# CASTLE, INC.


# Diagnostic Manual

## TSM-22 Pocket Hole Machine

Serial numbers up to 68260

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# Table of Contents

# 1 Introduction

Thank you for making the Castle TSM-22 Screw Pocket Machine a vital part of your shop. The TSM-22 is designed for use on a wide variety of materials including hardwoods, softwoods, melamine, particleboard and MDF.

This manual is intended for anyone working with, or performing maintenance or service on the TSM-22.

If trouble occurs, in most cases one of the major components is either not starting its function or not completing its function. This may lead to a skip or stall in the operational sequence.

**Troubleshooting the TSM-22 is greatly aided by understanding the machine's operational sequence which occurs in this order:**

1. The **Clamp** extends to secure the work piece
2. The **Router** creates the pocket then retracts
3. The **Drill** creates the Pilot screw Hole then retracts
4. The **Clamp** releases the work piece

## 1.1 How to Use This Manual

1. Closely observe the behavior of the machine noting which component is involved and when in the operational sequence the problem is occurring.

2. Go to Section IV-Diagnostic Descriptions, which is organized by the operational sequence of the machine.

3. Find the description which most closely matches the problem and systematically perform the Diagnostic Procedures listed, checking them off as you go.

***Example:***

| | Page | Procedure |
|---|---|---|
| **Clamp** comes down as soon as air is attached…with Machine power OFF: | | |
| . Check clamp Solenoid for function or blockage ..... | **12-13** | 21.11 |

**Note:** If you are unsure of your observations or if the fault behaviour seems irregular you should “Dry Cycle” test the machine. See Procedure 21.95, page 6.

# 2 Dry Cycle Testing 21.95

## 2.1 Purpose

Dry Cycle testing allows observation of the TSM-22's mechanical, electrical, and pneumatic functions without routing pockets or drilling holes.

**Caution:** Careful observation is essential when troubleshooting or seeking Technical Support

## 2.2 Dry Test TSM-22

1. Locate the ON/OFF switches on the Router and Drill and turn them **both off**.
2. Connect air and power to the machine. Turn the machine's MAIN Power Switch ON.
3. Depress one of the Safety Buttons with a piece of scrap wood positioned out of the path of both the router and drill bits. Position yourself to see both the Router and Drill bits when they extend.
4. Press the Foot Pedal and observe the following actions in this order.
    1. The **Clamp** extends to secure the scrap wood
    2. The **Router** extends then retracts
    3. The **Drill** extends then retracts
    4. The **Clamp** releases the scrap wood

    **Total elapsed time should be approximately two seconds.**
5. If the cycle does not begin, check the Air Supply, the Foot Switch, and the Safety Switch: Procedures 21.92, 21.80 and 21.82
6. If the cycle stalls with the router extended or if the cycle skips over the router stroke entirely, check the Router Stop Switch: Procedure 21.22

- If the cycle stalls with the drill extended or if the clamp starts to extend and then immediately retracts, check the Drill Stop Switch: Procedure 21.43

- If the complete cycle takes significantly longer than two seconds, check the Air Supply, the Pressure Regulator, and the Router Feed Rate: Procedures 21.92, 21.90 and 21.32

- If the Dry Cycle is successful, but a regular cycle fails when routing actual pockets and drilling holes, check the Tooling, the Motor Operation, and the Drive Cylinder: Procedures 21.83, 21.20 and 21.60

**Note:** For comprehensive diagnostic descriptions and procedures refer to Section IV.

After testing is complete, turn the MAIN Power Switch OFF and switch both motors back ON

## 2.3 Option #2 Dry Test TSM-22 With Work Top Open

1. Connect air and power to the machine. Turn the machine's MAIN Power Switch ON.
2. Lift the work top of the machine.
3. Depress one of the Safety Buttons with a piece of scrap wood. Position yourself in front of the machine.
4. Press the Foot Pedal and observe the following actions in this order.
    1. The **Clamp** extends to secure the scrap wood
    2. The **Router** extends then stops
    3. Place a screw driver or a piece of metal in between the router stop switch and the router stop magnetic. **See Fig 1.** The **Drill** should now extend and stop.

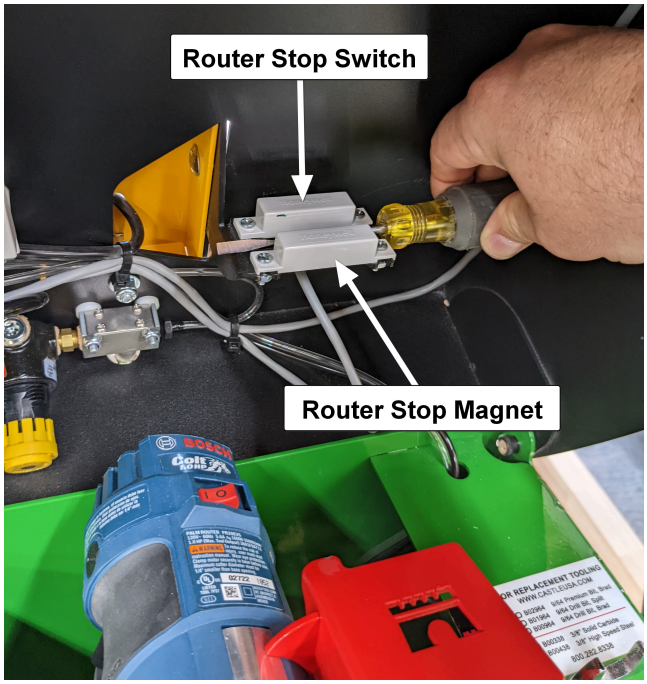


**Fig 1**

5. Place a screw driver or a piece of metal in between the drill stop switch and the drill stop magnetic. **See Fig 2.**The drill should return to its resting position and the clamp should release.

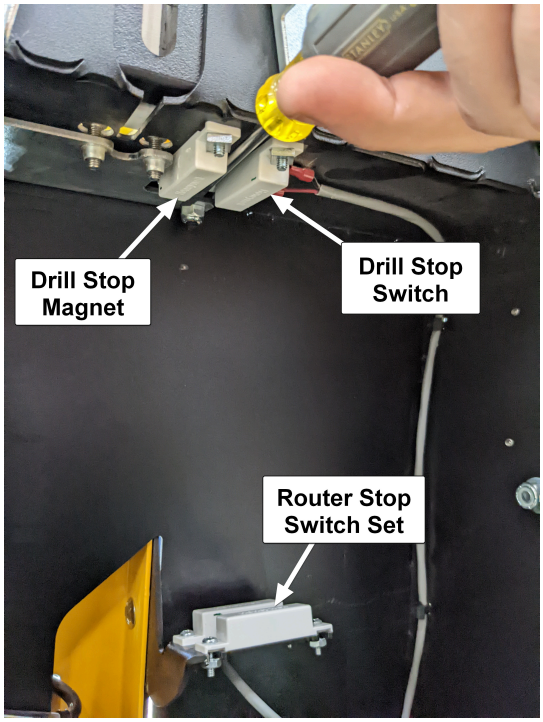


**Fig 2**

6. If the cycle does not begin, check the Air Supply, the Foot Switch, and the Safety Switch: Procedures 21.92, 21.80 and 21.82

7. If the router stop switch can not be triggered with a screw driver or a piece of metal or if the cycle skips over the router stroke entirely, check the Router Stop Switch: Procedure 21.22

- If the drill stop switch can not be triggered with a screw driver or a piece of metal or if the clamp starts to come down and immediately retracts, check the Drill Stop Switch: Procedure 21.43
- If the Dry Cycle with the Work Top up is successful, but a regular cycle fails when routing actual pockets and drilling holes, check the Tooling, the Motor Operation, and the Drive Cylinder: Procedures 21.83, 21.20 and 21.60

**Note:** If a dry cycle is preformed to confirm function of the switches and the router bit or the drill bit stays extended, verify that the carriage plate is not hitting the front of the switch/magnet. The carriage plate should land in between the switch and the magnet.

**Note: A normal cycle when cutting pockets should take approximately 2 seconds. If the complete cycle takes significantly longer than two seconds, check the Air Supply, the Pressure Regulator, and the Router Feed Rate: Procedures 21.92, 21.90 and 21.32**

**Note:** For comprehensive diagnostic descriptions and procedures refer to Section IV.

After testing is complete, turn the MAIN Power Switch OFF, then lower and secure the work top.

# 3 Definitions

| Term | Definition |
|---|---|
| **Air Pressure Regulator** | Used to set the main operational speed of the machine. Factory set at approximately 75 PSI. / approximately 5 full clockwise turns from stop. |
| **Bar Spring** | Provides pressure to return the Motor Carriage to neutral after the Pilot Drill stroke. |
| **Continuity Testing** | **"Visual Indicator" type testers use batteries and a light bulb.**<br><br>**"Audible Indicator" type testers use batteries and a beeper or buzzer.**<br><br>Normally **OPEN** (NO) switches read no continuity at rest, IE; NO light or sound from tester.<br><br>Normally **CLOSED** (NC) switches read continuity at rest, IE: light or sound from tester. |
| **Drill Motor** | Bosch PR10E or PR20EVS Trimmer motor used to drill the Pilot Hole. |
| **Drive Cylinder** | A double acting air cylinder which moves the Motor Carriage backwards for the Pocket Router stroke and forwards for the Pilot Drill stroke. |
| **Pilot Hole** | The Screw hole drilled by the Drill motor. |
| **Pocket** | The pocket cut in the material by the Pocket Router motor. |
| **Router Motor** | Bosch 1617 or 1617EVS used to cut the Pocket. |
| **Router Feed Rate Valve** | Controls the speed at which the Pocket Router moves through the material when cutting the Pocket.<br><br>**Note:** Should be adjusted AFTER the main operational speed of the machine has been set with the Air Pressure Regulator. |

| | |
|---|---|
| **Solenoids** | Electrically controlled air valves which send pressurized air to the Clamp Cylinder and Drive Cylinder.<br><br>***See Appendix C & E for illustrations.*** |
| **Exhaust Muffler** | The exhaust mufflers on the solenoid valves release air pressure from the clamping cylinder, and the drive cylinder after the Router and Drill strokes. |
| **Switches** | Normally **OPEN** (NO) switches at rest<br>• Foot Switch<br>• Safety Switch<br>Normally **CLOSED** (NC) switches<br>• Router Stop Switch<br>• Drill Stop Switch |
| **Web** | The distance between the deepest part of the pocket and the edge of the material. |

# 4 Diagnostic Descriptions

## 4.1 Clamp Operation

| | Page | Procedure |
|---|---|---|
| **Clamp** doesn't come down, Machine Does NOT Rout or Drill: | | |
| □ Check Foot Switch…….....…. | **57** | 21.80 |
| □ Check Safety Switch (Stock Sense)…… | **59** | 21.82 |
| **Clamp** doesn't come down, but Machine Routs and Drills: | | |
| □ Check Clamp cylinder air line for leakage…… | **26** | 21.12 |
| □ Check Clamp Solenoid for blockage…… | **22** | 21.10 |
| □ Check Clamp Cylinder for function……..…. | **26** | 21.12 |
| **Clamp** comes down and STAYS DOWN as soon as air is attached…with Machine power OFF: | | |
| □ Check Clamp Solenoid for function……... | **24** | 21.11 |
| **Clamp** comes down, but immediately retracts…Machine Does NOT Rout or Drill: | | |
| □ Check Drill Stop Switch……... | **47** | 21.43 |
| **Clamp** doesn't hold stock securely: | | |
| □ Clamp footpad replacement…… | **20** | 21.05 |
| □ Internal Air Pressure too low, adjust Pressure regulator…… | **63** | 21.90 |
| □ Router Feed Speed too fast, adjust Router Feed Rate…….. | **37** | 21.32 |
| □ Check Tooling, may be dull…… | **61** | 21.83 |
| □ Check Clamp Solenoid for blockage .....…….....….. | **17-18** | 21.10 |
| □ Check Clamp cylinder air line for leakage…… | **26** | 21.12 |

| | Page | Procedure |
|---|---|---|
| **Clamp** releases slowly, Machine Routs and Drills: | | |
| □ Check Clamp cylinder and air line……. | **26** | 21.12 |
| □ Check Exhaust Muffler on Clamp Solenoid Valve……...……. | **27** | 21.13 |
| □ Check Clamp Solenoid for blockage.……. | **22** | 21.10 |
| **Clamp** doesn't release…Machine Routs and Drills: | | |
| □ Check Drill Stop Switch……... | **47** | 21.43 |
| □ Check Exhaust Muffler on Clamp Solenoid Valve……. | **27** | 21.13 |
| □ Adjust internal Air Pressure…… | **63** | 21.90 |
| **Clamp** doesn't release…Machine Routs, Does NOT Drill: | | |
| □ Check Exhaust Muffler on Router Solenoid Valve…….. | **55** | 21.65 |
| □ Check Drill Solenoid for function or blockage…….. | **50** | 21.51 |
| □Check Drive Cylinder for function.....…….. | **52** | 21.60 |
| □ Check Bar Spring position.....…….. | **45** | 21.42 |
| **Clamp** doesn't release…Machine Routs but Router Does NOT retract, Does NOT Drill: | | |
| □ Router Stop switch……... | **33** | 21.22 |
| □Check Bar Spring position.....…….. | **45** | 21.42 |

## 4.2 Router Operation

Router doesn't cut pocket, Drill Does NOT come out and Clamp does NOT come down:

| | | |
|---|---|---|
| □ Check Foot Switch…….....…. | **57** | 21.80 |
| □ Check Safety Switch (Stock Sense)…… | **59** | 21.82 |

**Router** doesn't cut pocket… Machine Clamps, Drills and releases:

| | | |
|---|---|---|
| □ Check Router Stop Switch for function or adjustment…… | **33** | 21.22 |
| □ Check Router Solenoid for function or blockage……. | **36** | 21.31 |
| □ Unclog Router Solenoid…….. | **35** | 21.30 |

**Router** comes up and STAYS UP as soon as air is attached…..with Machine power OFF:

| | | |
|---|---|---|
| □ Check Router Solenoid for function or blockage……. | **36** | 21.31 |
| □ Unclog Router Solenoid…….. | **35** | 21.30 |

**Router** cuts pocket and STAYS UP, Drill doesn't come out and Clamp doesn't release:

| | | |
|---|---|---|
| □ Check Router Stop Switch for function or adjustment…… | **33** | 21.22 |

**Router** cuts pocket, Drill doesn't come out and Clamp doesn't release:

| | | |
|---|---|---|
| □ Check Drill Solenoid for function or blockage……..…….... | **50** | 21.51 |
| □ Unclog Drill Solenoid…….....…… | **49** | 21.50 |
| □ Check Bar Spring position.....…….....…….. | **45** | 21.42 |
| □ Router Stop Switch.....…….....…….. | **33** | 21.22 |
| □ Check Drive Cylinder .....……..... | **52** | 21.60 |

**Router** returning too slow:

| | | |
|---|---|---|
| □ Check Router Solenoid Exhaust Muffler…….. | **55** | 21.65 |

**Router** advances too aggressively:

| | | |
|---|---|---|
| □ Adjust internal Air Pressure…… | **63** | 21.90 |
| □ Adjust the Router Feed Rate…….. | **37** | 21.32 |

**Router** doesn't cut pocket OR drill… Clamp doesn't release:

| | | |
|---|---|---|
| □ Check to see that Router is ON and speed is set to high..…..... | **29** | 21.20 |
| □ Check Router Feed Rate (may be turned all the way down)…..... | **37** | 21.32 |
| □ Check Router Solenoid for function or blockage…….…..…. | **36** | 21.31 |
| □ Check Drive Cylinder for leaks……...…….. | **52** | 21.60 |
| □ Check for Blockage in Drill Solenoid Exhaust Muffler...…….. | **55** | 21.65 |

**Router** doesn't cut a consistent size web:

| | | |
|---|---|---|
| □ Check Tooling, may be dull.....……... | **61** | 21.83 |
| □ Check Router Solenoid Exhaust Muffler for blockage…....…… | **55** | 21.65 |
| □ Check Router Stop Switch, move magnet closer to reed switch.. | **33** | 21.22 |
| □ Router Stop Plate may be loose, tighten web adjustment nut..... | **32** | 21.21 |
| □ Adjust internal Air Pressure…… | **63** | 21.90 |
| □ Check Drive Cylinder for leaks……...…….. | **52** | 21.60 |

## 4.3 Drill Operation

| | Page | Procedure |
|---|---|---|

Drill Does NOT come out, Router does NOT cut pocket and Clamp does NOT come down:

| | | |
|---|---|---|
| □ Check Foot Switch…….....… | **57** | 21.80 |
| □ Check Safety Switch (Stock Sense).…… | **59** | 21.82 |

**Drill** Does NOT come out, Machine Routs, Clamp Does NOT release:

| | | |
|---|---|---|
| □ Check Drill Solenoid for function or blockage……...…….... | **50** | 21.51 |
| □ Unclog Drill Solenoid…….....…… | **49** | 21.50 |
| □ Check Bar Spring position.....…….....……. | **45** | 21.42 |
| □ Router Stop Switch.....……...…….. | **33** | 21.22 |
| □ Check Drive Cylinder .....……..... | **52** | 21.60 |

**Drill** comes out and stays out as soon as air is attached…with Machine power OFF:

□ Check Drill Solenoid for function / clean out drill solenoid..... **50** 21.51

**Drill** comes out and stops, Router cuts pocket and Clamp DOES NOT release:

Machine DOES finish cycle when carriage is pushed forward by hand:

□Check Drill Stop Switch……..…….. **47** 21.43

□ Adjust Air pressure, may be too low…….. **63** 21.90

□ Check Drill Solenoid for function or blockage…….. **50** 21.51

□ Unclog Drill Solenoid…… **49** 21.50

□Check Router Solenoid Exhaust port for blockage……..…… **55** 21.65

□Check Drill Solenoid Exhaust port for blockage…….....…. **55** 21.65

□ Check drive cylinder for function.....…. **52** 21.60

**Drill** bit not completing pilot hole into Pocket:

□Check to see that drill is ON and speed is set to high..…….. **39** 21.40

□ Adjust air pressure, Machine cycling too slowly…….. **63** 21.90

□ Bit mounted too deep into collet……. **44** 21.41

□ Check for inconsistent web depth-See Router Stop Switch..... **33** 21.22

□ Drill bit dull, Change drill bit..... **61** 21.83

□ Check Drill Stop Switch, move magnet closer to reed switch. **47** 21.43

**Drill** bit retracting too slow:

□ Drill bit dull, Change drill bit..... **61** 21.83

□ Check Drill Solenoid for function or blockage…….. **50** 21.51

□ Unclog Drill Solenoid…… **49** 21.50

□Check Drill Solenoid Muffler for blockage……..…. **55** 21.65

□ Check to see that drill speed is set to high, if variable speed..... **39** 21.40

□ Bit mounted too far out in collet……. **44** 21.41

□Check Bar Spring health.....……. **45** 21.42

□Check Carriage Pivot Point for smooth function, lubricate if necessary

**Drill** bit separating from the shank:

□ Adjust air pressure, Machine cycling too slowly…….. **63** 21.90

□ Bit mounted too deep into collet……. **44** 21.41

| | Page | Procedure |
|---|---|---|
| **Drill** bit breaking: | | |
| □Adjust air pressure, Machine cycling too fast…….. | **63** | 21.90 |
| □Bit extended too far out of collet…… | **44** | 21.41 |
| □Check Drill Motor U-bolt nuts……..… | **39** | 21.40 |

## 4.4 Overall Machine Operation and Pocket Adjustment

| | Page | Procedure |
|---|---|---|
| **Machine** will not start cycle…motors are running: | | |
| □ Check Air Supply, minimum 85 PSI required…….. | **62** | 21.92 |
| □Check Safety Switch (Stock Sense)……..…… | **59** | 21.82 |
| □ Check Foot Switch…….. | **57** | 21.80 |
| **Machine** can be cycled with no stock in place: | | |
| □Check the Safety Switch……. | **59** | 21.82 |
| **Machine** cycling too slowly | | |

**Note:** A normal cycle is approximately 2 seconds

| | | |
|---|---|---|
| □ Adjust Air Pressure Regulator…… | **93** | 21.90 |
| □ Check Drive cylinder for air leak…… | **52** | 21.60 |
| □ Check for other air driven machines on the same line……... | **93** | 21.90 |
| □ Check for Blockage in Drill Solenoid Exhaust Muffler……..…….. | **55** | 21.65 |
| □ Check for Blockage in Router Solenoid Exhaust Muffler……..... | **55** | 21.65 |

| | Page | Procedure |
|---|---|---|
| **Pocket** ragged or crooked: | | |
| □ Adjust Router Feed Rate, may be too fast…….. | **37** | 21.32 |
| □ Check Clamp footpad, may need replacement…….. | **20** | 21.01 |
| □ Check Tooling, may be dull…… | **61** | 21.83 |
| **Pocket** burned or smoking: | | |
| □ Adjust Router Feed Rate, may be too slow……. | **37** | 21.32 |
| □ Check Tooling, may be dull…… | **61** | 21.83 |
| **Pocket** misaligned with pilot hole: | | |
| □ Adjust Pilot Hole alignment……. | **57** | 21.72 |
| □ Check Drill motor mounting…… | **39** | 21.40 |
| **Pocket** too close or too far from the edge of the stock, WEB adjustment: | | |
| □ Adjust Web with Router Stop Plate…….. | **32** | 21.21 |

# 5 Procedures

## 5.1 Manual Override on Solenoids 21.01

The solenoids can be manually overridden to allow air flow to the cylinder while air is attached to the machine. This can also be used to flush air through the solenoid to remove any moisture or debris. The manual override buttons are located on the end of the solenoids opposite of the air ports. **See Fig 4.**

### 5.1.1 TO TEST SOLENOID FUNCTION AND FOR LEAKS:

1. Unplug the machine, but make sure air is attached.
2. Raise the work top up and locate the stack of solenoids on the left.
3. Depress the red button to allow air to flow through the solenoid to the cylinder to test for function or listen for air leaks.

