

# **ZX7-1250HD**

## **ARC WELDING MACHINE**

# **MANUAL INSTRUCTION**

(PLEASE READ CAREFULLY BEFORE OPERATING)

### **Safety Depends on You**

Huayuan arc welding and cutting equipment is designed and built with safety in mind. However, your overall safety can be increased by proper installation ... and thoughtful operation on your part.

**DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT WITHOUT READING THIS MANUAL AND THE SAFETY PRECAUTIONS CONTAINED THROUGHOUT.**



#### **Cautions**

*Arc and arc rays may harm health.*

*Arc welding can be hazardous. All performing welding workers ought to have health qualification that provided by authority organization. Protect yourself and others from possible serious injury or death. Keep children away. Pacemaker wearers should consult with their doctor before operating. Be sure that all installation, operation, maintenance and repair procedures are performed only by qualified individuals.*



- **Electric shock can kill:** The electrode and work (or ground) circuits are electrically “hot” when the welder is on. Do not touch these “hot” parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands. Users need to follow the below items to avoid electric shocks:

- Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground. Otherwise, use automatic or semiautomatic welding machines, DC welding machines as possible as you can.
- In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically “hot”.
- Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.
- Ground the work or metal to be welded to a good electrical (earth) ground.
- Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.
- Never dip the electrode in water for cooling.
- Never simultaneously touch electrically “hot” parts of electrode holders connected to two welders, because voltage between the two can be the total of the open circuit voltage of both welders.
- When working above floor level, please do wear safety belt to avoid falling or losing balance on electric shock.



- **Arc rays can burn:** Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Head shield and filter lens should conform to nation standards.

- Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.
- Protect other nearby personnel with suitable, non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.



- **Fumes and Gases can be dangerous:** Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. While working in limited room, use enough ventilation and/or exhaust to keep fumes and gases away from the breathing zone, or use the respirator.
- Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.
- Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.
- Read and understand the manufacturer's instructions for this equipment and the consumables to be used, including the material safety data sheet (MSDS) and follow your employer's safety practices. Make sure they are asepsis and innocuity.



- **Spatter:** Welding or cutting spatter can cause fire or explosion.
- Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.
- Where compressed gases are to be used in the field, special precautions should be used to prevent explosion.
- When not welding, make certain that no electriferous part is touching the work piece or the work stage. Accidental contact can create a fire hazard.
- Do not weld containers or lines, which are not proved to be innocuity.
- Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been "cleaned".
- Spatter might cause burn. Wear leather gloves, heavy shirt, cuffless trousers, high shoes and a cap over your hair to prevent from burning by spatter. Wear the ear shield when performing sideways or face up welding. Always wear safety glasses with side shields when being in a welding area.
- The welding cables should be as close to the welding area as possible, and the short, the better. Avoid welding cables going through the building framework, lifting chains, AC or DC cables of other welding machines and appliances. The welding current is strong enough to damage them while having short circuit with them.










- **Cylinder may explode if damaged.**
- Make sure that the gas in the storage cylinder is qualified for welding, and the decompression flowmeter, the adapter and the pipe are all in good condition.
- Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.
- Be sure to put the cylinder in the working space with no crash or shake, and far from welding area.
- Never allow the electrode, electrode holder or any other electrically "hot" parts to touch a cylinder.
- Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.



- **Power:** (For electrically powered welding and cutting equipment) Turn off input power before installation, maintenance and repair to avoid accidents.
- Huanyuan welding equipment is I class safeguard equipment; please install the equipment in accordance with the manufacturer's recommendations by specific persons.
- Ground the equipment perfectly in accordance with the manufacturer's recommendations.



- **Power:** (For engine driven welding and cutting equipment)
- Work in ventilated place or outdoors.

