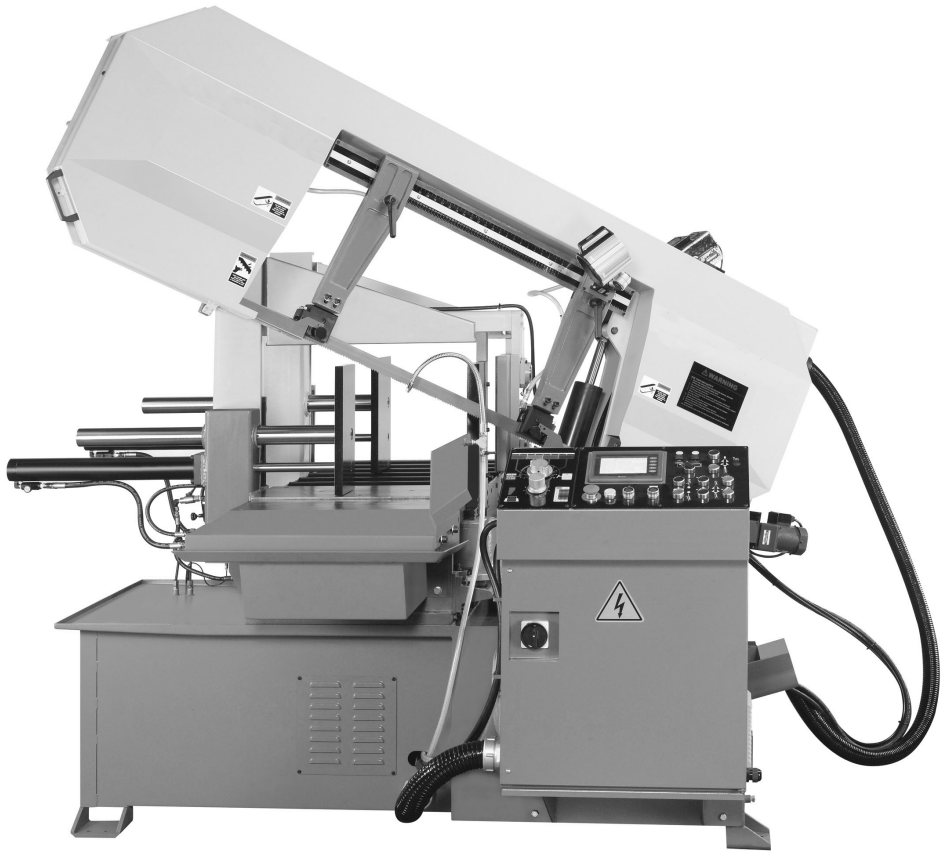
WS-1824FA

Touch Screen Fully Automatic Band Saw with miter cutting

Study Carefully Before Operating



Specifications

Capacity:			
90°	460mm (18")	460x460mm (18"x18")	380x610mm (15"x24")
45°	380mm (15")	380x380mm (15"x15")	

Blade Size
41x1.3x5330mm (1.6"x0.05"x210")

Blade Speed
30~85MPM (Inverter)

Blade Motor
5HP AC

Packing Measurement (L xWxH)
2750x2270x1950 mm

NW: 2150kgs **GW:** 2465 kgs

11/2013

Table of Contents

1 ACCIDENT PREVENTION AND SAFETY REGULATION

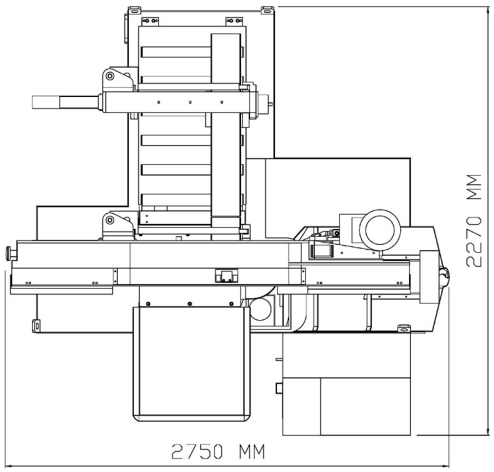
This machine has been designed to comply with national and community accident-prevention regulations. Improper use and/or tampering with the safety devices will relieve the manufacturer of all responsibility.

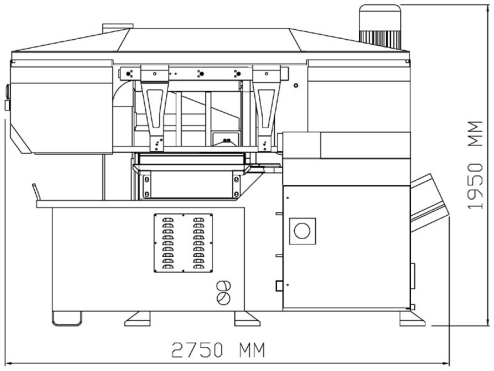
1.1 Advise for the Operator

- Check, the line voltage is the same as the voltage required by the machine's motor.
- Check the efficiency of your electric supply and grounding system; connect the power cable of the machine to the socket and the ground lead (yellow- green in color) to the grounding system.
- When the machine is in suspended mode (or stopped) the blade must not move.
- Only the blade section used for cutting must be kept unprotected. To remove guards to expose more of the cutting blade adjust the blade guides.
- It is forbidden to use the machine without its shields
- Always disconnect the machine from the power socket before blade change or carrying out any maintenance job, even in the case of abnormal machine operation.
- Always wear suitable eye protection.
- Never put your hands or arms into the cutting area while the machine is operating.
- Do not shift the machine while it is cutting.
- Do not wear loose clothing like: shirts with sleeves that are too long, gloves that are too big, bracelets, chains or any other object that could get caught in the machine during operation. Tie back long hair.
- Keep the area free of miscellaneous object; i.e. equipment, tools, etc…
- Perform only one operation at a time. Never have several objects in your hands at the same time. Keep your hands as clean as possible.
- All internal operations, maintenance or repairs, must be performed in a well-lit area or where there is sufficient light from extra sources to avoid the risk of accidents.
- Keep hands and other body parts away from a running blade.
- Do not open the blade cover while machine is running.
- Do not store combustible materials near or around machine.
- Always wear approved safety glasses/face shields while using this machine.
- Keep machine guards in place at all times.
- Do not wear gloves.
- Remove loose clothing and confine long hair.
- Keep the work area clean and free miscellaneous objects.

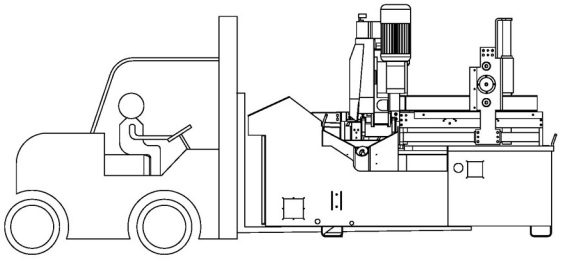
2 MACHINE TRANSPORTATION AND INSTALLATION

2.1 Machine Dimensions





2.2 Transporting the Machine



Unpack your machine carefully, and use a crane or forklift to set it in position. If a crane is used to lift the machine, attach the lifting cable carefully to the machine. Sufficient space should be left around the machine to allow safe handling of materials, inspection, and maintenance operations. Take precautions to choose a location that will keep the machine free of vibration and dust caused by other machinery.

2.3 Minimum Requirements for Housing the Machine

- Main voltage and frequency must comply with the machine's motor requirements.
- Environment temperature should fall within –10 ºC to +50 ºC.
- Relative humidity cannot be over 90%.

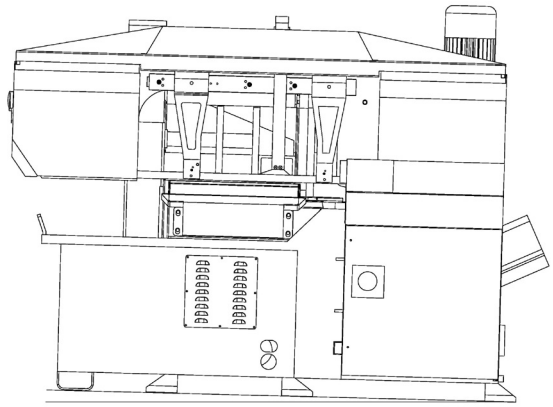
2.4 Securing to foundation

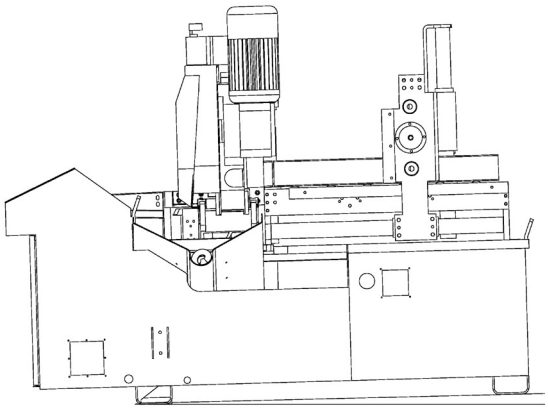
Position the machine on a flat and level foundation of reinforced concrete. Level machine and anchor it to the foundation with anchor bolts. Maintain a minimum distance of 800mm from the rear of the machine to the wall. Position the anchors using screws and expansion plugs or tie rods sunk in cement.

2.5 Leveling the Machine

The operating accuracy of all precision machinery depends on the accuracy of the installation of the machine. Manufacturing tolerance of the machine can only be guaranteed if the machine is installed firmly and properly. Once the machine is lowered on the prepared foundation, machinist levels should be used alternately on the vise slide plates and work feed table, adjust the left to right and front to back level of the machine with leveling bolts.

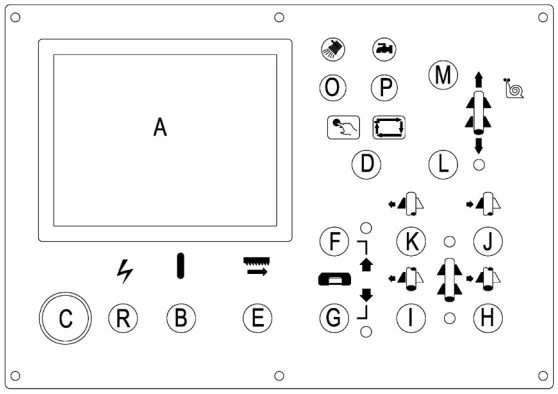
- When leveling front to back level, adjust the back to be approximately 1^{O} higher than the height of the front. This will provide proper return on the cutting fluid, and ease material feeding.
- When leveling left to right level, adjust left side to be approximately 1^{O} higher than the level of the right side. This will provide proper return of the cutting fluid. After proper leveling of the machine, use anchor bolts to secure to the foundation.
- Caution: All leveling bolts should support the weight the machine evenly.





3 DESCRIPTION OF MACHINE PARTS

3.1 The Machine Control Panels



A) Human-Machine Interface (Touch screen)
- Press the hydraulic start button B to start.

B) Hydraulic Pump Start Switch
- Press to start the pump.

C) Emergency Stop Button
- Stops the machine's function.
- Rotate the button to release.

D) Auto/Manual Switch
- This is an operation mode selector. Manual mode is for single cutting operations and Auto mode is for multiple cutting cycles.

E) Operation Start Button
- Starts the cutting operation cycle.

F) Bow Up Button and stop cycle cutting
- Press to raise the saw bow and stops the machine's operation without resetting.

G) Bow Down Button
- Press to lower the saw bow.

H) Bench Vise Close Button
- Press to approach or clamp the work-piece.

I) Bench Vise Open Button
- Press and hold to adjust the widths to desired lengths. When saw bow is not at the safe height limit, the vise will open 5mm at every one touch.

J) Shuttle Vise Close Button
- Press to approach or clamp the shuttle vise on the work-piece.

K) Shuttle Vise Open Button
- Press and hold to adjust the widths to desired lengths. Opens one full length when saw bow is at the safe height. When saw bow is not at the safe height, the vise will open 5mm at every one touch.

L) Shuttle Vise Forward Button
- Press to advance the vise or work-piece.

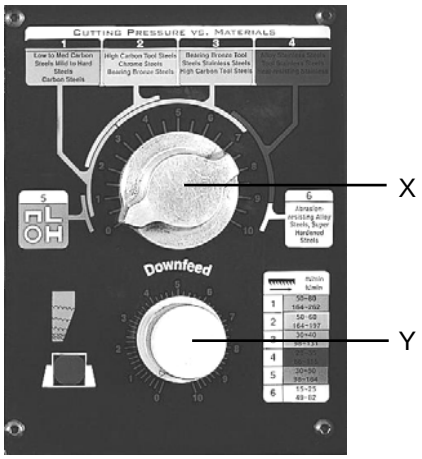
M) Shuttle Vise Backward Button
- Press to retreat the vise or work-piece.

O) Work Light Switch
- Press to start the work lamp and the button light will on. Press again the lamp will off.

P) Coolant Switch
- Press to start the coolant pump and begins coolant flow, the button light will on. Press again the coolant pump will off.

R) Power indicator light.

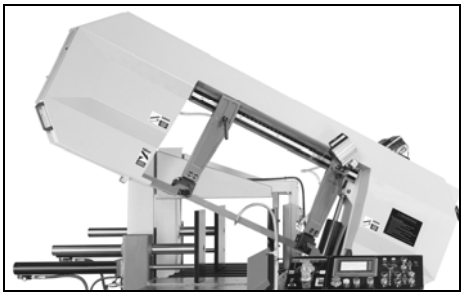
* There are five indicator lights on the control panel. They correspond to the vise and bow rise or down operation. One is for shuttle vise movement and two are for vises clamping. They will become light when material is properly clamped in their respective vises or shuttle vise has reached the forward limit position. The saw bow will not start if the clamping indicator lights are not lit.



X) Cutting Pressure Knob
- This switch set the rate for the cutting pressure for different materials.

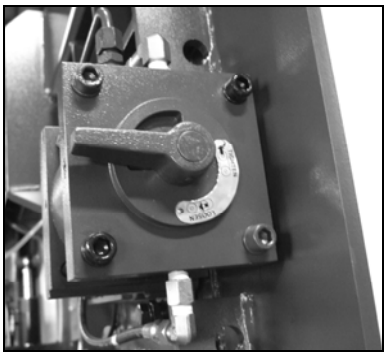
Y) Bow Down-feed Knob
- The switch sets powered down feed pressure.

3.2 The Saw Bow



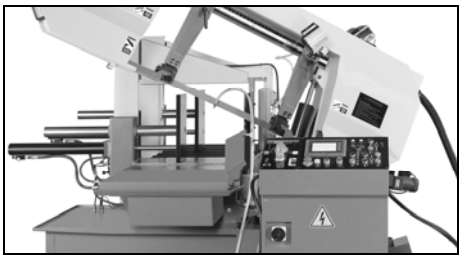
The saw bow consist of machine parts that include drive members (gear motor or variable speed motor, pulleys, flywheels), tensioning system, saw blade, guide assembly (guide arms and blade guide blocks), and work light.

3.3 The Blade Tension Control



- Tension the blade by turn the hydraulic handle to the tension position. Release the blade tension when saw is not in using or change dull blade.

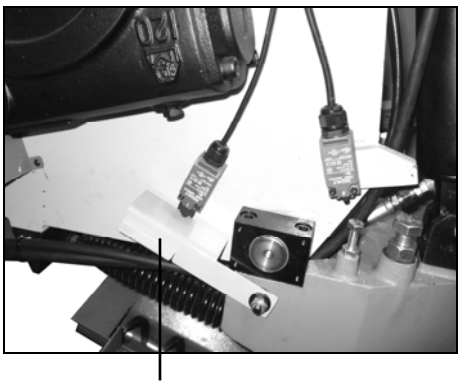
3.4 The Vise System



The vise system consists of a fixed vise and shuttle vise. The shuttle vise is movable for extension of stock material and can positioned to provide more support while clamping. Both jaws on the shuttle vise are hydraulic driven. This system allows flexibility and security while clamping irregular pieces.

The vises also built with vertical presses for bundle cutting.

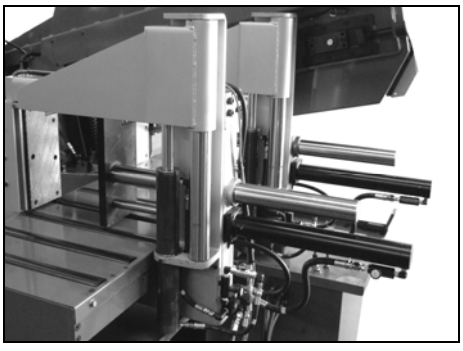
3.5 Bow height adjusting plate



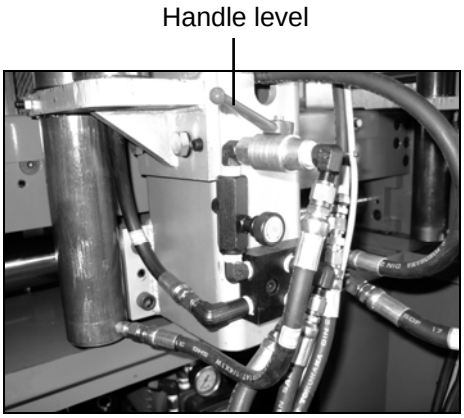
A plate is for bow height adjusting.

An adjusting plate that can be free adjusted upper or lower by hand according to the stock diameter and keep the saw blade teeth over the work-piece in approximate 15~20 mm gap to reduces operation cycle time.

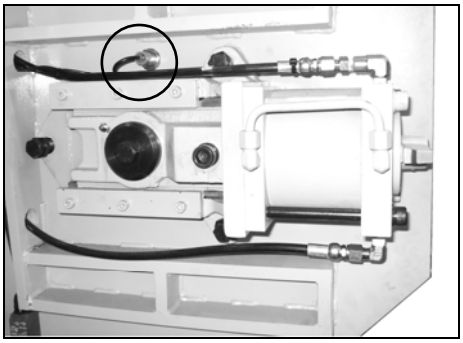
3.6 The Nestling Clamps (Optional)



Nestling clamps are used for bundle cutting operations including front and rear vertical vise. They are used to vertically press down upon a group of equally sized work-pieces. This allows cutting of multiple pieces at once. These clamps are hydraulically operated automatically, if want to stop this device function just open the vise let the vertical press up to the top position then switch off the hydraulic by turn the handle level to 90^{o}.

