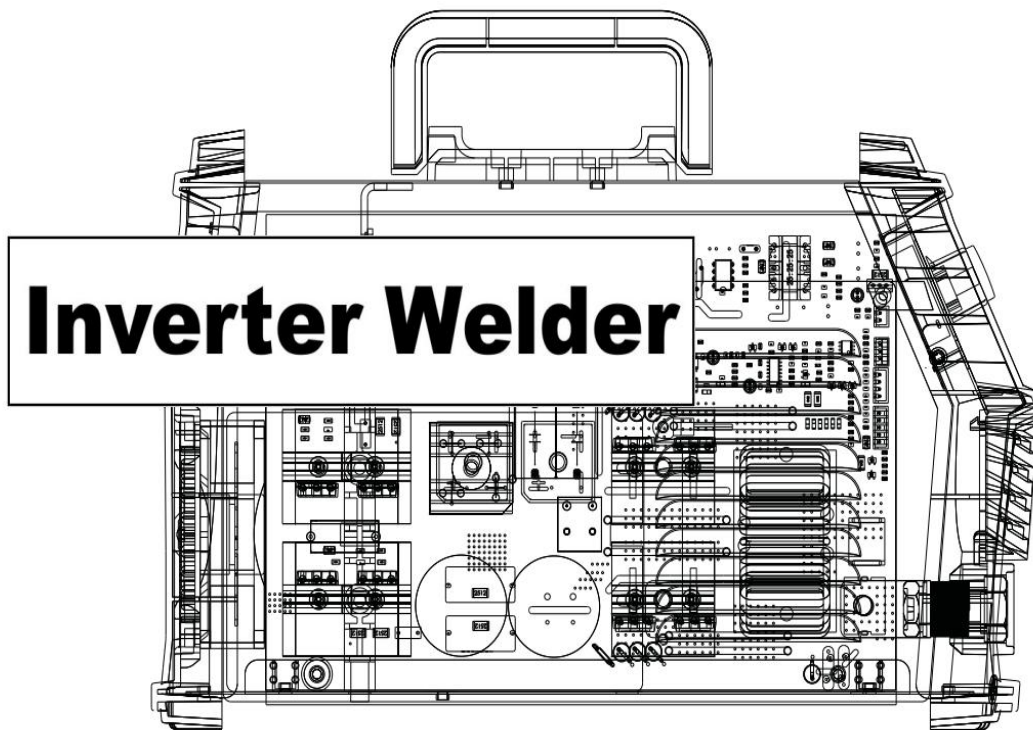




# Inverter Welding Machine

## ARC160/ARC200



**User Manual**

**[www.arccaptain.com](http://www.arccaptain.com)**



## Dear Valued Customer,

Thank you very much for being our valued customer. ARCCAPTAIN welder was built by high quality components, every single unit machine was passed multiple industry leading laboratory tests to provide a great welding experience and performance.

For your safety, please read and understand this manual carefully before using this product. Your satisfaction is our priority! For any question or concerns, please do not hesitate to contact ARCCAPTAIN for SUPPORT :

[service@arccaptain.com](mailto:service@arccaptain.com)



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# 1. SAFETY

Welding may result in injury to you and others, so please implement protection during welding. See more details in Safety Protection Guidebook for Operator which meets the requirements to manufactures on accident prevention.

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## **Operate this equipment by trained professional only!**

- Use welding labor protection supplies with approval of safety supervisory authority!
  - Operators must be the special workers with valid work permits of “Metal Welding (Gas Cutting) Operation”!
  - Do not maintain and repair welder with power.
- 



## **Electric shock-may result in serious injury or even death!**

- Install grounding device according to application standard.
  - Do not touch live parts with naked skin, wet gloves or wet clothes.
  - Be sure you are insulated from ground and workpiece.
  - Confirm the safety of your working position.
- 



## **Smoke-may be harmful to your health!**

- Keep your head away from the smoke to avoid inhalation of waste gas in welding.
  - Keep the working environment well ventilated with exhaust or ventilation equipment when welding.
- 



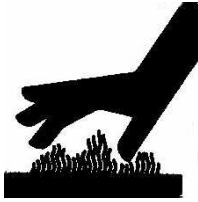
## **Arc radiation-may hurt your eyes and burn your skin!**

