

INVERTER MMA/ARC SMART WELDER MAX SERIES



PLEASE CAREFULLY READ THIS MANUAL BEFORE ASSEMBLY,
USEING OR MAINTAINANCE





WARNING

When the DC inverter welder works with AC welder, please don't let the output cable of two different machine connected together in case of welder damage

DANGER	Once you touch the electric parts will result in electric shock • Don't touch the electric parts. • Make sure the welder connect to earth before using. • Off power supply while assembly and maintenance. • Don't use the welder while opening the case. • Please use the good insulating gloves.
	ARC、Spatter and slag may burn eyes and skin, abnormal noise may hurt hearing • Please use the welding mask to protect your face and eye • Please use the welding clothes to protect your body • Please use hearing protecting tool when it is noising
CAUTION	Using welder in a narrow place or higher have the potential to cause electric shocks, stinging lead to falls and other accidents. • Please use the VRD device or build-in VRD welder in the following location • 2m or higher location with risk of falling, workers who may be exposed to bars and other places of grounding electrical conductivity. • Please check the VRD device per the safety rule while operating
DANGER	The dust, smoke or gas caused by welding are bad for health • Please use local exhaust ventilation equipment and respiratory protective equipment. • When operating in narrow places, please check and accept monitoring of adequate ventilation, wearing of respiratory protective equipment • Please don't use the welder in the degreasing, cleaning and spraying area
CAUTION	It may result in fire, blasting or other accident during welding • Please don't place any Combustible and flammable gases in the welding location. • Please don't weld any airtight container, like oil tank or tube or others • Please equip with fire apparatus in welding location.
CAUTION	Lifting Device: The standard package for this welder is carton or wooden box without any connector for lifting device, so when the welder arrive, please use the fork lift truck to move the machine and then open it. • When the welder equipped with rings for lifting, you can use the ring to transport the machine, but please notice that don't use roller to move the welder since it may damage the welder • Please make sure all accessories have been removed when lifting • When the welder is being lifted, please make sure there is nobody below the welder and there is someone to mention the passengers. • Please don't use the crane to move the welder quickly. • Please install the welder in accordance with the assembly direction.



WARNING

Please make the generator's power at least 2 times than the welder's rated power when using generators as power supply

CONTENTS

CONTENTS·····	1
1、 MACHINE DESCRIPTION·····	2
2、 TECHNICAL PARAMETERS TABLE·····	3
3、 PANEL FUNCTION INSTRUCTION·····	4
4、 ARC(MMA)WELDING·····	5
5、 LIFT TIG(GMAW)WELDING·····	11
6、 ACCESSORY DRAWING·····	14
7、 INSTALLATION INSTRUCTION·····	14
8、 KEY SPARE PARTS·····	16
9、 OPERATING INSTRUCTIONS ·····	18
10、 PRECAUTIONS·····	19
11、 MAINTENANCE,AFTER-SALES·····	20
12、 TROUBLESHOOTING AND FAULT FINDING·····	21

1. MACHINE DESCRIPTION

1) INVERTER ARC/MMA SMART WELDER MAX SERIES FEATURES

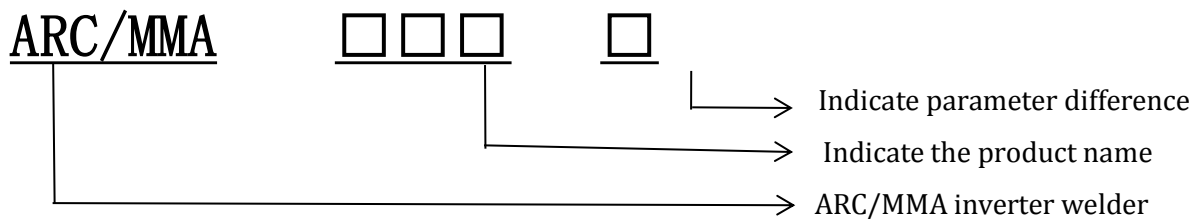
inverter MMA/ARC smart welder max series are our company's own R & D design , which has the following advantages:

- ① Strong ability against the power fluctuation, it can work normally under the fluctuation of $\pm 15\%$;
- ② Fashionable appearance, LED display ,small size, light weight and easy to move;
- ③ Using the three-proofed structure against the dust,moisture and corrosion, very considerable protection for all the electronic components;
- ④ This series of manual arc welding machine have been used the current-mode PWM pulse width adjustment technology,IGBT inverter technology and high-power fast recovery diode application technology, to ensure the product stability;
- ⑤ With under-voltage, overheating, over current, lack of phase protection, to ensure product reliability;
- ⑥ Stable output performance, real-time monitoring of the welding output power, the effective management of the output current to ensure welding welding reliability;
- ⑦ With a good dynamic characteristics, easy arc, arc stability, easy to control the pool;
- ⑧ With precise preset welding current to make sure good welding result and energy saving more energy ,easy to operate and suitable for different thickness work-piece, thin plate in small current and thick plate in large current.

2) APPLICATION:

Suitable for welding of carbon steel, alloy steel, non-ferrous metals, suitable for boiler pressure-melt industrial power plants, aerospace manufacturing, industrial, automotive and vehicle manufacturing, construction and other related metals welding industry.