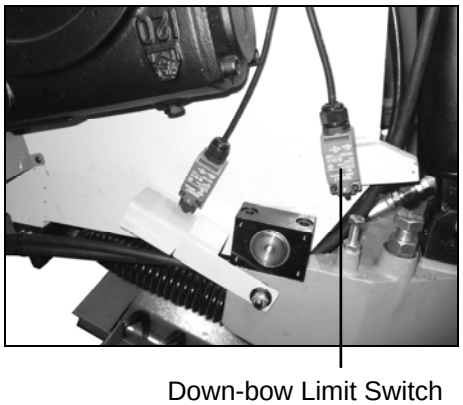


3.7 The Magnetic Sensor



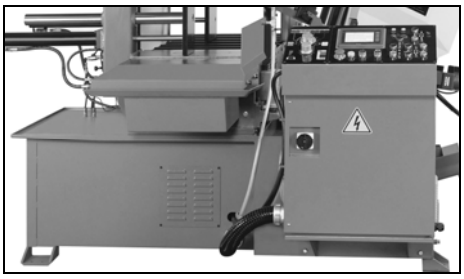
This machine is equipped with automatic power shut-off safety device to prevent any further damage when a blade has been broken. This micro -switch determines the movement of the blade flywheel. When the blade is broken and loosen in tension of the flywheel.

3.8 Down-bow Limit Switch



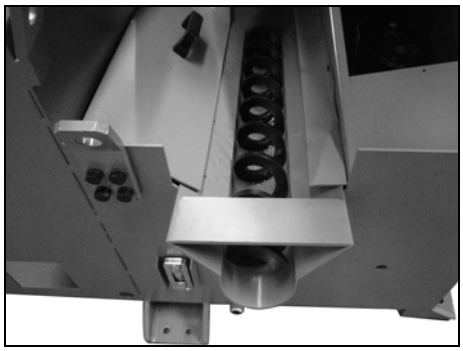
The down-bow limit switch stops descent of the saw-bow, the blade running and saw bow raise up when it has reached to the table.

3.9 The Base



The base is the structure supporting the saw bow (the bow pivot point and respective blocking system), the vise, the rollers, the feeding system, and coolant system.

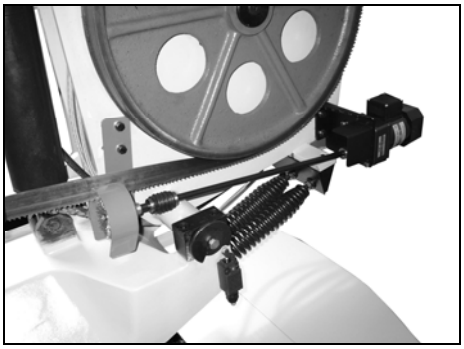
3.10 The Chip Auger



The chip auger is driven by a hydraulic motor. It automatically starts during the hydraulic pump on.

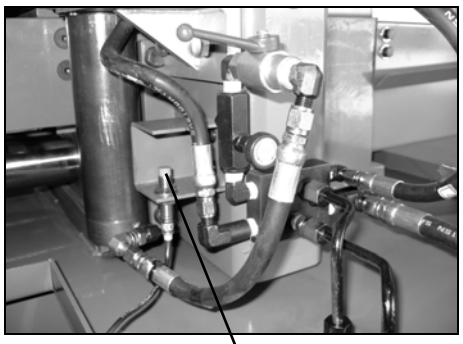
! Warning: Keep hands, hair, and article of clothing away from the Auger. The auger is a danger to hands and other body parts.

3.11 Chip brush



This model has a powered chip brush driven by an axle transfer from the motor. The chip brush is designed to clean the blade thus prolonging the life of the blade.

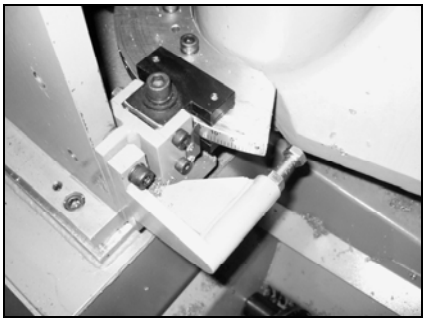
3.12 The Shuttle Vise Forward Sensor



Forward Sensor

The forward sensor function is when the shuttle vise moves forward to the zero position the sensor will sends signal to PLC for next motion.

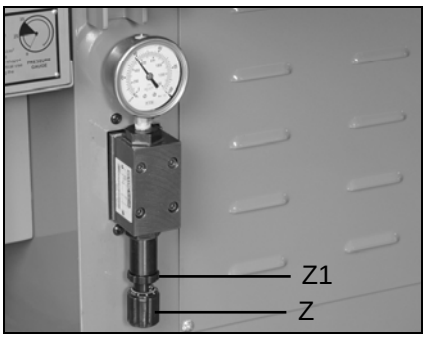
3.13 Miter angle lock device



The pivot platform is the structure that holds the saw bow and rotates horizontally for miter cutting up to 45°. Miter angles are secured in place with a clamping mechanism that is operated by a lock screw. An angle scale with a pointer in clear view of the saw operator allows for accurate setting of the cutting angle. The head is easily changed to set a different cutting angle by releasing tighten screw by hex tool to loosen the Brake lever, and then manually moving the Head to the cutting angle desired.

3.14 Hydraulic vise pressure

The hydraulic vise pressure can be adjusted by a pressure gauge on the base of the machine. The normal pressure is set at 35kgs/cm^2. This is good for most solid firm materials. For softer, hollow, or pipe materials reduce the pressure to over 25kgs/cm^2. Other materials may require different clamping force. The clamping pressure can be adjusted by a knob at the base of the pressure gauge assembly.



- Start by pressing the vise close switch (3.1G) continuously in manual mode to have the vise clamp onto a work piece.
- Next, unlock the fluted knob (Z) by releasing fluted lock nut (Z1).
- Turn the fluted knob (Z) counterclockwise to decrease the pressure, clockwise to increase the vise pressure.
- Lock the fluted nut (Z1) after adjustment

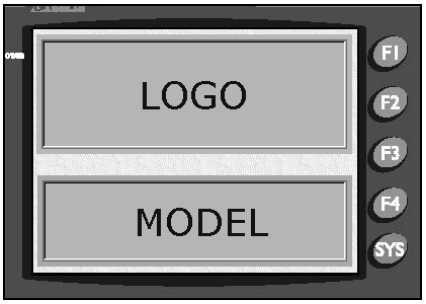
4 HUMAN-MACHINE INTERFACE

The colorful human-machine interface 3.1A is a touch screen input window. It allows for the programming of operation variables. It will also display current operation parameters or errors.

Operations are conducted in menu form. The human-machine interface 3.1A is activated when the hydraulic pump is started. Press the hydraulic start button 3.1B to begin. The interface will display a start page contain the machine brand and model number.

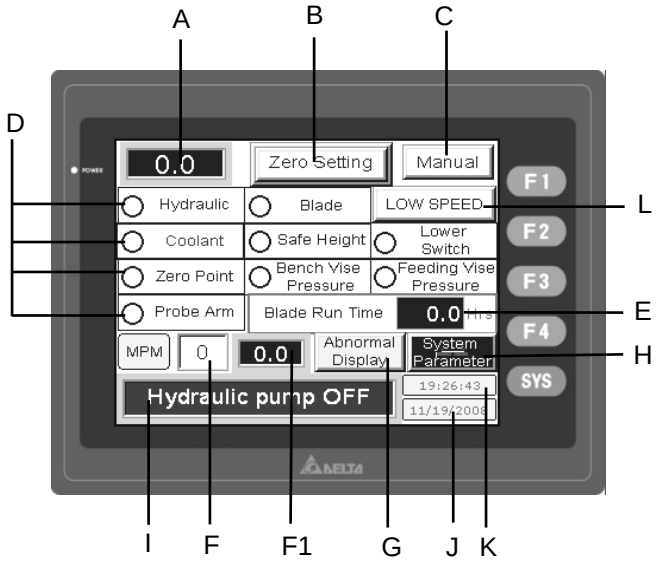
4.1 The Human Machine Interface (Monitor) (3.1A)

Starts pump the monitor will shows company Logo and machine model.



4.2 F1: Main Menu

Touch **F1** button monitor will display below page:



A. Feeding vise move position
The numeric column shows shuttle vise moving position.

B. Zero (Home) Setting:

- This function is to set the feeding vise zero position before executive automatic cutting when machine power has been shut off then turns ON again.
- **Execute zero setting should be after clamping the front vise and opening the rear vise in the manual mode.**

C. Operate mode
Shows machine operate situation Manual or Auto.

D. Working indicator lights
The indicator lights shows working situation that are including Hydraulic, Blade tension, Coolant, work light, Safe height, Lower limit switch, Zero point, Bench vise pressure, Shuttle vise pressure and Probe arm limit switch.

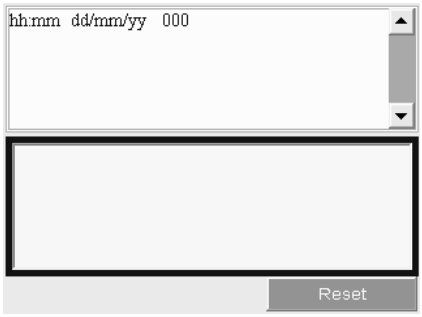
E. Blade running time

- Shows blade running time that has to touch left frame to start counting or zero setting after blade has been changed.
- Touch blade run time column to set the blade run time to zero, Yes or No.

F. Set the blade speed.
Touch to set blade speed directly and quickly.

F1. Blade speed
Shows actually blade-running speed.

G. Alarm display
Shows error notices when machine malfunction occur and how to solve it.



- This page also records the history alarm data, check the error data by moving right side vertical and horizontal arrow signs.

H. System parameter

- A password is required to enter into this section. After the password is entered, Parameter Setting will appear.
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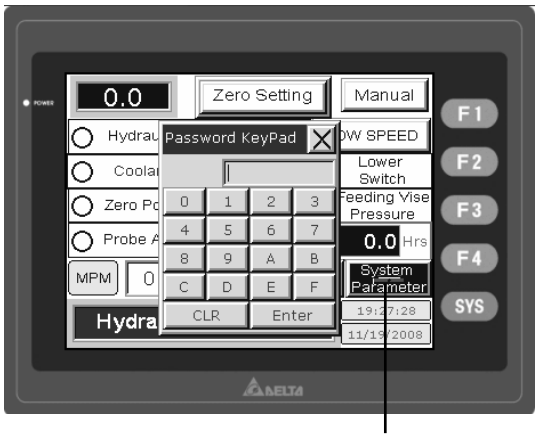


System parameter

- This page has loaded the adjusting parameter before machine shopping. Enter this page must be key in the password and hit ENT to enter password. It is not necessary to make any changes in the parameter setting.
- All changes should be conducted by a qualified personnel or distributor. Caution should be taking when making any changes in system parameters, because they could cause a malfunction in machine operation.

I. Machine executive message

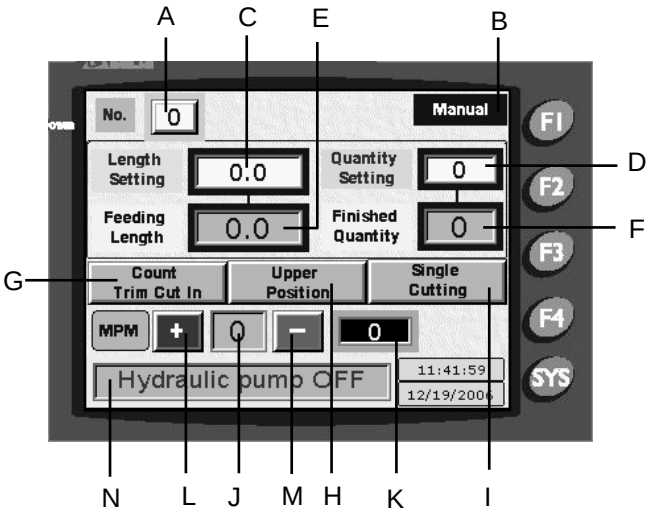
J. Date showing.

K. Time showing.

L. High speed or low speed selecting for shuttle vise in manual mode operation.

4.2.1 F2: Current Operation

Touch F2 button, monitor will shows executive situation.



A. **Executing No.**
Refers to the instruction task order. Touch it to go to F3 page Sets material cutting jobs.

B. **Operate mode**
Shows machine executive situation Manual or Auto.

C. **Preset Length:** – refers to the length setting of the current instruction task.

D. **Preset Q'TY**: – refers to the quantity setting of the current instruction task.

E. **Feeding material length**.

- Refers to the current total length of material that has fed forward. This includes distances beyond a single shuttle stroke.

F. **Cutting Completed**
Refers to the number of cut-pieces completed.

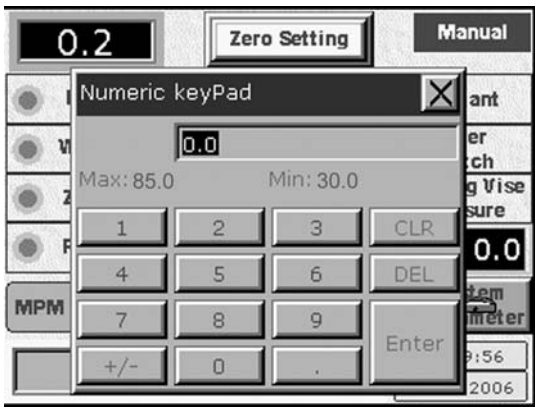
G. **Count trim cut in or out**
Touch this button to count trim cut out after starting automatic cutting cycle.

H. **Saw head stop position**
Set the saw head stop position at upper or lower after finished cutting in manual cutting mode.

I. **Single cutting or Bundle cutting**

- Touch it to select single cutting or Bundle cutting.
- For single cutting operation, the shuttle vise will clamp at a position in the back to prepare for the next feed.
- Bundle cutting means the shuttle vise will stay at the front position after feeding material forward.

J. **Blade Speed (MPM).**
Touch to set blade speed directly, the blade speed in meters per minutes.



K. Shows actually blade-running speed.

L. (+) sign that can set blade speed higher.

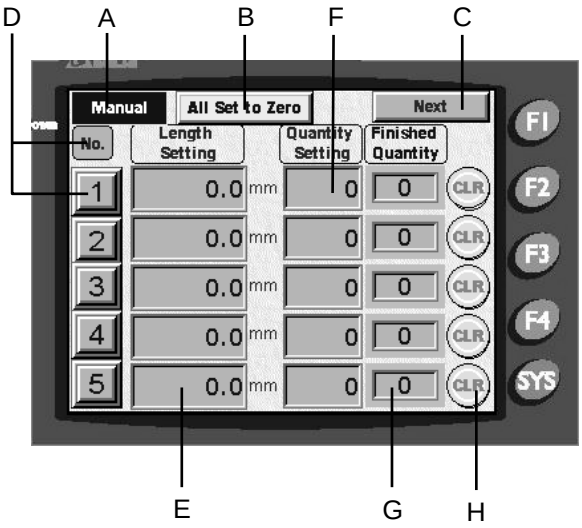
M. (−) sign that can reduce blade speed.

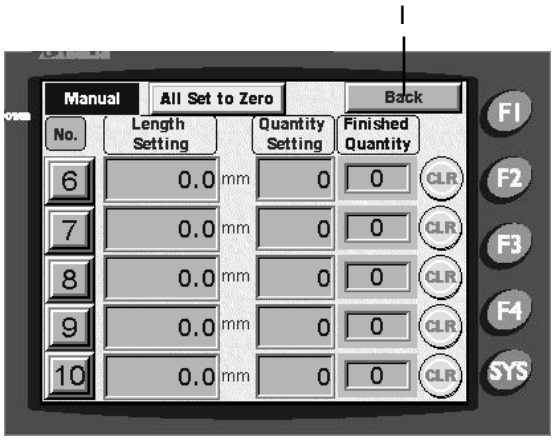
N. Machine executive message
This column shows machine executive steps and wrong procedure.

Executive messages	Remedy
1. Hydraulic pump OFF	1. Start hydraulic pump
2. Bench vise not clamping securely	2. Close bench vise until indicator light is on.
3. Front & Rear vises are clamping.	3. Open front vise or Rear vise.
4. Zero setting incomplete	4. Executive Zero setting.
5. Bow not released	5. Press bow rise button until indicator light is on.
6. Choose executive No.	6. Touch the executive No. to choose cutting job.
7. Probe arm limit switch is off.	7.Rise bow up.

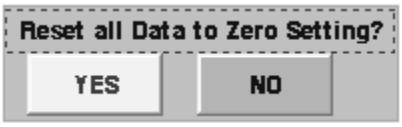
4.2.2 F3: Sets material cutting jobs

Touch F3 button will shows cutting jobs setting



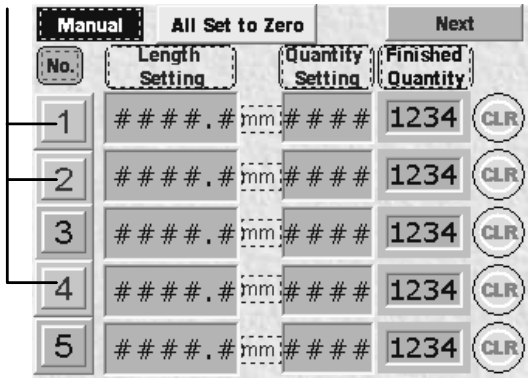


A. Shows Manual or Auto Mode
B. Touch to clean all set data to zero setting. Yes or No.



C. Touch to next page.
D. **Executing No**.–Refers to the instruction task order, cutting jobs No. from 1~10.
The machine will follow the selected jobs to cutting work-piece from the top to the bottom automatically.
- **Executing job No.**
- Touch the executive number to choose the cutting jobs, the column will change its color to green.

Chosen executing job No.



- The executive column can appear only when cutting length and quantity has been key in.
- The executive column can't appeared if cutting quantity has been finished or one of column, length or quantity, is zero.
- Cancel the No. of cutting job just touch the executive No. that will back to original.

E. **Length Setting –** refers to the length of cut-pieces.
- This menu allows the user to set the variables for work-piece cutting. There are 10 total task slots available for altering the production lengths and quantities.
- Touch task No. 1, to set the length and quantity.
- Then set the next task number.
- Touch the Next button to go to the next page and the next 5 available tasks.
- Modify the cutting length (in manual mode) just touch the length the next page will be displayed.
- Touch the cutting length (in manual mode) to set a new cutting length.
- The numeric keypad will display after touching the cutting length.

- This item allows the user to set the variables for work-piece cutting.
- Key in the cutting length, and hit the Enter button to finish the setting procedure.

F. **Quantity setting**
Set the cutting quantity procedure as same as the cutting length setting.
- There are 10 total task slots available for altering the production quantities.

