



ARC 120 Inverter Welding Machine

USER GUIDE





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PRECAUTIONS AND SAFE USE

Welding may result in injury to you and others, so please implement proper protections and precautions when welding.

	<p>Electric shock-may result in serious injury or even death! Ensure devices are properly grounded. Do not touch live parts with naked skin, wet gloves or wet clothes. Be sure you are insulated from the ground and workpiece. Confirm the safety of your working position.</p>
	<p>Smoke may be harmful to your health! Keep your head away from fumes and smoke to avoid inhalation of waste gas while welding. When welding, keep the working environment well-ventilated with exhaust or ventilation equipment.</p>
	<p>Arc radiation may hurt your eyes and burn your skin! Use a proper welding mask and wear protective clothing to protect your eyes and body. Ensure onlookers have a proper mask or curtain to avoid injury.</p>
	<p>Improper use and operation may result in fire or explosion. Welding sparks may cause fires, please ensure there are no flammables near the welding are and pay attention to fire safety. Ensure there is a fire extinguisher nearby, and make sure someone has been trained to operate the fire extinguisher. Do not weld in a closed unventilated container. Do not use this machine for pipe thawing.</p>
	<p>Hot workpieces can cause severe scalds or burns. Do not touch the workpiece(s) with bare hands. If continuously working, periodically cool the welding torch to avoid overheating the tip.</p>



	<p>Excessive noise can be harmful to people's hearing. Wear proper hearing protection when welding. Ensure onlookers have a proper hearing protection or distance to avoid injury.</p>
	<p>Magnetic field can impair cardiac pacemaker operation. People with a cardiac pacemaker should consult their physician prior to attempting to use welding equipment.</p>
	<p>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.</p>
	<p>Seek professional support with operating issues. When an issue arises with the installation and operation of the unit, please refer to the operating manual before attempting repairs. If the issue persists, or you still cannot solve the problem, please contact the dealer to obtain professional support.</p>

Working Environment

Prior to welding, properly inspect the work area for potential hazards before starting any welding operations.

- 1) Welding should be carried out in a dry environment with humidity below 90%.
- 2) The temperature of the work area should be between 14°F and 104°F.
- 3) Avoid welding in sunlight and rain. Keep everything dry at all times.
- 4) Avoid welding in dusty areas or environment with corrosive chemical gas.
- 5) Arc welding should be operated in an environment without strong airflow.
- 6) Weld in a well-ventilated area or use proper ventilation systems to remove harmful fumes and gases.



Safety Tips and Recommendations

This unit is equipped with an over-current/over-voltage/over-heating protection circuit. When the supplied voltage, output current or inner temperature exceeds these limits, the unit will stop automatically. Please check those conditions prior to restarting. **WARNING:** excessive use of the unit with these conditions will lead to welder damage.

1. Ventilation
 - 1.1. This welder will create powerful electrical currents that require the unit to have constant cooling.
 - 1.2. The internal fans are critical to ensuring proper and effective cooling of the machine.
 - 1.3. The operator must ensure that the louvers are uncovered and unblocked for proper airflow.
 - 1.4. The minimum distance between the unit and nearby objects should be 76 inches.
 - 1.5. Good ventilation is of critical importance for optimum performance and longer lifespan of the unit.
2. Overload Operation
 - 2.1. Remember to operate the welder within the allowable duty cycle (refer to the corresponding duty cycle).
 - 2.2. Ensure that the welding current does not exceed the max load current.
 - 2.3. Overload could obviously shorten the machine's lifespan, or even damage the machine.
3. Exceeding Recommended Voltage
 - 3.1. Verify the power supply voltage range of the unit, please refer to "Technical Parameters" table.
 - 3.2. This unit is equipped with automatic voltage compensation, which enables it to maintain a voltage range within the allowable supply ranges.
 - 3.3. Power supply voltage that exceeds the recommended levels may lead to damaging the components of the unit.



Safety Tips and Recommendations

4. Fault/Halt Indicator
 - 4.1. A sudden halt may occur and the red indicator on the front panel is lit.
 - 4.2. The welder has exceeded the standard duty cycle which triggers temperature alert due to overheating.
 - 4.3. Should this occur, halt the welding operations and allow the unit to cool down. Do not turn off the power and keep the cooling fan operating to reduce the unit temperature.
 - 4.4. Welding can be resumed after the unit temperature falls back to the standard operating range and the red indicator is off.



