Owner's Manual & Safety Instructions

Save This Manual Keep this manual for the safety warnings and precautions, assembly, operating, inspection, maintenance and cleaning procedures. Write the product's serial number in the back of the manual near the assembly diagram (or month and year of purchase if product has no number). Keep this manual and the receipt in a safe and dry place for future reference. 21i

CHICAGO ELECTRIC® **WELDING**

80 AMP INVERTER ARC WELDER

Visit our website at: http://www.harborfreight.com
Email our technical support at: productsupport@harborfreight.com

64057

When unpacking, make sure that the product is intact and undamaged. If any parts are missing or broken, please call 1-888-866-5797 as soon as possible.

⚠WARNING

Read this material before using this product.
Failure to do so can result in serious injury.
SAVE THIS MANUAL.

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WARNING SYMBOLS AND DEFINITIONS	
⚠	This is the Safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all Safety messages that follow this symbol to avoid possible injury or death.
⚠DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
⚠WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE CAUTION	Addresses practices not related to personal injury.

IMPORTANT SAFETY INFORMATION

⚠WARNING

Read all Safety warnings and instructions.
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.

General Safety

PROTECT yourself and others. Read and understand this information.

1. **Before use, read and understand manufacturer's instructions, Material Safety Data Sheets (MSDS's), employer's Safety practices, and ANSI Z49.1.**
2. **Keep out of reach of children.** Keep children and bystanders away while operating.
3. **Place the welder on a stable location before use.** If it falls while plugged in, severe injury, electric shock, or fire may result.
4. **Do not overreach. Keep proper footing and balance at all times.**
5. **Do not wrap cables over or around your body.**
6. **Stay alert, watch what you are doing and use common sense when operating a welder. Do not use a welder while you are tired or under the influence of drugs, alcohol or medication.** A moment of inattention while operating welders may result in serious personal injury.
7. **Avoid unintentional starting.** Make sure you are prepared to begin work before turning on the Welder.
8. **Never leave the Welder unattended while energized.** Turn power off if you have to leave.
9. **The warnings, precautions, and instructions discussed in this instruction manual cannot cover all possible conditions and situations that may occur.** It must be understood by the operator that common sense and caution are factors which cannot be built into this product, but must be supplied by the operator.

Fume and Gas Safety

INHALATION HAZARD:
Welding and Plasma Cutting produce toxic fumes.

1. **Exposure to welding or cutting exhaust fumes can increase the risk of developing certain cancers, such as cancer of the larynx and lung cancer.** Also, some diseases that may be linked to exposure to welding or plasma cutting exhaust fumes are:
   - Early onset of Parkinson's Disease
   - Heart disease
   - Ulcers
   - Damage to the reproductive organs
   - Inflammation of the small intestine or stomach
   - Kidney damage
   - Respiratory diseases such as emphysema, bronchitis, or pneumonia

   Use natural or forced air ventilation and wear a respirator approved by NIOSH to protect against the fumes produced to reduce the risk of developing the above illnesses.
2. **Do not use near degreasing or painting operations.**
3. **Keep head out of fumes.** Do not breathe exhaust fumes.
4. **Use enough ventilation, exhaust at arc, or both, to keep fumes and gases from breathing zone and general area.** If engineering controls are not feasible, use an approved respirator.
5. **Work in a confined area only if it is well-ventilated, or while wearing an air-supplied respirator.**
6. **Have a recognized specialist in Industrial Hygiene or Environmental Services check the operation and air quality and make recommendations for the specific welding situation.** Follow OSHA guidelines for Permissible Exposure Limits (PEL's) and the American Conference of Governmental Industrial Hygienists recommendations for Threshold Limit Values (TLV's) for fumes and gases.

Arc Ray Safety

Arc Welding produces ultraviolet (UV) and infrared (IR) rays that can injure eyes and burn skin without proper protection.

1. **Wear ANSI-approved welding eye protection featuring at least a number 10 shade lens rating.**
2. **Wear leather leggings, fire resistant shoes or boots during use.** Do not wear pants with cuffs, shirts with open pockets, or any clothing that can catch and hold molten metal or sparks.
3. **Keep clothing free of grease, oil, solvents, or any flammable substances.** Wear dry, insulating gloves and protective clothing.
4. **Wear an approved head covering to protect the head and neck.** Use aprons, cape, sleeves, shoulder covers, and bibs designed and approved for welding and cutting procedures.
5. **Wear an approved welding jacket or long sleeves to protect forearms from radiation burns.**
6. **When welding/cutting overhead or in confined spaces, wear flame resistant ear plugs or ear muffs to keep sparks out of ears.**

Electrical Safety

ELECTRIC SHOCK can KILL.

1. **Turn off, disconnect power, and discharge Electrode to ground before setting down torch/Electrode Holder and before service.**
2. **Do not touch energized electrical parts.** Wear dry, insulating gloves. Do not touch Electrode Holder, Electrode, welding torch, or welding wire with bare hand. Do not wear wet or damaged gloves.
3. **Connect to grounded, GFCI-protected power supply only.**
4. **Do not use near water or damp objects.**
5. **People with pacemakers should consult their physician(s) before use.** Electromagnetic fields in close proximity to heart pacemaker could cause pacemaker interference or pacemaker failure.
6. **Do not expose welders to rain or wet conditions.** Water entering a welder will increase the risk of electric shock.
7. **Do not abuse the cord. Never use the cord for carrying, pulling or unplugging the welder. Keep cord away from heat, oil, sharp edges or moving parts.** *Damaged or entangled cords increase the risk of electric shock.*
8. **Do not use outdoors.**
9. **Insulate yourself from the workpiece and ground.** Use nonflammable, dry insulating material if possible, or use dry rubber mats, dry wood or plywood, or other dry insulating material large enough to cover your full area of contact with the work or ground.

Fire Safety

ARC AND SLAG can cause fire.

1. **Clear away or protect flammable objects.** Remove or make safe all combustible materials for a radius of 35 feet (10 meters) around the work area. Use a fire resistant material to cover or block all open doorways, windows, cracks, and other openings.
2. **Keep ABC-type fire extinguisher near work area and know how to use it.**
3. **Maintain a safe working environment.** Keep the work area well lit. Make sure there is adequate surrounding workspace. Keep the work area free of obstructions, grease, oil, trash, and other debris.
4. **Do not operate welders in atmospheres containing dangerously reactive or flammable liquids, gases, vapors, or dust.** Provide adequate ventilation in work areas to prevent accumulation of such substances. *Welders create sparks which may ignite flammable substances or make reactive fumes toxic.*
5. **If working on a metal wall, ceiling, etc., prevent ignition of combustibles on the other side by moving the combustibles to a safe location.** If relocation of combustibles is not possible, designate someone to serve as a fire watch, equipped with a fire extinguisher, during the cutting process and for at least one half hour after the cutting is completed.
6. **Do not weld or cut on materials having a combustible coating or combustible internal structure, as in walls or ceilings, without an approved method for eliminating the hazard.**
7. **Do not dispose of hot slag in containers holding combustible materials.**
8. **After welding, make a thorough examination for evidence of fire.** Be aware that easily visible smoke or flame may not be present for some time after the fire has started.
9. **Do not apply heat to a container that has held an unknown substance or a combustible material whose contents, when heated, can produce flammable or explosive vapors.** Clean and purge containers before applying heat. Vent closed containers, including castings, before preheating, welding, or cutting.

