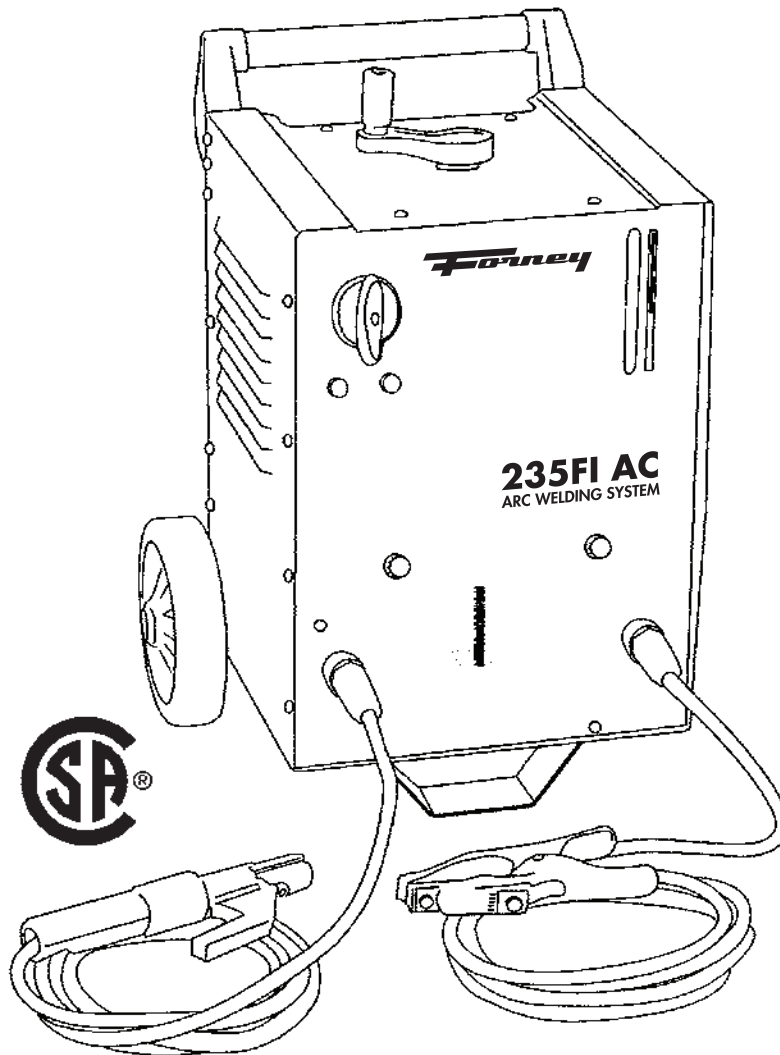




235FI AC & 235FI AC/DC ARC WELDING SYSTEM  
**SAFETY & OPERATING  
INSTRUCTION MANUAL**



FOR YOUR SAFETY . . .  
PLEASE READ CAREFULLY!

# Table of Contents

	<b>page</b>
Introduction .....	1
Safety Profile .....	1
Safety Information .....	1
Safety Symbols .....	1
General Welding Safety Instructions .....	3
Location .....	3
Personal Protection .....	3
Safety Instructions .....	3
Fire Prevention .....	3
Ventilation .....	4
Electromagnetic Compatibility .....	4
Health Hazards .....	4
Electric Shock .....	4
Welder Specifications .....	5
Welder Operating Characteristics .....	5
Specifications for 235FI AC Arc (SMAW) Welding System (1443-0404) .....	6
Specifications for 235FI AC/DC Arc (SMAW) Welding System (1443-0406) .....	6
Welder Installation .....	7
Power Source Connection .....	7
Power Requirements .....	7
Connection to Power Source .....	7
Welder Assembly .....	7
ARC Welding .....	8
Machine Operation .....	9
AC Output Connections (235FI AC and 235FI AC/DC) .....	9
DC Output Operations (235FI AC/DC) .....	9
Selecting AC or DC Welding Output .....	9
AC Current Welding .....	9
Direct Current Welding .....	10
Adjusting Amperage/Increasing Amperage .....	10
Lowering the Amperage .....	10
Preparations for Welding .....	10
Welding Positions .....	11
Preparing the Joint .....	11
Ground Clamp Connection .....	12
Selecting the Electrode .....	12
High vs. Low Voltage Electrodes .....	12
Selecting the Proper Amperage .....	13
Welding Parameters .....	13
AC Welding .....	13
DC Straight Polarity Welding .....	14
DC Reverse Polarity Welding .....	14
Striking the Arc .....	15
Learning to Weld .....	15
Arc Welding Techniques .....	15
Types of Commonly Used Weld Beads .....	16
Stringer Bead .....	16
Weave Bead .....	16
Finishing the Bead .....	16

Special Applications .....	17
Burning Holes .....	17
Cutting .....	17
Recognizing Metals .....	17
Magnetic Test .....	17
Color Test .....	18
Spark Test .....	18
Additional Safety Information .....	18
Maintenance and Troubleshooting .....	20
Spare Parts List (AC).....	21
Spare Parts List Diagram (AC) .....	22
Wiring Diagram (AC) .....	23
Spare Parts List (AC/DC) .....	24
Spare Parts List Diagram (AC/DC).....	25
Wiring Diagram (AC/DC) .....	26
Forney Limited Warranty .....	27

### Table of Illustrations

	<b>page</b>
Figure 1: Wheel and Handle Installation .....	8
Figure 2: Welding Positions.....	11
Figure 3: Workpiece Preparation .....	11
Figure 4: Shielded Metal Arc Welding .....	12
Figure 5: Bead Heat Requirement Samples.....	13
Figure 6: Weld Angles .....	15
Figure 7: Weld Appearance.....	15
Figure 8: Stringer Bead .....	16
Figure 9: Weave Bead.....	16
Figure 10: Triple Pass Cutaway.....	17
Figure 11: Triple Pass Welds .....	17
Figure 12: 235FI AC Parts Breakdown.....	22
Figure 13: 235FI AC Wiring Diagram .....	23
Figure 14: 235FI AC/DC Parts Breakdown .....	25
Figure 15: 235FI AC/DC Wiring Diagram.....	26

# INTRODUCTION

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This User's Guide provides specific information about your Forney Welding System. This guide provides pertinent information needed to safely and effectively use your Forney Welding System. The information in this manual applies to specific Forney Welding System models. It gives instructions on set-up, installation and actual use of your Forney Welding System.

## SAFETY PROFILE

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Tradesmen respect the tools and equipment with which they work. They are also aware that tools and equipment are dangerous if used improperly or abused.

Read this guide prior to using your welding system. It enables you to do a better and safer job. You will also learn the machine's application, limitations and the specific potential hazards related to welding.

## SAFETY INFORMATION

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The following safety information is provided to you as a guideline. Use it to operate your new Forney Welding System under the safest possible conditions. Any equipment that uses electrical power is potentially dangerous to use when the safety or safe handling instructions are not known and/or are not followed. This safety information gives you the necessary information for safe use and operation.

Items in this manual that significantly affect safety are identified with the following headings. Please read and understand this manual. Pay special attention to items identified with these headings.

**⚠WARNING** - Means there is a possibility of injury or death to yourself or others if the proper safety precautions are not followed.

