



CASTLE USA



Owner's Manual

TSM-22 Pocket Hole Machine

Serial numbers up to 68260

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1 Introduction

Thank you for making the Castle TSM-22 Screw Pocket Machine (Toe Screw Mortise) 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.

The Castle model TSM-22 is designed for use on a wide variety of materials. The machine preforms well in hardwoods, softwoods, melamine, particleboard and MDF. The machine will work on materials varying in thickness from 1/2" to 1 3/4".





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.






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

1.1 Definition of Terms

TERM	DEFINTION
Pocket	The depression cuts into material to allow for toe-screw mortise joinery.
Pocket Cycle	The machine function that clamps the work piece, cuts the mortised pocket, drills the pilot hole and then releases the work piece.
Web-	The offsest distance from the end of the pocket to the edge of the work piece.

1.2 Identification of Operating Features and Controls

	<p>Power Switch: Located on the left side of the machine, this toggle switch turns on the Pocket Router Motor and the Pilot Drill Motor as well as energizing the Controls.</p>
	<p>Clamp Cylinder: The large cylinder on the top of the machine is a clamp that holds the work piece 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.</p>
	<p>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 action.</p>
	<p>Router Stop Plate: Located on the operator right side, this black metal plate extends through the top of the case and along the side of the Clamp Guard. The position of this plate determines the size of the "Web".</p>

	<p>Foot Pedal and Guard: Mounted inside a yellow metal guard, the Foot Pedal is connected to the machine by an electrical cord. Pressing the Foot Pedal will activate the machine cycle (but only if the Safety Buttons are depressed by the work piece as well).</p>
	<p>Safety Buttons: Two small, silver button-head screws under the clamp guard detect if a work piece is in place for pocketing. The machine will not cycle unless these buttons are depressed when the Foot Pedal is depressed.</p>
	<p>Safety Switch: This magnetic proximity switch is mounted inside, near the top of the TSM-22. It is activated when the Safety Buttons are depressed by the work piece.</p>
	<p>Motor Carriage: The Motor Carriage is the red, pivoting A-frame structure inside the machine. Both the Router Motor and the Drill Motor are mounted to this carriage. The forward and back carriage motion during the machine cycle is provided by the Drive Cylinder.</p>
	<p>Drive Cylinder: This double-acting pneumatic cylinder connected to the Motor Carriage and the machine case, moves the carriage through the routing and drilling phases of the cycle. When the cylinder rod extends (moving the carriage toward the rear) the router cuts the pocket. When the cylinder rod retracts (moving the carriage forward) the pilot drill bores the pilot hole into the pocket.</p>



Router Stop Switch: This magnetic proximity switch is mounted on the Router Stop Plate inside of the machine. At the full extension of the routing stroke, the Castle plate on the carriage interrupts the white switch to signal the start of the drilling stroke.



Drill Stop Switch: This magnetic proximity switch is mounted inside the machine case near the Safety Buttons. At the full extension of the drilling stroke, the carriage interrupts this switch to signal the end of the cutting cycle. The carriage returns to the natural position and the clamp releases the work piece.



Control Box: The Control Box is the sheet metal enclosure containing the electrical and pneumatic controls. Mounted in the Control Box are the power switch and the power outlets for the motors. Mounted on the underside of the Control Box are the air inlet, the Pressure Regulator, the Router Speed Control Valve, and the solenoid valves.

1.3 Manual Contents Notice

This manual is not fully comprehensive. It may not convey every possible safety and operational problem that may arise while using this machine. The manual will cover many of the basic and specific safety procedures needed in a shop environment.

All federal and state laws and any regulations having jurisdiction, covering the safety requirements for use of this machine, take precedence over the statements in this manual. Users of this machine must adhere to all such regulations.

Most national and international standards that may apply to your machines and accessories contain requirements for manuals. These change from time to time and will require constant monitoring to assure that your products and manuals are in compliance. Castle products and the information in this manual are the proprietary property of Castle USA or its licensors, and may not be copied, disclosed, or used for any purpose not expressly authorized by the owner thereof.

Since Castle USA constantly strives to improve all of its products, we reserve the right to change this manual and hardware mentioned therein at any time without notice.

2 Machine Safety

The Castle TSM-22 was designed with operator safety as a priority. This machine was carefully packaged 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 USA. **DO NOT** attempt to operate the machine if you observe any physical damage. Contact Castle USA at 800.282.8338 for instructions.

2.1 Safety Rules

The Castle Model TSM-22 Pocket Machine was designed with operator safety as a priority, which is why Castle highly recommends the following:

1. USE CAUTION WHEN OPERATING THIS MACHINE! Only skilled operators should use this machine, or be within ten feet when the machine is in operation.
2. Read the Operator Manual carefully before operating. An Operator Manual should be attached to 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 injuries to persons and property.
3. Always wear protective eyewear when operating or standing near an operating machine.
4. Be certain that the machine is properly grounded before operating it.
5. Keep all body parts away from the moving parts of this machine whether it is in operation or at rest.
6. Do not place hands or fingers between the work piece and the clamp or near the cutters at any time. Always use a securing device when undertaking close work.
7. Do not wear gloves or loose clothing (such as sweaters, jackets, or jewelry) when operating or standing near an operating machine.
8. Keep two hands on the work piece when initiating a pocket cycle on this machine.
9. Before attempting adjustments, maintenance, or repair, **TURN OFF** this machine, disconnect it from its power source and air supply. Wait for all motion to stop. Failure to disconnect this machine from its power source and air supply or wait for all motion to stop could result in

electrocution or injury.