	<ul style="list-style-type: none"> <li>■ Do not add fuel near to fire or during engine starting or welding. When not working, add fuel after engine is cooling down; otherwise, the evaporation of hot fuel would result in dangers. Do not splash fuel out of the fuel tank, and do not start the engine until complete evaporation of the outside fuel.</li> </ul>
	<ul style="list-style-type: none"> <li>■ Make sure that all the safeguard equipments, machine cover and devices are all in a good condition. Be sure that arms, clothes and all the tools do not touch all the moving and rotating components including V belt, gear and fan etc.</li> <li>■ Sometimes some parts of the equipment have to be dismantled during maintenance, but you still have to keep the strongest safety awareness .</li> <li>■ Do not put your hand close to fans and do not move the brake handle while operating.</li> <li>■ Please remove the connection between the engine and the welding equipment to avoid sudden starting during maintenances.</li> </ul>
	<ul style="list-style-type: none"> <li>■ When engine is hot, it is forbidden to open the airtight cover of the radiator water tank to avoid hurt by the hot vapor.</li> </ul>
	<ul style="list-style-type: none"> <li>● <b>Electromagnetic:</b> Welding current going though any area can generate electromagnetic, as well as the welding equipment itself. <ul style="list-style-type: none"> <li>■ Electromagnetic would affect cardiac pacemaker, the cardiac pacemaker users should consult one's doctor first.</li> <li>■ The effect of electromagnetic to one's health is not confirmed, and it might have some negative effect to one's health.</li> <li>■ Welders may use following method to reduce the hazardous of electromagnetic: <ol style="list-style-type: none"> <li>a. Bundle the cable connected to the work piece and the welding cable together.</li> <li>b. Do not unwind partially or entirely your body with the cable.</li> <li>c. Do not place yourself between the welding cable and the ground (work piece) cable, if the welding cable is by your left side, then the ground cable should be by your left side too.</li> <li>d. The Welding cable and the ground cable are as short as possible.</li> <li>e. Do not work near to the welding power source.</li> </ol> </li> </ul> </li> </ul>
  	<ul style="list-style-type: none"> <li>● <b>Lifting equipment:</b> carton or wooden boxes package the welding machines supplied by Huayuan. There is no lifting equipment in its wrapper. Users can move it to the prospective area by a fork-lift truck, then open the box.</li> <li>■ If there are rings, the machine can be transited by rings. While Huayuan Welding Machine Manufacture reminds users, there is potential risk to damage the welding machine. So it is better to push the welding machine by its rollers unless special situations.</li> <li>■ Be sure that the appurtenances are all removed off when lifting.</li> <li>■ When lifting, make sure that there is no person below the welding machine, and remind people passing by at any moment. Do not move the hoist too fast.</li> </ul>
	<ul style="list-style-type: none"> <li>● <b>Noise:</b> Huayuan Welding Machine Manufacture reminds users: Noise beyond the limit (over 80 db) can cause injury to vision, heart and audition depending on oneself. Please consult local medical institution. Use the equipment after doctor's permission would help to keep healthy.</li> </ul>

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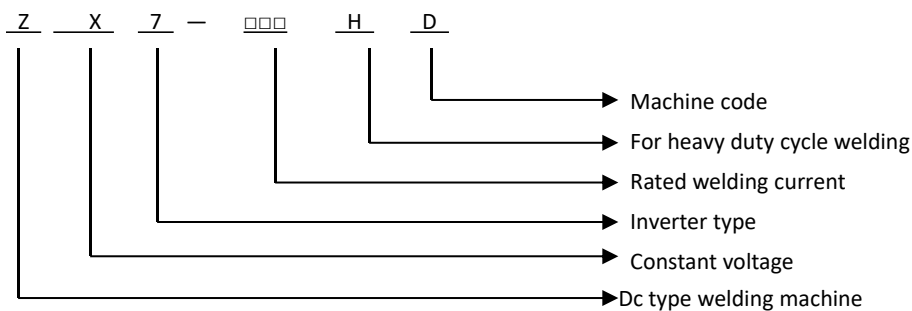
# 1 Main usage and application

1. This Series welding machine can be used for different types of electrode, especially suitable for hydrogen electrode to weld low carbon steel, mid-carbon steel and their alloy work-piece. It is mainly used in the industries like ship-building, boiler, power tower, petroleum and construction industries.

ZX7-HD series is one of our newest energy-saving power source, which with excellent technical standard and welding craft.

