WSE-350MD/500HD

AC/DC ARGON WELDING MACHINE

MANUAL INSTRUCTION

(PLEASE READ CAREFULLY BEFORE OPERATION)

Safety Depends on You

Huayuan arc welding and cutting equipments are designed and built with ample safety consideration. However, proper installing and operating the machine can increase your safety.

DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT CASUALLY WITHOUT READING THIS MANUAL THROUGHOUT.

Special Attention (Very Important):

BE SURE TO AVOID THE WELDING MACHINE FALLING DOWN WHEN IT IS PLACED ON THE GRADIENT GROUND.

IT'S FORBIDDEN UNFREEZING THE PIPELINE BY THE WELDING MACHINE.

THE SHIELD RANK OF THIS SERIAS OF WELDING MACHINES IS IP21S, SO WORKING IN RAIN IS NOT SUTABLE.

Purchase Date：_____

Serial Number：_____

Machine Type：_____

Purchase Place：_____

Cautions	Arc and arc rays can hurt.

All performing welding workers ought to have health qualification from the authority organization to prevent you and others from arc radiation and burn, it should be prevented for children to enter into dangerous area as well.
Be careful reading the following important items and the welder safety byelaw from the authority organization. Be sure that qualified professionals perform all installation, maintenances and repair procedures.

1 **Electric shock**: The welding circuits are not insulated when welding. If you touch the two output electrodes of the machine with your bare skin at the same time, it will lead to electric shock, sometimes even fatal dangers. Users need to follow the items below to avoid electric shocks:

- If possible, lay some insulating materials, which are dry and large enough, in your working field. Otherwise, use the automatic or semiautomatic welding machine, DC welding machine as possible as you can.
- Components in the automatic and semiautomatic welding machine such as the welding wire reel, feed wheel, contact tip and welding head are all electriferous.
- Always be sure the machine has been connected perfectly to the work piece with the work cables and should be as close as possible to the working area.
- The work piece should be grounded perfectly.
- Make sure that the insulating material of the electrode holder, the grounding clamp, the welding cable and the welding head are not affected by damp, mildewed or spoilt, and be replaced momentarily.
- Never dip the electrode in water for cooling.
- Never touch electriferous parts of two welding machines at the same time, because this voltage is supposed to be two times of welding voltage while the grounding mode is not clear.
- While working high above the ground or other places having the risk of falling, please be sure to wear safety belt to avoid losing balance caused by electric shock.

2 **Arc**: Use an arc welding mask to protect your eyes and skin from sparks and the rays of the arc, pay special attention to the filter glass, which must be conformable to the national standard.

- Use clothing made from durable flame-resistant material or sailcloth to protect your skin from hurting by the arc rays.
- Remind other nearby personnel before working lest arc rays hurt them by accident.

3 **Fumes and Gases**: 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. Do not weld at the same time when using of degreasing, cleaning or spraying operations. The heat and rays of the arc can react with these gases to form phosgene, a highly toxic gas,.

- Some protective gases used in welding might displace the oxygen in the air, and can lead to hurt or even death.
- Read and understand the manufacturer's instructions for this equipment, and validate the health certification of consumptive materials, make sure they are asepsis and innocuity.

4 **Spatter**: Spatter can cause fire or explosion.

- Remove fire hazards from the welding area. Remember that spatter from welding can easily go through small cracks and touch fire hazards. Keep the safety of all kinds of lines going though welding area, including hydraulic lines in the wild.
- 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.
- It is very dangerous to heat, cut or weld tanks or containers at entry holes. Does not start work until the proper steps have been taken to insure that there are no flammable or toxic gases there.
- 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.

5 **Cylinder**: Damage of it might cause explosion.

- 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.
- Make sure that the installation of cylinder is by the wall and bundled tightly by a chain.
- Be sure to put the cylinder in the working space with no crash or shake, and far from welding area.
- It is forbidden to touch cylinder with the welding clamp or the work cables.
- Avoid facing the cylinder while installing the decompression flowmeter or the gasometer.
- When not working, please tighten the valve.

6 **Power**: (For electrically powered welding and cutting equipment) Turn off input power before installation, maintenances and repair, so that avoid accident.

- Huanyuan welding equipment is I class safeguard equipment; please install the equipment by manufacture's professional person
- Ground the equipment perfectly in accordance with the manufacturer's recommendations.

7 **Power**:(For engine driven welding and cutting equipment)

- Work in ventilated place or outdoors.

- 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.

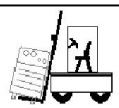
- Make sure that all the safeguard equipments, machine cover and devices are all in a good condition. Be sure that arms, clothes and all the tools do not touch all the moving and rotating components including V belt, gear and fan etc.
- Sometimes having to dismantle some parts of the device during maintenance, but must keep safety awareness strongly every time.
- Do not put your hand close to fans and do not move the brake handle while operating.
- Please remove the connection between the engine and the welding equipment to avoid sudden starting during maintenances.

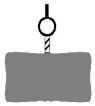
- When engine is hot, it is forbidden to open the airtight cover of the radiator water tank to avoid hurt by the hot vapor.

8 **Electromagnetic**: Welding current going though any area can generate electromagnetic, as well as the welding equipment itself.

- Electromagnetic would affect cardiac pacemaker, the cardiac pacemaker users should consult one's doctor first.
- The effect of electromagnetic to one's health is not confirmed, so it might have some negative effect to one's health.
- Welders may use following method to reduce the hazardous of electromagnetic:

a. Bundle the cable connected to the work piece and the welding cable together.
b. Do not enwind partially or entirely your body with the cable.
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.
d. The Welding cable and the ground cable are as short as possible.
e. Do not work near to the welding power source.





9 **Lift equipment**: 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.

- If having rings, the machine can be transited using rings. While Huayuan Welding Machine Manufacture reminds users, there is possible risk to damage the welding machine. It is better to push the welding machine moving in use of its rollers unless special situations.
- Be sure that the appurtenances are all removed off when lifting.
- 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.

10 **Noise**: 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 with doctor's permission would help to keeping healthy.

CONTENT

Warnings

For the electric circuit and connector inside welding machine exceeding the requirement of safety voltage《GB3805-93》, only the professional person after training can open the machine cover for checking & repairing when the power is on. Please cut off the power when the maintenance is operated.

Features and Usage

WSE series AC/DC pulsed TIG welding machine has the function of DC TIG welding, DC pulsed TIG welding, AC TIG welding, and AC pulsed TIG welding. It is a kind of tungsten TIG welding machine incorporated multi-function.

The first inverter of WSE series AC/DC pulsed TIG welding machine adopts the latest IGBT and fast recovery diode etc big power breaker, the invert frequency reaches 20KHZ. The small mid-frequency transformer replaced the heavy industrial frequency transformer, which has the advantages of high efficiency, low non-load loss, stable current, energy saving, material saving and high reliability etc..

The second inverter of WSE series AC/DC pulsed TIG welding machine adopts the semi-bridge inverter circuit, which has advantages like adjustable frequency and width rate, good reliability and energy saving etc

WSE series AC/DC pulsed TIG arc welding machine has all functions required by welding technique: high frequency arc striking, gas pre-send (adjustable), initial current (adjustable), current up-slope (adjustable), current down slope (adjustable), crater current (adjustable), gas post-cut off etc. During the AC TIG welding the clean width is adjustable and AC frequency is adjustable, which are fully considered according to customer's different requirements to the form of weld seam. The machine can be used for ordinary welding as well as pulsed welding. The advantage of the pulsed welding is interchange of the high and low welding current, better arc stiffness due to the electromagnetic pinch effect, the melting time for the metal is short, so the weld seam is much more fine with higher strength. The form of weld seam surface could also be changed through changing the four pulse parameters, so it could also decided by welding machine..

This welding machine can mainly used for all metals like aluminum, magnesium, copper, stainless steel on pipe, boiler, aviation, etc.

Working Conditions and Environment

Input power

1.1 The exact input voltage wave shape should be sine wave, the frequency fluctuation should be no more than ±1% of the rated value.

1.2 The fluctuation of input voltage must be within ±15% of the rated value.

1.3 The unbalance rate of input voltage should be ≦5%.

Environment

A. Ambient temperature ranges:

Welding temperature range: -10℃~+40℃

Transportation and Storage temperature range: -25℃~+55℃

B. Relative humidity: ≤50% @ 40℃

≤90%@20℃

C. The dust, acid, corrosive gas or material around should not exceed the normal content, except the one produced during welding.

D. Operating altitudes: less than 1000m

E. Wind speed should be no more than 1m/s

F. Keep the machine inside and dry all the times, do not locate where the machine is exposed to direct sunlight and rain.