10. Always keep the area around this machine clean and uncluttered. Poor housekeeping could result in slips, falls, or other injuries.
11. Concentrate at all times. Failure to pay attention to the task at hand is the cause of most accidents.

2.2 Inventory

With your Castle machinery shipment, you should receive the following:

CASTLE TSM-22 POCKET CUTTER MACHINES HARDWARE PACK		
Part #	Part Description	Qty
S90022	TSM-22 Operator Manual with Warranty Activation Card	1
	TSM-22 Outer Shell	1
	Storage Door	1
M24013	Dust Diverter	1
	Foot Pedal	1
	Trimmer Wrench Bosch PR10E	2
	Router Wrench Bosch 1617 2	2
B00622	#2x 6" Square Driver Bit	1
G00234	Bit Gauge	1
G00101	Door Spring	1
F14125	¼ x 20 Bolt	1
H00141	T-Handle	1
F51616	5/16 SAE Flat Washer	4
F51699	5/16 -18 Nylon Locknut	2
H24002	Gas Spring – 20.12" Extended	1
F14553	¼-20 x 1-1/4 FH Socket Head Cap Screw	6
F01420	¼-20 Nylon Locknut	9
F01410	1/4 SAE Flat Washer	9
F44100	¼-20 X 1 FH Socket Head Cap Screw	1
M24010	Stainless Lid Plate	1
F14340	¼-20 x ¾ Carriage Bolt	2
T00532	Allen Hex L-Key – 5/32"	1
H55202	Rare Earth Magnet	1

2.3 Machine Requirements

Power Supply: 115 VAC \pm 10%, 60 Hz, 20 Amp Service

WARNING: Do not use an extension cord. Using an extension cord to power your TSM-22 will VOID YOUR WARRANTY.

Air Supply: 80psi (minimum), 150psi (maximum) 1.5cfm; Minimum 1/4" ID air line.

WARNING: Failure to provide an adequate supply of CLEAN, DRY air will VOID YOUR WARRANTY.

Dust Collection: The TSM-22 will function better with proper dust collection attached. A vent for this purpose has been provided. Attaching dust collection will prolong motor life by keeping the router motors cooler and free from sawdust buildup.

WARNING: Failure to clean sawdust from your machine will VOID YOUR WARRANTY.

3 Setting Up Your TSM-22

CAUTION: Always use eye protection when operating power equipment. Please be sure to visit our YouTube page for videos on set up and use of the TSM-22. [Click here to go to our TSM-22 Playlist.](#)

[Watch the TSM-22 Pocket Cutter Assembly Video here.](#)

1. **Step 1:** Inspect shipping carton for signs of freight damage. Pocket machines are all shipped in a white cardboard cover (**Fig 1**), with plastic shrink-wrap underneath to help highlight any potential damage. Remove cardboard covering to further inspect any signs of marring and potential damage.
2. **Step 2:** Remove wrapping, power cord, foot switch, and accessories from inside the machine (**Fig 2**). Remove 2x4 skids used for shipping purposes, removing bolts on the interior of the base (**Fig 3**).



Fig.1



Fig.2

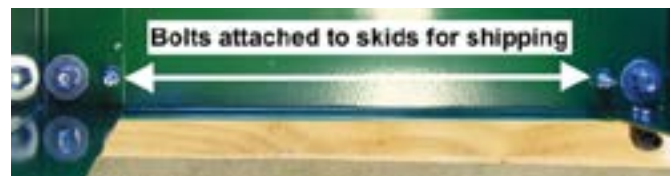


Fig.3

3. Step 3: Remove the swivel elbow from black urethane hose (**Fig 4**) by pushing the floating ring toward the elbow, then pulling on the hose at the same time.
4. Step 4: Thread the elbow into the top of the Clamp Cylinder and tighten. It is pre-primed and self-sealing. Point it toward the rear of the machine and firmly push the hose back into the elbow fitting (**Fig 5**).



Fig.4



Fig.5

5. Step 5: Open the lid and locate the wrapped Router Stop Plate hanging inside the back of the machine. (Fig 6) Unwrap to begin installation process.

NOTE: The machine will not cycle correctly without the Router Stop Plate in place.

- Remove the nut, washer and carriage bolt loosely attached to the clamp guard. (Fig 7)



Fig.7



Fig.6

- Insert the Router Stop Plate from inside the lid through the slot by the clamp guard. (Fig 8) The white magnetic sensors should face toward the operator when the lid is closed. (Fig 9).



Fig.8



Fig.9

- Insert the carriage bolt with the head inside the machine. (Fig 10)



Fig.10

- Place the washer and nut on the carriage bolt and leave loose. Position the Router Stop Plate between the two pieces of tape and tighten the nut. **(Fig 11)** Remove the tape when done.



