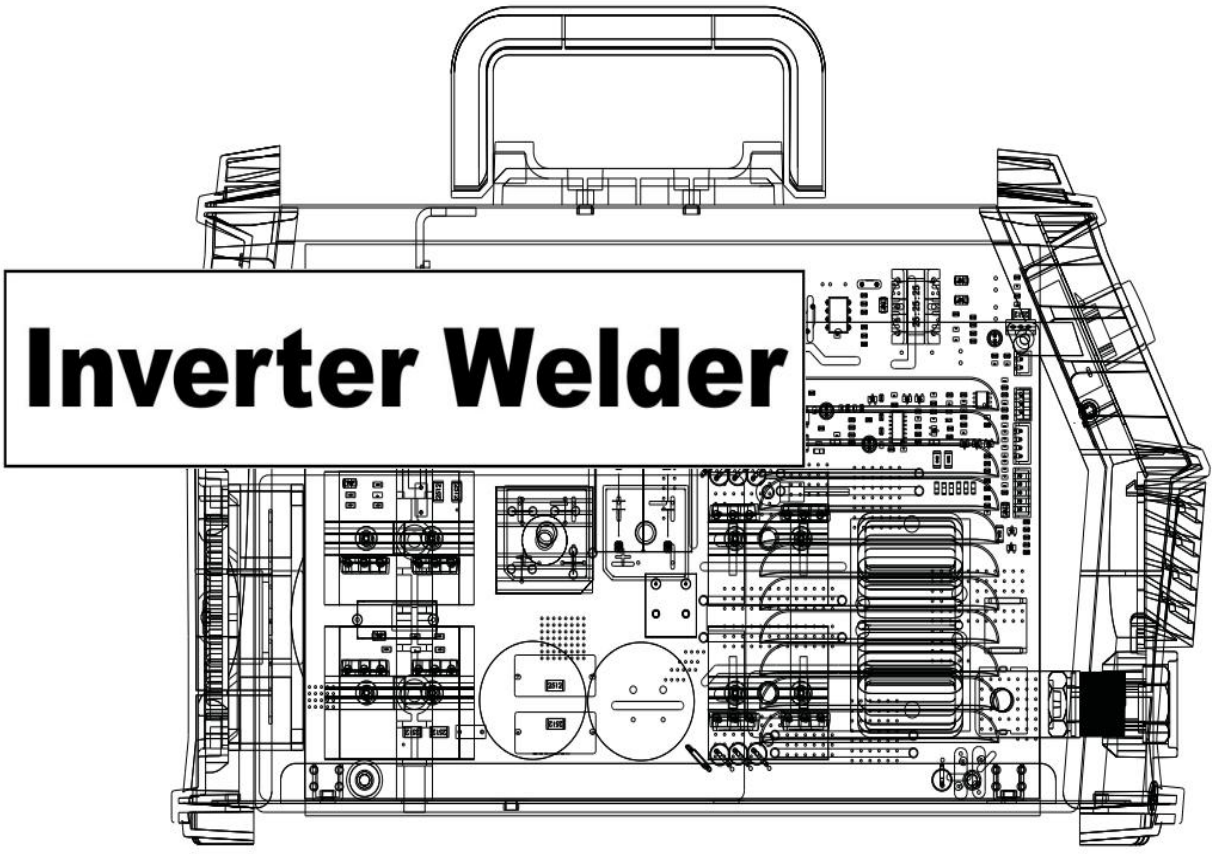
ARCCAPTAIN®

Inverter Welding Machine

ARC160/ARC200



User Manual

www.arccaptain.com

Dear Valued Customer,

Thank you for going with ARCCAPTAIN! We're all about making welders superior for you. ARCCAPTAIN 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.

Two-year warranty service is provide to yours! When unpacking, make sure that the product is intact and undamaged. DO NOT return directly before contact our customer service.

Six ways to connect us and join in ARCCAPTAIN Community:

Email: service@arccaptain.com

Online: www.arccaptain.com/pages/contact-us

Facebook: arccaptainwelder

Instagram: arccaptain_welder

Youtube: arccaptain-weld

Whatsapp: +19892449456

This manual is designed to help you get the most out of your ARCCAPTAIN products. Please save this manual and take time to read the safety warnings and precautions, assembly, operating, inspection, maintenance. They will help you protect yourself against potential hazards on the worksite. Failure to do so can result in serious injury!

Save for future reference:

Product：	
Date Purchased:	
Serial Number:	
Product Feedback:	

User Manual

1. SAFETY

⚠ WARINING READ ALL SAFETY WARNINGS BEFORE WORKING!

Failure to follow the warnings and instructions may result in electric shock, fire and/or serious injury. Save all warnings and instructions for future reference!

If you encounter any issues during installation or operation, refer to the relevant sections in this manual for inspection. If you're still unsure or unable to resolve the problem, please contact ARCCAPTAIN professional support.

1.1 General Safety

- **Do NOT use the welder if the switch does not turn it on and off.**
- **Disconnect the plug from the power source before making any adjustments, changing accessories, or storing the welder.**
- **Ensure the switch is off before connecting to power or moving the welder to prevent accidental starting.**
- **Always maintain and use safety guards, covers, and devices properly.**
- **Keep hands, hair, clothing, and tools away from moving parts like V-belts, gears, and fans.**
- **Follow these instructions and consider working conditions when using the welder and accessories.**
- **This manual may not cover every possible situation. It's important for the operator to use common sense and caution while using this product.**

1.2 Electrical Safety

⚠ WARINING BEWARE OF ELECTRIC SHOCK!

- **DO NOT weld in a damp area or come in contact with a moist or wet surface.**
- **DO NOT modify any wiring, ground connections, switches, or fuses in this welding equipment.**
- **DO NOT come into physical contact with any part of the welding current circuit, including the workpiece, ground clamp, electrode or welding wire, and metal parts on the electrode holder or MIG gun.**
- **DO NOT connect the ground clamp to electrical conduit, and DO NOT weld on electrical conduit.**
- **NEVER leave the Welder unattended while energized. Turn off the power if you have to leave.**
- **DO NOT attempt to plug the welder into the power source if the ground prong on INPUT POWER CABLE plug is bent over, broken off, or missing.**
- **DO NOT alter INPUT POWER CABLE or plug in any way.**
- **People with pacemakers should consult their physicians before use. Magnetic field can make cardiac pacemaker a bit wonky.**

⚠ WARINING REPLACING COMPONENTS CAN BE DANGEROUS!

- **Only experts should replace machine parts. Avoid dropping foreign objects into the machine during component replacement. Ensure correct wire connections after replacing PCBs to prevent property damage.**

1.3 Fire Safety

⚠ WARINING BEWARE OF FIRE HAZARD!

- **Place the machine on non-combustible surfaces to prevent fires.**
- **Ensure no flammable materials are near the working area to reduce fire risk.**
- **Avoid installing the machine near water sources to prevent water damage.**
- **Always weld/cut materials in a dry environment with humidity below 90% and maintain a working temperature between -10°C and 40°C.**
- **When welding/cutting outdoors, ensure shelter from sunlight and rain, keeping the machine dry at all times.**
- **Do not operate the machine in dusty or chemically corrosive environments.**
- **Remove or secure all combustible materials within a 35 feet (10 meters) radius of the work area. Use fire-resistant material to cover or seal open doorways, windows, cracks, and other openings.**
- **Improper use can lead to fire or explosion. Avoid flammable materials near the working area, keep a fire extinguisher nearby with trained personnel, refrain from cutting closed containers, and do not use the machine for pipe thawing.**

1.4 Fumes and Gases Safety

⚠ WARINING SMOKE CAN BE HARMFUL TO YOUR HEALTH!

