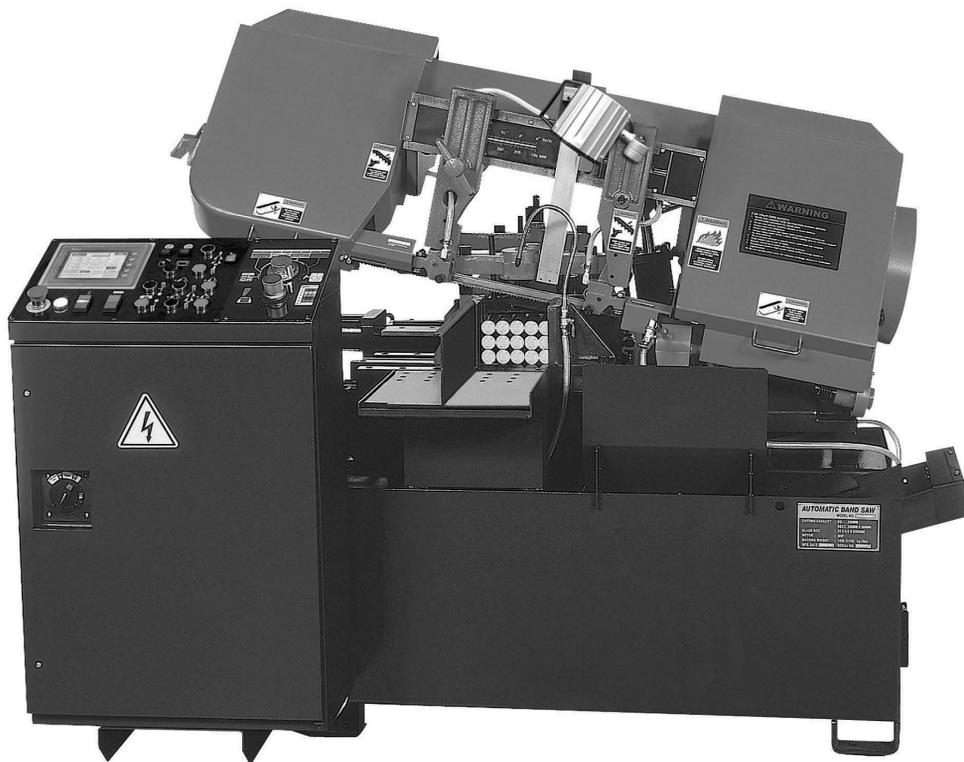


# LX-250NC

## Human-Machine and Numerical Control Band Saw

Study Carefully Before Operating



### Specifications

#### Capacity:

0° 250mm (10") 250 x 300mm (10" x 12")  
bundle (WxH) 150~250 x 100~130mm (6"~10" x 4"~5")

#### Blade Size

34 x 1.1 x 3505mm

#### Blade Speed

50Hz 16~66m/min (52~216FPM)  
60Hz 20~80m/min (65~262FPM)

#### Motor

3HP (2.2kW) 4P

#### Packing Size (LxWxH)

2210 x 2290 x 1890mm (87" x 90.15" x 74.4")

**NW:** 1430kg (3146 lbs)

**GW:** 1570kg (3454 lbs)

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# 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 Advice 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.

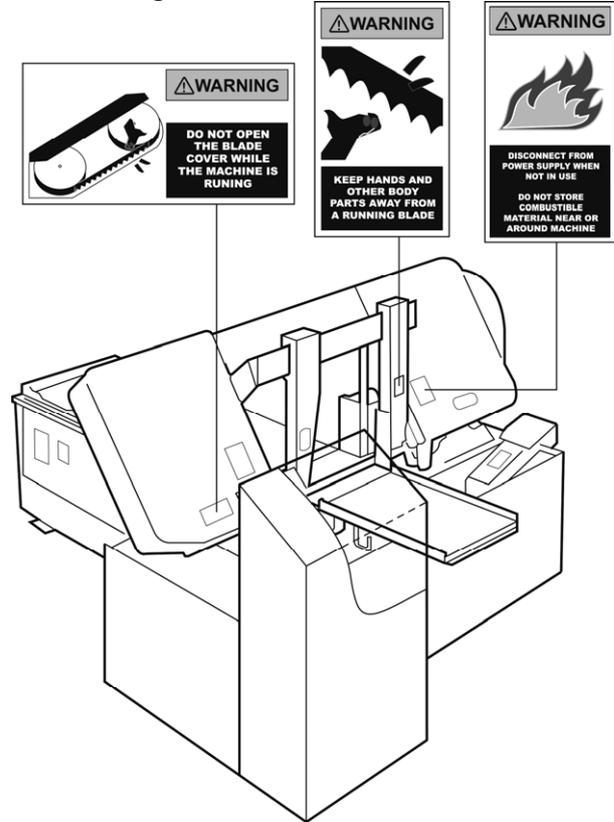
## 1.2 The electrical equipment according to European Standard" CENELEC EN 60 204-1" which assimilates, with some integrating modifications, the publication "IEC 204-1 (1992)"

- The electrical equipment ensures protection against electric shock because of direct or indirect contact. The active parts of this equipment are housed in a box to which access is limited by screws that can only be removed with a special tool; the parts are fed with alternating current as low voltage (24V). The equipment is protected against splashes of water and dust.
- Protection of the system against short circuits is ensured by means of rapid fuses and grounding;

in the event of a motor overload, protection is provided by a thermal probe.

- In the event of a power cut, the specific start-up button must be reset.
- The machine has been tested in conformity with point 20 of EN 60204

## 1.3 Warning labels



Replace warning labels if they become obscured or removed.

- 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.

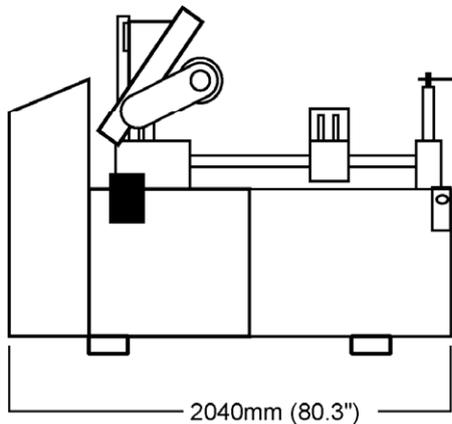
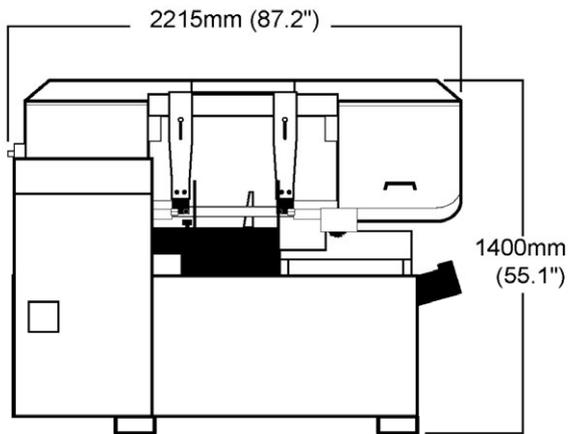
## 1.4 Emergencies according to European Standard "CENELEC EN 60 204-1 (1992)"

- In the event of incorrect operation or a danger condition, the machine may be stopped immediately by pressing the red mushroom shaped button.

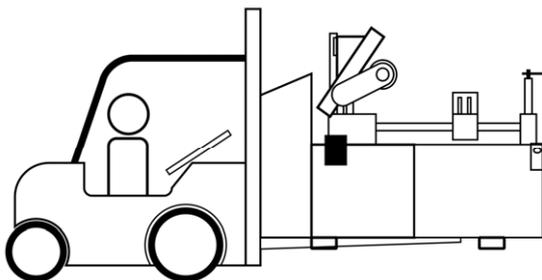
NOTE: Resetting of machine operation after each emergency stop requires resetting the emergency stop button.

## 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  $-10^{\circ}\text{C}$  to  $+50^{\circ}\text{C}$ .
- Relative humidity cannot be over 90%. Lifting and transportation

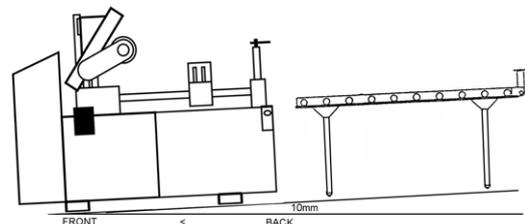
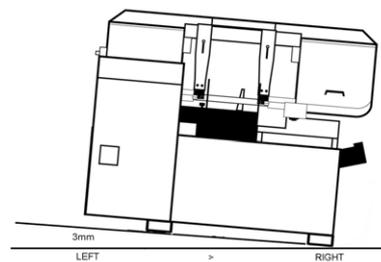
### 2.4 Securing to foundation

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 firmly and properly installed. Once the machine is lowered on the prepared foundation, machinist levels should be used alternately on the vice 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 10mm 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 3mm 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

## 2.6 Deactivation of machine

If the machine is to be out of use for a long period, it is advisable to proceed as follows:

- 1) Disconnect from the power supply
- 2) Loosen the tension on the blade
- 3) Release the bow return spring
- 4) Empty the coolant tank
- 5) Carefully clean and grease the machine
- 6) If necessary, cover the machine.

## 2.7 Dismantling (due to deterioration and/or obsolescence)

As a General Rule,

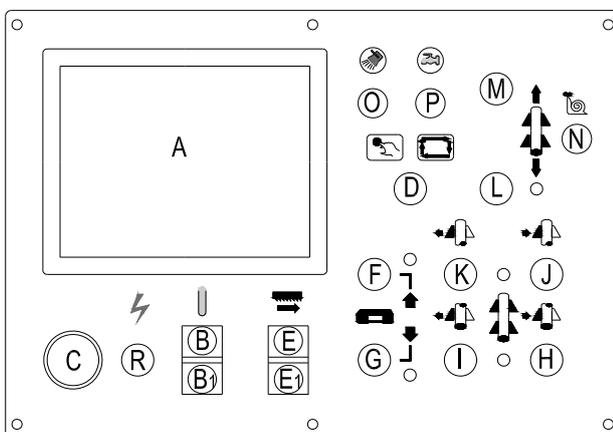
If the machine is to be permanently demolished and/or scrapped, divide the material to be disposed of according to type and composition, as follows:

- 1) Cast iron or ferrous materials, composed of metal alone, are secondary raw materials, so they may be taken to an iron foundry for re-smelting after having removed the contents (classified in point 3).
- 2) Electrical components, including the cable and electronic material (magnetic cards, etc.), fall within the category of material classified as being assimilated to urban waste according to the laws of your local, state, or federal government, so they may be set aside for collection by the public waste disposal service;
- 3) Old mineral and synthetic and/or mixed oils, emulsified oils and greases are considered hazardous or special refuse, so they must be collected, transported and disposed of at a special waste disposal service.

NOTE: The standards and legislation concerning refuse is in a constant state of evolution, therefore is subject to changes. The user must keep informed of the regulations at the time of disposal as these may differ from those described above.

## 3 DESCRIPTION OF MACHINE PARTS

### 3.1 Controls panel



A) Human-Machine Interface

- Press the hydraulic start button B to start.

B) Hydraulic Pump Start Switch

- Press to start the pump and indicator light will on.

B1) Hydraulic Pump off Switch

- Press to stop the pump and indicator light will off.

C) Emergency Stop Button

- Stops and resets the machine parameters.

- Rotate the button to release.

D) Auto/Manual Switch

- This is an operation mode selector. Manual mode for single cut operations and Auto mode 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.

N) Shuttle Vise slow motion in manual operation.

- Press feeding vise forward (L) or backward button (M), then touch the slow motion (N), the button will light and the feeding vise will move in slow speed.

O) Work Light Switch

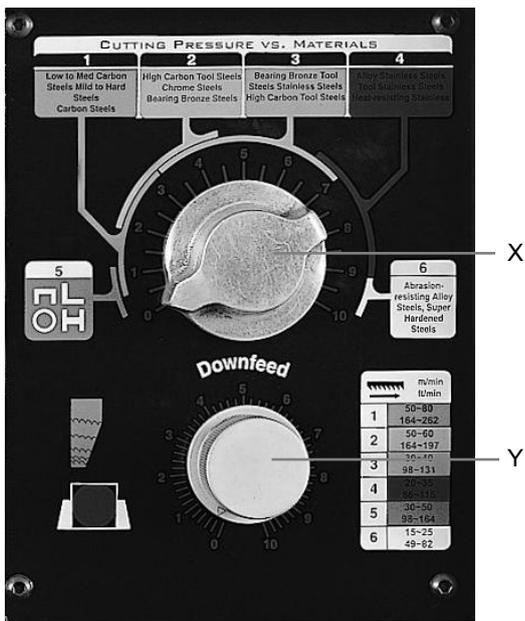
- Press to start the work lamp and the button light will on. Press again the lamp will off.

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.

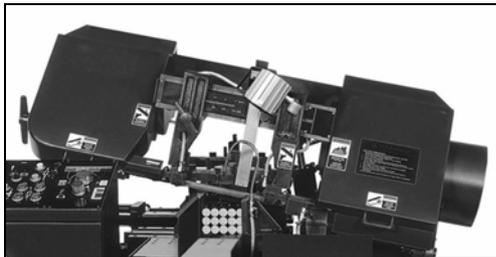
R) Power indicator light.

\* 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



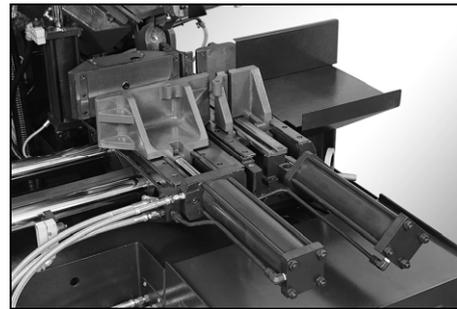
Machine parts consisting of drive members (gear motor or variable speed motor, flywheels), tightening and guide (blade tightening slide, blade guide blocks) of tool.

### 3.3 The Blade Tension Control



This control is a manual rotation device to set and release the blade tension.

### 3.4 The vise system



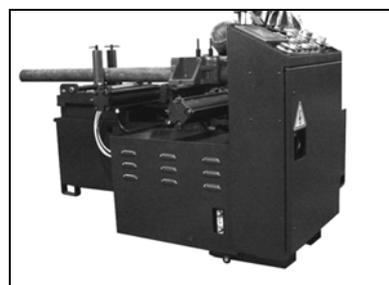
This machine requires the use of two vises to perform the automatic feed operation. The vise system consists of a stationary bench vise with a slot for three phase clamping, and a shuttle vise for feeding work material. The shuttle vise has a floating system that allows it to clamp and feed irregular pieces without binding.