Welder Use and Care

1. **Do not use the welder if the switch does not turn it on and off**. Any welder that cannot be controlled with the switch is dangerous and must be repaired.
2. **Disconnect the plug from the power source before making any adjustments, changing accessories, or storing welders**. Such preventive Safety measures reduce the risk of starting the welder accidentally.
3. **Prevent unintentional starting. Ensure the switch is in the off-position before connecting to power source or moving the welder.** Carrying or energizing welders that have the switch on invites accidents.
4. **Store idle welders out of the reach of children and do not allow persons unfamiliar with the welder or these instructions to operate the welder.** Welders are dangerous in the hands of untrained users.
5. **Use the welder and accessories in accordance with these instructions, taking into account the working conditions and the work to be performed.** Use of the welder for operations different from those intended could result in a hazardous situation.
6. **Do not use the welder for pipe thawing.**

Maintenance

1. **Maintain welders. Check for misalignment or binding of moving parts, breakage of parts and any other condition that may affect the welder's operation. If damaged, have the welder repaired before use.** Many accidents are caused by poorly maintained welders.
2. **Have your welder serviced by a qualified repair person using only identical replacement parts.** This will ensure that the Safety of the welder is maintained.
3. **Maintain labels and nameplates on the Welder.** These carry important information. If unreadable or missing, contact Harbor Freight Tools for a replacement.
4. **Unplug before maintenance.** Unplug the Welder from its electrical outlet before any inspection, maintenance, or cleaning procedures.

SAVE THESE INSTRUCTIONS.

Grounding

⚠WARNING

TO PREVENT ELECTRIC SHOCK AND DEATH FROM INCORRECT GROUNDING WIRE CONNECTION:
Check with a qualified electrician if you are in doubt as to whether the outlet is properly grounded. Do not modify the power cord plug provided with the tool. Never remove the grounding prong from the plug. Do not use the tool if the power cord or plug is damaged. If damaged, have it repaired by a service facility before use. If the plug will not fit the outlet, have a proper outlet installed by a qualified electrician.

1. The green wire inside the power cord is connected to the grounding system in the welder. The green wire in the power cord must be the only wire connected to the welder's grounding system and must never be attached to an electrically "live" terminal. Never leave the grounding wire disconnected or modify the Power Cord Plug in any way.
2. Do not use any adapters between the welder's power cord and the AC (power source) receptacle.

Grounded Tools: Tools with Three Prong Plugs

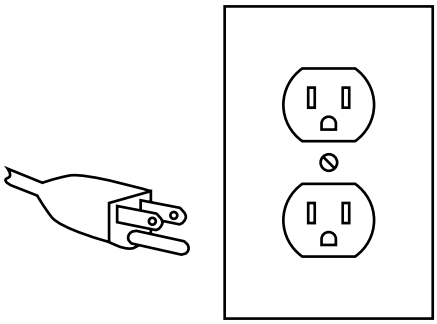


Figure A: 3-Prong Plug and Outlet

1. Tools marked with "Grounding Required" have a three wire cord and three prong grounding plug. The plug must be connected to a properly grounded outlet. If the tool should electrically malfunction or break down, grounding provides a low resistance path to carry electricity away from the user, reducing the risk of electric shock. **(See 3-Prong Plug and Outlet.)**
2. The grounding prong in the plug is connected through the green wire inside the cord to the grounding system in the tool. The green wire in the cord must be the only wire connected to the tool's grounding system and must never be attached to an electrically "live" terminal. **(See 3-Prong Plug and Outlet.)**
3. The tool must be plugged into an appropriate outlet, properly installed and grounded in accordance with all codes and ordinances. The plug and outlet should look like those in the preceding illustration. **(See 3-Prong Plug and Outlet.)**

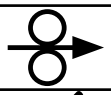
Extension Cords

Extension cords should be avoided because of the voltage drop they produce which can affect the performance of the welder. If an extension cord is necessary then it must be minimum #12 gauge cord and no longer than 25 feet.

Replacement Cords

1. Use only the supplied power cord for this welder or an identical replacement cord.
2. Do not install a thinner or longer cord on this welder.
3. Do not patch cords of any length together for this item. Patches may allow moisture to penetrate the insulation, resulting in electric shock.

Symbology

	Wire Feed (Speed)
	Workpiece Ground Cable
	Overheat Shutdown Indicator
	Cooling Fan
VAC	Volts Alternating Current
A	Amperes
OCV	Open Circuit Voltage
KVA	Kilovolt Amperes (Volts / 1000 * Amperes)
IPM	Inches Per Minute

AWG	American Wire Gauge
	Electric Shock Hazard. Do not touch energized parts.
	Inhalation Hazard. Keep head out of fumes and use proper ventilation.
	Read manual before setup and/or use.
	Fire Hazard. Keep flammable materials away during welding. Spatter can cause accidental fires.
	Arc Ray Hazard. Wear welding helmet with properly rated filter lens.
	Pacemaker Hazard. Welding processes may interfere with pacemakers. Consult doctor before use.

Specifications

Electrical Input Requirement	Single phase 120VAC, 50/60Hz fused with 20A time delayed fuse or circuit breaker
Rated Output Current	75A
Weldable Materials	Steel and Stainless Steel
Material Thickness	1/16″ maximum
Electrode Holder Capacity	1/16" – 3/32" (1.6mm) – (2.5mm)
Duty Cycle	40% @ 75Amps
Electrode Holder Cable	5.5ft Long with Dual-Angle Electrode Holder
Ground Cable	5ft Long with Clamp