3) MODEL EXPLANATION:



4) LABEL EXPLANATIONS:

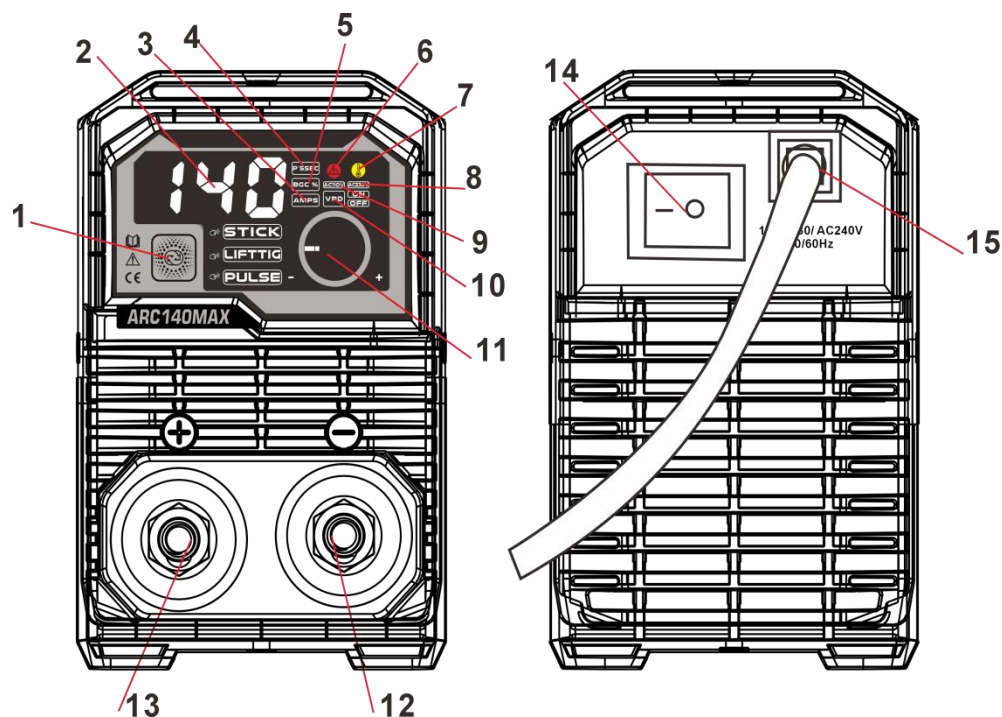
	Read all safety regulations and instructions		Earthing loop
	Disconnet the machine from the mains before installation or adjustment		Attention.Warning of possible user health damage
	Wear a welding mask		Movement direction
	Wear a dust mask		Unlocked
	Rotation direction		Locked

note:Be sure to identify the product model on the nameplate, the same product model may have different parameters.

2. TECHNICAL PARAMETERS TABLE

Model Parameters	ARC140MAX
Power voltage (V)	AC230/AC240V±10%
Frequency (Hz)	50/60
Rated input current (A)	29.5
No-load voltage (V)	65
Output current (A)	ARC:10-140 LIFT TIG:10-140
Rated output voltage (V)	25.6
Pulses Per second(P`S SEC)	ARC:0.2-5 LIFT TIG:0.5-100
Back Ground Current(BGC%)	ARC:60-80 LIFT TIG:25-75
Duty cycle (%)	10
No-load loss (W)	40
Efficiency (%)	80
Power factor	0.73
Insulation grade	F
Housing protection grade	IP21
Net Weight (kg)	2.75kg
Dimensions (mm)	253*100*160

3. PANEL FUNCTION INSTRUCTION



Picture3-1 ARC 140 MAX

Function description:	
1	Process Selection Button (ARC/LIFTTIG/PULSE)
2	Digital Meter
3	Ampere
4	Pulses Per second(P`S SEC)
5	Back Ground Current(BGC%)
6	Overload lamp
7	Overheating lamp
8	AC110V indicator light
9	AC230V indicator light
10	VRD ON/OFF Indicator
11	Control Knob
12	Negative output terminal
13	Positive output terminal
14	Power switch
15	Input power line

4. ARC (MMA) WELDING

4.01 ARC (MMA) MODE AND SETUP

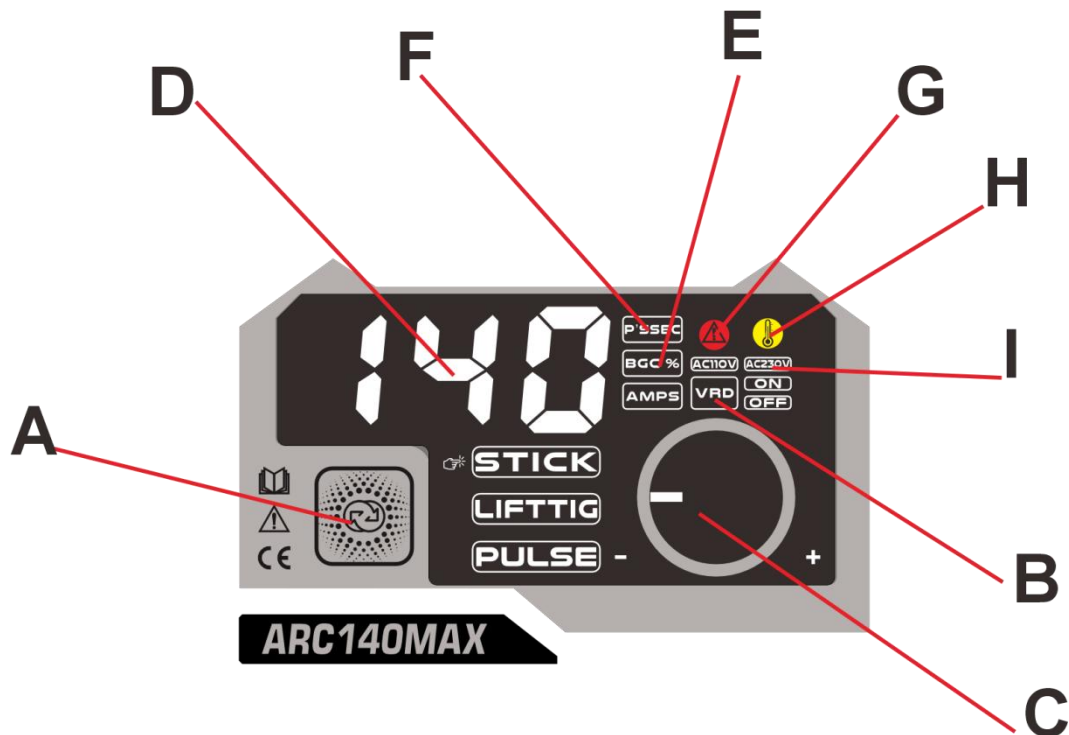


Figure 4-1 ARC(MMA)MODE

A.Process Selection Button.

