RSR-2500

STUD WELDING MACHINE

MANUAL INSTRUCTION

(PLEASE READ CAREFELLY BEFORE OPERATION)

Safety Depends on You

Huayuan arc welding and cutting equipments are designed and built with safety in mind. However, your overall safety can be increased by proper installation.

DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT WITHOUT READING THIS MANUAL AND THE SAFETY PRECAUTIONS CONTAINED THROUGHOUT. And, most importantly, think before you act and be careful.

Special Attention (Very Important):

- **AVOID FALLING DOWN WHEN THE WELDING MACHINE IS PLACED ON THE INCLINED PLANE.**
- **IT'S CAN NOT BE USED FOR UNFREEZING PIPELINES.**
- **THE SHIELD RANK OF THIS SERIES OF WELDING MACHINE IS IP21S, AND IT IS NOT SUTABLE FOR WORKING IN THE RAIN.**

Purchase Date：_____

Serial Number：_____

Machine Type：_____

Purchase Place：_____

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.

1 **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 electricalconnection 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.

2 **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. Headshield 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.

3 **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.

4 **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.

5 **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.

6 **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.

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 some parts of the equipment have to be dismantled during maintenance, but you still have to keep the strongest safety awareness .
- 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, and 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 **Lifting 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 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.
- 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 after doctor's permission would help to keep healthy.

CONTENT

1 USAGE AND FEATURES

1.1 Usage

The machine is very suitable for welding studs that made of carbon steel, stainless steel, copper, aluminum and its alloy stud, and it is widely used in those fields such as shipbuilding, boiler, architecture, metallurgy, bridge, electric switching equipment, communication, light and chemical industry, household electric appliances and automobile manufacture, etc.

1.2 Features

1.2.1 It limits the charge current to avoid the impact to power system, and the rated power supply capability is very low.

1.2.2 The charge voltage stability of the storage capacitors is very good. The capacitance changes little during long time work, which assures the consistency of storage energy and the stability of welding quality.

1.2.3 Charge and discharge are interlocking. The function of over voltage protection insures the safety of weldors.

1.2.4 Welding time is at millisecond level, so there is little thermic effect as well as welding deformation. It is very suitable for sheet welding(0.5mm≤thickness≤5mm).

1.2.5 Compact size, light weight, convenient moving as well as simple operation.

1.3 Service Conditions

1.3.1 The rated supply voltage of the welding machine is AC 220V, 50Hz. And the fluctuation of the supply voltage should not exceed ±10%.

1.3.2 The environment temperature should be in the range of -10℃~+40℃.

1.3.3 The environment relative humidity≤90%(+25℃).

1.3.4 The altitude should not be beyond 1000m.

1.3.5 There should be no things which will impact the operation, such as gases, steam, chemical deposition, dust, mycete, corrosive and explosive medium in the operation areas.

1.3.6 There should be no bamp and shake in the operation areas.

2 TECHNICAL PARAMETERS

2.1 Main Technical Parameters

Model		RSR-2500
Power Voltage (V)		~220
Power Capacity (VA)		≤1000
Rated Energy Storage (J)		2500
Voltage regulation range of Capacitor (V)		60-190
Stud Diameter (mm)	Carbon Steel Stainless Steel	4-10
	Copper、Aluminium and their Alloy	3-8
Welding Productivity (n/min)		10-5
Dimensions (mm)		490*260*405
Weight (kg)		36

2.2 Working Principle

As shown in Fig.5, turn the switch SA1 on and the fan FS1 begin to work, and the major transformer is electrified. The control circuit “RSR Main PCB” begins to work and start the charge current limiting circuit, and then it controls VC1, V1 to charge up the capacitors with steady current. When it comes to the capacitor voltage set by RP1, the capacitor charge voltage is stabilized by VC1 and V1. Hereafter, push the work button SB1 on the welding torch at any time, the controlling circuit always stops charge V1, V2 first, and then V3 is switched on, so that the capacitor discharge and one-time welding can be done. Pull up welding torch, the capacitor charges with current limiting under controlling of VC1 and V1. After turning off SA1, KM1 releases and the storaged energy releases via R0, R1, R2, R3.

2.3 Structure

The main parts of the welding machine and their assembly are shown in Fig.1.

