



# CASTLE INC



## Owner's Manual

TSM-31



# Table of Contents

1	INTRODUCTION.....	3
2	MACHINE SAFETY.....	4
2.1	SAFETY RULES .....	4
2.2	INVENTORY.....	5
2.3	MACHINE REQUIREMENTS .....	6
3	SETTING UP YOUR TSM-31 .....	7
4	OPERATING INSTRUCTIONS.....	9
5	MACHINE ADJUSTMENTS.....	10
5.1	WEB ADJUSTMENT.....	10
5.2	POCKET DEPTH ADJUSTMENT.....	11
5.3	PILOT DRILL DEPTH ADJUSTMENT.....	12
5.4	PILOT DRILL HEIGHT ADJUSTMENT .....	13
5.5	LEFT AND RIGHT PILOT DRILL ADJUSTMENT .....	14
5.6	LEFT AND RIGHT ROUTER ADJUSTMENT.....	15
5.7	ROUTER FEED SPEED .....	16
5.8	DRILL FEED SPEED .....	17
5.9	DRILL DELAY ADJUSTMENT.....	18
5.10	DRILL STOP SWITCH .....	19
5.11	ROUTER STOP SWITCH .....	20
6	DEFINITION AND DESCRIPTION OF PARTS .....	22
7	SERVICE AND MAINTENANCE.....	28
7.1	GENERAL .....	28
7.2	MOTORS AND BITS.....	29
7.3	SERIAL NUMBER LOG.....	30
8	WARRANTY INFORMATION .....	31

---

# 1 Introduction

Thank you for making the Castle TSM-31 the latest addition to your shop. Since 1985 our goal has been to manufacture and develop machines that make cabinetmaking and casework easier, faster and more profitable for the woodworker. This machine represents our commitment to your productivity. Castle machines are made in Petaluma, California and are manufactured to the highest standards using local vendors wherever possible.

This instruction manual is intended for use by anyone setting up or servicing this machine. It should be kept available for immediate reference so that all operations can be performed with maximum efficiency and safety.

Your TSM-31 will pocket any material you would normally rout. It is designed for material from 1 ½" to ½". Use of materials thinner than ½" is not recommended. Every TSM-31 machine is factory adjusted and tested with sample material. If you should find a small amount of saw dust in the bottom of your TSM-31, please don't be alarmed.

---

**Note:** Do not attempt to perform maintenance or operate this machine until you have read and understand the information contained in this manual.

---

---

## 2 Machine Safety

This machine was carefully prepared for shipment at our factory. Upon receipt of the machine, inspect for shipping damage. Report any damage **IMMEDIATELY** to the freight company, your Castle dealer and to Castle, Inc. **DO NOT** attempt to operate the machine if you observe any physical damage. Contact Castle, Inc. at 800-282-8338 for instructions.

---

### 2.1 Safety Rules

The Castle Model TSM-31 Pocket Machine was designed with operator safety as a priority, which is why Castle highly recommends the following:

1. Always use a qualified electrician in hard wiring your machine to 1-phase electrical power.
2. Do not electrically wire machine until ready to operate.
3. Always wear eye protection when operating or servicing mechanical equipment.
4. Always wear hearing protection when the machine is in operation.
5. Always check for proper tooling tightness prior to use.
6. Do not at any time put hand under the clamp guard, in the path of router bit or drill bit.
7. Familiarize yourself with the clamping action, routing and drilling functions of the machine before electrically wiring the machine to any 1-phase electrical power supply.
8. Double check the tag on the electrical box of your machine to be sure it reads the proper 1-phase voltage that you are using with your machine.
9. NEVER ALLOW MACHINE TO GET WET OR BE USED IN A WET ENVIRONMENT.

---

## 2.2 Inventory

CASTLE TSM-31 POCKET CUTTER MACHINES HARDWARE PACK		
Part #	Part Description	Qty
<b>S90011</b>	TSM-31 Operator Manual with Warranty Activation Card	1
<b>T30465</b>	# 30465 <sup>9</sup> / <sub>16</sub> Wrench	1
<b>T30466</b>	# 30466 <sup>11</sup> / <sub>16</sub> Wrench	1
<b>G00234</b>	Bit Gauge	1
<b>S00350</b>	Air Tool Oil for Sioux Drill	1
<b>M00400</b>	Castle Front Door, Black w/ Logo	1
<b>D00720</b>	Female Hinge	2
<b>H00141</b>	Door Handle	1
<b>G00101</b>	Door Spring Clip	1
<b>F14125</b>	¼ - 20 x ¾ Bolt	1
<b>B02622</b>	Square Driver Bit	1

---

## 2.3 Machine Requirements

**Electricity:** 1-Phase 208VAC, 230VAC or 460VAC (see voltage tag on the machine or wiring diagram inside the voltage box).

---

**Caution:** Always have a qualified electrician do any machine wiring.

---

**Shop Air Supply:** 80 PSI minimum, 150 PSI maximum

**Dust Collection:** The TSM-31 relies on motor cooling from dust collection. A 4" dust collection tube is located in the rear of the machine.

---

## 3 Setting Up Your TSM-31

---

**Caution:** Always use eye protection when operating power equipment.

---

1. Remove the machine from the pallet, position and secure your machine in its chosen location.

---

**Note:** Holes in the base are for securing the machine to the floor. In some operations the machine should be elevated for better ergonomic operation but it still must be secured in place so that it cannot rock or tip.

---

2. Remove the brass elbow from the black urethane hose by pushing the floating ring towards the elbow and pulling the hose at the same time.
3. Thread the elbow into the top of the Clamp Cylinder. It is pre-primed and self-sealing. Point it toward the back of the machine and firmly push the hose back into the fitting.
4. Supply compressed air to the Regulator/ Lubricator Assembly at the front of the machine. The regulator is factory set at approximately 85 PSI. (Check the gauge to confirm this setting.) Castle suggests that a minimum of 3/8 inch air line should be used to operate this machine. Quick disconnects are not recommended as they generally restrict the air flow (volume).

---

**Caution:** Inadequate air supply may cause the machine to malfunction.

---

5. Remove Lubricator bowl and fill to Maximum Oil Level line with proper oil (supplied), then replace full bowl.
6. Electrically hard wire to correct voltage as tagged on the machine. This is a 1-phase machine and the voltage tag attached to the gray voltage box will show the voltage.

---

**Caution:** Use only a qualified electrician to hard wire your machine.

---

---

**Note:** The machine will not start if the air is off and/or the Case Top is in the lifted position.

---

7. Connect a dust collection system to the machine. Collection systems clear particles of dust as well as venting heat away from your machine motor.
8. In the event that you are using your TSM-31 for face frames, we have provided adjustable stops for faster, more efficient pocket cutting.
9. Check the rotation direction of the router before operation. The bit should turn counter clockwise. To check direction, start machine by pressing the green Start Button on the



gray electrical box at the front of the machine. Press red Stop Button and look into the slot where the bit comes up to make the pocket. As the machine slows to a stop, notice the direction.

---

**Warning:** Do not open the lid to check the direction as it will turn for several seconds after the motor has been shut off.

---

If the bit turns in the wrong direction (clockwise) go to the Troubleshooting section of this manual. Do not attempt to cut a pocket yet. First, read the entire manual before you begin cutting pockets.

---

## 4 Operating Instructions

---

**Caution:** Always use eye and hearing protection when operating machinery.

---

1. With the air on and the Case Top down, press the green Start Button. Note: the red Stop Button must be in the “out” position before the Start Button will activate your machine. If the red button is pushed in, simply turn the button ¼ turn counter clockwise to release.
2. Place stock to be pocketed under the yellow Clamp Guard.
3. To cut a pocket, push in the Safety Buttons under the Clamp Guard with the material to be pocketed and depress the Foot Pedal to activate the machine.
4. The cycle start up must be achieved by both the Foot Pedal AND the Safety Buttons. The Foot Pedal does not have to be released to repeat the machine cycle but the Foot Pedal must be depressed to operate the machine.
5. The machine will extend the Hold-down Clamp, cut the pocket, drill the pilot hole, and then release the Hold-down Clamp when the process cycle is complete.
6. Remove the stock and inspect the pocket. If the pocket and pilot hole look correct, you are ready to proceed with production.
7. A typical machine cycle will take from 1 ½ to 2 seconds to complete if the machine is functioning properly.
8. If the machine fails to cycle properly, call Castle at **(800) 282-8338**.

---

## 5 Machine Adjustments

Your TSM-31 comes factory-adjusted to handle typical pocket-hole needs. Some additional adjustment may be necessary after you have satisfied the air and electrical requirements explained above. Your pockets are adjusted at the factory for a 1 ½" length screw.

---

**Note:** For your safety, before making any adjustments please make sure that the red Stop Button is in the OFF position and both power and air are disconnected.

---

### 5.1 Web Adjustment

In the event that you wish to experiment with different length screws for different applications, your TSM-31 has what is called a Web Adjustment. This adjusts the distance from the front of the pocket to the edge of the material, as shown below.



*Fig 1*

1. **Turn off Air to the machine** and lift the Case Top to its fully opened position.

2. Locate the  $\frac{7}{8}$ " x 2" plate mounted on the back of the white pallet, to the right of center, behind the air drill motor.
3. Use a  $\frac{7}{16}$ " wrench to loosen both of the  $\frac{1}{4}$ " hex head cap screws on the  $\frac{7}{8}$ " x 2" plate.

---

**Note:** Do not loosen more than  $\frac{3}{4}$  of a turn.

---

4. Once both bolts are loose the plate can move forward and backward. By moving the plate toward the rear of your machine, your pocket will adjust for a shorter distance from the edge of your material. Moving the plate toward the front of the machine will adjust for a longer distance from the edge of your material.
5. This is a trial and error method and should be moved only a small amount at a time.
6. After making each adjustment, **snug** down the  $\frac{1}{4}$ " hex head cap screws with your  $\frac{7}{16}$ " wrench each time.

Be sure to close the Case Top and turn on air before trying to start your machine. The machine will not start with the Case Top open or with the air off.

---

## 5.2 Pocket Depth Adjustment

In the event that you wish to adjust the depth of your pocket for shorter or thicker material, your machine has a Pocket Depth Adjustment.