Press Process Selection Button to select ARC(MMA)mode.Press Process Selection Button again to select ARC (MMA) with PULSE mode. Select ARC(MMA) or ARC(MMA) and PULSE for Pulse ARC Welding.



Figure 4-2: VRD ON

B.VRD ON/OFF Indicator (MMA/ARC MODE)

The green VRD light illuminates when the VRD is active. Under this condition the open circuit voltage of the unit is less than 35 VDC, thus reducing the potential of serious electric shock (such as when changing electrodes).



Figure 4-3: VRD OFF

The red VRD indicator illuminates when the VRD is inactive during welding operation. Under this condition the output voltage of the unit will be at welding potential which in most cases exceeds 35 VDC.

C. Control Knob.

- Turn clockwise to increase the value;
- Turn counter-clockwise to decrease the value;
- Turn slowly in order to adjust value in small increments.
- Turn quickly in order to adjust value in larger increments.

D. Digital Meter

In ARC (MMA) Mode the digital meter will display the Set Amperage (adjustable) when not welding.

Whilst welding the digital meters display the actual welding Amperage of the power source.

At the completion of welding digital meters hold the last recorded welding voltage and amperage for 10 seconds.

The amperage meter will hold the value until; (1) any of the front panel controls are adjusted in which case the unit will revert to viewing mode, (2) welding is recommenced, in which case actual welding amperage will be displayed, or (3) a period of 10 seconds elapses following the completion of welding in which case the unit will return to viewing mode.

E. BackGround Current(BGC%)**(Only available in ARC (MMA) with Pulse Mode)**

Press the Control Knob (Quick press) to cycle through the settings until reaching BackGround Current (or Base Current, it will highlight as shown on image below). Use the Control Knob to adjust to the desired level. Pulse Base Current Range is 60 - 80%. Factory setting is 70%



Figure 4-4: BackGround Current

Note: If no adjustment is made after 5 seconds it will return to the primary adjustment screen (Current - AMPS).

It's the percentage of current that your Pulse will have at the Bottom (base). This percentage is calculated from your peak current, which is set with the Control Knob (See Section 4.01 C. Control Knob). It is the low-current pulse that follows the peak current. It helps maintain the arc stability and keeps the weld pool in a controlled state while minimizing heat input. The background current is usually set at a lower value compared to the peak current.

For example, if a Pulse Base Current of 60% is set, the variation will be 40% between Peak and Base. This will make the weld much hotter when the pulse is at the Top compared to the Bottom.

F. Pulses Per Second (P'S SEC) (Only available in ARC (MMA) with Pulse Mode)

Press the Control Knob (Quick press) to cycle through the settings until reaching Pulses Per Second (It will highlight as shown on image below). Use the Control Knob to adjust to the desired level. Pulses Per Second Range is 0.2 - 5Hz. Factory setting is 1Hz.



Figure 4-5: BackGround Current

Note: If no adjustment is made after 5 seconds it will return to the primary adjustment screen (Current - AMPS).

It is the number of times per second that a pulse (also known as cycle) will take place. The unit of measurement is Hertz (Hz). A Pulse cycles between Pulse Base current (bottom of the pulse) and the Peak Current (top of the pulse). This allows you to control the overall heat input, maintain arc stability and have a better-looking weld by improving control over the weld pool.

Higher frequencies result in more rapid cycling between the two current levels. As an example, if the Pulse Frequency is set for 2 Hz, you will observe 2 pulses per second (10 pulses every 5 seconds).

Anti ARC Feature (Not Shown)

This feature operates in ARC(MMA) mode. The anti ARC feature senses when the electrode ARC and automatically reduces the current to prevent the ARC Electrode from ARC to the work piece. This is a preset feature and is not adjustable.

⚠ NOTE ON ARC MACHINES WITH VRD

To strike an arc with this machine which has VRD enabled, it is easier, to use the Touch and Lift technique, rather than trying to strike the electrode like lighting a match. Touch & Lift, means you lightly touch the electrode to the steel, and drag the rod a couple of millimeters in the direction you intend to weld, then lift the electrode and the arc will initiate easily.

4.02 SETUP FOR ARC(MMA)WELDING

A.Ensure that the Power Source ON/OFF Switch located on the rear of the Power Source is in the OFF position.

B.Connect the Electrode Holder lead to the positive welding terminal (+). If in doubt, consult the electrode manufacturer. Welding current flows from the Power Source via DINSE type terminals. It is essential, that the male plug is inserted and turned securely to achieve a sound electrical connection.

C.Connect the work lead to the negative welding terminal (-)If in doubt, consult the electrode manufacturer. Welding current flows from the power source via DINSE type terminals. It is essential, that the male plug is inserted and turned securely to achieve a sound electrical connection.

D.Switch the Power Source ON/OFF Switch located on the rear of the Power Source to the ON position and ensure the LED screen on the Front Panel lights up.

E.Select ARC (MMA) mode with the process selection control. Refer to Section 4.01-A

F.Adjust the Current (Amps) with the Control Knob to the desired level. Refer to Section 4.01-C.Control Knob for further information.



