

**Operating and
Maintenance
Instructions
Manual**

**VE414MC
Pipe Roll Grooving Tool**



⚠ WARNING



Failure to follow instructions and warnings could result in serious personal injury, property damage, and/or product damage.

- Before operating or servicing the VE414MC Roll Grooving Tool, read all instructions in this manual and all warning labels on the tool.
- Wear safety glasses, hardhat, foot protection, and hearing protection.
- Save this operating and maintenance manual.

If you need additional copies of any literature, or if you have questions concerning the safe and proper operation of this tool, contact Victaulic Tool Company, P.O. Box 31, Easton, PA 18044-0031, Phone: 610-559-3300, e-mail: pickvic@victaulic.com.

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HAZARD IDENTIFICATION

Definitions for identifying various hazard levels are provided below.



This safety alert symbol indicates important safety messages. When you see this symbol, be alert to the possibility of personal injury. Carefully read and fully understand the message that follows.

DANGER

The use of the word "DANGER" identifies an immediate hazard with a likelihood of serious personal injury or death if instructions, including recommended precautions, are not followed.

WARNING

The use of the word "WARNING" identifies the presence of hazards or unsafe practices that could result in serious personal injury or death if instructions, including recommended precautions, are not followed.

CAUTION

The use of the word "CAUTION" identifies possible hazards or unsafe practices that could result in personal injury and product or property damage if instructions, including recommended precautions, are not followed.

NOTICE

The use of the word "NOTICE" identifies special instructions that are important but not related to hazards.

OPERATOR SAFETY INSTRUCTIONS

The VE414MC is designed only for roll grooving pipe. Use of this tool requires dexterity and mechanical skills, as well as sound safety habits. Although this tool is manufactured for safe, dependable operation, it is impossible to anticipate the combinations of circumstances that could result in an accident. The following instructions are recommended for safe operation of this tool. The operator is cautioned to always practice "safety first" during each phase of use, including setup and maintenance. It is the responsibility of the owner, lessee, or user of this tool to ensure that all operators read this manual and are fully trained to operate this tool.

- 1. Read this manual before operating or servicing this tool.** Become familiar with the tool's operations, applications, and limitations. Be particularly aware of its specific hazards. Store this manual in a clean area where it is always readily available. Additional copies of this manual are available upon request by calling or writing to the Victaulic Tool Company.
- 2. This tool is designed ONLY for roll grooving pipe sizes, materials, and wall thicknesses listed in the "Tool Rating and Roll Selection" section starting on page 31.**
- 3. Avoid using the tool in dangerous environments.** Do not expose the tool to rain, and do not use the tool in damp or wet locations. Do not use the tool on sloped or uneven surfaces. Keep the work area well lit. Allow sufficient space to operate the tool properly.
- 4. Ground the machine to protect the operator from electric shock.** The tool components are grounded to the tool's frame. Make sure the frame is properly grounded.
- 5. Prevent back injury.** During tool setup, a lift must be used to handle and position the tool.
- 6. Inspect the equipment.** Before starting the tool, check the moveable parts for any obstructions. Make sure guards and tool components are properly installed and adjusted. Refer to the "Roll Guard Adjustment" section on page 9.
- 7. Prevent accidental startups.** Place the power switch in the "OFF" position before connecting the tool to an electrical source.
- 8. Wear proper apparel.** Do not wear loose clothing or jewelry, and keep long hair tied back.
- 9. Wear protective items when working with tools.** Always wear safety glasses, hardhat, foot protection, and hearing protection.
- 10. Stay alert.** Do not operate the tool if you are drowsy from medication or fatigue. Avoid horseplay around the equipment.
- 11. Keep visitors away from the immediate work area.** All visitors should be kept a safe distance from the equipment at all times.
- 12. Keep work areas clean.** Keep the work area around the tool clear of any obstructions that could limit the movement of the operator. Clean up any oil or other spills.
- 13. Secure the work, machine, and accessories.** Make sure the machine is stable. Refer to the "Tool Setup" section on page 5 for securing the machine to the floor or a platform.
- 14. Support work.** Support long pipe lengths with a pipe stand that is secured to the floor or the ground.
- 15. Operate the tool from the control station side only.** The tool must be operated with the safety foot switch that is located for easy operator access. Never reach across moving parts.
- 16. Keep hands and tools away from grooving rolls and stabilizer wheel during the grooving operation.** Grooving rolls can crush or cut fingers and hands.
- 17. Do not overreach.** Maintain proper footing and balance at all times. Make sure the safety foot switch is easily accessible at all times.
- 18. Never reach inside pipe ends during operation.**
- 19. Do not force the tool.** Do not force the tool or accessories to perform any functions beyond their capabilities. Do not overload the tool.
- 20. Do not abuse the foot switch cord.** Never yank the cord out of the receptacle. Keep the cord away from heat, oil, and sharp objects.
- 21. Disconnect electrical power before servicing the tool.** Only authorized personnel should attempt to perform maintenance on the tool. Always disconnect the power before servicing or making any adjustments.
- 22. When tools are not in use, store them in a dry, secure place.**
- 23. Maintain tools with care.** Keep tools clean at all time to ensure proper and safe performance. Follow the instructions for lubricating the tool.
- 24. Use only Victaulic replacement parts and accessories.** Use of any other parts may result in a voided warranty, improper operation, and hazardous situations. Refer to the "Parts Ordering Information" and "Accessories" sections on page 22.
- 25. Do not remove any labels.** Replace any damaged or worn labels.

INTRODUCTION

NOTICE

- Drawings and/or pictures in this manual may be exaggerated for clarity.
- This tool and operating manual contain trademarks, copyrights, and/or patented features that are the exclusive property of Victaulic Company.

The Victaulic® Vic-Easy® Series VE414MC is a fully motorized, hydraulic feed tool for roll grooving pipe to receive Victaulic grooved pipe couplings. The VE414MC is designed to roll groove pipe of various materials and wall thicknesses (refer to the "Tool Rating and Roll Selection" section starting on page 31).

CAUTION

- This tool should be used **ONLY** for roll grooving pipe designated in the "Tool Rating and Roll Selection" section of this manual.
- Using this tool for other purposes, or for exceeding the pipe specifications, will overload the tool, shorten tool life, and/or damage the tool.

RECEIVING THE TOOL

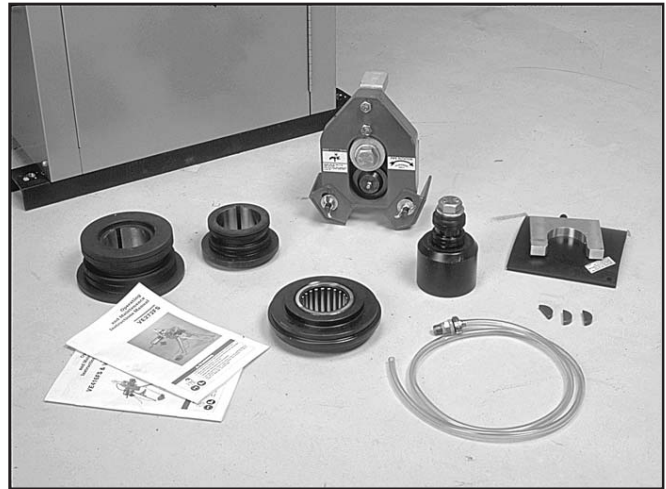
NOTICE

- Save the original shipping materials for return shipment of rental tools.
- Grooving rolls for other specifications and materials must be purchased separately.

VE414MC Roll Grooving Tools are palletized individually and covered with a cardboard sleeve that can be re-used for shipping rental tools back to the Victaulic Tool Company.

Upon receipt of the tool, make sure all necessary parts are included. If any parts are missing, notify the Victaulic Tool Company or your Victaulic representative.

The standard series VE414MC tools are supplied with grooving rolls for 2 – 16" (60,3 – 406,4 mm) carbon steel pipe. Rolls are marked with the size and part number. For roll grooving to other specifications and materials, refer to the "Tool Rating and Roll Selection" section starting on page 31.



Qty.	Description
1	Tool Assembly
1 set	Enhanced Tracking Rolls (ETR) for 2 – 16" (50 – 400 mm) Steel Pipe (8 – 12"/200 – 300 mm roll set is installed on the tool)
2	Operating and Maintenance Instructions Manual
1	Guard Setting Pad
1	Slide Spacer
2	Spare Woodruff Keys
1	Hydraulic System Bleeder Hose
1	Safety Foot Switch with Detachable Cord
1	PT-100 Pipe Tape

POWER REQUIREMENTS

⚠ DANGER



- To reduce the risk of electric shock, check the electrical source for proper grounding.
 - Before performing any maintenance on the tool, disconnect the cord from the electrical source.
- Failure to follow these instructions could result in death or serious personal injury.

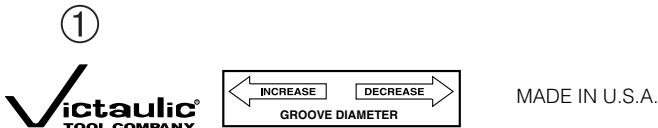
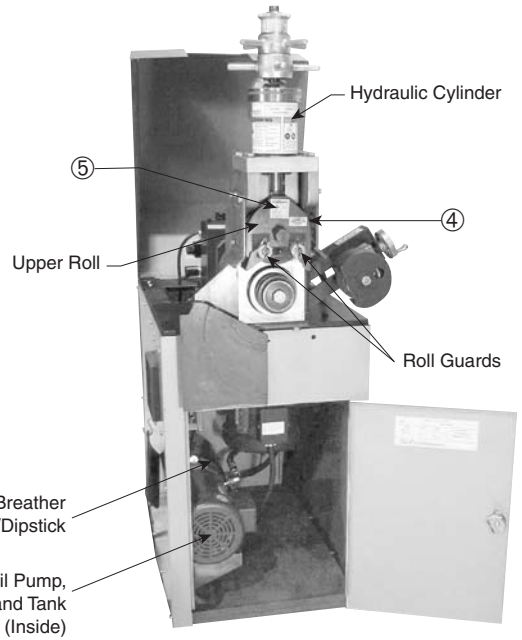
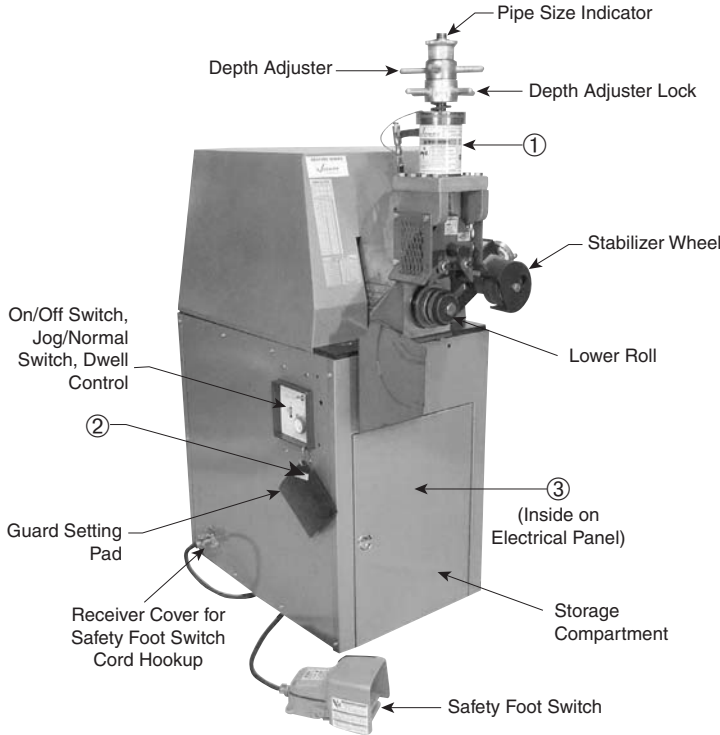
The VE414MC is designed to operate on a 230/460 volt, 3-phase, 60-Hertz power supply. The tool is shipped with the wiring set for 230 volt operation, unless specified otherwise on the order. The 230-volt service requires a minimum 30-amp circuit protection.

To re-wire for 460 volt service, refer to the electrical schematic on page 30 and the information on the drive motor and hydraulic pump motor. The 460 volt service requires a minimum 15-amp circuit protection.

All VE414MC components are grounded to the tool frame. Make sure the tool frame is properly grounded.

For other voltages and frequencies, contact the Victaulic Tool Company. NOTE: If the tool is ordered for another voltage, no additional wiring is necessary.

TOOL NOMENCLATURE



1

WARNING

Grooving rolls can crush or cut fingers and hands.

- Be sure guard is properly adjusted before grooving pipe.
- Keep hands away from grooving rolls and stabilizer wheel.
- Never reach inside pipe end or across the tool or pipe during operation.

- Always groove pipe in a clockwise direction only.
- Never manually groove pipe shorter than what is recommended.
- Never wear loose clothing, loose gloves, or jewelry while operating tool.

R010414LBL

WARNING

Failure to follow instructions and warnings can result in serious personal injury.

- Before installing, operating or servicing this tool, read and understand the Operating Instructions and all warning labels on this tool.

- Always wear safety glasses and foot protection.

If you have any questions about the safe operation of this tool, contact Victaulic Tool Company, P.O. Box 31, Easton, PA 18044-0031, Phone: 610-559-3300.

3/98 2271 Rev. A

2

ALWAYS KEEP THIS PAD WITH THE TOOL. USE IT TO SET THE GUARDS IN ACCORDANCE WITH THE TOOL OPERATION AND MAINTENANCE MANUAL.

R068272LAB

3

DANGER

Only Qualified Persons should open this door.

Hazardous voltage inside will cause serious injury or death.

ALWAYS disconnect power before servicing.

0305.1

4

PIPE ROTATION

CLOCKWISE ONLY

3318 Rev. A 9/01 R040416LAB

5

WARNING

Grooving rolls can crush or cut fingers and hands.

- Always turn power switch OFF before adjusting guards.
- Make sure guards are properly adjusted before grooving pipe.

2914 Rev. B 9/01 R039416LAB

TOOL SETUP

⚠ WARNING

- Do not connect the power until instructed otherwise. Accidental startup of the tool could result in serious personal injury.

1. Remove all components from the containers, and make sure all necessary items are included (refer to the "Receiving the Tool" section on page 3).
2. The VE414MC is designed for use in a permanent location, on a level concrete floor or base. Refer to Figure 2 below for overall dimensions.
3. The choice of tool location and position should take into account the following factors:
 - a. Pipe handling and support requirements
 - b. Power supply requirements
 - c. Ambient temperature requirements of 20°F (-7° C) to 104°F (40° C)
 - d. Adequate clearance around the tool for adjustment and maintenance
4. Once the tool is located, it must be leveled and securely anchored (refer to Figure 1 below). **NOTE:** An uneven tool can severely affect proper grooving operations.

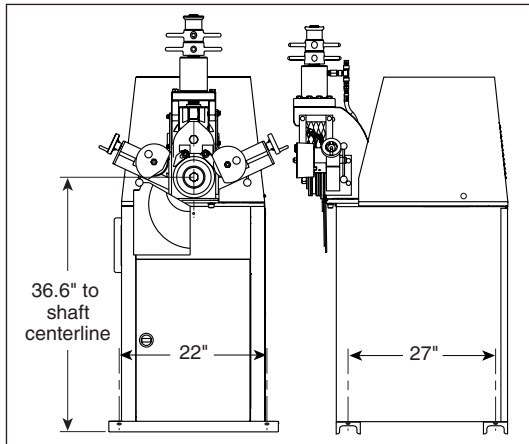


Figure 1
MOUNTING HOLE LOCATIONS
(Four 3/16"/14 mm diameter through holes)

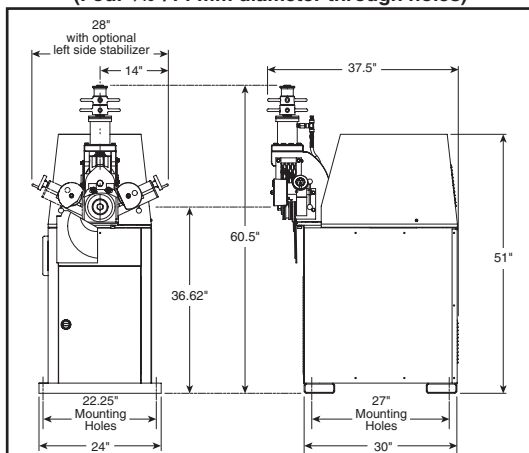
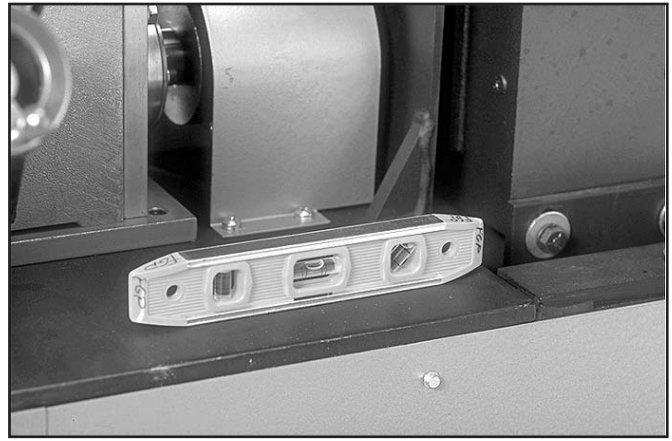


Figure 2



5. When checking tool levelness front-to-back, place the level directly on the tool frame, as shown above. Turn the level 90° to check left-to-right levelness.

NOTICE

- The safety foot switch can be removed easily for storage in the cabinet when the tool is not in use.



6. Install the safety foot switch by aligning the pins/tab of the male adapter plug with the receptacle.



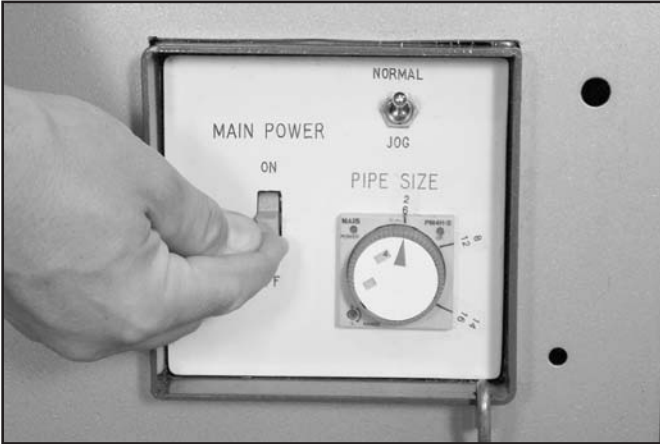
7. Tighten the locking ring on the plug.

POWER HOOKUP

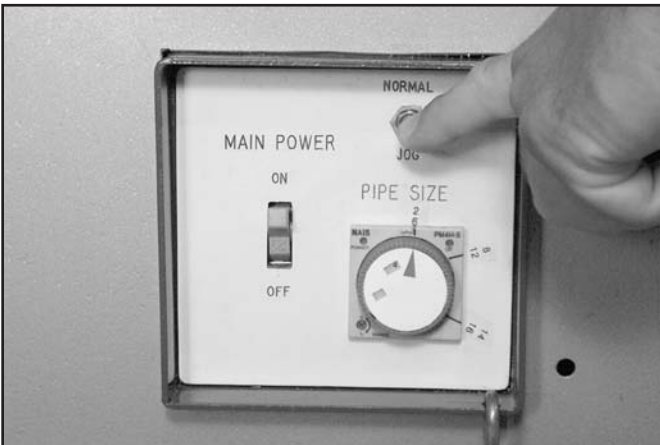
The VE414MC is supplied with a #10/4 line cord (3 power, 1 ground) and is set up for 230-volt, 3-phase, 60-Hz power, unless specified otherwise on the order.