### 3.5 Work-piece sensor



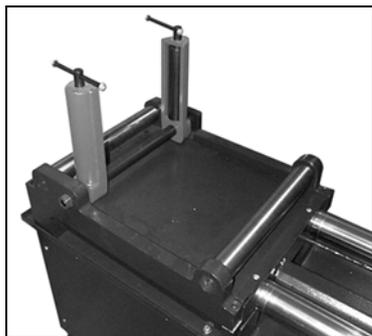
A device that speeds up the operation time by allowing the saw bow to descend quickly and then slow to the cutting pressure rate just before blade touches the workpiece.

### 3.6 The base



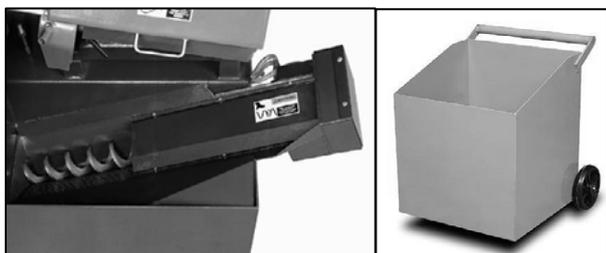
The base is the structure supporting the saw bow (the bow pivot point and respective blocking system), the vise, the rollers, the feeding system, and coolant system.

### 3.7 The Vertical Rollers



The rollers assist the machine by giving support to long material while allowing the material to glide smoothly during material feeding.

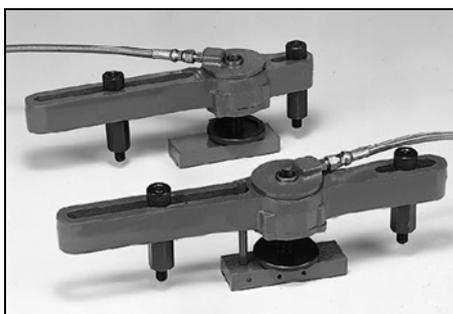
### 3.8 Chip auger and Chip Cart



The chip auger automatically starts during a cutting cycle. It is also equipped with anti-jamming device to protect the hydraulic motor. The chip auger conveys chips to the chip cart. Then the cart can be easily wheeled away for waste removal.

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

### 3.9 Nestling Clamps



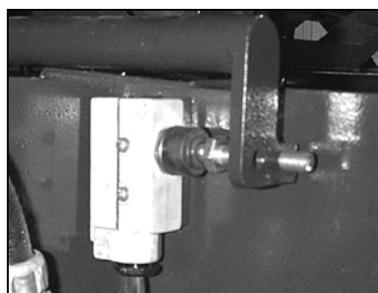
Nestling clamps are used for bundle cutting operations. They vertically press down the material allowing the grouping of many small diameter work pieces. This is efficient for cutting many small, equally sized pieces. These clamps are hydraulically operated.

### 3.10 Blade slide magnetic switch



This machine is equipped with automatic power shut-off safety device to prevent any further damage when a blade has been broken. This magnetic switch senses the movement of the blade flywheel. When the blade is broken or loose in tension the flywheel does not move.

### 3.11 Limit switches



The forward limit switch function as stops for the shuttle vise. Two similar switches are positioned on the hydraulic cylinder of the saw bow to limit the saw bow stroke.

## 4 HUMAN-MACHINE INTERFACE

The 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. Touch the window once.

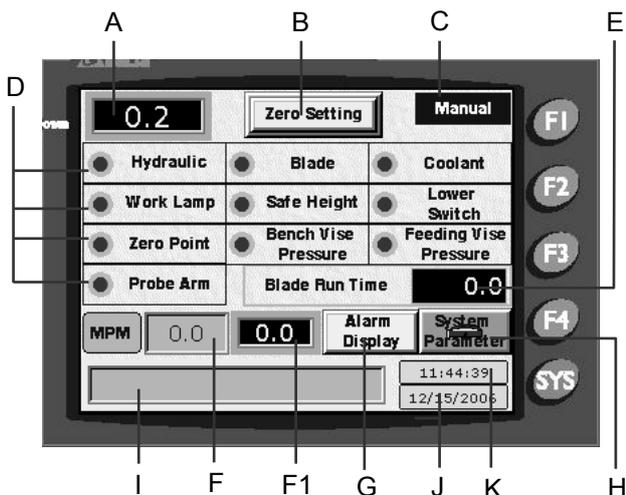
### 4.1 The Human Machine Interface (3.1A)

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

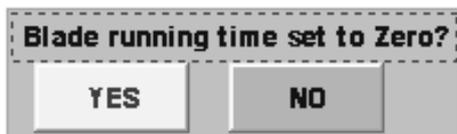


## 4.2 F1: Main Menu

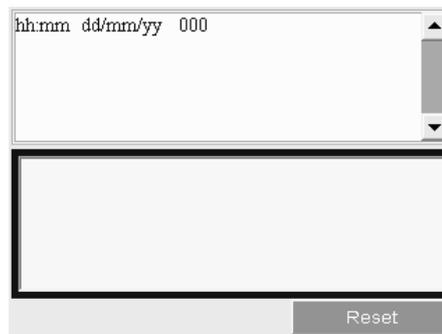
Touch F1 button monitor will display below page:



- 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.

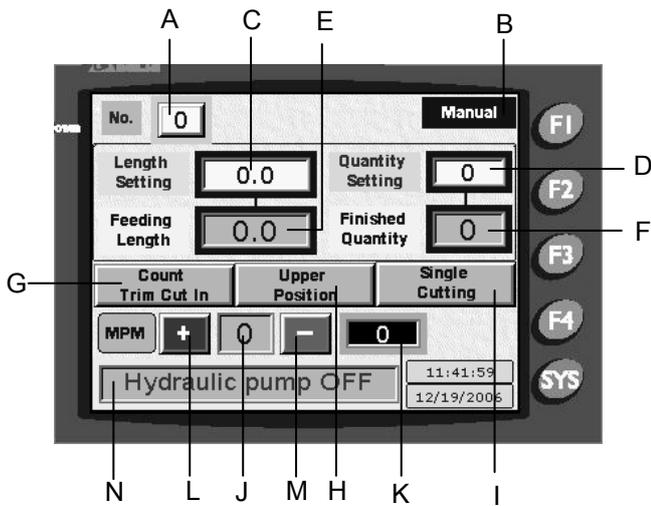


System parameter

- 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.

### 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 from 25~85mpm, the blade speed in meters per minutes.

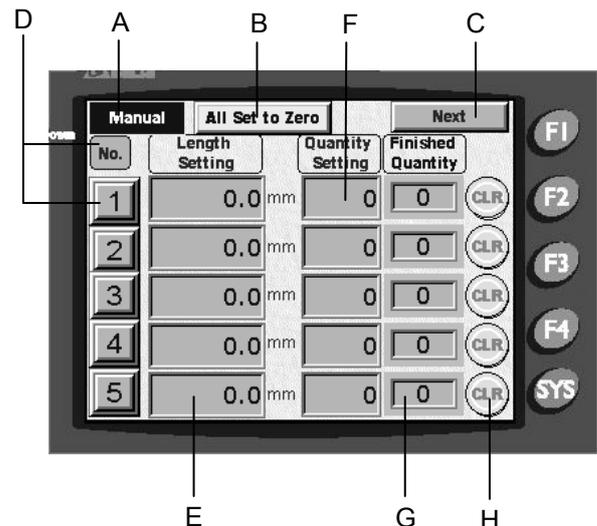


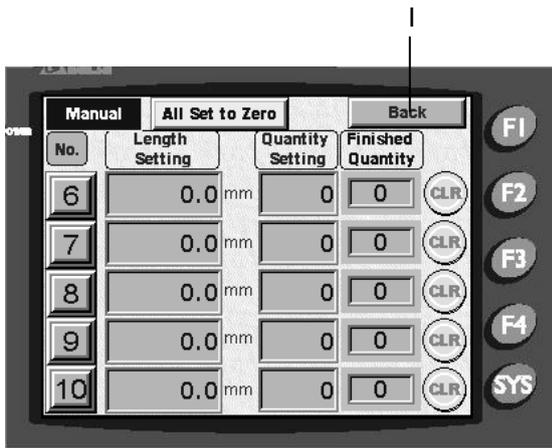
- K. Shows actually blade-running speed.
- L. (+) sign that can set blade speed higher.
- M. (-) sign that can reduce blade speed.
- N. Machine executive message  
This column shows machine executive steps and wrong procedure.

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.

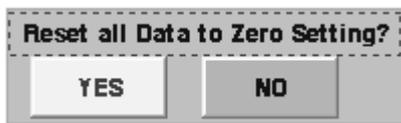
### 4.2.2 F3: Sets material cutting jobs

Touch F3 button will shows cutting jobs setting



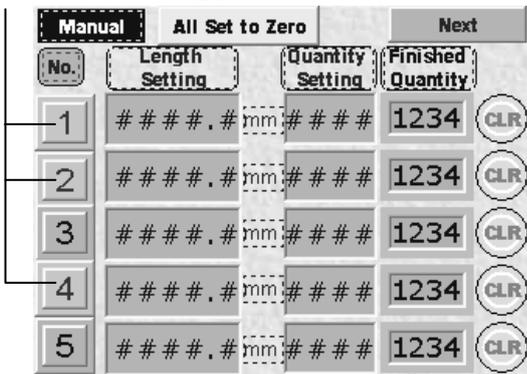


- A. Shows Manual or Auto Mode
- B. Touch to clean all set data to zero setting. Yes or No.



- 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

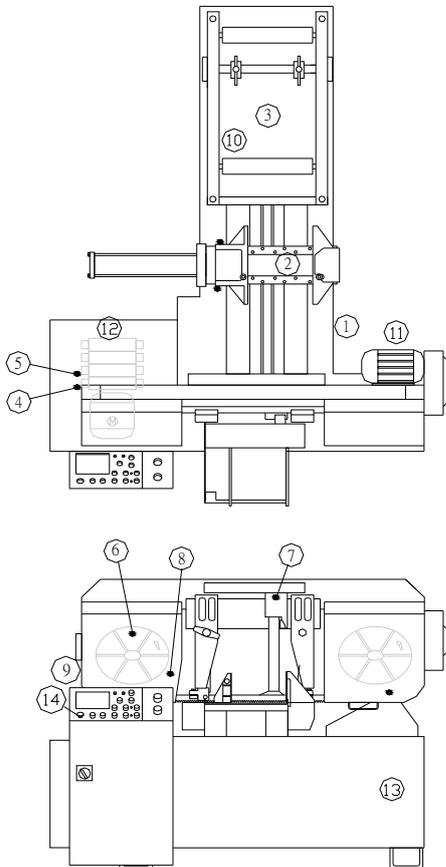
This menu allows the user to change the user language.

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



### 4.3 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:

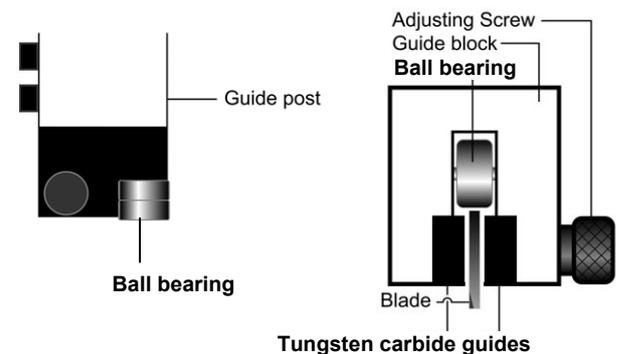
- 1 – Abnormal forward limit switch
  - Check forward limit switch.
- 2 – No material in the shuttle vise
  - Check material in the shuttle vise
- 3 – Abnormal Linear scale
  - Check linear scale wires.
  - Check linear scale function.
- 4 – Abnormal shuttle-vise pressure sensor
  - Check shuttle vise 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 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 SET UP AND PRE-OPERATIONS

### 5.1 Adjusting the tungsten carbide guides

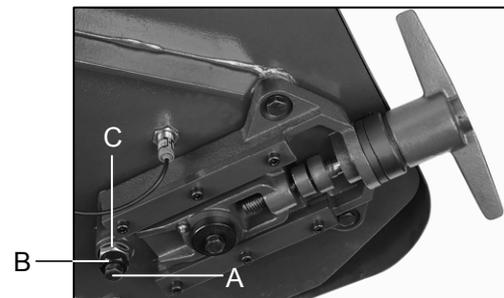
The blade is guided by the upper ball bearings, side ball bearings, and tungsten carbide guides.



- 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.

### 5.2 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 be set by factory and should not require any adjustment. If a tracking problem occurs, adjust the machine as follows:

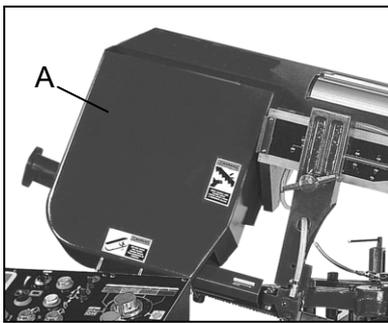
- Raise saw arm to a usable height.
- Disconnect the machine from the power source.
- Locate tracking adjustment bolt on the backside of the saw bow behind the flywheel.
- Open the blade's wheels cover.

- Loosen nut C and bolt A.
- Tracking adjustment is accomplished by either loosening or tightening adjusting tracking nut 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.
- Tighten locking bolt A then tighten the nut C, after proper tracking is completed.
- Close the blade's wheels cover.
- Connect machine to the power source.

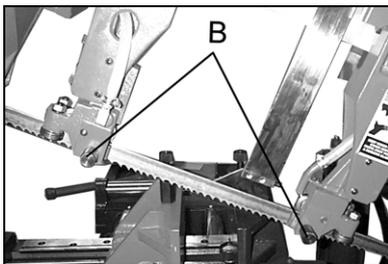
### 5.3 Removing and installing the blade

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.

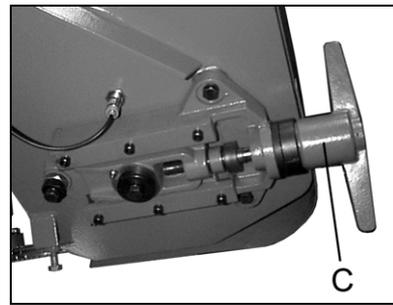
- This machine requires a blade 34x1.1x3505mm
- Raise the saw bow to a height clearing the bench vise jaw, use the switch 3.1F.
- Disconnect the machine from the power source.