Welding Fundamentals

Welding is a relatively simple process for bonding two pieces of metal together. As an example, soldering two wires together is the same concept. To connect the wires, we use heat to melt solder onto the wires to create the connection and a permanent bond and circuit.

The welding process utilizes a very strong electrical current that creates enormous heat that literally melts the two pieces together, and a consumable rod (ARC Welder) or wire (MIG Welder) is melted into the joint and creates a strong metallic bond between the two pieces.

The ARC-120 is an ARC welder that utilizes a consumable electrode that conducts the current to the pieces, as well as the bonding material to create the weld. This type of welder is perhaps the easiest to use, as it is somewhat of a point-and-shoot type of welder suitable for hobbyists and even professionals.

There is a slight learning curve and experimentation as to the welding voltage and the electrode type (charts are provided at the end of this document). We recommend starting with an E-6013 general purpose welding rod which is ideal for most shallow welding needs.

The ARC-120 will work with nearly all generally available electrodes, however some electrodes may require reversed polarities and the larger diameter / demand electrodes may exceed the holder capacity and power delivery of this unit.



WHAT IS IN THE BOX / PARTSLIST

The ARC120 system is a clean, simple and easy to use design.

NOTE: The Safety Face Shield is shown assembled and consists of three parts.



1	Main Welding Unit
2	Electrode Rod Holder / Welding Handle
3	Grounding Clamp Cord
4	Welding Face Shield
5	Cleaning Brush
6	Carry Strap



FEATURES AND FUNCTIONS



1	Digital current meter. Readout indicates output power
2	Overheating LED indicator. When illuminated this indicates that the temperature inside the machine is too high and the machine is under overheating protection status. The unit is then shut down.
3	TIG – MMA Selector – Leave in MMA Selection
4	Current knob: Welding current, arc-force current and hot start arc igniting current can be adjusted from low to high output by rotating the knob clockwise
5	Positive (+) output terminal. Connect electrode rod holder / welding handle
6	Negative (-) output terminal. Connect ground clamp cord
7	Welding Unit Cooling Fan
8	Main Power Control Switch – ON/OFF
RED ARROWS	The RED arrows show where the positive and negative indicators are on the front of the unit!



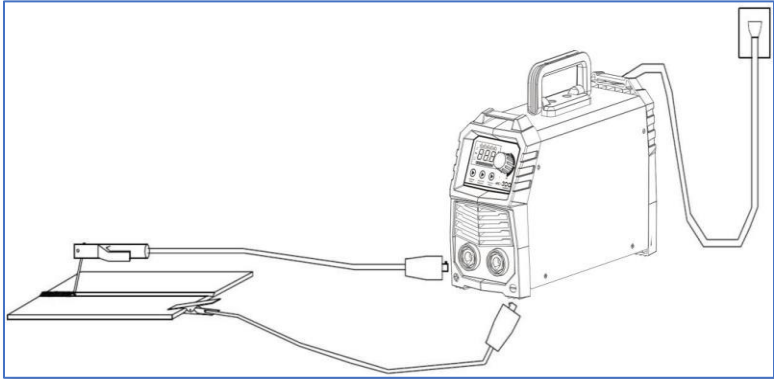
SAFETY FACE SHIELD ASSEMBLY

Proper eye and face protection is required and essential! Here are the steps to assemble the basic handheld safety face shield.





SETUP AND OPERATION



The picture above illustrates how the welder unit and cables are connected for proper operation. The connections outlined below are for “Basic Operation”.

1. Verify that the Welding Main Power Switch is in the OFF position.
2. Connecting the cables. Each connector has a metal key on the end of it. Align the key with the matching female key, insert and twist to the right till it is secure.
3. Connect the Electrode Rod Holder / Welding Handle cable into the positive (+) output terminal, refer to Features and Functions, position 5.
4. Connect the Grounding Clamp Cord into the negative (-) output terminal, refer to Features and Functions, position 6.
5. Verify that both cables are properly installed and sufficiently tight.
6. Turn the Current Knob counterclockwise to the lowest power position.
7. Turn the Welding Main Power Switch to the ON position.
8. The unit will “spin up” and verify all the indicator lights and displays are working correctly.



OPERATING YOUR WELDER

At this point, you can now begin your welding project!

1. Clip the desired electrode securely into the electrode clamp.
2. Turn the Welding Unit on and verify that it is operating, all displays are on, and the cooling fan is operating.
3. Ensure you are following all of the Safety Procedures and Precautions outlined above before proceeding.
4. Preset the welding current according to the type and size of the electrode. For basic welding parameters, please refer to the table below.