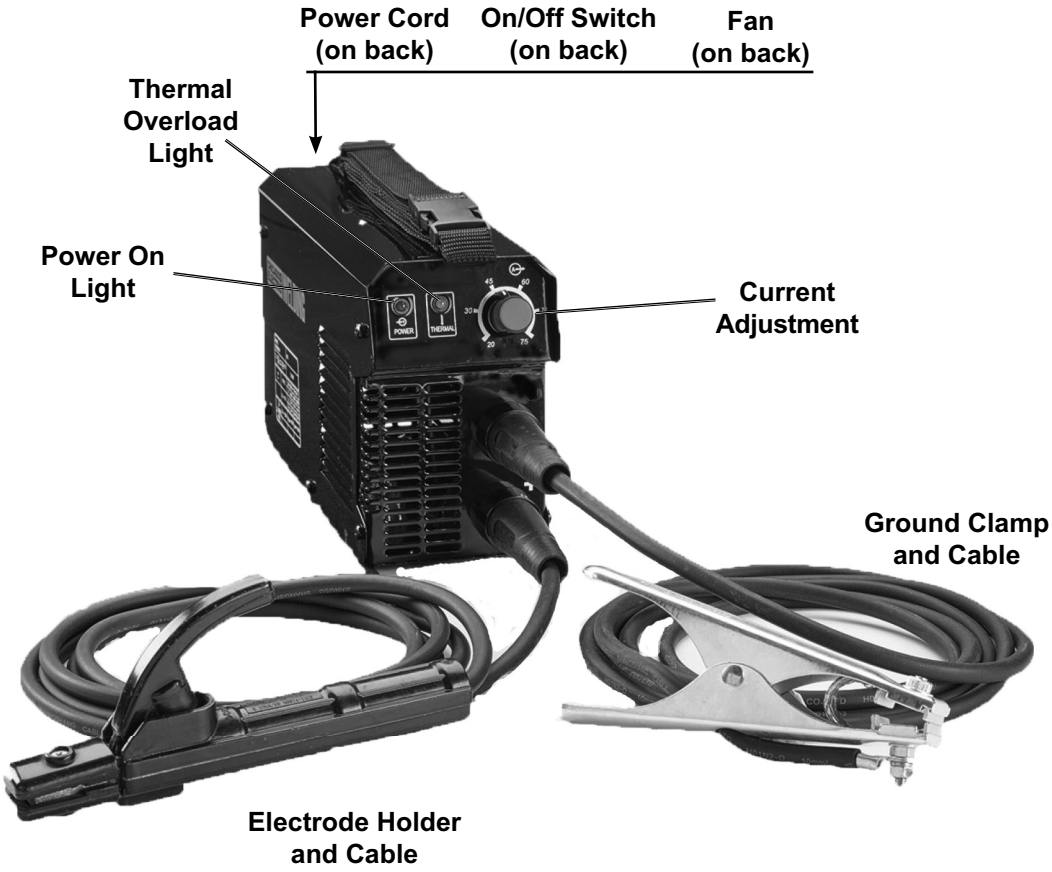
CHICAGO ELECTRIC WELDING

Read the ENTIRE IMPORTANT SAFETY INFORMATION section at the beginning of this manual including all text under subheadings therein before set up or use of this product.

⚠WARNING **TO PREVENT SERIOUS INJURY FROM ACCIDENTAL OPERATION: Turn the Power Switch off and unplug the welder before set up.**

Place the Welder on a level surface that can bear its weight near the work area. Leave space around the Welder for proper air flow.

Functions



Power On Light:
Lights when is the Welder is powered on.

Thermal Overload Light:
Lights when the Welder's internal temperature is too high. Output to the Electrode Holder will turn off automatically but the **Fan** will still be operating. Keep welder on to allow Fan to cool the Welder. When the internal temperature decreases, the Thermal Overload Light will turn off and the Welder will be ready to weld.

Current Adjustment:
Adjusts the current output of the Welder.

Electrode Holder and Cable:
The cable connects to the Welder's positive terminal and the holder grasps the electrode welding rod.

Ground Clamp and Cable:
The cable connect's to the Welder's negative terminal and the clamp connects to the workpiece.

Power Cord (on back):
Connects to 120VAC GFCI-protected outlet.

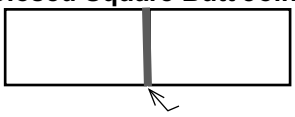
On/Off Switch (on back):
Turns Welder power on or off.

Fan (on back):
Cools Welder.

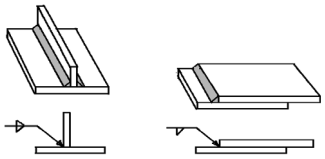
Setting up the Workpiece

1. There are two basic **welding positions**: Flat and Horizontal. Flat welding is easier and allows for better penetration. For best results the workpiece should be positioned on a flat surface so that the bead runs smoothly.

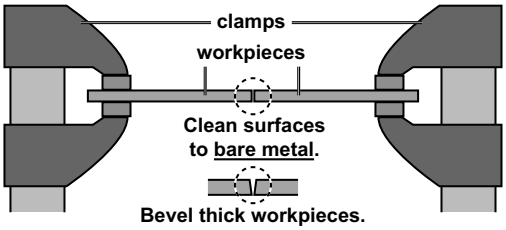
Example of Flat Welding Position: Closed Square Butt Joint



Example of Horizontal Welding Position: Fillet Weld Joints

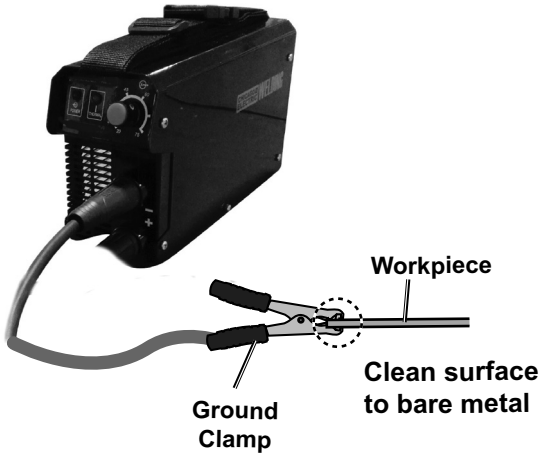


2. **Prepare the welding surface** by cleaning it thoroughly with a wire brush or angle grinder. There must be no rust, paint, oil, or other materials on the weld surfaces, **only bare metal**.
3. **Use clamps** (not included) to hold the workpieces in position so that you can concentrate on proper welding technique. The distance (if any) between the two workpieces must be controlled properly to allow the weld to hold both sides securely while allowing the weld to penetrate fully into the joint. The edges of thicker workpieces may need to be beveled to allow proper weld penetration.
   - If necessary, **bevel the edges to around 60 degrees** with a metal grinder.



Ground Workpiece

1. To ensure a good connection, clean any dirt, rust, scale or paint from the Ground Clamp.
2. Attach Ground Clamp cable to the Welder's **negative (-) socket.** Attach the Ground Clamp to **bare metal** on the workpiece, near the weld area or to a metal welding table where the workpiece will be placed.



Electrode (not included)

1. The welding electrode is a metal rod coated with a layer of flux. When welding, electrical current flows between the electrode (rod) and the grounded metal workpiece creating intense heat (arc) melting the fill metal and flux.
2. Connect the Electrode Holder cable to the Welder's **positive (+) socket**. Put an electrode into the Electrode Holder by squeezing its handle and placing the electrode in the holder.
3. The electrode and amount of heat used to weld is determined by the thickness and type of metal you're working with and the position of the workpiece. Heavier, thicker metals require more amperage. See Table A for guidelines but its best to practice your welds on scrap metal, matching the type metal on your workpiece, to determine the correct current (amp) setting and electrode choice.

