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 Manuals provided with the machine. The tethered (cabled) manual must remain attached to the machine for ready reference. Store it in the manual storage box 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.
HAMMERHEAD MOLE®, and ACTIVE HEAD™ are trademarks of Earth Tool Company, LLC.

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

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(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 service for one full year after delivery to the owner or 1000 operating hours, whichever occurs first. During the warranty period, the authorized selling HammerHead Dealer shall furnish parts without charge for any HammerHead product that fails because of defects in material and workmanship. Warranty is void unless warranty registration card is returned within ten days from the date of purchase. This warranty and any possible liability of Earth Tool Company LLC 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 services or replacement of normal service items. Equipment and accessories not of our manufacture are warranted only to the extent of the original Manufacturer’s Warranty and subject to their allowance to us, if found defective by them.

ETC reserves the right to modify, alter, and improve any products or parts without incurring any obligation to replace any Active Head Mole.
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
DEALER PREP

*Check or perform the following:*

___ Check tailcone or tailbolts:
   - 1-3/4” Mole - torque tailcone to 175 ft-lb (235 Nm)
   - 2” Mole - torque tailbolts to 12 ft-lb (16.8 Nm)
   - 2-1/2” Mole - torque tailbolts to 28 ft-lb (37 Nm)
   - 3” Mole - torque tailbolts to 35 ft-lb (47 Nm)

___ Check for foreign material around the hose connection at the tool and exhaust ports.

___ Check for foreign material in the hose and around the hose coupler.

___ Check forward and reverse valve for proper function.

___ Check internal striker by tipping tool back and forth. The striker should slide freely.

___ Check the condition of the decals.

Review of Operation

Review and demonstrate with the customer the various aspects of tool operation:

___ Overall explanation of how HammerHead Mole pneumatic boring tool works.

___ HammerHead Mole safety measures.

___ Preparing the HammerHead Mole boring tool for operation.
## Dealer/Customer Information

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**IDENTIFICATION NUMBERS - RECORD**

Machine Model Number ________________

Machine Serial Number ________________
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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 nor procedures are not followed.

Understanding Safety Alert Symbol
This is the safety alert symbol. This symbol placed on your machine or in the manual is used to alert you to the potential for bodily injury of death.

Understanding 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

Do not operate the machine unless the instructions in the following manuals have been carefully read and understood:

- This HammerHead Mole Operator’s Manual
- Air Compressor Manual

Read and understand all safety messages in this manual and on your machine safety decals.

Safety decals located on your machine contain important information that will help you operate your equipment safely. Keep safety decals in good condition. Replace missing or damaged safety decals.

Allow only responsible, properly instructed individuals to operate the machine. Carefully supervise inexperienced operators.

CALL YOUR ONE-CALL SYSTEM FIRST

WARNING: Always contact your local One-Call system before starting a digging project

Before you start any digging project, don’t forget to call the local One-Call system in your area and any utility company that does not subscribe to the One-Call system. For areas not represented by One-Call Systems International, contact the appropriate utility companies or national regulating authority to locate and mark the underground installations. If you don’t call, you may have an accident, suffer injuries, cause interruption of services, damage the environment, or experience job delays.

The One-Call representative will notify participating utility companies of your proposed digging activities. If you are in the U.S. or Canada, and do not know the number for the local One-Call representative in your area,
you can dial the North America One-Call number 1-888-258-0808 for this information. Utilities will then mark their underground facilities by using the following international marking codes:

<table>
<thead>
<tr>
<th>Color</th>
<th>Utility</th>
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<tr>
<td>Red</td>
<td>Electric</td>
</tr>
<tr>
<td>Yellow</td>
<td>Gas, Oil or Petroleum</td>
</tr>
<tr>
<td>Orange</td>
<td>Communication, Telephone, TV</td>
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<tr>
<td>Blue</td>
<td>Potable Water</td>
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<tr>
<td>Green/Brown</td>
<td>Proposed Excavation</td>
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<td>White</td>
<td>Proposed Excavation</td>
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<tr>
<td>Pink</td>
<td>Surveying</td>
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**UNDERGROUND UTILITY CONTACT**

**WARNING:** Contact with buried utilities can cause death or serious injury.

- Cut electric cables can shock or electrocute.
- Ruptured gas lines can cause fire or explosion
- Laser light from cut fiber optic cables can cause eye damage.

Before excavating or drilling, contact the local One-Call system and any utility company that does not subscribe to the One-Call system, to locate all buried utilities in and around the proposed excavation or bore.

**OSHA CFR 29 1926.651** requires that the estimated location of underground utilities be determined before beginning the excavation or underground drilling operation. When the actual excavation or bore approaches an estimated utility location, the exact location of the underground installation must be determined by a safe, acceptable and dependable method. If the utility cannot be precisely located, it must be shut off by the utility company.

Before drilling, contact the One-Call System to locate all buried utilities in and around bore path.

- select a bore path that will not intersect buried utilities.
• Never bore on a path toward electric or gas lines.
• If the utility cannot be precisely located, have the utility company shut it off before starting any underground work.

**PERSONAL PROTECTION**
Wear required personal protective equipment.
Wear close-fitting clothing and confine long hair.
Avoid wearing jewelry, such as rings, wristwatches, necklaces, or bracelets.
Always wear:
• safety glasses
• safety shoes
• hard hat
• high visibility clothing when working near traffic
• hearing protection.

**CHECK LAWS AND REGULATIONS**
Know and obey all Federal, State, and local laws and regulations that apply to your work situation.
offices. Be sure to contact suitable authorities for these requirements before working in the trench.
**KEEP SPECTATORS AWAY FROM MACHINE**

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

**WORK IN VENTILATED AREA**

Exhaust fumes can be fatal.

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

**KEEP MACHINE IN GOOD CONDITION**

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

Visually inspect the tool daily before starting.

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

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 OSHA offices.

**CLEAR WORK AREA**

Clear the work area of all objects that might interfere with the proper operation of the tool or hoses. Avoid placing tools or other objects where they can fall into the boring pit.

**HANDLING THE BORING TOOL**

To avoid back injury, use proper lifting technique. Lift with your legs - not your back!

**CHECK HARDWARE**

Ensure all airline couplings are tightened and secured to eliminate the chance of accidental uncoupling. Use hose connection retaining devices such as locking rings, clips, pins, chains, or cables.

Check the tightness of the four tailcone bolts before use. Tailcone bolts should be torqued to the correct value.

**CHECK AIR COMPRESSOR**

Be sure the air compressor is securely parked at a safe distance from the excavation pit to prevent pit cave-in. Chock the wheels to prevent the compressor from rolling or falling into the pit.