G. **Finished Quantity** – refers to the number of cut-pieces completed.

H. **Clear Setting**
Press any CLR button in **two sec** to clear length and quantity to zero setting at that item.

I. Back to front page.

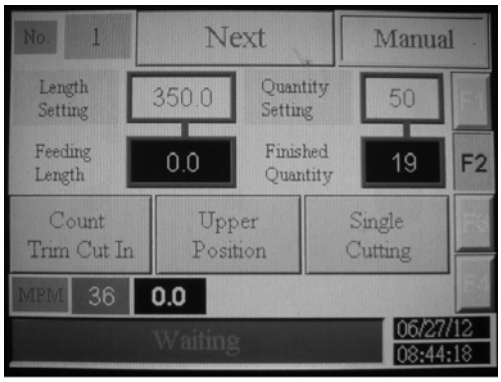
4.2.3 F4 Page: Language Option

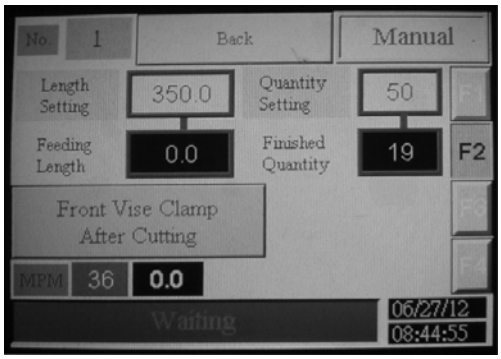
This menu allows the user to change the user language.

Touch one of languages and press Back to front page to return to the main menu in your desired language.

4.3 Cutting Options

There are some cutting options for user's needs:



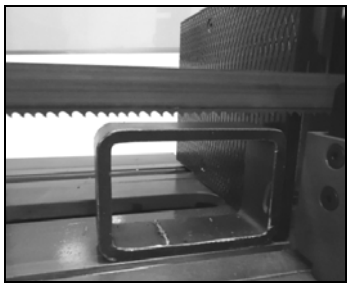


1. Count Trim Cut in/out

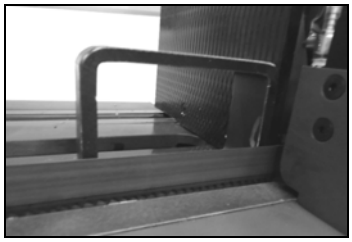
When selected count in, the first cutting would be counted. If material is not smooth that need to cut off firstly, the user can choose count trim cut out to not count first cut.

2. Upper Position/Lower Position

In manual mode, there are two options to decide saw bow position after finish cutting. User can set as their need with various kind of material and cutting demand.



Upper position



Lower position

This function is for Manual mode use; when it run auto mode, the bow will rise as upper position.

3. Single cutting /Bundle cutting

To cut multiple work pieces, it can select "Bundle cutting" to change feeding vise moving procedure via this option.

In cutting cycle process:

If selected bundle cutting, the feeding vise will move to back after cutting.

If selected single cutting, the feeding vise will move to back when start cutting

Note: The multiple work pieces cutting that need to weld each other. It is not also help cutting effect but also extend blade life longer.

4. First vise open/close after cutting

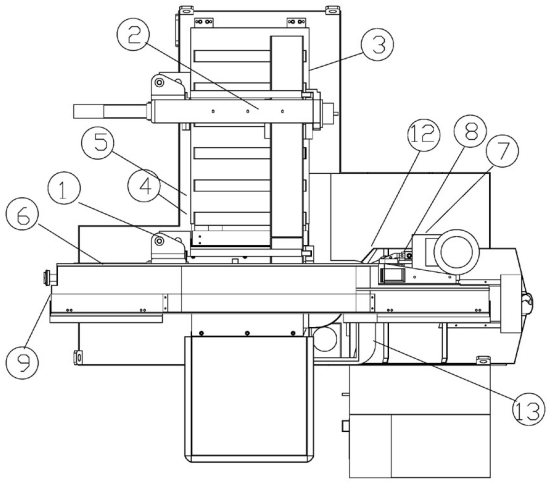
Select "first vise open": first vise will open after cutting, then saw bow rise up

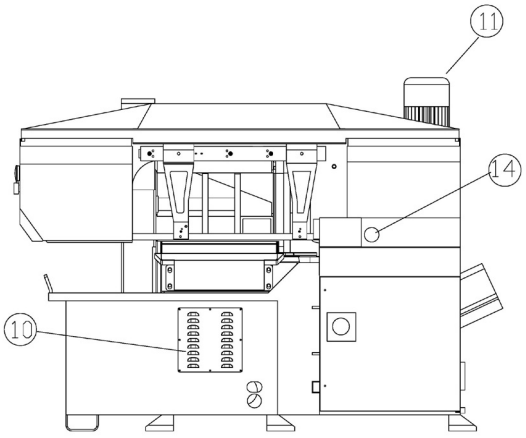
In normal, select "first vise clamp": saw bow rise up firstly. Then first vise open and feeding vise transfer the material accordingly.

4.4 Machine Error Notices

The Human-Machine Interface will show error notices when machine malfunction occur. They will display the probable cause and possible remedies.

Follow the remedies to resolve the problem and press reset button to remove the Error Notice.





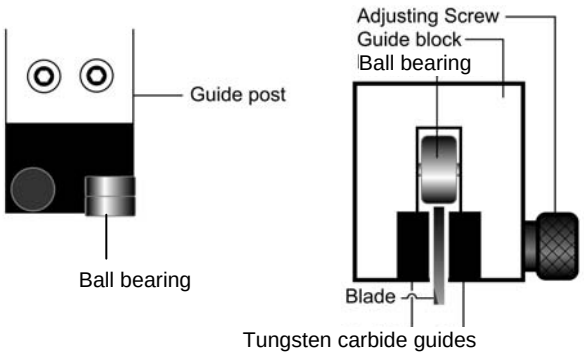
Above is a map showing the number and location of various malfunctions.
- Malfunctions display and remedy:
1 – Abnormal forward limit switch
- Check forward limit switch.
2 – No material in the shuttle vise
- Check material in the shuttle vise
3 – Abnormal encoder scale
- Check linear scale wires.
- Check linear scale function.
4 – Abnormal shuttle-vise pressure sensor
-Check shuttle vise pressure sensor function.
5 – Abnormal bench-vise pressure sensor
- Check bench vise pressure sensor function.
6 – Abnormal blade tension
- Check for broken blade
- Check for blade tension
- Check blade sensor
7 – Abnormal probe arm limit switch
- Check probe arm limit switch
- Check probe arm sliding function
8 – Abnormal bow down limit switch
- Check bow down limit switch
9 – Blade cover opened
- Check blade cover limit switch
- Close blade cover
10 – Abnormal motor inverter
- Check motor inverter
11 – Abnormal blade motor.
- Check overload relay of blade motor
12 – Abnormal hydraulic motor
- Check overload relay of hydraulic motor
13 – Abnormal coolant motor
- Check overload relay of coolant motor
14 – Emergency button locked
- Release Emergency button

5 SAW BLADE OPERATIONS

Choose a proper saw blade by select the saw blade best suited to the work-piece to be cut. Size the shape of the work-piece, and type of material should all be considered when selecting the saw blade to be used.

5.1 Adjusting the tungsten carbide guides

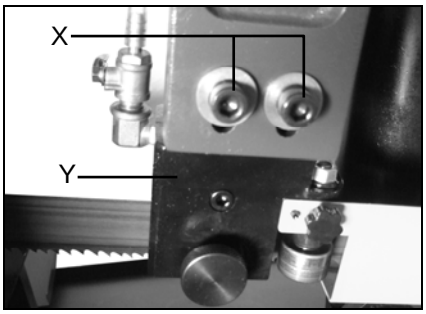
The blade is guided by the upper ball bearings, side ball bearings, and tungsten carbide guides.



- When ready to cut the work piece, the carbide guide must be adjusted by adjusting the screws to properly compressed blade. The tungsten carbide blades should touch, but not pinch the blade.
- For moving the blade guide posts or changing blade, the tungsten carbide guides should be released by using the adjusting screw.

In case the blade needs to be replaced, make sure to always install 1.3mm thick blade.

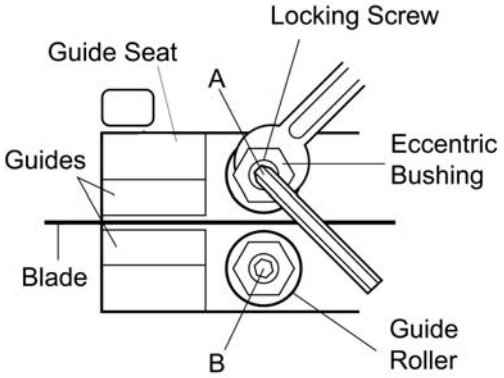
5.2 Thrust Roller Adjustment



1. Disconnect machine from the power source.
2. Loosen two hex socket cap screws (X).
3. Move guide seat (Y) up or down until a clearance of .003" to .005" between back of blade and thrust roller is obtained.
4. Tighten two hex socket cap screws (X).
5. Repeat for other blade guide assembly.
6. Connect machine to the power source.

5.3 Guide Roller adjustment

Note:
Only bearing (A) is adjustable. Bearing (B) is fixed.

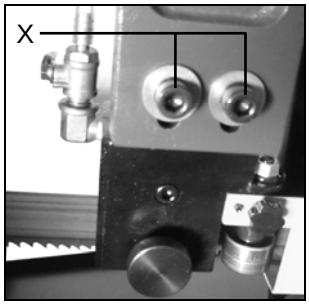


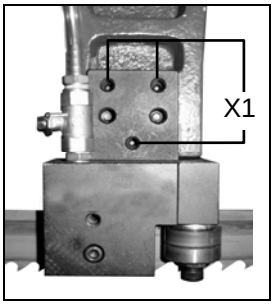
1. **Disconnect machine from the power source.**
2. Loosen blade guides by loosening guide adjustment screw (Z4.2).
3. Loosen locking screws (A) by using a hex wrench.
4. Adjust the eccentric bushings with a combination wrench until the ball bearings are snug to the blade (A)

Note: blade should travel freely up and down between the ball bearings. do not pinch the blade.

5. Tighten locking screws (A).
6. Connect machine to the power source.

5.4 Adjusting the cutting precision



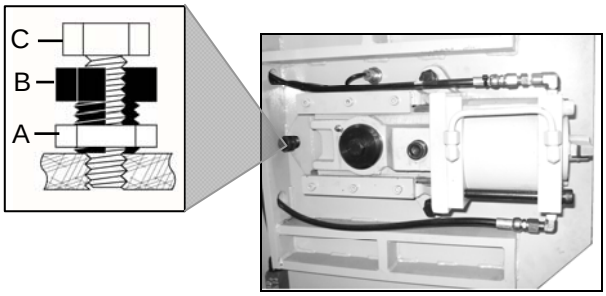


The cutting precision has been set at the factory. This adjustment should only be accomplished by a qualified personnel that are familiar with this type of adjustment.

- Disconnect the machine from power supply.
- Loosen the adjusting bolts (X) slightly, if needed.
- Use the setscrews (X1) to adjust the direction of the guide blocks.
- After adjusting, tighten the adjusting bolts (X).

5.5 Blade tracking adjustment

This adjustment must be accomplished by qualified personnel that are familiar with this type of adjustment and the dangers associated with it.



The blade tracking is factory set and should not require any adjustment. If a tracking problem occurs, adjust the machine as follows:

- Raise saw arm to a usable height.
- Disconnect the machine from the power source.
- Locate tracking adjustment bolt on the backside of the saw bow behind the flywheel.
- Loosen hex cap screw C, located on the top of the tracking nut B.
- Tracking adjustment is accomplished by either raising or lowering adjusting screw B.
- Tracking is set properly when the back of the blade lightly touches the wheel flange. Note: over tracking (allowing blade back to rub hard against wheel flange) will damage the blade wheels and blade.
- Secure the locking bolt A. Tighten hex cap screw C and tracking nut B.
- Connect machine to the power source.

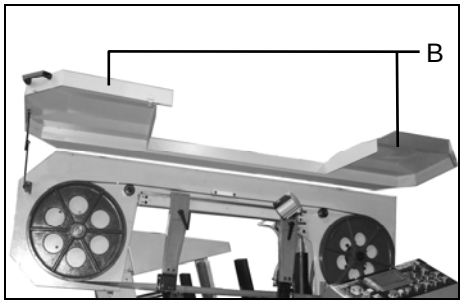
5.6 Removing and Installing the Blade

Blade changes are periodically required when they become worn or to match the properties of varying materials.

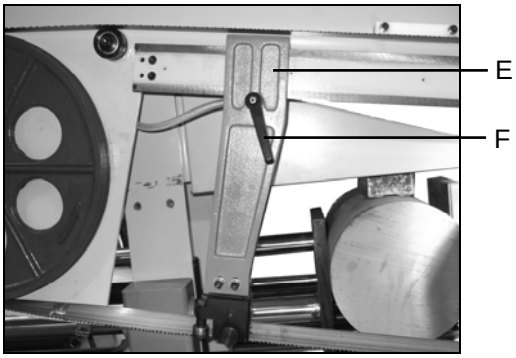
⚠ WARNING
Disconnect the machine from the power source before making any adjustments or repairs! Failure to comply may result in serious injury!

- Raise the saw bow approximately 6” in height.
- Disconnect the machine from the power source.

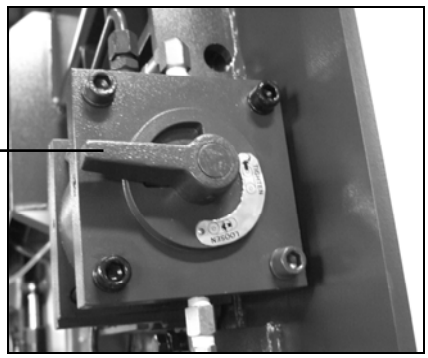
- Remove the blade guards (A) and (A1) from the base of the guide post and saw bow cover.



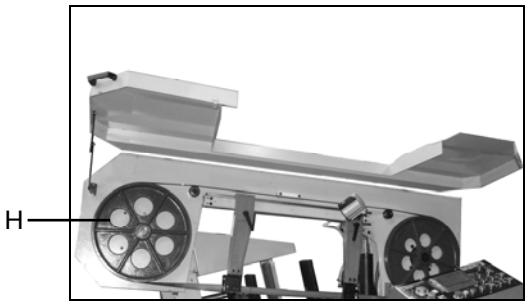
- Open the saw bow covers (B).
- Release the tension on the carbide guides by turning the knob (C) counter clockwise 1/4” turn.



- Loosen left blade guide post (E) lock handles (F) and slides it to the right side as far as possible.



- Release the blade tension. Turn the blade tension handle (G) to “Loosen “position to free the blade.



Wear gloves for protection from the sharp blade!

- Remove the old blade from both wheels (H) and out of each blade guide.

※ **Caution**: **Even dull blades are sharp to the skin !**
Use extra caution handling band saw blades !

- Place the new blade in the carbide guides, and then slide the blade over the wheels (H). The teeth should be pointing towards the drive side as they pass through the carbide guides. The blade teeth should protrude from 4.5mm to 5mm from the face of the blade wheels.
- With the blade in place, turn the tension handle (G) to the “Tighten” to tension blade.
- Set the carbide guides. Turn the two carbide locking handles clockwise to the locked position. Jog the blade a few rotation to check that the blade is not moving in or out on the blade wheels.
- Close all covers and fasten all guards.

5.7 Breaking in the Saw Blade

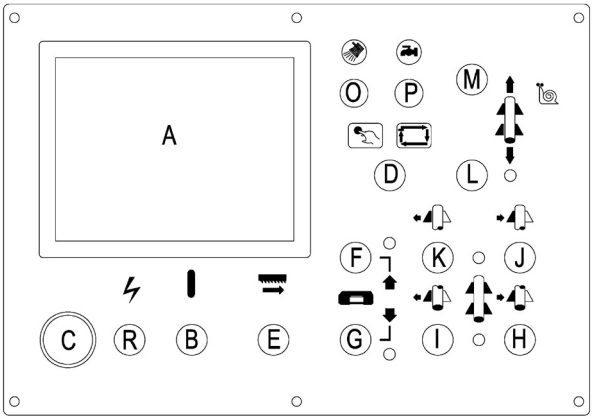
When a new blade is used, be sure to first break in the blade before using it for extended operation. Failure to break in the blade will shorten the service life of the blade, and result in less than optimum efficiency. To break in the blade, proceed as follows:

- Reduce the blade speed setting to one half of its normal setting.
- Lengthen the time required for cutting to 2-3 times that of normal:
- The break-in operation can be considered sufficient if all unusual noises or metallic sounds have been eliminated. (For instance, to completely break in the blade, a minimum of five complete cuts of a 200mm (8ins.) Diameter work-piece will be required).
- After the break-in operation has been completed, return the blade speed and feed rate to their normal setting.

6 SET UP AND OPERATION PREPARATIONS

6.1 Vise Operation

- The vises can be opened to one full stroke when saw bow is raised to the highest limit. If the saw bow at a position below the highest limit, then the vises will only open 5mm. They will not continue open when vise open buttons 3.1I,K, are pressed again.
- The shuttle vise will not move material when the bench vise is clamped.
- The shuttle vise will not move material if the approach sensor is active.
- If the vises are to be closed, then start with the bench vise.
- If the vises are to be open, then start the shuttle vise.



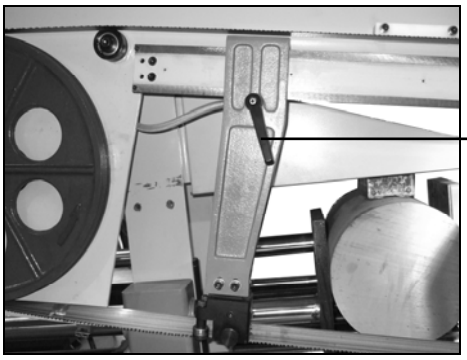
[Ref.] 3.1 Machine Control Panels

6.2 Securing the Work-piece

- Raise the saw frame to the safe height..
- Open the vise wide enough for the material.
- Place work-piece onto the roller table.
- Gently push the work-piece through the vertical rollers and shuttle vise, taking care not to hit the vertical rollers.
- The machine will automatically clamp the material in auto mode and the vise can close a full stroke to do so.
- In manual mode, use the vise close buttons 3.1 H, J.

6.3 Adjusting the Guide Posts

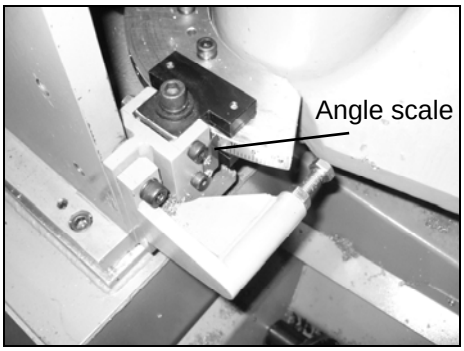
The blade-guide posts adjust horizontally to control the spacing of the blade guides. Having the blade exposed to the minimal amount provides better safety protection and a more accurate cutting by reducing blade flexing.



