4470 Industrial Planer 25”

Owner’s Manual

Oliver Machinery

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M-4470 9/2017

Warranty

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.

Warning

Read this manual thoroughly before operating the machine. 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.

For More Information

Oliver Machinery is always adding new Industrial Woodworking products to the line. For complete, up-to-date product information, check with your local Oliver Machinery distributor, or visit www.olivermachinery.net

WARNING

Read this manual completely and observe all warning labels on the machine. Oliver Machinery has made every attempt to provide a safe, reliable, easy-to-use piece of machinery. Safety, however, is ultimately the responsibility of the individual machine operator. As with any piece of machinery, the operator must exercise caution, patience, and common sense to safely run the machine. Before operating this product, become familiar with the safety rules in the following sections.

- **Always keep guards and covers in place and in proper operating condition.**

1. If you are not properly trained in the use of a planer do not use until the proper training has been obtained.

2. Read, understand and follow the safety instructions found in this manual. Know the limitations and hazards associated with this machine.

3. 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 plug are used, make certain that the grounding plug connects to a suitable ground. Follow the grounding procedure indicated in the National Electrical Code.

4. Wear an approved safety shield, goggles, or glasses to protect eyes. Common eyeglasses are only impact-resistant, they are not safety glasses.

5. Before operating the machine, remove tie, rings, watch and other jewelry and roll up sleeves above the elbows. Remove all loose outer clothing and confine long hair. Protective type footwear should be used. Where the noise exceeds the level of exposure allowed in Section 1910.95 of the OSHA Regulations, use hearing protective devices. Do not wear gloves.

6. Keep the machine guards and covers in place for every operation. If any guards and covers are removed for maintenance, DO NOT OPERATE the machine until the guards and covers are reinstalled.

7. Keep the floor around the machine clean and free of scrap material, saw dust, oil and other liquids to minimize the danger of tripping or slipping. Be sure the table is free of all scrap, foreign material and tools before starting the planer. 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.

8. Maintain a balanced stance and keep your body under control at all times.

9. Before turning on machine, remove all extra equipment such as keys, wrenches, scraps, and cleaning rags away from the machine.

10. Give the work you are doing your undivided attention. Looking around, carrying on a conversation, and “horseplay” are careless acts that can result in serious injury.

11. Before performing any service, maintenance, adjustments or when changing knives disconnect the machine from power source. A machine under repair should be RED TAGGED to show it should not be used until the maintenance is complete.

12. Do not plane boards with loose knots, nails or any foreign material in the workpiece. Irregular, or warped stock should be jointed first on one side before planing a parallel surface.

13. If the operator leaves the machine area for any reason, the planer should be turned "off" and the cutterhead should come to a complete stop before their departure. In addition, if the operation is complete, they should clean the planer and the work area. NEVER clean the planer with power "on" and never use hands to clear sawdust and debris; use a brush or air hose.

14. Use only genuine Oliver Machinery factory authorized replacement parts and accessories; otherwise the warranty and guarantee is null and void.

15. Do not use this Oliver planer 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.

16. Do not operate this machine while under the influence of drugs, alcohol, or any medication.

17. This machine is deigned for planing wood products only. Do not use to plane any kind of substance other then wood.

18. Never start the planer while a workpiece is in contact with the cutterhead or knives.

19. Always feed workpiece against the rotation of the cutterhead.

20. Some dust created by power sanding, sawing, grinding, drilling and other construction activities contains chemicals known to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:
    - Lead from lead-based paint.
    - Crystalline silica from bricks and cement and other masonry products.
    - Arsenic and chromium from chemically-treated lumber.

    Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals, work in a well-ventilated area, and work with approved safety equipment, such as those dust masks that are specifically designed to filter out microscopic particles.

Familiarize yourself with the following safety notices used in this manual:

CAUTION: (This means that if precautions are not heeded, it may result in minor or moderate injury and/or possible machine damage)

WARNING: (This means that if precautions are not heeded, it could result in serious injury or possibly even death).

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Specifications

Stock No.	(10HP, 1Ph HSS Straight Knife) 4470.001
Stock No.	(15HP, 3Ph HSS Straight Knife) 4470.002
Stock No.	(10HP, 1Ph Carbide Helical Cutterhead) 4470.101
Stock No.	(15HP, 3Ph Carbide Helical Cutterhead) 4470.102
Maximum Stock Width (in.)	25
Maximum Depth of Cut (in.)	1/4
Maximum Stock Thickness (in.)	9-1/4
Minimum Stock Thickness (in.)	1/8
Minimum Stock Length (in.)	10
Dust Port Diameter (in.)	5
Minimum CFM Required	900
Segmented Infeed Roller Diameter (in.)	3
Two Steel Outfeed Roller Diameter (in.)	3
Feed Speeds (FPM)	20, 25 and 30
Bed Rollers	2, Adjustable
Table Size (L x W/in.)	32 x 26
Cutterhead Diameter (in.)	3-1/2
Number of Knives	4
Cutterhead Speed (RPM)	4,800
Table Support	2-Column
Motor	10HP, 1Ph, 220V Only
	10HP, 3Ph, 220V/440V, Prewired 220V
Gross Weight (lbs.)	1,837

Oliver 4470 - 25” Industrial Planer

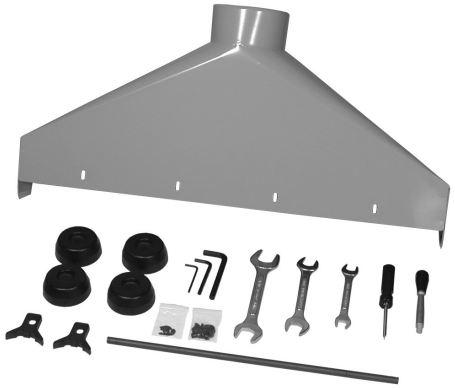
1. 25” Planer

Box 1

4. Leveling Pads
3. Hex Key Wrenches
3. Open End Wrenches
1. Screwdriver
2. Knife Setting Gauges
1. Knife Setting Gauge Shaft
4. E-Clips
1. Handle

Box 2

1. Dust Chute
8. Hex Head Screws M6x10



Uncrating the Machine

Retain all packaging materials in case it becomes necessary to ship the machine to another site.

Machine Preparation and Setup

□□□WARNING!

The equipment used to lift this machine must have a rated capacity at, or above the weight of the planer. Failure to comply may cause serious injury!

The planer can be lifted from over head using slings and the four lifting hooks (A, Figure 1).

The planer must be positioned on a smooth, level surface. Install the leveling pads (B, Figure 1) under the four corners of the planer.

Clean all rust protected surfaces with a commercial solvent. Do not use acetone, gasoline, lacquer thinner or any type of flammable solvent, or a cleaner that may damage paint. Cover cleaned surfaces with WD-40 or a 20W machine oil.

Place a level on the table of planer and adjust leveling bolts (C, Figure 1) until the machine is resting level. Tighten the hex nuts (D, Figure 1) against the base of the planer to keep the leveling bolts from turning.

Figure 1

Electrical Connections

□□□WARNING!

Electrical connections and wiring must be done by a qualified electrician. The machine must be properly grounded. Failure to comply may cause serious injury!

This planer is available in both 1-Phase and 3-Phase versions.

- **Electrical Connections for a 3-Phase Unit**

This planer is 3-Phase, 220V/440V **pre-wired 220V**. If you need to switch the planer from 220V to 440V have a qualified electrician make the changes.

Make sure the voltage of your power supply matches the specifications on the motor plate of the machine.

1. **Disconnect machine from power source!**
2. Remove screws that secure the cover to connection box.
3. Insert the power cable through strain relief, and attach the wires to terminals.
4. Re-install connection box cover. With 3-Phase power verify table raises when pressing the "Table Up" button. If it does not, disconnect machine from power source and reverse any two incoming power leads.
5. When wiring is completed, tape all power box joints to keep out dust.

- **Electrical Connections for a 1-Phase Unit**

This planer is 1-Phase, **220V only**.

Make sure the voltage of your power supply matches the specifications on the motor plate of the machine.

1. **Disconnect machine from power source!**
2. Remove screws that secure the cover to connection box.
3. Insert the power cable through strain relief, and attach the wires to the terminals.
4. Re-install connection box cover.
5. When wiring is completed, tape all power box joints to keep out dust.

Dust Chute Assembly

Mount the dust chute (A, Figure 2) to the planer hood with eight M6x10 hex head screws (B, Figure 2). Make sure the dust collection system has sufficient capacity and suction for your planer. Always turn on the dust collection system before starting the planer.

Table Roller Handle Assembly

Thread the handle (C, Figure 3) into the hub.

Control Panel

D. **Emergency Stop Button:** Stops all functions of machine, but the planer still has power. To reset rotate switch clockwise until the button pops out.

E. **Main Motor:** Starts rotation of cutterhead. Will not work if the "Emergency Stop" switch is engaged, or hood is open.

F. **Digital Thickness Controls:** Displays and controls table position, units, etc..

G. **Table Up:** Raises the table. **Note:** Table will contact the upper limit switch at about 5/8" and will automatically shut down. You can continue to raise manually by using the handwheel.

H. **Table Down:** Lowers the table. **Note:** Table will contact the lower limit switch at about 8-5/8" and will automatically shut down. You can continue to lower manually by using the handwheel.

Digital Controller

I. LED readout displays the thickness setting.

J. The digital thickness controls are capable of operating and displaying in either inches, or millimeters by pressing the "Units" button.

K. The "+" and "-" buttons can be used to move the table up or down without keying in an exact numerical thickness value. **Note:** The "-" button raises the table to subtract from workpiece thickness. The "+" button lowers the table.

L. "Start" button is used to begin table travel after a numeric value has been keyed in.

M. The "Stop" button is used to stop the table travel after it has started.

N. The "Set" button is used when calibrating or setting the thickness scale.

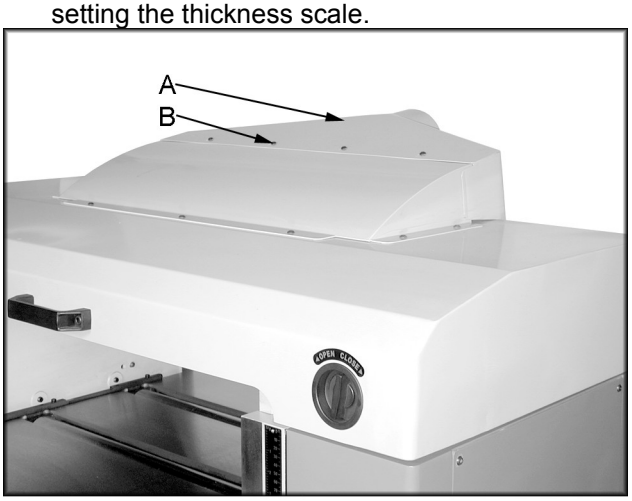


Figure 2

Figure 3

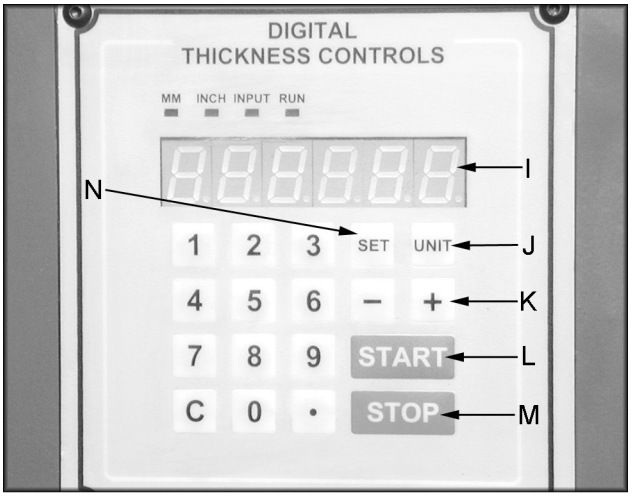


Figure 4

Changing Units of Measure

Press unit button (A, Figure 5) to toggle back and forth between inches and millimeters.

Calibrating the Display

The following sections will describe the use of a calibrating board. The calibrating board should be made of a hardwood and have one side that has been run through a jointer.

1. With the planer turned "OFF – cutterhead **NOT** spinning", place your calibrating board jointed surface down on the table and slide it into the machine.

2. Use the table "UP" button to raise the table so that the in-feed roller is about 1/32" above the calibrating board.

3. Remove calibrating board from planer and turn the planer "ON".

4. Use the table "UP" button to raise the table about 0.1", as indicated by LED and run the calibrating board through the planer.

5. Repeat Step 4 until the planer removes the entire top surface of your calibrating board.

6. Measure the thickness of the board using a pair of calipers.

7. Press the "SET" button (C, Figure 5) and then type in the measured thickness from step 6. Press the "SET" button again and hold in until the decimal point stops blinking (about three seconds).

Planing to a Specific Thickness

1. Measure thickest section of the workpiece.

2. Subtract the amount you wish to remove from the current thickness of the workpiece.

3. Press the "SET" button and enter the amount from step 2.

4. Press "START" button (D, Figure 5) to begin the table movement up, or down until the set value is achieved.

   Note: Do not feed material through the planer while the table is raising or lowering.

