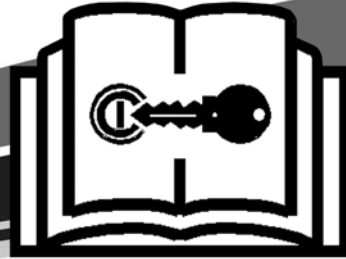


Pneumatic Piercing Tools

2" (51 mm), 2-1/2" (63.5 mm), 3" (76 mm), 4" (102 mm)

Operator's and Maintenance Manual



VPT200_VPT250_VPT300_VPT400_o-m1_00

VPT200 Serial No. 110001 -

VPT250 Serial No. 210001 -

VPT300 Serial No. 310001 -

VPT400 Serial No. 410001 -

Order No. 105400CA1

McLAUGHLIN[®]

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 McLaughlin 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.

McLaughlin 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.

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

NOTICE TO OWNER

You are requested to notify Vermeer Corporation when you have purchased a **used** machine. Notify the Customer Data Department by telephone: 800-829-0051 or 641-628-3141; email: customerdata@vermeer.com; internet: www.vermeer.com or www.vermeerag.com; or letter: Customer Data Dept., Vermeer Corporation, PO Box 200, Pella IA 50219 USA. Upon request, an owner of a used Vermeer machine will receive one free set of Operator's, Maintenance and Parts manuals.

TRADEMARKS

VERMEER and **VERMEER** Logo are trademarks of Vermeer Manufacturing Company.
MCLAUGHLIN is a trademark of McLaughlin Group, Inc.

McLAUGHLIN LIMITED WARRANTY

The Manufacturer warrants its product to be free from defects in material and workmanship for a period of twelve months from the date of shipment from the factory. The Manufacturer shall not be responsible for any damage resulting to or caused by its product by reason of installation, improper storage, unauthorized service, alteration of the products, neglect or abuse, or use of the product in a manner inconsistent with its design. The warranty does not extend to any component parts not manufactured by Manufacturer; however, Manufacturer's warranty herein shall not limit any warranties made by manufacturers of component parts which extend to Buyer.

Claims for defects in material and workmanship shall be made in writing to Manufacturer within ten days of discovery or defect. Manufacturer may either send a service representative or have the product returned to its factory at Buyer's expense for inspection. Upon notification of defect, Manufacturer will issue a return goods authorization number to Buyer. The return goods authorization number must accompany the product returned. If judged by Manufacturer to be defective in material or workmanship, the product will be replaced or repaired at the option of the Manufacturer, free from all charges except authorized transportation. Buyer shall be responsible for all maintenance services consisting of lubrication and cleaning of equipment, replacing expendable parts, making minor adjustments and performing operation checks, all in accordance outlined in manufacturer's maintenance literature.

Model No. _____ Ser. No. _____

Purchased From _____

Date of Purchase _____

THE FOREGOING WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES AND NO REPRESENTATIONS, GUARANTEES, OR WARRANTIES, EXPRESS OR IMPLIED, (INCLUDING, BUT NOT LIMITED TO, A WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE) ARE MADE BY THE MANUFACTURER IN CONNECTION WITH THE MANUFACTURE OR SALE OF ITS PRODUCTS. NO EMPLOYEE, DISTRIBUTOR, OR REPRESENTATIVE IS AUTHORIZED TO CHANGE THIS WARRANTY IN ANY WAY OR GRANT ANY OTHER WARRANTY ON BEHALF OF MANUFACTURER.

THE REMEDIES OF BUYER SET FORTH HEREIN ARE EXCLUSIVE AND ARE IN LIEU OF ALL OTHER REMEDIES. THE LIABILITY OF MANUFACTURER WHETHER IN CONTRACT, TORT, UNDER ANY WARRANTY, OR OTHERWISE SHALL NOT EXTEND BEYOND ITS OBLIGATION TO REPAIR OR REPLACE, AT ITS OPTION, ANY PRODUCT OR PART FOUND BY MANUFACTURER TO BE DEFECTIVE IN MATERIAL OR WORKMANSHIP. MANUFACTURER SHALL NOT BE LIABLE FOR COST OF INSTALLATION AND/OR REMOVAL OR BE RESPONSIBLE FOR DIRECT, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES OF ANY NATURE.

**FOR SERVICE OR ASSISTANCE, SEE THE AUTHORIZED
McLAUGHLIN DEALER IN YOUR AREA, OR CALL TOLL-
FREE 800/435-9340**



2006 Perimeter Rd., Greenville, SC 29605
864/277-5870 Worldwide
Telefax 864/235-9661

**MANUFACTURED BY:
McLaughlin Group, Inc.
2006 Perimeter Rd.
Greenville, SC 29605 USA**

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Receiving and Delivery Report

DEALER PREP

Check or perform the following:

- ___ Check tailcone bolt torque. Refer to “Tool Specifications,” [page 70-2](#).
- ___ Check for foreign material around the hose connections at the tool and exhaust ports, in the hose, and around the hose coupler.
- ___ Check forward and reverse valve for proper function.
- ___ Check that internal striker slides freely by rocking tool back and forth.
- ___ Check condition of safety signs and decals.

DELIVERY

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

- ___ overall explanation of how the tool works
- ___ tool safety
- ___ preparing the tool for operation
- ___ Complete “Identification Numbers - Record,” [page iii](#).

DEALER/CUSTOMER INFORMATION

dealer

address

city

state / province

zip / postal code

country

owner

address

city

state / province

zip / postal code

country

IDENTIFICATION NUMBERS - RECORD

Machine Model Number _____

Machine Serial Number _____

Located on rear lip of tool body and along outer tool body



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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 or procedures are not followed.

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 Indicates a hazardous situation that, if not avoided, will result in death or serious injury.

