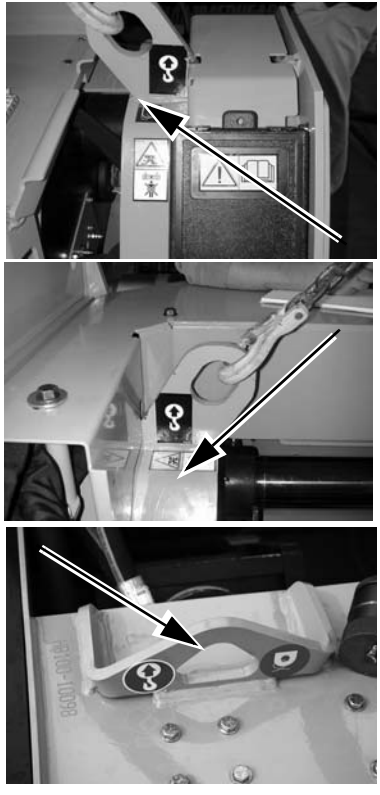

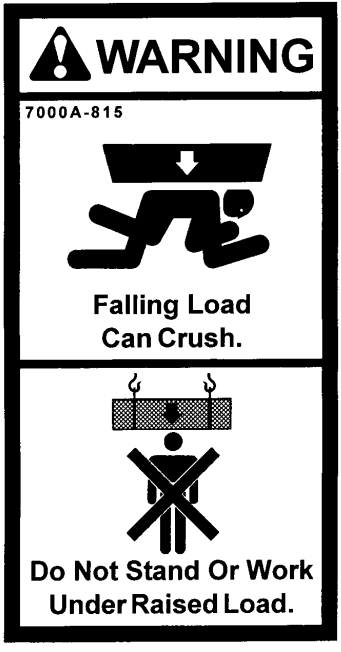
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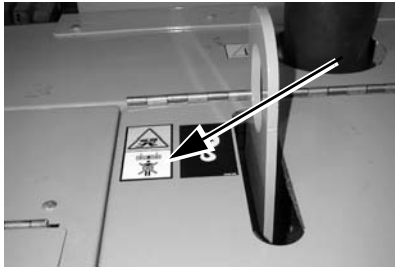

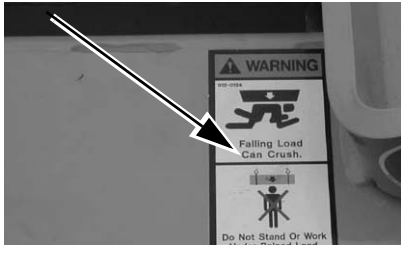
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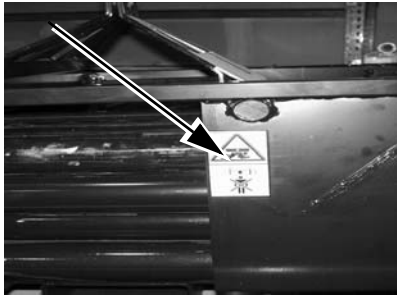

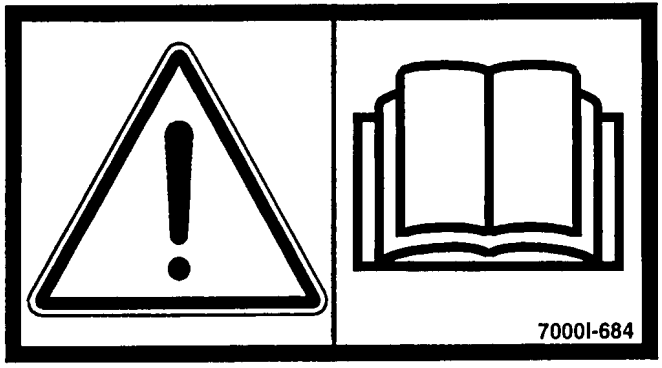
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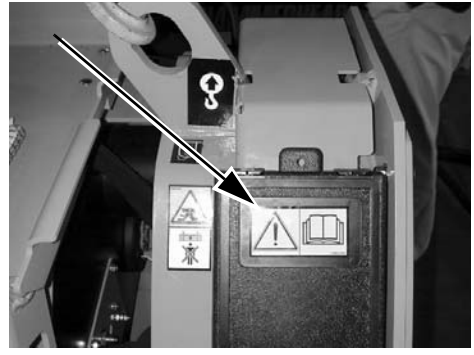
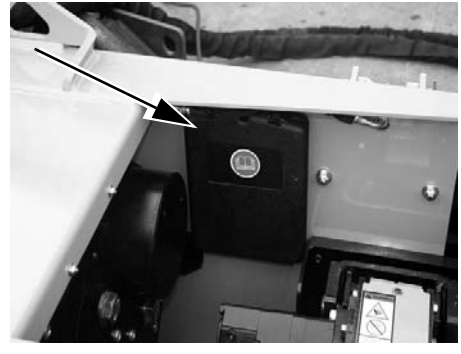
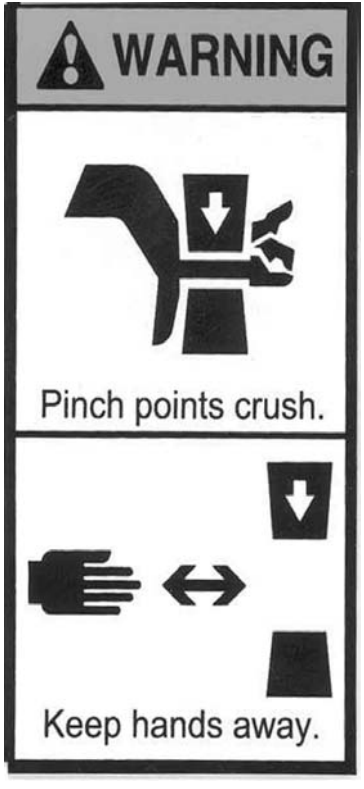
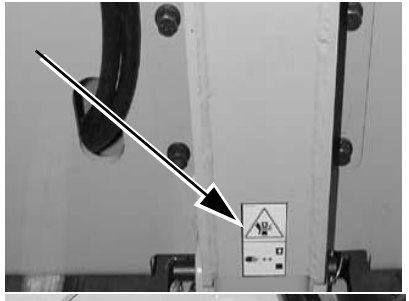
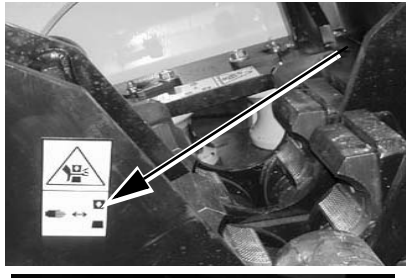
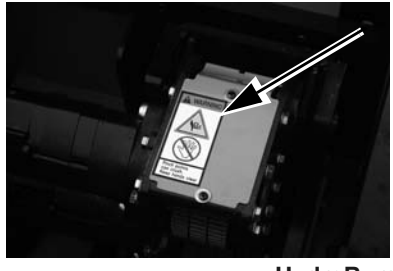


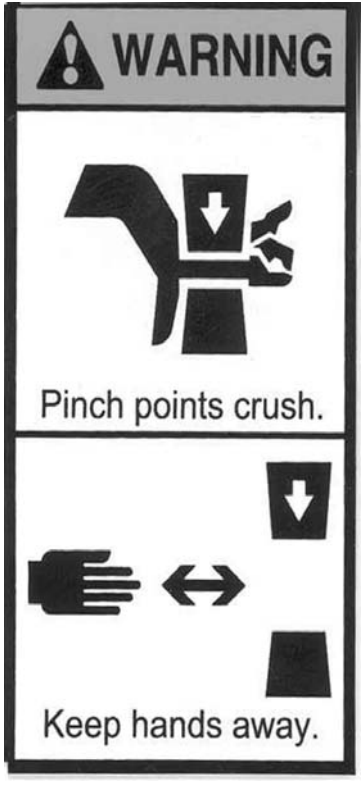



WARNING
Pinch points crush.
Keep hands away.





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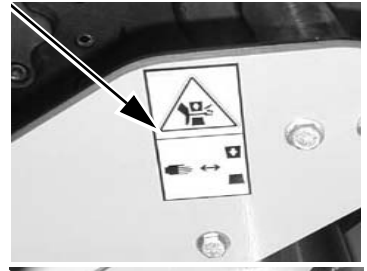

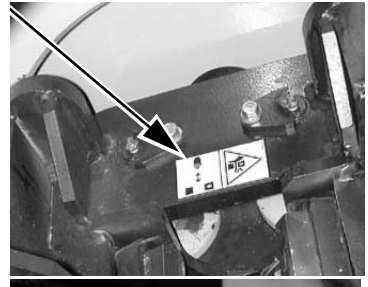

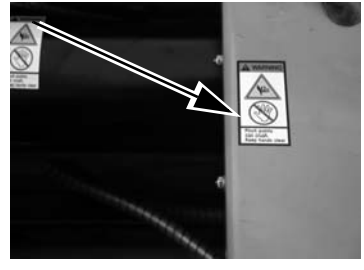

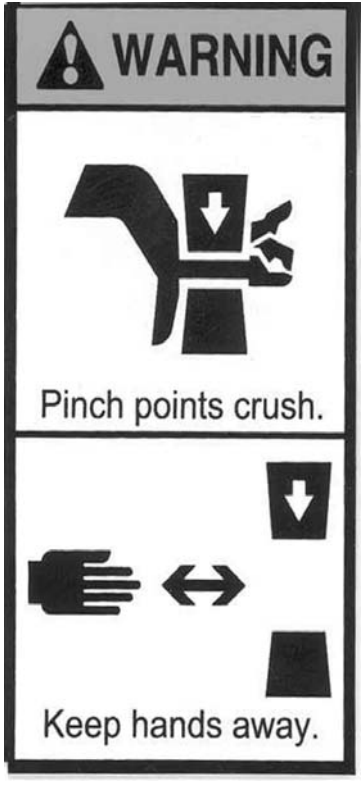
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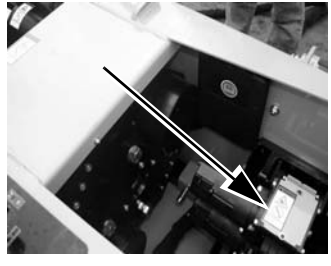

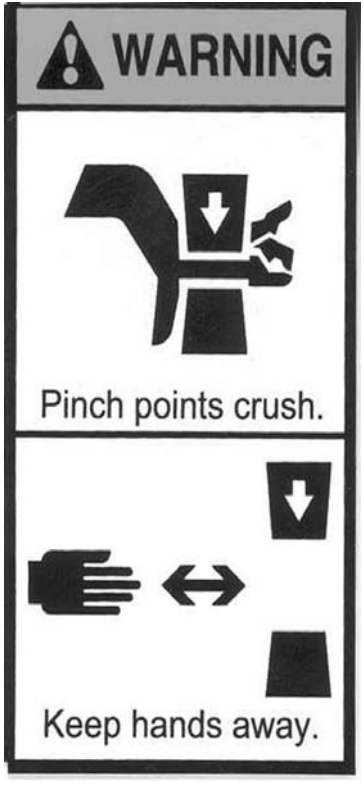
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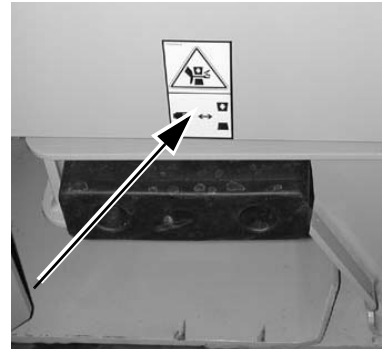