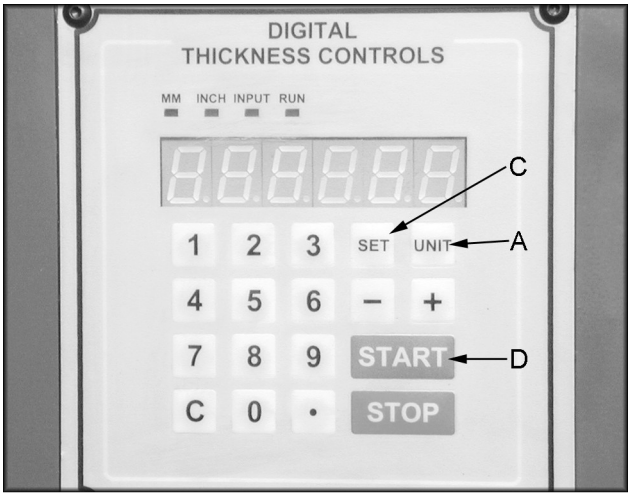


Figure 5

Fraction	Decimal	Metric
1/32	0.031	0.794
1/16	0.063	1.588
3/32	0.094	2.381
1/8	0.125	3.175
5/32	0.156	3.969
3/16	0.188	4.763
7/32	0.219	5.556
1/4	0.250	6.350
9/32	0.281	7.144
5/16	0.313	7.938
11/32	0.344	8.731
3/8	0.375	9.525
13/32	0.406	10.319
7/16	0.438	11.113
15/32	0.469	11.906
1/2	0.500	12.700
17/32	0.531	13.494
9/16	0.563	14.288
19/32	0.594	15.081
5/8	0.625	15.875
21/32	0.656	16.669
11/16	0.688	17.463
23/32	0.719	18.256
3/4	0.750	19.050
25/32	0.781	19.844
13/16	0.813	20.638
27/32	0.844	21.431
7/8	0.875	22.225
29/32	0.906	23.019
15/16	0.938	23.813
31/32	0.969	24.606
1	1.00	25.400

Figure 6

Raising and Lowering Table

Turn the handwheel (A, Figure 7) clockwise to raise the table. One revolution equals 1/32" or 0.03". **Note:** The handwheel is spring loaded. Push in on the handwheel and rotate until the pins engage the detents.

Adjusting Thickness Scale

1. Run a board through the planer and measure the thickness of the planed board with a pair of calipers.

2. Adjust the pointer (B, Figure 7) by loosening the screw that holds it in place. **Note:** This measurement should be the same as digital readout.

Table Roller Adjustment

Loosen the handle (C, Figure 7) and move the table rollers up, or down by raising, or lowering the handle (D, Figure 7). When you reach the desired position tighten the handle.

The rollers are usually set higher when planing rough stock. When planing smooth stock the table rollers should be set slightly above, or flush with the table.

Changing Feed Rate

The planer has three selectable feed speeds that feed stock at 20, 25 and 30 feet per minute. To adjust speed, turn lever (E, Figure 8) until it clicks into place. **Change feed speed only while the feed system is RUNNING!**

Table Stop

The socket head cap screws (F, Figure 8) act as a stop and prevent you from running the table into the cutting and feeding assembly.

Opening Hood

Turn the locks (G, Figure 8) to open the hood. The hood will open automatically. Use the handle (H, Figure, 8) to shut the hood.

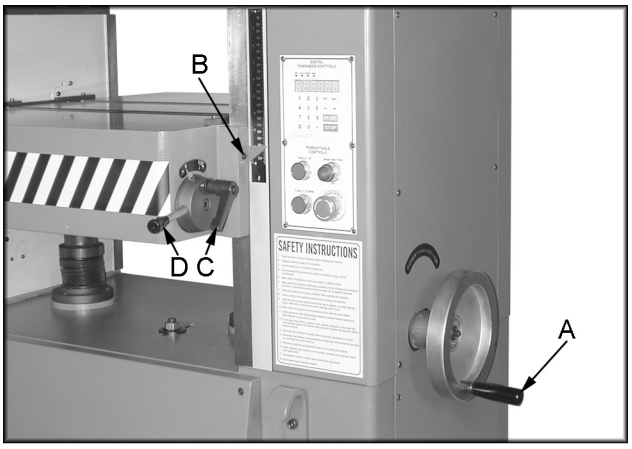


Figure 7

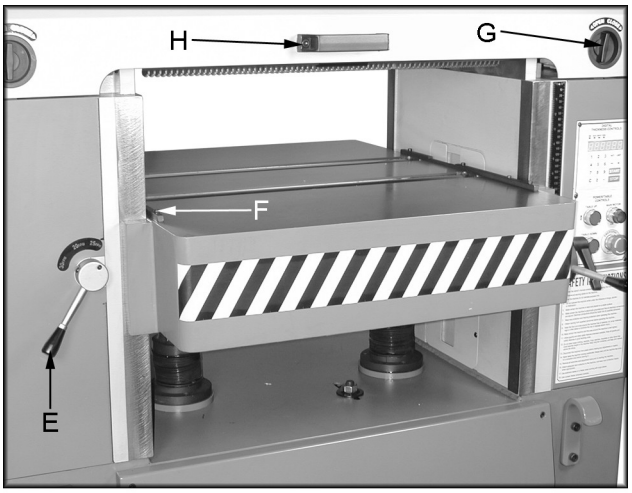


Figure 8

Setting / Changing Knives

□□□WARNING!

Knives are extremely sharp. Be very careful when handling knives. Failure to comply may cause serious injury!

The Oliver 25" planer was designed to accept 25-1/8" x 1" x 1/8") knives. Installing straight knives accurately is an important step to achieve a smooth finish. End to end, and knife to knife adjustment must be accurate within .001". Use a dial indicator if available to check results and fine tune. Remove and replace the knife in one slot before changing the next knife. Any knife sharpening, or replacement should be done to all four knives at the same time.

1. **Disconnect machine from power source.**

2. Open the hood, loosen ten locking bolts (A, Figure 9) on the clamping block and remove the knife. Remove and clean the clamping block, and springs (B, Figure 10). Also clean cutterhead knife slot before re-installing the sharpened, or new knife.

3. Re-install the springs, knife and clamping block, and just snug the ten locking bolts (A, Figure 9). **Note:** You should still be able to raise and lower the knife.

4. Notice that the knife does not rest at the bottom of the knife slot. Instead, the knife rests on three jack screws (C, Figure 9), and two springs. These jack screws are used to support and raise the knife.

5. Place the knife setting gauge (D, Figure 11) on to the cutterhead as shown in Figure 11. Use the jackscrew to raise the knife so that the point just touches the raised portion of the gauge.

6. Once knife is set to the proper height, tighten two center locking bolts and, work your way towards the ends until all bolts are tight.

7. Re-check knife with the knife setting gauge after tightening all of the locking bolts.

8. Repeat for the remaining three knives.

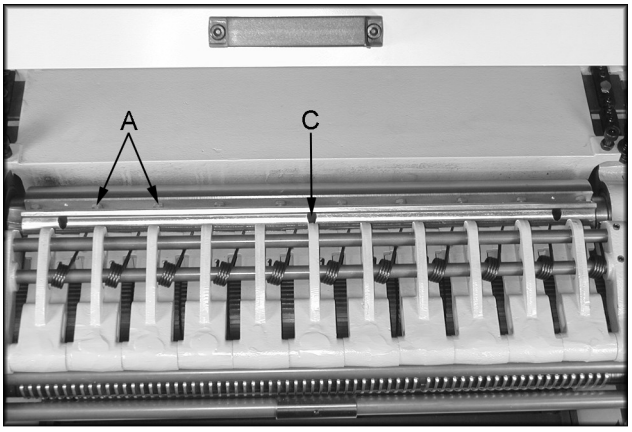


Figure 9

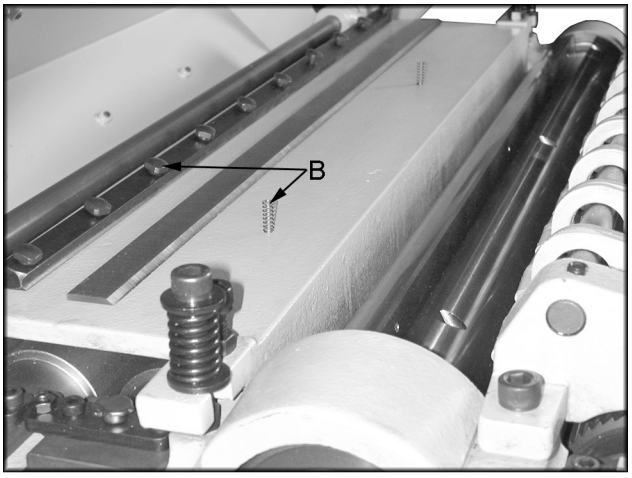


Figure 10

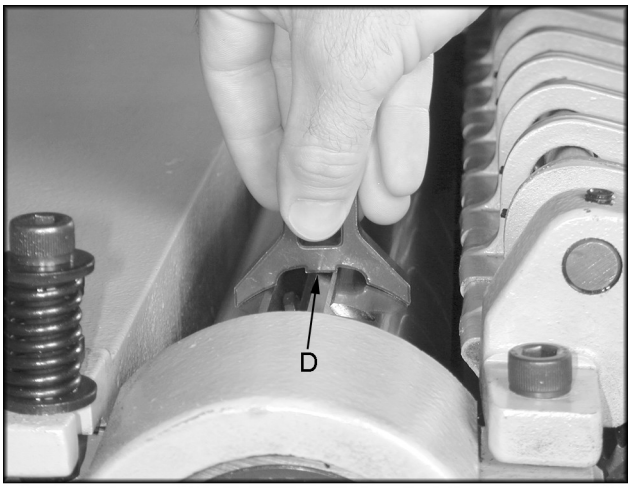


Figure 11

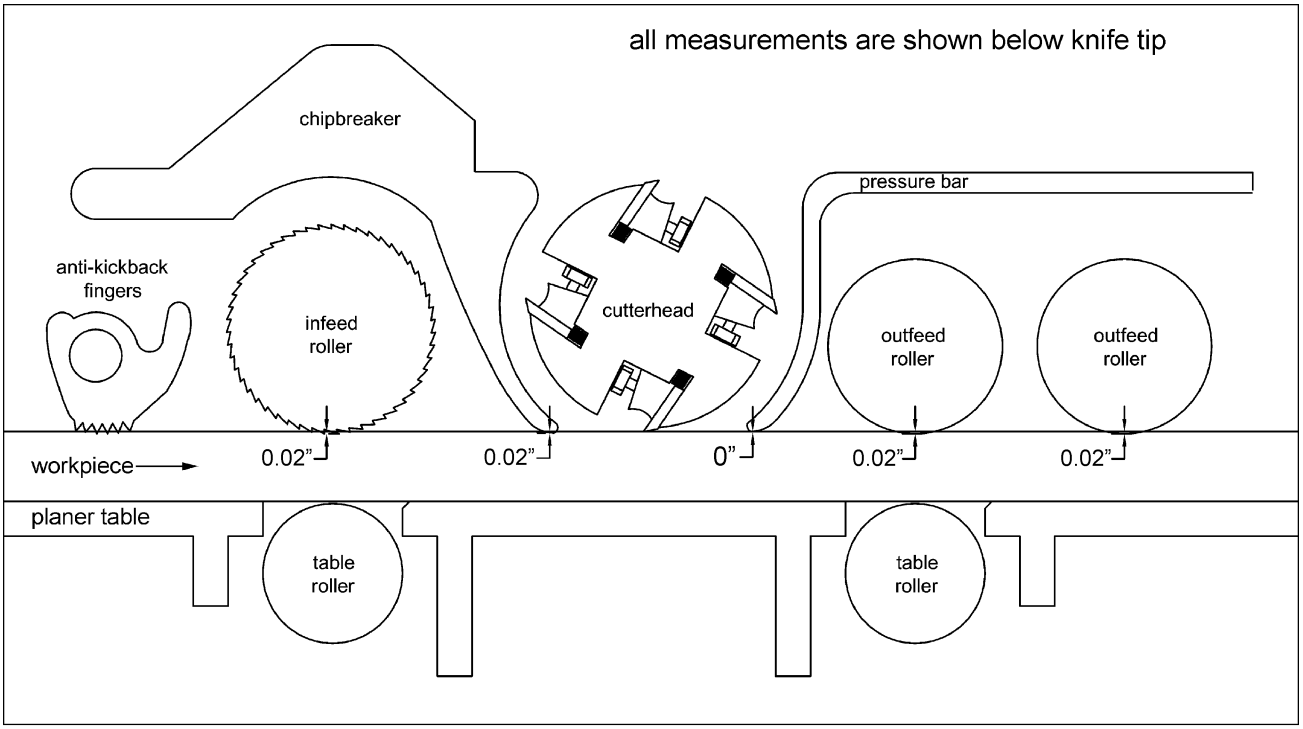


Figure 12

Setup of Feed Rollers, Chipbreaker and Pressure Bar

□□□WARNING!

Disconnect machine from the power source before performing any adjustments or maintenance. Failure to comply may cause serious injury!