**⚠CAUTION** - Means there is the possibility of damage to the Forney Welding System or other property.

**NOTICE** - Indicates points of interest for more efficient and convenient installation or operation. It may be used before or after a procedure to highlight or better explain the step.

**READ ALL SAFETY AND WARNING INSTRUCTIONS CAREFULLY** before attempting to install, operate or service this welding unit. Your failure to comply with the instructions could result in personal injury and/or property damage.

**⚠ IMPORTANT ⚠ RETAIN THESE INSTRUCTIONS FOR YOUR FUTURE REFERENCE.**

## SAFETY SYMBOLS

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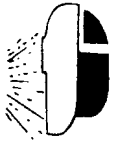
Familiarize yourself with the warning symbols listed on the following pages. These symbols identify important safety messages in this manual. When you see one of these symbols, be alert to the possibility of personal injury and carefully read the message that follows.



Indicates that the possibility of electric shock hazard exists during the operation of the step(s) that follow.



Indicates that the possibility of fire hazard exists during the operation of the step(s) that follow.



Indicates that the helmet must be worn during the step(s) that follow to protect against eye damage and burns due to flash hazard.



Indicates that the possibility of toxic gas hazard exists during operation of the step(s) that follow.



Indicates that the possibility of being burned by hot slag exists during operation of the step(s) that follow.



Indicates that eye protection should be worn to protect against flying debris in the following step(s).



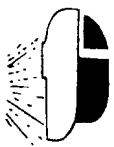
Indicates that the possibility of injury or death exist due to improper handling and maintenance of compressed gas cylinders or regulators.



**ELECTRIC SHOCK CAN KILL!** Reduce the risk of death or serious injury from shock. Read, understand and follow the following safety instructions. Additionally, make certain that anyone else who uses this welding equipment, or who is a bystander in the welding area, understands and follows these safety instructions as well.



**FIRE OR EXPLOSION CAN CAUSE DEATH, INJURY AND PROPERTY DAMAGE!** Reduce the risk of death, injury or property damage from fire or explosion. Read, understand and follow the following safety instructions. Additionally, make certain that anyone else who uses this welding equipment, or who is a bystander in the welding area, understands and follows these safety instructions as well. Remember, welding by nature produces sparks, hot spatter, molten metal drops, hot slag and hot metal parts that can start fires, burn skin and damage eyes.



**ARC RAYS CAN INJURE EYES AND BURN SKIN!** Reduce the risk of injury from arc rays. Read, understand and follow the following safety instructions. Additionally, make certain that anyone else who uses this welding equipment, or who is a bystander in the welding area, understands and follows these safety instructions as well.



**FUMES, GASSES AND VAPORS CAN CAUSE DISCOMFORT, ILLNESS AND DEATH!** Reduce the risk of discomfort, illness or death. Read, understand and follow the following safety instructions. Additionally, make certain that anyone else who uses this welding equipment, or who is a bystander in the welding area, understands and follows these safety instructions as well.



IMPROPER HANDLING AND MAINTENANCE OF COMPRESSED GAS CYLINDERS AND REGULATORS CAN RESULT IN SERIOUS INJURY OR DEATH! Reduce the risk of injury or death from compressed gasses and equipment hazards. Read, understand and follow the following safety instructions. Additionally, make certain that anyone else who uses this welding equipment, or who is a bystander in the welding area, understands and follows these safety instructions as well.

## **GENERAL WELDING SAFETY INSTRUCTIONS**

---

### **LOCATION**

**⚠WARNING** Welding processes of any kind can be dangerous not only to the operator but to any person situated near the equipment, if safety and operating rules are not strictly observed.

### **PERSONAL PROTECTION**

1. **⚠WARNING** Wear closed, non-flammable protective clothing, without pockets or turned up trousers and protective gloves for welding.
2. Wear a non-flammable welding helmet to shield the neck, face and sides of the head. Keep the protective lens clean. Replace the protective lens if broken or cracked. Position a transparent glass between the lens and the welding area. Weld in a closed, well ventilated area that does not open into other working areas.
3. **NEVER** look at the arc without proper protection to the eyes.
4. Thoroughly clean metal of rust or paint to avoid producing harmful fumes. Parts degreased with a solvent must dry before welding.
5. **NEVER** weld on metals or coated metals containing zinc, mercury, chromium, graphite, lead, cadmium or beryllium unless the operator and the people standing in the same area use an air-supplied respirator.

### **SAFETY INSTRUCTIONS**

For your safety, **BEFORE** connecting the power source to the line, follow these instructions. If you are not qualified to make these changes, a trained electrician is recommended:

1. Insert an adequate two-pole switch, equipped with time-delay fuses, before the main outlet.
2. Make the single-phase connection with a two-pole plug compatible with the above mentioned socket.
3. The two wires of the two-pole input cable are used for the connection with the single-phase line. The yellow/green wire is for the compulsory connection to the ground in the welding area.
4. When working in a confined space, keep the power source outside the welding area and fix the ground cable to the workpiece. **NEVER** work in a damp or wet area.
5. **DO NOT** use damaged input or welding cables.

**⚠WARNING** **NEVER** operate the power source without its panels in place. This could cause serious injury to the operator and could damage the equipment.

### **FIRE PREVENTION**

Welding operations use fire or combustion as a basic tool.

1. The work area **MUST** have a fireproof floor.
2. Work benches or tables used during welding operations **MUST** have fireproof tops. **DO NOT** weld on wooden work benches.
3. Use heat-resistant shields or other approved material to protect nearby walls or unprotected flooring from sparks and hot metal.
4. Keep an approved fire extinguisher of the proper size and type in the work area. Inspect it regularly to ensure that it is in proper working order. Know how to use the fire extinguisher.

5. Remove all combustible materials from the work site. If you can not remove them, protect them with fire-proof covers.

**⚠️WARNING NEVER** perform welding operations on a container that has held toxic, combustible or flammable liquids or vapors. **NEVER** perform welding operations in an area containing combustible vapors, flammable liquids or explosive dust.

## VENTILATION



**⚠️WARNING** Ventilate welding work areas adequately. Maintain sufficient air flow to prevent accumulation of explosive or toxic concentrations of gases. Welding operations using certain combinations of metals, coatings and gases generate toxic fumes. Use respiratory protection equipment in these circumstances. **BEFORE** welding, read and understand the Material Safety Data Sheet for the welding alloy.

## ELECTROMAGNETIC COMPATIBILITY

**BEFORE** installing an Arc power source, inspect the surrounding area checking the following points:

1. Make sure there are no other power supply cables, control lines, telephone cables or other devices close to the power source.
2. Make sure that telephones, televisions, computers or other control systems are not in the working area.
3. People with pace-makers or hearing aides should keep far from the power source. In particular cases, special protection measures may be required.

Reduce interference by following these suggestions:

1. If there is interference in the power source line, mount an E.M.T. filter between the power supply and the power source.
2. Shorten the output cables of the power source, keep them together and connected to ground.
3. Securely fasten the panels of the power source in place after performing maintenance.