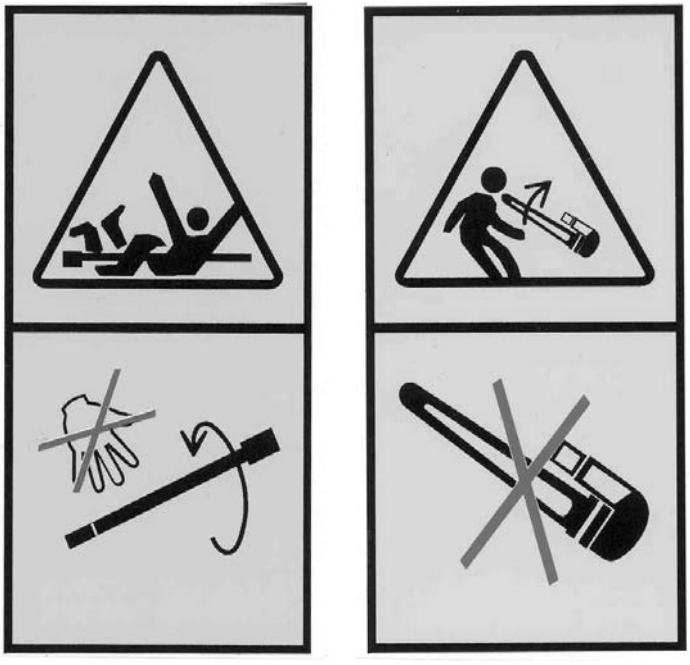

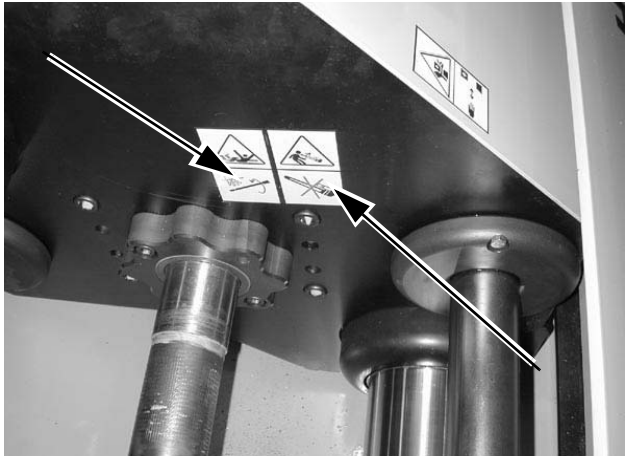

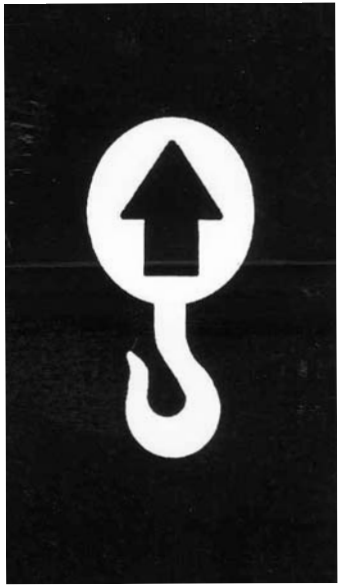

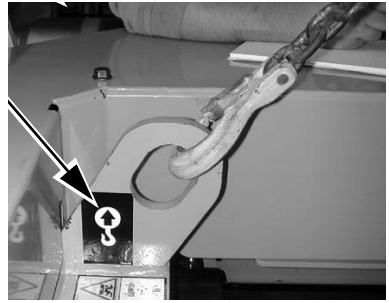

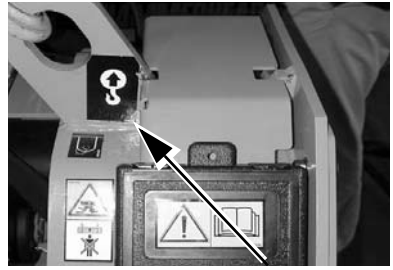

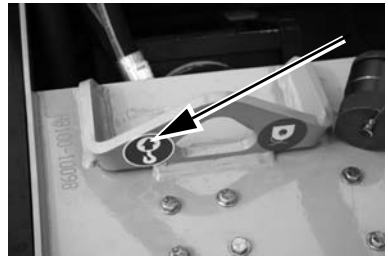

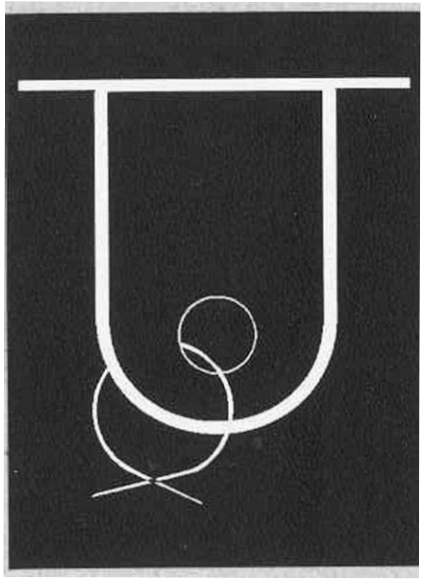

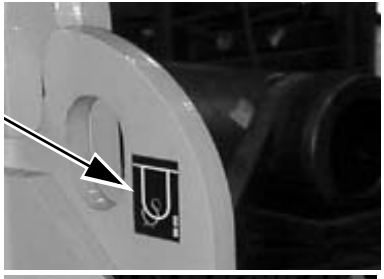

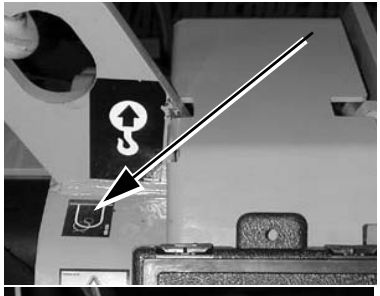

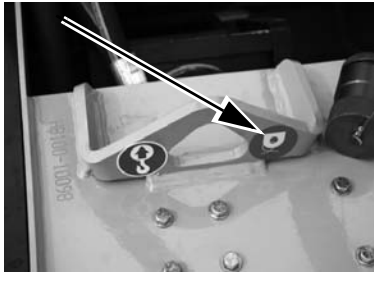

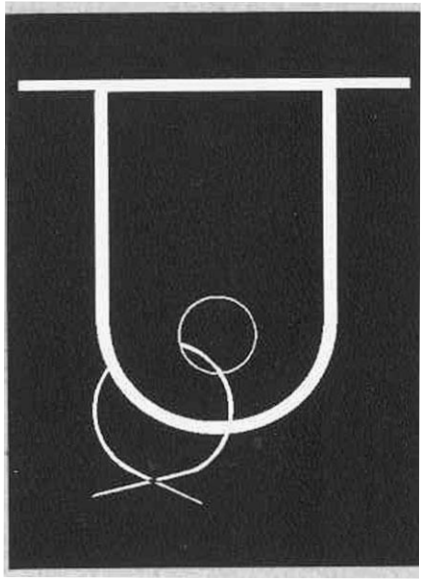

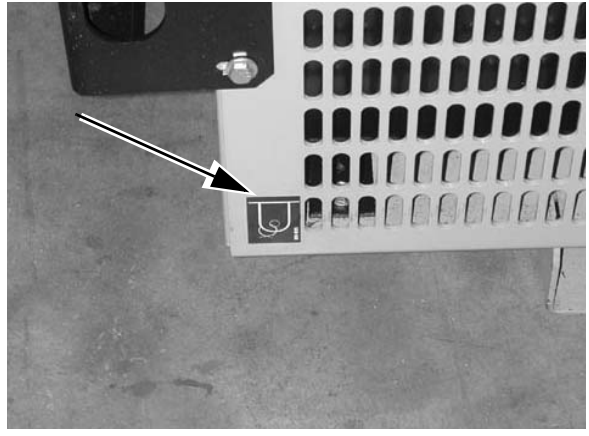

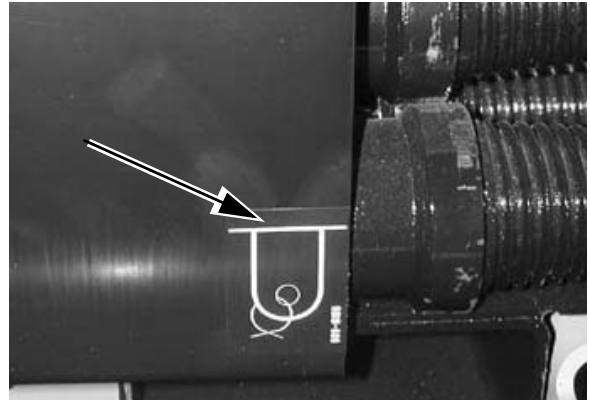


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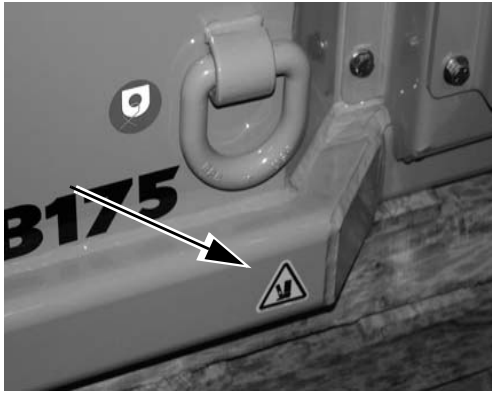
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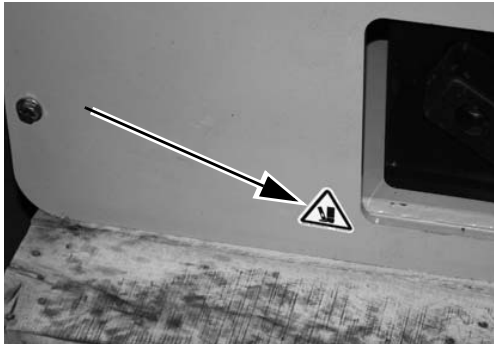

Section 20: How the HydroBurst Works

The HammerHead HB175, HB125, HB100, HB80, HB5058 and HB3038 Hydroburst are hydraulically powered static pipe bursting systems that can be set up to install 4” (100mm) to 20” (400mm) potable water, sewer or gaslines using pipebursting technology. The units are also capable of replacing 4” (100mm) to 12” (300mm) ductile iron, galvanized steel and steel slitting depending upon the unit being used, the depth of the servise and soil conditions. The rod is pushed through the existing utility from either the entrance or exit pit and attached to a burst head which has the replacement carrier line to it. As the control valve is cycled, the rod is pulled toward the exit pit. This in turn pulls the burst head which bursts the old utility and simultaneously installs the new line. When the new utility reaches the exit pit, the burst head is removed and the new carrier line is reattached at both ends to the remaining utility.

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Section 25: Controls

HB175 HydroBurst

(1) Vertical Stabilizers 1, 2 , 3 & 4

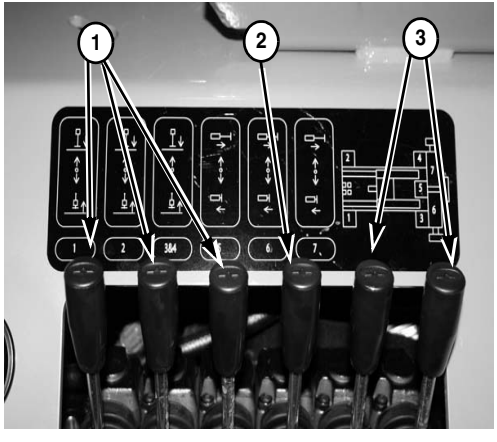
Center position.....nuetral
Push..... extends vertical stabilizer
Pull.....retract vertical stabilizer

(2) Horizontal Stabilizer 5

Center position.....nuetral
Push..... extends horizontal stabilizer
Pull.....retract horizontal stabilizer

(3) Lateral Stabilizer 6 & 7

Center position.....nuetral
Push..... extends lateral stabilizer
Pull.....retract lateralal stabilizer



MAIN CONTROLS

(4) Thrust/Pullback

Center.....nuetral
Down .....pullback
Up.....thrust

(5) Thrust/Fast Pullback

Center.....nuetral
Down .....fast pullback
Up.....thrust

(6) Rotation

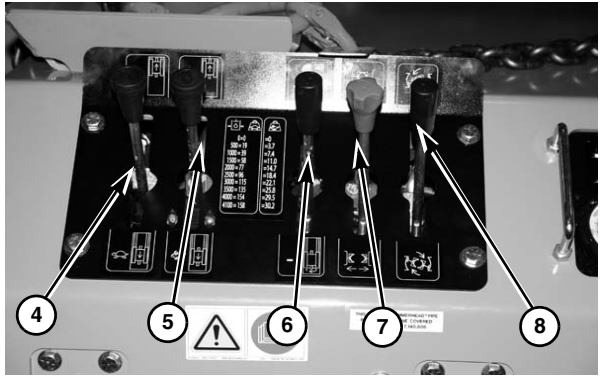
Center.....no rotation
Down .....counterclockwise
NOTE: Will only rotate CCW when front jaw is closed
Up.....clockwise

(7) Front Vise (Bungee)

Center.....neutral
Push ..... close jaws
Pull .....open jaws

(8) Rear Vise

Center.....neutral
Push ..... close and rotate
Pull .....open and rotate



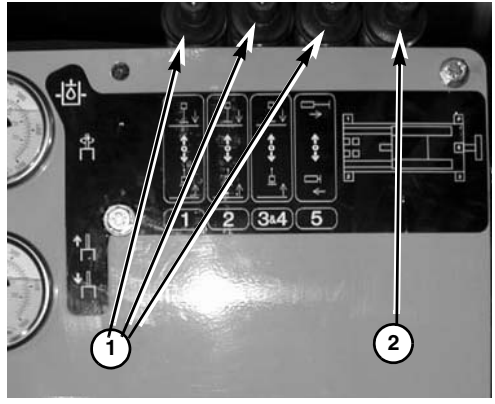
HB125 HYDROBURST

(1) Vertical Stabilizers 1, 2 , 3 & 4

Center position.....nuetral
Push..... extends vertical stabilizer
Pull.....retract vertical stabilizer

(2) Horizontal Stabilizer

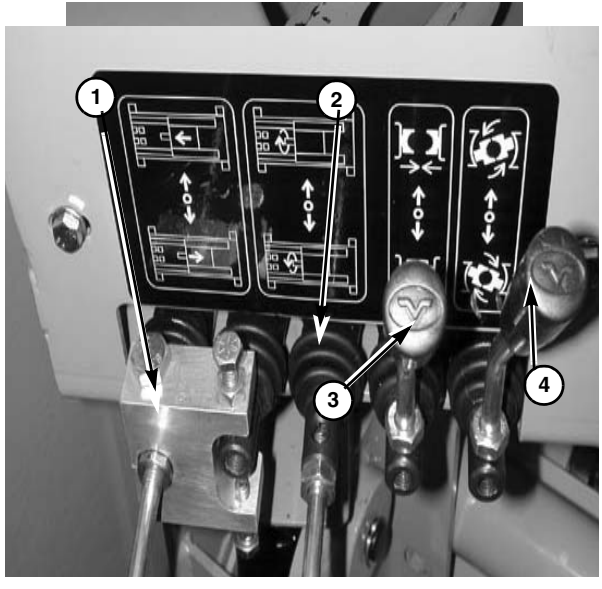
Center position.....nuetral
Push..... extends horizontal stabilizer
Pull.....retract horizontal stabilizer



(3) Water Valve

Clockwise ..... decreqase or shut off fliud supply

Counterclockwise .....increase or fully open fluid supply



MAIN CONTROLS

(1) HydroBurst Control Levers

Center ..... nuetral
Down ..... pullback
Up ..... thrust

(2) Rotation Control

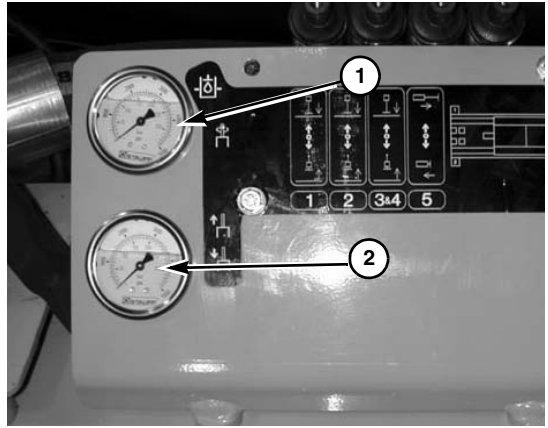
Center ..... no rotation
Down ..... counterclockwise
NOTE: Will only rotate CCW when front jaw is closed
Up ..... clockwise

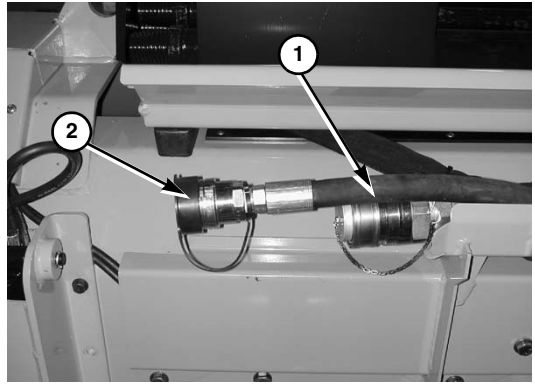
(3) Front Jaw

Center ..... neutral
Push ..... close jaws
Pull ..... open jaws

(4) Rear Jaw

Center ..... neutral
Push ..... close and rotate
Pull ..... open and rotate





HYDRAULIC PRESSURE GAUGE

(1) Hydraulic Pressure Gauge

Rotational Pressure ..... 0 - 3000 psi CW only

(2) Thrust/Pullback Pressure Gauge

Thrust/pullback .....0 - 4500 psi

HYDRAULIC CONNECTIONS

(1) Return Coupling

(2) Pressure Coupling

HB100 HydroBurst

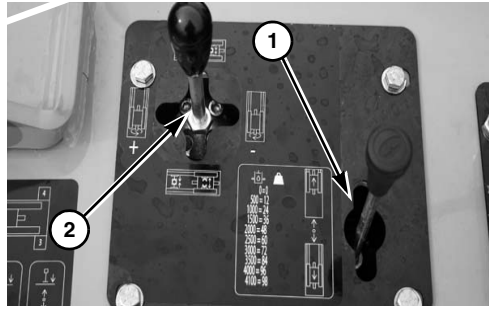
With Optional Spinner

(1) Thrust/Pullback Lever

Center position.....nuetral
Up - Thrust.....feeds rod out
Down -Pull ..... pulls back rod

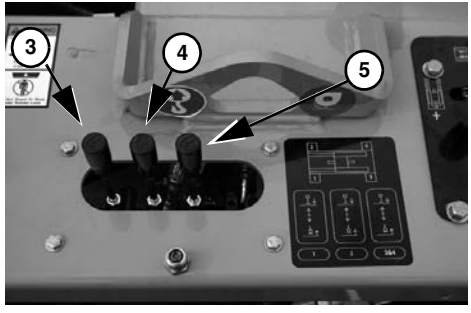
(2) Spinner Contro

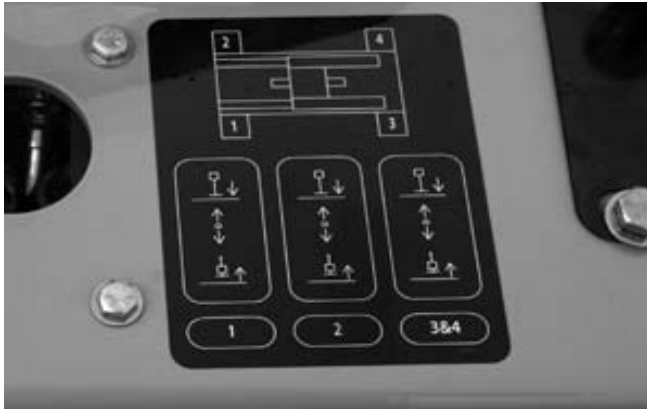
Center position.....nuetral
Up - Push.....close push /pull vise and open bungee vise
Down - Pull .....open push/pull vise and close bungee vise
Push Left..... tighten - rotates spinner clockwise
Push Right .....loosen - rotates spinner counter clockwise



(3) **vertical Stabilizers 3, 4 and 5**

Center position ..... nuetral
Up - Thrust ..... extends stabilizer
Down -Pull ..... retracts stabilizer





HB80 HydroBurst

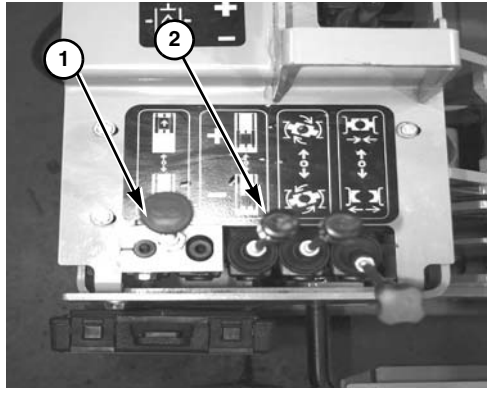
With Optional Spinner

(1) Thrust/Pullback Lever

Center position.....nuetral
Thrust .....feeds rod out
Pull..... pulls back rod

(2) Spinner Control

Center position.....nuetral
Push..... tighten - rotates spinner clockwise
Pull.....loosen - rotates spinner counter clockwise



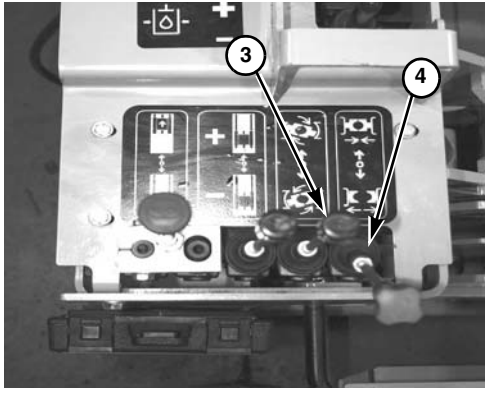
With Optional Spinner

(3) Breakout Clamp

Center position ..... nuetral
Push ..... tighten rod
Pull..... loosen rod

(4) Rod Lock Vise Control

Center position ..... nuetral
Push ..... clamp
Pull..... unclamp



With Optional Spinner

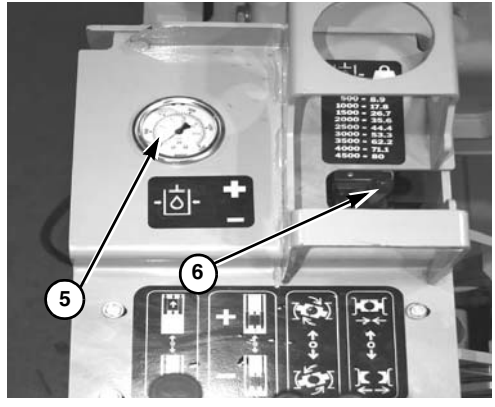
(5) Pressure Gauge

Indicates approximate tonnage.....

(6) Mode Selector Control

+ Push Position..... add rod

- Pull Position..... remove rod



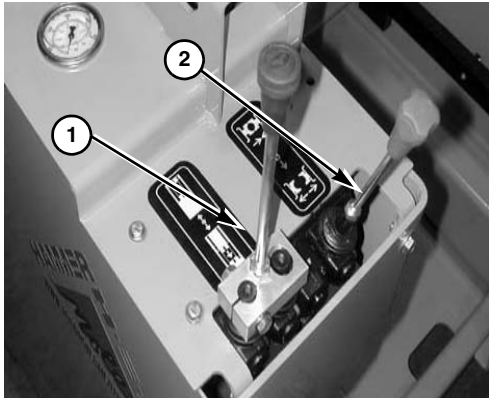
Without Spinner

(1) Thrust/Pullback Lever

Center position .....nuetral
Thrust .....feeds rod out
Pull.....pulls back rod

(2) Rod Lock Vise Control

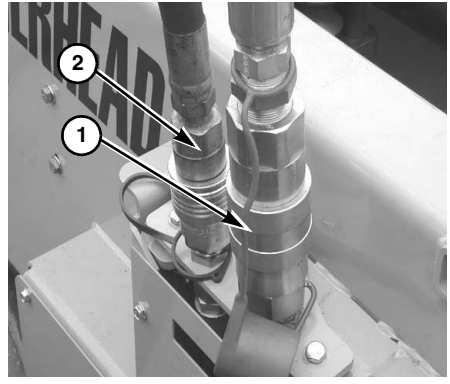
Center position .....nuetral
Push ..... clamp
Pull..... unclamp

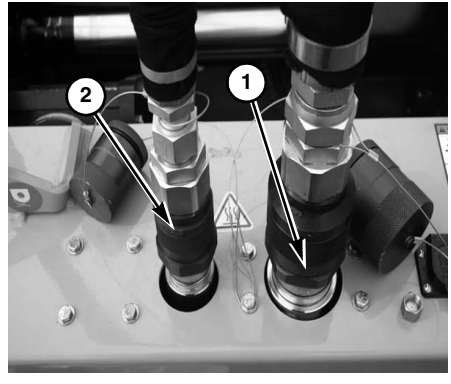


HYDRAULIC CONNECTIONS

(1) **Return Coupling**

(2) **Pressure Coupling**

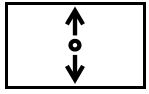




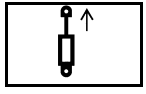
HB3038 AND HB5058 HYDROBURST

Hydraulic Controls

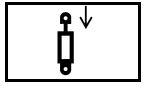
(1) Cylinder Control
Extends and retracts cylinders. They move in the same direction the handle is moved.