### 5.1.2 TO FLUSH THE SOLENOID:

1. Remove the air line out fitting and the exhaust muffler and press the override button for several seconds. Air should flow through the solenoid. Reassemble and cut a test pocket.

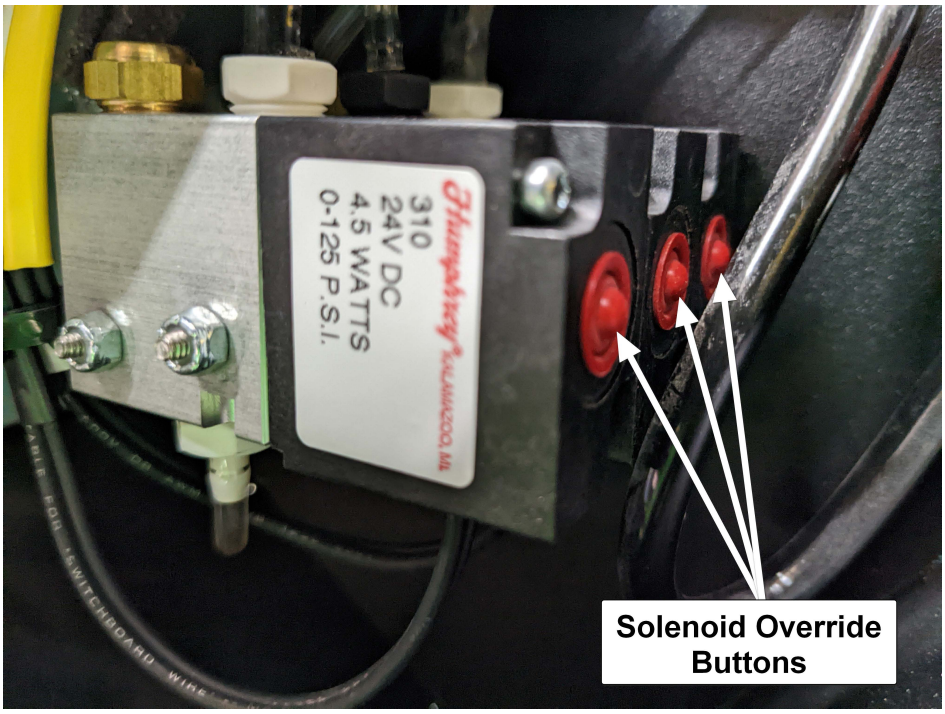


***Fig 4***

## 5.2 Clamp Foot Pad or Cylinder Replacement 21.05

### 5.2.1 TO REPLACE THE CLAMP FOOT PAD:

1. The Clamp Foot Pad is not attached by adhesive. While the Clamp Foot is still attached to the machine, use a flat blade screwdriver to remove the old Pad by carefully levering it out of its seat.

2. The rim of the new Pad must be bent and popped into place. Insert an edge of the new pad into the Clamp Foot and use a flat blade screwdriver to wedge the rest of the Foot Pad into the Clamp Foot.

### 5.2.2 TO REPLACE THE CLAMP FOOT OR CLAMP CYLINDER:

1. Connect 85 PSI directly to the Clamp Cylinder to manually actuate it.

2. With the shaft fully extended, hold the shaft stationary with a ½" wrench and loosen the jamb nut with a ¾" wrench. Continue holding the shaft stationary with the ½" wrench and use large slip-joint pliers to turn the Clamp Foot and break it free of thread lock compound. **See Fig 3.**

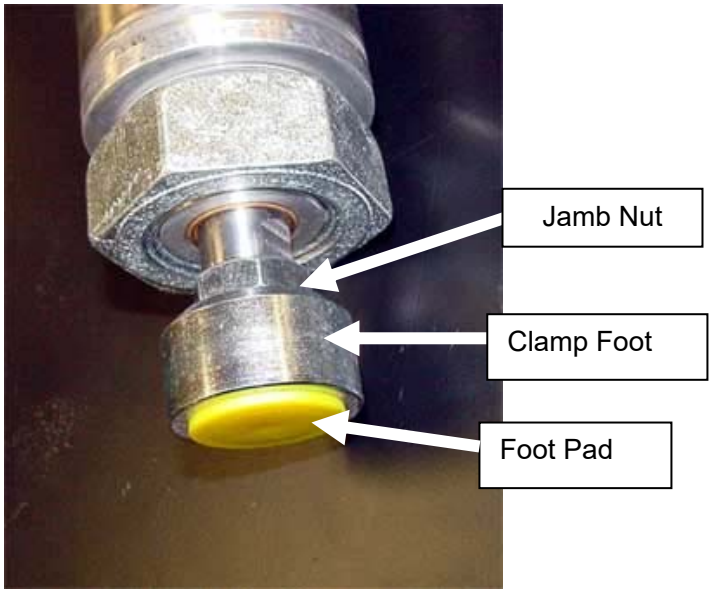


***Fig 3***

## 5.3 Unclogging the Clamp Solenoid 21.10

**Note:** To remove an air line, twist and pull air line from the barbed plastic fitting or unscrew the plastic fitting from the soleniod by using a 7/16" wrench.

***1.*** Disconnect power from the machine.

***2.*** Remove the air line from the clamp cylinder Push-In fitting **(see Fig 5)** and the exhaust muffler from the clamp solenoid (**See Fig 5a).** Lift the work top of the machine and press the override button for several seconds to flush the solenoid. Air should flow through the air line. Press the override switch several more times for several seconds to throughly flush the solenoid. **See Fig 5a.**

**Note: To remove the air line from the clamp cylinder, push in the plastic or metal rim of the fitting and pull the air line out. To re-install, push the air line in until it meets resistance and then push in another 1/2'".**

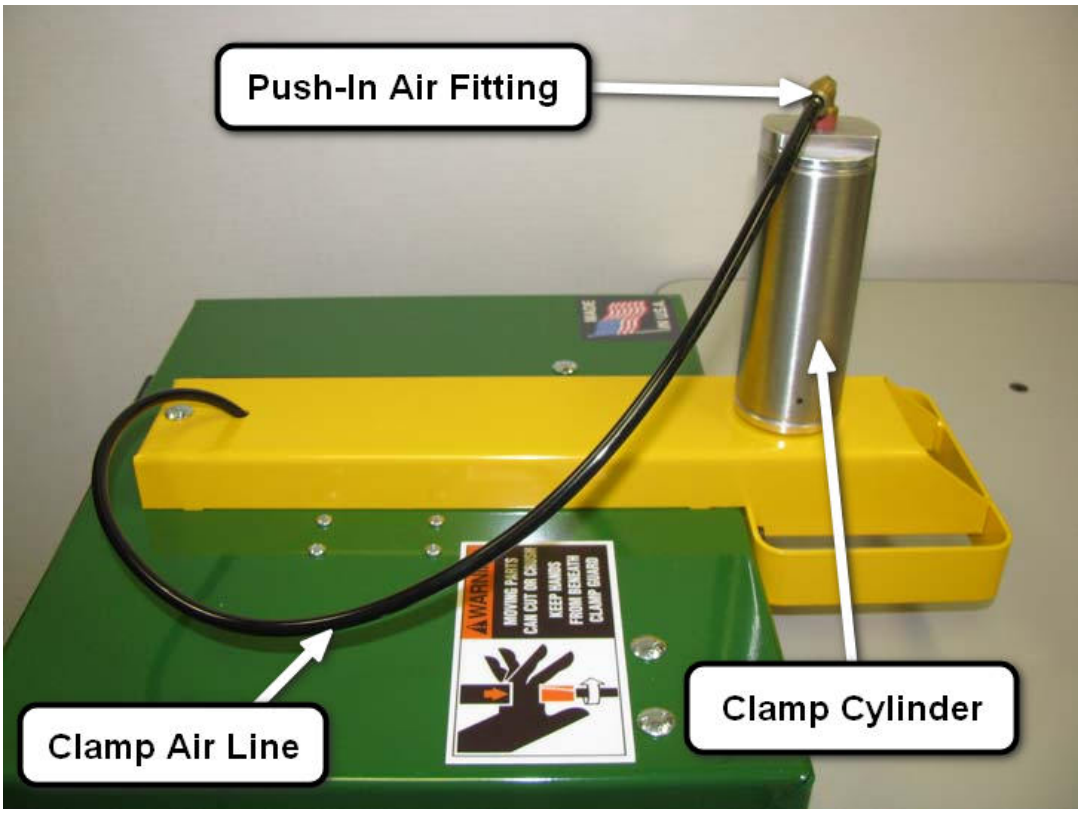


***Fig 5***

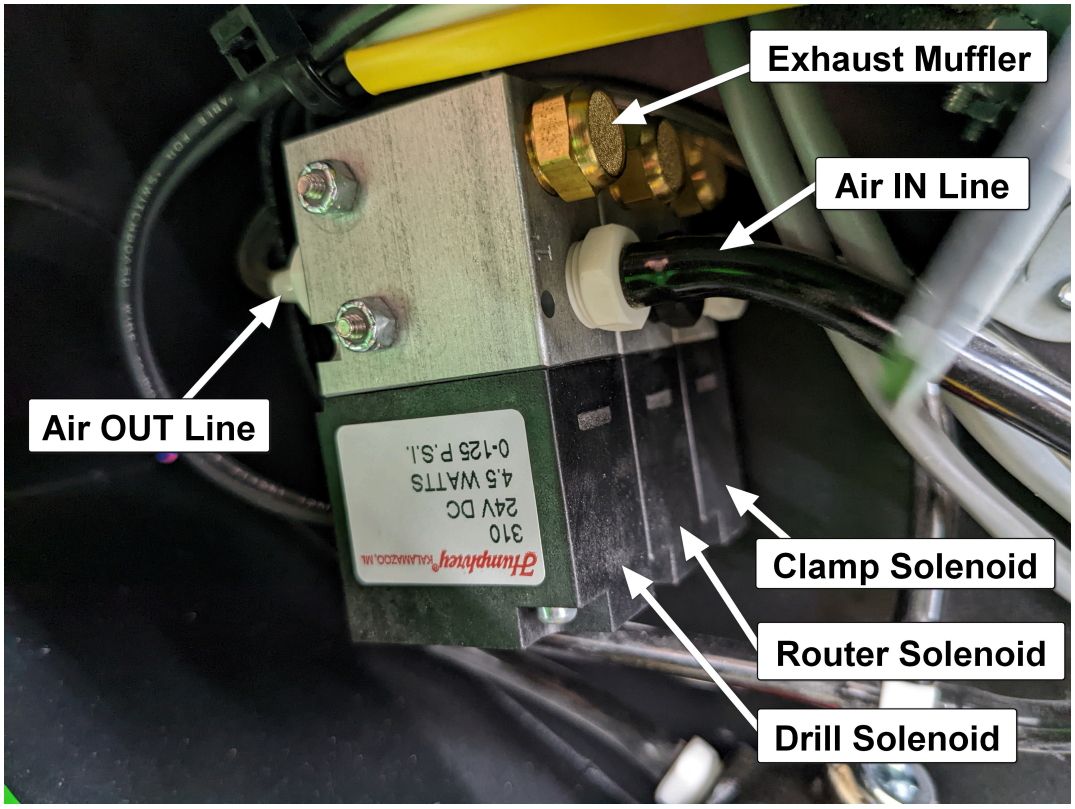


***Fig 5a***

3. Reinstall the air line on the clamp cylinder and exhaust muffler on the exhaust port of the solenoid.

4. Lower and secure the work top, then reconnect power. Cut a test pocket.

Note: If this procedure does not correct the problem, the Clamp Solenoid will need to be replaced. **Refer to Procedure 21.91, "Replacing Solenoids"**

## 5.4 Clamp Solenoid Check 21.11

The Clamp Solenoid provides full air pressure to the Clamp. If the Clamp Solenoid has failed open the clamp will come down as soon as air is attached to the machine, without the power being turned on. If the clamp fails to come down the Clamp Solenoid may be stuck closed or clogged.

### 5.3.1 Troubleshooting Steps:

1. Connect the shop air supply to the machine.
2. If the clamp automatically extends, then the Clamp Solenoid is stuck open.
3. If the clamp does not extend, lift the work top of the machine  Locate the manual overide button on the clamp solenoid. **See FIG 6 and Fig 6a**

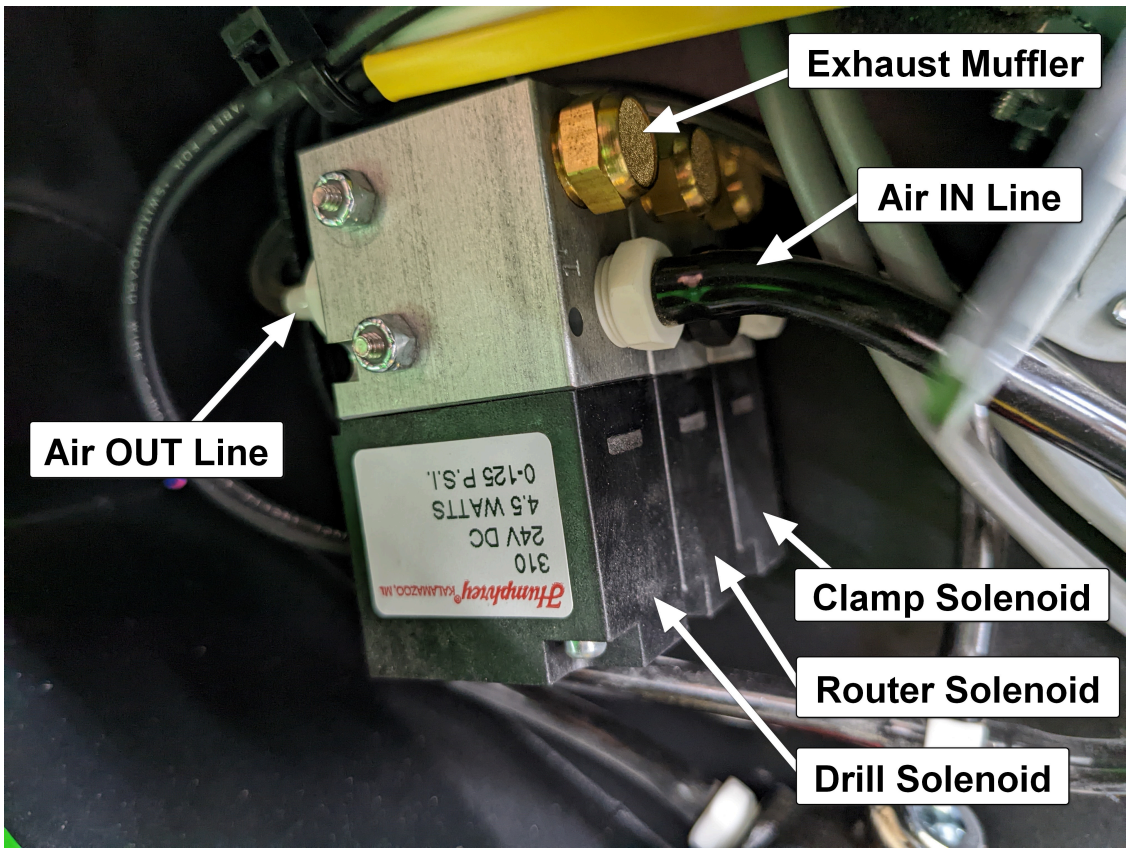


**FIG. 6**

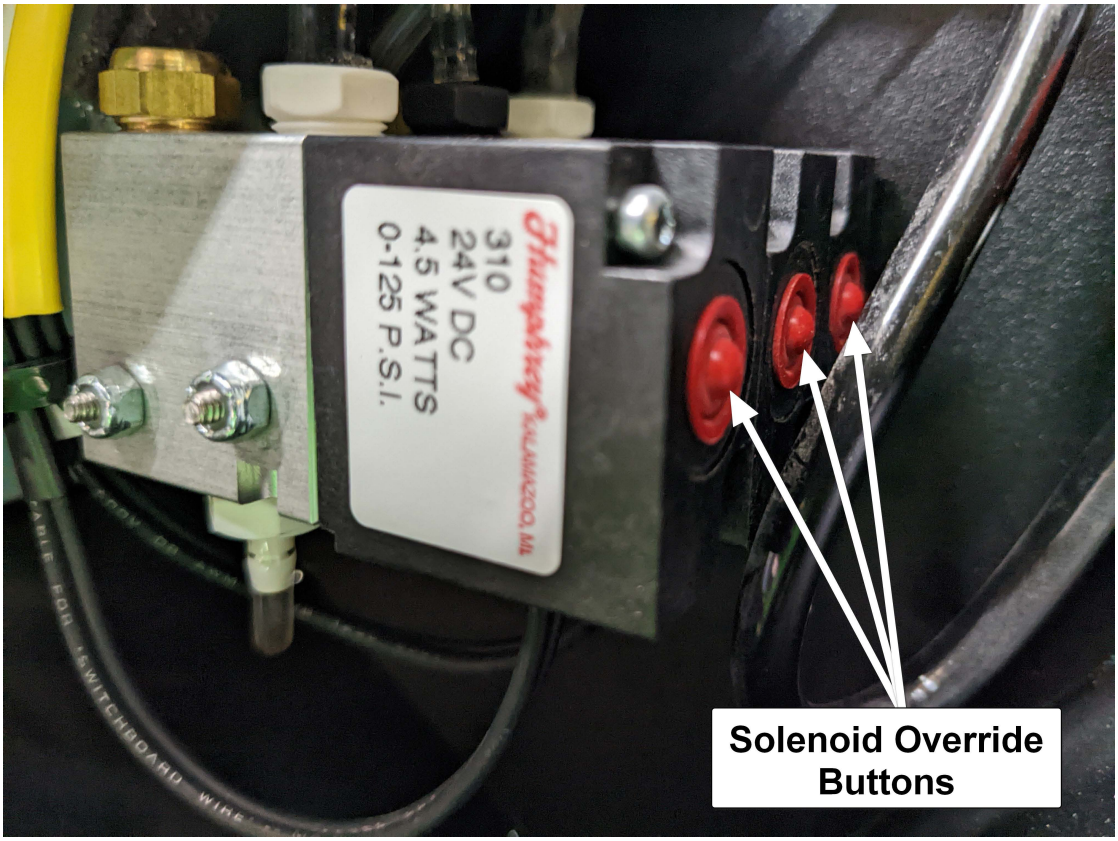


**FIG. 6a**

4. Press and hold the manual override button on the clamp solenoid.

5. If the clamp cylinder does not extend, then the Clamp Solenoid may be stuck closed or clogged.

6. If the Clamp Solenoid is stuck open/closed or clogged, Perform procedure 21.10, Unclogging the Clamp Solenoid.

## 5.5 Clamp Cylinder Check 21.12

If the Clamp Cylinder clamps or retracts slowly it is having trouble filling or exhausting, or it may be faulty. If the clamp operates normally with an external air supply, look for a crimp in the black ¼" air line from the Clamp Cylinder to the Clamp Solenoid.