Maximum air pressure that can be delivered to the tool is 110 psi (7.6 bar). Do not exceed this pressure or damage to the tool or personal injury may result.
PRECAUTIONS DURING OPERATION

Two people are required to operate the boring tool. One person should always be outside the excavation pit and in control of the air supply to the tool in case of an emergency. The boring tool operator must monitor the tool to be sure that the air supply hose does not create an unsafe condition around the pit.

Eye protection is necessary when using the boring tool. Avoid looking into the bore hole while the boring tool is in use. High pressure exhaust can eject dirt, stones, or other materials. Be careful when blowing out the hose. Aim the hose away from yourself and other persons.

If the tool runs but does not move forward, turn off the air supply. Check to ensure tool is not in contact with a gas line, waterline, electric line, or some other underground obstruction that can be damaged or cause personal injury.

Do not override any safety controls on the tool or any support machinery.

Shut down the unit at the first sign of malfunction or hazardous condition.

Do not disconnect the air supply without first shutting off the air valve. Serious injury may result from the air under high pressure or from uncontrolled hose movement.

DURING SERVICE

Read and follow service instructions in this manual before servicing the tool.

Shut off air supply valve and disconnect air line before servicing the tool.

Use only authorized parts for repair or replacement. These replacement parts, including bolts, are specified in this manual.

Check air supply hose periodically for damage to the hose or fittings. Never use boring tool with damaged or worn air lines or fittings. This will minimize chances or air line breakage while in use.

Check and tighten loose hose clamps and clamp bolts regularly.
Do not use a torch or welder on the boring tool. Applying heat may damage critical parts of the tool. Heating parts of the tool may alter the components’ strength and result in premature failure or personal injury.

When the tailcone and rear anvil are removed, be careful when elevating the tool. The heavy striker inside the tool body may slide out.

WARNING: Failure to follow any of the preceding safety instructions or those that follow within this manual, could resulting serious injury or death. This manual is to be used only for those purposes for which it was intended as explained in this Operator’s Manual.
Section 11: Safety Decals

INSPECTING SAFETY DECALS

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 the instructions given below:

- 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 except the decal (HammerHead) located on the tool body. When attaching decals, the temperature of the mounting surface must be at least 40°F (5°C). The surface must also be clean and dry.
- When replacing a tool component with a decal attached, replace the decal also.
- Replacement decals can be purchased from your HammerHead equipment dealer.
Safety Decals

11-2 Safety Decals

Active Head Mole
WARNING
Electricity, Or Gas
Explosion Can Kill.
Locate Utilities
Call 1-888-258-0808

WARNING
Locate Utilities
Call 1-888-258-0808
The Active Head Power Port tools use pneumatic power to drive the striker inside the tool forward at a very high velocity. The striker then impacts the bit shaft at the front of the tool driving only the bit shaft forward into the soil. As the striker travels forward, ports in the rear of the striker pass by the valve opening an air passage to the front of the tool. This allows the air to be redirected and push the striker towards the rear of the tool. Before the striker has a chance to hit the rear anvil, the striker passes the ports again and redirects the air, forcing the striker forward again. The striker travels forward again striking the anvil in the nose of the tool and simultaneously driving the body forward and resetting the bit shaft.

The Power Port Valve feature of the tool provides a 1/4 turn of the air supply hose to change the direction of the tool. Before the direction of the tool is changed, the air supply to the tool must be shut off.

When the tool is placed into reverse, the valve timing is changed so that the forward stroke of the striker becomes shorter and the reverse stroke becomes longer. This allows the striker to impact the rear anvil and not the front anvil, propelling the tool in the reverse direction.
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Section 21: Controls

AIR VALVE

Position (1) (perpendicular to valve body) ................. off
Position (2) (shown) ......................................... on

Tool speed is variable; the farther the handle is turned toward (2), the faster the speed.

TOOL OILER

During operation, the oiler unit continuously lubricates the air power tool

IMPORTANT: When operating the tool for the first time, add 1/2 oz (15 cc) of oil directly to the tool whip hose to provide lubrication during start-up.

Pressure Relief

Press the red pressure relief button (1) in fill plug (2) to relieve pressure:

• at the end of each use. High-pressure air, trapped inside the oiler, will force remaining oil into the air line, draining the oiler.
• before adding oil to reservoir.
• before disconnecting hoses.

Oil - Check and Add

Step 1: Turn off air supply.
Step 2: Relieve air pressure.
Step 3: Remove fill plug (2) and check/add oil (refer to Specifications, page 60-1.)
**IMPORTANT:** Do not overfill the reservoir. The oiler requires a small air space to pressurize the oiler and force the oil into the air line. Use only recommended HammerHead Mole oil. Failure to do so may affect the performance of the internal components and void warranty.

**Oiler - Adjust**

Screw (3) (inside the oiler) controls the amount of oil supplied to the tool. Remove the fill plug and use a screwdriver to adjust the screw between 0 and 9.

- "0" ....................................................lowest rate
- "4" ....................................................lowest recommended rate
- "9" ....................................................highest rate

Adjustments are made due to changes in the air pressure and oil viscosity.

*To adjust:*

Step 1: Turn off air supply.

Step 2: Relieve air pressure.

Step 3: Remove fill plug (2) and turn adjustment screw (3) with a slotted screwdriver.

Start on “9” and lower the setting until 1–2 oz (30–60 cc) of oil per hour is supplied to the tool. At this setting, add oil every 3 to 4 hours.

**NOTE:** It may take up to an hour before a setting change is noticed in the tool.
**Rear Whip Hose**

Turning the whip hose (1) controls which direction the tool travels.

- **Clockwise** ........................................... forward travel
- **Counterclockwise** ................................. reverse travel

**IMPORTANT:** Shut off air supply to the tool before changing directions. Failure to do so will damage the valve assembly on the Active Head Power Port Tool.

**NOTE:** With the optional Quick Reverse swivel fitting, the air supply hose does not need to be disconnected.

The Power Port feature of the tools provides only a 1/4 turn to change direction from FORWARD to REVERSE or REVERSE to FORWARD.

**Vari-Pitch Level**

Use the level to set the boring angle of the tool
SAE
The right edges of the bubble indicates the slope or pitch in “inches per foot.” The dashed bubble indicates “level.” The solid bubble indicates a 1/4” per foot pitch down.

Metric
The right edge of the bubble indicates the slope or pitch in “millimeters per meter.” The dashed line bubble indicates “level.” The solid bubble indicates a 20 mm per meter pitch, down.
Section 30: Operating the Tool

CALL YOUR ONE-CALL SYSTEM FIRST

WARNING: Always contact your local One-Call system before the start of your digging project

Before you start any digging project, don’t forget to call the local One-Call system in your area and any utility company that does not subscribe to the One-Call system. For areas not represented by One-Call Systems International, contact the appropriate utility companies or national regulating authority concerned to locate and mark the underground installations. If you don’t call, you may have an accident or suffer injuries; cause interruption of services; damage the environment; or experience job delays.