If 460 volt is used, make sure the proper conversions are made, which include: motor connections, fuse changes, thermal overload unit changes, and transformer connections. Refer to the electrical wiring diagram on page 30 for complete information.

When the 3-phase power is properly connected, the tool must be checked for proper rotational direction by completing the following steps:



1. Turn the main power switch "ON."



2. Position the toggle switch to "NORMAL." This switch is located on the left-hand side of the enclosure.

3. Move the depth adjuster lock to the full down position. Depress the safety foot switch, and observe the direction of the lower roll's rotation. Release the foot switch.

If the lower roll is rotating clockwise, proceed to the "Pipe Preparation" section, on the following page.

If the lower roll is rotating counterclockwise, turn the main power switch OFF, and proceed as follows:

⚠ DANGER



- Only qualified electricians should connect or disconnect incoming power to the tool.
- Failure to follow these instructions could result in death or serious personal injury.

- a. Disconnect the power.
- b. Reverse any two of the 3-phase power leads at the power source.
- c. Turn the main power "ON" (re-connect the main power).
- d. Turn the main power switch "ON," and depress the safety foot switch. If the lower roll still does not rotate clockwise, contact the Victaulic Tool Company.

PRE-OPERATION ADJUSTMENTS

Every VE414MC is checked, adjusted, and tested at the factory before shipment. Before grooving, however, the following adjustments must be made to ensure the tool is operating properly.

⚠ WARNING

- Always turn the main power switch OFF before making any tool adjustments, unless instructed otherwise.

Accidental startup of the tool could result in serious personal injury.

Grooving Rolls

NOTICE

- In late 1993, Victaulic introduced an improved type of grooving roll called "Enhanced Tracking Rolls" (ETR). The patented ETRs allow hands-free grooving for short pipe lengths. The photo below shows the difference between the ETR and the previous type of roll. The ETRs have two narrow grooves in the knurled surfaces, and the older rolls do not. It is important that you identify the type of grooving rolls you have available.



You may have the ETRs if you:

- Purchased or rented a Victaulic roll grooving tool after December 1993
- Purchased replacement grooving rolls after December 1993

Make sure the proper roll set is on the tool for the pipe size and material being grooved. These roll sets are marked with the pipe size range and part number. Refer to the "Tool Rating and Roll Selection" section starting on page 31. If proper rolls are not on the tool, refer to the "Roll Changing" section on page 18.

CAUTION

- Make sure the roll retaining bolts are tight. Loose retaining bolts could cause damage to the tool and rolls.

Pipe Preparation

For proper tool operation and to provide pipe grooves that are within Victaulic specifications, the following guidelines must be followed.

1. Square cut the pipe ends in accordance with the Column 1 note in the appropriate "Roll Groove Specifications" chart starting on page 33.
2. Internal or external weld beads or seams must be ground flush with the pipe surface, extending approximately 2" (50 mm) back from the pipe end.
3. The end of the pipe, both inside and outside, must be cleaned of loose rust, coarse scale, dirt, and other foreign material.

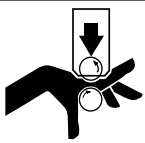
CAUTION

- For maximum grooving roll life, remove foreign material and loose rust from the inside and outside of pipe ends. Rust is an abrasive material that will wear the surface of grooving rolls. Foreign material may interfere with or damage grooving rolls, resulting in distorted grooves and grooves that are out of Victaulic specifications.

Victaulic recommends that pipe ends be square cut. When using beveled-end pipe (standard wall or less), the bevel must not exceed 35°. Square-end pipe MUST be used with FlushSeal® and EndSeal® gaskets. For heavier-wall pipe, the pipe ends MUST be square cut.

GROOVABLE PIPE LENGTHS

WARNING



- Grooving rolls can crush or cut fingers and hands.
- Loading and unloading pipe will place your hands close to the rollers. Make sure your hands are away from the roller when the machine is running.
 - Never groove pipe that is shorter than recommended in this manual.

The VE414MC is capable of grooving short pipe lengths without the use of a pipe stand. Refer to the "Short Pipe Lengths" section on this page.

Pipe lengths, longer than those listed in Table 1 on this page (and up to 20 ft/6 m), must be supported with a pipe stand.

Pipe lengths from 20 ft (6 m) up to double-random lengths (approximately 40 ft/12 m) must be supported with two pipe stands.

Short Pipe Lengths

Table 1 shows the minimum and maximum pipe lengths that can be grooved without the use of a pipe stand. Refer to the "Grooving Operation" section starting on page 15,

for instructions on how to groove short pipe lengths. For pipe longer than shown in Table 1, refer to the "Long Pipe Lengths" section on page 8.

NOTICE

- Grooved pipe nipples, shorter than those listed in the following table, are available from Victaulic.

TABLE 1 – GROOVABLE PIPE LENGTHS

Pipe Size		Length – inches (mm)	
Nominal Outside Dia. inches (mm)	Actual Outside Dia. inches (mm)	Min.	Max.
2 50	2.375 60,3	8 (200)	36 (915)
2½ 65	2.875 73,0	8 (200)	36 (915)
3 80	3.500 88,9	8 (200)	36 (915)
3½ 90	4.000 101,6	8 (200)	36 (915)
4 100	4.500 114,3	8 (200)	36 (915)
4½ 120	5.000 127,0	8 (200)	32 (815)
5 125	5.563 141,3	8 (200)	32 (815)
6 OD	6.000 152,4	10 (250)	30 (760)
6 150	6.625 168,3	10 (250)	28 (710)
8 OD	8.000 203,2	10 (250)	24 (610)
8 200	8.625 219,1	10 (250)	24 (610)
10 250	10.750 273,0	10 (250)	20/15* (510/380)*
12 300	12.750 323,9	12 (300)	18/14† (460/350)†
14 350	14.000 355,6	12 (300)	16/13§ (400/330)§
16 400	16.000 406,4	12 (300)	16^ (406)^

*20" (508 mm) long for aluminum, PVC, and light-wall steel and stainless steel
15" (380 mm) long for Schedule 30 and standard wall steel and stainless steel

†18" (457 mm) long for aluminum, PVC, and light-wall steel and stainless steel
14" (360 mm) long for Schedule 30 and standard wall steel and stainless steel

§16" (406 mm) long for aluminum, PVC, and light-wall steel and stainless steel
13" (330 mm) long for Schedule 30 and standard wall steel and stainless steel

^16" (406 mm) long for aluminum, PVC, and light-wall steel and stainless steel
NOTE: Always use a pipe stand for Schedule 30 and standard wall steel and stainless steel.

If a pipe, shorter than the minimum length listed in the above table, is required, shorten the next-to-last piece enough so that the last piece is as long (or longer) than the minimum length specified. Refer to the example below.

EXAMPLE: You need a 20-foot, 4-inch (6,2 m) length of 10-inch (273,0-mm) diameter pipe to finish a section, but you have only 20-foot (6,1 m) lengths available. Instead of roll grooving a 20-foot (6,1-m) piece of pipe and a 4-inch (0,1-m) pipe of pipe, follow these steps:

- Refer to Table 1 on the previous page. Note that the minimum length of 10-inch (273,0-mm) diameter pipe that can be roll grooved is 10 inches (250 mm).
- Roll groove a 19-foot, 6-inch (5,95-m) piece of pipe and a 10-inch (0,25-m) piece of pipe. Refer to the "Long Pipe Lengths" section on this page.

Long Pipe Lengths

Pipe that exceeds the maximum length, listed in Table 1 – Groovable Pipe Lengths on page 7, must be supported with a roller-type pipe stand.

NOTICE

- Figure 3 shows the Victaulic adjustable pipe stand (VAPS 112). The VAPS 112 is suitable for 3/4 - 12" (26,9 - 323,9 mm) pipe. The Victaulic model VAPS 224 is suitable for 2 - 24" (60,3 - 610,0 mm) pipe sizes. Refer to the "Accessories" section on page 29.
- For additional information about pipe stands, refer to the instructions included with the stand.

Important Information

Make sure the tool is level. Refer to the "Tool Setup" section for leveling and anchoring requirements.

When pipe-end flare is excessive, right-to-left tracking must be kept to a minimum. It may be necessary to use less than 1/2 a degree for the tracking angle.

Installation of couplings on pipe that exceeds the maximum allowable flare (listed in the "Roll Groove Specifications" chart starting on page 33) may prevent pad-to-pad closure of the housings and/or may cause damage to the coupling gasket.

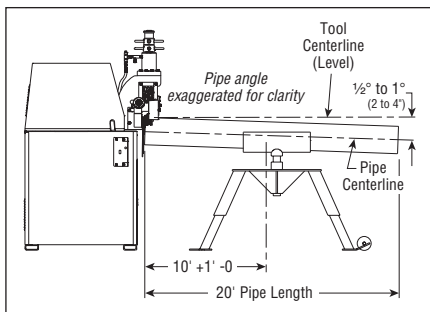
If the back end of the pipe is higher than the end being grooved, the pipe may not track, and excessive pipe-end flare may result.

CAUTION

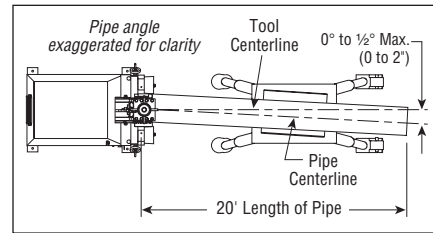
- Pipe position will affect pipe flare.
- Make sure the tool is level.

Failure to follow these instructions could result in property damage, gasket distortion/damage, joint leakage, and/or joint failure.

- Position the pipe stand, according to the following figures.



SUPPORT OF PIPE
Figure 3

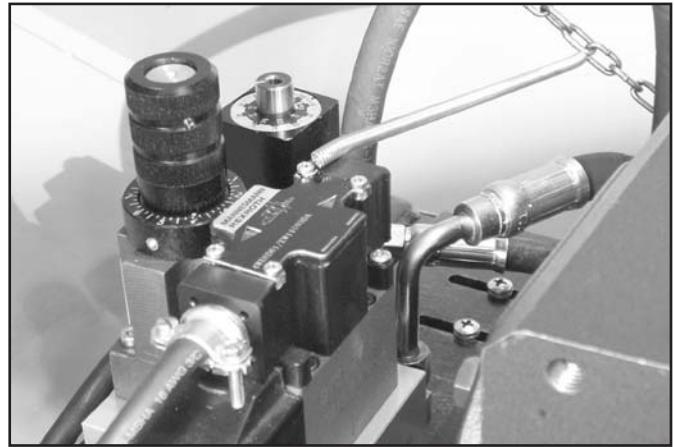


TRACKING ANGLE
Figure 4

RAM SPEED ADJUSTMENT

NOTE: Both the VE414 and the VE414MC use the same upper and lower grooving roll sets, as well as other features. Because of similarities between the VE414MC and the VE414 models, some of the photos in this section show the VE414 model. Therefore, some of these photos may look different from your model.

The ram speed adjustment is factory set for roll grooving steel pipe. If the pipe being grooved is another material, the ram speed must be re-adjusted.



- Open the top enclosure.



- Locate the key (stored in a magnetic key box), which fits the hydraulic speed control valve.



3. Insert the key into the ram speed control valve, as shown. Turn to unlock.



4. With the key inserted in the valve, rotate the knob until the knob “locks in.” Adjust the valve to the proper setting, as indicated in the table below.

Pipe Material	Valve Setting
Steel	2.0
Stainless Steel, Types 304 and 316	1.5
Aluminum, Types 6061-T4 and 6063-T4	3.0
PVC	10.0
Copper	1.5

NOTE: 2.0 is the factory setting for steel.

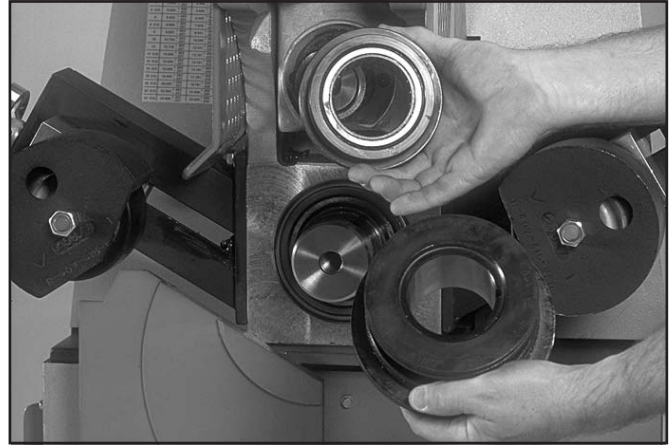
NOTICE

- The ram speed control valve affects only the rate at which the upper roll forms the groove. It does not affect the rate at which the upper roll advances to contact the pipe, nor does it affect the rate at which the roll retracts at the completion of the groove.
- Ram speed during the formation of the groove can have a significant effect on pipe-end flare. The recommended setting, listed in the table above, will produce excellent grooves in most situations. However, if excessive flare results at these settings, reduce the settings to correct the condition. For example, adjust the setting to 1.8 on steel when flare is excessive at the 2.0 setting.

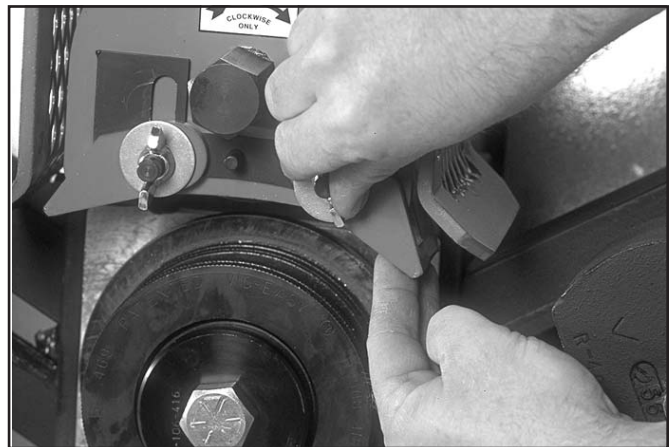
ROLL GUARD ADJUSTMENT

NOTE: Both the VE414 and the VE414MC use the same upper and lower grooving roll sets, as well as other features. Because of similarities between the VE414MC and the VE414 models, some of the photos in this section show the VE414 model. Therefore, some of these photos may look different from your model.

The VE414MC guards must be adjusted every time the rolls are changed, or when the pipe size or wall thickness is different from the pipe that was previously grooved.



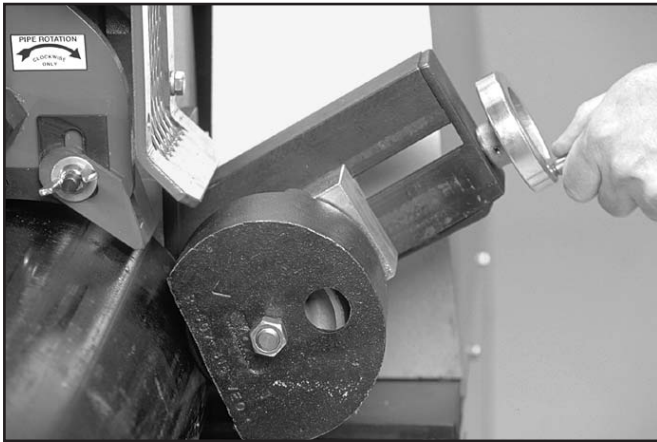
1. Make sure the proper roll set is on the tool for the pipe size and material. Rolls are marked with the pipe size, part number, and they are color coded for the pipe material (refer to the “Tool Rating and Roll Selection” section starting on page 31). If the proper rolls are not on the tool, refer to the “Roll Changing” section on page 18.



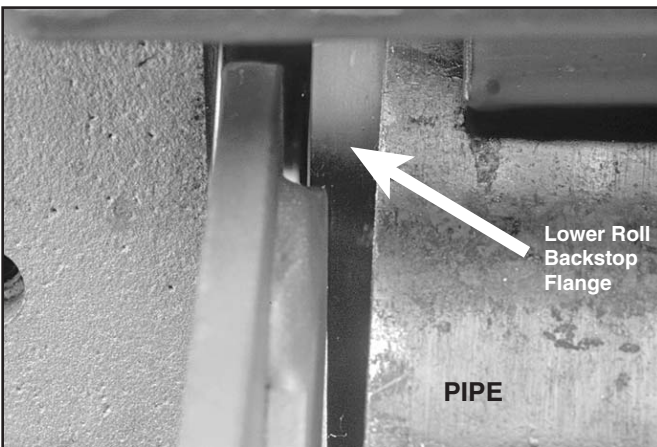
2. Loosen the wing nuts, and move the adjustable guards to the full-up position. Tighten the wing nuts.



3. Set the groove diameter stop to the pipe size and schedule/thickness to be grooved. Back off the depth adjuster lock, and align the depth adjuster with the proper diameter and thickness. Lock the depth adjuster in position with the depth adjuster lock. Refer to the "Groovable Pipe Lengths" section starting on page 7.

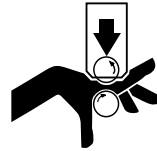


4. Retract the stabilizer, if necessary, to insert the pipe onto the lower roll. To do this, loosen the locking handle, and use the handwheel to retract the stabilizer roller. Tighten the locking handle.



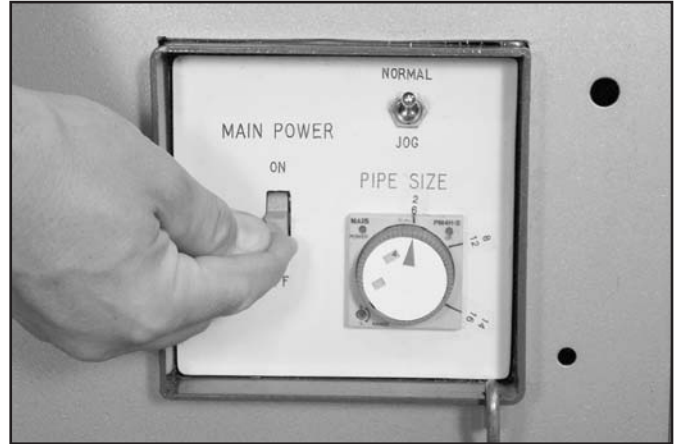
5. Insert a piece of pipe of the correct size and schedule/thickness over the lower roll (refer to the "Pipe Preparation" section starting on page 7). Make sure the pipe end contacts the lower roll's backstop flange.

⚠ WARNING

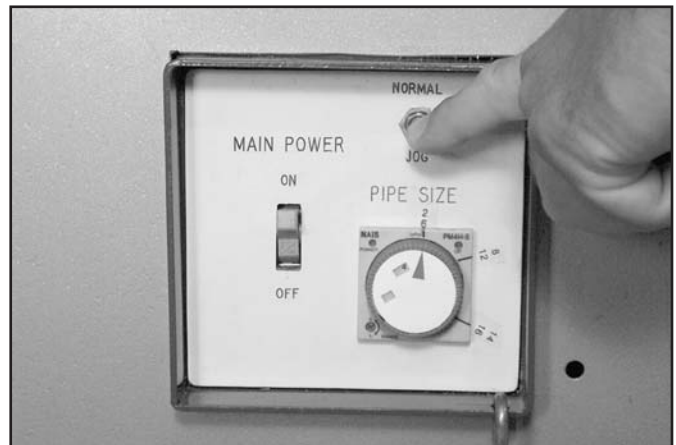


Grooving rolls can crush or cut fingers and hands.