## HEALTH HAZARDS

The welding process can be hazardous to your health. Therefore, follow these precautions:

1. **ALWAYS** wear protective clothing without pockets and cuffs. Wear a helmet, gloves and shoes with an insulating sole.
2. **ALWAYS** use a welding mask or helmet with the properly tinted protective glass in the shade adequate to the welding operation being performed and to the current intensity.
3. Make certain that bystanders in the welding area are also following these precautions.
4. **ALWAYS** keep the welding mask glass clean. Replace it if it is cracked or chipped.
5. **NEVER** weld in a damp area or come in contact with a moist or wet surface when welding.
6. If the welding area lacks proper ventilation, use fume extractors. Avoid continuous inhalation of welding fumes.
7. Clean the welding pieces from solvents or greases which develop toxic gases when exposed to heat.

## ELECTRIC SHOCK



**⚠️WARNING ELECTRIC SHOCK CAN KILL!** Reduce the risk of death or serious injury from shock. Read, understand and follow **ALL** safety instructions. Be sure that everyone who uses this welding equipment or who is a bystander in the welding area understands and follows **ALL** safety instructions as well.



**⚠WARNING** **ELECTRIC SHOCK CAN BE FATAL.** A person qualified in First Aid techniques should **ALWAYS** be present in the working area. If a person is unconscious and electric shock is suspected, **DO NOT** touch the person if he or she is in contact with cables. Disconnect power from the machine, then use First Aid. Use dry wood or other insulating materials to move cables, if necessary, away from the person.

1. Never touch or come in physical contact with any part of the input current circuit and welding current circuit.
2. Frequently, check that the input cable and plug are in good condition.
3. Make sure that the welder is disconnected from the main power supply **BEFORE** attempting any repairs, opening the side panels of the machine or repairing the input cable.
4. Fit the main line, **BEFORE** the distribution outlet, with a three-poles switch with adequate delayed fuses (check the characteristics plate for fuse values).
5. **DO NOT** weld with cables, torch or earth clamp in poor shape.
6. **DO NOT** coil the torch or the earth cables around your body.
7. Should you feel the slightest electrical shock, **STOP** welding **IMMEDIATELY**. **DO NOT** use the welder until the fault is found and resolved.

## **WELDER SPECIFICATIONS**

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Your new Forney ARC (SMAW) Welding System is designed for maintenance and sheet metal fabrication. The unit consists of a single-phase power transformer power source and arc stabilizer. This welding power source is capable of welding with mild steel electrodes.

This unit is also capable of welding with high carbon steel, special alloy steel, cast iron, and nonferrous, such as aluminum. The electrode material should correspond with the workpiece metal.

Flux coatings are made for use with either AC (Alternating Current), DC (direct current) reverse polarity, or DC straight polarity, although some function well on both AC and DC current.

Please refer to the instructions provided in this manual for proper machine setup.

## **WELDER OPERATING CHARACTERISTICS**

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The duty rating defines how long the welding system can be used before it must pause and cool down. Duty Cycle ratings are expressed as a percentage of a ten-minute period. It represents the maximum welding time allowed at the specified amperage setting. The remaining balance of a ten-minute period is required for cooling off the unit.

Forney 120 volt and 230 volt Welding Systems have duty cycle ratings based on 20 amp and 50 amp input currents. Please refer to the data plate located on the front of the unit for the specific rating that applies to your unit.

All Forney 230 volt Welding Systems are rated at the required input amperage for proper operation. Please refer to the data plate located on the front of the unit for the specific rating that applies to your unit.



## **SPECIFICATIONS FOR 235FI AC ARC (SMAW) WELDING SYSTEM**

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Type	.235 Amp ARC Welding System
Input Voltage	.230 Volt (60Hz)
Rated Output	.235 Amps @ 20% Duty Cycle
Agency Listing	.CSA Rated 200 Amps @ 20% Duty Cycle
Maximum Output	.235 Amps AC Peak
Output Power Settings	.Shunt (45-235 Amps)
Power Switch	.Illuminated On/Off Switch
Power Cord	.6 Ft Power Cord with Plug
Welding Lead	.10 Ft Welding Cable and 300 Amp Electrode Holder
Ground Cable & Clamp	.10 Ft Ground Cable and 300 Amp Work Clamp
Ground Cable Connection	.Fixed Connection
Accessories	.Wheel Kit and Handle (Optional) Instruction Manual

## **SPECIFICATIONS FOR 235FI AC/DC ARC (SMAW) WELDING SYSTEM**

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Type	.235 Amp AC/DC ARC Welding System
Input Voltage	.230 Volt (60Hz)
Rated Output	.235 Amps @ 20% Duty Cycle
Agency Listing	.CSA Rated 200 Amps @ 20% Duty Cycle AC CSA Rated 135 Amps @ 35% Duty Cycle DC
Maximum Output	.230 Amps AC Peak / 185 Amps DC Peak
Output Power Settings	.Shunt (45-235 Amps)
Power Switch	.Illuminated On/Off Switch
Power Cord	.6 Ft Power Cord without Plug
Welding Lead	.10 Ft Welding Cable and 300 Amp Electrode Holder
Ground Cable & Clamp	.10 Ft Ground Cable and 300 Amp Work Clamp
Ground Cable Connection	.Dinse Connection
Accessories	.Wheel Kit and Handle (Optional) Instruction Manual

# WELDER INSTALLATION

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## POWER SOURCE CONNECTION

---

### Power Requirements

235FI AC and 235FI AC/DC requires 230 Volt, 60 Hz, single phase AC with a 50 amp delayed fuse or circuit breaker. Please consult local codes for proper plug and receptacle applications. A qualified electrician should verify the **ACTUAL VOLTAGE** at the receptacle into which the welder will be plugged and confirm that the receptacle is properly grounded. The use of the proper circuit size can eliminate the nuisance of circuit breaker tripping when welding.

**DO NOT OPERATE THE 235FI AC OR 235FI AC/DC WELDER** if the ACTUAL power source voltage is less than 220 Volts AC or greater than 240 Volts AC. Contact a qualified electrician if this problem exists. Improper performance and/or damage to the welder will result if operated on inadequate or excessive power.

### Connection to Power Source

**⚠WARNING** High voltage danger from power source! Consult a qualified electrician for proper installation of receptacle at the power source.

This welder must be grounded while in use to protect the operator from electrical shock. If you are not sure if your outlet is properly grounded, have it checked by a qualified electrician. **DO NOT** cut off the grounding prong or alter the plug in any way. **DO NOT** use any adapters between the welder's power cord and the power source receptacle.

**⚠CAUTION** Make sure the POWER switch is OFF. Connect the 235FI AC / 235FI AC/DC to a properly grounded 230 VAC, single-phase outlet. Contact a qualified electrician if a problem exists. Improper performance and/or damage to the welder results if operated on inadequate or excessive power.

## WELDER ASSEMBLY

---

The following steps describe the assembly, installation, maintenance and operations of your new welder.



**⚠CAUTION** Be sure that the welder's electrical power supply cord is not connected while performing this procedure.

**⚠CAUTION** Avoid contacts with wires or parts. **DO NOT** work with the panels partially opened or removed completely from the power source.