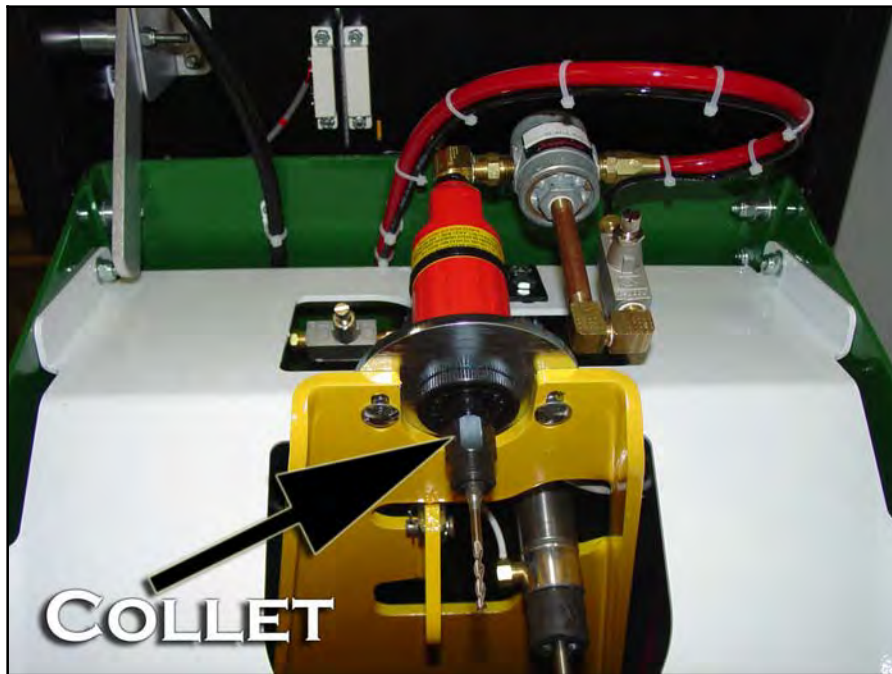
**Fig 2**

1. **Turn off Air and Electrical power** to your machine and raise the Case Top to its fully open position.
2. With wrenches provided, loosen the collet and move the router bit up or down slightly in the collet. Re-tighten the collet before testing.
3. An aluminum Bit Gauge has been provided so that you may record the depth that is most suitable for your purposes. When optimum height has been achieved, set the edge of gauge on top of the router collet and score a line at the top of the bit near the mark "R" for router bit.
4. Tighten the collet, replace the wrenches and Bit Gauge in the proper slots in the white pallet; and close the Case Top carefully so as not to pinch your hand or fingers. The machine will not start while the Case Top is open.

---

## 5.3 Pilot Drill Depth Adjustment

If you change the web of your pocket, (the distance from the pocket to the edge of the material) you may need to adjust how far the pilot hole is drilled into the material to ensure you drill all the way into the pocket.



**Fig 3**

1. **Turn off Air and Electrical power** to your machine and raise the Case Top to its fully opened position.
2. With the wrenches provided in the top of the pallet, loosen the collet on the drill.

3. After the collet has been loosened, move the drill bit in or out of the collet to adjust the depth of the pilot hole. Pull the bit out of the collet for a deeper pilot hole and push the drill bit in for a shallower pilot hole.
4. Once you have found the proper adjustment for your application, place the bottom of the aluminum Bit Gauge against the top of the drillcollet.
5. Use a scoring tool to mark a line of reference across the aluminum gauge.

---

## 5.4 Pilot Drill Height Adjustment

In some applications you may want to adjust where the pilot hole breaks through into the pocket. Castle recommends  $\frac{5}{16}$  of an inch from the surface of the material to the center of the pilot hole, but, for example, if you are cutting pockets in  $\frac{1}{2}$  inch material,  $\frac{1}{4}$  of an inch from the bottom of the pocket is a better distance.



*Fig 4*

1. **Turn off Electrical power to your machine** and raise the Case Top to its fully opened position.
2. Use a  $\frac{7}{16}$ " wrench to loosen the carriage bolts on the Drill Mounting Plate.
3. Once the bolts are loose you can raise or lower the Drill Mounting Plate (raising the mounting plate will put the pilot hole deeper into the pocket, while lowering the mounting plate will bring the pilot hole closer to the top of the pocket.)

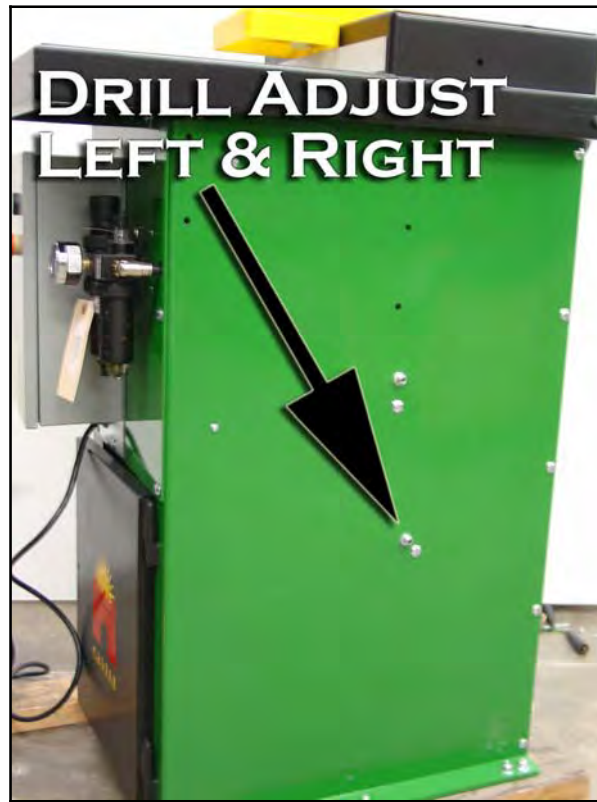


4. Once you have moved the Drill Mounting Plate tighten the carriage bolts, close the Case Top and test to see if the pilot hole is set to the appropriate height for your particular application.

---

## 5.5 Left and Right Pilot Drill Adjustment

If you ever find that the pilot hole has come out of adjustment and is offset to the left or right in the pocket, your TSM-31 has a Left and Right Pilot Drill Adjustment. The ideal adjustment for the pilot bit is the center of the hole provided in the case top. The following are instructions for adjusting where the centered position is.



*Fig 5*

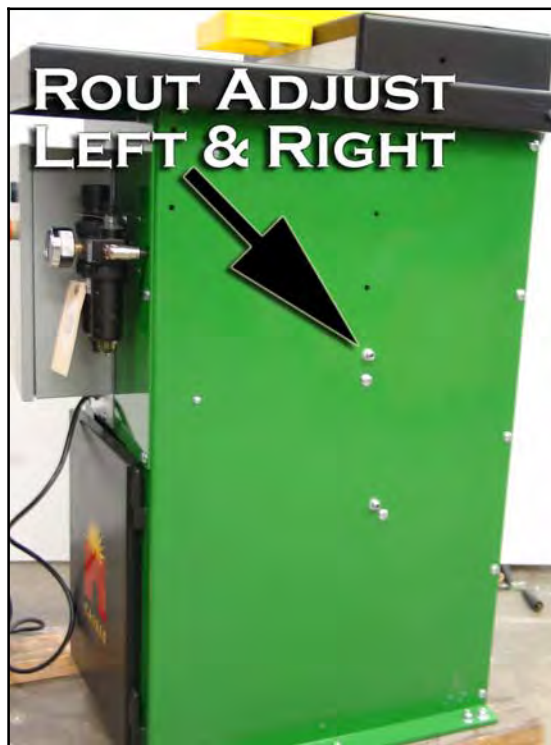
1. **Turn off Air and Electrical power to the machine** and raise Case Top to its fully opened position.
2. There are two Jacking Screws on each side of the machine. The bottom Jacking Screws are for the drill carriage.
3. Use a  $\frac{7}{16}$ " wrench to loosen the  $\frac{1}{4}$  -20 nylock nut on each side of the machine.

4. Once the nylock nuts are loose, use a  $\frac{1}{8}$ " Allen wrench to move the carriage left or right. Loosen the left side and tighten the right to move the carriage to the left. Loosen the right side and tighten the left to move the carriage to the right.
5. Once you have adjusted the Jacking Screws, apply air and power to the machine and cut a test pocket.
6. If the pilot hole is in the appropriate position for the particular application, use a  $\frac{1}{8}$ " Allen wrench to secure each Jacking Screw while tightening the  $\frac{1}{4}$ -20 nylock nut with a  $\frac{7}{16}$ " wrench on both sides of the machine.

---

## 5.6 Left and Right Router Adjustment

The ideal location for the router bit is to be directly in the center of the slot provided on the Case Top. If you find that the bit has moved to the left or right of the slot, your TSM-31 has a Left and Right Router Adjustment.



**Fig 6**

1. **Turn off Air and Electrical power to the machine** and raise the Case Top to its fully opened position.
2. There are two Jacking Screws on each side of the machine. The top Jacking Screws are for the router carriage.



3. Use a 7/16" wrench to loosen the 1/4 -20 nylock nut on each side of the machine.
4. Once the nylock nuts are loose, use a 1/8" Allen wrench to move the carriage left and right. Loosen the left side and tighten the right to move the carriage to the left. Loosen the right side and tighten the left to move the carriage to the right.
5. Once you have adjusted the Jacking Screws, apply air and power to the machine and cut a test pocket.
6. If the pilot hole is in the appropriate position for the particular application, use a 1/8" Allen wrench to secure each Jacking Screw while tightening the 1/4-20 nylock nut with 7/16" wrench on both sides of the machine.

---

## 5.7 Router Feed Speed

Your TSM-31 is equipped with a Router Feed Speed Adjustment to allow you to cut pockets faster or slower depending on the material you are cutting. For example, if you are cutting soft wood, it may be better for your machine to cut faster to avoid having your bit spin in the material too long. This can cause the bit to heat up and become dull. In applications where you are cutting hard wood with your TSM-31, you may want to slow the speed at which your router cuts a pocket. Feeding too fast into hard material can damage your tooling as well.



**Fig 7**

1. The adjustment for the Router Feed Speed is located on the front of the machine in the upper right hand corner below the case top.

2. Turn on the machine and push a scrap of test wood against the safety buttons.
3. Cut a pocket and note the speed of forward thrust during the rout part of the cycle.
4. Adjust the flow control knob counter-clockwise to increase the speed of the forward thrust and adjust it clockwise to slow the speed of the forward thrust.

---

**Note:** This only adjusts how fast the router advances.

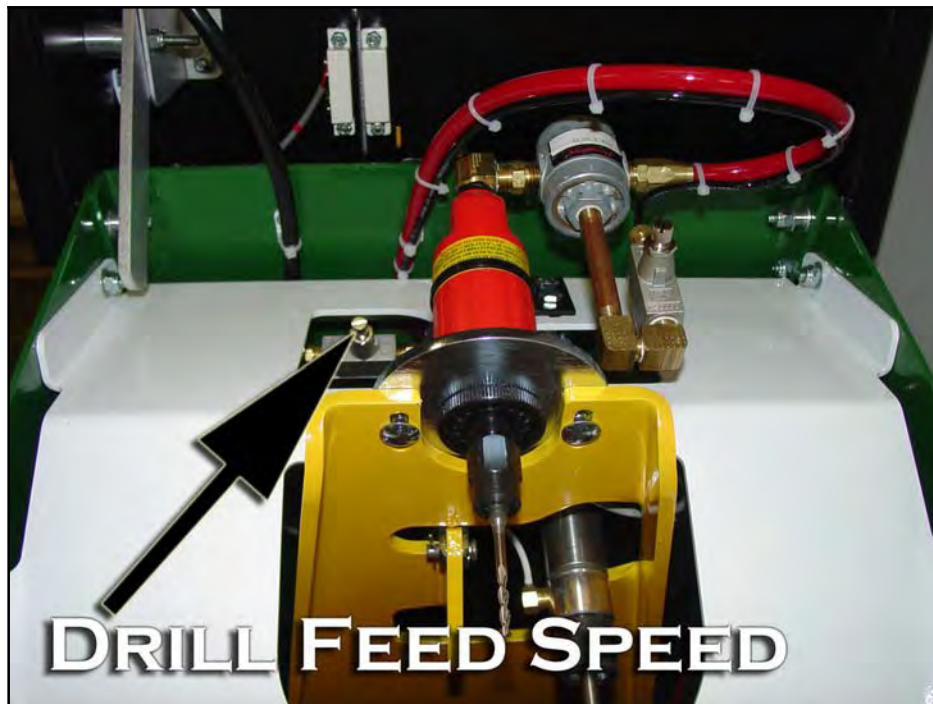
---

5. Once the appropriate rout speed has been found, tighten the jam nut on the flow control to ensure that machine stays in adjustment.

