

# Promax MPC600

## Magnetic pipe cutting machine OPERATION MANUAL



For every person who will be engaged in operation and maintenance supervision, It is recommended to read through this manual before any operations, so as to permit optimum operation of this machine. Hold this manual carefully so that you can use it next time.

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## **INSTRUCTION**

Thank you very much for purchasing this product. Read this instruction manual thoroughly to insure correct, safe and effective use of the machine. Read the manual first to understand how to operate and maintain the machine.

Make sure you read, understand and take all the necessary safety precautions.

## **SAFETY PRECAUTIONS**


This product is designed to be safe, but it can cause serious accidents if not operated correctly. Those who operate and repair this machine must read this manual thoroughly before operating, inspecting and maintaining the machine. Keep the manual near the machine so that anyone who operates the machine can refer to it if necessary.

- Do not use the machine carelessly without following the instructions in manual.
- Use the machine only after you completely understood the contents of the manual.
- If an explanation in the manual is difficult to understand, contact our company of sales service office.
- Keep the manual nearby at all times and read it so many times as necessary for a complete understanding.
- If the manual become lost or damaged, place an order with our company or sales service office for a new one.
- When transferring the machine to a new owner, be sure to hand over this instruction manual as well..

## **QUALIFICATIONS FOR MACHINE OPERATOR**

Operators and repair staff of this machine must completely understand the contents of the instruction manual and they must be qualified and educated to handle this equipment.

1. The license for gas welding ganger
2. The diploma of the training course on gas welding.
3. The qualification certificate approbated by the ministry of labor.

Symbol	Title	Meaning
	General	General caution, warning and danger
	Be careful not to get your fingers caught.	Possible injury to fingers if caught in the insertion part.
	Caution: Electric shock!	Possible electric shock under special conditions.
	Ground this equipment.	Operators must ground the equipment using the safety grounding terminal.
	Pull out the power plug from the outlet.	Operators must unplug the power plug from the outlet when a failure occurs or when there is a danger of lightning.
	Caution against bursting	Possible bursting under certain conditions.
	General	General warning.
	Caution: Hot !	Possible injury due to high temperature under certain conditions.
	Caution: Ignition!	Possible ignition under certain conditions.

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## 1 Safety instruction

Operation, inspection, and maintenance that are against the basic safety rules can cause many accidents. Carefully read, understand, and master the safety measures and precautions described in this instruction manual and on the machine before operating, inspecting, and maintaining the machine. The safety messages are classified as following.

### ■ WARNING

This word is used as a warning message or a warning label. It is positioned at places that could cause injury or serious accident.

### ■ CAUTION

This word is used as a caution message or a caution label. It is positioned at places that could cause slight injury or machine damage. This is also used as a caution for high dangerous actions.

### ■ NOTICE SIGNS

This is a sign to show machine operators and maintenance engineers items that relate directly to damage of machines and surrounding facilities and equipment.

## 1.1 General machine safety precautions

**Read and understand the following important safety information:**

### 1.1.1 Machine safety

1. The machine casing is mainly made of aluminum alloy to reduce weight. For this reason, be careful not to drop a heavy item on the machine, or not to drop the machine when carrying it, since the alloy is not designed to withstand such impact.
2. When fixing hoses to the torch and distributor, tighten the nut with the attached wrench. After fixing, be sure to check there is no gas leak with a detection liquid. If a gas leak is found, retighten the nut firmly.
3. When fixing a tip to the torch, tighten the nut with the two wrenches. In addition, avoid damaging the taper part of the tip since this may cause backfire.
4. Never disassemble the machine other than during maintenance and inspection. Malfunction will occur.
5. Never remodel the machine. Remodeling is very dangerous.
6. Must cut the power off when the machine is not in use.
7. Never use the machine outdoors when the weather is wet. This will cause failure of the machine and could cause a fatal accident due to electric shock.

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## 1.1.2 Safety clothing

1. Be sure to wear protector's gauntlets, goggles, helmet, and safety shoes during operation.
2. Avoid operating the machine with wet clothes or hands in case of accidents.

## 1.1.3 Safety precautions before operation and carrying

1. Read this instruction manual before operating the machine.
2. Fix the machine rightly and adjust a suitable range before operating.
3. Don't damage the magnetic roller wheel. Before operating the machine, you should check whether there are iron chips or other things.
4. Prior to operating the machine, check the safety of the surroundings to avoid accidents.
5. Never move the machine while the preheating flame burns.
6. When equip the machine, you must make the four magnetic roller wheels contact with pipe. Put the machine on pipe and hold knobs on two sides of machine. Wave the machine to and fro to make roller wheels stick to pipe naturally.
7. Notice: if the machine isn't be fixed rightly. It will decrease adsorption affinity much to lead to bad accuracy.
8. In the process of cutting, you must equip the safety device fully.
9. Direction changeover switch
  - The direction changeover switch is used to change the direction of clockwise revolution/anti-clockwise revolution of machine. Check the running direction or the direction of knob before cutting.
  - When changing the direction of running, you should make the driving button be on the " stop" position. And change the direction of running after the machine comes to a full stop.