- Loading and unloading pipe will place your hands close to the rollers. Make sure your hands are away from the roller when the machine is running.
- Never groove pipe that is shorter than recommended in this manual.



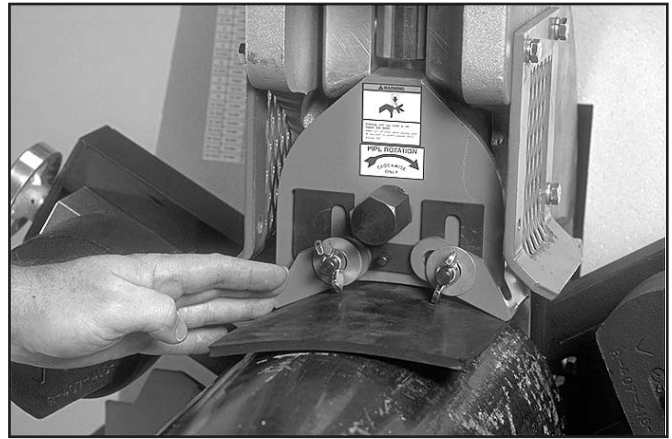
6. Set the main power switch to the "ON" position.



6a. Set the toggle switch to the "JOG" position.



7. The operator must be positioned on the switch side of the machine. Use the safety foot switch to energize the tool's motor and to bring the upper roll down into firm contact with the pipe. Withdraw your foot from the safety foot switch.

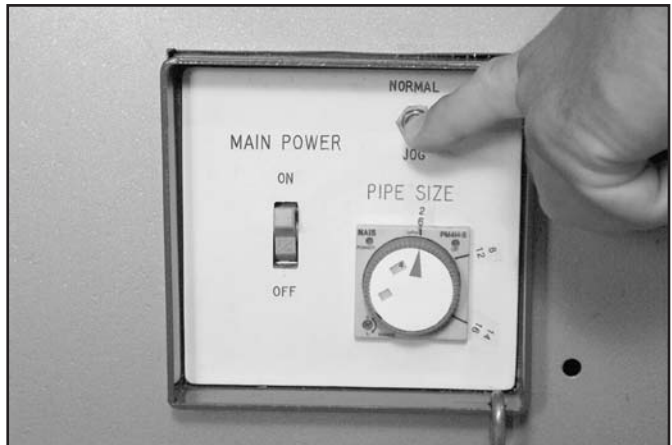


9. Loosen the wing nuts, and adjust each guard to lightly pinch the pad against the pipe. Tighten the wing nuts to secure the guards in position.

10. Remove the guard setting pad from between the pipe and the guards. Store the pad back on the hook provided.



8. Remove the guard setting pad from its storage hook.



11. Prepare to support the pipe, and set the toggle switch to the "NORMAL" position. The arm/upper roll assembly will return to its upper position, and the pipe will release.



8a. Hold the guard setting pad firmly down against the pipe. Push it under the adjustable guards.

⚠ CAUTION

- Use the "JOG" setting only for pre-operation adjustments to the tool. When the tool is left in the "JOG" setting with the power on, the pipe will be gradually released. This may result in the pipe falling out of the tool.
- Always return the switch to the "NORMAL" setting at the completion of the pre-operation adjustments.

Failure to follow these instructions could result in personal injury, product damage, and/or property damage.

PIPE STABILIZER ADJUSTMENT

NOTE: Both the VE414 and the VE414MC use the same upper and lower grooving roll sets, as well as other features. Because of similarities between the VE414MC and the VE414 models, some of the photos in this section show the VE414 model. Therefore, some of these photos may look different from your model.

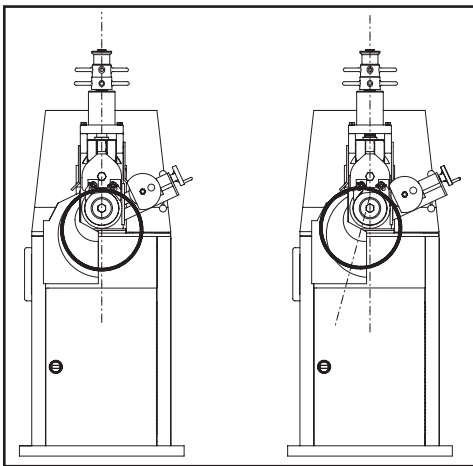
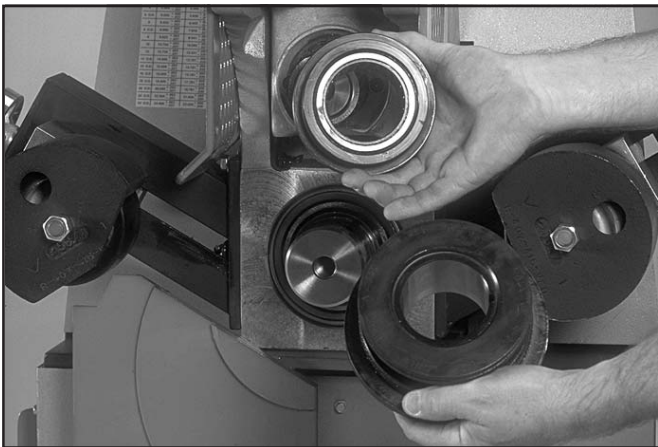


Figure 5

The VE414MC pipe stabilizer is designed to prevent sway of 6 – 16" (168,3 – 406,4 mm) IPS pipe sizes; this applies to short and long pipe sizes. Once the stabilizer is adjusted for a selected pipe size and wall thickness, it does not require further adjustment. Pipe of the same size and thickness may be moved in and out of the tool without retracting the stabilizer.

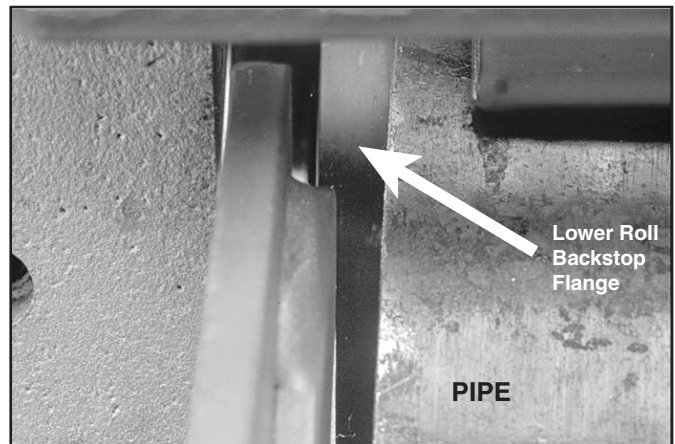


1. Make sure the proper roll set is on the tool for the pipe size and material. Rolls are marked with the pipe size range, part number, and they are color coded for the pipe

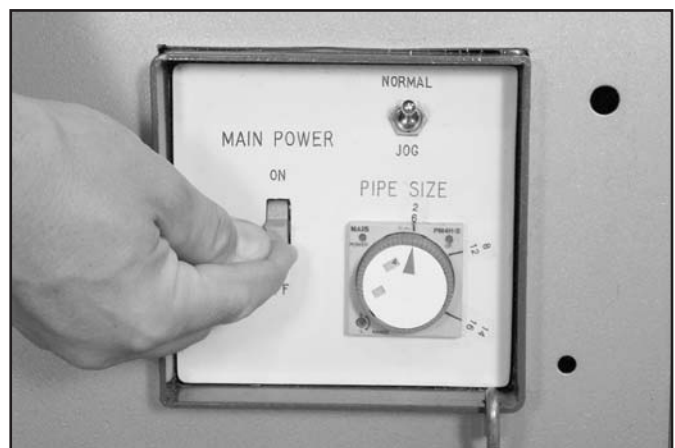
material (refer to the "Tool Rating and Roll Selection" section starting on page 31). If the proper rolls are not on the tool, refer to the "Roll Changing" section on page 18.



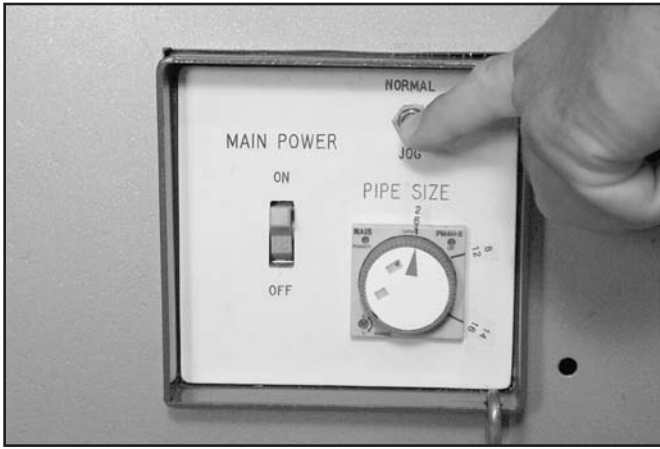
2. Loosen the stabilizer's locking handle. Using the hand-wheel, fully retract the stabilizer roller.



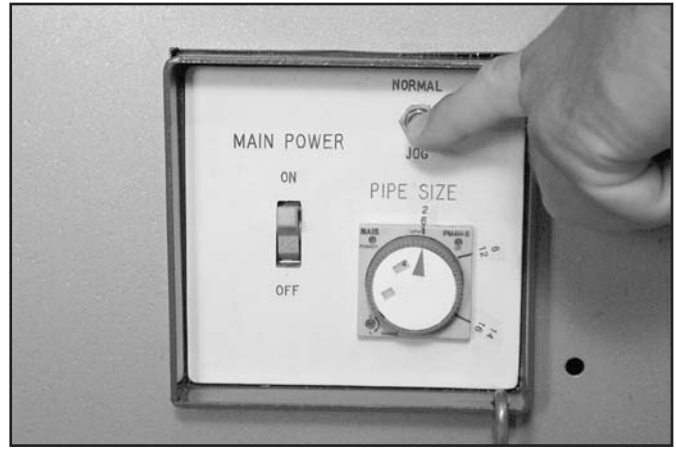
3. Insert a piece of pipe of the correct size and schedule/thickness (refer to the "Pipe Preparation" section starting on page 7) over the lower roll. Make sure the pipe end contacts the lower roll's backstop flange.



4. Set the main power switch to the "ON" position.



4a. Set the toggle switch to the "JOG" position.



7. Prepare to support the pipe, and set the toggle switch to the "NORMAL" position. The arm/upper roll assembly will return to its upper position, and the pipe will release.



5. The operator must be positioned on the switch side of the machine. Use the safety foot switch to energize the tool's motor and to bring the upper roll down into firm contact with the pipe. Withdraw your foot from the safety foot switch.

6. Using the handwheel, advance the stabilizer roller inward to the position indicated in Figure 5 on page 12. Tighten the locking handle.

! CAUTION

- **DO NOT** adjust the stabilizer to push the pipe to the left and off-center from the rolls. Doing so will cause increased pipe-end flare and will shorten roller life.

Failure to follow this instruction could cause increased pipe-end flare and shorten roller life, resulting in property damage, joint leakage, excessive gasket distortion/damage, and/or joint separation.

! CAUTION

- Use the "JOG" setting only for pre-operation adjustments to the tool. When the tool is left in the "JOG" setting with the power on, the pipe will be gradually released. This may result in the pipe falling out of the tool.
- Always return the switch to the "NORMAL" setting at the completion of the pre-operation adjustments.

Failure to follow these instructions could result in personal injury, product damage, and/or property damage.

8. Complete the "Pre-Operation Adjustment" section, and groove the pipe (refer to the "Grooving Operation" section starting on page 15).

The stabilizer roller should remain in light or intermittent contact with the pipe, and the pipe should rotate smoothly without swaying from side-to-side. If not, advance the stabilizer roller inward. Re-test and make further adjustments, as necessary. **DO NOT** adjust the stabilizer too far inward, since it will skew the pipe to the left and possibly result in excessive pipe-end flare.

DWELL CONTROL ADJUSTMENT

The dwell control adjustment controls the length of time the tool continues to rotate the pipe once the groove diameter stop contacts the top of the hydraulic cylinder. When adjusted to the proper size, the pipe will rotate a minimum of one revolution after the groove diameter stop contacts the hydraulic cylinder. This ensures that the groove in the pipe will be of uniform depth around the entire pipe circumference.



1. Adjust the dial marked "PIPE SIZE" to the pipe size range being grooved.

NOTICE

- During grooving, the groove diameter stop may occasionally ride up and down, making contact and then breaking contact with the hydraulic cylinder. This is normal for pipe that has a pronounced weld seam or hard spot.

GROOVE DIAMETER STOP ADJUSTMENT

NOTE: Both the VE414 and the VE414MC use the same upper and lower grooving roll sets, as well as other features. Because of similarities between the VE414MC and the VE414 models, some of the photos in this section show the VE414 model. Therefore, some of these photos may look different from your model.

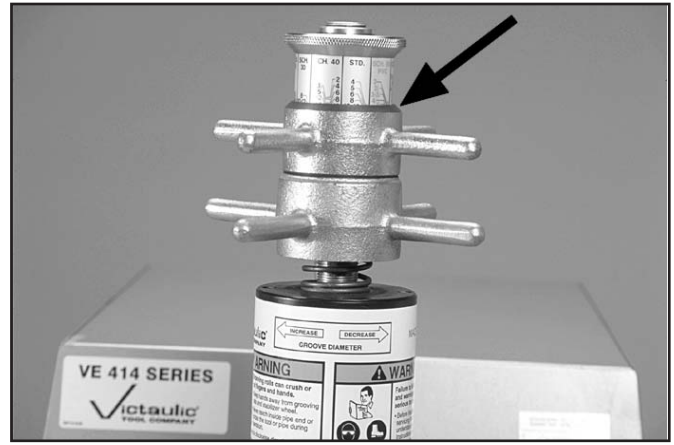
The groove diameter stop must be adjusted for each pipe size or change in wall thickness. The groove diameter, identified as the "C" dimension for each pipe size, is listed under the "Roll Groove Specifications" section starting on page 33.

NOTICE

- To perform and test the following adjustments, use several short scrap sections of pipe (but not shorter than what is recommended in Table 1, page 7) of the proper material, diameter, and thickness to be grooved.

To achieve the proper diameter:

1. Determine the size and thickness of the pipe to be grooved. Refer to the "Helpful Information – Pipe and Tubing Dimensions" section on page 35 to determine the proper schedule.



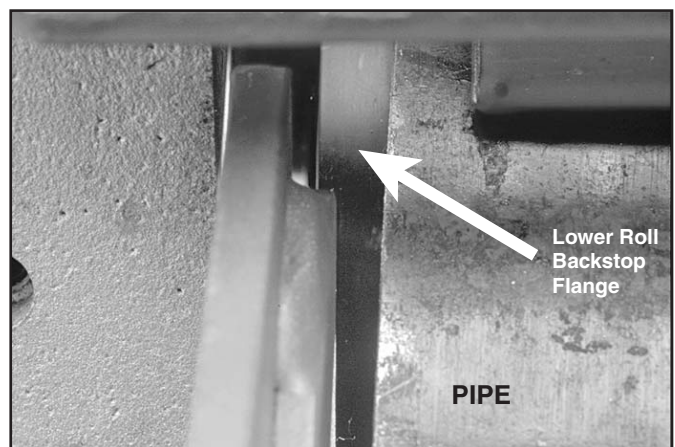
2. Locate the proper size and schedule on the pipe size indicator above the hydraulic power cylinder.



3. Back off the depth adjuster lock. Align the depth adjuster with the proper size and schedule, as shown. Lock the depth adjuster in position with the depth adjuster lock.

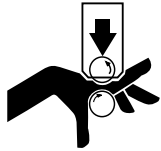
NOTICE

- The markings on the depth adjuster provide an approximate groove diameter adjustment and are not exact groove diameter settings. Variations in actual pipe outside diameters and wall thicknesses prevent the diameter stop from being calibrated to an exact setting.



4. Using a short piece of scrap pipe (refer to Table 1 – Groovable Pipe Lengths on page 7), place the pipe over the lower roll. Make sure the pipe end contacts the lower roll's backstop flange.

! WARNING



- Grooving rolls can crush or cut fingers and hands.
- Loading and unloading pipe will place your hands close to the rollers. Make sure your hands are away from the roller when the machine is running.
 - Never groove pipe that is shorter than recommended in this manual.

- Never reach inside pipe end or across the tool or pipe during operation.
- Groove pipe in a clockwise direction only.
- Never wear loose clothing, loose gloves, and/or jewelry when operating the tool.

5. Prepare a trial groove by following the "Grooving Operation" section, starting on this page.

6. After a trial groove is prepared and the pipe is removed from the tool, carefully check the groove diameter ("C" dimension), listed in the tables in the "Roll Groove Specifications" section starting on page 33. The PT-100 Pipe Tape, supplied with the tool, is the best method for checking this dimension. In addition, this dimension may be checked by using a vernier caliper or narrow-land micrometer at two locations (90° apart) around the groove. The average reading must equal the required groove diameter specification.

! CAUTION

- The "C" dimension (groove diameter) must always conform to Victaulic specifications to ensure proper joint performance. Failure to follow this instruction could result in serious personal injury, property damage, joint leakage, and/or joint failure.

7. If the groove diameter ("C" dimension) is not within tolerance, the diameter stop must be adjusted.

7a. To adjust for a smaller groove diameter, turn the depth adjuster counterclockwise.

7b. To adjust for a larger groove diameter, turn the depth adjuster clockwise.

NOTE: A quarter-turn either way will change the groove diameter adjustment by approximately 0.031"/0,8 mm (0.125"/3,2 mm per full turn).

8. Prepare another trial groove, and check the groove diameter ("C" dimension) again. Repeat step 7 until the groove diameter is within Victaulic specifications. If excessive pipe flare or stalling of the drive motor occurs, adjustment of the ram speed is required. Refer to the "Ram Speed Adjustment" section on page 8.

GROOVING OPERATION

NOTE: Both the VE414 and the VE414MC use the same upper and lower grooving roll sets, as well as other features. Because of similarities between the VE414MC and the VE414 models, some of the photos in this section show the VE414 model. Therefore, some of these photos may look different from your model.

! CAUTION

- The VE414MC is designed ONLY for roll grooving pipe of the sizes, materials, and wall thicknesses outlined under the "Tool Rating and Roll Selection" section starting on page 31.

Grooving pipe, other than what is recommended in this manual, could result in improper pipe-end configuration and/or improper groove dimensions.

1. Before roll grooving, make sure you have followed all of the instructions in the previous sections of this manual.

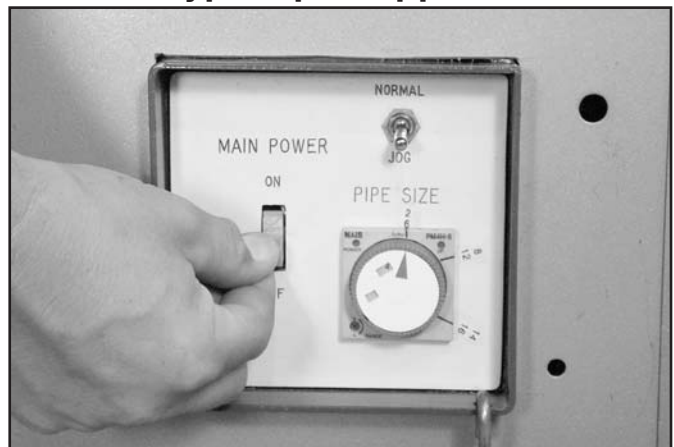
! WARNING



- Before operating this tool, review all safety precautions in the "Operator Safety Instructions" section on page 2.