Forward . . . . . extend

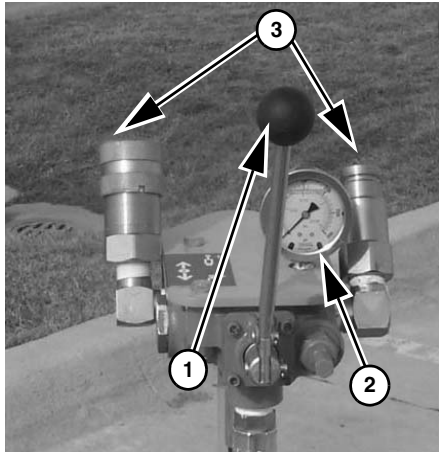


Back . . . . . retract



(2) Pressure Gauge
Shows operating pressure when pulling rod.

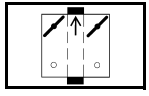
(3) Hydraulic Couplings
Connect hoses from power unit to down-hole unit.



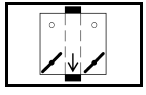
JAW STOP PINS

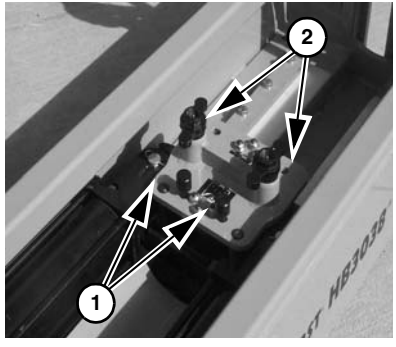
The jaws are designed to grip the rod in only one direction, depending on placement of pins **(1)**. Use holes **(2)** when pushing rod; use rear position holes (with pins as shown) when pulling rod.

Front position . . . . . push rod



Rear position . . . . . pull rod





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Section 26: Starting Procedure

POWERPACK PP20

WARNING: The instructions in this section are a brief description of the starting procedures for the HammerHead line of hydraulic powerpacks. For detailed instructions, please read the Hydraulic Power Pack Operator Manual before attempting to run the equipment.

STARTING THE ENGINE (SERIAL NUMBER 10014 AND LOWER)

IMPORTANT: To avoid engine component damage:

- Do not use ether or other starting fluids.
- Shut off pre-heat system when indicator glows a dull red. Do not turn pre-heat system on for more than 15 seconds at a time.
- Never run the starter motor for more than 15 seconds at a time. Allow the starter motor to cool 1 minute between attempts.
- Connect hydraulic hoses to each other or to the down-hole unit before starting the engine.

Step 1: Set the throttle to 1/2 throttle.

Step 2: On a cold engine, turn on pre-heat system until the indicator glows (approximately 15 seconds).

Step 3: Start the engine. If it doesn't start within 15 seconds, use the pre-heat system again.

Step 4: Slowly move the throttle to idle and allow engine to warm up.

STARTING THE ENGINE (SERIAL NUMBER 10015 AND HIGHER)

IMPORTANT: To avoid engine component damage:

- Do not use ether or other starting fluids.
- Do not turn pre-heat system on for more than 15 seconds at a time.
- Never run the starter motor for more than 15 seconds at a time. Allow the starter motor to cool 1 minute between attempts.
- Place the softstart switch in the down position. The engine will not start if the switch is in the up position or if the emergency stop button is pressed.

NOTE: The motor has a built in Low Oil Pressure timer circuit which prevents the engine from starting if it has not started after 15 seconds. The ingnition key must be placed in the off position to reset the timer before attempting to restart the motor.

Step 1: Set the throttle to 1/4 out.

Step 2: On a cold engine, turn on pre-heat system (approximately 15 seconds).

Step 3: Start the engine. If it doesn't start within 15 seconds, reset the ignition switch and use the pre-heat system again.

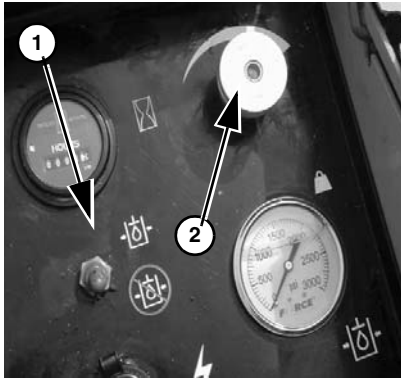
Step 4: Slowly move the throttle to idle and allow engine to warm up.

Step 5: Connect the hydraulic hoses to the slave machine.

Step 6: Pull throttle out completely.

Step 7: Place soft start switch (**1**) into the run or up position.

Step 8: Set operating pressure using pressure adjustment knob (**2**).



POWERPACK PP73

IMPORTANT: To avoid engine component damage:

- Do not use ether or other starting fluids.
- Do not turn on pre-heat system on for more than 15 seconds at a time.
- Never run the starter motor for more than 15 seconds at a time. Allow the starter motor to cool 1 minute between attempts.
- Place the softstart switch in the down position. The engine will not start if the switch is in the up position or if the emergency stop button is pressed.

NOTE: The motor has a built in Low Oil Pressure timer circuit which prevents the engine from starting if it has not started after 15 seconds. The ingnition key must be placed in the off position to reset the timer before attempting to restart the motor.

Step 1: Set the throttle to 1/4 out.

Step 2: On a cold engine, turn on pre-heat system (approximately 15 seconds).

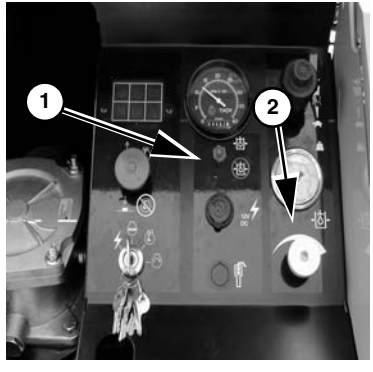
Step 3: Start the engine. If it doesn't start within 15 seconds, reset the ignition switch and use the pre-heat system again.

Step 4: Slowly move the throttle to idle and allow engine to warm up.

Step 5: Connect the hydraulic hoses to the slave machine.

Step 6: Place soft start switch (**1**) into the run or up position.

Step 7: Set operating pressure using pressure adjustment knob (**2**).



POWERPACK 70

IMPORTANT: To avoid engine component damage:

- Do not use ether or other starting fluids.
- Do not turn on pre-heat system on for more than 15 seconds at a time.
- Never run the starter motor for more than 15 seconds at a time. Allow the starter motor to cool 1 minute between attempts.
- Place the softstart switch in the down position. The engine will not start if the switch is in the up position or if the emergency stop button is pressed.

NOTE: The motor has a built in Low Oil Pressure timer circuit which prevents the engine from starting if it has not started after 15 seconds. The ignition key must be placed in the off position to reset the timer before attempting to restart the motor.

Step 1: Set the throttle to 1/4 out.

Step 2: On a cold engine, turn on pre-heat system (5 seconds above freezing, 10 seconds below freezing).

Step 3: Start the engine. If it doesn't start within 15 seconds, wait 1 minute, reset the ignition switch and use the pre-heat system again.

Step 4: Slowly move the throttle to idle and allow engine to warm up.

Step 5: Connect the hydraulic hoses to the slave machine.

Step 6: Place hydraulic on/off switch (**1**) into the run or up position.

Step 7: Set operating pressure using pressure adjustment knob (**1**).

COLD WEATHER STARTING

Engine

Before operating in cold weather, it is important to use the recommended engine oil viscosity and fuel to reduce starting problems. Refer to the *Engine Manual* for recommended engine oil, fuel, and starting procedures.

IMPORTANT: Do not spray starting fluid into the air cleaner. Engine damage can result.

Hydraulic Fluid

Allow adequate time for the hydraulic fluid to warm up. Refer to the *Specifications* section in the *Maintenance Manual* for recommended hydraulic fluids.

For frequent starts below 10°F (-12°C), consult your HammerHead dealer.

JUMP-STARTING

Battery Explosion - Avoid

WARNING: Battery fumes are flammable and can explode. Keep all burning materials away from battery. Do not smoke. Tools and cable clamps can make sparks. Shield eyes and face from battery.

Do not jump-start or charge a battery that is frozen or low on electrolyte.

Avoid explosion hazard. Battery caps must be in place and tight on all batteries.

IMPORTANT: Use only a 12-volt system for jump-starting. Do not allow vehicles to touch.

Battery Burns - Avoid

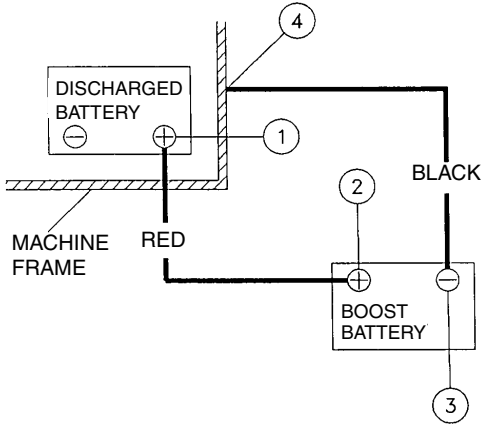
Battery contains sulfuric acid which can cause severe burns. Avoid contact with eyes, skin, and clothing.

In case of acid contact:

External: Flush with plenty of water. If eyes have been exposed, flush with water for 15 minutes and get prompt medical attention.

Internal: Drink large quantities of water or milk, follow with milk of magnesia, beaten egg, or vegetable oil. Call a physician immediately.

Jump-Starting Procedure



Step 1: Turn ignition key OFF. Remove battery access panel.

Step 2: Connect jumper cables in the following order:

a. Red to discharged battery POSITIVE (+) terminal **(1).**

b. Red to boost battery POSITIVE (+) terminal **(2).**

c. Black to boost battery NEGATIVE (-) terminal **(3).**

d. Black to frame **(4)** of machine with the discharged battery. Make connection away from battery.

NOTE: To avoid sparks near the battery, always disconnect black jumper cable at point **(4)** before making any adjustment to the red jumper cable at point **(1).**

Step 3: Start engine.

Step 4: Remove cables in REVERSE order and install cover over POSITIVE cable clamp. Install battery access cover.

Section 27: Shutdown Procedure

STOPPING THE MACHINE

When shutting off the engine, use the following shutdown procedure:

- Retract cylinders.

NOTE: If the hydraulic hoses are disconnected with the cylinders extended, the hydraulic oil level will appear to be low in the powerpack. If you add hydraulic oil to the powerpack to bring the level to normal and then reconnect the lower unit to the powerpack and retract the cylinders, the hydraulic oil tank will over flow.

- Shut off hydraulics.
- Reduce engine speed to idle.
- Shut the engine off and remove the key.

For your safety and the safety of others, use the shutdown procedure before servicing, cleaning, inspecting, or transporting the machine.

A variation of the above procedure may be used if instructed within this manual or if an emergency requires it.

NOTE: If disconnecting the hoses from the quick couplers, cycle the control valve to relieve hydraulic pressure. It will be hard to reconnect the hoses if there is hydraulic pressure in the system.

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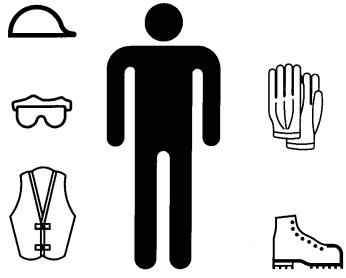
Section 30: Preparing Machine and Work Area

Personal Protective Equipment

Operating the machine will require you to wear protective equipment. You should always wear a hard hat, work shoes, and eye protection. Wear leather gloves when handling rods. If working near traffic, wear high visibility clothing.

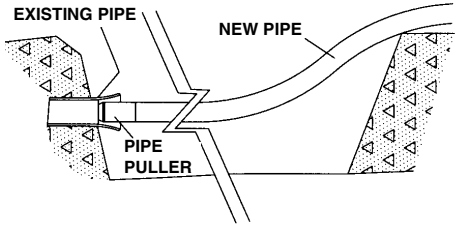


Pit Preparation

WARNING: Do not work in trench with unstable sides which could cave in. Specific requirements for shoring or sloping trench walls are available from several sources including federal and state O.S.H.A. offices. Be sure to contact suitable authorities for these requirements before working in the trench.

If entry into a confined space is necessary, follow all regulations and requirements for working in confined spaces to ensure a hazard-free environment.

The down-hole unit is located in the exit pit; the pipe is pulled in from the entry pit.



Entry Pit

Uncover the end of the servise being replaced. Make the pit large enough that new pipe can make a gentle bend into the old servise.

NOTE: It is imperitive that the new pipe enter the old utility as flat or as on grade as possible. Failure to do so will cause the first few feet of the utility to be above grade.

The rule of thumb for the entrance pit is that the length is normally 2-1/2 times the depth of the existing servise. Larger diameters and/or lower SDR specifications (thicker walls) will require longer entrance pits to accomodate the larger bend radius of the pipe.

Exit Pit - HB3038/HB5058

- Uncover the end of the servise being replaced. The pipe puller and spacer brace require a 1-1/2 ft by 9 ft (46 cm by 274 cm) pit. Add enough extra room so the operator can maneuver safely.
- Slope, terrace or shore the trench to avoid cave-ins.

NOTE: The centerline of the rods is 6-1/2˝ (16.5 cm) above the surface on which the down-hole unit sits.

- Slope the floor of the pit to the grade of the burst and square the face of the pit.
- It may be helpful to place two 2 x 8's, approximately 90˝ (230 cm) long, in the pit. Planks or timbers can also be placed on the face of the pit to distribute the pullback force over a larger area.
- Some situations may require other procedures, such as dewatering or bypass pumping.

Exit Pit - HB80

- Uncover the end of the servise being replaced. The HB80 requires a minimum pit size of 3-1/4 ft by 9 ft (100 cm by 274 cm). Add 5 ft (150 cm) to the length of the pit if the cage will be used. Add enough extra room so the operator can maneuver safely.
- Slope, terrace or shore trench following all OSHA standards for digging and shoring the pit.

NOTE: The centerline of the rod is 18.5" (470 mm) above the bottom of the machine. Therefore the pit must be at least 18.5" deeper than the centerline of the existing utility.

- Slope the floor of the pit to the grade of the burst. Extend the rear stabilizer to brace the rear of the machine. Side bracing may aslo be used to stabilize the unit further to prevent sudden movement of the machine.
- Square the face of the exit pit to the face plate of the HB80.
- Prepare the pit by stabilizing the bottom of the pit with a layer of gravel. Further stabilization can be accomplished by placing a road plate on top of the gravel before setting the machine in place.
- Some situations may require further stabilization, bracing or other procedures as necessary.

Exit Pit - HB100

- Uncover the end of the servise being replaced. The pipe puller and spacer brace require a 3 ft by 10-1/2 ft (91 cm by 320 cm) pit. Add enough extra room so the operator can maneuver safely.
- Slope, terrace or shore the trench to avoid cave-ins.

NOTE: The centerline of the rods is 14-1/4˝ (36.2 cm) above the surface on which the down-hole unit sits. This will vary on units with stabilizers depending on the distance the stabilizers are extended.

- Slope the floor of the pit to the grade of the burst and square the face of the pit. Exact adjustments can be made with the vertical stabilizers on the HB100 if the option is has been installed on the unit.
- Prepare the pit by stabilizing the bottom of the pit with a layer of gravel. Further stabilization can be accomplished by placing a road plate on top of the gravel before setting the machine in place.

Exit Pit - HB125

- Uncover the end of the servise being replaced. The HB125 requires a 4’ (1.2m) x 10-1/2’ (3.2m) pit. Add enough extra room so the operator can maneuver safely.
- Slope, terrace or shore trench to avoid cave-ins.

NOTE: The centerline of the rods is 18" (457mm) above the bottom of the machine. Therefore the pit must be at least 18" deeper than the existing utility measured from the centerline of the existing utility.

- Slope the floor of the pit to the grade of the burst. Exact adjustments can be made with the vertical stabilizers on the HB125.
- Square the face of the exit pit to the face of the HB125.
- Prepare the pit by stabilizing the bottom of the pit with a layer of gravel. Further stabilization can be accomplished by placing a road plate on top of the gravel before setting the machine in place.

WARNING: Proper pit preparation is critical. Injury or death may occur from movement or shifting of machine caused by an unstable or improperly prepared pit. Block machine left and right near the rear stabilizer legs to prevent sideways movement of the machine.

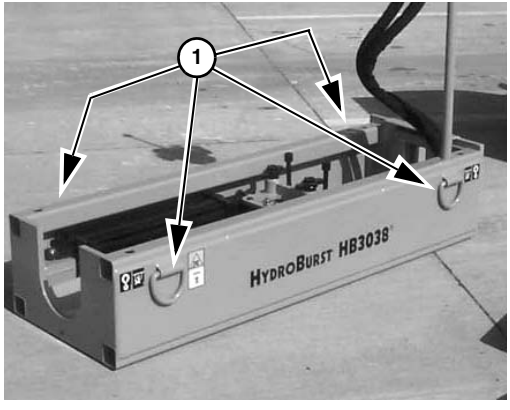
- Some situations may require other procedures, such as dewatering or bypass pumping.

EQUIPMENT PLACEMENT AND INSTALLATION

WARNING: Never lift equipment over personnel. The load may fall or shift, crushing anyone beneath it.