The planer comes set up from the factory and shouldn't need any adjustment.

If you find adjustment is necessary, follow the below listed sections for setting the in-feed roller, chipbreaker, pressure bar and outfeed rollers.

Make a hardwood block to the specifications in drawing Figure 13. You can use this wood gauge along with 0.02" feeler gauge to set the planer up as shown in Figure 12.

Figure 12 shows setup for general planing applications. Depending on the stock and cutterhead you may find that a different setup may work better for your particular planing operation.

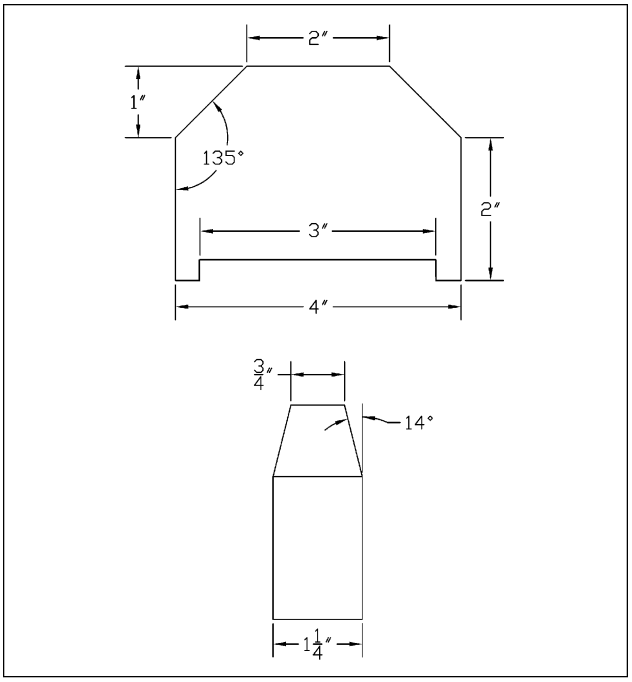


Figure 13

Anti-Kickback Fingers

Anti-kickback fingers help prevent stock from being kicked out of the machine towards the user. Keep the fingers clean and free from sawdust, pitch gum, etc. so they operate smoothly.

Adjustment of In-Feed Roller

The in-feed roller should be set 0.02" below the lowest point of knife. Make sure the knives are set properly see the "Setting / Changing Knives" section on page 11 prior to making any adjustments.

1. **Disconnect machine from power source.**

2. Place a hard wood gauge (A, Figure 14) under a knife in cutterhead. Place a 0.02" feeler gauge (B, Figure 14) on top of wood block and raise table until feeler gauge contacts the knife in its lowest position.

3. Remove feeler gauge and place wood block under the left side of in-feed roller. The top of wood gauge should just contact the in-feed roller. If it doesn't, loosen jam nut (C, Figure 15) and turn the adjusting screw (D, Figure 15) to raise, or lower the in-feed roller until it contacts wood gauge. Repeat for opposite side of the in-feed roller.

Adjustment of Chipbreaker

Chipbreaker should be set 0.02" below the lowest point of knife. Make sure the knives are set properly see the "Setting / Changing Knives" section on page 11 prior to making any adjustments.

1. **Disconnect machine from power source.**

2. Place a hard wood gauge (A, Figure 14) under a knife in the cutterhead. Place a 0.02" feeler gauge (B, Figure 14) on top of wood block and raise table until the gauge contacts the knife in its lowest position.

3. Remove feeler gauge and place wood gauge (E, Figure 16) under the left side of chipbreaker (F, Figure 16). The top of the wood gauge should just contact the chipbreaker. If it doesn't, remove the socket head cap screw (G, Figure 15) and remove washer (H, Figure 15), or replace with a shim of proper thickness to raise, or lower the chipbreaker until it contacts the wood gauge. Repeat for opposite side of the chipbreaker.

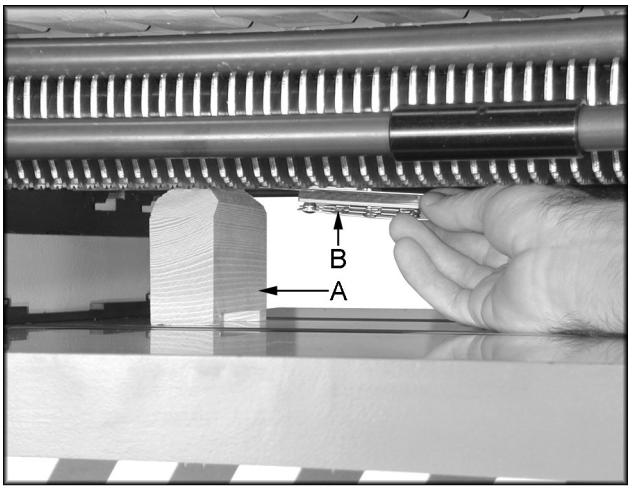


Figure 14

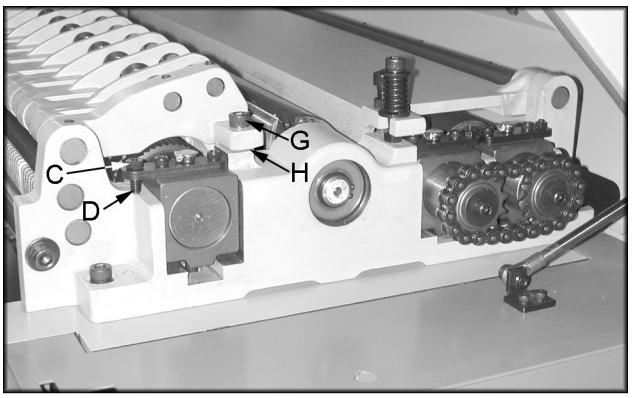


Figure 15

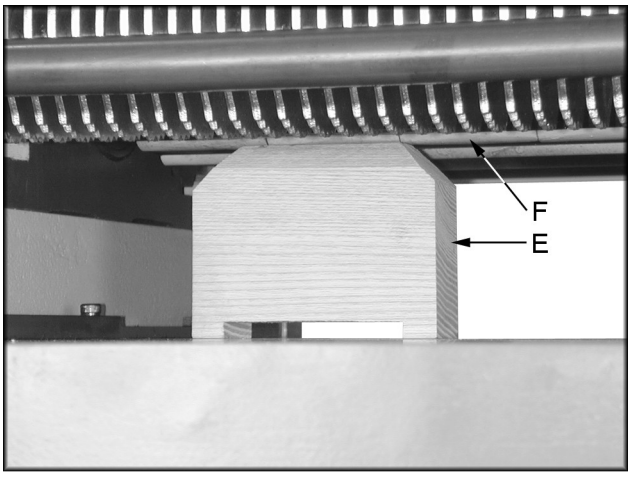


Figure 16

Adjustment of Pressure Bar

The pressure bar should be set even with the lowest point of knife. Make sure the knives are set properly see the "Setting / Changing Knives" section on page 11 prior to making any adjustments.

1. **Disconnect machine from power source.**

2. Place a hard wood gauge under a knife in cutterhead. Raise table until wood gauge contacts the knife in its lowest position.

3. Place wood block (A, Figure 17) under the left side of pressure bar (B, Figure 17). The top of wood gauge should just contact the pressure bar. If it doesn't, loosen jam nut (C, Figure 18) and turn the adjusting screw (D, Figure 18) to raise, or lower the pressure bar until it contacts wood gauge. Repeat for opposite side of the pressure bar.

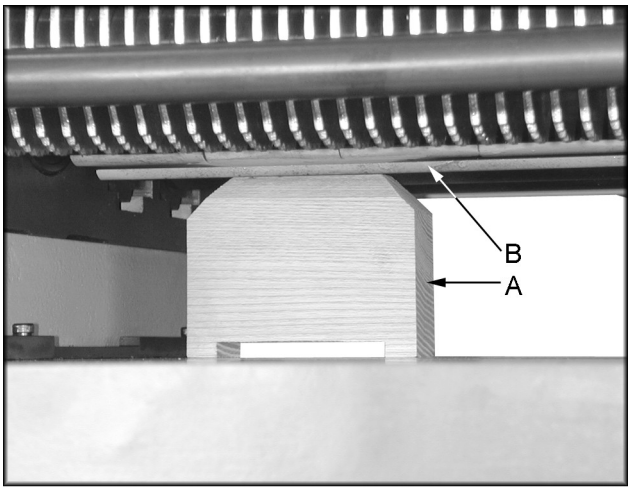


Figure 17

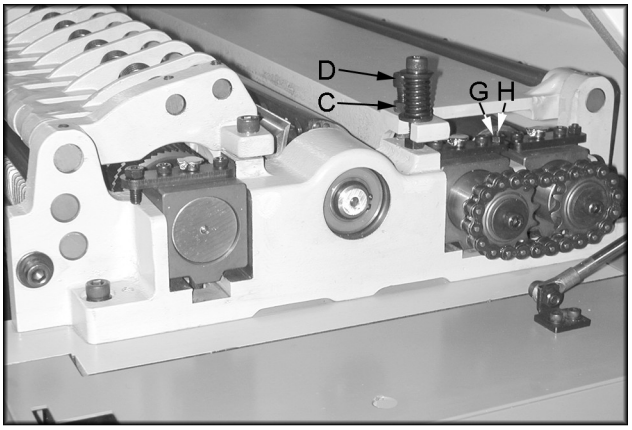


Figure 18

Adjustment of Out-feed Rollers

The out-feed rollers should be set 0.02" below the lowest point of knife. Make sure the knives are set properly see the "Setting / Changing Knives" section on page 11 prior to making any adjustments.

1. **Disconnect machine from power source.**

2. Place a hard wood gauge (A, Figure 14) under a knife in the cutterhead. Place a 0.02" feeler gauge (B, Figure 14) on top of wood block and raise table until the gauge contacts the knife in its lowest position.

3. Remove feeler gauge and place wood block (E, Figure 19) under the left side of out-feed roller (F, Figure 19). The top of wood gauge should just contact the out-feed roller. If it doesn't, loosen jam nut (G, Figure 18) and turn the adjusting screw (H, Figure 18) to raise, or lower the out-feed roller until it contacts wood gauge. Repeat for opposite side of the out-feed roller.

4. Repeat for second out-feed roller

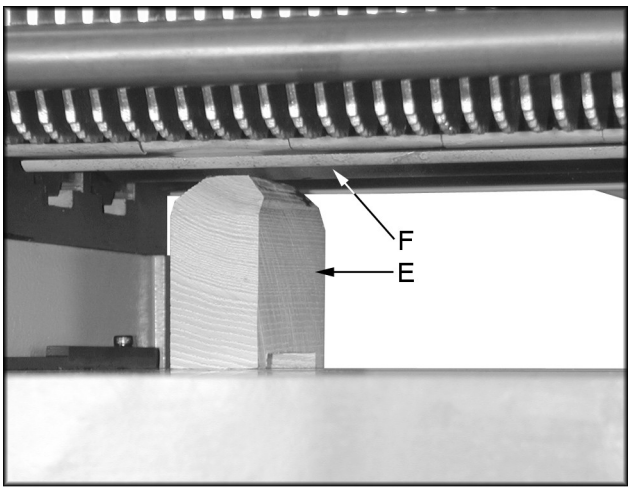


Figure 19

Helical Cutterhead

□□□WARNING!

Knives are extremely sharp. Be very careful when handling knives. Failure to comply may cause serious injury!

The helical cutterhead is set-up with the same relationship to the in-feed roller, chipbreaker, pressure bar and outfeed rollers as the straight knife cutterhead. The planer comes set up from the factory and shouldn't need any adjustment. If you find adjustment is necessary, follow the steps on pages 12-14 for setting the in-feed roller, chipbreaker, pressure bar and outfeed rollers in relation to the helical cutterhead.

When it is time to rotate the carbide knives ALL knives must be rotated at the same time. This is the same when replacing carbide knives ALL knives must be replaced at the same time. Mark the knives with a marker so you know which knives have been rotated. You can rotate the knives three times before replacing. Use the provided tork wrench to rotate, or remove knives.

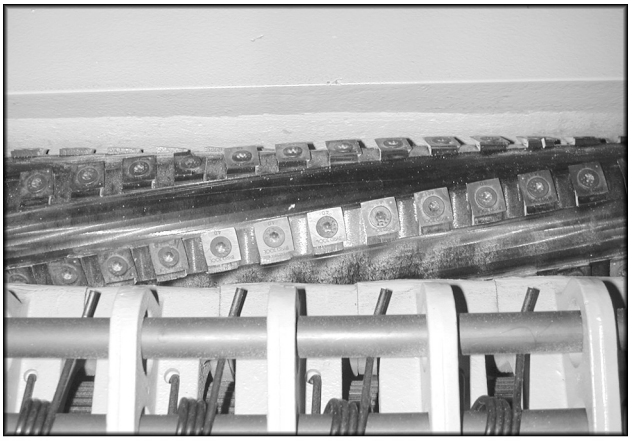


Figure 20

V-Belt Adjustment

Three v-belts (A, Figure 21) drive the cutterhead. The single v-belt (B, Figure 21) drives the in-feed and out-feed rollers. Belt tension has been set at the factory. If the belts have stretched and need adjustment.