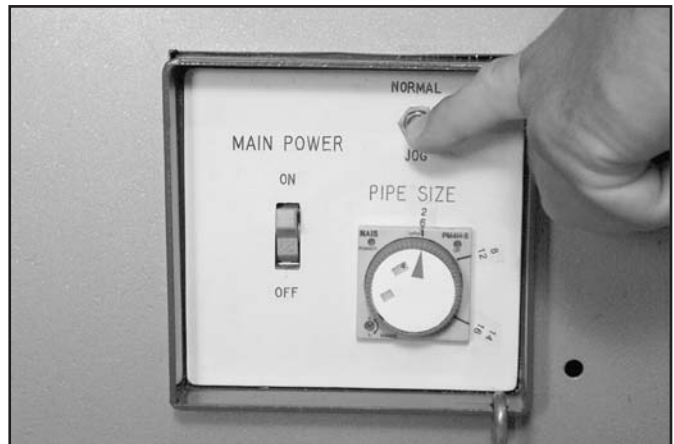
Failure to follow these instructions could result in serious personal injury and/or property damage.

Grooving Pipe that is Supported with a Roller-Type Pipe Support



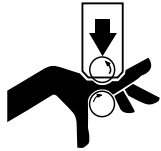
1. Set the power switch to the "ON" position.

2. Momentarily depress the safety foot switch to make sure the tool is operational.



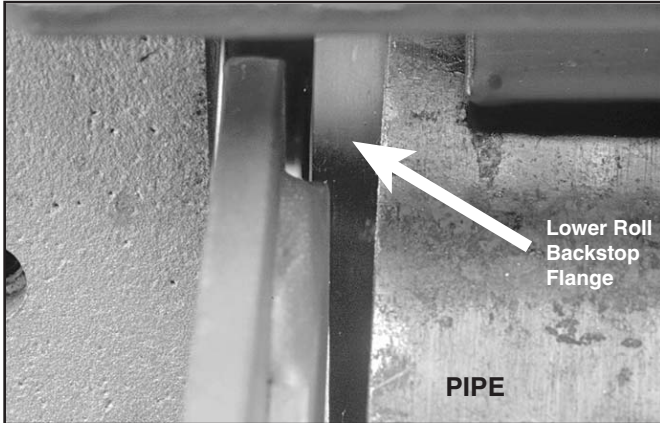
3. If the upper roll is not in the "full-up" position, set the toggle switch to the "NORMAL" position.

! WARNING

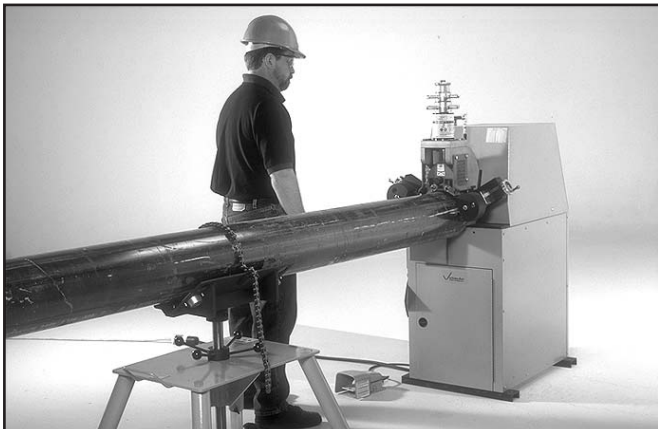


- Grooving rolls can crush or cut fingers and hands.
- Loading and unloading pipe will place your hands close to the rollers. Make sure your hands are away from the roller when the machine is running.
 - Never groove pipe that is shorter than recommended in this manual.

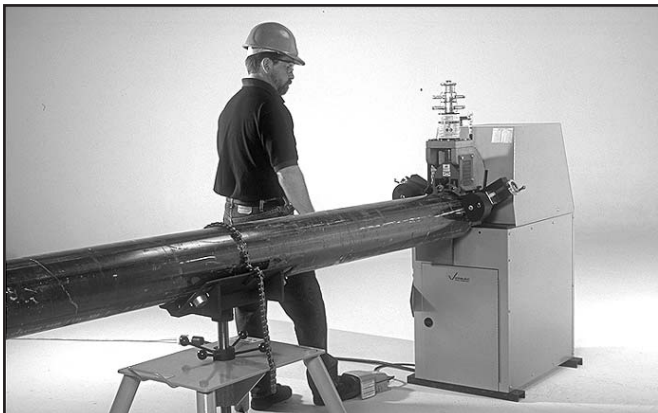
- Never reach inside pipe end or across the tool or pipe during operation.
- Groove pipe in a clockwise direction only.
- Never wear loose clothing, loose gloves, and/or jewelry when operating the tool.



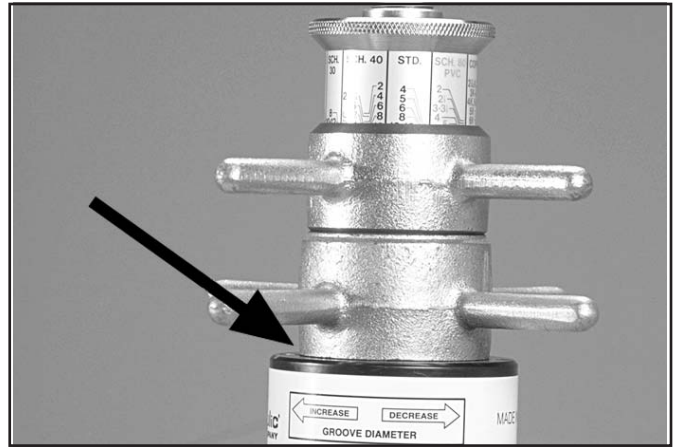
4. Place the pipe over the lower roll. Make sure the pipe end contacts the lower roll's backstop flange.



5. The operator should be positioned on the switch side of the tool, as shown above.



6. To start grooving, depress and hold down the safety foot switch. The upper roll will move down to contact the pipe, and the pipe will then begin rotating.

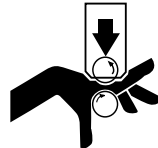


7. Allow the tool to continue grooving until the depth adjuster lock comes into full, firm contact with the top of the hydraulic power cylinder.



8. Prepare to support the pipe, and withdraw your foot from the safety foot switch. Remove the pipe from the tool.

! WARNING



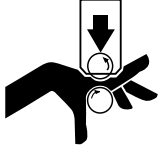
- Grooving rolls can crush or cut fingers and hands.
- Loading and unloading pipe will place your hands close to the rollers. Make sure your hands are away from the roller when the machine is running.
 - Never groove pipe that is shorter than recommended in this manual.

NOTICE

- The groove diameter should be checked and adjusted, as necessary, to ensure grooves are within Victaulic specifications.

Grooving Short Pipe Lengths

! WARNING



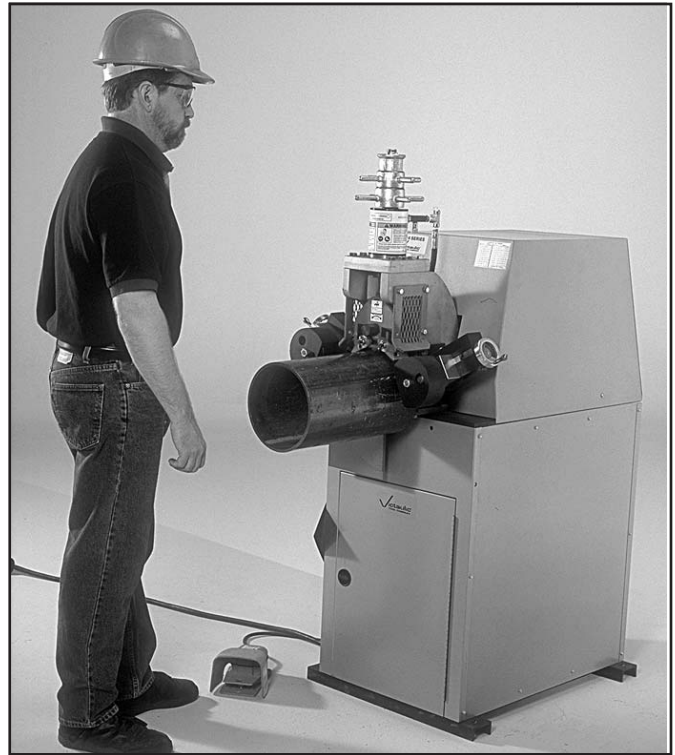
- Grooving rolls can crush or cut fingers and hands.
- Loading and unloading pipe will place your hands close to the rollers. Make sure your hands are away from the roller when the machine is running.
 - Never groove pipe that is shorter than recommended in this manual.



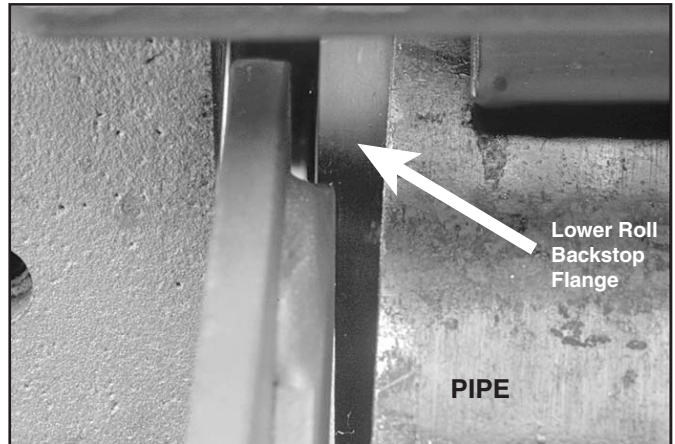
1. Set the power switch to the "ON" position.
2. Momentarily depress the safety foot switch to make sure the tool is operational.



3. If the upper roll is not in the fully open position, set the toggle switch to the "NORMAL" position.



4. The operator should be positioned on the switch side of the tool, as shown above.



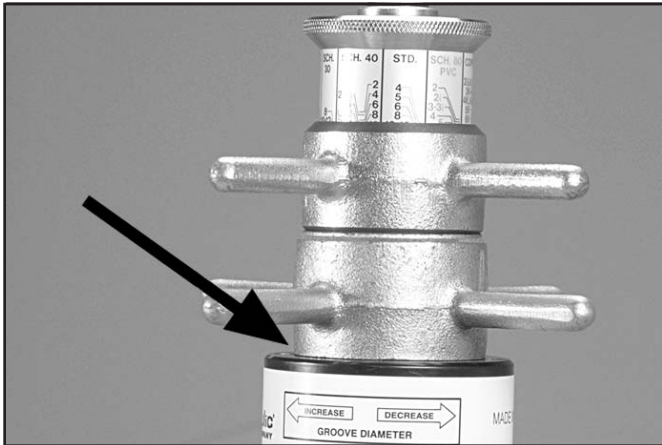
5. Place the pipe over the lower roll. Make sure the pipe end contacts the lower roll's backstop flange. Support the pipe, and depress and hold down the safety foot switch. The upper roll will move down to contact the pipe, and the pipe will begin rotating.

6. If using ETR rolls (refer to the NOTICE on page 6), remove hands from the pipe.

6a. When grooving a short piece of pipe (8-inch/200-mm length) with the old-type rolls (refer to the NOTICE on page 6), it will be necessary to pull the pipe to the left and downward with your right hand. DO NOT lift up on the pipe or push it to the right, since the pipe will not track and may spin (walk) out of the rolls.

6b. Depress and hold down the safety foot switch. Check the tracking of the pipe as it rotates to make sure it remains snug against the lower roll's backstop flange.

6c. If the pipe does not remain snug against the backstop flange, stop the tool by releasing the safety foot switch pedal. **NOTE:** Be prepared to support the pipe, since it will be released from the tool when the safety foot switch is released. Check to make sure the pipe is level and positioned properly.



7. Allow the tool to continue grooving until the depth adjuster lock comes into full, firm contact with the top of the hydraulic power cylinder.

8. Prepare to support the pipe, and withdraw your foot from the safety foot switch. Remove the pipe from the tool.

⚠ WARNING	
	<p>Grooving rolls can crush or cut fingers and hands.</p> <ul style="list-style-type: none"> • Loading and unloading pipe will place your hands close to the rollers. Make sure your hands are away from the roller when the machine is running. • Never groove pipe that is shorter than recommended in this manual.

NOTICE
<ul style="list-style-type: none"> • The groove diameter should be checked and adjusted, as necessary, to ensure grooves are within Victaulic specifications.

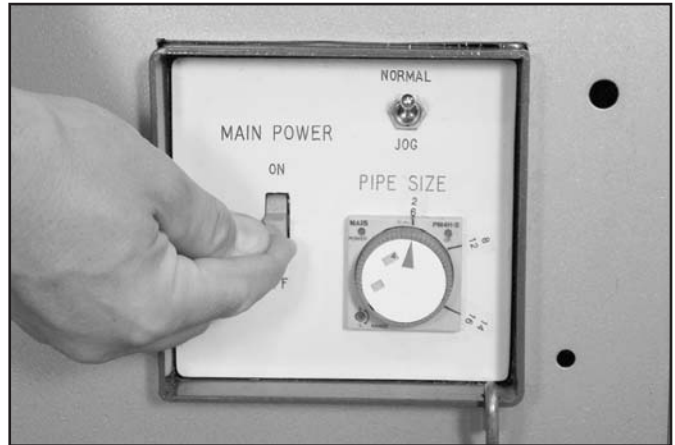
ROLL CHANGING

NOTE: Both the VE414 and the VE414MC use the same upper and lower grooving roll sets, as well as other features. Because of similarities between the VE414MC and the VE414 models, some of the photos in this section show the VE414 model. Therefore, some of these photos may look different from your model.

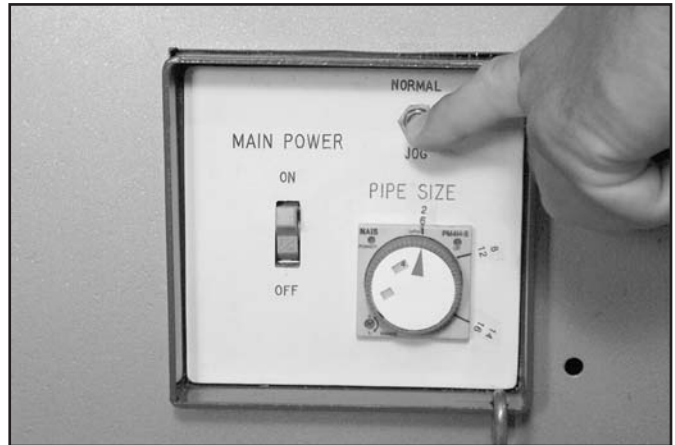
NOTICE
<ul style="list-style-type: none"> • The VE414MC grooving rolls accommodate several pipe sizes (refer to the “Tool Rating and Roll Selection” section starting on page 31 for proper roll selection) and eliminate the need for frequent roll changes. When a different size range, different pipe material, or grooving style is required, the grooving rolls must be changed, and the pre-operation adjustments must be performed again.

Installation and Removal of Slide Spacer for 2 – 3½" Sizes (60,3 - 101,6 mm)

The slide/upper roll must return to its “full-up” position before changing rolls. The slide spacer will limit the upward travel of the slide.



1. Set the main power switch to the "ON" position.



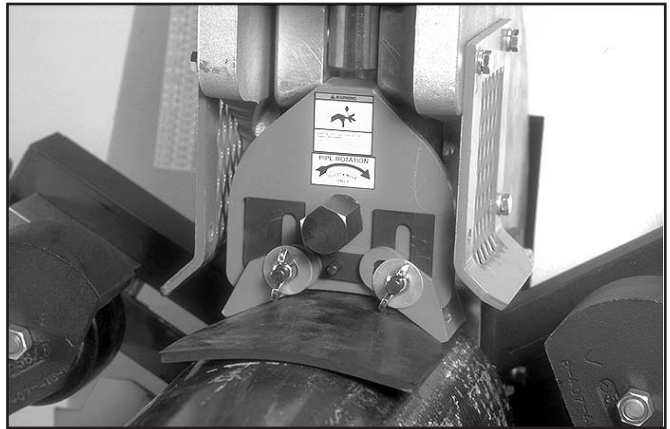
2. Set the toggle switch to the "JOG" position.



3. The operator must be positioned on the switch side of the machine. Use the safety foot switch to energize the tool and to bring the upper roll down into firm contact with the pipe.



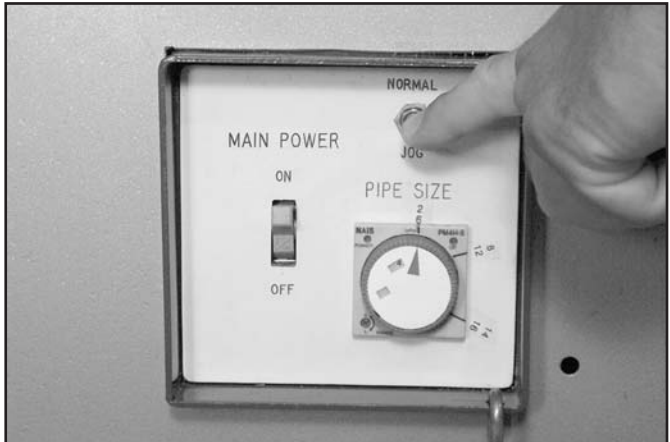
4. Withdraw your foot from the safety foot switch. Be prepared to support the pipe, since the slide/upper roll will return to its "full-up" position and the pipe will release from the rolls.



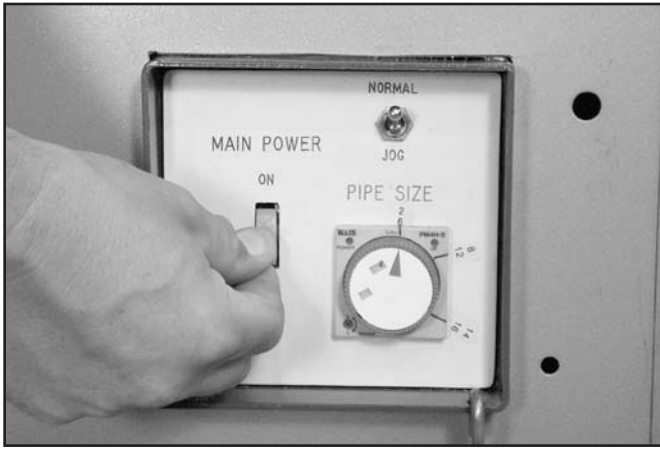
5. Make sure the guards are adjusted per the "Roll Guard Adjustment" section on page 9.



6. Snap in the slide spacer on top of the slide.

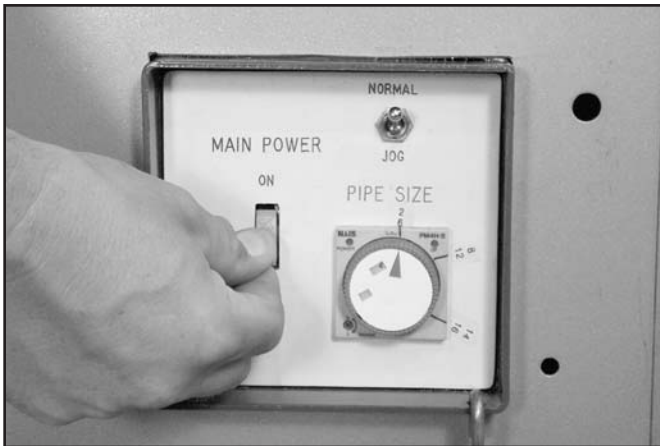


7. Set the toggle switch to the "NORMAL" position. The slide/upper roll will move up until the slide spacer contacts the hydraulic cylinder mounting block.