The One-Call representative will notify participating utility companies of your proposed digging activities. If you are in the U.S. or Canada and do not know the number for the local One-Call representative in your area, dial the North American One-Call number, 1-888-258-0808, for this information. Utilities will then mark their underground facilities by using the following international marking codes:

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<tr>
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<tr>
<td>Blue</td>
<td>Potable Water</td>
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<td>Surveying</td>
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IMPORTANT: Be sure to review the operating and safety instructions for the air compressor and any other support equipment.
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 OSHA.

Entry and Exit Pits

The depth of the entry pit should be approximately 10 times the tool diameter.

It should be long enough to keep the service line from kinking during launch.

Dig the exit pit at the correct location, adding extra width and depth to allow for tool misalignment.

Preparing to Bore

Step 1: Determine the length of the bore.

Step 2: Starting at the tool, wrap tape over the hose every 3–6 ft (1–2 m). Do this for the length of the bore. While boring, keep track of the increments to determine the location of the tool.

Keeping track of the time will also enable you to determine how fast the tool is moving.

Step 3: Place tool at the entry pit and aim it toward the exit pit. Place level on the straight surface of the tool. Use a support under the tool to keep the tool aligned.

Consider type of soil when aligning the tool. Some soils, such as topsoil and sand will cause the tool to rise. Pitching the nose of the tool slightly downward will provide a more accurate bore. The amount of downward pitch required depends upon the soil type and length of the bore.

Note: The Active Head model is designed for use in very hard compacted soils. When using the tool in soft loose soils, it will be necessary to throttle the tool back slightly to prevent “swimming” and insure a more accurate bore.

Important: Do not allow dirt or other material into the air hose.

Step 4: Connect hose to an air compressor.

Step 5: Remove any oil or debris that may make the hose slippery.
WARNING: To prevent the hose from whipping, do not fully open the compressor valve. Be sure to aim the hose away from yourself and other persons.

Step 6: Tightly hold other end of the hose and partially open compressor valve to blow the air hose clean.

NOTE: Be careful not to lose the rubber seal inside the hose coupling when blowing debris from the hose.

Step 7: Close the compressor valve.

Step 8: Turn whip hose (1) clockwise to FORWARD.

Step 9: Ensure air valve control handle is OFF.

Step 10: Fill oiler with HammerHead Mole oil (refer to the Controls section, “Tool Oiler,” page 21-1).

Step 11: Connect air supply hose to the oiler and the supply hose to the tool.

To avoid accidental uncoupling, tighten all hose locking collars against fittings or install any hose fitting retaining devices such as lock rings, clips, pins, chains, or cables.

BORING

Step 1: Fully open air supply valve to start the striker moving. Do this quickly, then slow it down. This will make it easier to control the tool and start the bore.

NOTE: Launching the tool at reduced power provides time for the operator to accurately aim the tool.

Step 2: Stop tool periodically as it enters the ground. Use a bubble level or aiming site to check the grade and aim. Adjust the direction of the tool if necessary.

Step 3: When the tool reaches the exit pit, shut it OFF.

If the tool does not reach the exit pit at the length marked off on the air hose:
Step 4: Turn air down so that the tool is barely running.
Step 5: Locate tool by sound and vibration.

**NOTE:** The Active Head Power Port Tool does not have a NEUTRAL position. The tool will be either in FOREWARD or REVERSE.

**REVERSING DIRECTION**

CAUTION: Do not attempt to change direction of the tool without first shutting off the air supply to the tool. Attempting to do so will damage the internal valve of the tool.

Reverse direction of the tool if it becomes stuck or deflected off course.

*To reverse direction:*

Step 1: Shut tool OFF.
Step 2: Disconnect air supply hose from the oiler.

**NOTE:** With the optional Quick Reverse swivel, the air supply hose does not need to be disconnected.
Step 3: Turn hose approximately 1/4 turn counterclockwise to the REVERSE position.

**NOTE:** It may be necessary to turn hose up to 1 full revolution to compensate for the flexibility of the hose.
Step 4: Clean connectors, then reconnect air supply hose.
Step 5: Turn tool ON.
Step 6: During operation, be sure tool stays in REVERSE by checking that the air supply hose is turned fully counterclockwise.
Step 7: Pull air supply hose as the tool is reversing. This will prevent the tool from backing over the air supply hose.
**IMPORTANT:** Use extra care when piercing in unstable soils, gravel, sand, or under trees. The tool cable should be used in these conditions because the probability of the bore path collapsing or tool oscillating is increased.

Prior to piercing in unstable conditions, connect tool cable to the back of the tool, then attach ample cable or chain to the tool cable to reach across the entire length of the shot. When reversing in these conditions, use cable or chain to assist in pulling the tool back.

**AFTER THE BORE**
Disconnected air hose from the tool and remove the tool from the exit pit. Cap inlet fitting or cover it with tape to prevent dirt and sand from entering the tool.

**ACCESSORIES**

**Tool Cable**

The tool cable provides additional versatility. It is attached to the tool through an exhaust port and allows the operator to pull a cable, chain, or pulling carrot with the tool. It can be used in combination with the pilot to pull plastic pipe through the bore.
Pulling Carrots

Pulling carrots provide a simple method of installing small plastic pipe (maximum diameter 1-1/4” or 32 mm). This accessory threads into the inside diameter of the pipe. The pipe can then be pulled into place by attaching the carrot to the tool cable, or by pulling it back with the air hose after the bore has been completed.

Pneumatic Fitting with Eyebolt

The pneumatic fitting with eyebolt allows the air hose to be used for feeding cable or chain through the bore or for feeding cable through plastic pipe.

Pulling Chain Assembly - 50 ft (15 m)

The pulling chain assembly is used in combination with the tensioner frame when pulling in plastic behind the tool. It can also be used as a safety precaution when piercing in unstable conditions.
Clevis Nut

The clevis nut is used when pulling in plastic pipe behind the tool. It takes the place of the eye nut on the pulling cable and connects the pulling chain to the tool cable.

Eye Nut

The eye nut connects the tool cable to the pulling chain when using the pulling chain as a safety precaution.

Pipe Pilot

The female pipe pilot is used for positive location of the plastic pipe. The pipe slips into the tailcone, which along with the tensioner frame, keeps the pipe coupled to the tool.
3/16” (5 mm) Quick Links

These are used to connect a pulling chain to the pneumatic fitting with eyebolt or to connect the pulling chain to the tool cable.

Tap Puller - 2” Gas Line (Polyethylene)

This accessory is used to pull 2” (50 mm) gas line behind the tool. It replaces the tailcone, and threads into the inside diameter of the plastic gas line. Threads are actually cut into the plastic which eliminates the need for a tensioner frame and pulling cables when pulling in service behind the tool.