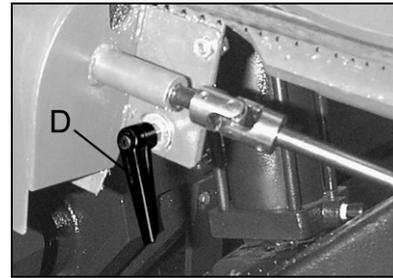
- Slide the blade guide into the left side blade cover and pull the blade guide up at right side.
- Open both wheel covers A and clean the chips out of the machine.



- Loosen the adjusting screws B of the carbide guides from the guide blocks.
- Slide the left blade guide arm to the right as far as possible.



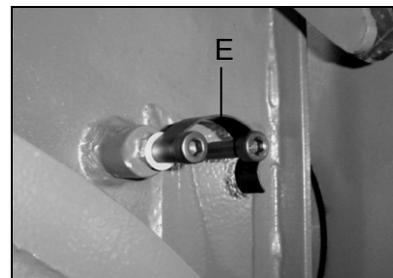
- Release blade tension by turning the blade tension hand wheel C counter-clockwise.



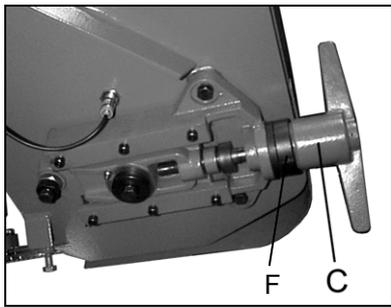
- Unlock the chip brush handle D then push the chip brush device down.



- Remove the blade from both wheels and out of each blade guide.
- Place the new blade onto the wheels and work the blade all the way up between the blade guide bearings. Make sure the blade back is against the vertical roller bearing.



- Use the blade clip E to set the blade on the wheel, put light tension on the blade, make sure the back of the blade lightly touch the wheel flanges of both wheels.



- For proper tension, turn the tension handle C clock-wise until the teeth F clutch together for 1-2 handle rotations.
- Tighten the adjusting screws properly to guide the blade.
- Adjust the position of the chip brush and lock it with handle D.
- Close the covers A and place the blade guides in position.
- Slide left blade guide arm right to the proper position and tighten it by its handle.
- Connect machine to the power source.

#### 5.4 Break-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 workpiece will be required).
- After the break-in operation has been completed, return the blade speed and feed rate to their normal setting.

## 6 OPERATION PREPARATIONS

### 6.1 Vise Operation

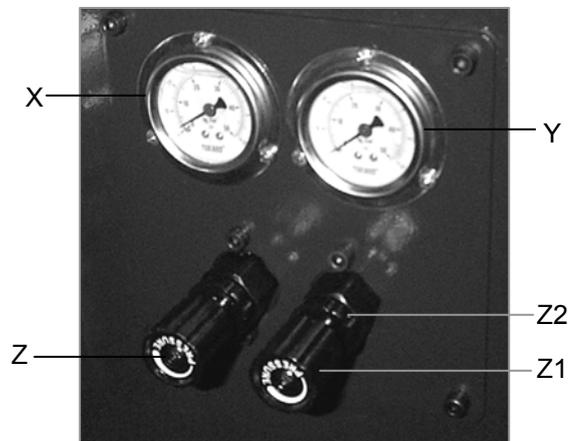
- The vises can be opened to one full stroke when saw bow is raised to the highest limit. If the saw bow at a position below the highest limit, then the vises will only open 5mm. They will not continue open when vise open buttons 3.11,K or I are pressed again.
- The shuttle vise will not move material 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.

### 6.2 Securing the work-piece

- Raise the saw frame, open the vise, and place work-piece on the roller table.
- Gently push the workpiece into the vertical rollers and shuttle vise, taking care not to hit the vertical rollers.
- The vises can hydraulically clamp the work-piece. So, when loading a workpiece be sure to manually close the vise jaw to a distance within 10 mm to prepare for automatic operation.
- Use the control panel switch H or J, to clamp the work-piece.

### 6.3 Hydraulic vise pressure (Option)

Located on the drive wheel side of the rear base are the hydraulic pressure gauges for the vises. The left gauge (X) is for the fixed bench vise while the right (Y) is for the shuttle vise. Both gauges indicate the hydraulic pressure or clamp force of the vises in kgs/cm<sup>2</sup>.



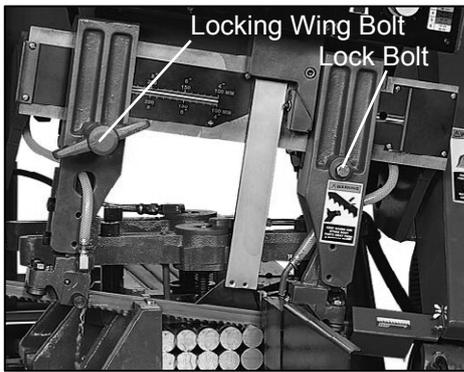
Located just below the gauges are the pressure adjuster knobs. They allow for the reduction of hydraulic pressure or clamping force. The normal pressure for each vise is set at 28kgs/cm<sup>2</sup>. This is good for most solid firm materials, which require 28-30kgs/cm<sup>2</sup>. For softer, hollow, or pipe materials using 15-20kgs/cm<sup>2</sup> is good. Different materials may require different clamping force, so the vise hydraulic pressure is easily changed.

The vise pressure can be changed by turning the pressure knob Z or Z<sub>1</sub>, when it has clamped the work-piece.

- Unlock the fluted knob nut Z<sub>2</sub> or Z<sub>3</sub>.
- Turn the fluted knob Z or Z<sub>1</sub> counterclockwise to decrease the pressure, clockwise to increase the vise pressure

### 6.4 Adjusting the guide posts

The 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 the blade flexing.



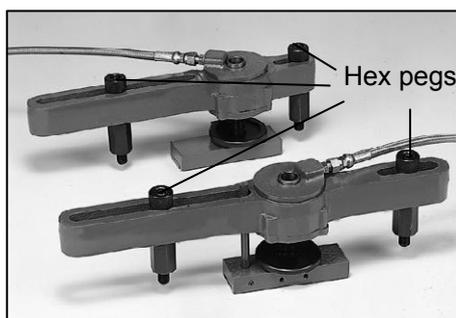
- Refer to the scale to adjust the distance.
- For most spacing changes, unlock the left guide post by turning Locking wing bolt.
- Grip the posts and move horizontally.
- Lock into position.

### 6.5 Cutting pressure

Cutting Pressure vs. Materials			
1	2	3	4
Alloy Tool Steels Chrome Steels Heat-resisting Stainless Wide Steel Plate	High Carbon Tool Steels Bearing Bronze Steels Chrome Steels Med Carbon Steels	Med Carbon Steels General Metal Materials Thick Metal Pipes Steels	Iron Pipes Angle Iron General Steels

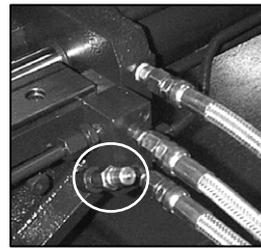
Select suitable cutting pressure for the workpiece to be cut. This varies according to the size and shape of the work piece, type of material, and what type of saw blade is being used. As a guide for materials: cutting hard, wide, tube, or structural materials, must to be done at a slower rate than mild 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. The materials are listed on the control panel. Please refer to it for proper cutting pressure setting.

### 6.6 Attaching the nestling clamps

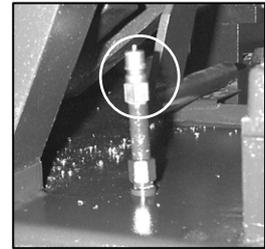


Attach the vertical hex pegs to the stationary vise and shuttle vise.

- Place the nestling clamp on to the hex pegs so that the short side of the clamp faces the motor side. The clamp with the hose pointing to the motor side should be placed on the stationary vise. The clamp with the hose pointing away from the motor should be placed on the shuttle vise.
- Secure nestling clamps with cap nuts. The hex pegs should slide freely.

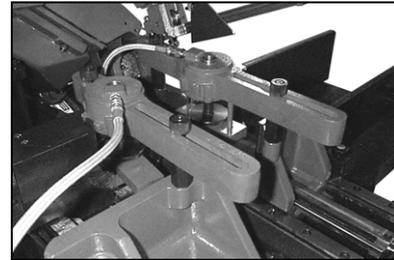


Shuttle vise



Stationary vise

- Connect the hydraulic hoses fixtures to their fixture heads.



## 7 OPERATION CYCLE

Before you start to cut the workpiece, you must inspect that ...

- The workpiece is well clamped.
- The saw blade is suitable for the material being cut.
- The lock levers of the blade guide arms are all tightened.
- Sufficient tension is placed on the saw blade.
- The wire brush is properly positioned.
- There is sufficient cutting fluid and it is in good condition.
- The feed length is set to the correct distance.

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.



## 7.1 Manual operation

Reference 6 *Operation Preparations* 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 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 3.1J.
- Move the work-piece to the desired. Use the shuttle vise Forward and Backward Buttons 3.1L,M.
- Clamp the work-piece with the bench vise use the Bench Vise Button 3.1H.
- Adjust the spacing of the blade guide post; refer to *Adjusting the Guide Posts* (6.4).
- Set the Blade Speed in manual mode. Use F1(I) or F2 (J) , F2 +/- can set the blade speed in auto mode.
- Set the rate for the Cutting Pressure 3.1X and Bow Down-feed speed 3.1Y; refer to *Cutting Pressure* (6.5).
- Press Operation Start Button 3.1E to start the cutting operation cycle.
- Press coolant switch 3.1P 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 Cutting pressure 3.1X and Down-feed 3.1Y 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 3.1F to raise the saw bow.

## 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 count trim cut out by pressing button 4.2.1 F2 (G) after start auto cutting.

## 7.3 -Automatic operation

Reference 6 *Operation Preparations* 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 rate for the Cutting Pressure 3.1X and Bow Down-feed speed 3.1Y; refer to *Cutting Pressure* (6.5).
- \*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 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 Cutting pressure 3.1X and Down-feed 3.1Y settings.
- After completion of the cut, the saw blade will stop at the lower limit position.
- The saw bow 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.

## 7.4 Bundle cutting

- Begin by attaching the nestling clamps to the vises; refer to *Attach the Nestling Clamps* (6.7).
- Follow either the *Manual Operation* (7.1) procedures or the *Automatic Operation* (7.3) procedures.
- Set the system to bundle cutting; refer to *Other Setting* (4.1.6).
- 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 you open the shuttle vise then the nestling clamp on the shuttle vise will open. And if you close the shuttle vise the nestling clamp on the shuttle vise will close. Etc...

## 7.5 Special Operation For a Jammed Blade

- While you are cutting a workpiece, if the saw blade suddenly jams in the workpiece, press the frame raise button 3.1F to lift the saw frame immediately.
- The saw blade jamming in the workpiece 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.
- Too blunt a saw blade.
- Too fine tooth spacing on saw blade for material being cut.
- Too fast feed rate for material being cut and blade used.

### 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.

If the hydraulic pump is on and the machine has not been active for 5 minutes, the power will be shut off automatically, and operating the machine need to restart the hydraulic pump.

## 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-monthly maintenance

- Test the continuity of the equip 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 Oil disposal

The disposal of these products is controlled by strict regulations. Please see the Chapter on "Machine dimensions Transport - Installation" in the section on Dismantling.

### 8.7 Special maintenance

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

## 9 TECHNICAL CHARACTERISTICS

### 9.1 Table of cutting capacity and technical details

Cutting Capacity		
0°	250mm (10")	250x300mm (10"x12")
Bundle cutting capacity (WxH)	150~250x100~130mm (6"~10"x4"~5")	

Electric motor-blade rotation	2.2kW (3HP)
Blade Dimensions	34x1.1x3505mm
Blade speed (50Hz)	16~66m/min
Working Table height	750mm
Machine weight	1430 kg

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	Lead screw	Grease	Suitable	Two weeks	
6	Drive wheel oil hole	Grease	Suitable	Two weeks	
7	Idle wheel oil hole	Grease	Suitable	Two weeks	
8	Slide of slide seat	Machine oil	Suitable	Two weeks	
9	Shuttle vise shorter jaw	Grease	Suitable	Two weeks	Oil after cleaning
10	Chip conveyer gears	Grease	Suitable	One month	
11	Transmission gear box	Gear oil #90	Middle level on gauge	Six months	Every year after the first
12	Hydraulic system tank	Hydraulic Oil AW-32	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:

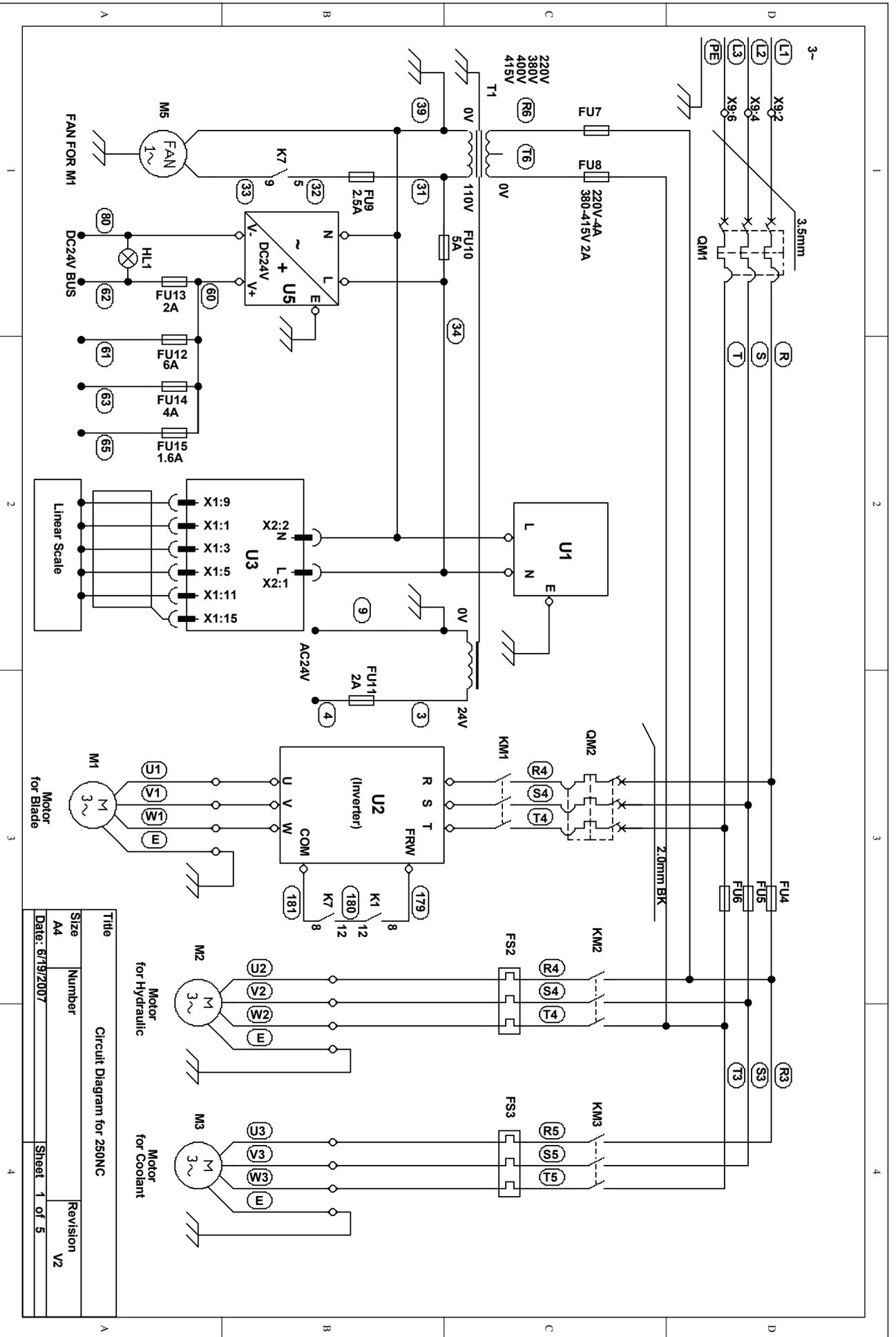
1. Disconnect the machine from the power source before any kind of maintenance.
2. Any special maintenance must contact skill personnel of dealer or importer. Do not remove parts for maintenance.