- **Keep your head away from the smoke while cutting to avoid breathing in harmful gases.**
- **Ensure the working area is well-ventilated with exhaust or ventilation equipment during cutting.**
- **Only work in a confined area if it's well-ventilated, or wear an air-supplied respirator.**

1.5 Arc Rays and Noice Safety

⚠ WARINING

EXCESSIVE NOISE DOES GREAT HARM TO HEARING!
ARC RADIATION MAY HURT YOUR EYES AND BURN YOUR SKIN !

- **Arc radiation can harm eyes and skin; excessive noise can damage hearing.**
- **Use certified welding eye protection with at least a number 10 shade lens rating.**
- **Wear leather leggings and fire-resistant shoes or boots; avoid clothing that can catch sparks or molten metal. Do not touch hot workpiece with bare hands.**
- **Keep clothing free of flammable substances and wear dry, insulating gloves and protective**

clothing.

- **Wear an approved head covering and use appropriate welding attire.**
- **When welding overhead or in confined spaces, use flame-resistant ear plugs or ear muffs.**
- **Wear ear covers or other hearing protectors when cutting.**

1.6 Gas Shielded Welding – Cylinder Safety

⚠ WARINING CYLINDERS CAN EXPLODE WHEN DAMAGED!

- **Never weld on a pressurized or closed cylinder.**
- **Avoid letting the electrode holder, electrode, welding torch, or welding wire touch the cylinder.**
- **Keep cylinders away from all electrical circuits, including welding circuits.**
- **Always keep the protective cap on the valve except when the cylinder is in use.**
- **Use only the correct gas shielding equipment designed for your specific type of welding, and maintain it properly.**
- **Protect gas cylinders from heat, physical damage, slag, flames, sparks, and arcs.**
- **Always follow proper procedures when moving cylinders.**
- **Do not install the machine in an environment with explosive gas to avoid an explosion.**

1.7 Additional Safety Information

- **Use only the supplied power cord for this welder or an identical replacement cord. Do not install a thinner or longer cord on this Welder.**
- **Maintain labels and nameplates on the Welder. These carry important information.**
- **Ensure the ground clamp is securely connected to the workpiece during welding.**
- **Pressing the gun switch when welding or cutting.**
- **When disposing of the cutting machine, please note the following:**
  Burning electrolytic capacitors on the main circuit or PCB board may cause explosions. Burning plastic components such as the front panel may produce toxic gases. Dispose of it as industrial waste.

2. PRODUCT DESCRIPTION

2.1 Product Overview

This is a new professional series MMA Welder with advanced technology, complete functions and excellent performance. This ultra-portable welding system is suitable for a variety of application needs.

- MCU digital control achieves intelligent synergy
- Latest IGBT Inverter Technology
- LED display screen for easy operation
- High output no-load voltage, available for cellulose electrode (for ARC200 only)
- Smart cooling fan, excellent heat dissipation
- Compact and portable with light weight
- MMA Synergic Control (SYN): ARC160/200 welders can automatically identify the type of electrode being used and optimise the corresponding welding parameters. Simplifying complexity makes the

welding process more comfortable and easier for the operator to control.

- Lift TIG argon arc welding(TIG)：When connecting the optional arc welding TIG torch, gas regulator and gas cylinder, the Arc160/200 becomes a TIG welding machine.
- Hot Start: Automatically increasing the current when starting welding, it ensures rapid generation of a stable arc and improves welding starting quality.
- Arc Force: In high-impedance conditions, such as short arc welding, by additionally increasing the welding current, the arc is prevented from extinguishing and ensuring a more stable welding process.
- Anti-stick Feature: The machine continuously outputs low current (usually 10A), making the stuck welding rod easy to detach.
- VRD (Voltage Reduction Device): Reduces the risk of electric shock for operator safety.
- Dual voltage 110V/220V.
- IP21S: Can be protected from solid and vertical dripping water larger than 12.5mm in places without internal circulation cooling, ensuring a stable and safe working environment.
- Multiple Protection Functions: Effectively prevent damage caused by overheating, overcurrent or undervoltage of components during operation, ensuring stable operation and service life of the equipment.

2.2 Packge

Name	Specification	Quantity (pcs)
Welding machine	**ARC 160/200**	**1**
Electrode Holder	**10ft**	**1**
Ground Clamp	**10ft**	**1**
Adapter	**220V to 110V**	**1**
Shoulder Strap	**/**	**1**
Wire Brush	**/**	**1**
Operator’s manual	**For ARC 160/200**	**1**

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	-	80%			
Protection grade	-	IP21S			
Power factor	-	COSφ=0.7			
Insulation grade	-	H			
Standard	-	UL60974-1			
Dimensions L*W*H	Inch	11.6*4.7*8.3		13.6*4.7*8.3	
	mm	295*120*212		347*120*212	
Net weight	Lb	6.5		7.94	
	KG	2.9		3.6	
Applicable electrode	Inch / mm	1/16"-3/25" 1.6-2.5	1/16"-1/8" 1.6-3.2	1/16"-1/8" 1.6-3.2	1/16"-5/32" 1.6-4.0

3. OPERATION AND INSTRUCTIONS

3.1 Panel of ARC160/ARC200

Part name	Function	Picture
1. Current knob	Rotate the knob to adjust the parameters	
2. MMA mode	It is MMA mode where electrode diameter cannot be adjusted but arc-force and hot start can be adjusted with indicator on	
3. SYN mode	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. Lift TIG welding mode	It is lift TIG welding mode with indicator on	
5. Electrode diameter selecting indicator	When the triangular symbol is on, the corresponding diameter is selected	
6. Current status indicator	When it is blinking, MMA welding current can be set at present	
7. Welding mode button	For MMA/MMA Synergy/Lift-TIG welding mode conversion	
8. hot start adjusting indicator	When it is blinking, hot start current can be set at present	
9. LED digital display	To display the welding information	
10. welding status and current setting indicator	Scrolling display of weld status and current settings during the welding process	
11. Welding Mode	For MMA/MMA Synergy/Lift-TIG welding mode conversion.	
12. Electrode Selection	When "**SYN**" indicator is on, electrode diameter can be selected by pressing this button	
13. Function Mode	For Welding/Hot start/Arc force current conversion.(For MMA mode only)	
14. Output "+" terminal	To connect the Ground Clamp/Electrode Holder	

