



Operator's Manual

Inverter DC MMA Welder

MMA-160FI MMA-250FI



IMPORTANT: This operational manual kindly show you how to install, dedug, operate and maintain the welder. Read this instructions carefully and you will understand how to use it to reduce the risk of error operation.



Warning!

This machine should be operated and maintained by full-time staffs or professionals. You are not allowed to operate and repair it unless read this manual

CONTENT

| | |
|---|----|
| 1 Brief Introduction | 3 |
| 2 Safety | 3 |
| 2.1 Self-Protection | 3 |
| 2.2 Cautions | 4 |
| 2.3 Safety Precaution for Installation and Location | 4 |
| 2.4 Security Check | 5 |
| 3 Technical Description | 5 |
| 3.1 Environment | 5 |
| 3.2 Input Power | 6 |
| 3.3 Equipment Principle | 6 |
| 3.4 Equipment Structure | 6 |
| 3.5 Guide for Marking Models | 7 |
| 3.6 Parameter | 7 |
| 3.7 Standard | 8 |
| 3.8 Symbol Chart | 8 |
| 4 Installation | 8 |
| 4.1 Connection | 8 |
| 4.2 Power Source Connection | 9 |
| 4.3 Electrode Polarity | 9 |
| 4.4 Workpiece Connection | 10 |
| 5 Operation Instruction | 10 |
| 5.1 Procedure | 11 |
| 5.2 Electrode Replacement | 11 |
| 5.3 Slag Removal | 12 |
| 5.4 Maintenance | 12 |
| 6 Basic Trouble Shooting | 13 |
| 7 Parts List | 14 |
| 8 Interconnection Diagram | 15 |
| 9 Accessories | 15 |
| 10 Transportation and Storage | 16 |
| 11 Quality Warranty | 16 |

1 Brief Introduction

INARC welder uses imported IGBT as main electric components. It is supplemented by a specially developed main PCB board. In addition, the uniform regulation of welding current has been designed to guarantee the arc reach good welding process adaptability. What's more, its perfect dynamic protection features ensure that it is safe and reliable when use. It is ideal for using low carbon steel, alloy steel etc.

INARC Features:

- 60% high duty cycle.
- Lower cost operation, more portable, more compact, superior output.
- Excellent arc properties and solution droplet transfer.
- With the protections of over-heating, over-current.
- Digital display function.
- Plastic handle makes it beautiful and easy to carry.
- Convenient quick connection for the output makes it quick, safe, simple and stable.

NOTES: The above description may be modified without prior notice such as omissions, unclear statements about this welder.

2 Safety

2.1 Self-Protection

- * The user must comply with occupational safety and health rules and wear appropriate labor protective equipment. Try to avoid injury on eye and skin.
- * It is safe to cover your head with face mask while welding, only do the observation on the arc through the window of the mask.
- * Don't expose any part of the body at the same time to the welding positive and negative output terminals without insulated protection.

2.2 Cautions

* INARC Inverter DC Arc welder is a kind of electronic product which makes its components more easily damaged. While replacing or modulating, the strength should not be too much in order to avoid causing damage to the device.

* Check the connection to see if it is correct or reliable each time before working.

Besides, ensure the grounding outlet device correct.

* While using, as smoke is harmful to human's health, the operation must be carried out in the ventilation and exhaust facilities.

* Prohibit non-professionals to change or replace the welder.

* Since the welder owns strong electromagnetic and radio frequencies, the people with cardiac pacemakers affected by the interference electromagnetic, electrical frequency are not allowed to stay nearby.

* When it works, please pay attention to its rated duty cycle. Do not overload.

2.3 Safety Precaution for Installation and Location

* In some areas, where something may fall from the sky, personal safety precaution should be taken.

* In some areas around construction site, something like the dust, acid, corrosive gases or other substance in the air cannot exceed the standard value except those generated while welding.