1. Tools required: Hammer, Flat Head Screwdriver, Allen Wrench (metric)

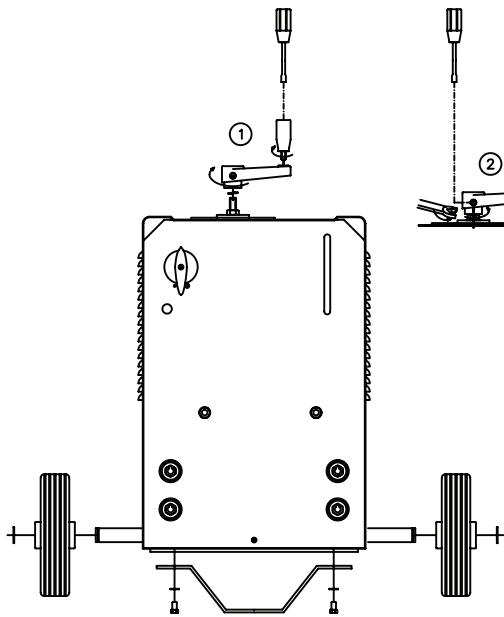


Figure 1

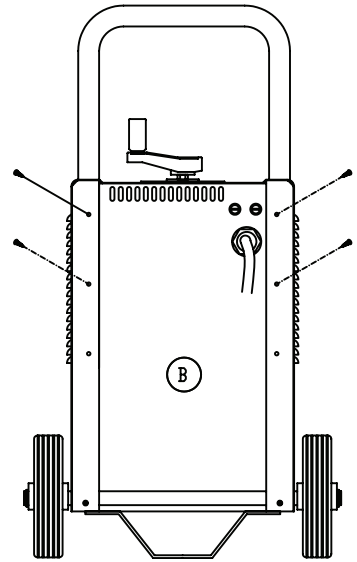
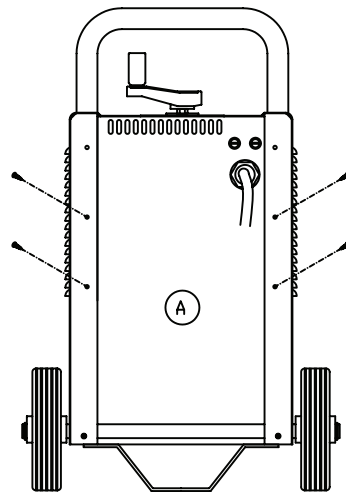


Figure 2

Wheel and Handle Installation (Optional - Must be purchased separately)

2. Slide the axle through the opening in the bottom of the welder cabinet. Insert axle into wheels. Use a hammer to attach pal nuts on the axle by simply tapping them into position.
3. Assemble the handle as shown in Figure 2. It can be placed in 2 different positions.
4. Amperage Adjustment Handle - Thread handle onto shunt control shaft at the top of the machine until it contacts locking nut (Be sure to install lock washer first). Thread crank handle into shunt handle. Tighten with a flat blade screwdriver. Tighten lock nut against handle. Then, tighten the set screw.
5. Place the power source in a well ventilated area. **DO NOT** obstruct the air intake and output vents. A reduced air flow can cause a reduced duty cycle and damage internal components.
6. Insure at least 6 feet of open space on each side of the welder.

## ARC WELDING

ARC (SMAW - Shielded Metal-Arc Welding) welding metals are bonded by heating them with an electric arc created between the electrode and the workpiece. There are two parts to electrodes used for SMAW welding. 1)The inner core is a metal rod or wire that should be similar in composition to the base metal. 2)The outer coating is called flux. There are various types of flux and each coating is used for a particular welding situation.

When the metal is molten, it can be contaminated by elements in the air. Because this contamination could weaken the weld, the flux coating creates a protective barrier called slag that protects the molten metal from contaminants.

When current (amperage) flows through the circuit to the electrode, an arc is formed between the end of the electrode and the workpiece. The arc melts the electrode and the workpiece. The melted metal of the electrode flows into the molten crater and forms a bond with the workpiece.

There are five basic choices you must make that affect your weld quality:

1. Electrode selection
2. Current setting
3. Weld angle
4. Arc length
5. Travel speed

**IMPORTANT** ONLY experienced personnel should use the power sources.

# MACHINE OPERATION

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## AC OUTPUT CONNECTIONS (235FI AC AND 235FI AC/DC)

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This welder has two AC outlet plugs that are clearly marked with the electrode and ground clamp symbols.

**⚠CAUTION NEVER** reverse cable connections as this could cause injury to the user as well as the equipment!)

Connect the electrode output cable to the electrode connections and the ground cable to the ground connection. These connections are Dinse type connections and require that they be twisted into place in order to insure the best connection. A slight twist is fine. You are now able to weld with 30 to 235 Amps of AC Power. The open circuit voltage of the AC connections is approximately 72 Volts.



**⚠WARNING ELECTRIC SHOCK CAN KILL!** Reduce the risk of death or serious injury from shock. Read, understand and follow **ALL** safety instructions. Be sure that everyone who uses this welding equipment or who is a bystander in the welding area understands and follows **ALL** safety instructions as well.



**⚠WARNING ELECTRIC SHOCK CAN BE FATAL.** A person qualified in First Aid techniques should **ALWAYS** be present in the working area. If a person is unconscious and electric shock is suspected, **DO NOT** touch the person if he or she is in contact with commands. Disconnect power from the machine, then use First Aid. Use dry wood or other insulating materials to move cables, if necessary, away from the person.

## DC OUTPUT CONNECTIONS (235FI AC/DC)

---

If you have purchased the 235FI AC/DC Model, it has two DC outlet plugs marked DC+ and DC-. These plugs can be connected in either the DC direct current position or in the DC reverse polarity position. The DC connectors are Dinse type connections and require a slight twist in order to insure the best possible connection. The open circuit voltage of the DC connectors is approximately 72 Volts.



**⚠WARNING ELECTRIC SHOCK CAN KILL!** Reduce the risk of death or serious injury from shock. Read, understand and follow **ALL** safety instructions. Be sure that everyone who uses this welding equipment or who is a bystander in the welding area understands and follows **ALL** safety instructions as well.



**⚠WARNING ELECTRIC SHOCK CAN BE FATAL.** A person qualified in First Aid techniques should **ALWAYS** be present in the working area. If a person is unconscious and electric shock is suspected, **DO NOT** touch the person if he or she is in contact with commands. Disconnect power from the machine, then use First Aid. Use dry wood or other insulating materials to move cables, if necessary, away from the person.

## SELECTING AC OR DC WELDING OUTPUT

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The use of the proper type of welding current is determined by the type of repair that needs to be made.

## AC CURRENT WELDING

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Alternating current (AC) welding is performed when the welding cables are connected to the AC electrode and ground jacks. This type of welding current is ideal for heavy plate steel in flat position welding.

Most AC welding operations will be general purpose work on mild steel utilizing AWS rated 6011 and 7018 type electrodes.

# **DIRECT CURRENT WELDING**

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Direct current DC welding is performed when the welding cables are connected to the DC+ (Positive) and DC- (Negative) output receptacles. The 235FI AC/DC offers you two DC welding options, straight or reverse polarity.

To weld with straight polarity place the electrode cable plugged into the receptacle marked DC negative and the ground cable or work cable plugged into the receptacle marked DC positive.

**STRAIGHT POLARITY DC** welding is ideal for:

- Cutting steel;
- Hardfacing work;
- Build up work for heavy deposits.

Reverse current DC welding is performed with the electrode cable plugged into the receptacle marked DC positive and the ground cable or work cable plugged into the receptacle marked DC negative.