Technical Specification

Model / Parameter		WSE-350MD	WSE-500HD
Input power		3～380/415V 50/60 Hz	
Rated input capacity(KVA)		15.3	25
Rated input current(A)		32.5	38
Open circuit voltage(V)		72	72
Rated welding current(A)		350	500
Rated welding voltage(V)		24	30
Rated duty cycle(%)		35%	60%
Gas pre-send time(S)		0.0～5.0	
Initial current adj. range(A)	AC	20～350	20～500
	DC	10～350	10～500
Current upslope time(S)		0.0～10.0	
Welding current adj. range(A)	AC	20～350	20～500
	DC	10～350	10～500
Peak current adj. range(A)	AC	20～350	20～500
	DC	10～350	10～500
Pulse frequency(Hz)		0.2～99.9	
PWM ratio(%)		10%～90%	
Base current adj. range(A)	AC	20～350	20～500
	DC	10～350	10～500
AC frequency(HZ)		20～200	
Clean width(%)		10%～50%	
Current down-slope time(S)		0.1～15	
Crater current adj. range(A)	AC	20～350	20～500
	DC	10～350	10～500
Gas post-cut off time(S)		0.0～20.0	
Dimension(L×W×H)(mm)		705×350×650	725×385×785
Weight(kg)		52	70

Product System Introduction

Working principle

WSE series AC/DC pulsed TIG welding machine adopts AC-DC-AC-DC-AC double inverter circuit. The first inverter takes IGBT as the inverter main component. After the three-phase AC input power is rectified through power frequency three phase, it is supplied to IGBT inverter, and inverted to 20KHz mid-frequency current, then it is voltage-decreasing and current rectifying through mid-frequency, further more, after filter and current negative feedback, the constant adjustable welding current meeting welding requirement is output.

The control circuit controls the output current through adjusting the pulse width of driven signal. The negative feedback signal coming from output generatrix is enlarged, then it is put into the opposite input end of error amplifier from special PWM circuit, then it controls the conduction time of IGBT, so that the output current can be kept stably to get descending external characteristic.

The second inverter takes IGBT as the inverter main component, changes the DC current to AC square wave current, then the square wave required by AC TIG welding is obtained.

This machine has functions of gas pre send, gas post cut off, HF arc striking, current upslope, current down slope. All these functions are controlled by the digital signal controller automatically.

Working circuit diagram

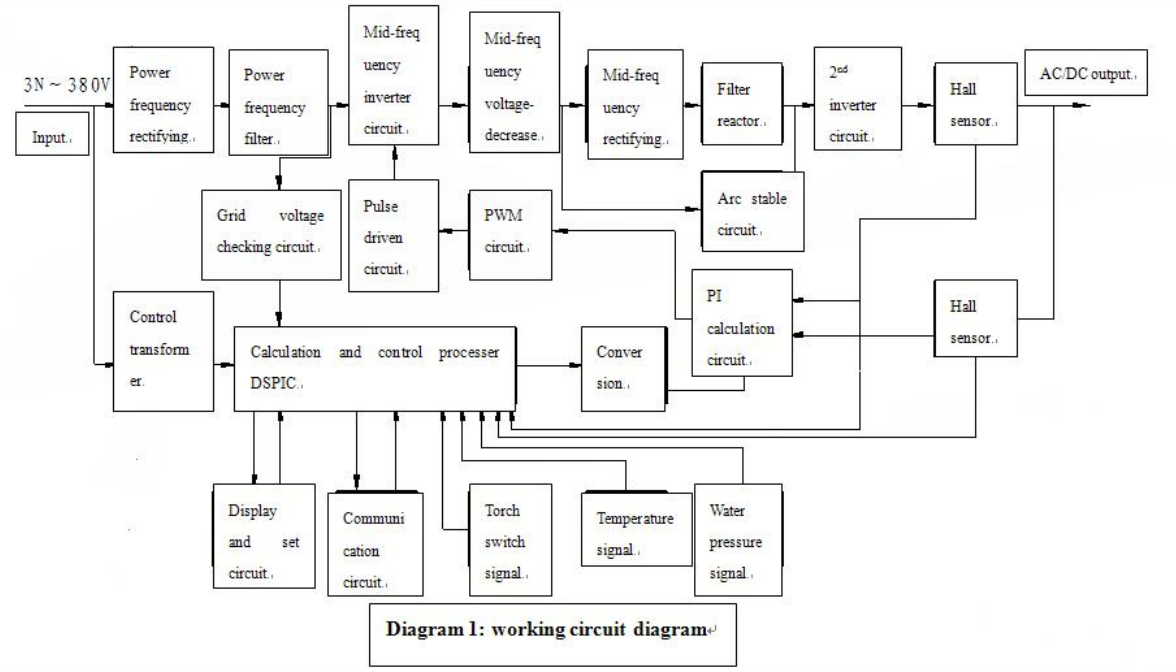
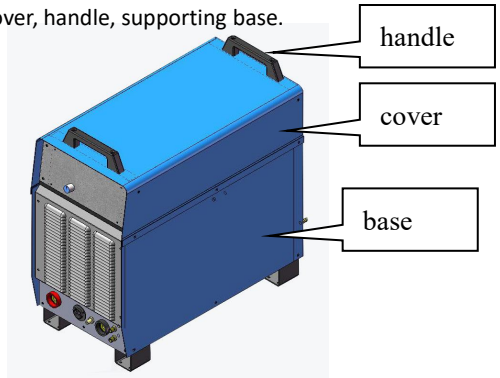


Diagram 1: working circuit diagram

Machine introduction

1. This machine is composed of inner part, cover, handle, supporting base.



2. Front panel description and function:

The front panel is divided into six areas according to the function:

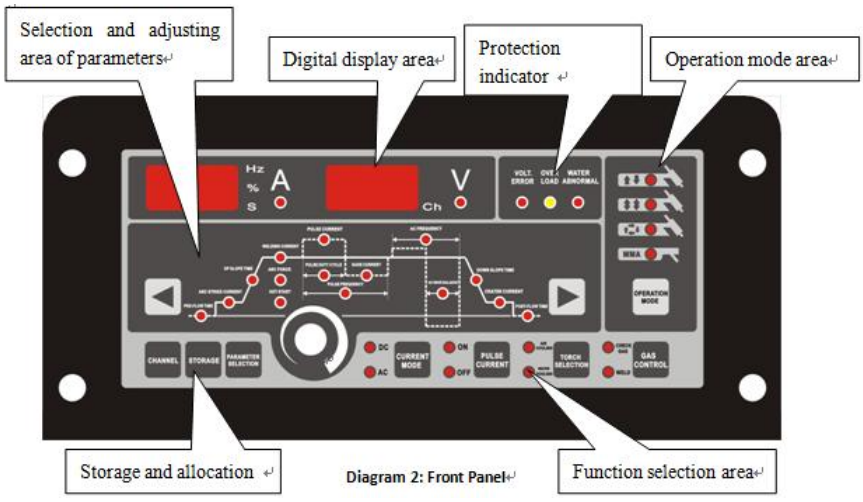
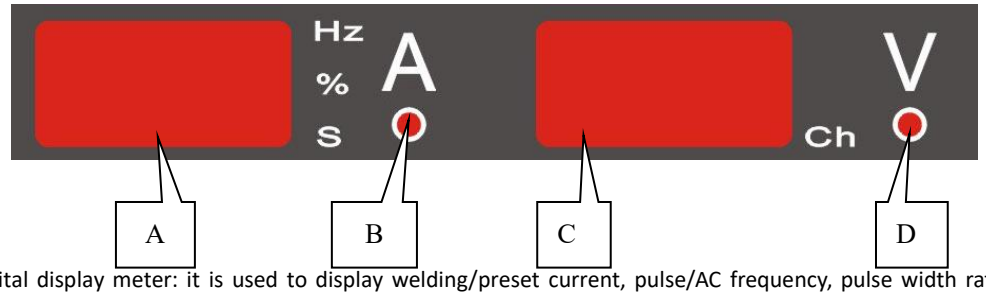


Diagram 2: Front Panel

1) Digital display area:



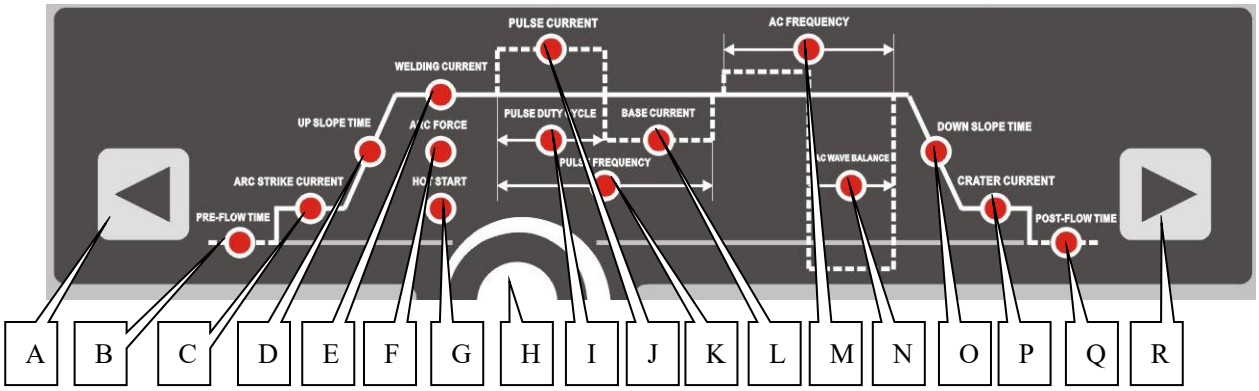
A. 1st digital display meter: it is used to display welding/preset current, pulse/AC frequency, pulse width ratio/clean width, pre-gas time etc.

B. Display type indicator of 1st digital display meter: when the 1st digital display meter is displaying welding current, this indicator is on.