### 5.5.1 TROUBLESHOOTING STEPS:

1. **Disconnect power and air from the machine.**
2. Disconnect the air line from the "push in" fitting of the Clamp Cylinder.
3. Connect an external air supply directly to the "push in" air fitting. **See Fig 7.**

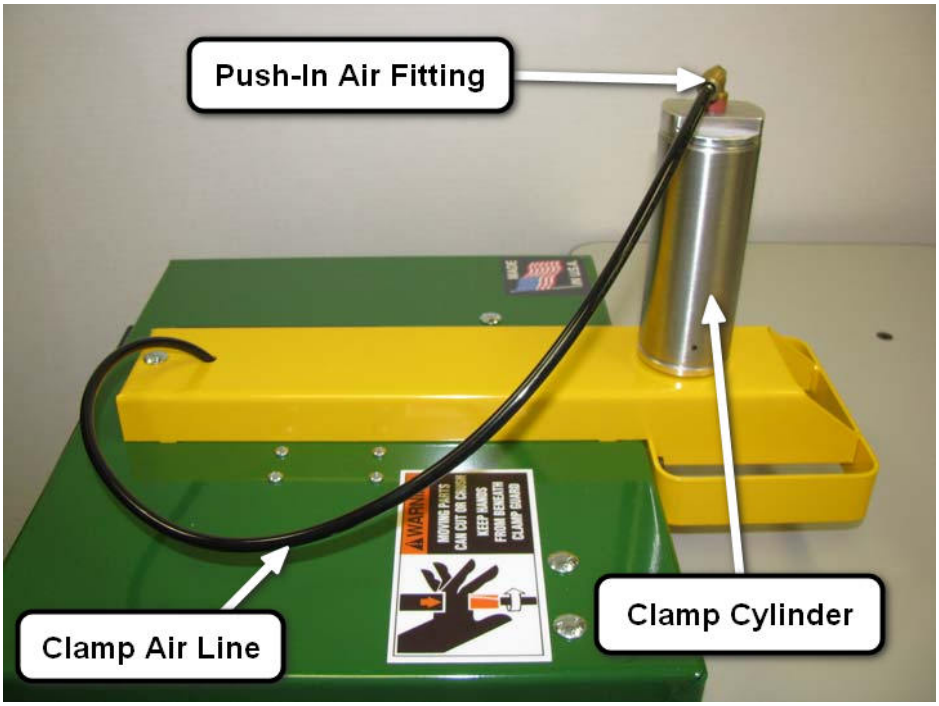


***Fig 7***

4. The Clamp Foot should fully extend quickly. Remove the external air supply and the Clamp Foot should fully retract quickly.
5. If both clamp actions are smooth and quick the Clamp Cylinder is operating properly. Continue troubleshooting the Clamp Cylinder Air Line, the Exhaust Muffler on the Clamp Solenoid and the Clamp Solenoid. **See Fig 8.**

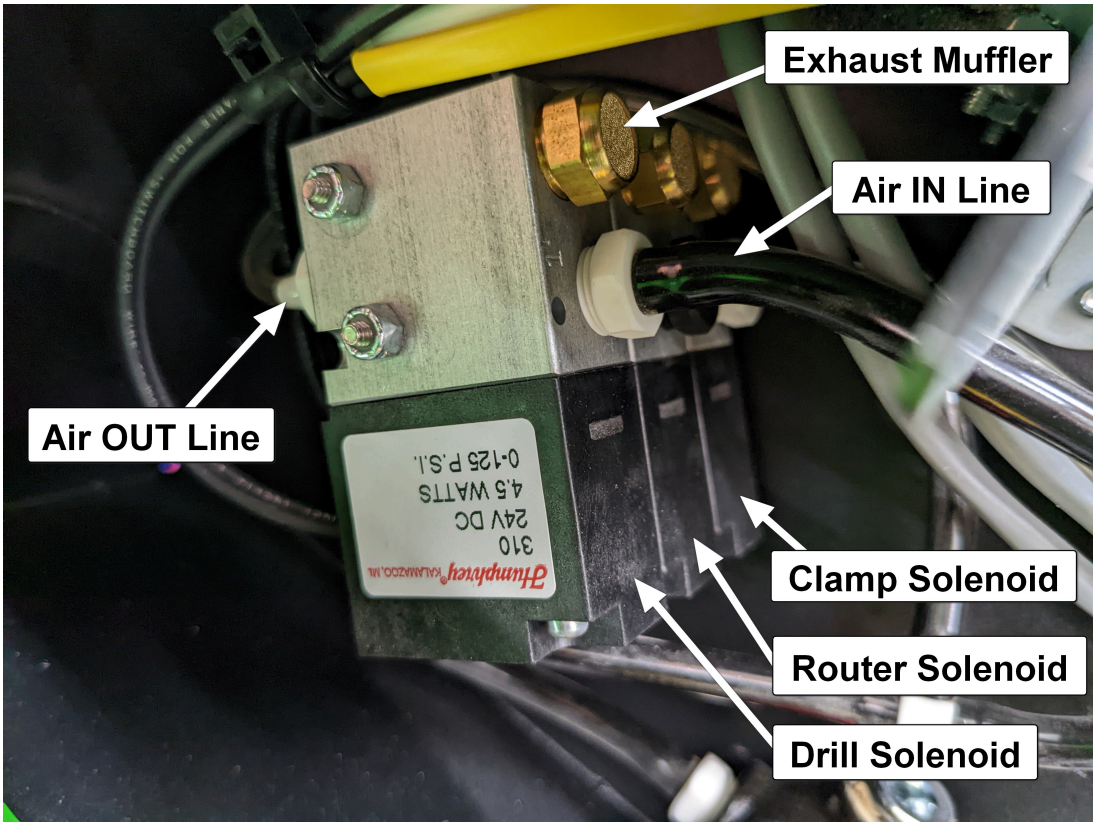


***Fig 8***

*6.* If the clamping and releasing actions are not smooth and quick, the Clamp Cylinder should be replaced.

## 5.6 Clamp Exhaust Check 21.13

Air from the Clamp Cylinder is exhausted out of the Clamp Solenoid Exhaust port. This port is located to next in the Air IN on the Clamp Solenoid Valve. If the clamp releases very slowly, the Exhaust Muffler on the Exhaust Port may be blocked.

### 5.6.1 TROUBLESHOOTING STEPS:

**1.** Lift the work top on the machine. The Exhaust muffler is the brass fitting located next to the air inlet on the clamp solenoid. **See Fig 9.**

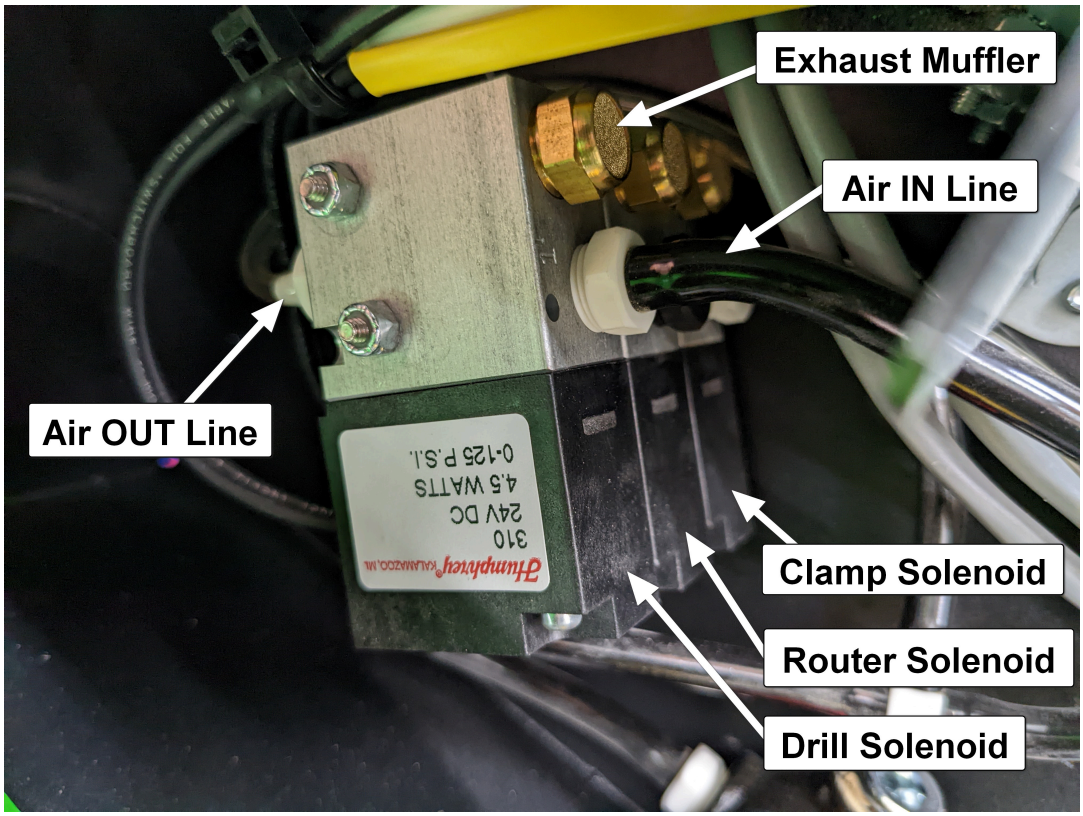


***Fig 9***

2. Make sure that exhaust muffler is clear of debris and unobstructed by air lines or control wires.

3. The exhaust muffler can be temporarily removed to test the clamp response. If the clamp returns at normal pace without the exhaust muffler then the exhaust muffler is obstructed and needs replaced.

## 5.7 Router Motor Operation 21.20

The Router Motor has its own power switch located on the motor body. This switch should be in the ON position as motor operation is controlled by the main Power Switch on the machine. If your machine is equiped with a variable speed router motor(Bosch 1617EVS), the variable speed rotatory selector on the end of the router should be on the highest setting.

**Warning: Do not run the motor for more than two hours at a time. The motor requires a ½ hour cool down period after each two hour period.**

### 5.7.1 REMOVING / INSTALLING THE ROUTER MOTOR:

1. Disconnect power and air from the machine. Lift the work top of the machine.

2. Remove router electric plug by first removing the 3 mounting screws in the machine cabinet. **See Fig 10.** Hold the plug retention plate in one hand while removing the screws. Remove the plug from the plate by first lifting the plug then by turning 90 degrees. Plug can now be removed from the retention plate. **See Fig 10a.**

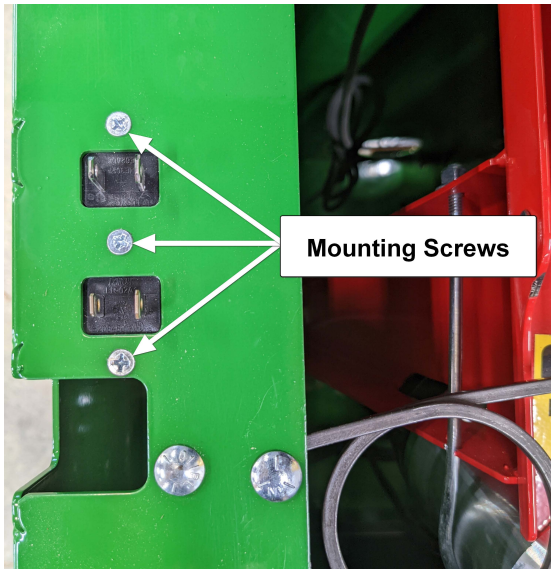


*Fig 10*

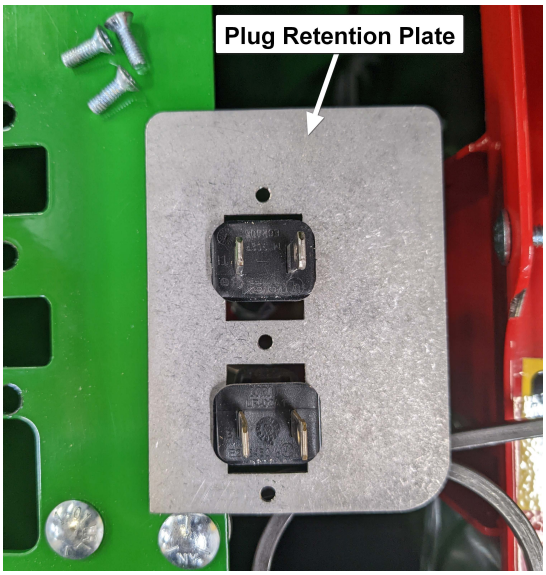


*Fig 10a*

3. Locate the Drill Motor. Behind the router carriage are two lock nuts that tighten a large U-Bolt holding the Router Motor in place. **See Fig 11.**

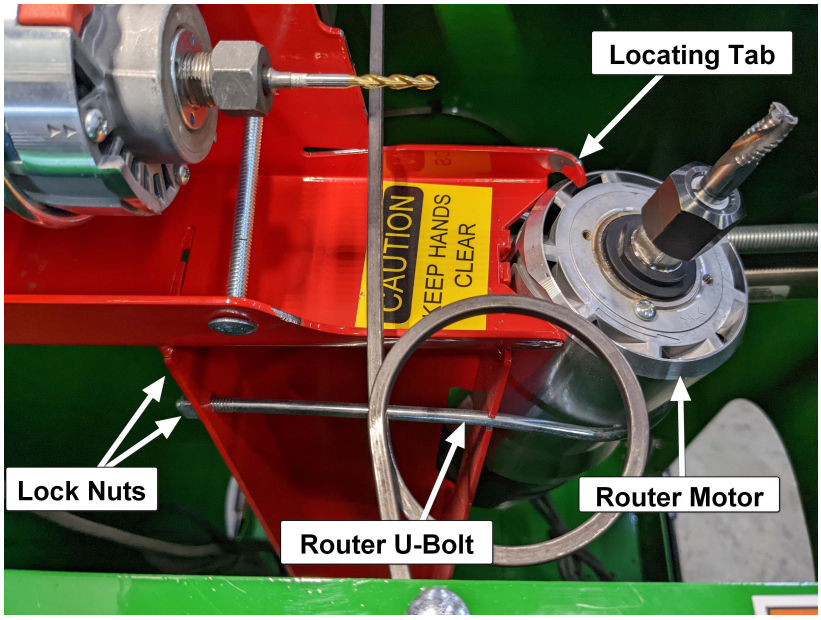


***Fig 11***

4. With a wrench loosens the two nuts a few turns to provide enough slack to drop the Router Motor down into your hand and then out the top of the unit.

5. Reinstall the Router Motor making sure the motor face is pushed up to seat flush with the locating tab on the red motor carriage, cord should face to front of machine. **See Fig 11**.

6. Tighten the two lock nuts on the U-Bolt. Hold the motor face flush with the red carriage and the locating tab until the motor has been fully secured by the two nuts.

7. Reinstall the plug with the retention plate and 3 screws in reverse order. Care must be taken to position the plug correctly. The wider electric prong on the plug should be closest to the center of the machine. **See FIG 12.**

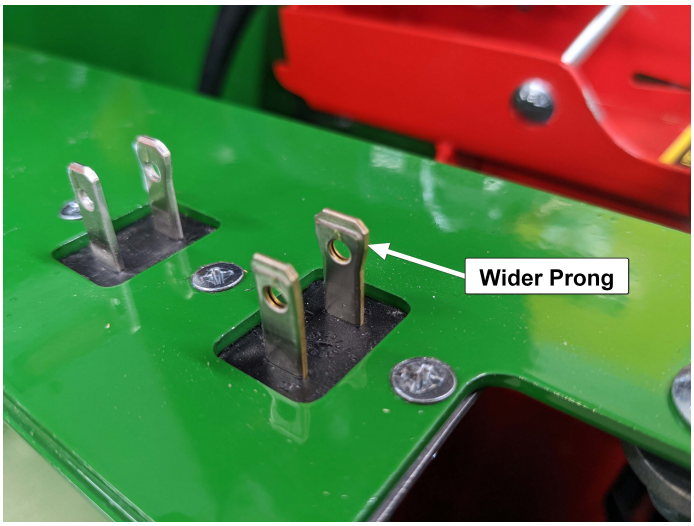


***Fig 12***

8. Lower and secure the work top. Through the front access door manually rock the Motor Carriage toward the rear of the machine and make sure that the router bit cleanly fits in the slot on the table top.

## 5.7.2 SERVICING THE ROUTER MOTOR:

1. Follow the instructions found in your Bosch manual on maintaining the motor. This includes information on keeping the motor clean and free of dust, maintaining the brushes and replacing the tooling.

2. The Router motor is warranted for one year from the purchase of the machine.

3. Warranty replacement and parts purchases can be handled by your nearest Bosch dealer/service center, or Castle.

4. The Router Motor has two electrical brushes that should be periodically replaced. **See Fig 13.**

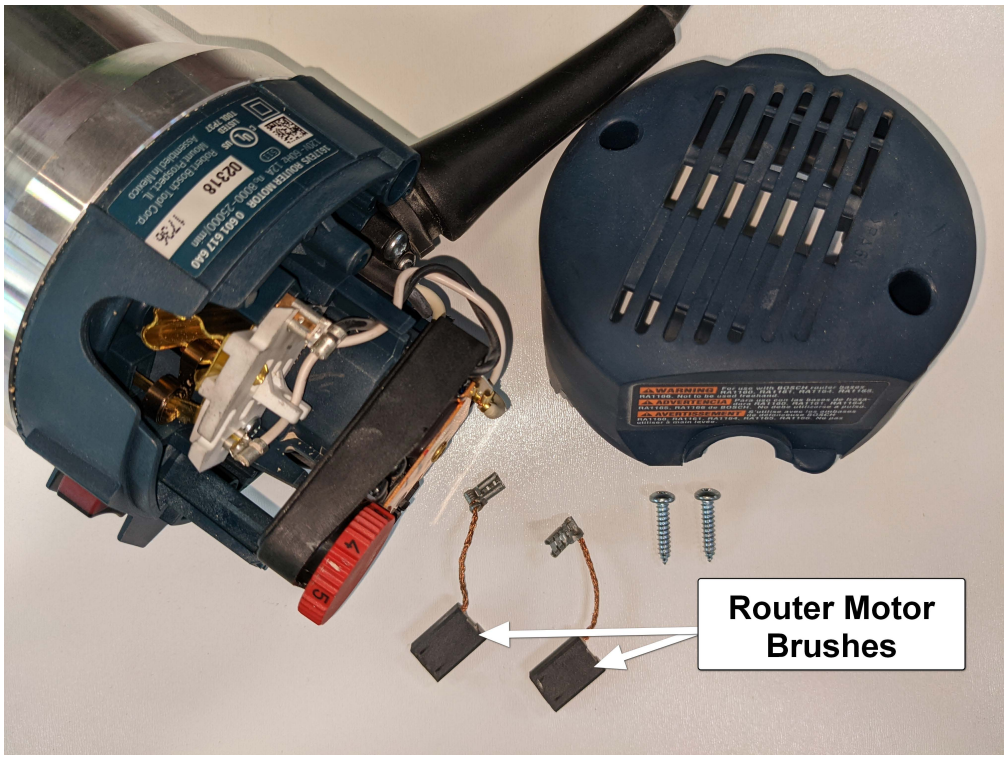


***Fig 13***

## 5.8 Adjusting the Web, Router Stop Plate 21.21

The space between the edge of the stock and the deepest part of the pocket is called the “Web”. The Web may be set between 5/8” and 13/16” by adjusting the Router Stop Plate from the top of the machine. The factory setting is approximately 5/8".

**Note:** If you experience inconsistent web size, make sure the lock nut on the Router Stop Plate is secure. If the router stop plate is secure, check Router Stop Switch for proper function.