ZX7-1250HD inverter arc welding machine has advantages below:

- Good dynamic characteristic, stable arc, good performance, little spatter
  - Wide distribution voltage: 380VAC±60VAC
  - Arc force adjust function
  - Hot current adjust function
  - Welding current preset function
  - Digital controlled, Easy to operate, with remote control connector
  - Lack voltage, over heat protection function
  - Input voltage fluctuation compensation function, keep stable output current
  - It can be controlled by a wireless network management system
  - High efficiency, Low non-load loss
  - Small volume, light weight, easy to move
2. Model specification
    - This welding machine designed and produced according to the GB15579.1-2004、JB/T7824-1995
    - Model develop instruction



- Symbol instruction:



Please read the manual



Ground



Positive pole



Negative pole



Parameter increase/Decrease



Dangerous voltage



Current



Voltage



Air gouging



MMA

## 2 Working condition and Environment

### 2.1 working environment condition

- Altitude less than 1000m;
- Temperature:  
Working:  $-10^{\circ}\text{C}$ ~ $+40^{\circ}\text{C}$   
Storage:  $-25^{\circ}\text{C}$ ~ $+55^{\circ}\text{C}$
- Relative humidity:  
50% $\geq$  on  $40^{\circ}\text{C}$   
90% $\geq$  on  $20^{\circ}\text{C}$
- Do not locate where there is harmful gases, chemical depositions, mycete, and other explosive or corrosive substances, prevent shaking and jolt.
- Keep the machine inside and dry all the times, do not place it in a confined space, do not locate where the machine is exposed to direct sunlight.

### 2.2 Power input

- Voltage input: 3~380V/50Hz;
- Voltage fluctuation range  $< \pm 10\%$ ;
- Frequency fluctuation range  $< \pm 1\%$ ;
- Three-phase voltage imbalance rate  $< \pm 5\%$ ;
- If use engine power generator: the generator output capacity should be two times higher than the welding machine input capacity, and with compensating coil.

### 2.3 Safety precautions

- Open and check the machine: only qualified personnel should perform to avoid danger or machine damage;
- Turn off input power before open the machine, do not touch the electrical conductors to avoid electric shock.
- Dirt and dust which may cause short circuit should be kept to a minimum.
- Welding may produce fumes and gases hazardous to health. Use enough ventilation and exhaust at the arc to keep fumes and gases away from the breathing zone.
- Arc rays may cause eye injury, please do not watch the arc nor expose to the arc rays.
- Remove fire hazards from welding area, welding sparks and hot materials from welding can easily go through small crack and cause fire.

## 3 Technical specification

### 3.1 Parameter

Model	ZX7-1250HD
Input power	3~ 380V $\pm 15\%$ / 50Hz
Rated input capacity(KVA)	67.1
Rated input current(A)	102
Open cuircuit voltage(V)	96
Rated welding current(A)	1250
Rated welding voltage(V)	44
Rated duty cycle(%)	100
Current adjust range(A)	40~1250
Insulation grade	F
Dimension(LxWxH)(mm)	795x410x835
Weight(Kg)	87

\* Rated duty cycle 60% means, take 10min as the working cycle, the welding machine work 6min under the rated current status, rest for 4min. When the welding machine work more than 6min, the temperature in the machine will higher than the setting value, the overload indicator will on, and machine no output until the temperature in the machine lower to the setting value. When the overload indicator off, the machine can work again.

### 3.2 Welding electrode and related parameter setting

422 type electrode

Electrode dia.(mm)	3.2	4.0	5.0	6.0
Welding current(A)	100~150	160~210	200~270	260~300

507 type electrode

Electrode dia.(mm)	3.2	4.0	5.0	6.0
Welding current(A)	100~140	140~180	180~230	240~270

Current using range for round electrode rod

Electrode rod (mm)	6	7	8	9	10	12
Welding current(A)	300~350	350~400	400~450	450~500	500~550	750~850

Current using range for flat electrode rod

Electrode rod (mm)	4×12	5×10	5×12	5×15	5×18	5×20
Welding current(A)	200~400	300~400	350~450	400~500	450~550	500~600

## 4 Hardware Overview

This machine including: shell, inner part, handle and base, while the inner part include: cooling fan, main transformer, IGBT modules, filter reactor, fast recovery diode modules and PCBs etc.

## 5 General description

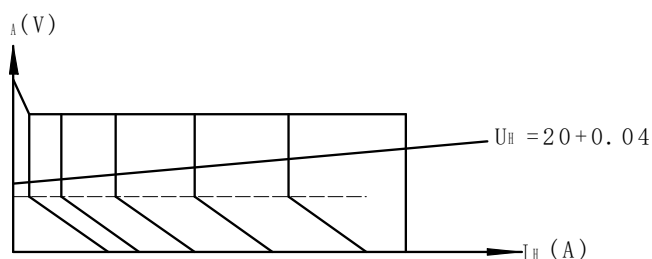
### 5.1 Working principal

ZX7-1250HD series welding machine adopts IGBT as the main circuit switch. The three-phase AC input power inverted to 20KHz HF current through the rectify of the full bridge. While after the depression of the HF transformer, rectified by the FRD and filtered by the reactor, the HF current will change to the low-voltage but high welding current.