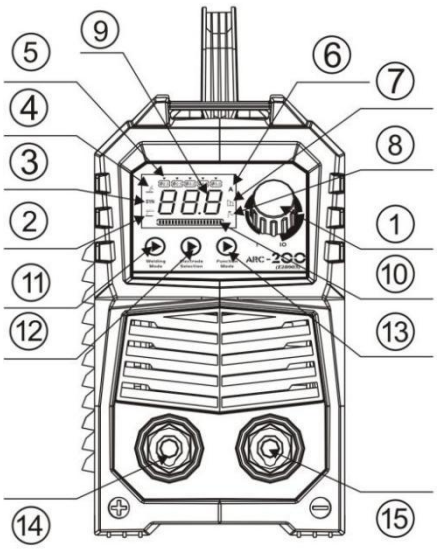
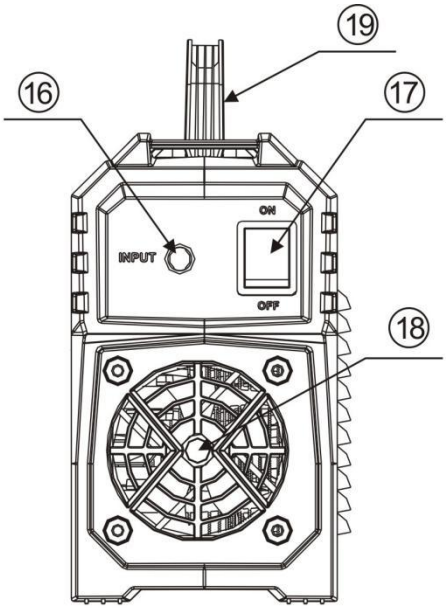


Figure 1 Front panel controls

15. Output " - " terminal	To connect the welding torch/Electrode Holder/Ground Clamp	
16. Power wire	For power supply input	 **Figure 2 Back panel controls**
17. Power switch	To control the ON/OFF of the input power of the machine	
18. Cooling fan	For heat dissipation through forced air cooling	
19. Handle	For translation and storage	

3.2 Control Panel

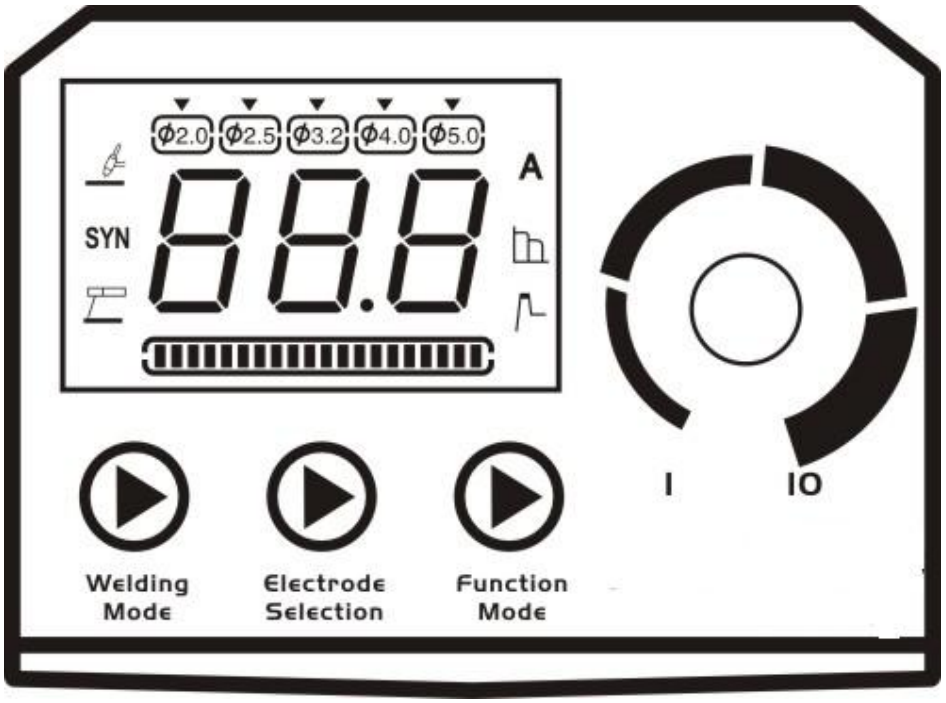


Figure 3

No.	Part name	Function
1	Parameter adjustment knob	Rotate the knob to adjust the parameters.
2	Button “**Welding Mode**”	For MMA/MMA Synergy/Lift-TIG welding mode conversion.
3	Button “**Electrode Selection**”	When ”SYN” indicator is on, electrode diameter can be selected by pressing this button.(For SYN mode only)
4	Button “**Function Mode**”	It is MMA functions selecting button. When  indicator is on, MMA functions can be set.
5		1. Displays the value of the current parameter. 2.If there is no operation after 3 seconds,it will automatically display the value of the setting welding current. 3.When the product is not working correctly, an error code is displayed.
6		If the indicator is on, it indicates the MMA mode is selected.
7	**SYN**	If the indicator is on, it indicates the MMA Synergy mode is selected.
8		If the indicator is on, it indicates the Lift-TIG mode is selected.
9		MMA synergic electrode diameter selecting indicator.
10		MMA hot start adjusting indicator. When it is blinking, hot start current can be set at present.
11		MMA arc-force adjusting indicator. When it is blinking, arc-force current can be set at present.
12		It is welding status and current setting indicator which is scrolling displaying during welding.
13	A	Unit of current.

3.3 Fault Code Table

Digital tube display code	Code meaning
E-60	overheat protection
E-13	over-current protection:internal components are damaged, please contact dealer for help

3.4 Nameplate:

On the machine, there is a plate that includes all the operating specifications for your new unit. The serial number of the product is also found on this plate.

The duty cycle rating of a welder defines how long the operator can weld and how long the welder must rest and be cooled. Duty cycle is expressed as a percentage of 10 minutes and represents the maximum welding time allowed. The balance of the 10-minute cycle is required for cooling.

For example, a welder has a duty cycle rating of 60% at the rated output of 160A/200A. This means with that machine： you can weld at 160A/200A output for six (6) minutes out of 10 with the remaining four (4) minutes required for cooling. The duty cycle of your new welder can be found on the data plate affixed to the machine. It looks like the diagram below.

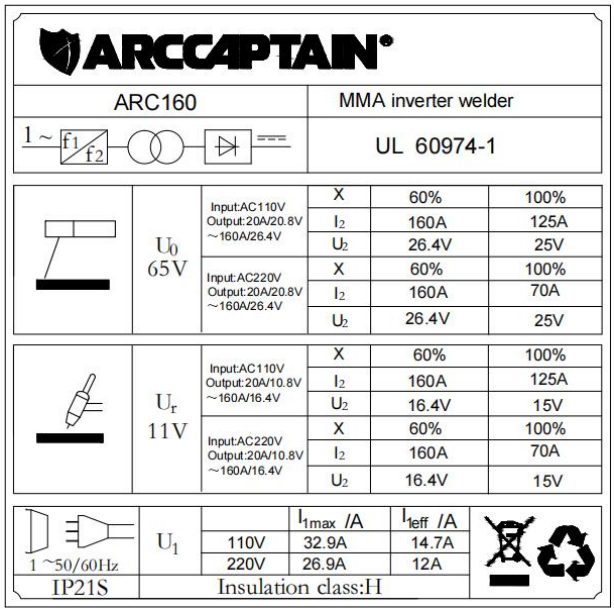


Figure 4

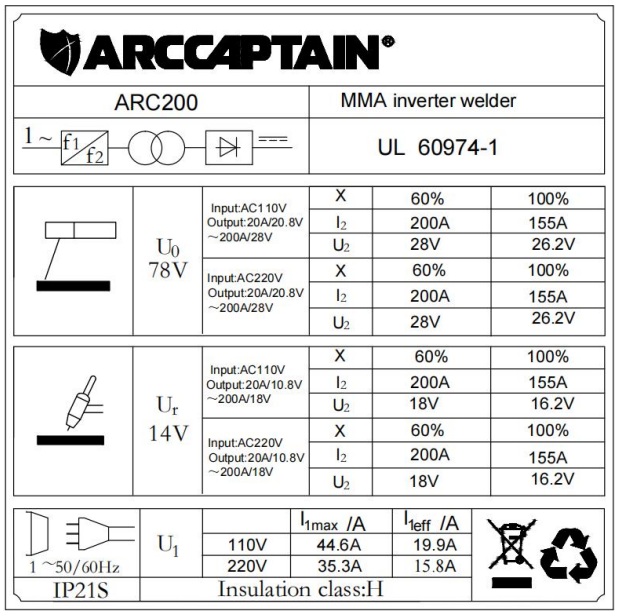


Figure 5

3.5 Press The Key Combination To Display The Code Table

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:

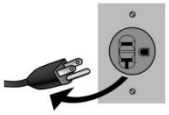
Electrode Selection and Function Mode are pressed simultaneously to switch on or off MMA anti-stick. Under MMA, anti-stick function is available by default, but it is unavailable when Electrode Selection and Function Mode buttons are pressed simultaneously for 3S with A **-0** display. And anti-stick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

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

4. INSTALLATION AND CONNECTION

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.