3 OPERATION

3.1 Connection

The Power supply for this product is AC single phase 220V 50Hz. Users should have proper switchboard which is accord with the table below:

Sectional Area of Copper Core Input Cable（mm^2）	Fuse Capacity（A）	Switch Capacity（A）	Sectional Area of Ground Cable（mm^2）
2.5	10	20	2.5

Before using the welding machine, fix the grounding clamp to workpiece. Insert the cable plug of the welding gun into the left socket on the front panel of the welding machine, and turn it right to end. Insert the cable plug of workpiece into right socket on the panel, and turn it right to end. Insert the controlling cable plug into the controlling socket, as shown in Fig.2.

Attention: All the socket connectors ought to be plugged well, and then tighten clockwise! Otherwise they would be destroyed.

3.2 Adjustment of Welding torch

Regulate the stick out length of the contact type stud welding torch

a) Chuck selection

Choose a suitable chuck according to the diameter of stud (Shown in Fig.7), put it into chuck holder , and tighten it by your hands.

b) Regulate the stick out length of stud

Plunge the stud into the chuck, and open the rear cover of welding torch. Then adjust the length of the stand bar, make sure the stand bar withstand the stud and the distance between the butt of the stud and the butt of the support foot is △≈3~5mm, then close the rear cover of welding torch. When adjusting, coordinate regulation should be done at the stand bar and support foot. First of all, the stud stick out length should be enough, and then we must assure enough length that insert into the chuck, and the length in the chuck is the more the better. If it is not long enough, the chuck will not clamp the stud firmly, then the stud would shake and cannot plumb to the workpiece, at the same time, discharge will appear because of the poor contact between the chuck and the stud. From above, the welding quality and the chuck will be influenced or damaged.

c) Check the torch

Push the chuck or the chuck holder, make sure that the torch head glide smoothly.

ATTENTION:

When inserting the stud, the chuck should clamp the stud tightly, or it may discharge and damage the stud because of poor contact.

3.3 Select Welding Parameter

As the welding is performed by discharge of capacitors, the welding time is very short, only several milliseconds, so the welding time is designed and there is no need to adjust it. Just adjust the charge voltage is ok. Generally, the bigger the stud diameter is, the more energy is needed, as well as the charge voltage. The storage energy of the welding machine is directly proportional to the square of capacitors charge voltage.

Different welding parameters and welding machine should be selected according to the graph. When weld copper stud, the voltage should be 20% higher than steel stud, and aluminum is 30% higher. Please check several times after choosing a elementary charge voltage, and eventually, get the optimal voltage parameter according to the welding quality.

3.4 Preparation Before Welding

Make sure the distribution voltage is accord with the welding machine:AC 220V.

Anticlockwise turn the charge parameter (voltage) potentiometer to zero.

Switch on the power, the power supply indicator lights and the fan begins to run and the capacitor begins to charge.

Turn potentiometer clockwise till the shown voltage is conformed to the set voltage parameter. If the voltage is exceeded, please press reset button to release the redundant voltage, and then turn potentiometer anticlockwise, do not loose the reset button switch till the voltage fall to the set value.

Grounding clamp should connect to work piece perfectly. Clear up the grease stain, lacquer, rust and oxidized layers. While welding sheets, there should be liners at the back of work piece to assure the smooth of surface.

3.5 Welding Operation

Hold the torch by your hand, and make the stud aim at the welding position of work piece.

Press the torch support foot on work piece, make sure the three-support feet are in the same plane of work piece.

Press the button on the welding torch.

“Bang” is a normal phenomenon while welding and that means the welding is finished.

Pull out the welding torch vertically, and the capacitor will charge again immediately to prepare for the next welding.

Install the stud and repeat 3.5.1~3.5.5 to carry through the next welding.

Turn off the machine: Turn the supply switch down and cut off the power. The energy stored in capacitor will be released automatically.

3.6 Pay Attention (Very Important)

While installing stud and aiming, do avoid pressing welding torch botton; furthermore, it is forbidden to aim at any parts of body to avoid accidents!

After pressing the button on welding torch, it is forbidden to move the torch.

Insert the stud into chuck, and contact the end of stand bar. The chuck must clamp the stud tightly; otherwise you must check out and repair it. Please don`t weld before getting rid of defects.