8. Set the power switch to the "OFF" position.

Removal of the Upper Roll (4 – 16" / 114,3 – 406,4 mm)

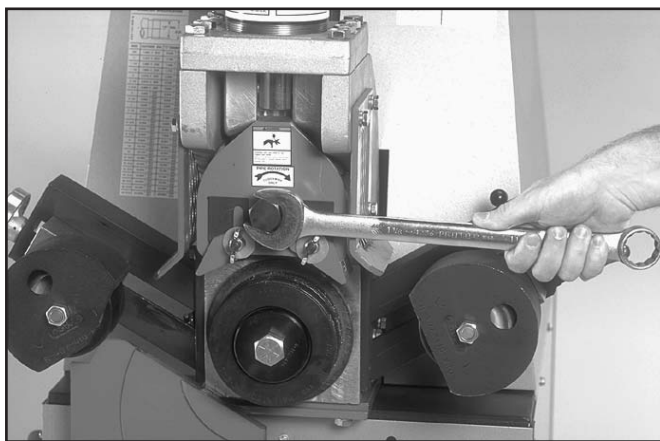


1. Set the power switch to the "OFF" position.

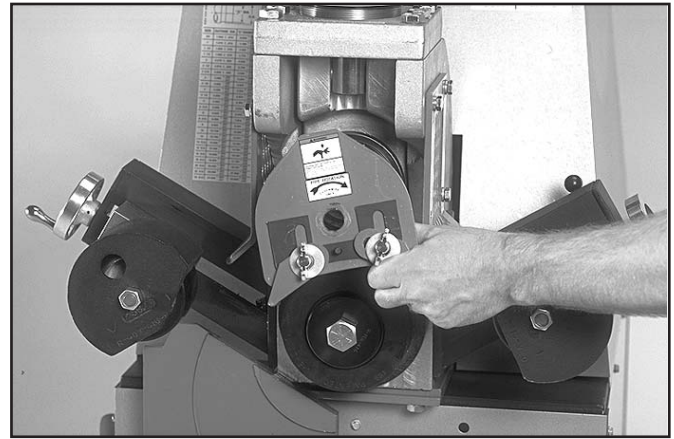
⚠ WARNING

- Always turn power OFF before making a roll change.

Failure to follow this instruction could result in serious personal injury.

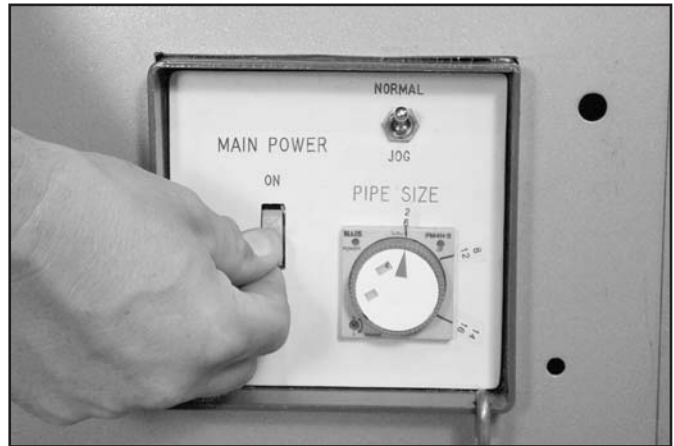


2. Loosen and remove the upper roll's bolt, as shown above. Place the bolt on a clean surface.



3. Slide the upper roll and retaining plate off the upper shaft, as shown. Store these components in the cabinet.

Removal of the Lower Roll (4 – 16" / 114,3 – 406,4 mm)

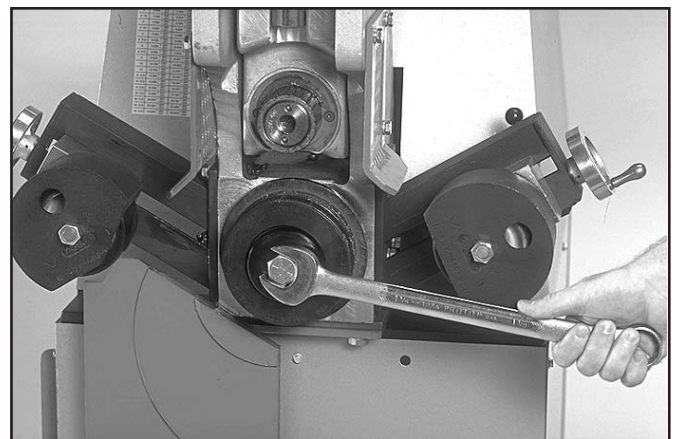


1. Set the power switch to the "OFF" position.

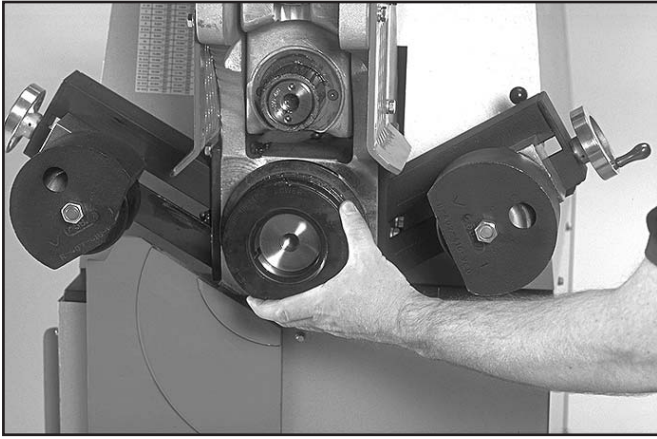
⚠ WARNING

- Always turn power OFF before making a roll change.

Failure to follow this instruction could result in serious personal injury.



2. Loosen and remove the lower roll's bolt and retaining plate, as shown. Place these components on a clean surface.



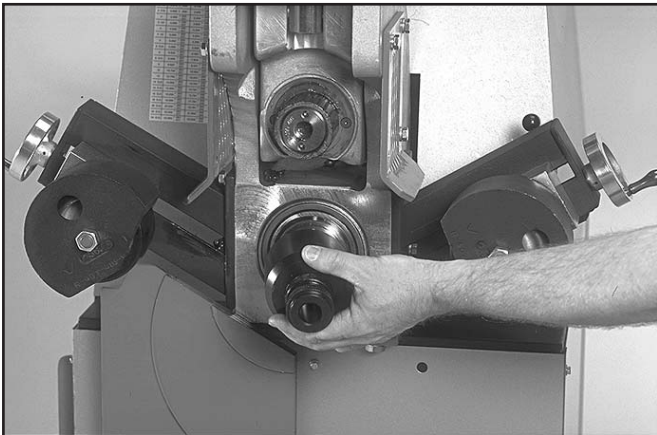
3. Slide the lower roll off the main shaft, as shown. Store the lower roll in the tool's storage compartment.

NOTICE

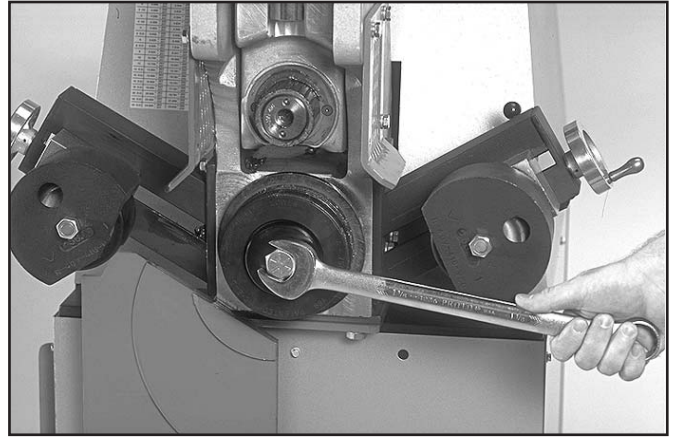
Be careful not to lose the Woodruff key. It should remain in the lower shaft. Inspect the Woodruff key and replace if damaged. Spare Woodruff keys are supplied with instruction manual.

Roll Installation (2 - 3½" / 60,3 - 101,6 mm)

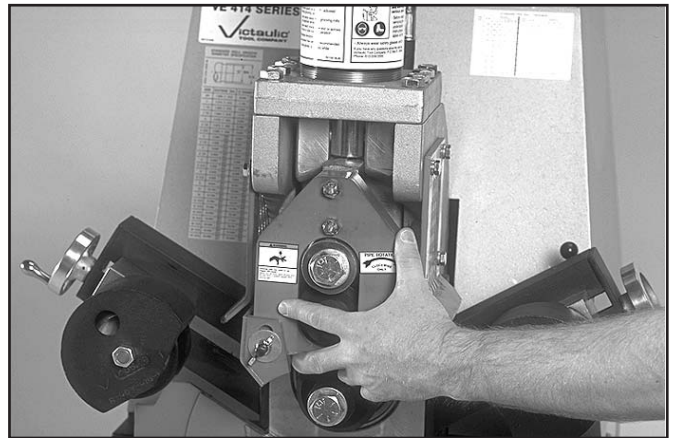
1. Remove the existing rolls, if necessary. Refer to the "Roll Changing" section starting on page 18.



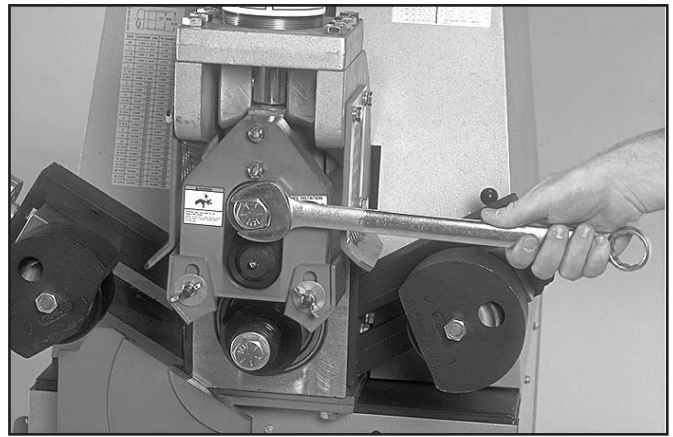
2. Lightly lubricate the lower shaft with a thin film of oil or grease before installing the lower roll. Slide the 2 - 3½" (60,3 - 101,6 mm) lower roll onto the main shaft. Properly align the roll with the Woodruff Key on the main shaft.



3. Place the ¾-inch (19-mm) flat washer onto the ¾" (19 mm) x 3¼" (83 mm) bolt. Install the bolt and washer, as shown above. Tighten the bolt securely with a wrench.



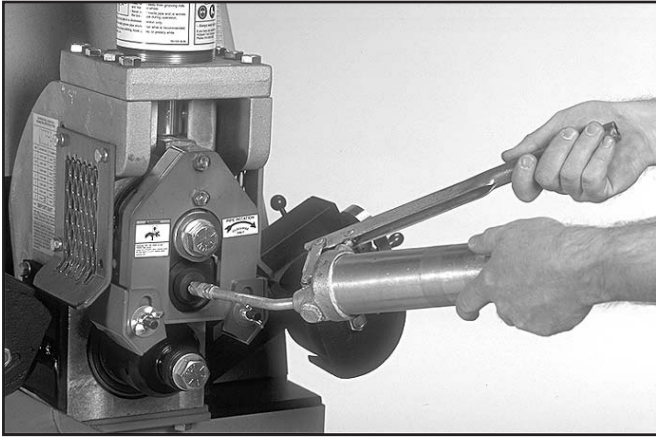
4. Carefully slide the upper roll assembly onto the upper shaft. Properly align the upper support block with the recess in the slide, as shown above.



5. Thread the upper support block's bolt into the upper shaft, as shown above. Tighten this bolt securely.

NOTICE

- As the upper support block's bolt is tightened, it will draw the upper roll assembly into proper alignment with the lower roll.

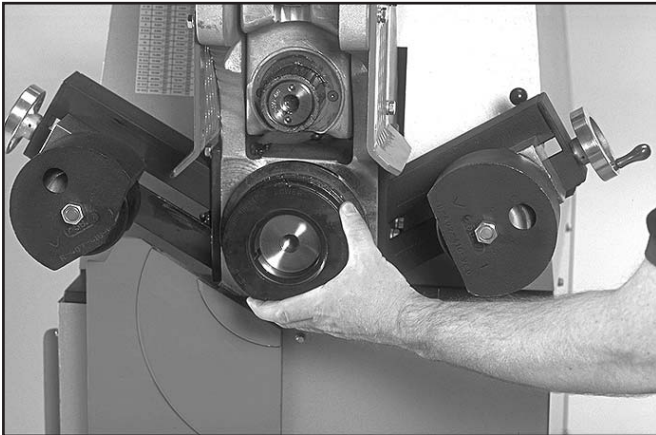


6. Lubricate the upper roll with No. 2EP Lithium-base grease, as shown. Refer to the "Maintenance" section starting on page 24, for additional information.

Lower Roll Installation (4 – 16"/ 114,3 – 406,4 mm)

NOTICE

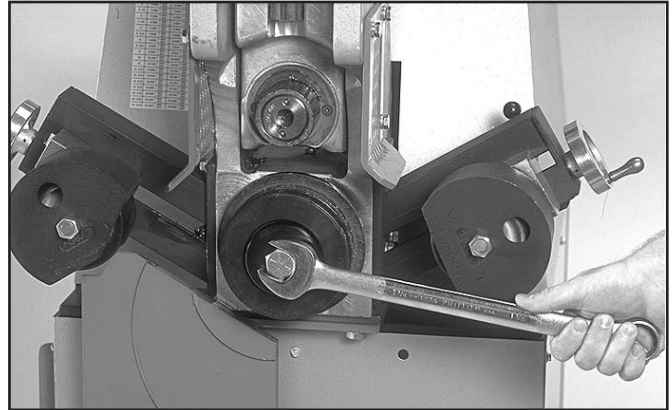
- Clean the main shaft and the lower roll's bore of any dirt and/or scale before installation. Make any repairs, as necessary.



1. Carefully slide the applicable size lower roll fully onto the main shaft with the marked side facing forward, as shown above. Properly align the roll with the Woodruff Key on the main shaft.

NOTICE

- To aid in removing the roll later, apply a thin film of oil or grease (anti-seize lubricant) to the main shaft before installing the lower roll.

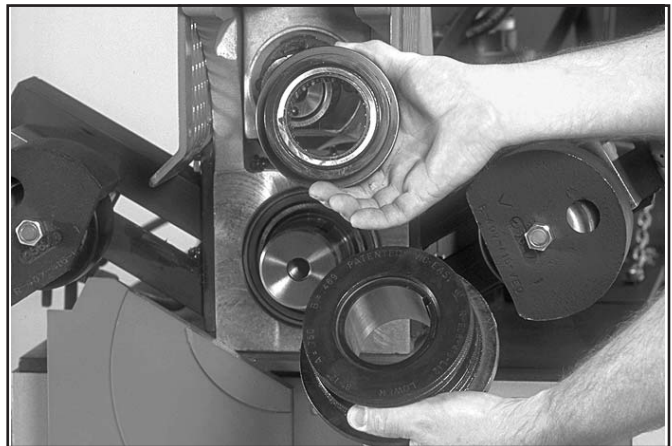


2. Install the lower roll's retaining plate (marked R-106-414-VEO) and bolt, as shown above. Securely tighten the bolt with a wrench.

Upper Roll Installation (4 – 16"/ 114,3 - 406,4 mm)

NOTICE

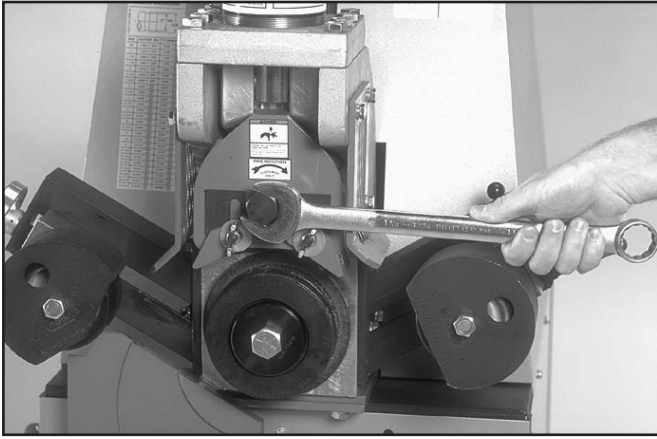
- Clean the upper shaft of any dirt and/or scale before installing the upper roll.
- Inspect the roller bearing, inside the upper roll, for proper lubrication and condition. Make any repairs, as necessary.



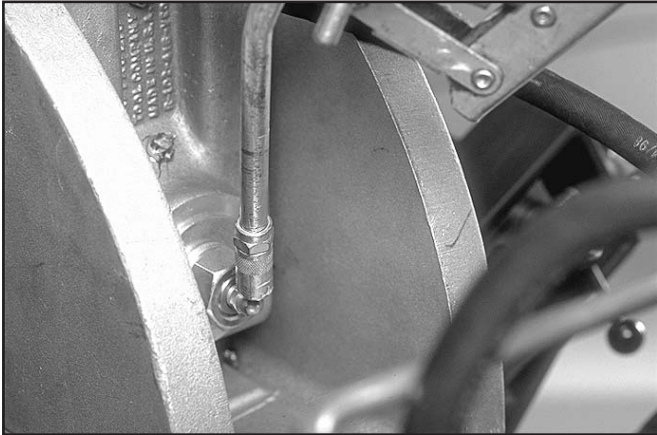
1. Carefully slide the applicable size upper roll onto the upper shaft, as shown above, with the markings facing forward.



2. Install the upper roll's retaining plate by aligning the tab on the plate with the recess in the slide, as shown above.



2a. Install the upper roll's retaining bolt, and securely tighten the bolt with a wrench.



3. Lubricate the upper roll's bearing with a No. 2EP Lithium-base grease, as shown above. Refer to the "Maintenance" section on the following pages, for additional information.

Copper Roll Installation

Removing and installing the 2 – 6" (60,3 – 168,3 mm) roll set for copper tubing is identical to the removal and installation of the standard roll set for 2 – 3½" (60,3 – 101,6 mm) steel pipe. Refer to the "Roll Changing" section starting on page 18 for complete instructions.

Removing and installing the 8" (219,1 mm) roll set for copper tubing is identical to the removal and installation of the standard roll set for 4 – 16" (114,3 – 406,4 mm) steel pipe. Refer to the "Roll Changing" section starting on page 18 for complete instructions.

MAINTENANCE

NOTE: Both the VE414 and the VE414MC use the same upper and lower grooving roll sets, as well as other features. Because of similarities between the VE414MC and the VE414 models, some of the photos in this section show the VE414 model. Therefore, some of these photos may look different from your model.

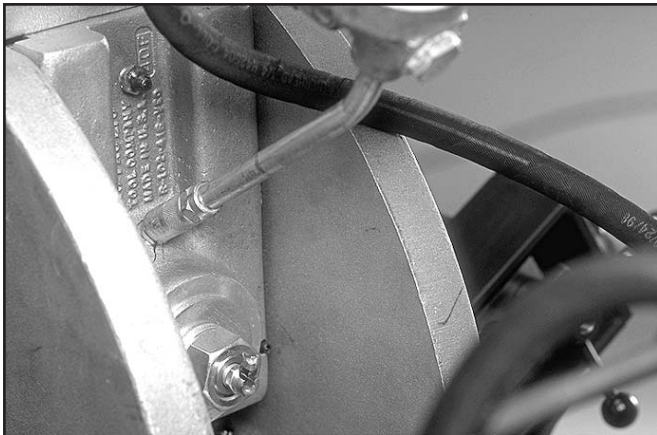
General

This section provides information that is critical in keeping the VE414MC tool in proper operating condition.