Fig.11

6. Step 6: Install Gas Spring on Right Case Side and Case Top. Insert the stud on the bottom of the gas spring into the hole on the Case Right as shown. Secure using a 5/16" washer and Nylock Nut on the inside of the case. **(Fig 12)**

- Raise the case top and place the stud located at the top of the gas spring through the hole shown. Secure with a 5/16" washer and Nylock Nut. **(Fig 13)**
- Install work top with the 6 flat head bolts and nylon lock nuts supplied. Install 4 on the outer edges of the top first. The 2 mounting holes closest to router slot will be used in next step. **(Fig 14)**



Fig.12



Fig.13



Fig.14

- Install the dust diverter using the two remaining socket head screws and nuts in the mounting holes that sit closest to the router slot. See proper orientation of dust diverter in (Fig 15)



Fig.15

7. Step 7: Install Stainless Lid Plate. With the 1/4-20 carriage bolts inserted through the top of the plate, add the 1/4" washers and finger tighten the 1/4-20 Nylock nuts. (Fig 16)



Fig.16

- Lower the work top and place the 1/4-20 x 1" FH Socket Head Cap screw in the hole in the work top. Start the Cap Screw with included allen wrench in the Lid Plate to position the Lid Plate. (Fig 17)



Fig.17

- Once the Lid Plate has been positioned, reach up inside the case through the front door opening to secure the Nylock Nuts for the Lid Plate. (**Fig 18**)
- A Rare Earth Magnet has been provided to secure the provided Allen Wrench to the case in a convenient location for easy access when making tooling changes. (**Fig 19**)



Fig.18

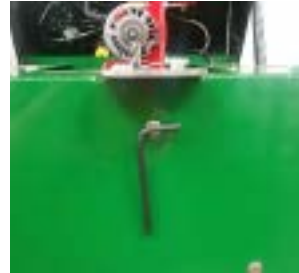


Fig.19

8. Step 8: Install the door by placing the hinges mounted to the door on the opposing hinge pins on the cabinet. Allow the door to completely seat on hinges. **Fig 20** and **Fig 21**



Fig.20



Fig.21

- Install the door latch by using the included door spring, 1/4-20 bolt, and the T- handle. See proper orientation in **Fig 22** and **Fig 23**. Tighten T-handle.



Fig.22



Fig.23

9. Step 9: Since the routers may have shifted in transit it is important to inspect the U-Bolts on the carriage (**Fig 24**) making sure that the routers are secure and tight.

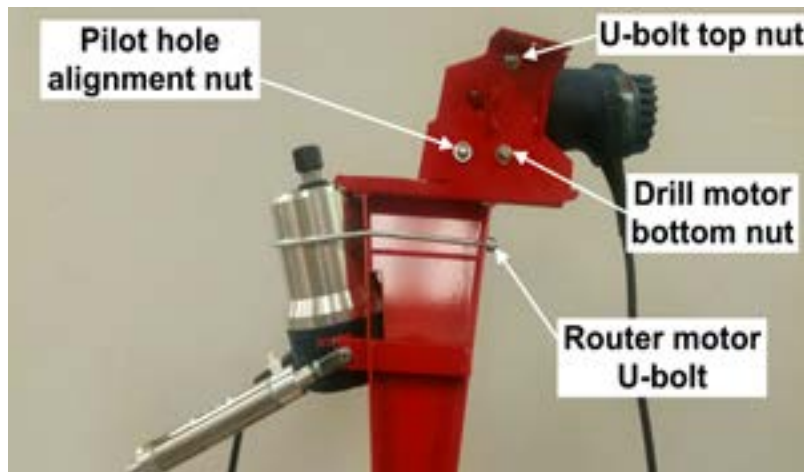


Fig.24

10. Step 10: Using the wrenches located inside the manual pack, make sure the router bit and the drill bit are secure in the respective collets. **(Fig 25)** Once done, lower the Work Top and secure the work top with the 1/4-20 Socket Head Cap Screw. **(Fig 26)**



Fig.25



Fig.26

11. Step 11: Connect a clean, dry air supply to the back side of the machine (**Fig 27**) (1/4" pipe thread) with a minimum supply of 80 PSI.

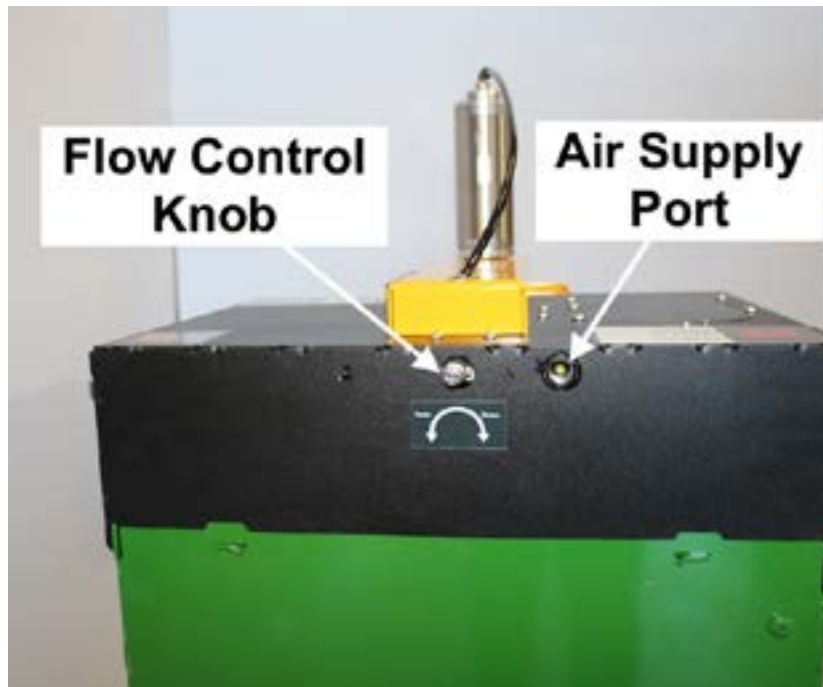


Fig.27

12. Step 12: Plug in the machine, turn on the Power Switch (**Fig 28**). Place a piece of scrap against the faceplate while depressing the Safety Buttons (**Fig 29**), Be sure to keep your hands clear of the clamp, and step on the Foot Pedal to start the cycle. A full cycle should take 1 1/2 - 2 seconds.