- Refer to the scale to adjust the distance.
- For most spacing changes, unlock the left guide post by loosening the handle A.
- Grip the posts and move horizontally.
- Use the handle A to lock into position.

6.4 Setting the miter angle

This machine can make miter cuts up to 45°. There is an angle scale with indicator for quick and accurate miter angle setting.

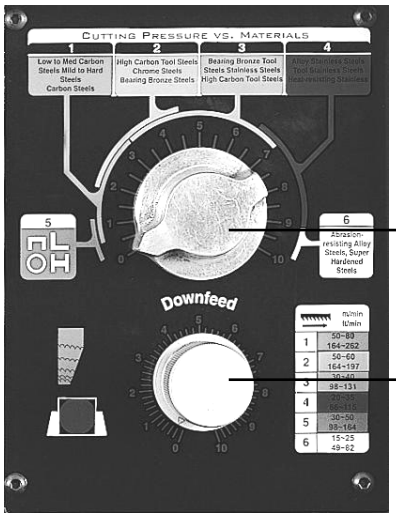


Always lock the horizontal rotation before performing any cutting operation.

- Unlock the saw bow. Raise the lock screw (A) by the hex tool.
- Rotate the saw bow. Check the angle scale for the desired angle.
- Set the miter angle. Lower the lock lever (A).

6.5 Cutting Feed Rate

Select suitable cutting feed pressure and down rate for the work-piece to be cut. This varies according to the size and shape of the work-piece, type of material, and what type of saw blade is being used. As a guide for materials: cutting hard, wide, tube, or structural materials, must to be done at a slower rate then mild steel bar. For the concerns the saw blade, high-speed steel is better than carbon steel and bi-metal alloy is better than high-speed steel.



Roughly. The materials are listed on the control panel. Please refer to it for proper cutting pressure and feed rate setting.

- Curled shaving indicate correct feed rate.
- Thick discontinuous chips indicate too much feed rate. Turn knob counterclockwise.
- Powdery chips indicate too little feed rate. Turn knob clockwise to increase feed rate.

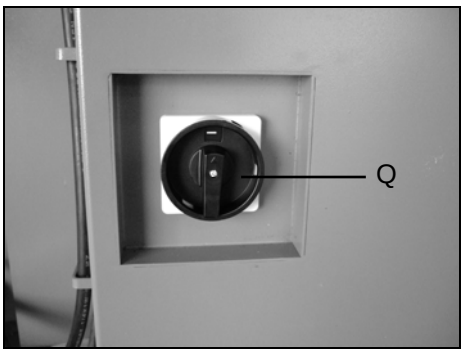
7 OPERATION CYCLE

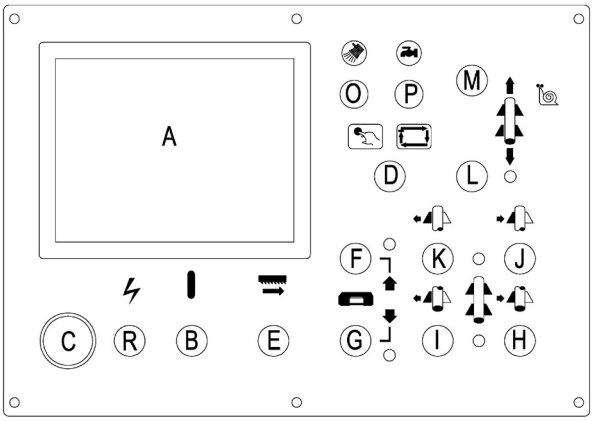
Before you start to cut the work-piece, you must inspect that …

- The work-piece is well clamped.
- The saw blade is suitable for the material being cut.
- The blade-guide post is secure and the hand wheel is tightened.
- Sufficient tension is placed on the saw blade.
- The wire brush is properly positioned.
- There is sufficient cutting fluid in the trough, and it is in good condition.
- The feed length is set to the correct distance.

7.1 Manual Operation

Reference 6 Set Up Operation Preparations for detailed instructions for some of the procedures below.





[Ref.] 3.1 Machine Control Panels

- Connect the main power, use switch Q.
- Press the Hydraulic Start button 3.1B.
- Use the Auto/Manual Switch 3.1D to select manual mode.
- Place the work-piece onto the vise; refer to *Securing the Work-piece* (6.2).
- Close the shuttle vise use the shuttle vise close button 3.1 J.
- Move the work-piece to the desired. Use the shuttle vise Forward and Backward Buttons L, M.
- Clamp the work-piece with the bench vise use the Bench Vise Button 3.1H.
- Adjust the spacing of the blade guidepost; refer to *Adjusting the Guide Posts* (6.3).
- Set the Blade Speed in manual mode. Use F1 (I) or F2 (J), F2 +/- can set the blade speed in auto mode.
- Set the Bow Down-feed rate 3.1X; refer to *Cutting feed rate* (6.6).
- Press Operation Start Button 3.1E to start the cutting operation cycle.
- Press coolant switch P to start the coolant pump and indicator light will on. The chip auger will also start turning. The saw bow will begin to descend quickly until the probe arm touches the work-piece. Then the blade descent speed will slow to the 3.1X settings.
- After completion of the cut, the saw blade will stop at the lower limit position. The bow stop location can be set at upper position or lower position in manual cutting mode 4.2.1 (F2) H.
- Press the Bow up button F to raise the saw bow.

Stopping the Machine

In event of an emergency, press either the Emergency Stop Button 3.1C, or the Bow up Switch 3.1F, to stop all machine functions.

7.2 The Initial Trim Cut

When inserting a new work-piece in automatic mode, the first cut-piece will not be the proper size unless an end-cut is performed. This initial cut will zero material length so that further cuttings will be performed accurately.

- Begin by inserting the material. Have the material slightly past the blade cut off line.
- Perform all the *Automatic Operation* (7.3) setting procedures.
- Switch the operation to manual mode by using the Auto/Manual Switch 3.1D.
- Start the initial trim cut with automatic mode. The initial trim cut can count trim cut in or trim cut out by pressing button 4.2.1 F2 (G) after start auto cutting.

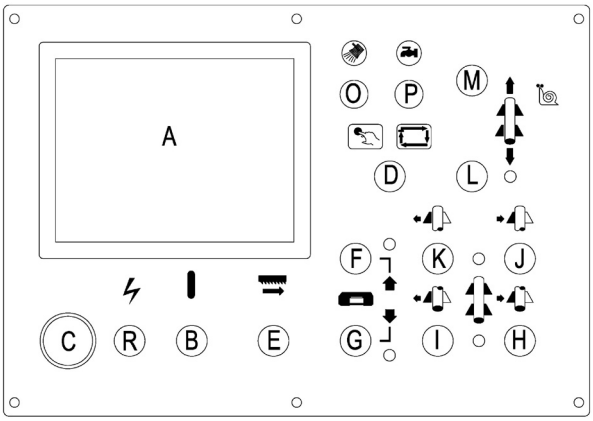
7.3 Automatic Operation

Reference ***6.*** *SET UP AND Operation Preparations that is* for detailed instructions for some of the procedures below.

- Connect the main power, use switch Q.
- Press the Hydraulic Start Button 3.1B.
- Use the Auto/Manual Switch 3.1D to select the manual mode.
- Clamp the work-piece; refer to *Securing the Work-piece* (6.2).
- Use the Auto/Manual Switch 3.1D to select the automatic mode.
- Set the cut-piece variables in the Human-Machine Interface 3.1A. Refer to 4.2.2 F3 Sets cutting jobs, and chooses executing No.4.2.2 F3 (D).
- Adjust the spacing of the blade guide post; refer to *Adjusting the Guide Posts* (6.4).
- Set the Blade Speed. Use 4.2 F1 (I) or 4.2.1 F2 (J).
- Set the Blade Speed in manual mode F1(I). Use F2 (J) + / - can set the blade speed in auto mode.
- Set the Bow Down-feed speed 3.1X; refer to *Cutting Feed Rate* (6.6).

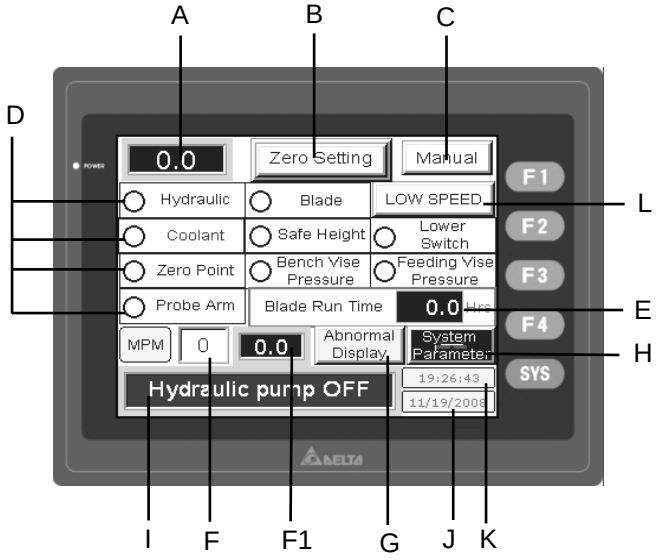
*If starting with a new work-piece; refer to *The Initial Trim Cut* (7.2) procedures.

- Press Operation Start Button 3.1E to start the operation cycle.
- Press 3.1(P) to start the coolant pump. The saw bow will begin to descend quickly until the probe arm touches the work-piece. Then the blade descent speed will slow to the Cutting Down-feed 3.1X settings.
- After completion of the cut, the saw blade will stop at the lower limit position.
- The saw head will rise and work-piece will feed for the next cut.
- The cycle will continue until all commands have been completed. The machine will stop and the motor will turn off.

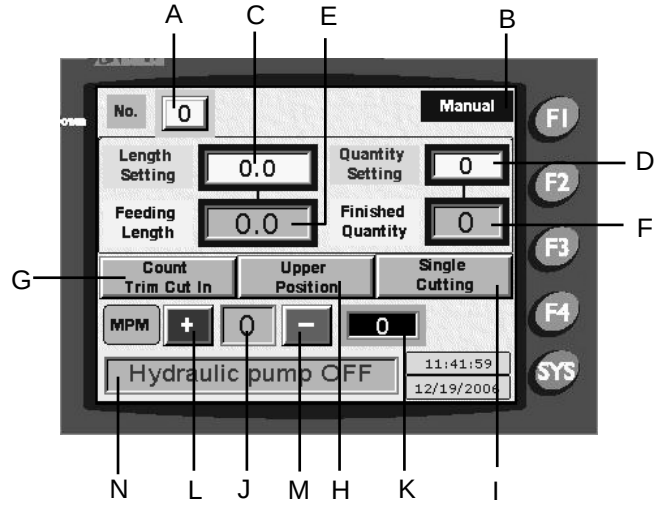


[Ref.] 3.1 Machine Control Panels

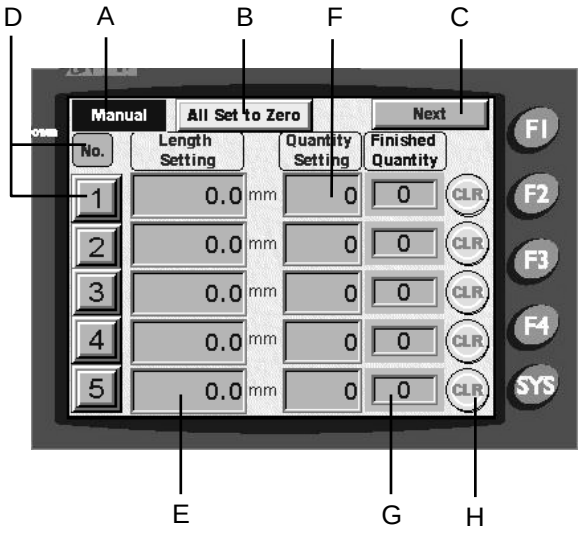
[Ref.] 4.2 F1 main panel



4.2.1. F2 Current Operation



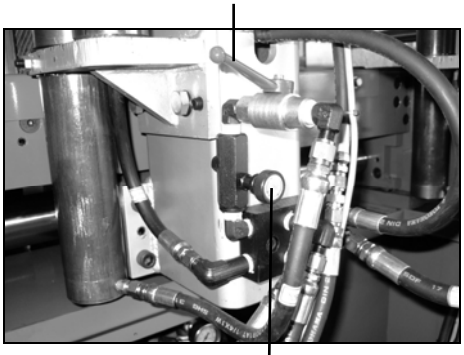
4.2.2 F3: Sets material cutting jobs



Stopping the Machine
In event of an emergency, press either the Emergency Stop Button 3.1C, or the Bow up Switch 3.1F, to stop all machine functions. It is recommended using the Bow up Switch 3.1F, because the emergency stop button will cancel all machine setting. When using the Bow up Switch 3.1F, the work-piece will still be clamped.
Also the machine can be stop between task cycles switching to manual mode with Auto / Manual Switch 3.1D. Using this switch will cause the machine to stop at the end of current task.

7.4 Bundle Cutting

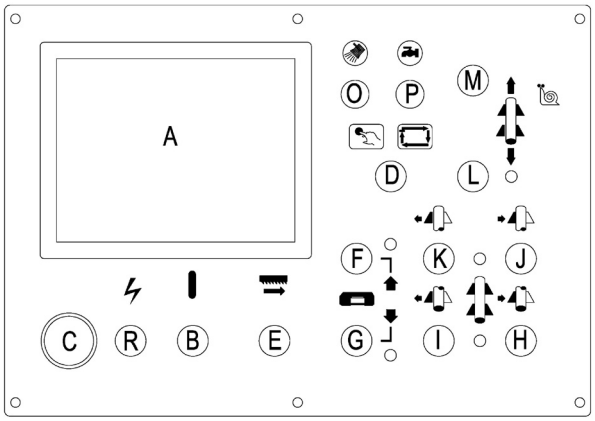
Hydraulic switches



Flow controller

- Refer to *the Nestling Clamps* (3.6).
- Follow either the *Manual Operation* (7.1) procedures or the *Automatic Operation* (7.3) procedures.
- Open the hydraulic switches on the side of front vise and feeding vise like as picture.
- Clamping operations are the same. The switch, 3.1H, I, J, K; that operate the vises also operate the vertical motion of the nestling clamp. So, if open the shuttle vise then the nestling clamp on the shuttle vise will rise up. And if close the shuttle vise the nestling clamp on the shuttle vise will lower to press the material.

[Ref.] 3.1 Machine Control Panels



7.5 Special Operation for a Jammed Blade

While you are cutting a work-piece, if the saw blade suddenly jams in the work-piece, press the frame raise button 3.1F to lift the saw frame immediately.

The saw blade jamming in the work-piece is most likely because of:

- Slippage occurring between saw blade and drive wheel. Tension placed on the saw blade is not sufficient.
- Slippage occurring between drive belt and motor pulley. Tension on drive belt is not sufficient or belt is worn.
- Broken teeth on the saw blade.
- The saw blade is too blunt.
- The tooth spacing on saw blade is too fine for material being cut.
- Feed rate is too fast for material being cut and blade being used.

8 ROUTINE AND SPECIAL MAINTENANCE

The maintenance jobs are listed below, divided into daily, weekly, monthly and six-month intervals. If the following operations are neglected, the result will be premature wear of the machine and poor performance.

8.1 Daily Maintenance

- Give general cleaning to the machine to remove accumulated shavings.
- Clean the lubricating coolant drain hole to avoid excess fluid.
- Top off the level of lubricating coolant.
- Check blade for wear.
- Rise of saw frame to top position and partial slackening of the blade to avoid useless yield stress.
- Check functionality of the shields and emergency stops.

8.2 Weekly Maintenance

- Thoroughly clean the machine to remove shavings, especially from the coolant tank.
- Removal of pump from its housing, cleaning of the suction filter and suction zone.
- Clean the filter of the pump suction head and the suction area.
- Use compressed air to clean the blade guides (guide bearings and drain hole of the lubricating cooling).
- Clean flywheel housings and blade sliding surfaces on flywheels.

8.3 Monthly Maintenance

- Check the tightening of the drive wheel screws.
- Check that the blade guide bearings on the heads are perfect running condition.
- Check the tightening of the screws of the motor, pump, and accident protection guarding.

8.4 Six-Month Maintenance

Test the continuity of the equipment potential protection circuit.

8.5 Oils for Lubricating Coolant

Considering the vast range of products on the market, the user can choose the one most suited to their own requirements, using as reference the type SHELL LUTEM OIL ECO. THE MINIMUM PERCENTAGE OF OIL DILUTED IN WATER IS 8 - 10 %.

8.6 Special Maintenance

Special maintenance must be conducted by skilled personnel. We advise contacting your nearest dealer and/or importer. Other protective and safety equipment, devises (of the reducer), the motor, the motor pump, and other electrical components also require special maintenance.

ROUTINE AND SPECIAL MAINTENANCE CHART					
Item	**Part**	**Lubricant**	**Quantity**	**Routine**	**Remark**
1	Bench vise slides	Machine oil	Suitable	Everyday	Oil after cleaning
2	Shuttle vise slides	Machine oil	Suitable	Everyday	Oil after cleaning
3	Lubricant fluid tank	Water-soluble cutting fluid	High level on gauge	Everyday	
4	Worm gear	Grease	Suitable	Every month	
5	Drive wheel oil hole	Grease	Suitable	Two weeks	
6	Idle wheel oil hole	Grease	Suitable	Two weeks	
7	Slide of slide seat	Machine oil	Suitable	Two weeks	
8	Shuttle vise shorter jaw	Grease	Suitable	Two weeks	Oil after cleaning
9	Transmission gear box	Gear oil # 90	Middle level on gauge	Six months	Every year after the first
10	Hydraulic system tank	Hydraulic Oil AW-46	High level on gauge	Six months	Every year after the first

* Clean the chip from the flywheel housings and bench vise everyday to keep performance well.

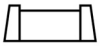
Warning:
1. Disconnect the machine form the power source before any kind of maintenance.
2. Any special maintenance must contact skill personnel of dealer or importer. Do not remove parts for maintenance.