* It is should be equipped in the open air where there is no direct sunlight, anti-rain, temperature range from -10°C to $+40^{\circ}\text{C}$ and low humidity place.

* 50cm space is needed to ensure good ventilation.

* No metal impurities are tolerant inside the welder.

* In some areas, there is no severe vibration.

* Make sure no interference will be caused to the surrounding in the welding area.

* Whether the power supply capacity is sufficient to allow the welder to work normally or not. And a safety protection device should be equipped in the input power.

* Prevent it from dumping if the welder is put in the place of over 10° incline.

2.4 Security Check

The following items must be checked up by the operator each time before access to the power source.

- * Make sure the power socket is reliably grounded.
- * Make sure the output terminals are well connected without short circuit.
- * Make sure output and input cables are perfect with no exposure.

The welding machine must be inspected by professionals at regular time (not exceed 6 months). The contents as follow:

- * Whether the electronic components are loosed or not and dust removal must be conducted.
- * Whether the panel mounted on the device should be able to guarantee the normal implementation of the machine.
- * Whether the input cables are damaged or not. If yes, safe handling must done.



Disconnect the power source before servicing it. Contact with the manufacturer or agent immediately to acquire the service and support skills when users do not have the ability to repair it.

3 Technical Description

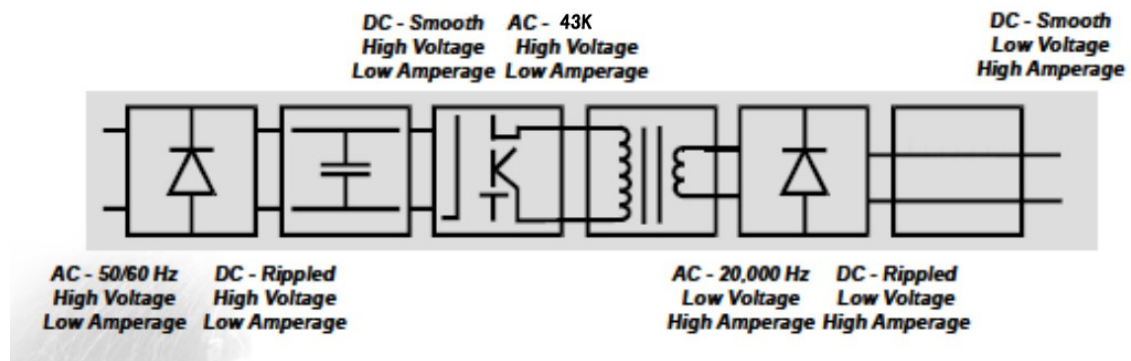
3.1 Environment

- * Working temperature: $-10^{\circ}\text{C}\sim 40^{\circ}\text{C}$.
- * Transportation and storage: $-25^{\circ}\text{C}\sim 55^{\circ}\text{C}$.
- * Relative air humidity: $40^{\circ}\text{C}\leq 50\%$; $20^{\circ}\text{C}\leq 90\%$.
- * The dust, acids, corrosive gases and substance in the ambient air must be lower normal level except those from welding process.
- * Altitude must be less than 1km.
- * Keep good ventilation at a distance of 50cm around.
- * Put it in somewhere the speed of wind not less than 1m/s.

3.2 Input Power

- * Power supply waveform should be sine wave and frequency fluctuations with less than $\pm 1\%$ of its rating.
- * The fluctuations of input voltage must be lower than $\pm 10\%$ of the rated value.

