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MC-370F

Operation Manual

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1 Introduction

Features and Functions :

MC-370 series are manual circular sawing machines by air clamping vise for ferrous solid bars and tubes cutting. The capacity for round tubes is ϕ 115mm. The capacity for square tubes is 100x100.

- **Burr Free & Less Dust**

Self-centering vise with two sides clamping to solidly hold the work piece and ensure a smooth and burr free cutting surface. Low operation noise and low pollution working environment

- **Fast, Precision & Clean**

Compared to band sawing, circular sawing is much more economical, faster in cutting, more precise, and cleaner

- **Miter Cutting**

The saw head can be swiveled either direction at various degrees for miter cutting, providing excellent precision in angle accuracy

- **Cooling System**

Equipped with electrical cooling pump and a large coolant tank to ensure excellent working temperature on the Saw Blade and the Work Piece, as well as a smooth cutting surface and longer blade life

2 Safety Precautions

2-1 Introduction

1. Machine operators must read the manual thoroughly, and fully understand the functions of the machine and its safety requirements before usage.
2. No one other than qualified operators should operate the machine.
3. This machine design has complied with safety requirements of your company. In case of any concern, check on the detail of each requirement as needed.
4. The operator should check to ensure that the machine is connected to proper power source before usage.
5. Depress emergency stop button and shut off power source if any unusual situation occurs during usage.
6. Un-plug power source while installing, dismantling, maintaining, or adjusting the machine
7. During the process of adjusting or testing the machine, if the electric power needs to be on, the operator should pay extra attention to the action of automatic mode to ensure people safety.
8. Keep the machine and its surrounding clean and bright to ensure operation safety.
9. Maintain the machine periodically to ensure normal functions of each part of the machine.
10. Do not operate the machine beyond its specifications.
11. Do not remove or alter any safety protection part of the machine, such as saw blade protection cover, operator safety cover, emergency power switch etc.
12. The operator must wear eye protective goggle while operating the machine.

2-2 Personal Protective Equipment

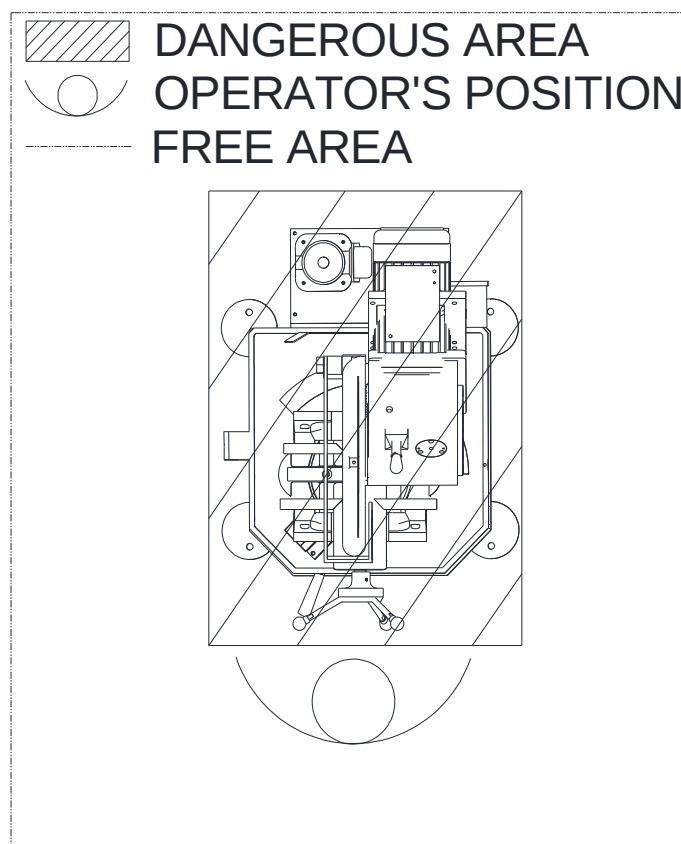
1. Operators and maintenance personnel carrying out various operations on the machine must used personal protection equipment, e.g. goggles, boots and gloves to eliminate the possible risks related to the various activities being carried out.
2. The clothing of machine operators and maintenance personnel must comply with the essential safety requirements specified in community Directives 89/656/EEC, 89/686/EEC and laws in force in the country where the machine is installed.
3. Do not wear accessories or jewelers, including bracelets, watches, rings or necklaces, when carrying out maintenance operations in which operation in unprotected area is required to avoid mechanical risks, such as dragging, entrapment or other.

4. Wear safety boots and protective gloves during all working phases and when changing the tools, filling the tubes, handling cut parts, setting the machine and carrying out maintenance operations.

2-3 Danger Zones

The operator's workplace and the necessary free space around the system to ensure regular activities related to the machine.

