Please read the instruction carefully before installation

EMPOWERING FUTURE

MIG-500C

INVERTER MIG/MAG ARC WELDER

OPERATOR'S MANUAL

Contents

1 GENERAL 1
1.1 Working Principles 1
1.2 Applications 1
1.3 Features 1
2 WELDER INSTALLATION 2
2.1 Place of Installation 2
2.2 Power Supply 2
2.3 Diagram of Equipment Assembly 3
3 NAMES AND FUNCTIONS OF COMPONENTS 3
3.1 Front & Rear Panel 3
3.2 Combination key function settings 5
3.3 Wire Feeding Device Control Panel 8
4 CONNECTION AND USE METHOD OF MANUAL ARC WELDING 8
4.1 Connection of MMA output cable 8
4.2 Use Method of MMA 9
5 CONNECTION AND USE METHOD OF GAS SHIELDED WELDING 9
5.1 Connection of Gas Shielded Welding 9
5.2 Preparations for Gas Shielded Welding 10
5.3 Use Method of Basic Welding Function 12
6 USE METHOD OF EXTENDED OUTPUT CABLE 13
7 MAINTENANCE AND DEBUGGING 14
7.1 Daily Maintenance 14
7.2 Cyclic Check List 14
7.3 Regular Overhaul 17
7.4 FAQ and Analysis of Welding 17
7.5 Common Weld Defects 18
7.6 Self-Fault Identification 19
8 TECHNICAL DATA 20
8.1 Technical Parameters of Welding Power Supply 20
8.2 Internal Structure Diagram of Welding Power & Basic Spare Parts List 21
8.3 Electrical Diagram of Welding Power(Standard) 23
8.4 Cut-away View of Wire Feeder 24
9 COMPLETENESS OF PRODUCTS 24
10 WELDING INSTANCES 25



Please read this manual carefully before use and operate it correctly.

This manual is only applicable for the installation, operation and maintenance of this welding machine.

This model is subject to change of function, structure and manual content without prior notice.



Please hand this manual or its copy over to the welding machine operator.

Installation, repair and maintenance personnel shall also follow the instructions in this manual.



Warning 

Electric shock can be hurt or even fatal!

Please turn off the distribution cabinet and power switch when wiring!
Do NOT touch the exposed conductive parts.



Welding can cause a fire or explosion!
Welding splashes may ignite nearby flammable materials. The flammable material shall be 10 meters away from the welding site.
Make sure to prevent splashes from falling on clothes or body.



Welding dust is harmful to health
Do NOT inhale the fumes generated during welding.
Please clean up the oil stain on the workpiece.
Please maintain air circulation at the welding site.
The cutting station shall be equipped with dust exhaust device.



Arc can damage eyes and skin.
Strong arc can damage the eyes.
Considering that the ultraviolet rays generated by arc can damage skin and eyes, please wear protective clothing during welding.



Overheating parts can burn the skin
Do NOT touch the overheating weld parts.
Do NOT touch the welding cable or electrode holder overheating during welding with free hands.



A rotating fan can cause injury.
Do NOT stretch your hands or fine objects into the fan cover.
Please properly cover the opened case during welding.



Hazard of Electromagnetic Field
·The health effects of electromagnetic fields have not been confirmed and identified, but negative effects on human body are considered.
·The welding operating personnel shall reduce the damage of electromagnetic field to human body by following the steps below:
(1) Bundling the weld and the cable for connecting workpiece;
(2) Do NOT completely or partially turn the cable around human body;
(3) Do NOT stand between the cutting cable and grounding (workpiece) cable, keep the grounding cable always at the same side with welding cable;
(4) The grounding and welding cables shall be as short as possible;



·In case of injuring eyes or skin, please observe the labor safety and hygiene rules, and wear protective equipment if necessary!



For a safe and correct use of the welding machine, please pay attention to the following matters:
Please confirm the rated specifications on the main nameplate of this machine before using so as to avoid unreasonable use.
Avoid overload use: severe overload can burn the machine, shorten the life of the cutter even if it is not burned.
The terminal of welding machine shall be firmly connected to cable should. Please notice that the poor connection will cause local heating and the terminal will be burnt.
The excessively long output cable will lower output current and increase power loss.
The GMAW shall select suitable light-shielding filter according to the cutting current and actual operation.



Be sure to power off before dust removal or overhaul. Do NOT arbitrarily move the internal thread or damage the components.
During use, please pay attention to check the connector of welding cable from time to time to ensure its reliable connection.



Precautions of Electromagnetic Compatibility
This product belongs to Class A equipment (applicable to all occasions excluding residential areas powered by public low-voltage power systems).
Warning: Class A equipment is not applicable to the residential areas powered by public low-voltage power systems, where the electromagnetic compatibility can hardly be guaranteed due to conduction and radiation disturbance. User are responsible for the interference caused by welding.

1 General

1.1 Working Principles

The working principles of inverter welding power supply in this series of are shown in the following Figure1 .

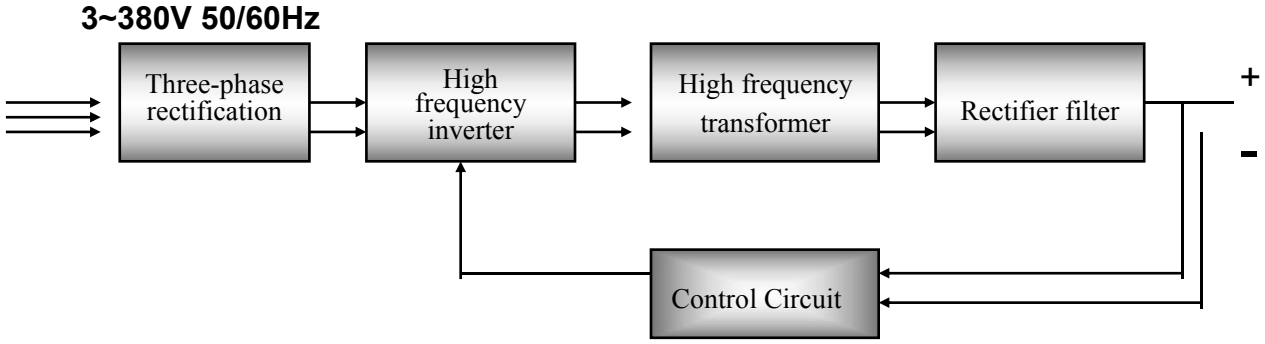


Figure 1 Principle Block Diagram

Based on the IGBT inverter technology, the power frequency three-phase 380V power supply, after being input and rectified, is turned into 19~20KHz high-frequency alternating current through IGBT inverter, and then is stepped down by a high-frequency transformer, rectified by the high-frequency rectifier, and filtered to output direct current suitable for welding. In this process, the dynamic response speed of welding power supply is improved, while the volume and weight of welding power supply are reduced. Meanwhile, the closed-loop control of the whole machine through control circuit endows welding power supply with better ability to resist grid fluctuations and achieves excellent welding performance.

1.2 Applications

- Suitable for welding of ordinary low carbon steel, stainless steel, aluminum and its alloys.
- Suitable for flat welding, vertical welding, overhead welding, horizontal welding and all-position welding.
- Suitable for solid core and flux-cored welding wire with diameter of 1.0/1.2/1.4/1.6mm.
- Suitable for manual arc welding by using acidic, alkaline, stainless steel, and low-hydrogen electrodes.

1.3 Features

✧ Small welding spatter and perfect weld seam with a high-speed ARM platform and unique fine waveform control;

✧ Adjustable arc shape and free setting of arc hardness through the “arc control” knob.

✧ Greatly enhanced arc starting success rate and high-quality fast spot welding with unique arc striking and ball cutting technology.

✧ More stable wire feeding based on fully digitalized wire feeding control system.

✧ Easier operation with rich built-in rich welding expert database and fully unified adjustment.

✧ Simple and intuitive digital operation panel displays the preset current and voltage, as well as the actual welding current and voltage.

✧ The fault error code alarm display makes it easier for diagnosing fault types and self-checking.

✧ The loop automatic compensation function realizes automatic compensation of cable loss according to the cable length, and lengthened cable output to 100m.

✧ Welding specification limitation can limit the maximum welding current and voltage of each welding power supply so as to prevent non-standard operations.

✧ Extensible analog interface or the digital interface can realize automatic welding by matching with special machines and robots to.

✧ Scalable network interface realizes interconnection and intercommunication with intelligent manufacturing and Industry 4.0.

2 Welder Installation

2.1 Place of Installation

(1) Be sure to place it in a rainproof room with no direct sunlight, low humidity and dust, and surrounding air temperature at -10℃～+40℃.

(2) The ground inclination shall be less than 10°.

(3) For the sake of a good air cooling cycle, there must be at least 20cm of gap before and after the welding machine and at least 10cm of space between the left and right sides.

(4) Welding shall be done in a place without wind (use windshield if necessary).

(5) Antifreeze is necessary when using a water-cooled welding torch.

2.2 Power Supply

(1) The waveform shall be a standard sine wave with effective value at 400V ± 10%, and the frequency at 50/60Hz.

(2) The unbalance of the three-phase voltage is ≦ 5%.

(3) See Table 1 for power input requirements:

Table 1

Welding Power		MIG 500
Input Power		Three pahse AC410V
Capacity of Power Equipment	Power Grid	≧31kVA
	Generator	≧48kVA
Input Protection (Distribution Box)	Fuse	50A
	Breaker	63A
Cable	Welding power input side	≧6mm^2
	Welding power output side	≧50 mm^2
	Welding power grounding cable	≧Welding power input side

Caution

■The capacities of fuse and circuit breaker in the above table are for reference only.

■Please install a leakage protector when operating in a humid workplace or on an iron plate or iron frame.

2.3 Diagram of Equipment Assembly

Figure 2 shows the connection and assembly diagram of welding power supply in this series and other equipment.