It is forbidden to move welding machine by hauling cables.

3.7 Quality Checking

Besides checking the appearance welding seam, the welding quality can be checked by bending: make the stud incline some degrees to a direction by hammering, 30^0 for mild steer and stainless steer; and15^0 for brass, aluminum and its alloy. If there is no fracture or crack, it is suppose to be qualified.

ATTENTION:

Aluminum cannot be hammered; you can only make it incline by tools.

4 MAINTENANCE AND REPAIR

4.1 Maintenance

4.1.1 If welding machine is not used for a long time, please maintain the welding machine every 3 months, switch on the supply power to make the capacitor charge voltage from low to high for more than three times.

4.1.2 The cooling fan of the welding machine is at the back of welding machine, please do not close to wall while using, or the wind-tunnel will be blocked up.

4.1.3 Avoid crash while using and transferring welding machine.

4.1.4 While maintenance, please cut off the power first, after several minutes, connect the anode and cathode of the charge capacitor with a 2.5mm^2 wire for several times to release all energy stored in it, then the maintenance can be carry on.

4.1.5 While installing chuck, clean the inner and outer surface of the chuck holder; avoid sundries such as scrap iron entering into the fit clearance. Or it may cause discharge by bad fitting, and damage the chuck or chuck holder.

4.1.6 Keep the inner surface of the chuck clean and no sundries like scrap iron or dirt on it. Or it would damage the chuck and cause discharge because of the loose clamping. If chuck is destroyed by losing elasticity or the reasons of 4.1.5, 4.1.6, please replace it in time.

4.2 Common troubles and troubleshooting

Troubles	Reasons	Troubleshooting
1. No power indication	a. Supply input circuit L-1-3-5-4-2-N is broken. b. Fuse FU1 is burned c. Defects on transformer T1 winding d. Power switch SA1 or indicator light is broken	a、Check-up and connect b、Replace Fuse c、Replace or repair T1 winding d、Replace the power switch or indicator
2. The shell of machine is electriferous	a. Power line L-1-3-5 contacts the shell b. Transformer, power switch or fuse contacts the shell c. The machine is not grounded or not connected well	a. Eliminate It b. Eliminate It c. Ground the wire well
3. The fan do not work or the wind isn't strong enough	a. Fan FS is blocked b. Fan FS winding is broken c. The start capacitor of the fan is broken or not connected well	a Remove the sundries b Repair or replace c Repair or replace
4. The capacitor cannot be charged	a. There is no output voltage on the main transformer T1 b. Rectifier VC1, V1 is broken c. Welding torch controlling button SB1 is short circuit d. Discharge thyristor V3 is broken e. Welding torch contacts the work piece f. The freewheel diode V2 is broken g. The control PCB is damaged	a. Check if T1 is broken, repair it b. Check VC1, V1 C. Check if SB1 is short broken, repair it d. Check if V3 is broken down e. Replace f. Replace g. Replace
5. Charge voltage cannot be controlled (Voltage goes up	a. Charge thyristor V1 is damaged b. 9# wire is broken off	a. Replace b. Connect

itself)	c. Controlling board is damaged	c. Replace
6. Fuse FU1 Blast	a. Charge thyristor V1 is damaged b. Some work capacitor is broken down c. Rectifier VC1 is broken down d. Freewheel diode V2 is damaged	a. Backout or replace b. Replace c. Replace d. Replace
7. Discharge is out of Control	a. Discharge thyristor V3 is damaged b. Welding torch control wire 19 and 20 contact c. Welding torch switch SB1 is damaged d. Control PCB is damaged	a. Connect b. Eliminate c. Replace d. Replace
8. No discharge	a. Discharge thyristor V3 or control circuit is open circuit b. Controlling line on welding torch is open circuit or SB1 is damaged c. Control PCB is damaged	a. Connect b. Repair, replace c. Replace
9. Voltage does not fall down after power off	a. The charge and discharge resistances R0.R1.R2.R3 are damaged b. Poor contact on KM1	a. Repair or replace b. Repair or replace
10. Cannot weld fast	a. Improper welding parameter b. The stick out length △ of the stud is too short c. The stud is not qualified d. The cable of discharge circuit is not connected well e. The spring in the welding torch is damaged (no pressure) f. The torch head cannot glide smoothly	a. Enhance charge voltage b. Increase the stick out length c. Choose standard stud d. Clamp the work piece with grounding clamps tightly e. Change the spring f. Repair
11. Stud burned	a. There are sundries between the chuck and the stud b. The chuck has no elasticity c. The plunge length is to short	a. Clear away b. Replace c. Readjust

ATTENTION:

If there are some other problems, please contact the Agents or the Service of Huayuan Company.