**REVERSE POLARITY DC** welding is ideal for:

- Overhead welding;
- Vertical welding;
- Cast Iron welding;
- Heavy Aluminum welding;
- Rivet welding;
- Sheet Metal welding;
- Low Hydrogen Electrode welding;
- Arc Bronze Electrode welding.

Most DC welding processes are performed in the reverse polarity position.

## **ADJUSTING AMPERAGE/INCREASING AMPERAGE**

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Simply crank the amperage adjustment handle on top of welder clockwise. As you crank the handle you will see the amperage indicator located in the sight glass on the amperage setting scale move upward increasing the amperage. Stop cranking when you have reached the desired amperage range.

### **LOWERING THE AMPERAGE**

Simply crank the amperage adjustment handle on top of welder counter clockwise. As you crank the handle you will see the amperage indicator located in the sight glass on the amperage setting scale move downward. Stop cranking when you have reached the desired amperage range.

**NOTICE** Be sure that the amperage adjustment handle is secured properly and that the screw and nut are tight. Failure to do so will result in the inability to adjust amperage. Also be careful not to over tighten the connections which could result in damage to the unit.

## **PREPARATIONS FOR WELDING**

---

Your work should be performed in a safe, comfortable and organized area. The work area should be free of all flammables with both a fire extinguisher and bucket of sand available for emergencies. To properly prepare for welding follow these simple instructions:

1. Prepare an organized well lighted work area.
2. Follow the instructions for personal protection (page 3) for yourself as well as those around you.
3. Make sure you've studied all safety instructions found at the front of this manual.
4. Set up the workpiece and make the ground clamp connection.

5. Select the appropriate electrode.
6. Turn on the power switch of your welder.



**⚠WARNING** Arc rays can injure eyes and burn skin! Prolonged exposure to arc rays can cause blindness and burns. **NEVER** strike an arc or begin welding without adequate eye and skin protection. Follow our Health Hazard safety instructions on page 4 before welding.

## WELDING POSITIONS

Arc welding can be performed from any of four basic positions

1. Flat - generally easier, faster, and allows for better penetration of the metal
2. Horizontal - generally easier, faster, and allows for better penetration of the metal
3. Vertical - usually used only when welding with DC welding capabilities
4. Overhead - considered the most difficult, usually used only when welding with DC welding capabilities

For best results, position the workpiece so that the bead will run on a flat surface.

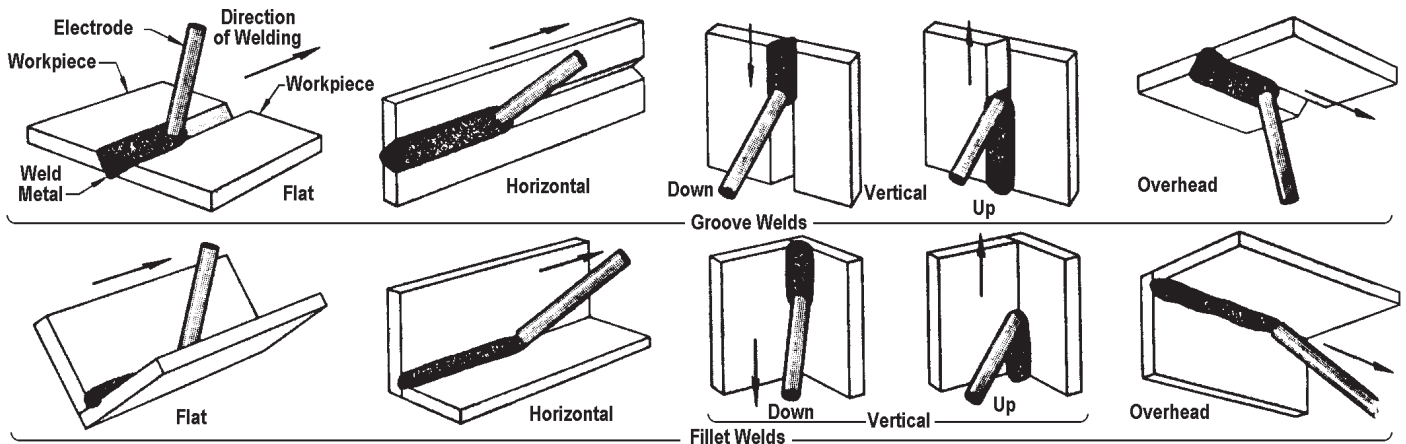


Figure 2: Welding Positions

## PREPARING THE JOINT

For the most effective welding, surfaces to be joined must be free of dirt, rust, scale, oil or paint. Welding on metals not properly cleaned will result in brittle or porous welds.

If the base metal to be joined is thick or heavy, it may be necessary to bevel the edges with a metal grinder directly at the point of contact. The angle of the bevel should be approximately 60 degrees.

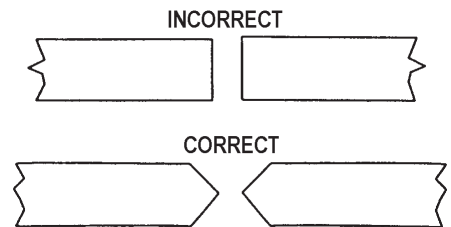


Figure 3: Workpiece Preparation



**⚠WARNING** When grinding, **ALWAYS** wear goggles and ensure machine guards are in place. The grinder **MUST** also be inspected to verify it is in good condition.

For the types of Weld Joints, see Figure 2.

During the process of welding, workpieces will become very hot and tend to expand. This expansion may cause the pieces to shift from the beginning position. If possible, workpieces should be clamped into position required when the welding is completed.

# GROUND CLAMP CONNECTION

Be certain you have a solid ground connection. The ground clamp connection is part of the current circuit. A poor connection at the ground clamp will result in wasted power and heat. Scrape away any dirt, rust, scale, oil or paint you may find on the workpiece. Make sure the ground clamp directly touches the metal surface.

## SELECTING THE ELECTRODE

Forney provides a complete set of electrodes. Check with your local dealer for more information.

Welding electrode is a rod or wire of electrically conductive metal, coated with a layer of flux. When welding, electrical current flows between the electrode or "rod" and the grounded metal workpiece. The intense heat of the arc between the rod and grounded metal melts the wire and the flux.

The rod wire joins with the base metal of the workpiece to form the weld bead. Burning Flux forms a gas shield around the arc, helping to control the flow of the fusing metals that form the weld bead.

Type and thickness of the metal and the position of the work piece determines the electrode type and the amount of heat needed to weld (see Figure 4). Heavier and thicker metals require more heat or amperage.

Although there is no hard and fast rule that determines the exact rod or heat setting required for any given situation, you can check the rod requirements by referring to the rod guide on your welder, then experiment on scrap metal.