NOTE: Special Tailbolts (P/N 218345001) must be used with this puller.
Pipe Puller - Die

This accessory replaces the tailcone, and threads over the outside diameter of the plastic pipe. This threading will hold the pipe secure to the tool which will be pulled behind the tool when piercing.

Tensioner Frame

This accessory is used when pulling in plastic pipe behind the tool. Used with a pipe pilot, the tensioner frame will hold the plastic pipe secure to the back of the tool.

Replaceable Head Options

NOTE: Active Head HammerHead Moles will not accept these replaceable heads, nor can they be modified to use them.
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Section 40: Maintenance - 30 Service Hours

**STRIKER WEAR RINGS - CHECK**

**VALVE WEAR RING - CHECK**

Instructions for checking the wear rings are included in the the *Maintenance - 150 Service Hours or Yearly* section.

- Follow instructions in “A. Disassemble,” page 41-1.
- Proceed to “B. Striker - Inspect (All Tools),” page 41-3, and “C. Valve - Inspect,” page 41-5, instructions to check the wear rings and O-rings.
- Follow applicable instructions in “H. Active Head Tool - Assemble,” page 41-16.
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A. DISASSEMBLE

Screw Reverse - 3” Mole

Step 1: Thoroughly clean the tool.

Step 2: Place the tool on a clean surface. Lay it flat or with the nose down slightly to prevent the striker from falling out when the inner assembly is removed.

IMPORTANT: Failure to use two wrenches when removing the rear whip hose can result in internal damage to the adjuster screw.

Step 3: Turn the rear whip hose (1) fully counterclockwise to REVERSE. Use two wrenches to remove the external hose; one to hold fitting (2) and one to turn hose fitting (3). Plug fittings to prevent debris from entering the hoses.

Step 4: Use a 3/8” (9.5 mm) 12-point socket to loosen each bolt (4) five or six turns.

Step 5: Rotate the tailcone counterclockwise to unthread the inner assembly from the body. It will take approximately 30 full turns.

Step 6: Remove the inner assembly (5) from the body.

Step 7: Tip the body and remove the striker (6). Be careful not to damage the body threads.
Power Port - 1-3/4" Mole

Step 1: Thoroughly clean the tool.

Step 2: Loosen tailcone (1) using a 1-1/2" open end wrench.

Step 3: Continue turning the tailcone (1) counterclockwise until:
   a. the internal assembly unthreads from the body, or
   b. the rear anvil unthreads from the body.

Step 4: If internal assembly unthreads from the body:
   a. Remove inner assembly (2) from the body.
   b. Secure tailcone (1). Using a 1-5/8" open end wrench, remove the rear anvil (3) from the tailcone (1).
   c. Tip the body and remove the striker. Be careful not to damage the body threads.
   d. Proceed to “B. Striker - Inspect (All Tools),” page 41-3.
Step 5: If the tailcone unthreads from the rear anvil:
   a. Remove tailcone (1).
   b. Loosen rear anvil (3) using a 1-5/8" open end wrench.
   c. Remove inner assembly from the body.
   d. Tip the body and remove striker (4). Be careful not to damage the body threads.
   e. Proceed to “B. Striker - Inspect (All Tools),” page 41-3.

B. STRIKER - INSPECT (ALL TOOLS)

Step 1: Inspect the front (1) and rear impact surfaces of the striker. If more than 50% of either surface is heavily chipped or cracked, replace the striker.
Step 2: Check striker ring wear with a straightedge. If there is no space between the straightedge and the wear pad, replace rings.

To replace ring:

a. Clean ring groove (2).

b. Oil all surfaces of the ring with HammerHead Mole Oil.

c. Install ring (3). If the ring is overexpanded, take ring off, overlap ends to make a tighter diameter, and then reinstall.

**NOTE:** The striker wear pads have been designed so the tool will operate with worn-out rings. Although the tool will run, steel to steel contact will result in increased friction and internal wear, as well as shorten body and striker life.

Step 3: Check end gap (4) of each ring with the ring fully seated in the striker ring groove. The gap should be .080 – .100" (2.0 – 2.5 mm). If it is less, remove ring and trim enough off one end to ensure the proper gap.

**IMPORTANT:** Wear rings should be checked after the first 30 hours of use, first clean the ring and ring groove. Check ring gap and wear.

Step 4: Use a flashlight to inspect the striker valve bore for rust, debris, and burrs. If needed, clean the bore with a soft abrasive, such as a Scotch Brite scouring pad on a drill extension.

**IMPORTANT:** The use of hard abrasives, such as a wire brush or emery cloth, can damage the bore by removing metal, creating a rough surface.
Step 5: Inspect bore again for burrs. Burrs and nicks can accelerate valve skirt wear. If burrs are still there, replace striker.

Step 6: Check valve bore of the striker with a snap gauge. Take measurements 2” (5 cm) into the bore at the 12 o’clock and 3 o’clock positions. Replacement of the striker will improve performance if the average bore diameter is more than:

- 1.52” (38.6 mm) for the 3” Screw Reverse Mole
- 1.58” (40.1 mm) for the 3” Power Port Mole
- 1.459” (37 mm) for the 2-1/2” Mole
- 1.145” (29.1 mm) for the 2” Screw Reverse Mole
- 1.17” (29.7 mm) for the 2” Power Port Mole
- 1.020” (25.9 mm) for the 1-3/4” Mole

C. VALVE - INSPECT

Screw Reverse Valve

Step 1: Remove valve ring (1) by expanding it and sliding it over the end of the valve.

Step 2: Check for sand embedded in the ring. If you find any, replace ring.

Step 3: The inside surface has a groove designed to collect debris. Remove all debris or particles from the ring.

Step 4: Check rings for scratches. Light scratching on the ring is acceptable. Replace a heavily scratched or scored ring.
To replace a ring:

a. Clean the ring grooves (2).

b. Oil all surfaces of the ring with HammerHead Mole Oil.

c. Install rings. If rings are overexpanded, take ring off, overlap ends to make a tighter diameter, and the reinstall.

Step 5: Check valve ring wear with a straightedge. If there isn’t any space between the straightedge and the front edge (Inset A), replace the ring.
Step 6:  Check valve ring end gap with the ring fully seated in the ring groove. The gap should be .060 – .080” (1.5 – 2.0 mm) for both 3” and 2-1/2” Moles. If it is less, remove ring and trim enough off one end to get the proper gap.

IMPORTANT: Valve ring wear should be checked initially after 30 hours of use. First clean the ring and ring groove. Check ring gap and wear. The 3” Power Port and 2” Power Port valves have solid rings; valve ring gaps do not apply to these valves.