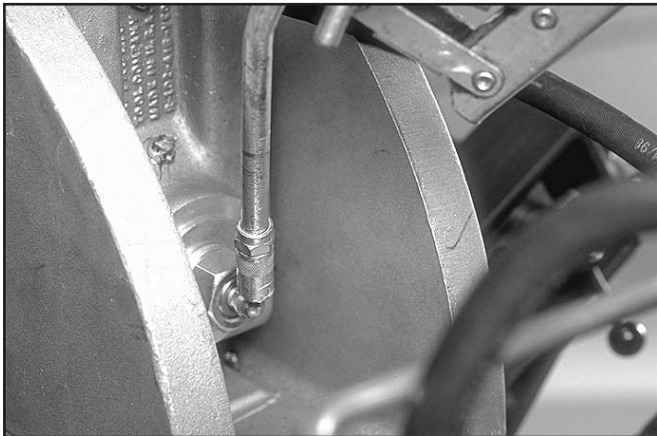
Only genuine Victaulic replacement parts should be ordered to ensure proper operation of this tool.

⚠ DANGER	
	<ul style="list-style-type: none">• Before performing any repair or maintenance, disconnect the tool from the electrical source to prevent accidental startup. <p>Failure to follow this instruction could result in death or serious personal injury.</p>

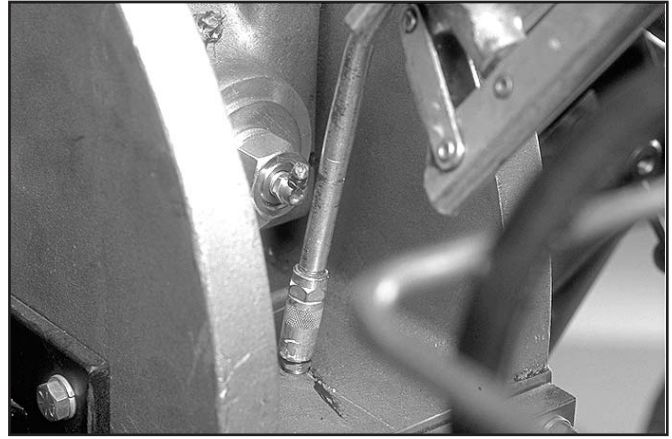
After every eight hours of operation, lubricate the tool. Always lubricate the upper roll bearings when changing the rolls.



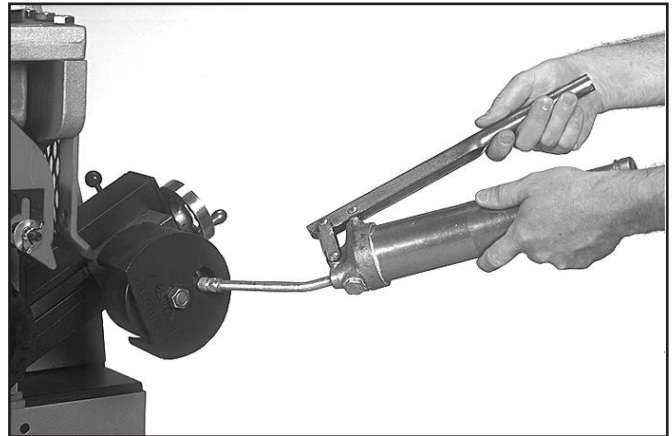
1. Grease the slide gibs at the two grease fittings, as shown.



2. Grease the upper roll bearing at the fitting, as shown.



3. Grease the main shaft bearings at the fittings, as shown.



4. Lubricate the stabilizer wheel with a No. 2EP Lithium-base grease. Refer to the "Recommended Lubricants" section on page 29.

Gear Reducer Oil Level

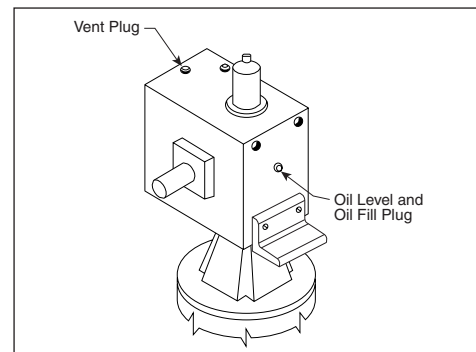


Figure 6

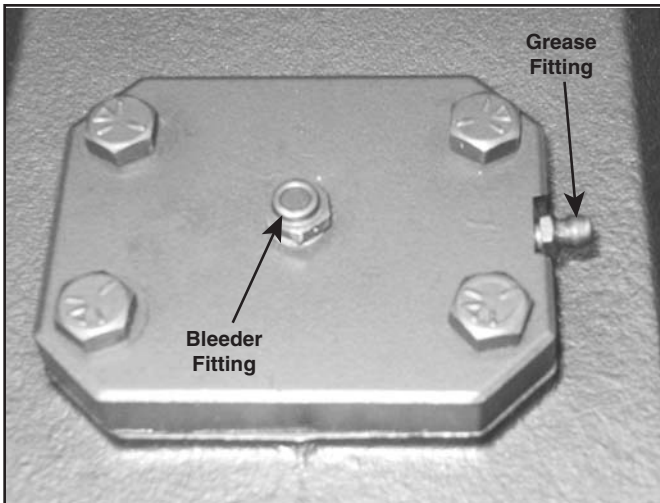
1. Remove the oil level plug from the gear reducer (refer to Figure 6 above). The oil level should be even with the bottom of the hole.

2. To add oil, remove the oil fill/level plug from the side of the gear reducer. Fill to the proper level (refer to Figure 6 above).

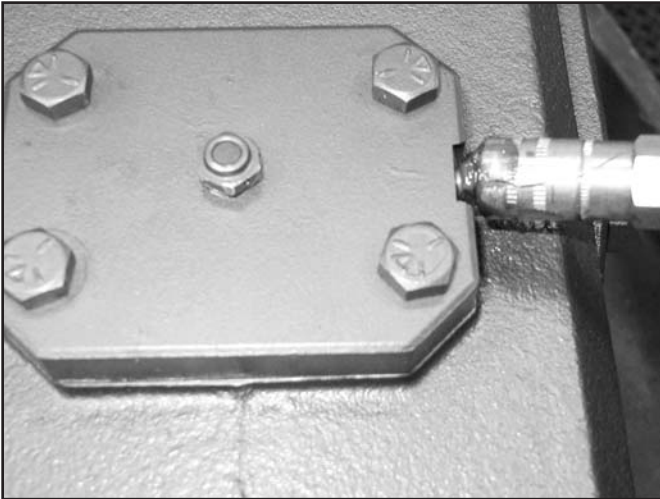
3. Install plug(s).

NOTE: The gear reducer's oil capacity is 75 oz (2 liters).

Gear Reducer Input Shaft



1. The gear reducer's input shaft cover contains a grease fitting (shown above). This grease fitting is located on the chain coupling side of the gear reducer. A bleeder fitting is located on the center of the gear reducer's input shaft cover (shown above).



2. Lubricate the input shaft bearing after every 40 hours of operation. This fitting must be lubricated with a No. 2EP Lithium-base grease until it weeps from the bleeder fitting.

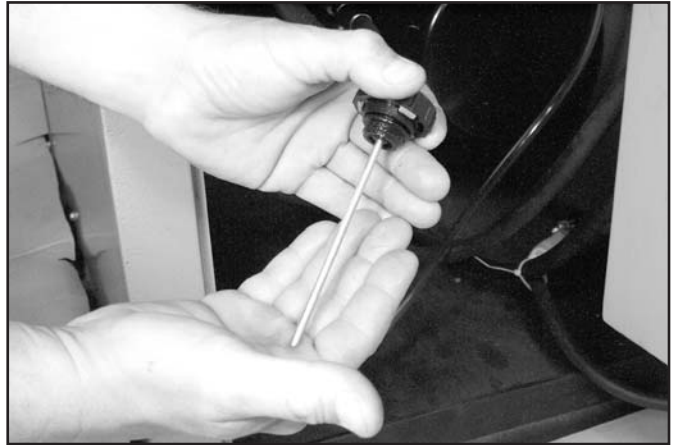
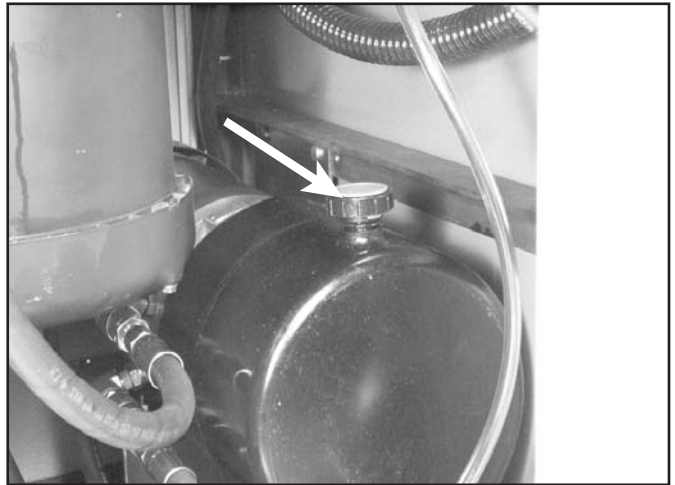
Hydraulic Oil Level

1. Using the dipstick, check the hydraulic oil level at least once per month. The level should be approximately $\frac{3}{4}$ - 1" (20 - 25 mm) below the oil tank's threaded neck. DO NOT over-fill the tank, since the oil may overflow due to thermal expansion. Refer to the "Recommended Lubricants" section on page 29 for the proper hydraulic oil.

Replacement of Hydraulic Oil and Filter

1. Replace the hydraulic oil and oil filter once per year or every 2000 hours of operation, whichever comes first.

2. Open the tool's rear door.



3. Remove the hydraulic breather cap/dipstick on top of the hydraulic tank.



4. Position a container, large enough to hold $1\frac{1}{2}$ gallons (6 liters) of oil, underneath the oil tank's drain plug. Remove the drain plug, located on the underside of the hydraulic oil tank. Allow the oil to drain completely into the $1\frac{1}{2}$ -gallon (6-liters) or larger container.

5. Replace the drain plug.



6. Place a tray under the oil filter, and remove the filter.



7. Lubricate the new filter gasket with new hydraulic oil. Install the new filter hand-tight.

8. Fill the tank with new hydraulic oil to approximately $\frac{3}{4}$ - 1" (20 - 25 mm) from the threaded neck of the tank.

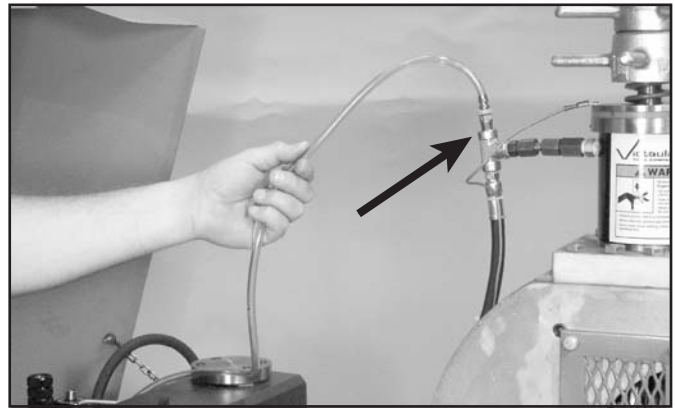
9. Re-install the hydraulic breather cap/dipstick.

Hydraulic Fluid Bleeding

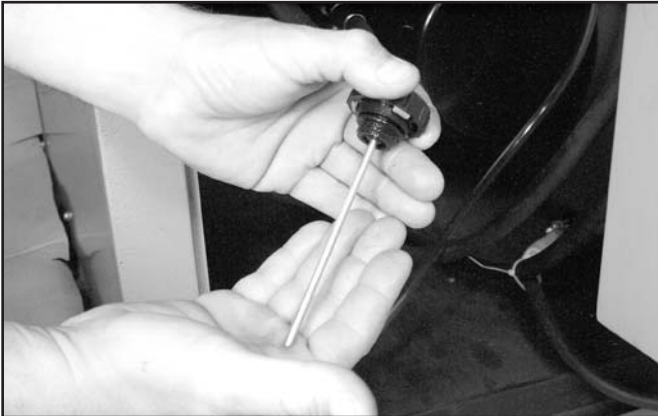
1. Fill the hydraulic tank with a recommended hydraulic oil (refer to page 26) to approximately $\frac{3}{4}$ - 1" (20 - 25 mm) below the threaded neck of the tank.



2. Remove the plug from the tee fitting near the hydraulic cylinder.



3. Install the bleeder tube (supplied with the tool) hand-tight into the tee fitting.

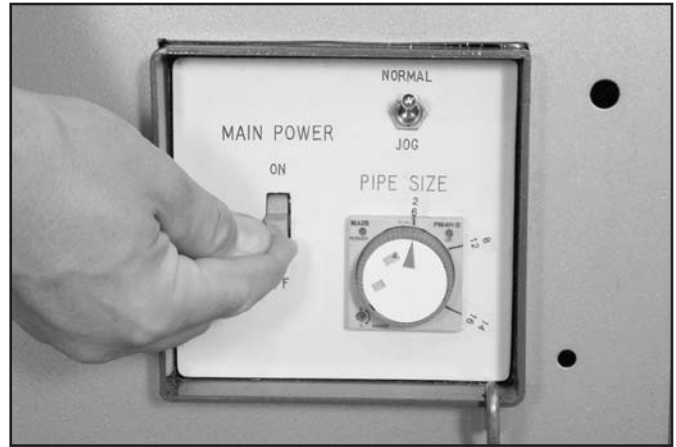


4. Remove the hydraulic breather cap/dipstick.

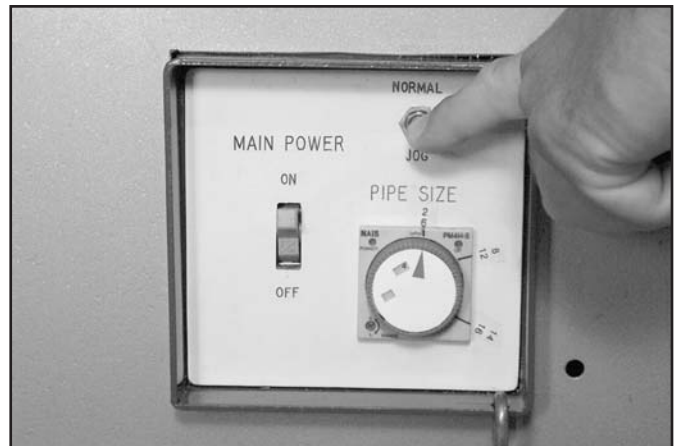


5. Insert the end of the bleeder tube (clear hose) into the tank so that the end is submerged in the hydraulic fluid.

6. Connect the tool to the proper power supply.



7. Set the main power switch to the "ON" position.



8. Set the toggle switch to the "JOG" position.

9. Depress the safety foot switch. The fluid will start to flow through the bleeder tube (the fluid should contain air bubbles).

9a. Continue to run the fluid through the bleeder tube for at least five minutes. While doing this, lightly tap on all of the steel hydraulic tubes to free any trapped air inside the walls.

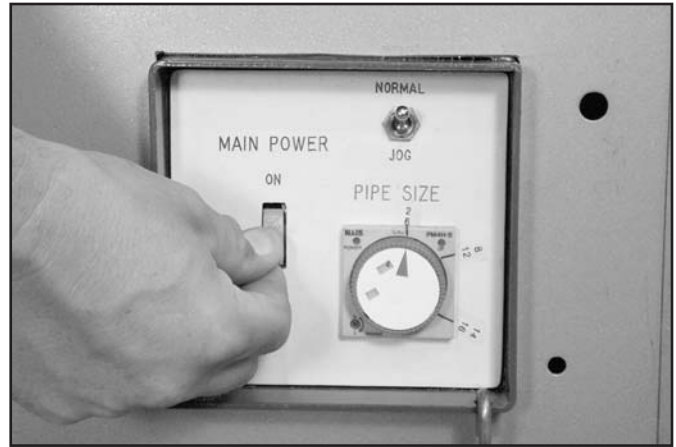
9b. Once the fluid flows through the bleeder tube without any air bubbles, continue to run it through for another two to three minutes. After this is complete, release the safety foot switch.

10. Remove the bleeder tube from the tee fitting and tank. Install the plug back into the tee fitting. Make sure air is not allowed back into the tee fitting while doing this.

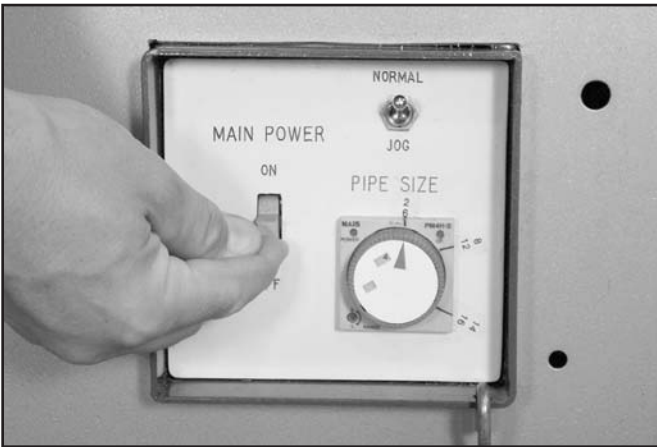
11. Fill the tank with new hydraulic oil approximately $\frac{3}{4}$ - 1" (20 - 25 mm) from the threaded neck of the tank.



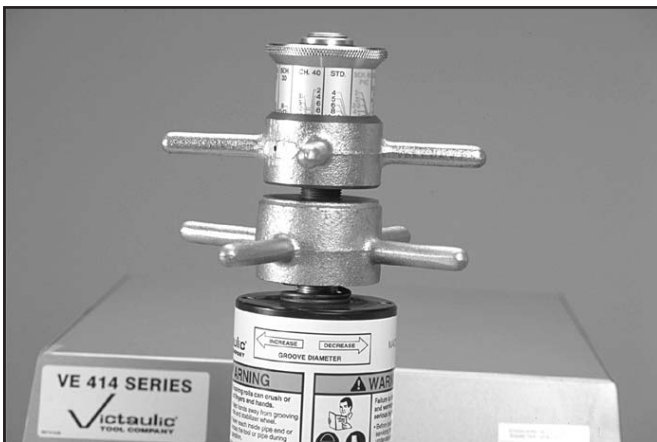
12. Set the depth stop on the tool to obtain approximately a 1/4-inch (5-mm) gap between the depth stop and the cylinder.



16. Set the power switch to the "OFF" position.



13. Set the toggle switch to the "NORMAL" position.



14. Depress the foot switch, and observe the hydraulic ram's motion. The hydraulic ram should move down approximately 1/4-inch (5-mm) rapidly. Release the foot switch. The hydraulic ram should return to its full-up position. Repeat this step several times.

15. If the slide does not move rapidly in the downward direction, repeat steps 2 – 14.

RECOMMENDED LUBRICANTS

Bearing and Slide Grease

General Purpose EP Lithium Base Grease

Manufacturer	Product
Amoco Oil	Amolith Grease #2EP
Arco Petroleum Prod. Co.	Litholine HEP 2
Ashland Oil, Inc./Valvoline Oil Co.	Multi-Lube Lithium EP Grease
Exxon Co., USA	Lidok EP 2
Gulf Oil Corp.	Gulfcrown Grease EP #2
Kendall Refining Co.	L-426
Lubriplate	No. 630-2
Mobil Oil Corp.	Mobilux EP2
Pennzoil Prod. Co.	Pennlith EP 712 Lube
Shell Oil Co.	Alvania EP2
Sun Refining	Sun Prestige 742 EP
Texaco Inc.	Multifak EP2

Gear Oil

Refer to the tag located on the gear reducer.