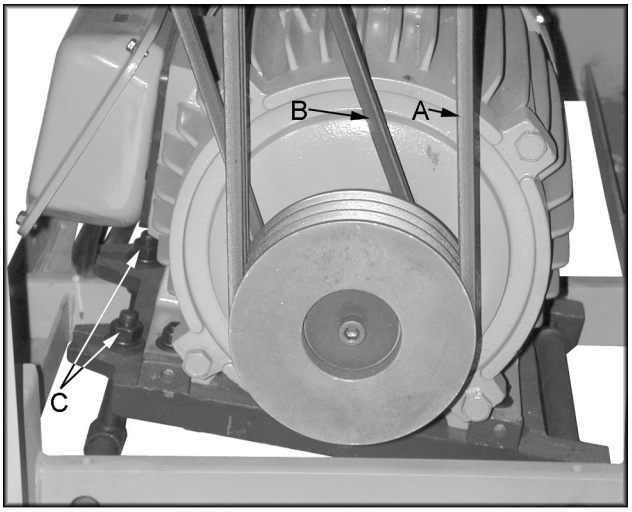


Figure 21

1. **Disconnect machine from power source.**

2. Open lower rear, and lower left-hand side panels. Loosen and tighten four adjustment nuts (C, Figure 21) to move motor plate up, or down to increase, or decrease belt tension. Tighten nuts against motor plate after adjustment is made.

3. Belts are tensioned properly when moderate finger pressure can deflect the v-belts about a 1/4"-1/2" midway between the pulleys.

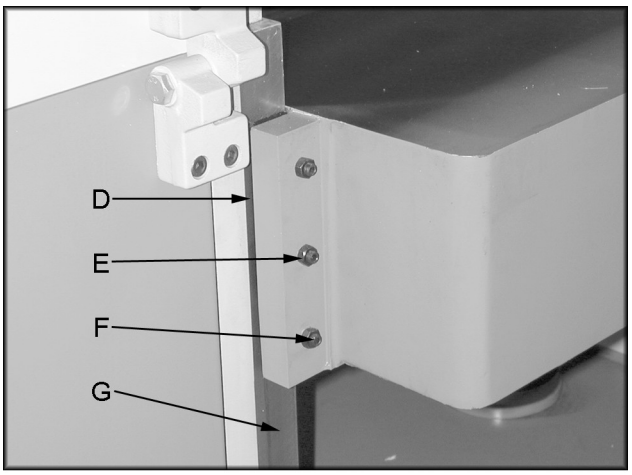


Figure 22

Adjusting Table Gibs

Adjust gibs (D, Figure 22) by loosening the hex nuts (E, Figure 22), and turning gib screws (F, Figure 22) so that the ways (G, Figure 22) are lightly contacted. You should be able to get a 0.005" feeler gauge in between the gib and way.

Adjusting Table Rollers

The table rollers come pre-set from the factory and shouldn't need any adjustment. If you find adjustment is necessary, follow the below listed steps.

1. Lay a straight edge (A, Figure 23) on the table across the roller (B, Figure 23).

2. Raise the rollers until it contacts the straight edge and lock the handle. The pointer should be set at "0". If not adjust the pointer to read zero. **Note:** Spin the roller by hand to know when roller makes contact with the straight edge.

3. Move straight edge to the opposite side of bed roller and check to see that the roller just contacts straight edge. If not loosen the hex nut (C, Figure 24) and turn the hex cap bolt (D, Figure 24) to raise or lower the bed roller until it just contacts the straight edge.

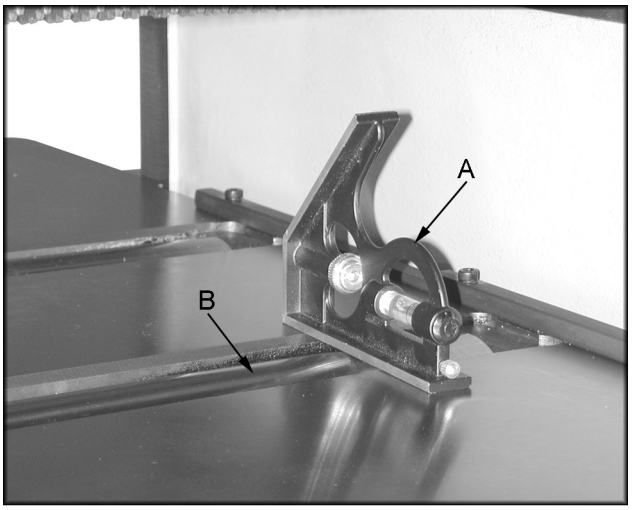


Figure 23

Figure 24

Maintenance

□□□WARNING!

Disconnect the machine from power source before proceeding with any maintenance, lubrication or assembly! Failure to comply may cause serious injury!

- Periodic, or regular inspections are required to ensure that the machine is in proper adjustment, and that all hardware is tight.

- Clean out-feed rollers and table with a non-flammable solvent to remove pitch, gum and other unwanted build-up.

- Periodically clean the inside of the machine for dust control.

- Keep pulleys and belts free from dirt, dust, oil and grease. Replace worn v-belts as needed.

- Replace worn knives or sharpen. If a knife gets nicked stagger the knives. Move one knife no more than 1/8" to the right and another knife no more than 1/8" to the left.

- There are three limit switches on the planer, one that triggers if the hood is open, and a raising and a lowering limit switch to prevent the table from automatically traveling too far. Keep these clean and blown out with an air hose.

Lubrication

- Add a few drops of medium weight oil to the six oil cups (A, Figure 25) weekly or every eight hours of use (which ever comes first).

- Lubricate the two table elevation screws (B, Figure 26) as needed. Raise the table and remove the two screws holding the top of the accordion cover (C, Figure 26) in place. Pull the cover down and lightly grease the elevating screws, see Figure 26.

- Use an oiled cloth to wipe the ways (D, Figure 26) weekly.

- Lubricate the chain system with an oiled cloth as needed.

- The gear box oil should be changed once a year. Remove the drain plug (E, Figure 27) to drain the oil. Refill the gear box with 60-90 weight gear oil through the fill hole (F, Figure 27) until the sight glass reads full. The sight glass (G, Figure 27) should be checked periodically and oil added as necessary.

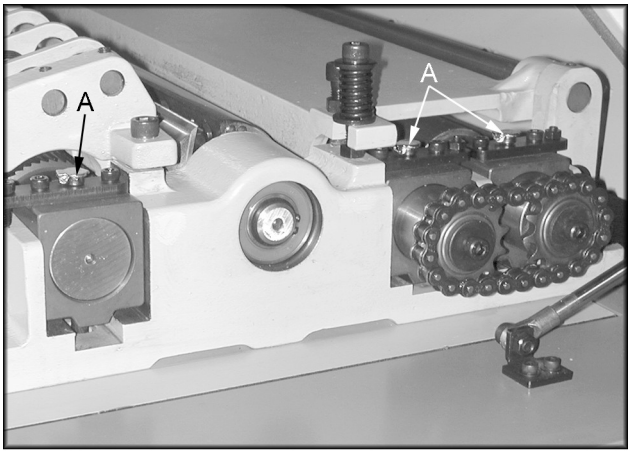


Figure 25

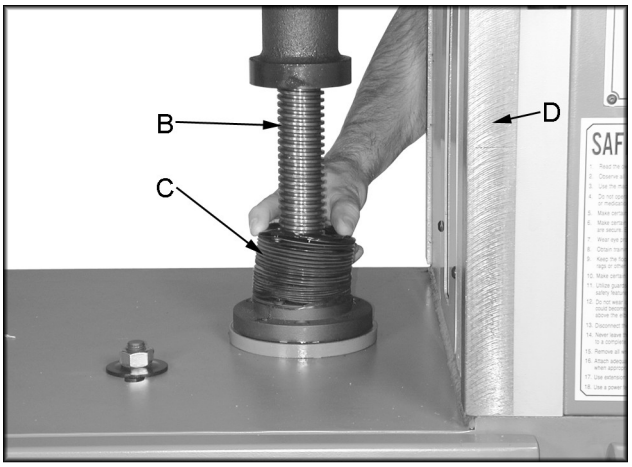


Figure 26

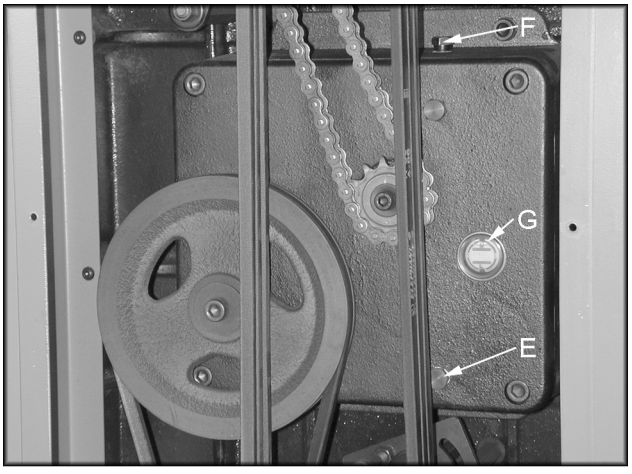


Figure 27

Halted Feeding

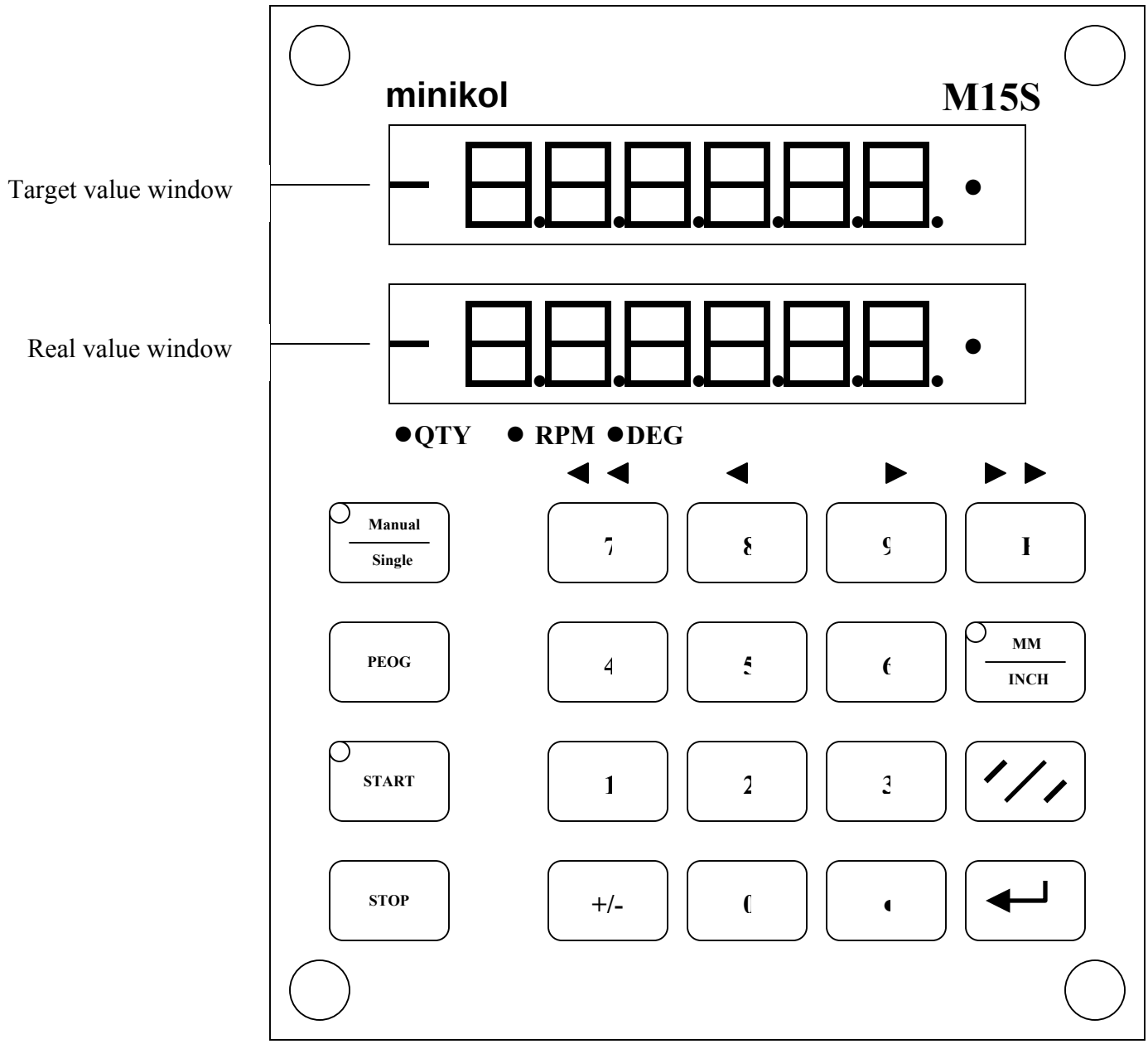
If the in-feed roll takes stock away from you while feeding, then feeding stops before contacting the knives, the chipbreaker is probably too low. Or the in-feed roller is not set low enough, or does not have enough pressure. In a similar situation, the in-feed roll takes the stock, the chipbreakers lift, and stops as you hear the knives contact the material. In this case the pressure bar is too low. Follow the steps on pages 12-14 for setting the in-feed roller, chipbreaker, pressure bar and outfeed rollers in relation to the cutterhead.