Note:

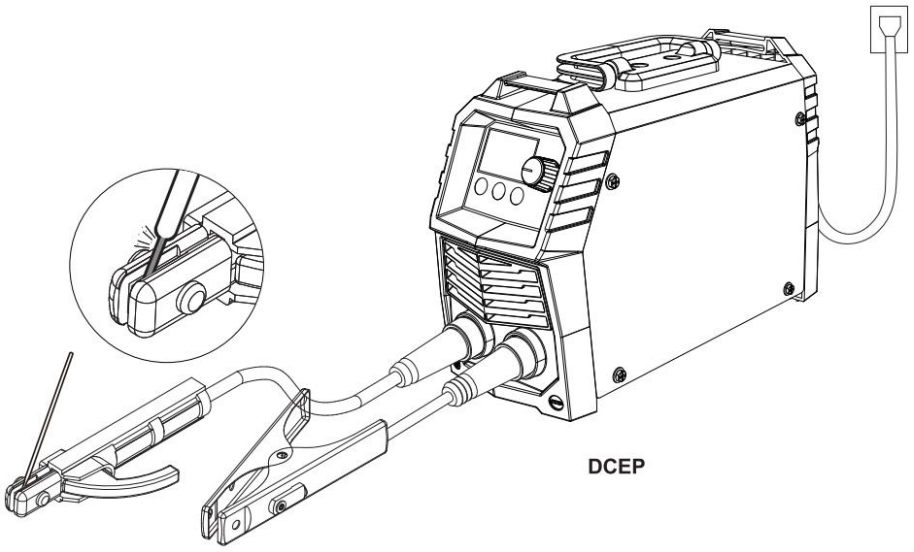
Turn off the power supply switch before any electric connection operation.

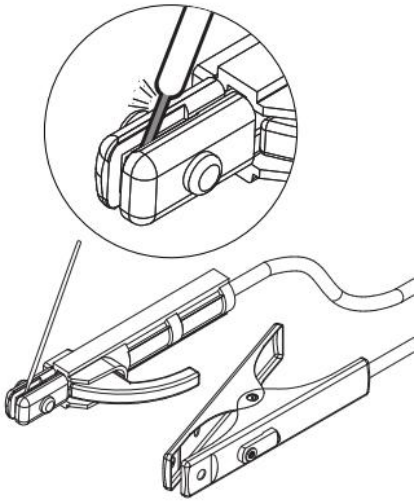
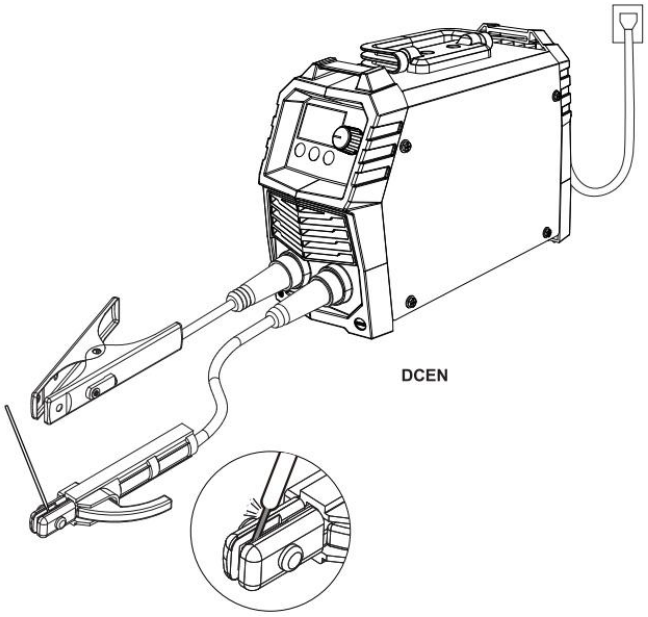
The housing protection grade of this machine is IP21S, so do not use it in rain.

Place the Welder on a level surface that can bear its weight near the work area.

4.1 Installation

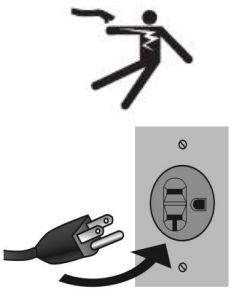
Please install the machine strictly according to the following steps.（check page 11)

Description	Picture
1. Insert the cable plug with electrode holder into the “+” socket on the front panel of the welding machine, and tighten it clockwise. **NOTICE：** • **The holder connector MUST be tightly connected to the socket to avoid power short circuit.** • **Set Electrode Holder down on nonconductive, nonflammable surface away from any grounded objects.**	 **Figure 6 DCEP Schematic Diagram of MMA Welding**
2. Insert the cable plug with ground clamp into the “－” socket on the front panel of the welding machine, and tighten it clockwise. **NOTICE:** • **The ground clamp connector MUST be tightly connected to the socket to avoid power short circuit.** • **Ensure the ground clamp is connected on clean, bare metal (not rusty or painted)**	

3. Place the bare metal end of the Stick Electrode inside the jaws of the Electrode Holder. **NOTICE:** **Ensure that the clip is on the conductive side of the electrode. Ensure that it is securely clamped.**	 **Figure 7**
4. When you use Alkaline rods (E7018), need to DCEP, that is connect the holder and ground clamp as mentioned above in above 1. and 2. 5.If you use Acidic rods(E6013), need to DCEN, that is connect the holder to "-"and ground clamp to "+" . **NOTICE:** **Incorrect connecting can affect welding results.**	 **Figure 8 DCEN Schematic Diagram of MMA Welding**

4.2 Input Power Connection

⚠ WARINING BEWARE OF ELECTRIC SHOCK!



NOTICE: The following steps require applying power to the Welder with the cover open.

To prevent serious injury from fire or electric shock:

1. DO NOT touch anything, especially not the ground clamp, with the gun or welding wire or an arc will be ignited.

2. DO NOT touch internal Welder Components while it is plugged in.

- The ARC160/ARC200 operates with a 110V OR 220V power supply.

- Turn the Power Switch to the OFF position, then plug the Welder into a properly grounded 220V receptacle that matches the plug. Use the included 110V power adaptor if plugging the Welder into a 110V receptacle.
- Plug the Power Cord into a properly grounded. Set Electrode holder down on nonconductive, nonflammable surface away from any grounded objects. And then turn the Power Switch ON.