C. 2nd digital display meter: it is used to display welding voltage, pass no. etc.

D. Display type indicator of 2nd digital display meter: when the 2nd digital display meter is displaying voltage, this indicator is on.

2) Selection and adjusting area of parameters:



or one time, there is only one indicator on in this area, which indicates current displayed& adjusted parameter, and the parameter value is displayed on 1st digital display meter, adjusted by encoder. When there is no pulse during working, the welding current is displayed. When there is pulse during working, the peak current is displayed. The current displayed or adjusted parameter can be selected through pressing the left or right selection key.

A. Left selection key: press the key, the lighted parameter indicator will move to left, it moves one after press key one time.

B. Pre-gas time: adjusting the pre-gas time.

C. Arc striking current: it is the current when the arc is started.

D. Upslope time: current is transited from arc striking current to welding current(when there is no pulse)/peak current and base current (when there is pulse)time.

E. Welding current: it is the current when there is no pulse working.

F. Arc force: under the MMA status

G. Hot start:under the MMA status

H. Peak current: it is pulsed peak current when there is pulse working.

I. Rotary encoder: it is used to adjust current displayed parameter.

J. PWM ratio: when there is pulse working, the ratio between peak current time and pulse cycle.

K. Pulse frequency: when there is pulse working, it is pulsed working frequency (the inverse of pulse cycle).

L. Base current: when there is pulse working, it is the base current of pulse.

M. AC frequency: during AC welding, adjusting the current frequency.

N. Clean width: when it is AC welding, adjusting the width ratio of current negative half-wave, and clean width of negative pole.

O. Down-slope time: the time of current transited from welding current(no pulse)/peak current and base

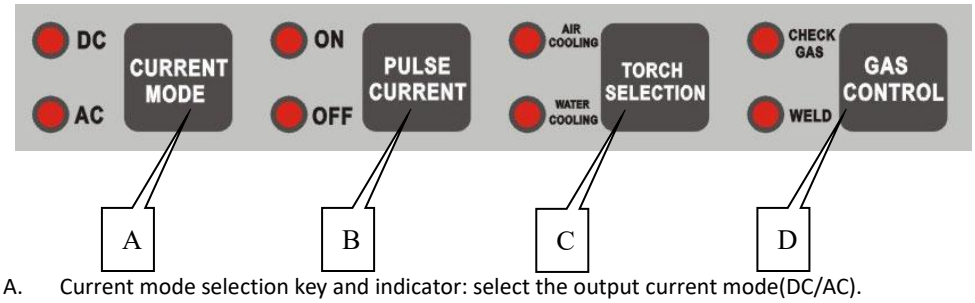
current(with pulse) to crater arc current.

P. Crater arc current: the current during the arc ending.

Q. Gas-post time: it is gas-post cut off time.

R. Right selection key: press the key, the lighted parameter indicator will move to right, it moves one after press key one time.

3) Function selection area:



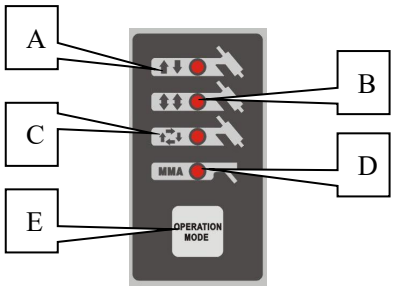
A. Current mode selection key and indicator: select the output current mode(DC/AC).

B. Pulse current key and yes or no indicator: select the current with pulse or without pulse.

C. Welding torch selection key and indicator: when the gas cooling torch is chosen, this switch should be in gas cooling operation. When the water cooling torch is chosen, this witch should be in water cooling operation, and water pressure checking function is started.

D. Gas control selection key and indicator: before welding it is in the position of gas checking. Adjusting the argon flux, after adjusting, when the switch is in automatic position, the welding machine sends gas and cut off gas automatically.

4) Operation mode area：



A. Non self-lock: when this indicator is on, the welding machine is the non self-lock status of TIG welding.

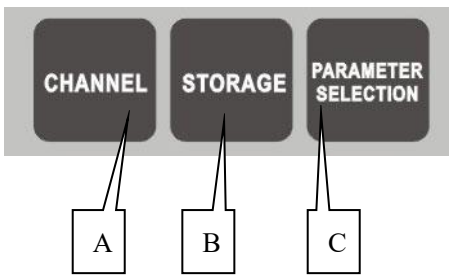
B. Self-lock: when this indicator is on, the welding machine is the self-lock status of TIG welding.

C. Repetition: when this indicator is on, the welding machine is the repeated non self-lock status of TIG welding.

D. MMA: when this indicator on, the machine is under MMA status

E. Operation mode selection key: this key is used to switch the operation modes of welding machine.

5) Storage and allocation area：

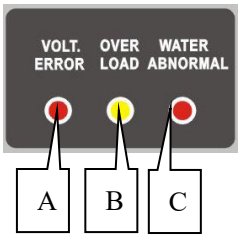


A. Pass key: when it is the 1st time to press this Pass key, voltmeter displays current pass no., and ammeter displays current storage welding parameters. The left selection key or right selection key can be pressed to display other parameters stored inside the pass. The storage key can be pressed to store the current welding parameter into current pass. The allocation key can be pressed to allocate the storage parameter inside pass as current welding parameter. The pass key can be pressed to choose next pass. If no key is pressed, it will back out from the pass.

B. Storage key: have current welding parameter stored inside current pass.

C. Allocation key: have current parameter which is stored inside the pass allocated out to use as current welding parameter.

6) Protection indicator area:

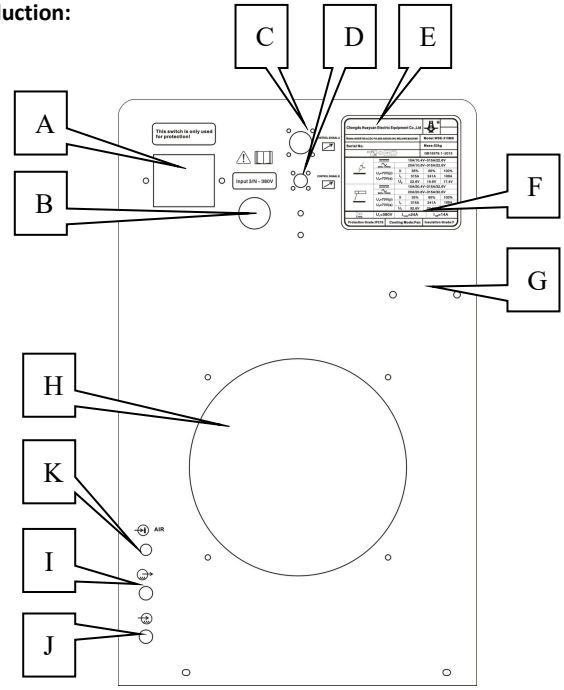


A. Grid voltage abnormity indicator: when the input voltage exceeds 380±15% or lacks phase, this indicator is on.

B. Overload indicator: when the ambient temperature is too high, or the machine is used over the rated duty cycle, which causes the overheat inside machine, this indicator is on.

C. Water cooling abnormity indicator: when the water cooling torch is used, it shows the water pressure status. When the water pressure is enough, the indicator is off, when the water pressure is not enough, the indicator is on.

7.back panel picture and introduction:



A. Power protection switch: it only used for protection of the over load current.

B. Power input cable: the three phase input cable is fixed on the machine through the screw connector.

C. Communication interface A: it connects the pedal controller (WSE-350MD) or the same frequency communication interface of double machine (WSE-500HD).

D. Communication interface B: it connects wireless controller.

E. Silk print place of name plate.

F. Label place for welding machine series no..

G. Installation place of wireless controller.

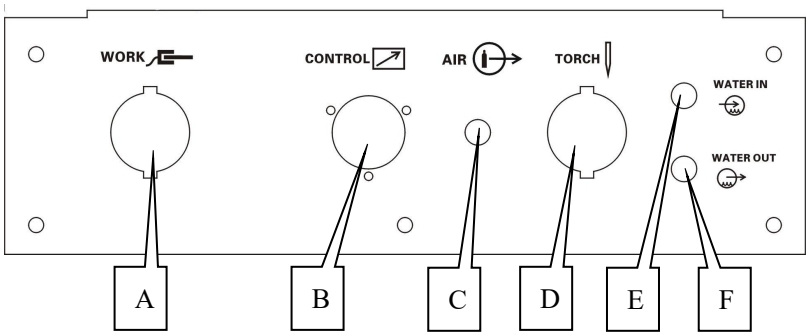
H. Cooling fan.

I. Water-returning connector.

J. Water inlet connector.

K. Gas inlet connector: it connects argon relieve valve.

8.Front below panel introduction:



A. Connect workpiece.

B. Connect the plug of welding torch switch.

C. Argon output mouth.

D. Connect welding torch.

E. Connect water-returning mouth of water cooling torch.

F. Connect water-output mouth of water cooling torch.

Preparation before welding

1.Input power capacity and connecting cable:

The input power of this machine is 3 phases, 380V, 50/60HZ. Customer should have the related electricity cabinet and install the automatic breaker and earth cable. Please connect the green and yellow earth cable on the machine back with the protection earth cable on electricity cabinet, the outer cable should not be less than the following table value.