Set the unit up in a safe and efficient working position. If setting up near traffic, use the necessary warning and diversion systems for motor vehicles and pedestrian traffic. Use the necessary signs, cones, and flag persons needed for the work situation.

Down-Hole Unit HB3038/HB5058



Step 1: Attach lifting chains or straps to lifting points **(1)** and use suitable equipment to lower the unit into the work pit.

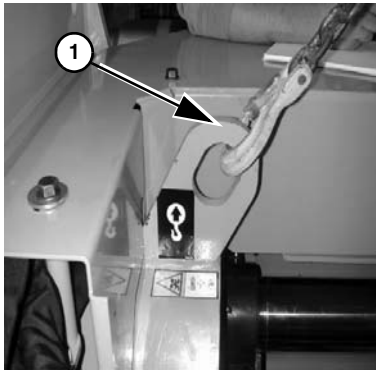
Step 2: Check unit for grade and adjust as required. It may be helpful to slide a rod into the jaws to help align with the old servise.

Step 3: Brace the rear of the unit to prevent it from shifting while pushing rods into the existing line.

Rod Boxes

Step 1: Measure the length of the burst to determine the number of rods required. Each rod is 47-3/8˝ (120 cm) long.

Step 2: Attach lifting chains or straps to lifting points **(1)** and use a hoist, or use a fork lift in tubes **(2)**, to place the rod boxes near the exit pit.

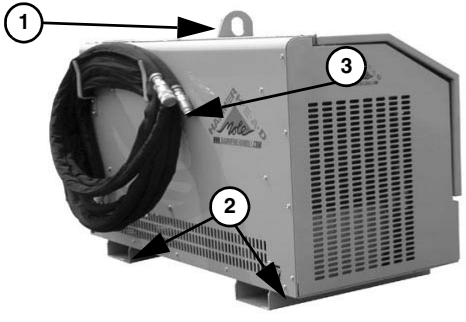


Power Unit

Step 1: Attach lifting chains or straps to lifting point **(1)** and use a hoist, or use a fork lift in tubes **(2)**, to place the power unit near the exit pit - close enough that the 25-ft (7.6-m) hoses will reach the down-hole unit.

Step 2: Connect hoses **(3)** to quick couplers on down-hole unit.

IMPORTANT: The hoses must be connected to each other or to the down-hole unit before starting the engine.



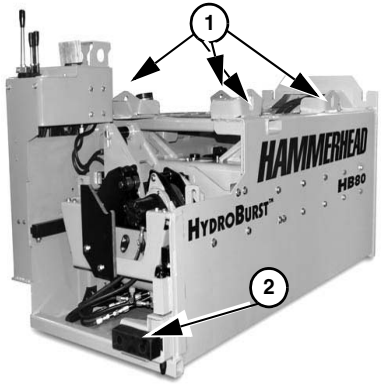
HB80

WARNING: Never lift equipment over personnel. The load may shift, crushing anyone beneath it. The HB80 weighs approximately 3060 lbs (1388 kg). Use lifting equipment designed and equipped to lift objects of this size and weight.

Step 1: Attach lifting sling to 4 lifting points **(1)** and use proper equipment to lower the unit into the work pit.

Step 2: Check the unit for grade and adjust as required. It may be helpful to slide a rod into the jaws to assist in alignment with the old servise.

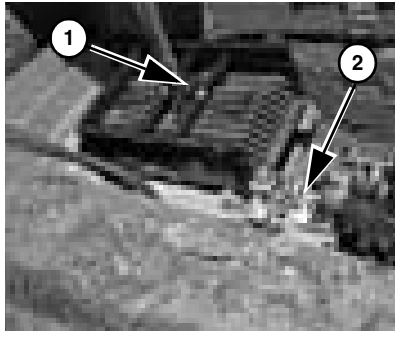
Step 3: Extend the horizontal stabilizer **(2)** to brace the unit in the exit pit to assist in preventing sudden movement of the machine.



Rod Box

Step 1: Measure the length of the burst to determine the number of rods required. Each rod has a usable length of 35.44" (90 cm) long.

Step 2: Attach lift chains to lifting point of rod box and set on HB80 as shown **(2)**. Each rod box contains 30 - 2.25" (57mm) x 35.44 (90 cm) rods for a total weight of 810 lb (367 kg).

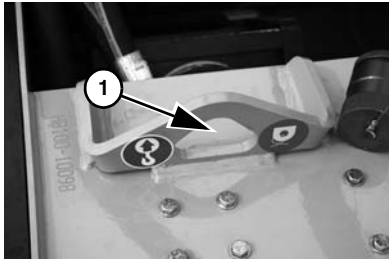


HB100

WARNING: Never lift equipment over personnel. The load may shift, crushing anyone beneath it. The HB100 weighs approximately 3138 lbs (1423 kg) or 4070 lbs (1846 kg) with optional stabilizers and rod spinner. Use lifting equipment designed and equipped to lift objects of this size and weight.

Step 1: Attach lifting chains to lifting points **(1)** and use suitable equipment to lower the unit into the work pit.

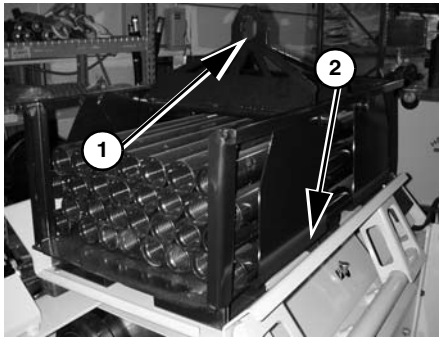
Step 2: Check unit for grade and adjust as required using the optional vertical stabilizers. It may be helpful to slide a rod into the jaws to help align with the old servise.



Rod Box

Step 1: Measure the length of the burst to determine the number of rods required. Each rod has a usable length of 35.44" (0.9 m) long.

Step 2: Attach lift chains to lifting point of rod box and set on HB100 as shown **(2)**. Each rod box contains 51 - 2.25" (57mm) x 39.4 (1.0 m) rods for a total weight of 1377 lb (624 kg).

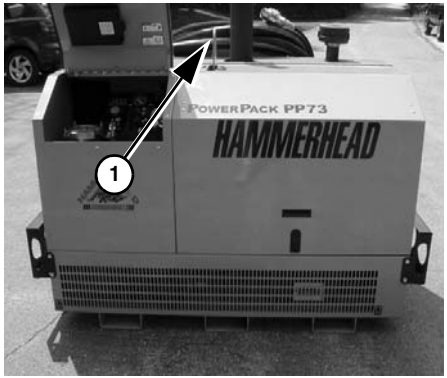


PowerPack PP73/PP70

Step 1: Attach lifting chains to lifting point **(1)** and use a hoist to place the powerpack near the exit pit - close enough that the 40 ft (12m) hoses will reach the HB80.

Step 2: Connect hoses to quick connect couplers on HB80/HB100.

IMPORTANT: The hoses must be connected to the HB80/HB100 before starting the engine.



HB125

WARNING: Never lift equipment over personnel. The load may shift, crushing anyone beneath it. The HB125 weighs approximately 7500 lbs (3402 kg). Use lifting equipment designed and equipped to lift objects of this size and weight.

Step 1: Attach lifting chains to lifting points **(1)** and use suitable equipment to lower the unit into the work pit.

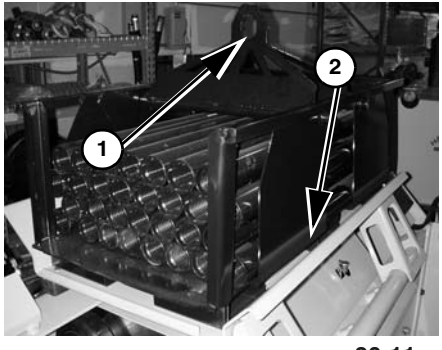
Step 2: Check unit for grade and adjust as required using the vertical stabilizers. It may be helpful to slide a rod into the jaws to help align with the old servise.

Step 3: Extend horizontal stabilizer to brace the unit in the exit pit to assist in preventing sudden movement of the machine.

Rod Box

Step 1: Measure the length of the burst to determine the number of rods required. Each rod has a usable length of 39.38" (1 m) long.

Step 2: Attach lift chains to lifting point of rod box and set on HB125 as shown **(2)**. Each rod box contains 30 - 2.75" (70mm) x 39.38 (1 m) rods for a total weight of 1753 lb (795 kg).

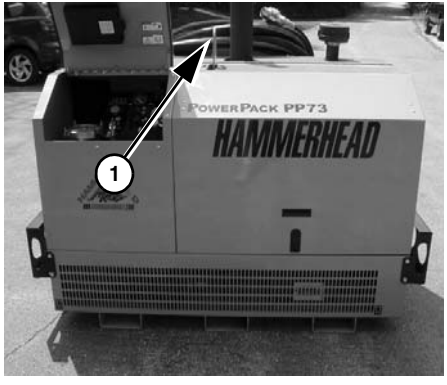


PowerPack PP73

Step 1: Attach lifting chains to lifting point **(1)** and use a hoist to place the powerpack near the exit pit - close enough that the 25 ft (7.6m) hoses will reach the HB125.

Step 2: Connect hoses to quick connect couplers on HB125.

IMPORTANT: The hoses must be connected to the HB125 before starting the engine.



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Section 40: Operating the HydroBurst System

INTENDED USE

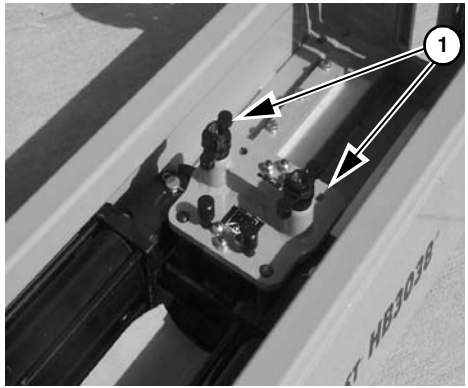
The HammerHead HydroBurst HB3038/HB5058, HB80, HB100 and HB125 pipe-bursting systems are portable hydraulically-powered machines designed to economically install underground utilities where open cutting or trenching is not feasible or desirable.

The down-hole unit of the HB3038 and HB5058 is capable of bursting 2 - 6˝ (5 - 15 cm) pipe and replacing it with up to 6˝ HDPE pipe. The HB100 is capable of bursting 3 - 16" (75 - 400mm) pipe depending on the type of material and the depth of the existing utiltiy. The HB125 is capable of bursting 4 - 20" (100 - 400mm) pipe also depending on type of material and depth the the existing utility.

START UP - HB3038 & HB5058

NOTE: Clean threaded ends of rods to ensure a tight, secure connection and apply a small amount of grease to the threads for easier disassembly.

NOTE: To know where the bursting head is and how much farther the burst must go, count the number of rods being pushed.



Step 1: Install nose piece onto the first rod. This will prevent the rod from snagging on the existing pipe and will protect the threads.

Step 2: Check that the jaw stop pins are set in holes **(1)** for pushing rods and start the power unit.

IMPORTANT: To avoid serious damaging or breaking the rods, do not allow the jaws to grip them on the threaded joints.

IMPORTANT: Push the first two or three rods slowly, while noting the amount of pressure required and the stress on the HydroBurst system. If more than 1000 psi (70 bar) pressure is required, or if the unit moves, it may need to be realigned.

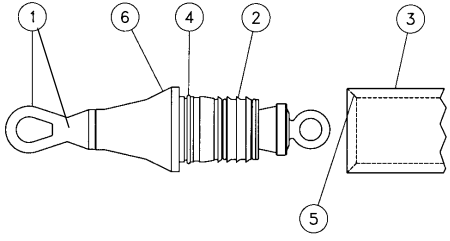
Step 3: Slide the first rod through the jaws and slowly drive it into the existing line. If necessary, move the jaws back to get another grip on the rod.

Step 4: With the first rod clamped in the jaws, thread the next rod onto the first rod. The shoulders of the rods should be firmly seated and square.

Step 5: Move the jaws back and grip the second rod. Drive it into the existing line.

Step 6: Repeat these procedures until the first rod reaches the entrance pit.

BURSTING HEAD AND HDPE - ATTACH



NOTE: The HammerHead Expanding Taper Pullers are intended for use with HDPE SDR11/17.5 plastic pipe. The holding power of the puller may be reduced if used with other SDR's or materials.

Step 1: Follow the *Shutdown Procedure*, page *22-1*.

Step 2: Unscrew stem eye **(1)** until collets **(2)** have fully collapsed.

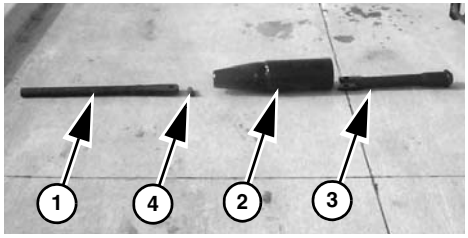
Step 3: Insert jaw end of puller into pipe **(3)**. For heavy wall pipe, grease O-ring **(4)**. Carving a slight chamfer **(5)** in the mouth of the pipe may also help.

Step 4: With the shoulder of the outer cone bottomed against the pipe face, hold the outer cone **(6)** against the pipe and pull the stem eye to set the collets into the pipe wall.

Step 5: Hold the outer cone against the pipe while pulling and tightening the stem eye **(1)**.

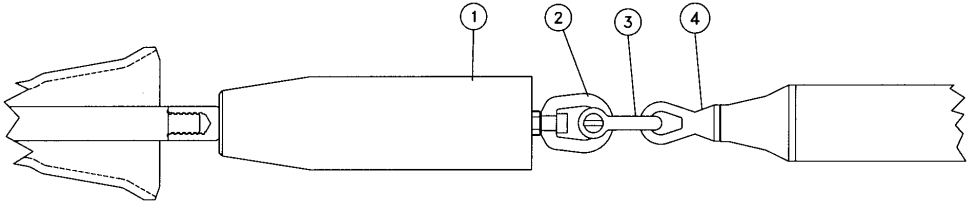
Step 6: When the stem eye is against the outer cone, use a bar for leverage and tighten the eye at least five more turns.

IMPORTANT: The connections between the first rod, bursting head, and expander section must be tight.



Step 1: Remove nose piece and connect bladed starter rod **(1)**.

Step 2: Install the bursting head **(2)** and connect expander rod **(3)** to the starter rod using pin **(4)**.



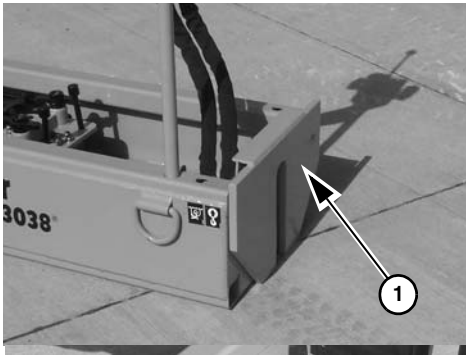
Step 3: Slide expander sleeve **(1)** forward toward the bursting head to expose the pulling eye **(2)** and clevis **(3)**.

Step 4: Use the clevis to connect pulling eye **(2)** to puller eye **(4)**.

Step 5: Slide expander sleeve back over the clevis and eyes.

STARTING THE BURST

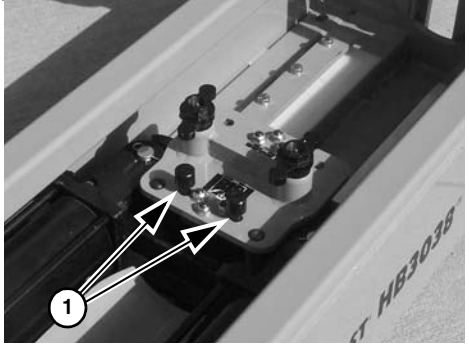
Position shore plate **(1)** between the down-hole unit and the face of the pit.



IMPORTANT: To monitor the location of the bursting head, count the rods as they are removed.

To pull pipe, insert jaw stop pins in rear holes **(1)** and start the power unit.

Pull in the new line and unscrew the rods as they are extracted. The jaws must be gripping the next rod to keep other joints from being loosened.



ENDING THE BURST

WARNING: Do not stand behind the HydroBurst while pushing it away from the face of the pit. Serious injury or death may occur.

IMPORTANT: Be careful not to pull the bursting head into the face plate.

When the last rod has reached the down-hole unit:

Step 1: Follow the *Shutdown Procedure*, page *22-1*.

Step 2: Remove the rear braces.

Step 3: Insert the jaw stop pins into the front holes.

Step 4: Start power unit and use control lever to push the unit back far enough that the spacer brace (3 ft/91 cm long) can be installed.

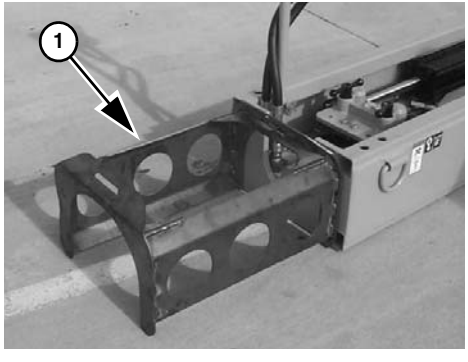
Step 5: Follow the *Shutdown Procedure*.

Spacer Brace - Install

Step 1: Remove shore plate.

Step 2: Install spacer brace **(1)** between down-hole unit and face of pit. Place end of brace against end of unit.

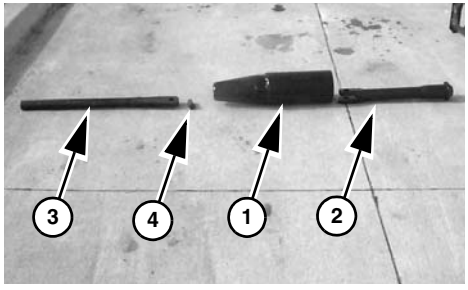
IMPORTANT: Be careful not to pull the bursting head into the face plate.



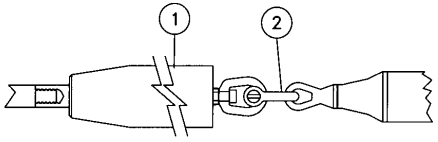
Bursting Head - Remove

Step 1: Remove bursting head **(1)** and connect expander section **(2)** to rod **(3)** using pin **(4)**.