NOTE：

- **For optimal performance, connect the ARC160/ARC200 to a 40A branch circuit. If connected to a circuit with lower capacity, expect reduced welding current and duty cycle.The circuit must be equipped over 40A with delayed action-type circuit breaker or fuse.**

5. OPERATION

⚠ WARINING BEWARE OF ELECTRIC SHOCK!

5.1 MMA WELDING MODE(NON-SYN)

MMA NON-SYN Welding Mode allows to independently adjust the Current, Workpiece Thickness,Arc Force, and Hot Start parameters as needed.**(Beginners should use the SYN function. Refer to section 5.2 for more details.)**

Describe	Part	Select
1. Press **"Welding Mode"** Button , select , rotate the knob to adjust the current.		
2. Adjustable Arc Force in MMA non-SYN welding mode.Press **"Function Mode"** Button, select , rotate the knob to adjust the Arc Force current. Adjustment range is 0-100 amps.		
3. Adjustable Hot Start in MMA non-SYN welding mode.Press **"Function Mode"** Button , select , rotate the knob to adjust the Hot Strat current. Adjustment range is 0-60 amps.		

If there is any other question about the installation meeting applicable electrical code requirements, consult a qualified electrician.

5.2 MMA Welding Mode(SYN)

MMA SYN WELDING MODE allow the welder to automatically identify the type of electrode used and optimize the corresponding welding parameters.**(This function is suitable for beginners)**

Describe	Part	Select
1.Press **"Welding Mode"** Button, select SYN, rotate the knob to adjust the current.		
2.Press **"Electrode Selection"** Button, select the welding rod size, and the welder will automatically match the current.		

5.3 Welding Parameters Table

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

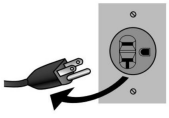
Electrode Diameter mm(inch)	Plate thickness mm (inch)	Recommended Welding Current(A)
1.6mm 1/16	1~2.5mm 0.04~0.11	30~65
2mm 2/25	2.3~4mm 0.09~0.16	49~94
2.4mm 3/32	3.5~4.5mm 0.14~0.18	78~123
3.2mm 1/8	4.8~8.3mm 0.19~0.33	99~177
4.0mm 5/32	8.6~10mm 0.34~0.39	178~200

6. OPERATION FOR LIFT TIG

WARNING

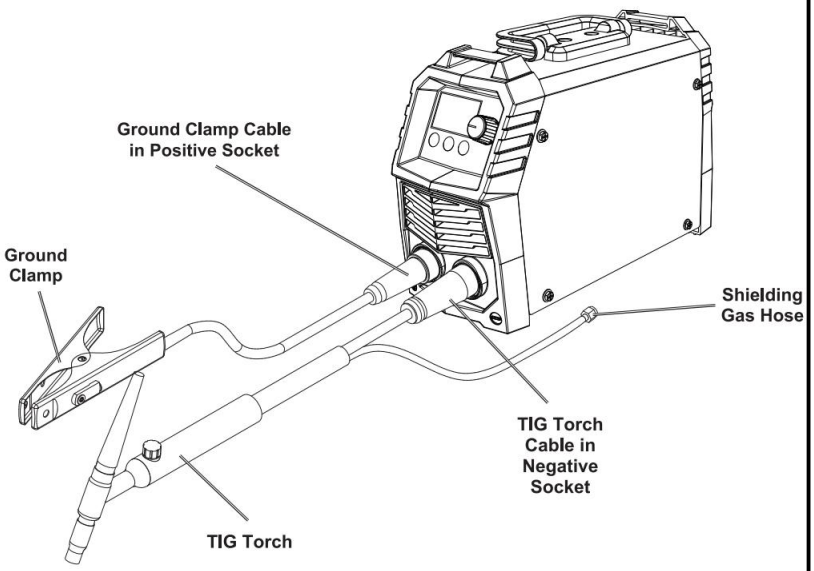
The following operation requires sufficient professional knowledge on electric aspect and comprehensive safety knowledge. Operators should be holders of valid qualification certificates which can prove their skills and knowledge. Make sure the input cable of the machine is disconnected from the electricity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

⚠ WARINING DO NOT set up without SWITCH OFF !



6.1 LIFT TIG Welder Cable Connection

NOTICE: Before setting up or using this product for new function, make sure to read the entire Important Safety Information section at the beginning of this manual!

Description	Picture
Step 1: Connect cables. 1. Insert the ground clamp cable into the positive socket and twist it all the way clockwise to lock it in place. **NOTICE:** • **The ground clamp connector MUST be tightly connected to the socket to avoid power short circuit.** • **Ensure the ground clamp is connected on clean, bare metal (not rusty or painted)**	 **Figure 9**
2. Plug the Lift-TIG torch cable into the negative socket and twist it clockwise to lock it in place. 3.For instructions on connecting a shielded gas hose, refer to the 'Connecting Shielded Gas' section on the following page. **NOTICE:** • **TheLift-TIG torch cable MUST be tightly connected to the socket to avoid power short circuit.** • **Set Lift-TIG torch cable down on nonconductive, nonflammable surface away from any grounded objects.**	

Step 2: connect Shielding gas

1. With assistance, place a 100% Argon cylinder (not included) onto a cabinet or cart near the welder. Secure the cylinder in place with two straps (not included) to prevent tipping.
2. Remove the cylinder's cap. Stand to the side of the valve opening, then briefly open the valve to blow dust and dirt from the valve opening. Close the cylinder valve.
3. Locate the regulator (not included) and loosen its valve. Thread the regulator onto the cylinder and tighten the connection with a wrench.
4. Connect the shielding gas hose on the TIG torch cable connector to the regulator's outlet and tighten the connection with a wrench.

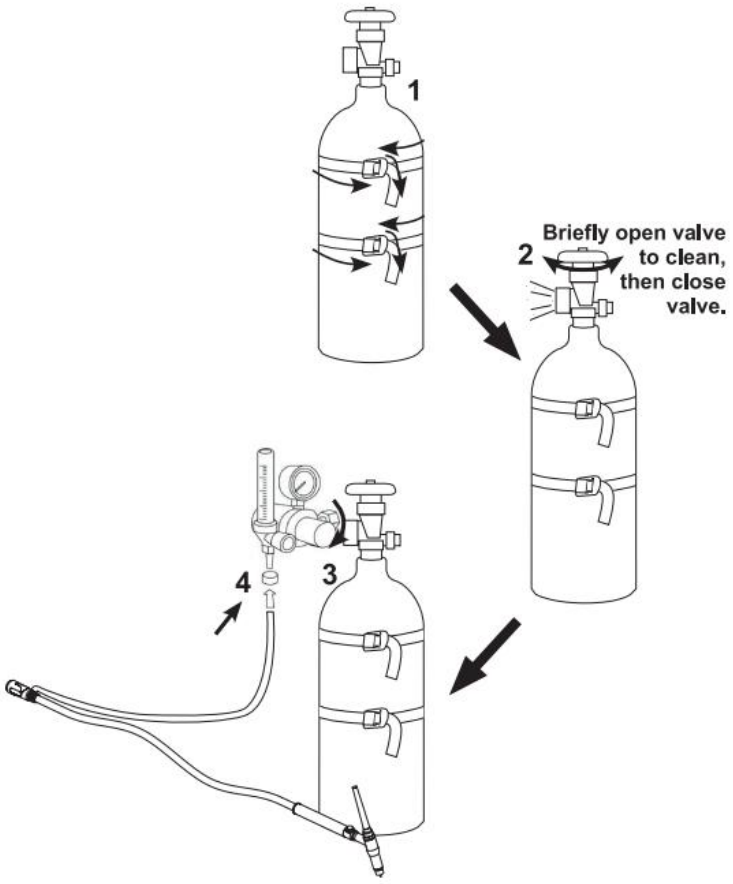


Figure 10

More information:

Sharpen tungsten Electrode

To avoid Electrode contamination, dedicate a fine grit grinding wheel exclusively to Electrode grinding.