9 TECHNICAL CHARACTERISTICS

9.1 Chart of Steel Characteristics

TYPES OF STEEL						CHARACTERISTICS		
USE	I UNI	D DIN	F AF NOR	GB SB	USA. AISI-SAE	Hardness BRINELL HB	Hardness ROCKWELL HRB	R=N/mm²
Construction steels	Fe360 Fe430 Fe510	St37 St44 St52	E24 E28 E36	---- 43 50	---- ---- ----	116 148 180	67 80 88	360÷480 430÷560 510÷660
Carbon steels	C20 C40 C50 C60	CK20 CK40 CK50 CK60	XC20 XC42H1 ---- XC55	060 A 20 060 A 40 ---- 060 A 62	1020 1040 1050 1060	198 198 202 202	93 93 94 94	540÷690 700÷840 760÷900 830÷980
Spring steels	50CrV4 60SiCr8	50CrV4 60SiCr7	50CV4 ----	735 A 50 ----	6150 9262	207 224	95 98	1140÷1330 1220÷1400
Alloyed steels for hardening and tempering and for nitriding	35CrMo4 39NiCrMo4 41CrAlMo7	34CrMo4 36CrNiMo4 41CrAlMo7	35CD4 39NCD4 40CADG12	708 A 37 ---- 905 M 39	4135 9840 ----	220 228 232	98 99 100	780÷930 880÷1080 930÷1130
Alloyed casehardening steels	18NiCrMo7 20NiCrMo2	---- 21NiCrMo2	20NCD7 20NCD2	En 325 805 H 20	4320 4315	232 224	100 98	760÷1030 690÷980
Alloyed for bearings	100Cr6	100Cr6	100C6	534 A 99	52100	207	95	690÷980
Tool steel	52NiCrMoKU C100KU X210Cr13KU 58SiMo8KU	56NiCrMoV7C100K C100W1 X210Cr12 ----	---- ---- Z200C12 Y60SC7	---- BS 1 BD2-BD3 ----	---- S-1 D6-D3 S5	244 212 252 244	102 96 103 102	800÷1030 710÷980 820÷1060 800÷1030
Stainless steels	X12Cr13 X5CrNi1810 X8CrNi1910 X8CrNiMo1713	4001 4301 ---- 4401	---- Z5CN18.09 ---- Z6CDN17.12	---- 304 C 12 ---- 316 S 16	410 304 ---- 316	202 202 202 202	94 94 94 94	670÷885 590÷685 540÷685 490÷685
Copper alloys Special brass Bronze	Aluminium copper alloy G-CuAl11Fe4Ni4 UNI 5275 Special manganese/silicon brass G-CuZn36Si1Pb1 UNI5038 Manganese bronze SAE43 - SAE430 Phosphor bronze G-CuSn12 UNI 7013/2a					220 140 120 100	98 77 69 56,5	620÷685 375÷440 320÷410 265÷314
Cast iron	Gray pig iron G25 Spheroidal graphite cast iron GS600 Malleable cast iron W40-05					212 232 222	96 100 98	245 600 420

9.2 Table of Cutting Capacity and Technical Details

Cutting Capacity			
90°	460mm (18")	460x460mm (18"x18")	380x610mm (15"x24")
45°	380mm (15")	380x380mm (15")	

Blade size	41 x 1.3 x 5330 mm (1.6"x0.05"x210")
Blade speed	30 ~ 85 MPM
Blade motor	5 HP
Hydraulic tank	15 Liters
Coolant tank	55 Liters
Packing size	2750 x 2270 x 1950 mm
Machine weight	2150 kgs (4730 lbs)

10 TECHNICAL CHARACTERISTICS

10.1 Selecting the proper blade speed

Use the following chart for reference

CUTTING SPEEDS FOR VARIOUS MATERIALS		
MATERIALS	**BLADE SPEED (MPM)**	**COOLANT REQURIED**
Free Cutting Steel 1100 & 1200 Series Low & Medium Carbon 1008 - 1045	70	YES
1046 - 1095 Alloy Steels Tool Steels Pipe & Structures Nickel Base Alloys Cooper Base Alloys	40~ 60 40~60 30~40 40~60 30~40 30~ 40	YES
Stainless Steels 430F, 416, 420F, 303	40~60 40~60	YES
Cast Iron	40~60	NO OIL BLADE

- Blade speeds higher than recommended will quickly dull the blade. Blue chips are evidence of excessive blade speed.
- Lower than recommended speeds will not prolong blade life, and will require a reduced feed rate – reduced speeds may be helpful in reducing vibration, and will increase blade life in that case.

10.2 Selecting the Blade

This machine uses 41 x 1.3 x 5330mm blade.
Refer to the section on selecting the blade.

Cutting material / Sawblade						
	<3mm	>5mm	>50mm	>100mm	<150mm	<300mm
	<0.12"	>0.2"	>2"	>4"	<6"	<8"
(HSS) 14T	●					
(HSS) 6/10T		●				
(HSS) 5/8T			●			
(HSS) 4/6T			●	●		
(HSS) 3/4T				●		
(HSS) 2/3T					●	●
(HSS) 1/2T						●
(HCS) 10T	●					
(HCS) 8T		●				
(HCS) 6T			●			
(HCS) 4T				●		
(HCS) 2T					●	●

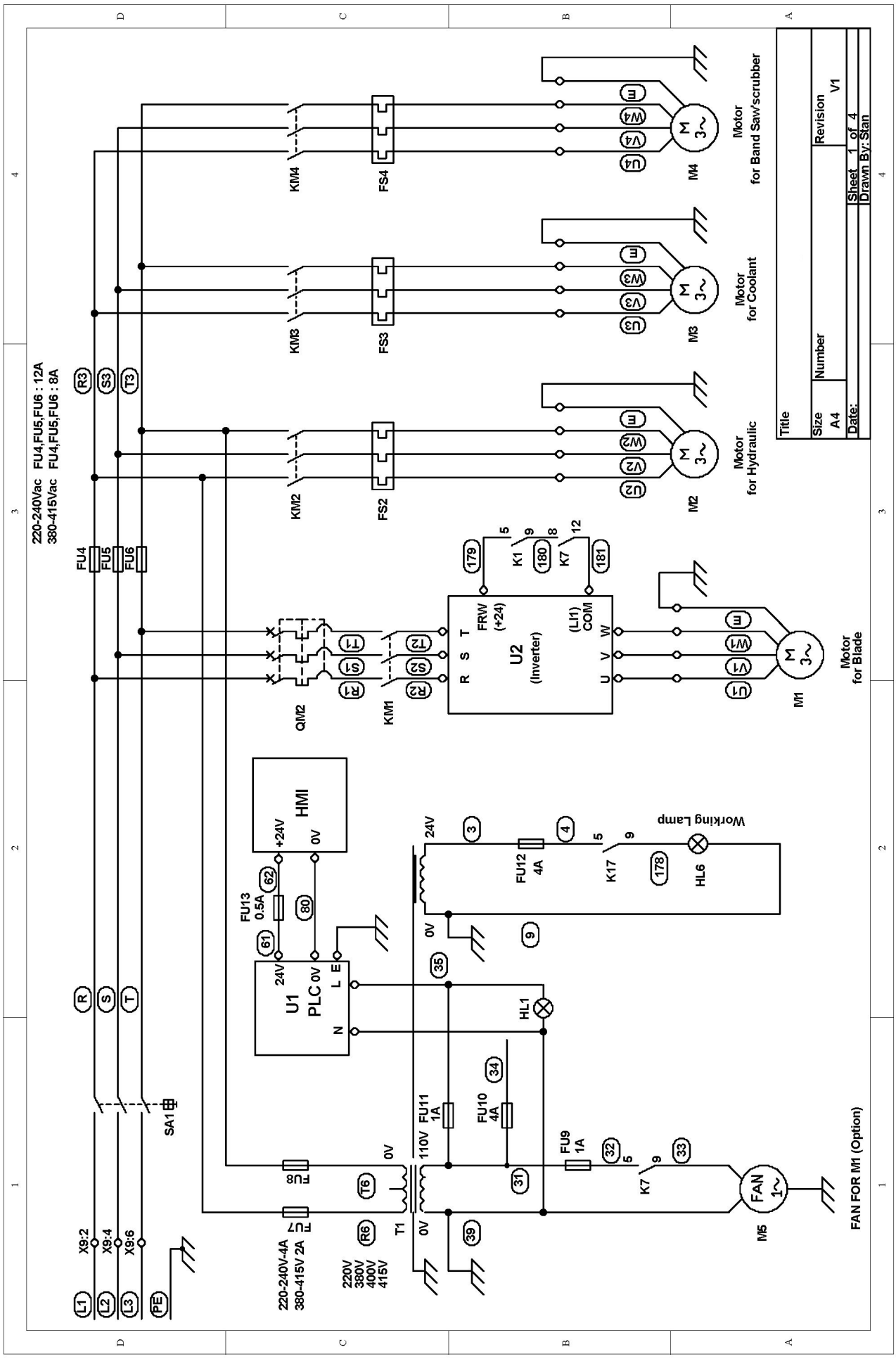
HSS = HIGH SPEED STEEL
HCS = HIGH CARBON STEEL

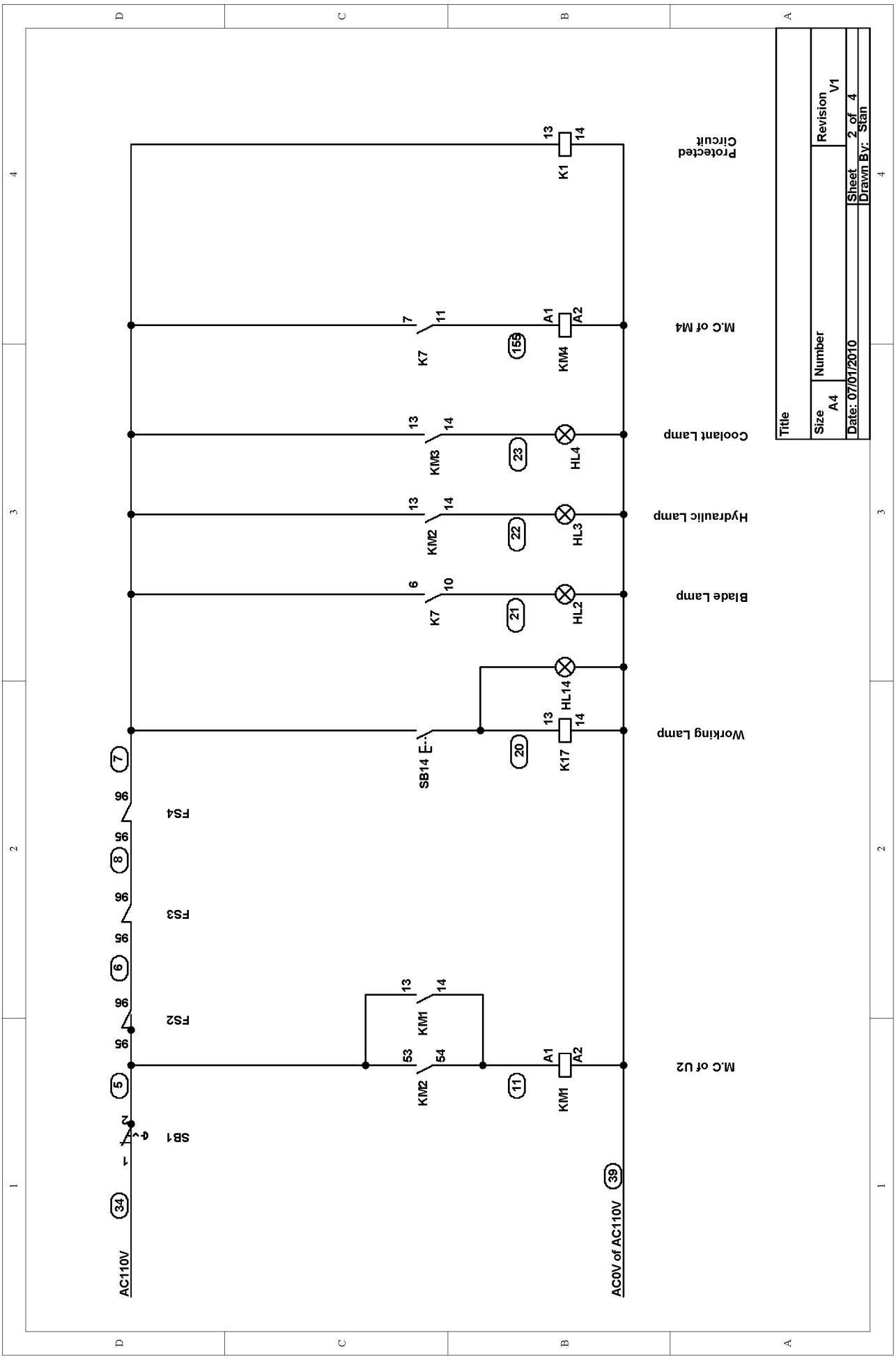
- Never use a blade so coarse that less than 3 teeth are engaged in the work-piece at anytime. (Too few teeth will cause teeth to strip out.)
- Never use a blade finer then required to obtain a satisfactory surface finish or satisfactory flatness. (Too many teeth engaged in the work piece will prevent attainment of a satisfactory sawing rate; frequently cause premature blade wear; frequently produce “dished” cuts or the cuts are neither square nor parallel.)
- The chart s not expected to be correct for all cases. It is intended as a general guide to good sawing practices. Your blade supplier or qualified engineers should be you most reliable source for correct information on operational details of saw blades and their use.

Note:

- When cutting a thin walled pipe, angle steel, and I-beam steel use a blade with 10T/in.
- When cutting pipe with a wall 1/2” or more in thickness, use a blade with 8-12 T/in or 6-10T/in.
- When cutting angle steel, I-beam, or solid bar; cut the thinnest cross section of the material first. There must be at least three teeth cutting the material at all times.

11 CIRCUIT DIAGRAM

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SB1
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FS2
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FS3
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FS4
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SB14
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K17
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14
HL14
Working Lamp
HL2
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K7
6
10
Blade Lamp
HL3
22
KM2
13
14
Hydraulic Lamp
HL4
23
KM3
13
14
Coolant Lamp
KM4
155
K7
7
11
A1
A2
M.C of M4
KM1
11
KM2
53
54
KM1
13
14
A1
A2
M.C of U2
AC0V of AC110V
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K1
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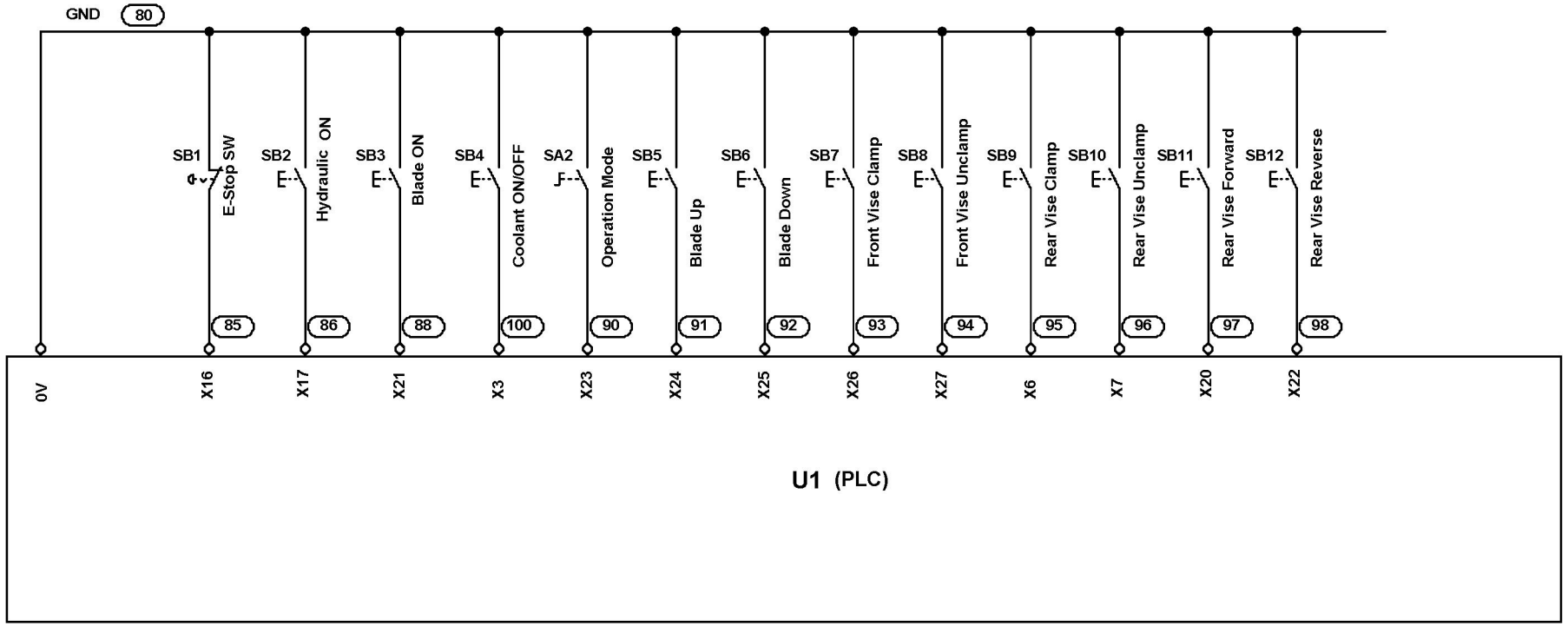
Revision
V1
Date: 07/01/2010
Sheet 2 of 4
Drawn By: Stan



