

SECTION 1 – SAFETY PRECAUTIONS - READ BEFORE USING

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1-1. Symbol Usage



Means Warning! Watch Out! There are possible hazards with this procedure! The possible hazards are shown in the adjoining symbols.

▲ Marks a special safety message.

☞ Means "Note"; not safety related.



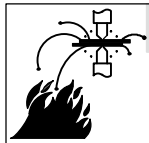
This group of symbols means Warning! Watch Out! possible ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

1-2. Resistance Spot Welding Hazards

▲ The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-4. Read and follow all Safety Standards.

▲ Only qualified persons should install, operate, maintain, and repair this unit.

▲ During operation, keep everybody, especially children, away.



SPOT WELDING can cause fire.

Sparks can fly off from the weld. The flying sparks, hot workpiece, and hot equipment can cause fires, burns, and explosions.

- Protect yourself and others from flying sparks and hot metal.
- Do not spot weld where flying sparks can strike flammable material.
- Remove all flammables within 35 ft (10.7 m) of the weld. If this is not possible, tightly cover them with approved covers.
- Be alert that welding sparks can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Do not spot weld on closed containers such as tanks or drums.
- Do not weld where the atmosphere may contain flammable dust, gas, or liquid vapors (such as gasoline).
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.
- After completion of work, inspect area to ensure it is free of sparks, glowing embers, and flames.
- Do not exceed the equipment rated capacity.
- Use only correct fuses or circuit breakers. Do not oversize or bypass them.

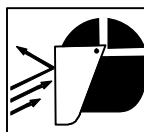


ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The input power circuit and machine internal circuits are also live when power is on. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Disconnect input power before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).

- Properly install and ground this equipment according to this manual and national, state, and local codes.
- Check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet – always double-check the supply ground before applying power.
- When making input connections, attach the grounding conductor first – double-check connections.
- Keep cords dry, free of oil and grease, and protected from hot metal and sparks.
- Frequently inspect input power cord and ground conductor for damage or bare wiring – replace immediately if damaged – bare wiring can kill. Check ground conductor for continuity.
- Turn off all equipment when not in use.
- For water-cooled equipment, check and repair or replace any leaking hoses or fittings. Do not use any electrical equipment if you are wet or in a wet area.
- Use only well-maintained equipment. Repair or replace damaged parts at once.
- Wear a safety harness if working above floor level.
- Keep all panels, covers, and guards securely in place.



FLYING SPARKS can cause injury.

Very often sparks fly off from the joint area.

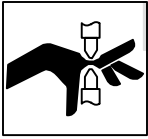
- Wear approved face shield or safety goggles with side shields.
- Wear protective garments such as oil-free, flame-resistant leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap. Synthetic material usually does not provide such protection.
- Protect others in nearby areas by using approved flame-resistant or noncombustible fire curtains or shields. Have all nearby persons wear safety glasses with side shields.



HOT METAL can cause burns.

Wear gloves or allow cooling period before servicing tongs or tips.

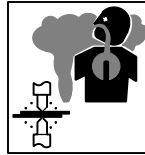
- Always wear welding-type, insulated gloves when using this equipment.
- Do not touch workpiece, tips, or tongs with bare hands.
- Allow tongs and tips to cool before touching.



MOVING PARTS can cause injury.

The tong tips, tongs, and linkages move during operation.

- Keep away from moving parts.
- Keep away from pinch points.
- Do not put hands between tips.
- Keep all guards and panels securely in place.
- OSHA and/or local codes may require additional guarding to suit the application.



FUMES can be hazardous.

Coatings, cleaners, paints, and platings can produce fumes when welded. Breathing these fumes can be hazardous to your health.

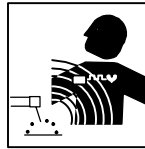
- Do not breathe the fumes.
- If inside, ventilate the area and/or use exhaust at the weld to remove fumes.
- In confined spaces, use an approved air-supplied respirator.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, or if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.
- Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, coatings, and cleaners.

1-3. Additional Symbols For Installation, Operation, And Maintenance



FIRE OR EXPLOSION hazard.

- Do not install or place unit on, over, or near combustible surfaces.
- Do not install or operate unit near flammables.
- Do not overload building wiring – be sure power supply system is properly sized, rated, and protected to handle this unit.



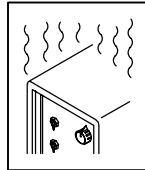
MAGNETIC FIELDS can affect pacemakers.

- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near resistance spot welding operations.



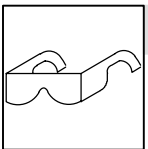
FALLING EQUIPMENT can cause injury.

- Use equipment of adequate capacity to lift the unit.
- Have two people of adequate physical strength lift portable units.
- Secure unit during transport so it cannot tip or fall.



OVERUSE can cause OVERHEATING.

- Allow cooling period; follow rated duty cycle.
- Reduce duty cycle before starting to weld again.



FLYING METAL or DIRT can injure eyes.

- Wear approved safety glasses with side shields or wear face shield.

1-4. Principal Safety Standards

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami FL 33126

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

Safe Practices For Occupation And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting And Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

1-5. EMF Information

Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields

Welding current will cause electromagnetic fields. There has been and still is some concern about such fields. However, after examining more than 500 studies spanning 17 years of research, a special blue ribbon

committee of the National Research Council concluded that: "The body of evidence, in the committee's judgment, has not demonstrated that exposure to power-frequency electric and magnetic fields is a human-health hazard." However, studies are still going forth and evidence continues to be examined.