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/mm <sup>2</sup>
Construction steels	Fe360	St37	E24	----	----	116	67	360÷480
	Fe430	St44	E28	43	----	148	80	430÷560
	Fe510	St52	E36	50	----	180	88	510÷660
Carbon steels	C20	CK20	XC20	060 A 20	1020	198	93	540÷690
	C40	CK40	XC42H1	060 A 40	1040	198	93	700÷840
	C50	CK50	----	----	1050	202	94	760÷900
	C60	CK60	XC55	060 A 62	1060	202	94	830÷980
Spring steels	50CrV4	50CrV4	50CV4	735 A 50	6150	207	95	1140÷1330
	60SiCr8	60SiCr7	----	----	9262	224	98	1220÷1400
Alloyed steels for hardening and tempering and for nitriding	35CrMo4	34CrMo4	35CD4	708 A 37	4135	220	98	780÷930
	39NiCrMo4	36CrNiMo4	39NCD4	----	9840	228	99	880÷1080
	41CrAlMo7	41CrAlMo7	40CADG12	905 M 39	----	232	100	930÷1130
Alloyed casehardening steels	18NiCrMo7	----	20NCD7	En 325	4320	232	100	760÷1030
	20NiCrMo2	21NiCrMo2	20NCD2	805 H 20	4315	224	98	690÷980
Alloyed for bearings	100Cr6	100Cr6	100C6	534 A 99	52100	207	95	690÷980
Tool steel	52NiCrMoKU	56NiCrMoV7C100K	----	----	----	244	102	800÷1030
	C100KU	C100W1	----	BS 1	S-1	212	96	710÷980
	X210Cr13KU	X210Cr12	Z200C12	BD2-BD3	D6-D3	252	103	820÷1060
	58SiMo8KU	----	Y60SC7	----	S5	244	102	800÷1030
Stainless steels	X12Cr13	4001	----	----	410	202	94	670÷885
	X5CrNi1810	4301	Z5CN18.09	304 C 12	304	202	94	590÷685
	X8CrNi1910	----	----	----	----	202	94	540÷685
	X8CrNiMo1713	4401	Z6CDN17.12	316 S 16	316	202	94	490÷685
Copper alloys Special brass Bronze	Aluminium copper alloy G-CuAl11Fe4Ni4 UNI 5275					220	98	620÷685
	Special manganese/silicon brass G-CuZn36Si1Pb1 UNI5038					140	77	375÷440
	Manganese bronze SAE43 - SAE430					120	69	320÷410
	Phosphor bronze G-CuSn12 UNI 7013/2a					100	56.5	265÷314
Cast iron	Gray pig iron		G25			212	96	245
	Spheroidal graphite cast iron		GS600			232	100	600
	Malleable cast iron		W40-05			222	98	420

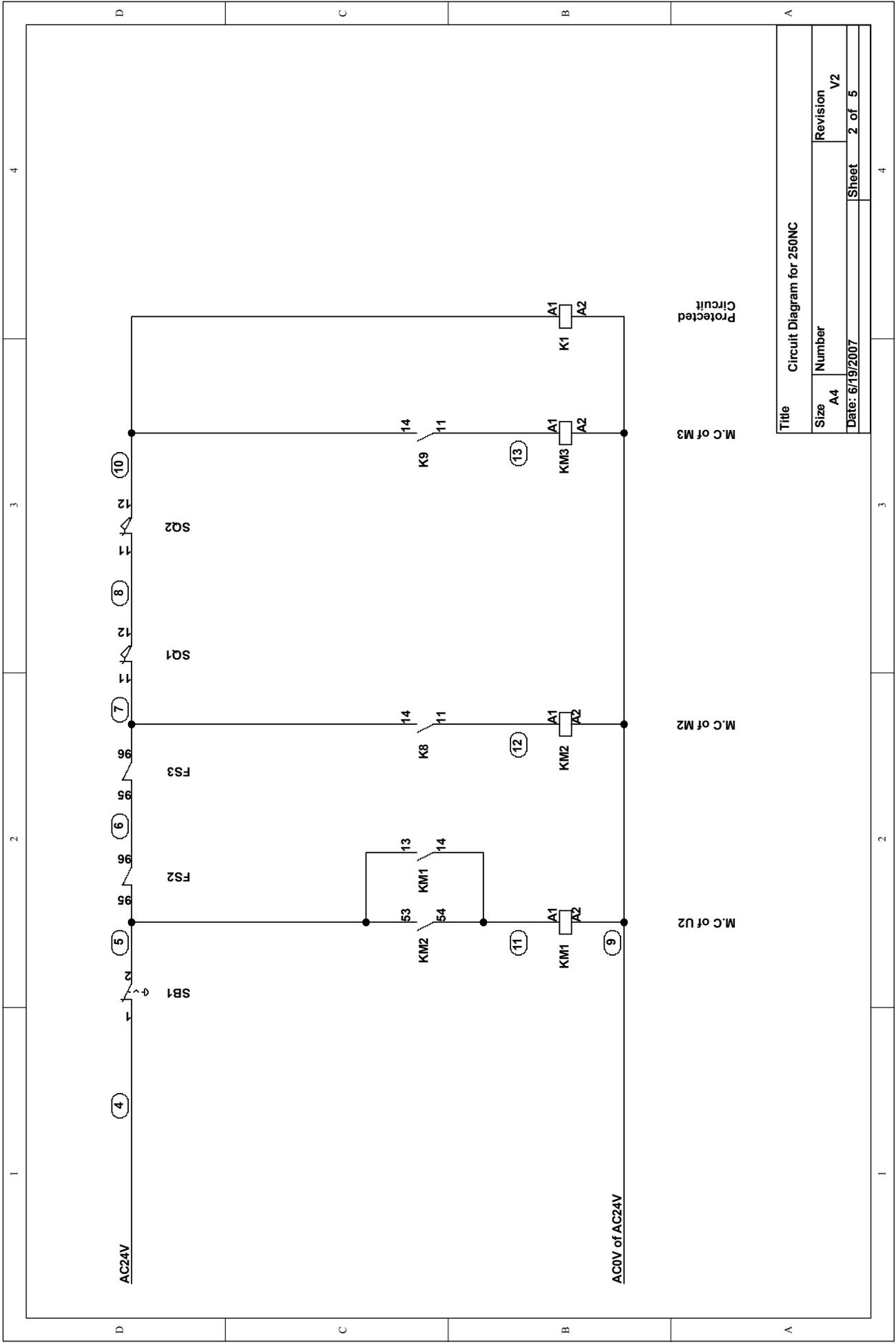
## 10 NOISE TESTS

The test was held under environmental noise levels of 65db. Noise measurements with the machine operating unload was 71db. Noise level during the cutting of mild carbon steel was 73db.

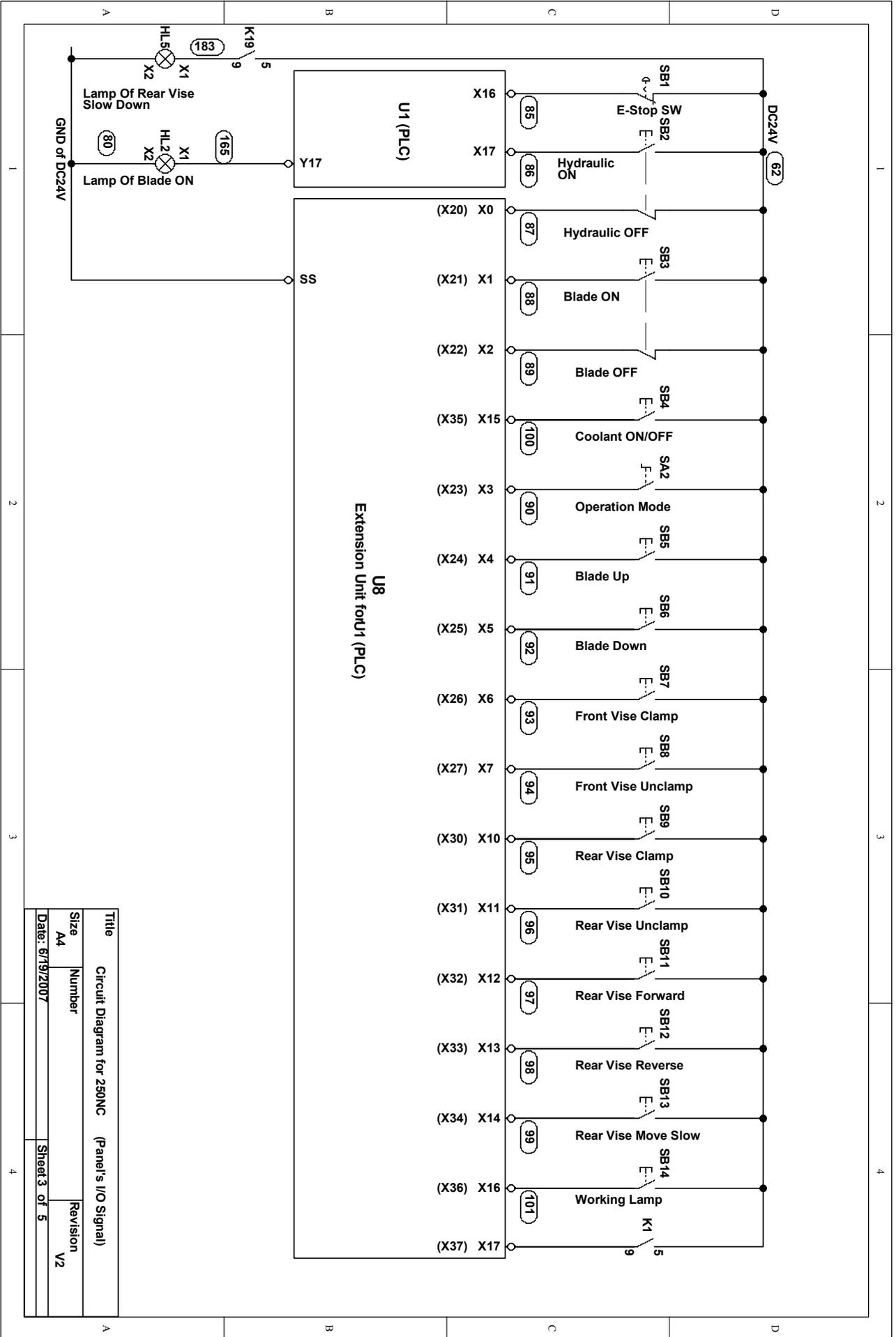
NOTE: with the machine operating, the noise level will vary according to the different materials being processed. The user must therefore assess the intensity and if necessary provide the operators with the necessary personal protection, as required by Law 277/1991.