- Use proper welding mask and wear protective clothing to protect your eyes and body.
  - Use proper mask or curtain to protect onlooker from being injured.
- 



## **Improper use and operation may result in fire or explosion**

- Welding spark may result in fire, so please make ensure there are no inflammables near the welding position, and pay attention to fire safety.
  - Ensure there is fire extinguisher nearby, and make sure someone has been trained to operate the fire extinguisher.
  - Do not weld closed container.
  - Do not use this machine for pipe thawing.
-



**Hot workpiece can cause severe scald.**

- Do not touch hot workpiece with bare hands.
  - Cool the welding torch for a while after continuously working.
- 



**Excessive noise does great harm to people's hearing.**

- Wear ear covers or other hearing protectors when welding.
  - Give warning to onlooker that noise may be potentially hazardous to hearing.
- 



**Magnetic field can make cardiac pacemaker a bit wonky.**

- People with cardiac pacemaker should stay away from the welding spot without first talking to a doctor.
- 



**Moving parts may injure your body.**

- Please keep away from moving parts (like fan).
  - Each door, panel, cover, baffle plate, and protective device the like should be closed and located correctly.
- 



**Seek professional support when trouble strikes.**

- When trouble strikes in installation and operation, please inspect according to related contents in this manual.
  - If you still cannot understand fully, or you still cannot solve the problem, please contact the dealer to obtain professional support.
- 

## 1.1 Working Environment

- 1) Welding should be carried out in dry environment with humidity of 90% or less.
- 2) The temperature of the working environment should be between -10°C and 40°C.
- 3) Avoid welding in the sunlight and rain. Keep it dry at all times.
- 4) Avoid welding in dusty area or environment with corrosive chemical gas.
- 5) Gas shielded arc welding should be operated in environment without strong airflow.

## 1.2 Safety Tips

Over-current/over-voltage/over-heating protection circuit is installed in this machine. When the network voltage, output current or inner temperature exceeds the set standard, the machine will stop automatically. However, excessive use (e.g. too high voltage) of machine will lead to welder damage.

Therefore, please note:

1) Ventilation

This industrial welder can create powerful welding current that has strict cooling requirements that cannot be met with natural ventilation. Therefore two internal fans are very important in enabling the machine to work steadily with effective cooling. The operator should make sure that the louvers be uncovered and unblocked. The minimum distance between the machine and nearby objects should be 30cm. Good ventilation is of critical importance to the better performance and longer lifespan of the machine.

2) Overload is forbidden!

Remember to operate the welder within allowable duty cycle (refer to the corresponding duty cycle). Make sure that the welding current should not exceed the max load current. Overload could obviously shorten the machine's lifespan, or even damage the machine.

3) Over-voltage is forbidden!

Regarding the power supply voltage range of the machine, please refer to "Technical Parameters" table. This machine is of automatic voltage compensation, which enables the maintaining of the voltage range within the allowable range. In case that the power supply voltage exceeds the allowable value, it would possibly damage the components of the machine. Users should learn about this circumstance and take proper precaution.

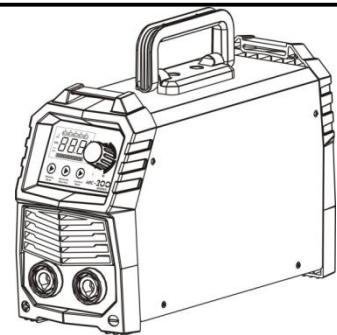
4) An earth screw is available for the machine. Connect it with an earth cable (section $\geq$ 6mm<sup>2</sup>) to avoid the static and electric shock.

5) A sudden halt may occur with the red indicator of the front panel on while the actual duty cycle of the welder is over standard duty cycle which triggers temperature detect switch due to overheat. Under this circumstance, it is unnecessary to unplug the power plug. Keep cooling fan working to cool down the welder. Welding can be continued after the inner temperature falls into the standard range and the red indicator is off.

## 2. PRODUCT OVERVIEW

Unique electric structure and air channel design in this series of machines can speed up the heat rejection of the power device as well as improving the duty cycles of the machines. The unique heat rejection efficiency of the air channel can effectively prevent the power devices and control circuits from being damaged by the dust absorbed by the fan, and the reliability of the machine is greatly improved thereby.