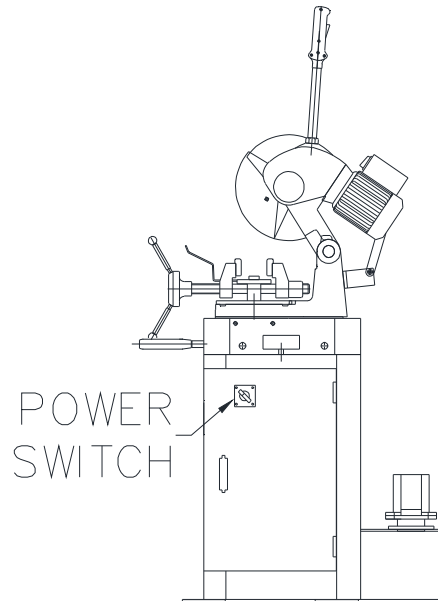
A free space of at least one meter around the entire perimeter of the machine is required to ensure safe operation.



2-4 Safety Devices(CE type)

- Power switch

To disconnect main electric power when it is placed at ON position. For maintenance, you should turn it to OFF position then could open this electric box door.



2-5 Operating 、 Running

Please reading the manual in advance and operating this machine according to the manual instruction.

★ **We will not be responsible for any operating accident due to the customer unauthorized remodeling or adding any additional device.**

1. Operation, always arrange single operator to operate this machine. It is very dangerous to have multiple operators operating this machine in the same time. Please absolutely avoid doing it.
2. Never let hands or body near and inside the machine running partitions. It is very dangerous and please absolutely avoids doing it.
3. Always turn off electrical motor and confirm the machine stop before replacing die. It is very dangerous to do this without turning them off. Please absolutely avoid doing it.
4. Always confirm that there is no tools, fixtures, or any other unnecessary things inside the action area before operating this machine, otherwise machine failure or human injury may happen. Attention required, please.

2-6 Maintenance 、 Inspection

1. Never disassemble and remodel any component of this machine, otherwise it may result in fire, machine failure and malfunctions.
2. Never do directly welding on this machine; otherwise it may result in machine failure

and malfunctions.

3. Always cutoff the power supply and wait for 5 minutes before loading/unloading and replacing any components, otherwise it may result in electrical shock or machine failure.
4. Always cutoff the power supply before performing daily inspection, otherwise it may result in electrical shock in the power on condition.
5. In order to avoid non duty person turning on the machine power during the machine maintenance and inspection periods, please paste a warning sign of “No Power On” or “Power On Forbidden” beside the machine primary power at the machine power control panel, otherwise it may result in electrical shock or human injury.
6. Never load or unload any wire, baseboard, and connectors while machine is power on, otherwise it may result in electrical shock, machine failure and malfunctions.
7. Please confirm that every bolts installation, applying tools collection and cover doors of control panel and machine are all well arranged after maintenance and inspection work finished, otherwise it may result in electrical shock, fire, human injury or machine malfunctions.

2-7 Warning Plates and Warnings

The form and contents of warnings are described in the following.

No	DRAWING	POSITION	EXPLANATION
1			● Always wear earplug when operating machine. °
2			● Always wear goggle when operating machine. °

3	 CAUTION CIRCULAR SAW BLADE DO NOT USE WITHOUT THIS SAFETY GUARD, WHEN CHANGING SAW BLADE MAKE SURE MAIN POWER IS TURN OFF. ALWAYS WEAR SAFETY GLASSES WHEN OPERATING THIS MACHINE.		● This symbol indicates operators should be aware of saw blade edge to prevent cutting injuries happening. When changing saw blade, make sure main power is turned off.
4	 Dangerous High Voltage !! Do not open this cover Before turn the switch to "OFF" position Only opened by qualified electrician CAUTION!!		● This symbol indicates there are high voltage electric facilities with potentially danger and may cause risk to the life and health of individuals. Do not remove this cover without disconnecting main power supply. Not observing these notes may result in injuries. ● Only opened by qualified electrician. Avoid electric shock.



3 Machine Specifications

Please consult appendices 8-2.

4 Installation

Please read the instruction carefully before installation.

If having any question please contact your dealer for prompt service.

4-1 Unpacking and Inspection

1. Check if there is any damage on the wooden case or the plastic bag that used to pack the machine. Should any damage be found on the machine, please claim for the damage against the delivery or insurance company.
2. Check the machine and accessories against the packing list. Should any shortage, please contact your dealer.

4-2 Handling, Lifting, Transporting and Unloading Procedure

4-2-1 Preliminary operations

Follow the preliminary lifting activities listed below before handling the machine:

1. Suitably lock all parts.
2. Remove all tools from the unit, where relevant.
3. Arrange the units so that they are balanced.

4-2-2 Lifting the machine

The main component lifting points are show in figures 4-1.