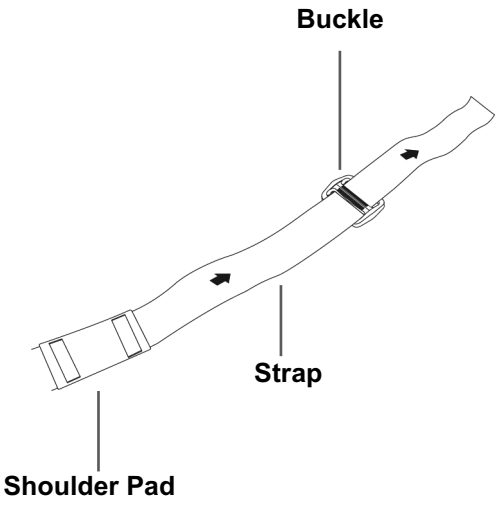
Table A: Electrode and Amp Chart

Electrode Type	Electrode Diameter	Amperage Range
E6010 DC+	3/32"	40–70
E6011 AC/DC+	1/8"	75–130
E6013 DC+/AC	1/16"	25–40
	3/32"	40–90
	1/8"	75–125
E7014 DC+/AC	3/32"	75–110
E7018 DC+/AC	3/32"	70–110

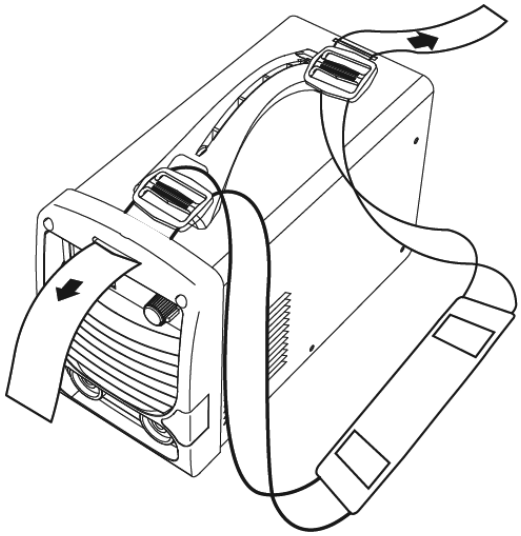
4. The **Welding Current Adjustment Knob** adjusts the current (amps) output of the Welder to the Electrode Holder. Heat intensity will increase as the Amps setting increases.

Strap Attachment

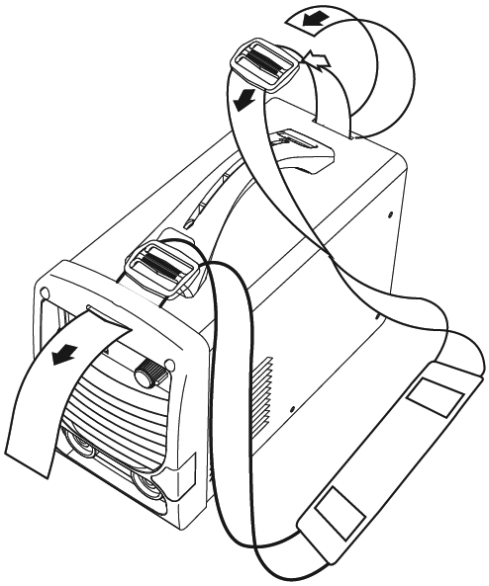
1. Thread Strap through Buckle. Leave at least 6-1/2″ of Strap on either side of the Buckle. Adjust Shoulder Pad so that it is in the middle of the Strap.



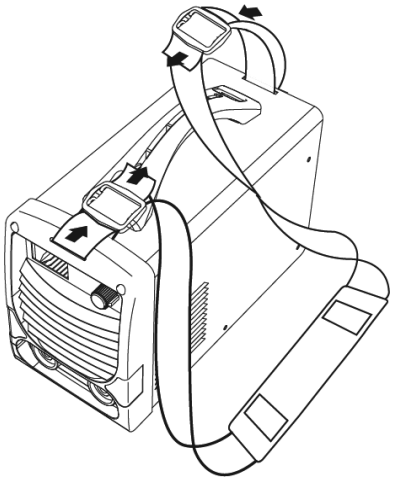
2. Thread strap through holes at each end of the product.



3. Thread the end of the Strap back through the buckle on the same side.



4. Once the Strap is threaded back through the Buckle, pull the Strap tight until the Strap is securely fastened.



Basic Welding

Read the ENTIRE IMPORTANT SAFETY INFORMATION section at the beginning of this manual including all text under subheadings therein before set up or use of this product.

⚠WARNING

TO PREVENT SERIOUS INJURY:
Protective gear must be worn when using the Welder; minimum shade number 10 full face shield (or welding mask), ear protection, welding gloves, sleeves and apron, and fire resistant work clothes without pockets should be worn when welding.
Light from the arc can cause permanent damage to the eyes and skin.
Use in a well ventilated area.
Do not breathe arc fumes.

- Stick (or Arc) Welding is used to weld mild steel and stainless steel using a Stick Electrode without shielding gas.

Good welding takes a degree of skill and experience. Practice a few sample welds on scrap before welding your first project. Additional practice periods are recommended whenever you weld:

- a different thickness of material
- a different type of material
- a different type of connection
- using a different process

⚠WARNING

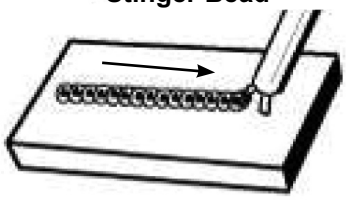
TO PREVENT SERIOUS INJURY, FIRE AND BURNS:
Keep welding tip clear of grounded objects whenever unit is plugged in and turned on.

Make practice welds on pieces of scrap to practice technique before welding anything of value.

Types of Arc Weld Beads

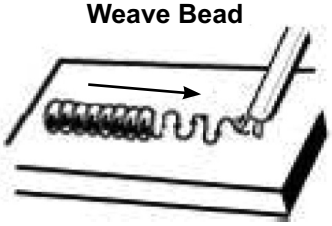
1. The **stringer bead** is formed by traveling with the electrode in a straight line while keeping it centered over the weld joint.

Stinger Bead



2. The **weave bead** is used to deposit metal over a wider space than possible with a stringer bead. The weave bead is made by moving the electrode side to side hesitating monetarily, at the end of each weave before traveling further, for good metal penetration.