Step 7:  Install a new valve ring and check valve ring groove width. Measure gap between the ring and groove. If it is more than .050” (1.25 mm), replace valve.

NOTE: Valve groove wear will accelerate if the tool is dirty or without oil, or if the valve ring does not have the correct end gap.

Step 8:  Measure valve skirt wear. Replace a valve with a diameter less than:

- 1.49” (37.8 mm) for the 3” Mole
- 1.090” (27.7 mm) for the 2-1/2” Mole
- 1.105” (26.6 mm) for the 2” Mole

To remove the valve:

IMPORTANT: The valve (3) is covered with a hard ceramic coating. Be careful not to chip the coating.

a. Slip a piece of hose over the valve or wrap valve in a cloth to prevent damaging the valve surface.

b. Secure valve (3) in a vise.

c. Remove retainer (4) using 7/16” hex key.

d. Turn hose (5) clockwise to remove it from the valve.
Power Port Valve

Step 1: Remove valve ring (1) by expanding it and sliding it over the end of the valve (2).

Step 2: Check for sand embedded in the ring. If you find any, replace ring.

Step 3: The inside surface has a groove designed to collect debris. Remove all debris or particles from the ring.

Step 4: Check ring for scratches. Light scratching on the ring is acceptable. Replace a heavily scratched or scored ring.

To replace a valve ring:

a. Clean ring groove (3).

b. Oil all surfaces of the ring with HammerHead Mole Oil.

c. Install rings. If the rings are overexpanded, take ring off, overlap ends to make a tighter diameter, and then reinstall.

Step 5: Remove valve O-ring (4) by stretching it and sliding it over the end of the valve (2).

NOTE: Steps 6 and 7 only pertain to the 1-3/4” Power Port valve.

Step 6: Check O-ring for cuts or tearing. Replace if cut or torn.

To replace an O-ring:

a. Clean ring groove (5).

b. Oil all surfaces with HammerHead Mole oil.

c. Install O-ring.

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Active Head Mole
Step 7: Check valve ring wear with a straightedge. If there isn’t any space between the straightedge and the front edge (**Inset A**), replace ring.

Step 8: Check valve ring end gap with the ring fully seated in the ring groove. The gap should be .060 – .080” (1.5 – 2.0 mm). If it is less, remove ring and trim enough off one end to get the proper gap.

**IMPORTANT:** Valve ring wear should be checked initially after 30 hours of use. First clean the ring and ring groove. Check ring gap and wear.

Step 9: Install a new valve ring and check valve ring groove width. Measure gap between the ring and groove. If it is more than .050” (1.25 mm), replace valve.

**NOTE:** Valve groove wear will accelerate if the tool is run dirty or without oil, or if the valve ring does not have the correct end gap.
Step 10: Measure valve skirt wear. Replace a valve with a diameter less than:
- 1.52" (38.6 mm) for the 3" tool
- 1.40" (35.5 mm) for the 2-1/2" tool
- 1.11" (28.2 mm) for the 2" tool
- .965" (24.5 mm) Power Port Moles

To remove the valve:

a. Use the following hex keys to remove the control stud (4).
   - 5/32" for the 1-3/4" and 2" Moles
   - 9/64" for the 2-1/2" and 3" Moles
b. Pull valve (5) off control sleeve.

**D. CONTROL STEM AND ISOLATOR - INSPECT**

Step 1: Slide rear anvil (1) off isolator halves (2).
Step 2: Remove isolator halves.
Step 3: Inspect grooves (3) in isolator halves. If the material is torn, replace isolator halves.

Step 4: Slide control sleeve (4) over control stem (5).

**NOTE:** Step 5 only applies to the 1-3/4” Power Port Mole.

Step 5: Slide isolator retaining disc (6) over control stem (5).

Step 6: Inspect stop (7). Contact ends should be flat. Replace control stem if stop is rounded.

Step 7: Inspect lands (8). They should be flat on top. If lands are worn, replace control stem.
E. **REAR ANVIL - INSPECT**

   Step 1: Inspect the face (1) which contacts the striker. If more than 50% of the surface is heavily chipped or cracked, replace anvil.

   Step 2: Thoroughly clean rear anvil. Use an approved air nozzle and carefully blow out air ports and bore.

F. **ACTIVE HEAD - INSPECT**

   Step 1: Remove front head assembly by using two wrenches on the front and rear heads as shown

   **NOTE:** An Active Head Tooling Kit (P/N 296253107) is available from your HammerHead dealer.
Step 2: Un螺丝 the front head assembly completely, then unscrew the rear head (1). It may be necessary to use a punch or screwdriver in the hole of the bit shaft or an Allen wrench in the front face of the bit shaft (2) to prevent the bit shaft from turning.

Step 3: Remove the rear head assembly, being careful not to damage the head seal ring (3). Inspect the ring for nicks, cuts, and wear. The ring should protrude above the body slightly. If it does not, replace the ring (refer to Step 5).

Step 4: Once the rear head assembly is removed, remove the bit shaft (4) by pushing it into the body and removing it from the other end of the body.

Step 5: If the rear head ring is damaged, remove the ring. It may be necessary to cut the ring to remove it. Slide the new ring over the front of the tool and allow it to seat in the slot (5).

**NOTE:** The head ring seal is a continuous ring. **Do not cut the ring to install.** It will be necessary to place a hose clamp (6) over the ring, once installed, to compress the ring back to its normal size.
Step 6: After removing the bit shaft, inspect bit shaft ring for nicks, cuts, and wear. The ring should protrude above the bit shaft for proper protection. If it is necessary to replace the ring, remove ring by cutting it off.

Step 7: Slide new ring (7) over the threaded end of the bit shaft (8) and into the groove near the back of the shaft (not shown). The ring is a continuous hoop and will expand as it is slid over the bit shaft.

**NOTE:** It will be necessary to compress the ring back to its normal shape by placing a hose clamp (9) over the ring and tightening the hose clamp.

### G. ACTIVE HEAD - ASSEMBLE

Step 1: Coat bit shaft with a light coating of anti-seize. Slide bit shaft down the rear of the body, threaded end first, toward the nose of the tool. Grab bit shaft and pull it through the front anvil.

Step 2: Apply anti-seize to the threads of the rear head and inside rear of the assembly. Install it onto the bit shaft. It may be necessary to hold the bit shaft from turning by using a punch or screwdriver inserted through the hole in the nose of the bit shaft or a hex wrench in the front face of the bit shaft.
Step 3: Screw rear head onto the bit shaft until it bottoms out. A light coat of anti-seize on the head seal ring will aid in sliding the rear head over the ring.

Step 4: Coat threads of the front head and the mating surfaces of the rear and front heads. Tighten front head until it bottoms, then torque rear head to the front according to the chart below.