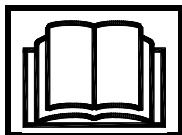
WARNING Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

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

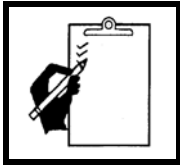
SAFETY SYMBOL EXPLANATION



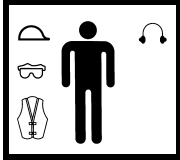
This is the safety alert symbol. This symbol is used in combination with an exclamation mark or other symbols to alert you to the potential for bodily injury or death.



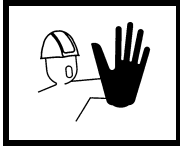
WARNING: Read Operator’s Manual and safety signs before operating machine.



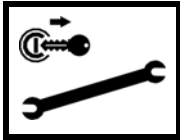
WARNING: Check tool before operating. Tool must be in good operating condition and all safety equipment installed and functioning properly.



WARNING: Wear personal protective equipment. Dress properly. Refer to “Personal Protection,” [page 40-3](#).



WARNING: Keep spectators away.



WARNING: Use [Shutdown Procedure](#) before servicing, cleaning, repairing or transporting machine. [Refer to page 23-1](#).



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: Intended Use

The McLaughlin piercing tool is designed solely for use in creating horizontal holes through the earth. Utilities are typically installed in these underground holes.

Always use the piercing tool in accordance with the instructions contained in this Operator's Manual, safety signs on the tool, and other material provided by Vermeer Corporation.

Proper maintenance and repair is essential for safety, and for efficient operation of the tool. Do not use the tool if it is not in suitable operating condition.

HOW THE TOOL WORKS

The tools use pneumatic power to drive the striker inside the tool forward at a very high velocity. The striker then impacts the anvil at the front of the tool, driving the tool 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 toward 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.

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, not the front anvil, propelling the tool in the reverse direction.

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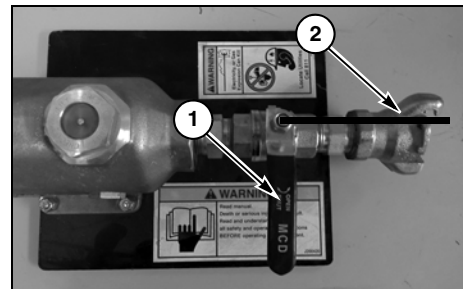
Section 20: Machine Controls

NOTE: Representative oiler shown. Oiler is supplied by customer and style may vary. Oiler instructions included in this manual represent typical operation. Refer to operating instructions supplied by oiler manufacturer for more detail.

AIR VALVE

- (1) Perpendicular to valve body (shown) off
- (2) Parallel to valve body. on

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



TOOL OILER

During operation, the oiler unit continuously lubricates the air-powered tool.

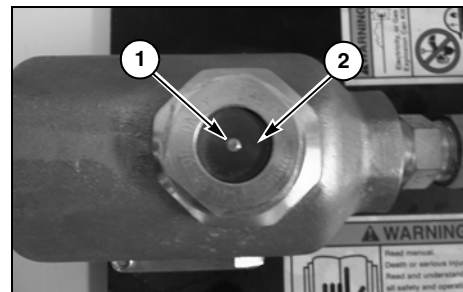
IMPORTANT: When operating tool for the first time, add 1/2 oz (15 ml) of oil directly to the tool whip hose to provide lubrication during start-up.

Pressure Relief

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

Relieve pressure from oiler:

- at the end of each use. High-pressure air, trapped inside oiler, will force remaining oil into air line.
- 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 “Lubricants,” [page 70-1](#).

Oiler - Adjust

Screw (3) 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.

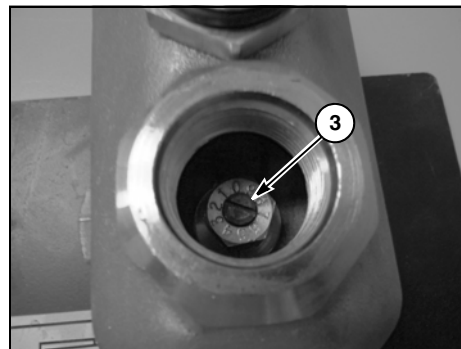
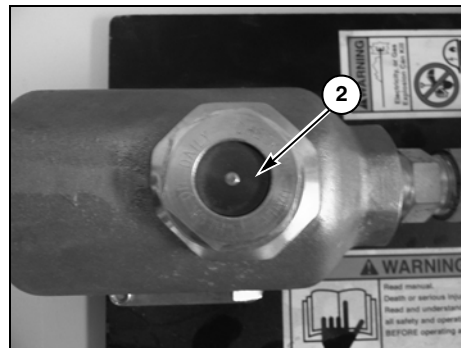
Step 2: Relieve air pressure.

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

Fill to cover the adjustment screw but leave an air space to allow for oil flow.

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

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



NOTE: The adjustment screw has been set at the factory. To reset or adjust the oiler, turn adjustment screw clockwise until closed, then turn screw counterclockwise 1 full turn. This setting is suitable for 2" tools. The 4" tool will need to have the setting at 1/2 turn CCW from closed. For example, to adjust the oiler to 7/8 open, fully close screw, and then open 1 full turn. Note where the slot in the adjustment screw is, and then close the screw 1/8 of a turn. The oiler is now set to 7/8 open.

Tool Size	Turns CCW from Closed
2"	1
2-1/2"	7/8
3"	7/8
4"	1/2

REAR WHIP HOSE

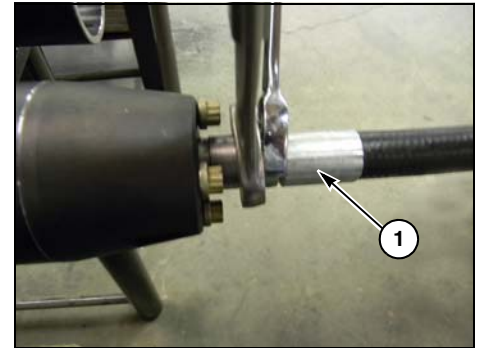
Turning the whip hose (1) controls which direction the tool travels.