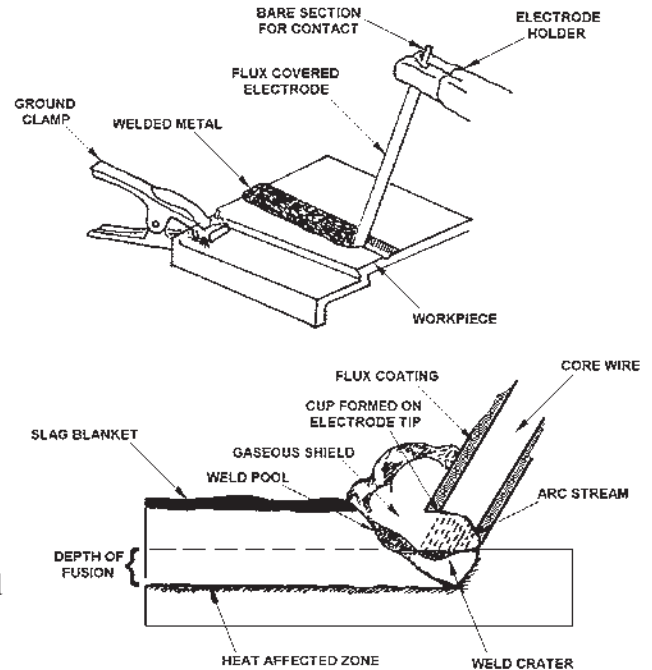


Figure 4: Shielded Metal Arc Welding

## HIGH VS. LOW VOLTAGE ELECTRODES

Be sure you have the best electrode for the welding job you are doing. Electrode manufacturers make most standard welding electrodes in two basic types:

1. Designed to run on welders with High Open Circuit Voltage.
2. Designed to run on welders with Low Open Circuit Voltage.

Most welding is done with Low Open Circuit Voltage AC rods such as E-6013 or E07014 general purpose rods. See Rod Table. Use rods of 1/16", 5/64" or 3/32" diameter.

High Open Circuit Voltage rods such as 6010, 6011, 7018, etc. will not work with most low power welders of 100 Amps or smaller.

Electrode manufacturers have adopted a uniform marking code for rods. Each electrode is marked with a prefix letter and four numbers. Each of the numbers has particular significance. For example, a commonly used general purpose electrode is marked E-6013. The E signifies the electrode is for electric arc applications.

The first two digits in the number indicate the minimum tensile strength of the deposited metal, in thousands of pounds per square inch. In this instance, 60 indicates the melting rod will have a minimum tensile strength of 60,000 p.s.i. The third number indicates the welding position for which the rod is intended. A number 1 indicates it is for use in any position.

Number 2 represents an electrode restricted to welding in horizontal and flat positions. Number 3 represents an electrode intended for use in a flat position only. The fourth digit shows some specific characteristics of the electrode such as weld quality, type of current or amount of penetration. For all practical purposes, the fourth position marking will not affect the rod you would normally purchase.

# SELECTING THE PROPER AMPERAGE

The electrode type and thickness of the metal work-piece determine the amount of heat needed in the welding process. See Figure 5 for bead examples of heat based on rod size. Heavier and thicker metals require more heat or amperage. Refer to a rod and amperage guide or experiment on scrap metal.

When you weld with proper rod your results will be:

1. Bead will lay smoothly over the workpiece without ragged edges.
2. Base metal puddle will be as deep as the bead that rises above it.

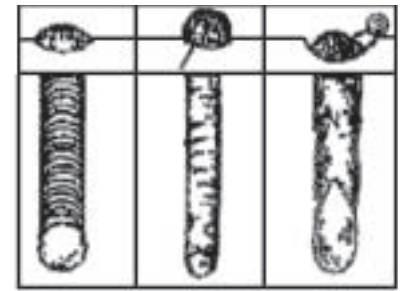


Figure 5: Bead Heat Requirement Samples

When you weld with rod that is too small your results will be:

1. Bead will be high and irregular.
2. Arc will be difficult to maintain

When you weld with rod that is too large your results will be:

1. Arc will burn through light metals.
2. Bead will undercut the work.
3. Bead will be flat and porous.
4. Rod may freeze or stick to the workpiece.

**NOTICE** The rate of travel over the workpiece affects the weld. To ensure proper penetration and enough deposit of rod, move the arc slowly and evenly along the weld seam.

# WELDING PARAMETERS

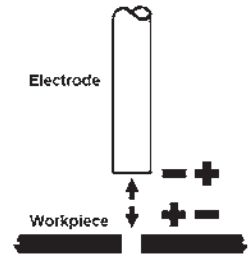
Following tables provide recommended welding parameters for various welding jobs using various welding types.

## AC WELDING

Alternating current continuously changes polarity.

### Ideal Current For:

- Down Hand Heavy Plate.
- Fast Fill.



AWS ROD NO.	USE	ROD SIZE	AMPERAGE	METAL THICKNESS
E6013 General Purpose	Down Hand	1/16"	Min. - 40 amps	Min. - 1/8"
	Mild Steel	3/32"	30 - 80 amps	1/16" - 1/4"
	General Purpose	1/8"	70 - 160 amps	1/8" - 1/2"
	Work on Mild Steel	5/32"	120 - 180 amps	1/4" - Up
E7014 General Purpose Iron Powder and All other AC Rods	New Steel Fabrication	5/64"	30 - 100 amps	Min. - 1/8"
	General Purpose	3/32"	40 - 100 amps	1/16" - 1/4"
	Build Up Worn Surfaces	1/8"	100 - 170 amps	1/8" - 1/2"
	General Purpose	5/32"	140 - 150 amps	1/4" - Up
E6011 General Purpose	Down Hand	1/8"	100 - 150 amps	1/8" - 1/2"
	Mild Steel	5/32"	120 - 170 amps	1/4" - Up
	General Purpose Work on Mild Steel			

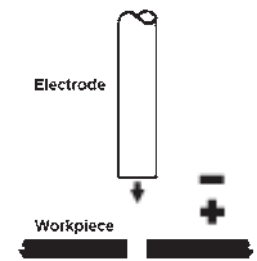


## DC STRAIGHT POLARITY WELDING

The electrode in DC straight polarity (DCSP) welding is negative and the work surface is positive. The current flow is from the electrode to the work.

### Ideal Current for:

- Hard Facing.
- Build Up - Heavy Deposits.
- Cutting Steel.



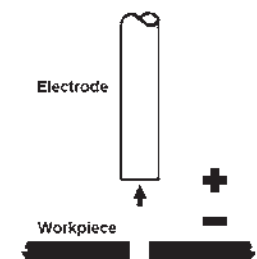
AWS ROD NO.	USE	ROD SIZE	AMPERAGE	METAL THICKNESS
R52	Hard Surface			
General Purpose	Tillage Tools Subject to Impact and Abrasion	1/8"	80 - 140 amps	1/16" - Up
R88 Tung Rod	To Resist Serious Abrasion	1/8"	70 - 90 amps	1/16" - Up
ARC CUTTING	Cutting and Drilling All Metals Drilling All Metals	1/8"	80 - Max.	1/16" - Up
E6011 Deep Penetrating		1/8" 5/32"	Maximum Dial Setting	Any Thickness
ARC GOUGING				
E6011 Deep Penetrating	Arc Gouging	5/32"	Maximum Dial	Any Thickness

## DC REVERSE POLARITY WELDING

The electrode in DC reverse Polarity (DCRP) welding is positive and the work surface is negative. The current flow is from the work to the electrode.

### Ideal Current For:

- Overhead.
- Vertical.
- Cast Iron Welding.
- Heavy Aluminum.
- Rivet Welding.
- Sheet Metal.
- Low Hydrogen Welding.
- Arc Bronze Rod.