The machine adopts streamline shape. Front and rear panels and handle are sprayed with rubber oil which gives good touch feeling.



Pic 1

## 2.1 Features

- MCU digital control achieves intelligent synergy
- Latest IGBT Inverter Technology
- Automatic saving of welding parameters
- LED display screen for easy operation
- High output no-load voltage, available for cellulose electrode (only ARC200)
- Smart cooling fan, excellent heat dissipation
- Compact and portable with light weight
- Easy arc starting, less spatter, stable current and good shaping
- Application to aerial work, indoor, outdoor and decoration, etc

## 2.2 Specifications

- MMA Synergic Control (SYN)
- Lift TIG argon arc welding(TIG)
- Manual metal arc welding
- Hot start (fixed or adjustable)
- Anti-stick
- Arc-force (fixed or adjustable)
- VRD (Voltage reduce device)
- Dual voltage 110V/220V
- O.H./O.V./O.C protection
- LED Meter display

## 2.3 Package

- 1X MMA Welder
- 1X 10ft Electrode Holder
- 1X 10ft Earth Clamp
- 1X Conversion plug
- 1X Wire Brush
- 1X Shoulder Strap
- 1X User Manual



Pic 2


### 3. TECHNICAL PARAMETERS

TECHNICAL PARAMETERS	Units	Model			
		ARC160		ARC200	
Rated input voltage	V	AC110V±15% 50/60HZ	AC220V±15% 50/60HZ	AC110V±15% 50/60HZ	AC220V±15% 50/60HZ
Rated input power	KVA	5	7.1	6	9.4
Welding current range (MMA)	A	20-160	20-160	20-200	20-200
	V	20.8-26.4	20.8-26.4	20.8-28	20.8-28
Welding current range (TIG)	A	20-160	20-160	20-200	20-200
	V	10.8-16.4	10.8-16.4	10.8-18	10.8-18
Rated duty cycle		60%			
No-load voltage	V	65		78	
Overall efficiency		85%			
Protection grade		IP21S			
Power factor		COSφ=0.7			
Insulation grade		H			
Standard		UL60974-1			
Size	Inch	14.37*6.30*13.00		15.35*6.30*13.00	
Weight	lb	11.73		13.42	
Applicable electrode	Inch/	1/16"-3/25"	1/16"-1/8"	1/16"-1/8"	1/16"-5/32"
	mm	1.6-2.5	1.6-3.2	1.6-3.2	1.6-4.0





## 4. OPERATION AND DESCRIPTION

1. **Current knob:** Welding current, arc-force current and hot start arc igniting current can be adjusted from low to high by rotating the knob clockwise.

2.  : It is MMA mode where electrode diameter cannot be adjusted but arc-force and hot start can be adjusted with indicator on.


3. **“SYN”:** It is MMA synergic mode where the hot start current and arc-force current are selected automatically by program after specified electrode is selected with indicator on.


4.  : It is lift TIG welding mode with indicator on.


5.  : MMA synergic electrode diameter selecting indicator. When the triangular symbol is on, the corresponding diameter is selected.

Hot start current and arc-force current are selected automatically by program at this time.

6. **“A”:** MMA welding current status indicator. When it is blinking, MMA welding current can be set at present.

7.  : MMA arc-force adjusting indicator. When it is blinking, arc-force current can be set at present.

8.  : MMA hot start adjusting indicator. When it is blinking, hot start current can be set at present.

9.  : It is welding status and current setting indicator which is scrolling displaying during welding.

10.  **LED digital display:**

① , LED digital tube displays current value which is set currently;

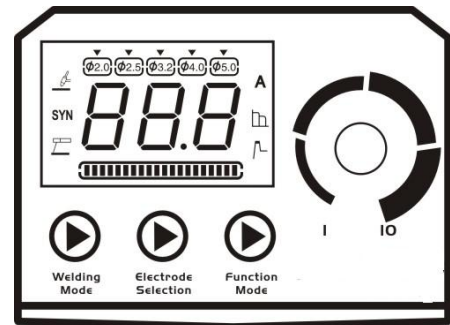
② , It displays setting value of arc-force when arc-force indicator is blinking;