**Instruction:** Before the power is turned on, it is necessary to check if the driving button is on the " stop" position. It is very dangerous to operate the machine when the driving button is on the " on" position.

10. Don' t touch the rotary section to avoid accidents.
11. You must clean the surface of pipe, such as iron chips or dirt. Don' t cut the pipe which is distorted or has oil paint.
12. Connect the gas hoses rightly.
13. You must close preheat valve and fuel gas valve when checking the running of the machine before operation and cutting allocation.
14. The bottom of the tip and torch are very hot after cutting, so it is necessary to wear gloves if you want to touch them.
15. Don' t drag power cable much. Don' t make hoses or power cable hanged to lead to dropping of machine.

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16. Don't leave the machine alone before it flames out.
  17. You must use hose-hoop in case of dangers.
  18. When the fuse burns out frequently, it is not allowed to use high-current fuse before finding out the cause.
  19. When carrying the machine, you must not make the machine drop or shake much.

#### 1.1.4 Electrical system precautions



1. Check the input power voltage of the machine before operation. The input power voltage should be in the range of  $\pm 10\%$  of the rated voltage. The machine should not be operated out of this range.
2. The metal plugs are screw-threaded. Therefore, you should tighten them so that they will not loose during operation.
3. Be sure to ground the power cable of the machine.
4. **Stop operation and cut off the power in the following cases, and ask a qualified electrician to repair the machine.**
  - 1) Broken or abraded cables.
  - 2) Leak of water or liquid, which damages the machine.
  - 3) The machine operates abnormally despite of operating the machine according to the instruction manual.
  - 4) Machine is broken down.
  - 5) The machine has a poor performance and needs to be repaired.
5. Periodically inspect the electrical system.

#### 1.1.5 Maintenance and inspection precautions



1. Ask a qualified electrician to perform repair and inspection service.
2. Disconnect the power plug before inspecting and repairing the machine.
3. Maintain the machine periodically.

### 1.2 Gas cutting safety precautions

Strictly observe the safety rules and precautions to ensure the safety of gas cutting operations. Operators and supervisors **MUST** keep " safety" in mind.

#### 1.2.1 Prevention of explosion



1. Never cut pressurized cylinders or hermetically sealed containers.
2. Ensure sufficient ventilation for gas cutting to prevent the air from being polluted.

#### 1.2.2 Pressure regulator safety precautions



1. Before operating, check that all pressure regulators are operating correctly.

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2. Ask a skilled repair engineer to perform maintenance and inspection service.
  3. Do not use malfunctioning pressure regulators or pressure regulators from which gas is leaking.
  4. Do not use pressure regulators smeared with oil or grease.

### 1.2.3 High pressure gas cylinder safety precautions



1. Never use broken cylinders or cylinders from which gas is leaking.
2. Install cylinder upright and take measures to prevent them from falling.
3. Use cylinders only for specified purposes.
4. Do not use pressure regulators smeared with oil or grease.
5. Install cylinders in a place free from heat, sparks, slag, and open flame.
6. Contact the distributor if the container valves will not be opened. Never use a hammer, wrench, or other tools to forcibly open container valves.

### 1.2.4 Safety precaution for hoses



1. The oxygen hose is used for transporting oxygen gas only.
2. Replace cracked hoses or other hoses damaged by sparks, heat, unshielded fire, etc.
3. Install hoses without twisting.
4. Take great care during operation and transportation to prevent hoses from breakage.
5. Do not drag the hoses when moving the machine.
6. Periodically check the hoses for damage, leakage, fatigue, loose joints, etc, to ensure safety.
7. Cut hoses to the minimum possible length. Short hoses reduce hose damage and pressure drop, as well as reduce the flow resistance.

### 1.2.5 Safety precautions for fire



Take safety precautions to avoid fire before cutting.

It could cause a fire due to ignoring hot metal, sparks, and slag.

1. Keep a fire extinguisher, fire extinguish sand, bucket full of water, etc. be ready on the site where gas cutting is performed.
2. Keep flammables away from the cutting area to avoid splashing sparks.
3. Before bringing the hot steel plates, as well as hot cut parts or scrap, to flammables, you must cool down them.
4. Never cut containers, which flammable materials are stuck to.

### 1.2.6 Safety precautions for skin burns



Observe the safety precautions to avoid burning skin. It could cause a fire or burning skin due to ignoring heat, spatter, and sparks during operation.

1. Do not perform cutting near flammables. (Move flammables well away from the



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sparks.)

2. Do not cut containers filled with flammables.
3. Do not keep lighters, matches, and other flammables near by.
4. Flames from the torch will burn the skin. Keep your body away from the torch and tip, and check the safety before operating the switches and valves.
5. Wear the correct protectors to protect your eyes and body.
6. Correctly tighten the tip to prevent backfire.
  - When fixing a tip to the torch, tighten the nut with the two wrenches attached.
  - If the tip is tighten excessively, it will be heated during cutting and tightened still more, making it difficult to remove the tip.
  - Avoid damaging the taper of the tip because it may cause backfire.
7. Check any leakage of gas from the connection part of the distributor, hoses and torch with soapsuds.