Weave Bead



Operation

After practice welding on scrap, stop, and check your progress. Perform Strike Test, then clean and compare your weld's appearance with the diagrams and descriptions in the **Welding Tips** section starting on the next page. After making any necessary adjustments, continue to weld ***while carefully following the DUTY CYCLE guidelines as explained below.***

1. Make sure the Welder's Power Switch is OFF before plugging its Power Cord into the AC receptacle.
2. After the Power Cord is plugged in, the Welder's front panel Power On light should be off. Keep Welder off until ready to use.
3. Plug Electrode Holder cable into Positive Socket. Twist clockwise all the way to lock in place.
4. Plug Ground Clamp cable into Negative Socket and twist all the way into place.
   a. Connect Ground Clamp onto workpiece (see **Ground Workpiece,** page 9).

⚠WARNING

Warning! Before striking an arc, put on protective gear (see Basic Welding warning).

5. Place the bare metal end of the rod, or stick electrode (sold separately), inside the jaws of the Electrode Holder.
6. Power on Welder. The Power On light should brighten.
7. With gloved hand holding onto Electrode Holder handle, stroke the workpiece lightly with the electrode to ignite the arc.
   Tips for igniting the arc:
   a. Tap the surface with the Electrode.
   b. Stroke the surface with the Electrode.
   c. Strike the surface like a match with the Electrode.
8. After the arc ignites:
   a. Lift the Electrode off workpiece the same distance (gap) as the diameter of the bare metal end.
   b. Tilt Electrode back 10 to 20 degrees.
   c. Drag Electrode to the back end of the weld bead puddle to deposit material as needed.
   d. Tips for maintaining the arc:
      - The gap between electrode and workpiece must be maintained during welding. It takes practice to maintain the gap. If too wide the arc will extinguish. If too narrow the rod will stick to the workpiece.
      - If the rod sticks to the workpiece, gently rock them back and forth to make them separate.
   e. A good arc is accompanied by a crisp, crackling sound, similar to frying eggs.
   f. To lay a weld bead, only two movements are needed: downward and in the direction the weld is to be laid.
9. When finished welding; lift the Electrode from the workpiece, then **set Electrode Holder down on nonconductive, nonflammable surface away from any grounded objects.**
10. Allow internal fan to cool Welder. When cool, turn Power Switch off.
11. To prevent accidents, **after use**:
    - Allow Welder to cool down.
    - Unplug Welder's power cord from outlet.
    - Disconnect electrode, Electrode Holder and Ground Clamp Cables.
    - Clean, then store Welder and its accessories indoors out of children's reach.

Duty Cycle (Duration of Use)

Avoid damage to the Welder by not welding for more than the prescribed duty cycle time. The Duty Cycle defines the number of minutes, within a 10 minute period, during which a given welding process can produce a particular welding current without overheating.

For example, a 75 amp welder with a duty cycle of 40% must be allowed to "rest" for at least 6 minutes after every 4 minutes of continuous welding.

Failure to carefully observe duty cycle limitations can easily over-stress a welder's power generation system contributing to premature welder failure.

This Welder has an internal thermal protection system to help prevent this sort of over-stress. When the Welder overheats, it automatically shuts down and the **Thermal Overload Indicator** lights. The welder automatically returns to service after cooling down. When cooling, rest the Electrode Holder on an electrically non-conductive, heat-proof surface, such as a concrete slab, well clear of the ground clamp.

Allow the Welder to cool with the Power Switch on, so that the internal Fan will help cool the Welder.

When the Overload Indicator is no longer lit and the Welder can be used again, use shorter welding periods and longer rest periods to prevent needless wear.

Welding Tips

A good way to test welding technique is to examine a weld's appearance after it has cooled and the slag has been removed (for Stick welds). Then, better welding can be learned by adjusting your weld technique to remedy any problems found.

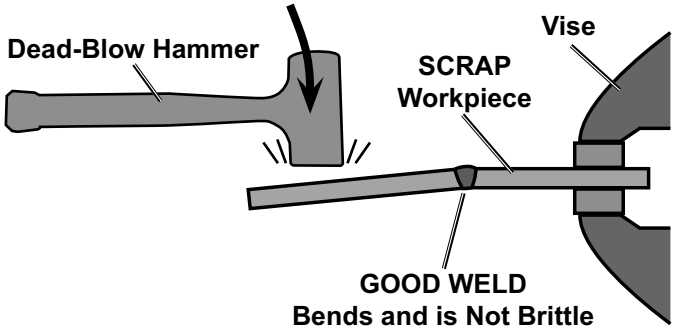
After practice welding a couple of welding beads, STOP and examine your weld using the following guidelines.

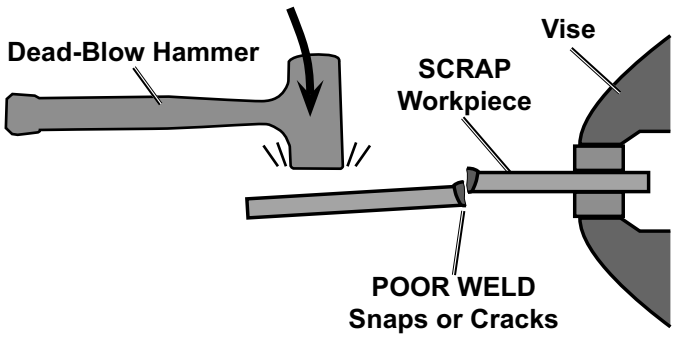
Strike Test

A test weld on a PIECE OF SCRAP can be tested by using the following procedure. WEAR ANSI-APPROVED SAFETY GOGGLES DURING THIS PROCEDURE.

WARNING! This test WILL damage the weld it is performed on. This test is ONLY an indicator of weld technique and is not intended to test working welds.

1. After two scraps have been welded together and the weld has cooled, clamp one side in a sturdy vise.
2. Stay clear from underneath while you strike the opposite side with a heavy hammer, preferably a dead-blow hammer.
3. A **GOOD WELD** will deform but not break, as shown on top.
   A **POOR WELD** will be brittle and snap at the weld, as shown on bottom.