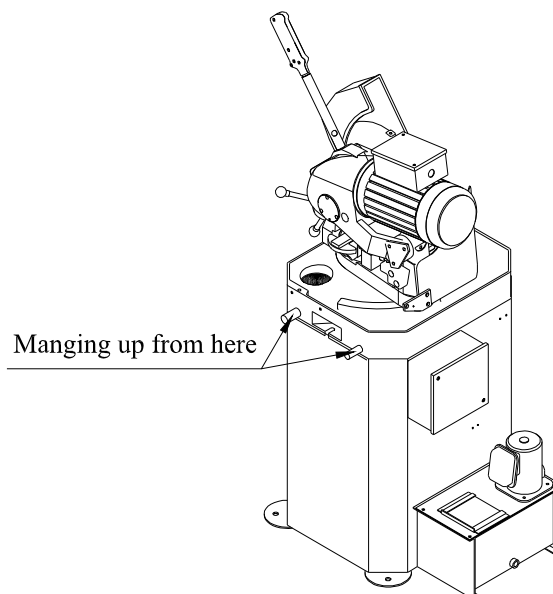


Figure 4-1 Lifting the machine



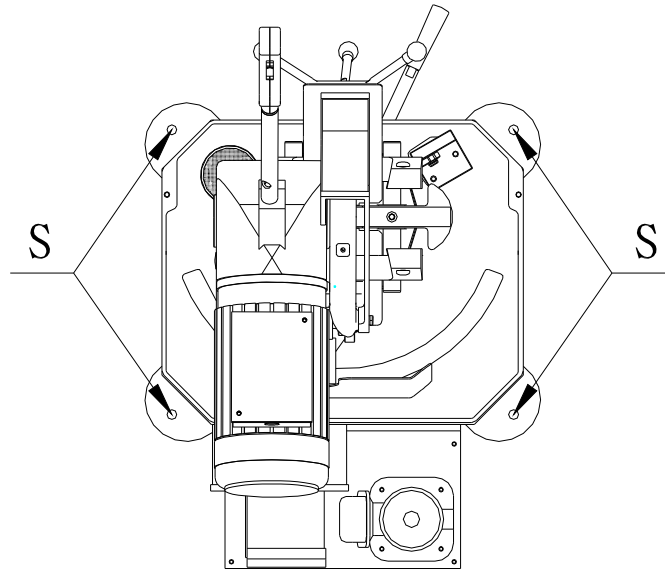
1. Drive a forklift to move the machine. The operator must be qualified to drive a forklift to move the machine.
2. Lift the machine a few centimeters and check the machine is balanced or not.
3. The weight of the machine is shown in the machine specification table. Make sure the capacity of the forklift is enough to lift the machine.
4. When moving the machine, there should be at least two workers. One person drives the forklift and another should be responsible for the safety of surrounding people and making sure that the machine does not collide with other objects.
5. When the machine is lifted higher than 50mm, there should be keeping a safety distance more than 2 meters around the machine.
6. Be careful when moving the machine.
7. Be sure to install the machine in a horizontal base.
8. The mounted feet of the machine base and material rack need to be fixed by bolts and nuts on the shock-proof mat.

4-3 Installation

The machine installation area must be sufficiently wide to house the machine and provide space to move around it for carrying out the various intervention related to machine operation.

Follow the procedure to install the machine:

1. Use foundation bolts to install the machine, as the following picture shows.(Figure 4-2)
2. Please connect the power by a qualified electrical technician, according to the machine specifications and electric wiring diagrams.
3. Please provide appropriate power source and connect the power line.



S are the holes for foundation bolts.

Figure 4-2 Leveling points

4-4 Connecting Electric Power

1. Only qualified electrician can connect electric power.
2. The voltage, amperage and protection capacity of the power source shall meet the requirement of the machine.
3. Check the rotation of the saw blade shaft (arbor). Change over two conductors in junction box if the direction of rotation does not consist with the direction of the label on the saw blade safety cover.

Note:

1. Assure the main power switch is at “OFF” position and the saw blade motor speed select switch is at “OFF” position before connecting the machine to electric power source
2. Do not install saw blade on the main shaft when checking the rotational direction of the main shaft.

4-5 Add Cutting Oil

1. Add specified vegetable cutting oil to the oil can of the oil-mist jet located at the back of the machine.
2. Add oil up to the fill-up line, around 5 liters.

4-6 Procedure to Install the Stopper

1. Mount the stopper arm at the "0" point on the stopper support beam as illustrated on following figure1.
2. Put the stopper support beam into the hole in the base plate.
3. Fix the stopper support beam when the stopper is just touching the sawblade as illustrated on following figure2.