Figure 4-6: Select ARC (MMA)Mode

4.03 SETUP FOR ARC (MMA)WITH PULSE

See Section 4.02, paragraphs **A** to **D**.

E. Select ARC (MMA) with PULSE mode with the process selection control. Refer to Section 4.01-A

F. Adjust the Current (Amps) with the Control Knob to the desired level. Refer to Section 4.01-C. Control Knob for further information.



Figure 4-7: Select ARC (MMA) with PULSE

G. Quick-Press the Control Knob to adjust BackGround Current(BGC %). Refer to Section 4.01-E. BackGround Current(BGC %)

H. Quick-Press the Control Knob to adjust Pulses Per Second (P'S SEC). Refer to Section 4.01-F. Pulses Per Second (P'S SEC)

5. LIFT TIG (GTAW) WELDING

5.01 LIFT TIG MODE AND SETUP

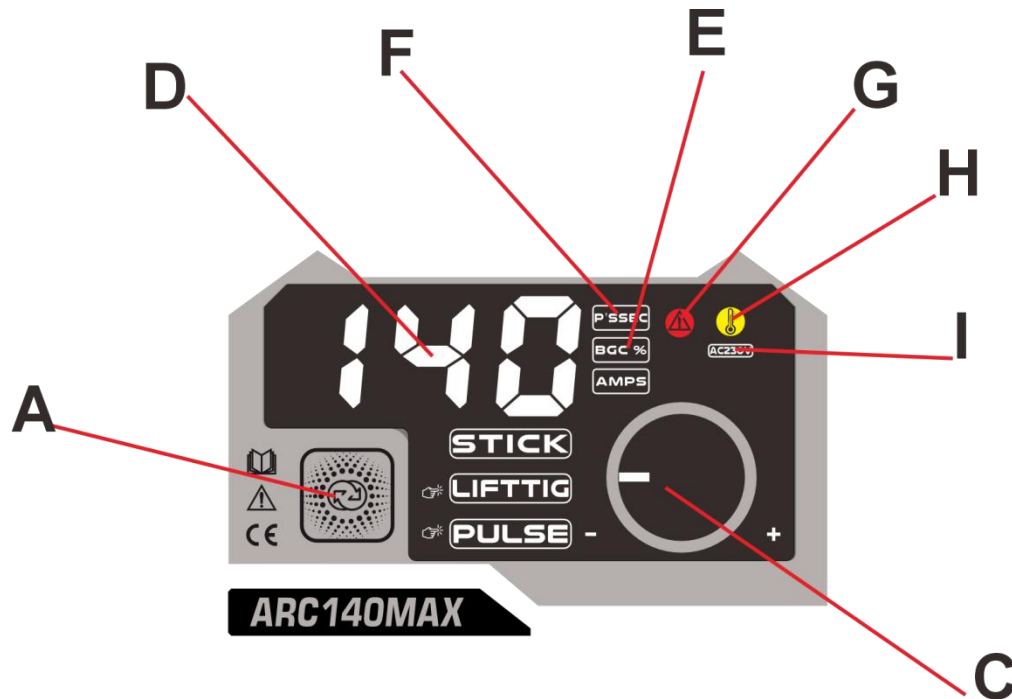


Figure 5-1: LIFT TIG Mode

A. Process Selection Button.

Press Process Selection Button to select LIFT TIG mode Press Process Selection Button again to select LIFT TIG with PULSE mode.

Select LIFT TIG or LIFT TIG and PULSE for Pulse LIFT TIG Welding.

B. Control Knob.

Turn clockwise to increase the value;

Turn anti-clockwise to decrease the value;

Turn slowly in order to adjust value in small increments.

Turn quickly in order to adjust value in larger increments.

C. Digital Meter

In LIFT TIG Mode the digital meter will display the Set Amperage (adjustable) when not welding. Whilst welding the digital meter will display the actual welding Amperage of the power source.

At the completion of welding digital meters hold the last recorded welding voltage and amperage for 10 seconds. The amperage meter will hold the value until; (1) any of the front panel controls are adjusted in which case the unit will revert to viewing mode, (2) welding is recommenced, in which case actual welding amperage will be displayed, or (3) a period of 10 seconds elapses following the completion of welding in which case the unit will return to viewing mode.

D. BackGround Current(BGC%) (Only available in TG (GTAW) with Pulse Mode)

Press the Control Knob (Quick press) to cycle through the settings until reaching BackGround Current (it will highlight as shown on image below). Use the Control Knob to adjust to the desired level. Pulse Base Current Range is 25 -75%Factory setting is 50%.



Figure 5-2: BackGround Current

Note: If no adjustment is made after 5 seconds it will return to the primary adjustment screen (Current -AMPS).

It's the percentage of current that your Pulse will have at the Bottom (base). This percentage is calculated from your peak current, which is set with the Control Knob (See Section 5.01 B. Control Knob). It is the low-current pulse that follows the peak current, It helps maintain the arc stability and keeps the weld pool in a controlled state while minimizing heat input. The background current is usually set at a lower value compared to the peak current.

For example, if a Pulse Base Current of 60% is set, the variation will be 40% between Peak and Base. This will make the weld much hotter when the pulse is at the Top compared to the Bottom.

E. Pulses Per Second (P'S SEC) (Only available in TIG (GTAW) with Pulse Mode)

Press the Control Knob (Quick press) to cycle through the settings until reaching Pulses Per Second (It will highlight as shown on image below). Use the Control Knob to adjust to the desired level. Pulse Frequency Range is 0.5 -100Hz Factory setting is 1Hz.