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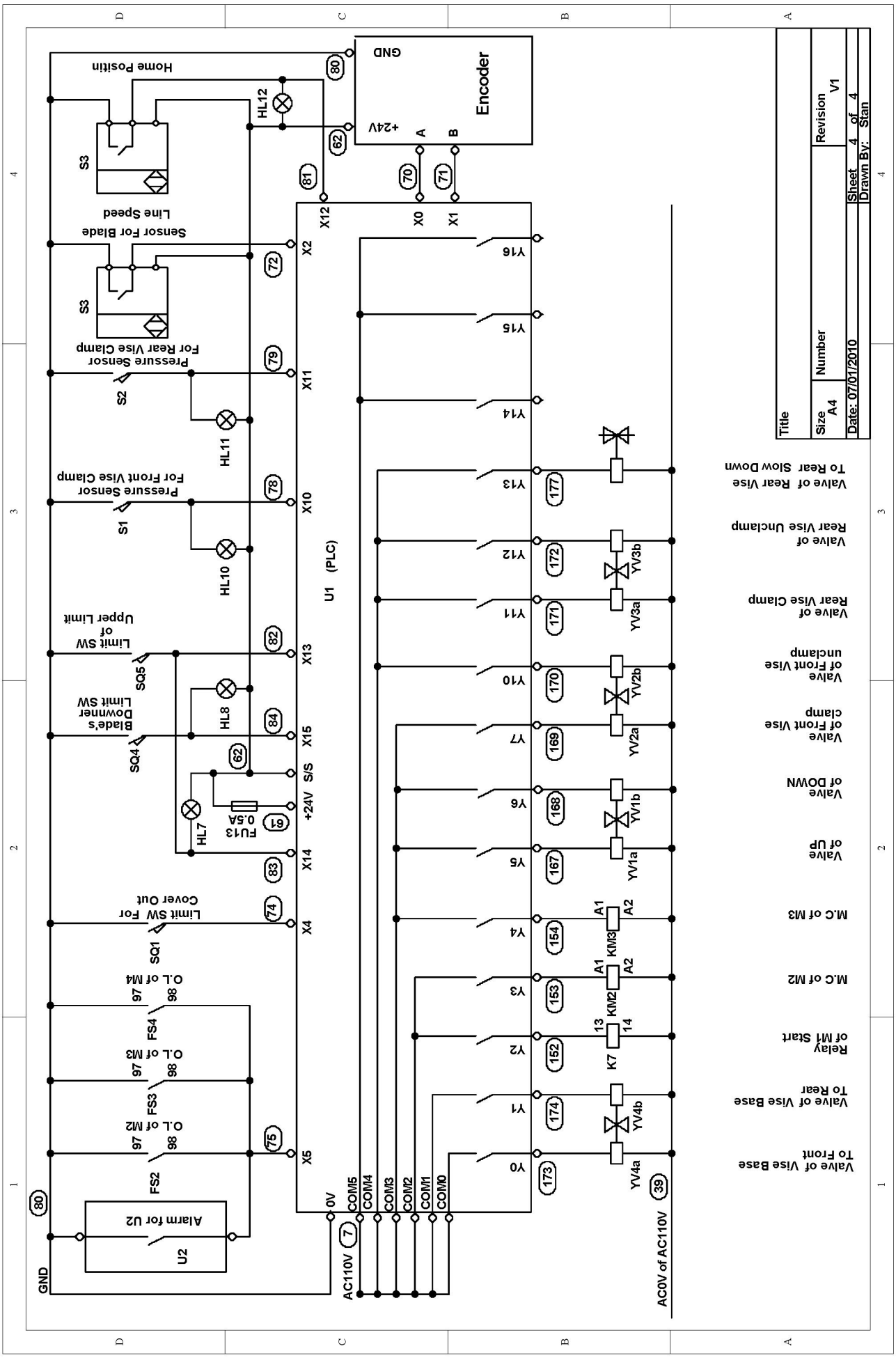
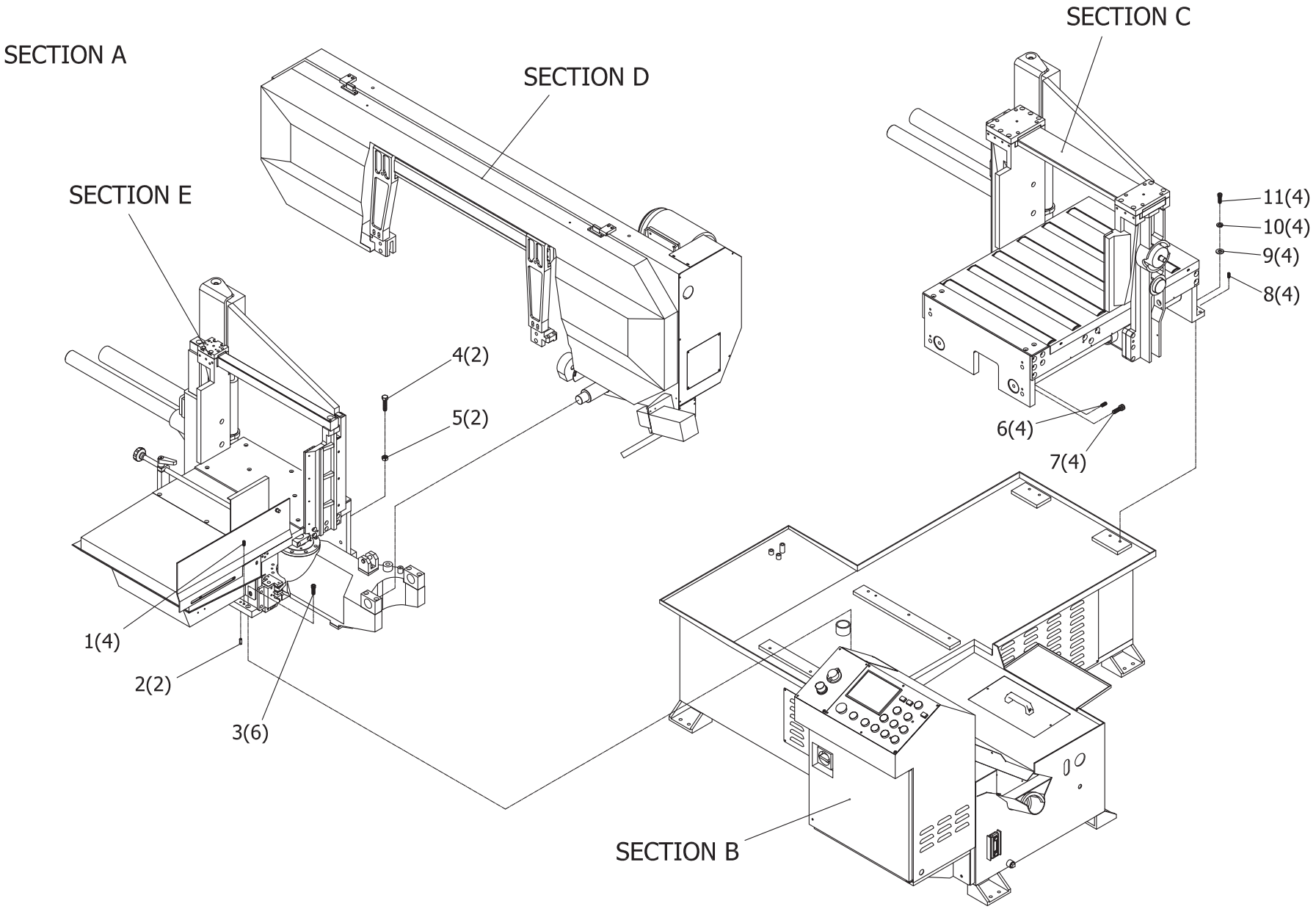
Date: 07/01/2010		Sheet 3 of 4
		Drawn By: Stan


Encoder
GND
+24V
A
B
Home Positin
Line Speed
Sensor For Blade
Pressure Sensor For Rear Vise Clamp
Pressure Sensor For Front Vise Clamp
Limit SW of Upper Limit
Blade's Downner Limit SW
Limit SW For Cover Out
O.L of M4
O.L of M3
O.L of M2
Alarm for U2
U2
U1 (PLC)
0V
COM5
COM4
COM3
COM2
COM1
COM0
AC110V
GND
AC0V of AC110V
Valve of Vise Base To Front
Valve of Vise Base To Rear
Relay of M1 Start
M.C of M2
M.C of M3
Valve of UP
Valve of DOWN
Valve of Front Vise clamp
Valve of Front Vise unclamp
Valve of Rear Vise Clamp
Valve of Rear Vise Unclamp
Valve of Rear Vise To Rear Slow Down
Title
Size A4
Number
Revision V1
Date: 07/01/2010
Sheet 4 of 4
Drawn By: Stan

SECTION A - PARTS LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
A1	Set Screw	M12x25L	4				
A2	Spring Pin	8x20L	2				
A3	Hex. Socket Cap Screw	M12x45L	6				
A4	Hex. Cap Bolt	M12x45L	2				
A5	Nut	M12	2				
A6	Set Screw	M10x20L	4				
A7	Hex. Socket Cap Screw	M16x45L	4				
A8	Set Screw	M12x25L	4				
A9	Washer	M12	4				
A10	Spring Washer	M12	4				
A11	Hex. Socket Cap Screw	M12x45L	4				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SECTION D
SECTION C
SECTION E
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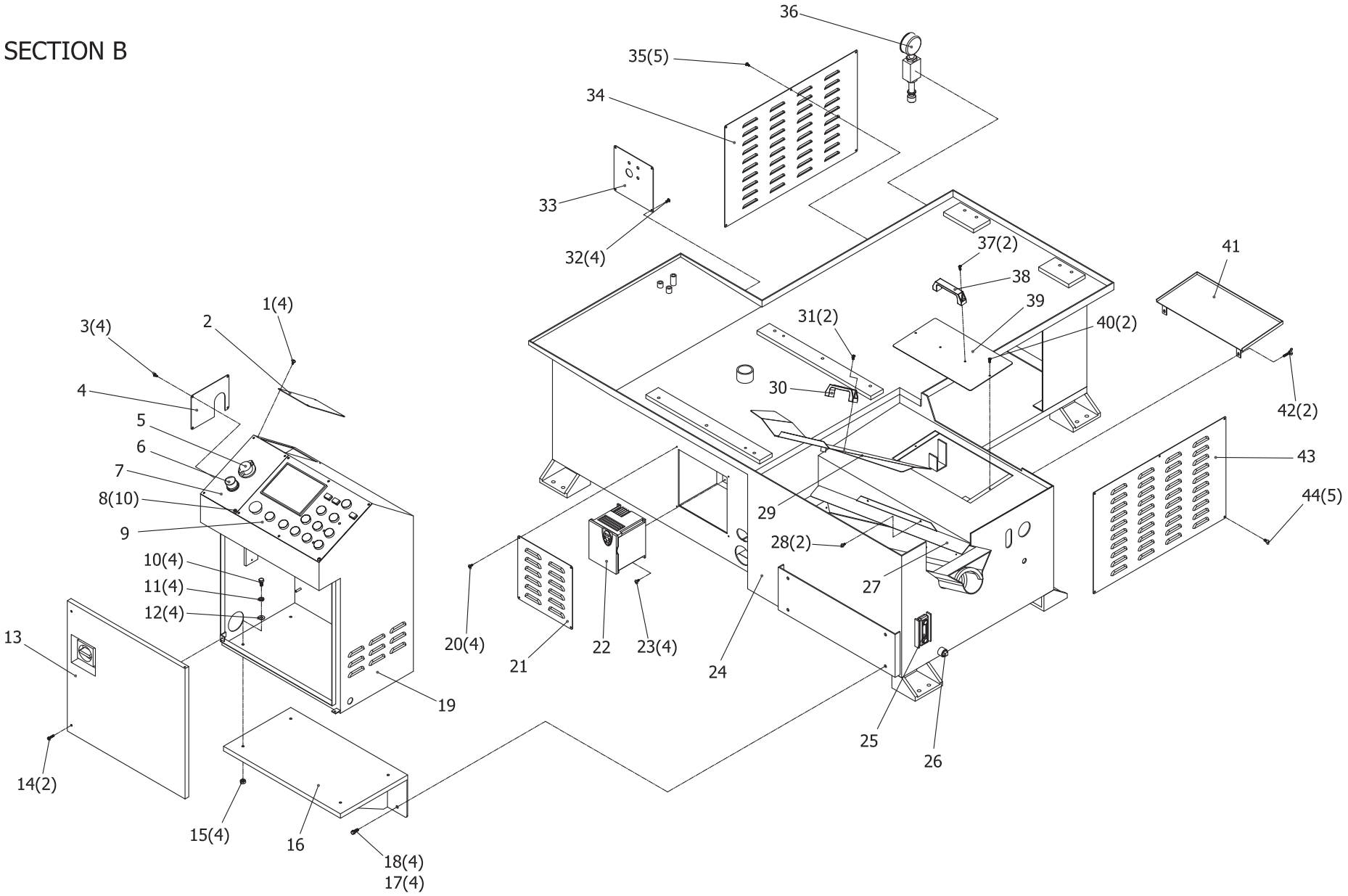
SECTION B

SECTION B - PARTS LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
B1	Button Head Socket Screw	M5x6L	4				
B2	Upper Cover	461F3-01-I	1				
B3	Button Head Socket Screw	M5x6L	4				
B4	Left Cover	461F3-01-H	1				
B5	Pressure Regulator Knob	L25A1-42	1				
B6	Cutting Rate Knob	L25A2-01	1				
B7	Flow Valve Panel	NPB-001	1				
B8	Button Head Socket Screw	M5x8L	10				
B9	Operation Panel	NPB-006	1				
B10	Hex. Cap Bolt	M8x16L	4				
B11	Spring Washer	M8	4				
B12	Washer	M8	4				
B13	Electrical Box Door	461F3-01-J	1				
B14	Hex. Socket Cap Screw	M6x25L	2				
B15	Nut	M8	4				
B16	Supporting Bracket	461F3-01-C	1				
B17	Hex. Cap Bolt	M10x16L	4				
B18	Spring Washer	M10	4				
B19	Electrical Box	461F3-01-B	1				
B20	Button Head Socket Screw	M6x8L	4				
B21	Inverter Cover	461F3-01-D	1				
B22	Motor Inverter 5HP	ML0006	1				
B23	Half Round Head Screw	M5x8L	4				
B24	Machine Base	461F3-01	1				
B25	Coolant Level Gauge	9160418	1				
B26	Drain	3/8"PT	1				
B27	Left Lateral Cover	461F3-03	1				
B28	Button Head Socket Screw	M5x8L	2				
B29	Right Lateral Cover	461F3-03-A	1				
B30	Plastic Handle	9160502	1				
B31	Big Round Head Screw	M6x12L	2				
B32	Button Head Socket Screw	M6x8L	4				
B33	Fixed Wires Plate	461F3-01-F	1				
B34	Hydraulic Unit Cover (Left)	461F3-01-E	1				
B35	Button Head Socket Screw	M6x8L	5				
B36	Vise Pressure Valve		1				
B37	Big Round Head Screw	M6x12L	2				
B38	Plastic Handle	9160502	1				
B39	Coolant Pump Cover	461F3-01-G	1				
B40	Button Head Socket Screw	M6x8L	2				
B41	Coolant Plate (RR)	461F3-23-A	1				
B42	Wing Screw	M6x12L	2				
B43	Hydraulic Unit Cover (Right)	461F3-01-E	1				
B44	Button Head Socket Screw	M6x8L	5				

SECTION B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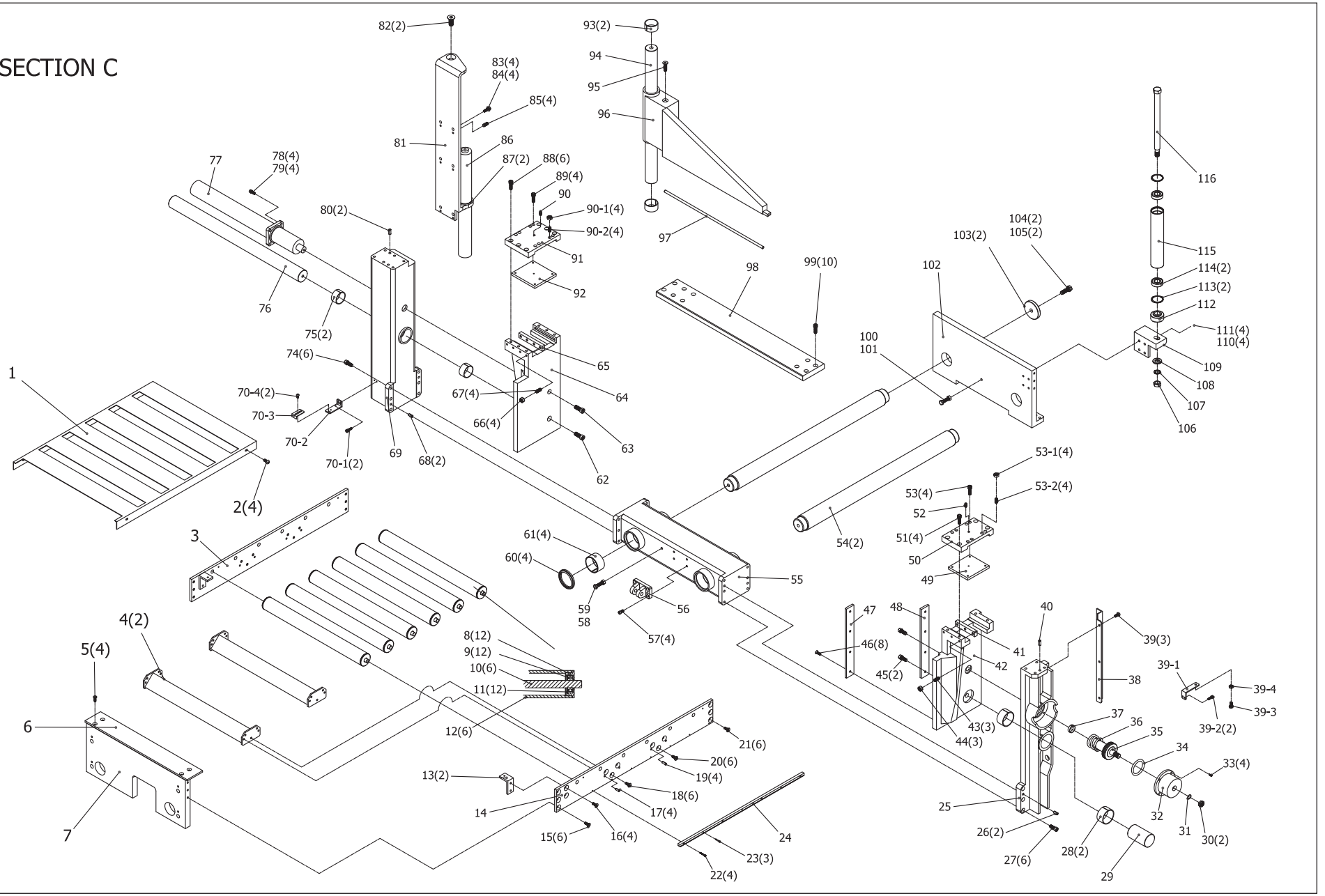
SECTION C - PARTS LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
C1	Roller Cover	461F3-04	1	C44	Nut	M10	3
C2	Button Head Socket Screw	M6x12L	4	C45	Hex. Socket Cap Screw	M14x40L	2
C3	Side Plate (Left)	461F2-04-C	1	C46	Flat Head Screw	M8x20L	8
C4	Roller Strengthen Bracket	461F3-04-A	2	C47	Vise Steel Plate	461F2-08	1
C5	Flat Head Screw	M8x20L	4	C48	Vise Steel Plate	461F2-08	1
C6	Roller Plate (Upper)	461F2-04-D	1	C49	Block Cover	461F2-23-A	1
C7	Roller Plate (Front)	461F2-04	1	C50	Upper Cover	461F2-23	1
C8	Shaft Cover	S13802-07-C	12	C51	Hex. Socket Cap Screw	M12x30L	4
C9	Shaft	6203	12	C52	Oil Nipple	1/8"PT	1
C10	Roller Shaft	461F2-10	6	C53	Hex. Socket Cap Screw	M8x16L	4
C11	C Ring	R40	12	C53-1	Nut	M8	4
C12	Roller	461D2-04	6	C53-2	Set Screw	M8x25L	4
C13	Roller Bracket	461F3-04-B	2	C54	Guide Shaft	461F2-01	2
C14	Side Plate (Right)	461F2-04-B	1	C55	Guide Rod Bracket	461F3-12	1
C15	Flat Head Screw	M10x25L	6	C56	Cylinder Bracket	S138F1-03	1
C16	Flat Head Screw	M10x25L	4	C57	Hex. Socket Cap Screw	M10x25L	4
C17	Spring Pin	8x20L	4	C58	Hex. Cap Steel Screw	M12x65L	1
C18	Flat Head Screw	M10x25L	6	C59	Nut	M12	1
C19	Spring Pin	8x20L	4	C60	Dust Seal DKB75.89.8/11	L40N4-22	4
C20	Flat Head Screw	M10x25L	6	C61	Oilless Bushing 7540	L40N5-01	4
C21	Flat Head Screw	M10x25L	6	C62	Hex. Socket Cap Screw	M16x25L	1
C22	Hex. Socket Cap Screw	M4x20L	4	C63	Hex. Socket Cap Screw	M14x25L	1
C23	Spring Pin	4x25L	3	C64	Vise Jaw	461F1-11	1
C24	Rack Rod	S138F2-12	1	C65	Adjusting Block	461F2-20	1
C25	Feeding Vise Fixing Bracket	461F1-09	1	C66	Nut	M10	4
C26	Spring Pin	10x30L	2	C67	Set Screw	M10x35L	4
C27	Hex. Socket Cap Screw	M12x40L	6	C68	Spring Pin	10x30L	2
C28	Oilless Bushing 6540	L25A5-09-1	2	C69	Cylinder Bracket	461F3-10	1
C29	Upper Shaft	461F2-17-B	1	C70-1	Hex. Socket Cap Screw	M6x16L	2
C30	Nut	M20x1.5	2	C70-2	Adjusting Bracket	461F3-15-A	1
C31	O Ring P24	H36D4-20	1	C70-3	Sensor Plate	S138F3-21-C	1
C32	Cylinder Cover	461F2-17	1	C70-4	Button Head Socket Screw	M6x8L	2
C33	Hex. Socket Cap Screw	M8x25L	4	C74	Hex. Socket Cap Screw	M12x45L	6
C34	O Ring P70	H36D4-22	1	C75	Oilless Bushing 6040	S138F5-11	2
C35	Hydraulic Piston	461F2-17-A	1	C76	Upper Shaft	461F2-03	1
C36	Spring	S138F4-05	1	C77	Vise Cylinder		1
C37	Oilless Bushing 4015	S138F5-14	1	C78	Hex. Socket Cap Screw	M10x35L	4
C38	Guide Plate	461F3-17	1	C79	Spring Washer	M10	4
C39	Button Head Socket Screw	M8x12L	3	C80	Spring Pin	10x30L	2
C39-1	Support Bracket	S138F3-34-D	1	C81	Fixing Bracket	461F3-08	1
C39-2	Hex. Socket Cap Screw	M6x12L	2	C82	Flat Head Screw	3/4"x1-1/4"L	2
C39-3	Hex. Cap Bolt	M10x20L	1	C83	Hex. Cap Bolt	M12x30L	4
C39-4	Nut	M10	1	C84	Spring Washer	M12	4
C40	Spring Pin	10x30L	1	C85	Set Screw	M10x16L	4
C41	Adjusting Block	461F2-21	1	C86	Down Clamp Cylinder		1
C42	Feeding Vise Jaw	461F1-12	1	C87	C Ring	S60	2
C43	Set Screw	M10x35L	3	C88	Hex. Socket Cap Screw	M12x30L	6