Value / Model	Section surface of input cable($mm^{2)}$)	Breaker capacity(A)	Section surface of earth cable($mm^{2)}$)
WSE-350MD	≥6	40	≥6
WSE-500HD	≥6	60	≥6

If the electricity generator is used for power supply, then the capacity of all the generators and compensation cables should be 3 to 5 times of power source.

2.Electricity-usage safety

L. As to the following situations, the input power source must be cut off by the switch of the electricity distribution cabinet.

. When there is need to contact input or output terminals of power source, or open the machine cover for interior examination.

. When there is need to check welding torch of exchange spare parts.

. When there is no need to use welding machine.

M. For avoiding electricity shock, please make sure if it is earth-connected reliably.

N. The damaged cables must be replaced.

O. When operating in the moist field or connecting mother-material cables, the dry working clothes, fur gloves and rubber safety shoes must be worn.

3.ventilation

Dusts and harmful gas are produced in the welding process; the ventilation measures must be taken.

4.Protection from arc

The strong arc is produced in the welding process, so the welding shield mask with filter glass must be used during the welding process. Additionally, the neck, face and hands should be protected from the damages of arc and metal splash.

Filter glass selection

Welding current	Below 100A	100A-300A	300A-500A
Filter glass class	9 or 10	11 or 12	13 or 14

5.burning

In order to avoid metal splash and ray-heat radiation produced in the welding process, the working clothes and fur gloves should be worn, as well as pay attention to protect face, neck, arms and legs. The protection barrier should be installed around the welding fields, to avoid the splash melt burning people around.

6.Fire

The melted metals with high temperature may splash around during the welding process, so the following items must be paid attention to:

- ●The flammable matters must be far away from the welding site.
- ●Before welding, check if there are flammable matters in the operation range or not, in order to take them away for eliminating hidden troubles.

Installation

1. Installation location

The location conditions should follow the items below and the distance between the machine and the wall or the other machines should be at least 30cm.

- Indoors with low humidity, less dusts and avoiding directly sunshine and rain.
- The floor must be massive and flat, such as cement floor.

2. Exterior connection

- A fuse breaker or a breaker without fuse must be set at the input side of each welding machine.
- Before connecting, the switch of the electricity distribution box must be turned off.
- Have the fast connector of earth cable connected to output + terminal of welding machine, and the other end of cable is connected to workpiece firmly.
- Have the fast connector of torch cable connected – terminal, and the gas inlet nut of the torch to the gas outlet of the machine. The water inlet pipe of the torch connects with the water outlet connector of the machine; the water outlet pipe of the torch connects with the water backward of the machine.

Warning: the fast connector must be connected tightly, or else it may produce heat to damage connector.

- Argon flow meter

Argon flow meter is the exclusive flux regulator for argon, which cannot be used for the other high pressure gas. It is not allowed to disassemble the argon flow meter.

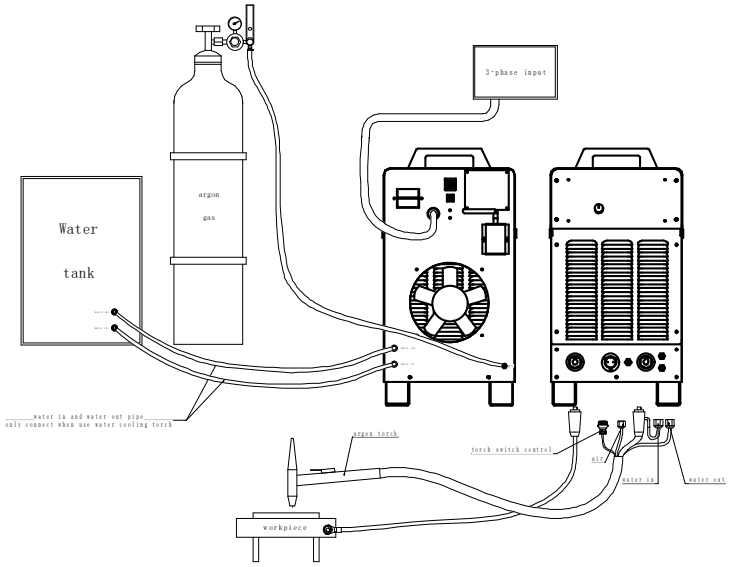
Additionally, it is not allowed to touch the pressure adjusting devices and screws inside the meter. Otherwise, fatal accidents may happen.

The using methods please refer to the operator's manual attached in the flow meter.

- The water inlet mouth of welding machine is connected with the water output mouth of recycling water cooler, the water-returning mouth of welding machine is connected with water-returning mouth of recycling water cooler.

Notice: For this series welding machines, there is no need to water cooling inside, only the water cooling torch is required, so to connect the water when the water cooling torch is applied for welding.

Picture 4：Installation Diagram



Operation Introduction

1. Turn on the power source, the welding machine proceeds self-check, the digital display meters and indicators on the panel all is on for 1.5s, and goes off for 0.5s, then the display is normal.
2. Pres the gas control key, the indicator of gas checking is on. As per technology requirement, adjust the argon flux, then press the gas control key again, then indicator of automatic is on.
3. Choose the current mode according to the welding material. Choose AC welding for Aluminum, Magnesium and their alloy, while choose DC welding for carbon steel.
4. As per technology requirement set pulse on/pulse off, and press the pulse current key to set.
   If choose the welding with pulse off, adjusting encoder sets the welding current.
   If choose the welding with pulse on, set the peak current, pulse width ratio, pulse frequency, base current, press left selection key or right selection key to select the needful parameters to set.
5. When the AC welding is adopted, as per technology requirement set the AC frequency and clean width.
6. As per technology requirement, set gas pre-flow time, initial current, up-slope time, down-slope time, arc crater time, gas post cut-off time.
7. Welding operation sequence
   a) Non self-lock

Keep the tungsten 1～3mm from workpiece, then press the torch switch , after the current up slopes the normal welding starts, after finishing welding loosen the torch switch, the current down slopes to crater arc current and then it is off. After finishing welding please do not take the welding torch away immediately, until the postponed gas cut-off time is ended, so that the molten pool and tungsten could be better protected.

b) Self-lock

Keep the tungsten 1～3mm from workpiece, then press the torch switch to strike arc. After the arc strikes, keep the striking arc current, and find the welding position, release the torch switch, the current will up slope to the preset value, the welding begins. Press the torch switch again when you want to finish the welding, the current will down slope to crater arc current, then loosen switch, the arc is off, the welding finishes. After finishing welding please do not take the welding torch away immediately, until the postponed gas cut-off time is ended, so that the molten pool and tungsten could be better protected.

c) Repetition

Keep the tungsten 1～3mm from workpiece, then press the torch switch to strike arc. After the arc strikes, keep the

striking arc current, and find the welding position, release the torch switch, the current will up slope to the preset value, the welding begins. Press the torch switch again, the current will down slope to crater arc current, then loosen switch, the current is increased to welding current. Above process is repeated. When it is ready to finish welding, lift up the torch and cut off arc, the welding is finished. After finishing welding please do not take the welding torch away immediately, until the postponed gas cut-off time is ended, so that the molten pool and tungsten could be better protected.

Operation

1. Warning

To avoid shock, the following items should be complied with:

- ✧ The fatal shock or burnt accident can be caused if touching the electrified parts.
- ✧ It is prohibited to touch the tungsten electrode when press the switch of torch
- ✧ Before replacing the tungsten electrode, the input power must be cut off.
- ✧ Dry working clothes and gloves must be worn when operating.

Security operating instruction

- ✧ The contents of the manual must be understood adequately, the machine must be operated by the professionals with security operation knowledge and skill.
- ✧ The machine must be used under the rated duty cycle. If the duty cycle exceeds the rated value, the machine may be burnt.
- ✧ The following items should be complied with during the operation process.
- ✧ Change the appropriate electrode when it is difficult to strike arc.
- ✧ If it is difficult to strike arc, please check the flow of shield gas

2. AC TIG welding

The following items should be pay attention when the machine is used in AC TIG welding mode.

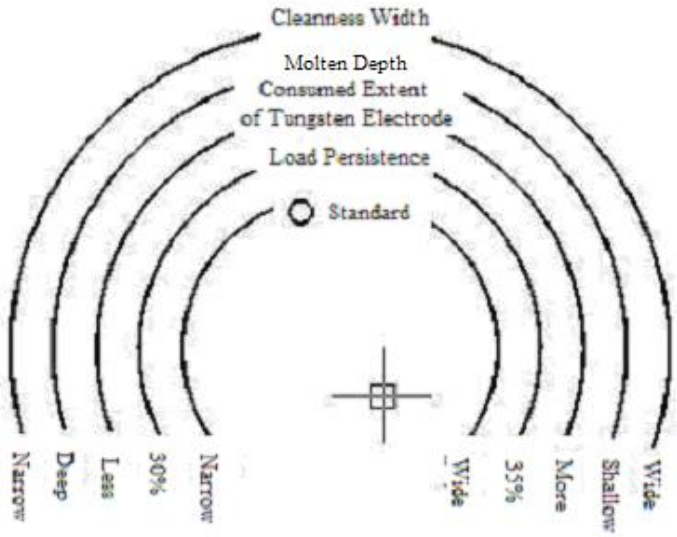
- ✧ The unnecessary prolong cable is no use, it should be as short as possible.
- ✧ When use prolong cable，it is better to enlace the mother-material cable and the torch cable, bundle insulating tape and pull as straightly as possible.