Hydraulic Oil

High Pressure, Anti-Wear Hydraulic Oil – ISO Grade 32

Manufacturer	Product
Amoco Oil	Rykon Oil #32
Arco Petroleum Prod. Co.	Duro AW 32
Ashland Oil, Inc./Valvoline Oil Co.	AW Oil #15
Exxon Co., USA	Nuto H 32
Gulf Oil Corp.	Harmony 32 AW
Kendall Refining Co.	Kenoil R&O AW-32
Lubriplate	HO-O
Mobil Oil Corp.	Mobil DTE 24
Pennzoil Prod. Co.	AW 32 Hydraulic Oil/Penreco Oil 32
Shell Oil Co.	Tellus 32
Sun Refining	Survis 706, 816 WR
Texaco Inc.	Rando Oil HD 32

PARTS ORDERING INFORMATION

When ordering parts, the following information is necessary for the Victaulic Tool Company to process the order promptly and accurately. You can order parts from the nearest Victaulic sales office. Refer to the back page of this manual for the nearest Victaulic sales office.

(1) Tool Model Number – VE414MC

(2) Tool Serial Number – The serial number can be found on the tool's nameplate.

(3) Quantity, Item Number, Part Number, and Description – Example: (1) #R-001-414-MCH, Main Shaft

(4) Where to send the part(s) – Company Name and Address

(5) To whose attention to send the part(s) – Person's Name

(6) Purchase Order Number

(7) Billing Address

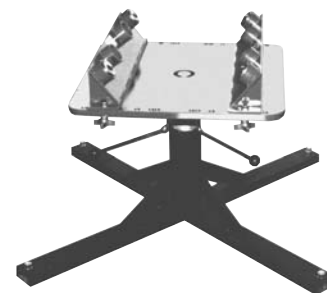
ACCESSORIES

Victaulic Adjustable Pipe Stands



VAPS 112

The Victaulic Model VAPS 112 is a portable, adjustable, roller-type, four-leg pipe stand for use with Victaulic Series VE414MC roll grooving tools. Ball transfer rollers, adjustable for 3/4 - 12" (26,9 – 323,9 mm) pipe, will accommodate linear and rotational movement. The turnstile design allows easy swivel for grooving both pipe ends.



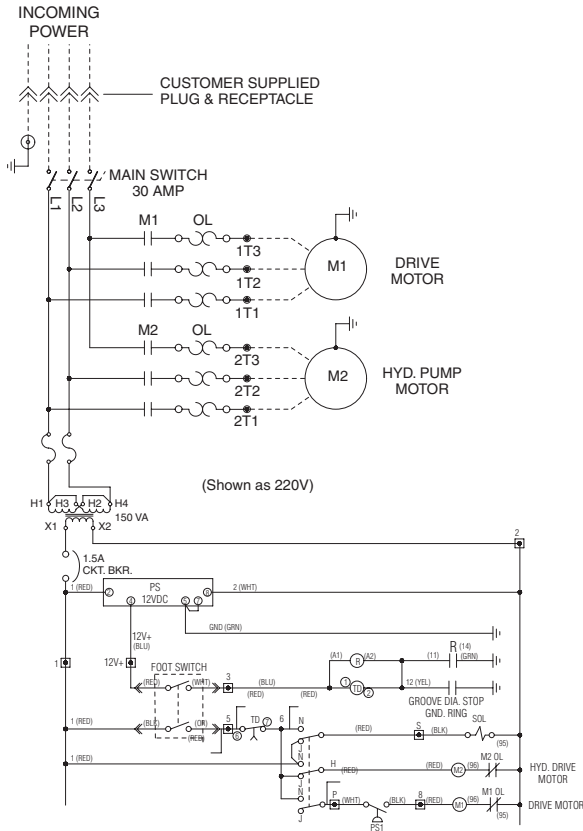
VAPS 224

The Victaulic Model VAPS 224 has features similar to the VAPS 112; however, the VAPS 224 is suitable for pipe sizes 2 – 24" (60,3 – 610,0 mm).

Optional Rolls

Refer to the "Tool Rating and Roll Selection" section starting on page 31 for rolls for different materials and groove specifications.

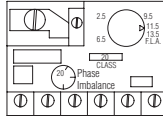
ELECTRICAL SCHEMATIC



TRANSFORMER CONNECTIONS					
220 VOLT 220 V 230 V 240 V		440 VOLT 440 V 450 V 480 V		380VOLT 380V 277V 208V	
FUSES		FUSES		FUSES	
TYPE	BUSS NO.	TYPE	BUSS NO.	TYPE	BUSS NO.
Primary	FNQ-R-2	Primary	FNQ-R-2	Primary	*
Secondary	LP-CC-1 1/2	Secondary	LP-CC-1 1/2	Secondary	*
5 HP MOTOR, WIRE FOR LOW VOLTAGE PER MOTOR NAMEPLATE TO PRODUCE CLOCKWISE ROTATION OF TOOL'S LOWER SHAFT. 1 HP MOTOR, WIRE FOR LOW VOLTAGE PER MOTOR NAMEPLATE TO PRODUCE DOWNWARD MOVEMENT OF UPPER ROLL WHEN FOOTSWITCH IS PRESSED.		5 HP MOTOR, WIRE FOR HIGH VOLTAGE PER MOTOR NAMEPLATE TO PRODUCE CLOCKWISE ROTATION OF TOOL'S LOWER SHAFT. 1 HP MOTOR, WIRE FOR HIGH VOLTAGE PER MOTOR NAMEPLATE TO PRODUCE DOWNWARD MOVEMENT OF UPPER ROLL WHEN FOOTSWITCH IS PRESSED.		5 HP MOTOR, WIRE FOR HIGH VOLTAGE PER MOTOR NAMEPLATE TO PRODUCE CLOCKWISE ROTATION OF TOOL'S LOWER SHAFT. 1 HP MOTOR, WIRE FOR HIGH VOLTAGE PER MOTOR NAMEPLATE TO PRODUCE DOWNWARD MOVEMENT OF UPPER ROLL WHEN FOOTSWITCH IS PRESSED.	

* Square D #MG24501 circuit breaker is used on all 380V applications.

Motor Starter Settings



	220V		380V		440V	
	GE 306B 5 H.P. Drive Motor	GE 306B 1 HP Hydraulic Pump Motor	GE 306B 5 H.P. Drive Motor	GE 306B 1 HP Hydraulic Pump Motor	GE 306B 5 H.P. Drive Motor	GE 306B 1 HP Hydraulic Pump Motor
F.L.A.	13.5 amp	3.4 amp	6.5 amp	2.6 amp	6.5 amp	2.6 amp
Class	30	20	30	20	30	20
Phse Imbalance	20	20	20	20	20	20

TOOL POWER RATING

230 or 460 Volt, 3-Phase, 60-Hertz

Grooving Roll Drive Motor

13.2 AMP Full Load @ 230 Volts
 6.6 AMP Full Load @ 460 Volts

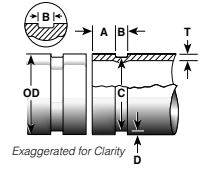
Hydraulic Oil Pump Motor

3.8 AMP Full Load @ 230 Volts
 1.9 AMP Full Load @ 460 Volts

INCOMING POWER MUST BE SHORT CIRCUIT PROTECTED BY A BREAKER OR FUSE

TOOL RATING AND ROLL SELECTION

Standard and "ES" Rolls – Color-Coded Black



Pipe Size		1		2		3		4		Standard Roll Numbers	"ES" Roll Numbers
Nominal Diameter inches	Actual Outside Dia. in/mm	Nominal Wall Thickness Dimensions – inches/mm									
		Steel Pipe		Stainless Steel Pipe		Aluminum Pipe		PVC Plastic Pipe			
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
2	2.375 60,3	0.065 1,7	0.154 3,9	0.154 3,9	0.154 3,9	0.065 1,7	0.154 3,9	0.154 3,9	0.154 3,9	Lower Roll R902416L03	Lower Roll RZ02416L03
2½	2.875 73,0	0.083 2,1	0.203 5,2	0.203 5,2	0.203 5,2	0.083 2,1	0.203 5,2	0.203 5,2	0.276 7,0		
3	3.500 88,9	0.083 2,1	0.216 5,5	0.216 5,5	0.216 5,5	0.083 2,1	0.216 5,5	0.216 5,5	0.300 7,6		
3½	4.000 101,6	0.083 2,1	0.226 5,7	0.226 5,7	0.226 5,7	0.083 2,1	0.226 5,7	0.226 5,7	0.318 8,1	Upper Roll R9A2416U03	Upper Roll RZA2416U03
4	4.500 114,3	0.083 2,1	0.375 9,5	0.237 6,0	0.237 6,0	0.083 2,1	0.237 6,0	0.237 6,0	0.337 8,6		
4½	5.000 127,0	0.095 2,4	0.375 9,5	0.237 6,0	0.237 6,0	0.095 2,4	0.237 6,0	–	–		
5	5.563 141,3	0.109 2,8	0.375 9,5	0.258 6,6	0.258 6,6	0.109 2,8	0.258 6,6	0.258 6,6	0.375 9,5	Lower Roll R904416L06	Lower Roll RZ04416L06
152,4 mm	6.000 152,4	0.109 2,8	0.375 9,5	0.258 6,6	0.258 6,6	0.109 2,8	0.258 6,6	–	–		
6	6.625 168,3	0.109 2,8	0.375 9,5	0.280 7,1	0.280 7,1	0.109 2,8	0.280 7,1	0.280 7,1	0.432 11,0		
6	6.625 168,3	0.109 2,8	0.375 9,5	0.280 7,1	0.280 7,1	0.109 2,8	0.280 7,1	0.280 7,1	0.432 11,0	Upper Roll R9A4416U06	Upper Roll RZA4416U06
203,2 mm	8.000 203,2	0.109 2,8	0.375 9,5	0.250 6,4	0.322 8,2	0.109 2,8	0.322 8,2	–	–		
8	8.625 219,1	0.109 2,8	0.375 9,5	0.250 6,4	0.322 8,2	0.109 2,8	0.322 8,2	0.322 8,2	0.500 12,7		
10	10.750 273,0	0.134 3,4	0.375 9,5	0.250 6,4	0.365 9,3	0.134 3,4	0.250 6,4	0.365 9,3	0.593 15,1	Lower Roll R908416L12	Lower Roll RZ08416L12
12	12.750 323,9	0.156 4,0	0.375 9,5	0.250 6,4	0.375 9,5	0.156 4,0	0.250 6,4	0.406 10,3	0.687 17,5		
14	14.000 355,6	0.156 4,0	0.375 9,5	0.312 7,9	0.375 9,5	–	–	0.438 11,1	0.438 11,1		
16	16.000 406,4	0.165 4,2	0.375 9,5	0.312 7,9	0.375 9,5	–	–	0.500 12,7	0.500 12,7	Upper Roll R9A8416U16	–

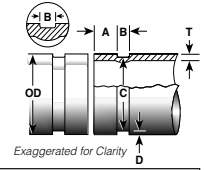
COLUMN 1: Steel Pipe – Maximum ratings on steel are limited to pipe of 180 BHN (Brinell Hardness Number) and less.

COLUMN 2: Stainless Steel Pipe – Types 304/304L and 316/316L

COLUMN 3: Aluminum Pipe – PVC Type I, Grade I – PVC1120; PVC Type I, Grade II – PVC1220; PVC Type II, Grade I – PVC2116

In addition, the following OD pipe sizes can be grooved: 76,1 mm; 127,0 mm; 133,0 mm; 139,7 mm; 159,0 mm; 165,1 mm; 267,4 mm ; and 318,5 mm. Contact Victaulic for details.

Rolls for Schedule 5S and 10S Stainless Steel Pipe (RX Rolls) – Color-Coded Silver[†]



Pipe Size		Nominal Stainless Steel Pipe Wall Thickness – inches/mm			RX Roll Numbers
Nominal Diameter inches	Actual Outside Diameter inches/mm	Schedule 5S	Schedule 10S	Schedule 10	
2	2.375 60,3	0.065 1,7	0.109 2,8	– –	Lower Roll RX02416L03
2½	2.875 73,0	0.083 2,1	0.120 3,0	– –	
3	3.500 88,9	0.083 2,1	0.120 3,0	– –	
3½	4.000 101,6	0.083 2,1	0.120 3,0	– –	Upper Roll RXA2416U03
4	4.500 114,3	0.083 2,1	0.120 3,0	– –	Lower Roll RX04416L06
5	5.563 141,3	0.109 2,8	0.134 3,4	– –	
6	6.625 168,3	0.109 2,8	0.134 3,4	– –	Upper Roll RXA4416U06
8	8.625 219,1	0.109 2,8	0.148 3,8	– –	Lower Roll RX08416L12
10	10.750 273,0	0.134 3,4	0.165 4,2	– –	
12	12.750 323,9	0.156 4,0	0.180 4,6	– –	Upper Roll RXA8416U16
14	14.000 355,6	0.156 4,0	0.188 4,8	0.250 6,4	Lower Roll RX14416L16
16	16.000 406,4	0.165 4,2	0.188 4,8	0.250 6,4	

[†] Types 304/304L and 316/316L

Rolls for Copper Tubing – Color-Coded Copper[†]

Tubing Size		Nominal Copper Tubing Wall Thickness – inches/mm		Copper Roll Numbers
Nominal Diameter inches	Actual Outside Diameter inches/mm	Minimum	Maximum	
2	2.125 54,0	0.042 1,1	0.083 2,1	Lower Roll RR02416L06
2½	2.625 66,7	0.065 1,7	0.095 2,4	
3	3.125 79,4	0.045 1,1	0.109 2,8	
4	4.125 104,8	0.058 1,5	0.134 3,4	Upper Roll RRA2416U06
5	5.125 130,2	0.072 1,8	0.160 4,1	
6	6.125 155,6	0.083 2,1	0.192 4,9	Lower Roll RR08416L08
8	8.125 206,4	0.109 2,8	0.271 6,9	

[†] Drawn copper tubing – DWV, ASTM B306 – Type "M," ASTM B88 – Type "L," ASTM B88 – Type "K," ASTM B88
Rolls are available for grooving British Standard, Australian Standard, and DIN Standard copper tube. Contact Victaulic for details.

ROLL GROOVE SPECIFICATIONS

Steel Pipe and All Materials Grooved with Standard and RX Rolls

Pipe Size		1		2			3			4		5	6	7
Nominal Dia. inches	Actual Outside Dia. in/mm	Nominal Wall Thickness Dimensions – inches/mm												
		Pipe Outside Diameter		Gasket Seat "A"			Groove Width "B"			Groove Diameter "C"		Groove Depth "D" (ref.)	Min. Allow. Wall Thick. "T"	Max. Allow. Flare Dia.
		Min.	Max.	Basic	Min.	Max.	Basic	Min.	Max.	Max.	Min.			
2	2.375 60,3	2.351 59,7	2.399 60,9	0.625 15,9	0.595 15,1	0.655 16,6	0.344 8,7	0.314 8,0	0.374 9,5	2.250 57,2	2.235 56,8	0.063 1,6	0.065 1,7	2.480 63,0
2½	2.875 73,0	2.846 72,3	2.904 73,4	0.625 15,9	0.595 15,1	0.655 16,6	0.344 8,7	0.314 8,0	0.374 9,5	2.720 69,1	2.702 68,6	0.078 2,0	0.083 2,1	2.980 75,7
3 O.D. 76,1 mm	3.000 76,1	2.970 75,3	3.030 76,9	0.625 15,9	0.595 15,1	0.655 16,6	0.344 8,7	0.314 8,0	0.374 9,5	2.845 72,3	2.827 71,8	0.078 2,0	0.083 2,1	3.100 78,7
3	3.500 88,9	3.469 88,1	3.535 89,8	0.625 15,9	0.595 15,1	0.655 16,6	0.344 8,7	0.314 8,0	0.374 9,5	3.344 84,9	3.326 84,5	0.078 2,0	0.083 2,1	3.600 91,4
3½ O.D.	4.000 101,6	3.969 100,8	4.040 102,6	0.625 15,9	0.595 15,1	0.655 16,6	0.344 8,7	0.314 8,0	0.374 9,5	3.834 97,4	3.814 96,9	0.083 2,1	0.083 2,1	4.100 104,1
4¼ O.D. 108,0 mm	4.250 108,0	4.219 107,2	4.293 109,0	0.625 15,9	0.595 15,1	0.655 16,6	0.344 8,7	0.314 8,0	0.374 9,5	4.084 103,7	4.064 103,2	0.083 2,1	0.083 2,1	4.350 110,5
4	4.500 114,3	4.469 113,5	4.545 115,4	0.625 15,9	0.595 15,1	0.655 16,6	0.344 8,7	0.314 8,0	0.374 9,5	4.334 110,1	4.314 109,6	0.083 2,1	0.083 2,1	4.600 116,8
4½	5.000 127,0	4.969 126,2	5.050 128,3	0.625 15,9	0.595 15,1	0.655 16,6	0.344 8,7	0.314 8,0	0.374 9,5	4.834 122,8	4.814 122,3	0.083 2,1	0.095 2,4	5.100 129,5
5¼ O.D. 133,0 mm	5.250 133,0	5.219 132,6	5.303 134,7	0.625 15,9	0.595 15,1	0.655 16,6	0.344 8,7	0.314 8,0	0.374 9,5	5.084 129,13	5.064 128,6	0.083 2,1	0.109 2,8	5.350 135,9
5½ O.D. 139,7 mm	5.500 139,7	5.469 138,9	5.556 141,1	0.625 15,9	0.595 15,1	0.655 16,6	0.344 8,7	0.314 8,0	0.374 9,5	5.334 135,5	5.314 135,0	0.083 2,1	0.109 2,8	5.600 142,2
5	5.563 141,3	5.532 140,5	5.619 142,7	0.625 15,9	0.595 15,1	0.655 16,6	0.344 8,7	0.314 8,0	0.374 9,5	5.395 137,0	5.373 136,5	0.084 2,1	0.109 2,8	5.660 143,8
6 O.D. 152,4 mm	6.000 152,4	5.969 151,6	6.056 153,8	0.625 15,9	0.595 15,1	0.655 16,6	0.344 8,7	0.314 8,0	0.374 9,5	5.830 148,1	5.808 147,5	0.085 2,2	0.109 2,8	6.100 154,9
6¼ O.D. 159,0 mm	6.250 159,0	6.219 158,0	6.313 160,4	0.625 15,9	0.595 15,1	0.655 16,6	0.344 8,7	0.314 8,0	0.374 9,5	6.032 153,2	6.002 152,5	0.085 2,2	0.109 2,8	6.350 161,3
6½ O.D. 165,1 mm	6.500 165,1	6.469 164,3	6.563 166,7	0.625 15,9	0.595 15,1	0.655 16,6	0.344 8,7	0.314 8,0	0.374 9,5	6.330 160,8	6.308 160,2	0.085 2,2	0.109 2,8	6.600 167,6
6	6.625 168,3	6.594 167,5	6.688 169,9	0.625 15,9	0.595 15,1	0.655 16,6	0.344 8,7	0.314 8,0	0.374 9,5	6.455 164,0	6.433 163,4	0.085 2,2	0.109 2,8	6.730 170,9
8 O.D. 203,2 mm	8.000 203,2	7.969 202,4	8.063 204,8	0.750 19,1	0.720 18,3	0.780 19,8	0.469 11,9	0.439 11,2	0.499 12,7	7.816 198,5	7.791 197,9	0.092 2,3	0.109 2,8	8.170 207,5
8	8.625 219,1	8.594 218,3	8.688 220,7	0.750 19,1	0.720 18,3	0.780 19,8	0.469 11,9	0.439 11,2	0.499 12,7	8.441 214,4	8.416 213,8	0.092 2,3	0.109 2,8	8.800 223,5
10 O.D. 254,0 mm	10.000 254,0	9.969 253,2	10.063 255,6	0.750 19,1	0.720 18,3	0.780 19,8	0.469 11,9	0.439 11,2	0.499 12,7	9.812 249,2	9.785 248,5	0.094 2,4	0.134 3,4	10.170 258,3
10	10.750 273,0	10.719 272,3	10.813 274,7	0.750 19,1	0.720 18,3	0.780 19,8	0.469 11,9	0.439 11,2	0.499 12,7	10.562 268,3	10.535 267,6	0.094 2,4	0.134 3,4	10.920 277,4
12 O.D. 304,8 mm	12.000 304,8	11.969 304,0	12.063 306,4	0.750 19,1	0.720 18,3	0.780 19,8	0.469 11,9	0.439 11,2	0.499 12,7	11.781 299,2	11.751 298,5	0.109 2,8	0.156 4,0	12.170 309,1
12	12.750 323,9	12.719 323,1	12.813 325,5	0.750 19,1	0.720 18,3	0.780 19,8	0.469 11,9	0.439 11,2	0.499 12,7	12.531 318,3	12.501 317,5	0.109 2,8	0.156 4,0	12.920 328,2
14 O.D. 355,6 mm	14.000 355,6	13.969 354,8	14.063 357,2	0.938 23,8	0.908 23,1	0.968 24,6	0.469 11,9	0.439 11,2	0.499 12,7	13.781 350,0	13.751 349,3	0.109 2,8	0.156 4,0	14.100 358,1
15 O.D. 381,0 mm	15.000 381,0	14.969 380,2	15.063 382,6	0.938 23,8	0.908 23,1	0.968 24,6	0.469 11,9	0.439 11,2	0.499 12,7	14.781 375,4	14.751 374,7	0.109 2,8	0.165 4,2	15.100 383,5
16 O.D. 406,4 mm	16.000 406,4	15.969 405,6	16.063 408,0	0.938 23,8	0.908 23,1	0.968 24,6	0.469 11,9	0.439 11,2	0.499 12,7	15.781 400,8	15.751 400,1	0.109 2,8	0.165 4,2	16.100 408,9