Figure 5-3: Pulses Per Second (P'S SEC)

Note: If no adjustment is made after 5 seconds it will return to the primary adjustment screen (Current -AMPS)

It is the number of times per second that a pulse (also known as cycle) will take place. The unit of measurement is Hertz (Hz). A Pulse cycles between a Pulse Base current (bottom of the pulse) and the Peak Current (top of the pulse). This allows you to control the overall heat input, maintain arc stability and have a better-looking weld by improving control over the weld pool.

Higher frequencies result in more rapid cycling between the two current levels. As an example, if the Pulse Frequency is set for 2 Hz, you will observe 2 pulses per second (10 pulses every 5 seconds).

NOTE

This machine is a DC LIFT TIG Welder with Pulse, it is NOT suitable for TIG Welding Aluminium and Aluminium Alloys.

6. ACCESSORY DRAWING

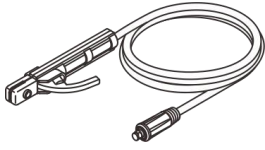


Figure 6-1 Electrode holder with cable

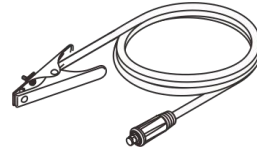


Figure 6-2 Earth clamp with cable

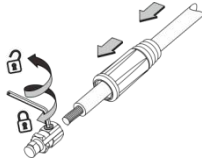


Figure 6-3 Connector assembly way



Figure 6-4 Internal hexagonal wrench

7. INSTALLATION INSTRUCTION

If the connecting cable is too long, it will have a great influence on the arcing performance as well as the stability of the welding performance. Therefore, please use the recommended length. If you want to reduce the voltage drop, please use a cable with a larger cross section.

1) Ground the cables with section area no less than 6mm^2 to the housing, the way is connecting screw in the back of the power source to ground device;

2) Connect the power cable to the distribution box with the corresponding voltage level of the welder. Do not connect the wrong voltage and ensure that the fluctuation of the input voltage is within the allowable range;

3) Make sure that the input power cable, output electrode holder, and output earth clamp are reliably connected. For the output interface, refer to the connection method below and tighten it clockwise;

4) Please pay attention to the connecting terminal, DC welding machine has two connecting ways: positive connection and negative connection. Positive connection: connect the electrode holder with “-” terminal, while workpiece with the “+” terminal. Negative connection: workpiece with the “-” terminal, holder with the “+” terminal. Choose suitable way according to the working situation. If unsuitable choice is made, it will cause unstable arc, more spatters and conglutination. If such problems occur, please change the polarity of the fastening plug.