③ , It displays setting value of hot start;

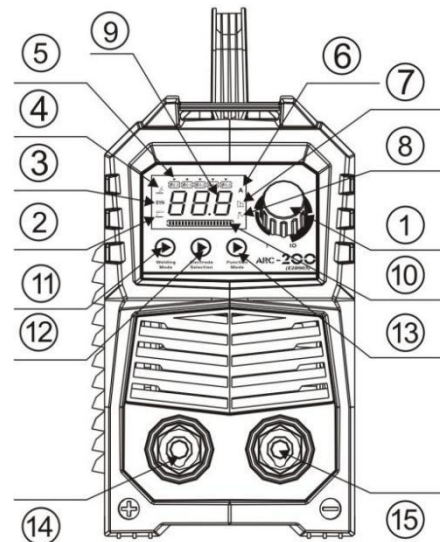
④ , It displays E60 when machine is under overheat protection and stops working until E60 disappears;

⑤ , It displays E13 when machine is under over-current protection which means internal components are damaged, please contact dealer for help.

11, **Welding Mode:** following welding modes can be switched





Pic 3




Pic 4

by pressing this button:


- ①  indicator is on under lift TIG argon arc welding;
- ② “SYN”indicator is on under electrode diameter selection mode;
- ③  indicator is on under MMA mode.


12 , **Electrode Selection:** When“SYN” indicator is on, electrode diameter can be selected by pressing this button.

13 , **Function Mode:** It is MMA functions selecting button.

When  indicator is on, MMA functions can be set:

- ①,Function Mode button is pressed once to adjust welding current by rotating current knob with indicator“A” blinking. Welding current setting is finished with “A”off after 3S.
- ②, Function Mode button is pressed twice to adjust arc-force

current by rotating current knob with  indicator blinking. Arc-force current setting is finished with arc-force indicator off after 3S.

- ③, Function Mode button is pressed three times to adjust hot start current by rotating current knob with  indicator blinking. Hot start current setting is finished with hot start indicator off after 3S.

14. **+output terminal:** Connected to electrode holder.

15. **-output terminal:** Connected to earth clamp.

16. **Power cord**

17. **Power switch:** Control power.

18. **Cooling fan**

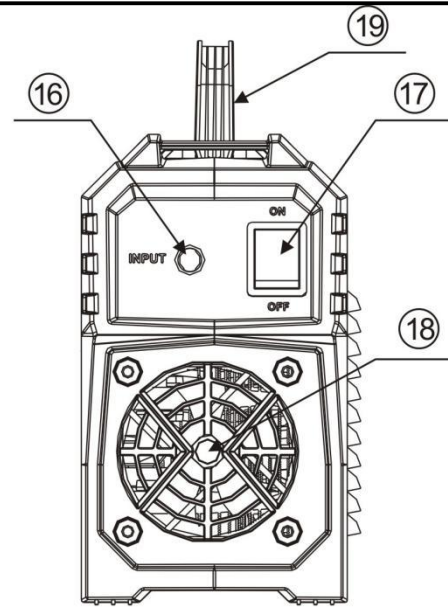
19. **Handle**

**Combination key for switching VRD on and off:**

Welding Mode and Electrode Selection buttons are pressed simultaneously to switch on or off MMA VRD. Under MMA, VRD is not available by default, but it is available when welding Mode and Electrode Selection buttons are pressed simultaneously for 3S with  $U$  -1 display. And VRD is unavailable if press them for 3S again with  $U$ -0 display.

**Combination key for switching anti-stick on and off:**

Electrode Selection and Function Mode are pressed simultaneously to switch on or off MMA anti-stick. Under MMA, anti-stick function is available by default, but it is unavailable when Electrode Selection and Function Mode buttons are pressed simultaneously for 3S with  $A$ -0display. And anti-stick function is available if press them for 3S again with  $A$ -1display.