AWS ROD NO.	USE	ROD SIZE	AMPERAGE	METAL THICKNESS
E6011 Deep Penetrating	Overhead and Vertical Welding or Rusty Metals	1/8" 5/32"	80 - 150 amps 100 - 170 amps	1/8" - 1/2" 1/4" - Up
E7018 Low Hydrogen	High Carbon Spring Steel or Cast Steel	1/8" 5/32"	80 - 140 amps 100 - 170 amps	1/8" - 1/2" 1/4" - Up
ENiCl Nickel Machineable	Cast Iron	3/32" 1/8"	50 - 70 amps 80 - 120 amps	1/16" - 1/4" 1/8" - Up
E308-16 Stainless Steel	Cast Iron Stainless Steel or Unknown Metal Max. Strength	3/32" 1/8"	50 - 100 amps 90 - 150 amps	1/16" - 1/4" 1/4" - Up

E6013	Sheet Metal	1/16"	Min. - 60 amps	Min. - 1/16"
General Purpose		3/32"	30 - 80 amps	1/16" - 1/8"
E7014	Sheet Metal	5/64"	Min. - 100 amps	Min. - 1/4"
General Purpose				
Iron Powder				

## STRIKING THE ARC



**⚠WARNING** Exposure to a welding arc is extremely harmful to the eyes and skin. Prolonged exposure can cause blindness and burns. **NEVER** strike an arc or begin welding until you have adequate protection. Wear flameproof welding gloves, heavy long sleeved shirt, cuffless trousers, high topped shoes and a welding helmet or shield.

To strike an arc, bring the tip of the rod in contact with the workpiece surface and quickly raise it until there is about 1/8 inch (3.2) gap between the rod and workpiece.

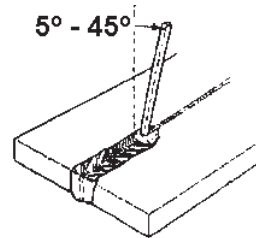
The easiest way to strike an arc is to scratch the tip of the rod (for a short distance) on the workpiece surface (as you would strike a match), then quickly lift it to the required 1/8 inch (3.2mm). It is important that the gap be maintained during the welding process and that it be neither too wide or too narrow. If the gap becomes too narrow, the electrode will freeze or stick to the workpiece.

Striking a proper arc and maintaining the gap between the electrode and the base metal takes practice. Knowing when the arc is just right is a matter of experience. A good arc is accompanied by a crisp, cracking sound.

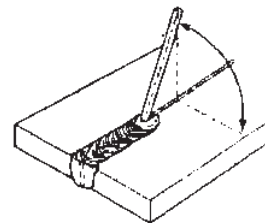
To lay a weld bead, only 2 positions are possible (see Figure 6):

1. Downward angle (work angle);
2. In the direction the weld is to be laid (travel angle).

Always watch the weld puddle to keep the slag from flowing in front of it to prevent causing inclusions and gas pockets.



Travel Angle



Work Angle

Figure 6: Weld Angles

## LEARNING TO WELD

The self taught welder learns through a process of trial and error. The best way to teach yourself how to weld is with short periods of practice at regular intervals. All practice welds should be done on scrap metal that can be discarded. **DO NOT** attempt to make any repairs on valuable equipment until you have satisfied yourself that your practice welds are of good appearance and free of slag or gas inclusions. What you fail to learn through practice will be learned through mistakes and re-welds later on.

## ARC WELDING TECHNIQUES

After learning how to establish and hold an arc, the next step is learning how to run a good bead. Probably the first attempts in practice will fall short of acceptable weld beads. Too long an arc will be held or the travel speed will vary from slow to fast (see Figure 7).

- A. Weld speed is too fast.
- B. Weld speed is too slow.
- C. Arc is too long.

A solid weld bead requires that the electrode be moved slowly and steadily along the weld seam. Moving the electrode rapidly or erratically prevents proper fusion or creates a lumpy, uneven bead.

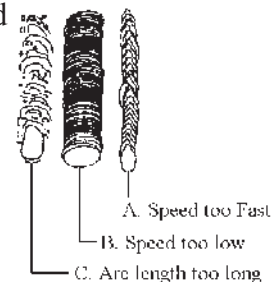
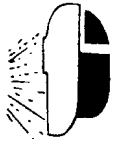


Figure 7: Weld Appearance



**⚠WARNING** Exposure to a Welding arc is extremely harmful to the eyes and skin. Prolonged exposure can cause blindness and burns. **NEVER** strike an arc or begin welding until you are adequately protected. Wear flameproof welding gloves, a heavy long-sleeved shirt, cuffless trousers, high-topped shoes and a welding helmet.



**⚠WARNING** To prevent **ELECTRIC SHOCK**, **DO NOT** perform any welding while standing, kneeling or lying directly on the grounded work.

## **TYPES OF COMMONLY USED WELD BEADS**

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The following paragraphs discuss the most commonly used arc welding beads.

### **STRINGER BEAD**

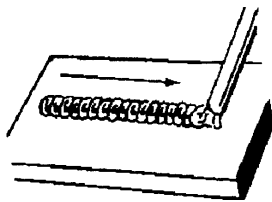


Figure 8: Stringer Bead

A string bead (see Figure 8) is formed by laying down a continuous strip of new metal in one steady, forward pass.

To lay a stringer bead:

1. Strike a short 1/8 inch (3.22 mm) arc and hold it at the starting point.
2. When a puddle is formed and the base of the bead begins to build, move the arc along the work without weaving or oscillating.
3. Hold the electrode so that the holder is always slightly ahead of the arc.
4. The action will pile the molten metal just behind the arc. If the electrode motion is smooth and even, the bead will be of consistent height and width with a uniform, closely spaced ripple.

### **WEAVE BEAD**

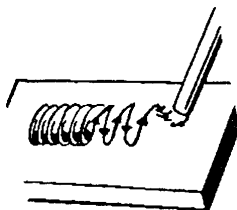


Figure 9: Weave Bead

The weave bead will deposit metal in a wider space than would normally be possible with the string bead (see Figure 9).

The weave bead is accomplished by:

- a. Weaving from one edge of the space to be filled in to the other edge.
- b. Continue this motion as well as the forward speed of travel.

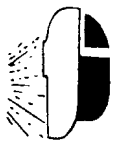
Hesitate momentarily at each edge of the weave. This will provide the same heat at the edge of the weave as in the middle.

## **FINISHING THE BEAD**

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As the coating on the outside of the electrode burns off, it forms an envelope of protective gasses around the weld. This prevents air from reaching the molten metal and creating an undesirable chemical reaction.

The burning coating, however, forms slag. Slag formation appears as an accumulation of dirty metal scale on the finished weld. The slag should be removed with a welding hammer or chisel, after it is cooled.



**⚠WARNING** Peening the slag from a weld joint causes small chips of metal to fly through the air. Metallic chips flying through the air can cause eye injury or injury to other parts of the head, hands or exposed portions of the body. Wear eye glasses with side shields and protect the hands and other exposed parts of the body with protective garments or if possible work with a shield between the body and the workpiece.