Clockwise forward travel

Counterclockwise reverse travel

LEVEL

Use a level to set the boring angle of the tool.

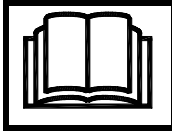


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Section 30: Preparing the Machine and Work Area

Preparing Personnel

OPERATOR QUALIFICATIONS



WARNING: Read Operator's Manual and safety signs before operating machine.

Allow only responsible, properly instructed individuals to operate machine.

Become familiar with the controls, operation, and use of the machine under the supervision of a trained and experienced operator.

The operator must be familiar with the workplace's safety rules and regulations, and must be mentally and physically capable of operating the machine safely.

Safety Conscious Operators and Workers

Operators and workers should exercise reasonable accident-prevention measures.

TRAINING

Before operating the tool, the operator and crew should be trained in the operation of piercing tools. Initial training should cover the following:

- all sections of this manual
- jobsite safety, including safety barriers and protective clothing, as well as operating and emergency procedures
- two-way radio communication
- setup of the tool
- operation of the tool

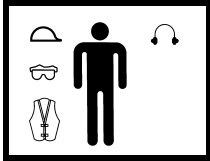
WARNING SAFETY SIGNS AND OPERATING INSTRUCTIONS

Warning safety signs and operating instructions provide information on potential safety hazards and safe operating instructions.

HANDLING THE PIERCING TOOL

To avoid back injury, use proper lifting technique. Lift with your legs, not your back. Use an appropriate lifting device when necessary. See “Tool Specifications” for tool weights. Refer to [page 70-2](#).

PERSONAL PROTECTION



WARNING: Wear personal protective equipment. To reduce the risk of being caught and entangled in moving components wear close-fitting clothing and confine long hair. Avoid jewelry, such as rings, wristwatches, necklaces, or bracelets.

Operating the machine will require you to wear protective equipment. Always wear a hard hat and wrap-around eye protection or goggles. If working near traffic, you may need to wear reflective clothing.

Hearing protection must be worn by machine operator. Other crew members may need to wear hearing protection when working close to the machine and/or support equipment

Eye protection must consist of wrap-around safety glasses or goggles.

Other workers in the immediate area must also wear hard hats and eye protection.

Wear close-fitting clothing and confine long hair.

Avoid wearing jewelry, such as rings, wristwatches, necklaces, or bracelets.

Sound and Vibration Levels

NOTE: The stated sound levels are representative for a given operating condition. Operating conditions may vary at each jobsite. The actual sound levels for your application and operating conditions may be different.

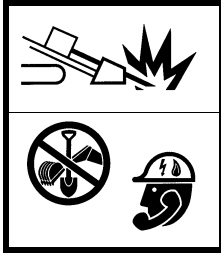
Equivalent Continuous A-Weighted Sound Pressure at Operator's Ear
as specified by directive 2000/14/EC, ISO 3744, and ISO 11201 * dB(A)

Guaranteed Sound Power Level as determined by directive 2000/14/EC * dB(A)

*Not available at time of printing.



UNDERGROUND UTILITY CONTACT



WARNING: Electricity or gas explosion can kill. Laser light in cut cable can result in eye damage.

Locate utilities before drilling. Call 811 (U.S. only) or 1-888-258-0808 (U.S. or Canada) or local utility companies or national regulating authority.

Before you start any digging project, do not 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 do not 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. Utilities will then mark their underground facilities by using the following international marking codes:

Red	Electric	Green/Brown	Sewer
Yellow	Gas, Oil or Petroleum	White	Proposed Excavation
Orange	Communication, Telephone, TV	Pink	Surveying
Blue	Potable Water		

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.

JOBSITE ASSESSMENT

Examine work area for any obstructions, conditions, or situations which may impair machine operation or create a safety hazard for the operator or other persons. Use information in this manual combined with your own good judgment when identifying these hazards and implementing hazard avoidance measures.

LAWS AND REGULATIONS - CHECK

Know and obey all federal, state, and local laws and regulations that apply to your work situation.

CHECK HARDWARE

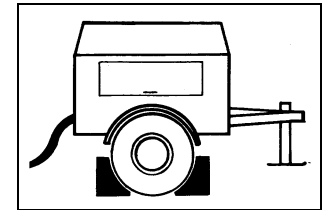
Ensure all air line couplings are tightened and secured to eliminate the chance of accidental uncoupling. Use hose connection retaining devices such as locking rings, clips, pins, chains, or cables.

Check the tightness of the tailcone bolts before use. Refer to “Tool Specifications,” [page 70-2](#).

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 (760 kPa). Do not exceed this pressure or damage to the tool or personal injury may result.



Section 40: Operation

PRECAUTIONS DURING OPERATION

Two people are required to operate the 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 tool operator must monitor the tool to be sure that the air hose does not cause an unsafe condition around the pit.

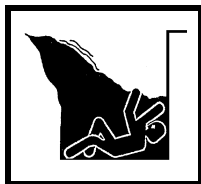
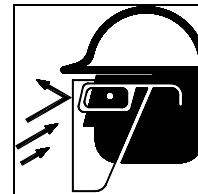
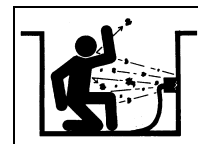
Eye protection is necessary when using the piercing tool. Avoid looking into the bore hole while the piercing tool is in use. High pressure exhaust can eject dirt, stones, or other materials. Be careful when blowing out the hose. Aim the hose away from yourself and other persons.

If the tool runs but does not move forward, turn off the air supply. Ensure the tool is not in contact with a gas line, water line, electrical 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.