Pic 5

**Fault code table:**

Digital tube display code	Code meaning
E60	overheat protection: machine is under overheat protection and stops working until E60 disappears
E13	over-current protection:internal components are damaged, please contact dealer for help

**Press the key combination to display the code table**

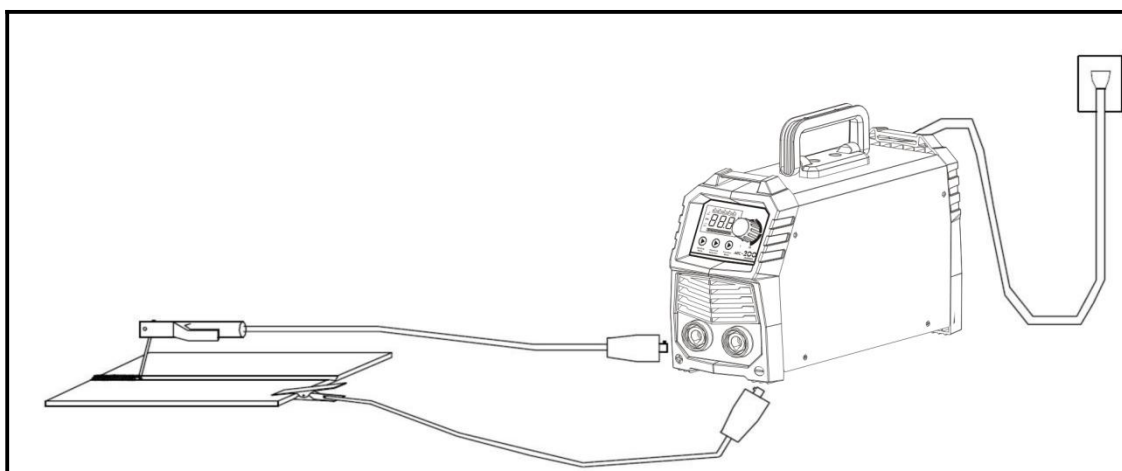
Digital tube display code	Code meaning
<i>U-0/U-1</i>	<i>U-0</i> :Represents no VRD; <i>U-1</i> :Representative has VRD
<i>A-0/A-1</i>	<i>A-0</i> :Represents no anti-stick; <i>A-1</i> :Representative has anti-stick

**5. INSTALLATION AND OPERATION**

Note: Please install the machine strictly according to the following steps.

Turn off the power supply switch before any electric connection operation.

The housing protection grade of this machine is IP21S, so do not use it in rain.

**5.1 Installation:**

Pic 6 Schematic Diagram of MMA Welding

- 1) A primary power supply cable is available for this welding machine. Connect the primary power supply cable to the corresponding voltage class based on rated input power of the welder. Misconnection should be avoided.
- 2) The primary cable should be tightly connected to the corresponding power binding post or socket to avoid oxidization.
- 3) Check whether the input voltage value varies in acceptable range with a multi-meter.
- 4) Insert the cable plug with electrode holder into the “+” socket on the front panel of the welding machine, and tighten it clockwise.
- 5) Insert the cable plug with ground clamp into the “—” socket on the front panel of the welding machine, and tighten it clockwise.
- 6) Connect the power ground well.

The connection as mentioned above in 4) and 5) is DCRP connection. Operator can choose DCSP connection according to workpiece and electrode application requirement. Generally, DCRP connection is recommended for basic electrode (electrode is connected to positive pole), while there is no special requirement for acid electrode.

## 5.2 Strap Installation

Step 1: Separate the velcro.



Step 2: Pull out one side through the strap hole on the front panel with hook side of the velcro up.



Step 3: Pull out it to well stick hook side of the velcro to loop side and across the nylon buckle. Repeat it on the other side.



Step 4: Adjust the length by pulling the nylon buckle (as shown in the picture).



Step 5: Proper state after installation:

1. Strap does not twist;
2. Buckle side of shoulder pad is up, while its flat side faces the machine (as shown in the picture);
3. Straps are well locked.



### 5.3 Operation

- 1) After being installed according to the above method, and the power switch being switched on, the machine is started with the power LED on and the fan working.
- 2) Pay attention to the polarity when connecting. There are two connection modes for DC welder in general, one of which is straight polarity in which electrode holder is connected to negative pole and workpiece is connected to positive pole, the other is reverse polarity to which is opposite. Phenomena such as unstable arc, spatter, and electrode sticking could happen if improper mode is selected. Exchange the quick plug to change the polarity if necessary.
- 3) Select cable with larger cross-section to reduce the voltage drop if the secondary cables (welding cable and earth cable) are long and distance between workpiece and welder is far.