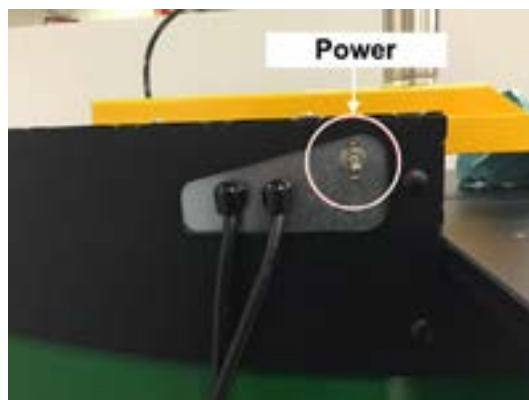


Fig.28



Fig.29

13. Step 13: Inspect the pocket. If the drilled hole is off center (**Fig 30**), it can be centered using the adjusting nut just below the drill motor. (See “**Fig.24**” on page 19”). Tightening the nut moves the drill tip left relative to the operator. Adjust accordingly.

CAUTION! DO NOT overtighten the adjustment nut. Overtightening may cause an uneven bias to the pilot hole position.

14. Step 14: The Router Feed Rate is adjusted using the flow control knob (**Fig 31**) next to the Air Supply Port. Turning it clockwise will slow the feed rate, counter-clockwise will speed it up. If the Feed Rate is too slow it may burn bits and cause them to become prematurely dull.



Fig.30

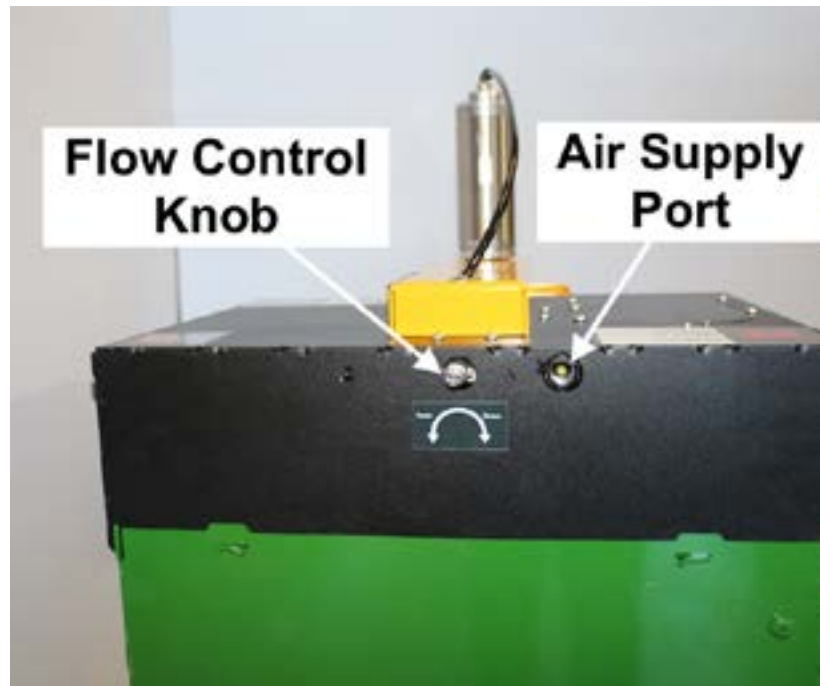


Fig.31

4 Adjustments

4.1 Router Feed Rate Adjustment

The Router Feed Rate adjustment knob is located right next to the air inlet port on the back side of the machine. (See “Fig.31” on page 22). Turn the knob clockwise to slow the Feed Rate or counter-clockwise to increase the Feed Rate. A suggested Router Feed Rate adjustment for hardwoods such as oak or maple is described as follows:

1. Loosen the jam nut on the threaded stem and spin the nut counter-clockwise..
2. Turn the knob clockwise until it reaches a mechanical stop.
3. Turn the knob counter-clockwise two full revolutions.
4. Adjust slower or faster in small increments as required.
5. Tighten the jam nut.

Note: If the work piece shifts noticeably during the Pocket Cycle, this usually means the Router Feed Rate is faster than the tooling's ability to clear the pocket. In general, the desired Feed Rate is slower for harder, denser materials.

4.2 Pocket Web Adjustment

The offset distance from the end of the pocket to the edge of the work piece is called the “Web”. The factory setting is approximately $7/8$ ”, assuming a $1\ 1/2$ ” screw is being used. (**Fig.32**). If you are using $1\ 1/4$ ” screws, you may choose to shorten the web to $5/8$ ”.



Fig.32

Note: Castle does not recommend a web under $5/8$ ”.

The web is adjusted by shortening or lengthening the travel of the router's cutting stroke.

1. Locate the Router Stop Plate nut on the right side of the yellow Clamp Guard on top of the machine. (**Fig. 33**)
2. Loosen the nylon lock nut. To shorten the web, slide the black Stop Plate towards the rear of the machine slightly. To lengthen the web, slide the black Stop Plate towards the front of the machine slightly



Fig.33

Note: When the desired position is achieved, tighten the nylon locking nut securely to prevent shifting during operation. Subsequent adjustment of the Router Stop Switch may also be necessary.