3. AC frequency：

- ✧ Output frequency should be freely set between 20HZ～100HZ
- ✧ The higher the frequency, the more centralize of the arc terminal.
- ✧ The higher the frequency, the shallower of the melt depth, the less of the deposition.
- ✧ The higher of the frequency, the less consumption of the electrode, tungsten electrode is suggested to use

AC wave balance

- When use AC TIG welding for aluminum, the clean strength of the arc negative can be adjusted through the clean width knob.
- The relationship between the knob set position of clean width knob, welding performance and tungsten consumption is as below:



- Note: Although the rated duty cycle of the machine is 35%, when use AC TIG welding, if the clean width set to “narrow” position, please use the machine under 35% duty cycle.

Exchange frequency and DC rate

- When use TIG welding for aluminum, use AC and DC together can ensure the clean width as well as reduce the tungsten burnt.

TIG welding (only for reference)

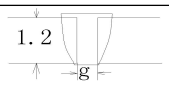
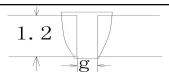
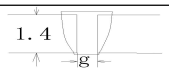
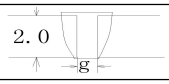
Normal TIG welding（without pulse）

Material	Thickness（mm）	Diameter Of electrode（mm）	Diameter Of Welding wire（mm）	Current（A）	Argon flow (L/min)	Layer	Groove
Stainless Steel (DC positive)	0.6 1.0 1.6 2.4 3.2 4.0 4.8 6.4	1.0,1.6 1.0,1.6 1.6,2.4 1.6,2.4 2.4,3.2 2.4,3.2 2.4,3.2,4.0 3.2,4.0,4.8	～1.6 ～1.6 ～1.6 1.6～2.4 2.4～3.2 2.4～3.2 2.4～3.2 3.2～4.8	20～40 30～60 60～90 80～120 110～150 130～180 150～220 180～250	4 4 4 4 5 5 5 5	1 1 1 1 1 1 1 1-2	a.b a.b b b b c.d c.d a.c
Desoxy -copper (DC positive）	0.6 1.0 1.6 2.4 3.2 4.0 4.8 6.4	1.0,1.6 1.6 2.4 2.4,3.2 3.2,4.0 3.2,4.0,4.8 4.0,4.8 4.0,4.8,6.4	～1.6 ～1.6 1.6～2.4 2.4～3.2 3.2～4.8 4.0～4.8 4.8～6.4 4.8～6.4	50～70 60～90 80～120 110～150 140～200 180～250 250～300 300～400	3～4 3～4 3～4 4 4～5 4～5 5～6 5～6	1 1 1 1 1 1 1 1-2	a.b a.b b b c c.d c.d c.d
Aluminum （AC）	1.0 1.6 2.4 3.2 4.0 4.8 6.4	1.6 1.6,2.4 1.6,2.4 2.4,3.2 3.2,4.0 3.2,4.0,4.8 4.0,4.8	～1.6 ～1.6 1.6～2.4 2.4～4.0 3.2～4.8 4.0～6.4 4.0～6.4	50～60 60～90 80～110 100～140 140～180 170～220 200～270	5～6 5～6 7 6～7 7～8 7～8 8～12	1 1 1 1 1 1 1-2	a.b a.b b b b b c.d
Magnesium （AC）	1.0 1.6 2.4 3.2 4.0 4.8	1.6 1.6,2.4 1.6,2.4 1.6,2.4 2.4,3.2, 3.0,1.4	～1.6 1.6～2.4 1.6～2.4 3.2～4.2 3.2～4.0	30～40 40～70 60～90 75～110 90～120	3～4 4～5 4～5 5～6 5～6	1 1 1 1 1 1	a. b b b c.d c.d

	6.4	3.2,4.0	4.0～4.8 4.0～4.8	110～150 130～170	5～6 6～7	1-2	c.d

DC pulse TIG welding

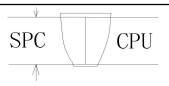
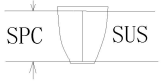
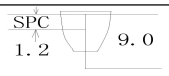
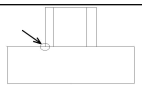
◆Flat welding, butt welding

Material	Shape of joint	Seam width（mm）	Pulse				Welding speed (cm/min)	Wire feed speed (cm/min)
			Pulse current（A）	Based current（A）	Pulse frequency(Hz)	Pulse width（%）		
Soft steel		0 1.2 1.6	200 150 130	50 20 20	2.5 1.5 1	50 45 50	60 30 15	60 60 40
Stainless steel		0 1.2 1.6 2.0	150 150 130 130	50 20 20 2	3 1 0.8 0.8	50 35 30 30	80 17 10 83	40 40 40 0
Copper		0 1.2 1.6	280 280 280	50 50 30	3 2 1.5	50 50 40	80 50 25	75 75
Titanium		0	200	100	1	30	25	0

Shielded gas: argon (10 L/min)　　Electrode: thorium tungsten electrode (3.2 mm)

Welding wire: diameter 1.2 mm　　Length of arc: 2 mm

◆　welding for different thermal capacity joint connector

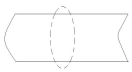
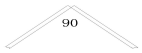
Material	Shape of joint	Seam width（mm）	Pulse				Welding speed (cm/min)	Wire feed speed (cm/min)
			Pulse current（A）	Based current（A）	Pulse frequency（Hz）	Pulse width（%）		
Soft steel +steel		1	250	50	0.8	20	10	60
Stainless steel + Soft steel		1	170	60	2.5	50	50	60
Soft steel		1	120	50	2	50	20	30
Stainless steel		1	160	50	1.5	45	8.5	30

Protection gas: argon(10L/min)　　electrode: tungsten electrode(２．４mm)

Fillet wire dia.:1.2mm　　arc length:2～３mm

A.　AC pulse TIG welding

Material	Shape of joint	Thickness（mm）	Pulse				Welding wire	
			Pulse current（A）	Based current（A）	Pulse frequency（Hz）	Pulse width（%）	Diameter（mm）	Wire feed speed (cm/min)

Aluminum		1.0	70	25	1	50	1.6	75
		1.5	80	40	1	50	1.6	95
		1.5	90	25	1	50	1.6	75
		1.5	85	25	1	50	1.2	95
		3.2	170	25	1	50	1.2	290
		3.0	170	25	1	50	1.6	170
		6.0	220	25	1	50	1.6	250
		6.0	180	25	1	50	1.6	
			180	25	1	50	1.6	250
		3.2	170	25	1	50	1.6	290
		6.0	220	25	1	50	1.6	270
		3.0	120	25	1	50	1.6	60

Maintenance

In order to use safely, periodical maintenance and repair should be carried out. When examining the interior and exterior connection ends, the primary distribution box must be cut off. (or take the fuses away)

a. Daily Notices

(1) There are abnormal vibration, sound, smell or not;

(2) There are abnormal heat at the cable connection or not;

(3) When the switch of power source is turned on, the cooling fan of the machine rotates agilely or not;

(4) Switches contact well or not;

(5) Cables are cut off or not;

b. Examine Items Once for 3-6 Months

(1) Electric connection

The bolts of the connection at the input and output sides of the welding machine are loose or not. There are contact problems due to the rusts and insulation problems or not.

(2) Grounding wires

The cover of the machine is connected with ground safely or not.

c. Eliminate the dusts inside the welding machine

The dusts deposited on the cooling board of thyristors will cause bad heat dispersal and bring adverse influence. The dusts deposited at the windings of the transformer will cause insulation deterioration. So, the examination should be carried out every half year, demounting the side board and top cover, using the dry compression air to clean the related parts.

d.High frequency adjustment

Generally, don't touch the spark electrode (the spark gap is 1 mm normally). When the surface of electrode isn't flat and has notable feculences, it should be burnished, and adjust the electrode gap to 1 mm.

e.Examination Points for Abnormal Action

e1. No arc initiation, No high frequency

(1) The fuse of control circuit melts;

(2) The high frequency fuse melts;

(3) The spark gap is too large or is shorted;

(4) The cable of torch's switch breaks off;

(5) Turn the conversion switch of welding methods to "Stick welding";

E2. High frequency is ok, but no arc initiation

(1) Forget to connect the cable to the mother-material or it is not connected perfectly.

(2) The cables of the welding torch and mother-material breaks off;

(3) The gap of the tungsten electrode to the mother-material is too great;

(4) The voltage of power source is too low (380±10% is better);

E3. Unsteady arc, Initiate arc difficultly, arc quenches

(1) The tungsten electrode is too thick (relative to current value)

(2) Pure tungsten electrode is used (should use the dthorium or cerium tungsten electrode)

(3) The other shielded gases are used except pure argon;

(4) The mother-material cable is not connected perfectly;

(5) The gas flux is too large;

E4. Gas sending is bad or even not

(1) Midway of the gas pipe is flexed

(2) The torch is blocked by dunghills;

(3) The gas valve doesn't act;

E5. Gas flows out of control.