1. Shut off the welder and wait until Electrode and Torch have cooled enough to handle.
2. Remove Back Cap to release Collet's grip on Electrode.
3. Pull Electrode out from front of Torch. (Pulling it from rear will damage Collet and create burrs on Electrode).
4. If Electrode has dulled or been otherwise contaminated, use pliers or a suitable tool to grip the Electrode above the contaminated section and snap off the end of the Electrode.
5. Lightly press Electrode tip against the surface of the grinding wheel at an angle. Rotate Electrode tip until a blunt point is formed.

NOTE: Grinding direction must be parallel to length of Electrode.

6. The conical portion of the ideal tip will be 2-1/2 times as long as the Electrode diameter.

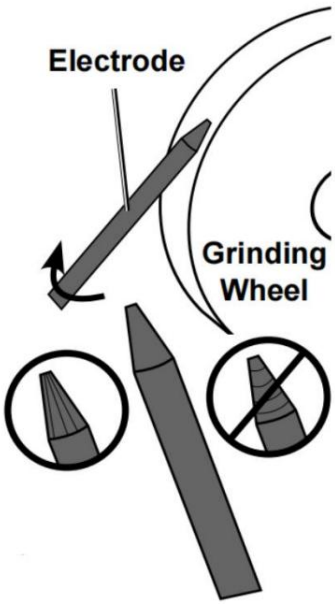


Figure 11

7. Re-insert Electrode into Collet with tip protruding 1/8"-1/4" beyond the Ceramic Nozzle, then re-tighten the Back Cap to secure the Electrode in place.

Assemble tig torch

1. Consult Settings Chart, on top of Welder, to determine proper Tungsten Electrode size to be used with thickness of material to be welded.
2. Match Collet and Collet Body sizes to Tungsten Electrode size.
3. Thread Collet Body into the front of the Torch.
4. Make sure Ceramic Nozzle size is appropriate for application.
5. Thread Ceramic Nozzle onto Collet Body.
6. Insert Collet into back of Torch and into Collet Body.
7. Insert Tungsten Electrode into Collet on front of Torch.
8. Lock Electrode in place with Back Cap. Electrode should protrude 1/8" to 1/4" beyond the Ceramic Nozzle.

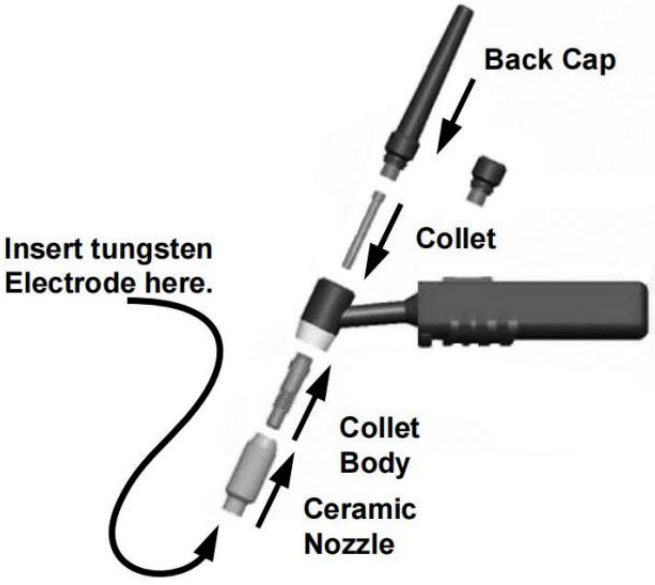


Figure 12

NOTE: The tig torch and tungsten electrode are not included in the machine. If you need to purchase, please log in to the official website: WWW.ARCCAPTAIN.COM

6.2 LIFT TIG Welder Operation

Lift TIG Mode: when connecting the optional arc welding TIG torch, gas regulator and gas cylinder, the Arc 160/200 becomes a TIG welding machine.

Operation step
1.Open gas cylinder's valve all the way. **NOTE: TO PREVENT DEATH FROM ASPHYXIATION:** **Do not open gas without proper ventilation. Fix gas leaks immediately.** Shielding gas can displace air and cause rapid loss of consciousness and death. **Shielding gas without carbon dioxide can be even more hazardous because asphyxiation can start without feeling shortness of breath.**
2.Set Flow Gauge to SCFH VALUE.
3.Connect power cord. **NOTE: Turn the Power Switch off before connecting Power Cord. Plug the Power Cord into a properly grounded and rated receptacle that matches the plug. The circuit must be equipped with delayed action-type circuit breaker or fuses.**

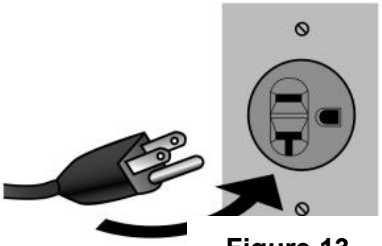


Figure 13

4.Turn the Power Switch ON.

NOTE: Set TIG Torch down on nonconductive, nonflammable surface away from any grounded objects.

The Operation interface will light up and the Cooling fan will rotate.

5.Press the "**Welding Mode" button**, for Lift TIG welding mode changeover.

6.Hold TIG Torch in one hand and the TIG Rod (sold separately) in other hand. Both hands need to wear protective gloves.

WARNING! TO PREVENT SERIOUS INJURY: Metalwork bench must be grounded when TIG welding.

NOTE: Maintain a constant distance between the Tungsten Electrode and the workpiece: between 1 and 1.5 times the diameter of the Electrode.

7.The initial settings may need to be adjusted after stopping and carefully inspecting the weld. Please refer to **6.4 Lift TIG Welding parameters table**，Proper welding takes experience.

8.Open valve on TIG Torch to start.

9.To initiate welding arc, touch Electrode to work piece and lift.

10.When welding puddle is hot enough, tilt Torch backward about 10-15 degrees from vertical and move it back slightly. Add TIG Rod material as needed to the front end of the weld puddle.

11.Alternate between pushing the torch/weld puddle and adding the TIG Rod material.

NOTE: Remove the TIG Rod each time the Electrode is advanced, but do not remove it from the gas shield. This prevents oxidation from contaminating the weld.

12.When finished welding, pull Torch away from work piece until welding arc is broken, then return the gas coverage until weld solidifies.

13.Close valve on TIG Torch and turn Right Knob to OFF to turn off power.

14.Set TIG Torch down on nonconductive, nonflammable surface away from any grounded object.

15.Turn the Power Switch OFF.

16.To prevent accidents, after use:

- Allow Welder to cool down.
- Unplug Welder's power cord from outlet.
- Remove Ground Clamp from workpiece or table.
- Disconnect TIG Torch and Ground Cables.
- Close gas cylinder's valve securely, remove regulator and replace cap.
- Disconnect Gas
- If Electrode has dulled or been otherwise contaminated, use pliers or a suitable tool to grip the Electrode above the contaminated section and snap off the end of the Electrode.