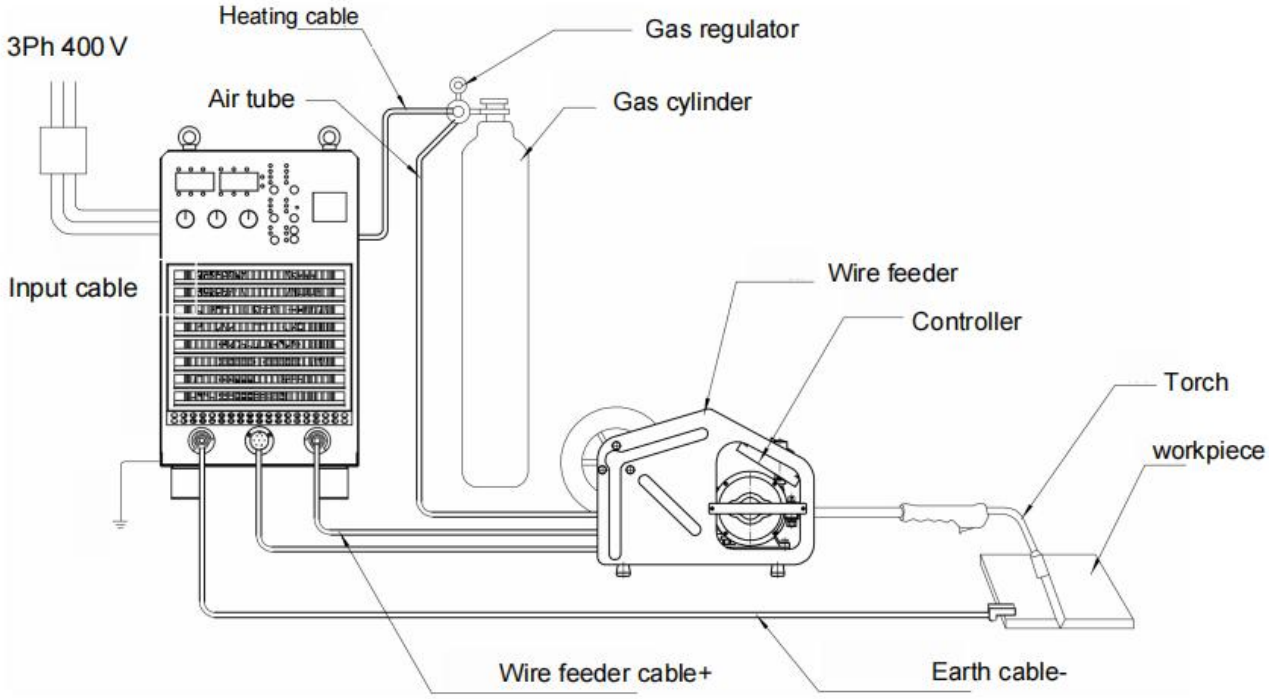


Figure 2 Connection and Assembly Diagram of Welding power supply and Other Equipment

3 Names and functions of Components

3.1 Front & Rear Panel

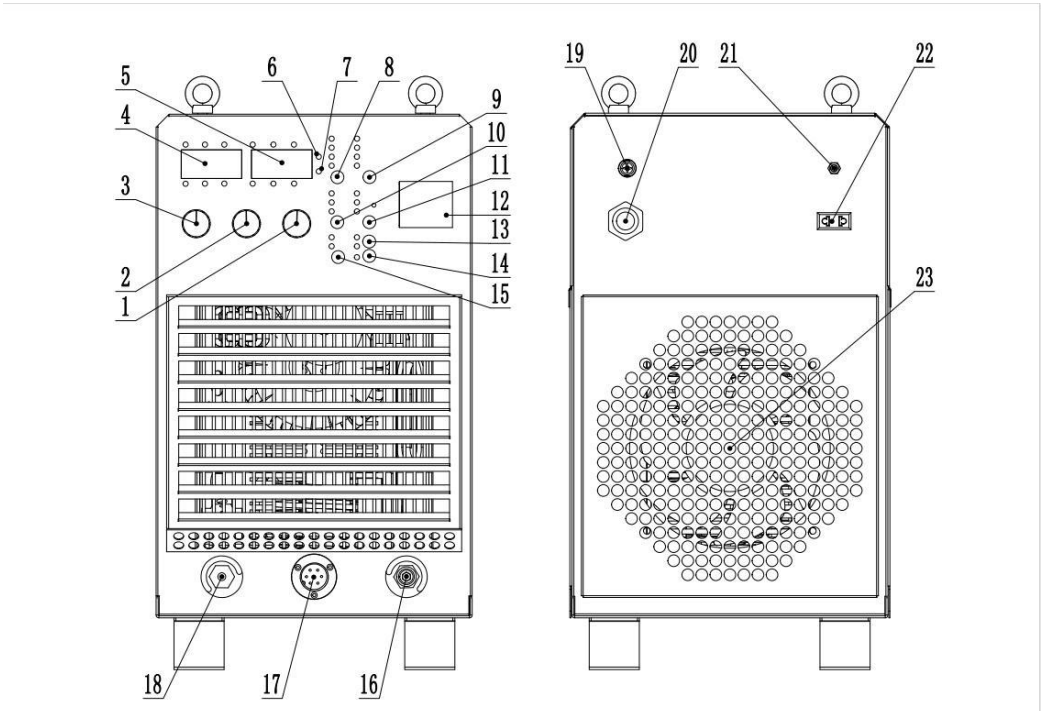


Figure 3

(1) Arc control

This knob controls the output characteristics of the arc. Rotating it clockwise results in a milder arc with reduced stability, deeper penetration, and less spatter. Rotating it counterclockwise produces a stiffer arc with improved stability, shallower penetration, and increased spatter. The adjustment range is "-5 to +5," with the default position set at 0.

(2) Arc-ending voltage

MIG: this knob adjusts the output voltage during the arc closing phase.

MMA: without remote box connected, this knob regulates the thrust current magnitude.

(3) Crater current

MIG: this knob adjusts the output current value during the crater filling stage.

MMA: when no remote control box is connected, this knob regulates the welding current.

(4) Digital current display

Shows preset current in standby mode and actual current during welding.

(5) Digital Voltage Display

Shows preset voltage in standby mode and actual voltage during welding.

(6) VRD indicator

Illuminates when "manual arc welding" mode is selected but remains inactive for 60 seconds; the voltage display will show the protective voltage.

(7) JOB indicator

When entering the calling state, the indicator light is on and the status of the panel keys cannot be changed.

(8) Selection of welding wire diameter

MIG 500 can choose 1.0、1.2、1.4、1.6, corresponding indicator lights will be on.

(9) Welding mode

According to the welding mode, you can choose flux-cored gas shielded welding, solid core gas shielded welding, and manual arc welding. corresponding indicator lights will be on.

(10) Selection of protection gas

CO2、MAG, corresponding indicator lights will be on.

(11) Selection of 2T、4T and S4T

Choose 2T or 4T, corresponding indicator lights will be on.

2T：Pressing the torch switch initiates normal welding, while releasing it stops welding immediately. Suitable for short weld seams.

4T：After pressing the welding gun switch to successfully ignite the arc, releasing the switch allows normal welding to continue. Pressing the switch again shifts to the crater-filling welding parameters preset by the front-panel knob. Welding stops upon releasing the switch. Ideal for long weld seams.

(12) Air switch

The primary function of this switch is to automatically cut off power when the welding machine experiences overload or malfunction, thereby protecting the operator's personal safety and critical components of the welding equipment. Typically, this switch is flipped upward to the ON position. For starting or stopping the welding machine, it's recommended to use the power switch on the power distribution panel (cabinet). This switch should not be used as the primary power switch.

(13) Save/Call

1：Press“save/call”button to enter call mode, where the JOB indicator lights up and the called channel and welding parameters alternate on the display.

2：Press the "save/call" button again to enter save mode. In standby save state, the panel shows "nPG S 1" (indicating Program Save mode and current Channel 1).

Then long-press the "save/call" button for 3 seconds until the display changes to "PrG S 1," confirming the save is complete.

3：Press the "save/call" button once more to exit the mode.

(14) Gas test

Press this button to supply gas for 30 seconds. If the button is pressed again within 30 seconds, the gas supply will stop. Press and hold the "Gas test" button for 3 seconds to lock the interface and make options unavailable. Press the

56

"Gas test" button again to unlock it.

(15) Standard/SYN

You can select "SYN on/off", and the corresponding indicator lights will turn on.

✧Standard on: Control current and voltage separately.

✧SYN on: Constant - voltage welding one - parameter mode; at this time, the voltage setting is linked with the current setting. First, set the voltage knob at the center indication position, then adjust the current knob, and the voltage will be automatically matched with the current adjustment. If you need to adjust the voltage, you can adjust it before or after the center position, and the voltage will increase

or decrease based on the default value

（16）Output terminal “+” of the welding power supply

（17）7 - pin control socket for the wire feeder This interface is used to connect the wire feeder.

（18）Output terminal “-” of the welding power supply

（19）Fuse holder

Internal power transformer fuse 2A.

（20）Input power cord fixator

（21）Resettable overload protector

Internal heating power supply fuse 5A.

（22）Heating socket

The heating cable connected to the CO2 gas regulator. The output voltage is AC36V.

Cool the heat-generating components inside the machine.

（23）Fan

Cool the heat-generating components inside the machine.