(1) The gas pipe leaks at the connection;

(2) Fault of gas valve;

Trouble shooting

TROUBLE (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
1. When machine energized, the circuit breaker trip	Three phase bridge rectifier was may damage	Replace the rectifier；
	IGBT damage	Replace IGBT
2. No output current	The control fuse on the back may broken	Replace fuse 1.5A
	Cooling fan not work, or overload cause overheat, then temperature relay protect	Repair the cooling fan and do not overload
	Temperature relay may damage	Replace the temperature relay
3. Arc strike can't success	Machine output terminal not connect reliably with the work piece	Reliably connect the work piece and output terminal
	Torch trigger or plug wire may damage	Replace the torch trigger and well connect the plug
4. There is no output voltage, but noise from the machine	FRD may damage	Replace the FRD
5. Difficult to strike arc	Workpiece too dirty	Clean the workpiece
	Tungsten quality not good	Replace good tungsten
6. Cannot turn off the argon gas.	PW03 damage；	Replace PW03；
	There are substance in gas valve；	Clean the air valve
	Check gas/auto selection switch does not set to auto position；	Put the switch to auto position；
	The spring in the air valve may have elastic shortage	open the air valve and extend the spring
7. No argon	The voltage of the air valve coil is insufficient or the coil was burnt	Check the coil voltage（~36V） or replace the air valve
	PW03 damage；	Replace PW03；
8. There is burnt smell from the machine	Some components was burnet or there are wires short circuit.	Replace the damaged components or deal with the short circuit parts；
9. Machine not work, but the overload indicator on	Machine overload	Stop welding, let the machine rest for 10min without load

	Cooling fan damage	Replace cooling fan
10. Arc break during welding or the machine not work, but the lack voltage indicator on	Water pressure too low or no water let in	Connect water
	The water checking switch damage	Replace the water checking switch
11. When use water cooling torch, machine not work, but the cooling water indicator on	The input lack-phase or lack voltage	Check three phase input

★ ★Note: if meet some problem can't solve, please turn off the machine immediately, only the professional worker can repair the machine.

Packing list

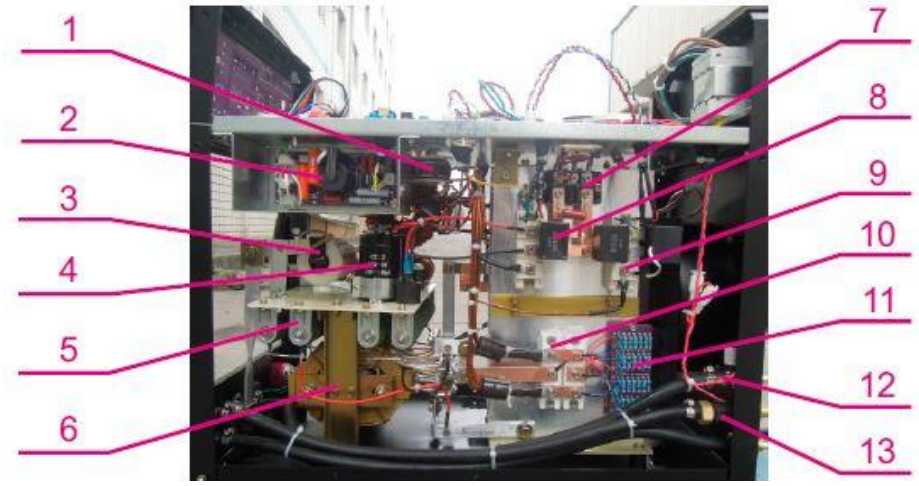
- WSE power source（WSE-350MD/WSE-500HD） 1 set
- Welding torch QS-300（WSE-350MD) 1 pc
- Welding torch QS-500（WSE-500HD） 1 pc
- Work cable 3m 1 pc

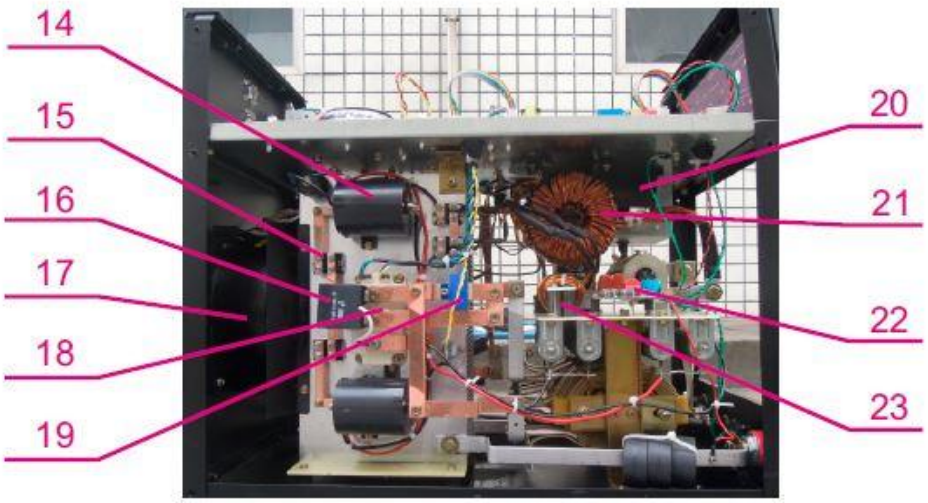
  （WSE-350MD with 35mm^2， one side with DKJ-50 connector， other side with OT35-10 connector）

  （WSE-500HD with 50mm^2 ,one side with DKJ-95connector， other side with OT50-10 connector）
- Instruction manual 1
- Qualified certificate 1
- Guarantee card 1

Main parts list

WSE-350MD

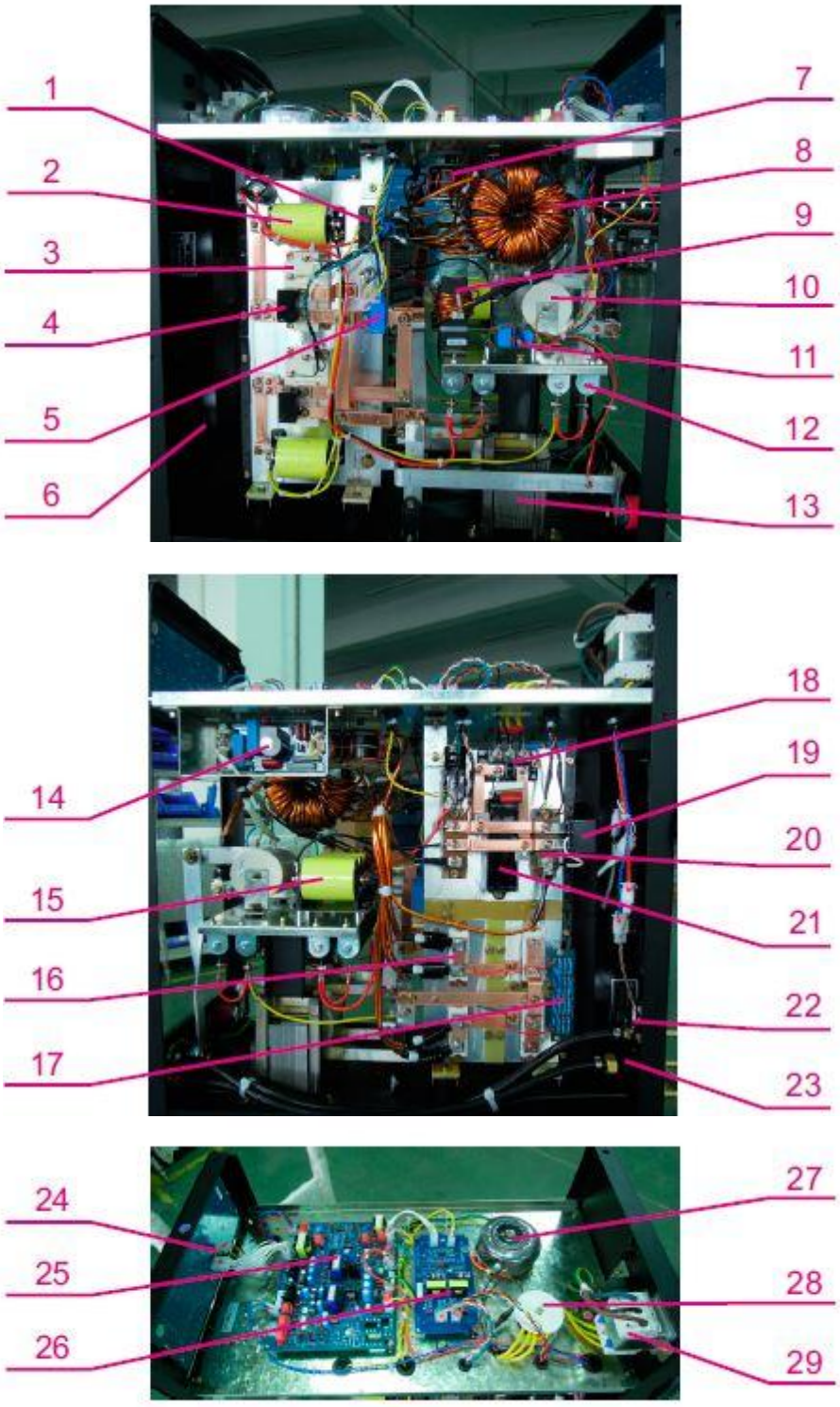




No.	Item	Model	Note
1	Saturation inductance		
2	HF board	HFAP1	
3	HF coupled inductance		
4	Capacitor	500VAC-100uF	
5	Resistor	RXGT13-200W-20Ω	
6	Filter reactor		
7	Bridge rectifier	MDS75D-12	
8	Capacitor	HYC4006	
9	IGBT	GD50HFF120C1SL	
10	Diode	SE2F100P60S	
11	PCB	PW07-B	
12	Gas valve	DF2-3B-AC36V（3mm）M10×1	
13	Water flow switch	W131DH	
14	Capacitor	500VAC-100uF	
15	Diode	S2F100N60SNI	
16	Capacitor	HYC3008	
17	Fan	200FZY2-D/220V	
18	IGBT	GD400HFX120C2SA_B20	
19	Hall sensor	TKC500BR	
20	Capacitor	HYC3001	
21	Inverter transformer		
22	PCB	PW06	
23	Linear inductance		
24	PCB	PW05	