SECTION C - PARTS LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
C89	Hex. Socket Cap Screw	M8x16L	4				
C90	Oil Nipple	1/8"PT	1				
C90-1	Nut	M8	4				
C90-2	Set Screw	M8x25L	4				
C91	Upper Cover	461F2-22	1				
C92	Adjusting Block	461F2-22-A	1				
C93	Oilless Bushing 5540	461D5-10	2				
C94	Guide Shaft	461F2-02	1				
C95	Flat Head Screw	M12x35L	1				
C96	Down Clamp Bracket	461F3-07	1				
C97	PU		1				
C98	Upper Slide Plate	461F2-19	1				
C99	Hex. Socket Cap Screw	M12x40L	10				
C100	Hex. Cap Steel Screw	M12x45L	1				
C101	Nut	M12	1				
C102	Roller Bracket (Rear)	461F2-04-A	1				
C103	Shaft Washer	461F2-01-A	2				
C104	Spring Washer	M16	2				
C105	Hex. Socket Cap Screw	M16x40L	2				
C106	Nut	M20	1				
C107	Spring Washer	M20	1				
C108	Washer	M20	1				
C109	Vertical Roller Bracket	S138F3-23	1				
C110	Hex. Cap Steel Screw	M10x25L	4				
C111	Spring Washer	M10	4				
C112	Roller Bush	S13802-18-2	1				
C113	C Ring	R52	2				
C114	Bearing	6205	2				
C115	Vertical Roller	461D2-05	1				
C116	Roller Shaft	461D2-05-A	1				

SECTION C



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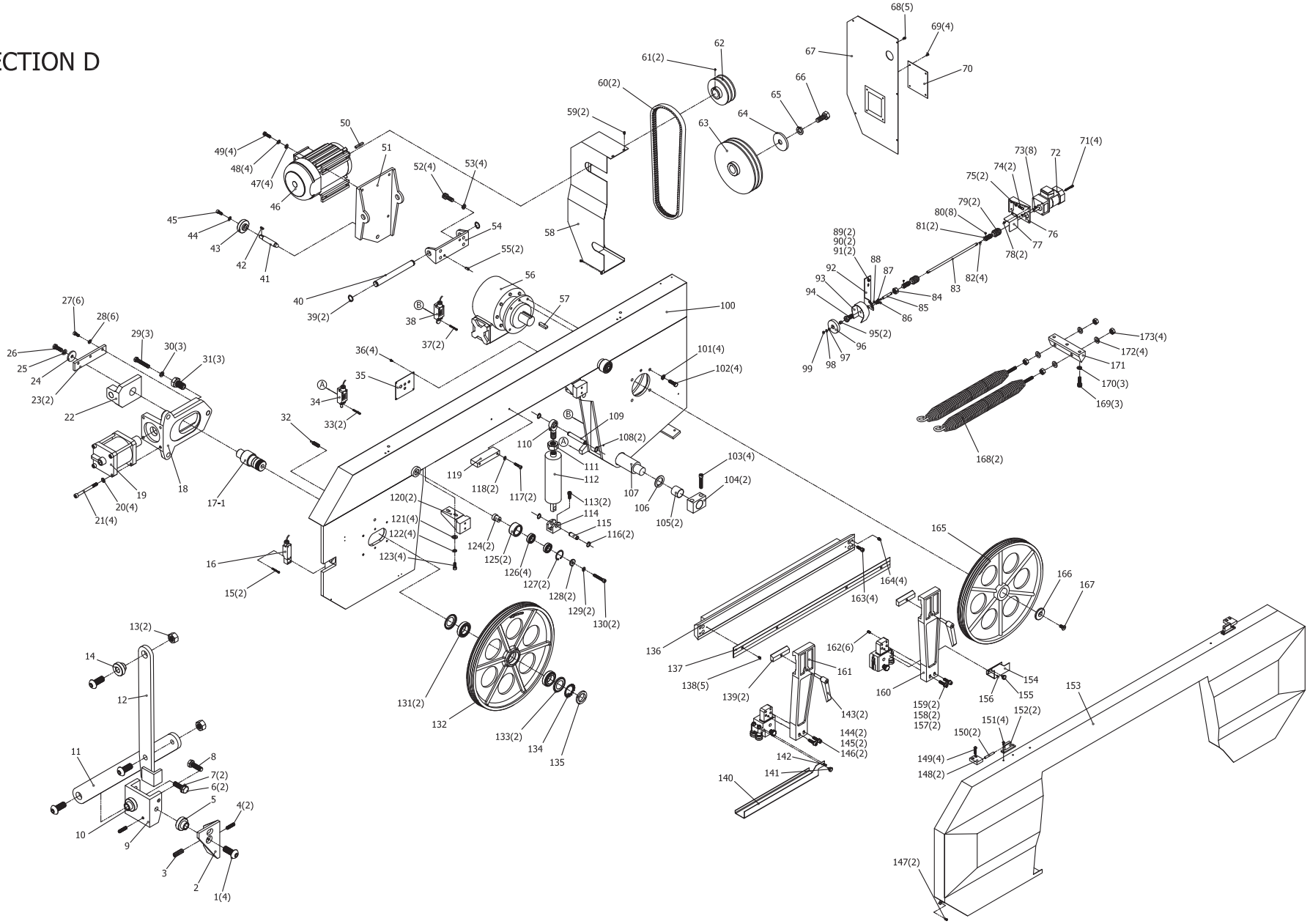
SECTION D - PARTS LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
D1	Button Head Socket Screw	M8x25L	4	D48	Spring Washer	M10	4
D2	Position Locker	460D3-27-4	1	D49	Hex. Cap Bolt	M10x30L	4
D3	Spring		1	D50	Key	10x8x40	1
D4	Set Screw	M4x12L	2	D51	Motor Supporter	461F3-13	1
D5	Threaded Sleeve	460D3-27-6	1	D52	Hex. Socket Cap Screw	M8x20L	4
D6	Hex. Cap Bolt	M8x20L	2	D53	Spring Washer	M8	4
D7	Spring Washer	M8	2	D54	Motor Fixing Bracket	530D3-06	1
D8	Hex. Cap Bolt	M8x20L	1	D55	Spring Pin	8x20L	2
D9	Fixing Bracket	460D3-27-2	1	D56	Reducer 120#1/40	460D4-15	1
D10	Threaded Sleeve	460D3-27-5	1	D57	Key	14x9x50	1
D11	Long Arm	460D3-27	1	D58	Wheel Box	461F3-05	1
D12	Short Arm	460D3-27-1	1	D59	Button Head Socket Screw	M5x8L	2
D13	Nut	M8	2	D60	Belt	22-560	2
D14	Threaded Sleeve	460D3-27-3	1	D61	Set Screw	M8x16L	2
D15	Hex. Socket Cap Screw	M4x30L	2	D62	Motor Shaft Pulley	L33N1-56	1
D16	Limit Switch AZD-S11	331D5-07	1	D63	Belt Pulley	461F1-02	1
D17-1	Wheel Shaft	461F2-14-A	1	D64	Washer	S13802-26	1
D18	Slider Seat	L46N1-10	1	D65	Spring Washer	M10	1
D19	Blade Tension Cylinder		1	D66	Hex. Socket Cap Screw	M10x35L	1
D20	Spring Washer	M12	4	D67	Cover	461F3-05-A	1
D21	Hex. Socket Cap Screw	M12x155L	4	D68	Button Head Socket Screw	M5x8L	5
D22	Slider	L46N1-10-A	1	D69	Button Head Socket Screw	M5x8L	4
D23	Adjusting Plate	L46N2-28	2	D70	Cover	461F3-05-B	1
D24	Washer	L46N2-22	1	D71	Hex. Socket Cap Screw	M6x90L	4
D25	Spring Washer	M12	1	D72	Brush Motor		1
D26	Hex. Cap Steel Screw	M12x30L	1	D73	Nut	M6	8
D27	Hex. Socket Cap Screw	M8x25L	6	D74	Hex. Socket Cap Screw	M8x20L	2
D28	Spring Washer	M8	6	D75	Spring Washer	M8	2
D29	Hex. Cap Steel Screw	M14x55L	3	D76	Fixing Bracket	460D3-31-B	1
D30	Spring Washer	M14	3	D77	Cover	460D3-31-C	1
D31	Threaded Sleeve	L46N2-12	3	D78	Button Head Socket Screw	M5x8L	2
D32	Blade Broken Sensor		1	D79	Universal Joint Bush	L25A4-02-1	2
D33	Hex. Socket Cap Screw	M4x35L	2	D80	Set Screw	M5x6L	8
D34	Limit Switch ED-31	331D5-06-C	1	D81	Universal Joint	L25A4-02	2
D35	Wire Fixing Plate	461F3-02-B	1	D82	Key	4x4x15L	4
D36	Button Head Socket Screw	M5x6L	4	D83	Brush Shaft (Long)	460D2-59-2	1
D37	Hex. Socket Cap Screw	M4x35L	2	D84	Nut	M20	1
D38	Limit Switch ED-1-3-32	H33D4-11	1	D85	Brush Shaft (Short)	460D2-59-1	1
D39	C Ring	S-20	2	D86	Wing Screw	M6x10L	1
D40	Motor Bracket Shaft	530D2-06	1	D87	Hex. Socket Cap Screw	M6x20L	1
D41	Adjusting Bolt	L46N2-10-A	1	D88	Spring Washer	M6	1
D42	Key	4x4x10L	1	D89	Hex. Cap Bolt	M8x20L	2
D43	Handle	L46N2-10-B	1	D90	Spring Washer	M8	2
D44	Washer	M6	1	D91	Washer	M8	2
D45	Hex. Socket Cap Screw	M6x12L	1	D92	Fixing Bracket	460D3-31-A	1
D46	Motor 5HP	ML46D001	1	D93	Cover	460D3-31	1
D47	Washer	M10	4	D94	Shaft Bush	460D2-59	1

SECTION D - PARTS LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
D95	Oilless Bushing 1212	L25A5-08	2	D142	Spring Pin	4x12L	1
D96	Brush	331D4-08	1	D143	Locking Handle M12x50L	331D4-39	2
D97	Washer	M6	1	D144	Hex. Socket Cap Screw	M10x35L	2
D98	Spring Washer	M6	1	D145	Washer	M10	2
D99	Nut	M6	1	D146	Spring Washer	M10	2
D100	Saw Bow	461F3-02	1	D147	Button Head Socket Screw	M6x8L	2
D101	Spring Washer	M12	4	D148	Fixing Block	460D2-44	2
D102	Hex. Cap Steel Screw	M12x45L	4	D149	Button Head Socket Screw	M8x30	4
D103	Hex. Socket Cap Screw	M12x75L	4	D150	Spring Pin	8x70L	2
D104	Fixing Block	461D2-08	2	D151	Button Head Socket Screw	M6x16L	4
D105	Oilless Bushing 4040	331D5-14	2	D152	Bow Cover Locker	460D2-45	2
D106	Washer	331D2-01-A	1	D153	Bow Cover	460D3-10-C	1
D107	Bow Shaft	460D2-01	1	D154	Blade Protector	460D3-13-A	1
D108	C Ring	S20	2	D155	Thumb Screw	M5x8L	1
D109	Bracket Shaft	460D2-38	1	D156	Spring Pin	4x12L	1
D110	Eye Bearing	POS16	1	D157	Hex. Socket Cap Screw	M10x35L	2
D111	Nut	M20xP1.5	1	D158	Washer	M10	2
D112	Hydraulic Cylinder		1	D159	Spring Washer	M10	2
D113	Hex. Socket Cap Screw	M8x20L	2	D160	Rear Bearing Bracket	460D1-07-A	1
D114	Lower Bracket	461F1-07	1	D161	Front Bearing Bracket	460D1-07	1
D115	Bracket Shaft	461F2-16	1	D162	Set Screw	M8x16L	6
D116	C Ring	S20	2	D163	Hex. Socket Cap Screw	M10x20L	4
D117	Hex. Socket Cap Screw	M8x40L	2	D164	Set Screw	M10x16L	4
D118	Spring Washer	M8	2	D165	Driver Wheel	460D1-13	1
D119	Blade Guide Block (POM)	460D2-55	1	D166	Washer	331D2-49	1
D120	Steel Plate Bracket	460D1-08-A	2	D167	Flat Head Screw	M12x25L	1
D121	Washer	M10	4	D168	Spring 9.0x56x54N	460D4-10	2
D122	Spring Washer	M10	4	D169	Hex. Socket Cap Screw	M10x25L	3
D123	Hex. Socket Cap Screw	M10x30L	4	D170	Spring Washer	M10	3
D124	Shaft	460D2-11	2	D171	Bracket	460D1-16	1
D125	Blade Guide Wheel	460D2-10	2	D172	Washer	1/2"	4
D126	Bearing 6005	460D4-21	4	D173	Nut	1/2"	4
D127	C Ring	R42	2				
D128	Washer	460D2-11-A	2				
D129	Spring Washer	M12	2				
D130	Hex. Socket Cap Screw	M12x60L	2				
D131	Bearing 32009	460D4-20	2				
D132	Idle Wheel	460D1-12	1				
D133	Shaft Cover 32009AV	460D4-08	2				
D134	Teeth Washer	AW09	1				
D135	Shaft Nut	AN09	1				
D136	Steel Plate	460D1-08	1				
D137	Steel Scale		1				
D138	Round Head Screw	M5x8L	5				
D139	Position Plate	460D2-46	2				
D140	Blade Protector	461D3-11	1				
D141	Thumb Screw	M5x8L	1				