WARNING: Do not work in excavation with unstable sides which could cave in. Specific requirements for shoring or sloping trench walls are available from several sources, including national and other governing authorities. Be sure to contact suitable authorities for these requirements before working in the excavation.

ENTRY AND EXIT PITS

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

The pit should be long enough to prevent the service line from kinking during launch.

Dig exit pit with extra width and depth to allow for possible tool misalignment.

PREPARING TO BORE

Step 1: Determine 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 the level on the straight surface of the tool. Use a support under the tool to keep the tool aligned.

Consider the type of soil when aligning the tool. Some soils, such as topsoil and sand, will cause a 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.

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

Step 4: Connect hose to a compressed air supply.

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: Hold the other end of the hose tightly and partially open the compressor valve to blow the air hose clean.

- Step 7: Close compressor valve.
- Step 8: Turn whip hose fully clockwise to FORWARD.
- Step 9: Ensure air valve control handle is OFF.
- Step 10: Fill oiler with Vermeer Piercing Tool Oil. Refer to “Tool Oiler,” [page 20-1](#).
- 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 locking rings, clips, pins, chains, or cables.

BORING

- Step 1: Fully open the air supply valve to start the striker motion. Do this quickly, then slow it down. This starts the bore more easily.

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

- Step 2: Stop tool periodically as it enters the ground. Use bubble level to check angle and aim. Adjust the direction of the tool by pushing or pulling the tool body.

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

If tool does not reach exit pit at length marked off on air hose:

- Step 4: Turn air hose counterclockwise until tool is in NEUTRAL - neither moving forward nor backward.
- Step 5: Locate tool by sound and vibration.

IMPORTANT: When using NEUTRAL for an extended time, slow the tool by reducing air flow at the valve.

AFTER THE BORE

Disconnect the air hose from the tool and remove the tool from the exit pit. Cap the inlet fitting or cover it with tape to prevent dirt and sand from entering the tool.

REVERSING DIRECTION

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

Step 1: Stop tool operation.

Step 2: Disconnect the air supply hose from the oiler.

Step 3: Turn the whip hose fully counterclockwise to REVERSE.

Step 4: Clean the connectors, then connect the air supply hose.

Step 5: Start tool operation.

Step 6: During operation, keep tool in REVERSE by keeping air supply hose turned fully counterclockwise.

Step 7: Continue to pull on the air supply hose as the tool is reversing. This will keep the tool from backing over the air supply hose.

IMPORTANT: Use extra care when piercing in unstable soils, gravel, sand, or under trees. Use the tool cable in these conditions because a tunnel may collapse or the tool may oscillate.

Connect the 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 bore. When reversing the tool in these conditions, use the cable or chain to assist in pulling the tool back.

Section 50: Maintenance

DURING SERVICE

- Read and obey the maintenance instructions in this section before servicing the tool.

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

- Use only authorized parts for repair or replacement. These replacement parts, including bolts, are specified in the *Parts Manual*.
- Check the air supply hose periodically for damage to the hose or fittings. Never use the piercing tool with damaged or worn air lines or fittings.
- Check and tighten loose hose clamps and clamp bolts regularly.

IMPORTANT: Do not use a torch or welder on the piercing tool. Applying heat may damage critical parts of the tool. Heating parts of the tool may alter the component's strength and result in premature failure or personal injury.

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

SAFETY SIGNS MAINTENANCE

Safety signs located on your machine contain important and useful information that will help you operate your equipment safely and correctly. Refer to the [Parts Manual](#) for identification and location of safety signs.

To assure that all safety signs remain in place and in good condition, follow the instructions given below:

- Keep safety signs clean. Use soap and water - not mineral spirits, abrasive cleaners, or other similar cleaners that will damage the sign.
- Replace any damaged or missing safety signs. When attaching safety signs, the temperature of the mounting surface must be at least 40°F (5°C). The mounting surface must be clean and dry.
- When replacing a machine component with a safety sign attached, replace the safety sign also.

Replacement safety signs can be purchased from your Vermeer equipment dealer.

After First 30 Service Hours

STRIKER AND VALVE WEAR RINGS - CHECK

Instructions for checking the wear rings are included on the following pages.

- “A. Tool - Disassemble,” [page 50-3](#)
- “B. Striker - Inspect,” [page 50-4](#)
- “C. Valve - Inspect,” [page 50-6](#)
- “G. Positive Reverse Rear Anvil - Assemble,” [page 50-8](#)

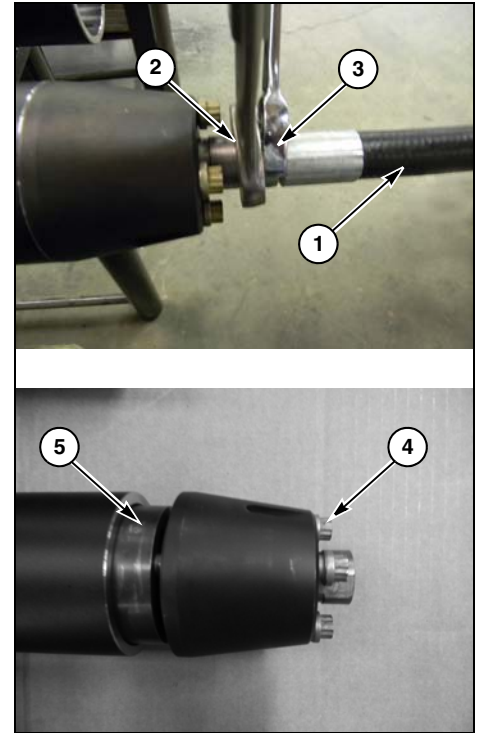
Every 150 Service Hours or Yearly

A. TOOL - DISASSEMBLE

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

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

- Step 4: Use proper socket or hex driver to loosen each bolt (4).
- Step 5: Rotate tailcone counterclockwise to unthread the inner assembly from the body.
- Step 6: Remove inner assembly (5) from the body.
- Step 7: Tip body and remove striker. Be careful not to damage body threads.