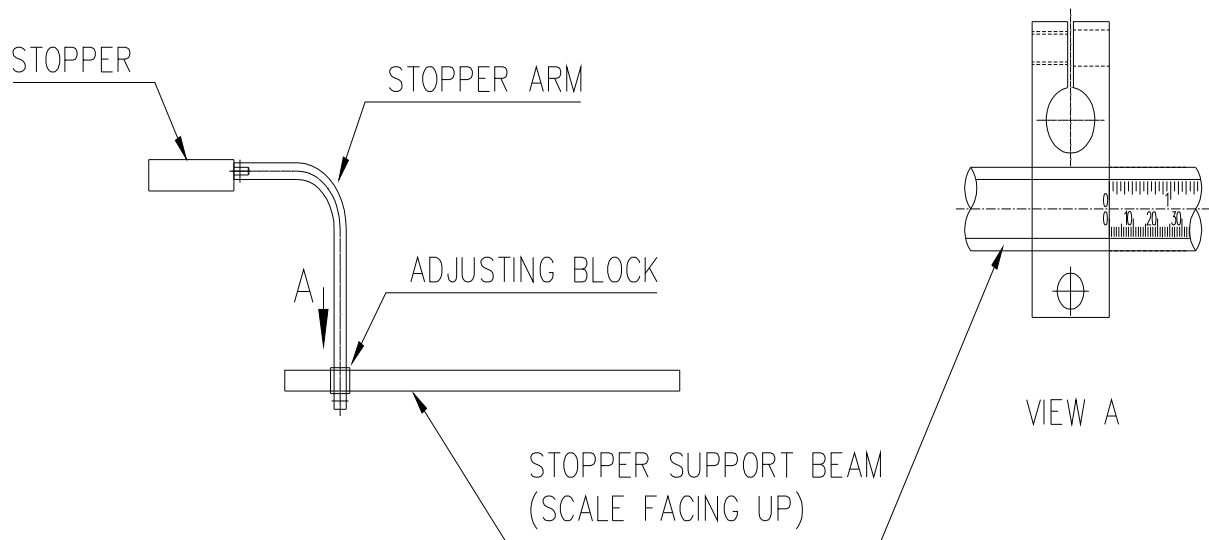


FIGURE 1

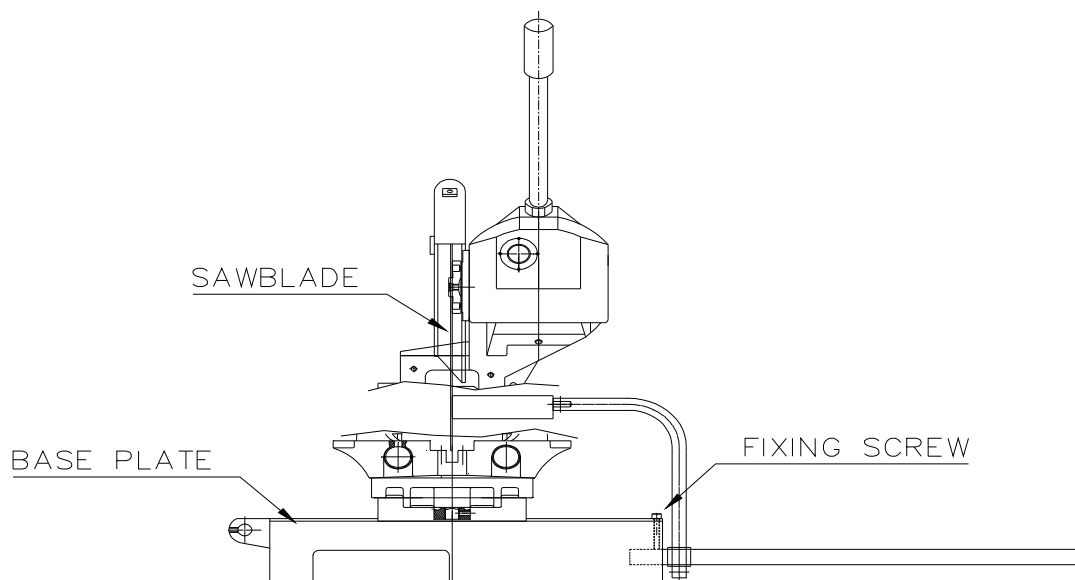


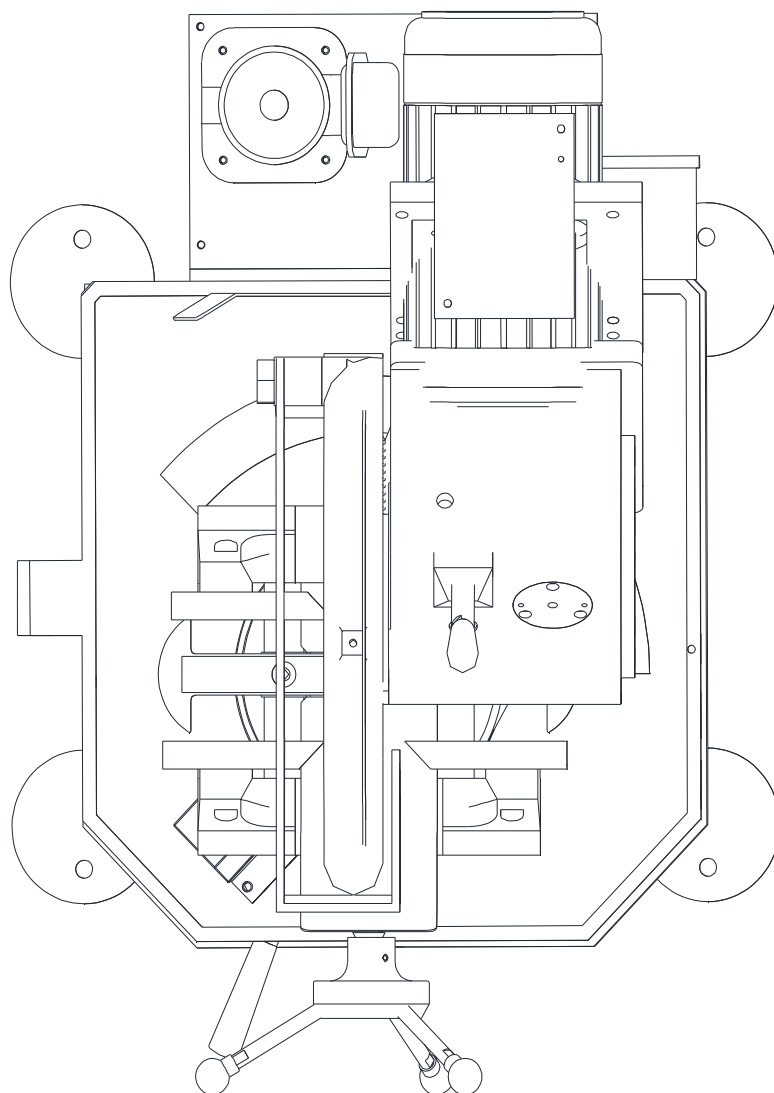
FIGURE 2

5 Machine Outline

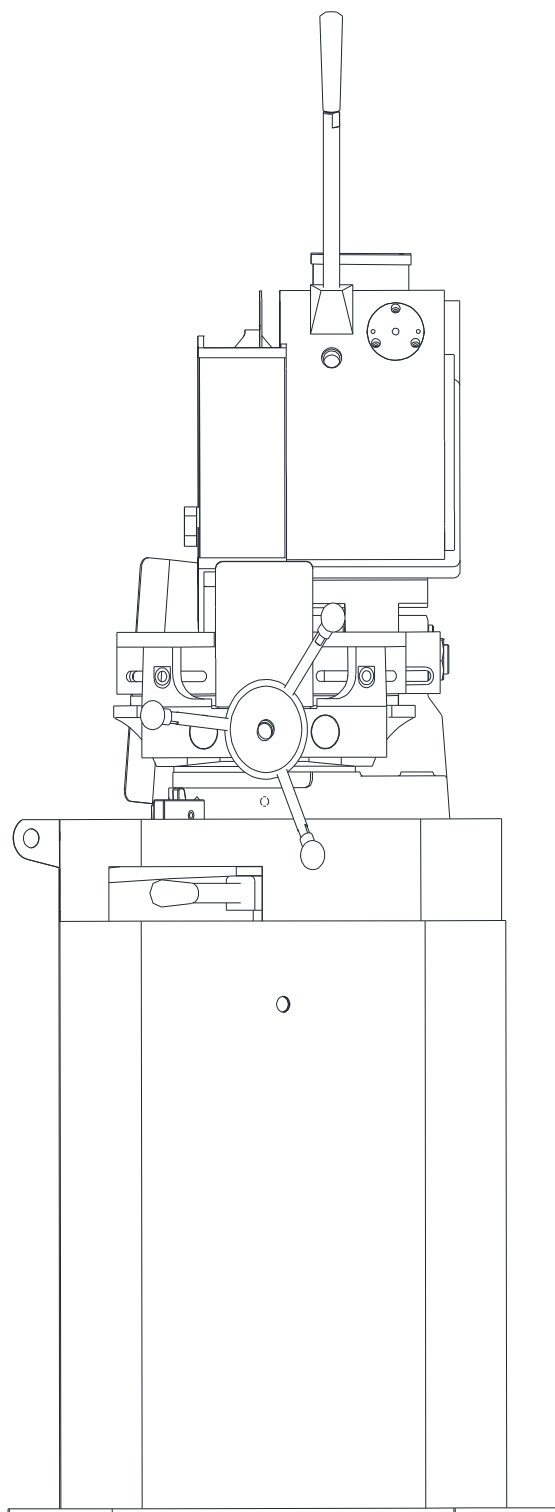


5-1 Machine Outline

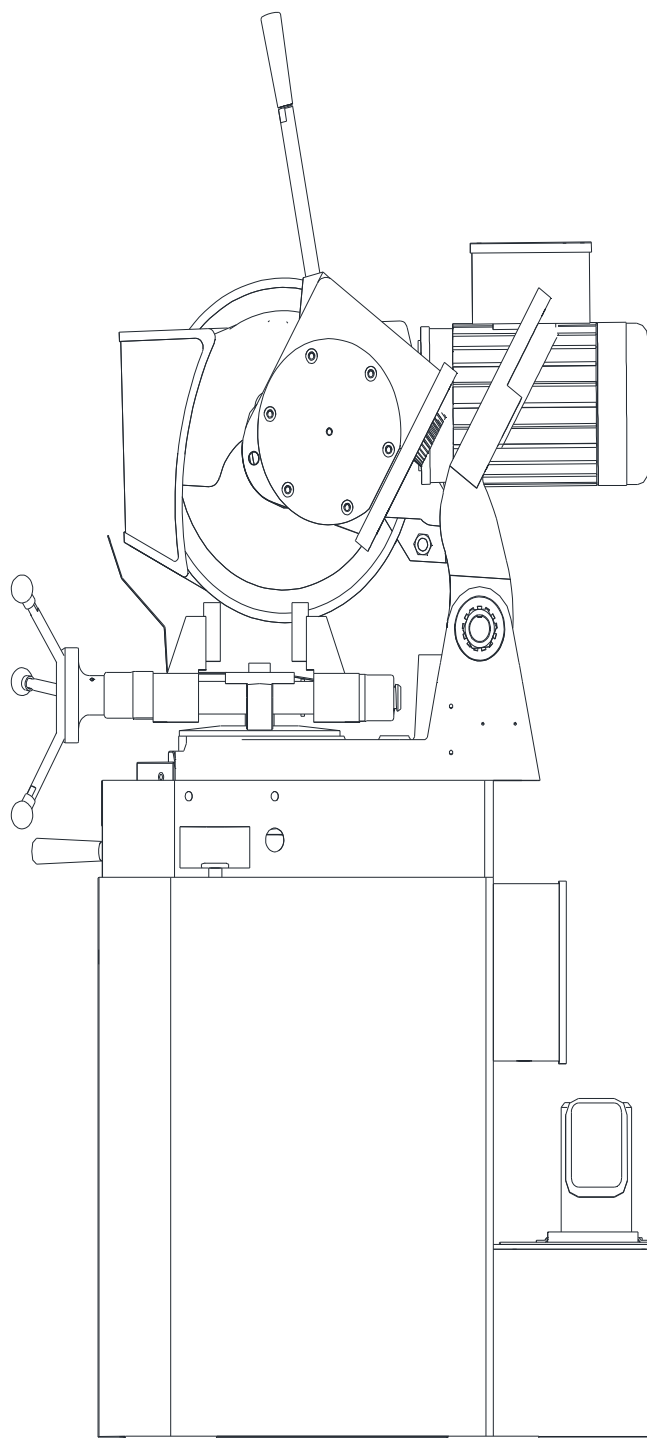
1. Section view



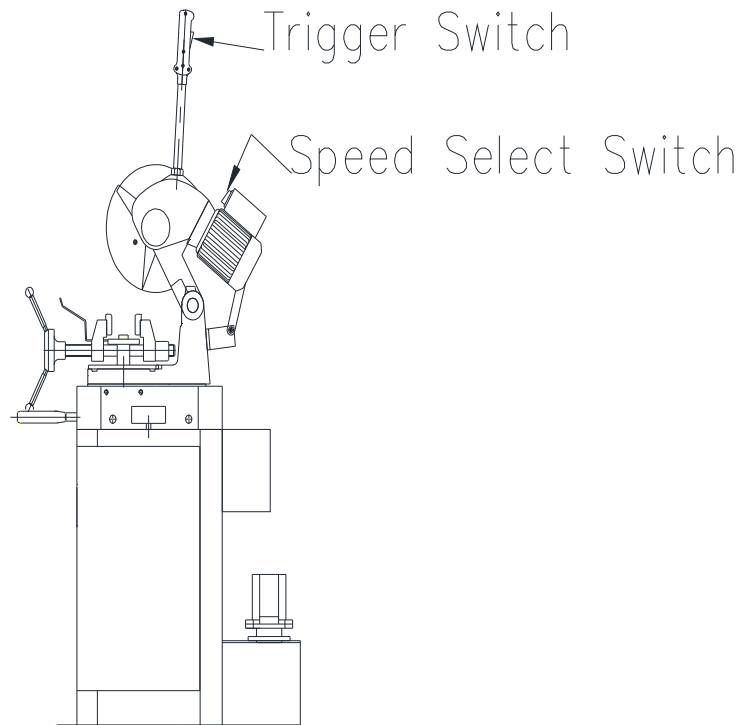
2. Front view



3. Right side view



5-2 Function of Control Switches



1. Trigger switch

This is an "ON-OFF" two-position trigger switch on the handle to connect or disconnect power to the machine. The main (saw blade) motor and coolant motor run when this switch is pressed. The above motors stop when this switch is released.

2. Saw blade Motor speed select switch