You must not use oil or grease on the connection of the oxygen pipe to avoid backfire. Because it may lead to explosion.

8. Check the following when igniting:
  - Place the torch on the torch holder before igniting.
  - Always wear the required protectors (gauntlets, helmet, goggles, etc.)
  - Check for any obstacles, dangerous materials and flammables near or in the direction of cutting.
  - Check the gas pressure. (The pressure must be in the right range)
9. When the temperature of torch and tip are high, you must wear gauntlets to carry them. The surface temperature of them is very high after cutting, so you don' t touch them even you wear gauntlets.

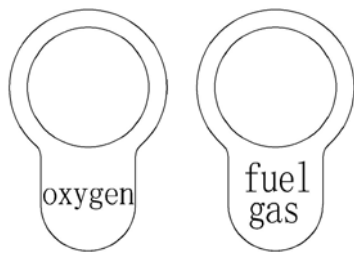
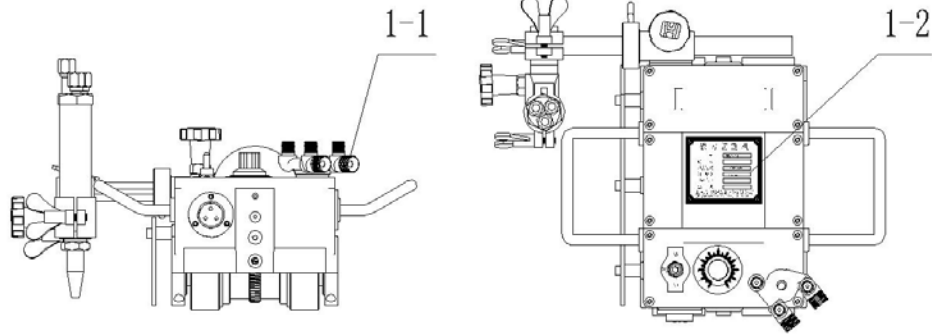
### **1.2.7 Magnetic roller wheel**

- 1 .The machine walks on pipe by magnetic adsorption affinity. So, in the cutting process, the machine can' t be knocked and the power cable or hoses can' t unwind in case of the machine dropping. The machine is designed with safety device based on safety.
- 2 . If the magnetic roller wheel has been used for a long time, you should check the adsorption affinity of magnetic roller wheel. If it has demagnetized, you must stop to use it and take it apart. Then, charge magnetism for it.

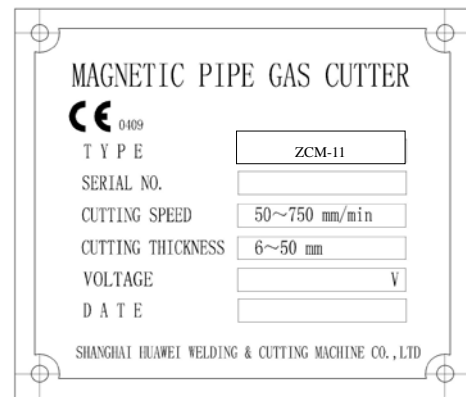
## 2 Location of safety labels

Safety labels and other labels for correct operation are affixed to the machine.

1. Carefully read the labels and follow the instructions on them when operating the machine.
2. Never remove the labels. Keep them clean and legible at all times.