3.2 Combination key function settings

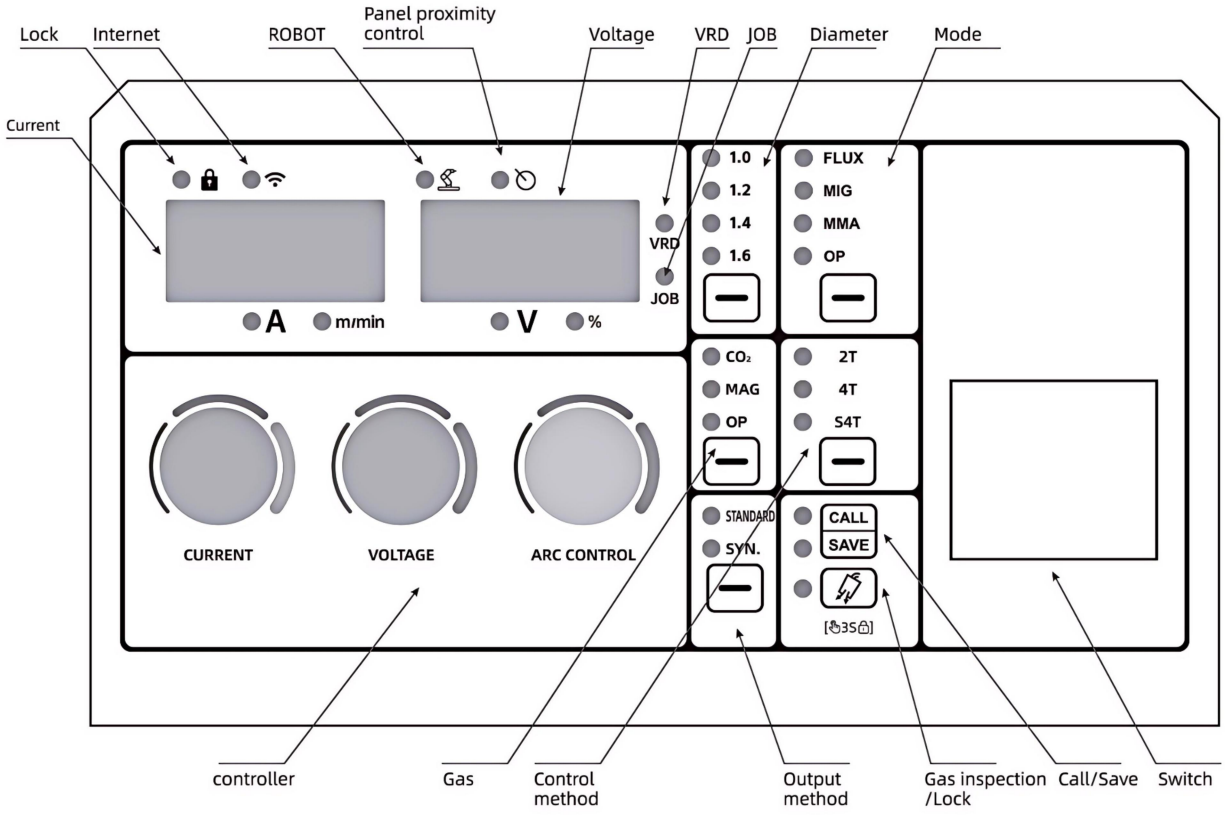


Figure 4

(1)Restore factory Settings: Press and hold the "Two Steps/Four Steps" and "Pulse Available/One Yuan Available" keys simultaneously 7 for 5 seconds to enter the restore factory Settings

(2)Welding Parameter Adjustment Mode: Press the "Gas Test" and "Pulse/Syn" buttons simultaneously to enter the parameter adjustment mode. The functional parameter definitions are as listed in Table 2

Table 2

Code	Function	Range	Factory settings	Remark
F01	Burn-back time	0.1~2s	0.10s	R1 : The F05 starting current parameters and F06 crater current parameters are both adjusted as a percentage of the welding current, with welding voltage automatically matched. If fine-tuning of the standard voltage is required, select the arc length adjustment mode under "Flux-Cored Arc Welding (FLUX), Gas Metal Arc Welding (MIG) to adjust voltage within the range of "-5.0 to +5.0". R2 : F20 Constant Penetration Control In conventional CO2/MAG welding, changes in wire stick-out length result in variations in welding current, workpiece penetration depth, and bead width. This function is set to "OFF" by default at the factory. When switched to "ON," constant penetration control becomes active.
F02	Slow wire feed speed	OFF~ON~10.0	ON	
	Slow wire feed voltage trim	-50~+50	00	
F03	Pre-flow time	0.01~9.99s	0.20s	
F04	Post-flow time	0.01~9.99s	1.00s	
F 10	Water flow control switch	OFF~ON~ONo	OFF	
F05 (R1)	Initial current setting	1~200%	135%	
	Initial standard voltage trim	-5.0~+5.0	0.0	
F06 (R)	Crater current setting	1~200%	50%	
	Crater standard voltage trim	-5.0~+5.0	0.0	
F07	Transition time	0.1~10s	0.5s	
F17	2T arc start time	OFF~10s	OFF	
F18	2T arc end time	OFF~10s	OFF	
F20 (R2)	Constant penetration control switch	OFF~ON	OFF	
F21	Max variation speed for constant penetration	0.1~8.0	4.0 M/min	
F22	Constant penetration standard voltage trim	-5.0~+5.0	0.0	
F23	Preset current and wire feed speed toggle switch	OFF~ON	ON	
F24	Arc length and voltage display toggle switch	OFF~ON	OFF	
F25	Necking voltage switch	OFF~ON	ON	
F26	Necking voltage offset	-5.0~+5.0	0.0	

(3)Implied parameters for arc-induced characteristics (initial specification)

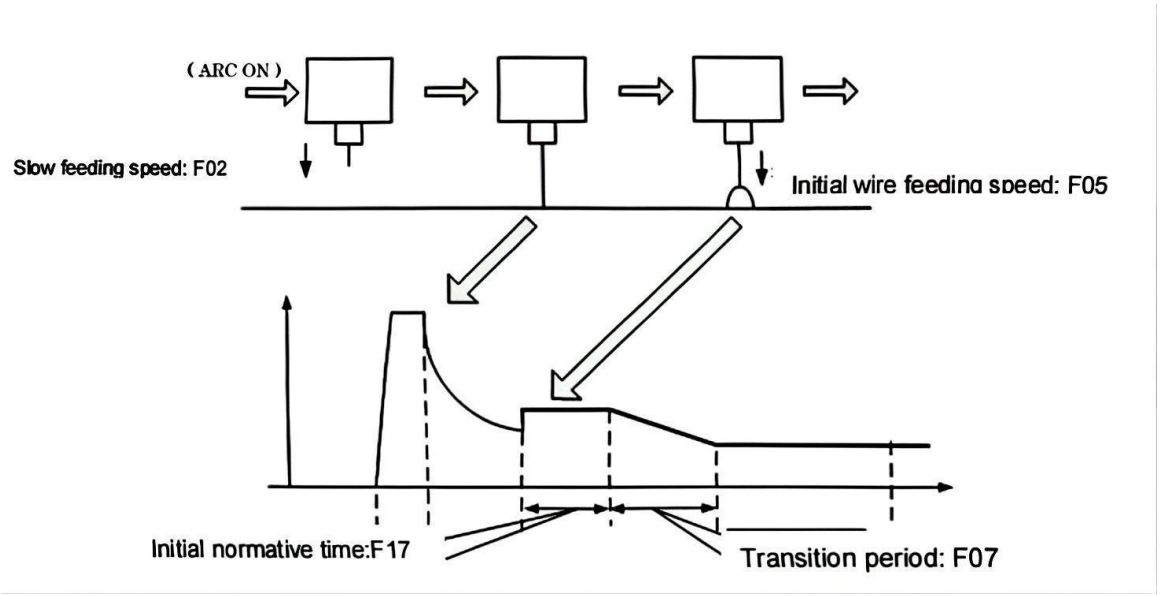


Figure 5

In the welding voltage, current setting is appropriate, but the arc is not smooth, according to the following table 3 to adjust the arc characteristics of process parameters, improve the arc performance.

Table 3

Item	Main function	Adjustment method
F02	Wire feeding speed when the welding wire is in contact with the base material	Welding wire on top of the base material to start the arc, arc bursting serious →smaller No arc or arc starting is very slow → larger
F05	Welding initial specification, the default is off	Welding arc forming narrower or the base material is not fused → larger Welding arc forming wider or the base material is perforated → smaller Arc forming no problem → closed
F17	Initial specification time	
F07	Transition time from the initial specification to the welding specification	Drastic changes in the forming of the lead-in arc section → larger No problem in the forming of the lead-in arc section → closed

In order to lead the arc smoothly, it is sometimes necessary to adjust the arc closing characteristics.

(4)Implied parameters for arc closure characteristics (arc closure specification)

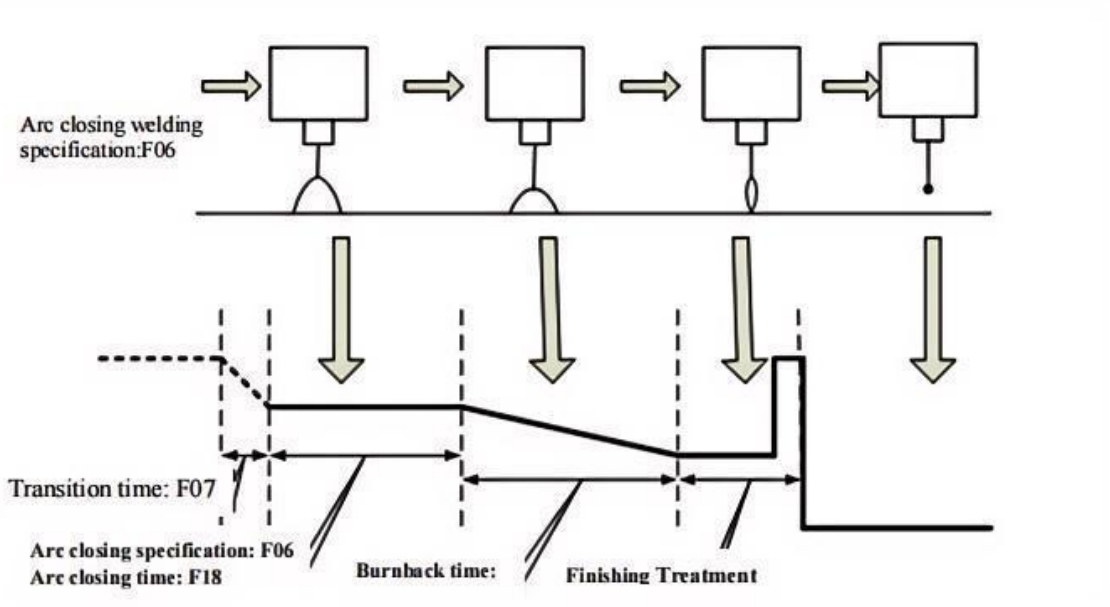


Figure 6

If the welding arc closing effect is unsatisfactory, please adjust the implied parameters of the arc closing characteristics according to Table 4 to improve the welding spatter and weld seam shaping during arc closing.

Table 4

Item	Main function	Adjustment method
F07	Transition time from welding specification to arc closing specification	Narrow arc forming →larger Wider arc formation→smaller Ideal arc formation→close
F18	Time of arc closing specification, default is off	
F06	Arc closing welding specification	
F01	Burning back time	Welding wire is sticking to the base material, and the base material is badly burned → larger Welding wire sticking to the conductive nozzle →smaller

3.3 Wire Feeding Device Control Panel

(1)A:Current adjustment knob

To adjust the welding current.