NOTE: On the 1-3/4” Mole, bottom rear head onto the bit shaft. Hold front head and tighten rear head to the front head until proper gap is obtained. On the 2”, 2-1/2” and 3” Active Head Moles, bottom rear head, then tighten front head to the rear.

<table>
<thead>
<tr>
<th>Tool Size</th>
<th>Head Torque</th>
<th>Head Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Back</td>
</tr>
<tr>
<td>1-3/4” (45 mm)</td>
<td>270 ft-lb (366 Nm)</td>
<td>.030” (.75 mm)</td>
</tr>
<tr>
<td>2” (50 mm)</td>
<td>300 ft-lb (407 Nm)</td>
<td>.060” (1.5 mm)</td>
</tr>
<tr>
<td>2-1/2” (65 mm)</td>
<td>500-ft-lb (680 Nm)</td>
<td>.030” (.75 mm)</td>
</tr>
<tr>
<td>3” (76 mm)</td>
<td>500-ft-lb (680 Nm)</td>
<td>.020” (.5 mm)</td>
</tr>
</tbody>
</table>
H. ACTIVE HEAD TOOL - ASSEMBLE

Screw Reverse

Step 1: Using anti-seize or grease, lubricate rear anvil inner threads.
Step 2: Thread valve end hose whip (2) into rear anvil (1).

**IMPORTANT:** The valve (3) is covered with a hard ceramic coating. Be careful not to chip the coating.

Step 3: Slip a piece of hose over the valve or wrap the valve in a cloth to prevent damaging the valve surface.
Step 4: Secure valve (3) in a vise.
Step 5: Turn hose (4) counterclockwise into the valve until the hose stops against the shoulder inside the valve bore.
Step 6: Lubricate inside of the hose and valve retainer (5) with HammerHead Mole oil.
Step 7: Install valve retainer and torque to 60 ft-lb (82 Nm) on both the 3” and 2-1/2” Moles.
Step 8: Turn valve assembly fully clockwise against the stops.
Step 9: Check valve assembly's overall length. A longer measurement than shown indicates the valve has not been threaded far enough onto the hose.

Step 10: Check for full range of motion in adjustment thread.

Step 11: With the rear anvil/hose whip assembly adjusted to full forward position, test fit the valve into the striker bore. The valve should slide freely in the striker until the rear anvil (6) contacts the striker (7).

Step 12: Rotate valve end hose whip fully counterclockwise.
Step 13: Place tailcone (8) over valve end hose whip.
Step 14: Inspect surface of the rear hose whip (9). Replace a torn or peeling hose whip to prevent reversing problems.
Step 15: Install and tighten rear hose whip to 60 ft-lb (82 Nm).
Step 16: Clean body bore thoroughly. Oil inside of the body and striker.

Step 17: With the tool body horizontal or slightly nose down, carefully slide the striker into the body. The tapered end of the striker (10) goes into the body first.

Step 18: Coat rear anvil's external threads (11) with anti-seize or grease lubricant.
Step 19: Slide inner assembly into the striker. Be careful not to cross-thread the rear anvil into the body. Tighten rear anvil until it bottoms against the body, then loosen it 1/8 turn. Do not apply torque to the rear anvil for the 3” Mole. For the 2-1/2” Mole, tighten rear anvil until it bottoms against the body. Do not apply torque or loosen anvil as in the 3” Mole.

IMPORTANT: Install new bolts when assembling the tailcone. The tail bolts or engineered and specially designed for the HammerHead Mole. Do not substitute other types of bolts.
Step 20: Coat threads of the tailbolts (12) with anti-seize or grease. Start tightening bolts.

**IMPORTANT:** Do not tighten the tailbolts with the hose whip in the reverse adjustment position. The tailcone and whip hose adjuster screw will be damaged.

Step 21: Check that hose whip is rotated fully clockwise (FORWARD).

Step 22: Use a cross pattern sequence and tighten all tailbolts:
- 35 ft-lb (47 Nm) for the 3” Mole
- 28 ft-lb (38 Nm) for the 2-1/2” Mole

Step 23: Check that tool freely shifts from FORWARD to REVERSE.

Step 24: Place adjuster screw in the forward position.

Step 25: Tip tool back and forth. The striker should slide easily and freely and contact anvils when the body is tipped from horizontal to approximately 22°.

**Power Port Reverse - 1-3/4” Mole**

Step 1: Using anti-seize, lubricate entire control stem (1).

Step 2: Slide isolator retaining disk (2) over the tapered end of the control stem (1), ensuring stop on the control stem is aligned with the space on the isolator retaining disk.
Step 3: Install isolator halves (3) onto the control stem (4) ensuring alignment between exhaust ports in isolator retaining disk (5) and isolator half (3).

Step 4: Install control sleeve over the control stem and onto key in isolator half. Verify exhaust port alignment between isolator halves (3) and isolator retaining disk (5).
Step 5: With keyways in rear anvil (6) and isolator halves (3) aligned, slide rear anvil (6) over control sleeve and onto isolator halves.

Step 6: Align tabs on isolator retaining disk (5) with slots in rear anvil (6).

NOTE: There should be a gap of .100 – .120″ (2.5 – 3 mm) between the isolator retaining disk (5) and the rear anvil (6).
Step 7: Install tailcone (7). Secure tailcone and tighten rear anvil (2) to 20 ft-lb (27 Nm) with a 1-5/8” wrench.

**IMPORTANT:** Failure to torque rear anvil properly will damage isolator retaining disk and lead to improper FORWARD/REVERSE adjustment as well as lead to premature isolator failure.

Step 8: Install valve (8) over the control stem, aligning key in valve with keyway on control sleeve (9). Install control stud (10) into control stem and tighten to 50 in-lb (5.6 Nm).

Step 9: Turn valve assembly clockwise against the stop.
Step 10: Seat valve on control stem by compressing control sleeve - push on the end of the valve until the control stud is located in the detent as shown.

**IMPORTANT:** Valve must be seated on control stem to obtain accurate measurement.

Step 11: With the valve seated on the control stem, check valve assembly’s overall length.

Step 12: Test fit the valve in the striker bore. The valve should slide freely into the striker until the rear anvil (6) contacts the striker (11). If it does not, determine reason for the obstruction before assembling the tool.
Step 13: Inspect surface of the rear hose whip (12) to prevent reversing problems, replace a torn or peeling hose whip.

Step 14: If necessary, install and tighten rear hose whip to 30 ft-lb (41 Nm).

**IMPORTANT:** The external hose whip must be assembled into the control stem before assembling the isolator and isolator disk on the 1-3/4” tool.

Step 15: Clean body bore thoroughly. Oil inside of body and striker.