Safety label



Date label

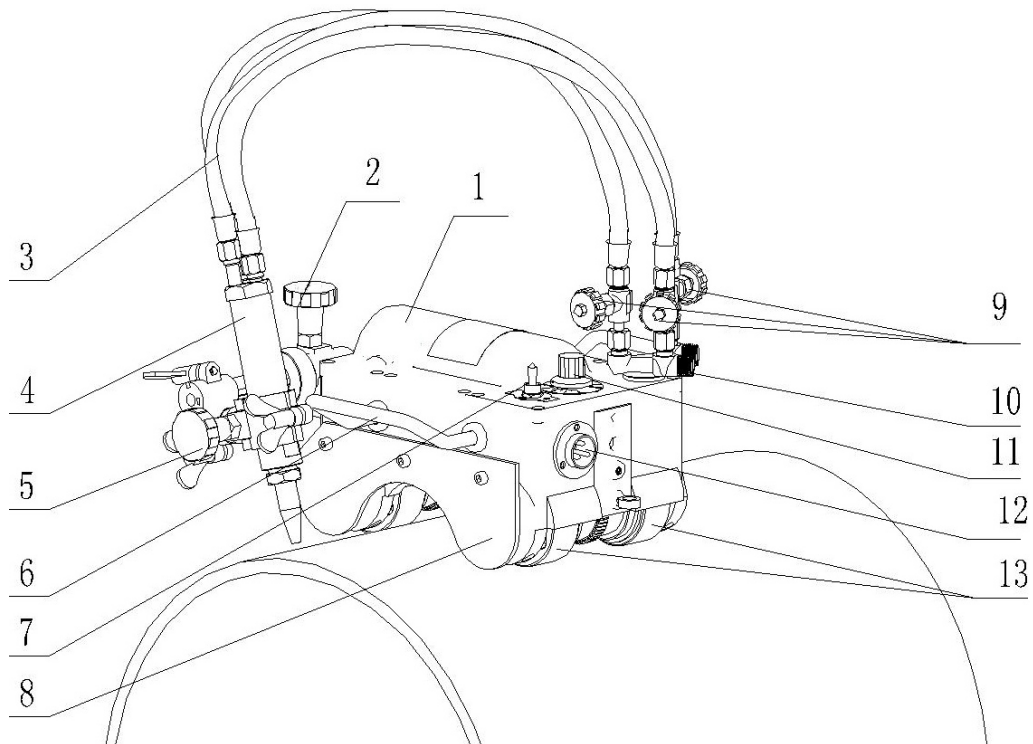
## 3 Outline of machine

### 3.1 Characters

It is convenient to operate the “ ZCM-11” . It can cut pipes, the diameters of which are above 100mm. It is used in many fields such as ship, mechanism, electric, petroleum industry and so on.

This machine is a advanced pipe gas cutter. It has impacted structure, light weight and can cut continuously.

### 3.2 Name and function of each section



1. Body	8 .Thermal baffle :To prevent heat to diffuse into the inner of machine.
2 .Cross feeding hand wheel To adjust horizontal position of torch.	9.Two-port valve : To adjust the flow.
3. Hoses : Connect them to gas distributor. There are three hoses: preheating oxygen hose, fuel gas hose and cutting oxygen hose.	10.Gas distributor : Gases are: preheating oxygen, fuel gas and cutting oxygen.
4 . Torch	11 Speed regulating knob : Decrease the speed along “ 10” toward “ 0” anti-clockwise.
5. Adjusting hand wheel of torch	12 . Plug seat
6 . Handlebar	13 .Magnetic roller wheel :The two magnetic roller wheels can make the machine walk along pipe wall smoothly.
7 . Reversing switch : To change the direction of machine. “ STOP” position is in the middle.	

### 3.3 Specifications

1. Weight(body)	14.5KG
2. Machine dimension	305MMX310MMX180MM
3. Power source	220V 50HZ
4. Cutting speed	50-750MM/MIN
5. Cutting thickness	6-50MM
6. Bevel angle	0°-45°
7. Cutting range	φ > 108MM(The no-seam pipe)
8) Cutting accuracy	When the machine walks a cycle on pipe, the error is below 0.5mm every 1m circumference. The smoothness of cutting and groove can reach $\sqrt{12.5} - \sqrt{6.5}$
9. Absorption force of magnetic roller wheel	50 kilograms plus
10. Impulse of machine.	When the machine walks up and down, it is below 0.5mm.
11. Motor	70SZ08 servo-motor. 6000r/min, 68W

## 4 Preparation for operation

### 4.1 Contents of package

Carefully take the machine out of its case.

The contents of the standard package are shown below. Check them carefully before assembling the machine.

<b>1. Standard pack</b>	
1 ) Main body	: 1set
2 ) Standard torch unit assemblage	: 1set
3 ) Connector of torch	: 1set
4 ) Tip ( ANME or PNME # 1 , 2, 3 , )	1pc each
6) Gas-in connector	: 1 set
7 ) Electric case and connecting wire	: 1set
8) Specification sheets and certificate of qualification	1 pc each
9) Safety rope	: 1pc
10 ) Safety buckle	: 1pc
11 ) fuse(3A)	: 1pc

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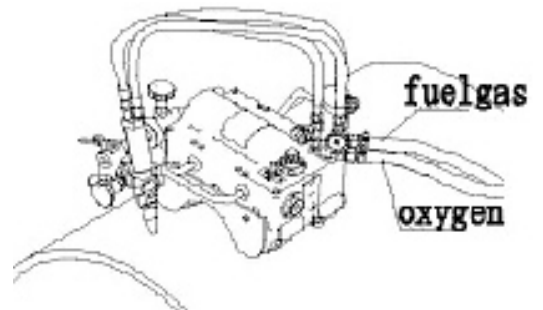
## 4.2 Machine assembly

1. Take the machine out of case.

2. Connect the horizontal cross moving gear rack with torch.

Move the horizontal cross moving gear rack (1) away a distance by cross moving hand wheel (2). Tighten the nut. Take the torch unit assembly out of case and equip the connector of torch to the receiving end of cross moving gear rack. Then, fix it with wing screw (M6X16).

3. Take the socket screw wrench (4) out of the cover of main machine. Then, equip the distributor (5) (As shown in diagram).



4. Connect primary hoses to gas distributor. You must use hoop to lock hoses. There are two oxygen hoses (black), one fuel gas hose (red). You must connect them rightly. (As shown in diagram)

## 4.3 Preparation for operation



### 4.3.1 Power cable connection

1. Before plugging the metal plug into the socket on the guidance panel, you must ensure there is no sundry or dust.
2. The metal plugs has threads, therefore, you should fully tighten them so that they will not loose during operation.

