

Planer

Model 4420

Owner's Manual

For Models Manufactured Since 05/2019



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Stock Number: 4420.101
Manual Version: 2.0.0



READ AND UNDERSTAND ALL INSTRUCTIONS IN THIS MANUAL BEFORE ATTEMPTING TO ASSEMBLE OR OPERATE THE MACHINE.

FOLLOW THE INSTRUCTIONS AND THINK SAFETY!

THE OWNER OF THIS MACHINE IS SOLELY RESPONSIBLE FOR THE SAFETY OF ANYONE USING THIS MACHINE. SUCH RESPONSIBILITY INCLUDES BUT NOT LIMITED TO:

- **PROPER ASSEMBLY, OPERATION, INSPECTION, MAINTENANCE, AND RELOCATION OF THE MACHINE.**
- **PROPER TRAINING FOR THE OPERATORS AND ENSURES THIS MANUAL IS AVAILABLE AT ALL TIMES.**
- **USAGE AUTHORIZATION.**
- **USAGE OF SAFETY AND PROTECTION DEVICE.**

OLIVER MACHINERY DISCLAIMS ANY LIABILITY FOR MACHINES THAT HAVE BEEN ALTERED OR ABUSED. OLIVER MACHINERY RESERVES THE RIGHT TO EFFECT AT ANY TIME, WITHOUT PRIOR NOTICE, THOSE ALTERATIONS TO PARTS, FITTINGS, AND ACCESSORY EQUIPMENT WHICH THEY MAY DEEM NECESSARY FOR ANY REASON WHATSOEVER.

**** SAVE THIS MANUAL FOR FUTURE REFERENCES. ****

PROP 65 NOTICE

WARNING: Drilling, sawing, sanding or machining wood products can expose you to wood dust, and/or other chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

Some examples of these chemicals are:

- Lead from lead-based paints.
- Crystalline silica from bricks, cement and other masonry products.
- Arsenic and chromium from chemically-treated lumber.

Avoid inhaling wood dust and other harmful chemicals. Use a dust mask and/or other safety devices for personal protection.

For more information go to <http://www.P65Warnings.ca.gov/wood>

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Introduction

Thank you for choosing Oliver! This manual contains important information on how to safely set up, operate, and maintain this machine. Please take the time to read through this manual, and make sure you understand all the instructions.

While this manual may provide tips on optimizing the result of your workpiece, the manual is not intended as a substitute for formal woodworking training. If you need to know how to safely perform an operation, please consult knowledgeable and qualified sources before proceeding further.

We made every effort to keep this manual up-to-date. Instructions, specifications, drawings, and photographs in this manual should match the machine delivered. If you find any differences, or anything that seems confusing in this manual, or some instructions are not available, please check our website for an updated version:

WWW.OLIVERMACHINERY.NET/MANUALS

Alternatively, you can contact our Technical Support for help:

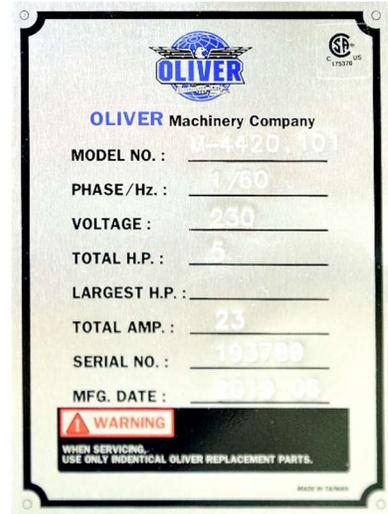
1-800-559-5065

Before calling, please note down the manufacture date and serial number of the machine. You can find the information on a nameplate located on machine cabinet below the power switch. This information is needed to provide proper technical support, and to determine if an updated manual is available for your machine.

Please let us know how well this manual serves you. If you have any suggestions, please call the number above or email us at:

info@olivermachinery.net

We love to hear from our customers and make improvements.



Specifications

Quick View

Model	4420 Planer
Stock Number	4420.101
Motor	TEFC Induction Motor 5HP, 230V, 1Ph
Max. Stock Width	16"
Max Depth of Cut	1/8" (Full width) 15/64" (Stock less than 6-1/4" wide)
Dimensions	44-1/4"(L) x 35-1/4"(W) x 43-1/2"(H)
Footprint	21"(L) x 24"(W)
Fully Assembled Weight	568 lbs.
Warranty	1 Year (Motor and electronics) 2 Years (All other parts)

Product Dimensions

Width x Depth x Height (Fully Assembled)	44-1/4"(L) x 35-1/4"(W) x 43-1/2"(H)
Footprint	21" (L) x 24"(W)
Fully Assembled Weight	568 lbs.

Shipment Info

Type	Wood Crate with Pallet Base
Content	Planer with Included Accessories
Dimensions	30" (L) x 35"(W) x 47"(H)
Weight	669 lbs.
Approximate Setup Time	60 minutes
Must Ship Upright	YES
Stackable	NO

Electricals

Power Requirement	230V, 1Ph, 60Hz
Full Load Current Rating	23A
Recommended circuit size	30A
Power Switch Type	Magnetic switch with overload protection.
Connection Type	Cord and plug not included. Electrical hookups required.
Overload Protection	Equipped

Motor

Motor Type	TEFC Induction Motor
Horsepower	5HP
Speed	3450 RPM
Efficiency	83%
Power Transfer Mechanism	V-belt and pulleys
Bearing type	Permanently sealed ball bearing

Planer Capacity and Performance

Maximum Stock Width	16"
Maximum Depth of Cut	15/64" (Stock less than 6-1/4" wide) 1/8" (Full Width)
Maximum Stock Thickness	6"
Minimum Stock Thickness	3/8"
Minimum Stock Length	6"
Feed Rate	16/20 FPM
Number of Cuts Per Square Inch	141 @ 16FPM 113 @ 20FPM

Cutterhead and Headstock

Cutterhead Type	Helical
Cutterhead Diameter	2-7/8"
Cutterhead Speed	4800 RPM
Number of Cutter Inserts	90
Number of Rows of Cutter Inserts	5
Cutter Insert Type	Four-sided, indexable German made carbide
Cutter Insert Diameters	15mm x 15mm x 2.5mm
Cutter Blade Angle	30 degree
Cutter Insert Screw Tensioning Torque	50-55 lbs.-inch
Infeed Roller Type	Serrated steel
Outfeed Roller Type	Polyurethane
Table Height Change Per Each Turn of Handwheel	Approx. 5/64" / 2mm
Stock Return Roller Load Limit	220 lbs.

Measurements

Measurement Units	Inch/mm
Measurement Devices	Digital Readout (Model 921727-000)
Digital Readout Resolution	0.0005" / 0.01mm
Digital Readout Accuracy	±0.001" / 0.03mm
Backup Measurement Device	Standard height scale installed.

Table

Table Dimensions	44-1/4" x 16" (With infeed/outfeed table) 19-7/8" x 16" (Without infeed/outfeed table)
Table Height Above Ground	29-1/4" - 35"
Table Height Lock	Equipped
Material	Precision ground cast iron
Bed Roller	Two
Extension Table Weight	21 lbs.

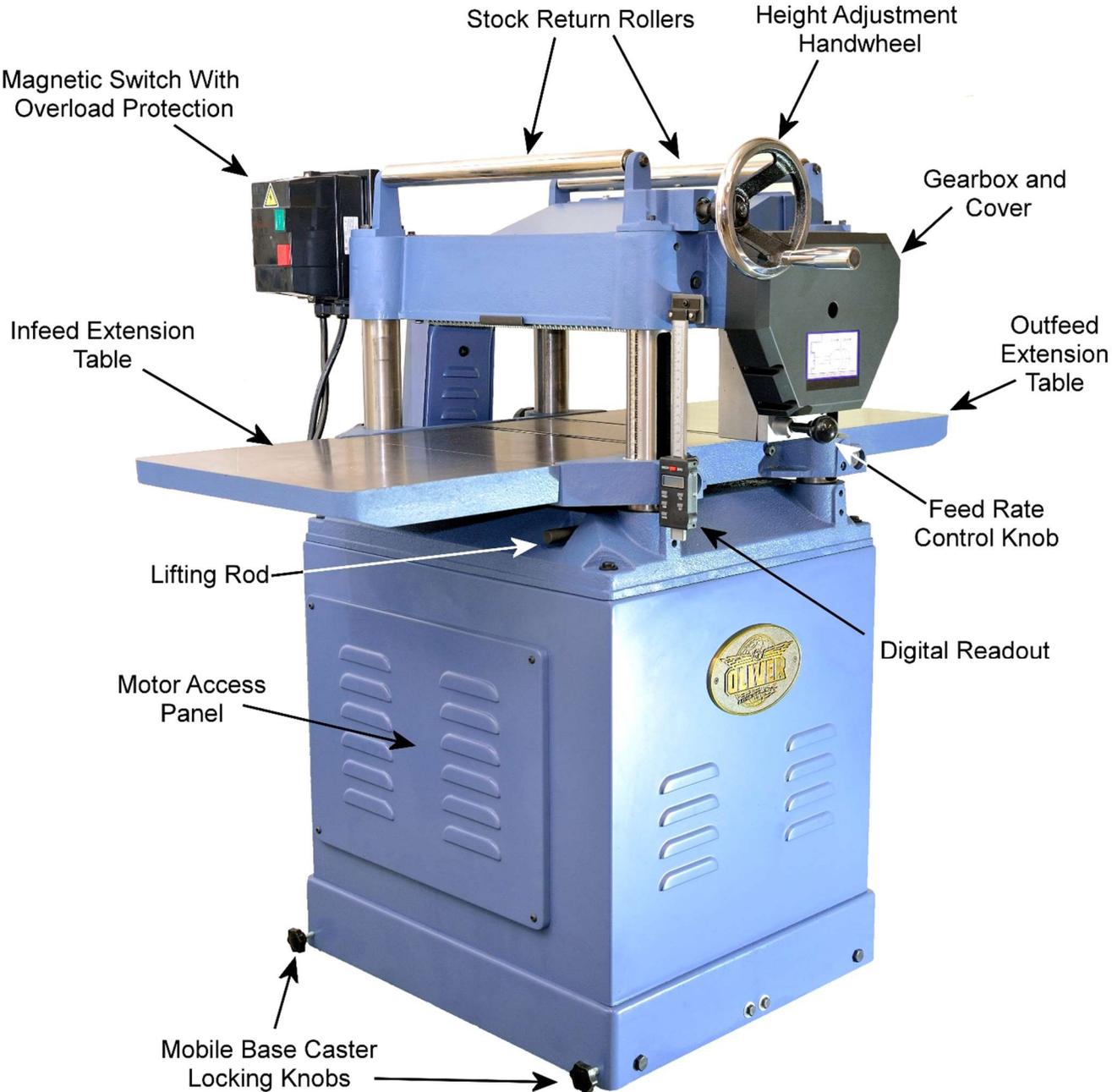
Safety

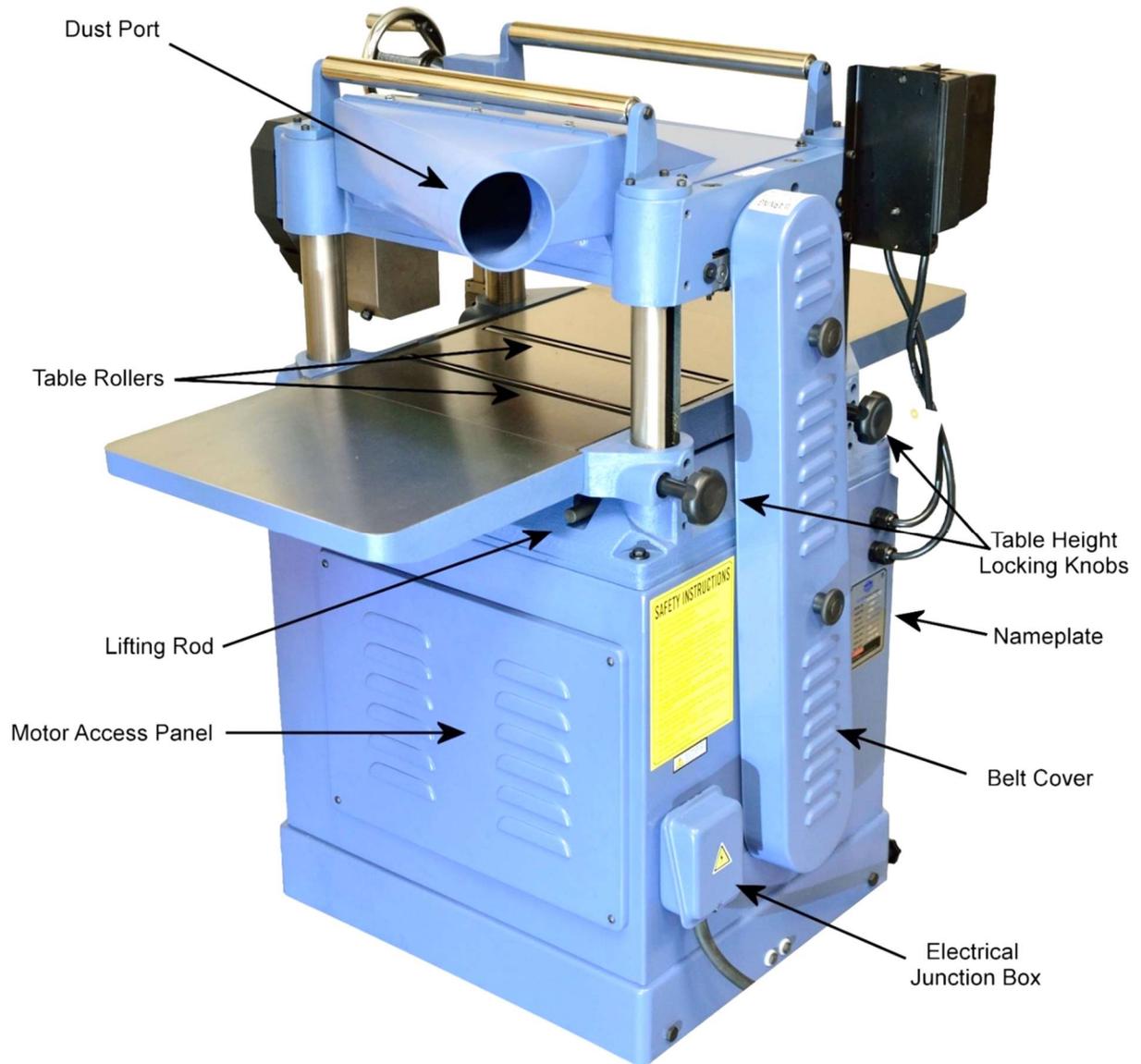
Number of Dust Ports	1
Dust Port Size	4"
Minimum CFM Required	450 CFM
Sound Rating @ 2' distance	85 dB

Others

Serial Number Location	On machine cabinet below the power switch.
Spare Parts Included	10 Cutter inserts and compatible torx screws.
Certification	CSA 175370
Country of Origin	Taiwan

Identification





Safety

Oliver Machinery has made every attempt to provide a safe, reliable, easy-to-use piece of machinery. Safety, however, is ultimately depending on the individual machine operator. **Before operating this machine, please become familiar with the following safety labels and guidelines.**

 DANGER	This indicate an imminent hazardous situation which, if not avoided, WILL cause death or serious injury.
 WARNING	This means if the warning is not taken seriously, it CAN cause death or serious injury.
 CAUTION	This mean if the precaution is not taken, it MAY cause minor or moderate injury.
IMPORTANT	This is a tip about proper operation of the machine to avoid machine damage.

General Safety Guidelines

1. **FAMILIARIZE** yourself with all safety instructions found in this manual. Know the limitations and hazards associated with this machine. Do not operate / service this machine until you are properly trained.
2. **ELECTRICAL GROUNDING**, when done properly, reduce the risk of electrocution, shocks and fire. Make certain that the machine frame is electrically grounded and that a ground lead is included in the incoming electrical service. In cases where a cord and a plug are used, make certain that the grounding plug connects to a suitable ground. Follow the grounding procedure indicated in the electrical code of your area.
3. **DISCONNECT** the machine from power before performing any service, maintenance, or adjustments. A machine under repair should be RED TAGGED to show it should not be used until the repair is complete.
4. **EYE PROTECTION**: Always wear an approved safety face shield, goggles, or glasses that complies with ANSI Z87.1 and CSA Z94.3 standards. Common eyeglasses are not safety glasses, and may not provide adequate protection.
5. **EAR PROTECTION**: Use hearing protective devices where the noise exceeds the level of exposure allowed in Section 1910.95 of the OSHA Regulations. When in doubt, use it.
6. **OTHER PERSONAL PROTECTION**: Before operating the machine, remove tie, rings, watch and other jewelry. Roll up sleeves above the elbows. Remove all loose outer clothing and confine long hair. Protective type footwear should be used. Do not wear gloves unless it is instructed to perform particular step(s) in the manual.
7. **GUARDS**: Keep the machine guards in place for all applicable operations. If any guards are removed for maintenance, DO NOT OPERATE the machine until the guards are reinstalled. Check clearance between the guards and the cutter before starting the machine.
8. **WORKPLACE SAFETY**: Keep the floor around the machine clean. Scrap material, saw dust, oil and other liquids increase the risk of tripping or slipping. Be sure to clean up the table before starting the machine. Make certain the work area is well lighted and that a proper exhaust system is used to

minimize dust. Use anti-skid floor strips on the floor area where the operator normally stands and mark off machine work area. Provide adequate work space around the machine.