Step 16: With tool body horizontal or slightly nose down, carefully slide striker into body. The end (13) with slots goes into body first.
Step 17: Coat rear anvils’s external threads (14) with anti-seize or grease.

Step 18: Slide inner assembly into the striker. Be careful not to cross-thread rear anvil into body.

Step 19: Tighten tailcone to 175 ft-lb (235 Nm).

Step 20: Check that the tool freely shifts from FORWARD to REVERSE.

Step 21: Tip the tool back and forth. The striker should slide easily and contact the anvils when the body is tipped from horizontal to approximately 22°.

**Power Port Reverse - 2”, 2-1/2” and 3” Mole**

Step 1: Using anti-seize, lubricate entire control stem (1).

Step 2: Slide isolator halves (2) onto control stem.

Step 3: Install isolator halves into rear anvil (3). Ensure exhaust ports are not blocked and screw holes line up.
Step 4: Install tailcone (4) onto rear anvil (3) with four new tailbolts (5). Tailbolts should only be finger-tight at this time.

Step 5: Install control sleeve (6) over control stem. Align slots in sleeve with keys in rear anvil.

Step 6: Install valve rings (7) on valve (8).

Step 7: Install valve (8) over control stem (1), aligning keys in valve with keyways in control sleeve (6).

Step 8: Ensure tapped hole is visible through slot in valve; install control stud (9) into control stem and tighten it to 50 in-lb (5.6 Nm) for the 2 and 2-1/2” tools and 65 in-lb (7.3 Nm) for the 3” tool.

Step 9: Turn valve assembly clockwise against the stop.

Step 10: Seat valve on control stem by compressing control sleeve - push on the end of the valve until the control stud is located in the detent as shown.

**IMPORTANT:** Valve must be seated on control stem to obtain an accurate measurement.

Step 11: With the valve seated on the control stem, check the valve assembly’s overall length.

The 1-3/4” Tool is 10-11/16” (271mm), 2” is 10-15/16 (278mm), 2-1/2 is 11-11/16” (297mm), and the 3” is 11-25/32 (299mm). All measurements are +/- 1/16” (0.8mm).
Step 12: Test fit the valve in the striker bore. The valve should slide freely into the striker until the rear anvil contacts the striker (10). If it does not, determine reason for the obstruction before assembling the tool.

Step 13: Clean bore body thoroughly. Oil inside of the body and striker.

Step 14: With tool body horizontal or slightly nose down, carefully slide striker into body. The end (11) with slots goes into the body first.

Step 15: Coat rear anvil’s external threads (12) with anti-seize or grease.

Step 16: Slide inner assembly into the striker. Be careful not to cross-thread rear anvil into the body. **Turn the rear anvil clockwise until bottomed against the body, hand-tight only. Do not apply torque to the rear anvil.**

Step 17: Secure tool in a chain vise to prevent tool from turning.

Step 18: Tighten tailbolts in a cross pattern to 12 ft-lb (16.2 Nm) for the 2” Mole, 28 ft-lb (38 Nm) for the 2-1/2” Mole and 35 ft-lb (48 Nm) for the 3” Mole.

Step 19: Inspect surface of the rear hose whip (13) to prevent reversing problems, replace a torn or peeling hose whip.

Step 20: Install and tighten rear hose whip to 30 ft-lb (41 Nm) on the 2” tool and 45 ft-lb (62 Nm) for the 2-1/2” and 3” tools.
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Section 50: Maintenance -As Required

Storage

Pour 1 oz (30 cc) of HammerHead Mole Anti-Rust storage oil into the air line. Oil should be added with the tool’s nose down.

Wait 30 seconds for the oil to get into the tool. Tip tool back and forth 20 to 30 times while rotating the tool to disperse the oil. Tape or cap tool whip hose to prevent dirt and sand from entering the tool.
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Section 51: Troubleshooting

**Tool Will Not Start**

Step 1: Check compressor for proper air output (90 – 110 psi or 620 – 760 kPa). Improper or low air pressure setting can cause starting problems.

Step 2: Check that full pressure air is available at the tool and hoses and fittings are of the proper diameter.

**WARNING:** High pressure air can forcefully eject dirt or other materials. Be careful when blowing out the hose. Aim hose away from yourself and other persons.

Step 3: Follow these restart procedures while tool is in the ground:
   a. Remove air supply hose from the oiler to the tool and inject 1/2 oz of oil directly into the hose.
   b. Turn air supply hose into REVERSE if in FORWARD, or into FORWARD if in REVERSE.
   c. Connect supply line to the oiler and snap open air control valve.
   d. If the tool does not start, repeat Steps a, b, c.

Step 4: Take tool apart and clean it (refer to *Maintenance - 150 Service Hours or Yearly, page 41-1*).

Step 5: Check that internal control stem and external whip hose are free from obstruction.

Step 6: If the tool fails to start after the above steps have been performed, return tool to your HammerHead dealer for inspection.
**Tool Will Not Reverse Direction**

Rotate air hose fully clockwise to FORWARD and then rotate air hose fully counterclockwise back to REVERSE.

**Note:** The Power Port feature of the tool requires air supply to the tool be shut off completely before attempting to reverse the tool.

1. If air supply hose will not turn into the REVERSE position while in the ground, the tunnel may have collapsed on the air supply hose. Turn air supply hose counterclockwise while tool is running. The impact action of the tool will help loosen a stuck supply line. This should only be done to free up the air line. The tool will not be able to be turned into REVERSE while the tool is running.

2. Reversing in unstable soil conditions, such as gravel, sand, under trees or watery slick clays, may cause a tool to oscillate or “swim”. A reciprocating hose indicates tool may be swimming. Reduce air flow at the control valve until traction is regained.

**Important:** Ensure all air line couplings are tight and lock collars in place so they don’t come loose while reversing.

3. Check air supply lines for possible obstructions.

**Tool Runs But Will Not Move in Hole**

**Step 1:** Check to see if hose is in FORWARD.

**Step 2:** If tool is oscillating back and forth, partially reduce air flow at the oiler valve. Soft or wet ground conditions can cause a tool to lose traction and oscillate.

**Step 3:** Put a mark on the hose for reference to determine if the tool is moving or has hit an obstruction. The Screw Reverse Moles allow you to maximize impact force by rotating the hose counterclockwise 2 to 3 turns until the tone of the impact changes. Turning the hose in the clockwise (FORWARD) direction slightly, until this tone is gone, will provide the most impact force available to break through an obstruction.

**Step 4:** If tool is unable to break through, reverse tool and start a new hole away from the obstruction.
**IMPORTANT:** When shooting a new bore, the operator should move over a distance of 10 times the diameter of the tool or the tool may cross into the other bore.