(2)V:Voltage adjustment knob

- ✧ Used to adjust the welding voltage when adjusted separately；
- ✧ Adjust the knob to “standard” in the case of unification adjustment.

When rotating the knob, the voltage can be fine-tuned.

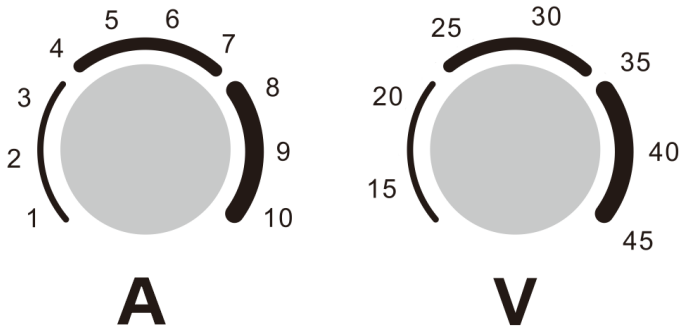


Figure 7

4 Connection and Use Method of Manual Arc Welding

4.1 Connection of MMA output cable

Turn off the power switch of the welding power source before connecting, as shown in Figure 8.

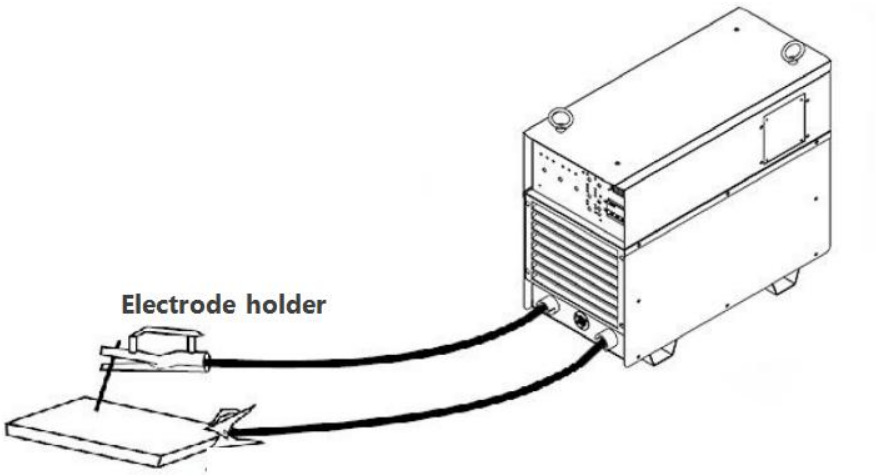
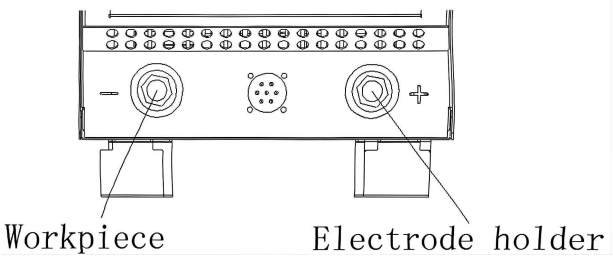
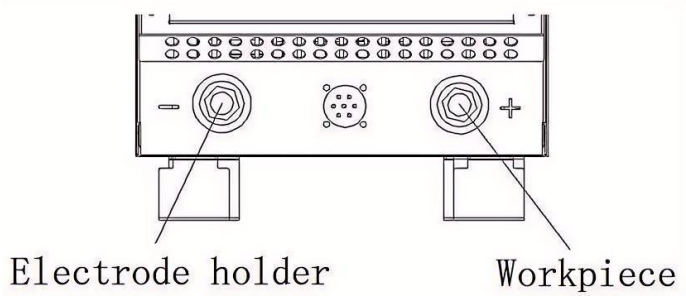


Figure 8

(1)DCEN:The workpiece is connected to the " — " terminal, and the electrode holder is connected to the " ＋" terminal. This method is typically used for MMA welding with basic (low-hydrogen) electrodes. It is good for deeper weld penetration . And it can improve arc stability when using basic electrodes .



(2) DCEN:The workpiece is connected to the "+" terminal, and the electrode holder is connected to the "-" terminal.This method is commonly used for MMA welding with acidic electrodes.Higher deposition rate and shallower penetration through using this method.



4.2 Use Method of MMA

1) Turn on the power switch of the machine.

2) Set the welding method on the welding power control panel to “MMA”.

3) Manual arc welding can only be performed after the output terminal of welding power is reliably connected to the welding cable in accordance with 4.1. When no remote control box is inserted, the welding current is adjusted by the “welding current” knob on the front panel of the welding power supply, and the thrust is adjusted by the “thrust current” knob on the front panel of the welding power supply. When the remote control box is inserted, the welding current and thrust are adjusted by the knob on the remote control box.

4) When welding, please wear leather gloves and safety boots and use light-shielding filters suitable for welding current.

5 Connection and Use Method of Gas Shielded Welding

5.1 Connection of Gas Shielded Welding

See Figure 2 for the connection between welding power supply and other equipment.

(1)Connection between welding power supply and power supply

Check each of the items specified in Article 2.2 Power Supply of this manual to confirm full comliance with the requirements.

(2) Connection between welding power supply and wire feeder

✧ In case of poor welding effect and even damage to the machine, please be sure to use our company’s supporting wire feeding device.

✧ Turn off the power supply switch of the machine before connecting;

✧ Reliably connect the copper joint of the welding cable of wire feeder to the output terminal “+” of the welding power supply;

✧ Reliably connect the copper joint of the grounding (workpiece) cable to the output terminal “-” of the welding power supply, and the other end to the workpiece with screws and nuts.

✧ Reliably connect the control plug (seven cores) of the wire feeder control cable to the control socket (seven cores) of welding power supply wire feeder, and then tighten the ring nut.

(3) Connection between wire feeder and welding torch

✧ Prepare the compatible European type welding torch

If the European plug of welding gun is connected to the socket of wire feeding device, please tighten the lock female of welding gun reliably;

(4) Connection between gas cylinder and gas regulator

✧ Install and screw the gas regulator included in the accessories on the gas cylinder tightly to prevent gas leakage;

✧ Insert the two-core plug on the gas regulator into the heating socket on the rear panel of the welding power

supply.

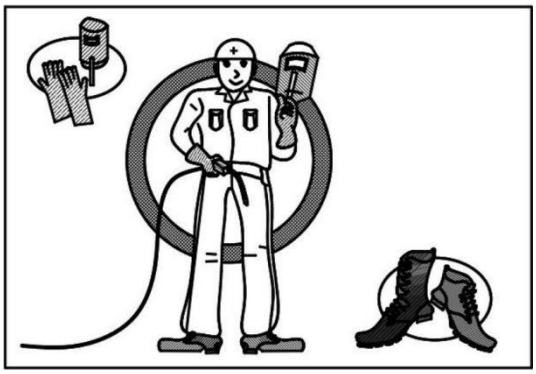
✧ Connect the gas tube on the wire feeding device to the outlet of gas regulator, and then lock it with the supplied hose clamp.

✧ Fix the gas cylinder on the gas cylinder bracket with belt , or at a self designated place.

✧ When welding with MAG gas, please use a mixed gas meeting the MAG welding requirements. In the case of mixing two bottles of gas, a gas proportioning mixer must be used to avoid uneven mixing.

5.2 Preparations for Gas Shielded Welding

(1)Preparation of safety appliance



✧ Be sure to wear leather gloves and safety boots to protect the operator’s skin or exposed parts of the body

✧ The shading filter shall be used to protect the operator’s eyes, and the selection of optical filter shall follow the principle shown in table 5:

Table 5

Welding Current	Less than 100A	100A-300A	Above 300A
Optical Proof	No.09、No.10	No.11、No.12	No.13、No.14

✧ The welding place shall be equipped with fume removal equipment to prevent the operator from inhaling the harmful fume and dust during welding.

(2) Switch operation and gas flow adjustment

✧ Turn on the power switch of the distribution box;

✧ Set the welding method on the welding power control panel to the option of “solid core” or “fluid core” gas shielded welding;

✧ Set the welding wire diameter and shielding gas on the control panel of the welding power supply at the needed position;

✧ Press the welding torch switch, turn on the gas cylinder switch, and adjust the gas regulator to make the value of the flow meter meet welding; (refer to Table 10 Welding Examples)

✧ Press the torch switch again to stop the air supply.

(3) Welding wire installation

Be sure to carefully check the specification of the wire feed wheel complies with the diameter of the used welding wire, and then install the welding wire. As shown in Figure 5.1/Figure 5.2.

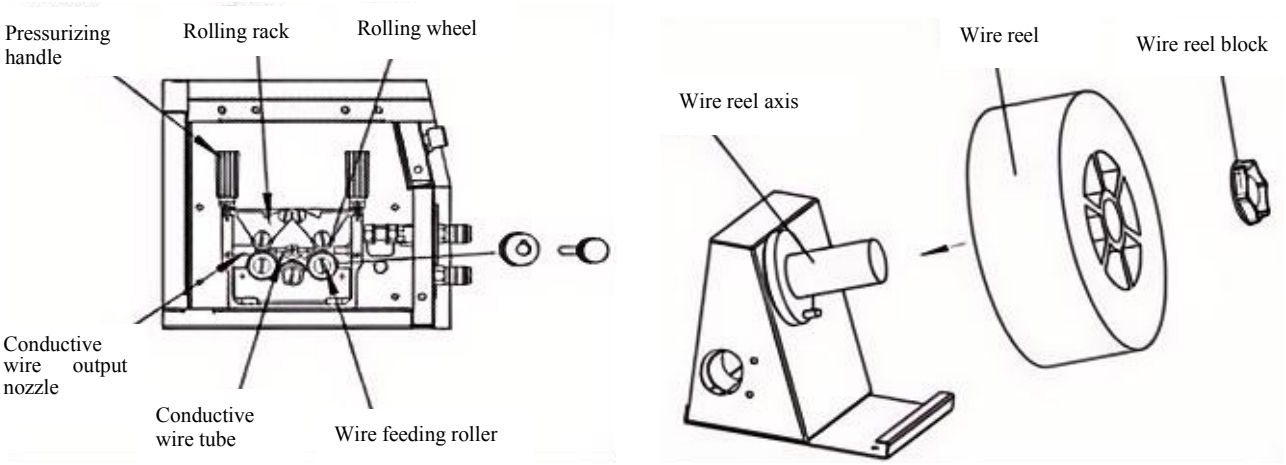


Figure 9 Installation Diagram of EDA Wire Feeder

- ✧ Select the appropriate welding wire diameter according to the welding process, and please also note that the selected diameter shall match with the specifications of the wire feeding roll of the wire feeder, the wire feeding hose in the welding torch, and the conductive nozzle; (refer to Table 10 Welding Examples)
- ✧ Lift the wire reel block and move it horizontally;
- ✧ Put the welding wire into the axis of wire reel; (the top of welding wire is exposed under the wire reel, and opposite to the wire feeder)
- ✧ Pull the wire reel block back to its original position;
- ✧ Raise the pressurizing handle;
- ✧ Lift the wire rolling frame.
- ✧ Introduce the welding wire into the “conductive wire tube” to make the welding wire align with the wire feed wheel groove, and then introduce the “conducive wire output nozzle” to press the “wire feeding roller” tightly. (The further wire feeding shall be conducted manually after powering on).
- ✧ Adjust the pressurizing handle to appropriate pressing force, so that the welding wire is conveyed normally without slip on the wire feeding roller. See Table 6.