9. **ACCESS CONTROL** should be enforced so only trained personnel can access the work area and operate the machine. Use childproof power switch when applicable.
10. **STAY ALERT** at all times. Do not operate this machine while under the influence of drugs/alcohol, or when not feeling well.
11. **REPLACEMENT PARTS:** Use only genuine Oliver Machinery replacement parts and accessories recommended for this machine. Generic parts made by other manufacturers may create a safety hazard, and WILL void the factory warranty and other guarantees.
12. **PROPER USE:** Do not use this machine for other than its intended use. If used for other purposes, Oliver disclaims any real or implied warranty and holds itself harmless for any injury or damage which may result from that use.

Safety Guidelines Specific to Planer

Before Work Begin:

1. **USE ONLY NATURAL, SOLID WOOD.** Do not plane any material such as plywood, MDF, OSB, laminate or anything that can disintegrate during operation. Do not plane treated lumber or anything that contains harmful chemicals, as this will spread wood dusts that contain such harmful chemicals. Do not attempt to plane workpiece with loose knots or with any other foreign materials.
2. **CHECK CUTTER INSERTS:** Make sure cutter inserts are sharp, clean, and free from damages. Forcing dull/damaged cutter inserts to work invites accidents, and lowers the quality of the finish. Use recommended amount of torque to securely fasten all inserts onto the cutterhead.
3. **SERVICING CUTTER INSERTS:** Wear heavy duty leather clothes to protect your hands when installing new cutter inserts or rotating the existing ones. Ensure the cutterhead is thoroughly clean before installing the insert. Debris between the cutter insert and the platform can create uneven pressure, causing the insert to break, and body injuries may occur.
4. **SUPPORT LONG WORKPIECE** with auxiliary stock feeding rollers/tables. This will help avoiding injuries and improve the quality of finish.

When Planning:

1. **DUST COLLECTION SYSTEM** is required for this planer. Please make sure the system is on and provide enough suction before operation begins.
2. **KICKBACK** happens when a workpiece is ejected, usually towards the infeed side of the planer, during the operation. **This can cause serious injuries or even death.** This planer is equipped with metal anti-kickback fingers to reduce the risk of kickback. Make sure they are clean and moving freely before operation. Even with this safety device installed, kickback can still happen due to workpiece quality, grain orientation and many factors. Operator should be cautious about possible kickback.
 - **ALWAYS** wear proper protection device and stay away from the line-of-fire to avoid kickback related accidents.
 - **NEVER** look inside the planer during operation.
 - **NEVER** plane boards that are shorter than 6" as mentioned in the specifications.
3. **PROPER WORKPIECE FEEDING** avoids kickback. Never start the machine with the workpiece engaging the cutterhead. Never start feeding until the planer has reached its full speed. Ensure there is proper gripping force from the feeding rollers when passing through a workpiece.
 - **NEVER** force a workpiece through the planer. Make adjustments as needed.
 - **ONLY** plane one board at a time.
 - For twisted workpieces, use a jointer to face joint the bottom side of the workpiece before planning.
4. **STUCK WORKPIECE** should be removed only after the planer is powered off, and the cutterhead comes to a complete stop. Do not use hands or push sticks to force feed a workpiece through the planer, as it can result in severe injuries and/or machine damage.
5. **DEPTH OF CUT SETTINGS:** Never exceed the designed maximum depth of cut capacity found in the specification. Failing to comply can cause machine damage and injuries. Consider the hardness of the workpiece when setting the depth of cut, as harder wood types increase the workload of the planer.

After Operation

1. **STOP THE MACHINE** if the operator leaves the machine for any reason.
2. **WAIT** until the machine comes to a complete stop.
3. **CLEAN UP** the work area before departure.

Electricals



WARNING All electrical work must be done by a qualified electrician, and must meet the electrical code in your area.

Minimum Circuit Size Required for Model 4420 Planer

<i>Stock Number</i>	Minimum Circuit Size Required
4420.101	30A

Please ensure the electrical circuit for this machine meets the minimum circuit size requirement. Minimum circuit size requirement applies to a dedicated circuit which provides power to one 4420 Planer. If more machines are sharing the same circuit, consult a qualified electrician to ensure the designated circuit is properly sized for safe operation.

If a circuit is available, but not meeting the minimum circuit size requirement listed above, a new circuit must be installed for this machine.

Grounding



WARNING Improper grounding can cause electric shock, fire, and equipment damage.

Proper grounding reduces the risk to the operator in the event of electrical malfunction or breakdown. This machine must be connected to the grounding conductor when available, and all grounding connections must meet or exceed the electrical code requirements in your area. Furthermore, all grounds must be verified and must meet or exceed the electrical requirement of the machine. If grounding is not available, consider the use of a GFCI protection device as an alternative, if this complies with the electric code in your area.

Electrical Wiring

This machine is not pre-wired with a cord and a plug. If you plan to connect the machine directly to the electrical panel (“Hardwiring”). Please ensure there is a readily accessible electrical disconnect near the machine. Refer to section “Wiring Diagram” for wiring your machine to a power source.

If you choose to connect this machine with a plug and a cord, please use a UL/CSA listed plug. If you need an extension cord to connect to the power outlet, select a durable cord type with high temperature rating (90C° or above). Both plug and power cord must be sized to meet the amperage requirement of your machine.



Minimum cord size (AWG) required based on amperage draw and length of the cord:

Amps	Power Cord Length				
	25 feet	50 feet	75 feet	100 feet	> 100 feet
< 5	16	14	14	14	NR
5 to 8	14	14	14	12	
8 to 12	14	14	12	10	
12 to 15	12	12	10	10	
15 to 20	10	10	10	NR	
21 to 30	10	NR	NR	NR	

*NR: Not Recommended

 WARNING	<p>Use properly sized wires that meet or exceed the power requirement of your machine. Using undersized wires may cause overheating and increase the risk of fire and machine damage.</p>
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 WARNING	<p>Improper copper-aluminum wire connection is a fire hazard. If the power circuit available uses aluminum wires, use certified CU/AL wire connectors.</p>
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Setup

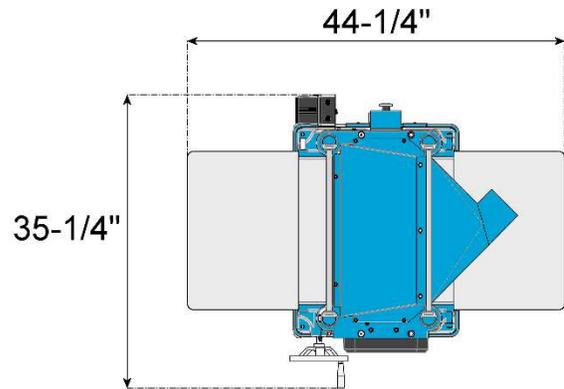
Shop Preparation

Space Requirement

The dimensions of this machine are 44-1/4"(L) x 35-1/4"(W). You will need additional spaces for manipulating your workpiece, electrical connection and dust collection.

Load Limits

This machine has a shipping weight of 669 lbs., and a net weight of 568 lbs. Please ensure all lifting tools and building structures have adequate load capacity, for transporting and supporting the total weight of this machine, the operator, and related items.



Electricals

Ensure a properly sized circuit and an electrical terminal are available nearby the machine. If the machine is to be hardwired, there must be a readily accessible power disconnect nearby, so that the machine can be disconnected from power source for servicing and adjustments. If the machine is to be connected with a cord and a plug, please ensure a matching outlet is installed nearby the machine.

Please refer to the “Electricals” section in this manual for details regarding electrical requirements and safety instructions.

Lighting

Adequate lighting is needed for operating this machine. Overhead, non-glare lighting should be installed near the work area.

Safety Labels

If this machine introduces a new safety hazard to your work place, display proper warning signs in highly visible location(s).

Dust Collection

Wood dusts created by this planer is a health hazard. Connect a dust collection system to this machine. Check air suction regularly to ensure the pipes are not jammed.

Dust masks should be available for using the planer.

	<p>Use a dust collection system that is rated above 450 CFM. Doing so improves air quality in the workplace, and protects the machine from jamming.</p>
<p>CAUTION</p>	<p>Piping of dust collection system introduces additional air resistance, and decreases the effective CFM measured at the dust ports. Ensure there is significant suction at the dust port, so dust and debris can be effectively removed from the machine.</p>

Receiving

Your shipment should come with one wood crate. Upon receiving your shipment, check for any significant damages before signing the delivery confirmation.

IMPORTANT

If items are damaged, please call us immediately at **1-800-559-5065**



You may need to remove strapping that is used for securing your package. Strapping may spring back violently when released and cause injury. Always wear safety goggles and gloves for this task.

Moving Machine into the Shop

Your machine will be delivered by freight service, and it will be left outside of your workshop by default. On the day of delivery, please be sure help is available to move the machine to its final location.



4420 Planer has a gross weight of 669 lbs. and a net weight of 568 lbs.

Safe moving techniques and proper lifting equipment required, or serious personal injury may occur.



Your shipment may be secured by the straps. Do not lift your shipment by the strap. They are not designed to hold the total weight of your shipment. They may snap without warning and cause serious injury and machine damage.

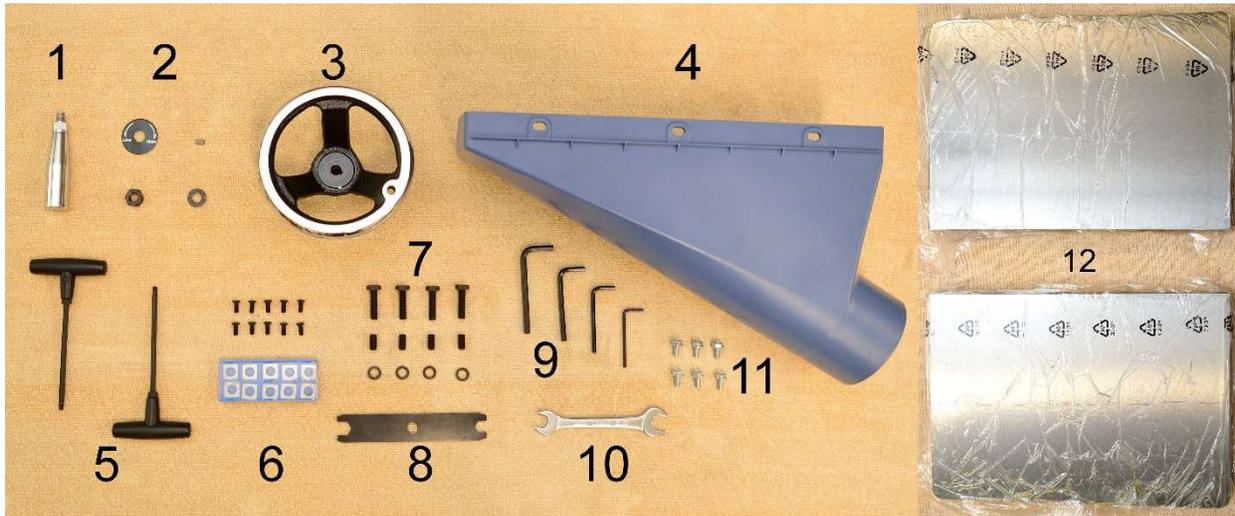
Unboxing

Upon removing the crate cover, you should find a planer that is mostly assembled, and three paper boxes that contain all the accessories. Everything is covered by a plastic bag.



Inventory

Carefully unwrap the packaging and make sure all components are included in the shipment. Lay out all the items received and inventory them.



<i>Item</i>	<i>Description</i>	<i>Quantity</i>
1	Height adjustment handwheel handle	1
2	Height adjustment handwheel hardware - Shaft Key - Nut - Bolt - Label	1 each
3	Height adjustment handwheel	1
4	Dust chute with 4" dust port.	1
5	T-Handle torx drivers (T-25)	2
6	Spare Cutter Inserts and Torx Screws	10 each
7	Fasteners for extension table: Hex Head Bolt (M8*1.25P*30) Spring Washer (M6*1.0P*6) Set Screws (M8*1.25P*16)	6 each
8	10/13 mm Combination Wrench	1
9	Metric hex wrench set (3,4,5,6 mm)	1
10	12/14 mm Combination Wrench	1
11	Fasteners for dust chute: Hex Flange Bolt (M6*1.0P*12)	6
12	Cast iron extension tables.	2

NOTICE: If you cannot find the item in the list above. Please check if they are still attached to the packaging or inside the cabinet. Occasionally the item may have been pre-installed at the factory. Please refer to the parts list section this manual to ensure you have all the components to set up this machine.

NOTICE: This machine comes with various standard sized, non-proprietary parts. If any of these parts are missing, we be happy to deliver them to you. To have the machine up and running as soon as possible, you can also find these parts at your local hardware store.

Additional Items Recommended for Machine Assembly

<i>Item</i>	<i>Purpose</i>
Safety Glasses	Protection
Disposable Gloves	Protection
Paper Towel / Rags	Cleaning
Rust Inhibitor	Cast iron table top rust protection.
Straight edge	Check alignments.
Metric Combination Wrench Set	Assembly and Maintenance
Metric Hex Wrench Set	Assembly and Maintenance
Torque Wrench	Cutter inserts installation and for checking torx screw tension (50-55 lbs.-inch).
T25 Star Bit Socket	Cutter inserts installation.

Removing Machine from Crate

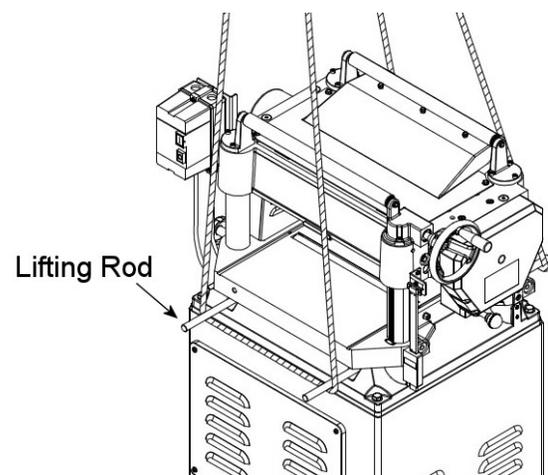
When all items are ready for setting up the machine, gently remove the machine from the pallet. The planer is equipped with casters so it can be pushed off the pallet with the help of a ramp.

The base of the planer is bolted onto the pallet to prevent shifting during transport. Remove these screws and brackets if you see them. You may reuse the hardware if the machine is to be bolted onto the floor.



To lift the machine up, extend all four lifting rods. Wrap a pair of lifting slings around the lifting rods as shown in the diagram and ensure the slings are parallel and balanced.

Be careful with the power switch and the digital readout when lifting the machine with lifting devices.



WARNING 4420 Planer has a net weight of 568 lbs. All lifting devices must be capable to handle the load, or serious personal injury and machine damage may occur.

Cleaning

To prevent rusting, the cast iron bed and extension tables of this planer are covered with machine oil and a plastic film. Remove the plastic film, then wipe off the machine oil with paper towels or rags.

Once all the machine oil is removed, routinely coat the unpainted cast iron surface with rust preventive such as Boeshield® T-9 or paste wax. Do not use rust preventives that contains silicon, which is known to interfere with certain finishes and glues.



Assembly

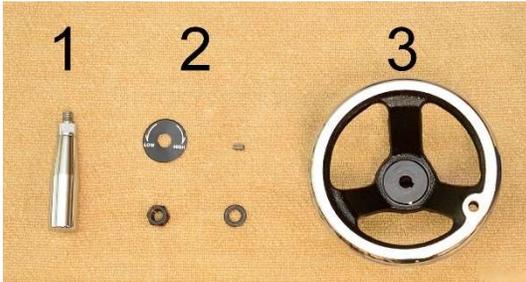
This planer is mostly assembled in the factory. There are a few more items to set up before the machine is ready for a test run:

1. Install height adjustment handwheel.
2. Install dust hood.
3. Install extension tables.
4. Install power switch.
5. Connect planer to a dust collection system.
6. Connect planer to power source.

The approximate time for cleaning and assembly is approximately 60 minutes.

Installing Height Adjustment Handwheel

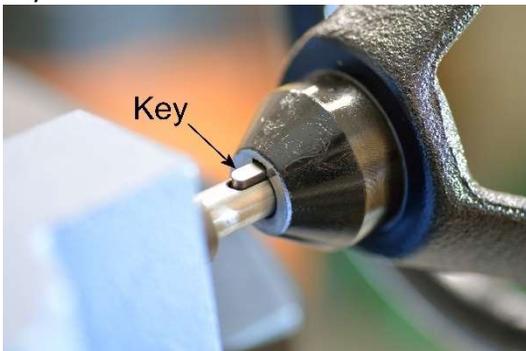
1. To install the height adjustment handwheel, you will need items #1, #2, and #3 listed in section "Inventory".



2. Locate the keyway on handwheel shaft, then insert the key into the keyway.



3. Insert the handwheel and make sure the keyway on the handwheel is aligned with the key.



4. Install direction label first, then the washer and the nut. Tighten the nut with a 17mm wrench to secure the handwheel in place.