### 5.8.1 WEB ADJUSTMENT STEPS:

1. The Router Stop Plate is a black bracket found on the right side of the yellow Clamp Guard.

2. It is held in place by a ¼” lock nut. **See Fig 14**.

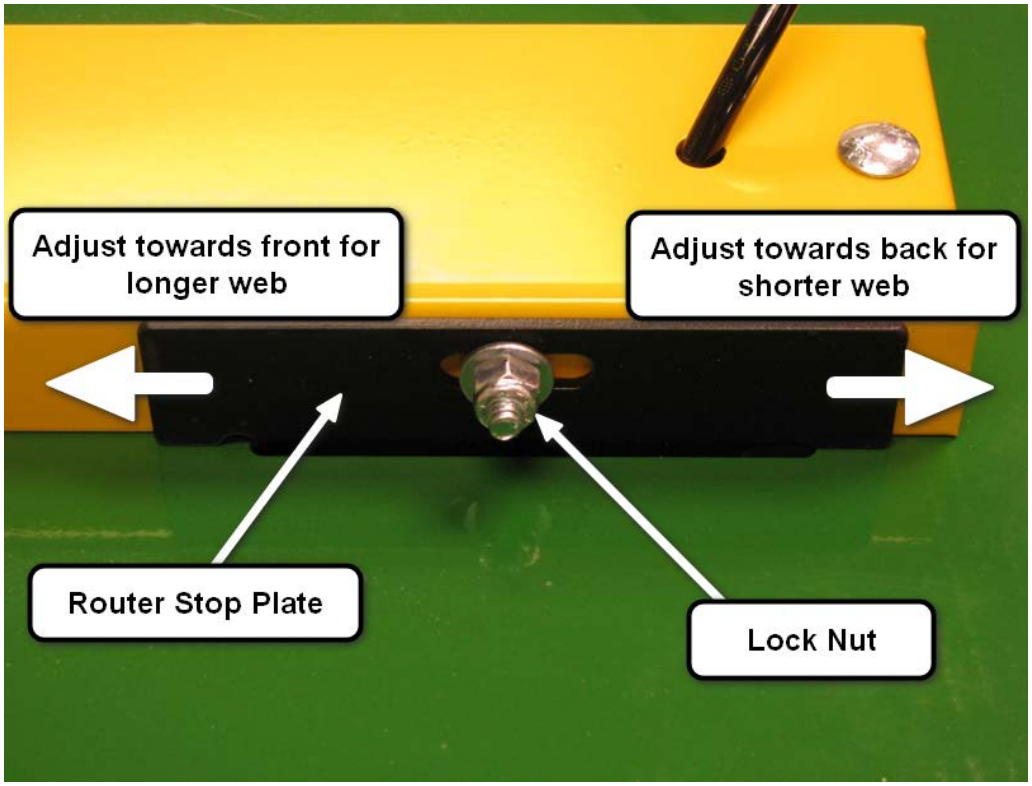


***Fig 14***

3. Adjust the Web length by loosening the lock nut and moving the Router Stop Plate towards the front of the machine for a longer web and towards the back of the machine for a shorter Web.

4. Secure the lock nut after making any adjustments.

## 5.9 Router Stop Switch (NC) 21.22

The Router Stop Switch consists of a magnetic reed switch (with wires) and a magnet (no wires). It is Normally CLOSED (NC) and OPENS at the end of the pocket routing stroke when the Motor Carriage breaks the magnetic field. The switch signals two solenoid valves that reverse the direction of airflow in the drive cylinder causing the carriage to retract the Router and extend the Pilot Hole Drill.

If the switch fails, or the magnetic field weakens or becomes misaligned, the machine will not sense the end of the rout cycle properly and the router may stay forward in the pocket causing

the cycle to stall, or the router may not extend at all although the Pilot Hole Drill and Clamp finish the cycle.

### 5.9.1 TROUBLESHOOING STEPS:

1. Disconnect power and air from the machine. Lift the work top of the machine.
2. The Router Stop Switch and Magnet are attached to the front side of the Router Stop Plate, which is located just to the right of the control box. **See Fig 15.**

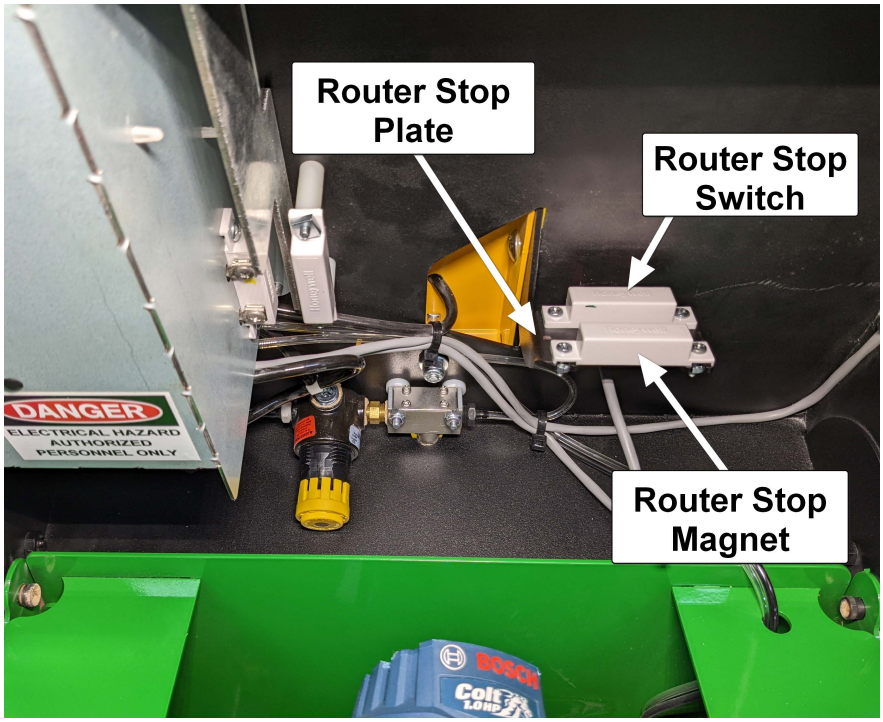


***Fig 15***

3. Test for continuity across the terminals of the switch with the Motor Carriage at rest. The switch should measure as CLOSED.

4. Put a piece of metal or a screwdriver in between the switch and the magnet. The switch should now measure as OPEN.

*5.* If the switch does not measure as OPEN, adjust the magnet 1/16" farther away from the switch and repeat step 4 until the switch measures OPEN with the metal/screwdrver in between the switch and the magnet. If no more adjustment can be made, flip the magnet 180 degrees to see if that will allow the switch to open during testing.

*6.* If the switch continuously measures CLOSED regardless how far away the magnet is, replace the switch and magnet.

*7.* If the switch measures OPEN without the metal/screwdriver in between, adjust the magnet 1/16" closer to the switch and repeat the test. Make additional adjustments closer until the switch measures CLOSED.

*8.* If the switch continuously measures OPEN regardless how close the magnet is, replace the switch and the magnet

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**Note:** If a dry cycle is preformed to confirm function of the switch and the router bit stays extended, verify that the carriage plate is not hitting the front of the switch/magnet. The carriage plate should land in between the switch and the magnet.

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## 5.10 Unclogging the Router Solenoid 21.30

**Note:** To remove an air line, twist and pull air line from the barbed plastic fitting or unscrew the plastic fitting from the soleniod using a 7/16" wrench.

***1.*** Disconnect power from the machine. Lift the work top of the machine.

***2.*** Remove the air out line and the exhaust muffler from the router solenoid and press the override button for several seconds to flush the solenoid. Air should flow through the solenoid. Gently open the Router Feed Rate valve (located on the rear of the machine next to the air inlet) fully counter clockwise. Press the override switch several more times for several seconds to throughly flush the solenoid.**See Fig 16.**

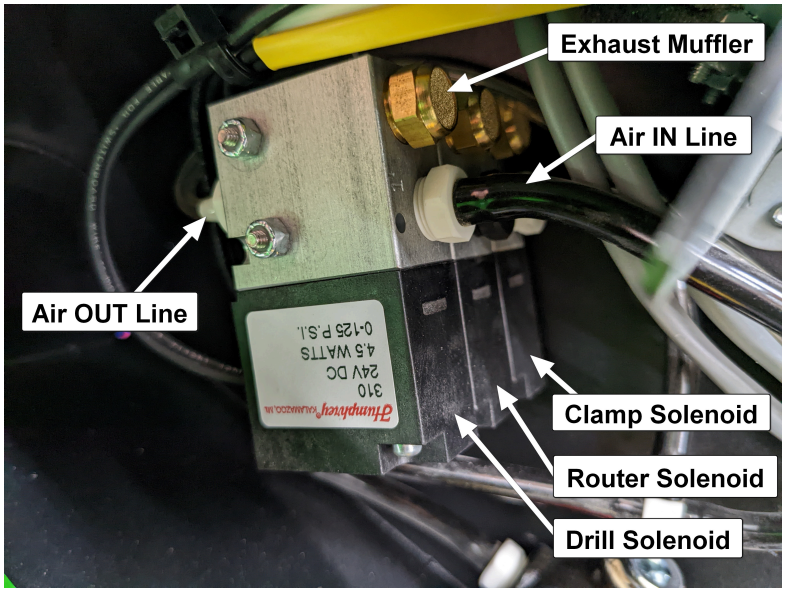



***Fig 16***

3. Reinstall the air line on the out port and exhaust muffler on the exhaust port of the solenoid.

4. Lower and secure the work top, then reconnect power.

5. Turn the Router Feed Rate valve clockwise while cutting test pockets (typically 2 turns counterclockwise from mechanical stop), until the desired Router Feed Speed is reached.

**Note:** If this procedure does not correct the problem, the Router Solenoid will need to be replaced. Refer to Procedure 21.91, “Replacing Solenoids”.

***Rule of Thumb:*** Router feed speed should be as fast as possible while still maintaining smooth, clean, straight pockets.

## 5.11 Router Solenoid Check 21.31

The Router Solenoid controls air pressure to the Drive Cylinder, which provides the forward motion of the router's cutting stroke. If the Router Solenoid has failed open, the Router will extend as soon as the air is attached to the machine, regardless of whether the power is turned on. If the Router Solenoid is clogged, the Router may not start or complete the pocket.

### 5.11.1 TROUBLESHOOTING STEPS:

1. Connect the shop air supply to the machine.
2. If the router automatically extends, then the Router Solenoid is stuck open.
3. If the router does not extend, lift the work top of the machine Locate the manual overide button on the router solenoid. **See FIG 17 and Fig 17a**

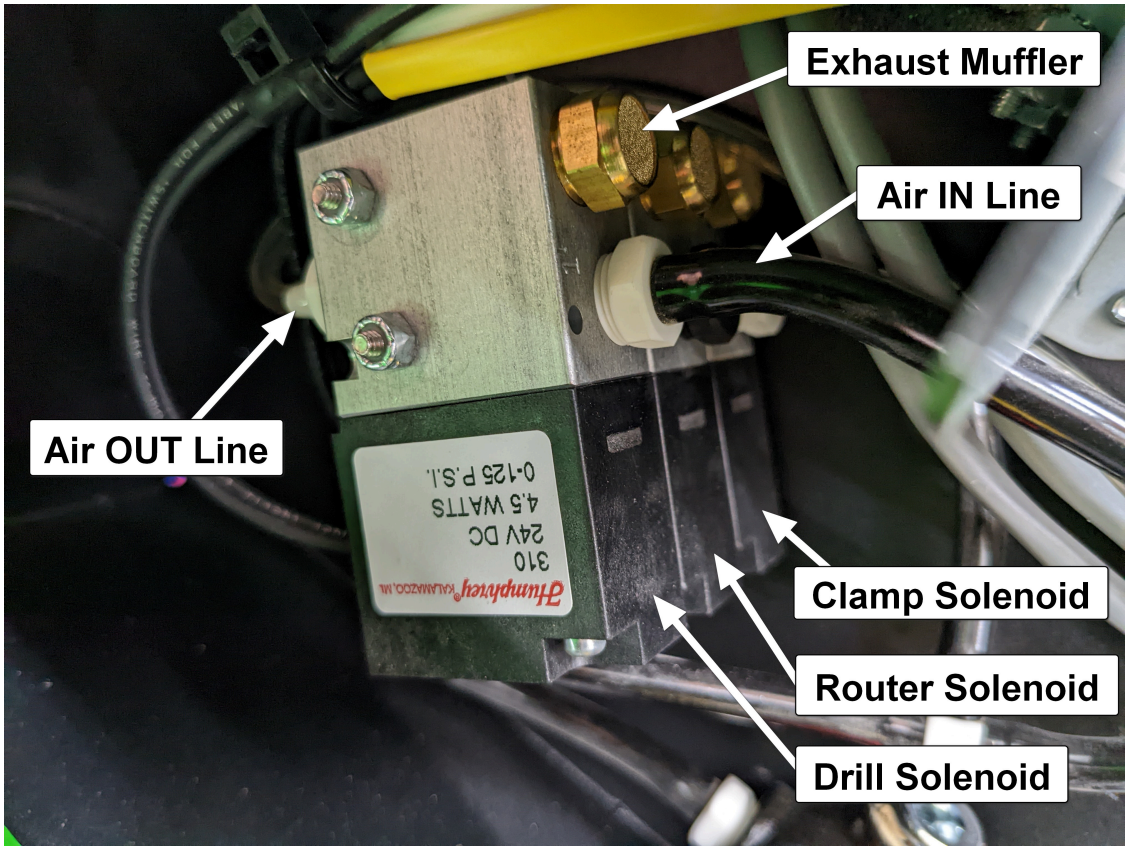



**FIG. 17**

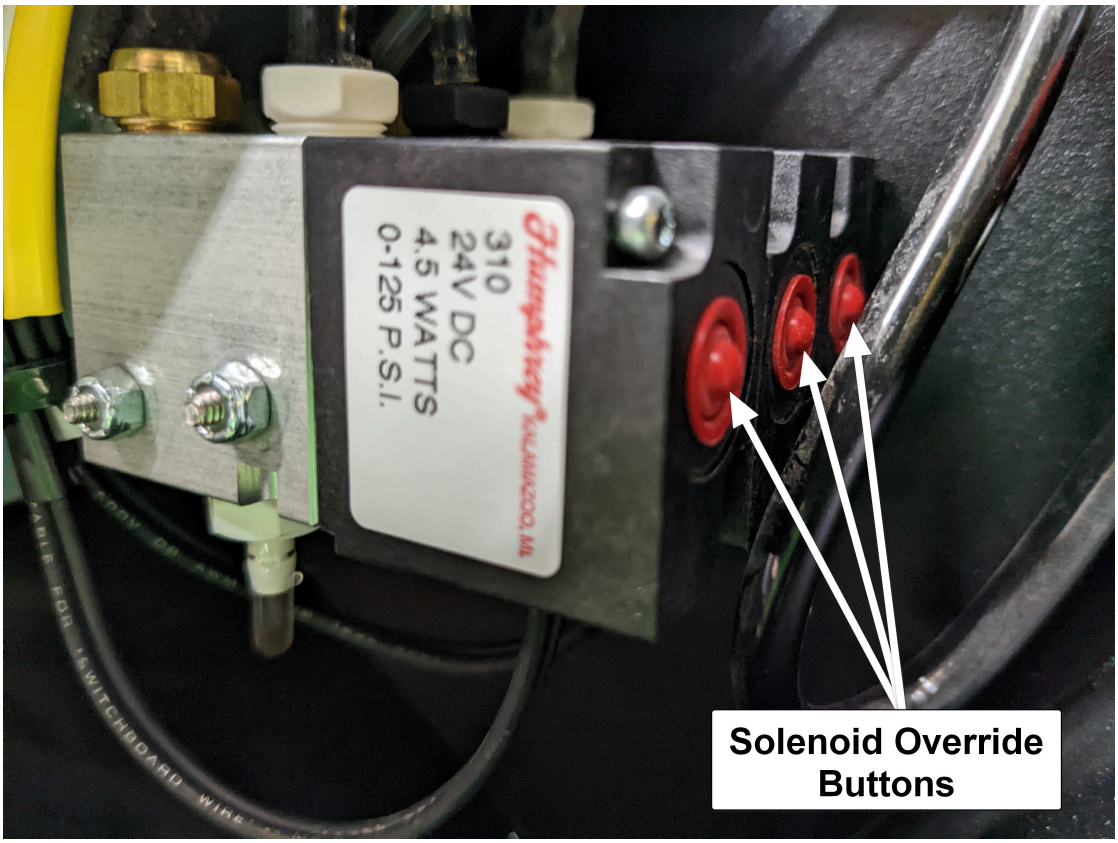



**FIG. 17a**

4. Press and hold the manual override button on the router solenoid.

5. If the carriage does not tilt toward the back of the machine, then the Router Solenoid may be stuck closed or clogged.

6. If the Router Solenoid is stuck open or clogged, Perform procedure 21.30, Unclogging the Router Solenoid.

## 5.12 Router Feed Rate Adjustment 21.32

The Router Feed Rate is adjustable to accommodate varying materials and/or bit types. If the Router Feed Rate is too fast, stock slippage, poor pocket quality, or dulled tooling may result. If the Router Feed Rate is too slow pocket burning and premature wear of the tooling may result.

***Rule of Thumb:*** Router feed speed should be as fast as possible while still maintaining smooth, clean, straight pockets. The harder the material, the slower the feed rate of the Router.

**Note:** If the Pressure Regulator has been adjusted, readjust the Router Feed Rate (if necessary) AFTER the Pressure Regulator setting has been finalized.

## 5.12.1 TO RESET THE ROUTER FEED RATE:

1. Locate the Feed Rate knob on the rear of the case and fully loosen the Jamb Nut. **See Fig 18**.

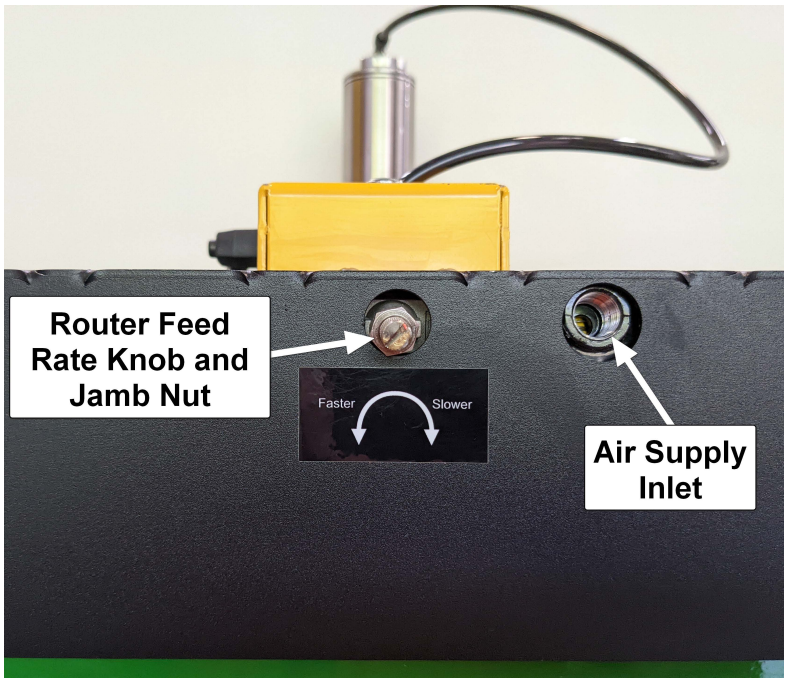



***Fig 18***

2. Rotate the Feed Rate knob fully clockwise until it stops.
3. Rotate the Feed Rate knob 2 full revolutions counter-clockwise.
4. This setting is typical for hard woods.
5. Adjust the Feed Rate to your material by ½ or ¼ turn at a time to obtain a clean, smooth pocket.
6. Counter-clockwise increases the Router Feed Rate, Clockwise decreases the Router Feed Rate.
7. Tighten the Jamb Nut after adjustments are finalized.