Table 6

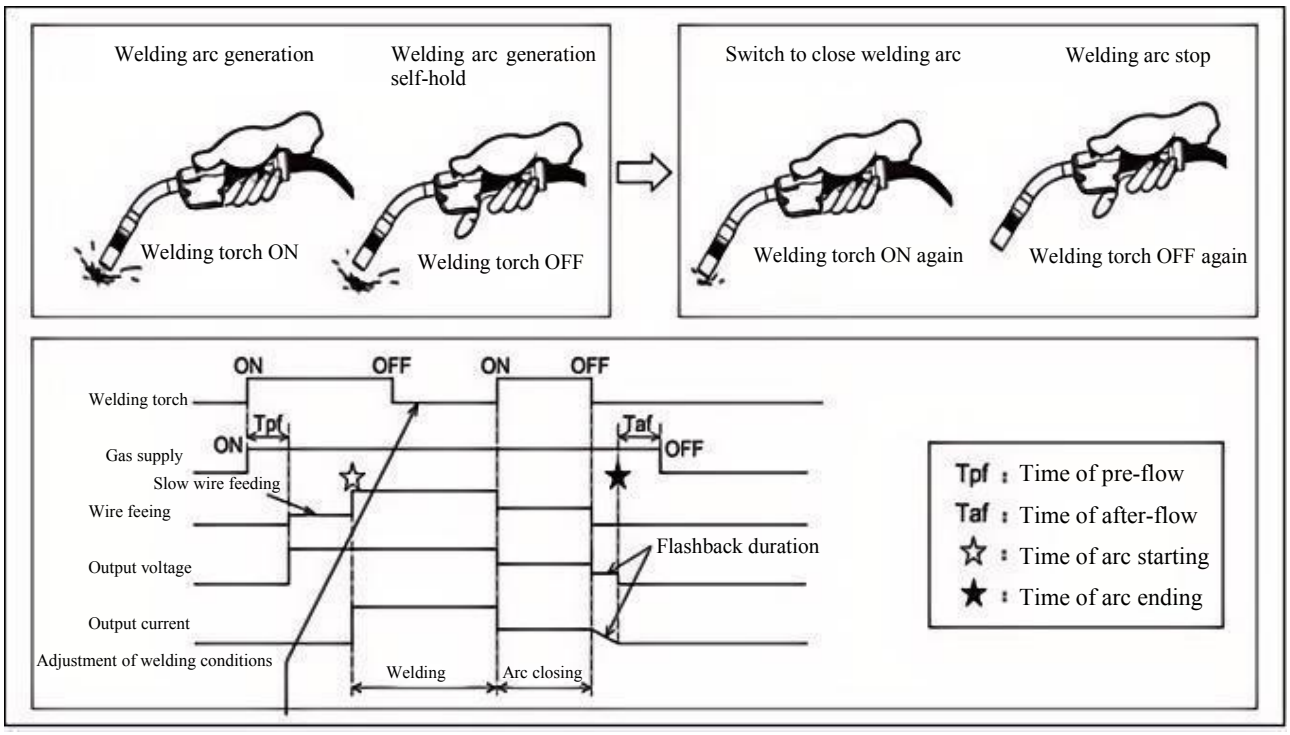
Recommended Value of Pressurizing Handle	
Weld Wire Diameter	Adjusting Scale for Reference
Φ1.2	4～5
Φ1.0	3～4
Φ0.8	2～3

■ There is a damping tightening mechanism in the wire reel axis (hexagonal screw visible on the shaft cover by unscrewing). Pull the wire reel by hand for coarse adjustment. In the case of large resistance, please adjust the damping bolt clockwise to increase it, and vice versa. Please also tighten the axis cover after adjustment.

(4) Manual Wire Feeding

Press and hold the “manual wire feeding “button on the remote control box of the wire feeder, and adjust the welding current adjustment knob to appropriate wire feeding speed. Do not loosen it until the 15 ~ 20mm welding wire is exposed at the welding torch head;

⚠ **Caution**



■ When feeding the wire manually, please do not get close to conductive nozzle to check whether the welding wire is sent out.

5.3 Use Method of Basic Welding Function

(1)The meaning of arc ending (four steps) and no arc ending (two steps)

Except for very small current welding, small craters like dimples usually appear at the end of the welding (weld seam end), which is called "arc crater". The formation such arc crater is the downforce of arc and the condensation and shrinkage of the molten metal. Generally, the larger the welding current, the larger the arc crater, and the welding components are prone to cracks at the arc crater. In order to minimize the size of the arc crater and improve the weld quality, a small current (generally set to 60~70% of the welding current) shall be used to close the arc and fill the arc crater.

By operating the welding torch switch at the end of welding, it can be converted to a program of arc closing welding current lower than the welding current, which is called arc closing (self-locking). Therefore, no arc closing (non-self-locking) means that there is no setting of control program to fill the arc crater. In this condition, by operating welding torch switch, the welding will be ended with the original welding current.

(2)"Four-Step" Welding

Set the "flux core gas shielded welding/solid core gas shielded welding/manual arc welding" on welding power control panel to "flux cored gas shielded welding" or "solid core gas shielded welding", and "two steps/four steps" to the "four steps", the operation steps are shown in Figure 5.2 below.

Figure 5.2 Operation Logic Diagram of "Four-Step" Welding

As shown in the figure above, the arc can be closed by operating the torch switch. When the welding is ended, press the torch switch to automatically convert to the arc closing current to fill the arc crater. After the arc crater is filled, the arc is extinguished when the torch switch is released.

(3)"Two-Step" Welding

Set the "flux core gas shielded welding/solid core gas shielded welding/manual arc welding" on welding power control panel to "flux cored gas shielded welding" or "solid core gas shielded welding", and "two steps/four steps" to the "two steps", the operation steps are shown in Figure 5.3 below.

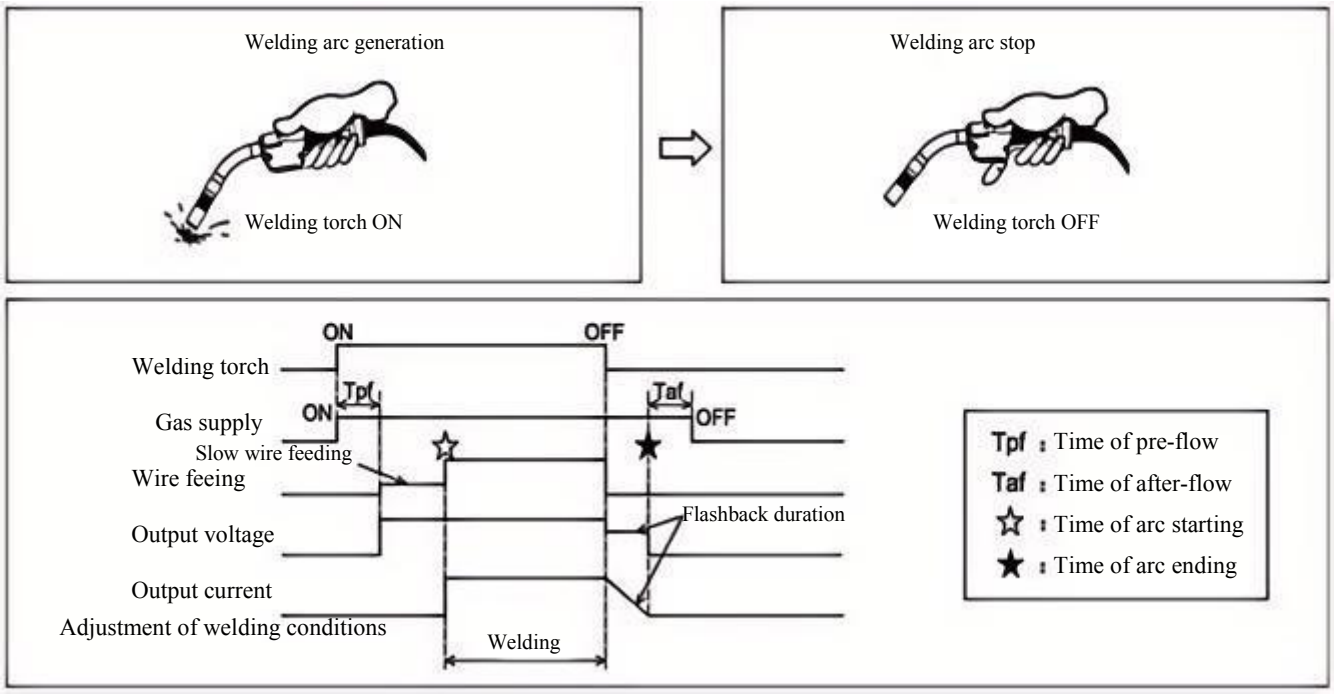


Figure 5.3 Operation Logic Diagram of "Two-Step" Welding

As shown in the figure above, by operating the torch switch, the arc cannot be closed. In this condition, when the welding is finished, the arc crater cannot be filled, and the welding can only be ended with the original welding current. This kind of welding is mainly used for repeated tack welding, instant welding and thin plate welding.