5 Packing list

A Stud Welding Machine

A Contact Type Welding Torch

3m 35mm^2 Grounding wire With A Workpiece Clamp

Chucks

A Qualification

A Operators Manual

Attached drawings: The electrical sketch drawing, welding torch adjusting sketch drawing, chuck, connection of welding machine, etc. (1 each)

A Warranty Card

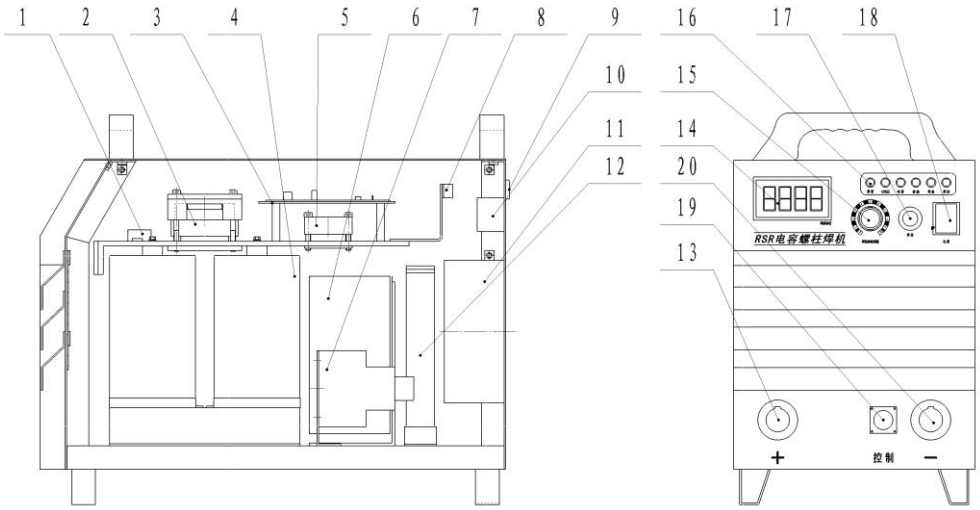


Fig.1 Assemblage Sketch of the Welding machine

1.Rectifier bridge 2.Discharge Thyristor 3.Control PCB 4.Capacitor Set 5.Discharge Diode 6.Annular transformer 7.Auxiliary Relay 8.Rectangle socket 9.Wire Gripper 10.Supply Filter 11.Fan 12.Resistance 13.Output Anode 14.Digital Panel Meter 15.Welding Parameter Adjusting potentiometer 16.Indicator light 17.Reset Button 18.Power Switch 19.Control Socket 20.Output Cathode