Welding Parameters Table

Electrode Diameter (mm)	Recommend 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 charts for reference.

If you experience issues while using your ARC120 Welder, please review the Common Problems and Solutions Section.

If any conditions persist, please contact product support for assistance, ProductSupport@HValleyTools.Com or



COMMON ARC WELDER ELECTRODES

Electrode	Coating	Position	Current	Penetration	Tensile Strength
E-6010	High Cellulose Sodium	All Positions	DCEP	Deep	60,000 PSI
E-6011	High Cellulose Potassium	All Positions	DCEP AC	Deep	60,000 PSI
E-6012	High Titania Sodium	All Positions	DCEP AC	Medium	60,000 PSI
E-6013	High Titania Potassium	All Positions	DCEP DCEN AC	Shallow	60,000 PSI
E-7018	Iron Powder Low hydrogen	All Positions	DCEP AC	Shallow to Medium	70,000 PSI
E-7028	Iron Powder Low hydrogen	Flat Horizontal Fillets	DCEP AC	Shallow to Medium	70,000 PSI

ELECTRODE POLARITY CHART

ELECTRODE	DC*	AC	POSITION	PENETRATION	USAGE
6010	EP	—	ALL	DEEP	MIN. PREP, ROUGH, HIGH SPATTER
6011	EP	✓	ALL	DEEP	
6013	EP, EN	✓	ALL	LOW	GENERAL
7014	EP, EN	✓	ALL	MED.	SMOOTH, EASY, FAST
7018	EP	✓	ALL	LOW	LOW HYDROGEN, STRONG
7024	EP, EN	✓	FLAT HORIZ. FILLET	LOW	SMOOTH, EASY, FASTER
Ni-CI	EP	✓	ALL	LOW	CAST IRON
308L	EP	✓	ALL	LOW	STAINLESS
*EP = ELECTRODE POSITIVE (REVERSE POLARITY) EN = ELECTRODE NEGATIVE (STRAIGHT POLARITY)					



Common Problems and Solutions

Problem	Causes and Solutions
Turn on the machine, the power indicator is off, the fan is not running and there is no welding output.	<ol style="list-style-type: none">1) Verify the unit is plugged into a power outlet.2) Verify that unit has been turned on, and that the power switch is in the on position.
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">1) Check for loose cable connections and that connectors are clean and now fowled.2) If condition persists, contact product support.
Turn on the machine, the power indicator is on, the fan works, but no welding output.	<ol style="list-style-type: none">1) Turn unit off and verify that the BOTH cables are properly connected.2) Check the cable connection terminals for loose or improper connections.3) The Overheating LED indicator is on, the unit is overheated. Leave the unit on and cooling fan running and wait for the Overheat LED to turn off.
The electrode holder becomes very hot.	The rated current of the electrode holder is lower than its actual working current. Replace it with a higher current electron holder.
Excessive spatter in MMA welding.	The output polarity connection is incorrect. Reverse the polarity by reversing the connector cables. Ground to positive, Electrode to negative.



Recommended Maintenance

- 1) Periodically check that all connector and connections are in good condition, connectors are properly fastened. Tighten any loose connections. If there is any oxidization on the connectors, carefully remove it with fine steel wool or a high grit sandpaper and then reconnect.
- 2) Clean and blow the unit out periodically with dry and clean compressed air. Perform this operation more frequently in environments with heavy dust and smoke. 60-80 PSI should be sufficient and avoid excess pressure to avoid damaging the small parts inside the unit.
- 3) Periodically check cables and connectors for wear and deterioration from use. Replace cables if any cracks, defects or wear are evident.
- 4) Store your welder in its original box and in a dry location if it is not going to be used for a long period of time.



Technical Specifications

Specification	Unit of Measure	Model ARC120
Rated input voltage	V	AC110V ± 15% 50/60 HZ
Rated input power	KVA	4.7
Welding current range (MMA)	A	20-120
	V	20.8-24.8
Welding current rang (TIG)	A	20-160
	V	10.8-16.4
Rated duty cycle		40%
No-load voltage	V	57
Overall efficiency	85%	
Protection grade	IP21S	
Power factor	COSφ=0.7	
Insulation grade	F	
Standard	EN60974-1	
Size	Inch	11.02 x 4.72 x 7.08
Weight	LB	4.5
Applicable electrodes	Inches	1/16 – 1/8
	MM	1.6 – 3.2

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