6 Use Method of Extended Output Cable

This equipment allows properly lengthening the cable between the output terminal "+" of the welding power supply and the wire feeder, but the following regulations must be observed:

✧ When extending the cable, be sure to choose a cable that meets the national standards and has a larger cross-sectional area than the original cable. Because the extension cable will increase the cable resistance and the cable voltage drop, which is not conducive to the welding operation; and the smaller the cable cross-sectional area, the greater the impact.

✧ Be sure to straighten the cable or coiling or coil as shown in Figure 6.1 below:

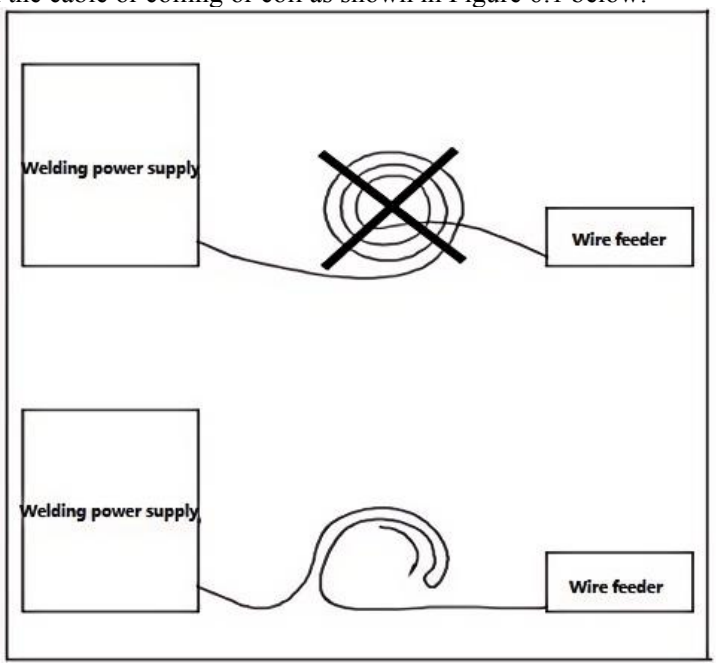


Figure 6.1 Correct Coiling of Welding Cable

7 Maintenance and Debugging

7.1 Daily Maintenance

Routine maintenance is critical to fully utilize the performance of this unit and ensure safe operation.

During routine maintenance, the key point is to check whether the parts in welding torch and feeder device are worn or deformed, and if the pores are clogged. The descaling and replacement of certain parts should be performed when necessary. In order to maintain the original performance when replacing parts, be sure to use the authorized parts of our welding machine.

Caution

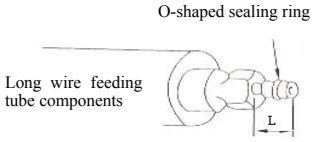
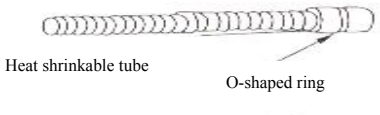
- Unless there is special need, the overhaul must be carried out under safe condition by cutting off the power supply of distribution cabinet.
- Failure to comply with the above principles may result in serious accidents related to personal safety, such as electric shock and burns.

7.2 Cyclic Check List

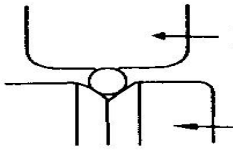
(1)Welding Power

Position	Key points for overhaul	Remarks
Control panel	Switch operation, conversion and installation. Verify whether the power indicator is on or off	
Cooling fan	Check if there is wind and whether the sound is normal.	International overhaul is available for the condition without fan rotation or abnormal sound.
Power Source	Whether there is abnormal vibration or buzzing when powering on. Whether there is odor when powering on Whether there is heating trace in appearance, such as color change	
Periphery	Whether the air supply line is damaged, and if the connection becomes loose. Whether the outer casing and fastening parts become loose.	

(2) Welding Torch

Position	Key points for overhaul	Remarks
Nozzle	Is the installation firm and whether the front end is deformed	Caused of composing and generating pores
	Whether there is plashing attached	Causes of burning welding torch (the effective method is using anti-spatter agent)
Electrode	Whether the installation is firm	The cause of welding torch thread damage
	Tip injury, hole abrasion and blocking	Cause of unstable arc or arc breaking
Wire feeding hose	Inspect the size of “L” part in wire feeding hose 	It should be replaced if less than 6mm. The small size of "L" part will cause unstable arc. (When replacing the wire feeding hose, please note that it is better to make the size of "L" part slightly longer than specification)
	Whether the wire diameter matches with the inner diameter of wire feeding hose.	Mismatch is the cause of arc instability, so please use the suitable wire feeding hose.
	Partial buckling and stretching 	It is the cause of poor wire feeding and arc instability. Please replace the appropriate wire feeding hose.
	Dirt in the wire feeding hose and blockage of the wire coating residue.	May cause poor wire feeding and arc instability. (Wipe with kerosene or change into new wire feeding hose)
	Damage to the heat shrinkable tube, wear of the O-shaped ring. 	May cause splashing The heat shrinkage is broken and shall be changed into a new wire feeding hose. O-ring is worn and shall be changed into a new one.
Gas Shunt	Forget the insertion or holes are blocked, or the assembly of components is purchased from other manufacturers.	May cause weld defects (splash, etc.) due to poor gas protection, or burning of the torch body (arc in the body), etc., please handle correctly.

(3) Wire Feeder

Position	Key points for overhaul	Remarks
Handle	Whether the wire diameter is adjusted above the pressurizing indication line. (Special note: it is strictly forbidden to damage the wire below φ1.2mm)	Will cause unstable wire feeding and arc
Wire Feeding Roller	● Whether the wire diameter and the nominal diameter of wire feeding wheel are the same. ● Inspect and check if there is blocking in wire feeding wheel.	● Cause the cut powder in welding wire, blocking of the wire feeding hose and the arc instability. ● Please replace it with a new one once an abnormality occurs.
Pressurizing Roller	Check the smoothness of rotation, the wear of the welding surface of wire and the narrowing of contact surface.  	Cause poor wire feeding and even unstable arc.

(4) Cable

Position	Key points for overhaul	Remarks
Cable in output	Wear and damage of cable insulation. Bareness (insulation damage) and looseness at the cable joint (terminal of cutting power supply and cable at the base metal connection).	Routine maintenance shall be general and simple Regular overhaul shall be profound and meticulous
Cable in input	●Whether there is secure connection between the input and output terminals of input protection device of distribution cabinet. ●Is the cable connection of the safety device reliable ●Whether there is secure cable at the input terminal connection of welding power supply. ●Whether the insulation of input cable is worn or damaged during the wiring process, so that the conductor portion is exposed.	
Grounding cable	●Whether there is open circuit in the grounding wire for welding power supply and the connection is firm. ●Whether there is open circuit in grounding wire of base metal and the connection is firm.	In order to prevent electric leakage, please be sure to carry out routine maintenance.

7.3 Regular Overhaul

In order to maintain the machine performance and ensure long-term service, it is far from enough to merely rely on routine maintenance.

Regular overhaul refers to the in-depth and meticulous maintenance inside the cutting machine, including the maintenance and purification inside the welding power supply.

Generally, splashing particles and oil dust will accumulate in a large amount within half a year. The accumulation will be larger in poor factory environment, so it is best to carry out maintenance every three months.

Customers shall increase some special items based on their own needs.

(1)Dedusting inside Power Supply

Remove the two side plates and one top cap of welding power supply, and blow off the spatter and dust accumulated inside the power supply through compressed air without moisture.

(2)Overhaul of the Whole and Surroundings of Welding Power

Focus on checking the odors, discoloration, signs of heating, and internal connections; the key point are the defects in routine maintenance.

(3)Cable

The inspection of the output cable, input cable and grounding wire should be carried out meticulously based on routine maintenance.

7.4 FAQ and Analysis of Welding

No.	Phenomenon	Cause analysis	Method for troubleshooting
1	The power indicator is off after powering on	No power inside control cabinet	Check if the circuit is in good contact
		Air switch on rear panel is damaged	Replace the air switch
		Damage of power transformer	Replace the power transformer and inspect the control panel
		Damage of control panel	Replace control panel
		Damage of indicator light	Replace indicator light
2	The automatic air switch on the rear panel is automatically powered off immediately once turning on the welding power supply.	Failure of automatic air switch	Replace the air switch
		Damage of IGBT module	Replace the IGBT module, check the secondary rectifier and control board at the same time
		Damageof three-phase rectifier bridge	Replace the three-phase rectifier bridge
		Damage of welding power supply control panel	Replace welding power supply control panel
3	The automatic air switch on the rear panel of the welding power supply is automatically powered off during the welding process.	Long-term overload running	Use according to welding power supply load rate
		Damage of air switch	Change air switch
4	Welding current cannot be adjusted	Breakage of wire feeder control cable or damage of controller	Replace wire feeder control cable or controller
		Damage of circuit board of welding power supply controller	Change the control panel

		Damage of current sensor inside welding power supply	Change the current sensor
5	Unstable arc and large spatter	Wrong welding condition	Fine tuning the welding specification
		Severe wear of contact nozzle	Change contact nozzle
6	CO2 gas regulator does not heat	Damage of CO2 gas regulator	Change CO2 gas regulator
		Breakage or short circuit of heating cable	Repair heating cable
		Damage of heater fuse	Change the heater fuse
7	When pressing and holding the torch switch, the wire is normal, but the gas path is blocked.	Insufficient air pressure inside gas cylinder	Inspect air pressure inside gas cylinder
		Damage of gas meter	Change gas meter
		Damage of control circuit board	Change control circuit board
		Damage of magnetic valve	Change magnetic valve
		Foreign matter in the connection between welding torch and magnetic valve	Change or dredge
8	Pressing and holding the torch switch, the wire feeder does not work, and there is no indication of no-load voltage	Damage of welding torch switch	Change the welding torch
		Breakage of wire feeder control cable	Repair the wire feeder control cable
		Damage of control circuit board	Change control circuit board

7.5 Common Weld Defects

No.	Weld Defect	Analysis of causes and elimination methods
1	Pores	Excess oil, rust and water on welding wire and workpiece.
		Poor CO2 gas protection. (Low flow rate, insufficient silicon and manganese content in the welding wire, impure gas, nozzle block, air leakage, and large wind)
2	Cracks	Excess oil, rust and water on welding wire and workpiece.
		Improper matching between current and voltage
		Excessive penetration depth and high carbon content inside base metal weld
		Excessively small first weld of the multi-layer welding, improper welding sequence, and excessive water content of the gas.
3	Undercut	Small arc length and fast weld speed
		Unsuitable position of torch, small welding current, and deep groove of the pad.
4	Slag insulation	Unclear slag removal of the front weld.
		Too large deposition quantity and large welding swing in low and small current.
5	Large spatter	Improper matching between current and voltage
		Poor clean of welding wire and workpiece
		Too large or small pore diameter of conductive nozzle and excessively long extension of welding wire.
6	Insufficient penetration	Small welding current, excessively long extension of welding wire, improper groove, small angle and gap.