---

## 5.8 Drill Feed Speed

Drilling into any material too quickly can cause your drill bit to break due to the force of impact. Drilling into any material too slowly can also cause your drill bit to break because it will heat up and lose its tempered strength. In order to prolong the life of your tooling, your TSM-31 is equipped with a Drill Feed Speed Adjustment.



**Fig 8**

1. Cut a test pocket into the material you plan on working with and take note of the speed of forward thrust during the drill portion of the cycle.

2. **Turn off Air and Electrical power to the machine** and lift the Case Top to its fully opened position.
3. The flow control for the Drill Feed Speed Adjustment is to the rear of the machine, just left of center, and below the white safety pallet.
4. Once you have located the Drill Feed Speed knob, turn it counter-clockwise to increase the speed of the forward thrust and clockwise to decrease the speed of the forward thrust. NOTE: This only adjusts how fast the drill advances.
5. After the adjustment has been made close the Case Top and restore air and power to the machine.
6. Cut a test pocket, then repeat this process if needed.
7. Once you have found the appropriate Drill Feed Speed for the particular application, tighten the jam nut on the Drill Feed Speed flow control to ensure your machine stays in adjustment.

---

## 5.9 Drill Delay Adjustment

If you find that, in a particular application, your drill bit sticks in the material, a possible cause is that your drill has shut off before the drill bit exits the pilot hole. To test for, and fix this problem your TSM-31 is equipped with a Drill Delay Adjustment.



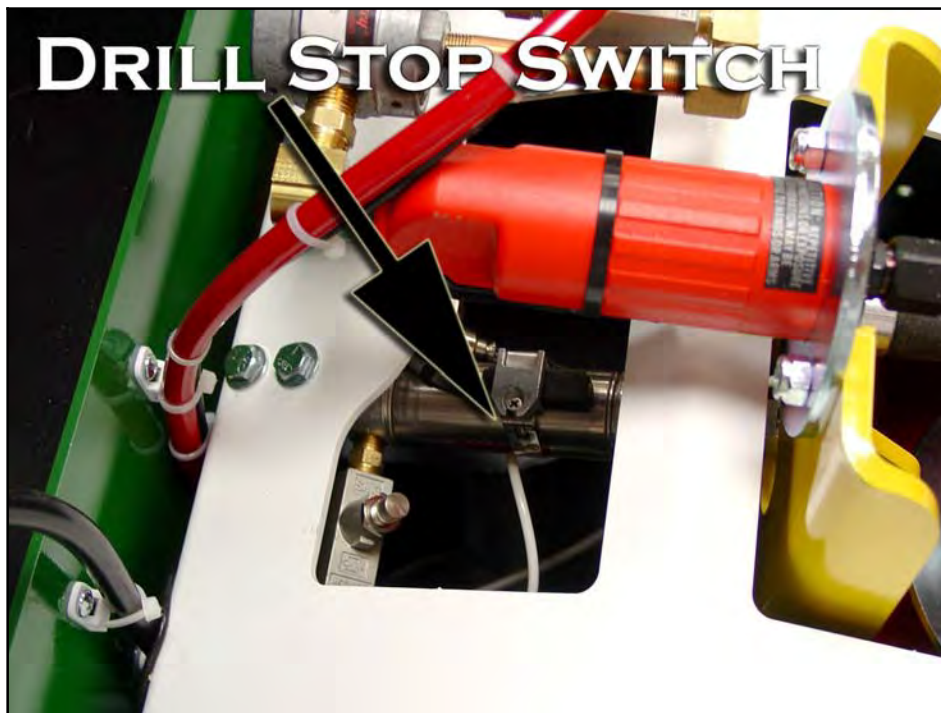
*Fig 9*

1. **Turn off Electrical power to your machine** and raise the Case Top to its fully opened position.
2. Locate the Drill Delay flow control mounted next to the drill.
3. To keep the drill spinning longer, loosen the jam nut on the flow control, then turn the knob clockwise  $\frac{1}{2}$  turn. Please note that this **ONLY** controls how long the drill stays on during the cycle. The drill should **NOT** remain spinning indefinitely.
4. Close the Case Top, restore power, and cut a test pocket. Repeat this process if necessary.
5. Once you have found the proper adjustment, tighten the jam nut on the flow control to ensure your machine stays in adjustment.

---

## 5.10 Drill Stop Switch

Your TSM-31 has a switch that tells the drill to retract when it reaches its maximum travel. This switch may come out of adjustment and you may find that the drill goes forward, but does not retract, and the clamp does not release. In this situation you may need to readjust the Drill Stop Switch.



*Fig 10*

1. **Turn off Air and Electrical power to the machine** and raise the Case Top to its fully opened position.
2. Under the red drill, you will find two cylinders. The cylinder on the left is the cylinder which drives the Drill Carriage.
3. On the Drill Carriage Cylinder there is a magnetic reed switch with a tensioning screw. Use a Phillips screw driver to loosen the screw so that the switch can move freely.
4. Open the door on the Control Box after you are sure that electrical power and air have been shut off to the machine.
5. Use a continuity tester and touch it to pins **9 and 10** on the Control Board Terminal Strip. You might read a few kilo Ohms of resistance.
6. Once touching 9 and 10, pull the Drill Carriage forward until it is approximately  $\frac{1}{16}$  inch away from the end of the stroke and hold in place.
7. Slide the Drill Stop Switch until you read NO RESISTANCE and tighten the tensioning screw.

---

**Note:** Over tightening this screw may cause switch failure.

---

---

## 5.11 Router Stop Switch

Much like the Drill Stop Switch, the Router Carriage also uses a magnetic reed switch to tell your TSM-31 when it has reached the end of its stroke for the router part of the cycle. In the event that this switch comes out of adjustment, your router will come up in the pocket and either return before reaching the end of the stroke, or the router bit will not return at all after cutting the pocket.





**Fig 11**

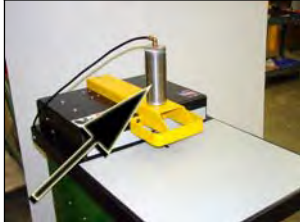
1. **Turn off Air and Electrical power to machine** and raise the Case Top to its fully opened position.
2. Under the drill you will find two cylinders. The cylinder on the right is the cylinder which drives the Router Carriage.
3. On the Router Carriage Cylinder, there is a switch with a tensioning screw. Use a Phillips screw driver to loosen the screw so the switch can move freely.
4. Open the door on the Control Box after you are sure that electrical power and air have been shut off to the machine.
5. Use a continuity tester and touch it to pins **7 and 8** on the Control Board Terminal Strip. You may read a few kilo Ohms of resistance.
6. Once touching 7 and 8, push the Router Carriage forward until it is approximately  $\frac{1}{16}$ " away from the black bumper on the Router Cylinder and hold it in place.
7. Slide the Router Stop Switch until you read NO RESISTANCE and tighten the tensioning screw.

---

**Note:** Over tightening this screw may cause switch failure.

---

## 6 Definition and Description of Parts



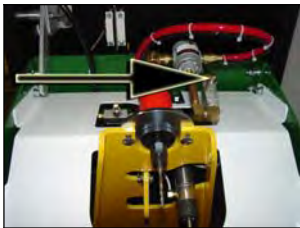
### **Clamp Cylinder:**

The large cylinder on the top of the machine acts as a clamp to hold the work safely in place during operation. This is a single acting, spring return, pneumatic cylinder with a padded foot on the end of the cylinder rod. The clamping force exerted is directly proportional to the amount of air pressure measured at the machine's regulator. The Clamp Cylinder is secured by the Clamp Guard.



### **Clamp Guard:**

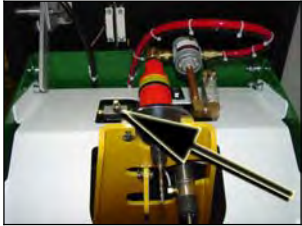


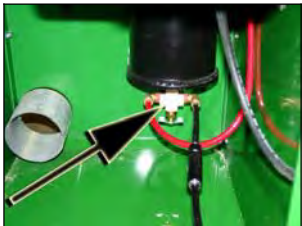

The yellow metal Clamp Guard on top of the machine serves to secure the Clamp Cylinder and to safeguard the operator from the clamping and pocket cutting operation.




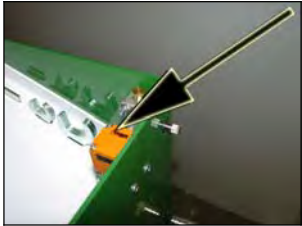


### **Drill Delay Valve:**

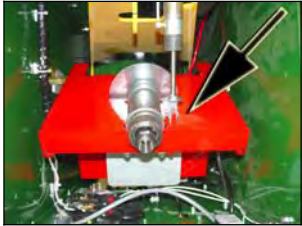

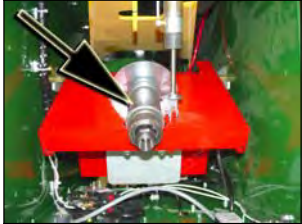

This is the flow control valve located under the Case Top and is plumbed to the right of the Sioux air drill. This valve controls how fast air is released from the pilot valve; the slower the air is released, the longer the drill bit will spin after the drill has cycled.