6.3 LIFT TIG Welding Mode

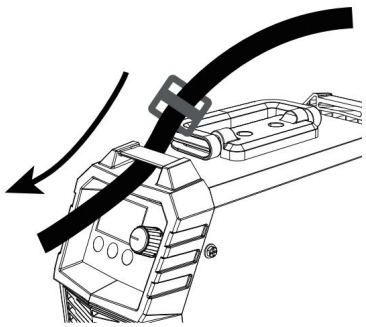
Describe	Part	Select
• Press **"Welding Mode"** Button, for **Lift TIG welding mode** changeover.		

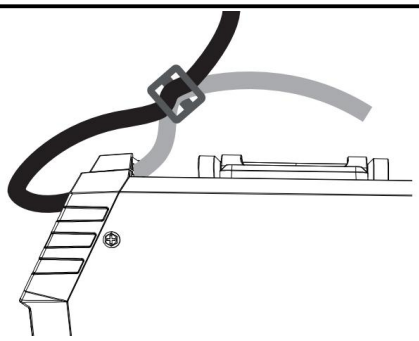
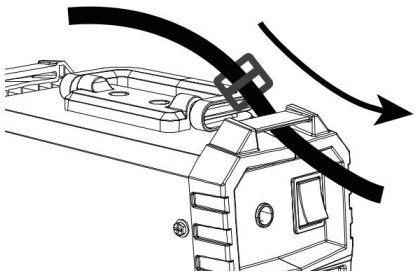
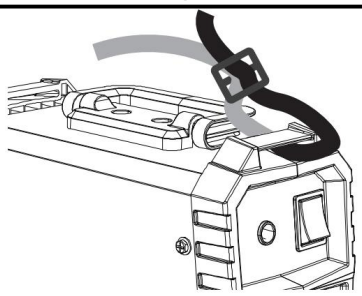
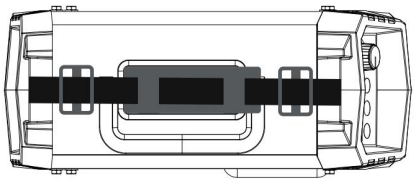
6.4 LIFT TIG Welding Parameters Table

Following table is suitable for stainless steel welding. For other materials, consult related materials and welding process for reference.

Electrode diameter mm (inch)	Plate thickness mm (inch)	Welding current(A)	Gas flow(L/min)
1mm 1/32	1mm 0.04”	20~50	5
1mm 1/32	2mm 0.08”	51~80	6
1.6mm 1/16	3mm 0.12”	81~120	7
1.6mm 1/16	4mm 0.16”	121~165	8
2.4mm 3/32	5mm 0.20”	166~200	9

7. Strap Installation

Step 1: Thread the strap through the strap hole in front of the welder.	 **Figure 14**

Step 2: Thread the strap through the nylon buckle as shown in the diagram.	 **Figure 15**
Step 3: Thread the strap through the strap hole in back of the welder.	 **Figure 16**
Step 4: Thread the strap through the nylon buckle as shown in the diagram.	 **Figure 17**
Step 5: The strap installation is complete.	 **Figure 18**

8. BASIC KNOWLEDGE OF WELDING

Manual metal arc welding, MMA for short, is an arc welding mode by manually operating electrode. Equipment for MMA is simple, convenient and flexible to operate, and with high adaptability. MMA is applied to various metal materials with thickness more than 0.08inch and various structures, in particular to weldment with complex structure and shape, short weld joint or bending shape, as well as weld joints in various spatial locations.

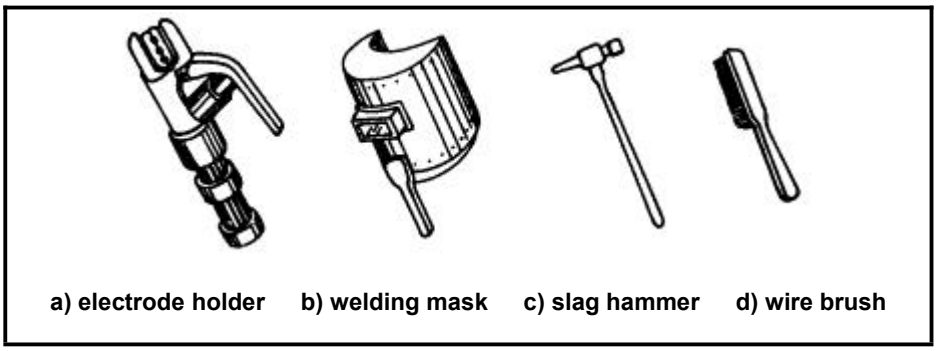
8.1 Welding Process Of MMA

Connect the two output terminals of the welder to the weldment and electrode holder respectively,

and then clamp the electrode by the electrode holder. When welding, arc is ignited between the electrode and the weldment, and the end of the electrode and part of the weldment are fused to form a weld crater under the high-temperature arc. The weld crater is quickly cooled and condensed to form weld joint which can firmly connect two separate pieces of weldement as a whole. The coating of the electrode is fused to produce slag to cover the weld crater. The cooled slag can form slag crust to protect the weld joint. The slag crust is removed at last, and the joint welding is finished.

8.2 Tools For MMA

Common tools for MMA include electrode holder, welding mask, slag hammer, wire brush **(see Figure 19)**, welding cable and labor protection supplies.



a) electrode holder b) welding mask c) slag hammer d) wire brush

Figure 19 Tools for MMA

- Electrode holder: a tool for clamping electrode and conducting current, mainly including 300A type and 500A type.
- Welding mask: a shielding tool for protecting eyes and face from injuring due to arc and spatter, including handholding type and helmet type. Colored chemical glass is installed on the viewing window of the mask to filter ultraviolet ray and infrared ray. Arc burning condition and weld crater condition can be observed from the viewing window during arc burning. Thus, welding can be carried out by operators conveniently.
- Slag hammer (peen hammer): for the use of removing slag crust on the surface of weld joint.
- Wire brush: for the use of removing dirt and rust at the joints of the weldment before welding, as well as cleaning the surface of weld joint and the spatter after welding.
- Welding cable: generally cables formed from many fine copper wires. Both YHH type arc welding rubber sleeve cable and THHR type arc welding rubber sleeve extra-flexible cable can be used. Electrode holder and welding machine are connected via a cable, and this cable is named as welding cable (live wire). Welding machine and workpiece are connected via another cable (earth wire). The electrode holder is covered with insulating material performing insulation and heat insulating.

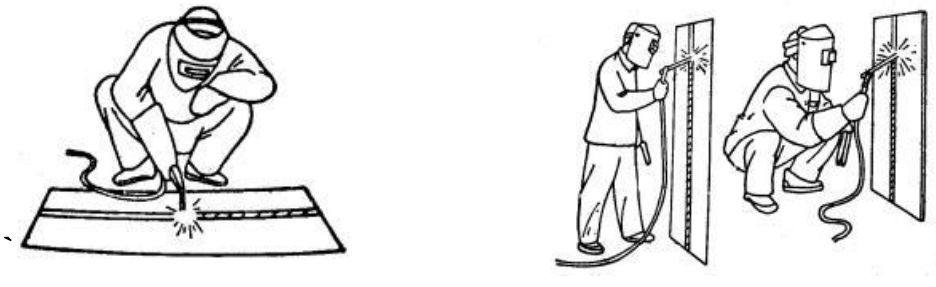
8.3 Basic Operation Of MMA

- **Welding joint cleaning**

Rust and greasy dirt at the joint should be removed completely before welding in order to implement arc igniting and arc stabilizing conveniently as well as ensure the quality of weld joint. Wire brush can be used for condition with low requirement on dust removal; grinding wheel can be used for condition with high requirement on dust removal.