3.3 Equipment Principle



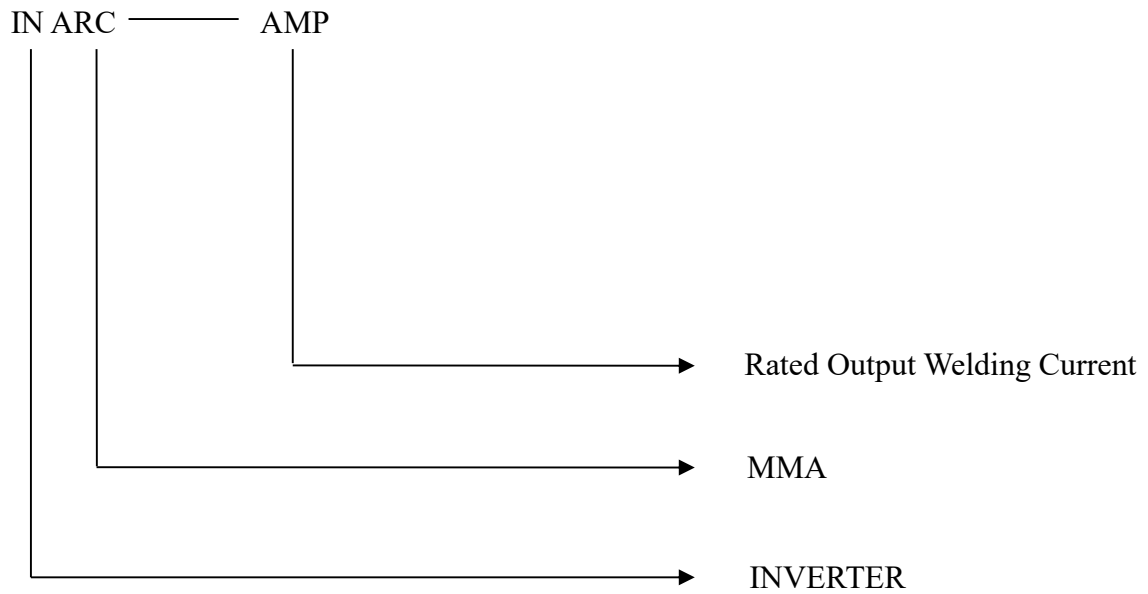
NOTES: This is inverter technology. The main part as follow:

Rectifier → Filter → IGBT → Transformer → Rectifier → Choke

3.4 Equipment Structure

The INARC Inverter DC MMA Welder uses portable cabinet structure: the upper part of front panel has been equipped with welding current adjustment knob, power indicator (green), abnormal indicator (yellow). The output terminal is fitted with quick connector both “+” and “-”. The back panel owns power switch, motor fan, input power cable. The inside body of the machine includes PCB main board, electronic components, radiator etc.

3.5 Guide for Marking Models



It means INARC-150 is an Inverter MMA (Manual Arc Welding) welding machine and its rated output current can reach 150A.

3.6 Parameter

















| Item/Model | MMA-160FI | MMA-250FI |
|---------------------------|----------------|----------------|
| Rated Input Voltage (V) | 120 ±10% | 120 ±10% |
| Frequency (Hz) | 50/60 | 50/60 |
| Rated Input Capacity (KW) | 4.56 | 5.32 |
| Rated Input Current (A) | 21.9 | 30.5 |
| Rated Duty Cycle | 60% @ 115A | 60% @ 135A |
| No Load Voltage (V) | 56 | 56 |
| Output Current Range (A) | 20~115 | 20~135 |
| Efficiency (%) | 85 | 85 |
| Electrode Size (mm) | 1.5-3.2 | 1.5-3.2 |
| Cooling Type | AF | AF |
| Overall Dimension (INCH) | 15.4*4.88*9.29 | 15.4*4.88*9.29 |
| Gross Weight (LBS) | 10.74 | 10.74 |

3.7 Standard

- * EN 60917-1: Arc Welding Machine Standards
- * JB / T 7824-95: Technical Conditions of Inverter Arc Welding Rectifier
- * GB 4208-93: Protection Class (IP Code)

3.8 Symbol Chart

Note that only some of these symbols will appear on your model.

| | | | |
|--|---------------------|--|----------------------|
|  | On | Hz | Hertz (cycles / sec) |
|  | Off | f | Frequency |
|  | Dangerous Voltage | — | Negative |
|  | Increase / Decrease | + | Positive |
|  | AC Auxiliary Power | ≡ | Direct Current (DC) |
|  | Fuse |  | Protective Earth |
| A | Amperage |  | Line |
| V | Voltage | 1  | Single Phase |
| 3  | Three Phase | X | Duty Cycle |
|  | SMAW |  | GMAW |
|  | GTAW |  | High Temperature |
|  | Wire Feed Function |  | Welding Gun |

4 Installation

4.1 Connection

* The welder should be placed in dry and no dusty surrounding where there is no corrosive chemicals, flammable, explosive gases.