Step 2: Insert the jaw stop pins into the back holes.



Expander Section - Remove



Step 1: Start power unit and pull expander section into spacer brace.

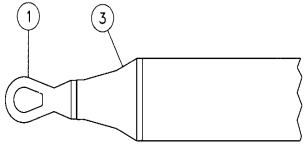
Step 2: Follow the *Shutdown Procedure*, page *27-1*, and remove expander section from rod.

NOTE: When pulling small diameter pipe, do not pull the expander section too far into the brace. Leave enough room to slide the expander sleeve forward to gain access to the clevis.

Step 3: Slide expander sleeve **(1)** forward, disconnect clevis **(2)** and remove expander sleeve **(1)**.

Step 4: Connect the clevis to the rod puller. Pull the HDPE into the spacer brace, disconnect the clevis, remove the last rod, and remove the expander section from the rod.

Puller - Remove



Step 1: Loosen stem eye **(1)** until shoulder **(2)** can be pulled away from outer cone **(3)**.

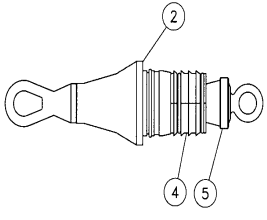
Step 2: Push in the stem eye to dislodge the expander taper from collets **(4)**.

Step 3: Pull on outer cone **(3)** to remove puller from pipe.

Step 4: Clean collets **(4)** and expander cone **(5)**.

Step 5: Grease expander cone **(5)** to keep it turning freely on the stem screw.

Down-Hole Unit - Remove



Step 1: Fully retract hydraulic cylinders and follow the the *Shutdown Procedure*, page *27-1* Cycle the control valve to relieve hydraulic pressure.

Step 2: Disconnect hydraulic hoses and install dust caps, making sure no contaminants get in the couplings.

WARNING: Never lift equipment over personnel. The load may fall or shift, crushing anyone beneath it.

Step 3: Attach lifting chains or straps to lifting points and use suitable equipment to lift the unit out of the work pit.

Step 4: Clean dirt from the unit and collect all tools, parts, and accessories.

PREVENTIVE MAINTENANCE TIPS

- Be careful not to damage cylinder rods when they are extended. Nicks and dents will damage seals, resulting in oil leakage.
- When not in use, the cylinders should be fully retracted to protect the rods from dirt and moisture. If left extended, wipe them off before retracting them.
- The jaw stop pins should always engage the bottom slide block. If the holes fill with dirt, use a 5/8˝ drill bit to clean them.

To prevent premature wear of the jaw blocks and moving components, keep the unit free of dirt and debris.

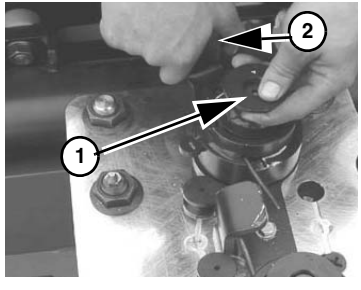
START UP - HB80

Push Out (+ Plus) Position

Step 1: Clean flat face couplings and connect to the lower unit if not already connected.

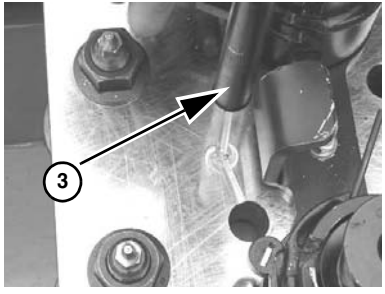
NOTE: Power Pack must be within 40' (12m) of the lower unit.

Step 2: If necessary during pushout, extend the rear stabilizer and insert pin to lock into position



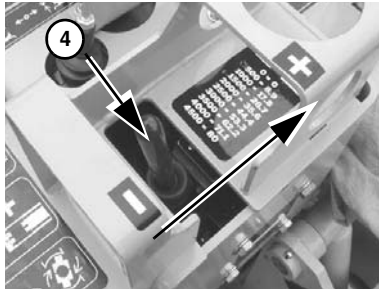
Step 3: Lift the Direction Change Plunger **(1)** and rotate the direction change lever arrow **(2)** to the **(+)** position. Do this for both plungers.

Step 4: Place the Direction Pins **(3)** in the 2 holes on the **(+)** side of the rachet assembly.



Step 5: Place the Mode Selector Control Valve **(4)**, which controls the direction of the grip and rotate vise, into the **(+)** position.

NOTE: Units without rod spinners will not have the Mode Selector Control Valve.

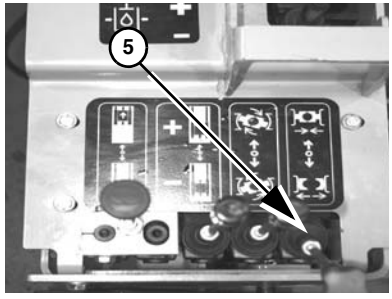


Step 6: Place and lock the spinner/torque assembly in the **(+)** position. Units without spinners will nor have a spinner/torque assembly.

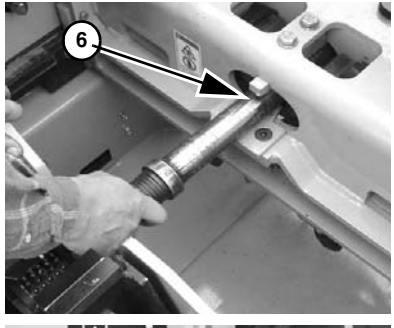
Step 7: Start the power pack and place the soft start switch into the "on" position. Allow the power pack to warm up to operating temperature.

Step 8: Increase hydraulic pressureusing the control switch at the power pack. Set the gauge pressure above 3,000 Psi.

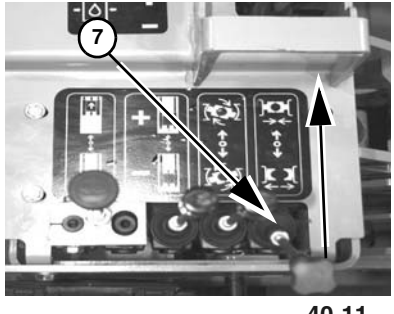
Step 9: Release the Rod Lock Vise by moving the control lever **(5)** back to release the vise jaws.



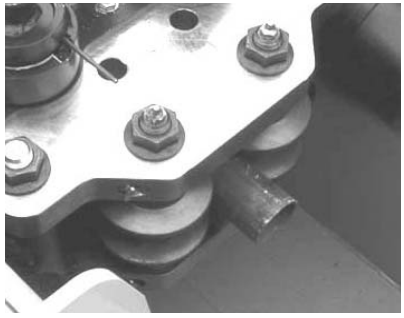
Step 10: With the Rod Lock Vise open, install a push point onto the first threaded rod and slide the first rod through the rod vise and pawl assemblies **(6)** as shown.



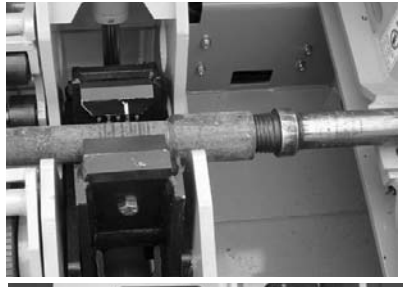
Step 11: Engage the Rod Lock Vise by pushing the control lever **(7)** forward.



Step 12: The Thrust/Pullback Lever controls both rapid and slow speeds. Pull the thrust control lever back to allow the first rod to slide through the rachet assembly.

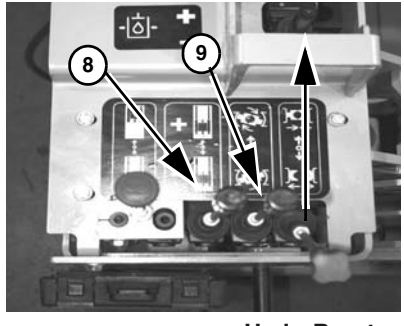


Step 13: Place the next rod into the spinner/torque assembly. Make sure the threads are clean and lined up as shown. Apply a small amount of lubricant to the mating threads for easier disassembly.



Step 14: Move the rod spinner lever forward to thread the rods together. Release the valve once the rods are threaded togather.

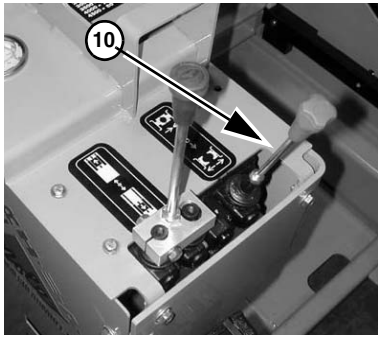
NOTE: Units without the Rod Spinner must be manually threaded and torqued together.



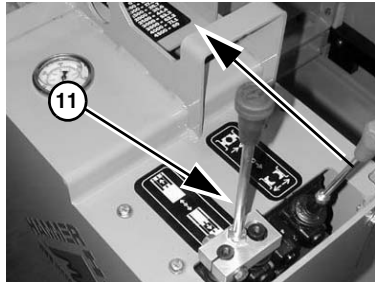
Step 15: Move the Breakout Clamp Lever **(9)** forward to clamp and torque rods together (275-300 ft lb machine torque). It may be necessary to repeat until the rods are shouldered.

Step 16: Pull back the breakout clamp lever **(9)** to release and rotate the jaws from the rod.

Step 17: Release the rod lock vise by pulling the rod lock vise control lever **(10)** back and then releasing and placing the lever into the neutral position.



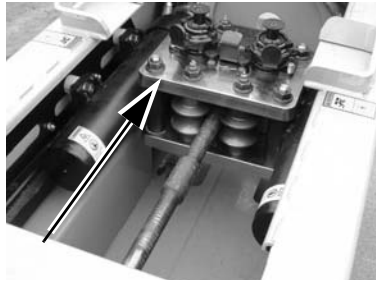
Step 18: Push the THrust Control Lever forward and feed the rods through the existing utility. The ratchet assembly is designed to only push or pull the rods behind the larger sections of the rod.



Step 19: The ratchet assembly contains two pawls that must fully engage the rod upset to pull properly. By moving the ratchet assembly fully in each direction, whether adding or removing rod, will help place these pawls in the correct positions to engage the rod. It is neccessary to cycle the ratchet assembly twice per rod before adding or removing another rod.

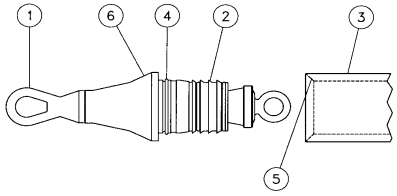
Step 20: Continue this sequence until the rods have reached the entrance pit.

Step 21: Remove the push point and install the burst tooling. Torque the starter rod to a minimum of 300 ft lb.



HB80 Expander and HDPE - Attach

NOTE: The HammerHead Expanding Taper Pullers are intended for use with HDPE SDR11/17.5 plastic pipe. The holding power of the puller may be reduced if used with other SDR's or materials.



Step 1: Follow the the *Shutdown Procedure*, page *27-1*.

Step 2: Unscrew the stem eye **(1)** until collets **(2)** have fully collapsed.

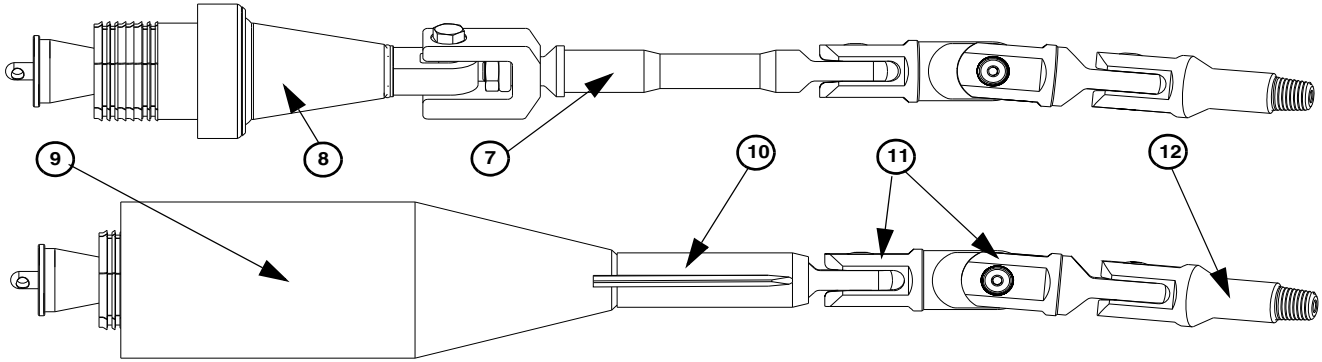
Step 3: Insert jaw end of puller into pipe **(3).** For heavy walled pipe, grease O-ring **(4)**. Carving a slight chamfer **(5)** in the mouth of the pipe may also help.

Step 4: With the shoulder of the outer cone bottomed against the pipe face, hold the outer cone **(6)** against the pipe and pull the stem eye to set the collets into the pipe wall.

Step 5: Hold the outer cone against the pipe while pulling and tightening the stem eye **(1)**.

Step 6: When the stem eye is against the outer cone, use a bar for leverage and tighten the eye at least 5 more turns.

IMPORTANT: The connections between the first rod, bursting head, and expander section must be tight.



Step 7: Connect expander rod assembly **(7)** to puller **(8)**.

Step 8: Install the burst head **(9)** and slide over the expander rod.

Step 9: Install the blade **(10)** and slide over the expander rod.

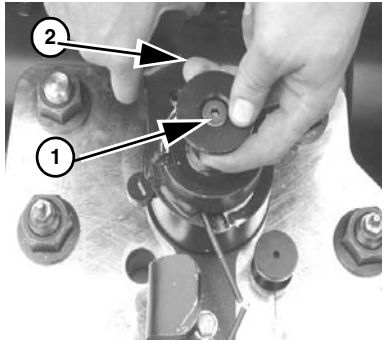
Step 10: Connect the knuckle assembly **(11)** to the expander rod.

NOTE: It may be easier to install the threaded knuckle **(12)** to the rod and the compound knuckle **(11)** to the expander rod first. Then attach the two knuckles together.

CAUTION: Make sure all pins are secure and tight before starting the bursting procedure. Failure to do so may result in an incomplete burst.

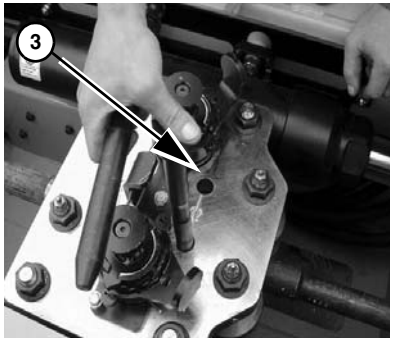
PULL BACK (- MINUS) POSITION

Step 1: Lift the direction changer plunger **(1)** and rotate the change lever arrow **(2)** to the **(-)** position. Do this for both plungers.



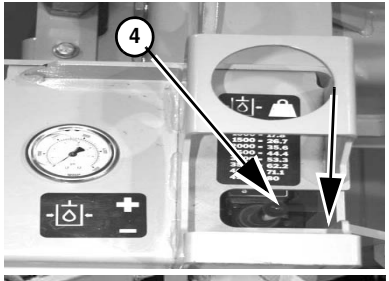
Step 2: Place direction pins **(3)** in the 2 holes on the **(-)** side of the ratchet assembly.

NOTE: If the pawls interfere with the insertion of the direction pins, move the ratchet assembly either forward or back to move the pawls clear of the direction pin holes.

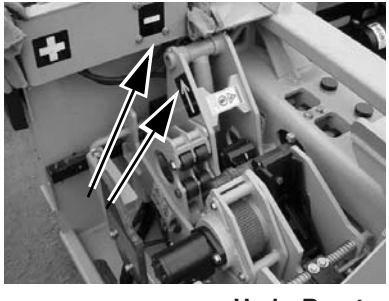


Step 3: Place the mode selector control lever **(4)**, which controls the direction of the grip and rotate vise, into the **(-)** position.

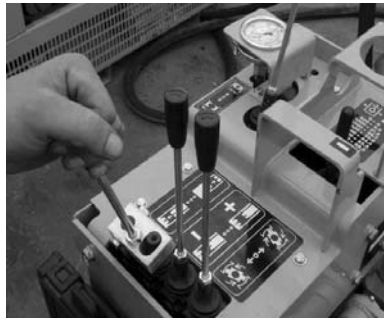
NOTE: Units with out Spinner Option do not have this control valve.



Step 4: Place and lock the spinner/torque assembly in the **(-)** position if the unit is so equipped.



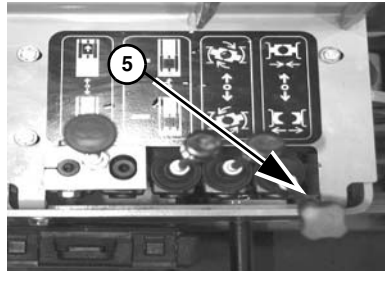
Step 5: Pull the thrust/pullback lever back with light force on the directional lever to start pulling back the rod, slitter/bursthead assembly and new utility.



Removing Rod

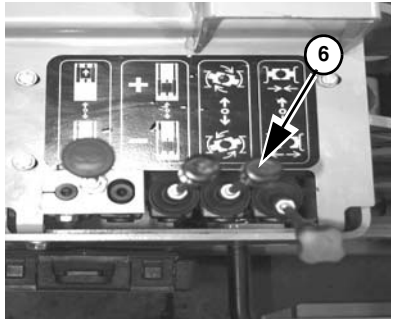
Step 6: Cycle pull back cylinder to the end of travel. This positions the rod correctly for rod installation or removal. Do not place the threaded joint into the vise clamp jaws.

Step 7: Engage the rod clamp vise by moving the rod clamp lever **(5)** forward.



Step 8: Pull the grip and torque sequence valve **(6)** back to break the rod joint loose.

NOTE: The Rod CLamp Vise must never allow down hole rotation of the rods. If rotation occurs, check the rod vise jaws for wear.