Title		Circuit Diagram for 250NC	
Size	Number	Revision	
A4		V2	
Date: 6/19/2007		Sheet 1 of 5	



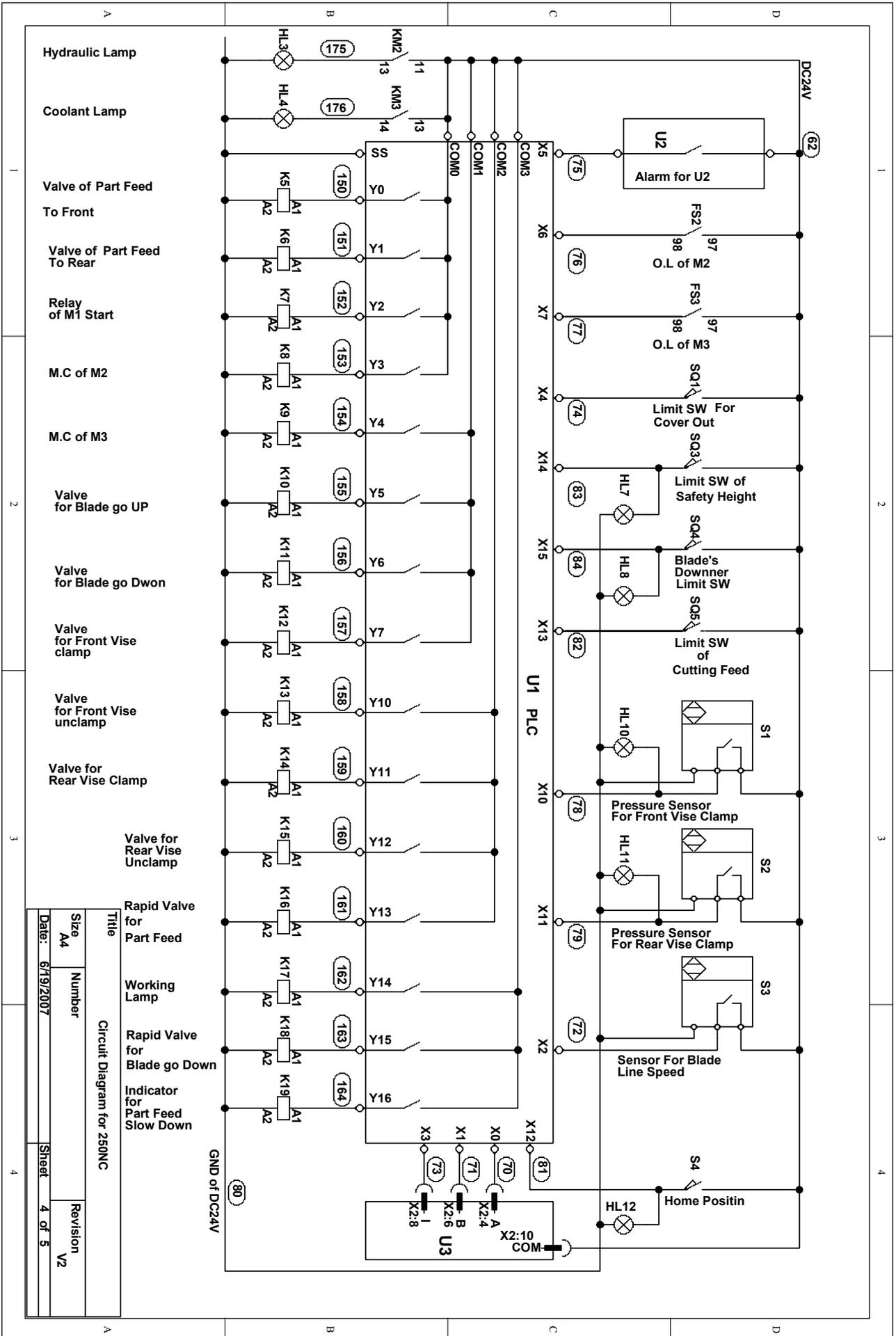
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Size	Number	Revision	V2
A4			
Date: 6/19/2007		Sheet	2 of 5



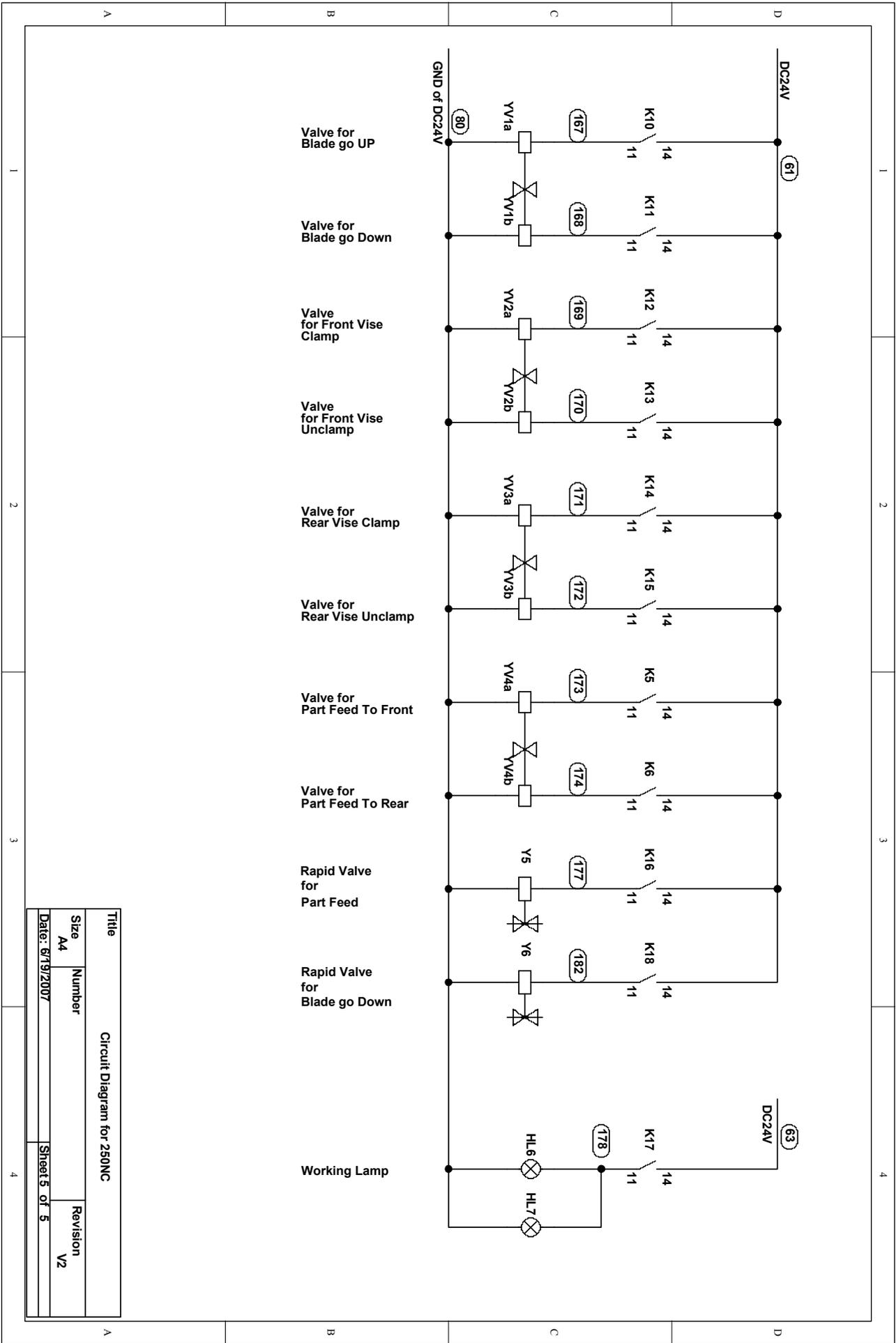
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Size	Number	Revision	
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Title		Circuit Diagram for 250NC	
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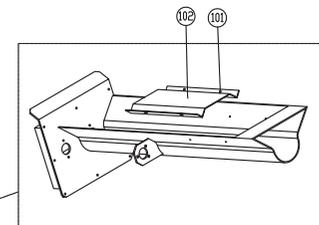
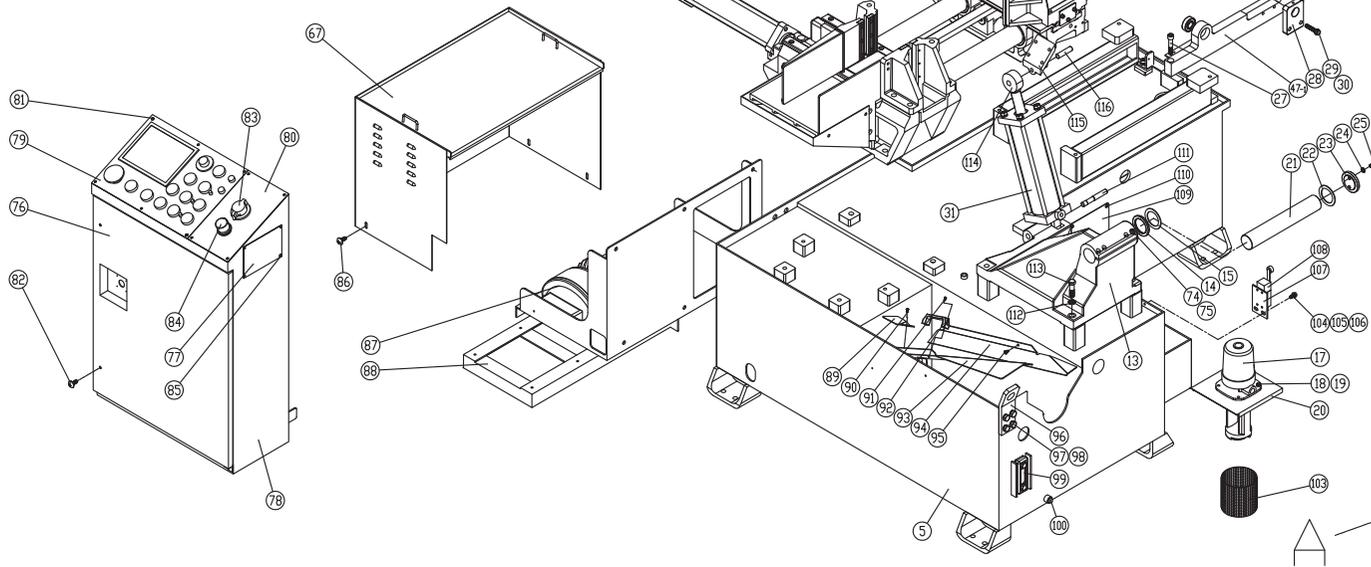
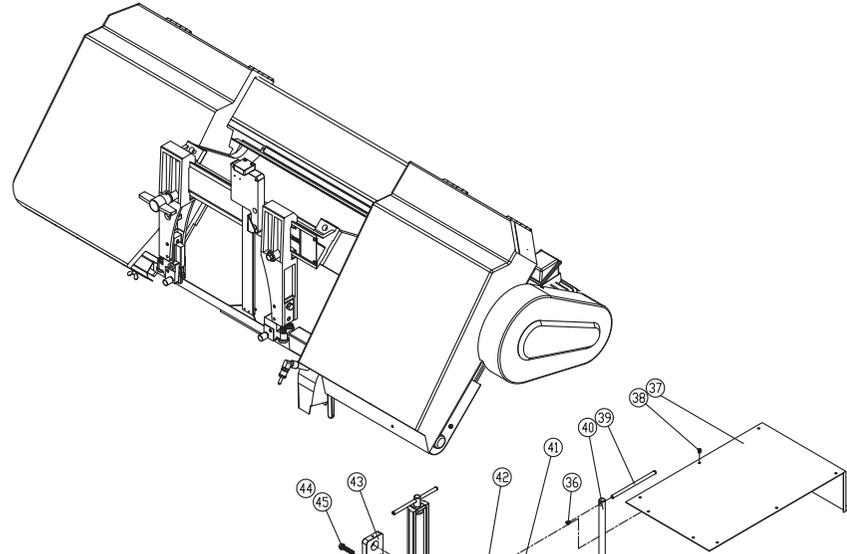
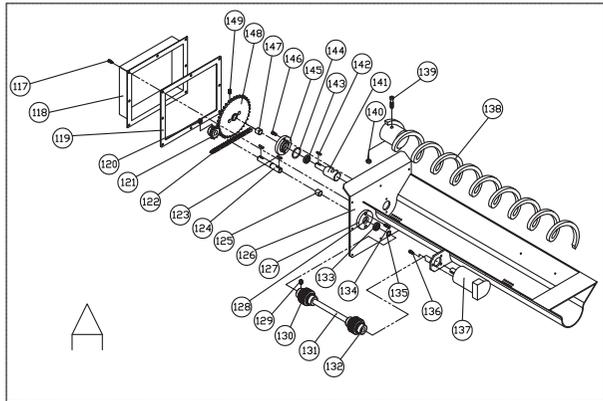


Title		Circuit Diagram for 250NC	
Size	Number	Revision	
A4		V2	
Date: 6/19/2007		Sheet 5 of 5	

## SECTION A - PARTS LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
A5	Base		1	A95	Round Head Screw	M5x8L	2
A13	Saw Bow Setting Bracket		1	A96	Lifting Plate		1
A14	Spacer		1	A97	Steel Hex Cap Bolt	M12x25L	4
A15	Oilless Bushing		1	A98	Spring Washer	M12	4
A17	Coolant Pump		1	A99	Coolant Level Gauge		1
A18	Hex Cap Bolt	M6x12L	2	A100	Drain	PT3/8"	1
A19	Flat Washer	M6	2	A101	Round Head Screw	M5x8L	4
A20	Pump Support Plate		1	A102	Conveyer Upper Cover		1
A21	Shaft		1	A103	Coolant Filter		1
A22	Oilless Bushing		1	A104	Hex Cap Bolt	M8x16L	2
A23	Adjusting Cover		1	A105	Spring Washer	M8	2
A24	Spring Washer	M8	2	A106	Flat Washer	M8	2
A25	Hex Soc. Cap Screw	M8x20L	2	A107	Bow Up Limit Switch Seat		1
A27	Hex Soc. Cap Screw	M12x65L	2	A108	Bow Up Limit Switch		1
A27-1	Hex Soc. Cap Screw	M12x55L	1	A109	Cover		1
A28	Setting Plate		1	A110	Round Head Soc. Screw	M6x8L	4
A29	Hex Cap Bolt	M12x35L	2	A111	Cylinder Support Rod		1
A30	Spring Washer	M12	2	A112	Spring Washer	M14	4
A31	Hydraulic Cylinder		1	A113	Steel Hex Cap Bolt	M14x60L	4
A33	Ball Bearing	6204	1	A114	Fish Eye Bearing	POS16	1
A34	Vertical Roller Stand		2	A115	Cylinder Upper Bracket		1
A35	Vertical Roller		2	A116	Cylinder Support Rod		1
A36	Round Head Screw	M6x8L	4	A117	Round Head Soc. Screw	M6x8L	8
A37	Cover		1	A118	Chain Wheel Cover		1
A38	Round Head Screw	M6x8L	8	A119	Rubber Seal		1
A39	Hand Shaft		2	A120	Set Screw	M6x6L	2
A40	Shaft		2	A121	Small Chain Wheel		1
A41	Roller		2	A122	Chain		1
A42	Shaft		1	A123	Key	5x5x20L	2
A43	Setting Plate		1	A124	Small Shaft		1
A44	Hex Cap Bolt	M12x50L	2	A125	Oilless Bushing	1625	1
A45	Spring Washer	M12	2	A126	Conveyer Base		1
A47	Roller Setting Bracket (Left)		1	A127	Small Shaft Bush		1
A47-1	Roller Setting Bracket (Right)		1	A128	O Ring	P-32	1
A67	Hydraulic System Cover		1	A129	Set Screw	M6x8L	8
A74	Hex Soc. Cap Screw	M8x45L	4	A130	Rubber Cover	SJD16	2
A75	Spring Washer	M8	4	A131	Drive Shaft		1
A76	Control Box Door		1	A132	Universal Joint	SJD16	2
A77	Plate		1	A133	Oil Seal	16x26x7	1
A78	Control Box		1	A134	Hex Soc. Cap Screw	M6x12L	2
A79	Control Panel		1	A135	C Ring	S-16	1
A80	Cutting Rate Panel		1	A136	Hex Soc. Cap Screw	M6x12L	3
A81	Round Head Screw	M6x8L	10	A137	Hydraulic Motor		1
A82	Big Round Head Screw	M6x8L	2	A138	Conveyer Screw		1
A83	Cutting Pressure Regulator		1	A139	Hex Soc. Cap Screw	M8x55L	1
A84	Cutting Rate Adjust Knob		1	A140	Nut	M8	1
A85	Round Head Screw	M6x8L	4	A141	Large Chain Wheel Shaft		1
A86	Big Round Head Screw	M8x10L	3	A142	Key	5x5x20L	1
A87	Hydraulic Motor		1	A143	Oil Seal	16x26x7	1
A88	Hydraulic Unit Bracket		1	A144	O Ring	P32	1
A89	Conveyer Cover (C)		1	A145	Shaft Bush		1
A90	Round Head Screw	M5x8L	2	A146	Hex Soc. Cap Screw	M6x8L	2
A91	Big Round Head Screw	M6x12L	2	A147	Oilless Bushing	1625	1
A92	Plastic Handle		1	A148	Big Chain Wheel		1
A93	Conveyer Cover (A)		1	A149	Set Screw	M6x6L	2
A94	Conveyer Cover (B)		1				