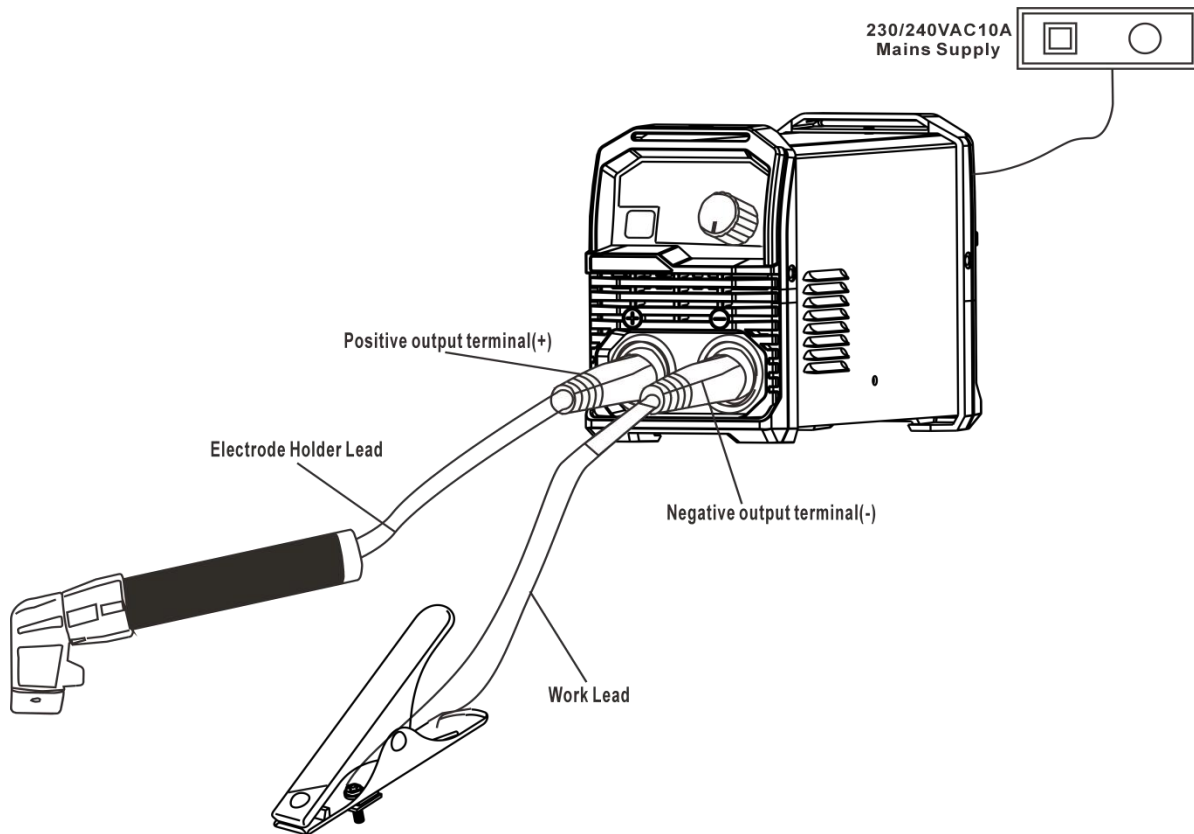


Figure 7-1 Setup for ARC(MMA) Welding

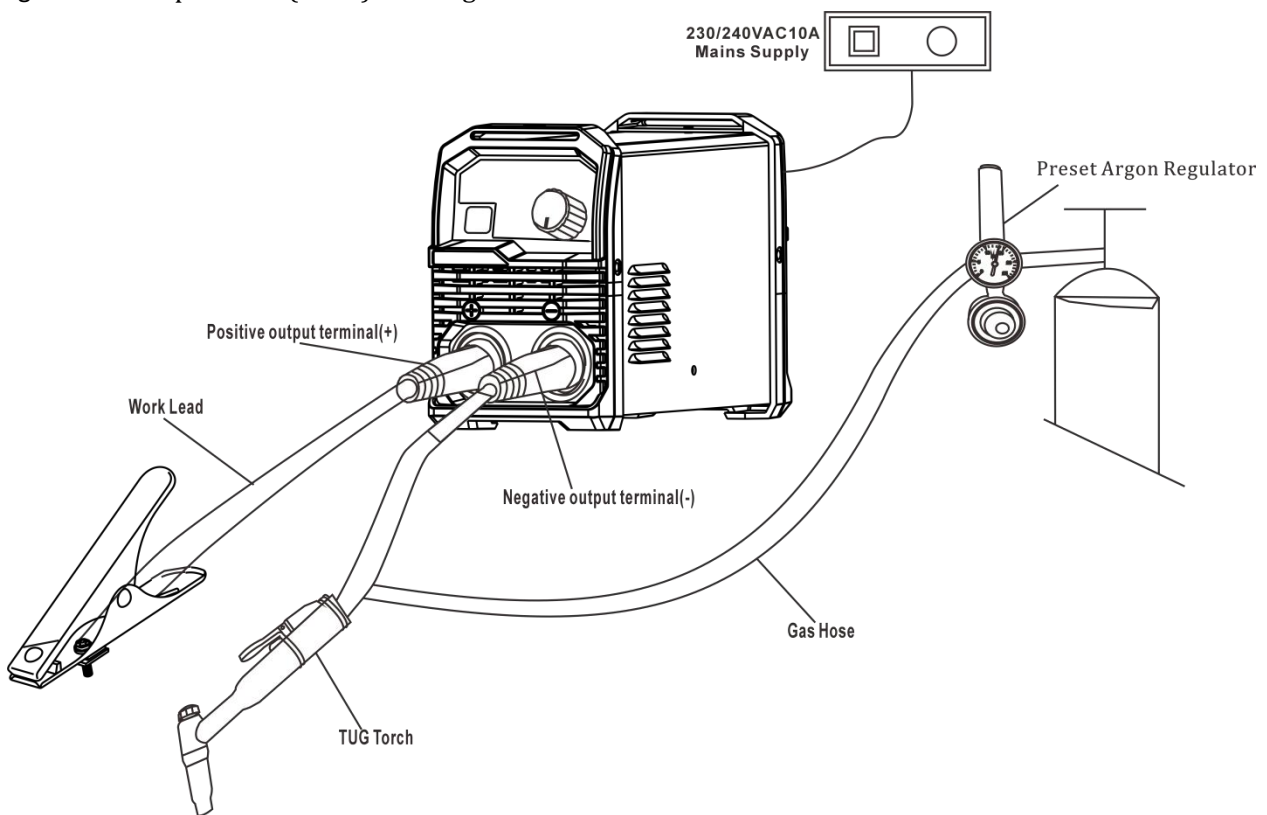


Figure 7-2 Setup for LIFT TIG(GTAW) Welding