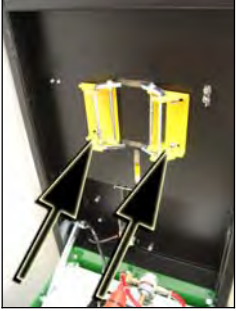
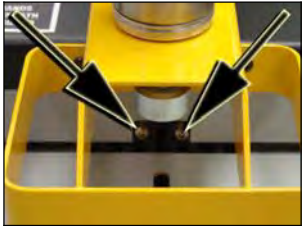
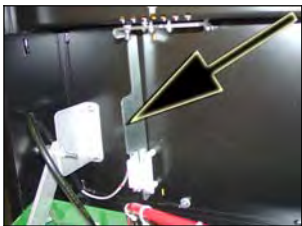
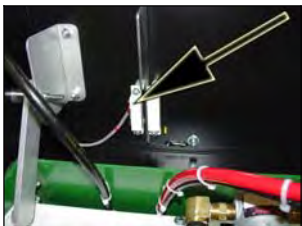



	<p><b>Drill Feed Speed:</b></p> <p>The Drill Feed Speed is the flow control valve located under the Case Top, near the back of the machine, left of center and can be seen through an access hole in the Safety Pallet. The Drill Feed Speed controls how fast the drill comes forward into the material.</p>
	<p><b>Web Adjustment Plate:</b></p> <p>The Web Adjustment Plate is under the Case Top, mounted at the rear of the white Safety Pallet, just to the right of center. The plate can be identified by the two bolt heads sitting on top of the plate. The position of the plate determines the size of the web.</p>
	<p><b>FRL (Filter, Regulator, Lubricator):</b></p> <p>The FRL or Filter, Regulator, Lubricator, is located on the front of the machine to the right of the Control Box. The FRL regulates and filters the air going into the machine. It also sends oil to the Sioux air drill.</p>
	<p><b>Drain Cock:</b></p> <p>Located on the bottom of the Air Reservoir, it can be accessed through the front door of the machine. The Drain Cock allows you to keep the reservoir and the drill free of excess condensation.</p>
	<p><b>Inline Filter:</b></p> <p>The Inline Filter is located behind the door on the case front. It can be seen hanging down at the top of the door opening. The Inline Filter cleans the air before it goes into the machine's valves.</p>



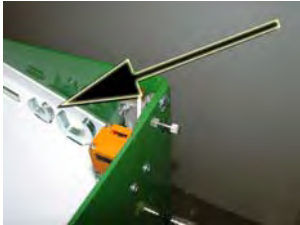
	<p><b>Foot Pedal and Guard:</b></p> <p>The Foot Pedal is mounted inside a yellow metal guard and is connected to the machine by an electrical cord. The Foot Pedal will activate the machine cycle only if the Safety Buttons are depressed by the work piece.</p>
	<p><b>Safety Interlock Switch:</b></p> <p>The Safety Interlock Switch will automatically turn off the machine if the Case Top is opened while the machine is on. The machine will not turn on unless the Case Top is closed and the Interlock Key is in the switch. Take care to keep the Interlock Safety Switch free of sawdust.</p>
	<p><b>Router Motor:</b></p> <p>The Router Motor is located in the center of the machine and can be accessed through the front door. The Baldor 1 ½ horse, 1-Phase motor turns the spindle that routs the pocket.</p>
	<p><b>Drill Motor:</b></p> <p>The Drill Motor is a custom designed, Sioux air drill mounted to the yellow Drill Carriage. It is located under the Case Top in the center of the white Safety Pallet, and is slightly offset towards the rear of the machine. The Drill Motor is what drills the pilot hole.</p>

	<p><b>Router Carriage:</b></p> <p>The Router Carriage is the red weldment located inside the machine and holds the Router Spindle and motor in place. This carriage is mounted to the machine with the upper two Jacking Screws which can be found on the side of the machine (one on each side). The carriage is moved back and forth through the rout cycle by a Drive Cylinder which links the carriage to the Web Adjustment Plate.</p>
	<p><b>Drill Carriage:</b></p> <p>The Drill Carriage is the yellow A-frame weldment inside the machine, to which the Sioux air drill is mounted. This carriage is mounted to the machine with the lower two Jacking Screws which can be found on the side of the machine (one on each side). The carriage is moved back and forth through the drill cycle by the Drive Cylinder, which anchors the carriage to the Safety Pallet.</p>
	<p><b>Router Spindle Assembly:</b></p> <p>The Router Spindle Assembly is attached to the red Router Carriage, and is what spins the router bit. This spindle has a small pulley on the bottom which connects, via a flat rubberized belt, to the large pulley on the motor.</p>
	<p><b>Control Box:</b></p> <p>The Control Box is a gray sheet metal enclosure that houses the electrical controls of the machine: Transformer, Overload, Contactor, Control Board, and Pressure Switch. Mounted to the back side of the Control Box are all the pneumatic valves that control the function of the machine's cycle.</p>

	<p><b>Indexing Brackets:</b></p> <p>The Indexing Brackets are located on the underside of the Case Top. The Indexing Brackets are used for quickly locating a pocket from the edge of the material. This is ideal for indexing face frame stock left and right for maximum productivity.</p>
	<p><b>Safety Buttons:</b></p> <p>Two small, silver/black button head screws project from the front of the machine under the Clamp Guard. The Safety Buttons push the Safety Blade, which then activates the Safety Switch, allowing the machine to cycle.</p>
	<p><b>Safety Blade:</b></p> <p>The Safety Blade is an L-shaped, galvanized part mounted to the underside of the Case Top. The Safety Blade activates the magnetic Safety Switch, allowing the machine to cycle.</p>
	<p><b>Safety Switch:</b></p> <p>This magnetic proximity switch is mounted far back on the underside of the Case Top. The Safety Switch is activated when the Safety Buttons are depressed by a piece of stock.</p>
	<p><b>Safety Pallet:</b></p> <p>The Safety Pallet is the white sheet metal fixture under the Case Top with a slight bend in the middle. The pallet is what holds the top of the machine together and anchors the Drive Cylinders for the Drill and Router Carriages.</p>

**Jacking Screws:**

The Jacking Screws are located on both sides of the machine. The top Jacking Screws are for adjusting the Router Carriage left and right, and the bottom Jacking Screws are for adjusting the Drill Carriage left and right.

**Supplied Tools:**

Supplied tools are located on the front right side of the Safety Pallet. The tools provided with the TSM-31 are for servicing the machine's tooling.

---

## 7 Service and Maintenance

---

**Warning:** Electrical hazard: Do not attempt to service Control Box components. Contact Castle, Inc. for the proper service information.

---

---

### 7.1 General

To ensure productivity and longevity for your Castle Screw Pocket Machine, it is essential to follow a few simple steps. How often these steps are performed depends upon the number of hours the machine is operated each day. As a general rule, operators should visually inspect the machine at the start of each work shift in the following manner:

- Check power cord and Foot Switch cord for wear or damage.
- Ensure that the router bit and the drill bit are clean, sharp and undamaged.
- Keep the router and drill motors free from dust buildup.
- Check for proper Safety Switch function. Turn the machine on and press the Foot Switch without a work piece against the Safety Buttons. If the Safety Switch is working properly the machine should not cycle. If you suspect a Safety Switch malfunction, contact Castle, Inc. at 800.282.8338 as soon as possible for corrective action.
- It is recommended that periodically (at least once per 40 hours of operation) you blow out all upper areas of your model TSM-31 by turning off the power supply and lifting the Case Top to its fully open position. Blow out the compartment with approximately 30 PSI compressed air. Pay particular attention to keeping the Interlock Safety Switch free of sawdust.

---

**Caution:** Always wear safety goggles when using compressed air.

---

---

**Note:** The model TSM-31 uses bearings that are pre-lubricated. No bearing lubrication is necessary. However, an automatic Lubricator is attached to the Air Regulator. Air tool oil must be kept in the Lubricator at all times.

---

- The Lubricator should be set so that a slight deposit of oil and dust occurs at the drill motor exhaust. The exhaust is located in front of the drill motor behind the drill motor collet.
- The oil / dust deposit should not occur until the machine has been run for at least 4 hours. If after 4 hours of use you don't see this deposit, adjust the Lubricator knob on the front of your machine counter clockwise about ¼ turn and run the machine again. Keep adjusting until the deposit begins to show.

---

## 7.2 Motors and Bits

Because the motors are enclosed in the machine, it is important that the maintenance guidelines provided in the manufacturer's instruction manual be strictly observed.

- Periodically during operation, blow out the air passages on both motors with 30 PSI compressed air.

---

**Caution:** Always wear safety goggles when using compressed air.

---

- To prolong motor life, and avoid costly downtime, a dust collection system must be used. A port has been provided on the rear of the machine for this purpose.
- To ensure safe and effective operation, make certain that there is at least 80PSI air pressure to the machine. Check cycle time of machine for proper duration. A typical cycle under normal conditions will last from 1½ to 2 seconds. A cycle significantly longer than this may lead to excessive bit wear.
- It is suggested that a two flute, carbide tipped B00138 Castle bit be used when pocketing particleboard, Melamine, MDF, etc. This leaves a clean cut and offers economically longer bit life.
- When cutting pockets in solid woods such as maple, oak, ash or alder we recommend the B00438 three flute HSS cobalt bit.

- If pockets are being cut in both types of materials (i.e., particleboard and hard wood) or if an exceptionally long bit life is desired, then it is suggested that the B00338 solid carbide bit be used. All three bits are available through Castle, Inc.
- The pilot hole is made with a  $\frac{9}{64}$ " drill bit, B02964. This size drill bit comes with your machine. Also available are a  $\frac{7}{64}$ " and  $\frac{3}{16}$ " size drill bit.
- Feel free to contact your local Castle Dealer or our Parts Department TOLL FREE at 800-282-8338 for information and pricing on tooling and accessory products for your TSM-31.

---

## 7.3 Serial Number Log

SERIAL NUMBER LOG		
MANUFACTURER	PART NUMBER	SERIAL NO.
Castle, Inc.	A00031 – TSM-31 Heavy Duty Screw Pocket Machine – Single Phase	
Sioux	P01957 – Sioux SDG75S25FCT Motor	
Baldor	E27301 – Baldor 3 HP Single Phase Motor	
PURCHASE DATE:		

---

## 8 Warranty Information

Castle, Inc. uses only the highest quality materials available for the construction of our machines. Your TSM-31 is warranted for one (1) full year from the date of purchase against workmanship or material defects under normal use and service. Castle, Inc. is not responsible for failures or injuries due to negligence, misuse, alteration, unauthorized service, or accidents.

Owners of new machines are obligated to contact their dealer AND Castle before contracting for, or attempting warranty repairs or service.

If Castle or dealer technicians determine that reasonably simple adjustments or tests are necessary in delivering remedy to a failed machine, owners of warrantied machines are obligated to exercise due diligence while assisting in the execution of these simple adjustments or tests.

When a problem cannot be resolved via telephone support, Castle will, at its expense, send replacement parts and instructions to the purchaser necessary to cure the defect. Castle will not be responsible for providing labor on repairs that are deemed reasonable for the owner to accomplish. Castle, Inc., at its sole discretion, will elect to either repair (by a Castle technician or dealer technician) or replace a machine in the case of warranty issues that exceed reasonable owner repair expectations. Alternatively, Castle will factory repair any machine provided the machine is returned to Castle, shipping prepaid, within the warranty period.