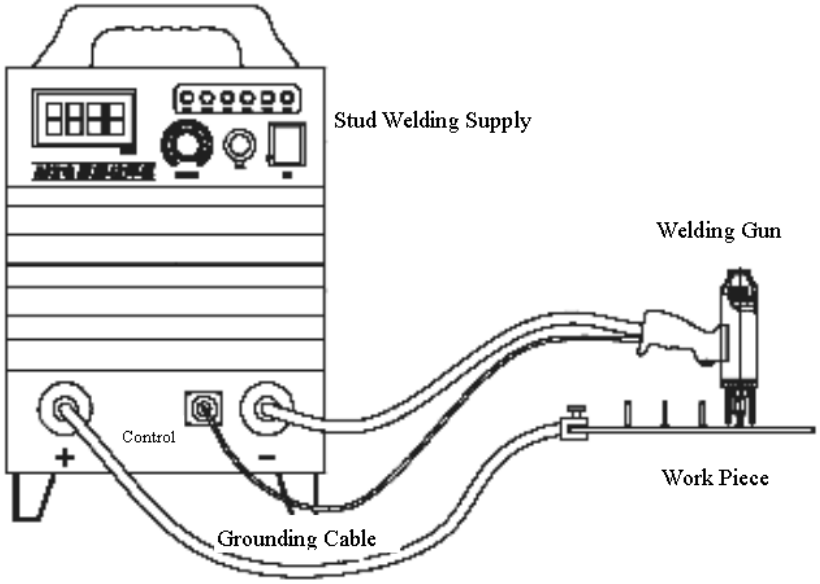


Fig.2 Welding Machine Connection Sketch

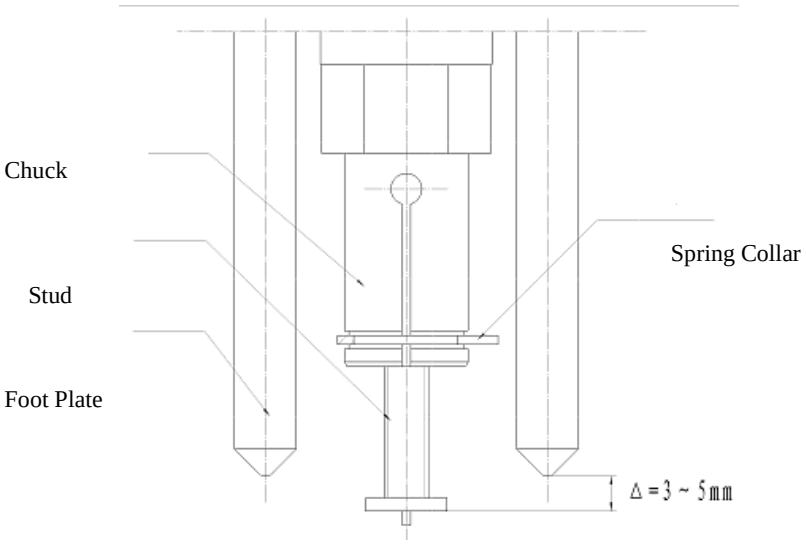


Fig.3 The adjustment of stick out length (Contact Type Welding torch)

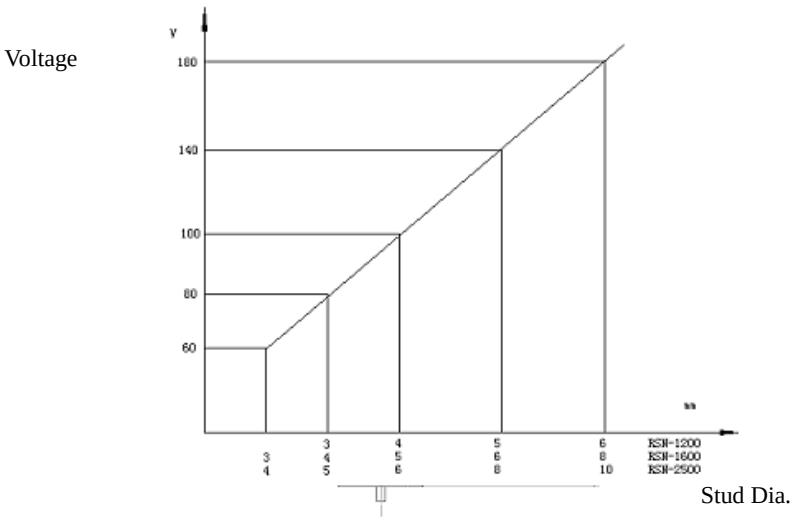


Fig.4 The Relationship Between the Diameter of Steel Studs and Capacitor Charge Voltage

(Just for reference, it may not meet the technologic needs!)