**Note:** If the Router comes up with the Feed rate knob turned fully clockwise or if it runs at full speed regardless of the setting, the Feed rate valve should be replaced. This can be confirmed by closing the router feed rate valve (clockwise until it hits the mechanical stop). Initiate a dry cycle. Router should not move. If the router moves forward, replace the router feed rate valve. Now, turn the Router Feed Rate valve up slightly (counter clockwise). If the router moves slowly then the router feed valve should be OK. If the router comes up extremely fast, replace the router feed rate valve.

## 5.13 Drill Motor Operation 21.40

The Drill Motor has its own power switch located on the motor body. This switch should always be in the ON position. Drill motor operation is controlled by the Power Switch on the machine. If your machine is equiped with a variable speed drill motor( Bosch PR20EVS), the variable speed rotatory selector on the end of the router should be on the highest setting.

Warning: **Do not run the motor for more than two hours at a time. The motor requires a ½ hour cool down period after each two hour period.**

The Drill Motor is attached to the Motor Carriage by a U-bolt that is secured with two lock nuts. This U-bolt may become loose due to vibration causing inconsistent pilot hole boring and/or frequently broken drill bits.

### 5.13.1 TIGHTENING THE DRILL MOTOR:

1. Lift the work top of the machine.
2. The Drill Motor is mounted on top of the red Motor Carriage. **See Fig 19**.

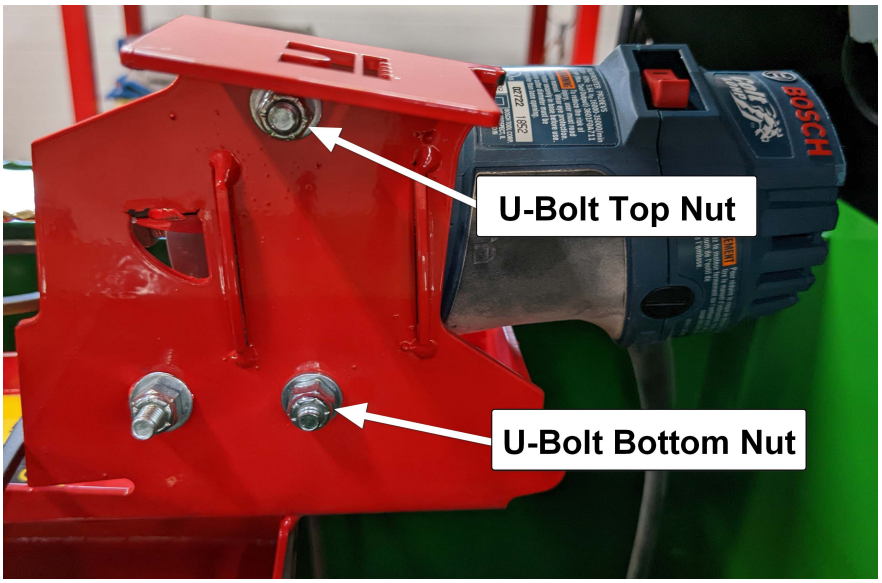



***Fig 19***

3. Locate the two lock nuts on the right side of the Motor Carriage.

4. Make sure the Drill Motor Face is pushed up to seat flush with the locating tab on the red carriage. Rotate the Drill Motor so the screw on the motor face stops on the locating tab. Please note that the spindle lock of the Drill Motor will be pointed up. **See Fig 19a.** Hold the Drill Motor in position as you tighten the two lock nuts on the U-Bolt.

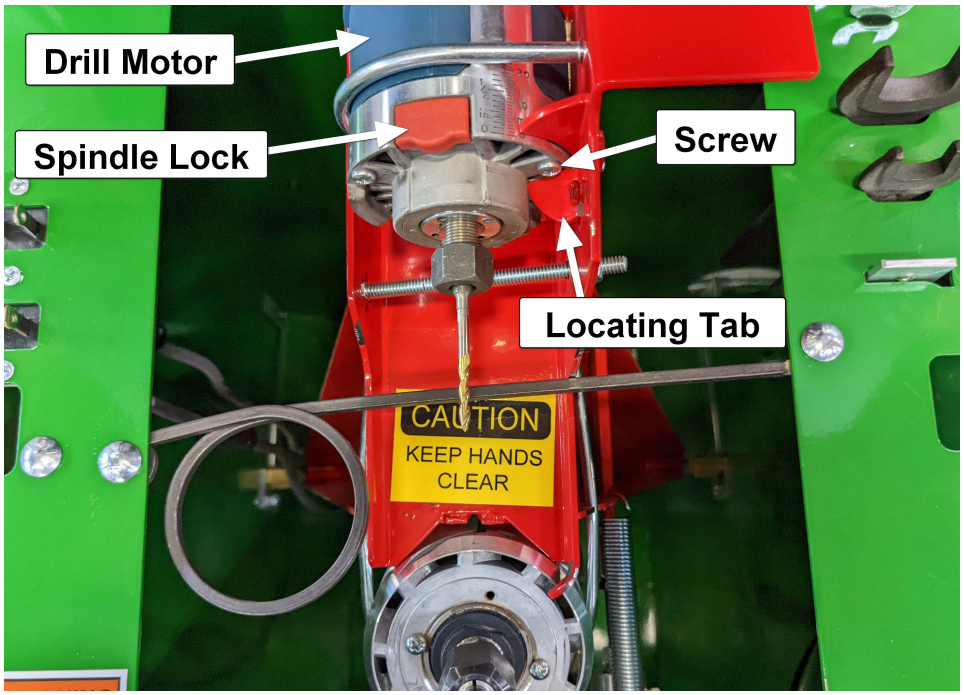



***Fig 19a***

## 5.13.2 REMOVING / INSTALLING THE DRILL MOTOR:

1. Disconnect power and air from the machine. Lift the work top of the machine.

2. Remove router electric plug by first removing the 3 mounting screws in the machine cabinet. **See Fig 20.** Hold the plug retention plate in one hand while removing the screws. Remove the plug from the retention plate by first lifting the plug then by turning 90 degrees. Plug can now be removed from the retention plate. **See Fig 20a.**

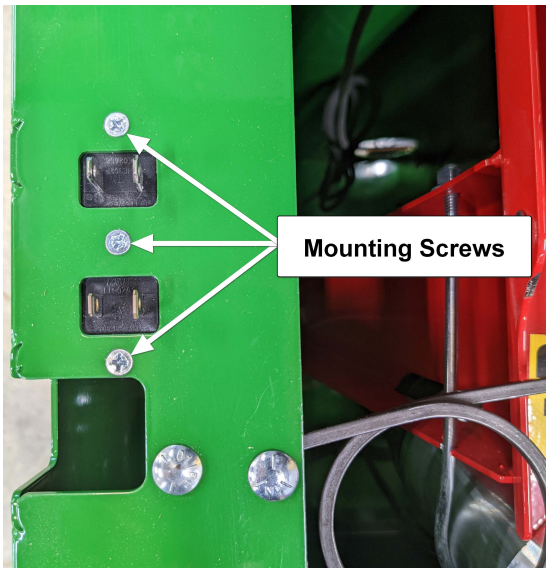



*Fig 20*

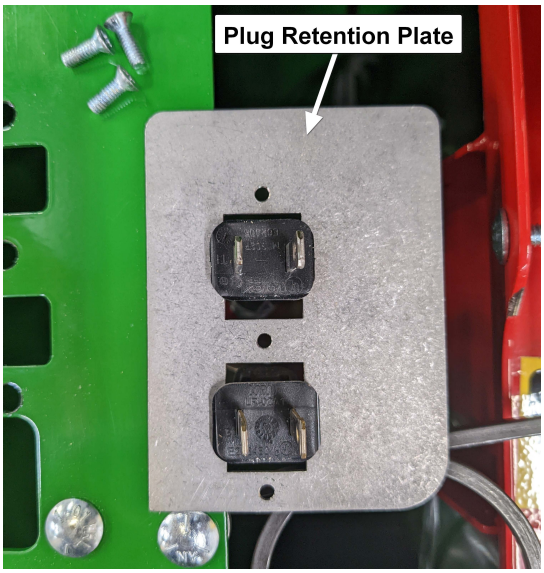



*Fig 20a*

3. With a wrench loosen the the two lock nuts on the U-bolt until it releases the Drill Motor. Lift the motor back and then out of the machine.

4. Install the new router to make sure the Drill Motor Face is pushed up to seat flush with the locating tab on the red carriage. Rotate the Drill Motor so the screw on the motor face stops on the locating tab. Please note that the spindle lock of the Drill Motor will be pointed up. **See Fig 21.** Hold the Drill Motor in position as you tighten the two lock nuts on the U-Bolt.

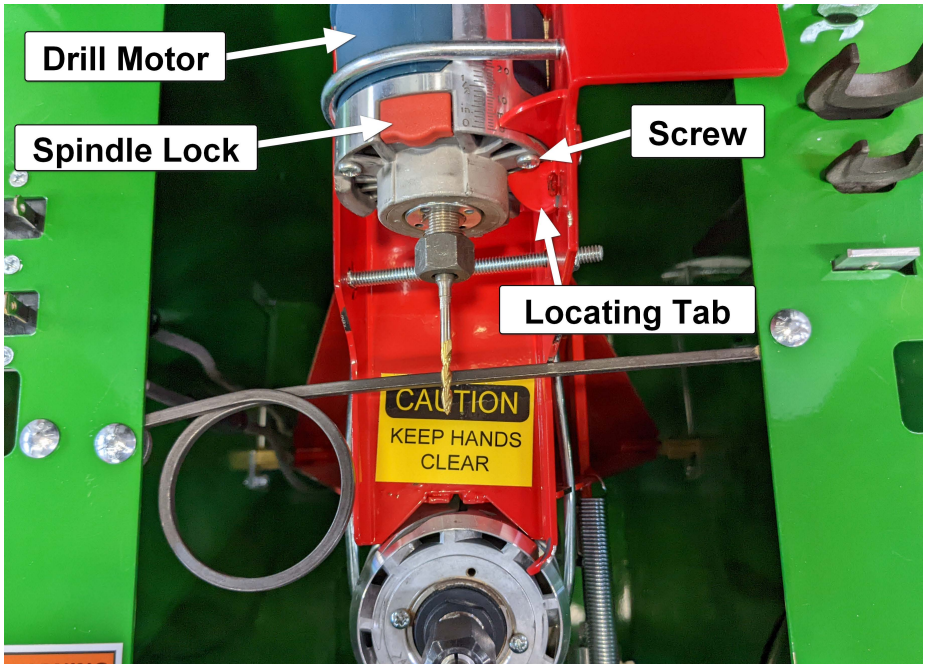



*Fig 21*

5. Reintall the plug with the retention plate and 3 screws in reverse order. **Care must be taken to position the plug correctly.** The wider electric prong on the plug should be closest to the center of the machine. **See FIG 22**.

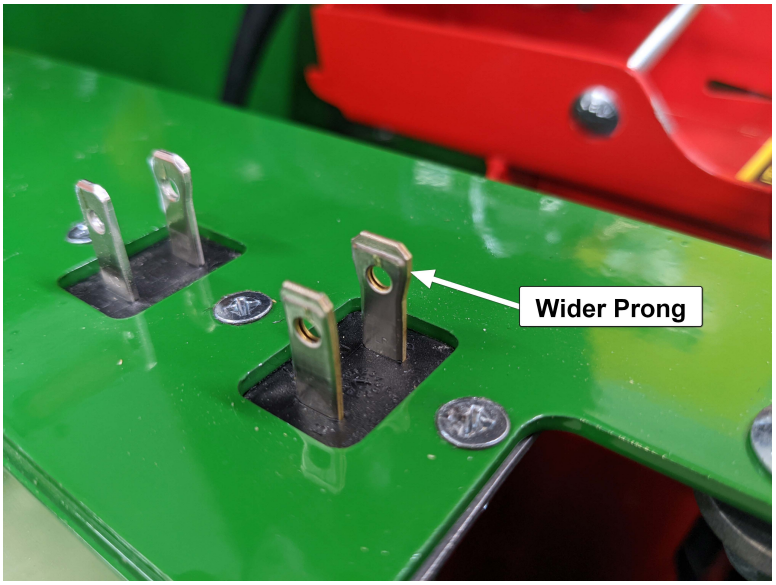



*Fig 22*

6. Lower and secure the work top.

7. Reach through the front access door and manually rock the Motor Carriage toward the front of the machine to make sure that the Drill Bit cleanly fits through the hole on the face plate.

## 5.13.3 SERVICING THE DRILL MOTOR:

1. The motor is warranted for one year from the purchase of the machine.

2. Warranty replacement and parts purchases can be handled by your nearest Bosch dealer/ service center, or Castle.

3. Follow the instructions found in your Bosch manual on maintaining the motor. This includes information on keeping the motor clean and free of dust, maintaining the brushes and replacing the tooling.

4. The Drill Motor has two electrical brushes that should be periodically replaced. **See Fig 23.**


***Fig 23***

## 5.14 Drill Settings and Bit Depth 21.41

The TSM-22 is designed to handle many types and thicknesses of material. Depending on screw type and length, and the thickness of the material, the drill collet setting may need to be adjusted. If the drill bit appears blackened or burned it is spending too much time boring the Pilot Hole and may overheat and loosen in its shank.

### 5.14.1 TESTING STEPS:

1. Hold the shank against a solid surface, and tap the end of the bit with a piece of wood.
2. If the bit slides down into the shank AT ALL it needs to be replaced.
3. If the bit doesn't slide in the shank, hold the shank with pliers and with another pair of pliers; grip the bit BELOW THE FLUTE, just above where the bit joins the shank. Do not use excess grip pressure on the bit itself.
   Twist the bit and shank in two, opposite directions
4. If the shank and the bit can twist independently, the bit should be replaced.

To simplify tooling changes or settings, a Bit Gauge is included to record the depth setting most suitable for your purposes. **See Fig 24**. The Bit Gauge is under the work top in front of the router wrenches. Proper bit depth varies by application but as a rule of thumb - the drill depth only needs to be long enough to just penetrate the pocket.

***Fig 24***

### 5.14.2 SETTING STEPS:

1. Set the gauge on top of the collet and use an awl to scratch a reference line in the soft aluminum where each bit should be. “D” for Drill and “R” for Router.

2. The plate has two sides that can be used settings for different processes in the shop.

## 5.15 Drill Single Coil Bar Spring 21.42

The Bar Spring is located inside the machine across the top of the case. The Motor Carriage compresses this spring as it moves forward to drill the Pilot Hole. After the Pilot Hole is drilled, the Bar Spring provides the push to return the carriage to neutral position. If you pull the carriage forward by hand it should “spring” back when released. If the carriage remains forward the Bar Spring may be loose or broken.

### 5.15.1 REPLACEMENT STEPS:

1. Disconnect air and power from the machine. Lift the work top.

2. The 2 carriage bolts on the left anchor the Bar Spring. Loose booth of the carriage bolt nuts and slid the bar up and to the right to remove. **See Fig 25.**

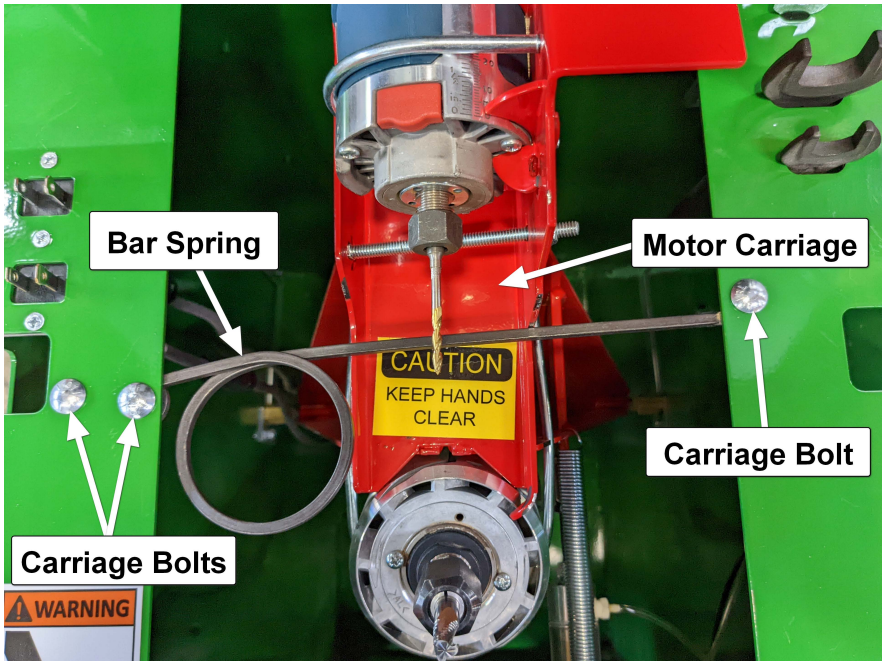



*Fig 25*

3. Slide the new Bar Spring in between the case and the mounting plate. **See Fig 26.**

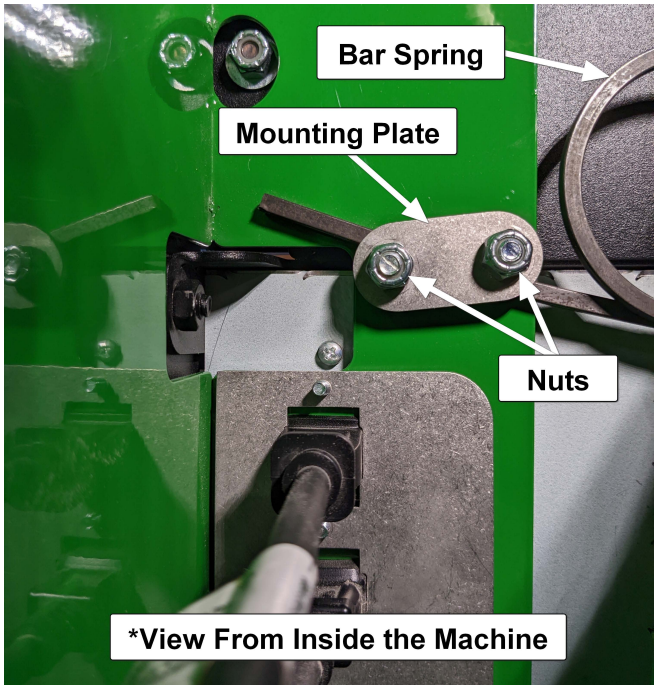



***Fig 26***

4. Please note the proper orientation of the Bar Spring. **See Fig 25 and Fig 26.**

5. Make sure the Bar Spring is on the front side of the carriage bolt on the right side and then tighten the 2 nuts on the carriage bolts on the left. **Fig 25.**

6. Pull the carriage forward by hand. The carriage should “spring” back when released.

7. Lower and secure the work top. Reconnect air and then power to the machine.

NOTE: If the bar spring is out of position and on the back side of the carriage bolt on the right side, then router bit will be above the work surface and the drill bit will not extend when running a cycle. Reposition the bar spring to the front of the carriage bolt (**see Fig 26**) to correct.

## 5.16 Drill Stop Switch (NC) 21.43

The Drill Stop Switch consists of a magnetic reed switch (with wires) and a magnet (no wires). The switch is Normally CLOSED (NC) and OPENS at the end of the Pilot Hole cycle when the Motor Carriage breaks the magnetic field. The switch then signals both the Drill solenoid and Clamp solenoid to stop airflow, which allows the Drill to retract and Clamp to release.

If the Drill Stop Switch fails, or the magnetic field weakens or becomes misaligned, the machine will not sense the end of the drill cycle. The drill may stay forward in the Pilot Hole causing the cycle to stall or the clamp may extend but immediately release.

### 5.16.1 TESTING STEPS:

1. Disconnect power and air from the machine. Lift the work top of the machine.
2. The Drill Stop Switch and magnet are located inside the machine on the back side of the Face Plate, slightly to the right of the Pilot Drill Hole. **See Fig 27**.