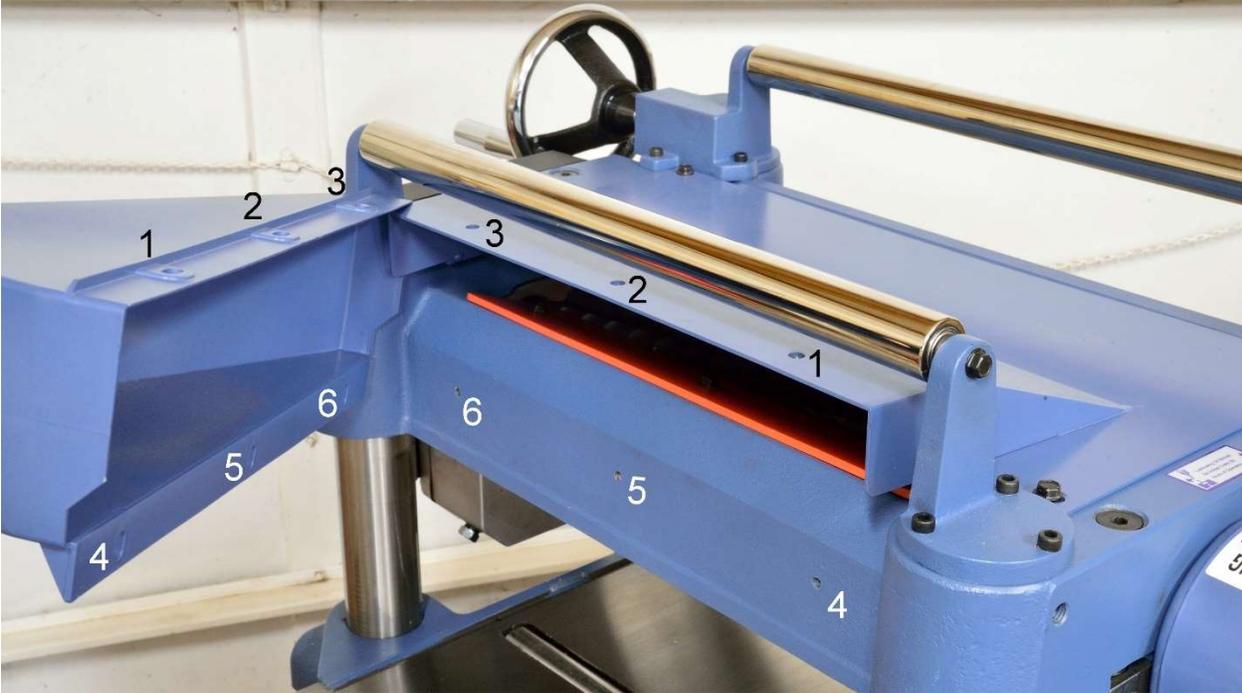


5. Lastly, install the handle of the handwheel and tighten with a 14mm wrench.



Installing Dust Hood

Use the provided hex flange bolt (#11 in "Inventory") to mount the dust hood on top of the cutterhead cover:

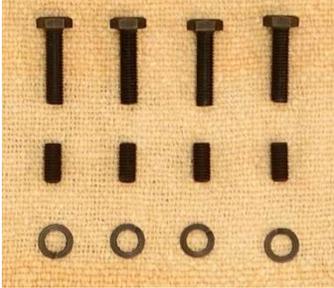


Installing Extension Tables

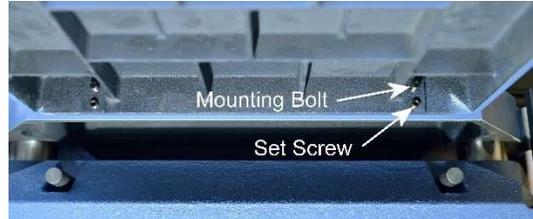


Each extension table weighs 21 lbs. and it can be difficult to install by one person. Get assistance to install the extension tables when needed.

1. Gather hex bolts, locking washers, and set screws listed in inventory item #7 for extension table installation.



3. Attach the extension table to the planer. Do not fully tighten the bolts yet. Just make sure it is tight enough to hold the extension table in place. Then hand thread the set screws into the extension table.



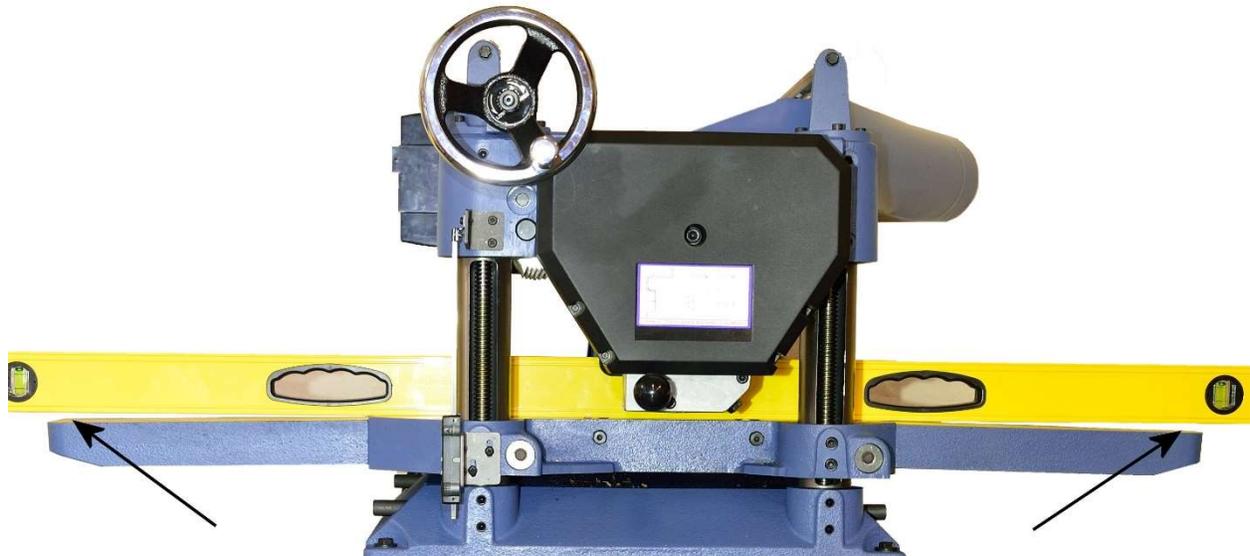
2. Insert the locking washer into the hex bolt, then insert the both items from the backside of the planer base.



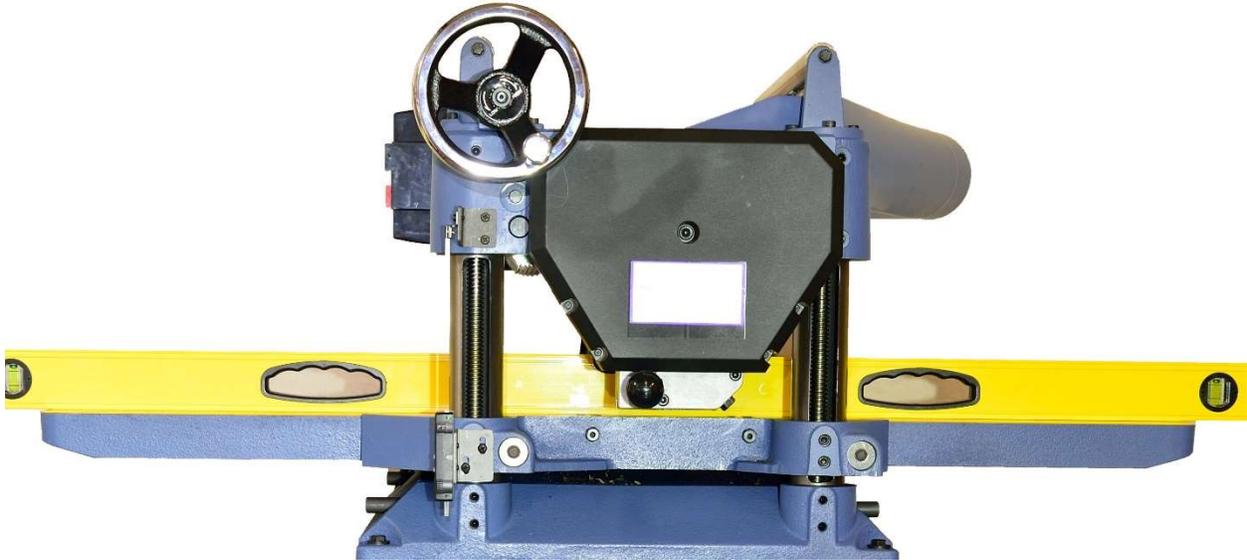
4. Align the edge of extension tables with the edge of the planer bed. Make sure the edges are flush with each other.



5. Use a straight edge to check if the extension tables are in parallel with the planer bed. At this point the extension table should be slightly sagged.



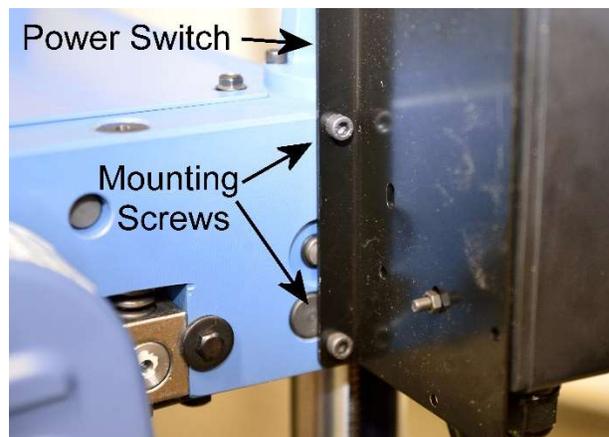
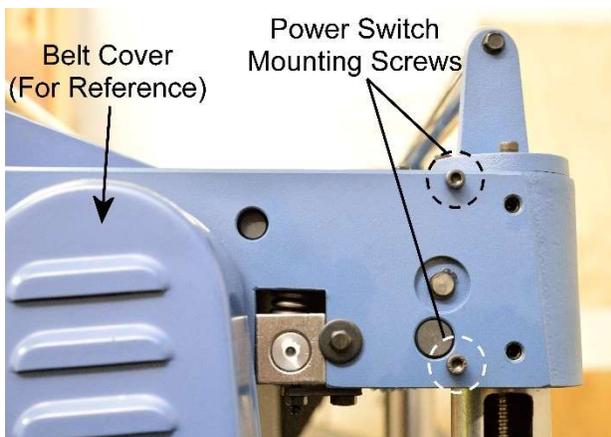
6. Rotate the set screws with a hex wrench to raise the extension tables. For each set screw, make small, incremental adjustments, and then move on to the next set screw. Repeat until both extension tables are in parallel with the planer bed. If a set screws become too difficult to turn, you may need to slightly loosen the mounting bolts before continue to raise the extension table.



7. When the extension tables are in parallel with the planer bed, tighten all mounting bolts. Recheck table parallelism for one more time.
8. Save these instructions as the extension tables will need to be adjusted from time to time.

Installing Power Switch

The mounting screws for the power switch are pre-installed in the headstock. Remove the cap screws as show in the picture, then use them to mount the power switch.



Dust Collection

Wood planer can generate a lot of wood shavings and dusts. Connect the dust collection system to this machine. Minimum CFM requirement for this planer is 450 CFM at the dust port, which means your dust collection system should have a rating greater than 450 CFM, as air friction from the ducts reduces the effective CFM at the dust ports.

IMPORTANT

Running this planer without dust collection system, or using a dust collection system with inadequate suction, will cause dust and shavings to accumulate inside the planer. This can damage the machine and cause other hazardous situations. Check your dust collection system regularly to make sure it is not jammed or filled up.

Wiring and Grounding



Deenergize the electrical circuit before touching any enclosed, electrified parts. Touching electrified part WILL result in serious personal injury or death.



WARNING

All electrical work must be done by a qualified electrician, and must meet the electrical code in your area.

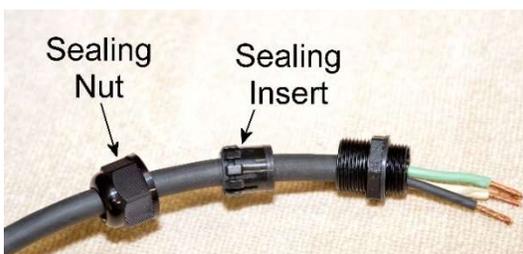
Make sure the voltage of your power circuit matches the specifications on the nameplate of the machine, and the circuit is sized to supply power to the planer.

Wiring Instructions

1. **Power off before connecting any wires!!**
2. Remove the screws that secure the cover to the junction box. You should find three wire nuts for connecting the wires.
4. Follow the wiring diagram in section “Wiring Diagram” to attach the wires to the terminal.



3. Insert power cord through strain relief. In case if the strain relief needs to be removed, the picture below shows how the strain relief components fit through the cord.



5. Hand tighten the sealing nut of the strain relief to keep the cord in place.
6. Re-install the connection box cover.

Break-in Period

Congratulations for getting this machine assembled and ready for a test run! Please set a reminder to service this machine as it goes through the break-in period. Completing these services will maximize the performance and longevity of your machine.

After 16 hours of operation: Adjust V-belt tension.

After 50 hours of operation: Replace gearbox oil.

Controls and Components

ON / OFF Switches

To Turn On Machine	Press the green "ON" button. (GREEN)	
To Turn Off Machine	Press the "OFF" button. (RED)	

Table Height Adjustment

The table height adjustment handwheel is located on the side of the planer headstock.

Turn **CLOCKWISE** to raise the table.

Turn **COUNTERCLOCKWISE** to lower the table.

Each rotation of the handwheel changes the height by approximately 5/64" (2mm).



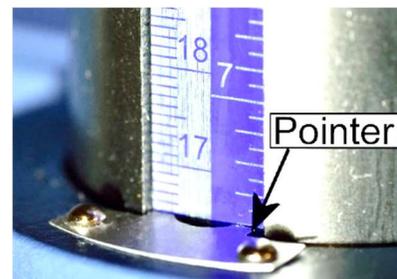
Table Height Locking Knobs

Two locking knobs are located on the power switch side of the table. Tightening these knobs will stop the table from moving.



Table Height Scale

The table height scale is located on the front right column next to the digital readout. A metal pointer marks the current height of the table.



Digital Readout (DRO)

This planer is equipped with a DRO with 0.0005"/0.01mm resolution.

On/Off/Zero Button

- Press the button to turn on the DRO.
- Hold the button for 3 seconds to turn off the DRO.
(See "ABS Button" below for important notes.)
- To zero the reading, press the button while DRO is on.

MM/IN Button

Press the button to toggle between inch and mm as measurement unit.

ABS Button

There are two modes of measurements: **Absolute** and **Incremental**.

Absolute mode shows the distance between the table and the cutterhead. Once calibrated, the settings will be memorized unless the battery is exhausted, OR if user hits the ON/OFF/ZERO button in absolute mode.



IMPORTANT

Do NOT turned off DRO in absolute mode, or the calibration will be reset.

Incremental mode shows the distance the table travelled from the last reset position. The reading can be reset by pressing the ON/OFF/ZERO button.



Hold Button

The hold button helps operator to memorize current table height when an operation needs to be disrupted. It can be useful for situations such as removing a jammed workpiece. The hold button works in both absolute or incremental mode.

Press **HOLD** once to retain current reading. The indicator "H" will show on the screen indicating the DRO is in hold mode. DRO reading will remain unchanged regardless of the table position.



When the operation is ready to resume, memorize the reading in hold mode, then press **HOLD** to show the current table position. The operator can now move the table back to the previous position.

SET Button

This is for absolute mode calibration. See section "DRO Calibration" at the end of this chapter.

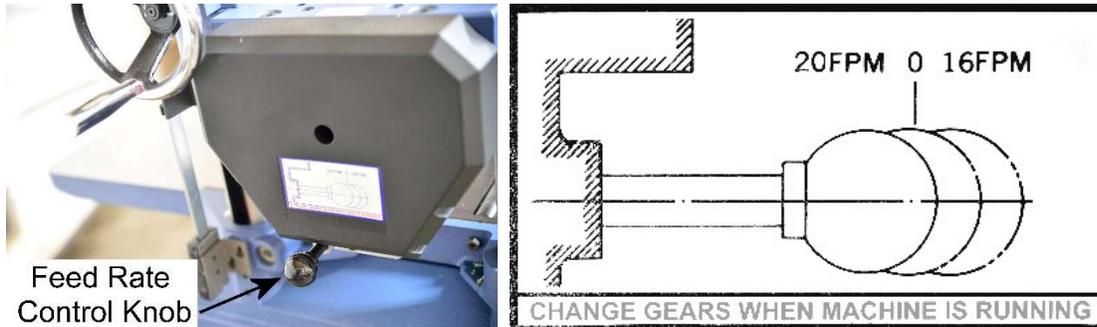
TOL Button

Not used.

Feed Rate Control

4420 Planer can feed stock at 16/20 FPM (feet-per-minute). To change feed rate, shift the position of the feed rate control knob when the machine is running at full speed with no load:

- Push in: 20 FPM
- Pull out: 16 FPM
- In between: 0 FPM (Neutral)

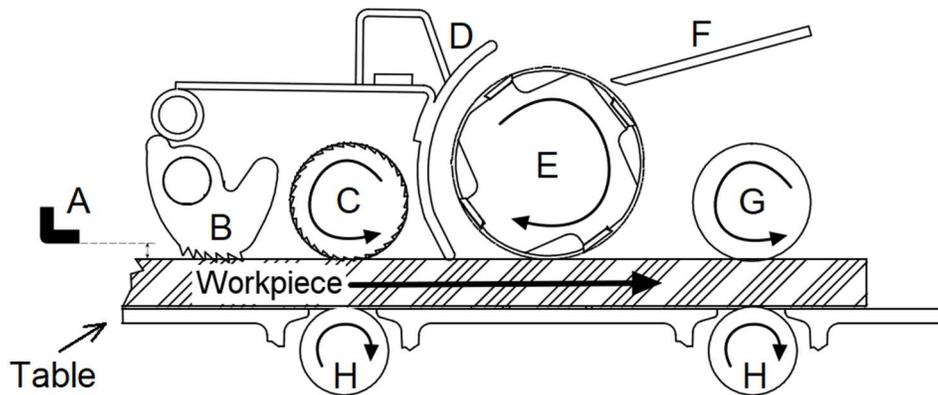


IMPORTANT

Only change feed rate when the machine is running at full speed. Failure to do so may cause the gearbox to jam and damage the machine.