7.6 Self-Fault Identification

Alarm code	Abnormal phenomena	Causes	Elimination methods
E05	Over-voltage input	Excessively large input power voltage	Detect power voltage and recover to the normal value;
E06	Under-voltage input	Excessively low input power voltage	Detect power voltage and recover to the normal value;
E15	Abnormal starting up	①The torch switch is closed when starting up; ② No-load voltage ③ There is current output	① Detect torch switch; ② Replace the corresponding control panel; ③ Change the driver board;
E17	Excessively large output current	① Overcurrent; ② Failure current sensor; ③ Disconnection of signal wire; ④ Failure of main control panel	① Repair output cable; ② Exclude the failure of signal wire; ③ Change current sensor; ④ Change main control panel
E19	Overheat protection	①Overheating inside the welding power supply (use beyond the rated load duration, the front and rear vents are blocked); ②Temperature relay failure; ③ Failure of signal wire; ④Failure of main control panel;	① Inspect the fan and wait for cooling inside the welding power supply; ②Check the wiring of the temperature relay; ③Replace temperature relay; ④Replace the main control panel;
E40	Abnormal communication between the main control panel and the display panel inside welding power supply	① Looseness or breakage of communication line; ② Failure of main control panel; ③Failure of display panel;	① Inspect communication line; ② Change main control panel; ③ Change display panel;
E41	Abnormal communication between the display panel and main control panel inside welding power supply	① Looseness or breakage of communication line; ② Failure of main control panel; ③Failure of display panel;	① Inspect communication line; ② Change main control panel; ③ Change display panel;
---	No such specification	No software database for this specification	This specification is not applicable.

8 Technical Data

8.1 Technical Parameters of Welding Power Supply

Table 7

	MIG-500C
Rated Input Voltage (V)	3～AC380V±10%
Frequency (Hz)	50/60
Rated Input Capacity (KVA)	25
Rated Load Duration (40℃)	500A
	100%
No-load Voltage (V)	80
Adjusting Scope of Output Current (A)	50～500
Adjusting Scope of Output Voltage (V)	12～48
Efficiency (%)	≥88%
Power factor COSφ	≥0.92
Diameter of Wire Used (mm)	Φ1.0～Φ1.6
Insulation Grade	H
IP Grade	IP23S
Weight of Welder (Kg)	52KG
Packing Size (L*W*H) (mm)	689*323*601.5

8.2 Internal Structure Diagram of Welding Power & Basic Spare Parts List

(1) Internal structure diagram and basic spare parts list of MIG-500C power supply

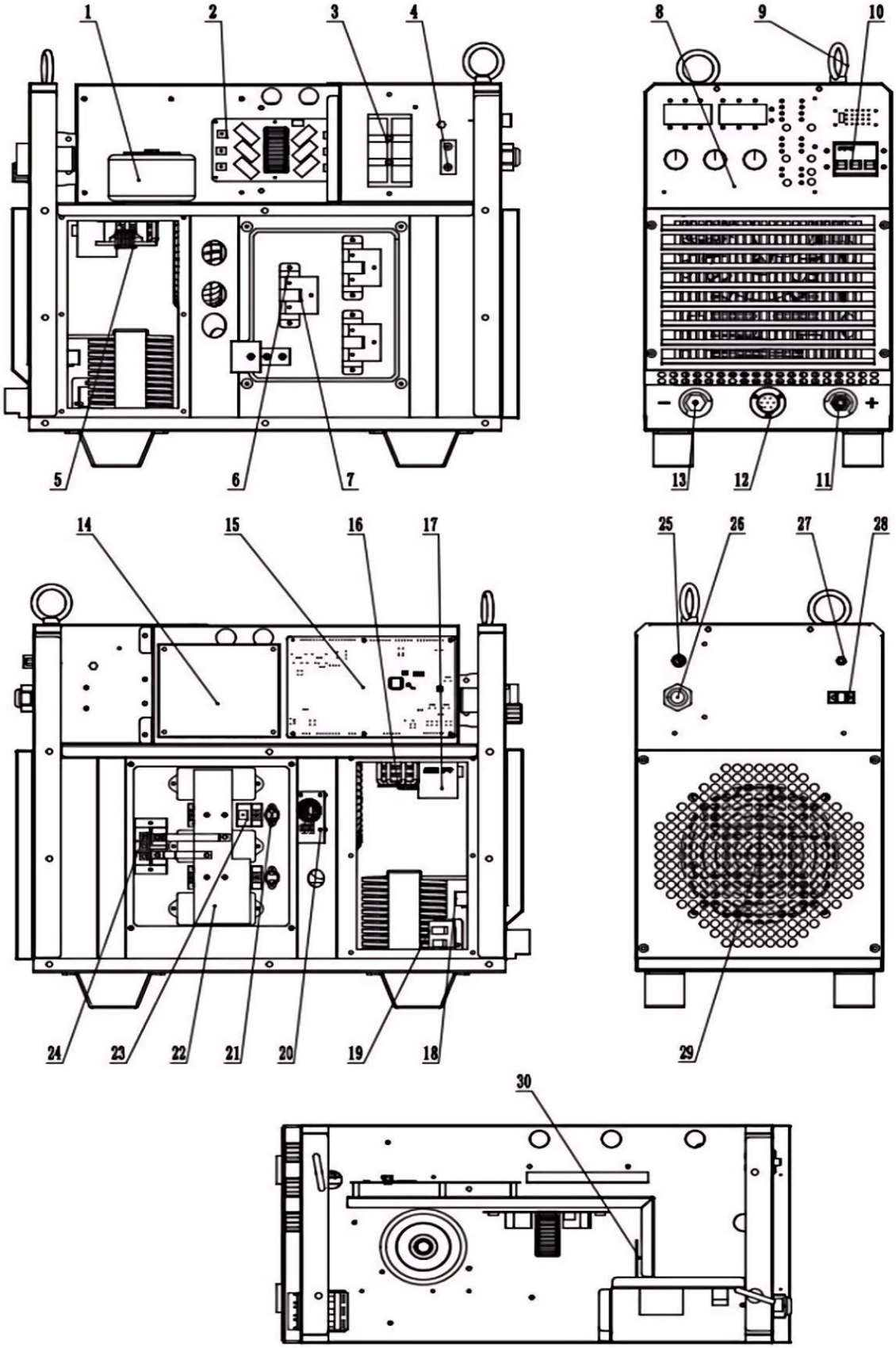
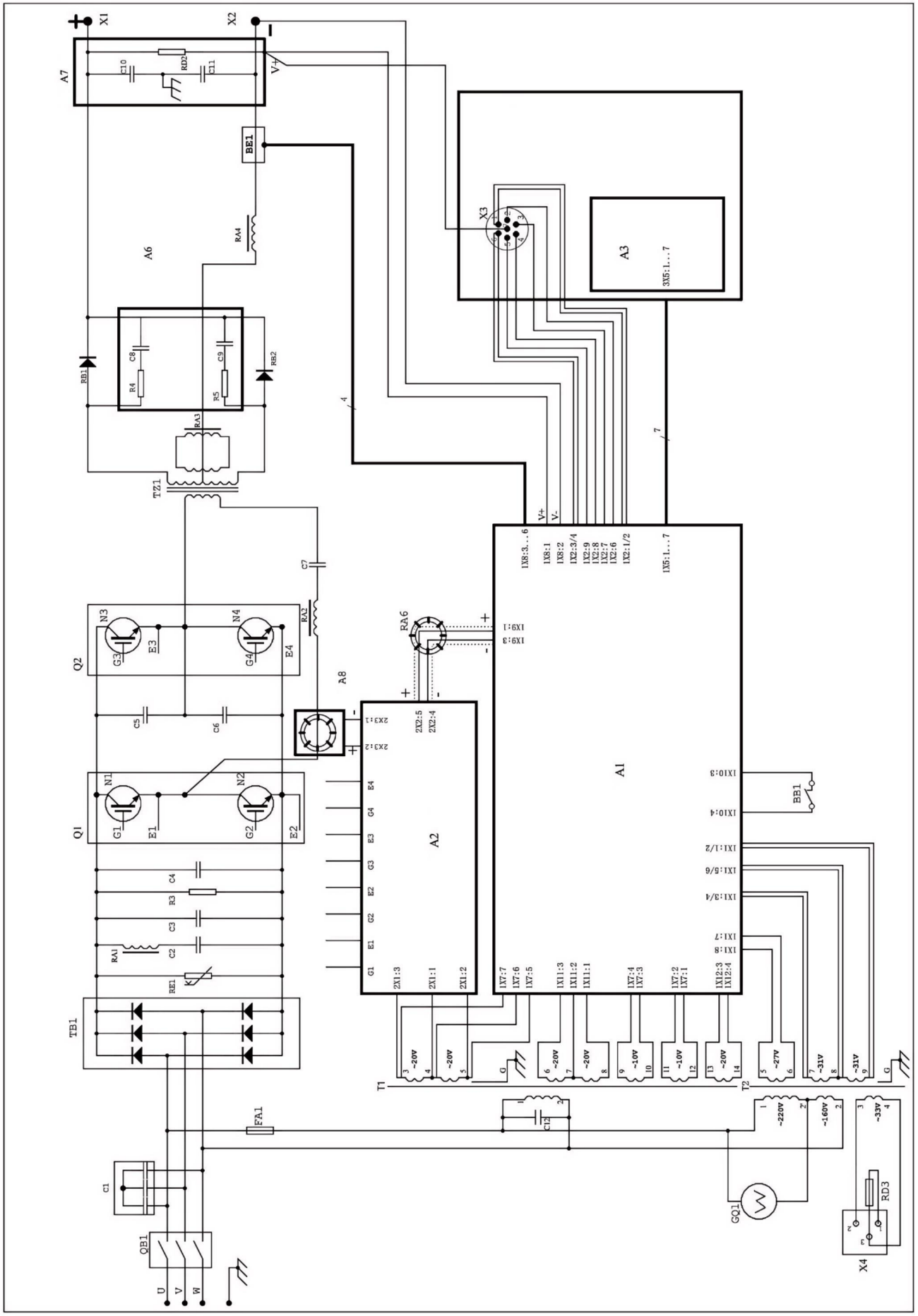