**Castle will not, under any circumstances, be liable for consequential, incidental, special or exemplary damages, or for loss of time, revenue or production. Further, Castle disclaims any warranty, expressed or implied, as to the merchantability or fitness of a Castle product for any particular purpose.**

### 30 Day Refund Policy

Any Castle machine that is un-altered and in almost new condition may be returned by the purchaser, for any reason, within 30 days of the purchase date for a full refund. Please contact your Castle authorized dealer for more information.

For Technical Assistance, Parts & Tooling:

Call 800-282-8338, Monday through Friday, 8:00am - 4:00pm, Pacific Time

Fax: 707-765-0953



# **Castle Model TSM-31**

## **Heavy Duty Screw Pocket Machine**

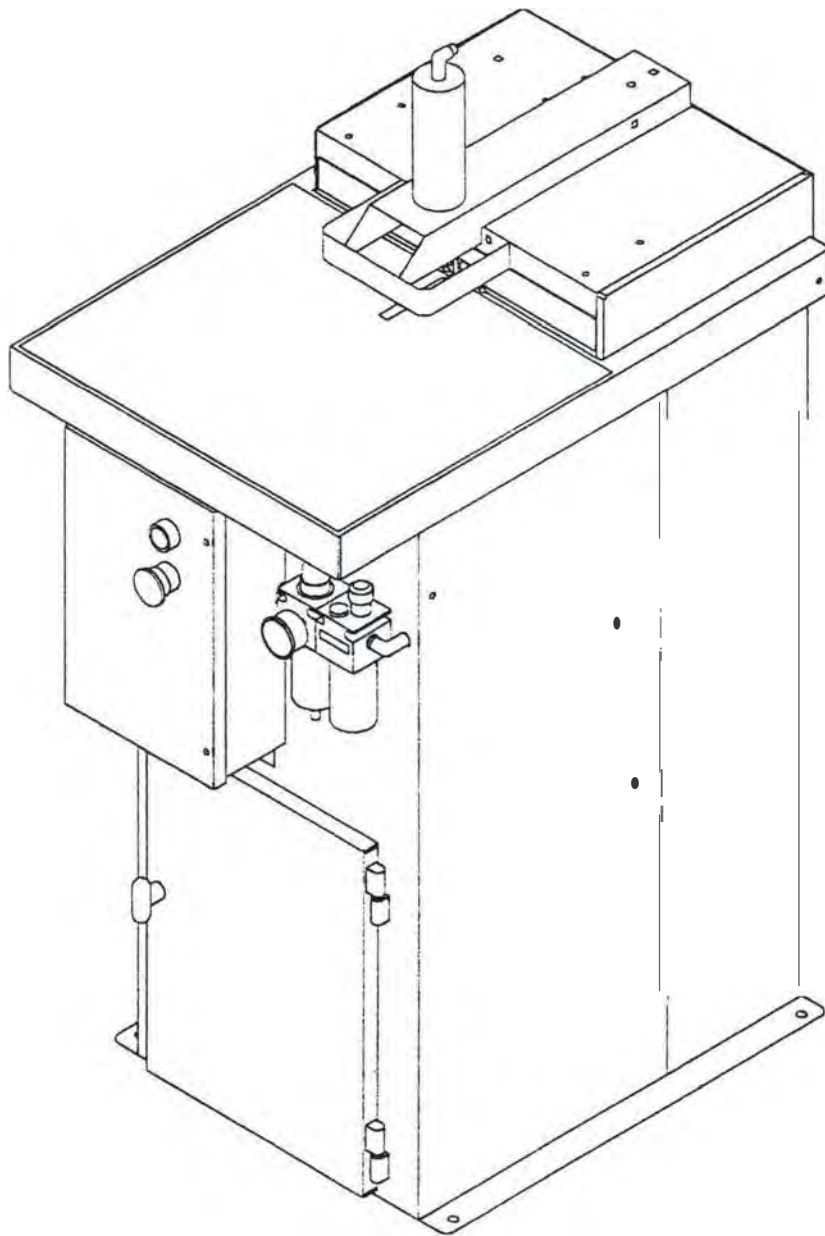
***For Models with Serial Number 61825 to 63657***  
**Items Included with Machine**

<b>Part No.</b>	<b>Description</b>	<b>Qty</b>
B02964	9/64" Castle Premium Brad Point Drill Bit w/ 1/4" Shank	1
B00338	Solid Carbide 3/8" Three Flute Rough Mill Cutter	1
T42596	Wrench, Porter Cable 690	2
B00622	Square Driver Bit, #2 x 6"	1
S00350	Sioux Air Tool Oil	1 Qt
O00234	Bit Depth Gauge	1
S90035	Operator's Manual	1

## NOTES:

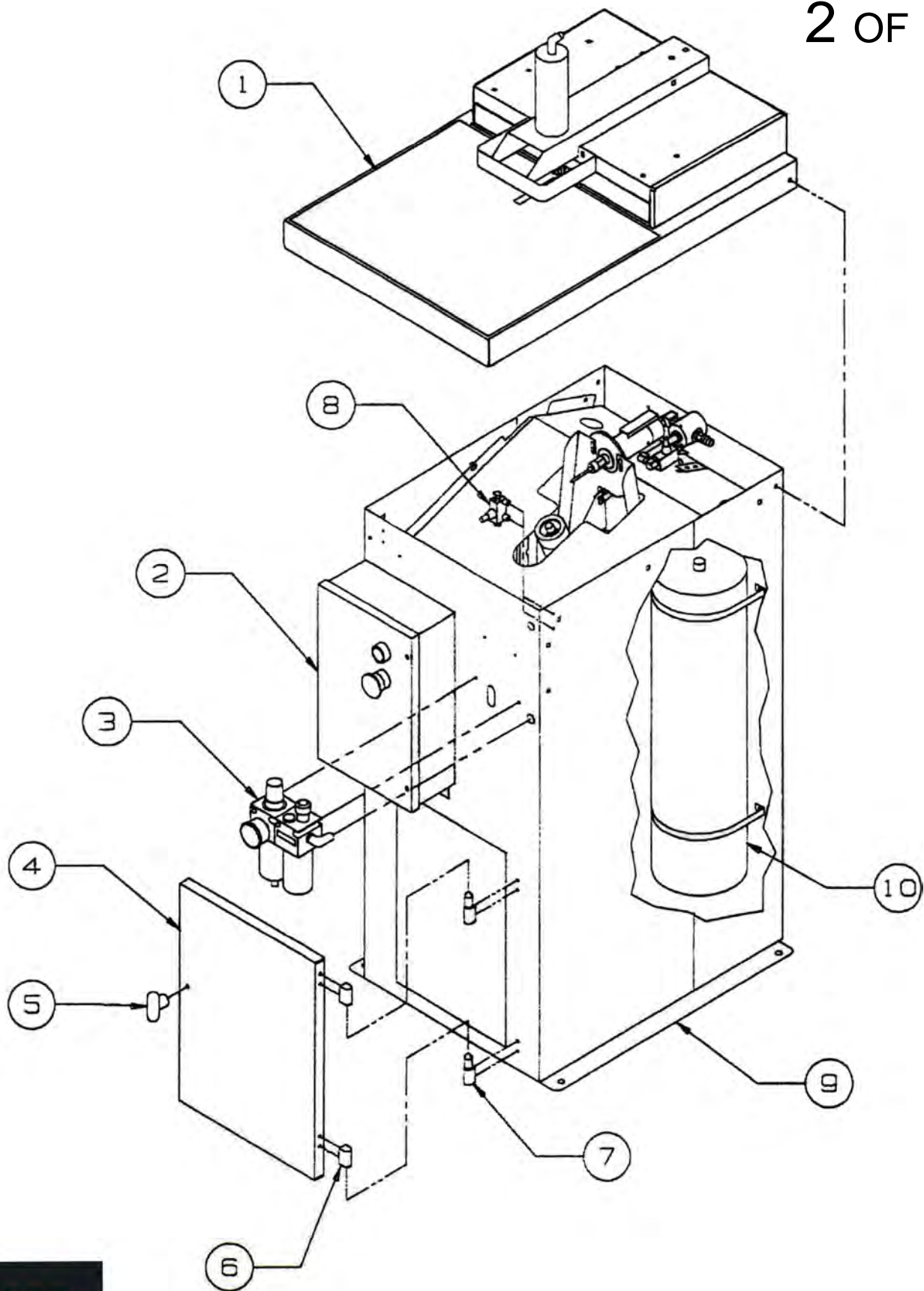
1. CABINETS ASSEMBLY DETAIL - PAGE 2
2. TOP ASSEMBLY DETAIL - PAGE 3
3. ROUTER AND DRILL CARRIAGE DETAILS - PAGE 4
4. ELECTRICAL BOX ASSEMBLY - PAGE 5