Components for Planing Wood

This diagram shows components involved for planing a piece of wood:



How it works:

1. This planer is equipped with height-adjustable table. Raise the table to increase the depth of cut, and vice versa.
2. When a workpiece enters the planer, with planer's depth of cut properly set, it will clear the depth limiter **[A]**. For workpiece with width less than 6-1/4", it is possible to bypass the limiter and receive a deeper cut.
3. The anti-kickback fingers **[B]** then engage the workpiece to prevent accidental kick-back.
4. As the workpiece moves further into the planer, it will engage the infeed roller **[C]**. The infeed roller will bring the workpiece towards the chip breaker **[D]** and the cutterhead **[E]**.
5. As the cutterhead cuts on the workpiece, the woodchips will be broken down by the chip breaker.
6. The chip breaker and the chip deflector **[F]** then divert the woodchips towards the dust port for removal.
7. As the workpiece leaves the cutter head, it will engage the outfeed roller **[G]**, which helps pulling the workpiece away from the planer.
8. The bottom side of the workpiece is supported by the table rollers **[H]**. These rollers raise slightly above the planer table to help feeding workpieces through the planer. The height of the bed roller can be adjusted to accommodate workpieces with various roughness.

Test Run

Each planer has been inspected and calibrated before leaving the factory to meet our quality and precision standards. Due to various reasons, the machine may need to be re-adjusted when it arrives at your workshop. It is recommended to complete the test run before using the planer for production work, and repeat the test run if the planer is relocated.

Step 1: Verify all electrical components are functional.

1. Remove all tools and debris from the machine.
2. Press OFF button.
3. Connect machine to the power source.
4. Press ON button. The machine should be running with no excessive noise and vibration.
5. Press OFF button to stop the machine.
6. Press ON button to restart the machine. Disconnect the machine from power source while the machine is running, then reconnect machine to power. The machine should **NOT** restart.

Step 2: Verify the planer headstock is functional and calibrated.

1. Connect planer to a dust collection system.
2. Raise the table all the way up. The table should stop at approximately 1/4" below the headstock.
3. Lower the table all the way down. Ensure all the anti-kickback fingers can move freely.
4. Turn on the DRO to check the readings of digital readout. The readings should reflect the movement of the table.
5. Prepare a piece of good quality, straight grain wood board with flat bottom for a test run. It is advised to choose a board that is close to 16" wide and at least 2 feet long.
6. Start the dust collection system.
7. Set the depth of cut to approximately 1/16" for a test pass.
8. Turn on the planer and gently feed the workpiece towards the infeed roller. Once the infeed roller engages the workpiece, it should pull the workpiece through the planer. Verify the entire top surface has been cut.
9. Inspect the workpiece for defective finish.
10. Use a caliper to measure the thickness of each side to ensure the cutterhead is parallel with the planer table. If the thicknesses are the same, check if the reading is the same as shown on the headstock height scale.
11. Check for excessive snipes. Minimum amount of snipe may occur at the ends of the board, and it is expected.
12. While the machine is running idle, move the feed rate control knob to change feed rate. This ensures the gearbox and feed rate control knob is functional.
- 13. Press OFF to turn off the planer when all tests complete.**

Congratulations for completing the test run! Now your planer is ready for production work. If you discover any issue from the tests, please refer to the troubleshooting section and maintenance section for how to diagnose the issue and make adjustments.

DRO Calibration

You will need a piece of flat scrap wood and a caliper for calibration.

1. Plane down the scrap wood until the entire surface is cut. Lock the table with the table locking knobs.
2. Using a caliper, measure the thickness of the midsection of the workpiece. Note down the thickness.
3. Press the ABS button on the DRO to switch to absolute mode.
4. Hold the SET button until the "SET" indicator is flashing on the screen to enter calibration mode.



5. In calibration mode, holding the SET button will take you to the next digit for setting values, and tapping the set button will change/increment the value of the current digit.



IMPORTANT

Do NOT turned off DRO in absolute mode, or the calibration will be reset.

Operation

For safety and best results, please take the following steps for operating this machine.

Step 1: Preparation

Only Use Natural, Good Quality Wood

Only plane natural wood materials that is in good quality. Cracked stock, board with loose knots, plywood and other engineered wood products can break apart and cause severe kickbacks, which can lead to severe injuries and machine damages.

Do not plane treated lumber or anything that contains harmful chemicals, as this will spread wood dusts that contain such harmful chemicals. NEVER plane boards that are shorter than 6" as mentioned in the specifications.

Inspect the Workpiece

Carefully inspect the workpiece for foreign objects. Nails, staples, rock chips and other objects embedded on the wood surface will damage the planer. To avoid chipping/dulling the cutter inserts, it is advised to clean a workpiece with a stiff brush to remove all dirt and foreign objects before planing, especially for rough sawn or reclaimed lumber. Use metal detector to scan for metal as needed.

Check Moisture Content

Check moisture content of the workpiece before operation. "Green wood" with moisture content over 20% will not cut properly and may jam the machine. Excessive moisture content will also cause planer's unpainted surface to rust. Besides, as the workpieces dries, the planed surface will become fuzzy, and the workpiece may warp. It is recommended to allow the workpiece to dry and stabilize before it is processed.

Wrapped Stock

Workpiece should have a flat bottom to be processed by a planer. It is acceptable to process a slightly cupped board with the cupped side facing down and begin with light cuts. Boards with moderate cupping, bowing or twisting should have one side face-jointed before being processed by a planer.

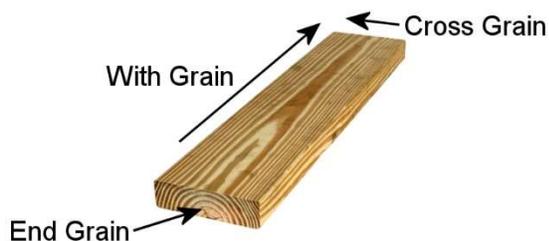
Avoid using boards with severe warping, as they can be unstable and might cause severe kickbacks during operation.

Glue-Ups

Glue left on the workpiece surface can dull the cutters and reduce cut quality. Scrape off all glue from the workpiece before operation.

Wood Grain Direction

This planer is designed to plane WITH the grain direction of the wood. Do not plane cross-grain or end-grain. Severe kickback and chipping may occur.



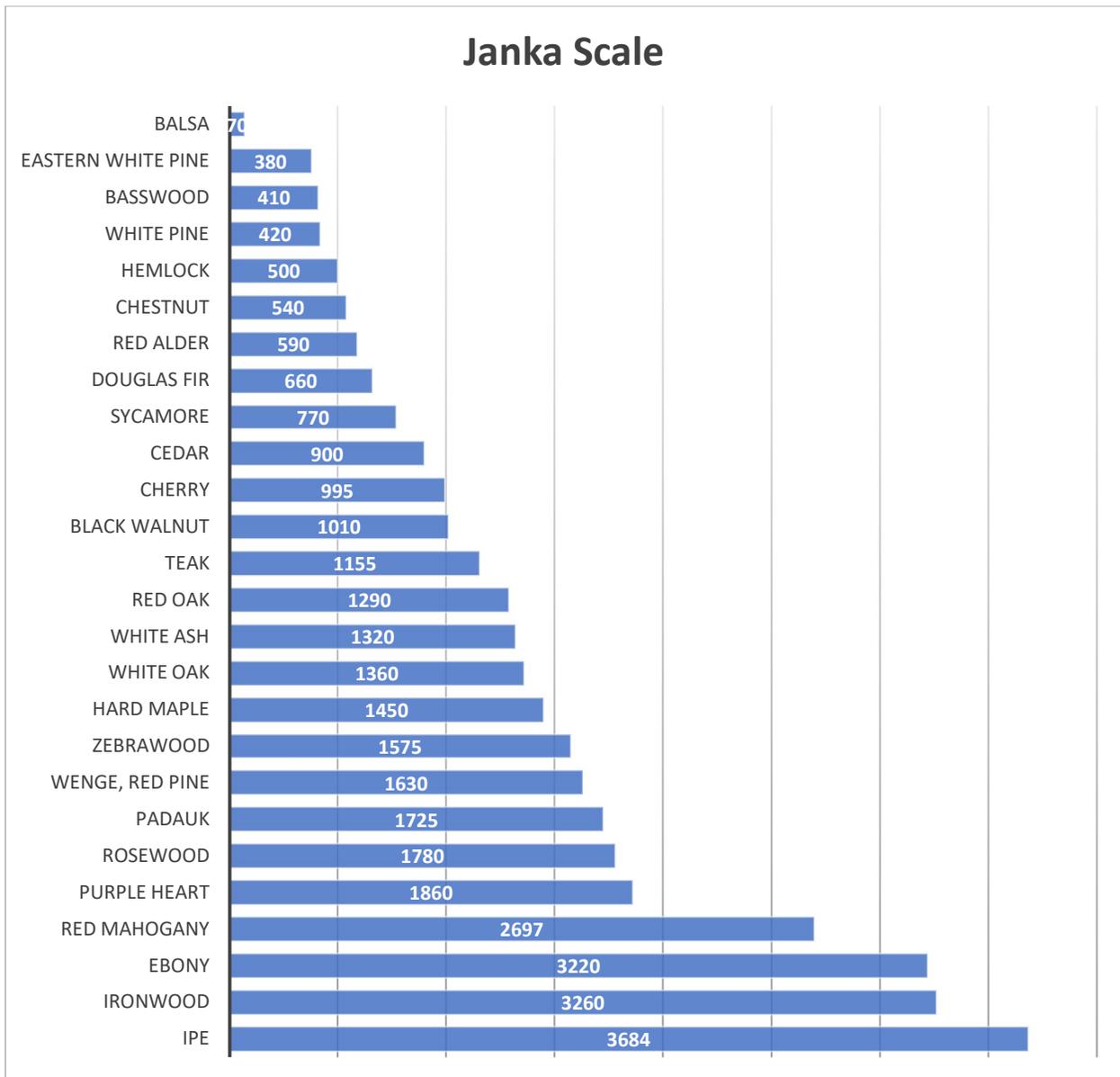
Step 2: Setting Depth of Cut and Feed Rate

This planer is capable of removing at most 1/8" per pass. For stock that is less than 6-1/4" wide, the planer can cut as much as 15/64" per pass. For best results, it is recommended to take light passes with low feed rate when approaching the desired thickness.

Wood Hardness

Depends on the hardness and brittleness of the wood type, operator should adjust the maximum depth of cut and feed rate accordingly. For workpiece that is hard/brittle, reduce the depth of cut and feed rate.

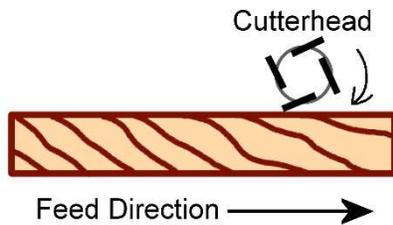
For your reference, this Janka scale shows the hardness of wood types that are commonly used. It ranks the hardness of various wood types by measuring the amount of force (in lbs.) required to embed a 0.444" steel ball halfway into the wood.



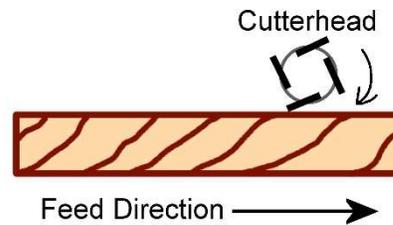
Step 3: Select Feed Direction

Inspect the workpiece and identify the direction of the edge grain. Choose a feed direction such that workpiece will receive a downhill cut.

Good – Planer Cuts Downhill



Not Ideal – Planer Cuts Uphill



Sometimes it is impossible to perform a downhill cut for the entire length of a workpiece. In this case, try feeding the workpiece in opposite direction and see what works best. Reducing the depth of cut and feed rate can also help improving cut quality.

Step 4: Planing Wood to Desired Thickness



WARNING

ALWAYS wear goggles, and other protection device when operating this machine. Stay on the side of the planer next to the power switch to avoid kickback related accidents. NEVER look inside the planer during operation. Failing to comply may result in serious injuries or death.



CAUTION

Use ear protection device to prevent hearing loss. Ensure dust collection system is functional and use dusk mask to avoid inhaling harmful airborne particles.

With the above preparation steps completed, the workpiece is ready for planing.

1. Please put on all protection devices before proceed. If you have a long workpiece, please make sure it is properly supported throughout the process.
2. Measure the thickness/height of the workpiece, then set the initial depth of cut to no more than 1/16". This allows the feed rollers to properly engage the workpiece, and at the same time not taking too much materials off for a test pass.
3. Turn on dust collection system and the planer.
4. While standing on the side of the planer, place the workpiece on the table with the flat side down. Gently feed the workpiece towards the infeed roller. Once the infeed roller engages the workpiece, allow the machine to feed the workpiece. **DO NOT** force feed the workpiece through the planer.

If the infeed roller does not engage the workpiece:

- Table height is set too low.
- Stop the machine. Wait for the machine to come to a complete stop.
- Lower the table to remove the workpiece.
- Increase the initial table height, and restart form step 3.

If the machine stalls or the workpiece gets stuck:

- Table height is set too high.
 - Stop the machine and wait for the machine to come to a complete stop.
 - Lower the table to remove the workpiece.
 - Decrease the depth of cut, and restart from step 3.
5. If the workpiece is feeding properly, wait until the entire workpiece clears the outfeed roller, then remove the work piece.
 6. After the initial pass, measure the thickness at the midsection of the workpiece.

If more material needs to be removed, continue with the following steps.

7. If you need to remove a lot of material, run a few passes with deeper cuts, then finish with a light pass with shallow cuts and slow feed rate.
8. If your DRO is already calibrated, simply switch to absolute mode. Gradually plane down the wood until the desired thickness is achieved. Each pass should remove no more than 1/8" for workpiece wider than 6-1/4", and no more than 15/64" for workpieces 6-1/4" wide or less. Reduce maximum depth of cut for harder wood types.
9. Alternatively, you may toggle to INC mode and progressively plane the workpiece to desired thickness. Upon completion of each pass, reset the reading of DRO. Use a caliper to measure workpiece's mid-section thickness, and decide the depth of cut for the next pass. Repeat the process until the desired thickness is achieved.

Turn machine off when operation completes.

Common Cutting Problems

Snipe

When a workpiece is not properly supported as it enters or leaves the machine, the ends of the workpiece will have more materials removed than the rest of the section. To mitigate this problem, hold the workpiece up slightly as it enters and leaves the machine. Sometimes, a small amount of snipe is inevitable, and the best way to fully eliminate sniping is to prepare a workpiece with extra length, and then trim the ends when planing is done.



Chipping

Happens when making a cut against the grain direction. See “Uphill” cut in Step 3 of this section. For highly figured lumber and areas near the knot, some amount of chipping is normal. In this case, moistening the problematic area before planing can sometimes mitigate the issue.

Chipping can also be caused by dirty or dull cutters. If chipping happens while planing straight grain stocks, inspect the cutter inserts and remove all resin buildups. Rotate/replace dull cutter inserts when they are dull.



Indentation

This can happen when a foreign object is pressed on the workpiece when it passes through the planer. Remove all resin buildups from the rollers, cutterhead and the table. Also check the dust collection system and ensure all wood chips generated are effectively removed. Adjust the chip breaker and chip deflector as needed.

Fuzzy Grain

Can happen when planing wood with high moisture content or if the cutter is dull. Sometimes fuzzy grain is unavoidable due to the nature of certain wood types. To mitigate this issue, avoid using wood with high moisture content and use sharp cutters.

Accessories

Oliver Machinery has a collection of accessories and add-ons to enhance productivity of your planer. To purchase these items, please call us at **1-800-559-5065**, our representatives are available Monday through Friday, 9AM - 5PM pacific time.

You may also purchase them online: WWW.OLIVERMACHINERY.NET/ACCESSORIES or
E-mail our parts department: PARTS@OLIVERMACHINERY.NET



WARNING

Using unapproved accessories may cause machine to malfunction, resulting in serious injury and/or machine damage. Only use accessories recommended for this machine.

Cutter Inserts



Genuine four-sided indexable carbide cutter insert that will fit the cutterhead of Oliver 4420 Planer. Made in Germany.

Parts number: **P-15mm 4S**

Touchup Paint



Keeping all painted surface in good condition not only keeps your machine looks nice, it keeps rusts away. We have pre-mixed spray paint available in Oliver-Blue for purchase.

Please visit our website at WWW.OLIVERMACHINERY.NET/ACCESSORIES for other recommended accessories.

Maintenance

Routine maintenance keeps your planer in top shape. Please follow the maintenance schedule below, and use the maintenance record worksheet attached in the back of the manual to document all tasks completed. **NOTICE:** Maintenance schedule may vary for individual users due to different situations and safety requirements.