### 4.3.2 Tip connection

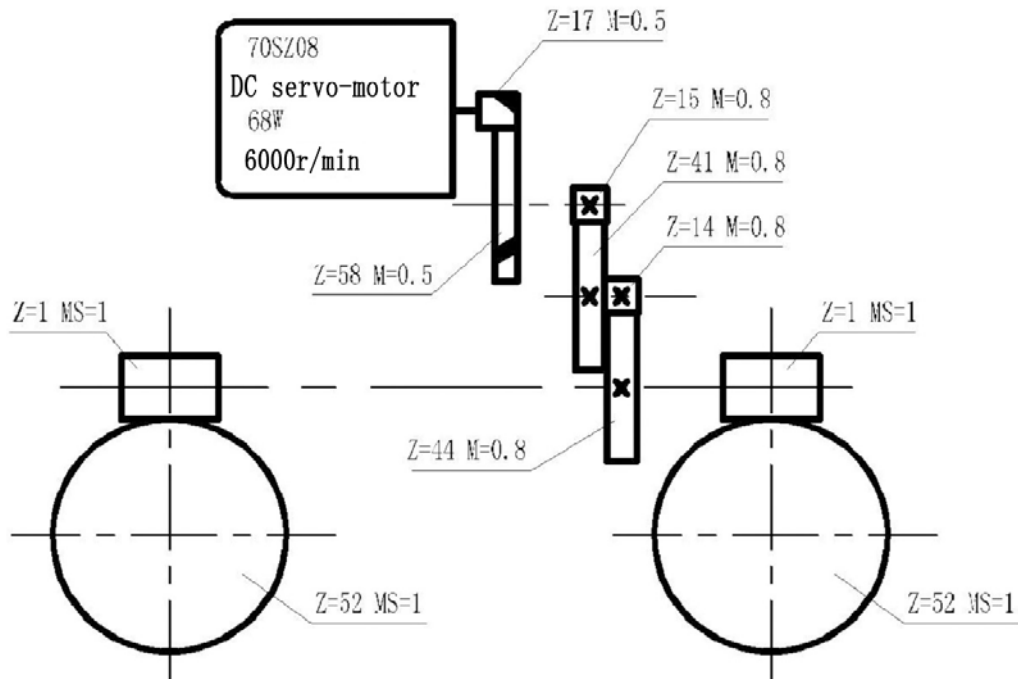
1. Select a proper tip according to the thickness of the steel plate and fix it to the torch. (Refer to the cable of Cutting Data to select a tip)

- When fixing a tip to the torch, tighten the nut with the two wrenches.
- If the tip is tightened excessively, it will be heated during cutting and tightened still more, making it difficult to remove the tip.
- In addition, avoid damaging the taper of the tip since this may cause backfire.

## 4.4 Main structures of machine

### 4.4.1 Driving mechanism

It is made up of 70SZ08 DC servo-motor, three pairs of gears (the reducing gear  $M=0.8$ ) and a worm-gear conjugation.



#### 4.4.2 Running mechanism

It is made up of magnetic roller wheel, axis, axis bush and magnetic steel.

#### 4.4.3 Body

The box body is made of ZL101 A-alloy.

#### 4.4.4 Torch and Tip

The torch adopts equal pressure and the tip is CO<sub>2</sub> or CO<sub>3</sub>. Torch can do cross moving and up-down moving. The groove of torch is in the range of 0°-45° and you can adjust it according to the angle of groove..

#### 4.4.5 Electricity unit assembly

The electric system is made up of electric case, control panel of body and motor. There are a supply transformer and a control wire panel in the electric case. The control panel is equipped with power switch, indicated lamp and fuse. The control panel of body is equipped with adjusting speed potentiometer and reversing switch.

The machine uses silicon controlled DC motor system to adjust speed. The principle is that it uses the sign, which is made by resistance-capacitance phase AC and DC, to activate thyristor. You can control the angle flow of thyristor by changing the size of DC sign to realize the infinite speed variation. The principle is shown in circuit diagram.

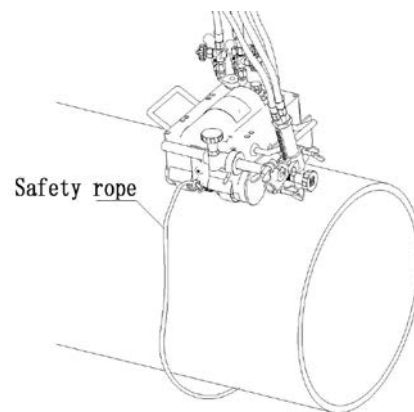
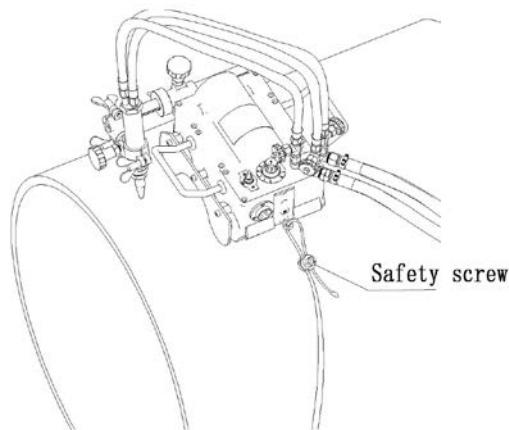


#### 4.5 Fix the machine on pipe

- Before equipment, you must clean dirt on ectotheca of pipe. Then, check whether there are iron chips or others on the magnetic roller wheels. You must clean them.
- Put the machine on pipe lightly. Because of the strong adsorption affinity, you can't

make the two groups of roller wheels contact with pipe at the same time. First, you can make one group contact with pipe. Second, you put another group down slowly. When all the two groups contact with pipe, you should hold knob with your hands and swing it to-and-fro to check whether the machine is fixed fully.