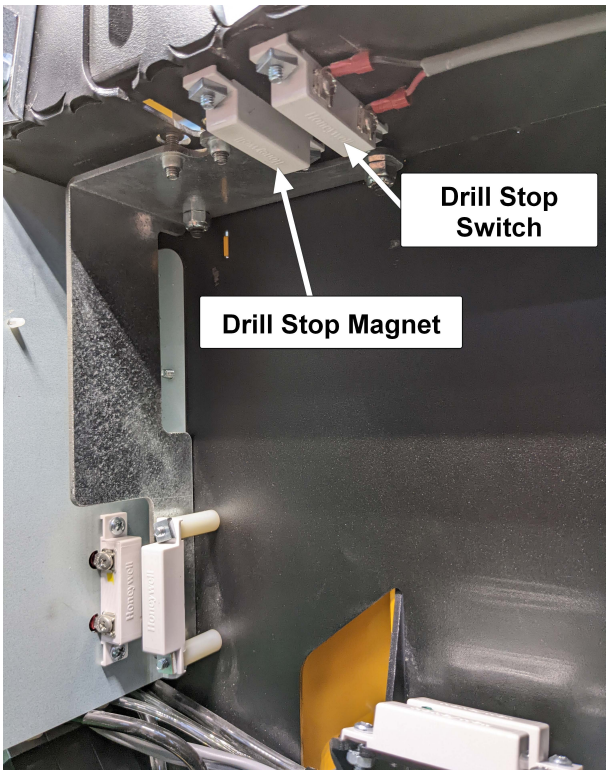



***Fig 27***

3. Test for continuity across the terminals of the switch. The switch should measure as CLOSED.

4. Put a piece of metal or a screwdriver in between the switch and the magnet. The switch should now measure as OPEN.

5. If the switch does not measure as OPEN, adjust the magnet 1/16” farther away from the switch and repeat step 4 until the switch measures OPEN with the metal/screwdrver in between the switch and the magnet. If no more adjustment can be made, flip the magnet 180 degrees to see if that will allow the switch to open during testing.

*6.* If the switch continuously measures CLOSED regardless how far away the magnet is, replace the switch and magnet.

*7.* If the switch measures OPEN without the metal/screwdriver in between, adjust the magnet 1/16” closer to the switch and repeat the test. Make additional adjustments closer until the switch measures CLOSED.

*8.* If the switch continuously measures OPEN regardless how close the magnet is, replace the switch and magnet. NOTE: You will need to remove the work top to access both sets of screws to replace the switch set.

**Note:** If a dry cycle is preformed to confirm function of the switch and the drill bit stays extended, verify that the carriage plate is not hitting the front of the switch/magnet. The carriage plate should land in between the switch and the magnet.

## 5.17 Unclogging the Drill Solenoid 21.50

**Note:** To remove an air line, twist and pull air line from the barbed plastic fitting or unscrew the plastic fitting from the soleniod using a 7/16" wrench.

1. Disconnect power from the machine. Lift the work top of the machine.

2. Remove the air out line and the exhaust muffler from the Drill solenoid and press the override button for several seconds to flush the solenoid. Air should flow through the solenoid. Press the override switch several more times for several seconds to throughly flush the solenoid. See **Fig 28.**

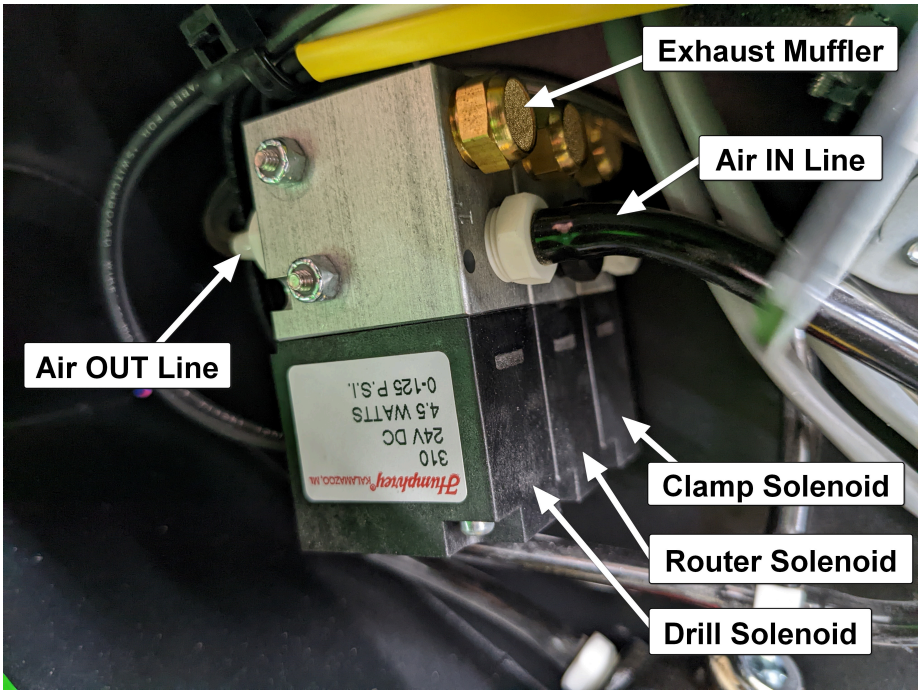



***Fig 28***

3. Reinstall the air line on the out port and exhaust muffler on the exhaust port of the solenoid.

4. Lower and secure the work top, then and reconnect power. Cut a test pocket.

Note: If this procedure does not correct the problem, the Drill Solenoid will need to be replaced. **Refer to Procedure 21.91, "Replacing Solenoids"**

## 5.18 Drill Solenoid Check 21.51

The Drill Solenoid controls air pressure to the side of the Drive Cylinder that provides the forward motion of the Drill's boring stroke. If the Drill Solenoid has stuck open, the drill will extend as soon as air is attached to the machine, regardless of whether the power is turned on. If the Drill Solenoid is clogged the Drill may not start or complete the pilot hole.

### 5.18.1 TESTING STEPS:

1. Connect the shop air supply to the machine.
2. If the drill automatically extends, then the Drill Solenoid is stuck open.
3. If the drill does not extend, lift the work top of the machine Locate the manual overide button on the drill solenoid. **See FIG 29 and Fig 29a**

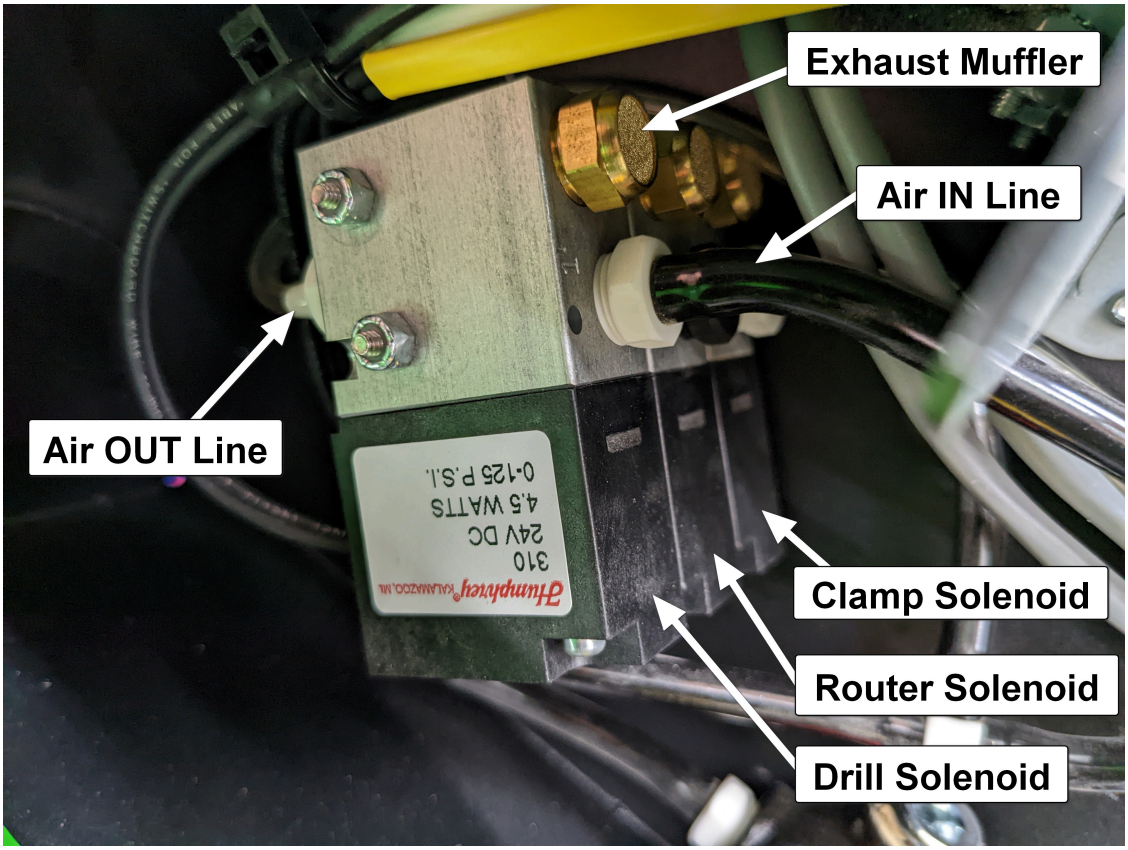



**FIG. 29**

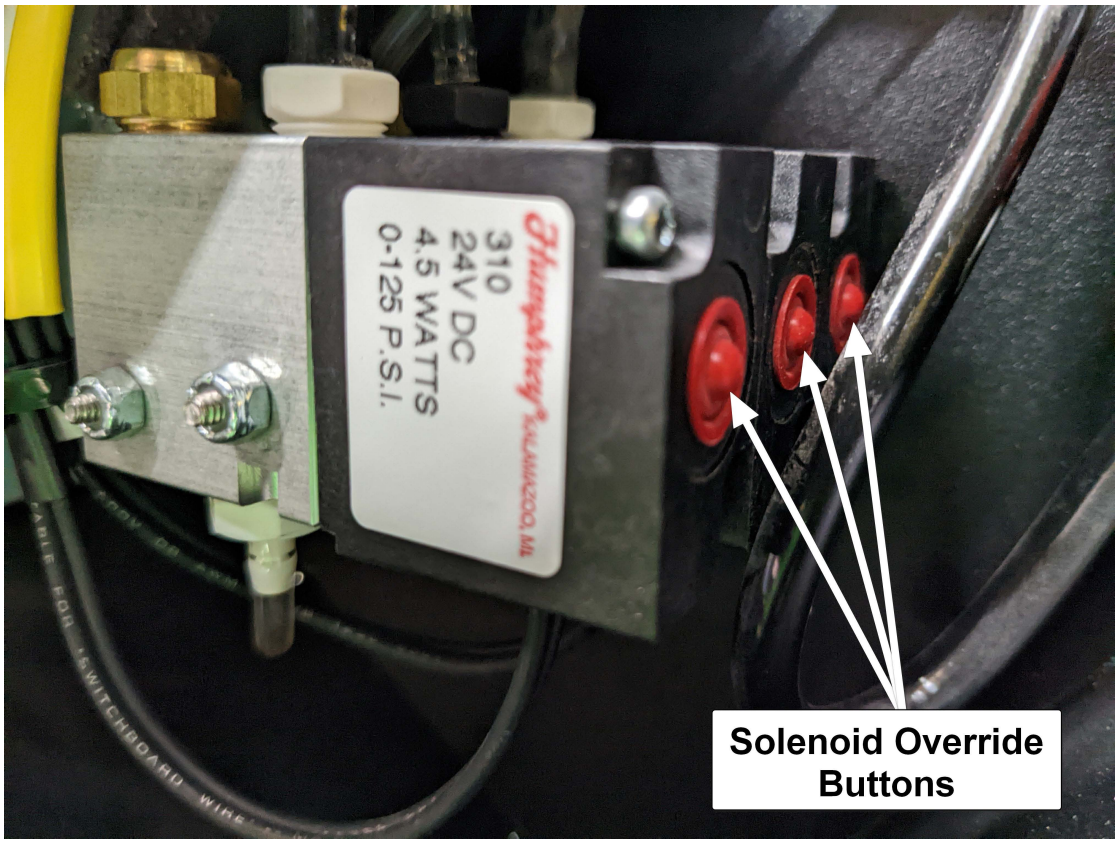



**FIG. 29a**

4. Press and hold the manual override button on the Drill solenoid.

5. If the carriage does not tilt toward the front of the machine, then the Drill Solenoid may be stuck closed or clogged.

6. If the Drill Solenoid is stuck open or clogged, Perform procedure 21.50, Unclogging the Drill Solenoid.

## 5.19 Drive Cylinder Check 21.60

The Drive Cylinder provides the forward and back stroke to the Motor Carriage for the Router and Pilot Drill phases. If the cylinder fails or if the air lines become clogged, the machine may not complete one or both of these phases. Occasionally the cylinder seal may need to be reseated. Do this by rocking the carriage back and fourth by hand with the work top in the up postion. It is normal to detect a “puff” of air at the at the exhaust ports of the Router and Drill Solenoids when rocking the carriage.

### 5.19.1 TO DETECT A BAD CYLINDER SEAL:

If the cylinder seal is dry, damaged, or not seated properly, air may bypass the cylinder piston and constantly exhaust out of the exhaust ports of the Router and Drill Solenoids. (often accompanied by an audible hissing sound).

1. Lift up the work top on the machine.
2. Connect power and air to the machine, and turn the Power Switch ON.
3. Depress the Foot Pedal to induce a stall during the router stroke. Router Carriage will tilt toward the back of the machine and stop.
4. Listen for constant hissing and feel for leaking air at the exhaust ports of the Router Solenoid and the Drill Solenoid. **See Fig 30**.

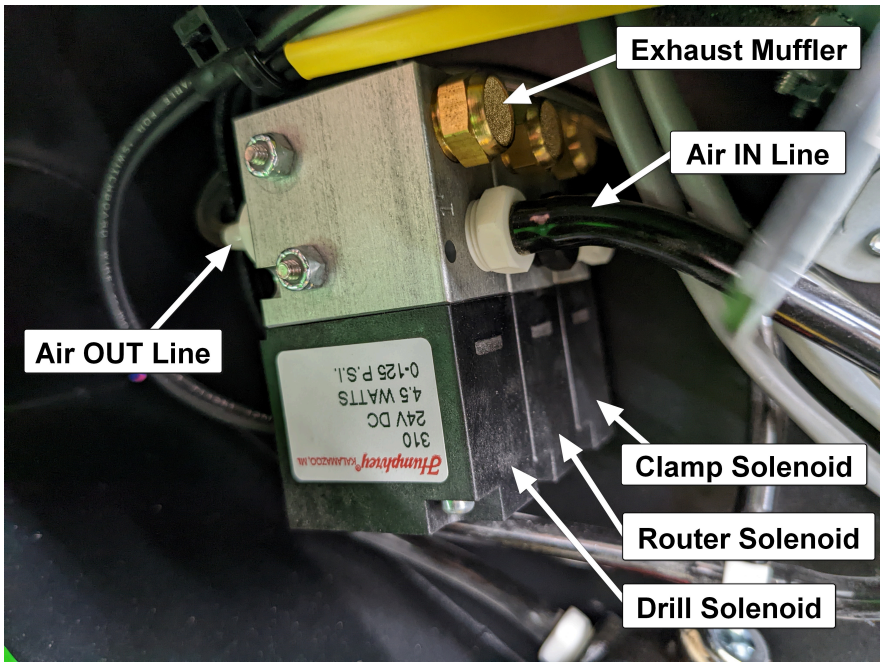



***Fig 30***

5. Turn power OFF then back ON to reset the machine.

6. Cycle the machine a few more times to see if the situation can be repeated.

7. If the stalled Drive Cylinder consistently leaks air, the cylinder must be replaced.

## 5.19.2 OPTIONAL STEPS:

Sometimes an air leak may be more noticeable during the Drill stroke.

8. Lift up the work top on the machine.

9. Connect power and air to the machine, and turn the Power Switch ON.

10. Depress the Foot Pedal to initiate the cycle. The Router Carriage will tilt toward the back of the machine and stop. Place a Screw driver or piece of metal in between the Router Stop Switch and the Router Stop Magnet. This will trigger the carriage to come forward and stop. **See Fig 31.**

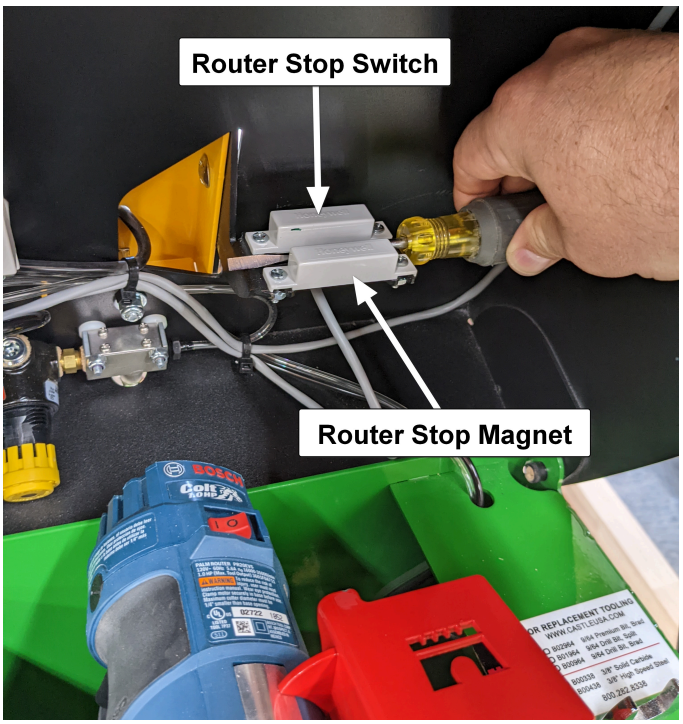



**Fig 31**

11. Listen for constant hissing and feel for leaking air at the exhaust ports of the Router and the Drill Solenoids. **See Fig 30**.

12. Turn power OFF then back ON to reset the machine.

13. Cycle the machine a few more times (start back at step 9) to see if the situation can be repeated.

14. If the stalled Drive Cylinder consistently leaks air, the cylinder must be replaced.

## 5.20 Exhaust Mufflers on Solenoids Valve 21.65

The Drive Cylinder provides the forward and back stroke to the Motor Carriage for the Router and Pilot Drill phases of the cycle. If the exhaust mufflers on the solenoid valves become clogged, the machine may not complete one or both of these phases. Test by rocking the carriage back and fourth by hand. You should detect a “puff” of air at the exhaust mufflers when manually rocking the carriage. Exhaust Mufflers can also be temporarily removed to cut a couple of test pockets. If having the Exhaust Muffler removed solves the issue, then the Exhaust Mufflers should be replaced. **Please note, it is never recommended to run the machine without Exhaust Mufflers as sawdust can be pulled back into solenoid valve and cause issues.**

### 5.20.1 TESTING STEPS:

1. Lift the work top o the machine. Remove the exhaust mufflers from the Router and Drill Solenoids. **See Fig 32**.

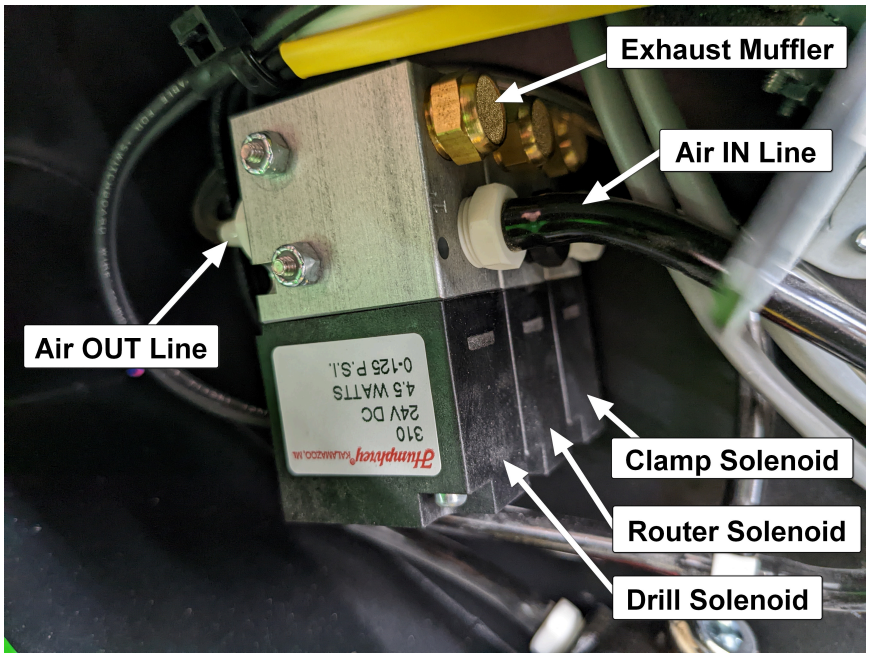



***Fig 32***

2. Lower the work top.
3. Cut a test pocket. If this fixes the issue then replace the exhaust mufflers.
4. Reconnect the air lines to the Drive Cylinder as shown **Fig 32.**

**Note:** It is never recommended to run the machine without Exhaust Mufflers as sawdust can be pulled back into solenoid valve and cause issues.