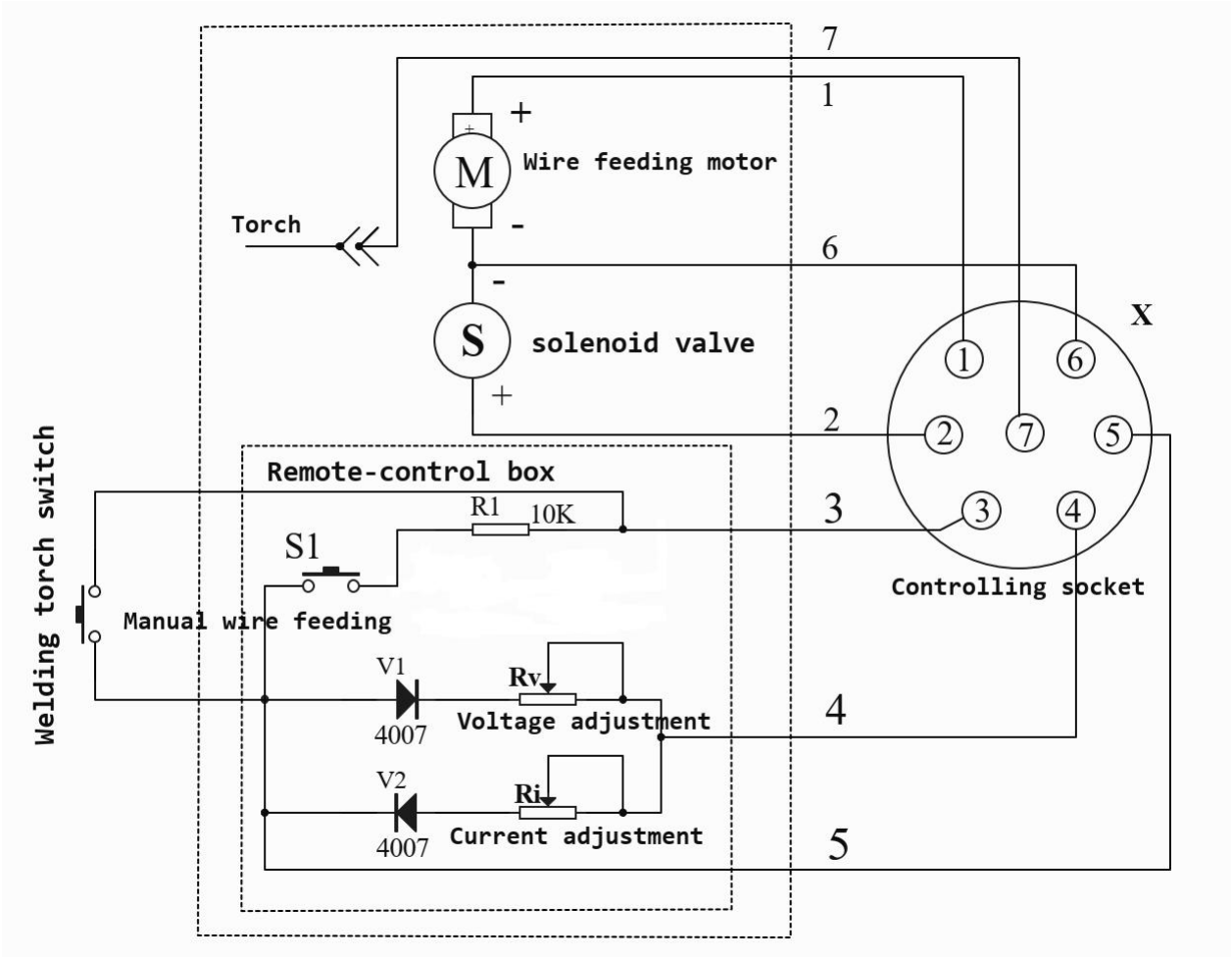
Table 8

No.	P/N	Name	Q'ty
1	103030541	Power supply transformer	1
2	CN6102050018	EMC Filter board assembly	1
3	102021114	High-current terminal block	1
4	102030251	Crimping button	2
5	CN101001015	Commutation inducto	1
6	CN101036050	Fast recovery diode module	3
7	6102110201-2.1	Diode resistance-capacitance absorption plate assembly	3
8	6102200391	Display board	1
9	111003073	Lifting ring screw	1
10	102001088	Circuit breaker	1
11	107002100	Prefabricated cable socket	1
12	102024052	Aviation socket	1
13	107002100	Prefabricated cable socket	1
14	6102030052	Drive board	1
15	CN6102020643	Main control board	1
16	CN101001002	Resonant inductance	1
17	CN101009004	Non-polar film capacitor	1
18	107001102	Current sensor wiring harness	1
19	CN6102200161	Rack capacitor plate assembly	1
20	6102200421	Current mutual inductance board assembly	1
21	CN10201117	Temperature controller	1
22	6102200420	IGBTresistance-capacitance absorption board	1
23	CN101043019	IGBT Module(1200V)	2
24	CN102016066	Three-phase rectifier bridge module	1
25	6104202400	Fuse holder assembly wiring harness	1
26	CN106003012	Cable waterproof clamping joint	1
27	CN101001097	Overload protector	1
28	CN101039013	Power socket	1
29	CN102001011	Fan	1
30	CN6102200153	Fan power control board assembly	1

8.3 Electrical Diagram of Welding Power(Standard)



8.4 Cut-away View of Wire Feeder



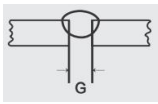
9 Completeness of products

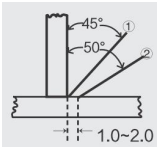
NO.	NAME	QUA	NOTE
1	Packing list	1	
2	Instruction Manual (with warranty card)	1	
3	Certificate of product	1	
Accessories to be used - wearing parts			
1	Wire feeding device	1	
2	Clamp 8～12	2	
3	Grounding cable	1	
4			

The wearing parts are not within the warranty scope of the company, If the order contract provides otherwise, the contract shall prevail.

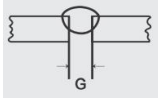
10 Welding Instances

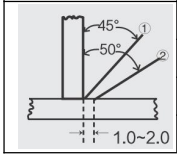
10.1 Example of CO2 Welding

IShape of butt welding	Plate Thickness (mm)	Welding Wire Diameter (Φ)	Root Gap (mm)	Welding Current (A)	Welding Voltage (V)	Welding Speed (cm/Min)	Gas Flow (L/Min)
	0.8	0.8,0.9	0	60～70	16～16.5	50～60	10
	1.0	0.8,0.9	0	75～85	17～17.5	50～60	10～15
	1.2	0.8,0.9	0	80～90	17～18	50～60	10～15
	1.6	0.8,0.9	0	95～105	18～19	45～50	10～15
	2.0	1.0,1.2	0～0.5	110～120	19～19.5	45～50	10～15
	2.3	1.0,1.2	0.5～1.0	120～130	19.5～20	45～50	10～15
	3.2	1.0,1.2	1.0～1.2	140～150	20～21	45～50	10～15
	4.5	1.0,1.2	1.0～1.5	140～150	22～23	40～50	15
	6.0	1.2	1.2～1.5	170～185	24～26	40～50	15～20
	9.0	1.2	1.2～1.5	320～340	32～34	40～50	15～20

T fillet weld	Plate Thickness (mm)	Welding Wire Diameter (Φ)	Welding Current (A)	Welding Voltage (V)	Aiming at position ① ②	Welding Speed (cm/Min)	Gas Flow (L/Min)
	1.0	0.8,0.9	70～80	17～18	①	50～60	10～15
	1.2	0.9,1.0	85～90	18～19	①	50～60	10～15
	1.6	1.0,1.2	100～110	18～19.5	①	50～60	10～15
	2.0	1.0,1.2	115～125	19.5～20	①	50～60	10～15
	2.3	1.0,1.2	130～140	19.5～21	①	50～60	10～15
	3.2	1.0,1.2	150～170	21～22	①	45～50	15～20
	4.5	1.0,1.2	180～200	23～24	①	40～45	15～20
	6	1.2	230～260	25～27	①	40～45	15～20
	8.9	1.2,1.6	270～380	29～35	②	40～45	20～25
	12	1.2,1.6	300～380	32～35	②	35～40	20～25

10.2 Example Table of MAG welding

IShape of butt welding	Plate Thickness (mm)	Welding Wire Diameter (Φ)	Root Gap (mm)	Welding Current (A)	Welding Voltage (V)	Welding Speed (cm/Min)	Gas Flow (L/Min)
	1.2	0.8,0.9	0	60～70	15～16	30～50	10～15
	1.6	0.8,0.9	0	100～110	16～17	40～60	10～15
	3.2	0.8～1.2	1.0～1.5	120～140	16～17	25～30	10～15
	4.0	1.0～1.2	1.5～2.0	150～160	17～18	20～30	10～15

T fillet weld	Plate Thickness (mm)	Welding Wire Diameter (Φ)	Welding Current (A)	Welding Voltage (V)	Aiming at position ① ②	Welding Speed (cm/Min)	Gas Flow (L/Min)
	1.0	0.8	85～90	15～17	①	50～60	10～15
	1.6	0.8	100～110	15.5～17.5	①	50～60	10～15
	2.4	0.8～1.0	115～125	16～18	①	50～60	10～15
	3.2	0.8～1.2	130～140	16.5～18.5	①	50～60	10～15