The control circuit control the output current through the adjusting of the pulse width. The negative feedback signal, which is the real welding current get from the output current sensor, put into the special PWM circuit after compared with the current adjust signal, then output the driving pulse to control the IGBT, so that the output current will keep stable to get descending external characteristic.

Force current function: the control circuit will increase the current when the welding voltage less than 15V, so that the electrode will not stick with the work-piece to enlarge the arc penetration。

#### 1. Welding machine output CC/CV feature diagram





## 5.2 Principal diagram

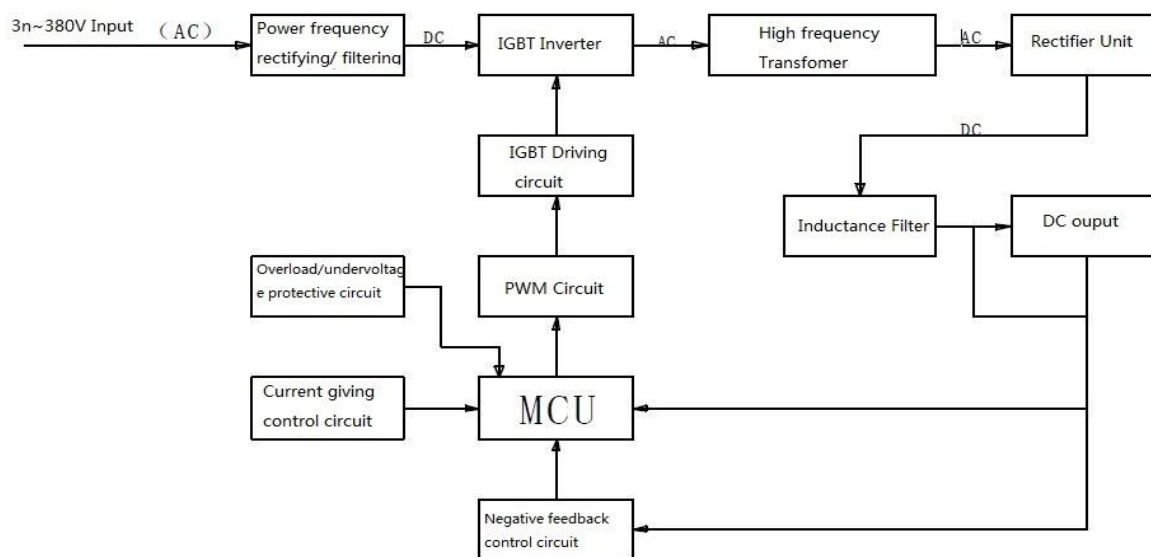


Fig2 ZX7-HD series Inverter DC welding machine diagram

## 6 Installation and adjustment

### 6.1 The moving and lifting

- Power off before moving. If the lifting of machine frequent, you should use special lifting equipment. Since the thrust face is on the bottom of machine, so forklift is the right choice;
- Should be lifted vertically;
- Welding machines and operation place should be away from combustibles;
- Prevent machine from dropping and crash.

### 6.2 Installation and operation conditions

- The installation should be done by authorized person;
- The fluctuation of distribution voltage should  $\leq +_10\%$ , three phase unbalance rate should  $< 5\%$ , frequency fluctuation should  $\leq +_1\%$
- This machine requires 3 phase 380v/50Hz power input, so the related power cable and distribution box is needed, as well as the circuit breaker and ground lead. Reliably connect the protective ground and the yellow-green wire which on the back of the machine. The wire CSA should no less than the following table

Model	CSA for input copper wire (mm <sup>2</sup> )	Breaker capacity (A)	Fuse protector (A)	CSA for ground lead cable(mm <sup>2</sup> )
ZX7-1250HD	$\geq 25$	150	150	$\geq 25$

- Power lead connection  
Open the insulation cover of the terminal box on the rear, use the power lead as above requires, connect it well, and cover the box.
- The connection of the ground cable  
The ground cable should be connected well.