1 OF 5



# TSM-31

## HEAVY DUTY POCKET MACHINE



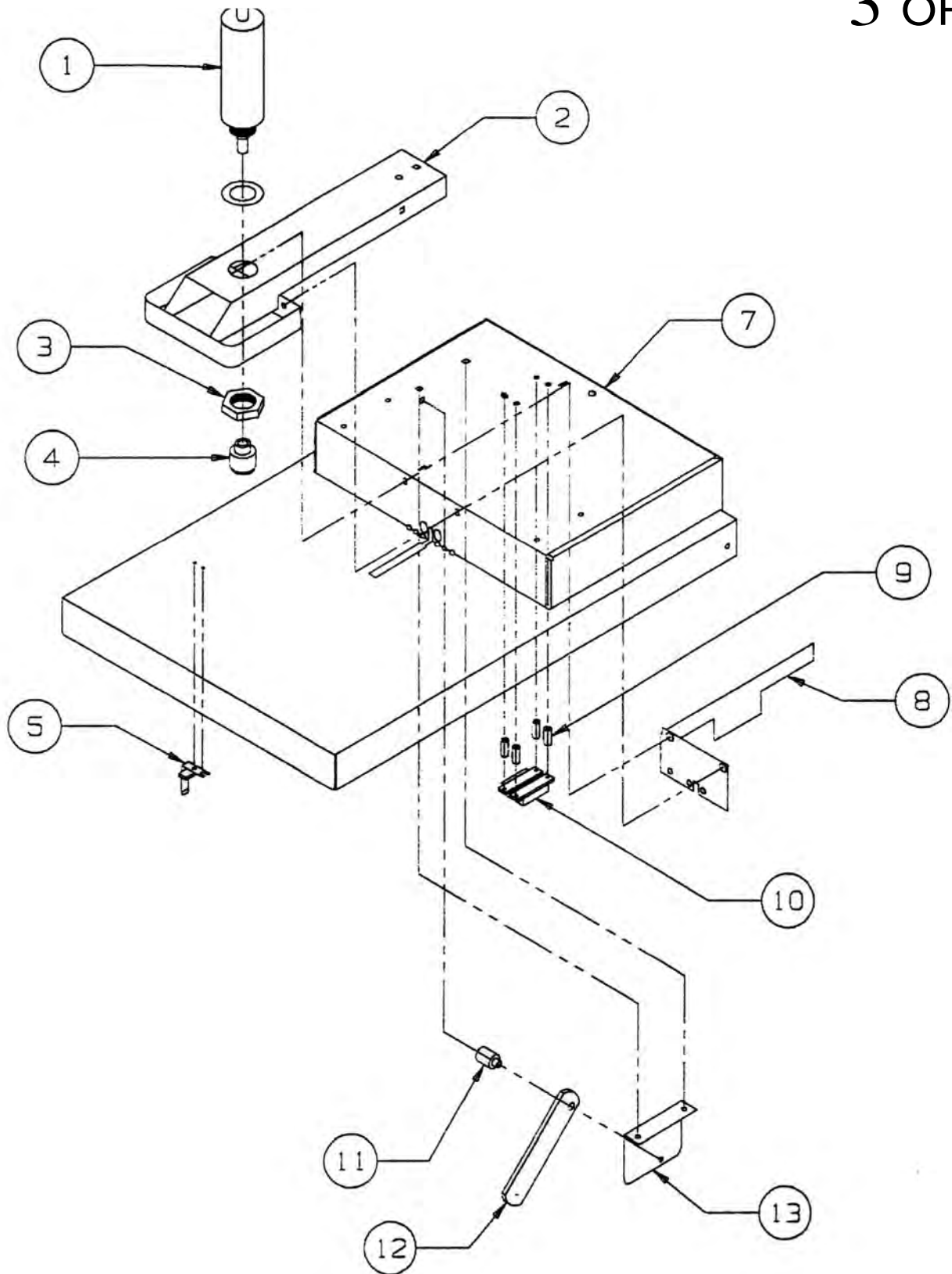
**TSM-31**  
CASE ASSEMBLY DETAIL

## DRAWING 2 OF 5 - CASE ASSEMBLY

Item #	Part #	Part Description	Qty
1	C35010	TSM-35 Case Top Assembly	1
2	C35035	TSM-35 Control Assembly, Low Voltage	1
or	C35056	TSM-35 Control Assembly, High Voltage	1
3	C35002	<b>TSM-35 FRL Assembly</b>	
	P35066	TSM-35 Filter/Regulator, Parker	1
	P35067	TSM-35 Lubricator, Parker	1
	P35068	TSM-35 FRL Mount Bracket	1
	P35069	TSM-35 FRL Connector	1
	P01478	TSM-35 Gauge	1
	P21244	1/4 M x 3/8 PI Elbow Norgren	1
	P26844	1/4M x 1/4 PI Straight Alkon	1
	P14116	1/4 Male Street L Brass	1
4	C00010	<b>Castle Front Door Assembly</b>	
	M00400	Door, Front, Black w/ Logo	1
5	C00015	<b>Door Handle Assembly</b>	
	H00141	Bar Knob, Plastic, 1/4-20	1
	N00101	Spring Door Clip	1
	F14585	Screw, Hex Head Cap, 1/4-20 x 5/8 ZP	1
6		<b>Door Hinge Assembly</b>	
	D00720	Hinge, Plastic, Black, Female	2
	F10011	Screw, Pan Head Phillips, 10-24 x 1/2 ZP	4
7		<b>Case Hinge Assembly</b>	
	D00710	Hinge, Plastic, Black, Male	2
	F10011	Screw, Pan Head Phillips, 10-24 x 1/2 ZP	4

Item #	Part #	Part Description	Qty
9		<b>Main Case</b>	
	U35001	Case Front, Green	1
	U35002	Case Rear, Green	1
	U35003	Case Bottom, Green	1
	U35005	Case Left Side, Green	1
	U35006	Case Right, Green	1
	S00320	Label, Serial Number	1
	M35033	TSM-35 Pivot Plate	2
	O00400	Dust Port Tube, 4" x 3-1/2"	1
	F14584	Carriage Bolt, 1/4-20 x 5/8 ZP	22
	F01420	Nut, Nylon Lock, 1/4-20 ZP	22
	F38034	Carriage Bolt 3/8-16 x 3/4 ZP	4
	F38168	3/8 Hex Nut	8
	F03810	Washer, 3/8 SAE ZP	4
	F01410	Washer, 1/4 SAE ZP	4
	F51684	Carriage Bolt, 5/16-18 x 4 ZP	4
	F00516	5/16 Anti Turn Washer	4
	F51699	Nut, Nylon Lock, 5/16-20 ZP	4
	D08320	Cable Tie Holder, Small White Nylon	5
10		<b>Air Reservoir Assembly</b>	
	G35014	Air Tank w/ Bulkheads, 6" x 20", Black	1
	F14210	Carriage Bolt, 1/4-20 x 1 ZP	4
	F01411	Washer, 1/4 USS ZP	4
	F01420	Nut, Nylon Lock, 1/4-20 ZP	4
	P38220	4 Way Cross Tee, Brass	1
	P00087	3/8 M x 3/8 PI Elbow	2
	P38523	3/8 Hex Nipple	1
	P38921	3/8 Brass Drain Cock	1

8	Router Feed Rate Control		
	P00117	Valve, Flow Control, SMC NAS-2000-N01	1
	P18165	Fitting, 1/8 NPT x 1/16 Side Out Barb, Brass	1
	P18161	Fitting, 1/8 NPT x 1/16 Barb, White Nylon	1
	F08112	Screw, Pan Phillips, 8-32 x 1-1/2 ZP	2
	F08032	Nut, Nylon Lock 8-32	2



**TSM-31**  
TOP ASSEMBLY DETAIL

## DRAWING 3 OF 5 - TOP ASSEMBLY

Item #	Part #	Part Description	Qty
<b>1</b>		<b>Clamp Cylinder</b>	
	P00215	Cylinder Spring Return, 2" Bore, 1.5" Stroke, SS Rod	1
	F12222	1/2-20 Hex Jam Nut	1
	P14414	Fitting, 1/4 NPT x 1/4 Push In Elbow	1
	H10138	Washer, Fiber, 1-3/8 ID	1

<b>2</b>		<b>Clamp Guard</b>	
	M00210	TSM Clamp Guard, Yellow	1
	F14234	Carriage Bolt, 1/4-20 x 1-3/4 ZP	1
	F01410	Washer, 1/4 SAE ZP	1
	F01420	Nut, Nylon Lock, 1/4-20 ZP	1
	F14378	Screw, Button Head Socket, 1/4-20 x 7/8, BkOxide	2
	F14201	Nut, Pem Self Clinching, 1/4-20 #1	2

<b>3</b>	F11412	Nut, Hex Jam 1-1/4-12 ZP	1
----------	--------	--------------------------	---

<b>4</b>	C00200	<b>Clamp Foot Assembly</b>	
	N21351	Clamp Foot, Small Zinc Plated	1
	N70118	Pad, Polyurethane 1-1/8"	1

<b>5</b>		<b>Safety Interlock Key</b>	
	E03322	Key, Security Interlock, ABB LSA30	1
	F08032	Nut, Nylon Lock, 8-32 ZP	2

<b>7</b>	C35010	<b>Main Case Top</b>	
	U35102	Case Top, Black	1
	C00350	Case Top Laminate, Dolphin Grey	1
	C00210	Face Plate Laminate, Dolphin Grey	1
	S00301	Label, Warning, Keep Hands Clear, Lexan	1

Item #	Part #	Part Description	Qty
		<b>Case Top Hinge Assembly</b>	
	F38118	Shoulder Bolt 3/8 x 1-1/2	2
	F51699	Nut, Nylon Lock, 5/16-18 ZP	2
	F03810	Washer, 3/8 SAE ZP	2

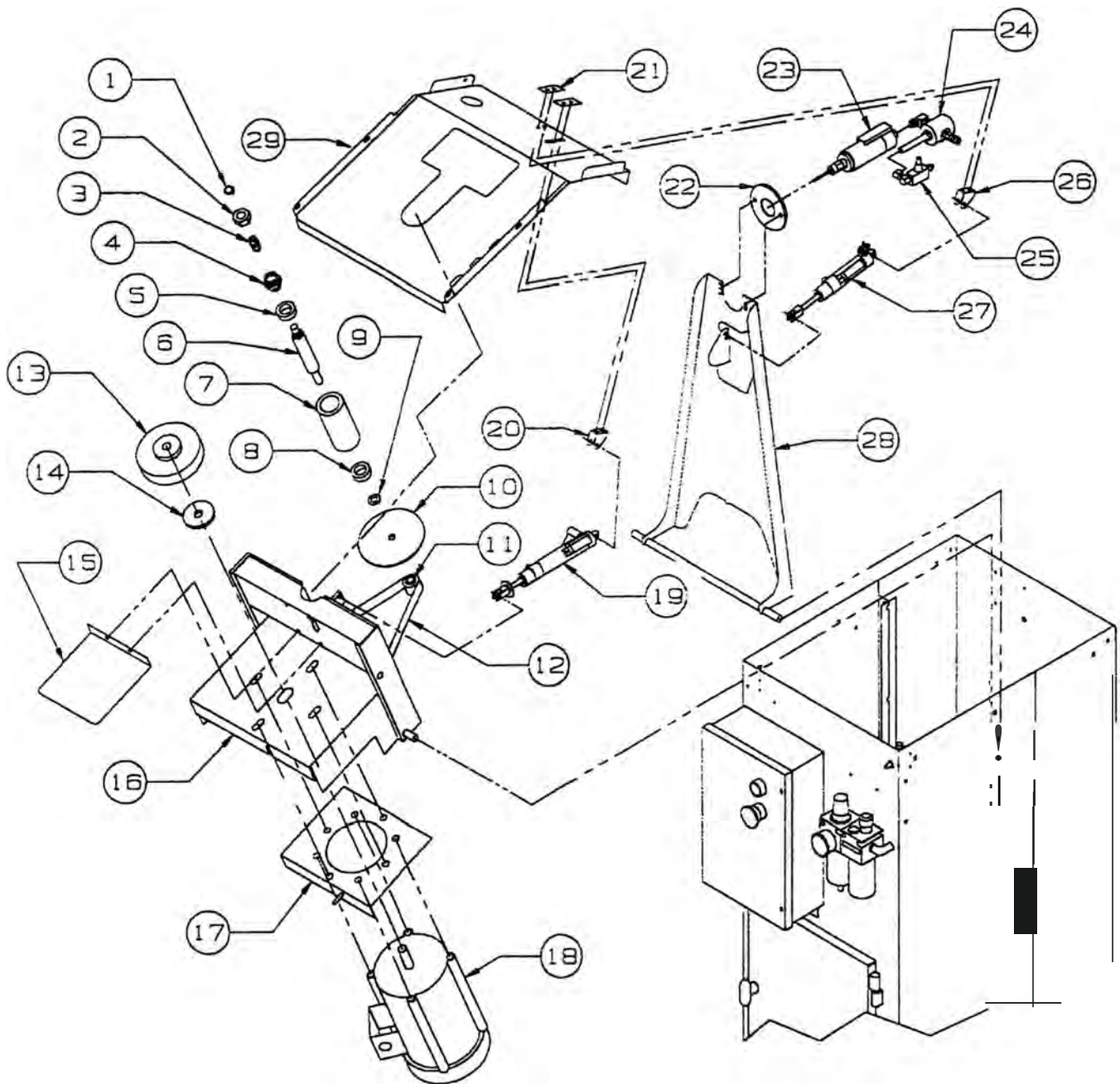
<b>8</b>	C35101	<b>Safety Switch / Blade Assembly</b>	
	M35016	TSM-35 Safety Blade	1
	F10358	Screw, Button Head Socket, 10-32 x 5/8 Bk Oxide	3
	F10322	Nut, Hex Jam, 10-32 ZP	1
	F01420	Nut, Nylon Lock, 1/4-20 ZP	2