This is a "LOW-OFF-HI" three-position level switch on the top of motor for selecting a suitable speed for the saw blade to cut material.

6 Operation Mode

6-1 Adjustment of the Clamping Vise

1. Release the handle.
(Cutting head shall be at up position)
(Saw blade motor shall stop.)
2. Turn the vise hand wheel counter-clockwise to open the vise.
3. Put a work piece into the clamping area of vises.
4. Turn the vise hand wheel clockwise to close the vise and fasten a work piece.
5. Turn the vise hand wheel 1/2 (half) turn counter-clockwise to open the vise slightly.
This is the ready position to take in or remove a work piece.

6-2 Installation of the Saw Blade

1. Release the handle.
2. Turn off the saw blade motor speed select switch.
3. Open saw blade safety cover.
4. Remove the clamping flange from the saw arbor.
5. Clean the clamping surfaces of flange and arbor free from any dirt or chips.
6. Clean the clamping area of the saw blade.
7. Mount saw blade on the arbor. Align the pinholes of saw blade and arbor. Put the clamping flange on the saw blade, and tighten the center bolt.

Note: The rotation of saw blade shall be counter-clockwise while looking at the mounting surface. There is a directional mark labeled on the protection cover.

8. When lock the center bolt, keep the front part of saw blade downward to eliminate the gap between pin and pinhole.
9. Close the saw blade safety cover.

6-3 Number of Saw Blade Tooth Selection

Note: The following Charts of " Number of Saw Blade Tooth Selection " are for reference.