 WARNING	Disconnect machine from the power source before any maintenance work is performed. After servicing the planer, remove all wrenches and tools before restarting the machine. Failure to comply can cause serious injury!
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Maintenance Schedule

Interval	Component
Every day	Remove dust buildups from planer and dust collection system.
	Inspect power cord for sign of aging and damages. Replace as needed.
Every week	Inspect and clean cutterhead, rollers and anti-kickback fingers. Remove any dust and resin accumulation.
	Inspect/rotate/replace worn cutter inserts.
	Apply rust protectant on unpainted cast iron surfaces.
	Verify extension tables are level with the planer bed. Adjust as needed.
Every month	Check V-belt tension and replace if belt shows signs of cracking or glazing.
Every 4-6 months	Remove dust buildups from motor and the cabinet.
	Inspect table chain for chain slacks.
	Check parallelism between the table and cutterhead, and the rollers.

Notice: Motor bearings are permanently sealed and lubricated, and do not require lubrication.

Lubrication Schedule

Component	Interval	Types of Lubricant	Reference
A - Feed roller shafts	Every 30 hours	SAE-30 oil.	Figure 1
B - Drive chains and sprockets	Monthly	General purpose grease	Figure 2
C - Lead screws (x4)		General purpose grease	
D - Columns (x4)		Clean and lubricate weekly Light coat of SAE-30 oil	
E - Gear box	Replace gear box oil after first 50 hours, then every year.	Standard gear oil, 70-90 weight. Remove gearbox cover to access drain plug and fill plug. Drain and recycle used oil. Refill oil until it reaches the fill plug.	Figure 3
F - Anti-kickback fingers	Clean and lubricate as needed.	Very light coat of SAE-30 oil.	Figure 4
G - Infeed roller			Figure 5
H - Bed roller			Figure 6
I - Table chain and sprockets	Every 4 to 6 months	Grease, or good quality cycle chain lubricant. Remove motor access panel to access components.	Figure 6

Figure 1

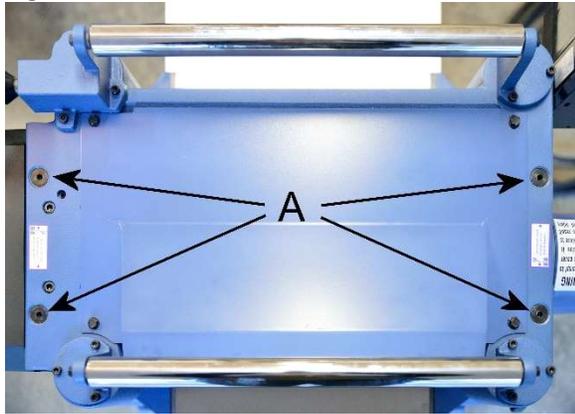


Figure 2

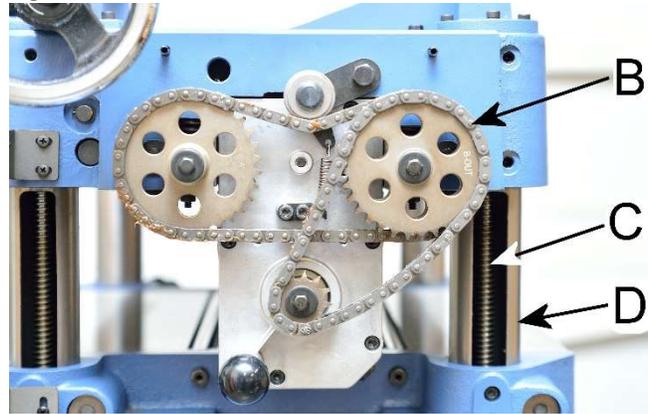


Figure 3

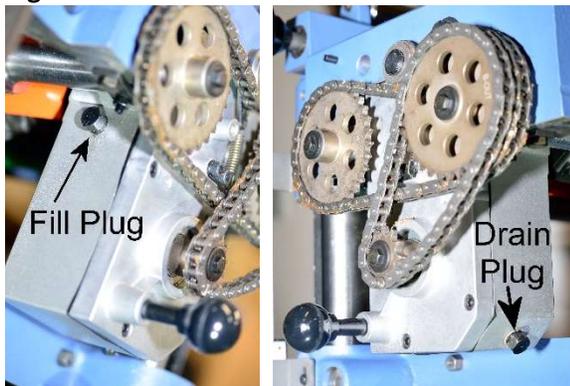


Figure 4

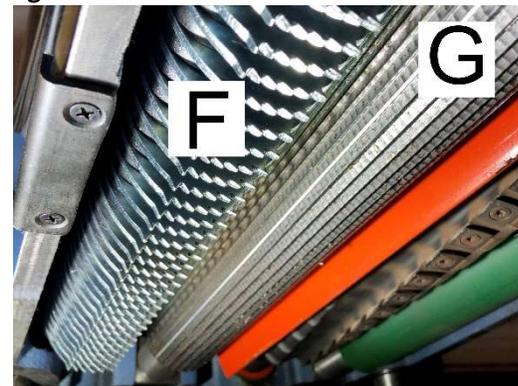


Figure 5

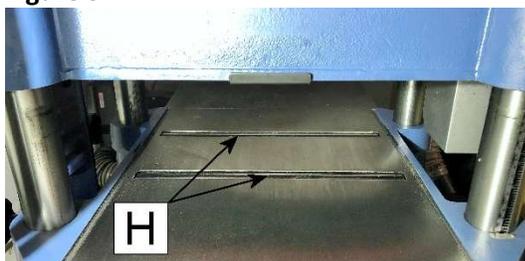
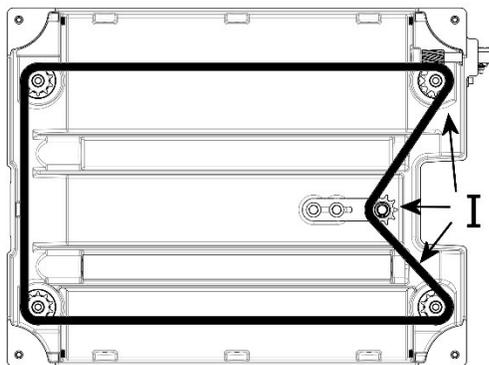


Figure 6





Disconnect machine from the power source before any maintenance work is performed. After servicing the planer, remove all wrenches and tools before restarting the machine. Failure to comply can cause serious injury!

Remove Planer Top Cover

This allows you to service the cutterhead, chip deflector, and chip breaker.

1. **Disconnect planer from power source!!**
2. Remove dust hood.



3. Remove the planer cover by removing the four cap screws from the top of the planer.



Adjust Chip Deflector Clearance

The chip deflector was pre-installed in the factory and should not require adjustments initially. If the gap between chip deflector and cutterhead goes beyond the 1/16" - 1/8" tolerance, adjustment is needed.

1. **Disconnect planer from power source!!**
2. Remove dust hood and top cover.
3. Loosen the three bolts that secures the chip deflector.



4. Adjust the distance between the chip deflector and the cutterhead. The entire edge of the chip deflector should be no less than 1/16" away from the closest point of the cutter head, but no more than 1/8".



5. Re-tighten the bolts to secure the chip deflector, then reinstall the top cover and dust hood.
6. Remove all wrenches and tools before restarting the planer.

Service Cutterhead and Rotate Cutter Inserts



CAUTION

Cutter inserts on the cutterhead are extremely sharp. Protect your hands with thick leather gloves to avoid injuries.

1. **Disconnect planer from power source!!**
2. Remove dust hood and top cover.
3. Remove dusts and resin accumulations on the cutterhead and the area nearby.
4. Rotate the cutter inserts 90° clockwise when they get dulled or nicked. Use a permanent marker to mark the new edge to be used.
5. To rotate/replace a cutter insert, remove the torx screw with a T-25 torx bit. Turn **COUNTERCLOCKWISE** to loosen the screw.



6. With the cutter insert removed from its platform, thoroughly clean the cutter insert platform with a vacuum or compressed air.



IMPORTANT: Obstacles between the insert and cutterhead platform will create uneven pressure against the insert. This will lower cut quality and may cause the insert to crack.

7. Reinstall the cutter insert with the marked cutting edge facing out.

8. Inspect the torx screw. Replace any damaged screws. Lubricate the screw thread with a thin coat of light weight machine oil.

IMPORTANT: Do not use excessive amount of lubrication, or the torx screw and the cutter insert will not sit properly.

9. Using a torque wrench, re-tighten the torx screw with 50-55 lbs.-inch of torque.

IMPORTANT: Do not overtighten the screw or the inserts may break. Do not use power tools to tighten the torx screws as it can strip the screws.

10. Reinstall top cover and dust hood when cutterhead service completes.

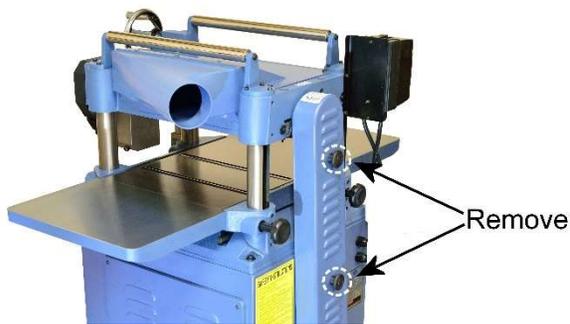
11. Remove all wrenches and tools before restarting the planer.

Adjust Belt Tension

⚠ CAUTION: Belt and pulleys may be hot after operations. Allow components to cool before servicing.

IMPORTANT: After initial break-in period. The V-belt should stretch by some amount. Check and adjust belt tension after 16 hours of operation.

1. **Disconnect planer from power source!!**
2. Remove the belt cover knobs and the belt cover.

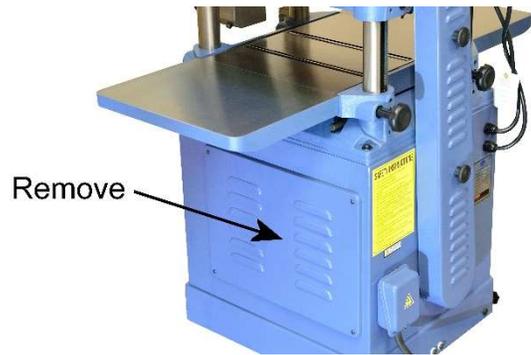


3. Apply moderate pressure on the V-belt midway between the two pulleys. Properly tensioned V-belt should deflect by approximately 1/2".

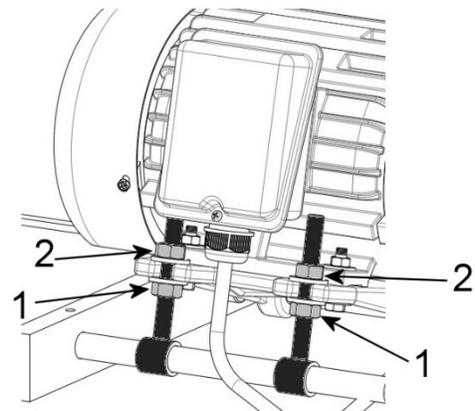


If belt tension needs adjustment:

1. Remove the motor access panel that is on the outfeed side of the planer.



2. To tighten the belt, loosen both lower motor mounting bolts (#1). Lower the motor until proper belt tension is reached. Secure the motor mounting plate by tightening both upper mounting bolts (#2), and the lower mounting bolts.

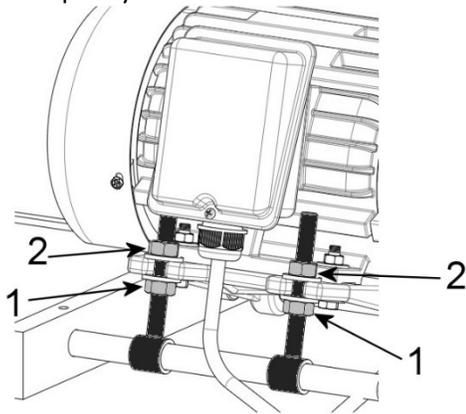


If V-belts need replacement:

IMPORTANT: V-Belts should be replaced as a group to ensure even wear and tear.

IMPORTANT: After initial break-in period. The V-belt should stretch by some amount. Check and adjust belt tension after 16 hours of operation.

1. Loosen the upper mounting bolts (#2). Raise the motor to loosen the belt, and roll them belt off the pulleys.



3. Install new belts and make sure the belts sit into the grooves of pulleys.
4. Adjust belt tension.
5. Set a reminder to readjust belt tension after the new belt is broken in. The process takes approximately 16 hours of run time.

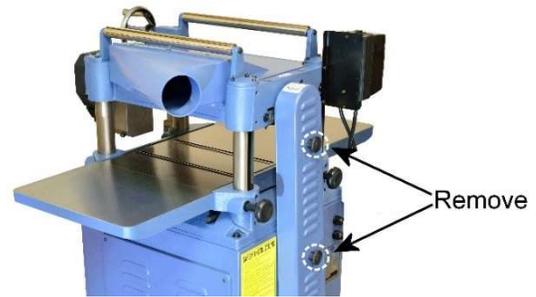
When Belt Maintenance Completes

Reinstall all the panels and covers. Remove all wrenches and tools before restarting the planer.

Align Belt Pulleys

The belt pulleys were aligned in the factory and should not require further adjustments. It is a good practice to check pulley alignment while checking belt tension.

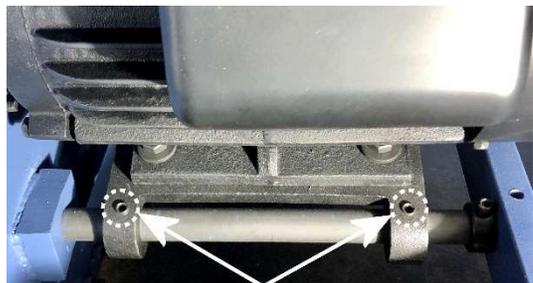
1. **Disconnect planer from power source!!**
2. Remove the belt cover knobs and the belt cover.



3. Use a straight edge to check the alignment of the belt pulleys.
4. If re-alignment is needed, open the motor access panel that is on the infeed side of the planer.



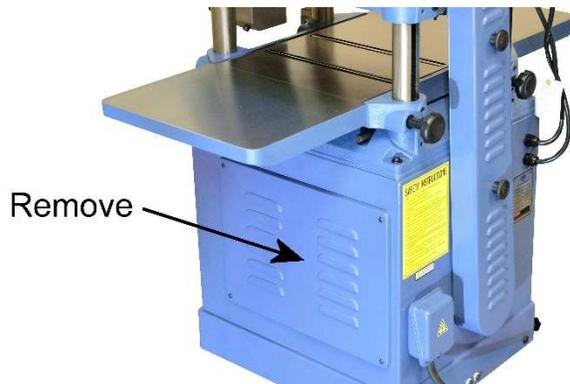
5. Loosen two set screws that hold the motor in place.



6. Move motor assembly along the mounting shaft to align the pulleys.
7. Retighten the set screws and close the motor access panel when adjustments complete.

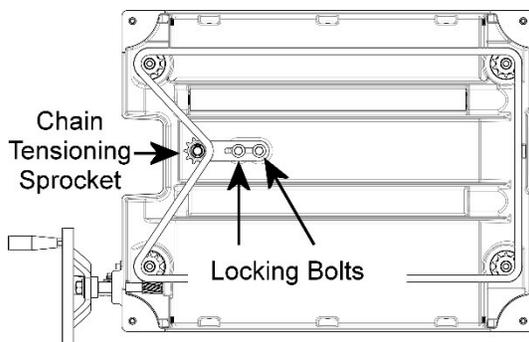
Adjust Table Chain Tension

1. **Disconnect planer from power source!!**
2. Remove motor access panel.



3. Loosen the two locking bolts for holding the chain tensioner bracket in place.

IMPORTANT: Keep table chain tensioned while loosening the locking bolt. If the chain falls off from the sprockets, it can take a lot of time to reinstall the chain and recalibrate the planer.



4. Push the chain tensioning sprocket against the chain with moderate tension to remove chain slack. Hold the sprocket in place, and re-tighten the locking bolts.
5. Clean and lubricate the chain as needed.
6. Re-install motor access panel when adjustments complete.

Adjust Table Roller Height

Your planer is equipped with table rollers to help feeding a workpiece through the planer. There is no fixed rule for setting the exact height of the table rollers, because each piece of wood behaves differently. The acceptable range of table roller height is: **0.002" - 0.005"** above the table.

As a general rule of thumb:

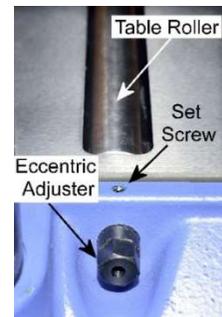
- Raise the roller when planing rough stock.
- Lower the roller when planing smooth stock.

NOTICE: If the roller is set too high, the workpiece will be more likely to have snipe on the ends.

To adjust table roller height:

1. **Disconnect planer from power source!!**

2. Each end of the table roller is equipped with a set screw and an eccentric adjuster. Make sure height adjustment is done on both ends.



3. Loosen the set screws that hold the eccentric adjusters.
4. Rotate the eccentric adjusters to change roller's height.
5. Use a dial indicator to verify the height is the same side-to-side. Make fine adjustments as needed.