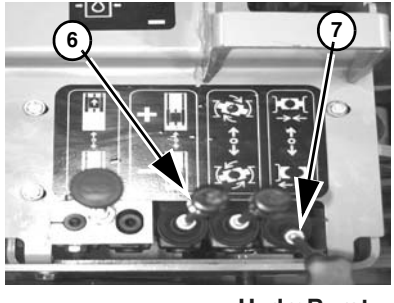


Step 9: The jaws for the grip and torque sequence valve will clamp onto the rod and then rotate to loosen the rod. Repeat if necessary.

Step 10: Pull the rod spinner lever **(6)** back to engage the rod spinner and unthread the rods from each other.

Step 11: Release the rod spinner lever, remove the rod and place rod in box.

Step 12: Release the rod lock vise lever **(7)** by moving into the neutral position.



Step 13: Continue the sequence until all rods have been pulled back and the new utility has reached the exit pit.

NOTE: Before the last rod is pulled back into the lower unit, remove the front brace plate so that the tooling string can be pulled into the unit for removal.

Docking Procedure

Step 1: Upon recieving the starter rod into the lower unit, remove the rod box from the to of the HB80 lower unit. Leave the last full length of rod attached to the starter rod.

Step 2: Remove the 1" threaded pins from the front and rear ends of the ductile slitter. Lift the ductile slitter from the hull of the machine.

Step 3: With no change to the direction/arrow handles on the ratchet block, remove both direction pins.

Step 4: Extend the rod forward and place the male end of the starter rod into the female end of the expander rod. Replace the threaded pin in the expander rod.

Step 5: Deflect the torsion springs of thje direction arrow handles on the ratchet block to allow both direction pins to be replaced.

Step 6: Cycle the machine twice to pull the new product pipe and expander into the machine.

Step 7: Remove the threaded pin from the expander rod and deflect the expander rod and remove the expander rod from the hull.

Step 8: Remove the shoulder bolt from the swivel on the expander rod and remove the expander rod from the hull.

Step 9: Repeat steps 3 thru 5 again.

Step 10: Pass the bolt of the 7 ton shackle (from standard accessory kit) through the eye of the starter rod. Link the two shackles and pass the pin of the second shackle through the eye of the pulling head.

Step 11: Cycle the machine twice to pull the product pipe into the hull. Remove the shackle pin.

Step 12: Lift the HB80 unit from the exit pit.

START UP - HB100

Step 1: Clean flat face couplings and connect to the lower unit if not already connected.

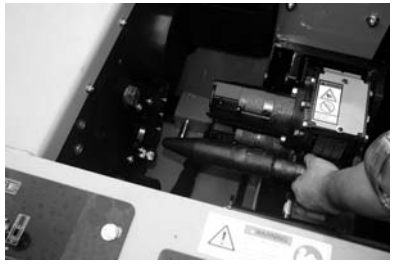
NOTE: Power Pack must be within 40' (12m) of the lower unit.

Step 2: Adjust vertical stabilizers so that the centerline of the rod is on the same grade and centerline of the existing utility. With the stabilizer legs retracted, the centerline is 14.5" (36.8 cm) from the bottom of the unit.

Step 3: Adjust the rear stabilizer manually, to brace the unit during pay out.

Step 4: Extend the main cylinders completely.

Step 5: Thread the rod pilot (1) onto the leading edge of the first rod. Place the first rod through the push/pull vise assembly.



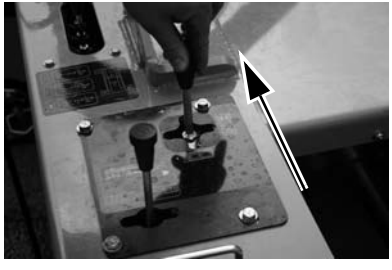
Step 6: Make sure the middle upset of the first rod is completely through the push/pull vise assembly.

Step 7: Close the push/pull vise.

Step 8: Place the female end of the next rod over the end of the male end of the previous rod.

NOTE: On units without the spinner option, Tighten the rod with a pipe wrench to approximately 250 - 300 ft lbs (339 - 407 Nm).

Step 9: Move the 4 way control lever towards the front plate of the machine, engaging the spinner. This clamps the rod and tightens it to the previous rod.



CAUTION: When threading on rod using the spinner, make sure the drive roller of the spinner is gripping the rod on the minor diameter of the rod. Do not torque the rods together using the major diameter of the rod.

Step 10: Retract the main cylinders completely.

Step 11: The tip of the rod pilot should extend slightly past the front plate as shown.

Step 12: Close the bungee vise and open the push/pull vise. This operation is accomplished with a single position of the 4 way control lever.

NOTE: This is a sequential operation. Do not attempt to extend the main cylinders until the push/pull vise has been released.

Step 13: Extend the main cylinders.

Step 14: Close the push/pull vise.

Step 15: Retract the main cylinders.

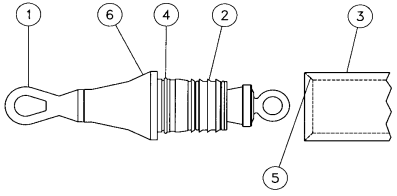
Step 16: Open the push/pull vise.

Step 17: Extend the main cylinders.

Step 18: Close the push/pull vise.

Step 19: Repeat steps 8 through 18 (skip step 11) until the required amount of rod has been deployed. It is good practice to count the number of rods that have been deployed.

HB100 Expander and HDPE - Attach



NOTE: The HammerHead Expanding Taper Pullers are intended for use with HDPE SDR11/17.5 plastic pipe. The holding power of the puller may be reduced if used with other SDR's or materials.

Step 1: Follow the the *Shutdown Procedure*, page *27-1*.

Step 2: Unscrew the stem eye **(1)** until collets **(2)** have fully collapsed.

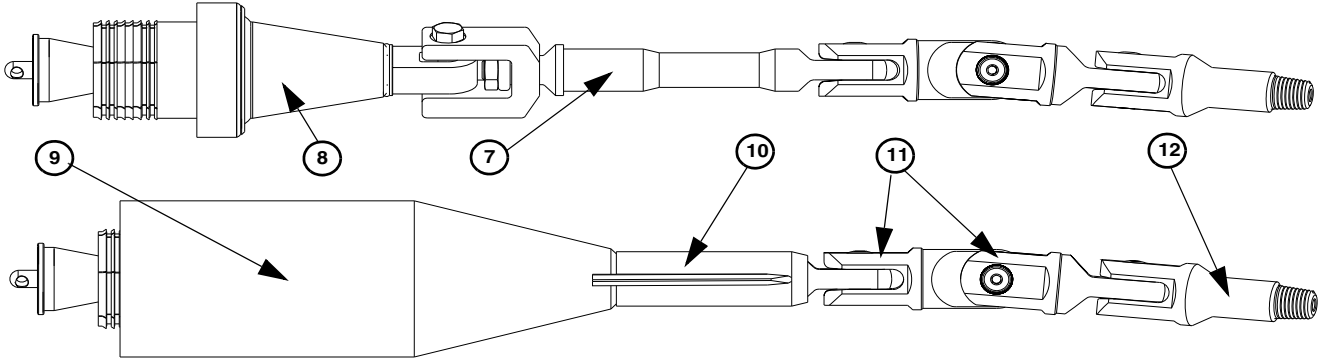
Step 3: Insert jaw end of puller into pipe **(3).** For heavy walled pipe, grease O-ring **(4)**. Carving a slight chamfer **(5)** in the mouth of the pipe may also help.

Step 4: With the shoulder of the outer cone bottomed against the pipe face, hold the outer cone **(6)** against the pipe and pull the stem eye to set the collets into the pipe wall.

Step 5: Hold the outer cone against the pipe while pulling and tightening the stem eye **(1)**.

Step 6: When the stem eye is against the outer cone, use a bar for leverage and tighten the eye at least 5 more turns.

IMPORTANT: The connections between the first rod, bursting head, and expander section must be tight.



Step 7: Connect expander rod assembly **(7)** to puller **(8)**.

Step 8: Install the burst head **(9)** and slide over the expander rod.

Step 9: Install the blade **(10)** and slide over the expander rod.

Step 10: Connect the knuckle assembly **(11)** to the expander rod.

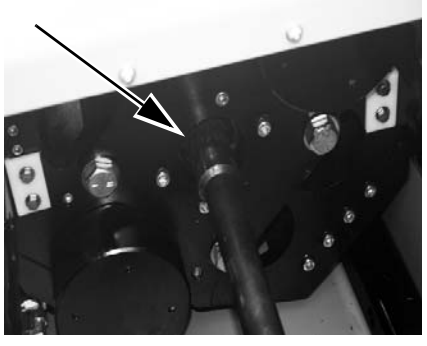
NOTE: It may be easier to install the threaded knuckle **(12)** to the rod and the compound knuckle **(11)** to the expander rod first. Then attach the two knuckles together.

CAUTION: Make sure all pins are secure and tight before starting the bursting procedure. Failure to do so may result in an incomplete burst.

HB100 - PULLBACK

Step 1: Before starting pullback, verify that the upset of the rod is not in the bungee vise. Close the bungee vise.

Step 2: Position the push/pull vise ahead of the the first upset that the push/pull vise can fully access. This may require a partial stroke to achieve this position on the first rod only.



Step 3: Close the push/pull vise.

Step 4: Extend the main cylinders completely.

NOTE: If a full rod is extending past the push/pull vise, proceed to step 9

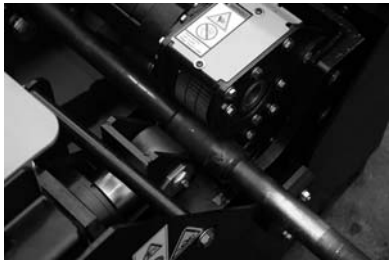
Step 5: Close the Bungee vise. The rod may retract slightly until the rod upset is seated against the bungee vise jaws.

Step 6: Retract the main cylinders completely.

Step 7: Close the push/pull vise.

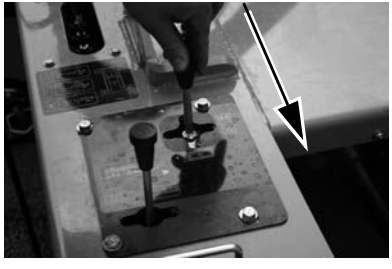
Step 8: Extend the main cylinders completely.

Step 9: Check to see if a full rod extends past the push/pull vise and the upset is lined up with the spinner rollers.



Step 10: Move the 4 way control lever away from the front plate of the machine, engaging the spinner. This clamps the rod in the spinner and un-threads it from the rod in the push/pull vise. Clamp spinner on upset for unthreading.

NOTE: On units without the spinner option, loosen the rod with a pipe wrench.



Step 11: Remove the rod.

Step 12: Close the bungee vise.

Step 13: Retract the main cylinders

Step 14: Close the push/pull vise.

Step 15: Repeat steps 4 through 14 until the tooling string has reached the machine.

Start Up - HB125

Drive Chuck Sub-Saver Installation and Removal

Special Tools and Materials

- acetylene heating torch
- wire brush
- Formula "C" BAKERLOCK, or PLusco 170 Thread Locking Compound (Vermeer part no. 235804001)

Thread Locking Compound Considerations

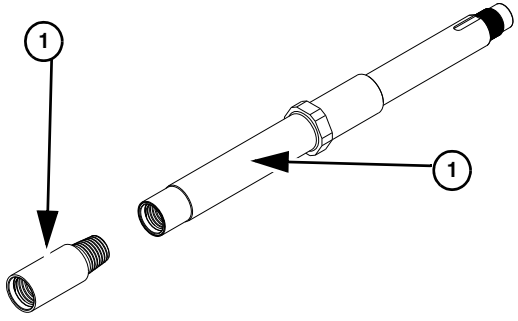
Thread locking compound has a shelf life of three years as long as the hermtically sealed containers are not opened. Prolonged storage at temperatures above 100 F (38 C) may cause some settling of the fillers and require careful, thorough re-mixing for best results. Freezing has no detrimental affects on the components.

The optimum drive chuck casing temperature for applying mixed compound to the threads is 70 - 150 F (21 - 66 C). The compound will not cure at temperatures below 40 F (4 C)

Once the compound has ben mixed, it has a limited usable life - apply as soon as possible.

TEMPERATURE	USABLE LIFE	FULL STRENGTH CURE TIME
70° F (21° C)	90 minutes	48 hours
100° F (38° C)	40 minutes	17 hours
120° F (50° C)	----	8 hours
150° F (65° C)	----	2 hours

Install Sub-Saver



1. Clean all threadson sub-saver (**1**) and spindle shaft (**2**) with solvent and rinse with water. Remove all grease, moisture, and foriegn matter. Remove any rust with a wire brush.
2. Thoroughly mix the can of thread locking compound with the applicator. Shake the vial of hardener and add to the compound. Mix until completely blended and no streaks are visible in the mixture.
3. Apply compound to the entire circumference of the first 2/3 of the male sub-saver threads.
4. Clamp the sub-saver in the rear rod vise and make up the joint with maximum torque.

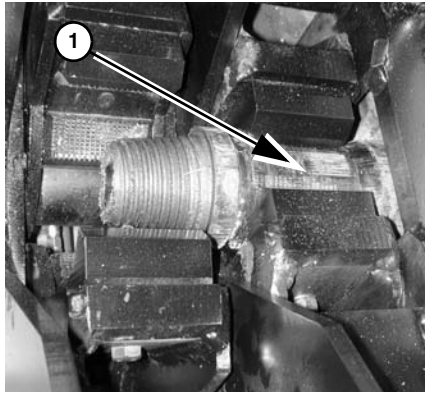
IMPORTANT: Do not put the sub-saver into use until the thread locking compound has cured to full strength, (see chart).

Remove Sub-Saver

CAUTION: To prevent damage to the spindle assembly, do not apply heat directly to it's surface.

1. Clamp the sub-saver in the rear rod vise
2. Using an acetylene heating torch, evenly and quickly apply heat to the threaded joint to loosen the threads. Apply heat only to the box end of the sub-saver. The thead locking compound will release at 500° - 600° F (260° - 315° C)
3. Quickly back the drive chuck out of the sub-saver before the heat transfers to the spindle shaft.

Installing First Rod



NOTE: Clean threaded ends of the rods to ensure a tight, secure connection and apply a small amount of anti-seize to the threads for easier disassembly.

NOTE: To know where the bursting head is and how much farther the burst must go, count the number of rods being pushed.

Step 1: Install push point onto the first rod and tighten. This will prevent the rod from snagging on the existing pipe and will protect the threads.

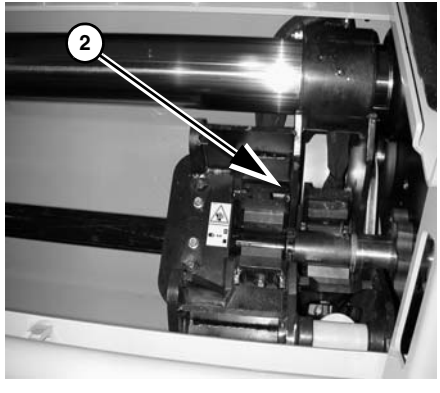
Step 2: Shuttle the ram all the way into the forward position.

Step 3: Clamp the sub-saver with the rear jaw **(1)**.

Step 4: Shuttle the ram all the way into the back position **(2)**.

Step 5: Release the rear jaw

Step 6: Place the necked down section of the first rod, with the push point installed, in the front jaw. Close the front jaw.



Step 7: Shuttle the ram all the way into the forward position

Step 8: Shuttle the ram all the way into the back position.

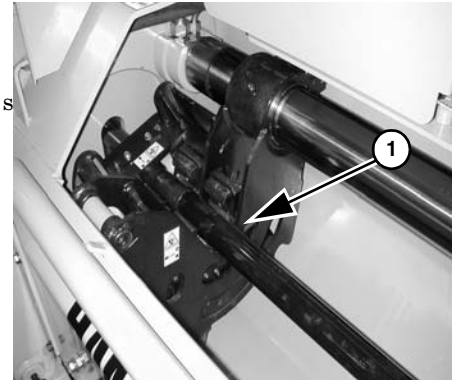
NOTE: At this point, the jaw assembly should be in the forward position with the front jaw gripping the first rod. The spindle should be in the back position.

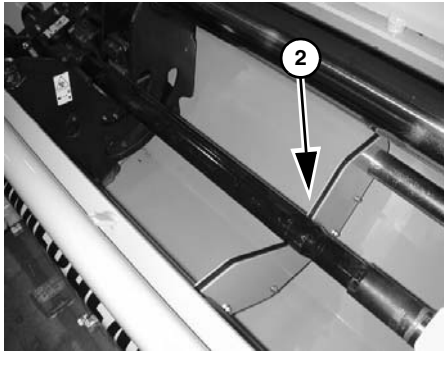
Installing Subsequent Rods

Step 1: Place the second rod through the rear jaws in the front of the machine **(1)** and s the rear of the rod on the cradle **(2)**.

Step 2: Rotate the chuck clockwise while slowly moving the ram forward.

Step 3: Once the rod is tight, stop rotation, release the front jaw and move the ram forward.

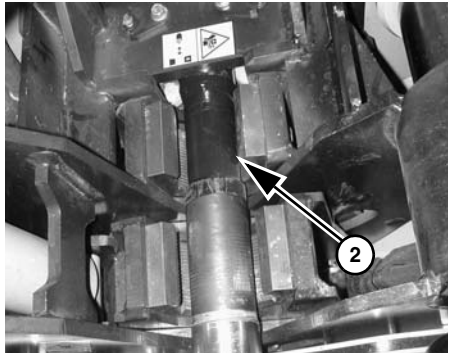




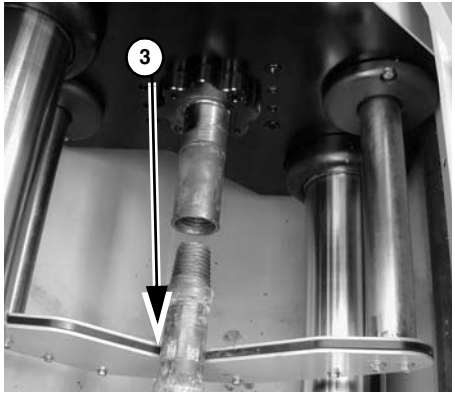
Step 4: When the end of forward travel is reached, clamp the rod with the front vise. Engage the rear vise to grip the rod on the spindle to loosen the joint.