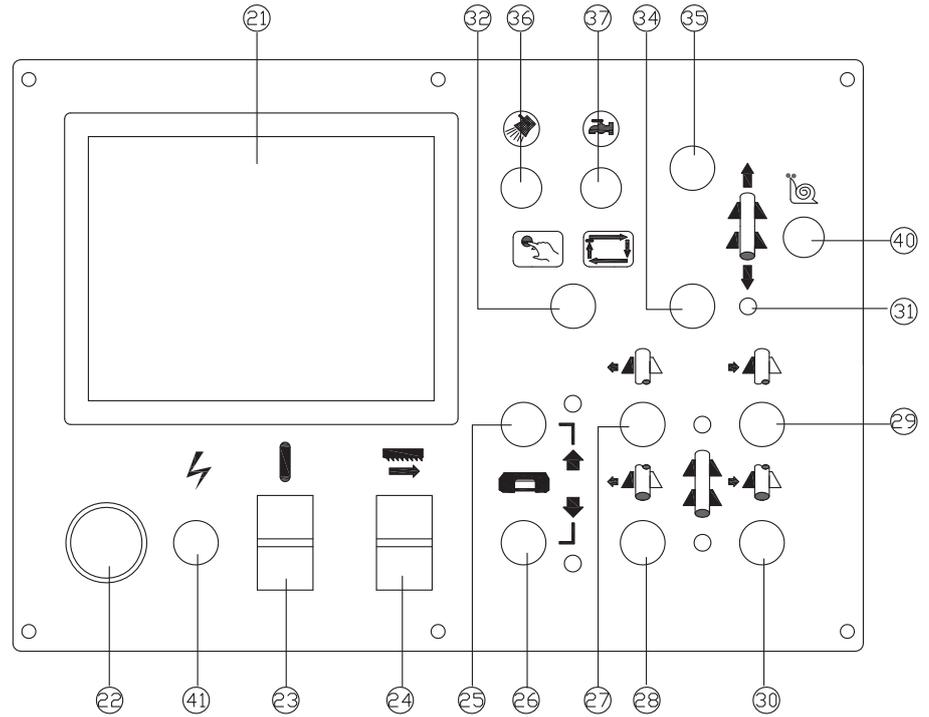
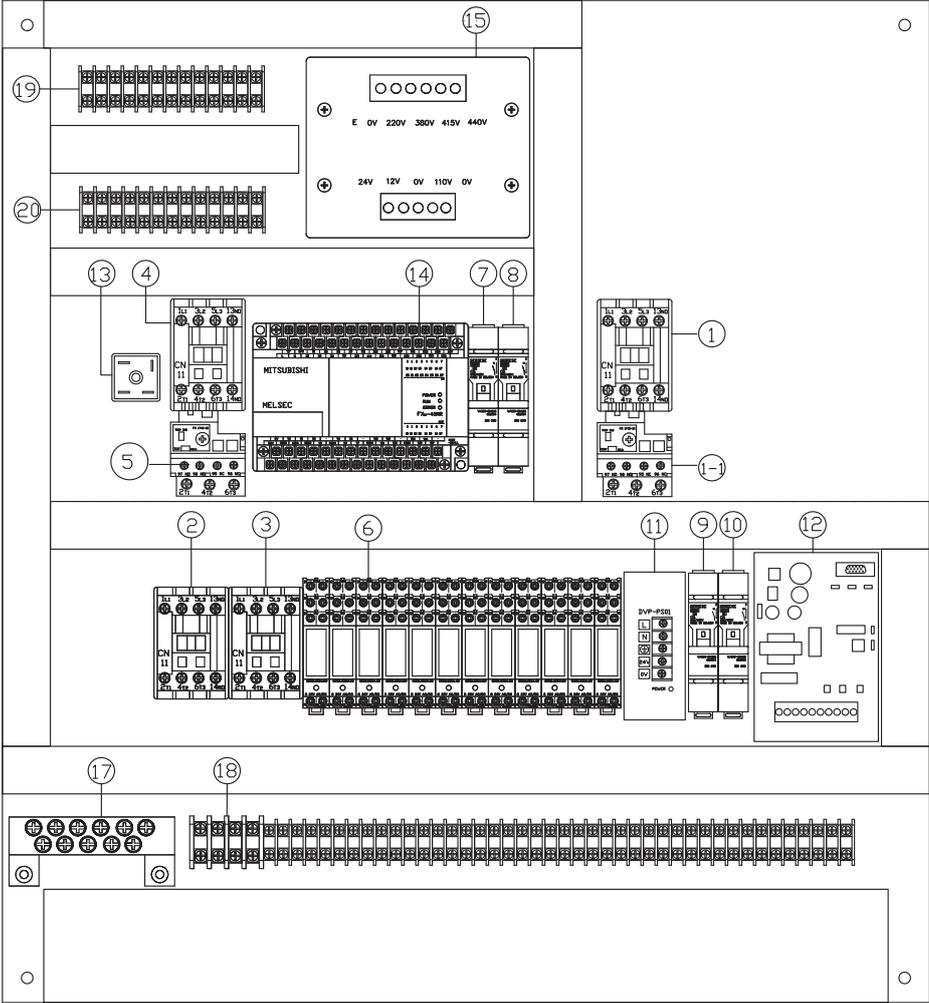
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SECTION A



## SECTION B - PARTS LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
B1	Contactator	M1	1				
B1-1	Overload		1				
B2	Contactator	M3	1				
B3	Contactator	M4	1				
B4	Contactator	M2	1				
B5	Overload		1				
B6	Relay	R1-R12	12				
B7	Fuse	6A (LF1)	1				
B8	Fuse	6A (LF2)	1				
B9	Fuse	6A (LF3)	1				
B10	Fuse	6A (LF4)	1				
B11	Power Supplier	DVP-PS01	1				
B12	PC Board		1				
B13	Commutator	25A	1				
B14	PLC	AXON-40MR	1				
B15	Transformer		1				
B17	Ground Block		1				
B18	Terminal Block	TS-025	1				
B19	Terminal Block	TS-015	1				
B20	Terminal Block	TS-015	1				
B21	Human- Machine Interface		1				
B22	Emergency Stop Button		1				
B23	Hydraulic Pump Switch		1				
B24	Operation Start Button		1				
B25	Bow Up Button		1				
B26	Bow Down Button		1				
B27	Shuttle Vise Open Button		1				
B28	Bench Vise Open Button		1				
B29	Shuttle Vise Close Button		1				
B30	Bench Vise Close Button		1				
B31	Indicator Light		5				
B32	M/A Selector Switch		1				
B34	Shuttle Vise Forward Button		1				
B35	Shuttle Vise Backward Button		1				
B36	Work Light Switch		1				
B37	Coolant Switch		1				
B40	Slow Speed Push Button		1				
B41	Power Indicator Light		1				

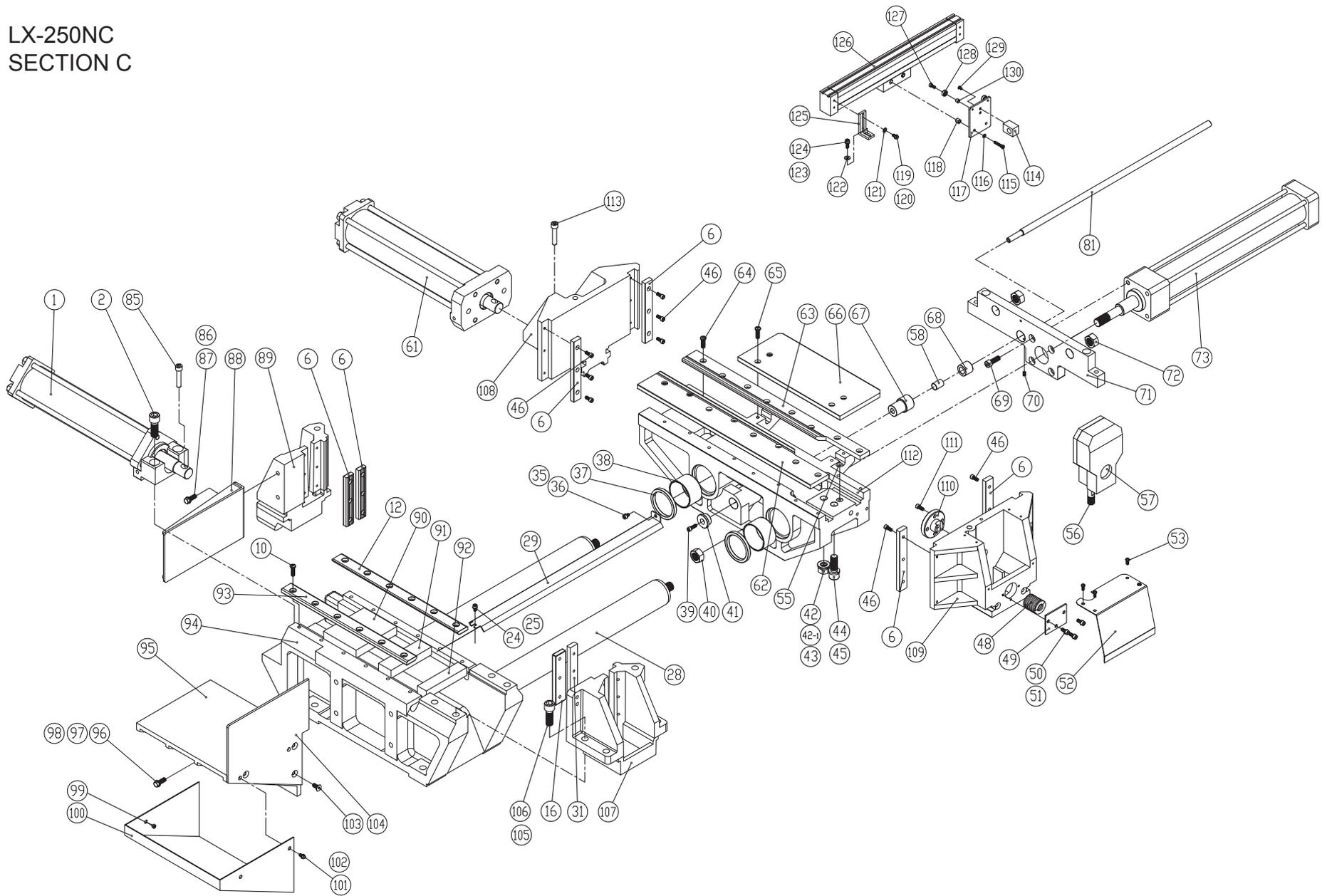
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SECTION B



## SECTION C - PARTS LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
C1	Bench Vise Hydraulic Cylinder		1	C81	Shaft		1
C2	Hex Soc. Cap Screw	M16x55L	2	C85	Rod Pin		1
C6	Steel Plate		6	C86	Hex Cap Bolt	M8x16L	2
C10	Round Head Soc. Screw	M8x20L	12	C87	Spring Washer	M8	2
C12	Steel Plate		1	C88	Retrieval Side Plate		1
C16	Steel Plate		1	C89	Front Movable Vise		1
C24	Hex Soc. Cap Screw	M6x12L	1	C90	Attached Plate (3)		1
C25	Flat Washer	M6	1	C91	Attached Plate (2)		1
C28	Lead Shaft		2	C92	Attached Plate (1)		2
C29	Rod Cover		1	C93	Steel Plate (Front)		1
C31	Steel Plate		1	C94	Vise Table		1
C35	Hex Soc. Cap Screw	M6x12L	1	C95	Retrieval Table		1
C36	Spring Washer	M6	1	C96	Steel Hex Cap Bolt	M12x30L	4
C37	Anti-Dust Ring	DKB65x79x8/11	4	C97	Spring Washer	M12	4
C38	Oilless Bushing	6540	4	C98	Flat Washer	M12	4
C39	Hex Soc. Cap Screw	M6x30L	1	C99	Nut	M8	1
C40	Nut	M20x1.5	1	C100	Coolant Collecting Tray		1
C41	Shaft Seat	Ø15	1	C101	Spring Washer	M8	3
C42	Nut	M16	1	C102	Hex Cap Bolt	M8x15L	3
C42-1	Spring Washer	M16	1	C103	Flat Head Screw	M8x15L	3
C43	Flat Washer	M16	1	C104	Side Plate		1
C44	Hex Soc. Cap Screw	M16x70L	1	C105	Hex Soc. Cap Screw	M16x65L	4
C45	Spring Washer	M16	1	C106	Spring Washer	M16	4
C46	Hex Soc. Cap Screw	M6x16L	12	C107	Front Fixed Vise		1
C48	Spring	TL35-40	1	C108	Feeding Vise		1
C49	Spring Set Plate		1	C109	Stationary Vise (Rear)		1
C50	Hex Soc. Cap Screw	M6x16L	3	C110	Shaft Bush		1
C51	Spring Washer	M6	3	C111	Hex Soc. Cap Screw	M8x16L	4
C52	Cover		1	C112	Feeding Base		1
C53	Round Head Screw	M6x16L	4	C113	Rod Pin		1
C55	O Ring	P11	1	C114	Adjusting Block		1
C56	Bolt		1	C115	Hex Soc. Cap Screw	M6x40L	2
C57	Hydraulic Cylinder Set		1	C116	Spring Washer	M6	2
C58	Oilless Bushing	1520	1	C117	Connect Plate		1
C61	Hydraulic Cylinder		1	C118	Bush		2
C62	Steel Plate (Front)		1	C119	Hex Cap Bolt	M5x16L	4
C63	Steel Plate (Rear)		1	C120	Spring Washer	M5	4
C64	Hex Soc. Cap Screw	M8x16L	16	C121	Flat Washer	M5	4
C65	Hex Soc. Cap Screw	M8x16L	4	C122	Flat Washer	M6	2
C66	Plate		1	C123	Spring Washer	M6	2
C67	Shaft Bush	Ø15	1	C124	Hex Soc. Cap Screw	M6x16L	2
C68	Bush Seat	Ø28	1	C125	Hold Bracket		2
C69	Hex Soc. Cap Screw	M10x35L	4	C126	Linear Scale	CT-42	1
C70	Set Screw	M6x6L	1	C127	Hex Soc. Cap Screw	M5x16L	2
C71	Cylinder Bracket		1	C128	Ball Bearing	605	2
C72	Nut	M20	2	C129	Flat Head Screw	M5x10L	2
C73	Feeding Hydraulic Cylinder		1	C130	Bearing Spacer		2