- Equip safety rope. For safety, you must equip safety device before operation. Put one end of safety rope into safety buckle and drag it to another side of machine. Then, put it into another safety buckle. Lock the junction with safety screw. You can not drag the safety rope too much. There should be enough space for the walking of machine. (As shown in diagram)



- After equipment, you should cut power in and make the machine walk a cycle along the pipe to check whether the machine walks well and the length of hoses and wires are long enough. You should also check whether the machine departs. If the departure is too big, you should stop operating and find causes.

#### 4.6 Usage and equipment of steel band



If the diameter of cutting pipe is bigger or cutting accuracy is high, you should equip locating device to assure a good quality. The locating device can make the starting point align with ending point. If the pipe is not standard, it may lead to departure of machine. Generally, the diameter is bigger, the cutting error is bigger.

After the equipment of steel band rail, the torch unit assembly can move freely. The torch is equipped on one end of cross moving bar and another end of the bar sticks to fracture of steel band rail because of pushing force of spring. Even if the machine departs, the torch can be adjusted freely by pushing force of spring and can not depart.



**Illustration :** The machine doesn' t be allocated with steel band device. So, if you need it, you should purchase it according to the diameter of pipe.

Choose a suitable position and make the steel band rail wind a cycle along pipe. Make the locking buckle hook the other side of band. Tighten M10 screw to make the band bind the pipe tightly.

The machine should be on the side of cutting pipe. The distance between machine and steel band rail should assure that the spring of cross moving bar has suitable pressure.

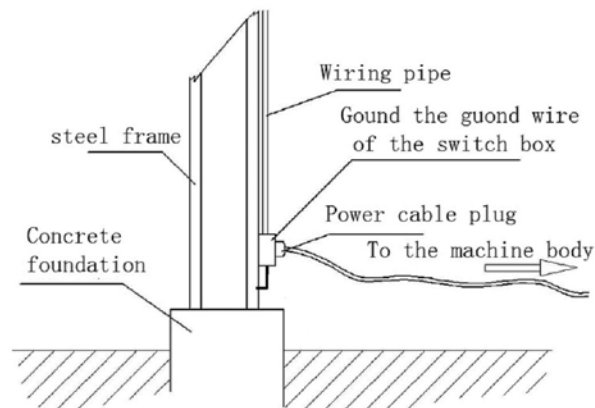
## 5 Cutting operation

### 5.1 Safety precaution before operation

#### 5.1.1 Safety precautions for grounding the machine



The cable of this machine is equipped with a grounding wire. For safety, be sure to ground the wire as follows, in addition to checking the connection of the power cable. (As shown in diagram)



#### 5.1.2 Tip choose

Refer to the cable of Cutting Data and select a proper tip according to the thickness of the steel plate. You should choose a bigger grade tip if the steel is rust-eaten seriously or the cutting angle of groove is bigger than 20°.

#### 5.1.3 Operation of the changeover switch

1. The changeover switch is used to change forward or backward direction. Before cutting, you should check the cutting direction.
2. If you want to change the cutting direction, you should make the driving button be on the " stop" position, then change the cutting direction after the machine stops.

**NOTE:** Before you turn on power, it is necessary to check if the driving button is on the " stop" position. It is very dangerous if the driving button is on the position of " on" .

#### 5.1.4 Ignition and flame adjustment

**NOTE:** Adjust the gas pressure according to the Cutting Data. The data shows the pressure of all valves which are open. Readjust the pressure after ignition.

1. First, cut gas supply in and put hoses in order to make the machine move freely.
2. Open the fuel gas valves 1/4 a turn, the preheating oxygen valves 1/2 a turn, and light the



torch with an igniter.

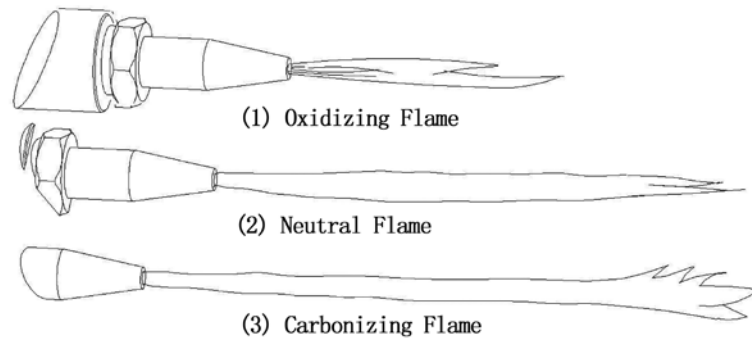
3. Then, open the preheating oxygen valve gradually until a white cone of the standard flame gas been obtained. (The incandescent area should be uniform and about 5-6 mm in length.)