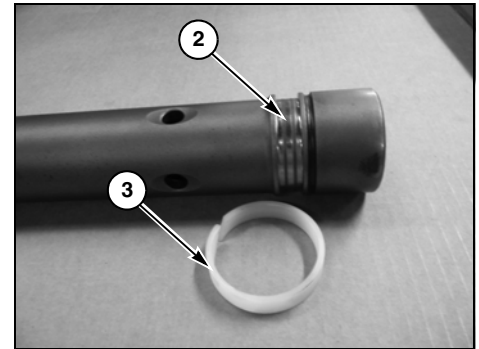
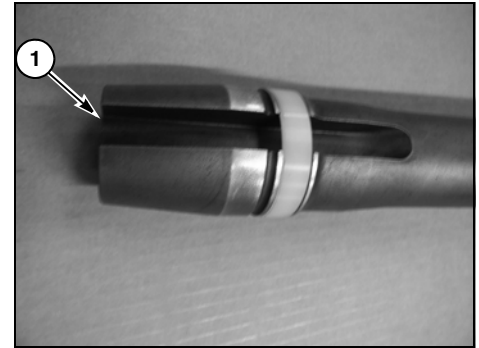
B. STRIKER - INSPECT

- Step 1:** Inspect 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 the rings.

To replace a ring:

- a. Clean ring groove (2).
- b. Oil all surfaces of the ring with Vermeer Piercing Tool Oil.
- c. Install ring (3). If the ring is over expanded, take the ring off, overlap the ends to make a tighter diameter, and 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 shortened body and striker life.



Step 3: Check end gap (4) of each ring with the ring fully seated in the striker ring groove. Recommended gap is shown below. If it is less, remove the ring and trim enough off one end to ensure the proper gap.

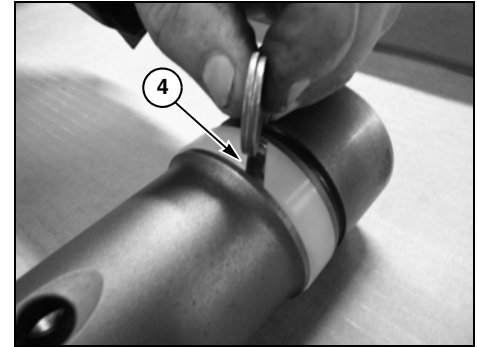
Tool Size	Ring Gap
2"	0.100–0.120" (2.5–3 mm)
2-1/2"	
3"	
4"	

IMPORTANT: Check wear rings after the first 30 hours of use. Clean ring and ring groove, and 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: Do not use hard abrasives, such as a wire brush or emery cloth. Abrasives 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 the striker.

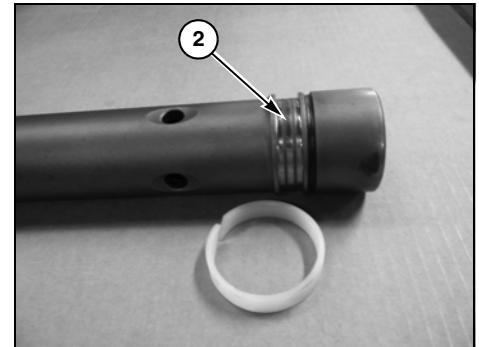
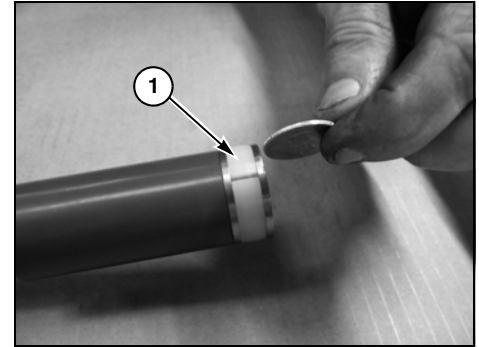


C. VALVE - INSPECT

- Step 1:** Remove valve ring (1) by expanding it and sliding it over the end of valve.
- Step 2:** Check for sand embedded in the ring. If you find any, replace the 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 is acceptable. Replace a heavily scratched or scored ring.

To replace a ring:

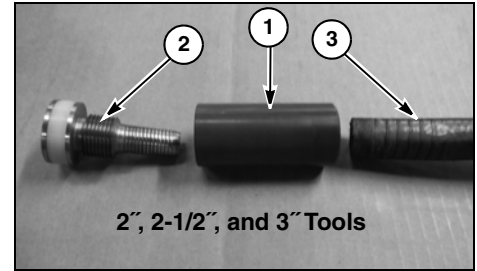
- a. Clean ring grooves (2).
- b. Oil all surfaces of the ring with Vermeer Piercing Tool Oil.
- c. Install rings. If the rings are overexpanded, take the ring off, overlap the ends to make a tighter diameter, and then reinstall.



D. VALVE REMOVAL

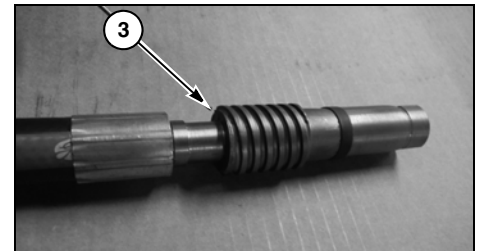
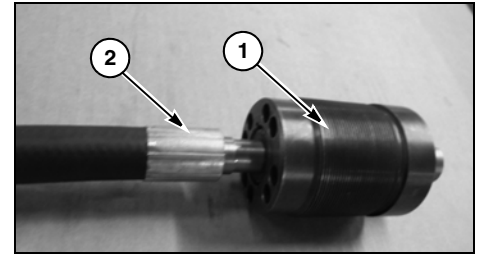
IMPORTANT: The valve (1) is covered with a hard ceramic coating. Be careful not to chip the coating.