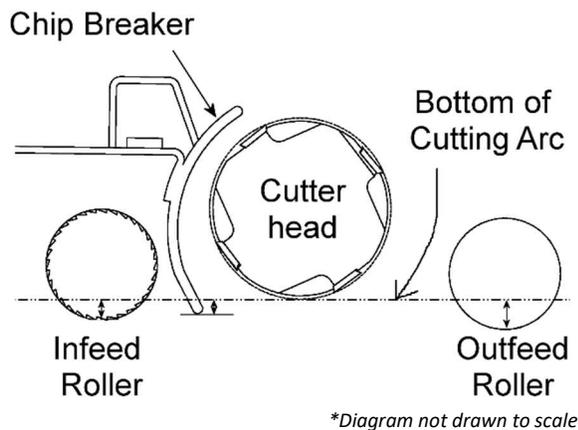


6. Retighten the set screws to lock the eccentric adjusters when adjustments complete.

Adjust Cutterhead/Feed Roller Height Offset

The infeed/outfeed rollers pull the workpiece through the planer. To ensure optimal feeding/cutting performance, it is important to ensure the height offsets between the cutterhead and the feed rollers are correct.

The following diagram shows the height offset between the cutterhead and various components inside the headstock of the planer. The feed rollers and chip breaker are installed **BELOW** the lowest point of cutterhead.



The height of the rollers and the chip breaker has been pre-calibrated in the factory and should not need further adjustments.

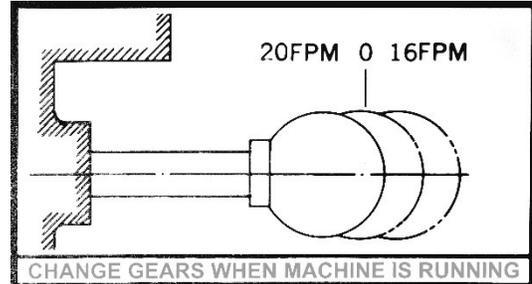
In case if adjustments are needed, you will need a dial indicator with a sturdy stand. If a dial indicator is not available, it is possible to make the adjustments with a home-made gauge block and a set of feeler gauges.

Clean the table and the rollers to remove any accumulations before making adjustments.



Method 1: Using a Dial Indicator

1. Remove all tools from the planer.
2. Turn on the planer, wait until it reaches full speed, then shift the feed rate control knob to 0 FPM (Neutral) position. This allows the feed rollers to rotate freely.



3. Turn off planer. Disconnect planer from power source!!
4. Remove the belt cover so you can rotate the cutterhead with the drive belt.
5. Adjust the table height so that the dial indicator can fit right below the cutterhead. Rotate the cutterhead and use the dial indicator to locate its lowest point. Using a flat bottom tip for the dial indicator can make this task easier.



6. Zero the dial indicator. Use this as the reference point for measuring the offset between the cutterhead and the feed rollers.

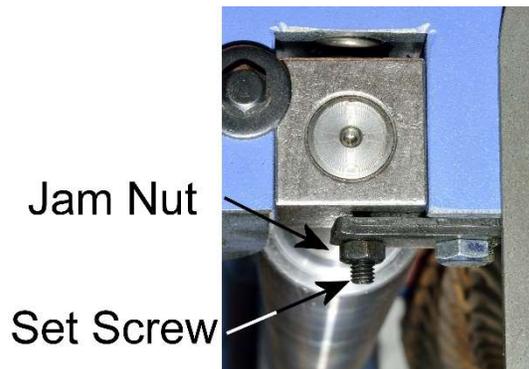
7. Move the dial indicator to the lowest point of the feed rollers. The reading from the dial indicator now shows the offset between the cutterhead and the roller. Make adjustments if the offset goes beyond the tolerance listed below.



Tolerance

<i>Infeed Roller</i>	0.020" - 0.027" below
<i>Chip breaker</i>	0.000" - 0.020" below
<i>Outfeed Roller</i>	0.059" - 0.079" below

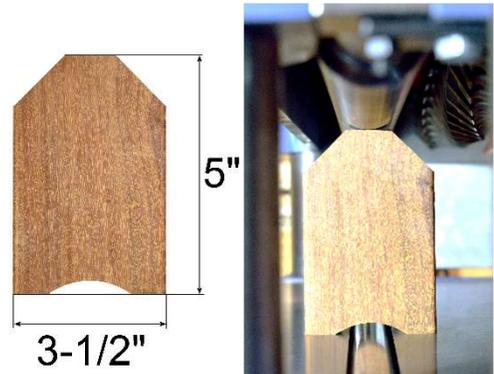
8. To adjust the height of the feed rollers, loosen the jam nuts on both ends of the feed roller. Rotate the set screws to change the height of the roller. Continue to calibrate until the cutterhead-roller offset is uniform across the entire feed roller.



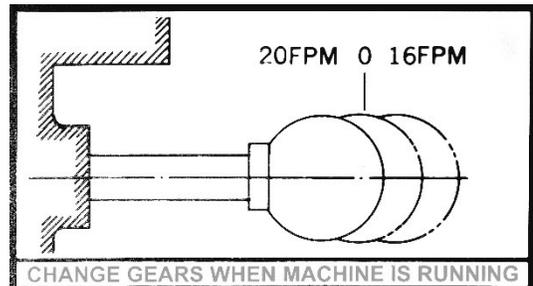
9. When the correct height is set, hold the set screws in place and re-tighten the jam nuts.
10. Re-install belt cover when adjustments complete.

Method 2: Using Feeler Gauge

1. Using hardwood, build a gauge block similar to this one below. The exact dimension is not critical. Just make sure the bottom clears the table roller. The top should be chamfered for better tool access and visibility.



2. Remove all tools from the planer.
3. Turn on the planer, wait until it reaches full speed, then shift the feed rate control knob to 0 FPM (Neutral) position. This allows the feed rollers to rotate freely.



4. Turn off planer. Disconnect planer from power source!!
5. Remove the belt cover so you can rotate the cutterhead with the drivebelt.

- Adjust the table height and place the gauge block below the cutterhead. For checking the infeed roller's offset, put the **0.020"** feeler gauge on top of the gauge block.
- Lower the cutterhead until the lowest point of the cutterhead barely touches the feeler gauge.



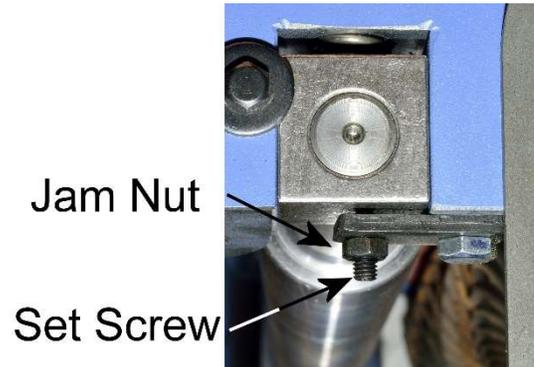
- Remove the feeler gauge and move the gauge block under the infeed roller. The gauge block should fit right under the infeed roller if the height setting is perfect. You may need to rotate the infeed roller to find the lowest spot. Made adjustments according to the specifications as needed:



	Tolerance
<i>Infeed Roller</i>	0.020" - 0.027" below
<i>Chip breaker</i>	0.000" - 0.020" below
<i>Outfeed Roller</i>	0.059" - 0.079" below

- To adjust the height of the feed rollers, loosen the jam nuts on both ends of the feed

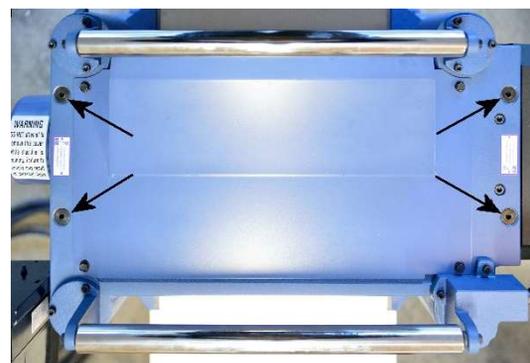
roller. Rotate the set screws to change the height of the roller. Continue to calibrate until the cutterhead-roller offset is uniform across the entire feed roller.



- When the correct height is set, hold the set screws in place and re-tighten the jam nuts.
- Repeat **STEP 7-13** for the outfeed roller, and use a 0.060" feeler gauge instead.
- Re-install belt cover when adjustments complete.

Adjust Feed Roller Tension

If your workpiece is slipping and not feeding through the machine, increase the feed roller pressure by turning the pressure bolts clockwise with a hex wrench.



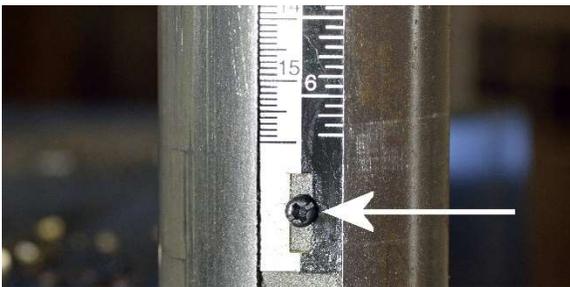
There is a pressure adjustment bolt on each end of the feed rollers. Make sure the adjustments are made on **BOTH** ends of the feed roller, so even pressure is applied across the entire feed roller.

If the workpiece is damaged by the feed roller, reduce pressure.

Adjust Cutterhead Height Scale

The cutterhead height scale is pre-calibrated at the factory. It can be adjusted to accommodate a different viewing angle, or if the scale is shifted.

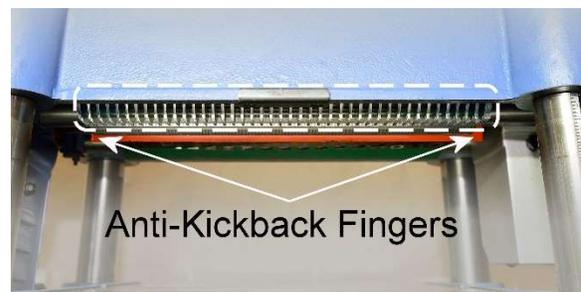
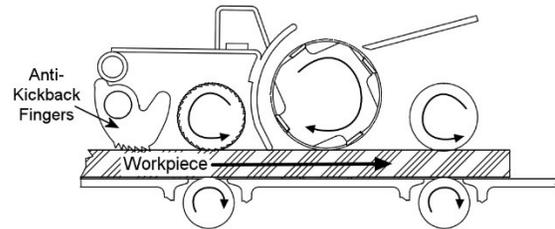
1. Prepare a piece of 2x4 with flat bottom for calibration.
2. Using the digital readout, plane the board down to 1-1/4" or 1". Use a caliper to measure the mid-section of the board for thickness.
3. Loosen the screws that holds the scale in place.



4. Shift the scale so that the pointer is pointing at the exact value as the thickness of the board.
5. Re-tighten the screws when adjustments complete.

Anti-Kickback Fingers Inspection

This planer is equipped with anti-kickback fingers. Once engaged, the workpiece can only move towards the cutterhead. This prevents accidental kickbacks which can cause serious injuries.



Inspect the anti-kickback fingers regularly to ensure they can move freely, and that their teeth are clean and are sharp enough to stop a board from moving backwards. Clean and lubricate with very light coat of SAE-30 machine oil as needed.

Replace anti-kickback fingers if they are damaged or worn.

⚠ CAUTION: Do not operate this planer without functioning anti-kickback fingers. Failure to comply can result in serious personal injuries.

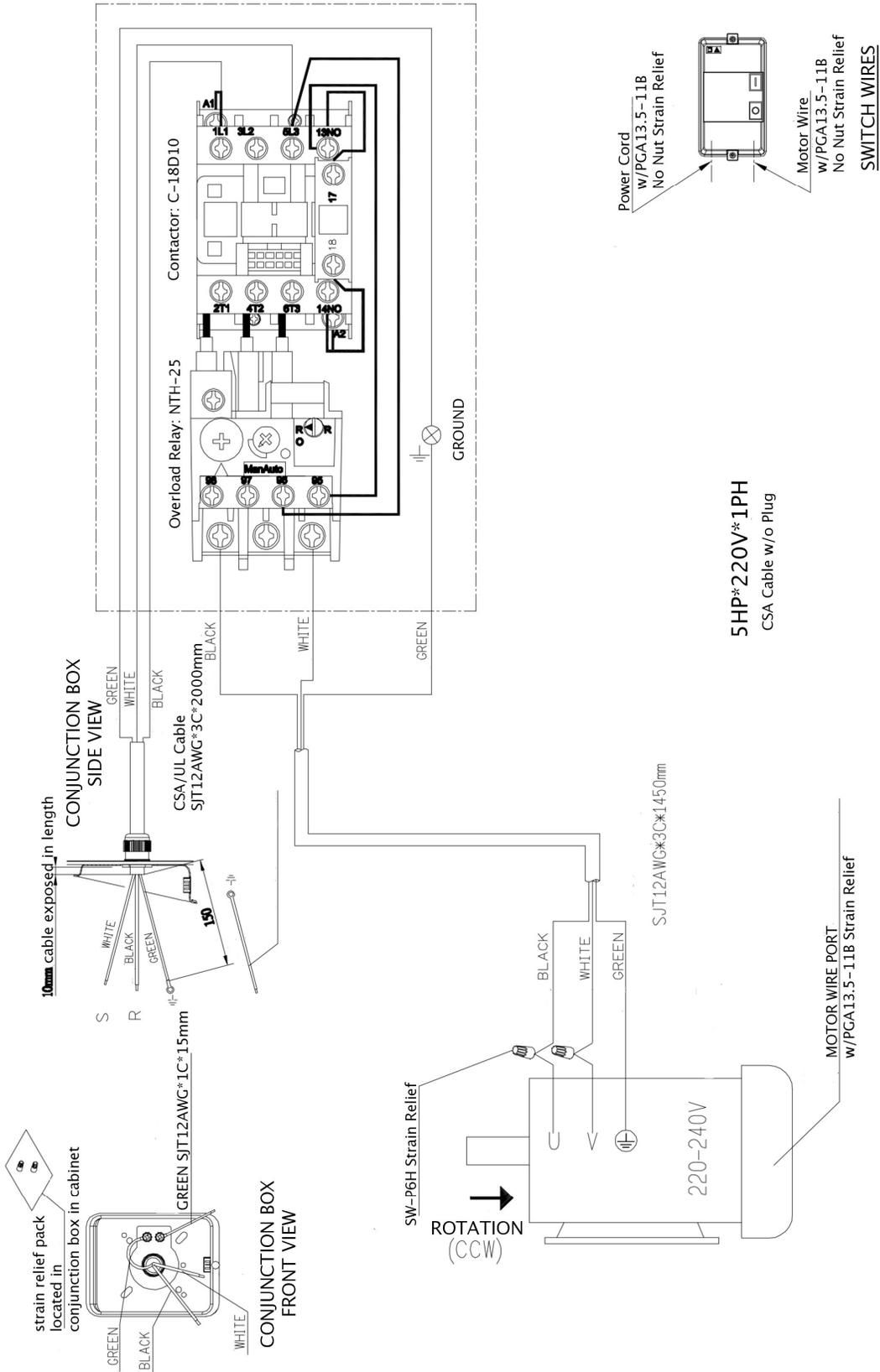
Troubleshooting

Problem	Possible Cause	Possible Solution
Machine does not start.	Machine is not connected to a power source.	<ol style="list-style-type: none"> 1. Make sure machine is plugged in, or power disconnect is at the ON position. 2. Check electrical panel for tripped circuit breaker or blown fuse. 3. Ensure all electrical connections have good contacts.
	Low voltage / current.	Have an electrician to check/repair the power circuit.
	Faulty switch/motor/capacitor.	Contact customer service for further assistance.
Machine trips thermal protection / circuit breaker, or blow fuses.	Machine is undersized for the operation.	Reduce the depth of cut and/or feed rate.
	Workpiece moisture level is too high.	Only plane wood with moisture level below 20%.
	Machine is jammed.	Inspect cutterhead and make sure it is not obstructed by woodchips. Check dust port and headstock and clear blockages.
	Too much load on a circuit.	Make sure the power circuit is sized for this machine. If the same circuit is shared, ensure the circuit is sized to supply power for all items in the circuit.
	Motor/capacitor issue.	Contact customer service for further assistance.
Machine stalls during operation.	Machine is undersized for the operation.	Reduce the depth of cut. Lower feed rate.
	Dull cutters	Rotate/replace cutter inserts.
	Belt slipping	Clean belt and the pulleys. Adjust belt tension.
	Motor/capacitor issue.	Contact customer service for further assistance.
Machine stopped during operation.	Thermal overload protection triggered.	Hit OFF button for at least 30 seconds to reset overload protection. Wait for the machine to cool down. Reduce depth of cut and feed rate before continue.
Chain jumps during operation.	Loose chain.	Adjust chain tensioner.
	Misaligned sprockets.	Align sprockets.
	Worn sprockets.	Replace sprockets and chains.
Digital readout not functional.	Dead battery.	Replace battery.