- * Avoid direct sunlight and rain. And maintain the ambient temperature ranging from -10°C to 40°C .
- * The space of 50cm should be left around the equipment.
- * If indoor ventilation is not good enough, the ventilation exhaust device should be installed.



Installation Diagram

4.2 Power Source Connection


Access the back panel (power source cable) to the power supply which is equipped with circuit breakers and grounding line (grid), and it is strictly prohibited that ground wire is connected to the grid, otherwise bear your own consequences.

4.3 Electrode Polarity (see above picture)

Connect the quick plug with electrode holder to the negative terminal and then tightened them up clockwise.

4.4 Workpiece Connection

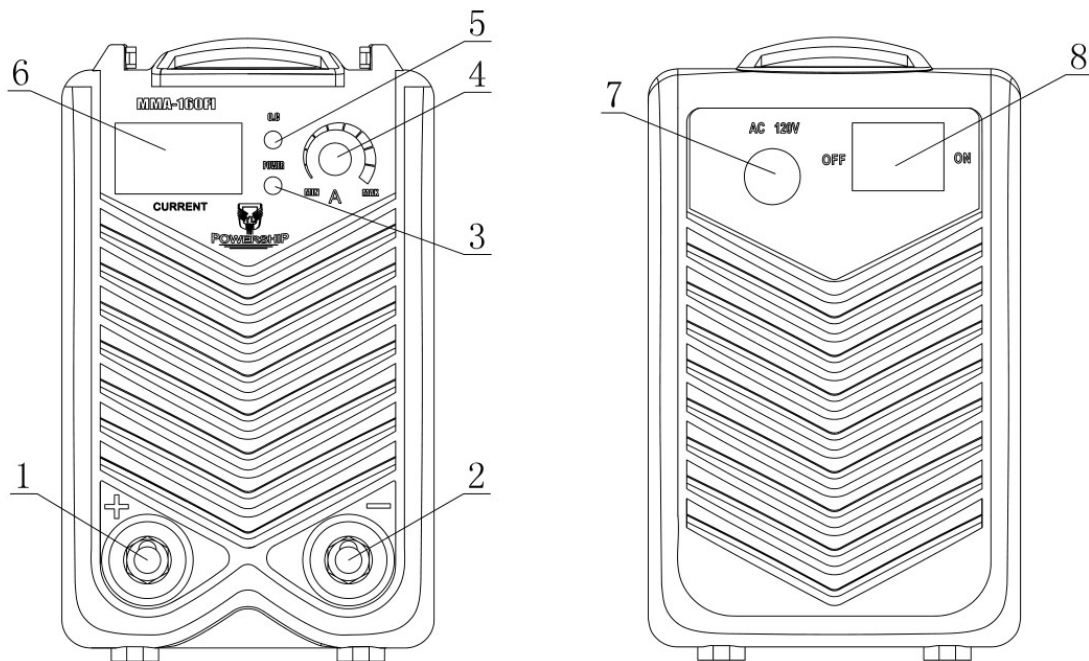
Connect the quick plug with earth clamp to the positive terminal on the front panel below. And then tighten them up. Access the earth clamp to the workpiece.

 **Warning!**

It is forbidden to connect the workpiece to the welder with iron or other poor conductors.