- Step 1:** Slip a piece of hose over the valve, or wrap the valve in a cloth, to prevent damaging the valve surface.
- Step 2:** Secure valve (1) in a vise.
- Step 3:** Remove retainer (2) using hex key.
- Step 4:** Turn hose (3) clockwise to remove it from the valve.



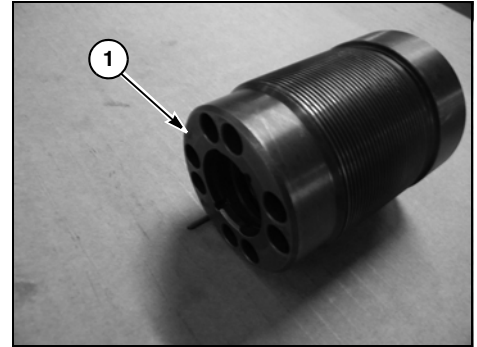
E. INSPECT VALVE END HOSE WHIP

- Step 1:** Remove tailcone.
- Step 2:** Unscrew hose whip (2) and remove it from rear anvil (1).
- Step 3:** Inspect threads (3). They should be flat on top. If threads are sharp, replace the hose whip.
- Step 4:** Inspect the bond between the screw and the tubular shaft. Replace hose whip assembly if needed.



F. REAR ANVIL - INSPECT

- Step 1:** Inspect face (1) which contacts the striker.
- Step 2:** Thoroughly clean the rear anvil. Use an approved air nozzle and carefully blow out the exhaust ports and bore holes.
- Step 3:** Check front stops on the screw thread for damage. Stops should be 0.060–0.080" (1.5–2.0 mm) wide on top. If stops are less, the rear anvil should be replaced.
- Step 4:** Inspect rear anvil inner screw threads. Threads should be flat on top. If threads are sharp, replace anvil.

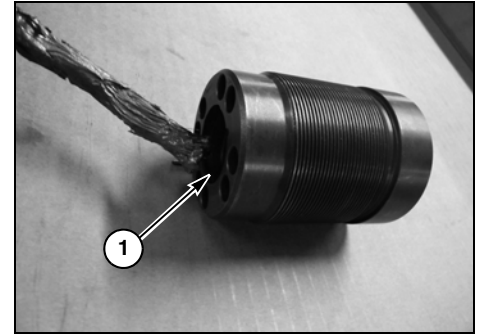


G. POSITIVE REVERSE REAR ANVIL - ASSEMBLE

- Step 1:** Apply anti-seize or grease to rear body threads and rear anvil threads.
- 3" and 4" tools: Tighten rear anvil until it bottoms against the body, then loosen it 1/8 turn.
 - 2" and 2-1/2" tools: Firmly hand-tighten rear anvil until it bottoms against the back of the tool body. Do not apply torque or loosen the anvil.
- Step 2:** Position internal hose in forward position by rotating internal hose clockwise.
- Step 3:** Install tailcone ensuring both tailcone and rear of body surfaces are flat and have 100% contact between the two parts.
- Step 4:** Apply anti-seize to tailbolts and install. Torque to proper specification.

H. SCREW REVERSE - ASSEMBLE

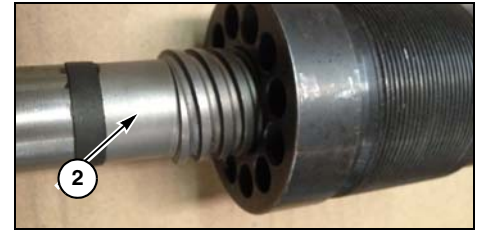
Step 1: Using anti-seize or grease, lubricate the rear anvil inner threads (1).



Step 2: Thread valve end hose whip (2) into rear anvil (1).

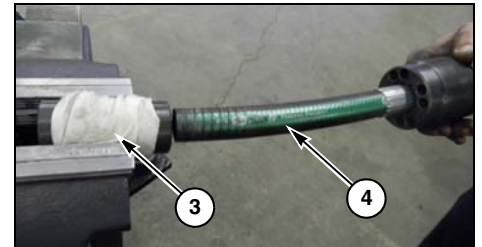
IMPORTANT: The valve is covered with a hard ceramic coating. Be careful not to chip the coating.

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 Vermeer Piercing Tool Oil.

Step 7: Install valve retainer and torque according to chart.

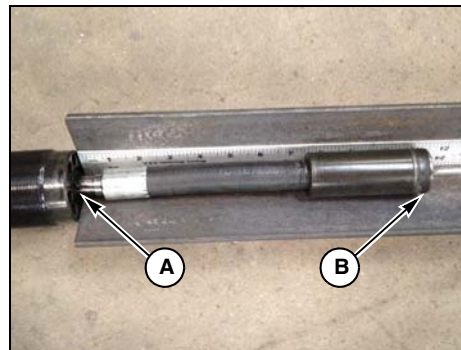
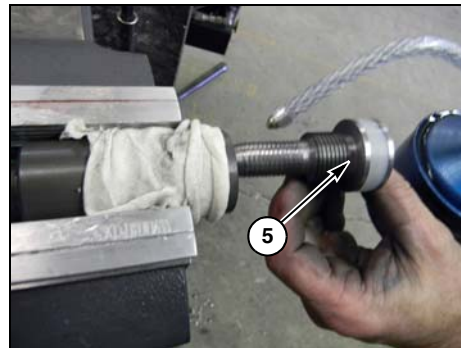
Tool Size	Valve Retainer Torque
2"	30 ft-lb (41 Nm)
2-1/2"	50 ft-lb (68 Nm)
3"	60 ft-lb (81 Nm)
4"	75 ft-lb (102 Nm)

Step 8: Turn valve assembly fully clockwise against the stops.