Troubleshooting

Description of Symptoms	Possible Cause	Corrective Action
Machine will not start	1. Fuse blown or circuit breaker tripped 2. Cord Damaged 3. Not connected to power source 4. Connected to wrong voltage 5. Top cover is open 6. Emergency stop button pressed 7. Table is in contact with either the upper or lower limit switch	1. Replace fuse or reset circuit breaker 2. Have cord replaced 3. Check connection 4. Check voltage 5. Close top cover 6. Rotate emergency stop button clockwise until it pops out 7. Manually lower or raise the table by using the handwheel
Cutterhead does not come up to speed	1. Low current 2. Motor not wired for correct voltage	1. Contact local electric company 2. Refer to motor nameplate for correct voltage
Workpiece stops when feeding	1. Too much material being removed in one pass 2. Chipbreaker or pressure bar set too low 3. Insufficient pressure on in-feed or out-feed rollers	1. Reduce the amount of material being removed 2. Raise the Chipbreaker or pressure bar per Figure 12, page 12 3. Increase pressure on in-feed or out-feed rollers per Figure 12, page 12
Snipe	1. Incorrect setting for in-feed, out-feed rollers, pressure bar or chipbreaker 2. Inadequate support of long boards 3. Table rollers not set properly	1. Adjust feed system per Figure 12, page 12 2. Support long boards with extension rollers 3. Adjust table rollers until desired results are achieved
Fuzzy Grain	1. Planing wood with a high moisture content 2. Dull knives	1. Allow wood to dry properly 2. Sharpen knives
Poor feeding of lumber	1. Inadequate feed roll pressure 2. Planer bed dirty 3. V-belts slipping 4. Dirty feed rollers 5. Incorrect setting for in-feed, out-feed rollers, pressure bar or chipbreaker	1. Adjust feed roll tension or lower feed rollers 2. Clean pitch and residue off table with a non-flammable solvent 3. Increase v-belt tension 4. Clean feed rollers with a non-flammable solvent 5. Adjust feed system per Figure 12, page 12

Controller (M15S) Operating Instructions

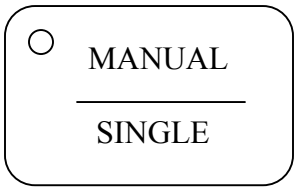
1. Front Panel Overview



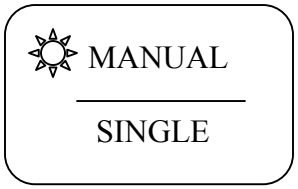
2. Operation Modes

There are two base operating modes – MANUAL and SINGLE

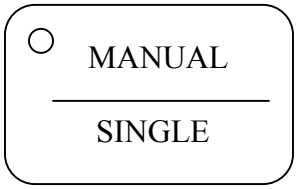
In MANUAL mode, the operator can raise or lower the table using the Controller keypad.
In SINGLE mode, the table will move to the pre-set value when you push the "Table Up" or "Table Down" buttons on the planer's control panel.

Press 

to select Manual mode or Single mode:

When 

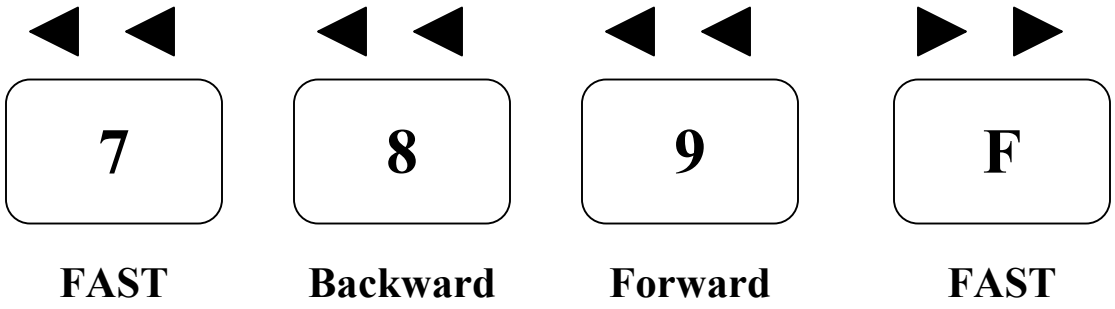
LED lamp is on – Manual mode.

When 

LED lamp is off – Single mode.

MANUAL MODE

Keyboard Function:



For planer table operations, the fast forward and fast backward keys have the same function as the forward and backward keys.

When the forward key is pressed, the planer table moves down. (This is also achieved using the “Table Down” push button on the planer).
When the back ward key is pressed, the planer table moves up. (This is also achieved using the “Table Up push button on the planer).

In Manual Mode, the planer table moves as long as a key is pressed and held. When the key is released, the table stops.

This mode can be used for manual positioning, or adjusting procedures.

SINGLE MODE

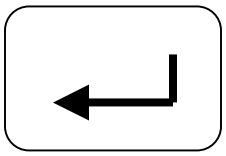
In single mode, the device performs automatic positioning of the table to the programmed target position. The “Table Up” or “Table Down” button on the planer should be pushed and held; when the table has fully adjusted to the target position, the table will automatically stop in position. Release the push button.

Setting Target Value

Step 1: Press 

(Target window LED Starts blinking)

Step 2: Enter the target value using numerical keypad.

Step 3: Press  to complete.

LED lamp starts blinking – the device is ready to start the positioning.

Start/Stop/Cancel

Press 

to start the positioning. The LED lamp now stops blinking and remains on during the procedure.

Press **STOP** to cancel the positioning. The LED lamp is turned off.

If the **STOP** key is pressed while the positioning is running, the procedure is interrupted, the machine is stopped, and the **START** LED is turned off.

To repeat the positioning of the same target, press **PROG** ↵ **START**

To program another target value,

press **PROG** - enter new value - ↵ **START**

Example:

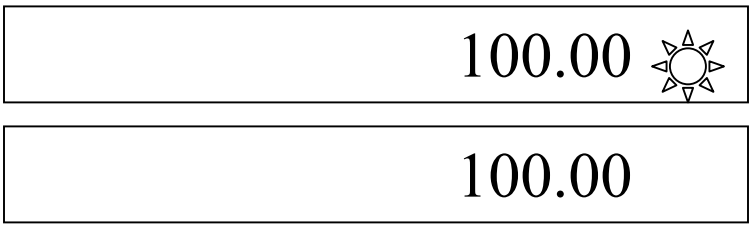
Assume:

Target value on display = 100.00 mm
Read value on display = 100.00 mm

To change the target value to 20.25 mm,

Step 1: Press **PROG**, the LED lamp on Target window is blinking.

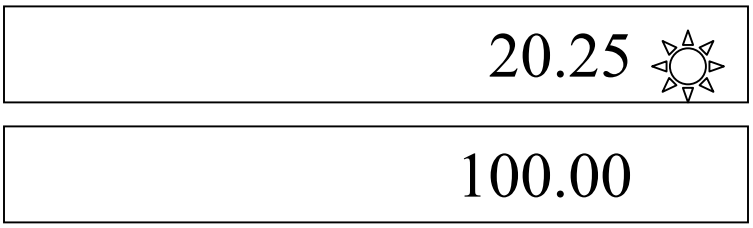
Display



Step 2: Enter new target value (example: 20.25 mm)

Press **2** **0** **•** **2** 5

Display



Step 3: Press ↵ to complete.

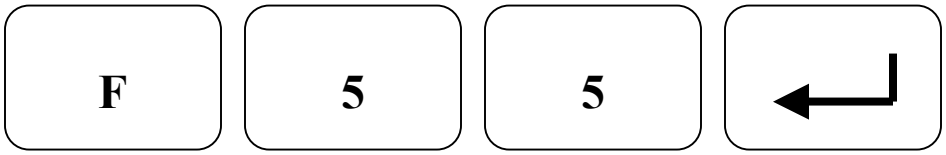
The **START** LED lamp is blinking – ready for positioning

Press **START** to start the positioning or press **STOP** to cancel.

3. Fast program (10 sets)

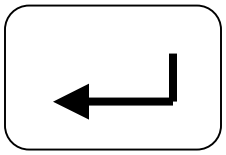
To facilitate frequently used positions, such as different board thicknesses, the keys 0 to 9 have associated preset target values. By pressing one of these keys, its target value is loaded automatically, and the positioning can be started immediately.

Entering preset target values:

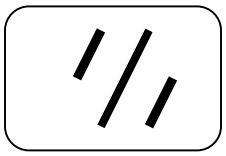
Step 1: Press 

Step 2: Select a key 0 to 9 (total of 10 values).

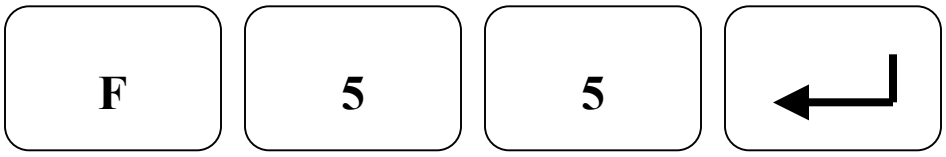
Step 3: Enter the target value.

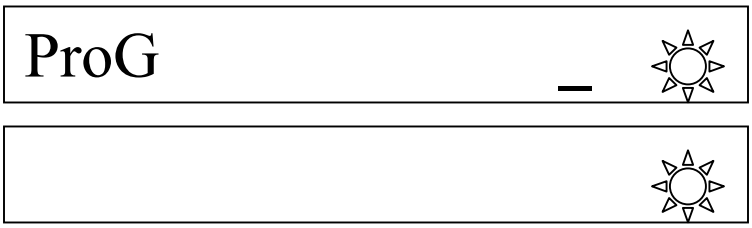
Step 4: Press  to confirm..

Follow the same procedure for entering the other preset target values.

Press  to exit.

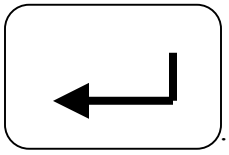
Example: Program 0 = 10.00 mm; Program 1 = 20.00 mm

Step 1: Press 

Display 

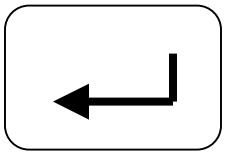
Step 2: Press **0** ……[select program key 0]

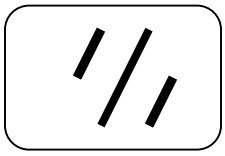
Step 3: Press **1** **0** ……[enter value]

Step 4: Press  ……[complete]

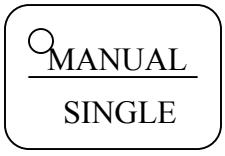
Step 5: Press **1** ……[select program key 1]

Step 6: Press **2** **0** ……[enter value]

Step 7: Press  ……[complete]

Step 8: Press  to exit.

Execute:

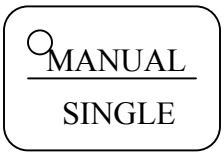
Step 1: Enter single mode, 

LED lamp is off.

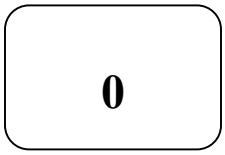
Step 2: Press a key 0 to 9

LED lamp is blinking, ready for start.

Example: Program 0 = 10:00 mm; Program 1 = 20.00 mm.

Step 1: In Single Mode, 

LED lamp is off.

Step 2: Press 

……..…….[Program 0]

Now you will see the preset value: 10.00 mm [Program 0]

LED lamp is blinking, complete.

Press 

to begin positioning.

4. Select Counting Direction

You can select the counting direction according to the table movement.

Step 1: Press **F** **1** ↵

Display — **dir** …[default]

Step 2: Press **PROG** to change the direction.

" – dir " numbers decrease as table rises (accords with scale on planer).
" dir – " numbers increase as table rises.

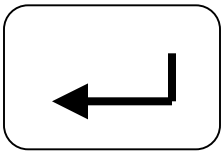
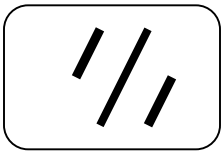
Step 3: Press ↵ to confirm or press // to clear.

5. Select Positioning Mode

Step 1: Press **F** **4** ↵

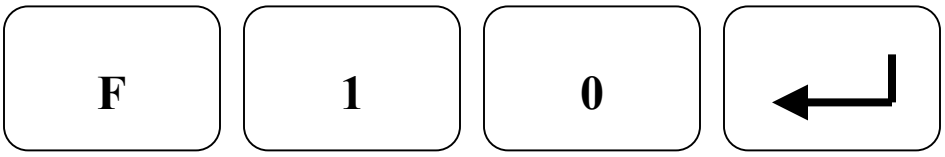
Step 2: Press **PROG** to select.