25	PCB	PW03	
26	PCB	PT01	
27	Control transformer	TW02	
28	Three phase inductance		
29	Air breaker	DZ47L3D40	

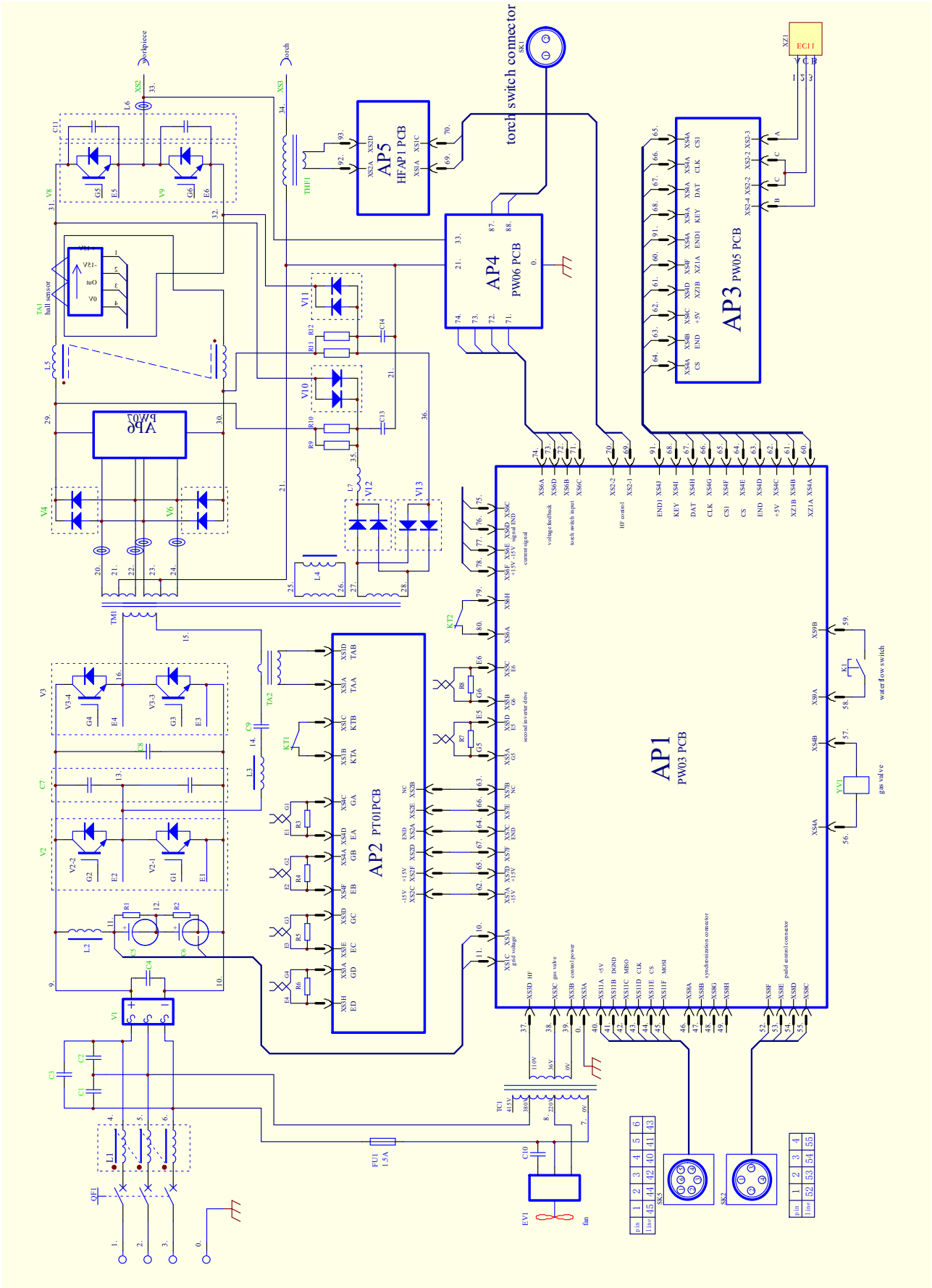
WSE-500HD

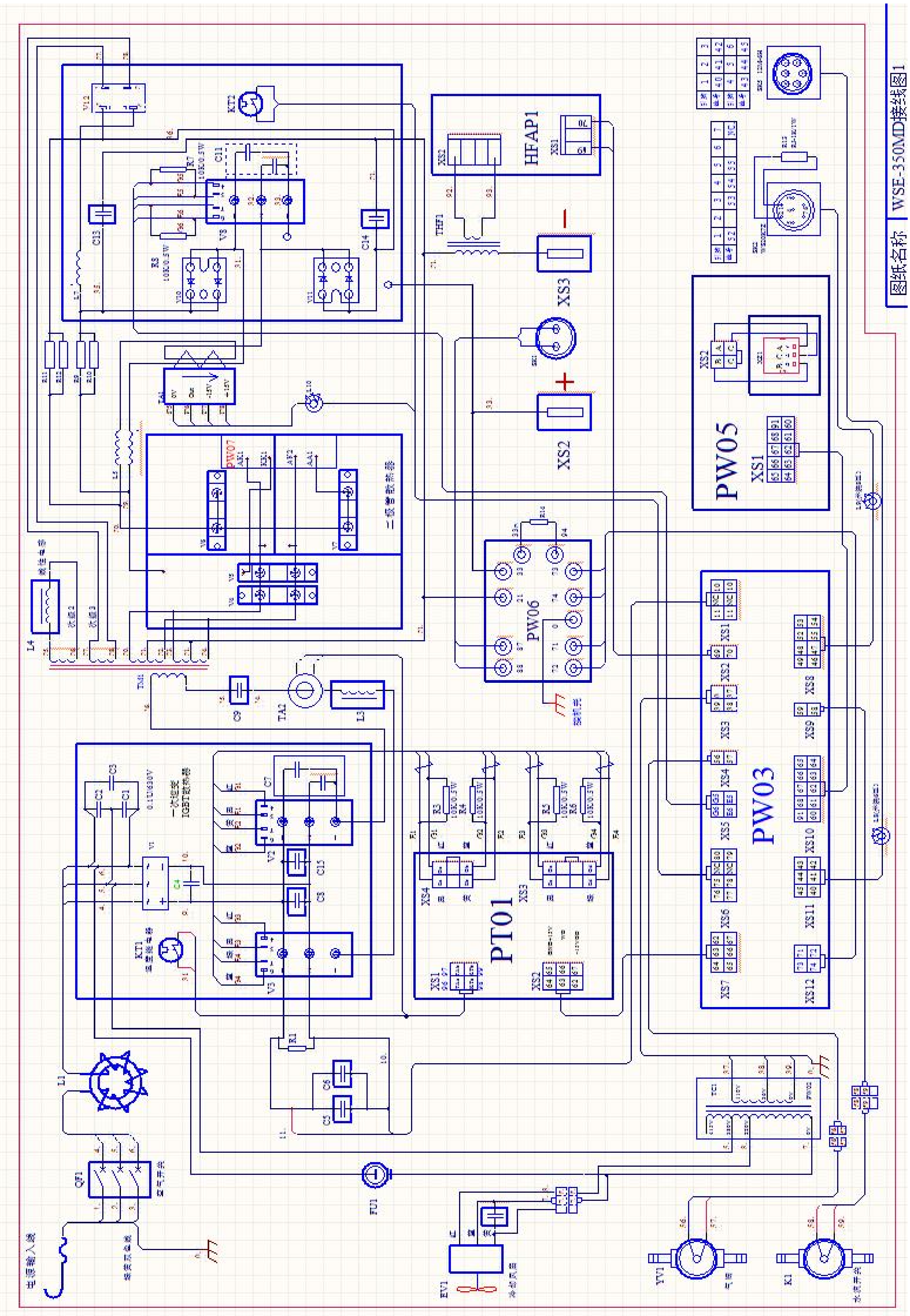


No.	Item	Model	Note
1	Bridge rectifier	MFQ60U6N	
2	Capacitor	500VAC-100uF	
3	IGBT	GD600SGY120C2S	
4	Capacitor	HYC3009	
5	Hall sensor	TKC500BR	
6	Fan	200FZY2-D/220V	
7	Saturation inductance		
8	Inverter transformer		
9	Linear inductance		
10	HF coupled inductance		
11	PCB	PW06	
12	Resistor	RXGT13-200W-20Ω	
13	Filter reactor		
14	HF board	HFAP1	
15	Capacitor	500VAC-100uF	
16	Diode	MMF300Y060DK1	
17	PCB	PW07-B	
18	Bridge rectifier	MDS100D-12	
19	Capacitor	HYC2001	
20	IGBT	FF100R12RT4	
21	Capacitor	HYC4001	
22	Gas valve	DF2-3B-AC36V（3mm）M10×1	
23	Water flow switch	W131DH	
24	PCB	PW05	
25	PCB	PW03	
26	PCB	PT01	
27	Control transformer	TW02	
28	Iron cord	35×50×20	
29	Air breaker	DZ47L3D63	