4.3 Pocket Depth Adjustment

The router bit for cutting the pocket is inserted into the router collet at the factory for a distance of 1 1/8" from the tip of the bit to the collet. This setting cuts at an optimal depth of approximately 7/16" for material that is 5/8" thick and greater.

To cut a shallower pocket (in 1/2" material, for example):

1. Place a shim with a known thickness (1/8" hardboard, for example) on the work top and place your work piece over it.
2. Loosen the motor collet and slide the bit to the desired exposure. If the bit does not move easily, try gently tapping on the bit near the collet with a wrench.
3. Secure the collet.

For your convenience, a blank Bit Gauge (**Fig. 34**) is included with your machine so that you may scribe a mark to record the depth of the drill bit and router bit that is most suitable for your purposes. Refer to the "Pilot Drill Depth Adjustment" for this procedure.



Fig.34

4.4 Drill Feed Rate Adjustment

The stroke speed with which the machine drills the pilot hole (and clamps the work piece) is solely a function of the air pressure set at the internal Pressure Regulator. There is no separate adjustment knob.

Note: If the Drill Feed Rate is so fast that the machine shakes violently during the Pocket Cycle or if the Drill Feed Rate is so slow that the Pocket Cycle is significantly longer than two seconds, then it may be necessary to adjust the Pressure Regulator. Do not adjust the internal Pressure Regulator unless absolutely necessary.

The internal Pressure Regulator knob is located next to the Control Box (**Fig. 35**). If in doubt whether the internal Pressure Regulator is set correctly, follow the steps described below:

1. Unlock the knob by pulling it slightly away.
2. Turn the knob counter-clockwise until it reaches a mechanical stop.
3. Turn the knob clockwise five full revolutions (it's helpful to make an index mark on the knob).
4. Lock the knob by pushing it slightly inward.

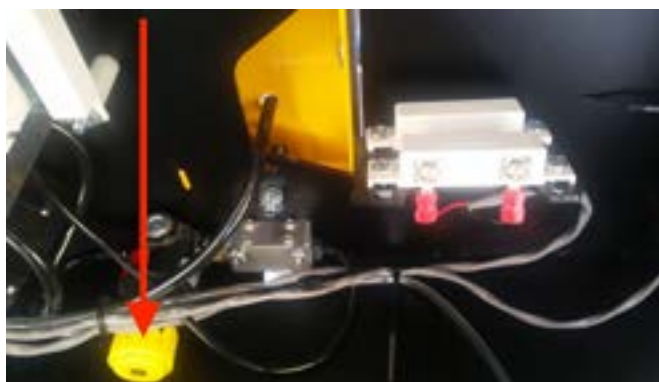


Fig.35

4.5 Pilot Drill Depth Adjustment

The Pilot Drill operation works best when the drill depth is adjusted so that the drill bit just barely breaks into the pocket. If the drill bit extends farther than necessary, it can cause shorter bit life and over-size holes. The drill bit is set at the factory for a length of approximately 1 13/16" from tip to drill motor collet (this is a suitable distance for the factory default 7/8" Web). As a general rule, if the Web is decreased, then the Pilot Drill depth should also be decreased.

For your convenience, a blank Bit Gauge (**Fig.36**) is included with your machine so that you may scribe a mark to record the depth that is most suitable for your purposes.

To adjust the Pilot Bit Depth:

1. Set the Bit Gauge on top of the collet and use any sharp object to scratch a reference line in the soft aluminum where each bit should be (**Fig. 37**).
2. Both sides of the plate can be used to mark settings for different processes in the shop.
3. Loosen the motor collet and slide the bit to the desired height. If the bit does not move easily, try gently tapping on the shank of the bit near the collet with a wrench.
4. Secure the collet.



Fig.36



Fig.37

4.6 Pilot Drill Height Adjustment

The position of the Pilot Hole can be raised or lowered slightly to accommodate various thickness in work pieces or various pocket depths. **In general, most users will be fine with the stock settings.**

1. On the sides of the machine case, secure the Carriage Centering Screw with a 1/8" Allen wrench. Loosen - but do not remove - the nylon lock nuts securing the set screw of the Motor Carriage to the machine case. (Fig. 38)



Fig.38



Fig.39

Note: The left-to-right alignment of the Motor Carriage may shift if care is not taken during the loosening of the nylon lock nuts. Make sure that each preload set screw is secured with an Allen wrench before loosening each lock nut.

2. From the Front Door of the machine locate the Bearing Jack plate on the inner wall of the cabinet. (Fig. 39)
3. Loosen, but do not remove, the nut on the plate that is nearest to the carriage axle.
4. Remove the nut and bolt on the plate that is farthest from the carriage axle. Typically this nut and bolt are factory set to the center hole of the five holes on this end of the plate.
5. To raise the pilot hole, slide the plate upward one or two hole positions (each hole position equals 1/16" of drill position). To lower the pilot hole, slide the plate downward.
6. Reattach the nut and bolt in the new hole position, and secure in place.

7. Tighten the nut on the plate that is nearest to the carriage axle.
8. Repeat for the other side.
9. On the outside of the machine, secure the Carriage Centering Screw with a 1/8" Allen wrench and tighten the nuts securing the pivot point of the Motor Carriage to the machine case.

5 Operation

CAUTION: Read the Operator Manual carefully before operating. Make sure that you are familiar with the functions described in the rest of the manual as well. Failure to follow this warning may result in serious injuries to persons and property.

WARNING: Always use eye protection when operating power equipment.