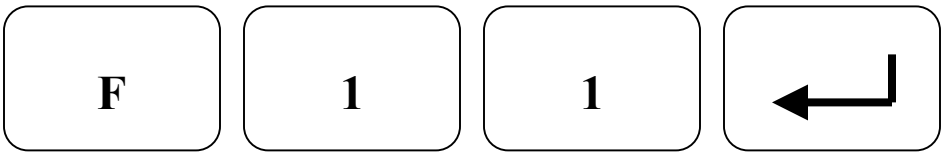
a. ---| |--- both directions
b. ---| left
c. |--- right

Step 3: Press  to confirm or press  to clear.

6. Set Software Limit (Hi/Lo End)

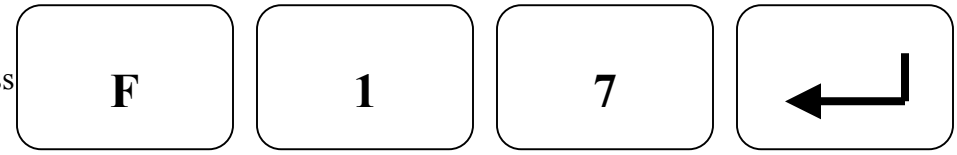
There are High and Low software limits. If there are exceeded, the display will give an error message.

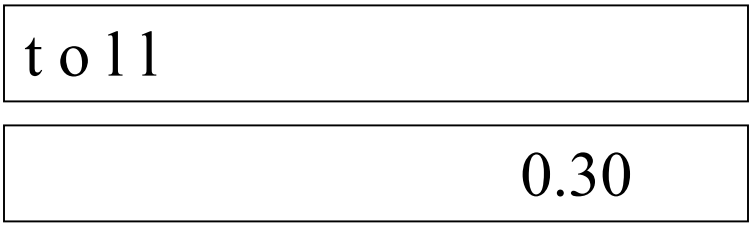
Te set the Lo_End press 

Te set the Hi_End press 

7. Set Tolerances

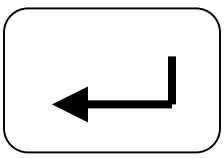
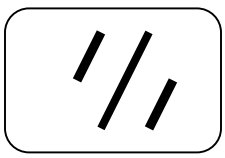
The tolerance defines the accuracy of the positioning.

Step 1: Press 

Display 

…….…[default]

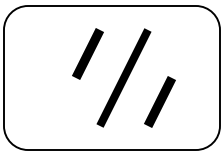
Step 2: Enter the value for tolerance.

Step 3: Press  to confirm or press  to clear.

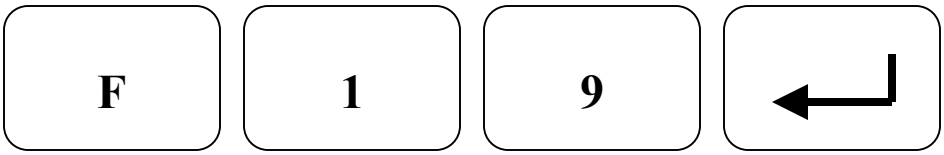
8. Set Low Speed Limit

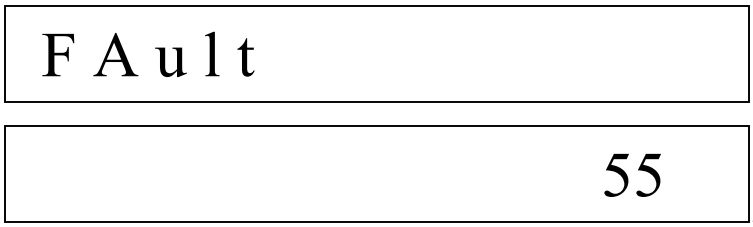
This function defines the speed level which is considered abnormal for the machine.

When the Controller starts the table movement up or down, and the table does not move, or moves with a speed lower than defined, it stops the machine and displays.

Press  to clear.

To Set low speed limit:

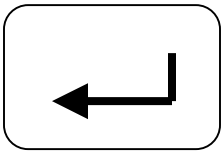
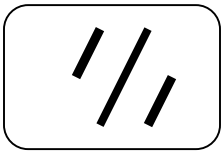
Step 1: Press 

Display 

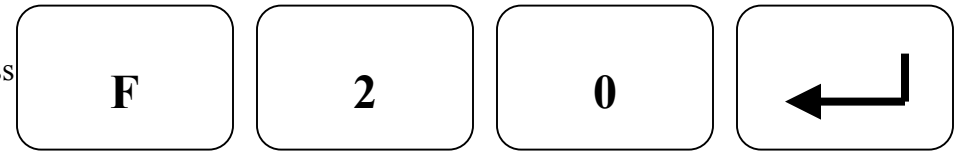
....[default]

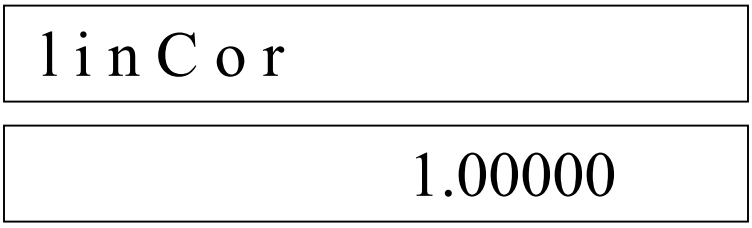
Step 2: Enter the low speed level 0 to 99

0 = Machine test is disabled
1 = Very low
:
:
99 = High

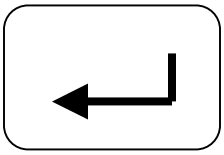
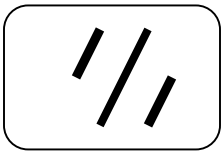
Step 3: Press  to confirm or press  to clear.

9. <u>Set Linear Correction</u>

Step 1: Press 

Display 

Step 2: Enter the value between 0.0001 and 9.999

Step 3: Press  to confirm or press  to clear.

10. Enter Parameter Settings Mode

With this function, you can select each parameter to be locked or unlocked. When a parameter is locked, then the end-user can only see the value, but can not change it.

Step 1: Press **F** **3** **0** ↵

Display

Step 2: Enter the password.

Step 3: Use **9** to scroll through the parameters.

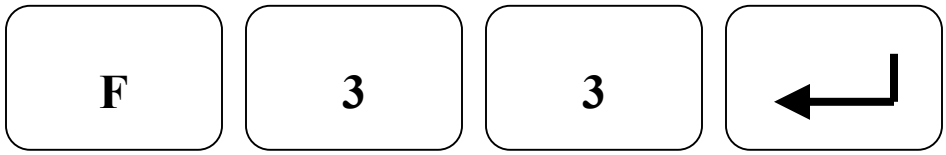
Step 4: Press **PROG** to lock or unlock.

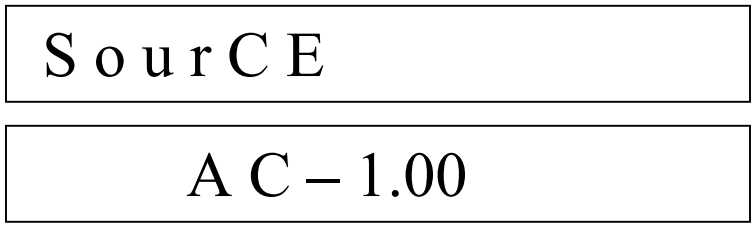
On = unlock
Off = lock

Step 5: Press ↵ to confirm or press // to clear.

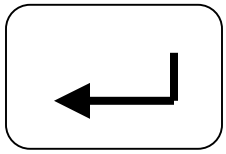
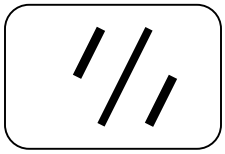
11. Check Software Version

To check the released version of the M15S Controller program:

Step 1: Press 

Display 

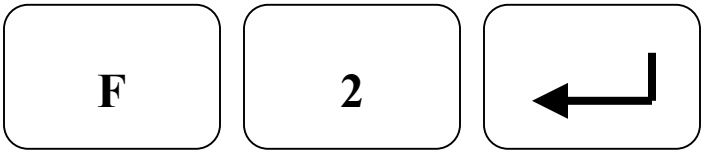
In the real value window, you will see the released version.

Step 2: Press  to confirm or press  to clear.

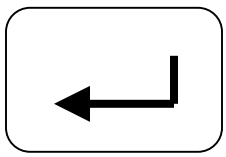
12. Load Datum Values

The real value refers to the distance between the machine table and the cutterhead. Thus, the cutterhead defines the zero point of the machine. It is, however, difficult or impossible to move the planer table to this point. Therefore, the zero point should be identified by either placing a gauge between table and cutterhead knife insert, or by planning a test board then measuring the board thickness with calipers. Program this real value into the Controller as follow.

Preset the real value:

Step 1: 

Step 2: Enter the value.

Step 3: Press 

Load the real value: **F** **0** ↵

Display

C H A n G E ☼

O r G ? ?

Step 1: Press ↵ to confirm or press // to cancel.

Example:

The current value is 10.00 mm but the actual thickness is 10.50 mm.

Step 1: Press **F** **2** ↵

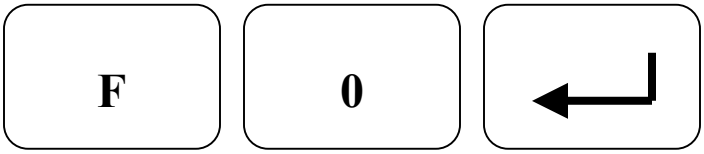
Display

O r i G i n ☼

0.00 ☼

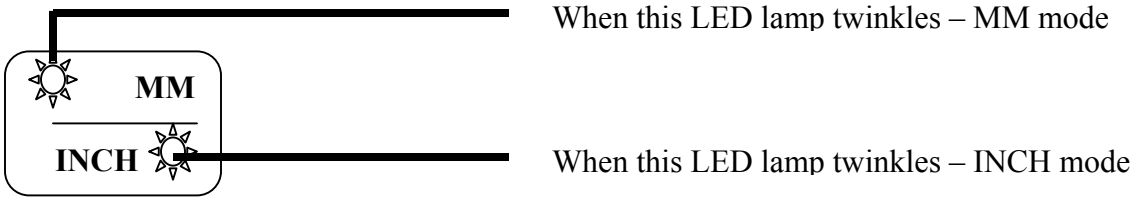
Step 2: Press **1** **0** • **5**

Step 3: Press ↵

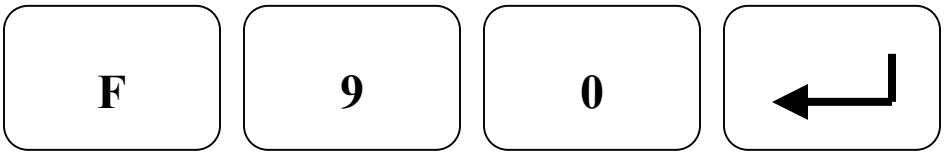
Step 4: Press 

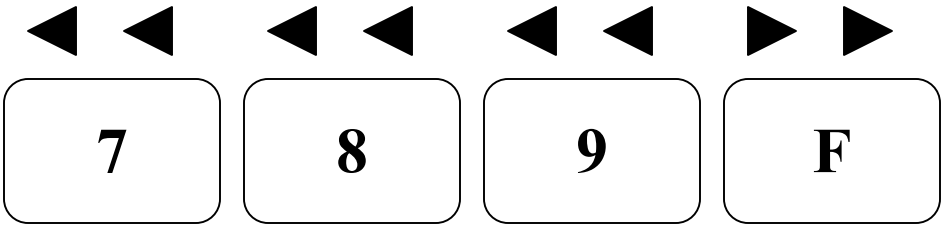
13. IN/MM Conversion

The dedicated mm/inch key allows for immediate switch of the units between millimeters and inches. The LEDs on the key indicate the selected unit. Switching between MM and INCHES has no effect on the control functions.

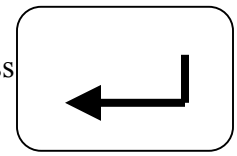
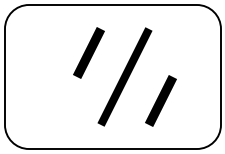


14. Set Device Resolution

Step 1: Press 

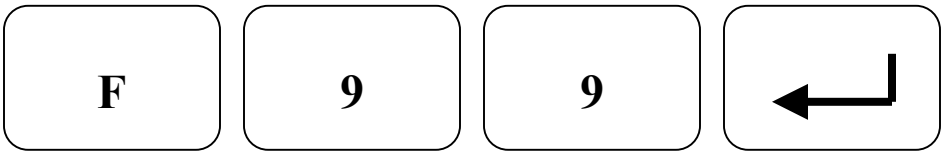
Step 2: Use 

to select resolution.

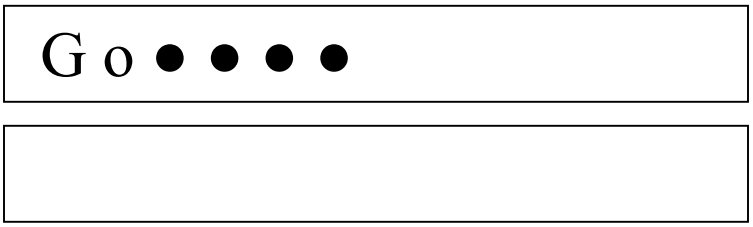
Step 3: Press  to confirm or press  to clear.