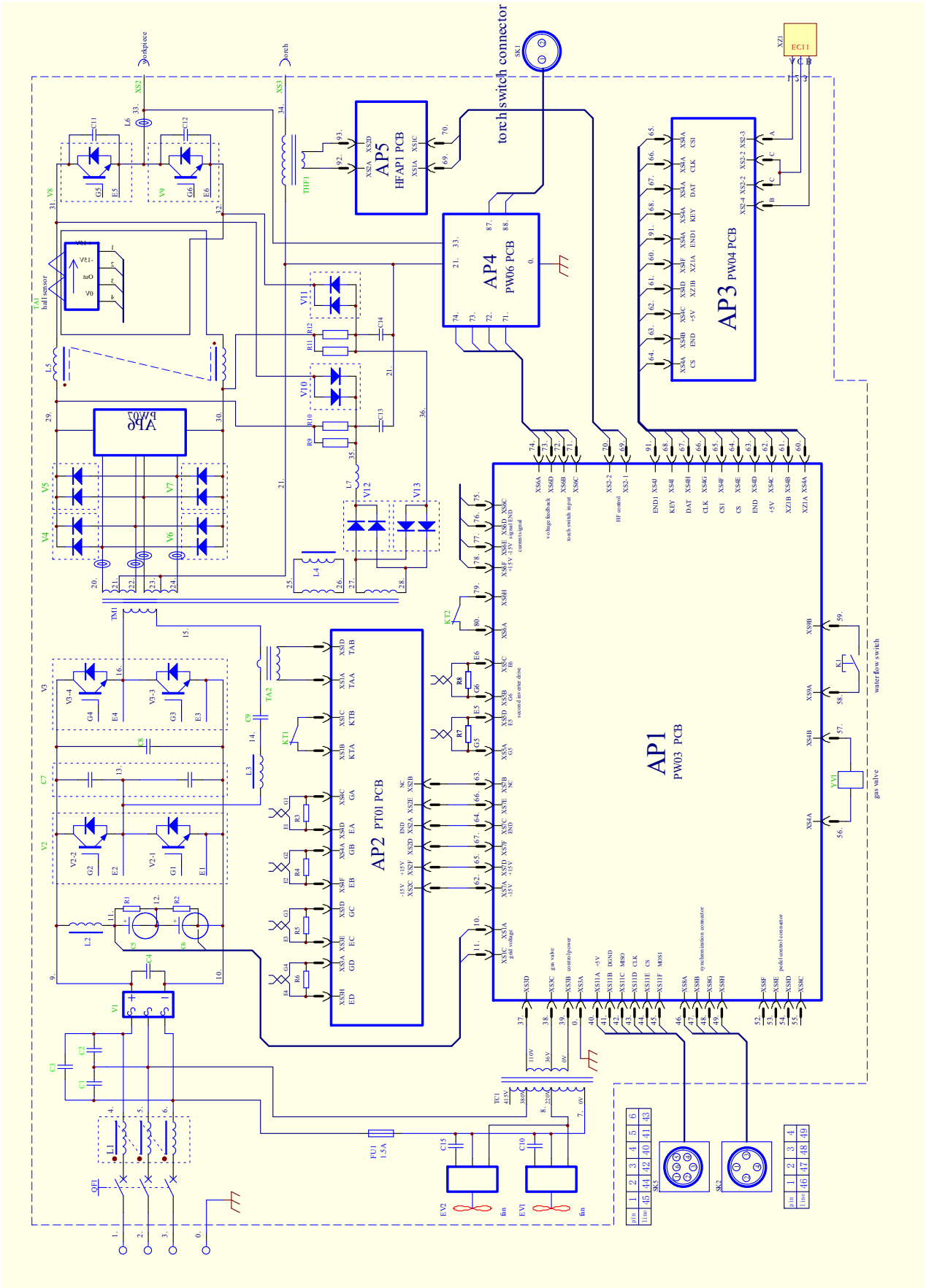
Appendix

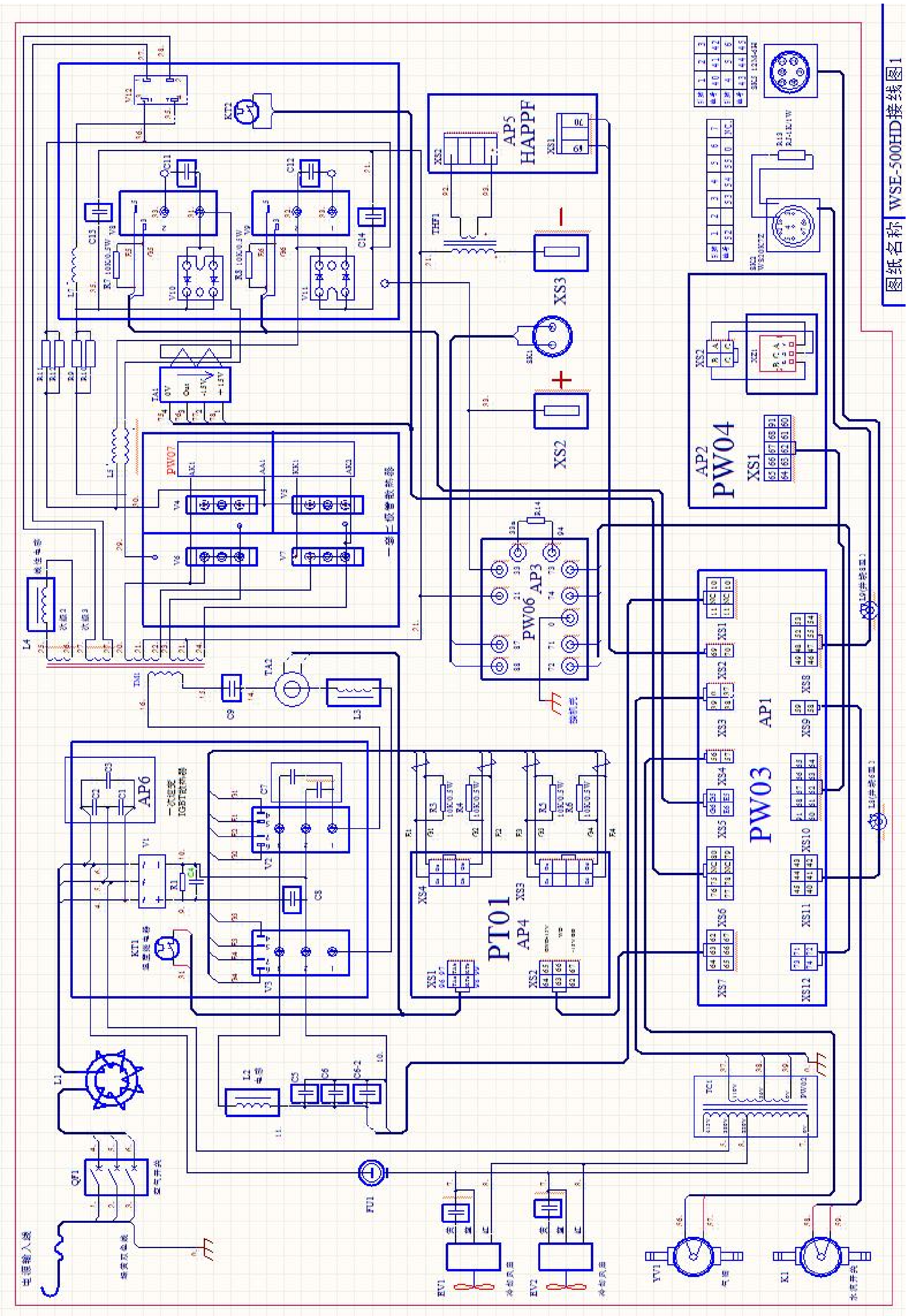
WSE-350MD electric schematic




图纸名称
WSE-350MD接线图1
HFAP1
PW05
PW06
PW03
PT01
PW07
XS2
XS3
QF1
FU1
EV1
YV1
K1
TA2
L3
L4
C9
TM1
THF1
电源输入端
二极管散热器

WSE-500HD electric schematic




图纸名称
WSE-500HD接线图1
AP5 HAPPF
XS3
XS2
AP2 PW04
AP3 PW06
PW07
AP6
AP4 PT01
AP1 PW03
TA1
TA2
L1
L2
L3
L4
QF1
FU1
EV1
EV2
YV1
K1
TC1
KT1
KT2

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If there is any changes in the manual instruction, forgive not to inform separately!

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