## 7 Operations

### 7.1 Panel instruction

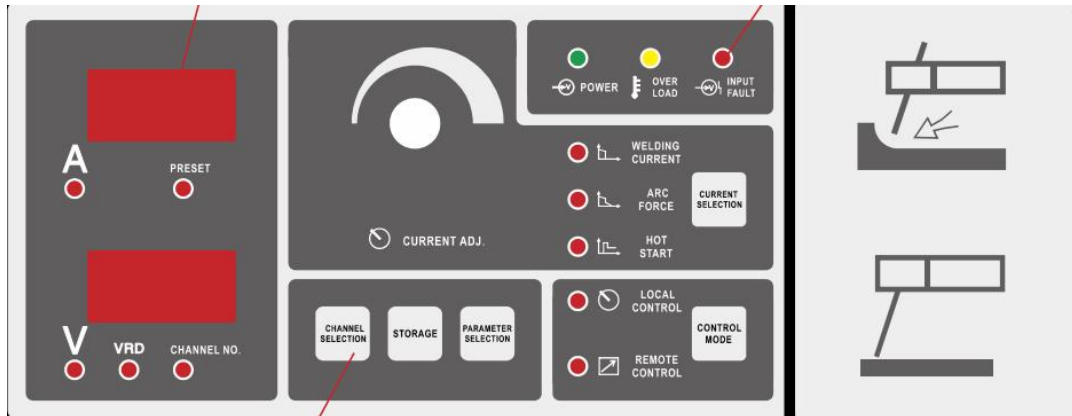


Figure 3 ZX7-1250HD front panel

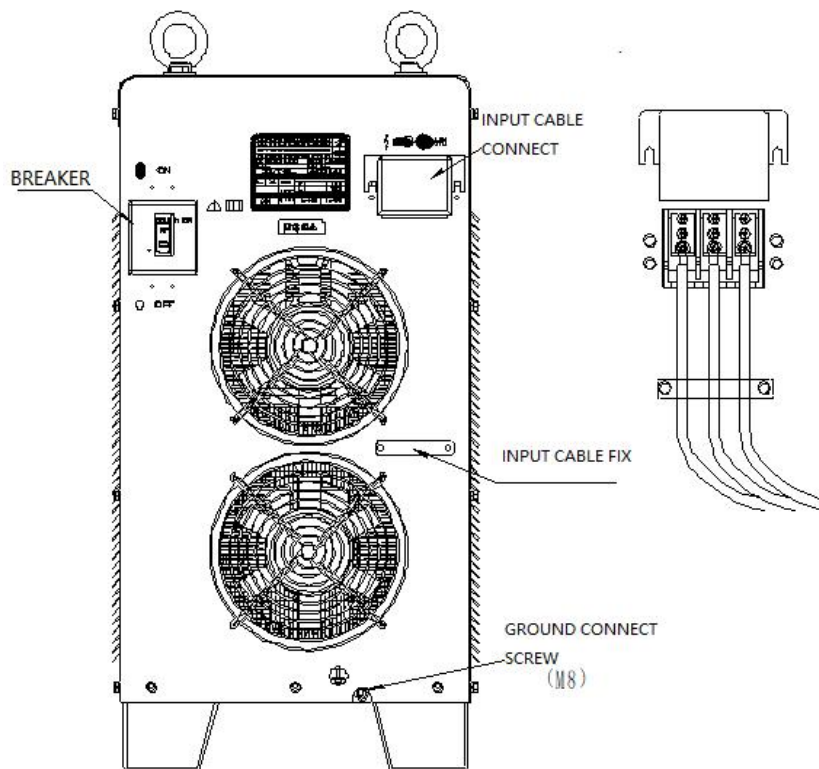


Figure 4 Rear panel

### 7.2 Function introduction

Power on, the indicator on the panel shall light.

- Power switch: up is on, down is off;
- Current LED: without press channel selection, it displays the present current during welding, display preset without welding. When Press channels selection, it displays the storage current of channel;
- Voltage LED: without press channel selection, it displays the real voltage of channel. When Press channel selection it displays the channel code;
- Channel selection: when press it, can shows the storage parameters, include welding current, arc force, hot start;