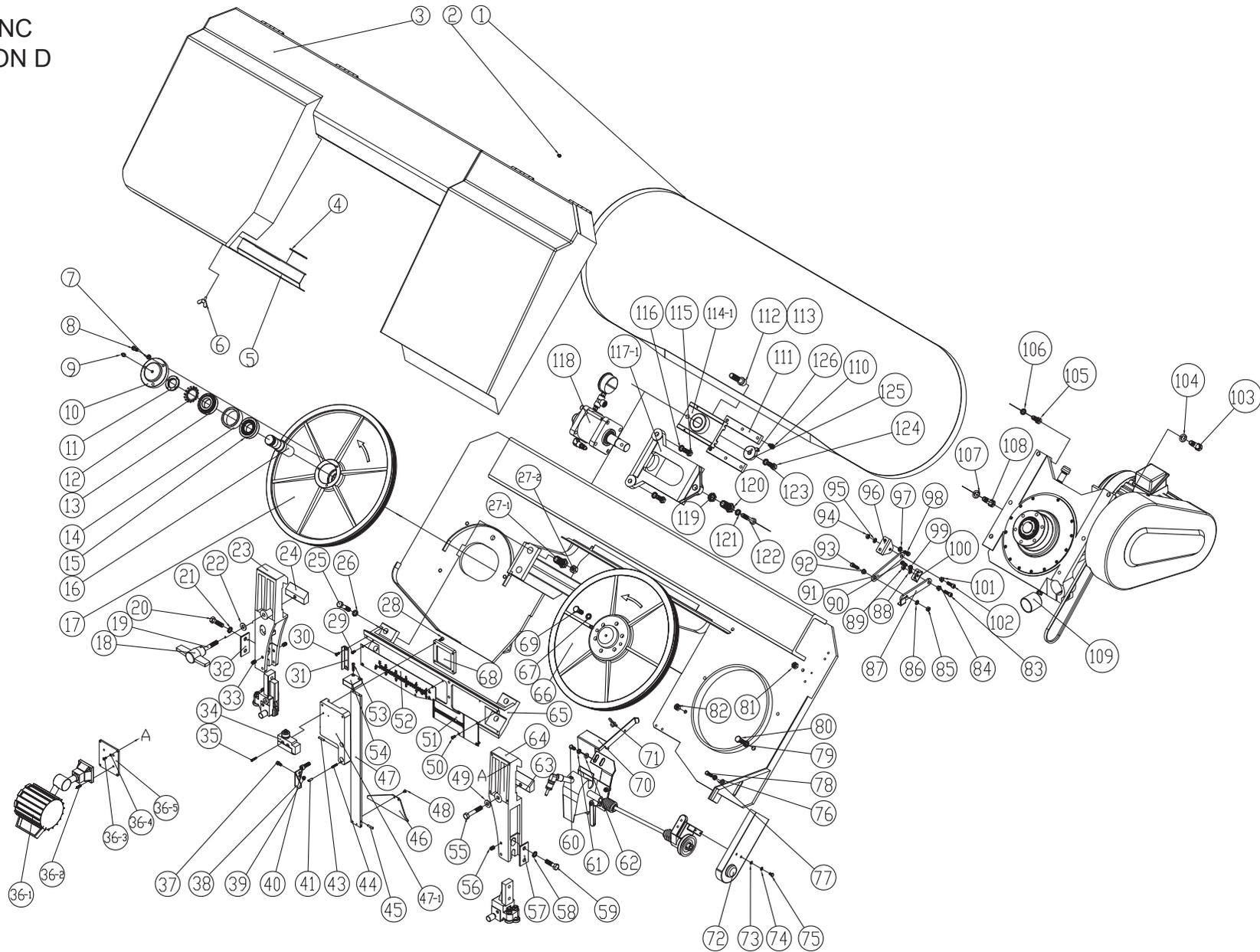
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SECTION C



## SECTION D - PARTS LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
D1	Blade		1	D62	Flat Washer	M8	2
D2	Big Round Head Screw	M6x12L	16	D63	Setting Bar		1
D3	Blade Cover		1	D64	Blade Guard (Rear)		1
D4	Setting Plate		1	D65	Steel Plate		1
D5	Blade Guard (Front)		1	D66	Drive Wheel		1
D6	Swing Screw	M6x16L	1	D67	Spring Washer	M12	6
D7	Spring Washer	M8	3	D68	Cover		1
D8	Hex Soc. Cap Screw	M8x20L	3	D69	Steel Hex Cap Bolt	M12x35L	6
D9	Oil Nipple	PT1/8	1	D70	Brush Cover		1
D10	Idle Shaft Cover		1	D71	Swing Screw	M6x16L	1
D11	Nut	AW07	1	D72	Belt Cover		1
D12	External Teeth Lock Washer	AW07	1	D73	Flat Washer	M6	2
D13	Rolling Bearing	30207	1	D74	Spring Washer	M6	2
D14	Spacer		1	D75	Hex Cap Bolt	M6x12L	2
D15	Rolling Bearing	30207	1	D76	Flat Washer	M8	2
D16	Idle Wheel Shaft		1	D77	Spring Washer	M8	2
D17	Idle Wheel		1	D78	Hex Soc. Cap Screw	M8x30L	2
D18	Handle (Left)		1	D79	Spring Washer	M12	1
D19	Shaft (Left)		1	D80	Steel Hex Cap Bolt	M12x35L	1
D20	Steel Hex Cap Bolt	M12x35L	2	D81	Nut	M12	1
D21	Spring Washer	M12	2	D82	Nut	M12	1
D22	Flat Washer	M12	1	D83	Hex Soc. Cap Screw	M8x30L	1
D23	Adjustable Post (Left)		1	D84	Flat Washer		1
D24	Setting Bar		1	D85	Nut	M8	1
D25	Steel Hex Cap Bolt	M12x60L	4	D86	Spring Washer	M8	1
D26	Spring Washer	M12	4	D87	Short Arm		1
D27-1	Adjusting Screw		4	D88	Spring Washer	M8	1
D27-2	Nut	M12	4	D89	Nut	M8	1
D28	Hex Soc. Cap Screw	M6x12L	4	D90	Hex Soc. Cap Screw	M8x30L	1
D29	Round Head Screw	M5x8L	4	D91	Long Arm		1
D30	Flat Head Screw	M5x8L	2	D92	Flat Washer		1
D31	Setting Plate		1	D93	Hex Soc. Cap Screw	M8x30L	1
D32	Plate		1	D94	Nut	M8	1
D33	Set Screw	M10x16L	4	D95	Spring Washer	M8	1
D34	Limit Switch		1	D96	Upper Arm Base		1
D35	Hex Soc. Cap Screw	M4x25L	2	D97	Flat Washer	M8	1
D36-1	Light Set		1	D98	Hex Soc. Cap Screw	M8x30L	1
D36-2	Round Head Screw	M6x10L	4	D99	Spring Washer	M8	1
D36-3	Hex Soc. Cap Screw	M5x12L	4	D100	Arm Base		1
D36-4	Spring Washer	M5	4	D101	Flat Washer	M8	1
D36-5	Fasten Plate		1	D102	Hex Soc. Cap Screw	M8x20L	1
D37	Hex Soc. Cap Screw	M6x16L	1	D103	Locking Screw	M12	1
D38	Locking Plate		1	D104	Spring Washer	M16	1
D39	Bushing		1	D105	Steel Hex Cap Bolt	M12x35L	3
D40	Hex Soc. Cap Screw	M10x35L	2	D106	Spring Washer	M12	3
D41	Shaft		1	D107	Spring Washer	M16	1
D43	Spring Pin	5x20L	1	D108	Locking Screw	M12	1
D44	Spring		1	D109	Oilless Bushing	5050	2
D45	Spring Pin	5x20L	1	D110	Hex Soc. Cap Screw	M8x25L	6
D46	Sensor Probe Foot (Feeler)		1	D111	Plate		2
D47	Sensor Probe Plate		1	D112	Hex Soc. Cap Screw	M16x70L	1
D47-1	Probe Plate Seat		1	D113	Spring Washer	M16	1
D48	Flat Head Machine Screw	M5x8L	2	D114-1	Slide		1
D49	Flat Washer	M12	1	D115	Steel Hex Cap Bolt	M12x40L	2
D50	Round Head Screws	M5x8L	4	D116	Spring Washer	M12	2
D51	Right Scale		1	D117-1	Slide Seat		1
D52	Left Scale		1	D118	Hydraulic Cylinder		1
D53	Hex Soc. Cap Screw	M5x20L	2	D119	Nut	M22x1.5	3
D54	Contact Plate		1	D120	Adjusting Screw		1
D55	Steel Hex Cap Bolt	M12x35L	1	D121	Spring Washer	M12	1
D56	Set Screw	M10x16L	4	D122	Steel Hex Cap Bolt	M12x75L	1
D57	Plate		1	D123	Spring Washer	M12	1
D58	Spring Washer	M12	2	D124	Steel Hex Cap Bolt	M12x35L	1
D59	Steel Hex Cap Bolt	M12x35L	2	D125	Setting Ring		1
D60	Hex Cap Bolt	M8x25L	2	D126	Oil Nipple	PT1/8"	1
D61	Spring Washer	M8	2				

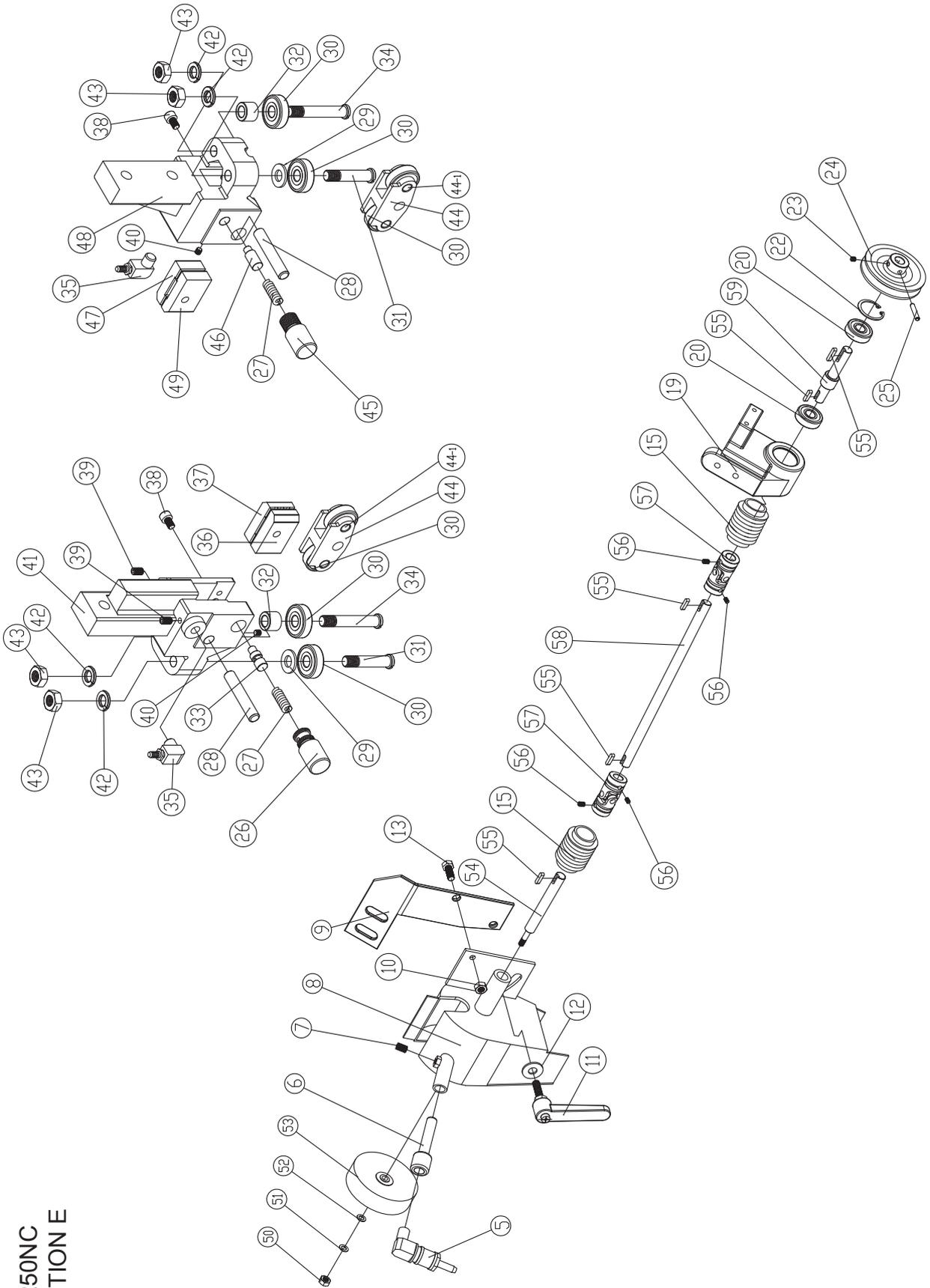
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SECTION D