4. Open the cutting oxygen value fully. Readjust the flame if its state has changed. A disorderly flow of cutting oxygen will adversely affect the quality of the cutting surface. In such a case, close the preheating oxygen valve and fuel gas valve. You should clean the tip with a suitable needle while the cutting oxygen is flowing.

5. Appropriate distance between the end of tip and cutting surface:

- Acetylene gas .....8-10mm
- LPG gas .....5-8mm

6. Neutral flame ensures a good quality of cutting surfaces. (Oxygen flame may be used for groove cutting.)Oxygen flame causes short cutting-oxygen current, allowing slugs to adhere, melting the upper edge of the cutting surface, and causing adverse effects on the cutting surface. Similar defects will occur when the pressure of cutting oxygen is too high.



## 5.2 Methods of cutting and piercing

1. Cut from the end of steel plate.
2. Pierce steel plate before cutting.
3. Drill a hole before cutting.

### ■ Piercing method

- 1) Ignite and adjust the flame.
- 2) Thoroughly preheat the cutting point until it is on state of white hot.
- 3) Open the cutting oxygen valve to make the flame pierce the steel plate. The tip should be about 15-20 mm from the plate to prevent slag from splashing onto the tip and adhering there, which will shorten the working life of the tip.

## 5.3 Cutting operation and steps of blanking flame

1. Align the tip with cutting start point and ignite, then adjust the flame.
2. Preheat the cutting start point fully.
3. After preheating, you should open cutting oxygen valve above 1/8 a turn. Cut power in and the machine begins to run (Refer cutting data of pressure).
4. Check the cutting state and use hand knob to control cutting speed. You can refer

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cutting data to check cutting speed.

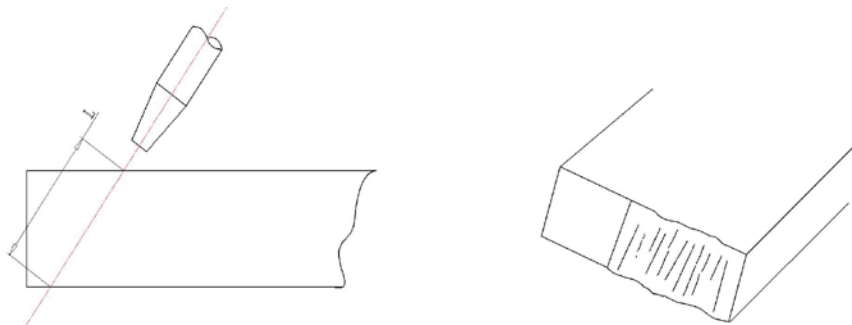
5. Blank the flame in the following steps after cutting after cutting.

- 1 ) Close cutting oxygen valve.
- 2) Close preheating oxygen valve
- 3 ) Close fuel gas valve.

## 5.4 Groove cut

When cutting groove, use the angle (use 5° as its basic unit) on the torch holder and allocate the torch on an expected angle. When choosing a tip for groove cutting, the thickness of the steel plate is “ L ” as shown in following picture. In order to compensate the over-dose heat loss due to the groove cutting, the operator should choose an upper rank tip based on the Cutting Data. Slight oxygenized flame will lead to an increase of efficiency and set the speed with a decrease of 20%-30%. The groove cutting surface in the diagram is a result of inadequate preheating, which requires to choose tip again and readjust preheating and speed.

When you cut 6mm sheet, you should choose suitable tip and pressure according to cutting data. Then, adjust weak flame and begin to cut. At the time of cutting, if the pressure of cutting oxygen is too big or preheating too much, it may lead to bad separation or having dross at the bottom of cut.



## 5.5 Speed setting

When the roller wheel starts to operate, you should adjust cutting speed according to thickness of steel. It can increase the cutting speed along “ 0 ” toward “ 10 ” clockwise, and decrease the speed along “ 10 ” toward “ 0 ” anti-clockwise.

## 5.6 Safety measures against backfire and flashback



### 5.6.1 Prevention of backfire



Backfires may cause serious accidents or fire. Be careful to prevent such disaster. When a backfire occurs, you should find the cause. Inspect and maintain the machine correctly before using the machine again.

The followings are causes of backfire:

1. Improper gas pressure adjustment.

- 
2. Overheated tip
  3. Dross clogging in tip
  4. Damages to the tapered section of tip or torch will cause backfire.

### 5.6.2 Prevention of flashback



Flashback could cause fire and damage the machine. If there be a hissing sound in the torch, you should quickly take the following action:

1. Close the preheating oxygen valve.
2. Close the fuel gas valve.
3. Close the cutting oxygen valve.

If flashback occurs, you should find the cause and take appropriate action before using the machine again.

## 6 Maintenance and inspection

Refer to the following points for maintaining and inspecting the machine in order to use the machine under the best conditions.