5 Operation Instruction

NOTES: Finger or round bars especially metal rod must be less than 12.5mm and it can not be inserted into the welder. Also you can not press it heavily.



| | | | |
|----------------------|---------------------|-------------------|----------|
| 1 Positive Terminal | 2 Negative Terminal | 3 Power Indicator | 4 Knob |
| 5 Abnormal Indicator | 6 Digital Display | 7 Power Cable | 8 Switch |

NOTES: When the welder works for a long time, the high temperature indicator will light. This means the inside temperature has exceeded its standard. The machine will stop, it is normal, after a little time cooling, the machine can recover the work automatically.

- * You have to wear canvas overalls and face mask to prevent from arc light and heat radiation.
- * Vibration screen should be laid out to prevent others from arc light.
- * Inflammable and explosive stuffs are not allowed to pile up. All the connections must be right, reliable.

5.1 Procedure

- a) Connect to the power switch digital ammeter lights on.
- b) To adjust the current potentiometer to the required value of the welding.
- c) Pick up electrode holder, and point at the welding edge. Then put the electrode on the workpiece, you can start welding.

5.2 Electrode Replacement

When the electrode is left only 2~3cm away from the holder, you have to replace new one to go on working.

NOTES: When the electrodes combustion is in process at high heat, do not touch it with bare hands while replacing it. Besides, the electrode head down should be unified in a metal container. And the cover coating should not be caught by the holder. Scratch gently when igniting the arc, otherwise it is easy to come across the phenomenon of sticking electrode.

5.3 Slag Removal

After finishing work, you should remove the slag with specific knock residue tools in the way of knocking.



Warning!

The welding slag should not be removed until it is cooled down. Don't point it at the other people while knocking on the slag incase that it will do harm with pop-up slag.

5.4 Maintenance

* The major difference between inverter arc welder and traditional welder is the inverter welder has lots of advanced electronic components. What's more, it is high technology product. And this requires high skill maintenance.

* It is very essential to do daily maintenance. You must be responsible for examination and repair. Once you do not have the ability to check it, kindly contact with manufacturer to acquire the service and support of technology.

The following is the steps for maintaining:

a) Dust removal.

b) Remove dust by professionals with dry and clean compressed air (using a compressor or Paper Tiger) regularly. Meanwhile, check inter circuit of welding machine regularly and make sure the cable is connected correctly and connectors are connected tightly. If scale and loose are found, please give a good polish to them. Then connect them again tightly. Generally, if welding machine is operating in environment where there is no heavy accumulated dust, the machine need remove dust once a year. If in the environment where is polluted with smokes and polluted air, it is needed to be removed once or even twice of each season.

c) To maintain good contact with cable and plugs.

d) Check up the contact conditions of cable and plug frequently, at least once a month for stationary use.



Warning!

Due to high voltage in the main circuit of the welder, you need to do the safety precaution measure to prevent accidental electric shock. Don't open the shell except for the professionals. Remember to turn off the power before removing dust. And don't meddle with the connections and components when doing this work.