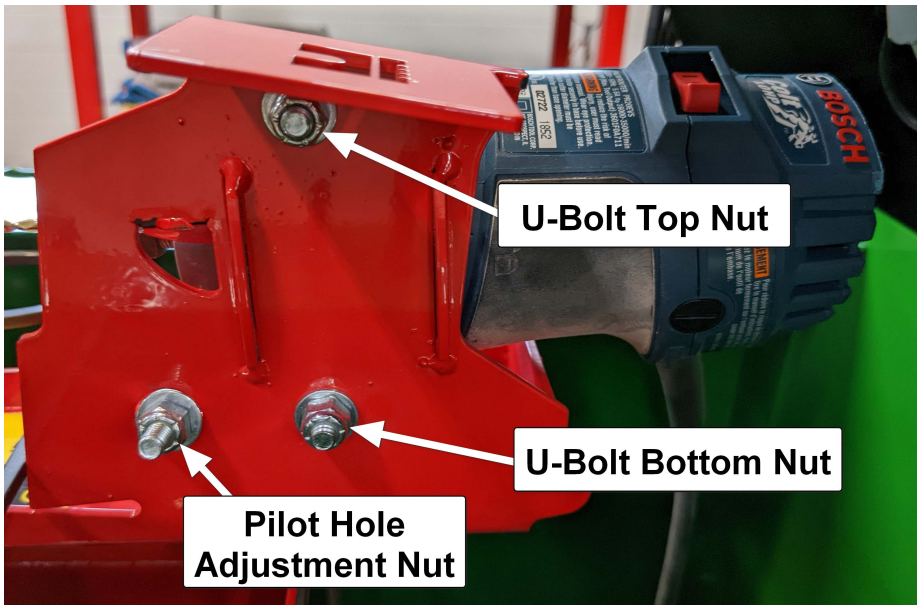
## 5.21 Pilot Hole Alignment 21.72

The Pilot Hole should be drilled in the center of the deepest part of the pocket.

### 5.21.1 ADJUSTMENT STEPS:

1. Lift the work top, locate the hex nut immediately to the left of the drill motor U-bolts nuts on the upper right side of the Motor Carriage. **See Fig 33**.

2. Tightening the hex nut moves the drill tip left relative to the operator. Adjust accordingly.



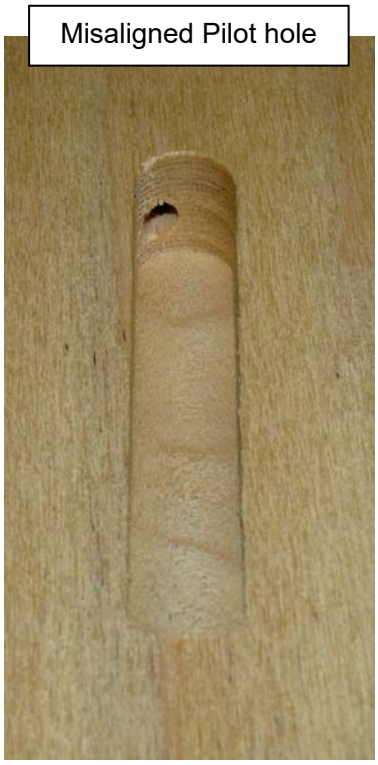




***Fig 33***

## 5.22 Foot Switch (NO) 21.80

The Foot Switch is located in the Foot Pedal. At rest, the Foot Switch is normally OPEN. It works in conjunction with the Safety Buttons/ Safety Switch. Closing the Foot Switch (while simultaneously closing the Safety Switch) starts the machine cycle.

## 5.22.1 TESTING STEPS:

1. Turn the Power Switch OFF.
2. Remove the two small screws that hold the Pedal to the yellow guard.
3. Use a flat tip screwdriver to pry the Pedal free from the guard. It is secured by silicone caulk.
4. Use a flat or Phillips screwdriver to remove the two screws on the sides of the pedal and remove the top. **See Fig 34**.

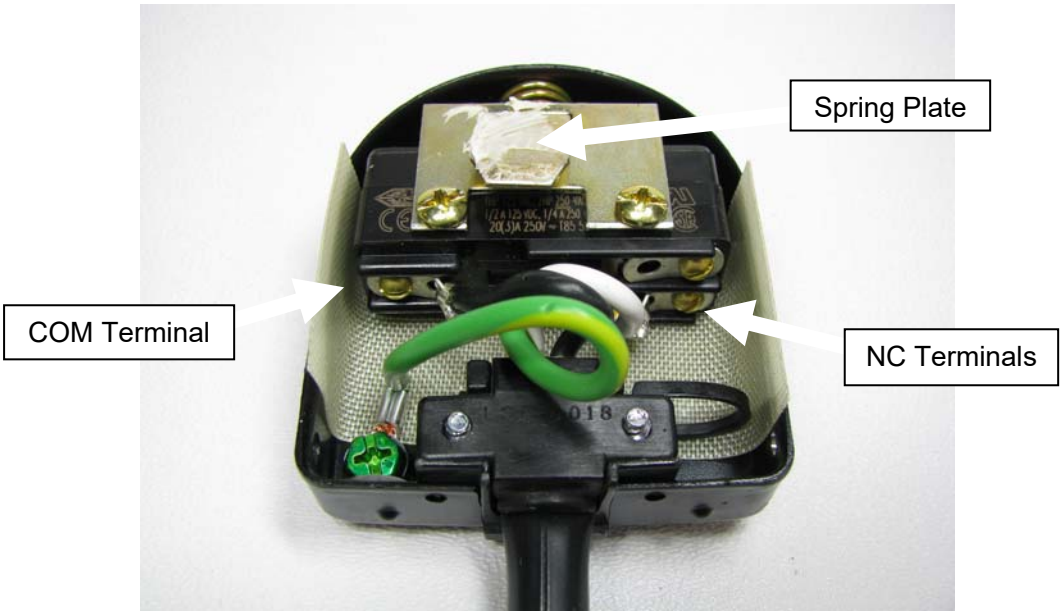



***Fig 34***

5. Test for continuity at the wired connections with the switch still in the pedal.
6. Without depressing the Spring Plate the switch should read OPEN. With the spring plate depressed, the switch should read CLOSED.

**Note:** The switch is wired at the COM and NC terminals because the Spring Plate depresses the button on the switch at rest, holding the switch OPEN.

7. If the switch fails this test it must be replaced. Remove the two remaining Phillips screws through the switch to remove it from the Foot Pedal.

**Note:** A quick way to test the foot switch is to test for continuity on terminals 3 and 4 of the control board pressing down on the foot pedal. **ONLY PERFORM THIS OPERATION WITH THE UNIT UNPLUGGED.**

## 5.23 Resetting the Machine 21.81

If the Power Switch is ON and the footswitch is pressed before the air supply is attached, the machine will begin to cycle as soon as the air is attached. This can result in the router bit becoming jammed against the Clamp Foot.

### 5.23.1 RESET STEPS:

1. Turn the Power Switch OFF. (This allows the solenoids to reset.)
2. Detach the air supply. (This allows the cylinders to reset)
3. Reattach the air supply.
4. Turn the Power Switch ON.

## 5.24 Safety Switch/Safety Buttons (NO) 21.82

The Safety Switch consists of a reed switch (with wires) and a magnet (no wires). It is normally OPEN (NO) to prevent operation and CLOSES when the Safety Buttons move the Safety Blade out of the way of the switch and the magnet. If the switch fails or the magnetic field weakens or becomes misaligned, the machine will not correctly detect if a cycle may begin or not. The cycle might not begin although wood is in place, or the cycle might begin with no wood in place.

### 5.24.1 TESTING STEPS:

1. Disconnect power and air from the machine. Lift the work top of the machine.
2. The reed switch and magnet are mounted to the right of the control box **See Fig 35**.

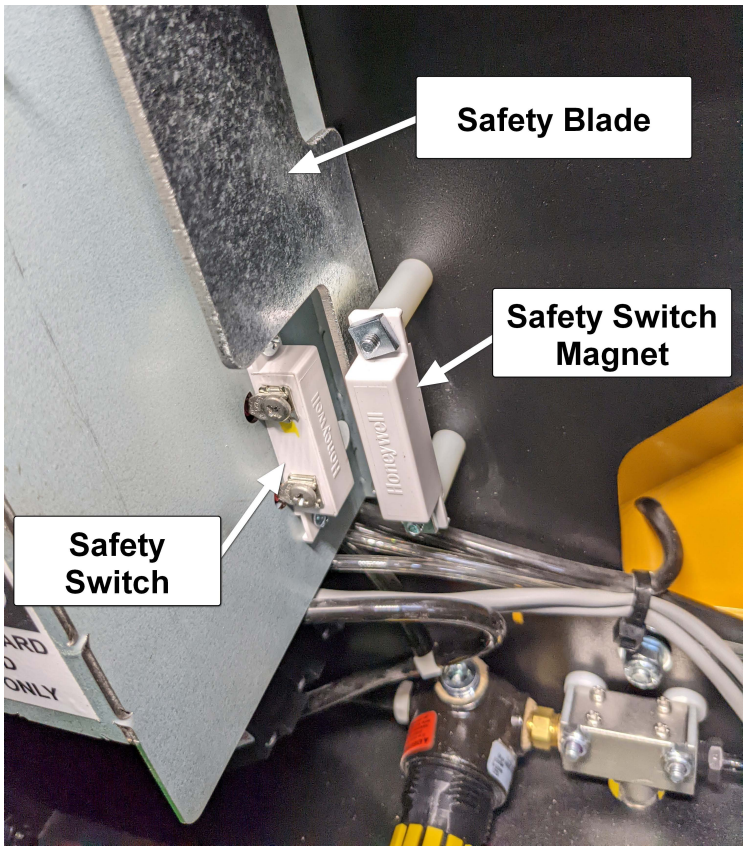



***Fig 35***

3. Test for continuity at the terminals of the switch with the Safety Blade resting between the switch and the magnet. The switch should measure as OPEN.

4. If the switch measures CLOSED make sure the blade is resting squarely between the switch and magnet. Otherwise the distance between the switch and magnet may need to be increased by 1/16". If no more adjustment can be made, flip the magnet 180 degrees to see if that will allow the switch to open during testing.

5. When pressing the Safety Buttons, the switch should measure CLOSED. If the switch measures OPEN, the distance between the switch and magnet may need to be decreased by 1/16”.

6. If the switch will not change from OPEN to CLOSED when the Safety Blade is raised despite adjustment, replace the switch and the magnet.

# 5.25 Tooling Check and Replacement 21.83

## 5.25.1 ROUTER:

1. **Disconnect power and air from the machine**.

2. Lift the Work Top of the machine.

3. Replace the bit. A Bit Gauge is provided to record your preferred Router Bit Height. Once a preferred setting is selected, mark or scribe your settings on the aluminum plate.("R" Router) **See Fig 36.**

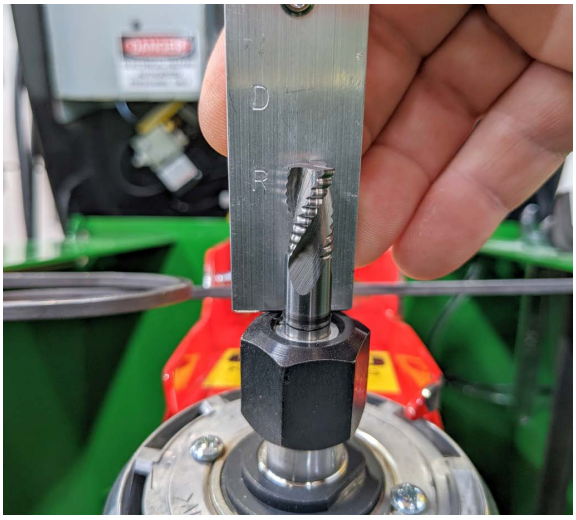



***Fig 36***

4. Lower and secure the work top. Through the front door, manually rock the Motor Carriage toward the front of the machine and make sure that the Router Bit cleanly fits in the slot on the work top.

## 5.25.2 DRILL:

1. Disconnect power and air from the machine.

2. Lift the work top of the machine.

3. Replace the bit. A Bit Gauge is provided to record your preferred Drill Bit Extension. Once a preferred setting is selected, mark or scribe your settings on the aluminum plate. ("D" Drill). **See FIG 37.**

***Fig 37***

4. Lower and secure the work top. Through the front door, manually rock the Motor Carriage toward the front of the machine and make sure that the Drill Bit cleanly fits through the hole on the face plate.

## 5.26 Air Pressure Regulator Setting 21.90

The Pressure Regulator determines Drill Feed Rate, clamping pressure, and overall speed of the machine. The factory setting is approximately 75 PSI and should be checked periodically or when machine performance becomes rough or too slow. Cycles that are too slow can burn bits and cause drill bit separation at the shank. Cycles that are too fast can cause drill bits to break or to cut over-sized holes.

**Note:** It's extremely important that a minimum 85 PSI be provided from your compressor. Operating pressure can be especially affected by other machines that share the same air line as your TSM-22.

### 5.26.1 TO RESET THE AIR PRESSURE REGULATOR:

1. Lift the work top and locate the Pressure Regulator mounted just to the right of the Control Box. See **Fig 38.**

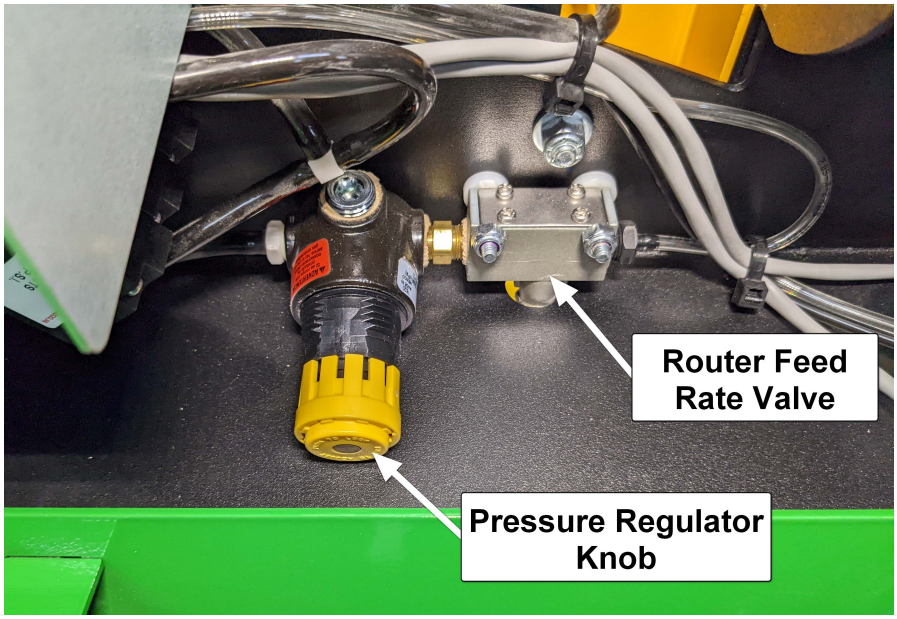



***Fig 38***

2. Pull out the Click-collar on the Regulator knob to unlock it.
3. Turn the knob fully counter-clockwise until it stops
4. Use a marker pen to make a reference point on the knob then turn it 5 full clockwise rota-tions. This process will set the pressure to approximately 75 PSI.

5. Lower and secure the work top. Cut test pockets and adjust slightly more or less than 5 turns until the appropriate opera-tional speed is reached. **NEVER EXCEED 6 FULL ROTATIONS**.

6. Re-open work top to push in the click-collar on the Regulator knob to lock it. Lower and secure the work top.

**Note:** If the Pressure Regulator has been adjusted, the Router Feed Rate may need re-adjustment after the Pressure Regulator setting has been finalized. **See Procedure 21.32**

## 5.27 Replacing Solenoid Valves 21.91

To replace a solenoid valve, follow the steps below.

### 5.27.1 STEPS

1. Disconnect power and air from the machine.

2. Raise the work top of the machne.

3. Label the three solenoids and remove the two hex nuts and lock washers that hold the solenoids together. **See Fig 39**.

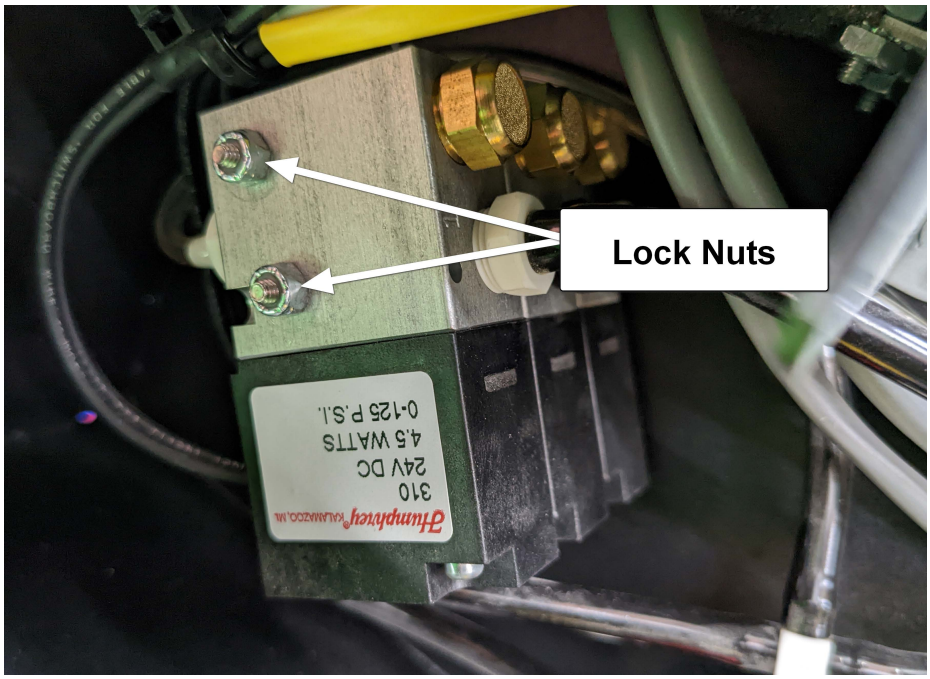



***Fig 39***

*4.* Label then disconnect the "Air In" and "Air Out" lines of the solenoid to be replaced. Then remove the pneumatic fittings and the exhaust muffler from the old solenoid with a 7/16” wrench.

**Note:** Only disconnect the air lines of the solenoid you are replacing.

5. Cut the electrical wires to the solenoid being replaced leaving an inch on the old solenoid.

6. Splice in and insulate the wires of the new solenoid, NOTE: polarity is not important.

7. Replace pneumatic fittings and exhaust muffler. Reconnect the “Air In” and “Air Out” lines.

**Note:** Install the pneumatic fittings with a 7/16” wrench: Port #1 = Air IN, Port #2 = Air OUT, Port #3 = Exhaust muffler, then reconnect the air lines.

*8.* Reassemble the solenoids in a stack and tighten the hex nuts and lock washers. Do not over tighten the hex nuts.

*9.* Reconnect air and then power to the machine.

## 5.28 Attaching Air Supply 21.92

An air supply with a MINIMUM of 85 PSI must be provided for proper operation of the TSM-22 Pocket Machine.

1. From the operator's position the air inlet is the 1/4" NPT fitting located on the back side. **See FIG 40.**
2. Use proper thread sealant and install desired attachment method.
3. CASTLE recommends the use of a secondary filter method directly in line with the supply at the machine.
4. Do not use lubricants or connect a lubricator to the machine.