SECTION D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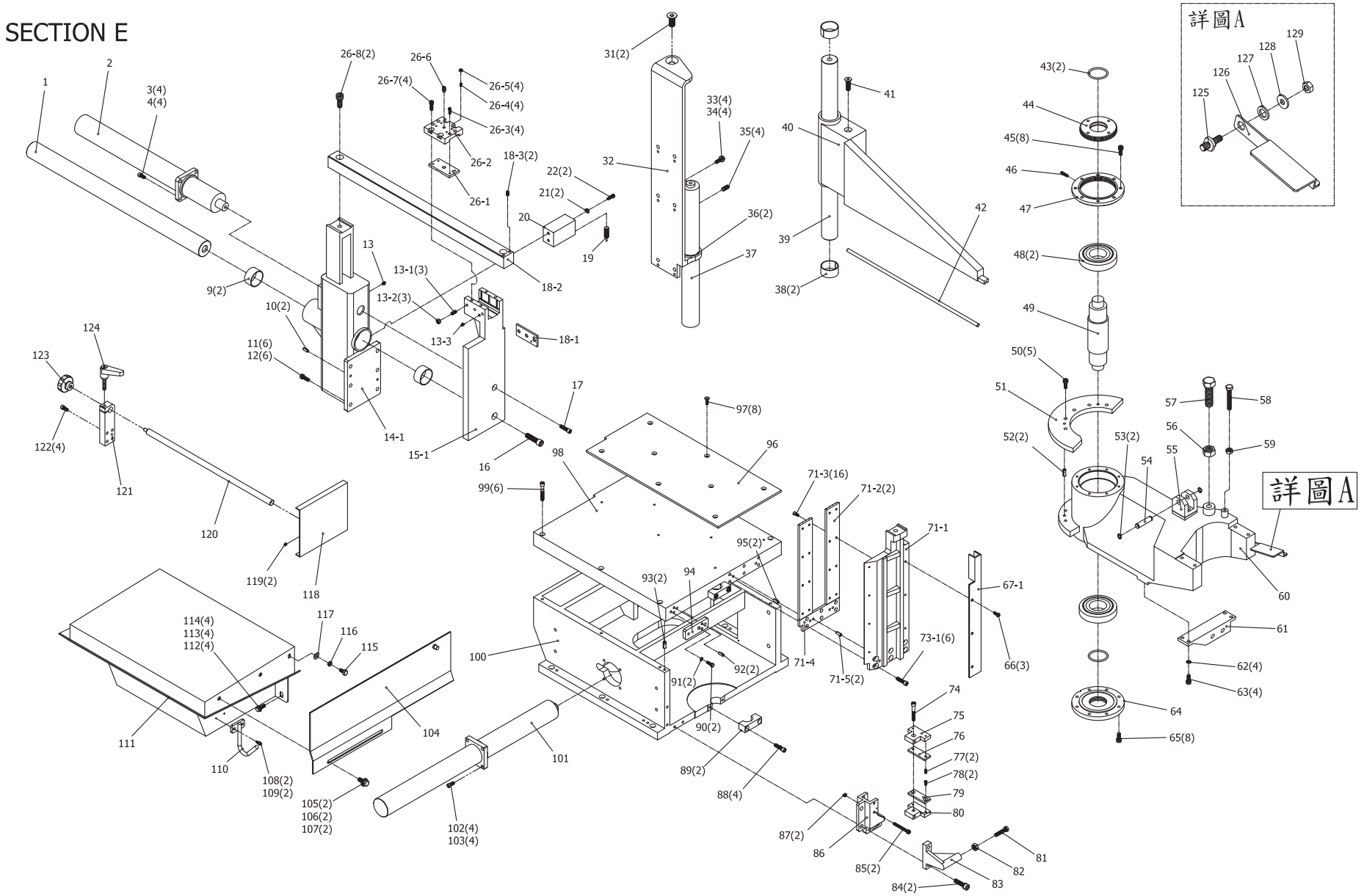
SECTION E - PARTS LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
E1	Vise Shaft	461F2-03-A	1	E47	Upper Cover	331D2-06	1
E2	Vise Cylinder		1	E48	Bearing 30312	331D5-12	2
E3	Hex. Socket Cap Screw	M10x35L	4	E49	Swiveling Shaft	331D2-03	1
E4	Spring Washer	M10	4	E50	Hex. Socket Cap Screw	M10x20L	5
E9	Oilless Bushing	461F4	2	E51	Angle Plate	461F1-05	1
E10	Spring Pin	10x30L	2	E52	Spring Pin	8x20L	2
E11	Hex. Cap Steel Screw	M12x40L	6	E53	C Ring S20		2
E12	Spring Washer	M12	6	E54	Cylinder Support Rod	461F2-16	1
E13	Oil Nipple	1/8"PT	1	E55	Lower Bracket	461F1-07	1
E13-1	Set Screw	M10x25L	3	E56	Nut	M20	1
E13-2	Nut	M10	3	E57	Hex. Cap Bolt	M20x65L	1
E13-3	Oil Nipple	1/8"PT	1	E58	Hex. Cap Bolt	M10x60L	1
E14-1	Cylinder Bracket	461F3-09-A	1	E59	Nut	M10	1
E15-1	Vise Jaw	461F2-05-A	1	E60	Swiveling Seat	460D1-06	1
E16	Hex. Socket Cap Screw	M16x25L	1	E61	Lower Bracket	461D1-17	1
E17	Hex. Socket Cap Screw	M14x25L	1	E62	Spring Washer	M8	4
E18-1	Lateral Adjusting Plate	461F2-06-C	1	E63	Hex. Socket Cap Screw	M8x25L	4
E18-2	Upper Slider Block	461F2-06	1	E64	Lower Cover	331D2-05	1
E18-3	Set Screw	M10x25L	2	E65	Hex. Socket Cap Screw	M8x20L	8
E19	Zero Point Sensor		1	E66	Button Head Socket Screw	M8x12L	3
E20	Sensor Bracket	461F3-15	1	E67-1	Guide Plate	461F3-16-A	1
E21	Spring Washer	M8	2	E71-1	Rear Fixed Vise	461F1-10-A	1
E22	Hex. Socket Cap Screw	M8x16L	2	E71-2	Rear Vise Steel Plate	461F2-07	2
E26-1	Adjusting Plate	461F2-06-B	1	E71-3	Flat Head Screw	M6x15L	16
E26-2	Cover	461F2-06-A	1	E71-4	Plate	461F2-09	1
E26-3	Hex. Socket Cap Screw	M6x20L	4	E71-5	Spring Pin	8x20L	2
E26-4	Nut	M6	4	E73-1	Hex. Socket Cap Screw	M12x45L	6
E26-5	Set Screw	M6x25L	4	E74	Hex. Socket Cap Screw	M12x60L	1
E26-6	Oil Nipple	1/8"PT	1	E75	Upper Clamping Block	461F2-12	1
E26-7	Hex. Socket Cap Screw	M10x25L	4	E76	Attached Plate	461F2-12-B	1
E26-8	Hex. Socket Cap Screw	M6x50L	2	E77	Flat Head Screw	M6x12L	2
E31	Flat Head Screw	3/4"x1-1/4"L	2	E78	Flat Head Screw	M6x12L	2
E32	Fixing Bracket	461F3-08	1	E79	Attached Plate	461F2-12-B	1
E33	Hex. Cap Bolt	M12x30L	4	E80	Lower Clamping Block	461F2-12-A	1
E34	Spring Washer	M12	4	E81	Hex. Cap Bolt	M12x50L	1
E35	Set Screw	M10x16L	4	E82	Nut	M12	1
E36	C Ring	S60	2	E83	0° Position Bracket	461D3-08	1
E37	Press Cylinder		1	E84	Hex. Socket Cap Screw	M12x40L	2
E38	Oilless Bushing 5540	461D5-10	2	E85	Hex. Socket Cap Screw	M8x70L	2
E39	Guide Shaft	461F2-02	1	E86	Angle Lock Bracket	461F3-18	1
E40	Outlet Plate	461F3-06	1	E87	Nut	M8	2
E41	Flat Head Screw	M12x35L	1	E88	Hex. Socket Cap Screw	M10x35L	4
E42	PU		1	E89	Seating Block	331D2-04	2
E43	O Ring P60	S138F5-01	2	E90	Hex. Cap Steel Screw	M10x25L	2
E44	Tighten Plate	331D2-06-A	1	E91	Spring Washer	M10	2
E45	Hex. Socket Cap Screw	M8x20L	8	E92	Spring Pin	8x20L	2
E46	Set Screw	M6x25L	1	E93	Spring Pin	8x20L	2

SECTION E - PARTS LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
E94	Supporting Bracket	461D3-03-C	1				
E95	Spring Pin	8x20L	2				
E96	Cutting Plate	461F2-25	1				
E97	Flat Head Screw	M8x16L	8				
E98	Cutting Table	461F1-08	1				
E99	Hex. Socket Cap Screw	M10x70L	6				
E100	Cutting Table Seat	461F1-01	1				
E101	Feeding Cylinder		1				
E102	Spring Washer	M10x35L	4				
E103	Hex. Socket Cap Screw	M10	4				
E104	Lateral Plate	461F3-06-A	1				
E105	Hex. Cap Bolt	M12x25L	2				
E106	Spring Washer	M12	2				
E107	Washer	M12	2				
E108	Hex. Socket Cap Screw	M6x20L	2				
E109	Spring Washer	M6	2				
E110	Coolant Gun Holder	S138F3-20	1				
E111	Retrieval Table	461F3-06	1				
E112	Hex. Cap Bolt	M12x25L	4				
E113	Spring Washer	M12	4				
E114	Washer	M12	4				
E115	Hex. Cap Bolt	M10x12L	1				
E116	Spring Washer	M10	1				
E117	Washer	M10	1				
E118	Left Lateral Plate	461F3-14	1				
E119	Set Screw	M8x6L	2				
E120	Adjusting Shaft	461F2-11	1				
E121	Position Bracket	S138F3-27-A	1				
E122	Hex. Socket Cap Screw	M8x25L	4				
E123	Bakelite Ball 2"x1/2"x12W	S1380403	1				
E124	Lock Handle 3/8"W	9160504-1	1				
E125	Position Screw	S20A2-01	1				
E126	Adjusting Plate	S138F3-29	1				
E127	POM Washer	S138F2-26-B	1				
E128	Washer	S138F2-26-A	1				
E129	Nylon Nut	M10	1				

SECTION E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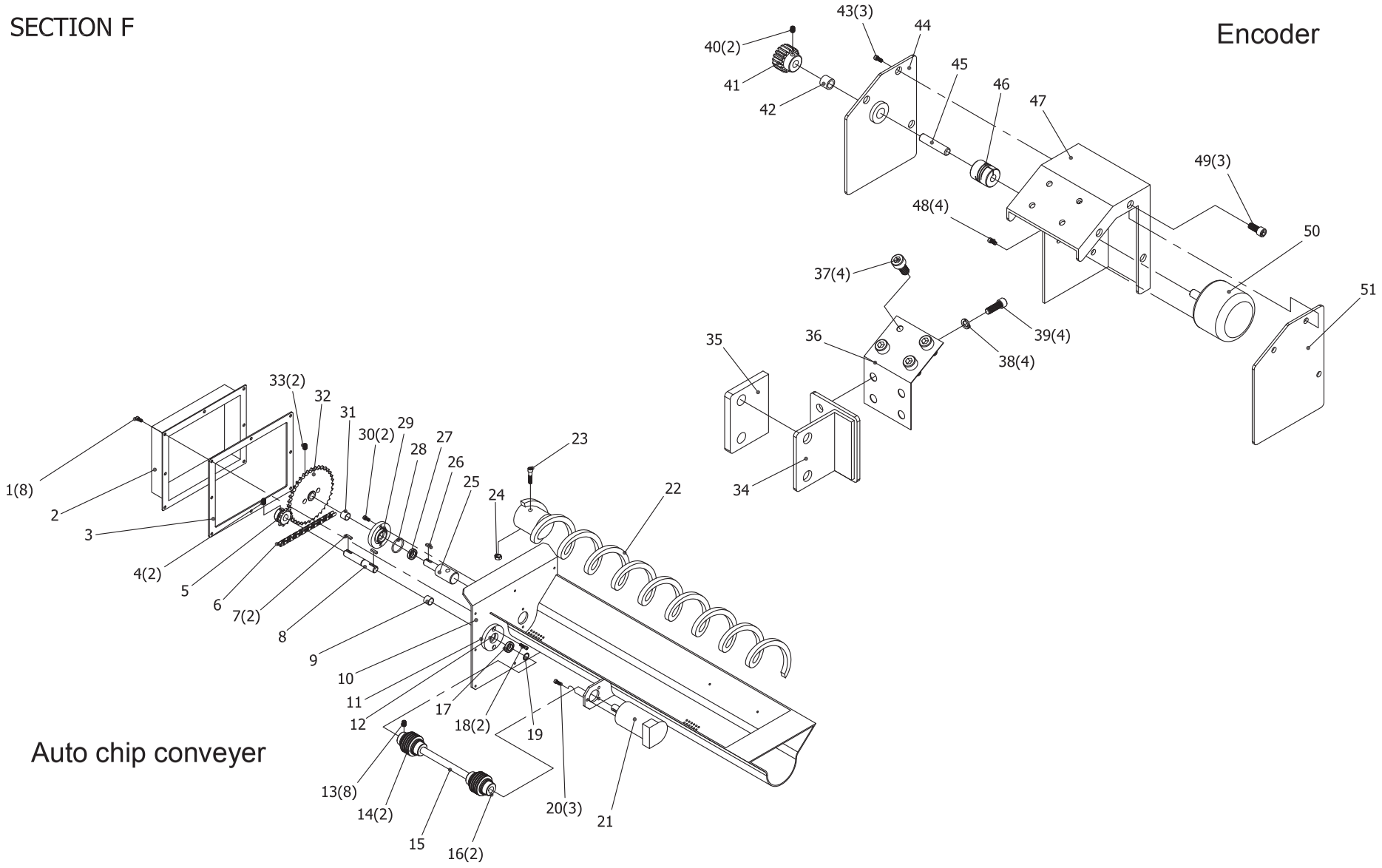
SECTION F - PARTS LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
F1	Button Head Socket Screw	M6x8L	8	F48	Round Head Screw	3/16"x1/4"L	4
F2	Cover	L25A3-09-A	1	F49	Round Head Screw	3/16"x1/4"L	3
F3	Rubber Seal	L25A5-38	1	F50	Encoder		1
F4	Set Screw	M6x6L	2	F51	Encoder Cover	S138F3-34-A	1
F5	Small Chain Wheel	L46N2-63-A	1				
F6	Chain L25A5-30+	L25A5-30A	1				
F7	Key	5x5x20L	2				
F8	Small Chain Wheel Shaft	L25A2-63	1				
F9	Oilless Bush 1625	L40N5-08-1	1				
F10	Conveyer Base	L25A3-06-A	1				
F11	Small Shaft Bush	L25A2-63-A	1				
F12	O Ring P-32	S138F5-02	1				
F13	Set Screw	M6x8L	8				
F14	Rubber Cover SJD16	L46N5-31	2				
F15	Drive Shaft	L25A2-64	1				
F16	Universal Joint SJD16	L46N5-30	2				
F17	Oil Seal 16x26x7	L46N4-11	1				
F18	Hex. Socket Cap Screw	M6x12L	2				
F19	C Ring	S-16	1				
F20	Hex. Socket Cap Screw	M6x12L	3				
F21	Hydraulic Motor		1				
F22	Conveyer Screw	L25A2-53-A	1				
F23	Hex. Socket Cap Screw	M8x55L	1				
F24	Nut	M8	1				
F25	Large Chain Wheel Shaft	L25A2-63-B	1				
F26	Key	5x5x20L	1				
F27	Oil Seal 16x26x7	L46N4-11	1				
F28	O Ring P32	S138F5-02	1				
F29	Shaft Bush	L25A2-63-C	1				
F30	Hex. Socket Cap Screw	M6x8L	2				
F31	Oilless Bush 1625	L40N5-08-1	1				
F32	Large Chain Wheel	L46N2-63	1				
F33	Set Screw	M6x6L	2				
F34	Adjusting Bracket	S138F3-34-F	1				
F35	Plate	461F3-11	1				
F36	Encoder Plate	S138F3-34-E	1				
F37	Hex. Socket Cap Screw	3/16"x3/8"L	4				
F38	Spring Washer	1/4"	4				
F39	Round Head Screw	1/4"x1/2"L	4				
F40	Set Screw	M4x4L	2				
F41	Small Gear	S138F2-11	1				
F42	Oilless Bushing	608	1				
F43	Round Head Screw	3/16"x1/4"L	3				
F44	Fixed Plate	S138F3-34-B	1				
F45	Steel Pin	6x30L	1				
F46	Shaft Coupling	SWS-16C	1				
F47	Encoder Bracket	S138F3-34	1				

SECTION F


Encoder
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18(2)
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Auto chip conveyer
13(8)
14(2)
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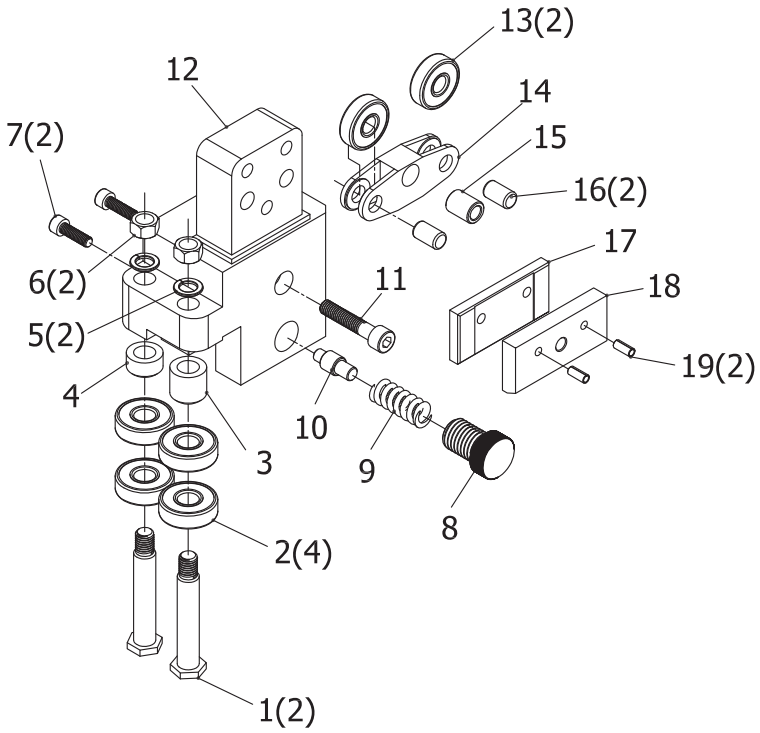
16(2)
20(3)
21

SECTION G - PARTS LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
G1	Bearing Long Shaft	L46N2-19	2				
G2	Bearing 6201	L25A5-03	4				
G3	Bearing Bush (Long)	460D2-63	1				
G4	Bearing Bush (Short)	L46N2-19-A	1				
G5	Spring Washer	M10	2				
G6	Nut	M10	2				
G7	Hex. Socket Cap Screw	M6x20L	2				
G8	Adjusting Screw	L46N2-33	1				
G9	Spring	460D4-11	1				
G10	Guide Pin	3500210	1				
G11	Hex. Socket Cap Screw	M8x40L	1				
G12	Front Bearing Seat	460D1-09	1				
G13	Bearing 6200	L25A5-01	2				
G14	Bearing Bracket	460D1-22	1				
G15	Bush	L46N2-51-1	1				
G16	Shaft	L46N2-51-2	2				
G17	Carbide Guide (Left front)	L46N2-34	1				
G18	Carbide Guide (Left back)	L46N2-34-1	1				
G19	Spring Pin	D5x12L	2				
G20	Spring Pin	D5x12L	2				
G21	Carbide Guide (Right back)	L46N2-34-3	1				
G22	Carbide Guide (Right front)	L46N2-34-2	1				
G23	Shaft	L46N2-51-1	2				
G24	Bearing Bracket	460D1-22	1				
G25	Bearing 6200	L25A5-01	2				
G26	Bush	L46N2-51-2	1				
G27	Hex. Socket Cap Screw	M6x20L	2				
G28	Rear Bearing Seat	460D1-10	1				
G29	Nut	M10	2				
G30	Spring Washer	M10	2				
G31	Bearing Bush (Long)	460D2-63	1				
G32	Hex. Socket Cap Screw	M8x40L	1				
G33	Guide Pin	3500210	1				
G34	Spring	460D4-11	1				
G35	Adjusting Screw	L46N2-33	1				
G36	Bearing 6201	L25A5-03	4				
G37	Bearing Long Shaft	L46N2-19	2				
G38	Bearing Bush (Short)	L46N2-19-A	1				

SECTION G

FRONT BEARING SEAT



REAR BEARING SEAT