## SECTION E - PARTS LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
E5	Hose Coupling	1/4"x3/8"	1	E48	Guide Seat (Right)		1
E6	Cleaning Pipe		1	E49	Front Carbide Guide		1
E7	Set Screw	M8x8L	1	E50	Nut	M10	1
E8	Brush Cover		1	E51	Spring Washer	M10	1
E9	Bracket		1	E52	Flat Washer	M10	1
E10	Nut	M8	1	E53	Brush		1
E11	Handle	M8x30L	1	E54	Shaft		1
E12	Flat Washer	M8	1	E55	Key	4x15L	5
E13	Hex Cap Bolt	M8x20L	1	E56	Set Screw	M6x8L	4
E15	Rubber Cover	KT12	2	E57	Universal Joint	KT12	2
E19	Bearing Seat		1	E58	Shaft (Long)		1
E20	Ball Bearing	6201	2	E59	Shaft		1
E22	C Ring	R32	1				
E23	Set Screw	M6x8L	1				
E24	Pulley		1				
E25	Spring Pin	5x20	1				
E26	Adjusting Screw (Left)		1				
E27	Spring		2				
E28	Steel Pin	10x30L	2				
E29	Flat Washer	M10	2				
E30	Ball Bearing	6200	8				
E31	Bolt (Short)		2				
E32	Spacer		2				
E33	Guide Shaft (Left)		1				
E34	Bolt (Long)		2				
E35	Hose Coupling	1/4"x3/8"	2				
E36	Front Carbide Guide		1				
E37	Back Carbide Guide		1				
E38	Hex Soc. Cap Screw	M6x12L	2				
E39	Set Screw	M6x8L	2				
E40	Set Screw	M5x8L	2				
E41	Guide Seat (Left)		1				
E42	Spring Washer	M10	4				
E43	Nut	M10	4				
E44	Ball Bearing Seat		2				
E44-1	Steel Pin	10x20L	4				
E45	Adjusting Screw (Right)		1				
E46	Guide Shaft (Right)		1				
E47	Back Carbide Guide		1				

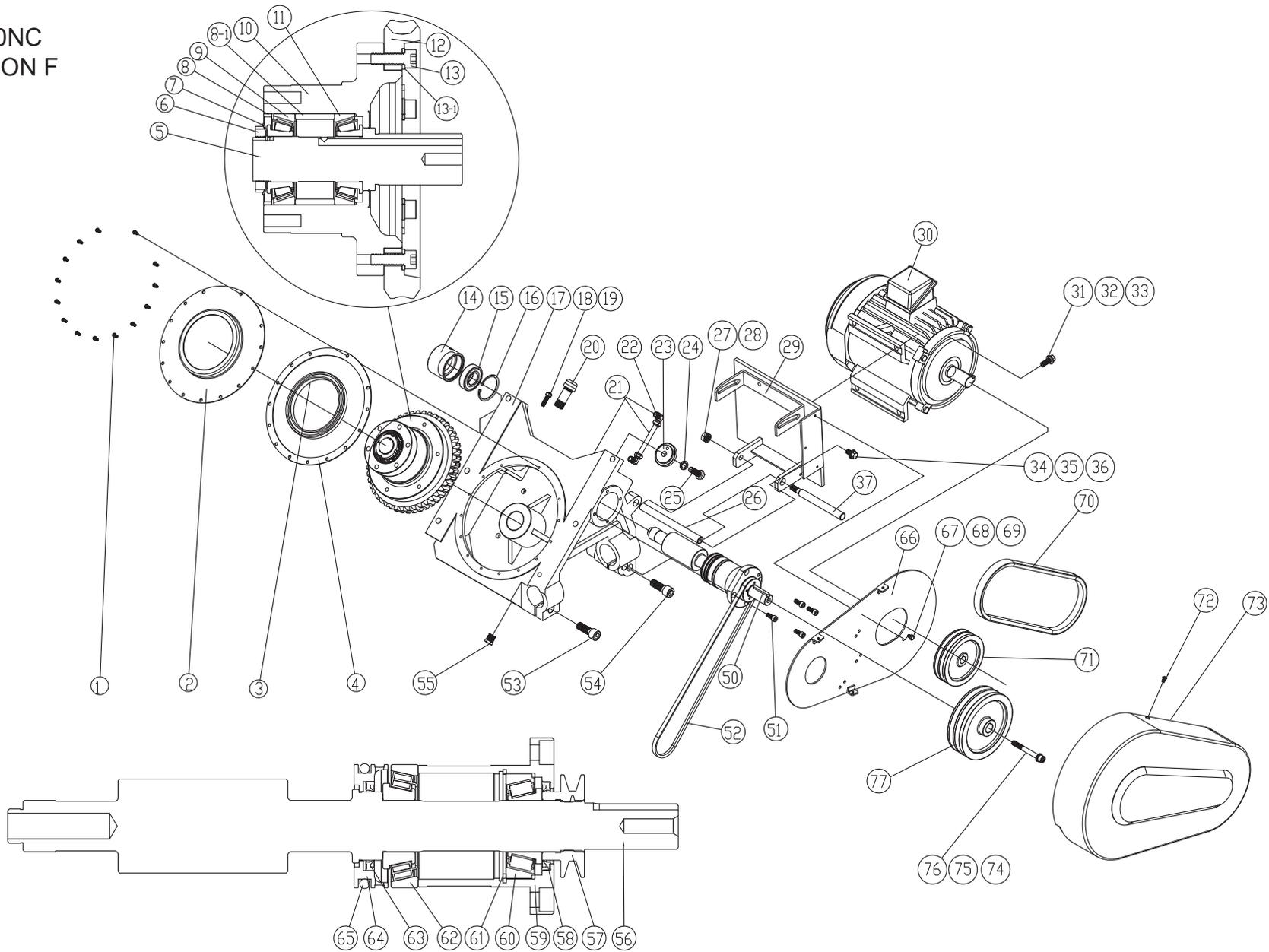
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SECTION E



## SECTION F - PARTS LIST

Part No.	Description	Size No.	Q'ty	Part No.	Description	Size No.	Q'ty
F1	Round Head Screw	M5x8L	14	F50	Key	7x7x50L	1
F2	Cover		1	F51	Hex Soc. Cap Screw	M8x25L	4
F3	Oil Seal	130.160.14	1	F52	Belt	M-37	1
F4	Rubber Ring		1	F53	Hex Soc. Cap Screw	M16x45L	1
F5	Gear Shaft		1	F54	Hex Soc. Cap Screw	M16x45L	1
F6	Shaft Nut	AN08	1	F55	Plug	PT1/4"	1
F7	Gear Washer	AW08	1	F56	Worm Shaft		1
F8	Spacer		1	F57	Brush Drive Pulley		1
F8-1	Bearing Spacer		1	F58	Oil Seal	40.52.6	1
F9	Roller Bearing	E32208J	1	F59	Shaft Seat		1
F10	Bearing Seat		1	F60	Roller Bearing	32206J	1
F11	Roller Bearing	E32208J	1	F61	C Ring	R62	1
F12	Worm Gear		1	F62	Roller Bearing	E30306J	1
F13	Hex Soc. Cap Screw	M10x35L	6	F63	Oil Seal	40.52.6	1
F13-1	Spring Washer	M10	6	F64	Dust Seal		1
F14	Bushing		1	F65	Oil Ring	P62	1
F15	Ball Bearing	6206ZZ	1	F66	Setting Plate		1
F16	C Ring	R60	1	F67	Big Round Head Screw	M6x12L	3
F17	Gear Box		1	F68	Spring Washer	M6	3
F18	Set Screw	M8x45L	1	F69	Flat Washer	M6	3
F19	Nut	M8	1	F70	Belt	VX-3435-2	1
F20	Oil Pipe	PT1/2"	1	F71	Motor Pulley		1
F21	PP Hose		1	F72	Big Round Head Screw	M6x12L	3
F22	90° Hose Fitting	1/4"PT	2	F73	Belt Cover		1
F23	Locking Bush		1	F74	Flat Washer	M10	1
F24	Spring Washer	M12	1	F75	Spring Washer	M10	1
F25	Hex Cap Bolt	M12x35L	1	F76	Hex Soc. Cap Screw	M10x70L	1
F26	Shaft		1	F77	Worm Shaft Pulley		1
F27	Nut	M12	1				
F28	Spring Washer	M12	1				
F29	Motor Supporter		1				
F30	Motor	3HP	1				
F31	Hex Cap Bolt	M10X30L	4				
F32	Spring Washer	M10	4				
F33	Flat Washer	M10	4				
F34	Hex Cap Bolt	M10x25L	2				
F35	Spring Washer	M10	2				
F36	Flat Washer	M10	2				
F37	Shaft		1				

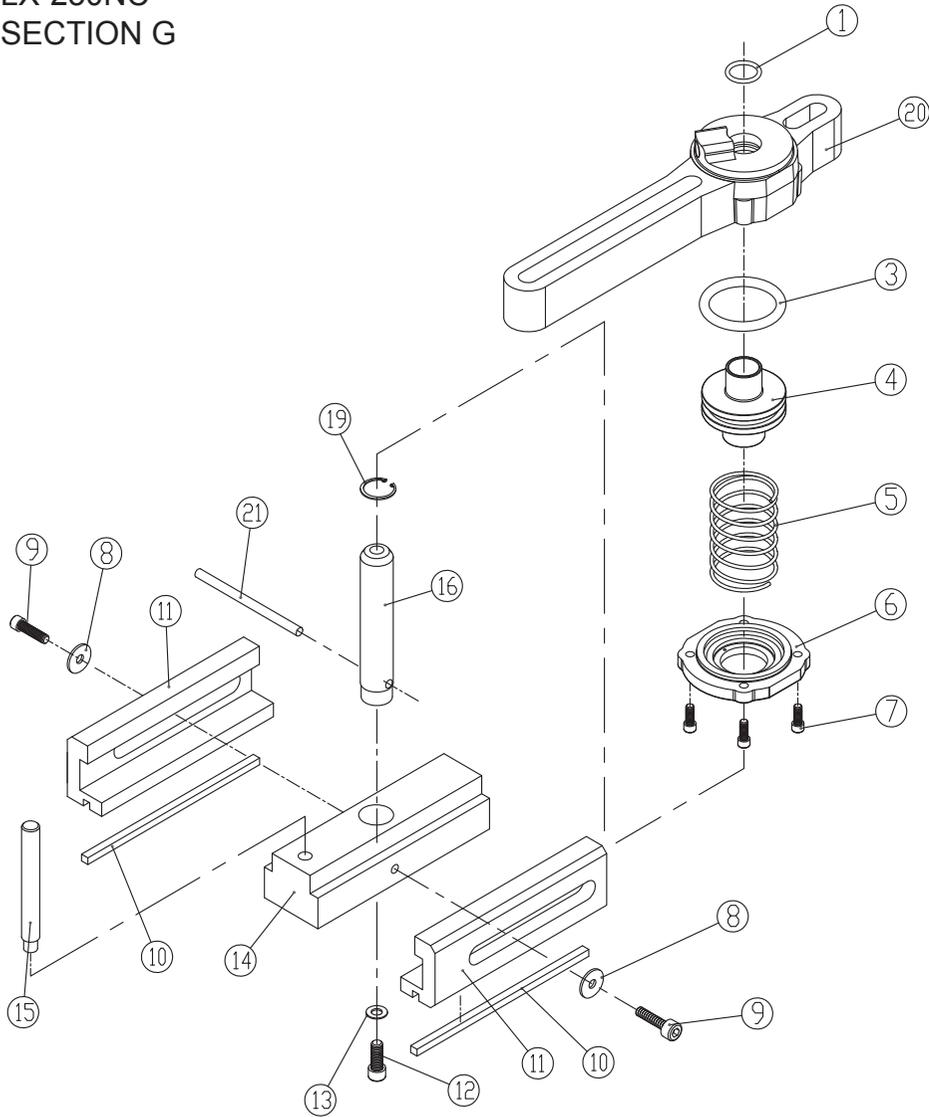
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SECTION F



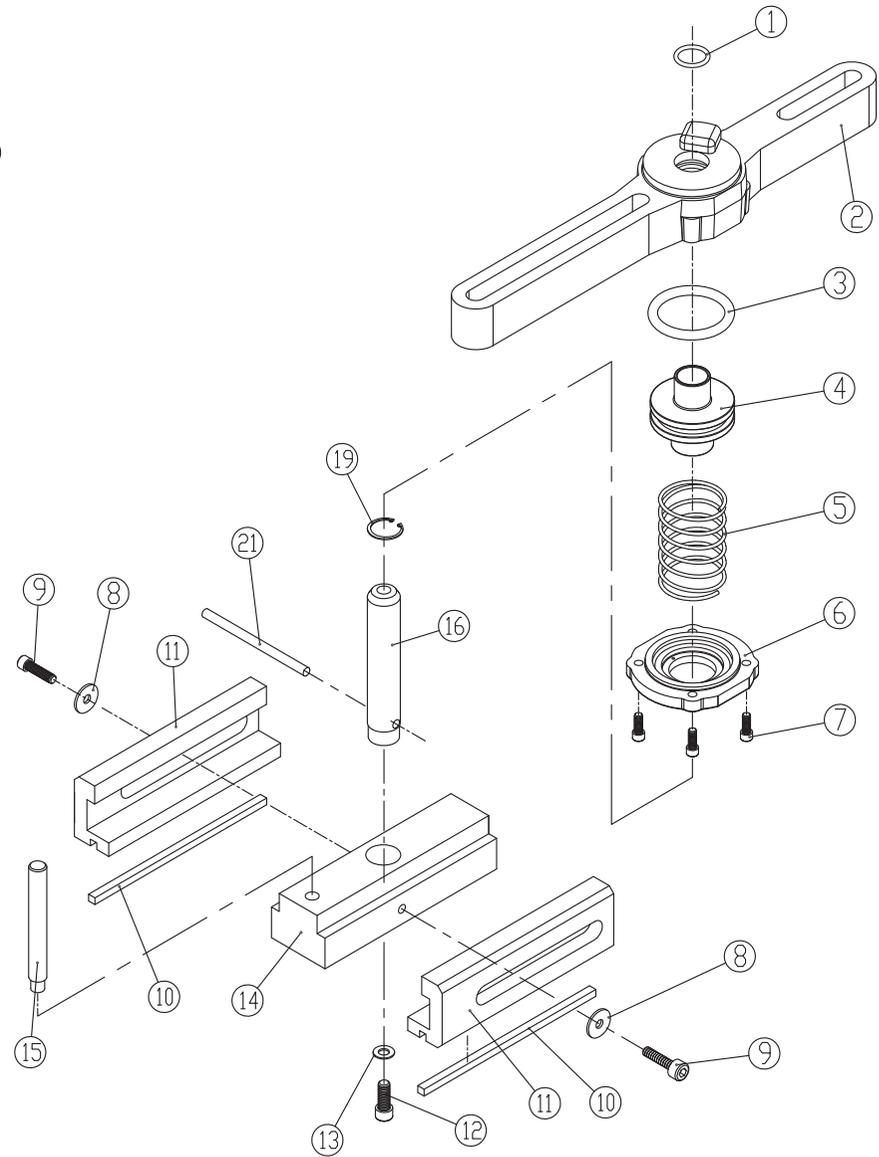


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SECTION G

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Shuttle Vise Nestling Fixture



Stationary Vise Nestling Fixture