Step 9: Check valve assembly overall length. Measure from end of valve retainer (A) to front face of rear anvil (B) with hose straight and in full forward position. A measurement longer than that listed in the table indicates the valve has not been threaded far enough onto the hose.

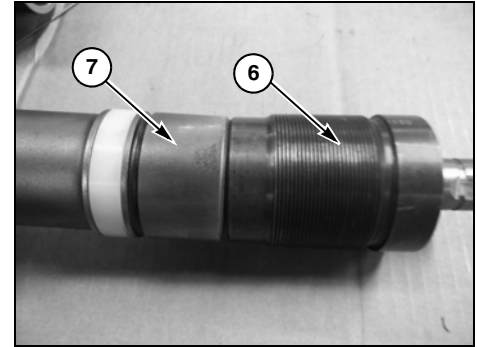
Tool Size	Internal Hose Length
2"	10-7/16" (265 mm)
2-1/2"	11-1/2" (292 mm)
3"	11-1/4" (286 mm)
4"	13-7/8" (352 mm)
NOTE: All measurements are + or - 1/16" (1.5 mm)	

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

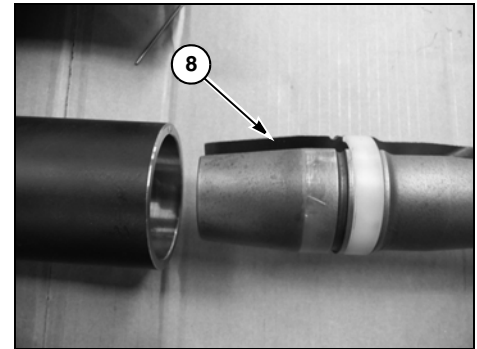


Step 11: With the rear anvil/hose whip assembly adjusted to full forward position, test fit the valve in the striker bore. The valve should slide freely into the striker until the rear anvil (6) contacts the striker (7). If it does not, determine the reason for the obstruction before assembling the tool.

Step 12: Clean the body bore thoroughly. Oil the inside of the body and the striker.



Step 13: With the tool body horizontal or slightly nose down, carefully slide the striker into the body. Insert the end of the striker with the milled slots (8) into the rear of the tool body first.



Step 14: Coat the rear anvil external threads (9) with anti-seize or grease lubricant.

Step 15: Slide inner assembly into the striker. Be careful not to cross-thread the rear anvil into the body.

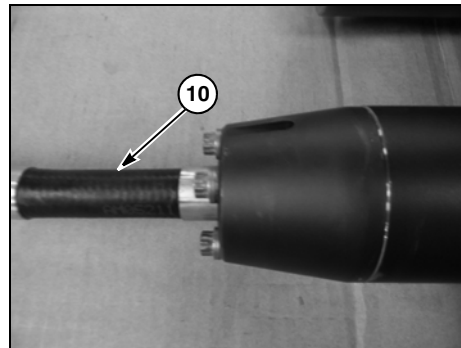
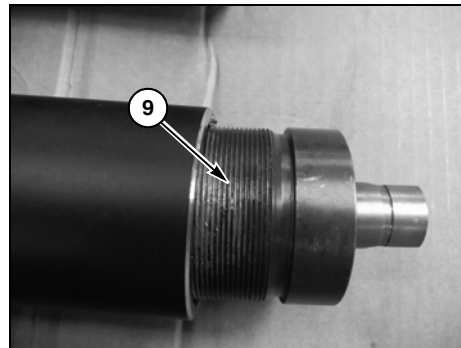
- 3" and 4" tools: Tighten rear anvil until it bottoms against the body, then loosen it 1/8 turn.
- 2" and 2-1/2" tools: Firmly hand-tighten rear anvil until it bottoms against the back of the tool body. Do not apply torque or loosen the anvil.

Step 16: Rotate internal hose whip clockwise to the full forward position.

Step 17: Apply anti-seize to tailbolt threads. Install bolts and torque according to table.

Tool Size	Tailbolt Torque
2"	10 ft-lb (14 Nm)
2-1/2"	28 ft-lb (38 Nm)
3"	35 ft-lb (47 Nm)
4"	

Step 18: Inspect rear hose (10). Replace a torn or peeling hose to prevent air flow loss and problems reversing direction.



Step 19: Slide rear hose whip through tailcone and thread into internal hose whip by hand.

Step 20: Turn rear hose whip counterclockwise, exposing the wrench flats for torquing the external hose to the internal hose whip.

Tool Size	External Whip Torque
2"	30 ft-lb (41 Nm)
2-1/2"	45 ft-lb (61 Nm)
3"	
4"	60 ft-lb (81 Nm)

IMPORTANT: Install new bolts when assembling the tailcone. The tailbolts are engineered and specially designed for Vermeer tools. **Do not substitute other types of bolts.**

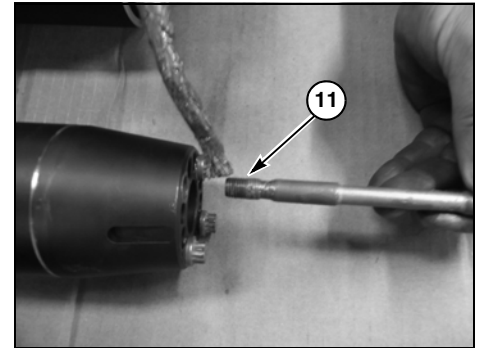
Step 21: Tighten rear hose whip to torque according to table in Step 20.

IMPORTANT: Do not tighten the tailbolts with the hose whip in the reverse adjustment position.

Step 22: Check that hose whip is rotated fully clockwise (FORWARD).

Step 23: Use a cross pattern sequence and tighten all tailbolts according to table.