6 Basic Trouble Shooting

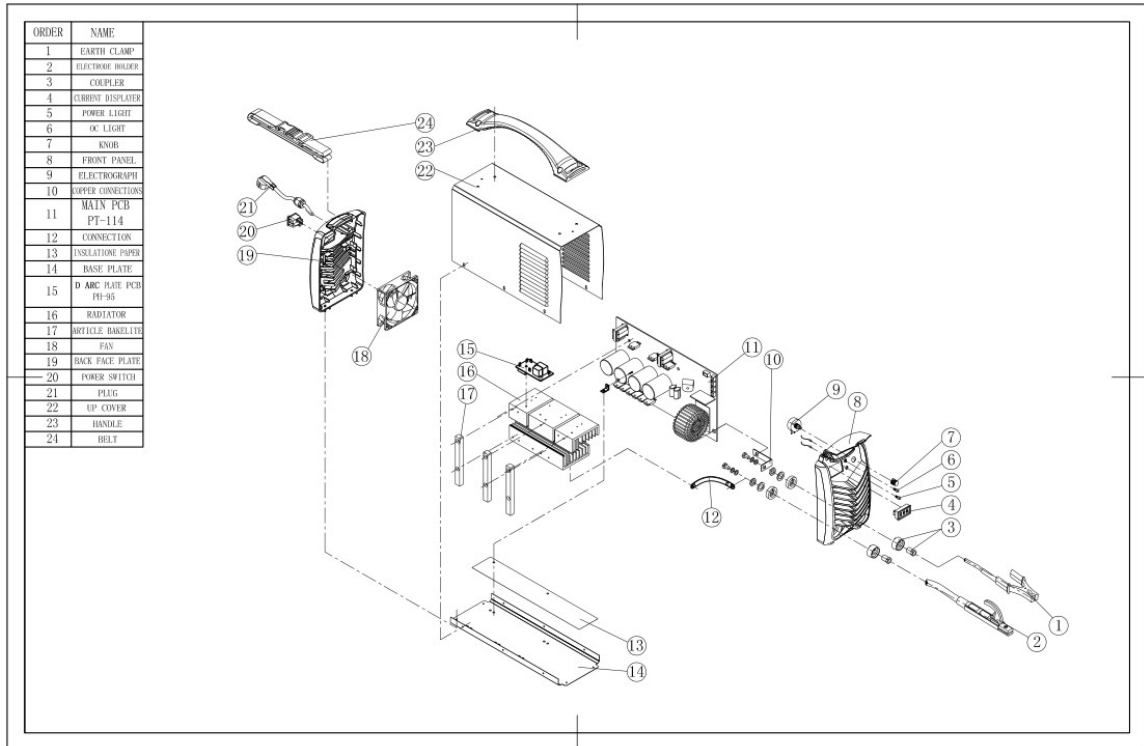
| No. | Description | Possible Cause | Remedy |
|-----|--|---|--|
| 1 | Abnormal indicator | Bad ventilation leads to overheating protection | Improve ventilation conditions |
| | | High environmental temperature | Automatic recovery after decreasing |
| | | Exceed rated duty cycle | Replace potentiometer |
| 2 | Current knob broken | Potentiometer damaged | Replace it |
| 3 | Motor fan can't work or low rotational speed | Bad power switch | Replace the switch |
| | | Bad fan | Replace the fan |
| | | Led broken | Check the circuit |
| 4 | No open circuit voltage | Overheating | See point 1 |
| | | Bad power switch | Replace the switch |
| 5 | Electrode holder cable is too hot; output terminals are too hot. | Capacity on electrode holder is too small | Replace larger capacity electrode holder |
| | | Cable is too thin | Replace a proper cable |
| | | Socket is loosen | Remove the oxide coat and re-tight it |
| 6 | Power off | Power capacity is not big enough | Enlarge the capacity |
| | | Welding process | Contact the supplier |
| 7 | Other problems | | Contact the supplier |



Warning!