- **Posture in operating**

Take flat welding of butt joint and T-shaped joint from left to right as an example. **(See Figure 20)** The operator should stand at the right side of the working direction of weld joint with mask in the left hand and electrode holder in the right hand. The left elbow of the operator should be put on his left knee to prevent his upper body from following downwards, and his arm should be separated from the costal part so as to stretch out freely.

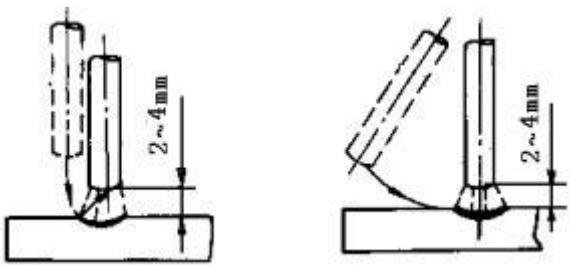


a) flat welding **b) vertical welding**

Figure 20 Posture in welding

- **Arc Igniting**

Arc igniting is the process for producing stable arc between electrode and weldment in order to heat them to implement welding. Common arc ignition mode includes scraping mode and striking mode. **(See Figure 21)** During welding, touch the surface of the weldment with the end of the electrode by scraping or light striking to form short circuit, and then quickly lift the electrode 0.08-0.16inch away to ignite arc. If arc ignition fails, it is probably because there is coating at the end of the electrode, which affects the electric conduction. In this case, the operator can strongly knock the electrode to remove the insulation material until the metal surface of the core wire can be seen.



a)striking mode **b) scraping mode**

Figure 21 Arc ignition modes

- **Tack weld**

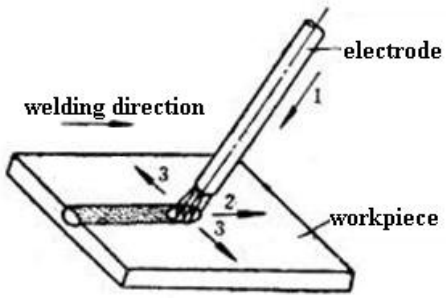
For fixing the relative positions of the two pieces of weldment and welding conveniently, 1.2-1.6inch short weld joints are welded every certain distance in order to fix the relative positions of the weldment during welding assembly. This process is named as tack weld.

- **Electrode manipulation**

The electrode manipulation actually is a resultant movement in which the electrode simultaneously moves in three basic directions: the electrode gradually moves along the welding direction; the electrode gradually moves toward the weld crater; and the electrode transversely swings. **(See Figure 22)** Electrode should be correctly manipulated in three movement directions after arc is ignited. In butt

welding and flat welding, the most important is to control the following three aspects: welding angle, arc length and welding speed.

- Welding angle: the electrode should be inclined in 70～80º forwards. **(See Figure 23)**
- Arc length: the proper arc length is equal to the diameter of electrode in general.
- Welding speed: proper welding speed should make the crater width of the weld bead about twice the diameter of the electrode, and the surface of the weld bead should be flat with fine ripples. If the welding speed is too high, and the weld bead is narrow and high, the ripples are rough, and the fusion is not well implemented. If the welding speed is too low, the crater width is excessive, and the workpiece is easy to be burned through. Besides, current should be proper, electrode should be aligned, arc should be low, and welding speed should not be too high and should be kept uniform during the whole welding process.



1-downwards feed

2-move toward welding direction

3-transversely swing

Figure 22 Three basic movement directions of electrode

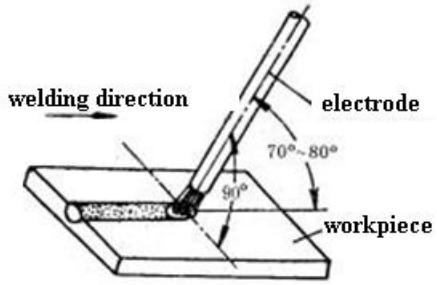
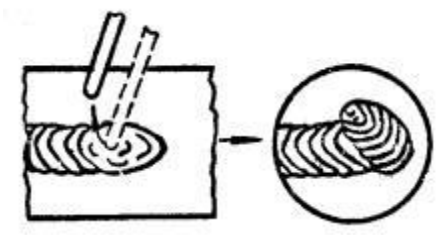


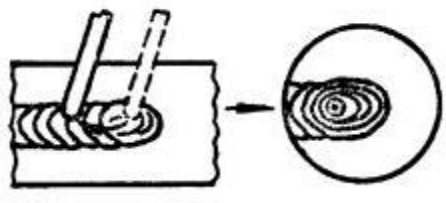
Figure 23 Angles of electrode in flat welding

- **Arc extinguishing**

Arc extinguishing is unavoidable during welding. Poor arc extinguishing may bring shallow weld crater and poor density and strength of weld metal by which cracks, air holes, slag inclusion and shortage the like are easy to be produced. Gradually pull the end of the electrode to the groove and raise the arc when extinguishing arc, in order to narrow the weld crater and reduce the metal and heat. Thus, defects such as cracks and air holes can be avoided. Pile up the weld metal of the crater to make the weld crater sufficiently transferred when extinguishing arc. Then, remove the excessive part after welding. The operation modes of arc extinguishing are shown in the figure below.



a) arc extinguishing at the outside of weld bead



b) arc extinguishing on the weld bead

Figure 24 Arc extinguishing modes

- **Weldment cleaning**

Clean welding slag and spatter with wire brush, etc after welding.

9. TROUBLESHOOTING

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.

Common Malfunction Analysis and Solution:

NOTE: If the above solutions do not solve the problem, please contact ARCCAPTAIN Customer Service.

Malfunction Phenomena	Causes and Solutions
Turn on the machine, the power indicator is off, the fan doesn't work, and no welding output.	• Check if the power switch is closed. • Make sure there is power for input cable.
Turn on the machine, the fan works, but the output current is unstable and can't be controlled by encoder when welding.	• The current encoder fails. Replace it. • Check if any loose contact exists inside the machine, especially connector, etc. If any, check.
Turn on the machine, the power indicator is on, the fan works, but no welding output.	• Check if any poor contact exists inside the machine. • Open circuit or poor contact occurs at the joint of output terminal.
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.
Display indicates E-60	• The machine is over-heating protection statues due to long time operation.Waiting for 4-7 minutes and the machine will go back to normal operation automatically • The thermistor is not well connected to control board. • The thermistor is damaged. Please replace it.

Display indicates E-10	• Restart machine. • If it is not solved, the circuit fails. Please contact your distributor.
Display indicates E-34	• Restart machine. • If it is not solved, the circuit fails. Please contact your distributor.
Non-arc	If it doesn't arc, make sure the ground clamp isn't clamped in an insulated or rusted area

10. 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.

- 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.
- 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.
- 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.
- 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.
- Check periodically whether the insulation cover of all cables is in good condition. If there is any dilapidation, rewrap it or replace it.
- Put the machine into the original packing in dry location if it is not to be used for a long time.