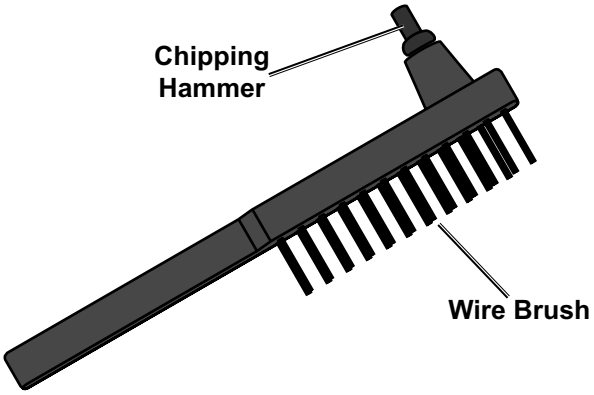


Cleaning Stick Weld

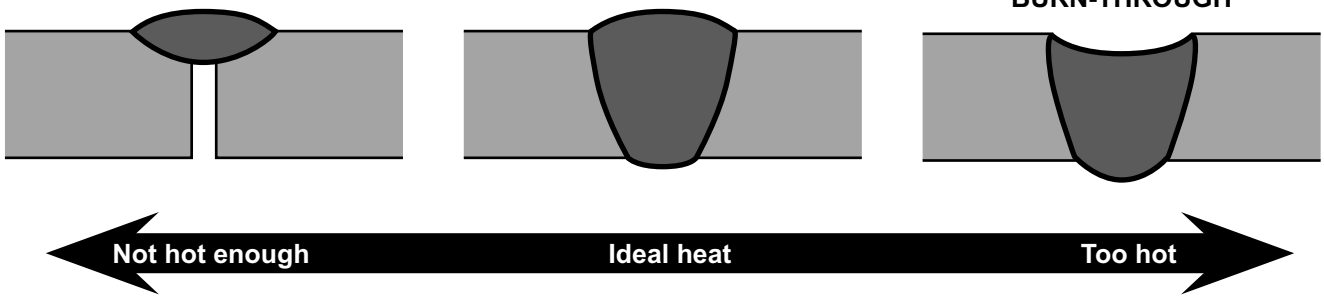
⚠WARNING

TO PREVENT SERIOUS INJURY:
Wear ANSI-approved safety goggles and protective wear when cleaning a weld.
Sparks or chips may fly when cleaning.

1. A weld from Stick welding will be covered by slag. Use a chipping hammer (not proided) to knock this off. **Be careful not to damage the weld or base material.**
2. Use a wire brush (not provided) to further clean the weld or use an angle grinder (sold separately) to shape the weld.



Stick Weld Diagnosis - Workpiece Heat Control / Weld Penetration



How to increase workpiece heat and increase penetration:
(to weld THICKER workpieces properly)

a. Increase current. b. Weld more slowly.

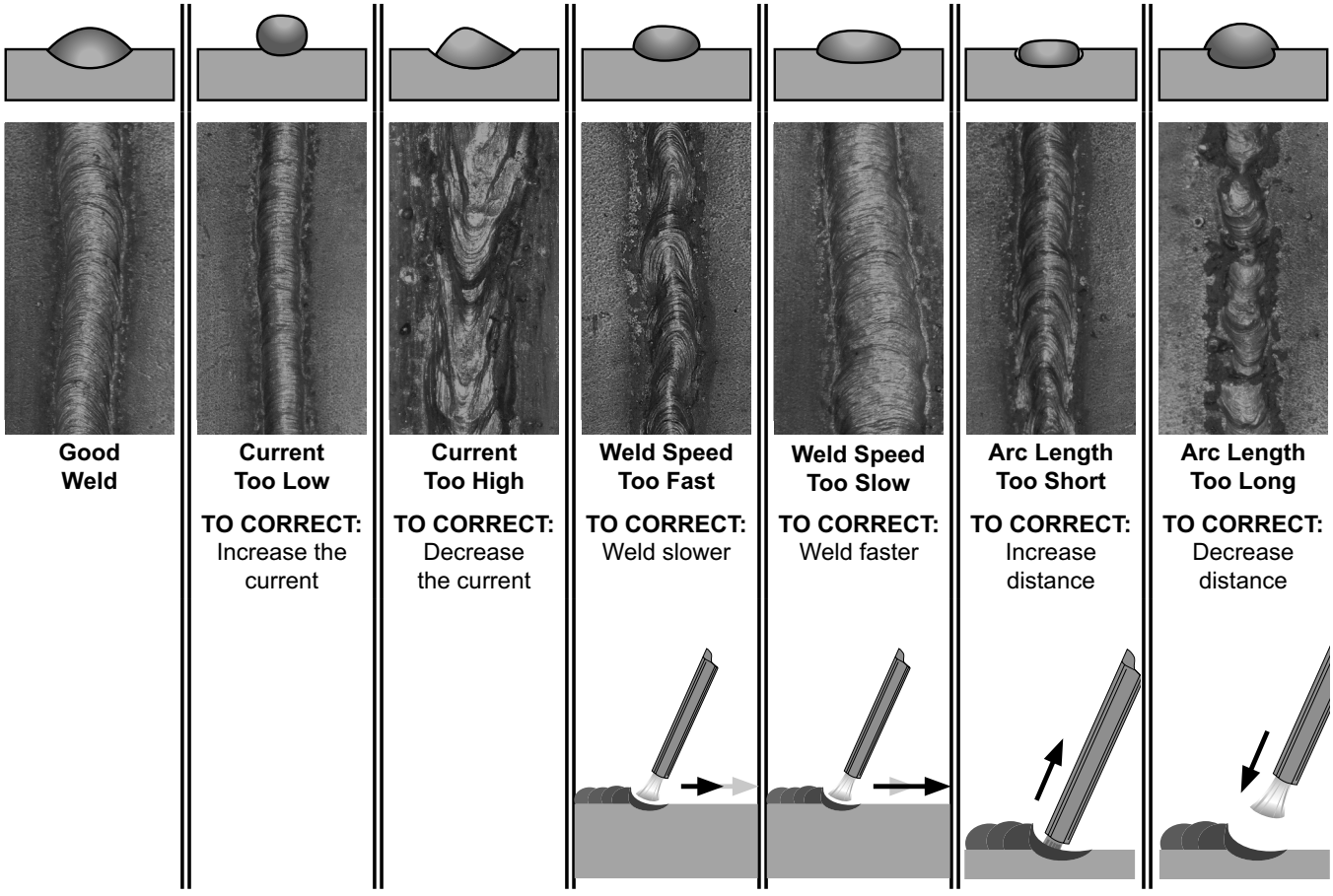
How to reduce workpiece heat and limit penetration:
(to weld THINNER workpieces properly)

a. Decrease current. b. Weld more quickly.

Stick Weld Example Diagrams

CLEAN WELDS FIRST!

Stick welds will have a coat of slag over them until cleaned.

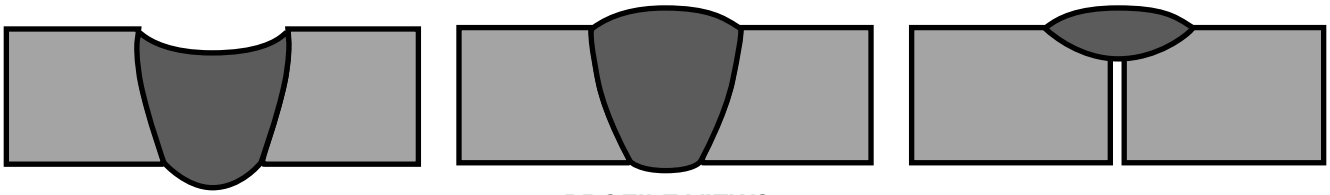


Stick Weld Penetration (Workpiece Heat Control)

EXCESS PENETRATION OR BURN-THROUGH
Weld droops on top and underneath or falls through entirely, making a hole.