COLUMN 1: IPS Outside Diameter – The outside diameter of roll-grooved pipe cannot vary more than the tolerance listed. For IPS pipe, the maximum allowable tolerance from square-cut ends is 0.030" (0.8 mm) for ¾-3½" (26,9 – 101,6 mm) pipe; 0.045" (1,1 mm) for 4 – 6" (114,3 – 168,3 mm) pipe; and 0.060" (1,5 mm) for sizes 8" OD and above. This is measured from the true square line.

COLUMN 2: Gasket Seat – The pipe surface must be free from indentations, roll marks, and projections, from the pipe end to the groove, to provide a leak-tight seal for the gasket. All loose paint, scale, dirt, chips, grease, and rust must be removed. Victaulic recommends that the pipe be square cut. When using beveled-end pipe, contact Victaulic for details. Square-cut pipe must be used with FlushSeal® and EndSeal® gaskets. The gasket seat "A" is measured from the end of the pipe. **IMPORTANT:** Roll grooving of beveled-end pipe may result in unacceptable pipe-end flare. Refer to column 8.

COLUMN 3: Groove Width – The bottom of the groove must be free of loose dirt, chips, and scale that may interfere with proper coupling assembly. The corners at the bottom of the groove must have a radius of the following dimensions. For IPS steel pipe, .06R on ¾- 1½" (26,9 – 48,3 mm) pipe; .08R on 2 – 6" (60,3 – 168,3 mm) pipe; .05R on 8" (219,1 mm) pipe and up.

COLUMN 4: Groove Outside Diameter – The groove must be of uniform depth for the entire pipe circumference and must be maintained within the "C" diameter tolerance listed.

COLUMN 5: Groove Depth – This is for reference only. The groove must conform to the groove diameter "C" listed.

COLUMN 6: Minimum Allowable Wall Thickness – This is the minimum wall thickness that can be roll grooved, except for PVC pipe.

COLUMN 7: Maximum Allowable Pipe-End Flare Diameter – This is measured at the most extreme square cut or beveled pipe-end diameter.

ROLL GROOVE SPECIFICATIONS

Steel Pipe and All Materials Grooved with “ES” Rolls

Pipe Size		1		2		3		4		5	6	7
Nominal Dia. inches	Actual Outside Dia. in/mm	Nominal Wall Thickness Dimensions – inches/mm										
		Pipe Outside Diameter		Gasket Seat “A”		Groove Width “B”		Groove Diameter “C”		Groove Depth “D” (ref.)	Min. Allow. Wall Thick. “T”	Max. Allow. Flare Dia.
		Min.	Max.	Max.	Min.	Min.	Max.	Max.	Min.			
2	2.375 60,3	2.351 59,7	2.399 60,9	0.572 14,5	0.552 14,0	0.250 6,4	0.265 6,7	2.250 57,2	2.235 56,8	0.063 1,6	0.065 1,7	2.480 63,0
2½	2.875 73,0	2.846 72,3	2.904 73,4	0.572 14,5	0.552 14,0	0.250 6,4	0.265 6,7	2.720 69,1	2.702 68,6	0.078 2,0	0.083 2,1	2.980 75,7
3	3.500 88,9	3.469 88,1	3.535 89,8	0.572 14,5	0.552 14,0	0.250 6,4	0.265 6,7	3.344 84,9	3.326 84,5	0.078 2,0	0.083 2,1	3.600 91,4
4	4.500 114,3	4.469 113,5	4.545 115,4	0.610 15,5	0.590 15,0	0.300 7,6	0.320 8,1	4.334 110,1	4.314 109,6	0.083 2,1	0.083 2,1	4.600 116,8
6	6.625 168,3	6.594 167,5	6.688 169,9	0.610 15,5	0.590 15,0	0.300 7,6	0.320 8,1	6.455 164,0	6.433 163,4	0.085 2,2	0.109 2,8	6.730 170,9
8	8.625 219,1	8.594 218,3	8.688 220,7	0.719 18,3	0.699 17,8	0.390 9,9	0.410 10,4	8.441 214,4	8.416 213,8	0.092 2,3	0.109 2,8	8.800 223,5
10	10.750 273,0	10.719 272,3	10.813 274,7	0.719 18,3	0.699 17,8	0.390 9,9	0.410 10,4	10.562 268,3	10.535 267,6	0.094 2,4	0.134 3,4	10.920 277,4
12	12.750 323,9	12.719 323,1	12.813 325,5	0.719 18,3	0.699 17,8	0.390 9,9	0.410 10,4	12.531 318,3	12.501 317,5	0.109 2,8	0.156 4,0	12.920 328,2

COLUMN 1: IPS Outside Diameter/Metric (ISO) Outside Diameter – The outside diameter of roll-grooved pipe cannot vary more than the tolerance listed. For IPS pipe, the maximum allowable tolerance from square-cut ends is 0.030" (0,8 mm) for ¾ - 3½" (26,9 – 101,6 mm) pipe; 0.045" (1,1 mm) for 4 – 6" (114,3 – 168,3 mm) pipe; and 0.060" (1,5 mm) for 8" OD and larger size pipe. This is measured from the true square line. For (ISO) metric pipe, the maximum allowable tolerance from square-cut ends is 0.76 mm for 26,7 – 88,9 mm pipe; 1,14 mm for 114,3 – 168,3 mm pipe; and 1,52 mm for 219,1 mm and larger size pipe. This is measured from the true square line.

COLUMN 2: Gasket Seat – The pipe surface must be free from indentations, roll marks, and projections, from the pipe end to the groove, to provide a leak-tight seal for the gasket. All loose paint, scale, dirt, chips, grease, and rust must be removed. Square-cut pipe must be used with FlushSeal® and EndSeal® gaskets. The gasket seat "A" is measured from the end of the pipe. **IMPORTANT:** Roll grooving beveled-end pipe may result in unacceptable pipe-end flare.

COLUMN 3: Groove Width – The bottom of the groove must be free from loose dirt, chips, rust, and scale that may interfere with proper coupling assembly. The corners at the bottom of the roll groove must be radiused. For IPS pipe, 0.04R on 1½ - 12" (48,3 – 323,9 mm) pipe; for (ISO) metric pipe, 1,2R mm on 26,7 – 323,9 mm pipe.

COLUMN 4: Groove Outside Diameter – The groove must be of uniform depth for the entire pipe circumference. The groove must be maintained within the "C" diameter tolerance listed.

COLUMN 5: Groove Depth – For reference only. The groove must conform to the "C" diameter listed.

COLUMN 6: Minimum Allowable Wall Thickness – This is the minimum wall thickness that can be roll grooved.

COLUMN 7: Maximum Allowable Pipe-End Flare Diameter – This is measured at the most extreme pipe end diameter.

Drawn Copper Tubing CTS US Standard – ASTM B-88

Tubing Size		1		2		3		4		5	6	7	
Nominal Dia. inches	Actual Outside Dia. in/mm	Dimensions – inches/mm											
		Pipe Outside Diameter		Gasket Seat “A”		Groove Width “B”		Groove Diameter “C”		Groove Depth “D” (ref. only)	Min. Allow. Wall Thick. “T”	Max. Allow. Flare Dia.	
		Max.	Min.	Basic	Max.	Min.	Max.	Min.	Max.				Min.
2	2.125 54,0	2.127 (54,0)	2.123 (53,9)	0.610 (15,5)	0.640 (16,3)	0.580 (14,7)	0.330 (8,4)	0.300 (7,6)	2.029 (51,5)	2.009 (51,0)	0.048 (1,2)	DWV (56,4)	2.220 (56,4)
2½	2.625 66,7	2.627 (66,7)	2.623 (66,6)	0.610 (15,5)	0.640 (16,3)	0.580 (14,7)	0.330 (8,4)	0.300 (7,6)	2.525 (64,1)	2.505 (63,6)	0.050 (1,2)	0.065 (1,7)	2.720 (69,1)
3	3.125 79,4	3.127 (79,4)	3.123 (79,3)	0.610 (15,5)	0.640 (16,3)	0.580 (14,7)	0.330 (8,4)	0.300 (7,6)	3.025 (76,8)	3.005 (76,3)	0.050 (1,2)	DWV	3.220 (81,8)
4	4.125 104,8	4.127 (104,8)	4.123 (104,7)	0.610 (15,5)	0.640 (16,3)	0.580 (14,7)	0.330 (8,4)	0.300 (7,6)	4.019 (102,1)	3.999 (101,6)	0.053 (1,4)	DWV	4.220 (107,2)
5	5.125 130,2	5.127 (130,2)	5.123 (130,1)	0.610 (15,5)	0.640 (16,3)	0.580 (14,7)	0.330 (8,4)	0.300 (7,6)	4.999 (127,0)	4.979 (126,5)	0.063 (1,6)	DWV	5.220 (132,6)
6	6.125 155,6	6.127 (155,6)	6.123 (155,5)	0.610 (15,5)	0.640 (16,3)	0.580 (14,7)	0.330 (8,4)	0.300 (7,6)	5.999 (152,3)	5.979 (151,9)	0.063 (1,6)	DWV	6.220 (158,0)
8	8.125 206,4	8.127 (206,4)	8.121 (206,3)	0.610 (15,5)	0.640 (16,3)	0.580 (14,7)	0.330 (8,4)	0.300 (7,6)	7.959 (202,2)	7.939 (201,7)	0.083 (2,1)	DWV	8.220 (208,8)

COLUMN 1 – Outside Diameter: the outside diameter of roll grooved tubing cannot vary from the tolerance listed. The maximum allowable tolerance from square cut ends is 0.030" (0,8 mm) for 2 – 3" (54,0 – 79,4 mm) and 0.045" (1,1 mm) for 4 – 6" (104,8 – 155,6 mm) sizes; this is measured from the true square line.

COLUMN 2 – Gasket Seat: The tubing surface must be free from indentations, projections, and roll marks from the end of the tubing to the groove to provide a leak-tight seal for the gasket. All loose scale, dirt, chips, and grease must be removed.

COLUMN 3 – Groove Width: The bottom of the groove must be free from loose dirt, chips, and scale that may interfere with proper coupling assembly.

COLUMN 4 – Groove Outside Diameter: The groove must be of uniform depth around the entire tubing circumference. The groove must be maintained within the "C" tolerance listed.

COLUMN 5 – Groove Depth: For reference only. The groove must conform to the groove diameter "C" listed.

COLUMN 6 – ASTM B-306 drain waste and vent (DWV) is the minimum wall thickness of copper tubing that can be roll grooved.

COLUMN 7 – Maximum Allowable End Flare Diameter: This dimension is measured at the most extreme tubing end diameter.

HELPFUL INFORMATION – PIPE AND TUBING DIMENSIONS

NOTICE

- These dimensions are for reference only.
- The VE414MC cannot groove all schedules of steel pipe listed in this table.

Seamless and Welded Steel Pipe

Pipe Size		Nominal Wall Thickness – inches/millimeters							
Nominal Dia. inches	Actual Outside Dia. in/mm	Sch. 5S	Sch. 10S	Sch. 10	Sch. 20	Sch. 30	Sch. 40	Sch. STD	Sch. 80
2	2.375 60,3	0.065 1,7	0.109 2,8	–	–	–	0.154 3,9	0.154 3,9	0.218 5,5
2½	2.875 73,0	0.083 2,1	0.120 3,0	–	–	–	0.203 5,2	0.203 5,2	0.276 7,0
3	3.500 88,9	0.083 2,1	0.120 3,0	–	–	–	0.216 5,5	0.216 5,5	0.300 7,6
3½	4.000 101,6	0.083 2,1	0.120 3,0	–	–	–	0.226 5,7	0.226 5,7	0.318 8,1
4	4.500 114,3	0.083 2,1	0.120 3,0	–	–	–	0.237 6,0	0.237 6,0	0.337 8,6
5	5.563 141,3	0.109 2,8	0.134 3,4	–	–	–	0.258 6,6	0.258 6,6	0.375 9,5
6	6.625 168,3	0.109 2,8	0.134 3,4	–	–	–	0.280 7,1	0.280 7,1	0.432 11,0
8	8.625 219,1	0.109 2,8	0.148 3,8	–	0.250 6,4	0.277 7,0	0.322 8,2	0.322 8,2	0.500 12,7
10	10.750 273,0	0.134 3,4	0.165 4,2	–	0.250 6,4	0.307 7,8	0.365 9,3	0.365 9,3	0.594 15,1
12	12.750 323,9	0.156 4,0	0.180 4,6	–	0.250 6,4	0.330 8,4	0.406 10,3	0.375 9,5	0.688 17,4
14	14.000 355,6	0.156 4,0	0.188 4,8	0.250 6,4	0.312 7,9	0.375 9,5	0.437 11,1	0.375 9,5	0.750 19,0
16	16.000 406,4	0.165 4,2	0.188 4,8	0.250 6,4	0.312 7,9	0.375 9,5	0.500 12,7	0.500 12,7	0.843 21,4

Drawn Copper Tubing

Tubing Size		Nominal Wall Thickness – inches/millimeters			
Nominal Diameter inches	Actual Outside Diameter in/mm	DWV ASTM B-306	Type “M” ASTM B-88	Type “L” ASTM B-88	Type “K” ASTM B-88
2	2.125 54,0	0.042 1,1	0.058 1,5	0.070 1,8	0.083 2,1
2½	2.625 66,7	–	0.065 1,7	0.080 2,0	0.095 2,4
3	3.125 79,4	0.045 1,1	0.072 1,8	0.090 2,3	0.109 2,8
4	4.125 104,8	0.058 1,5	0.095 2,4	0.110 2,8	0.134 3,4
5	5.125 130,2	0.072 1,8	0.109 2,8	0.125 3,2	0.160 4,1
6	6.125 155,6	0.083 2,1	0.122 3,1	0.140 3,6	0.192 4,9
8	8.125 206,4	0.109 2,8	0.170 4,3	0.200 5,1	0.250 6,4

TROUBLESHOOTING

Problem	Possible Cause	Solution
Pipe will not stay in grooving rolls.	<p>Incorrect pipe positioning.</p> <p>Improper manual grooving technique.</p>	<p>Refer to the "Long Pipe Lengths" section on page 8.</p> <p>Refer to the "Short Pipe Lengths" section on page 7.</p>
Pipe starts rotating during grooving.	<p>Rust or dirt has built up on the lower roll.</p> <p>Excessive ram speed.</p> <p>The ram speed control valve requires adjustment.</p> <p>Worn grooving rolls.</p>	<p>Remove any dirt or rust accumulation from the lower roll with a stiff, wire brush.</p> <p>Reduce the ram speed to a lower setting.</p> <p>Turn the ram speed control valve's knob clockwise two to three revolutions to reduce flow.</p> <p>Inspect the lower roll for worn knurls. Replace lower rolls, if worn.</p>
Pipe flare is excessive.	<p>Excessive ram speed.</p> <p>The ram speed control valve requires adjustment.</p> <p>The pipe support is adjusted too high.</p> <p>The tool is tilted forward.</p> <p>Pipe is "over-tracking" due to incorrect pipe support positioning.</p> <p>The stabilizer is pushing the pipe to the left and off center from the rolls.</p>	<p>Reduce the ram speed to a lower setting.</p> <p>Turn the ram speed control valve's knob clockwise two to three revolutions to reduce flow.</p> <p>Check pipe levelness. Refer to the "Long Pipe Lengths" section on page 8.</p> <p>Check tool levelness. Refer to the "Tool Setup" section on page 5.</p> <p>Move the pipe support to the right. Refer to the "Long Pipe Lengths" section on page 8.</p> <p>Back off the stabilizer to the furthest point to where it still stabilizes the pipe effectively. Refer to the "Stabilizer Adjustment" section.</p>
Pipe sways or vibrates from side to side.	Incorrect stabilizer adjustment.	Move the stabilizer in or out until the pipe rotates smoothly.
While grooving, loud squeaks echo through the pipe.	<p>Pipe is "over-tracking" due to incorrect pipe support positioning.</p> <p>Pipe is not square cut.</p>	<p>Move the pipe support to the right. Refer to the "Long Pipe Lengths" section on page 8.</p> <p>Cut pipe ends square.</p>
While grooving, loud thumps or bangs occur approximately once every revolution of the pipe.	Pipe has a pronounced weld seam.	Grind weld seams flush with the pipe surface inside and outside 2" (50,8 mm) back from the pipe end.
The pump will not start, or the lower roll will not rotate.	<p>The main power is off.</p> <p>The thermal units have tripped.</p> <p>Fuses have blown.</p>	<p>Turn the main power "ON."</p> <p>Reset the thermal units.</p> <p>Check all fuses and replace, as necessary.</p>
Tool comes up to operating pressure extremely slow.	Air is in the hydraulic system.	Bleed any air from the hydraulic system.
The upper roll will not rotate.	Dirt is trapped between the roll and slide or the retaining plate.	Remove the upper roll, and clean off any dirt. Re-install the upper roll.

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