Wall Thickness of Tube (mm)	Diameter of Saw Blade (mm)				Remark
	Φ250	Φ275	Φ300	Φ350	
0.6~0.8	T=280	280	300	320	For Tube Diameter $D \geq 10$ mm
0.8~1.0	240	280	280	320	
1.0~1.2	220	240	240	280	
1.2~1.6	200	220	240	240	
1.6~2.0	180	200	220	220	
2.0~2.5	150	180	180	200	$D \geq 15$ mm
2.5~3.5	120	150	150	180	$D \geq 20$ mm
3.5~4.5	90	120	120	150	$D \geq 25$ mm
4.5~5.5	80	80	90	120	$D \geq 30$ mm
5.5~7.0	64	64	80	90	$D \geq 40$ mm

For Wall Thickness ≥ 2 mm, the Formula for Number of Tooth **T** is as following

$$T = 2 \times (\text{Diameter of Saw Blade} \times 3.14) \div (\text{Wall Thickness of Tube})$$

For Size of Bar ≥ 38 mm, the Formula for Number of Tooth **T** is as following

Number of Saw Blade Tooth (T) for Mild Steel Solid Bar Cutting					
Size of Bar (mm)	Diameter of Saw Blade (mm)				
	Φ250	Φ275	Φ300	Φ350	
6~10	T=180	200	200	220	
10~14	160	160	180	200	
14~18	150	160	160	180	
18~22	120	150	150	160	
22~28	90	90	120	160	
28~35	80	80	90	120	
35~45	70	70	80	90	
45~50	64	64	70	80	

$$T = 4 \times (\text{Diameter of Saw Blade} \times 3.14) \div (\text{Size of Bar})$$

1. For stainless steel, the number of tooth is one grade more than mild steel.
2. For aluminum and copper, the number of tooth is one grade less than mild steel.
3. For 45° miter cutting, the number of tooth is one grade less than 90° cutting.

6-4 Adjustment of the saw blade Low stop position

1. Pull down the handle to the position that the saw blade just breaks through the work piece.
2. Adjust the bolt and lock nut that is under the saw head to just stop the saw head going down.



Lowermost limit adjustment nut

6-5 Adjustment of the miter cutting

1. Push the turning table fixing handle leftward.
2. Turn the turning table to the required angle.
3. Push the fixing handle rightward.

6-6 Specification and Outline Drawing

1. Technical data

MC-370F TECHNICAL DATA		
	A-TYPE	B-TYPE
MAIN MOTOR	3/2 HP, 2/4 POLE	2/1.4 HP, 4/8 POLE
ARBOR RPM (60 HZ)	44/22	22/11
SAW BLADE TYPE	HIGH SPEED STEEL BLADE	
SAW BLADE SIZE	OD: 300/350/370 mm	
COOLING PUMP	1/8 HP	
AIR PRESSURE	--	
WEIGHT	260 KG	

2. Cutting capacity

MC-370F CUTTING CAPACITY(USE $\phi 370$ BLADE) mm		
FOR MILD STEEL	CUTTING ANGLE	
	90°	45°
ROUND TUBE	$\phi 115$	$\phi 115$
SQUARE TUBE	100×100	85×85
ANGLE	100×100	85×85
RECTANGLE	100×100	85×85
SOLID ROUND TUBE	$\phi 75$	$\phi 50$
SOLID SQUARE TUBE	75x75	50x50

6-7 Steps of Operation

1. Put a work piece into vise.
2. Turn the vise hand wheel clockwise to clamp the work piece.
3. Pull down the handle and press trigger switch.
4. The saw blade starts rotating. The coolant starts flowing out of nozzle.
5. Continue to pull down the handle until the saw blade cuts off the work piece.
6. Release the trigger switch and let the saw head moves up slowly.
7. Turn the vise hand wheel 1/2 (half) turn counter-clockwise to release the work piece.
8. Repeat step (1) through (7) to finish the job.

NOTE: Release the trigger switch immediately if any malfunction or abnormal situation happens.

6-8 Maintenance

1. Chip collecting tray
Remove chip from collecting tray everyday.
2. Gear box of cutting head
 - a. Change gear oil (SAE 140) every six months.
 - b. Check temperature of the gearbox during continuous operation.

7 Troubleshooting

Problems	Sources	Solutions
1. Machine will not start.	a. Main power cable is not connected to the power source. b. Power indicator light is not on. The transformer is shorted and broken. c. The safety fuse is broken. d. The Emergency Switch is not returned to the original position.	a. Check power supply. b. Use multi meter to test the transformer. If the output value is incorrect, the transformer is broken. Replace it when needed. c. Replace the safety fuse if needed. (May test with multi meter). d. Turn the Emergency Switch toward the direction as shown by the instructing arrow, to return it to the original position.
2. Machine stops running during work process.	a. Out of material and the machine is set to "RUN" mode. (When set to "RUN" mode, the machine automatically stops when it's out of material). b. The screws that contact the Limit Switches are not properly placed (the screws should be able to touch the Limit Switches.) c. The number of completed pieces has reached the pre-set number. (Please check the Counter on the Control Panel). d. Dull blade (dull cutting bits) overburdens the machine e. The control wire is not properly connected.	a. If out of material, reload material. Also, if the Material Vise does not secure the material properly (opens too wide), the sensor may interpret it as "no material". Adjust the Material Vise if this happens. b. Adjust the screws to be able to touch the Limit Switches. c. Reload material and restart the machine to continue. d. Replace the cutting bits. e. Check the 110V control wire. Secure the electric terminal if it is loose due to the machine vibration.