Preset the welding current according to the type and size of the electrode, clip the electrode and then welding can be carried out by short circuit arc ignition. For welding parameters, please refer to the below table.

### 5.4 Welding parameters table (for reference only)

Electrode Diameter(mm)	Recommended Welding Current(A)	Recommended welding voltage(V)
1.6	30~70	21.2~22.8
2.0	40~90	21.6~23.6
2.5	50~100	22~24
3.2	70~150	22.8~26
4.0	140~180	25.6~27.2
5.0	160~200	26.4~28

**Note:** This table is suitable for mild steel welding. For other materials, consult related materials and welding process for reference.

## 6. TROUBLESHOOTING

### WARNING



The following operation requires sufficient professional knowledge on electric aspect and comprehensive safety knowledge. Operators should be holders of valid qualification certificates which can prove their skills and knowledge. Make sure the input cable of the machine is disconnected from the electricity utility before uncovering the welding machine.

1) **Common Malfunction Analysis and Solution:**

Malfunction Phenomena	Causes and Solutions
Turn on the machine, the power indicator is off, the fan doesn't work, and no welding output.	<ol style="list-style-type: none"> <li>1) Check if the power switch is closed.</li> <li>2) Make sure there is power for input cable.</li> </ol>
Turn on the machine, the fan works, but the output current is unstable and can't be controlled by potentiometer when welding.	<ol style="list-style-type: none"> <li>1) The current potentiometer fails. Replace it.</li> <li>2) Check if any loose contact exists inside the machine, especially connector, etc. If any, check.</li> </ol>
Turn on the machine, the power indicator is on, the fan works, but no welding output.	<ol style="list-style-type: none"> <li>1) Check if any poor contact exists inside the machine.</li> <li>2) Open circuit or poor contact occurs at the joint of output terminal.</li> <li>3) The abnormality indicator is on.               <ol style="list-style-type: none"> <li>A. The machine is under over-heating protection status due to long time operation. For this situation, it is unnecessary to unplug the power plug so that cooling fan can continue to cool down the welder. Welding can be continued after indicator is off;</li> <li>B. Check if the thermal switch is ok. Replace it if damaged.</li> <li>C. Check if the thermal switch connection is under good contact.</li> <li>D. It is possible for welder to be under over-current protection status if indicator is on for a long time. For this situation, please do not restart the machine, but contact local agent for professional assistance.</li> </ol> </li> </ol>
The electrode holder becomes very hot.	The rated current of the electrode holder is lower than its actual working current. Replace it with a bigger rated current.
Excessive spatter in MMA welding.	The output polarity connection is incorrect. Exchange the polarity.

## 7. MAINTENANCE

### WARNING



The following operation requires sufficient professional knowledge on electric aspect and comprehensive safety knowledge. Operators should be holders of valid qualification certificates which can prove their skills and knowledge. Make sure the input cable of the machine is disconnected from the electricity utility before uncovering the welding machine.

- 1) Check periodically whether inner circuit connection is in good condition, connector is fastened (esp. plugs or components). Tighten the loose connection. If there is oxidization, remove it with sandpaper and then reconnect.
- 2) Keep hands, hair and tools away from the charged parts such as the fan to avoid personal injury or machine damage when the machine is energized.
- 3) Clean the dust periodically with dry and clean compressed air. If welding environment with heavy smoke and pollution, the machine should be cleaned daily. The pressure of compressed air should be at a proper level in order to avoid the small parts inside the machine being damaged.
- 4) Avoid water and vapor infiltrating the machine. If there is, dry it and use tramegger to check the insulation of the equipment (including that between the connections and that between the connection and the enclosure). Only when there are no abnormal phenomena anymore, can the machine be used.
- 5) Check periodically whether the insulation cover of all cables is in good condition. If there is any dilapidation, rewrap it or replace it.
- 6) Put the machine into the original packing in dry location if it is not to be used for a long time.

## 8. SYMBOL EXPLANATION

### WARNING



**Matters to be noticed in operation**



**Objects to be specially described and pointed out**



**It is prohibited to dispose the electrical waste together with other common wastes. Please protect the environment.**