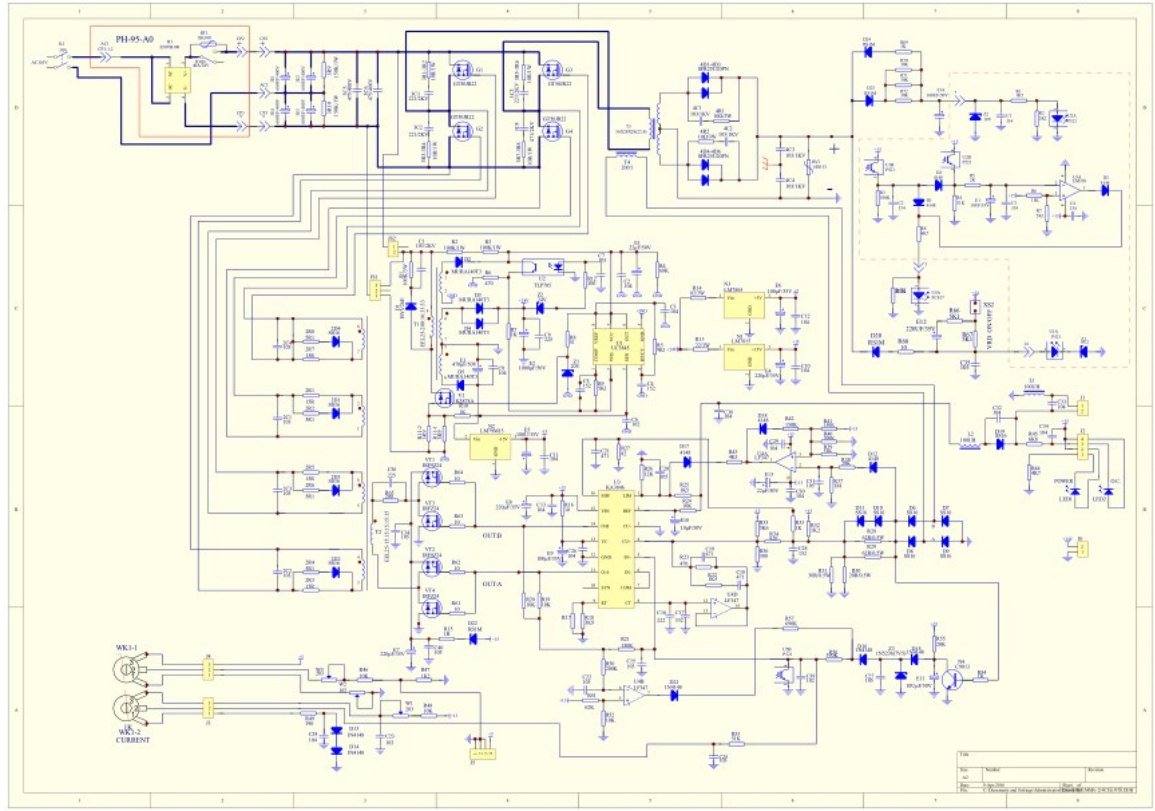
The machine has the function of prohibit switching power supply in rapid succession within a short period of time for switching on and off. The power will not open then (the indicator light is not on or the fan does not work or there is no-load voltage). Shut down the power switch and resume back to normal after a few minutes.

7 Parts List



NOTES: The above components listed are just for your reference. If something different with the real machine, kindly follow the real one.

8 Interconnection Diagram



Circuit Schematic of INARC Welder
(Figures for reference are subject to change without notice.)

9 Accessories

| No. | Description | Qty. |
|-----|-------------------|------|
| 1 | INARC Welder | 1set |
| 2 | Operator's Manual | 1pc |
| 3 | Electrode Holder | 1pc |
| 4 | Earth Clamp | 1pc |
| 5 | Brush & Hammer | 1pc |

NOTES: All above mentioned are based on the ordering contact unless otherwise agreed by the parties.

10 Transportation and Storage

* This machine is an indoor equipment and the attacks of rain and snow should be avoided in the process of transportation and storage. While loading and unloading, more attention should be paid on the package with words of warning. Storage warehouse should be kept dry with good air circulation and no corrosive gas or dust. The temperature should be maintained from 25°C to 55°C and relative humidity must be lower than 90%.

* If the products are still needed to continue storing after stripping, repacking should be carried out according to original package's requirement. Remember before storage, don't forget to clean and seal it with plastic bags.

* Users should maintain the cartons and shock blocks in order to be properly packaged in need of long distant transportation. For the long distant transportation, it should be retrofitted with a wooden case and mark the "up" or "rain" symbols.

11 Quality Warranty

If the machine is used in accordance with the regulations on the operation manual, in compliance with the rules on installation, storage, use, maintenance, safeguarding, manufacturers should provide free services for the users under the conditions of within 12 months from the date of purchase (based on the issued invoice date).