1. With the Power Switch turned off, reach through the door opening in the front of the case to pull the carriage forward and push it back to be sure it actuate the carriage to insure it moves freely without impediment. (**Fig. 40**). Neither the router bit nor the drill bit should be protruding from the machine while at rest.



Fig.40

2. Place the Foot Pedal in front of the machine in a safe and comfortable position (**Fig. 41**).
3. Turn the power switch on (**Fig. 42**).



Fig.41



Fig.42

4. Place the work piece to be pocketed on the Work Top. Slide it under the Clamp Guard and firmly push it against the face plate of the machine to press the Safety Buttons (**Fig. 43**).
5. Be sure to keep your hands clear of the clamp, then press and release the Foot Pedal to activate the cutting cycle.
6. The pocket will be cut at the point directly under the center of the Clamp Cylinder.
7. When the Pocket Cycle has been completed the Clamp Foot will automatically release the material.
8. A typical machine cycle will take from 1½ to 2 seconds to complete.
9. Reposition the same work piece or a new work piece under the Clamp Guard, then press and release the Foot Pedal again to activate the next cutting cycle.
10. Be sure to turn off the Power Switch when you are finished.
11. If the machine fails to cycle properly, call Castle at (800) 282-8338.



Fig.43

6 Service and Maintenance

6.1 Router Bit

CAUTION: Do not attempt to change tooling with compressed air or power supplied to the machine!

1. Loosen the ¼-20 Socket Head Cap screw to allow the Work Top to lift up. (Fig. 44)



Fig.44

2. Using the wrenches provided, loosen the collet nut on the router motor. Tap the collet nut with the wrench if the router bit is difficult to remove. (Fig. 45)



Fig.45

3. Using the bit gauge provided, install a fresh router bit to the depth indicated by the score mark on the gauge and tighten the collet nut. See Section 4.3 and Section 4.5 for more information.

6.2 Pilot Drill Bit

1. Loosen the 1/4-20 Socket Head Cap screw to open the Work Top. (**Fig. 46**)
2. Using the Collet Wrenches provided, loosen the Collet Nut. Tap the Collet Nut if necessary to loosen the bit from the collet.
3. Using the bit gauge provided, install a fresh drill bit to the depth indicated by the score mark on the gauge and tighten the collet nut. (**Fig. 47**)



Fig.46



Fig.47

6.3 General Machine Maintenance

The model TSM-22 requires some maintenance. To ensure the productivity and longevity of your Castle Pocket Cutter, 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:

1. Check the Power Cord and the Foot Switch cord for wear or damage.
2. Ensure that the Router Bit and the Drill Bit are clean, sharp, and undamaged.
3. Keep the Router and Drill Motors free from dust build up.

Check for proper Safety Switch function. To protect the bits in case of failure, place a piece of material under the clamp foot, but not pressed against the Safety Buttons. Turn the machine on and press the Foot Pedal. The machine should not cycle if the Safety Buttons are not pressed. If you suspect a Safety Switch malfunction, contact a Castle USA Support Technician at 1-800-282-8338 as soon as possible for corrective action.

WARNING: Do not introduce lubricants, oils, or solvents into the pneumatic system. Irreparable damage to pneumatic seals and components may occur. Using lubricants in the pneumatics of your TSM-22 will VOID your warranty!

6.4 Motors and Bits

The life of the machine is directly related to the care of the motors that cut the pocket and drill the pilot hole. Because the motors are enclosed in the machine care must be taken to ensure that they do not overheat. Use the motors as you would use typical router motors in your shop. It is important that the maintenance guidelines provided in the Bosch instruction manual be strictly followed.

CAUTION: Always wear safety goggles when using compressed air.

NOTE: Failure to clean sawdust from your machine will VOID your warranty!

1. Regularly blow out the air passages on both motors with compressed air.
2. Do not run the motors for more than **one hour** at a time.
3. To prolong motor life, and avoid costly downtime, it is strongly recommended that a dust collection system be connected to the machine. A port has been provided on the left side of the machine for this purpose.
4. To ensure safe and effective operation, make certain that there is at least 80psi air pressure to the machine. Pay attention to the cycle time of machine. A typical cycle will last from 1½ to 2 seconds. A cycle significantly longer than this may indicate low Router Feed rate, or low internal air pressure. This will lead to excessive bit wear and shortened motor life.

Castle provides premium versions of the Router Bit and Drill Bit in the TSM-22 as standard equipment from the factory. Castle recommends these bits for all applications:

Part No.	Part Description	Function
B00338	Solid Carbide, 3/8" Rough Mill, Three Flute Bit	Routs pocket – Works in all materials, especially particle board, plywood, MDF, Melamine, etc.
B02964	TiN Coated, 9/64" Brad and Spur Bit	Drills pilot hole – Works well in all materials. TiN coating provides longer life than standard bits.
B00438	Cobalt Steel, 3/8" Rough Mill, Four Flute (RM-38)	An alternative when cutting pockets exclusively in solid woods such as maple, oak, ash or alder. The B00438 will cut in any material, however exposure to glue and resin found in particle board, plywood, MDF, Melamine, etc. will lead to premature wear on the bit.
B00964	9/64" Brad and Spur Bit w/ 1/4" Shank (CDB-964)	An economic alternative based on the geometry of our premium TiN coated pilot bit.
B01964	9/64" Split Point Bit w/ 1/4" Shank	An alternative to the B00964. The split point construction is stiffer and is preferred in plywood and tightly grained hard woods.
B00764	7/64" Split Point Bit w/ 1/4" Shank	An alternative for smaller diameter pilot hole
B00316	3/16" Split Point Bit w/ 1/4" Shank	An alternative for larger diameter pilot hole

To purchase bits feel free to contact your local Castle dealer or contact our Parts Department TOLL FREE at 800-282-8338 or visit our website at www.castleusa.com for information and pricing on tooling and accessory products for your TSM-22.