PROPER PENETRATION
Weld is visible underneath and bulges slightly on top.

INADEQUATE PENETRATION
Weld does not contact the joint fully, just on the surface.



PROFILE VIEWS

POSSIBLE CAUSES AND SOLUTIONS FOR EXCESS PENETRATION OR BURN-THROUGH

1. **Workpiece overheating:**
   Reduce current.
2. **Welding speed too slow:**
   Increase welding speed and ensure that welding speed is kept steady.

POSSIBLE CAUSES AND SOLUTIONS FOR INADEQUATE PENETRATION

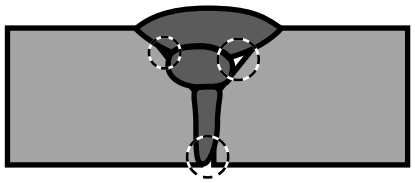
1. **Incorrect welding technique:**
   Keep arc on leading edge of weld bead puddle.
   Hold torch at proper angles.
2. **Insufficient weld heat:**
   Slow down so fill material has time to melt into the weld location. Increase current.
3. **Workpieces too thick/close:**
   Bevel thick workpieces, allow slight gap, and weld in several passes.
4. **Insufficient weld material:**
   Increase amount of fill material.

Stick Weld - Weld Not Adhering Properly

Gaps present between weld and previous bead or between weld and workpiece. See areas below.

POSSIBLE CAUSES AND SOLUTIONS

PROFILE VIEW

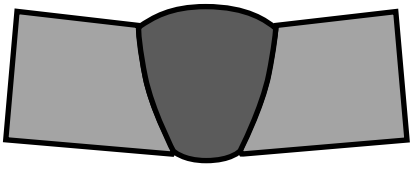


1. **Incorrect welding technique:**
   Place stringer bead at correct place in joint.
   Adjust workpiece position or weld angle to permit proper welding to bottom of piece.
   Keep arc on leading edge of weld puddle.
   Hold Electrode and fill material at proper angles.
2. **Insufficient weld heat:**
   Increase current.
3. **Dirty workpiece:**
   Clean workpiece down to bare metal.
4. **Insufficient weld material:**
   Increase amount of fill material.
5. **Distance between workpieces to large:**
   Decrease distance and increase bevel.

Stick Weld - Bend at Joint

POSSIBLE CAUSES AND SOLUTIONS

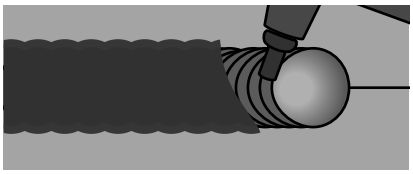
PROFILE VIEW



1. **Improper clamping:**
   Clamp workpieces securely.
   Make tack welds to hold workpieces.
2. **Excessive heat:**
   Weld a small portion and allow to cool before proceeding.
   Increase weld speed.

Stick Weld - Coat of Slag Over Weld

TOP VIEW



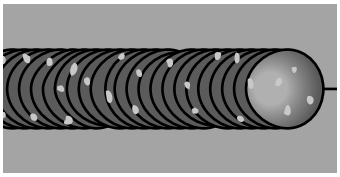
PARTIALLY CHIPPED AWAY TO SHOW WELD

Slag is a necessary part of a stick weld. It shields the weld from impurities. Clean off the slag with the Chipping Hammer and Wire Brush after welding.

Stick Weld - Porosity - Small cavities or holes in the bead.

POSSIBLE CAUSES AND SOLUTIONS

TOP VIEW

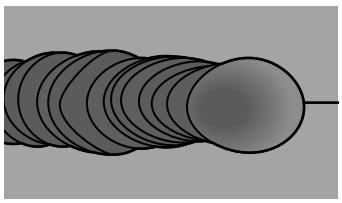


1. **Dirty workpiece or fill material:**
   Clean workpiece down to bare metal.
   Make certain that fill material and Electrode are clean and free from oil, coatings, and other residues.
2. **Inconsistent welding speed:**
   Maintain steady weld speed.

Stick Weld - Crooked/Wavy Bead

POSSIBLE CAUSES AND SOLUTIONS

TOP VIEW

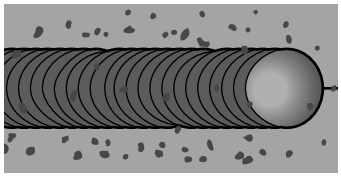


1. **Inaccurate welding:**
   Use two hands or rest hand on steady surface.
2. **Inconsistent welding speed:**
   Maintain steady weld speed.

Stick Weld - Excessive Spatter

POSSIBLE CAUSES AND SOLUTIONS

TOP VIEW



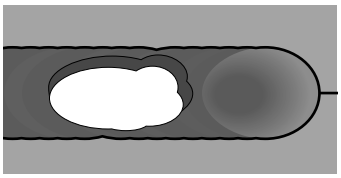
Fine spatter is normal. Spatter that is grainy and large is a problem.

Dirty workpiece or fill material:
Clean workpiece down to bare metal.
Make certain that fill material and Electrode are clean and free from oil, coatings, and other residues.

Stick Weld - Burn-Through - Base material melts away, leaving a hole in the weld.

POSSIBLE CAUSES AND SOLUTIONS

TOP VIEW



1. **Workpiece overheating:**
   Reduce current.
2. **Welding speed too slow:**
   Increase welding speed and ensure that welding speed is kept steady.
3. **Excessive material at weld:**
   Reduce amount of fill material.

Maintenance and Service

⚠WARNING

TO PREVENT SERIOUS INJURY, FIRE AND BURNS:
Unplug the Welder, rest the TIG Torch on a heat-proof, electrically non-conductive surface, and allow all parts of the Welder to cool thoroughly before service.

1. **BEFORE EACH USE,** inspect the general condition of the welder. Check for:
   - loose hardware,
   - misalignment or binding of moving parts,
   - damaged cord/electrical wiring,
   - frayed or damaged cables,
   - cracked or broken parts, and
   - any other condition that may affect its safe operation.
2. **PERIODICALLY,** clean dust, dirt, grease, etc. from your welder.
3. **EVERY SIX MONTHS**, have a qualified technician unplug the Welder, remove the Back Housing, and using compressed air, blow out all dust from the interior.
4. Replace power cord, ground cable, ground clamp, or Electrode Holder assembly when damaged or worn.
5. **AFTER EVERY USE,** Store in a clean and dry location. The welder should be cleaned before storage and sealed in a plastic bag.

Troubleshooting

IMPORTANT!

Be CERTAIN to shut off the Welder, disconnect it from power, and discharge the Electrode Holder to ground before adjusting, cleaning, or repairing the unit.