- e、 Storage:press it and storage the present parameter of any channels(total 10channels),the specific operation as follows:adjust the required welding parameter,press channels selection knob,the voltage LED display the present channel,if need to storage,press storage knob.If need to storage the parameter to other channels,continue to press selection channel till find the required channel,then press storage knob.It will return to the present adjustment parameter if without any operation within 5s;
- f、 Parameter selection: press the knob to select any parameter of any channels,as follows:press channel selection knob,to select the suitable parameter,and press selection parameter knob;
- g、 Current selection:Press it to choose the welding current,arc force or hot start;
- h、 Control mode: press and choose the control mode;
- i、 Power indicator: When this indicator is on means power on;
- j、 Overload indicator (Yellow): it on,mean overload,need to stop working and temperature drop;
- k、 Input fault indicator(Red): the indicator on means the power miss-phase or under-voltage,meanwhile,power off and check the power supply;
- l、 Anti-electric shock function indicator (VRD): When the indicator on means the output voltage is safe;
- m、 Welding current:the indicator on means current LED display the present welding current;
- n、 Arc force: the indicator on means the current LED display the arc force current.It will return to welding current indicator without any operation within 3s;
- o、 Hot start: The indicator on means the current LED display the hot start current.t will return to welding current indicator without any operation within 3s;
- p、 Locate: the indicator on means available to adjust the parameter on the power source;
- q、 Remote: the indicator on means not able to adjust any parameter on the power source,only adjust welding parameter by remote control box;
- r、 Channel No.: the indicator on means voltage LED display the present channel no;
- s、 Voltage(V): the indicator on means voltage LED display the present voltage;
- t、 Current(A): “on”mean the LED of current display the actual current;
- u、 Preset indicator: “on “mean the LED of current display the preset current.

**Note:**

- 1、 **The machine have intelligent fan function,it will work after power on but without welding for 15s,then stop;Fan keep rotating during welding,and stop after 8mins if end welding.**
- 2、 **The machine have anti-electric shock function,welding machine will output the safety voltage 8-10V if machine power on but without welding.When welding,output the normal arc voltage,but it will drop to the safety voltage if no welding after 1s.**

## 8 Maintenance

Specially note: Please turn off the power before any of maintenance and repairing of this welding power source, and because of the capacitor discharge, any of operation should be done at least 5 minutes after turning off the power.

1. The welding power should be opened and checked regularly (Once a year at least), clear the dust inside the machine with impressed air to avoid any of fault or short circuit.
2. The welding cables (Input and output) should be checked regularly (Once a week at least) to protect the reliable connection.

## 9 Troubles and troubleshooting

Attention: Only qualified technicians should perform troubleshooting work on the machine. If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, please contact us for technical assistance;

TROUBLE (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
When machine energized, the circuit breaker trip	1.Three phase bridge rectifier may damaged	1. change the bridge rectifier; 2. change the capacitor.

	2. The capacitor which parallel with the three phase bridge rectifier may damaged. 3. IGBT may damaged	3. Replace PCB and IGBT
When machine energized, the power indicator not on, no voltage indication	1. The protective fuse on the back of the machine may break 2. Lack phase	1. Replace fuse 2. Check the input power
When machine energized, the power indicator on, but no voltage indication	1. PCB AP1 may damage 2. IGBT module may damage 3. Voltmeter may damage	1. Replace AP1 2. Replace IGBT module 3. Replace voltmeter
No OCV, there is abnormal noise from the machine	FRD on the main circuit is damaged	1. Check and replace the FRD
The OCV is OK, but sometimes the arc will break	Lack-phase	Check the input power
Suddenly there is no welding current during the welding process	1.welding cable and work piece with poor connection 2.Protective fuse break	1.check the weld cable 2.Replace the fuse(1.5A)
Machine not work, but the overload indicator on	1. Cooling fan damaged cause overheat protection 2. Over-load use cause over heat protection	1. Replace cooling fan 2. Stop welding, let the machine operate for 10min without load
Machine not work, but the lack voltage indicator on	The input lack-phase or lack voltage	Check three phase input