15. Calibration

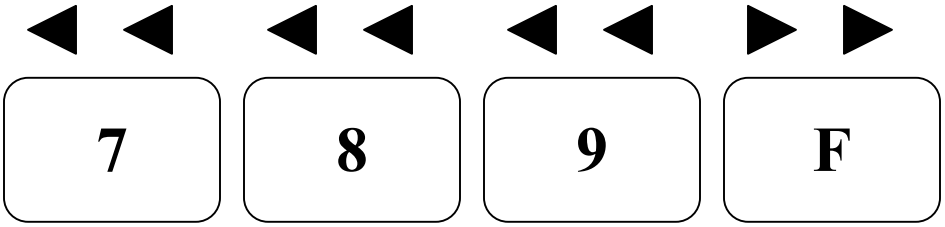
Step 1: Press



Display



Step 2: Use

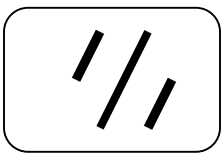


to move the planer table until M15S terminates the calibration and restarts.

16. M15S Troubleshooting

Display

"Change RST" message appears when the Controller detects a motion in the wrong direction. For example, the Controller switches the outputs to move upward but the table starts moving in the reverse direction. Usually this is caused by the wrong wiring of the three phase motor.

Press  to clear.

Check the wiring and change if necessary.

	S E n S o r
Display	E r r o r

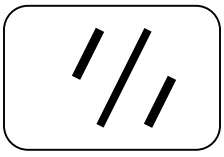
Possible cause:

a. no sensor
b. 9-pin connector is loose
c. Wire broken
d. The gap between sensor and tape is too large

Excluding: Check the sensor, sensor cable and sensor connector.

	E r r o r 
Display	

Possible cause: Incorrect operation.

Excluding: Press  to clear.

	C H A n G E
Display	b A t t

This message appears after power-on and indicates battery discharged. The C-type battery MUST be replaced to resume the operation of the device. Change as follows:

1. Open the planer's top right side panel to access the rear of the Controller.
2. Turn the power off. Be careful not to move the table during power off. Replace the battery and turn the power on. The device will resume normal operation.

17. M15S Specifications

Feature	Technical Data	Additional Information
Supply voltage	24 VDC 50Ma	C type battery x 1
Battery voltage control	Yes	Low power alarm via display
Display	15mm LED x 6 digits x 2 line	
Output	4 digital output	AC250V / 7A AC110V/7A DC24V/10A
Input	4 digital input	24VDC
Operating elements	20 button keyboard	
Travel speed	1.5m/s	
System accuracy	± (0.025 + 0.02L)mm L: Meter	
Repeatability	0.01 mm	
Temperature range	Working temperature 0+ 50°C	Storage temperature -20+70°C
Humidity	Max. 95% Rf	Condensation not permitted

鎖人機台

不須鎖人機台

4470

Oliver 4470 25" Planer					
Index No.	**Part Number**	**Item Descriptions**	**Specfications**	**QTY**	**Old Part Number**
0	850245-000	Bagged Hardware		1	PQ0201
29	250054-615	Handle Knob		1	LJ010110
30	360414-910	Handle Shaft		1	PN010025
99	041305-003	Poly Bag	275*185*0.1t	1	HR043800
131	040003-000	Hex. Wrench	3mm	1	HQ010400
159	040004-000	Hex. Wrench	4mm	1	HQ010500
229	050314-008	Feet		4	PN010061
254	550001-288	Controller Manual		1	PQ010040
262	041202-002	Poly Bag	175*110*0.1t	4	HR040300
275	040005-000	Hex. Wrench	5mm	1	HQ010600
276	040007-000	Hex. Wrench	8mm	1	HQ010800
277	040204-000	Open Wrench	12*14	1	HQ020900
278	040206-000	Open Wrench	17*19	1	HQ021200
279	040207-000	Open Wrench	22*24	1	HQ021400
280	040401-000	Screwdriver	1*75	1	HQ070100
0	850237-000	Bagged Hardware for Dust Chute		1	PQ0105
12	006001-022	Flat Washer	6.3*13*1.0t	8	HE010300
103	002501-102	Round HD Socket Locking Bolt	M6*1.0P*12L	8	HA340405
146	006303-100	Spring Washer	6.1*12.3	8	HE020900
281	041001-001	Zip Lock Bag	60*40*0.05	1	HR010100
1	171398-000	Dust Exhauster		1	PQ010020
2	000801-101	Round HD Socket Bolt	M6*1.0P*10	49	HA090404
3	171393-000	Dust Chute		1	PQ010009
4	000104-110	CAP Screw	M8*1.25P*30	4	HA020516
5	006305-100	Spring Washer	8.2*15.4	22	HE021100
6	050320-000	Upper Cover Seat		4	PN010084
7	008006-100	Hex. Nut	M8*1.25P(13B*6.5H)	13	HC010800
8	171559-000	Upper Cover		1	PQ020001
9	340007-615	Spacker		2	PG010046
10	250123-615	Upper Cover Handle		1	PG920008
11	000104-108	CAP Screw	M8*1.25P*25	8	HA020513
12	006001-022	Flat Washer	6.3*13*1.0t	11	HE010300
13	000102-104	CAP Screw	M5*0.8P*12	4	HA020305
14	006302-100	Spring Washer	5.1*9.3	8	HE020800
15	170893-901	Cylinder Bracket		2	PP010035
16	170501-904	Cam Bracket		1	PN010060
17	000105-104	CAP Screw	M10*1.5P*35	5	HA020619
18	008004-100	Hex. Nut	M5*0.8P(8B*4H)	1	HC010400
19	000104-106	CAP Screw	M8*1.25P*20	8	HA020510
20	290040-901	Cam Collar		1	PN010045
21	380259-000	Chain Gear		6	PP010064
22	006001-071	Flat Washer	10*25*3.0t	17	HE019700
23	008007-100	Hex. Nut	M10*1.5P(17B*8H)	20	HC011000

24	050580-000	Left Column		1	PQ010022
25	921333-000	Idle Belt Pulley Set		1	
.1	008308-100	Nylon Nut	M10*1.5P(17B*12H)	1	HC041000
.2	171709-902	Idle Belt Pulley Bracket		1	
.3	006001-069	Flat Washer	10*20*3.0t	2	HE019400
.4	010101-000	R-Ring	RTW-30	1	HF022800
.5	030105-000	Ball Bearing	6200ZZ	1	HJ021800
.6	380458-902	Idle Belt Pulley		1	
.7	000803-102	Round HD Socket Bolt	M10*1.5P*35	1	
27	000103-106	CAP Screw	M6*1.0P*16	2	HA020408
28	008005-100	Hex. Nut	M6*1.0P(10B*5H)	7	HC010600
29	250054-615	Handle Knob		1	LJ010110
30	360414-910	Handle Shaft		1	PN010025
31	380225-910	Shaft Holder		1	PP010060
32	011003-104	Spring Pin	5*25	5	HG011014
33	017002-000	Steel Ball	6	1	HL011200
34	280018-000	Compressed Spring		1	LJ010216
35	000204-103	SET Screw	M8*1.25P*12	1	HA030505
36	170895-000	Side Plate (Left)		1	PP010045
37	171560-000	Side Cover (Left)		1	PQ020003
39	000203-109	SET Screw	M6*1.0P*30	6	HA030416
40	170510-000	Dust Hood		1	PN010089
41	000001-103	Hex. Screw	M5*0.8P*25	1	HA010313
42	170957-902	Adjusting Block		6	PP010066
43	130047-903	Bearing Seat		6	PN010009
44	360196-000	Rear Roller		1	PQ010008
45	012003-003	Key	5*5*12	5	HH010406
46	170002-901	Washer		3	CL010015
47	000105-101	CAP Screw	M10*1.5P*20	11	HA020610
48	000105-109	CAP Screw	M10*1.5P*75	2	HA020643
49	280056-901	Compressed Spring		2	PN010087
50	000105-105	CAP Screw	M10*1.5P*40	3	HA020622
51	050455-000	Rear Holder Plate		1	PP010007
52	070019-000	Chain Gear (22T)		2	PP010061
54	360189-000	Rear Roller (Long)		1	PQ010007
55	030202-000	Ball Bearing	6007-2NSE	1	HJ031200
56	030219-000	Ball Bearing	6210-2NSE	2	HJ032800
57	012005-003	Key	8*7*35	2	HH010720
*58	PQ02-12	Cutterhead Ass'y			PQ0L
59	006701-100	Wavy Washer	WW-6	1	HE070300
60	002603-101	CAP Screw	M5*0.8P*10	2	HA310304
61	250352-615	Compressed Rubber		144	PM070102
62	290055-901	Shoulder Screw		1	
64	000104-111	CAP Screw	M8*1.25P*35	4	HA020519
65	006001-084	Flat Washer	11*53*3.0t	1	PN010046
66	050464-902	Cutterhead Pulley		1	PP010090
67	190151-902	Sleeve		1	PP010049
68	006307-100	Spring Washer	10.2*18.5	22	HE021300

69	000204-102	SET Screw	M8*1.25P*10	14	HA030504
70	006712-100	Wavy Washer	BWW-6001	1	HE071500
71	006001-056	Flat Washer	8.5*23*2.0	6	HE015300
72	050881-000	Cutterhead Bracket (Left)		1	
73	360624-902	Fixed Shaft		2	360151-902
74	360629-902	Press Shaft		2	PP010024
75	010011-000	S-Ring	STW-25	3	HF012300
76	380470-902	Front Roller Spacer		2	190075-902
77	012005-006	Key	8*7*16	1	HH010709
78	360506-000	Front Roller Shaft		1	PQ020004
79	190051-902	Limited Axis		1	PP010039
80	130052-903	Front Roller		24	PN010203
81	050880-000	Cutterhead Bracket (Right)		1	
82	170512-901	Packing		12	PN010097
83	360408-902	Seat Axis		6	PN010010
84	280055-901	Axis Compressed Spring		6	PN010078
85	050462-000	Press Plate Seat (Left)		1	PP010085
86	011106-102	Pin	8*30	4	HG021018
87	050305-000	Front Holder Plate		11	PN010004
88	280053-000	Turn Spring		11	PN010013
89	050463-000	Press Plate Seat (Right)		1	PP010086
90	360627-902	Shaft		2	PP010016
91	360632-902	Shaft		2	PP010036
92	250160-615	Spacer		79	PJ010035
93	172281-905	Anti-Kick Pawl		70	
94	010107-000	R-Ring	RTW-47	6	HF023700
95	380388-902	Hex. Post Bolt		1	360170-902
96	000102-103	CAP Screw	M5*0.8P*10	2	HA020304
97	000302-210	Round HD Phil. Bolt	M4*0.7P*30	6	HS040416
98	000301-104	Round HD Phil. Bolt	M3*0.5P*15	2	HA040207
100	021002-000		250M	2	
101	050575-000	Right Column		1	PQ010017
102	000805-102	Round HD Socket Bolt	M4*0.7P*10	8	HA090204
103	002501-102	Round HD Socket Locking Bolt	M6*1.0P*12L	11	HA340405
104	171561-000	Side Plate (Right)		1	PQ020002
105	171401-000	Side Cover (Right)		1	PQ010026
106	016001-000	Chain	#40*24P	1	HK241300
107	920667-000	Gear Box Ass'y		1	PP0107
.1	000105-101	CAP Screw	M10*1.5P*20	5	HA020610
.2	006001-071	Flat Washer	10*25*3.0t	1	PN010046/006001-084
.3	050324-902	Gear Box Pulley		1	PN010308
.4	000104-106	CAP Screw	M8*1.25P*20	1	HA020510
.5	006001-056	Flat Washer	8.5*23*2.0t	1	HE015300
.6	150014-000	Chain Gear		1	PN010309
.7	011106-101	Pin	8*18	2	HG021011
.8	050467-008	Gear Box Cap		1	PP010702
.9	340050-000	Gasket		1	PP010703
.10	012003-005	Key	5*5*16	1	HH010409