7 Troubleshooting

WARNING: Electrical Hazard: Do not attempt to service Control Box components. Contact a Castle Support Technician for proper service information.

7.1 Dry Cycle Test

Dry Cycling is an extremely useful troubleshooting technique if your Pocket Machine's performance and cycling sequence seem irregular or questionable. It affords the opportunity to closely observe the mechanical, electrical, and pneumatic systems without routing pockets or drilling holes.

1. Locate the ON/OFF switches on the motor housings and turn them off.
2. Connect air and power to the machine. Turn the machine's Power Switch ON.
3. Place a piece of scrap wood on the Table Top but do not cover the router slot. Align the piece with one of the Safety Buttons so that the button can be depressed but the piece will not block the path of the router bit or the drill bit.
4. Start a Pocket Cycle by pressing the scrap of wood against one of the Safety Buttons and stepping on the Foot Pedal. Observe the following actions in the described order:

The Clamp Foot extends to rest partly on the wood scrap while the router bit extends toward the rear of the Table Top slot. Almost immediately the router bit returns beneath the slot and the drill bit extends forward through the Pilot Hole under the Clamp Guard. Almost immediately the drill bit retracts while the Clamp Foot releases the wood scrap. (The Clamp Foot will not release until the final drill stroke is complete.)

1. If the cycle does not begin, inspect the Power Switch, the machine power cord, the Safety Switch (page 7), or the Foot Switch (page 7). Make sure that your air sup-ply is connected to the machine and inspect the internal Pressure Regulator (page 19).
2. If the Clamp Foot begins to extend but suddenly retracts and there is no further cycle motion, inspect the Drill Stop Switch (page 8).
3. If the Clamp Foot extends but the router does not, inspect or reset the Router Feed Rate Adjustment (page 17)

4. If the router extends at an excessive rate, inspect or reset the Router Feed Rate Adjustment (page 17).
5. If the Clamp Foot extends but the cycle stalls with the router extended or if the cycle skips over the router stroke entirely, inspect the Router Stop Switch (page 8).
6. If the router retracts and the drill extends at an excessive rate, inspect or reset the internal Pressure Regulator (page 19).
7. If the cycle stalls with the drill extended inspect the Drill Stop Switch (page 8).
8. If the cycle takes significantly longer than two seconds to complete, inspect the Air Supply, the Pressure Regulator (page 19), or the Router Feed Rate Adjustment (page 17).
9. If the Dry Cycle is successful, but a regular cycle fails when routing pockets and drilling holes, inspect the Tooling (page 23), or the Motor Operation (Bosch instruction manual).
10. After Dry Cycling is completed, turn the Power Switch OFF and turn the motor switches ON.

The list of possible behaviors described in Steps 5 through 13 is by no means exhaustive. Careful observation and description of the cycle behavior is essential when troubleshooting or seeking Technical Support.

7.2 Safety Switch (Stock Sense)

The Safety Switch (or Stock Sense) on the TSM-22 consists of a magnet (no wires) mounted near a magnetic reed switch (with wires). (**Fig. 48**) When the Safety Buttons are pushed by the work piece, they raise an L-shaped metal blade that rests between the reed switch and the magnet inside the machine. The assembly is wired in such a way that when the blade is raised the switch closes allowing electricity to flow to the Foot Pedal.

1. Disconnect the power to the machine.
2. First make sure that the side of the magnet housing with the notch in it is facing the Safety Blade. This ensures that the magnet is as close to the reed switch as possible.
3. If there is no notch in the housing, then detach it from the machine and visually inspect it. Make sure that the magnet is turned so that it is closest to the Safety Blade.
4. If the above steps don't work then test for proper function at the switch by connecting ohmmeter leads to the screw terminals on the reed switch.
5. When the blade is resting between the reed switch and magnet, an open circuit should be registered (a few kilo ohms of resistance is acceptable).
6. When the blade is raised a closed circuit should be registered (approximately 0 ohms). If an open circuit is still registered, then a new switch assembly (magnet and reed switch) should be installed.



Fig.48

7.3 Foot Switch

Designed to work in series with the Safety Switch, the Foot Switch is a simple mechanical micro-switch operated by a spring-loaded pedal. At rest the switch condition should be normally open. Closing the switch begins the cycle. Closing the switch begins the cycle.

1. Disconnect the power from the machine.
2. Turn the Foot Pedal and guard over and remove the two small screws that hold the pedal to the base.
3. Use a flat tip screwdriver to pry the pedal free from the yellow guard (it is held by a silicone caulk).
4. Using a Flat head or Phillips screw driver, remove the two screws on the left and right side of the pedal. This will allow the pedal to come apart exposing the switch underneath.
5. Use two leads of the ohmmeter to probe the wire terminals while the switch is still in the pedal. **(Fig. 49)**
6. Without depressing the spring plate, the switch should register as an open circuit. When depressing the plate, the switch should register as a closed circuit (approximately 0 ohms).
7. If an open circuit is still registered, then a new switch should be installed.



Fig.49

7.4 Pressure Regulator

The Pressure Regulator determines the Drill Feed rate and overall speed of the machine. It's important that at least 80 PSI is going into the machine from the compressor. Other machines on the same line as your Castle machine can affect this pressure.