<b>9</b>		<b>Safety Switch Mounting Assembly</b>	
	F08122	Screw, Pan Phillips Machine, 8-32 x 1-1/2 ZP	4
	F08032	Nut, Nylon Lock, 8-32 ZP	4
	N38314	3/8 OD x 1/4 ID x 5/16L Spacer	2
	D38507	#8 Spacer, Nylon, 3/8 OD x 7/8" L	4

<b>10</b>		<b>Safety Switch</b>	
	E10850	1085TW Magnet and Magnetic Reed Switch	1
	E22708	Wire, 22AWG, 2 Strand, Grey Jacketed	64"
	P38012	Tubing, 3/8 OD Black Polyethelene	22"

<b>11,12,13</b>		<b>Lid Catch Mounting Assembly</b>	
	U35040	Lid Catch, Plated	1
	F14225	Carriage Bolt, 1/4-20 x 1 ZP	2
	F01410	Washer, 1/4 SAE ZP	6
	F01420	Nut, Nylon Lock, 1/4-20 ZP	2
	N38314	Spacer, Steel, 3/8 OD x 1/4 ID x 5/16 L ZP	2





**TSM-31**

DRILL AND ROUTER CARRIAGE ASSEMBLY



## DRAWING 4 OF 5 - ROUTER SPINDLE ASSEMBLY

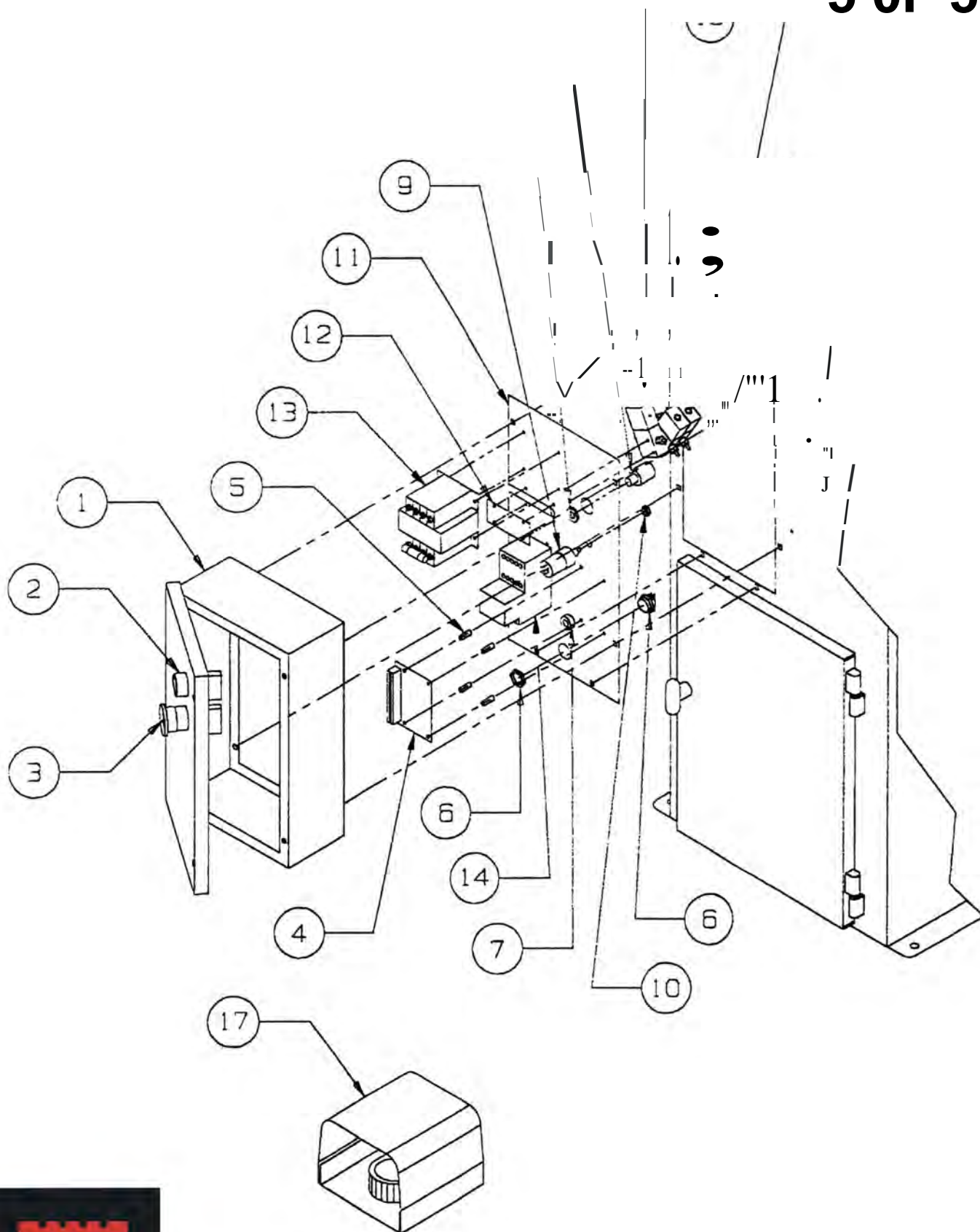
Item #	Part #	Part Description	Qty
<b>D50038      3/8" Collet Assembly</b>			
1		Snap Ring, Collet	1
2		Nut, Collet	1
3		Collet, 3/8"	1
<b>C35003      Router Spindle Assembly</b>			
4	D50055	Chuck	1
5	H78065	Bearing	1
	D35137	Snap Ring, Internal,	1
6	N35313	Router Spindle, Stress Proof Steel	1
7	N35352	Spindle Housing	1
8	H78065	Bearing	1
9	H58010	Bushing, Machinery 1" OD x 5/8 ID	1
10	U35011	Flywheel, 10 GA. Steel, 4.95 OD ZP	1
11	N35353	Small Driven Pulley	1
	F51625	Screw, Hex Head Cap, 5/16-24 x 3/4 Grade 5 ZP	1
	F01411	Washer, 1/4 USS ZP	1
<b>12      H12075      Belt, Flat Drive, 1" x 20.75</b>			
<b>13      C35115      Drive Pulley Assembly</b>			
	N35355	Large High Speed Drive Pulley	1
	H00058	Woods Bushing QT 5/8	1
	F14219	Ribbed Neck Carriage Bolt 1/4-20 x 2	2
	F01420	Nut, Nylon Lock, 1/4-20 ZP	2
<b>14      H35005      Motor Shaft Slinger</b>			
<b>15      M35030      Belt Cover</b>			

Item #	Part #	Part Description	Qty
<b>16      Router Carriage Assembly</b>			
	G35103	Router Motor Carriage	1
	F14222	U-Bolt, 1/4-20 x 1-1/2 ZP	2
	F01420	Nut, Nylon Lock, 1/4-20 ZP	7
	F01410	Washer, 1/4 SAE ZP	5
	F38161	Screw, Hex Head Cap, 3/8-16 x 1" ZP	4
	F03876	Washer, 3/8 USS ZP	4
	N03442	Bushing, 3/4" Hex Brass Carriage Pivot	2
	F14458	Screw, Cup Point Socket Head Set, 1/4-20 x 1-1/4	2
17	M35010	Motor Pull Plate	1
<b>18      Motor Assembly</b>			
	E35501	Motor, BaldorTEFC, 1-1/2HP 3Phase 3550RPM	1
	E35164	Motor Cord, 16-4 SOW	60"
	D12001	Clamp Connector, 3/8 - 1/2 KO	1
	H00604	Motor Slinger	1
<b>19      C35021      Router Drive Cylinder Assembly</b>			
	P35300	Cylinder, 1.06 DXPSRM Bore, 3" Stroke, Dbl Acting	1
	P18165	Fitting, 1/8 NPT x 1/16 Side Out Barb, Brass	1
	P00535	Fitting, 1/8 NPT x 5/32 Push In Swivel Elbow	1
	D07130	Shrader Clevis Kit	1
	F51600	Washer, 5/16 Large OD ZP	1
	H15858	Bumper, Black Rubber, 1" OD x 5/8 ID x 7/8 L	1
	D14034	Clevis Pin, 1/4 x 3/4	1
	D14934	Hairpin Cotter, 1/4 ZP	1
	F01424	Nut, Hex Jam, 1/4-20 ZP	1
	F01410	Washer, 1/4 SAE ZP	1
	P53293	Tubing, Clear Polyurethane, 5/32 OD	44"
	P16181	Tubing, White Polyurethane, 1/8 OD x 1/16 ID	62"
	E35010	Switch, Magnetic Reed	1
	E22708	Wire, 22 AWG, 2 Strand, Grey Jacketed	45"
	E35009	Switch Strap Assembly	1

## DRAWING 4 OF 5 - ROUTER SPINDLE ASSEMBLY

Item #	Part #	Part Description	Qty
<b>20</b>		<b>Clevis Bracket Assembly</b>	
	D07111	Clevis Bracket, 1/4" ZP	1
	D14078	Clevis Pin, 1/4 x 7/8 ZP	1
	D14934	Hairpin, 1/4 ZP	1
<b>21</b>		<b>Pallet Pivot Bracket Assembly</b>	
	U35009	Bracket, Pallet Pivot	2
	F14585	Screw, Hex Head Cap, 1/4-20 x 5/8 ZP	4
	F01420	Nut, Nylon Lock, 1/4-20 ZP	2
<b>22</b>		<b>Drill Motor Mount Assembly</b>	
	U35017	Bracket, Drill Motor Mount, ZP	1
	F14340	Carriage Bolt, 1/4-20 x 3/4 ZP	2
	F01420	Nut, Nylon Lock, 1/4-20 ZP	2
	F01410	Washer, 1/4 SAE ZP	2
<b>23</b>		<b>Drill Motor Assembly</b>	
	P01956	Air Motor, Sioux Model 1954HPHT	1
	B00964	Castle Drill Bit, 9/64 Cobalt w/ 1/4" Shank	1
	D71230	Cable Tie, Black Nylon, 7-1/2"	1
	D50044	Sioux 1/4" Collet	1
	D10140	Sioux 1/4" Collet Nut	1
<b>24</b>		<b>Drill Pilot Valve Assembly</b>	
	P35250	Valve, Humphrey Drill Pilot	1
	P14214	Nipple, 1/4M, Hex Close	1
	P14116	Fitting, Street L Brass, 1/4 NPT M/F	1
	P71415	1/4 NPT Red Plastic Plug	1
	P35389	Hose Assembly, 3/8 Red Urethane W/ Fitting	1
<b>25</b>		<b>Drill Delay Valve Assembly</b>	
	C35005		
	P00117	Valve, Flow Control, SMC NAS-2000-N01	1
	P00538	Fitting, 1/8 NPT x 5/32 Push In Straight	1
	P18141	Fitting, 1/8 NPT Street L M/F	2
	P18030	Pipe Nipple, 1.8 NPT x 3" Copper	1