Tool Size	Tailbolt Torque
2"	10 ft-lb (14 Nm)
2-1/2"	28 ft-lb (38 Nm)
3"	35 ft-lb (47 Nm)
4"	



Step 24: Install coupling onto the external whip and torque according to table.

Tool Size	External Whip Torque
2"	30 ft-lb (41 Nm)
2-1/2"	45 ft-lb (61 Nm)
3"	
4"	60 ft-lb (81 Nm)

Step 25: Check that tool freely shifts from FORWARD to REVERSE.

Step 26: Place adjuster screw in the FORWARD position.

Step 27: Tip tool back and forth. The striker should slide easily and freely and contact the anvils when the body is tipped from horizontal to approximately 22°.

Storage

Pour 1 oz (30 ml) of Vermeer Oil into the air line. Oil should be added with the tool nose down. Wait 30 seconds for the oil to get into the tool. Tip the tool back and forth 20 to 30 times while rotating the tool to disperse the oil. Tape or cap the tool whip hose to prevent dirt and sand from entering the tool.

Section 60: Troubleshooting

TOOL WILL NOT START

- Check air compressor for proper air output (90–110 psi or 620–760 kPa). Improper or low air pressure setting can interfere with starting.
- Check that full pressure air is available at the tool and that hoses and fittings are of the proper diameter. Refer to “Tool Specifications,” [page 70-2](#).



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

- Take tool apart and clean it. Refer to “A. Tool - Disassemble,” [page 50-3](#).
- *If tool is in the ground:*
 - a. Remove air supply hose from oiler to tool and inject 1/2 oz (15 cc) of oil directly into the hose.
 - b. Turn air supply hose one turn counterclockwise to REVERSE if in FORWARD, or one turn clockwise to FORWARD if in REVERSE.
 - c. Connect supply line to oiler and open air control valve.
 - d. If tool does not start, repeat Steps a, b, and c.

If tool fails to start after the above steps have been performed, return tool to your Vermeer dealer for inspection.

TOOL WILL NOT REVERSE DIRECTION

IMPORTANT: Ensure all air line couplings are tight and lock collars in place.

- If the tunnel has collapsed on the air supply hose, turn air supply hose counterclockwise while the tool is running. The impact action of the tool will help loosen the stuck supply line.
- If unstable soil conditions have caused the tool to lose traction and oscillate, reduce air flow at the control valve until traction is regained. Unstable soil conditions include gravel, sand, watery slick clays, and soil under trees.
- Check air supply lines for possible obstructions.

TOOL RUNS BUT WILL NOT MOVE IN HOLE

- Ensure hose is in FORWARD.
- If tool is oscillating, reduce air flow at the oiler valve. Soft or wet ground conditions can cause a tool to lose traction and oscillate.
- Put a reference mark on the hose to determine if the tool is moving. If the tool has hit an obstruction, rotate the hose counterclockwise 2 to 3 turns until the tone of the impact changes. Then turn hose in the clockwise (FORWARD) direction slightly, until the tone is gone. This provides maximum impact force to break through an obstruction.
- If the tool is unable to break through, reverse tool direction and start a new hole away from the obstruction.

IMPORTANT: When starting a new bore, the operator should move over a distance of 10 times the diameter of the tool, so that the tool does not cross into the other bore.

TOOL SLOWS DOWN DURING LONG BORES

- Perform the striker tip test: Tip the body from horizontal to approximately 22°. The striker should slide from front to back. A tool with high striker friction may have ingested dirt and should be taken apart before being used again.
- The tunnel behind the tool may have collapsed, restricting air flow. Refer to previous page for possible solutions.

TOOL RUNS BUT IS LOW ON POWER

- Step 1:** Check air compressor for proper air output and pressure.
- Step 2:** Check that the tool is using oil. Refer to “Machine Controls,” [page 20-1](#).
- 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 section).
- Step 5:** Perform striker tip test. Refer to previous page.
- Step 6:** Check striker wear ring end gap. Refer to “B. Striker - Inspect,” [page 50-4](#).
- Step 7:** Check valve assembly overall length. Refer to “E. Inspect Valve End Hose Whip,” [page 50-7](#).
- Step 8:** Check valve rings end gap. Refer to “C. Valve - Inspect,” [page 50-6](#).

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Section 70: Specifications

LUBRICANTS

Vermeer Piercing Tool 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.

Vermeer Piercing Tool Winter Oil

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

TOOL SPECIFICATIONS

	2" (51 mm)	2-1/2" (63.5 mm)	3" (76 mm)	4" (102 mm)
Air Feed Line Supply Hose Diameter	5/8" (16 mm)	3/4" (19 mm)		
Length	44.16" (112 cm)	47.5" (120.6 cm)	51.0" (130 cm)	53.5" (136 cm)
Weight	24 lb (11 kg)	50 lb (22.7 kg)	65 lb (29 kg)	100 lb (45.4 kg)
Air Consumption	22 cfm (623 L/min)	35 cfm (991 L/min)	32 cfm (906 L/min)	68 cfm (1926 L/min)
Internal Access	via 4 tail bolts			via 6 tail bolts
Tail Bolt Torque	10 ft-lb (14 Nm)	28 ft-lb (38 Nm)	35 ft-lb (47 Nm)	35 ft-lb (47 Nm)
Valve Retainer Torque	20 ft-lb (27 Nm)	30 ft-lb (41 Nm)	30 ft-lb (41 Nm)	50 ft-lb (68 Nm)
Pneumatic Fitting Torque	45 ft-lb (61 Nm)			
Operating Pressure (maximum)	110 psi (760 kPa)			
Blows Per Minute	470	385	480	435
Reversible	in 8 turns	in 6-1/2 turns	in 5 turns	in 6 turns

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Revision History

Revision	Date	Page(s)	Description
m1_00	12/11	All	First Edition Manual released

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