Warning: **Do not turn the machine on without air attached.**

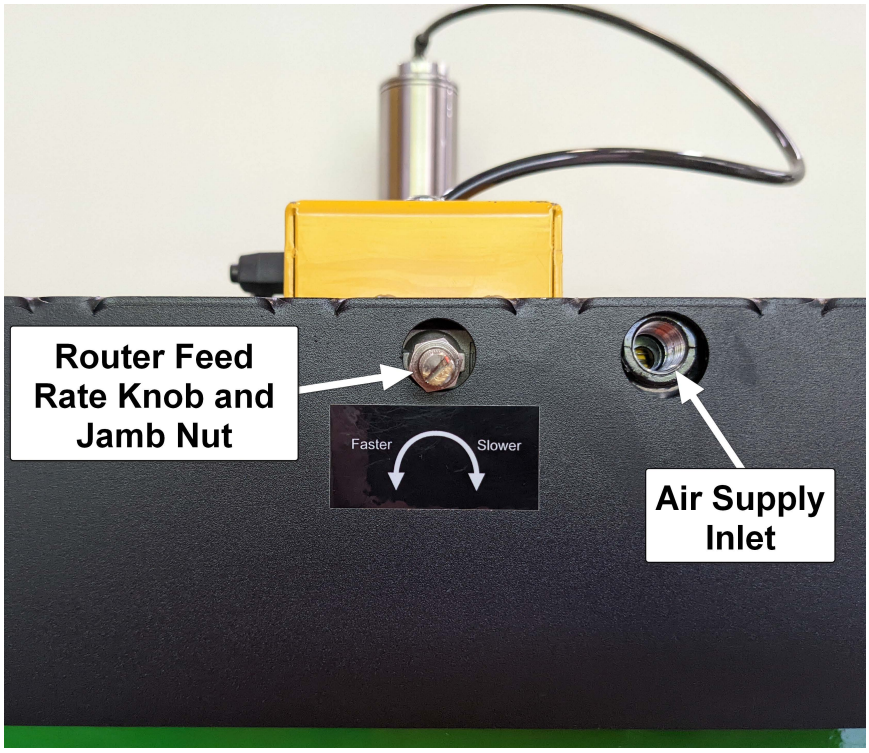



**FIG 40**

# 6 Appendix A – Machine Safety 21.80

It is your responsibility to ensure that you understand this procedure before performing the following tasks. Contact the document author if you have any questions about this procedure.

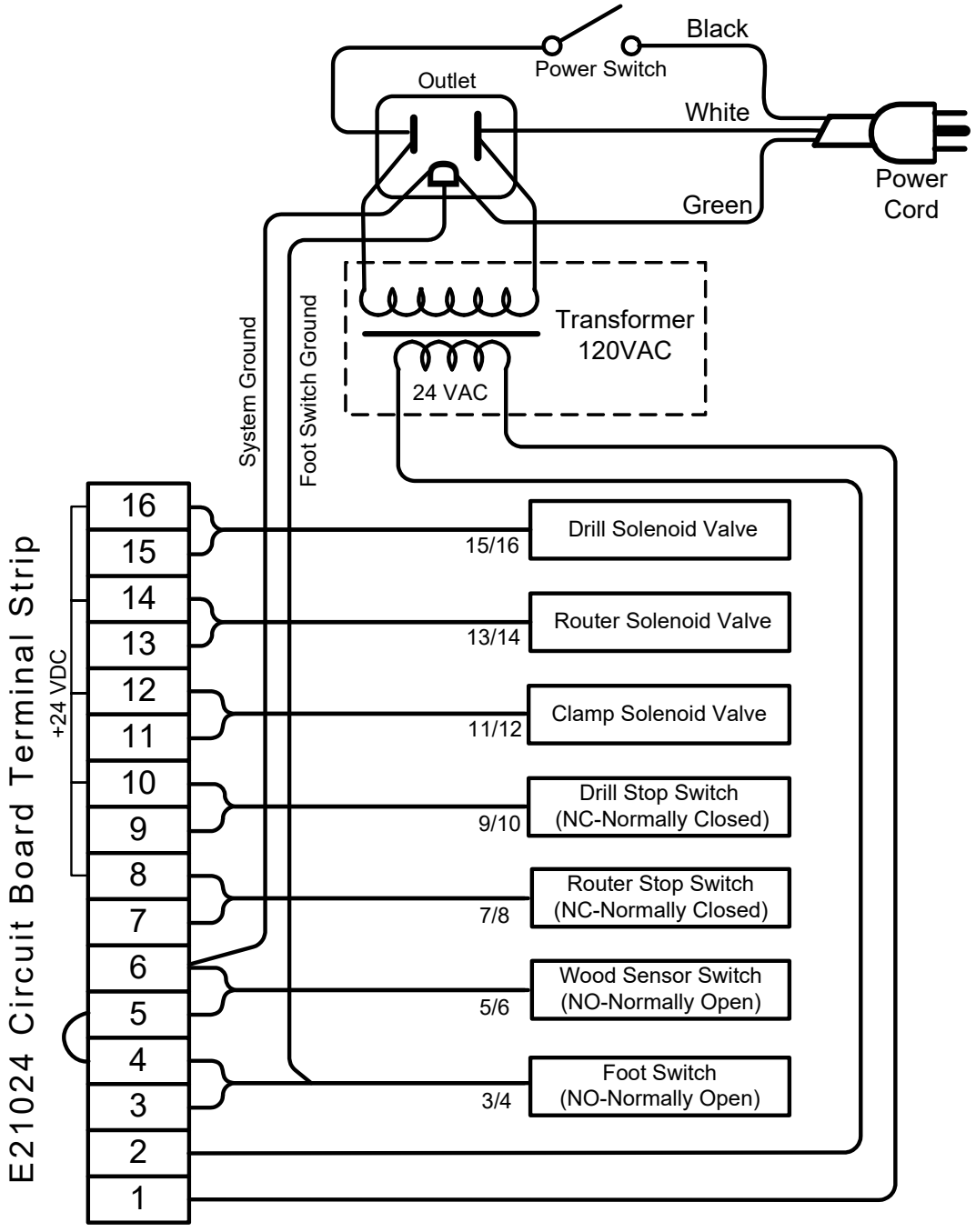
## 6.1 General Safety Rules for Machine Operators

- Read the Operator Manual carefully before operating this machine. It contains important information and warnings concerning the use and operation of this machine. Improper use of this machine may result in serious injury and/or damage to property.
- Use Caution when using this machine. Only trained operators should use this machine, or be within ten feet when the machine is in operation.
- Always wear protective eyewear and hearing protection when operating or standing near an operating machine.
- Be certain the machine is properly grounded before operating it.
- Operate this machine only when the doors and covers are in their proper position.
- Keep all body parts away from the moving parts of this machine whether it is in operation or at rest.
- Do not place hands or fingers between the work piece and the clamp or near the cutters at any time.
- Do not wear gloves or loose clothing (such as sweater, jackets, or jewelry) when operating or standing near an operating machine.
- Keep both hands on the work piece when initiating a Pocket Cycle on this machine.
- Before attempting adjustments, maintenance, or repair, STOP this machine and disconnect it from the compressed air supply and AC mains power. Wait for all motion

to stop. Failure to disconnect this machine from its air supply and power, or failure to wait for all motion to stop could result in electrocution or injury. When attempting any kind of electrical repair work, disconnect the machine from AC mains power.

- Always keep the area around the machine clean and uncluttered. Poor housekeeping could result in slips, falls or other injuries.

# 7 Appendix B – Wiring Diagram 21.84



# 8 Appendix C – Machine Works 21.93

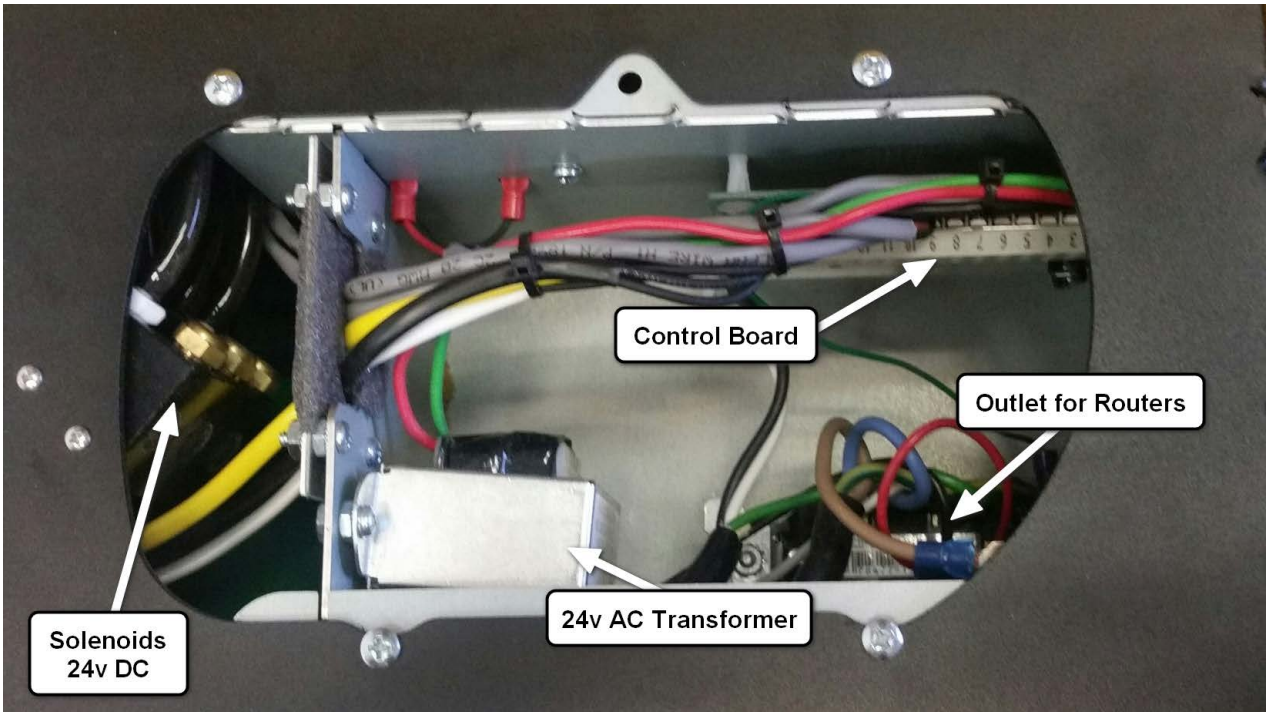



*Fig 41*

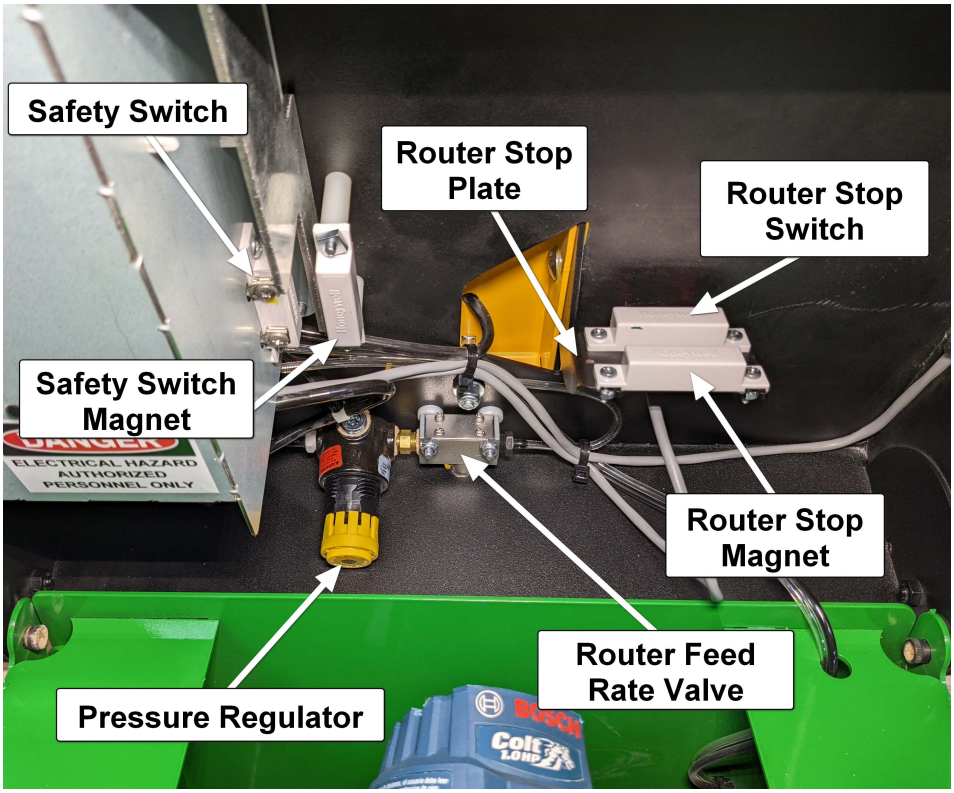



*Fig 42*

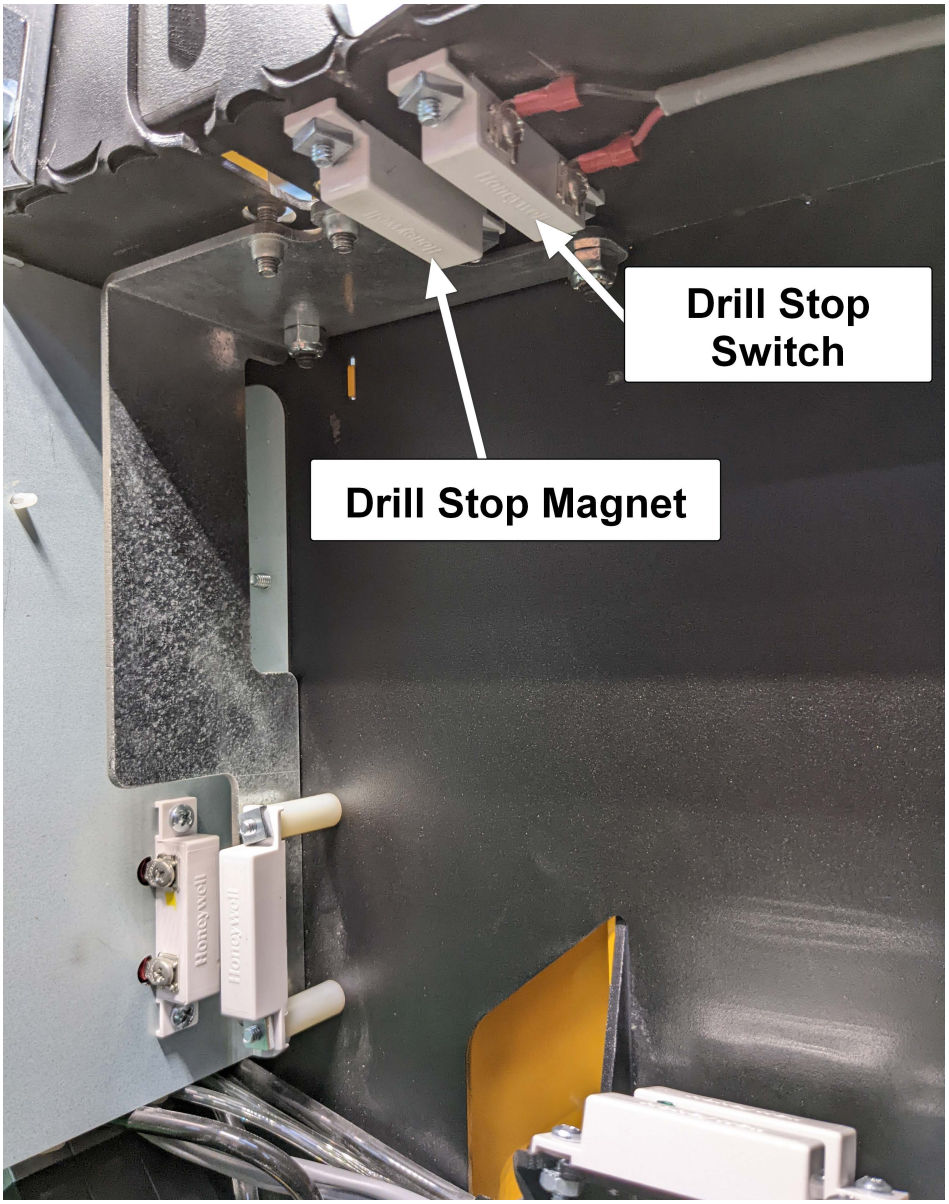
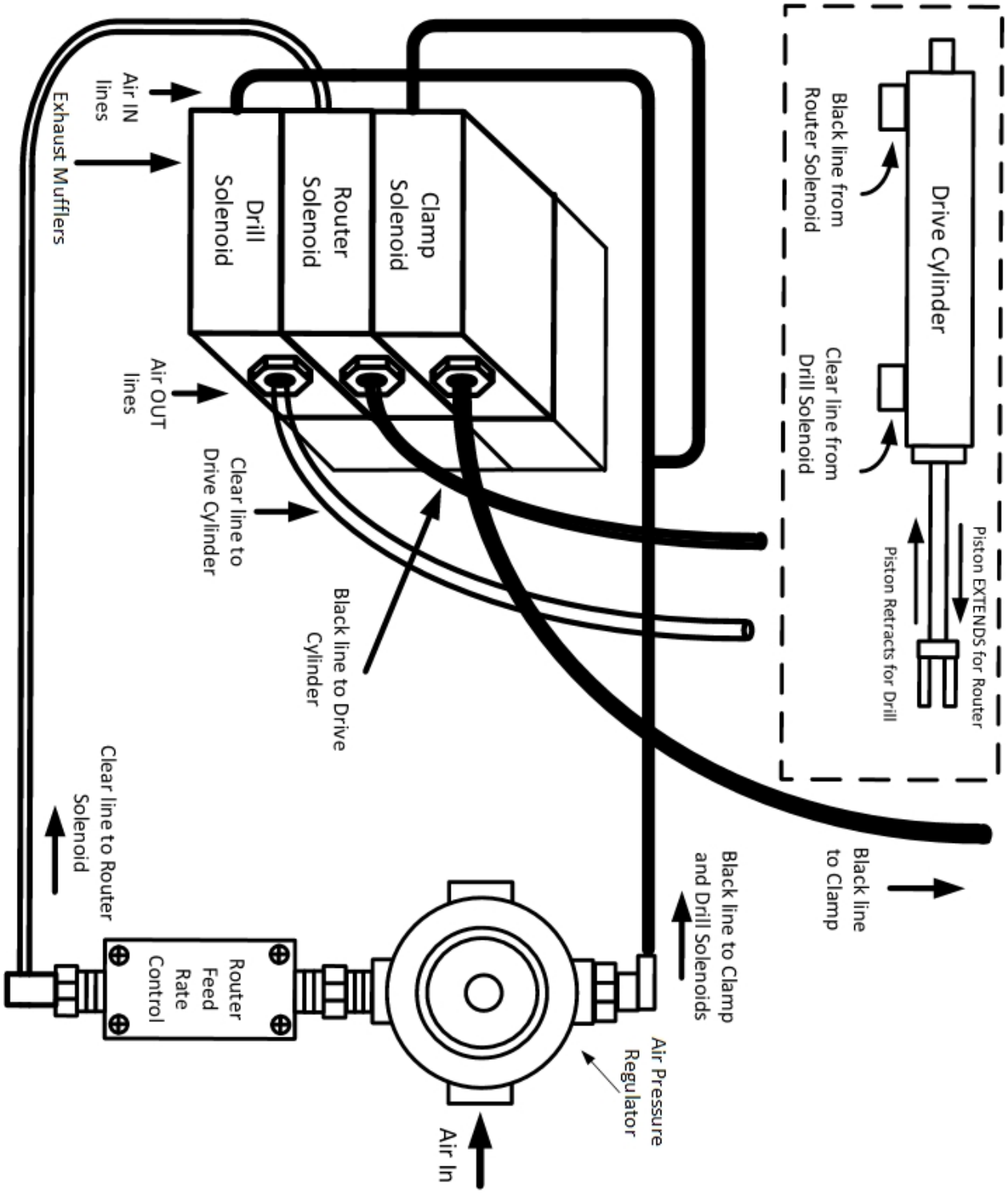



*Fig 43*

# 9 Appendix D – Solenoid, Pneumatic Diagram 21.94



# 10 Appendix E – Index