Problem	Possible Cause	Possible Solution
Unable to move feed rate knob.	Machine is not running.	Only move feed rate knob while the machine is running idle at full speed.
Feed rollers does not move when machine is running.	Gear box is in neutral.	Shift feed rate control knob to set feed rate to 16/20 FPM while machine is running idle at full speed.
Workpiece does not feed smoothly.	Low feed roller pressure.	Adjust feed roller spring tension.
	Incorrect feed roller height setting.	Adjust feed rollers height so the bottom of the rollers is below the lowest point of the cutterhead. Infeed Roller: 0.020" - 0.027" below. Outfeed Roller: 0.059" - 0.079" below.
	Dirty planer table / rollers.	Clean table and rollers. Apply paste wax on the table to reduce drag. Do not use silicon lubrications on table top.
	Belt slipping	Clean belt and the pulleys. Adjust belt tension.
	Stuck planer bed roller.	Clean and lubricate roller.
Machine vibrates excessively or makes unexpected noise.	Damaged cutter inserts.	Replace cutter inserts.
	Machine stands on uneven floor.	Reposition on flat, level surface.
	Chip deflector is hitting the cutterhead.	Move chip deflector 1/16" - 1/8" away from cutterhead.
	V-belt worn, slipping or hitting belt cover.	Clean belt and pulleys. Adjust belt tension. Replace V-belt if it shows signs of aging.
	Feed roller bushing needs lubrication.	Lubricate bushings.
	Bent pulley	Replace pulley.
	Improper motor mounting.	Check and adjust motor mounting.
	Loose components.	Tighten fasteners of the component.
Worn bearings	Contact customer service for assistance.	
Uneven depth of cut side to side.	Cutterhead is not parallel with planer table.	Adjust cutterhead-table parallelism. Tolerance: Less than 0.005" side-to-side.
Board thickness does not match the scale's measurement.	Cutterhead height scale is mispositioned.	Adjust the scale.

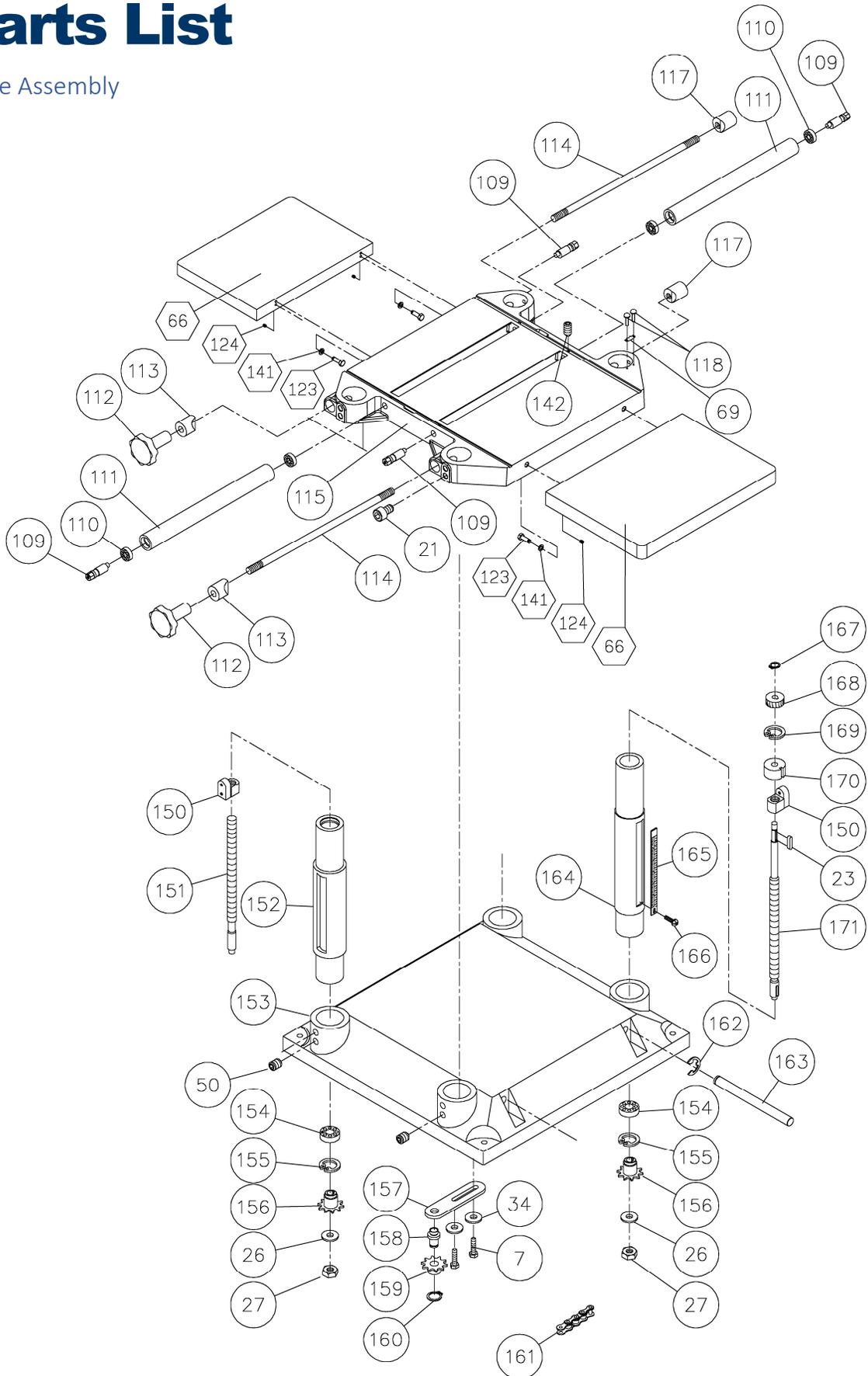
Problem	Possible Cause	Possible Solution
Workpiece came out twisted.	Workpiece is twisted before the cut.	Planer is not the tool to flatten a twisted workpiece. Flatten one side with a jointer before proceeding with a planer.
	Feed/bed roller is not parallel with the cutterhead.	Adjust roller/table parallelism.
Excessive snipe	Extension tables slope down.	Adjust the extension tables to make them parallel with the planer bed.
	Long workpiece is not supported properly.	Use auxiliary rollers to support long workpiece.
	A small amount of sniping can happen sometimes.	Add an extra 6" length on a workpiece for planing, and then trim off the ends.
End of workpiece chipping	Aggressive depth of cut for the wood type.	Reduce depth of cut.
	Planing end grain.	Do not plane end grain. Use a drum sander instead.
Chipping in workpiece surface.	Damaged cutter.	Rotate/replace cutter insert.
	Planing against/across grain; or knots.	Avoid planing workpiece with knots. Plane along the grain and perform downhill cut whenever possible. Moisten problematic areas before planing.
	Too much material removed in one pass.	Reduce feed rate / depth of cut.
Indentation in workpiece surface.	Dirty rollers.	Remove all buildups on infeed, outfeed, and table rollers.
	Inefficient chip removal.	Check dust collection system for suction. Adjust chip breaker and chip deflector.
Fuzzy looking finish.	Wood moisture content too high.	Only process wood with less than 20% moisture content.
	Dull cutter.	Rotate/replace cutter insert.
	Some wood types tend to have fuzzy grain.	Adjust feed rate / depth of cut. Use sharp cutters.
Glossy looking finish.	Dull cutter.	Rotate/replace cutter insert.
	Cutting depth too shallow.	Increase depth of cut.
Long line or ridges running along the length of board.	Chipped cutter.	Rotate/replace cutter insert.
Serrated marks on workpiece.	Cutting depth too shallow.	Increase depth of cut.