#### Some main components list

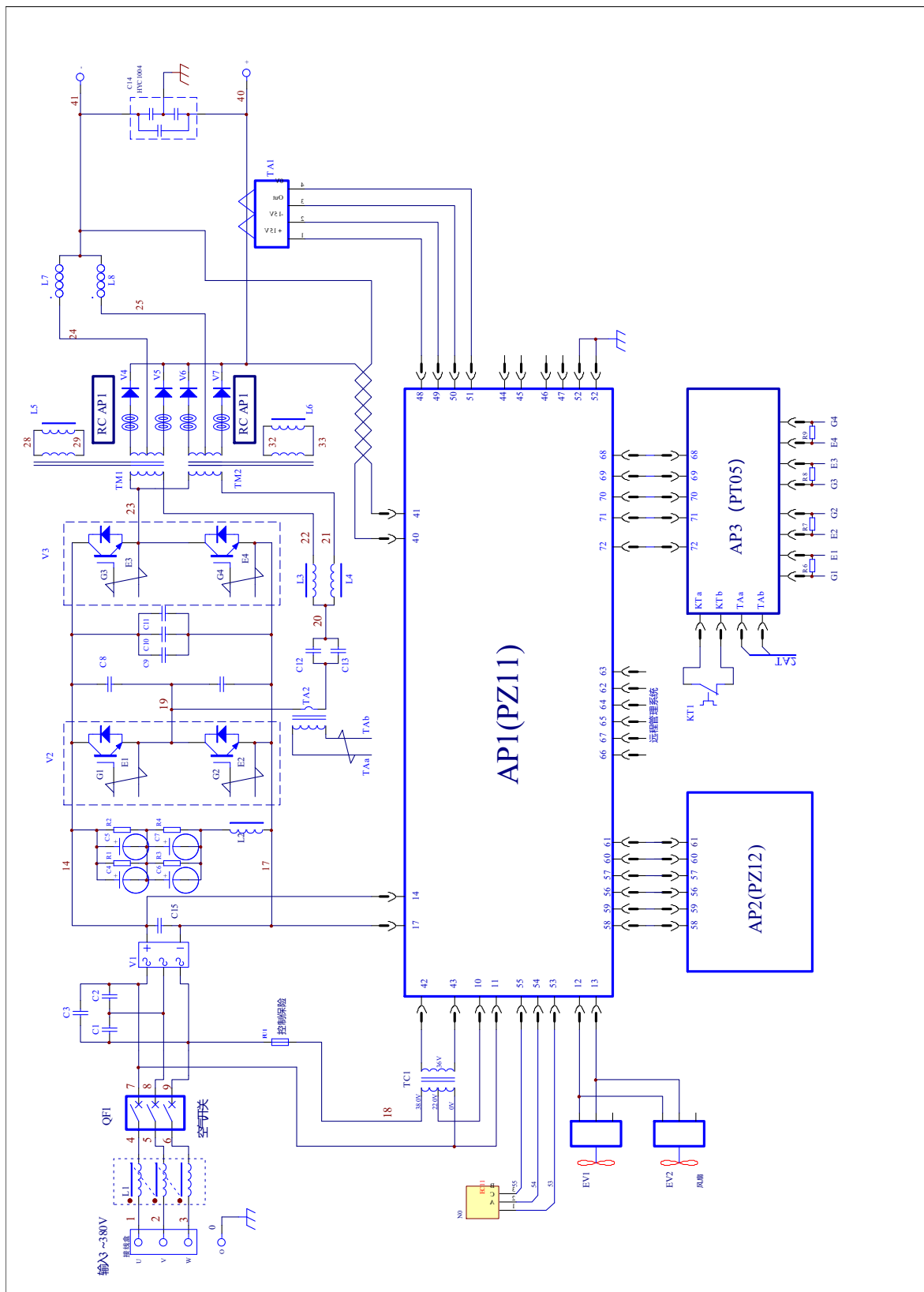
Item	Name	Code	Model	Specification
1	Air breaker	QF1	CDM3-125S	125A
2	Rectifier bridge	V1	MDS150-16	150A
3	Filter capacitor	C4-C7	2200 $\mu$ F / 400VDC+85 $^{\circ}$ C	
4	IGBT	V2、V3	FF300R12KT4	300A
5	Diode	V4-V9	MMF200ZB040DK1	200A
6	Current sensor	TA1	TKC1000BR	1000A/4V
7	Cooling fan	EV1、EV2	200FZY6-S	/
8	Control transformer	TC1	TZ02-A1	/
9	Control board	AP1	PZ28	/
10	Control board	AP2	PZ27	/
11	Control board	AP3	PT05	/

!Attention: Only qualified technicians should perform troubleshooting work on the machine. If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, please contact us for technical assistance.

## 10 Packing List

- |  |            |
|--|------------|
| 1. ZX7-1250HD inverter arc welding machine                           | 1 pcs      |
| 2. Air gouging torch   | 1 pcs      |
| 3. Documents (Guarantee card, operation manual, quality certificate) | 1 for each |

## 11 Drawing (The principle drawing of the main circuit)



The final explanation rights reserved to Huayuan Company!

If there is any changes in the user's manual, forgive not to inform separately!

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