NOTE: The front jaws will only grip the rod at the necked down section of the rod **(3)**. Do not attempt to grip the rods at any other place on the rod.

Step 5: Once the joint is loose rotate the spindle counter clockwise to finish unthreading the joint and pull back the ram.



Step 6: Install a new rod by placing it though the rear jaws at the front of the machine and setting the rear of the rod on the cradle **(3)**.



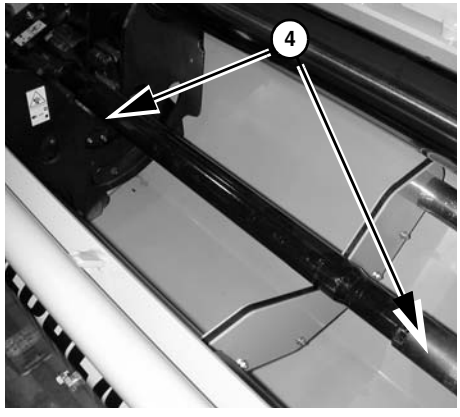
Step 7: Rotate the spindle clockwise while slowly moving the ram forward until both ends **(4)** of the rod have been threaded.

Step 8: Stop rotation and release the front jaw and continue to push forward with the ram.

Step 9: When the end of forward travel is reached, clamp the rod with the front vise. Engage the rear vise to grip the rod on the spindle to loosen the joint.

Step 10: Once the joint is loose rotate the spindle counter clockwise to finish unthreading the joint and pull back the ram.

Step 11: Repeat steps 1 thru 6 for each rod fed out.



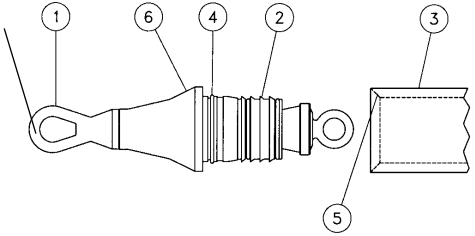
HB125 Burst Head and HDPE - Attach

NOTE: The HammerHead Expanding Taper Pullers are intended for use with HDPE SDR11/17.5 plastic pipe. The holding power of the puller may be reduced if used with other SDR's or materials.

Step 1: Follow the the *Shutdown Procedure*, page *27-1*.

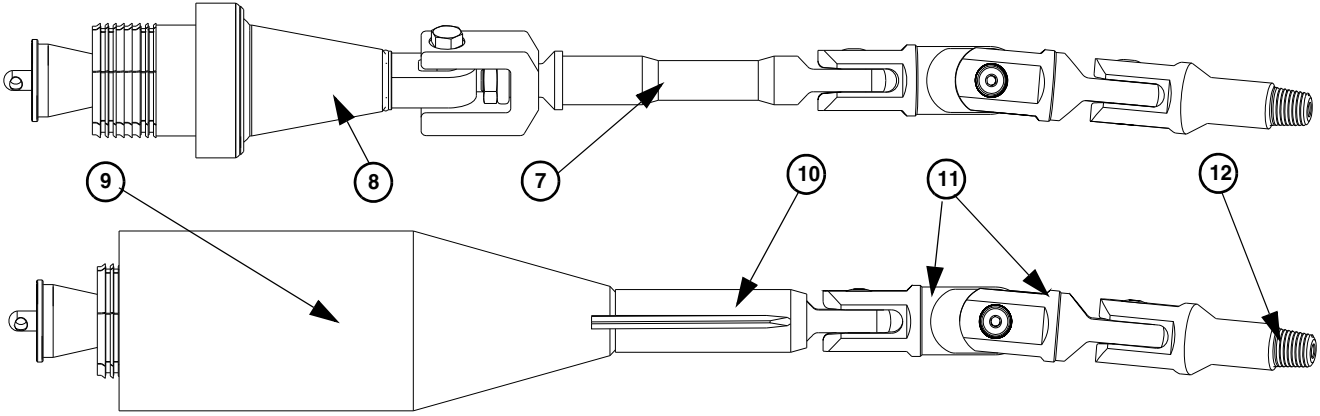
Step 2: Unscrew the stem eye **(1)** until collets **(2)** have fully collapsed.

Step 3: Insert jaw end of puller into pipe **(3).** For heavy walled pipe, grease O-ring **(4)**. Carving a slight chamfer **(5)** in the mouth of the pipe may also help.



Step 4: With the shoulder of the outer cone bottomed against the pipe face, hold the outer cone **(6)** against the pipe and pull the stem eye to set the collets into the pipe wall.

Step 5: Hold the outer cone against the pipe while pulling and tightening the stem eye **(1)**.



Step 6: When the stem eye is against the outer cone, use a bar for leverage and tighten the eye at least 5 more turns.

IMPORTANT: The connections between the first rod, bursting head, and expander section must be tight.

Step 7: Connect expander rod assembly **(7)** to puller **(8)**.

Step 8: Install the burst head **(9)** and slide over the expander rod.

Step 9: Install the blade **(10)** and slide over the expander rod.

Step 10: Connect the knuckle assembly **(11)** to the expander rod.

NOTE: It may be easier to install the threaded knuckle **(12)** to the rod and the compound knuckle **(11)** to the expander rod first. Then attach the two knuckles together.

CAUTION: Make sure all pins are secure and tight before starting the bursting procedure. Failure to do so may result in an incomplete burst.

STARTING THE BURST

Step 1: Make sure HB125 is aligned and braced well before attempting to pull back rod.

IMPORTANT: To monitor the location of the bursting head, count the rods as they are removed.

Step 2: Using the directional control valve, pull the rod back so that the necked down section of the previous rod is lined up with the front jaws.

Step 3: Engage the front jaws and clamp the front rod.

Step 4: Engage the rear jaw to break apart the rod joint. Release the rear jaw.

Step 5: Rotate the spindle counter clockwise to unthread the rod joint.

Step 6: Re-engage the rear jaws and then rotate the spindle counterclockwise to unthread the rod from the spindle.

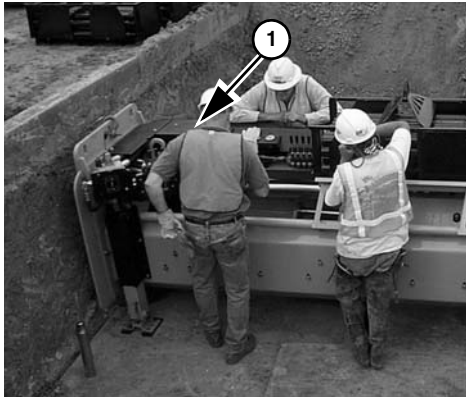
Step 7: Dis-engage the rear jaw and remove the rod.

Step 8: Extend the ram and thread the spindle into the rod clamped in the front jaws.

Step 9: Release the front jaw and retract the rams to pull back another section of rod.

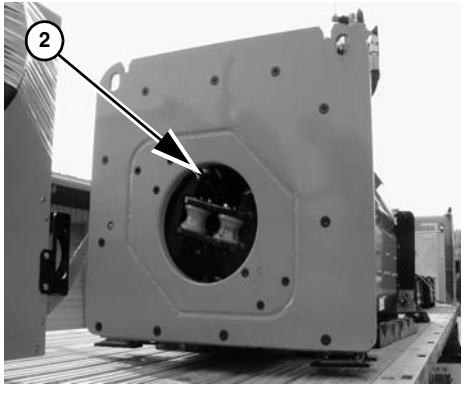
Step 10: Repeat steps 2 through 9 until the last rod is reached.

ENDING THE BURST



Step 1: Remove Resistance Plate **(1).**

IMPORTANT: The diameter of the hole in the front of the HB125 **(2)** will only accept tooling smaller than 16" (400mm) in diameter. Do not attempt to pull tooling larger than this through the front of the machine.



Step 2: Remove the last rod following the procedures in the previous section.

Step 3: Once the rod is removed, place the threaded knuckle in the forward jaws and clamp. Do not clamp the vise on the threads. Make sure the threads are exposed through the rear of the forward jaws.

Step 4: Extend the rams and thread the spindle onto the threaded knuckle.

Step 5: Leave the front jaws clamped onto the threaded knuckle and retract the ram. This should pull the jaw block assembly and the tooling string through the front of the HB125 and into the machine.

Step 6: Engage the rear clamp to loosen the spindle from the threaded knuckle.

Step 7: Cut pipe behind the expanding taper puller and remove one of the pins attaching the knuckles together and remove the bursting head assembly out of the machine.

Step 8: Release the front jaw and remove the threaded knuckle.

NOTE: It is good practice to leave the cylinders in the retracted position when not in use to protect the cylinder rods from damage and the elements.

HB125 -REMOVE

Step 1: Fully retract the horizontal stabilizer first and then the vertical stabilizers

Step 2: Shut down Hydraulic power supply and cycle spindle rotation control lever to release any pressure from the system.

Step 3: Remove hydraulic hoses and install dust caps. Make sure no contaminants get in the couplings

WARNING: Never lift equipment over personnel. The load may fall or shift, crushing anyone beneath it.

Step 4: Attach lifting chains to lifting points and use suitable equipment to lift the unit out of t work pit.

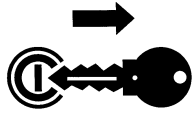
Step 5: Clean dirt from the unit and collect all tools, parts and accessories.

PREVENTIVE MAINTENANCE TIPS

- Be careful not to damage cylinder rods when they are extended. Nicks and dents will damage seals, resulting in oil leakage.
- When not in use, the cylinders should be fully retracted to protect the rods from moisture and dirt. If left extended, wipe them off before storing unit.
- To prevent the premature wear of the jaw blocks and moving components, keep the unit free of dirt and debris.

Section 50: Maintenance Intervals

WARNING: Before servicing, cleaning, repairing, inspecting, lubricating, fueling, or transporting the machine, refer to the *Shutdown Procedure*, page *27-1*, for proper instructions.



HOURMETER - CHECK FOR MAINTENANCE INTERVAL

The hourmeter on the power unit is used to determine maintenance intervals for the machine. The hourmeter indicates the total number of hours the engine has been in operation.

Maintenance intervals are based on normal operating conditions. When operating under severe conditions, the maintenance intervals should be shortened.

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Section 51: Maintenance - 10 Service Hours or Daily

FLUID LEVELS - CHECK

Check fluid levels daily before operating the machine. Also inspect the machine and make any necessary adjustments and repairs before starting the engine.

Hydraulic Fluid Level

Clean hydraulic fluid is very important so do not spill dirt or other contaminants into the tank. Filter all hydraulic fluid through a 10-micron filter before adding it to the tank.

NOTE: The hydraulic fluid must be free of bubbles. Bubbles indicate trapped air in the hydraulic system.

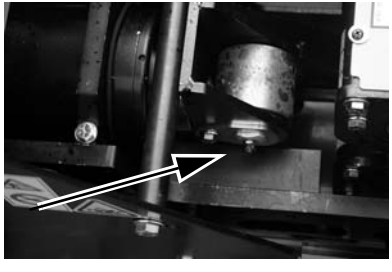
NOTE: Check hydraulic oil level of HB80, HB100 and HB125 with cylinders retracted.

General Maintenance

- Wipe down Rod arms with oil before every use.
- Clean jaw blocks of any debris.
- Keep jaw teeth clean and check for burrs. Replace when rods slip during operation.
- Check hydraulic hoses for loose fittings and pinched or damaged hoses. Tighten or replace as neccessary.

HB100

- Grease the serk on the idler roller of the rod spinner unit daily.



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Section 55: Maintenance - 500 Service Hours

HYDRAULIC FLUID FILTER - CHANGE

The hydraulic fluid will need to be changed earlier if the machine is in storage for a long period of time, such as through the winter.

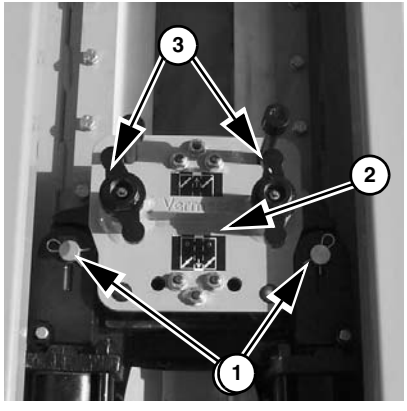
*To change filter on the PowerPack: Please refer to the **HammerHead Power Pack Operator Manual** for procedure and instructions.*

Step 1: Remove old filter.

Step 2: Fill new filter with Hydraulic oil and lubricate o-ring seal ontop of filter with oil.

Step 3: Install new filter and tighten.

JAW REPLACE - HB3038/5058



Remove two pins (1), held by hairpins on top and bottom, from clevis.

Step 1: Push jaw block **(2)** forward.

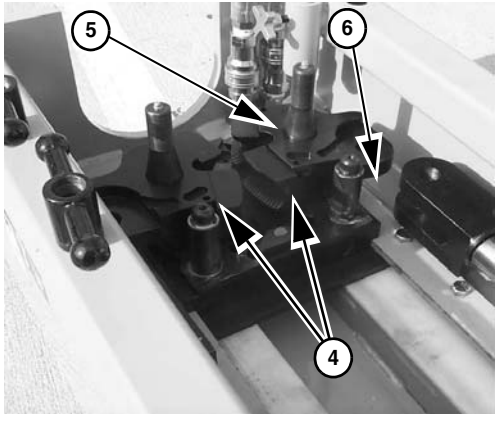
Step 2: Unscrew top clamp nuts **(3)** and lift top plate off.

Step 3: Lift out jaw carriers**(5)** and replace jaw inserts **(4)**.

Step 4: Replace carrier and pins **(3)**. Hand tighten, then tap with a hammer to ensure top plate is seated.

Step 5: Push jaw block back, aligning holes in jaws **(5)** with holes in clevis **(6)**.

Step 6: Replace pins into clevis.



JAW REPLACE - HB80/HB125

Step 1: Open all jaws and retract ram completely.

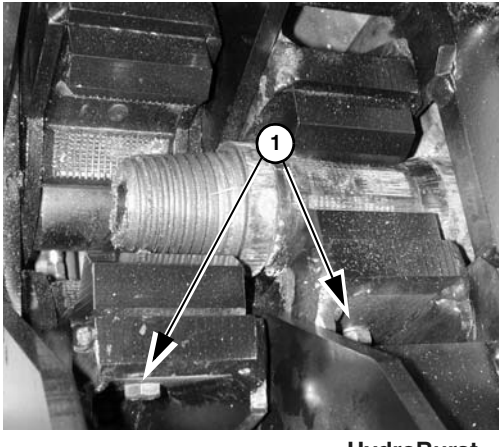
Step 2: Close both front and rear jaws to access retaining bolt **(1)** behind jaw block.

Step 3: Remove retaining bolt and spacer. Remove jaw block.

Step 4: Insert new jaw block and install space and retaining bolt.

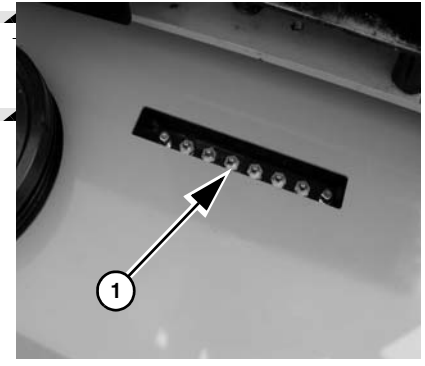
Step 5: Repeat for remaining jaw blocks.

IMPORTANT: The front set of jaw blocks have a smaller radious than the rear jaw blocks. Be sure to install the jaw blocks in the correct location. Failure to do so may result in damage to the equipment.



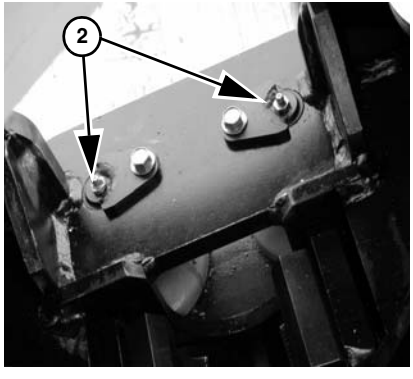
Section 56: Maintenance - 1000 Servise Hours

CAUTION: Before working on any machine, follow instructions in "Shutdown Procedure," *page 27-1*.



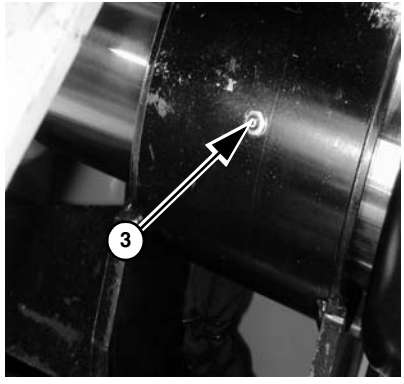
GREASE - HB125

Step 1: Grease bank of grease fittings **(1)** located on the top of the machine.

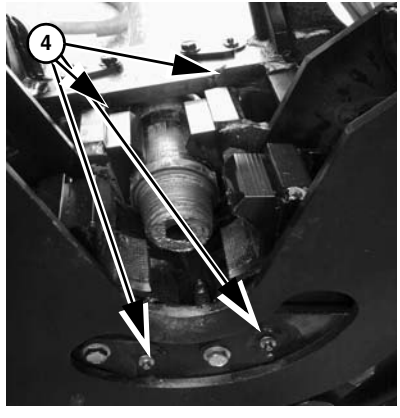


Step 2: Grease Guide Roller bearings **(2)** on front of machine.

Step 3: Grease bushings **(3)** on jaw block assembly.