Problems	Sources	Solutions
3. Motor will not start.	a. One or more of the 3 phases of the main power is not connected. b. The motor is shorted or broken.	a. Use multi meter to test if all of the 3 phases are connected. b. Use multi meter to test the 3 phases of the main power. If all 3 phases are normal, the motor may be broken. Replace it when needed.
4. Broken or Chipped Blade.	a. The fixing screws are loose. b. The 2nd Step Cutting Speed is too fast, or is not set. c. The Work Piece is not properly clamped and is loose. d. Wrong selection of Jaws for the Work Piece.	a. Properly tightened the fixing screws. b. Adjust the 2nd Step Cutting Speed by turning the Air Flow Valve. c. Properly adjust the Clamping Jaws. d. Replace the Jaws according to the Work Piece.
5. Cutting Head is not moving forward.	a. The screws that contact the Clamping Cylinder Limit Switches are not properly placed (the screws should be able to touch the Limit Switches.) Or the Holding Arm Cylinder Sensors are malfunctioning.	a. Adjust the screws that contact the Clamping Cylinder Limit Switches. Check the Holding Arm Cylinder Sensors.
6. Cutting Head is not moving backward.	a. The Cutting Cylinder Bottom Limit Switch is broken, or the screw that contacts the Limit Switch is not properly placed (the screw should be able to touch the Limit Switch). b. The Air Flow Valve for adjusting the 2nd Step Cutting Speed is not open. c. The Cutting Head Solenoid Valve is clogged, or the coil is burned, or the Cutting Head Solenoid Valve Power Cable is disconnected.	a. Adjust the Contacting Screw for the Limit Switch. b. Open the Valve. c. Take off the Solenoid Valve. Clean or replace the valve. Also check the power connection.

Problems	Sources	Solutions
7. The Work Piece cannot reach the Clamping Position.	a. The Holding Arm Sensors are not properly adjusted. b. The Screws that contact the Clamping Cylinder Limit Switches are not properly placed (screws should be able to touch the Limit Switches).	a. Check and adjust the Holding Arm Sensors on both the Left Head and the Right Head. b. Adjust the Screws that contact the Limit Switches.
8. No Action when set to Semi-Auto or Fully-Auto. (Functions normally under Manual Mode)	a. No program in the PLC. b. The Screws that contact the Cutting Cylinder Limit Switches are not properly placed (the Screw should be able to touch the Limit Switches). c. The Auto-Cycle Start Push Button is broken, or the connecting wire is broken.	a. The PLC battery will be dead if the machine is set idle for a certain period of time, and the program in the PLC will disappear. Replace the battery when the BATT. V light is on. If the RUN light on the PLC is NOT on, there is no program in the PLC. Re-enter program to the PLC or insert pre-loaded ROM. b. Adjust the screws to be able to touch the Limit Switches. c. Check the Button and the connecting wire.
9. Work Piece does not stay. (moves horizontally)	a. Wrong selection of Jaws for the Work Piece. b. Left and Right Head are moving at different speeds. c. Dull Blades.	a. Select the correct Jaws for the Work Piece. b. Adjust the speeds at which the Left and Right Heads move. c. Check and replace the blades.
10. Unsatisfactory quality. (finished pieces)	a. The Work Piece Tube is not round (may be damaged) in shape. b. Wrong selection of Jaws for the Work Piece.	a. Make sure the Work Piece Tube is not damaged and is round in shape. b. Make sure the Jaw size is correct for the Work Piece.

Problems	Sources	Solutions
11. Unsmooth chamfering action.	a. Dull Blades. b. The Tool Seats are not tightened. c. The Inside Tool Seat is larger than the Work Piece Tube Inside Diameter, and thus interferes when chamfering.	a. Replace the Blades. b. Tightened the Tool Seats. c. While possible, grind or adjust the shape of the Inside Tool Seat for it to fit in the Tube, and not interfere when chamfering.
12. Improper Adjustment of the Tool Head.	a. Incorrect Results on the Facial Chamfering. b. Incorrect results on the Inside and Outside chamfering.	a. Adjust the Cutting Head Moving distance for it to properly perform the Facial Chamfering. b. Adjust the Inside and Outside Tool Seats positioning.
13. Tube Transferring Angle Bar No Action or Non-Stop Action.	a. The Proximity Sensor on the Tube Transferring Chain is not functioning.	a. Test the Proximity Sensor. Replace it when needed.

8 Appendix

8-1 Machine Operates Range Pictures



8-2 Machine Specifications



8-3 Hydraulic Circuit Diagram and Air Circuit Diagram



8-4 Electrical Circuit Diagram



8-5 Parts Lists and Drawings