Wiring Diagram

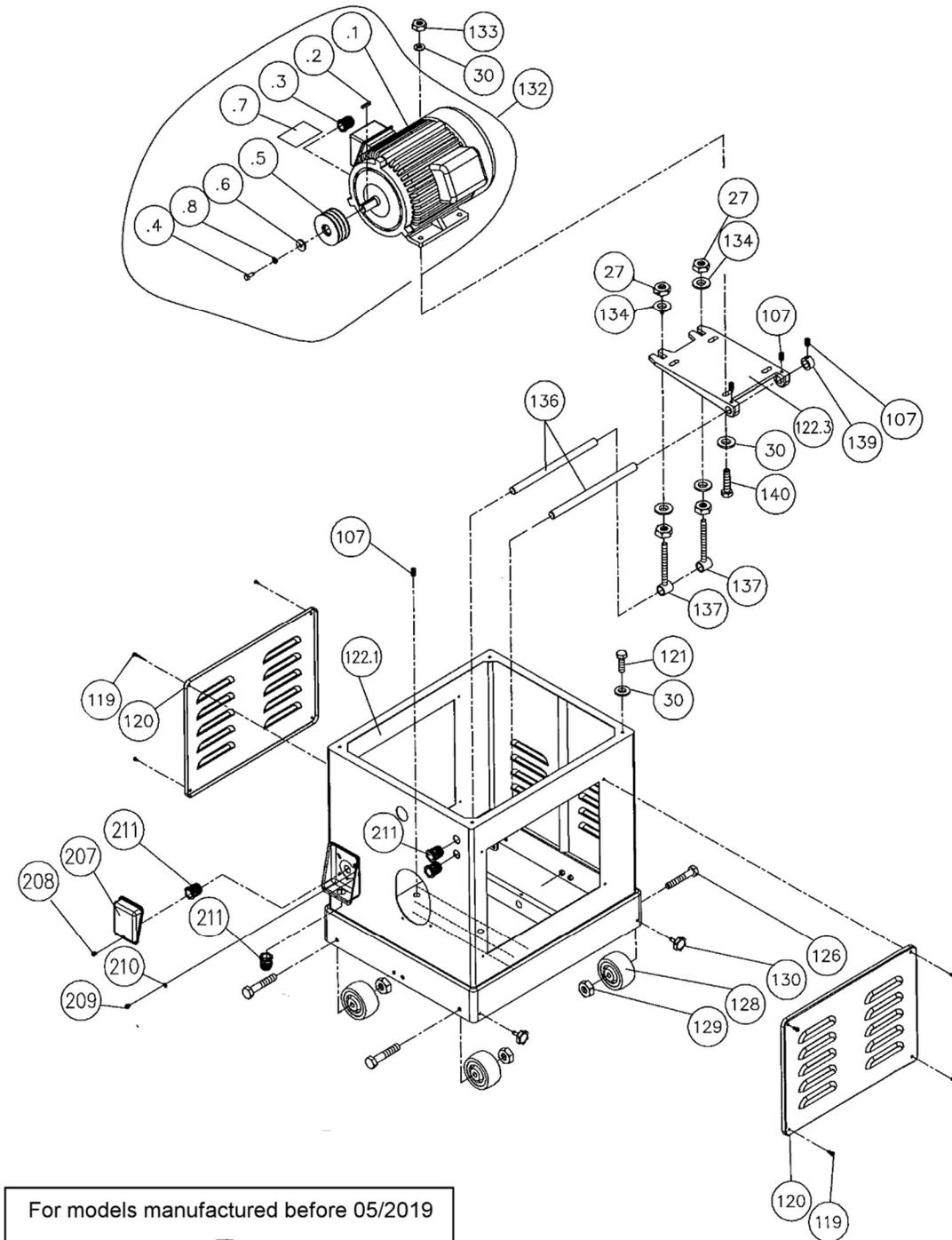


Parts List

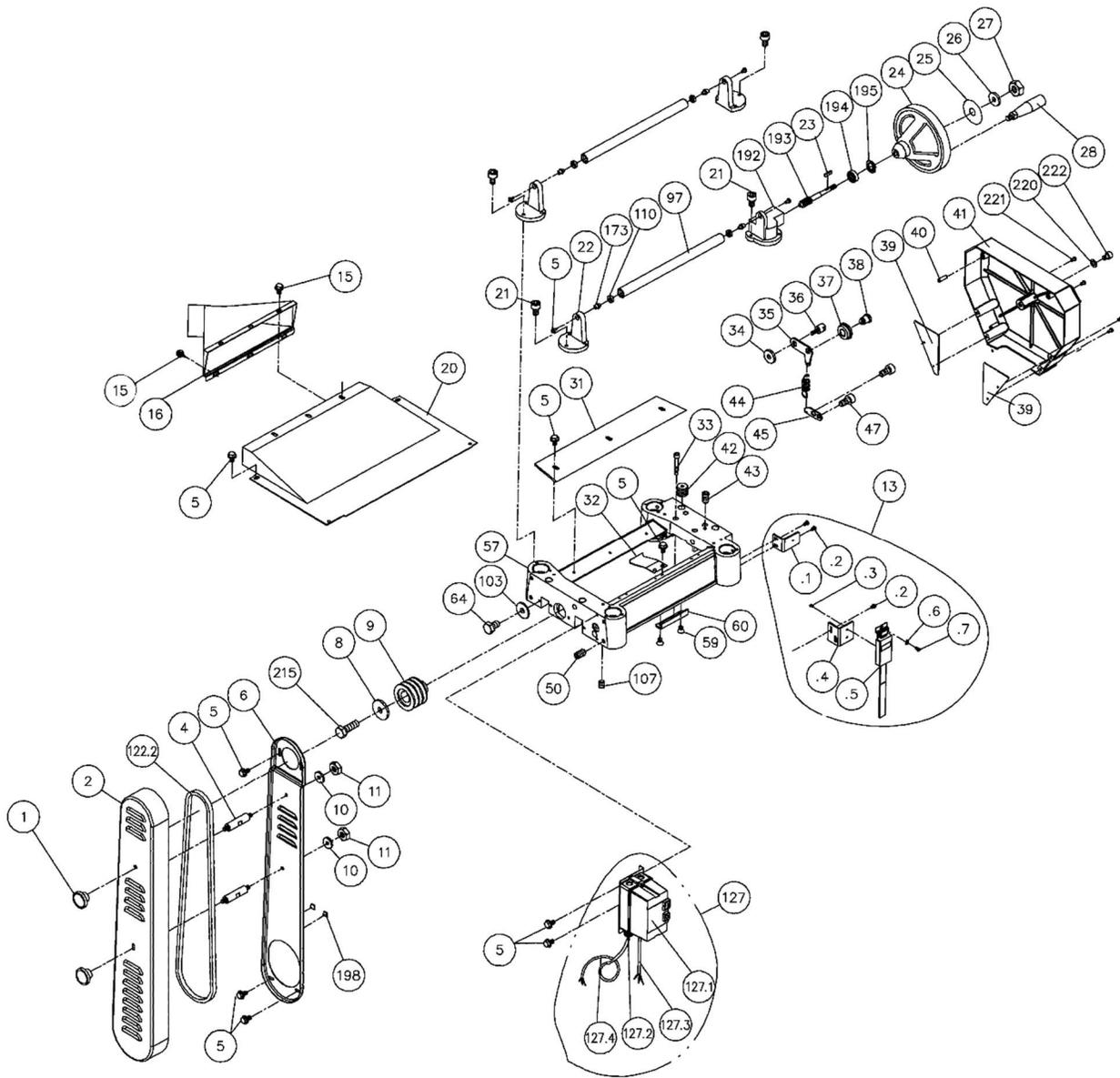
Table Assembly



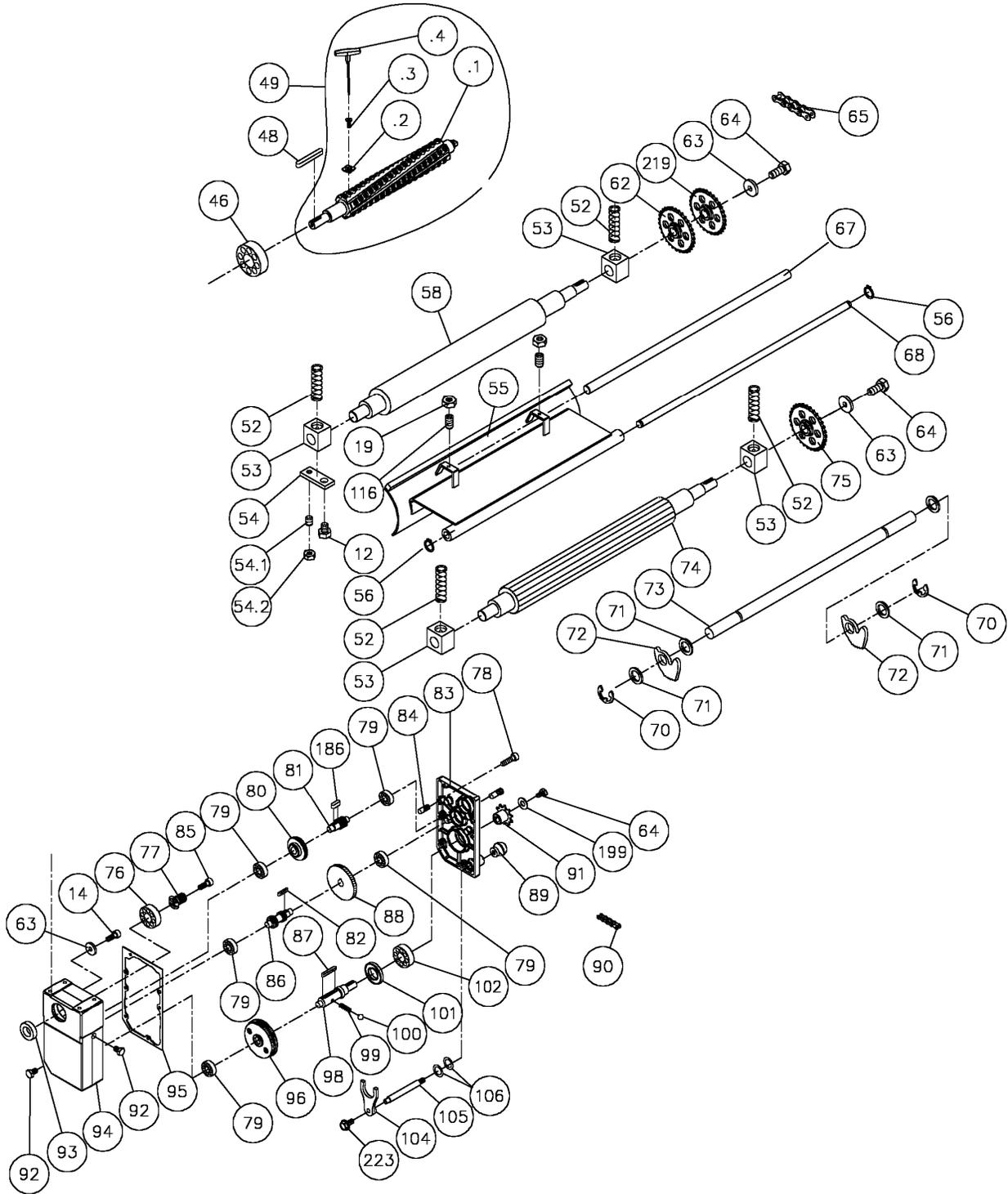
Motor and Cabinet Assembly



Headstock Assembly



Cutterhead and Rollers



Key	Part Number	Descriptions	Specifications	QTY
1	230118-000	KNOB		2
2	170871-000	BELT GUARD COVER		1
4	380147-901	SPECIAL BOLT		2
5	000902-102	HEX FLANGE BOLT	M6*1.0P*12	27
6	170432-000	BELT GUARD REAR		1
7	000003-105	HEX BOLT	M8*1.25P*25	2
8	006001-043	FLAT WASHER	8.2*30*4.0t	1
9	050273-901	CUTTER HEAD PULLEY		1
10	006002-046	FLAT WASHER	8.5*16*1.5t	2
11	009005-200	HEX NUT	5/16"-18NC	2
12	000003-104	HEX BOLT	M8*1.25P*20	4
13	921727-000	DRO SOLD AS ASSEMBLY ONLY		1
13.1	170812-902	BRACKET-UPPER (Reference only)		1
13.2	000303-102	ROUND HEAD SCREW (Reference only)	M5 x 0.8P x 8	4
13.3	000301-101	ROUND HEAD SCREW (Reference only)	M3 x 0.5P x 6	3
13.4	170811-902	BRACKET-DOWN (Reference only)		1
13.5	922366-000	DIGITAL READ OUT (Reference only)		1
13.6	006001-001	FLAT WASHER (Reference only)	4.3 x 10 x 1.0t	1
13.7	000302-102	ROUND HEAD SCREW (Reference only)	M4 x 0.7P x 8	1
14	000103-103	SOCKET HEAD CAP SCREW	M6*1.0P*12	1
15	000902-202	HEX FLANGE BOLT	M6*1.0P*12	7
16	250348-000	DUST CHUTE		1
19	008304-100	HEX NUT	M6*1.0P	2
20	172851-000	DUST HOOD		1
21	000103-107	SOCKET HEAD CAP SCREW	M6*1.0P*20	20
22	050288-000	ROLLER BRACKET		3
23	012002-004	KEY	4*4*10	2
24	240015-000	HAND WHEEL		1
25	570890-000	RAISE / LOWER DIRECTION LABEL		1
26	006001-067	FLAT WASHER	10*20*1.5t	5
27	008009-100	HEX NUT	M12*1.75P	4
28	230114-906	HANDLE		1
30	006001-056	FLAT WASHER	8.5*23*2.0t	12

Key	Part Number	Descriptions	Specifications	QTY
31	250158-617	CHIP DEFLECTOR		1
32	270015-901	SPRING PLATE		3
33	000104-114	SOCKET HEAD CAP SCREW	M8*1.25P*50	5
34	006001-041	FLAT WASHER	8.2*22*3.0t	3
35	170405-901	BRACKET		1
36	290039-901	SHAFT		1
37	130071-000	CHAIN TENSIONER		1
38	360349-901	CHAIN TENSIONER SHAFT		1
39	170424-905	SIDE COVER GUARD		2
40	011004-102	SPRING PIN	6*20	2
41	050276-000	SIDE COVER		1
42	380200-901	TENSION BOLT		4
43	000203-106	SET SCREW	M6*1.0P*16	1
44	280050-000	SPRING		1
45	170406-901	HOOK		1
46	030209-002	BALL BEARING	6205	1
47	000103-102	SOCKET HEAD CAP SCREW	M6*1.0P*10	2
48	012006-001	KEY	8*8*40	1
49	922839-001	HELICAL CUTTERHEAD ASSEMBLY		1
49.1	922840-000	HELICAL CUTTERHEAD ONLY		1
49.2	P-15mm 4S	INSERT	10PCS/BOX	90
49.3	038201-702	TORX SCREW	#10-32UNF*12.5	90
49.4	040703-000	TORX DRIVER		1
50	000205-101	SET SCREW	M10*1.5P*12	16
52	280051-000	SPRING		4
53	130039-000	BUSHING BLOCK		4
54	923901-000	RETAINER PLATE		4
54.1	000203-106	SET SCREW	M6*1.0P*16	1
54.2	008005-100	HEX HUT	M6*1.0P*(10B*5H)	1
55	170036-019	CHIP BREAKER		1
56	010003-000	RETAINING RING	STW-12	2
57	051069-000	HEAD CASTING		1
58	360024-000	OUTFEED ROLLER		1
59	000402-104	FLAT HEAD SCREW	M5*0.8P*12	2
60	170409-901	LIMIT PLATE		1

Key	Part Number	Descriptions	Specifications	QTY
62	070012-000	CHAIN SPROCKET		1
63	006001-020	FLAT WASHER	6.2*20*3.0t	3
64	000002-103	HEX SCREW	M6*1.0P*16	7
65	016306-000	CHAIN	#06B*63P	1
66	050009-000	EXTENSION TABLE		2
67	360021-902	ROD		1
68	360947-902	ROD		1
69	170464-156	POINTER		1
70	010209-000	RETAINING RING	ETW-15	2
71	250160-615	SPACER		45
72	172281-905	ANTI-KICKBACK FINGERS		44
73	360023-902	ANTI-KICKBACK SHAFT		1
74	360020-000	INFEED ROLLER		1
75	070013-000	CHAIN SPROCKET		1
76	030208-002	BALL BEARING	6204	1
77	320196-000	GEAR		1
78	000103-108	SOCKET HEAD CAP SCREW	M6*1.0P*25	5
79	030106-002	BALL BEARING	6201	5
80	320197-000	GEAR		1
81	320160-000	SHAFT		1
82	012003-002	KEY	5*5*10	1
83	050280-000	GEARBOX COVER		1
84	360355-901	PIN		2
85	002602-106	CAP LOCKING SCREW	M6*1.0P*25	1
86	320205-000	SHAFT		1
87	012004-003	KEY	6*6*40	1
88	320198-000	GEAR		1
89	250372-615	KNOB		1
90	016303-000	CHAIN	#06B*47P	1
91	150008-000	CHAIN SPROCKET		1
92	043401-000	PLUG	PT1/4"-19	2
93	043608-000	OIL SEAL	TCX4 28*40*8	1
94	050281-000	GEARBOX		1
95	340012-615	GEARBOX GASKET		1
96	922351-000	GEAR		1

Key	Part Number	Descriptions	Specifications	QTY
97	190176-906	ROLLER		2
98	360357-901	SHAFT		1
99	280052-000	SPRING		1
100	017002-000	STEEL BALL	Φ6	1
101	043505-000	OIL SEAL	SC25*47*6	1
102	030109-002	BALL BEARING	6204	1
103	006001-029	FLAT WASHER	6.5*23*3.0t	4
104	070014-000	SHIFTING CLAW		1
105	360358-901	SHAFT		1
106	043303-000	RETAINING RING	P12	1
107	000204-103	SET SCREW	M8*1.25P*12	7
109	360949-902	ECCENTRIC SHAFT		4
110	030005-001	BALL BEARING	608	8
111	190026-000	ROLLER		2
112	230115-000	KNOB		2
113	130037-000	COLUMN LOCK BUSHING		2
114	360948-902	FIXED ROD		2
115	051070-000	TABLE		1
116	000203-104	SET SCREW	M6*1.0P*12	2
117	130038-000	BUSHING		2
118	002301-201	RIVET	2*5	2
119	000801-104	ROUND HEAD HEX SCREW	M6*1.0P*20	8
120	173029-000	STAND ACCESS PANEL		2
121	000003-109	HEX SCREW	M8*1.25P*45	4
122.1	922873-000	CABINET ASSEMBLY		1
122.2	014009-000	V-BELT	M57	3
122.3	050321-008	MOTOR MOUNTING PLATE		1
123	000003-106	HEX HEAD BOLT	M8*1.25P*30	4
124	000204-104	SET SCREW	M8*1.25P*16	4
126	003005-106	HEX SCREW	3/8"-16NC*2-1/2"	4
127	937574-000	Magnetic Switch Assembly	5HP x 230V x 60HZ x 1PH	
127.1	821007-029	MAGNETIC SWITCH ONLY		1
127.2	172507-904	SWITCH PLATE		1
127.3	473004-037	SWITCH CORD	12AWG*3C*1450mm	1
127.4	473004-036	SWITCH CORD	12AWG*3C*2000mm	1

Key	Part Number	Descriptions	Specifications	QTY
128	250400-000	WHEEL		4
129	009102-100	HEX NUT	3/8"- 16NC(14.2B*11.5H)	4
130	004001-101	KNOB	5/16"-18NC*3/4"	2
Use the following part numbers for #132 for models manufactured BEFORE May 2019.				
132	900772-000	MOTOR ASS'Y	5HP x 230V x 60HZ x 1PH	1
132.1	593039-000	MOTOR	5HP x 230V x 60HZ x 1PH	1
132.2	012202-002	KEY	5 x 5 x 30	1
132.3	048201-203	HEX HEAD BOLT	M8 x 1.25P x 20	1
132.4	050271-902	MOTOR PULLEY		1
132.5	006001-043	FLAT WASHER	8.2 x 30 x 4.0t	1
132.6	021203-000	RELIEF BUSHING	SW-P6H	2
132.7	021369-000	RELIEF BUSHING	PGA13.5-11B	1
NS	496060-000	CENTRIFIGAL START SWITCH		1
NS	496222-000	MOTOR RUN CAPACITOR (30MFD)		1
NS	494061-000	MOTOR START POINTS		1
NS	496221-000	MOTOR START CAPACITOR (500MFD)		1
Use the following part numbers for #132 for models manufactured AFTER May 2019.				
132	901228-000	MOTOR ASS'Y	5HP x 230V x 60HZ x 1PH	1
132.1	593053-000	MOTOR	5HP x 230V x 60HZ x 1PH	1
132.2	012202-002	KEY	5 x 5 x 30	1
132.3	023701-007	RELIEF BUSHING W/NUT	MG25AS-14B	1
132.4	048201-203	HEX HEAD BOLT	M8*1.25P*25	1
132.5	050271-902	MOTOR PULLEY		1
132.6	006001-043	FLAT WASHER	8.2 x 30 x 4.0t	1
132.7	573556-000	MOTOR TAG		1
132.8	006305-100	SPRING WASHER	8.2*13.7	.
NS	496275-000	CENTRIFIGAL START SWITCH		1
NS	496276-000	MOTOR START POINTS		1
NS	496274-000	MOTOR RUN CAPACITOR (60MFD)		1
NS	496076-000	MOTOR START CAPACITOR (600MFD)		1
133	008006-100	HEX NUT	M8*1.25P(13B*6.5H)	4
134	006001-091	FLAT WASHER	13*28*3.0t	4
136	360986-902	MOTOR MOUNTING SHAFT		2

Key	Part Number	Descriptions	Specifications	QTY
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137	380249-901	MOTOR MOUNT TENSION SHAFT ASSEMBLY		2
139	190074-901	SPACER		2
140	000003-108	HEX SCREW	M8*1.25P*40	4
141	006305-100	SPRING WASHER	8.2*15.4	4
142	000203-101	SET SCREW	M6*1.0P*6	4
150	130043-000	COLUMN NUT		4
151	360359-000	COLUMN SCREW		3
152	050284-000	COLUMN		3
153	051071-000	BASE CASTING		1
154	030003-001	BALL BEARING	6202	4
155	010103-000	RETAINING RING	RTW-35	4
156	150010-000	CHAIN SPROCKET		4
157	170413-901	CHAIN TENSIONER BRACKET		1
158	360362-901	SPROCKET SHAFT		1
159	150009-000	CHAIN SPROCKET		1
160	010006-000	RETAINING RING	STW-15	1
161	016221-000	CHAIN	#410*148P	1
162	010208-000	RETAINING RING	ETW-12	4
163	360367-902	ROD		4
164	050286-000	MAIN COLUMN		1
165	570889-000	SCALE		1
166	000301-101	ROUND HD SCREW	M3*0.5P*6	1
167	010001-000	RETAINING RING	STW-10	1
168	320201-000	WORM GEAR		1
169	010104-000	RETAINING RING	RTW-38	1
170	130041-000	BUSHING		1
171	360372-000	ELEVATING SCREW		1
173	360380-902	SHAFT		4
186	012003-003	KEY	5*5*12	1
192	050289-000	ELEVATING SCREW GEARBOX		1
193	320306-000	LEAD SCREW		1
194	030006-001	BALL BEARING	6200	1
195	010101-000	RETAINING RING	RTW-30	1
198	200013-615	BELT GUARD SPACER		2
199	006001-021	FLAT WASHER	6.2*22*3t	5

Key	Part Number	Descriptions	Specifications	QTY
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207	490124-000	TERMNAL COVER		1
208	003303-102	ROUND HD SCREW	3/16"-24NC*1/4"	1
209	000303-103	ROUND HD SCREW	M5*0.8P*10	2
210	006502-100	TOOTH WASHER	5.3*10(BW-5)	3
211	021311-000	RELIEF BUSHING	PGA13.5-11B	4
215	048201-204	HEX LOCK SCREW	M8*1.25P*30	1
219	150025-000	CHAIN SPROCKET		
220	006001-045	FLAT WASHER	8.5*16*1.5t	1
221	002001-704	PAN HEAD LOCK SCREW	M4*0.7P*8	4
222	000104-102	CAP SCREW	M8*1.25P*10	1
223	029502-201	HEX LOCK SCREW W/ WASHER	M6*1.0P*12	1

Spare Parts

Part Number	Descriptions	Specifications	QTY
P-15mm 4S	INSERT (SOLD IN BOX OF 10)		10
038201-101	TORX SCREW	#10-32UNF*1/2"	10

Tools for Assembly

Part Number	Descriptions	Specifications	QTY
040006-000	HEX WRENCH (Local Purchase)	6mm	1
040005-000	HEX WRENCH (Local Purchase)	5mm	1
040004-000	HEX WRENCH (Local Purchase)	4mm	1
040003-000	HEX WRENCH (Local Purchase)	3mm	1
040201-000	COMBO WRENCH (Local Purchase)	8*10	1
040204-000	COMBO WRENCH (Local Purchase)	12*14	1

Warranty and Service

Oliver makes every effort possible to assure that its equipment meets the highest possible standards of quality and durability. All products sold by Oliver are warranted to the original customer to be free from defects for a period of 2 (two) years on all parts, excluding electronics and motors, which are warranted for 1 year. Oliver's obligation under this warranty shall be exclusively limited to repairing or replacing (at Oliver's option) products which are determined by Oliver to be defective upon delivery F.O.B. (return freight paid by customer) to Oliver, and on inspection by Oliver. This warranty does not apply to defects due, directly or indirectly, to misuse, abuse, negligence, accidents, unauthorized repairs, alterations, lack of maintenance, acts of nature, or items that would normally be consumed or require replacement due to normal wear. In no event shall Oliver be liable for death, personal or property injury, or damages arising from the use of its products.

Appendix

US Standard – Metric Conversion Chart

Fractions	Decimal In.	Millimeters
1/64	.0156	.396
1/32	.0312	.793
3/64	.0469	1.190
1/16	.0625	1.587
5/64	.0781	1.984
3/32	.0937	2.381
7/64	.1094	2.778
1/8	.125	3.175
9/64	.1406	3.571
5/32	.1562	3.968
11/64	.1719	4.365
3/16	.1875	4.762
13/64	.2031	5.159
7/32	.2187	5.556
15/64	.2344	5.953
1/4	.25	6.350
17/64	.2656	6.746
9/32	.2812	7.143
19/64	.2969	7.540
5/16	.3125	7.937
21/64	.3281	8.334
11/32	.3437	8.731
23/64	.3594	9.128
3/8	.375	9.525
25/64	.3906	9.921
13/32	.4062	10.318
27/64	.4219	10.715
7/16	.4375	11.112
29/64	.4531	11.509
15/32	.4687	11.906
31/64	.4844	12.303
1/2	.5	12.700

Fractions	Decimals In.	Millimeters
33/64	.5156	13.096
17/32	.5312	13.493
35/64	.5469	13.890
9/16	.5625	14.287
37/64	.5781	14.684
19/32	.5937	15.081
39/64	.6094	15.478
5/8	.625	15.875
41/64	.6406	16.271
21/32	.6562	16.668
43/64	.6719	17.065
11/16	.6875	17.462
45/64	.7031	17.859
23/32	.7187	18.256
47/64	.7344	18.653
3/4	.75	19.050
49/64	.7656	19.446
25/32	.7812	19.843
51/64	.7969	20.240
13/16	.8125	20.637
53/64	.8281	21.034
27/32	.8437	21.431
55/64	.8594	21.828
7/8	.875	22.225
57/64	.8906	22.621
29/32	.9062	23.018
59/64	.9219	23.415
15/16	.9375	23.812
61/64	.9531	24.209
31/32	.9687	24.606
63/64	.9844	25.003
1.0	1.	25.400



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