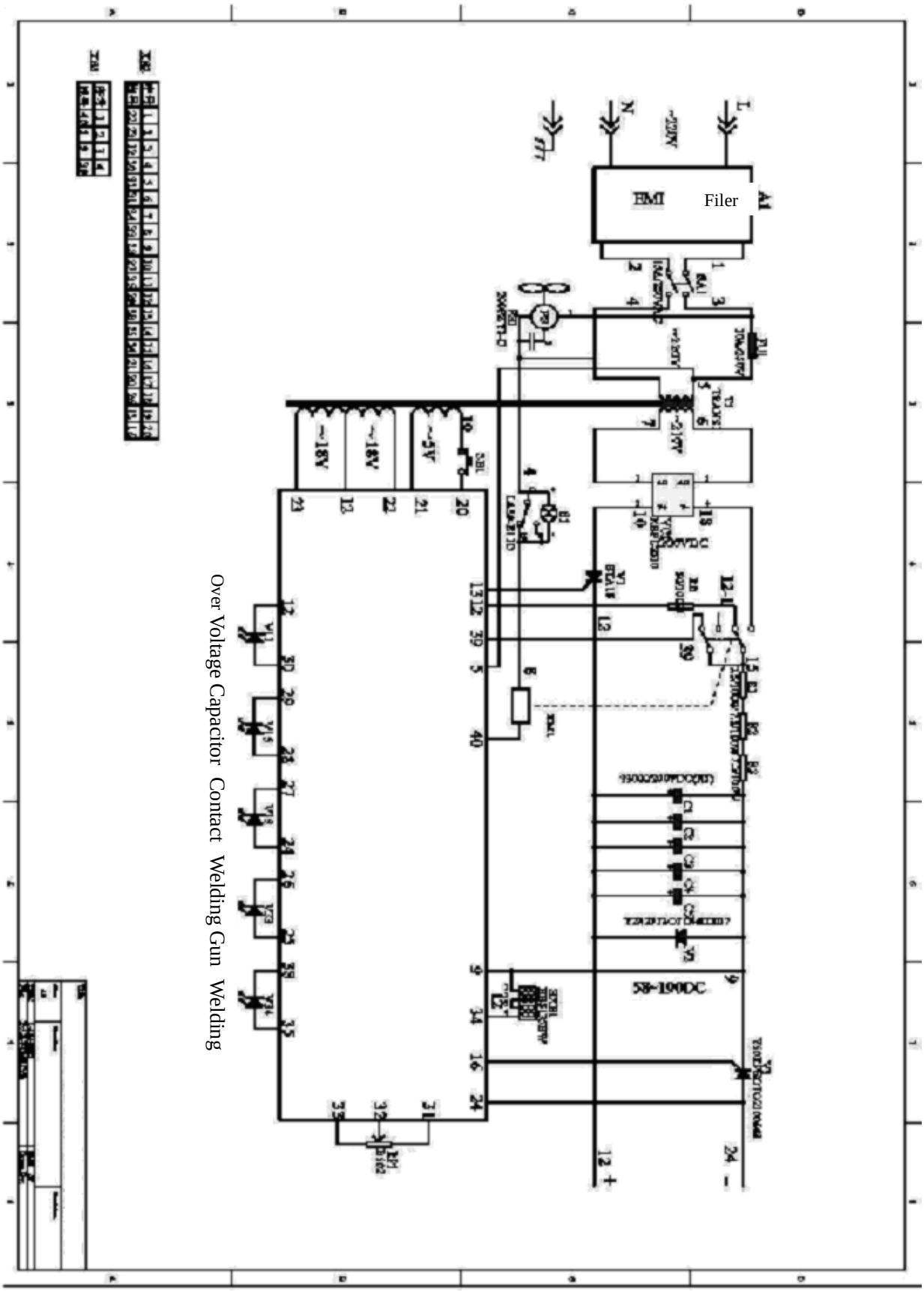


Fig.5 Electrical Sketch Drawing

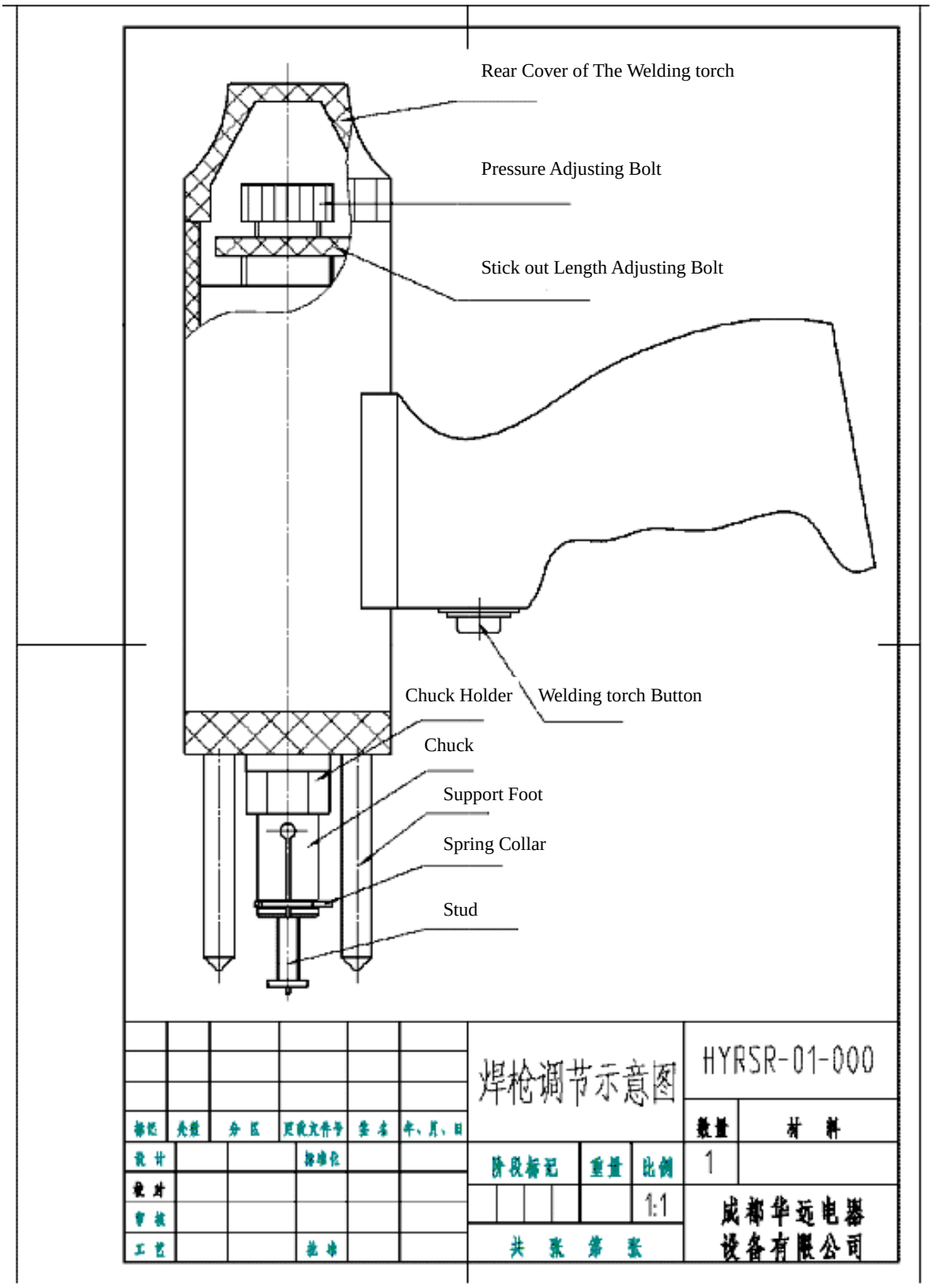
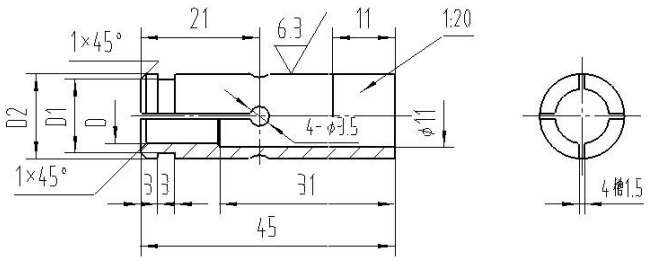


Fig.6 Welding torch Adjusting Sketch Drawing

其余 12.5



M	3	3	3	3	3	3	3
D	φ2.8	φ3.7	φ2.8	φ5.6	φ7.6	φ9.8	φ11.8
D1	φ12	φ12	φ12	φ12	φ12	φ13	φ14.5
D2	φ14	φ14	φ14	φ14	φ14	φ15	φ16