**TOOL CYCLES FAST AND SEEMS LOW ON POWER**

1. Check valve assembly overall length, an excessively short dimension will cause “fast” cycling with poor progress. Striker stroke is controlled by the valve overall length (refer to the *Maintenance - 150 Service Hours or Yearly* section, “H. Active Head Tool - Assemble,” page 41-16).

2. Soil conditions are important to tool operation. Dry soil may slow a tool’s progress. Wet soil will reduce body friction allowing the tool to oscillate, lose traction, or swim. Avoid losing traction by reducing air flow at the control valve during the entire operation.

**TOOL SLOWS DOWN DURING LONG BORES**

1. Perform striker tip test as follows: The striker should slide from front to back when the body is tipped from horizontal to approximately 22°. A tool with high striker friction may have ingested dirt and should be taken apart before being shot again.

2. The tunnel behind the tool may have collapsed, restricting air flow.

**TOOL RUNS BUT IS LOW ON POWER**

- **Step 1:** Check compressor for proper air output and pressure.
- **Step 2:** Check that tool is using oil (Refer to *Controls, page 21-1*).
- **Step 3:** Turn or adjust tool air service line while the tool is moving forward or reversing.
- **Step 4:** Check that supply lines and fittings are properly sized (refer to *Specifications, page 60-1*).
- **Step 5:** Perform striker tip test (see above).
- **Step 6:** Check valve assembly overall length (refer to the *Maintenance - 150 Service Hours or Yearly* section, “H. Active Head Tool - Assemble,” page 41-16).
Step 7: Check valve ring end gap (Refer to the Maintenance - 150 Service Hours or Yearly section, “C. Valve - Inspect,” page 41-5.

**Valve Whip Hose Will Not Thread Into Rear Anvil**

Step 1: Check adjuster screw for damage, burr, or nicks.

Step 2: If screw threads easily except for the last two threads, these threads may be bent. Bent threads are caused by improper rear anvil assembly (refer to the Maintenance - 150 Service Hours or Yearly section, “H. Active Head Tool - Assemble,” page 41-16).
Section 60: Specifications

Lubricants

HammerHead Mole Summer Oil

Summer oil with a zinc and paraffin hydraulic air line additive to reduce friction and inhibit rust (SAE-10W/ISO-22) is recommended for most applications.

HammerHead Mole Winter Oil

Winter oil contains a fully synthetic base of isopropyl alcohol and additives that reduce corrosion, evaporation, and make it compatible with summer oil. Winter oil at full strength will prevent freeze up at temperatures as low as -10°F (-23°C) (ISO-46).

HammerHead Mole Anti-Rust Oil

Anti-Rust oil is a paraffin-based product that contains additives to inhibit rust and corrosion (SAE 20W/ISO 68). It is recommended during maintenance or between jobs.
## GENERAL SPECIFICATIONS

<table>
<thead>
<tr>
<th></th>
<th>1-3/4 AH PP</th>
<th>2 AH PP</th>
<th>2-1/2 AH SR</th>
<th>2-1/2 AH PP</th>
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<td>47.5&quot; (120 cm)</td>
<td>47.5&quot; (120 cm)</td>
<td>51&quot; (130 cm)</td>
<td>52-1/2&quot; 133 cm</td>
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<td>WEIGHT</td>
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<td>32 cfm/.9 m³/min</td>
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<td>Via 4 Tailbolts</td>
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### PVC Pipe Type 1 Schedule 40 NSF

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<th>AVERAGE I.D.</th>
<th>NOMINAL WT./FT. TYPE I</th>
<th>BELL OR CONNECTING SLEEVE MIN. O.D.</th>
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<td>.857</td>
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<td>.161</td>
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## PVC Pipe Type 1 Schedule 40 NSF (Continued)

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<tr>
<th>Nominal Pipe Size (Inches)</th>
<th>O.D.</th>
<th>Average I.D.</th>
<th>Nominal WT./FT. Type I</th>
<th>Bell or Connecting Sleeve Min. O.D.</th>
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<tbody>
<tr>
<td>8</td>
<td>8.625</td>
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<td>11.810</td>
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</tbody>
</table>

(Please note: Continuation of the table is not shown in the provided text.)
Section 65: 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.

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

<table>
<thead>
<tr>
<th>Size</th>
<th>New Fittings</th>
<th>Loose Fittings</th>
</tr>
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<tbody>
<tr>
<td>#4 (1/4”)</td>
<td>2 to 2-1/2</td>
<td>3/4 to 1</td>
</tr>
<tr>
<td>#6 (3/8”)</td>
<td>2 to 2-1/4</td>
<td>1</td>
</tr>
<tr>
<td>#8 (1/2”)</td>
<td>1-1/2 to 1-3/4</td>
<td>1</td>
</tr>
<tr>
<td>#10 (5/8”)</td>
<td>1-1/2 to 1-3/4</td>
<td>3/4</td>
</tr>
<tr>
<td>#12 (3/4”)</td>
<td>1-1/2</td>
<td>3/4</td>
</tr>
<tr>
<td>#14 (7/8”)</td>
<td>2</td>
<td>1-1/4</td>
</tr>
<tr>
<td>#16 (1”)</td>
<td>1-1/4 to 1 1/2</td>
<td>3/4 to 1</td>
</tr>
<tr>
<td>#20 (1-1/4”)</td>
<td>1 1/2</td>
<td>3/4 to 1</td>
</tr>
<tr>
<td>#24 (1-1/2”)</td>
<td>1 1/4 to 1 1/2</td>
<td>1 to 1 1/4</td>
</tr>
<tr>
<td>#32 (2”)</td>
<td>1 1/4</td>
<td>3/4 to 1</td>
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# 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.

<table>
<thead>
<tr>
<th>Bolt Size</th>
<th>Grade 2</th>
<th>Grade 5</th>
<th>Grade 8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ft-Lb</td>
<td>Nm</td>
<td>Ft-Lb</td>
</tr>
<tr>
<td>1/4” -20 NC</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>1/4” -28 NF</td>
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<td>6</td>
<td>8</td>
</tr>
<tr>
<td>5/16” -18 NC</td>
<td>9</td>
<td>12</td>
<td>13</td>
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<td>5/16” -24 NF</td>
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<td>15</td>
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<td>3/8” -16 NC</td>
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<td>25</td>
</tr>
<tr>
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<td>30</td>
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<td>7/16” -14 NC</td>
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<td>60</td>
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<td>1/2” -20 NF</td>
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<td>60</td>
<td>70</td>
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<td>9/16” -12 NC</td>
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<td>Grade 2</td>
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<td>1 1/2&quot; -12 NF</td>
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### Torque Values for Metric Grade 5.8, 6.9, 8.8, 10.9, & 12.9 Cap Screws and Bolts

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<th>Grade 6.9</th>
<th>Grade 8.8</th>
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