.11	012003-002	Key	5*5*10	4	HH010405
.12	043605-000	Oil Seal	TC24*40*7	1	HM142103
.13	030208-000	Ball Bearing	6204-2NSE	2	HJ032200
.14	320208-000	Gear (20T)		2	PN010302
.15	010007-000	S-Ring	STW-16	4	HF011400
.16	030205-000	Ball Bearing	6201-2NSE	6	HJ031900
.17	043603-000	Oil Seal	TC20*40*7	1	HM140803
.18	010011-000	S-Ring	STW-25	1	HF012300
.19	012005-010	Key	8*7*72	1	HH010742
.20	360649-000	Output Spindle		1	PP010708
.21	320246-000	Gear		1	PP010034
.22	360646-000	Input Spindle		1	PP010705
.23	320209-000	Gear (60T)		2	PN010304
.24	012003-007	Key	5*5*20	2	HH010411
.25	360647-000	Gear Shaft		1	PP010706
.26	043001-000	Mirrow	29	1	HM010200
.27	320249-000	Gear (22T)		1	PP010704
.28	360648-000	Gear Shaft		1	PP010707
.29	320210-000	Gear (18T)		1	PN010312
.30	320211-000	Gear (24T)		1	PN010314
.31	070020-000	Transmission Jaw		1	PP010709
.32	011002-106	Spring Pin	4*25	1	HG010914
.33	050216-000	Transmission Arm		1	LL010734
.34	010001-000	S-Ring	STW-10	1	HF010800
.35	000203-102	SET Screw	M6*1.0P*8	1	HA030403
.36	380124-902	Sleeve		1	PP010710
.37	000203-101	SET Screw	M6*1.0P*6	1	HA030402
.38	360694-902	Transmission Shaft		1	PP010711
.39	050466-008	Gear Box		1	PP010701
.40	043401-000	Oil Plug	PT1/4"-19	2	HM110300
108	050566-000	Case Bed		1	PQ010003
109	006001-076	Flat Washer	10.3*23*2.0t	14	HE016000
110	290024-901	Shoulder Screw (A)		4	PN010037
111	001903-104	Shoulder Screw (B)	M8*1.25P*10	1	HA320504
112	000102-105	CAP Screw	M5*0.8P*16	6	HA020308
113	171818-902	Guide Bar		2	380355-902
114	170498-901	Datum Plate		2	PN010050
115	000204-109	SET Screw	M8*1.25P*40	6	HA030522
116	000004-103	Hex. Screw	M10*1.5P*30	4	HA010616
117	130049-903	Roller Bracket		4	PN010052
118	030207-000	Ball Bearing	6203-2NSE	6	HJ032100
119	920669-000	Roller Set		2	PP0106
	190053-000	Roller		1	PP010601
	360426-000	Roller Bracket		2	PN010102
120	006001-049	Flat Washer	8.5*16*2.0t	8	HE013600
121	360419-901	Cam Shaft		4	PN010053
122	130050-000	Up/Down Cam		4	PN010059
123	023301-000		AAM-20	2	

124	360636-902	Crank		2	PP010057
125	000202-102	SET Screw	M5*0.8P*8	6	HA030303
126	130048-903	Block		3	PN010044
127	290016-901	Shoulder Screw (B)		2	PN010075
128	170900-902	Transmission Link		1	PP010055
129	012003-002	Key	5*5*10	8	HH010405
130	010501-000	ISTW-Ring	ISTW-30	6	HF090100
132	171396-156	Indicator Bracket		1	PQ010018
133	170899-902	Transmission Link		1	PP010054
134	360420-902	Crank Shaft		1	PN010055
135	010211-000	E-Ring	ETW-24	1	HF032300
136	571986-000	Cutting Indicator		2	JE270009
137	000302-101	Round HD Phil. Bolt	M4*0.7P*6	2	HA040402
138	050313-902	Crank Seat		1	PN010056
139	000203-102	SET Screw	M6*1.0P*8	1	HA030403
140	230122-000	Universal Handle		1	PN010064
141	050318-902	Worm Shaft Column		2	PN010068
142	000104-112	CAP Screw	M8*1.25P*40	8	HA020522
*143	PQ02-01	Motor Ass'y			PQ0A
144	000003-105	Hex. Screw	M8*1.25P*25	4	HA010513
145	000103-107	CAP Screw	M6*1.0P*20	1	HA020410
146	006303-100	Spring Washer	6.1*12.3	5	HE020900
147	290015-901	Shoulder Screw (A)		1	PN010048
148	030116-000	Ball Bearing	6205ZZ	2	HJ022300
149	360642-000	Worm Shaft		1	PP010076
150	012003-008	Key	5*5*22	1	HH010412
151	320248-000	Worm Gear		1	PP010075
152	190085-901	Sleeve		1	PP010063
153	030109-000	Ball Bearing	6204ZZ	1	HJ022200
154	050461-008	Gear Box		1	PP010078
155	043607-000	Oil Seal	TC25*40*8	1	HM140904
156	360641-000	Worm Shaft		1	PP010074
157	320247-000	Gear (24T)		1	PP010050
158	030108-000	Ball Bearing	6203ZZ	2	HJ022100
160	050574-008	Idle Pulley Bracket		1	PQ010014
161	030106-000	Ball Bearing	6201ZZ	1	HJ021900
162	010007-000	S-Ring	STW-16	3	HF011400
163	320209-000	Gear (60T)		2	PN010304
164	360640-000	Output Spindle		1	PP010072
165	043501-000	Oil Seal	SC17*30*8	1	HM130205
166	010008-000	S-Ring	STW-17	2	HF011500
167	340049-000	Gasket		1	PP010067
168	050459-008	Gear Box Cap		1	PP010053
169	000103-108	CAP Screw	M6*1.0P*25	6	HA020413
170	011104-105	Pin	6.0*25	2	HG020915
171	320245-000	Chain Gear (26T)		1	PP010028
172	043401-000	Oil Plug	PT1/4"-19	2	HM110300
173	030107-000	Ball Bearing	6202ZZ	2	HJ022000

174	360643-000	Gear Shaft		1	PP010079
175	012003-007	Key	5*5*20	1	HH010411
176	320208-000	Gear (20T)		1	PN010302
177	006001-103	Flat Washer	16.8*38*2.5t	1	HE017500
178	016009-000	Chain	#40*58P	2	HK244600
179	150014-000	Chain Gear (B)		1	PN010309
180	920372-000	Hand Wheel Ass'y		1	PP0102
.1	230046-000	Fold Handle		1	PP010029
.2	000702-102	Flat HD Socket Bolt	M6*1.0P*12	1	HA080405
.3	011106-101	Pin	8*18	1	HG021011
.4	240033-000	Hand Wheel		1	PP010083
.5	030103-000	Ball Bearing	6004ZZ	1	HJ020900
181	050458-902	Hand Wheel		1	PP010041
*182	PQ02-28	Motor Cord Ass'y			PQ1C
183	012003-004	Key	5*5*15	1	HH010408
184	360631-000	Handwheel Shaft		1	PP010030
185	280091-000	Spring		1	PP010084
186	000104-102	CAP Screw	M8*1.25P*10	2	HA020504
187	000203-106	SET Screw	M6*1.0P*16	5	HA030408
188	380226-902	Sleeve		1	PP010082
189	011106-101	Pin	8*18	4	HG021011
190	000103-102	CAP Screw	M6*1.0P*10	8	HA020404
191	006001-029	Flat Washer	6.5*23*3.0t	1	HE012000
*192	PQ02-27	Main Motor Ass'y			PQ1B
193	032101-000	Ball Bearing	NA-6906	6	HJ115100
194	360155-902	Cam Collar		1	PQ010011
195	010108-000	R-Ring	RTW-52	1	HF024000
196	000004-306	Hex. Screw	M10*1.5P*50	4	HA010628
197	008009-100	Hex. Nut	M12*1.75P(19B*10H)	4	HC011200
198	006308-100	Spring Washer	12.2*21.6	12	HE021500
199	006001-091	Flat Washer	13*28*3.0t	16	HE019600
200	380249-901	Adjust Rod Ass'y		2	PM0111
201	050368-008	Motor Plate		1	EQ010069
202	360270-902	Support Rod		2	PQ010024
*203	PQ02-14	Manual			PQ0N
204	360634-000	Worm Shaft		1	PP010052
205	170481-901	Fixing Ring		4	PM010038
206	001601-101	Round HD Phil. Screw w/Washer	M4*0.7P*8/4*10*0.8t	8	HA260100
207	250173-615	Sleeve		2	PM010037
208	360423-000	Worm Shaft		1	PN010069
209	010110-000	R-Ring	RTW-68	2	HF024800
210	030203-000	Ball Bearing	6008-2NSE	2	HJ031300
211	031003-000	Thrust Bearing	51105	4	HJ130600
212	050662-902	Sleeve Seat		2	
213	006802-100	Sun Shape Washer (AN Washer)	25	2	HE080600
214	008201-100	Lock Nut	M25*1.5P	2	HC030400
215	190084-902	Chain Gear Washer		1	PP010056
216	014110-000	V-Belt	A81	3	HK027200

217	014107-000	V-Belt	A57	1	HK024300
218	070017-000	Chain Gear (26T)		1	PN010018
219	280067-901	Spring		1	TJ010013
220	170897-000	Rear Base Cover		1	PP010047
221	021802-000	Cord Ring	NB-2430	2	HP200200
222	021805-000	Cord Ring	NB-1216	2	HP200500
223	170894-000	Cord Plate		1	PP010037
224	008308-100	Nylon Nut	M10*1.5P(17B*12H)	4	HC041000
225	170638-156	Hook		4	EQ010099
226	000105-103	CAP Screw	M10*1.5P*30	14	HA020616
227	000006-203	Hex. Screw	M16*2.0P*80L	4	HS010847
228	008011-200	Hex. Nut	M16*2.0P(24B*13H)	5	HW011600
230	170902-000	Base		1	PP010073
231	360693-902	Middle Gear Shaft		1	PP010051
232	171562-000	Base Cover Front		1	PQ020005
233	170892-000	Base Side Cover		2	PP010033
234	006001-083	Flat Washer	11*37*3.0t	2	PN010028
235	001302-101	CAP Screw (Left Thread)	M10*1.5P*20	1	HA210610
236	000105-112	CAP Screw	M10*1.5P*45	2	HA020625
237	016010-000	Chain	#40*74P	1	HK246200
238	008306-100	Nylon Nut	M8*1.25P(13B*9H)	4	HC040800
239	230276-000	Cylinder	25kg	2	PP010048
240	016002-000	Chain	#40*54P	1	HK244200
241	016012-000	Chain	#40*84P	1	HK247200
242	006003-079	Flat Washer	10.5*19*2.0t	2	HU191400
243	006002-001	Flat Washer	4.3*10*1.0t	6	HY010600
245	000203-107	SET Screw	M6*1.0P*20	1	HA030410
*246	PQ02-02	Switch Ass'y			PQ0B
247	000103-103	CAP Screw	M6*1.0P*12	4	HA020405
249	000106-102	CAP Screw	M12*1.75P*40	12	HA020722
250	280098-000	Spring		1	MJ010082
251	490126-000	Wiring Connecting Box		1	EQ0B0101
252	490127-000	Connect Plate		1	EQ0B0102
253	000303-103	Round HD Phil. Bolt	M5*0.8P*10	4	HA040604
256	006001-034	Flat Washer	6.7*16*2.0t	4	HE012500
257	000004-107	Hex. Screw	M10*1.5P*70	2	HA010640
258	001301-101	CAP Screw (Left Thread)	M8*1.25P*20	1	HA210510
259	290009-902	Positioner Shoulder Screw		2	PN010085
260	190002-905	Positioner		2	PN010092
*261	PQ02-06	Power Cord Ass'y			PQ0F
263	190074-901	Spacer		2	PM010029
264	010205-000	E-Ring	ETW-8	2	HF031700
265	171399-902	Case Bed Sliding Bracket		1	PQ010021
266	921133-000	Magnetic Bar Ass'y		1	PQ0101
	490248-000	Magnetics Through Plate		1	PQ010101
	490249-000	Magnetic Bar		1	PQ010102
267	150001-000	Chain Gear (Sprocket)		2	PN010040
268	000105-107	CAP Screw	M10*1.5P*50	4	HA020628

269	520001-249	Carboard Box for Parts	680*170*440	1	PN010090
270	520001-221	Carboard Box for Dust Hood	370*250*110	1	PG071101
271	041503-019	Plastic Board	920*710*0.05t	1	630019-000
272	640020-000	Anti-Rust Bag	1800*2400*0.1t	1	EQ010060
273	610003-025	Closed Plywood Box	1350*880*1520	1	PP010031
*274	PQ02-10	Label			PQ1A
282	041305-018	Poly Bag	600*540*0.1t	1	HR041000
283	000201-101	SET Screw	M4*0.7P*6	1	HA030202
285	920664-000	Turn Type Locker Ass'y		2	PP0103
.1	250259-615	Locker Base		1	EQ010701
.2	250328-615	Locker Turner		1	EQ010702
.3	170903-902	Locker Plate		1	PP010081
.4	230167-615	Nylon Nut	P-LG-M63-B	1	EQ010704
.5	001105-502	Round Head Self-Tapping Screw	M6*2.54P*10	1	HA180604
.6	006001-022	Flat Washer	6.3*13*1.0t	1	HE010300
286	000105-102	CAP Screw	M10*1.5P*25	2	HA020613
287	171151-902	Fixed Plate		2	PP010077
288	200032-615	Anti-Dust Sponge (Long)	40*10*2t	1	
289	200033-615	Anti-Dust Sponge (Short)	33*10*2t	1	
290	003904-401	Wooden Screw	1/4"-20NC-1"	24	
291	010118-000	R-Ring	RTW-90	1	
292	010109-000	R-Ring	RTW-62	1	HF024500
293	380787-902	Spacer		1	
294	002602-102	CAP Lock Screw	M6*1.0P*20	12	HA310410
295	006304-100	Spring Washer	6.5*12.8	12	HE021000
296	006001-024	Flat Washer	6.4*11.5*1.6	12	HE019900