8. KEY SPARE PARTS

8.01 ARC 140 MAX KEY SPARE PARTS

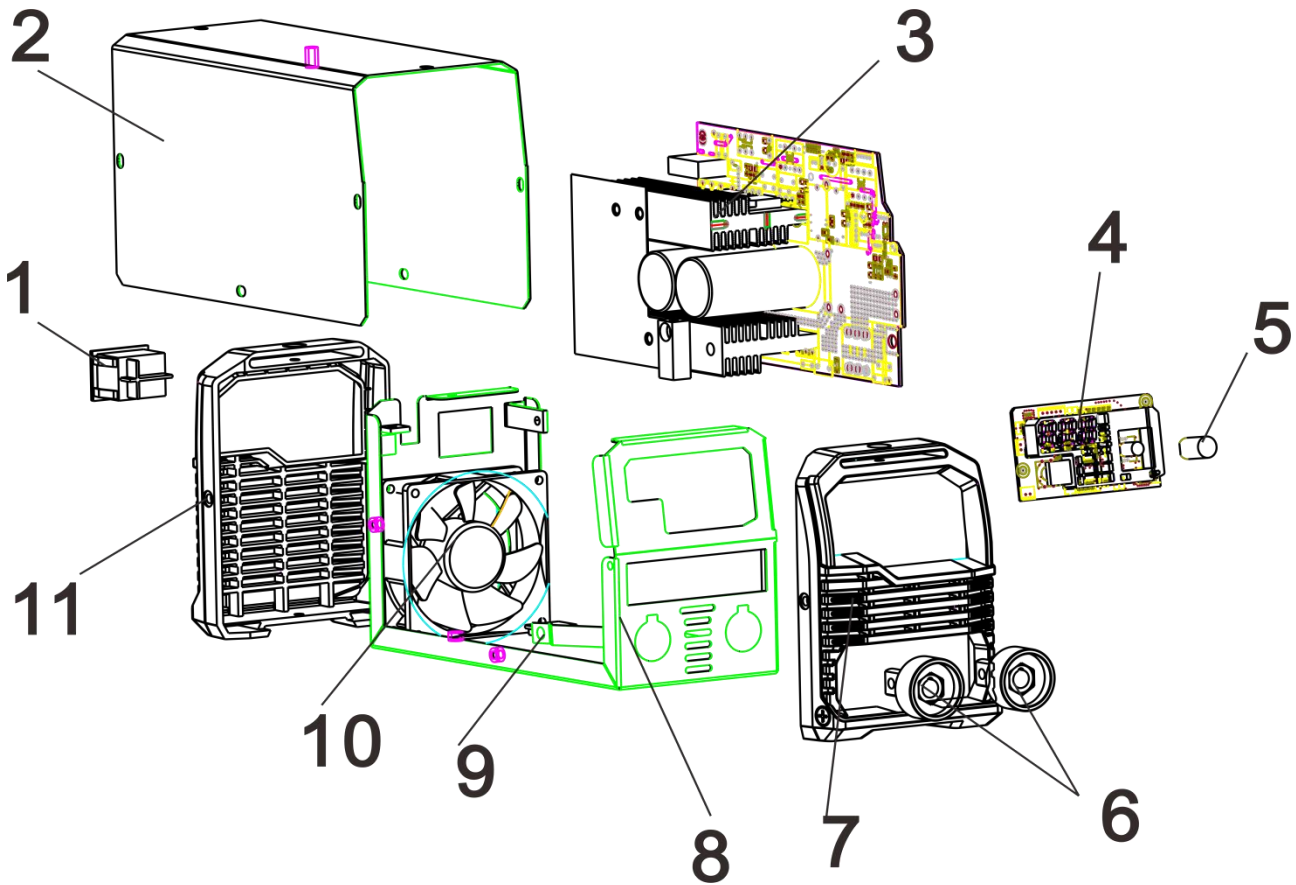


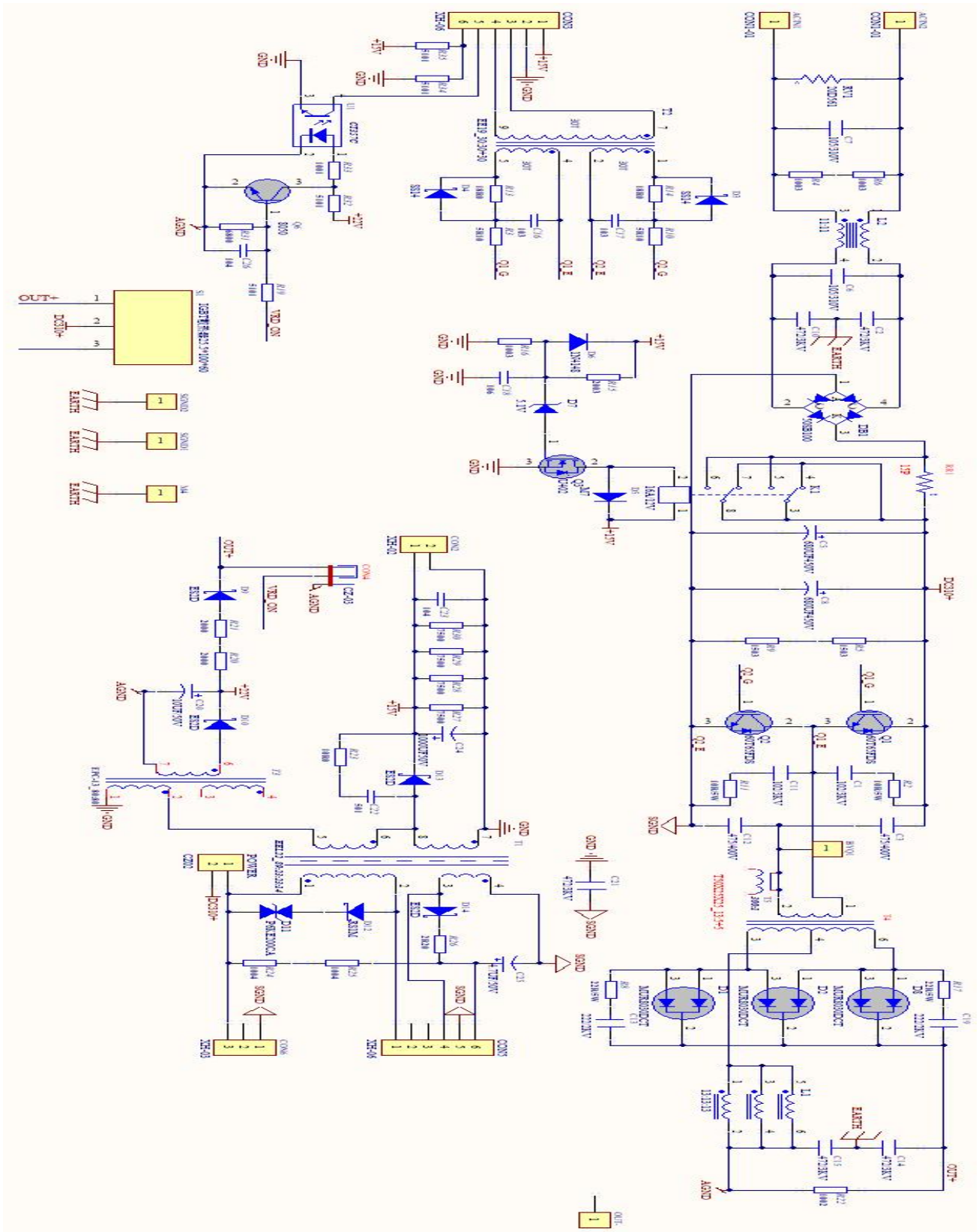
Figure 8-1 SPARK 140 MIN KEY SPARE PARTS