Problem	Possible Causes	Likely Solutions
When Switched On Power Indicator Lights, But Welder Does Not Function	1. Tripped thermal protection device.	1. If Thermal Overload Indicator is illuminated, keep power on and allow internal fan to cool the welder. When light goes out, you may continue to weld. Reduce duration or frequency of welding periods to help reduce wear on the welder. Refer to Duty Cycle (Duration of Use) on page 11.
	2. Ground Clamp not attached to workpiece.	2. Attach Ground Clamp to workpiece.
When Switched On Power Indicator Does Not Light	1. Unit is not connected to outlet properly.	1. Verify the voltage at the outlet and the connection to the outlet.
	2. Outlet is unpowered.	2. Check circuit breaker/GFCI devices. If any are tripped, determine and remedy cause before resetting.
	3. Circuit supplies insufficient input voltage or amperage.	3. Verify that the circuit is designed to supply the required input amperage as detailed in Specifications on page 7.
	4. Circuit breaker has tripped due to high input amperage.	4. Press Reset Button to reset circuit breaker.
Weak Arc Strength	1. Incorrect line voltage.	1. Check the line voltage and, if insufficient, have a licensed electrician remedy the situation.
	2. Improper gauge or length of cord.	2. Do not use an extension cord on this Welder. Use only one of the supplied power cords for this Welder or an identical replacement cord.
Welding Arc Not Stable.	1. Loose Electrode Holder cable or ground cable.	1. Check to ensure that all connections are tight.
	2. Damaged Electrode Holder or loose connection within Electrode Holder.	2. Have a qualified technician inspect and repair/replace as necessary.
	3. Adjust current setting.	3. Make sure setting matches recommended setting on chart.
Thermal Overload Light it on.	1. Internal Fan not working.	1. Have a qualified technician inspect and repair/replace as necessary.
	2. Bad Ventilation.	2. Improve ventilation in welding area.
	3. Not observing Duty Cycle.	3. Welder will automatically shut down if it over-heats. Allow internal fan to cool Welder and when Thermal overload light extinguishes, you may continue welding.
Internal Fan not working.	Fan broken.	Have a qualified technician inspect and repair/replace as necessary.

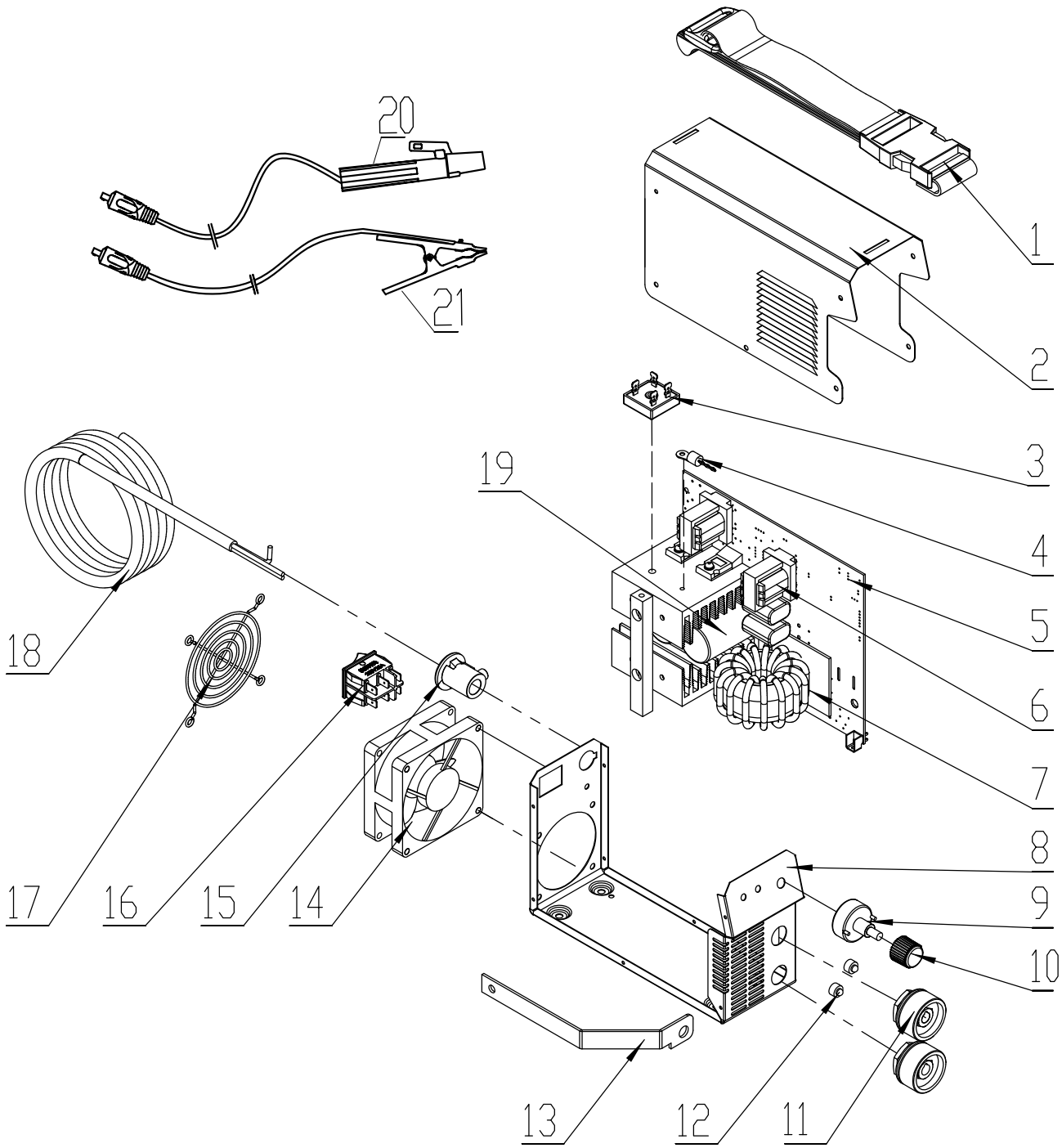
Follow all Safety precautions whenever diagnosing or servicing the tool. Disconnect power supply before service.

Parts List and Diagram

Part	Description	Qty
1	Belt	1
2	Case	1
3	Rectifier	1
4	NTC Resistance	1
5	Main Control Board	1
6	Power Transformer	1
7	Main Transformer	1
8	Front & Back Panel	1
9	Potentiometer	1
10	Knob	1
11	Connector	2

Part	Description	Qty
12	Light	2
13	Bar	1
14	Fan	1
15	Power Cable Holder	1
16	Switch	1
17	Fan Cover	1
18	Power Cable	1
19	Capacitor	4
20	Electrode Holder	1
21	Ground Clamp	1

Assembly Diagram



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Note: If product has no serial number, record month and year of purchase instead.

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This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

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