### 6.1 Gear case maintenance

Because there are gears and worms that run at a high speed in the gear case, so the operator should remove the shell of the machine, take out the gear case and wash the gears and the case with detergent every six months. When reassembling, we should put new lubricant into the machine. If the turbine is abraded, we must change a new one.

### 6.2 Magnetic roller wheel maintenance

The magnetic roller wheels are important parts of machine. So, it is important to maintain and service them.

- ( 1 ) In the process of using, the magnetic roller wheels must not be knocked or damaged.
- ( 2 ) In the process of cutting, you should avoid that the high temperature flame ejects directly.
- ( 3 ) There is enough lubricant between central axis of two ends of roller wheel and copper sheathing. At the bottom of machine, every leg has oil holes. You should add lubricant into them periodically.
- ( 4 ) Keep the surface of roller wheel clean. Clean iron chips or dross with metal brush.

### 6.3 Tip maintenance

The durability and security of the tip used in “ ZCM-11” cutter is very good. The operator should abide the right maintenance and operation precautions in order to ensure cutting quality.

1. Put the torch up a little and keep a 15mm distance from the plate when piercing, in order

to avoid damaging the tip by backfire.

2. Clean the jet hole of the tip carefully using suitable dip washer.
3. Pay attention not to damage taper seat.

Replace the tip if the following cases occur.

- a. The injection stream of cutting oxygen can't extend straightly after clean.
- b. The injection stream of cutting oxygen bifurcates at the end.
- c. The click may be heard from the tip when cutting.
- d. The gas leaks and burns at the hold-down nut.
- e. The preheat flame is out-of-flatness.

## 7 Troubleshooting

- 1 ) The motor does not run.

Possible Cause	Check	Correction
1 ) No power	Check the power circle	Change
2 ) Safety accident	Check safety	Change
3 ) Driving switch accident	Check whether you can hear a " dada" sound when cut the switch in. (It is good if you hear the sound)	Repair
4 ) Power wire is broken	Check it with test instrumentation.	Repair or change

- 2 ) The power motor does not run.

Possible Cause	Check	Correction
Disconnection of 10Ω resistance	Take the electric panel apart and check whether the resistance is good.	Change
Carbon brush of motor is jammed	Take out the carbon brush, grind the forepart and fix it to make it connected well. If the problem is not resolved, change carbon brush.	Change
The motor is burned out.	Check it with universal meter.	Change

- 3 ) During operation, the machine librates much and brings a big noise.

Possible Cause	Correction
1 ) Gear slips	Take the gear out and rivet the gear again.
2 ) Gear damage.	Check whether the turbine has been worn and whether worm has bad burrs. Then replace the bad parts.
3 ) Motor damage	Change the motor.

- 4 ) Gas leakage and fire leakage

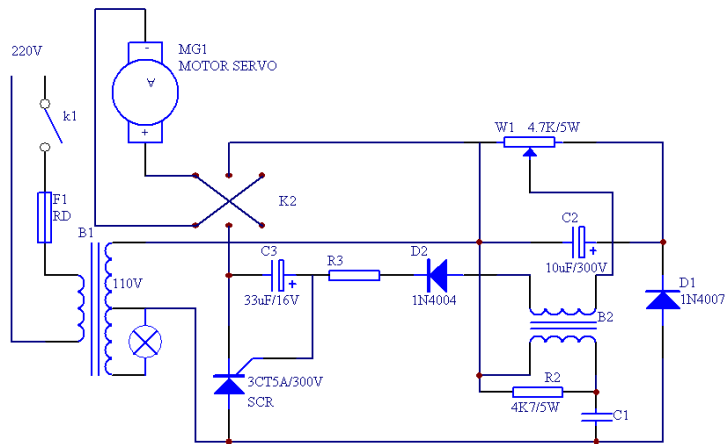
Possible Cause	Correction
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1 )The 30°taper is not contacted well due to incorrect usage.	Mend the 30°traper carefully with thin emery cloth to make it contacted well.
2 ) The cater nut is not tightened.	Tighten the cater nut.

5 ) The cutting flame is instable

Possible Cause	Correction
1 ) The duct of tip is jammed by impurity.	Make the duct expedite with needle.
2) The gas pressure is not enough and oxygen fineness is low.	Check whether air-feed pressure and oxygen fineness are in the specified range.

## 8 Wiring diagram



## 9 Maintenance illustration:

If you operate the machine according to the operating manual and the machine generates occurs accidents because of the product quality, we guarantee to keep the machine in good repair free of charge in half year based on invoice from the day we sell. According to the rules, if the following cases occur, we can't keep the machine in good repair free of charge:

- 1 ) The damages are leaded because of incorrect carriage or improper keeping.
- 2 ) The damages are leaded because of operating not according to the instruction manual and beyond the specified range of voltage.
- 3 ) The machine don't have maintenance card and receipt invoice.
- 4 ) The maintenance card don't match the machine.
- 5 ) The damages are leaded by natural disasters or some irresistible incidents.
- 6 ) The damages are leaded because the machine is token apart by unprofessional person
- 7 ) The damages are leaded because of using the fitting parts and accessories, which don't belong to our company.