Item #	Part #	Part Description	Qty
<b>26</b>		<b>Clevis Bracket Assembly</b>	
	D07111	Clevis Bracket, 1/4" ZP	1
	D14078	Clevis Pin, 1/4 x 7/8 ZP	1
	D14934	Hairpin, 1/4 ZP	1
<b>27</b>		<b>Drill Drive Cylinder Assembly</b>	
	C35022		
	P35125	Cylinder, 1.06 Bore, 1.25" Stroke, Dbl Acting	1
	D07130	Shrader Clevis Kit	1
	D14034	Clevis Pin, 1/4 x 3/4	1
	D14934	Hairpin, 1/4 ZP	1
	P18162	Fitting, 1/8 NPT x 1/8 Barb Black Nylon	1
	P16182	Tubing, Black Polyurethane, 1/8 OD x 1/16 ID	41"
	P25421	Nipple, 1/8M Hex Close	1
	P00117	Valve, Flow Control, SMC NAS-2000-N01	1
	P10328	Bushing, 10-32 x 1/8 NPT Brass	1
	P10320	Valve, SQE 10-32 Brass	1
	P10321	Fitting, 10-32 M x 1/16 Barb, White Nylon	1
	P10322	Fitting, 10-32 M x 1/16 Barb, Black Nylon	1
	P16182	Tubing, Black Polyurethane, 1/8 OD x 1/16 ID	31"
	E35010	Switch, Magnetic Reed	1
	E22708	Wire, 22AWG, 2 Strand, Grey Jacketed	45"
	E35009	Switch Strap Assembly	1
<b>28</b>		<b>Drill Carriage Assembly</b>	
	C35011		
	G35101	Drill Carriage	1
	N03442	Bushing, 3/4" Hex Carriage Pivot	2
	F14458	Screw, Cup Point Socket Head Set, 1/4-20 x 1-1/4	2
	F01420	Nut, Nylon Lock, 1/4-20 ZP	2
	F01410	Washer, 1/4 SAE ZP	2
<b>29</b>			
	U35008	Pallet, White	1
	H35013	MDS Filled Nylon Wear Strip, Cut to 3/4" L	1
	F01420	Nut, Nylon Lock, 1/4-20 ZP	6
	F01410	Washer, 1/4 SAE ZP	6
	F14340	Carriage Bolt, 1/4-20 x 3/4 ZP	6



# TSM-31

## CONTROL PANEL DETAIL

## DRAWING 5 OF 5 - CONTROL PANEL ASSEMBLY

Item #	Part #	Part Description	Qty
<b>1</b>		<b>Control Panel Enclosure Assembly</b>	
	M00134	Control Panel Enclosure	1
	F14225	Screw, Hex Head Cap. 1/4-20 x 1 ZP	4
	F01420	Nut, Nylon Lock, 1/4-20 ZP	4
	S17578	Label, Caution, "Wear Safety Glasses"	1
	S13264	Label, Warning, "Danger Electrical Hazard"	1
	S11635	Label, "Made in USA"	1
	S35002	Label, Wiring Diagram	1
	D06627	Cable Tie Anchor, White Nylon, W/ Adhesive	2
<b>2</b>	C30351	<b>Start Switch Actuator Assembly</b>	
	E03041	3SB3000-0AA41 Start Switch	1
	E03400	Normally Open Contact Block	1
<b>3</b>	C30352	<b>Stop Switch Actuator Assembly</b>	
	E03000	3SB3000-1XA20 Stop Switch	1
	E03401	Normally Closed Contact Block	1
<b>4</b>	E35424	Control Board, EL-35D	1
<b>5</b>		<b>Control Board Mounting Assembly</b>	
	D08012	1/4 x 1/2 #8 Plastic Spacer	4
	F08100	Screw, Pan Head Phillips, 8-32 x 1 ZP	4
	F08132	Nut, Lock Washer, 8-32 Kep ZP	4
<b>6</b>	D12001	Clamp Connector & Nut, Romex 3/8-1/2 KO	1
<b>7</b>	H12516	Grommet, Black Rubber, 5/16 ID x 1/2 OD	1
<b>8</b>		<b>Strain Relief</b>	
	D49600	90 Degree Cord Grip	1
	E03185	1/2 Conduit Locknut	1

Item #	Part #	Part Description	Qty
<b>9</b>		<b>Pressure Sensor Switch</b>	
	E35420	Switch, Air Pressure Sensing	1
	D22181	Terminal, 22-18 Fully Insulated, Female	2
	P33228	Fitting, 10-32 x 1/16 Barb, Black Nylon	1
	P01418	Tubing, 1/4 OD x 1/8 ID, Black Urethane	1"
<b>10</b>	F38241	Nut, Hex Jam, 3/8-24 ZP	1
<b>11</b>		<b>Control Panel Back Plate</b>	
	M35013	Control Panel Back Plate	1
	F14212	Carriage Bolt, 1/4-20 x 1/2 ZP	2
	F01423	Nut, Hex, 1/4-20 ZP	2
<b>12</b>		<b>Control Panel Back Plate Slot Cover</b>	
	M00130	Back Plate Slot Cover	1
	F08324	Screw, Pan Phillips Machine, 8-32 x 3/4 ZP	4
	F08132	Nut, Lock Washer, 8-32 Kep ZP	4
	S11436	Tape, PVC Foam S/A 1-1/4"	7.2"
<b>13</b>		<b>Transformer Assembly</b>	
	E35713	Transformer, 50VA, Multi-Input, 24VAC Output	1
	E16224	Fuse, 250V	1
	D82218	Vinyl Spade Lug, 22-18 #8	2
	E18373	Wire, 18AWG Hookup Blue	16.5'
	E18371	Wire, 18AWG Hookup Grey	17'
	D81614	Vinyl Spade Lug, 16-14 #8	2
	D61614	Vinyl Ring Lug, 16-14 #8	1
	E18374	Wire, 18AWG Hookup Orange	27"
	F08324	Screw, Pan Phillips Machine, 8-32 x 3/4 ZP	3
	F08100	Screw, Pan Phillips Machine, 8-32 x 1" ZP	1
	F08132	Nut, Lock Washer, 8-32 Kep ZP	4

## DRAWING 5 OF 5 - CONTROL PANEL ASSEMBLY

Item #	Part #	Part Description	Qty
<b>14</b>	<b>Starter Assembly</b>		
	E03015	Contactor, Siemens 3RT1015-1AB01 24VDC	1
	F83205	Screw, Pan Phillips Machine, 8-32 x 5/8 ZP	2
	F08132	Nut, Lock Washer, 8-32 Kep ZP	2
	E14316	Wire, 16AWG Stranded x 14"	3
	E18379	Wire, 18AWG Hookup White	7.5"
	E03116	Motor Overload, Siemens (460V) HI	1
		OR	
	E03161	Motor Overload, Siemens (208/230V) LO	1

<b>15</b>	<b>Pneumatic Control Assembly</b>		
	<b>Clamp Valve</b>		
	P21224	Parker 3 Way Poppet Solenoid Valve, 24 VDC	1
	P00538	Fitting, 1/8NPT x 5/32 Barb Blk Nylon	2
	P01418	Tubing, 1/4 OD x 1/8 ID, Black Polyurethane	2"
	P31302	Fitting, 1/8 T Barb, Black Nylon	1
	P01418	Tubing, 1/4 OD x 1/8 ID, Black Polyurethane	3"
	P01418	Tubing, 1/4 OD x 1/8 ID, Black Polyurethane	71"
	<b>Router Valve</b>		
	P49410	Parker 4 Way Solenoid Valve, 24 VDC	1
	P00538	Fitting, 1/8NPT x 5/32 Barb Blk Nylon	1
	P01418	Tubing, 1/4 OD x 1/8 ID, Black Polyurethane	1"
	P31302	Fitting, 1/8 T Barb, Black Nylon	1
	P01418	Tubing, 1/4 OD x 1/8 ID, Black Polyurethane	3.5"
	P01418	Tubing, 1/4 OD x 1/8 ID, Black Polyurethane	17"
	P18161	Fitting, 1/8NPT x 1/16 Barb, White Nylon	1
	P16181	Tubing, 1/8 OD x 1/16 ID White Urethane	31"
	P00538	Fitting, 1/8M x 5/32 Push In Straight	1
	P53293	Tubing, 5/32 OD Clear	42"

Item #	Part #	Part Description	Qty
<b>15</b>	<b>Pneumatic Control Assembly ( Continued )</b>		
	<b>Drill Valve</b>		
	P49410	Parker 4 Way Solenoid Valve, 24 VDC	1
	P00538	Fitting, 1/8NPT x 5/32 Barb Blk Nylon	1
	P01418	Tubing, 1/4 OD x 1/8 ID, Black Polyurethane	2"
	P31302	Fitting, 1/8 T Barb, Black Nylon	1
	P18162	Fitting, 1/8NPT x 1/8 Barb Black Nylon	1
	P16182	Tubing, 1/8 OD x 1/16 ID Black Urethane	31"
	P53202	Tubing, 5/32 OD x 3/32 ID, Black Urethane	30"
	P33216	Fitting, 3/32 x 1/16 T Barb, Black Nylon	1
	P53202	Tubing, 5/32 OD x 3/32 ID, Black Urethane	40"
	<b>Control Valve Assembly</b>		
	F63230	Screw, Pan Phillips Machine, 6-32 x 3" ZP	2
	F63201	Nut, Nylon Lock, 6-32 ZP	2
	<b>Harness Assembly</b>		
	S12043	Spiral Wrap. 1/2" Black Polyethelene	22"
	D40000	Cable Tie, White Nylon, 4"	23
	D51213	Cable Tie, White Nylon, 5-1/2"	1

<b>16</b>	<b>Security Switch Assembly</b>		
	E03200	Switch, Security Interlock, ABB LS35P80D11-S	1
	H12516	Grommet, Black Rubber, 5/16 ID x 1/2 OD	1
	E18202	Wire, 18-2 SJT, 2-Wire, Fully Insulated	25"

<b>17</b>	<b>Foot Switch Assembly</b>		
	E00491	Switch, Foot Activated, Linemaster 491-36SC w/Cord	1
	M00235	Guard, Universal Footswitch	1
	F40388	Screw, Oval Head Self-Tapping, #4 x 3/8 SS	2