标记	处数	分区	更改文件号	签名	年、月、日
设计			标准化		
校对					
审核					
工艺			批准		

夹 头

HYRSR-00-008

阶段标记	重量	比例	数量	材料
		1:1	1	H62

共 张 第 张

成都华远电器设备有限公司

Fig.7 Chuck

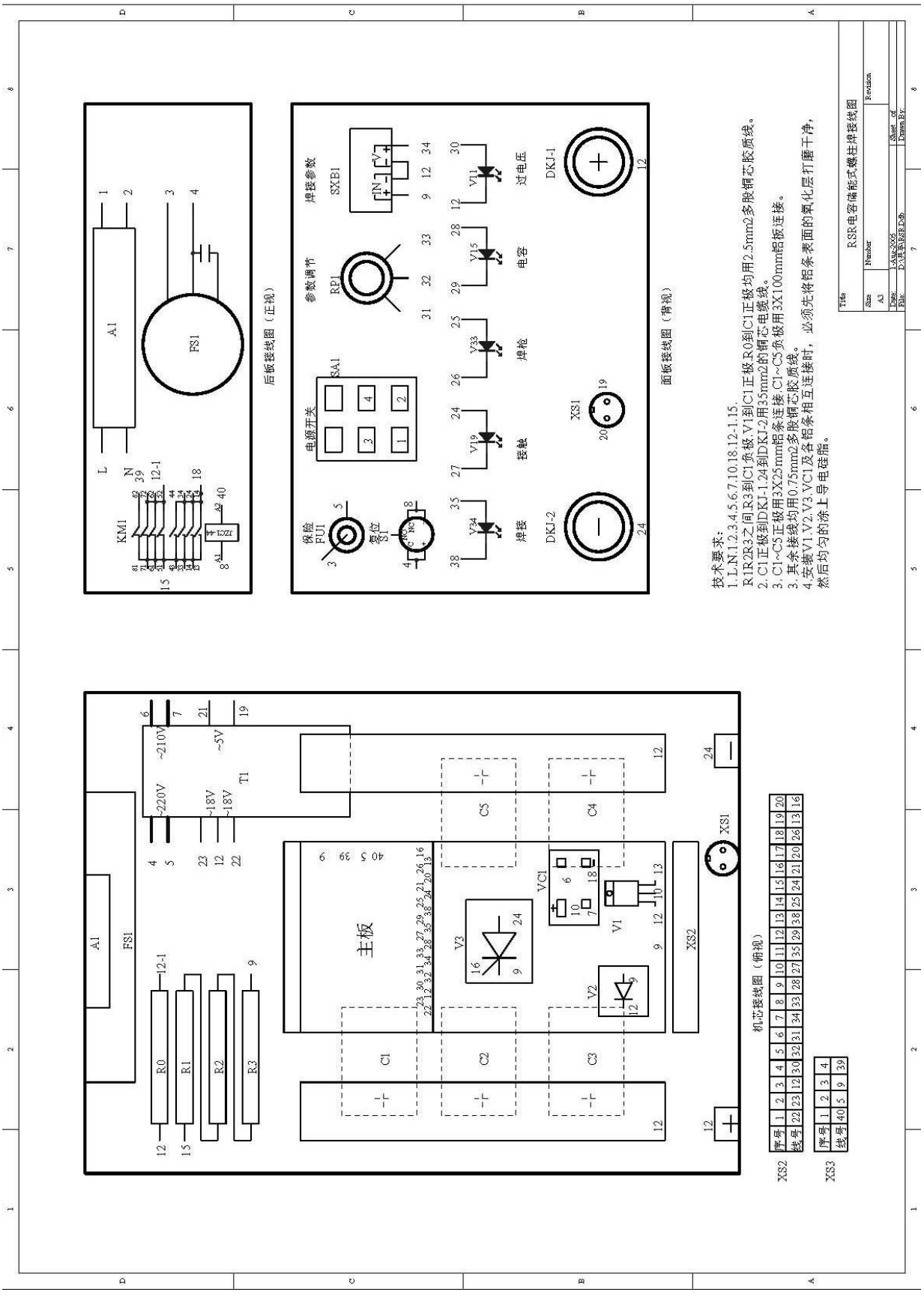


Fig.8 System Connection Sketch Drawing

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

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