ARC 140 MAX POWER SOURCE KEY SPARE PARTS

NO	SN	Part Name
1	07-010401-018	Power switch KR2-201 (BL) 40A/250VAC, blue, two
2	19-050102-672	Machine cover
3	41-010100-577	PCB semi-finished product
4	41-010400-928	PCB semi-finished product
5	37-231101-032	Black knob, blue top cover (color number C), 25*15
6	40-160600-026	Quick socket DKJ-35-50
7	19-020000-292	Front plastic cover
8	18-020403-781	Machine base
9	18-020403-781	connector
10	37-120001-001	Fan 80 type, DC15V
11	19-020000-291	Plastic cover at the back

APPENDIX1:

ARC 140 MAX CIRCUIT DIAGRAM



9. OPERATION INSTRUCTION

1) Turn the power switch to “ON”,the power indicator lit up,cooling fan within the machine start to work immediately

2) Please ensure the suitable welding current and arc force current according to the thickness of the workpiece ,the diameter of the electrode, station and technology needs

3) Clip electrode to the electrode holder,the machine is in the manual welding mode and standby state.

Flat welding current and electrode specification list:

Specification	φ2.5	φ3.2	φ4.0	φ5.0
Current	70-100A	110-140A	170-220A	230-280A

4) Arc force adjusting function is used to adjust the welding performance, specially in vertical and overhead welding.With the use of welding current adjusting knob,it can achieve the ideal effect of welding.

5) When welding in wet, high altitude, narrow, metal containers and other places, it is recommended to use the VRD function which can ensure the no-load output voltage is about 14v-24v . (VRD indicator is on, VRD function is on)



WARNING!

Before connecting operation,please make sure all the power is turned off. The right order is to connect the electrode cable and earth clamp cable to the machine first, and make sure they are firmly connected and then put the power plug to the power source.

10. PRECAUTIONS

1) Environment

- ① The machine should be operated in dry environments with humidity level of max 90%.
- ② Ambient temperature should be between -10 to 40 degree centigrade.
- ③ Avoid welding in sunshine or drippings. Do not let water infiltrate the machine.
- ④ Avoid welding in dusty area or the environment with corrosive gas.

2) Safety norms

The welding machine is installed with protection circuit of over voltage, over current and over heat. When voltage, output current and temperature of machine exceed the required standard, welding machine will stop working automatically. However, overuse (such as over voltage) will still result in damage to the welding machine. To avoid this, the user must pay attention to the following notes.

- ① The working area is adequately ventilated!

The welding machine is powerful machine. When it is being operated, it generated by high current, under this situation, natural wind will not satisfy machine cool demands. So a fan is used into inner-machine to cool down itself. Make sure the intake is not blocked or covered. The objects around the welding machine should be kept away not less than 0.3 meters. Make sure the working area adequately ventilated is specially necessary. It is vitally important for the performance and longevity of the machine

- ② Do not over load!

The operator should remember to watch the max duty current (Response to the selected duty cycle). Keep welding current is not exceed max duty cycle current. Over-load current will damage and burn up machine.

- ③ Do not over voltage!

Power voltage can be found in diagram of main technical data. Automatic compensation circuit of voltage will assure the welding current keep in allowable range. If power voltage exceeds the allowable range limited, it will damage to components of machine. The operator should understand this situation and take preventive measures.

④ There is a grounding screw behind welding machine, with a grounding marker on it. Before operation, welding crust must be grounded reliable with cable which section is over 6 square millimeter, in order to prevent from static electricity, and accidents possibly caused by electricity leaking.

⑤ If welding time exceeds the duty cycle limited, welding machine will stop working for protection. Because machine is overheated, temperature control switch is on "ON" position and the indicator light is yellow (red). In this situation, you needn't pull the plug, in order to let the fan cool the machine. When the indicator light is off, and the temperature goes down, it can weld again.

11. MAINTENANCE

1) Remove dust by dry and clean compressed air regularly, if welding machine is operating in environment where is polluted with smokes and pollution air, the machine need remove dust every month.

2) Pressure of compressed air must be within the reasonable range in order to prevent damaging to small components of inner-machine.

3) Check internal circuit of welding machine regularly and make sure the circuit connections are connected correctly and tightly (especially plug-in connector and components). If scale and rust are found, please clean it, and connect again tightly.

4) Prevent water and steam from entering into the machine. If that happens, please blow it dry and check insulation of machine.

5) If welding machine will not be used for long time, it must be put into the packing box and stored in dry and clean environment.

12. TROUBLESHOOTING AND FAULT FINDING

1) ARC140MAX fault symptom and remedy

Fault symptom	Remedy
No display on meter, fan does not work, no welding output.	1. Make sure power switch is on. 2. Confirm the power input cable receive electricity.
Normal meter display,,normal welding output ,fan does not work	1. Check whether the fan is damaged. 2. Check whether the fan power supply socket is voltage output.
No display on meter,fan works,no welding output,abnormal indicator does not lit.	1. Check whether digital display is damaged,if there is a loose, break cables. 2. Control circuit problem, please contact the distributor or the company.
Normal meter display,power indicator is lit, Fan is working and abnormal indicator is lit, no welding output.	1. May be over-current protection, turn off the machine until the abnormal light is off, then reboot. 2. May be overheating protection, wait for 5 to 10 minutes, the machine can recover automatically. 3. May be the feedback circuit or control board malfunction, please contact the distributor or the company.
Power on trip, power switch cannot be closed	1. Maybe there is a problem with the power switch itself. 2. Check for a short inside the machine. 3. Check whether the silicon bridge is damaged

If the machine still not work after the calibration and maintenance , please contact the local distributor or our after-sales service department.



Notes: The above operations must be carried out by qualified electricians with valid certification. Please contact us before repair to obtain professional advice.

INVERTER MMA/ARC SMART WELDER MAX SERIES