NOTE: Do not adjust the Internal Pressure Regulator unless absolutely necessary.

The internal Pressure Regulator knob is located outside the Control Box as shown (**Fig. 50**)

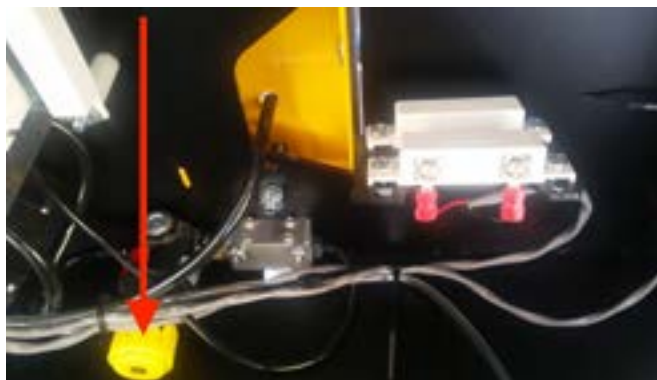


Fig.50

1. Unlock the knob by pulling it slightly away from the Control Box.
2. Turn the knob counter-clockwise until it reaches a mechanical stop.
3. Turn the knob clockwise five (5) full revolutions (it's helpful to make an index mark on the knob as a reference.)
4. Lock the knob by pushing it slightly toward the Control Box.

Note: Cycling too slow may cause the drill bits to heat up potentially causing separation at the shank. Cycling too fast will put too much pressure on the drill bits and cause them to break and/or cut over-size holes.

7.5 Router Stop Switch

The Router Stop Switch consists of a magnet (no wires) mounted near a magnetic reed switch (with wires) on the Router Stop Plate. At the full extension of the routing stroke, a tab on the Motor Carriage interrupts this switch to signal the start of the drilling stroke. If the clamp doesn't release and the pilot drill hasn't come out, then the Router Stop Switch may require a simple adjustment.

1. Open the front door of the machine and observe if the Motor Carriage has stalled with the router fully extended into the pocket. If the carriage is fully extended then it's likely that the magnet is too close to the reed switch.
2. Turn the power to the machine off and loosen the screw that secures the work top down. Lift up the work top
3. Loosen the two lower screws on the Router Stop Plate and slide the magnet (no wires) approximately a 1/16" further away from the reed switch (**Fig. 51**).
4. Turn on the power to the machine and make a test pocket.
5. If the router still stalls in the pocket test with a continuity tester as described in section 7.2 Safety Switch. If no continuity registers, a new switch assembly is needed.



Fig.51

7.6 Drill Stop Switch

The Drill Stop Switch consists of a magnet (no wires) mounted near a magnetic reed switch (with wires) mounted inside the machine case near the Safety Buttons. (**Fig. 52**) At the full extension of the drilling stroke, the carriage interrupts this switch to signal the end of the drilling stroke and the end of the cycle. If the clamp doesn't release and the pilot drill won't retract, then the magnet is too close to the reed switch.



Fig.52



Fig.53

1. Disconnect power from the machine.
2. Loosen the socket cap screw that secures the work top and lift up the work top.
3. Loosen, but do not remove, the screws (**Fig. 53**) that secure the magnet and the reed switch to the machine case. Although the mounts are not slotted, spread the magnet and the reed switch as far from each other as possible, then retighten the screws.
4. Turn on the power to the machine and make a test pocket.
5. If the drill still stalls in the pocket, loosen and remove the screws that secure the magnet and the reed switch to the machine case.
6. Make sure that the side of the magnet housing with the notch in it is facing away from the reed switch. This ensures that the magnet is as far from the reed switch as possible.
7. If there is no notch in the housing, then detach it from the machine and visually inspect it. Make sure that the magnet is turned so that it is farthest from the reed switch.
8. If possible, use a small file or drill bit to slot the mounting holes on the plastic housings, and then reinstall the magnet and the reed switch.
9. If the drill still stalls in the pocket, test with a continuity tester as described in Section 7.2 Safety Switch (page 33). If no continuity registers, a new switch assembly will be needed.

7.7 Serial Number Log

SERIAL NUMBER LOG		
Manufacturer	Part Number	Serial No.
Castle, Inc.	A00024 – TSM22 Pocket Hole Machine	
Bosch	E21617 – Bosch 1617 2.0 hp	
Bosch	E21610 – Bosch Colt PR10E 1.0 hp Trimmer Motor	
Purchase Date:		

8 Warranty Information

Castle USA is a Castle, Inc. Brand. Castle uses only the highest quality materials available for the construction of our machines. Your TSM-22 Pocket Hole Machine is warranted for one full year from the date of purchase against workmanship or material defects under normal use and service. We are not responsible for negligence, misuse or accidents. We suggest any and all machine maintenance or repair be discussed with an authorized Castle Representative prior to any disassembly. We will gladly answer any questions you may have prior to any part removal.

Castle, at its sole discretion, may either repair or replace machines that are found to be defective. This shall be the End User's sole remedy under this warranty.

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

Bosch warrants their router motors for one (1) year from date of purchase. We recommend that you keep your bill of sale and motor serial numbers. You will need this information for verification should there be any issues covered by the machine or motor warranty.

For Technical Assistance, Parts & Tooling contact Castle USA at 800-282-8338 Monday through Friday, 7:30am – 3:30pm, Pacific Time