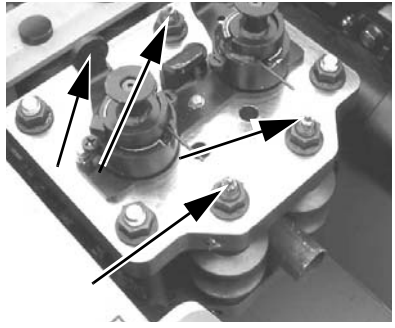


Step 4: Grease all 4 Vise Arm Pins **(4).**

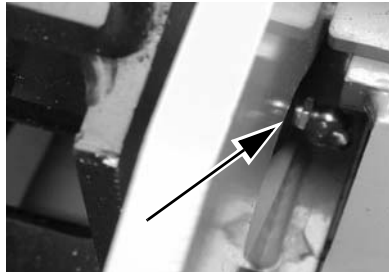


GREASE - HB80

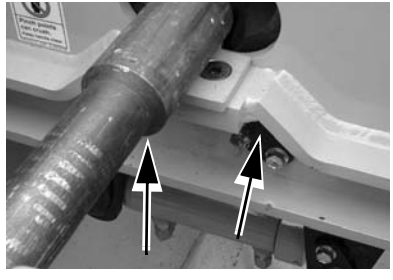
Step 1: Grease all 4 zerks on top of pawl assembly.



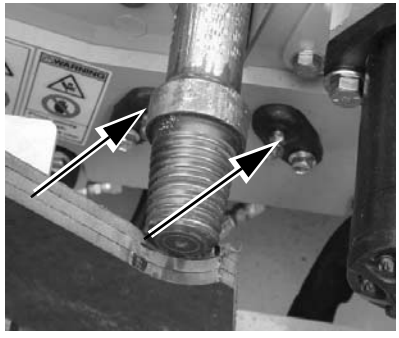
Step 2: Grease 2 zerks on front side of clamp and rotate jaw.



Step 3: Grease 2 zerks on rear of Clamp jaw assembly.

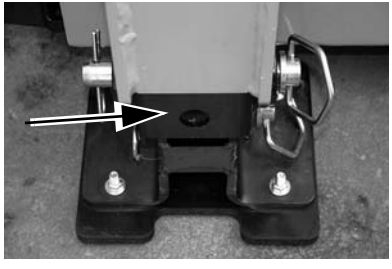


Step 4: Grease 2 zerks on rear of rod spinner assembly.

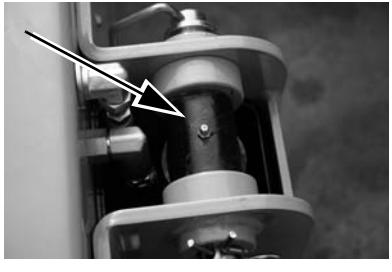


GREASE - HB100

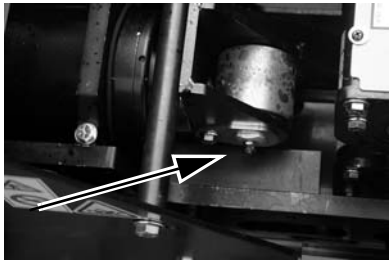
Step 1: Gease the zerk in the bottom of each stabilizer leg through the hole as shown (4)



Step 2: Grease the zerk in the top of each stabilizer (4)



Step 3: Grease the zerk on the idler roller of the rod spinner unit.



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Section 60: Specifications

LUBRICANTS

Lubricant	Capacity	Specification / Notes
Hydraulic Fluid	10.5 gal (40 L)	**Phillips: Type HG** **ISO STD or equivalent** Use caution not to get dirt or other contaminants into the system(s) when connecting with a tractor, or when servicing. Filter all fluid through a 10-micron filter before adding.
Grease	As required	**EP grease or equivalent** To minimize condensation in bearings, grease machine after it is shut down for the day. Fittings and grease applicator nozzle must be clean before applying grease. Replace all missing fittings.
General Lubricating Oil	As required	**SAE-30, 882 Heavy Moly Lube or equivalent**

HYDROBURST HB3038/5058		
	HB3038	**HB5058**
Overall Length	59.5″ (151 cm)	65.0″ (165 cm)
Overall Width	20.17″ (51 cm)	22.5″ (57 cm)
Overall Height	43″ (109 cm)	43″ (109 cm)
Transport Height	12.2″ (31 cm)	13.38″ (34 cm)
Weight	762 lb (346 kg)	993 lb (451 kg)
Rod Box		
Overall Length	57″ (145 cm)	40.5″ (103 cm)
Overall Width	16.25″ (41 cm)	16″ (40.6 cm)
Overall Height	15″ (38 cm)	18.25″ (46.36 cm)
Weight (empty)	24 lb (11 kg)	24 lb (11 kg)
Weight (full - 100 rods)	1400 lb (635 kg)	1605 lb (728 kg)
Rod Size	1.75″ diameter x 47.2″ long (4.4 cm diameter x 1.2 m long)	2″ diameter x 39.4″ long (5.1 cm diameter x 1.0 m long)
Rod Weight	32 lb (14.5 kg)	30.5 lb (13.9 kg)
Maximum Push Force	75,398 lb (335,388 N)	103,810 lb (462,613 N)
Maximum Pull Force	60,967 lb (271,193 N)	98,960 lb (440,197 N)
Shuttle Speed (No Load, One Cycle)	8.8 seconds	14.0 seconds

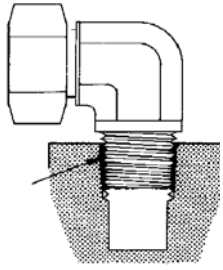
HydroBurst HB80 and HB100 (w/o Spinner and Stabilizers)		
	HB80	**HB100**
Overall Length	82" (208 cm)	72˝ (182.9 cm)
Overall Width	33" (84 cm)	35˝ (88.9 cm)
Overall Height	36" (91 cm)	34˝ (86.3 cm) behind shoreplate
Weight	3,060 lb (1,388 kg)	3138 lb (1423 kg)
Sound Level	89.6 dbA	74.5 dbA
Rod Box		
Overall Length	46˝ (116.8 cm)	46˝ (116.8 cm)
Overall Width	24.4˝ (62.0 cm)	24.4˝ (62.0 cm)
Overall Height	16.75˝ (42.5 cm)	16.75˝ (42.5 cm)
Weight (empty)	184 lb (83.6 kg)	184 lb (83.6 kg)
Weight (full)	1561 lb (708 kg)	1561 lb (708 kg)
Rod Size	2.25" diameter x 35.44" long (57mm diameter x 90 cm long)	2.25˝ diameter x 35.44˝ long (57mm diameter x .9 m long)
Rod Weight	27.0 lb (12.2 kg)	27 lb (12.2 kg)
Maximum Pull Force	160,000 lb (711,715 N)	200,000 lb (889,644 N)
Shuttle Speed (No Load, One Cycle)	16 seconds	16.0 seconds

HYDROBURST HB125		
	HB125	
Overall Length	125″ (317.5 cm)	
Overall Width	47″ (119.4 cm)	
Overall Height	42″ (106.7 cm) behind shoreplate 48.6" (123.5 cm) at shoreplate	
Weight	7500 lb (3402 kg)	
Sound Level	89.6 dbA	
Rod Box		
Overall Length	46″ (116.8 cm)	
Overall Width	24.4″ (62.0 cm)	
Overall Height	16.75″ (42.5 cm)	
Weight (empty)	184 lb (83.6 kg)	
Weight (full)	1753 lb (795 kg)	
Rod Size	2.75″ diameter x 39.4″ long (70mm diameter x 1.0 m long)	
Rod Weight	52.3 lb (23.7 kg)	
Maximum Pull Force	250,000 lb (1,112,500 N)	
Shuttle Speed (No Load, One Cycle)	19.0 seconds	

Section 97: Torque Values

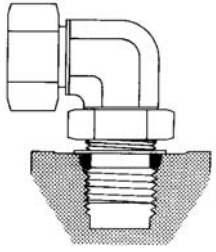
HYDRAULIC FITTINGS

Pipe Thread Fittings



- Ensure all threads are free from nicks, burrs, and dirt.
- Use a thread sealant such as Loctite Vibra-Seal, instead of pipe dope or Teflon tape, to seal the threads. Teflon tape can plug filters and drain orifices, and can cause hydraulic system failures.
- To tighten, turn the fitting approximately three turns past finger tight.

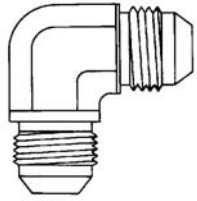
O-Ring Fittings



- Ensure the threads and sealing surfaces are free from nicks, burrs, scratches, or any foreign material.
- Lubricate the O-ring with a light coat of oil.
- To tighten adjustable O-ring fittings, hold the fitting and tighten the nut.
- To tighten non-adjustable O-ring fittings, tighten the fitting.

Size	Thread	Torque
#2	5/16˝ -24	7 - 8 ft-lb (10 - 11 Nm)
#3	3/8˝ -24	14 -16 ft-lb (19 - 21 Nm)
#4	7/16˝ -20	16 - 18 ft-lb (21 - 24 Nm)
#5	1/2˝ -20	22 - 24 ft-lb (29 - 32 Nm)
#6	9/16˝ -18	24 - 26 ft-lb (33 - 35 Nm)
#8	3/4˝ -16	40 - 43 ft-lb (54 - 59 Nm)
#10	7/8˝ -14	68 - 70 ft-lb (93 - 95 Nm)
#12	1-1/16˝ -12	98 - 102 ft-lb (133 - 138 Nm)
#16	1-5/16˝ -12	146 - 154 ft-lb (197 - 209 Nm)

JIC Fittings



- Ensure the threads and sealing surfaces are free from nicks, burrs, scratches, or any foreign material.
- To tighten, turn the fitting until finger tight. Then turn the fitting an additional number of flats as indicated on the chart below. **One flat equals 1/6 of a turn.**

IMPORTANT: Do not overtighten the fitting. If overtightened, the female side of the fitting may deform or break, causing the oil flow to become restricted or a leak to form.

Flats from Finger Tight		
Size	New Fittings	Loose Fittings
#4 (1/4˝)	2 to 2-1/2	3/4 to 1
#6 (3/8˝)	2 to 2-1/4	1
#8 (1/2˝)	1-1/2 to 1-3/4	1
#10 (5/8˝)	1-1/2 to 1-3/4	3/4
#12 (3/4˝)	1-1/2	3/4
#14 (7/8˝)	2	1-1/4
#16 (1˝)	1-1/4 to 1 1/2	3/4 to 1
#20 (1-1/4˝)	1 1/2	3/4 to 1
#24 (1-1/2˝)	1 1/4 to 1 1/2	1 to 1 1/4
#32 (2˝)	1 1/4	3/4 to 1

FASTENERS

For SAE Grade 2, Grade 5, and Grade 8 Cap Screws and Bolts

NOTE: Torque values specified in text take precedence over values shown below. These values do not apply when used with lock nuts.

	Grade 2 		Grade 5 		Grade 8 	
Bolt Size	**Ft-Lb**	**Nm**	**Ft-Lb**	**Nm**	**Ft-Lb**	**Nm**
1/4˝-20 NC	4	5	6	8.5	10	13
1/4˝-28 NF	5	6	8	11	11	15
5/16˝-18 NC	9	12	13	18	20	27
5/16˝-24 NF	10	13	15	20.5	22	29.5
3/8˝-16 NC	16	22	25	35	35	47
3/8˝-24 NF	18	24	30	40	40	55
7/16˝-14 NC	25	35	40	55	55	75
7/16˝-20 NF	30	40	45	60	65	88
1/2˝-13 NC	40	55	60	80	90	120
1/2˝-20 NF	45	60	70	95	95	130
9/16˝-12 NC	55	75	90	120	120	165
9/16˝-8 NF	60	80	95	130	135	185
5/8˝-11 NC	75	100	120	165	180	245

	Grade 2 		Grade 5 		Grade 8 	
5/8˝-18 NF	80	110	145	200	195	265
3/4˝-10 NC	130	175	210	285	300	405
3/4˝-16 NF	145	200	240	325	340	460
7/8˝-9 NC	150	205	320	435	500	680
7/8˝-14 NF	170	230	350	475	560	760
1˝-8 NC	180	245	480	650	800	1085
1˝-14 NF	200	270	560	760	920	1250
1 1/8˝-7 NC	240	325	700	950	1180	1600
1 1/8˝- 2 NF	275	375	780	1060	1340	1815
1 1/4˝-7 NC	340	460	1020	1385	1720	2330
1 1/4˝- 2 NF	370	500	1140	1545	1900	2575
1 3/8˝-6 NC	460	625	1360	1845	2280	3090
1 3/8˝-12 NF	540	730	1580	2140	2620	3550
1 1/2˝-6 NC	640	870	1840	2495	3060	4150
1 1/2˝-12 NF	740	1000	2100	2850	3460	4690

For Metric Grade 5.8, 6.9, 8.8, 10.9, & 12.9 Cap Screws and Bolts

	Grade 5.8 		Grade 6.9 		Grade 8.8 		Grade 10.9 		Grade 12.9 	
Bolt Size	**Ft-Lb**	**Nm**	**Ft-Lb**	**Nm**	**Ft-Lb**	**Nm**	**Ft-Lb**	**Nm**	**Ft-Lb**	**Nm**
M4	1.1	1.5	1.7	2.3	2	2.7	2.9	4	3.6	5
M5	2.3	3.1	3.5	4.7	4	5.4	6	8	7	9.5
M6	3.9	5.3	5.8	7.8	7	9.5	10	13.5	11	15
M7	6.5	8.8	9.4	12.7	11	15	16	22	20	27
M8	10	13.5	14	19	18	24	25	34	29	39
M10	20	27	29	39	32	43	47	64	58	79
M12	34	46	50	68	58	79	83	112.5	100	136
M14	54	73	79	107	94	127	133	180	159	216
M16	80	108.5	122	165	144	195	196	266	235	319
M18	114	155	170	230.5	190	258	269	365	323	438
M20	162	220	220	298	260	353	366	496	440	597
M22	202	274	318	431	368	499	520	705	628	852
M24	245	332	410	556	470	637	664	900	794	1077
M27	360	488	606	822	707	959	996	1351	1205	1634
M30	500	678	815	1105	967	1311	1357	1840	1630	2210

For Grade B, C, F, and G Lock Nuts

	Grade B (Grade 5) 		Grade C (Grade 8) 		Grade F (Grade 5 Flange) 		Grade G (Grade 8 Flange) 	
Nut Size	**Ft-Lb**	**Nm**	**Ft-Lb**	**Nm**	**Ft-Lb**	**Nm**	**Ft-Lb**	**Nm**
1/4″-20 NC	7.5 - 10	10 - 13	10 - 14	14 - 19	8 - 10	11 - 14	12 - 16	16 - 21.5
1/4″-28 NF	8 - 10	11 - 14	10 - 14	14 - 19	9 - 12	12 - 16	12 - 17	16 - 23
5/16″-18 NC	14 - 17.5	19 - 24	17.5-22.5	24 - 30.5	15 - 20	20 - 27	19.5 - 27	27 -36
5/16″-24 NF	15 - 18	20 - 25	18 - 23	25 - 32	16 - 22	21.5 - 29	19.5 - 26	27 - 35
3/8″-16 NC	21 - 27	28.5 - 37	29 - 37	39 - 50	22.5 - 32.5	30.5 - 44	30 - 41	41 - 56
3/8″-24 NF	27.5 - 38	37 - 51.5	22.5 - 31	30.5 - 42	23.5 - 31.5	32 - 43	31 - 42	42 - 57
7/16″-14 NC	31 - 40	42 - 54	39 - 53	53 - 72	36 - 50	49 - 68	45 - 62	61 - 84
7/16″-20 NF	39 - 51	53 - 69	41 - 56	56 - 76	38 - 53	51.5 - 72	51 - 71	69 - 96
1/2″-13 NC	49.5 - 62.5	67 - 85	62 - 79.5	84 - 108	50.5 -69.5	68.5 - 94	72 - 102	98 - 132
1/2″-20 NF	50 - 65	68 - 88	67 - 87	91 - 118	56.5 -78.5	77 - 106	67 - 106	91 - 144
9/16″-12 NC	67 - 87	91 - 118	95 - 120	129 - 163	72 - 102	98 - 132	105 - 145	142 - 197
9/16″-18 NF	74.5 - 94.5	101 - 128	95 - 120	129 - 163	79 - 111	107-150.5	113 - 157	153 - 213
5/8″-11 NC	95 - 120	129 - 163	125 -157.5	169.5-214	100 - 137	136 - 186	130 - 178	176 - 241
5/8″-18 NF	97.5-122.5	132 - 166	125 - 160	169.5 -217	105 - 145	142 - 197	150 - 210	203 - 285
3/4″-10 NC	160 - 200	217 - 271	200 - 255	271 - 346	170 - 230	230.5-312	205 - 285	278-386.5

	Grade B (Grade 5) 		Grade C (Grade 8) 		Grade F (Grade 5 Flange) 		Grade G (Grade 8 Flange) 	
3/4˝-16 NF	155 - 200	210 - 271	200 - 255	271 - 346	163 - 227	221 - 308	215 - 315	291.5-427
7/8˝ -9 NC	235 - 300	319 - 407	295-382.5	400 - 519				
7/8˝ -14 NF	250 - 320	339 - 434	295-382.5	400 - 519				
1 -8˝ NC	345 - 445	468 - 603	450-512.5	610 - 695				
1 -14˝ NF	370 - 470	502 - 637	452.5-590	617 - 800				

INDEX

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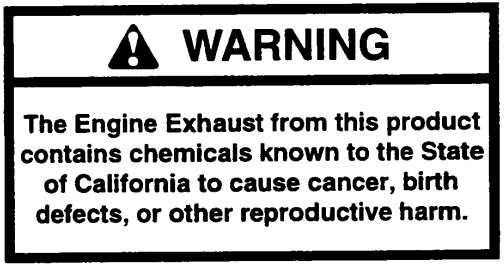
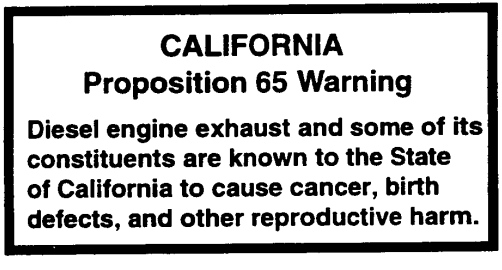
Revision History

Revision	Date	Page(s)	Description
o1_03	12/03	All	1st edition manual released. Combined HB3038/HB5058 manuals with HB125
01_05	10/05	Various	Add HB80 operating Instructions
05_08	05/08	Various	Add HB100 Operating Instructions


WARNING
The Engine Exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.


CALIFORNIA
Proposition 65 Warning
Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.