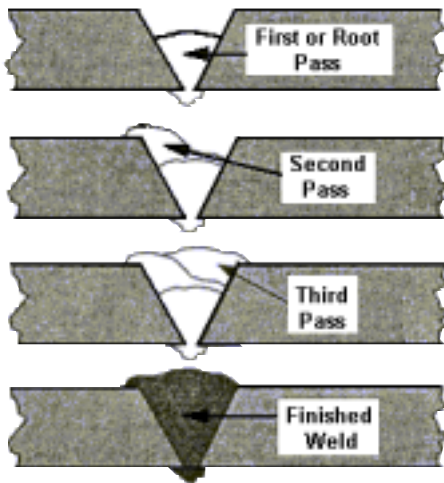


Figure 10: Triple Pass Cutaway

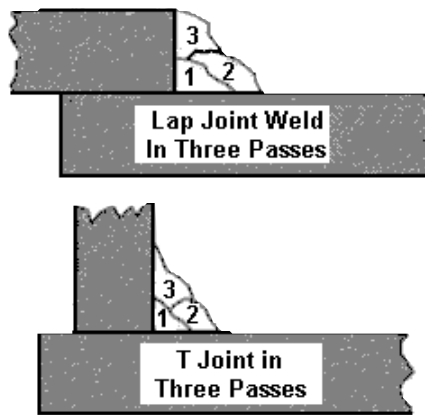


Figure 11: Triple Pass Welds

The intense heat produced at the arc sets up strains in the metal joined by welding. Peening the weld (striking the weld with a welding hammer) not only removes the scale left behind in the welding but relieves the internal strains developed by the heating and cooling process.

A complete weld may require more metal than can be deposited in a single pass by either the stringer or weave method. Very heavy beads can be built up by making several passes along the weld seam (see Figure 10 and Figure 11). When welds are to be laid one on top of another, slag left from the previous pass must be thoroughly cleaned away before the second pass is laid.

## SPECIAL APPLICATIONS

In cutting or burning, the heat of the arc is used to melt or burn away the base metal. No attempt is made to add metal from the melting electrode.

Special Cutting electrodes are available. If a general purpose rod is used for cutting, less of the electrode will be consumed if it is soaked in water for a few minutes prior to use.

### BURNING HOLES



**⚠ WARNING** Hot metal dripping from above can cause serious burns or start fires. **ALWAYS** protect head, hands, feet and body when cutting or burning holes. **DO NOT** cut or weld where hot metal can fall onto or into flammable materials.

When burning holes, the electrode is held perpendicular to the base metal and the arc is rotated in a small circle until the base metal becomes soft. Pushing or jabbing the electrode firmly through the base metal starts the actual hole. Its size and shape are determined by directing the arc in larger circles. Holes in heavier metal may be burned from the bottom, permitting the base metal to drop away from the hole.

### CUTTING

The procedure used in cutting is very simple. The heat of the arc is used to melt away the base metal along the cut line. Start the cut at the edge of the workpiece. Strike the arc and work it along the cut line. If the metal is fairly thick, work the electrode up and down from the top to the bottom of the cut.

### RECOGNIZING METALS

Because of the effect on the properties of steel from carbon content, temperature and time, the person welding must be able to determine accurately the nature of the steel that is being worked.

The manufacturer's specifications of the particular steel are most desirable. When specifications are not available, other methods may be used to determine the nature of the metal. The most common tests are:

### MAGNETIC TEST

The magnetic test is a basic test used to identify ferrous (iron and steel) metals from nonferrous metals.

Generally, all ferrous metals are affected by magnetism while the nonferrous metals are not. However, some stainless steels are not magnetic.

## **COLOR TEST**

The two main divisions of metal include the irons and steels which are indicated by their typical gray-white color and the nonferrous metals which come in two general color classifications of yellow and white. Copper may be easily identified due to its color (yellowish) as are brass and bronze. Aluminum, white metal, aluminum alloys, zinc and similar metals are all silver-gray (with shade variations) in color.

## **SPARK TEST**

This method of identifying metals is widely used by welders to identify irons and steels. A power grinder is used as the test equipment.



**⚠WARNING** To help prevent eye injuries when grinding, you **MUST ALWAYS** wear safety goggles. The grinder **MUST** be inspected to see that it is in good condition **BEFORE** proceeding with the test.

When testing a metal sample, if you touch it to the rim of the revolving wheel lightly, the friction of the wheel surface will heat the resulting metal particles to an incandescent and burning temperature.

The sparks resulting from contact with the grinding wheel contact will differ in character for different types of steel. The lighter the contact, the better. Use a black background to better identify the sparks.

The theory of the spark test is that when a metal is heated, the different parts of each metal oxidize at different rates and the oxidization colors are different.

Relatively pure iron, when heated by the grinding wheel, does not oxidize quickly. Therefore, the sparks are long and fade out on cooling. As the carbon content of steel or cast iron increases, the compounds of carbon and iron have different ignition temperatures. Consequently, the characteristics of the sparks differ.

Four characteristics of the spark generally tell the nature of the condition of the steel. Those characteristics are:

- spark color;
- spark length,
- the number of explosions (spurts) along the length of the individual sparks;
- and the shape of the explosions (forking or repeating).

## **ADDITIONAL SAFETY INFORMATION**

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Make sure you read and understand all of the information and instructions contained in this manual **BEFORE** proceeding.

The National Electrical Code, Occupational Safety and Health Act (OSHA) regulations, local industrial codes and local inspection requirements also provide a basis for equipment installation, use and service.

For additional information concerning welding safety, refer to the following standards and comply with them as applicable.

- ANSI Standard Z49.1 - SAFETY IN WELDING AND CUTTING - obtainable from the American Welding Society, 2051 N.W. 7th St. Miami, FL 33125 (305) 443-9353.
- ANSI Standard Z87.1 - SAFE PRACTICE FOR OCCUPATION AND EDUCATIONAL EYE AND FACE PROTECTION - obtainable from the American National Standards Institute, 1430 Broadway, New York, NY 10018.
- NFPA Standard SIB - CUTTING AND WELDING PROCESSES - obtainable from the National Fire Protection Association, 470 Atlantic Avenue, Boston, MA 02210.

- CGA Pamphlet P-I - SAFE HANDLING OF COMPRESSED GASSES IN CYLINDERS - obtainable from the Compressed Gas Association, 5005th Avenue, New York, NY 10038.
- OSHA Standard 29 CFR, Part 1910, Subpart 0. - WELDING, CUTTING AND BRAZING - obtainable from your state OSHA office.
- CSA Standard W117.2 - CODE FOR SAFETY IN WELDING AND CUTTING - obtainable from Canadian Standards Association, 178 Rexdale Blvd., Rexdale, Ontario Canada M9W 1R3.
- American Welding Society Standard A6.0 - WELDING AND CUTTING CONTAINERS WHICH HAVE HELD COMBUSTIBLES - obtainable from the American Welding Society, 2051 N.W. 7th St., Miami, FL 33125 (305) 443-9353.

**WARNING:** This product contains chemicals, including lead, or otherwise produces chemicals known to the State of California to cause cancer, birth defects and other reproductive harm. ***Wash hands after handling.*** (California Health & Safety Code § 25249.5 et seq.)

## MAINTAINING THE WELDER

This welder has been engineered to give many years of trouble-free service providing that a few very simple steps are taken to properly maintain it.

1. Replace power cord, ground cable, ground clamp, or electrode assembly when damaged or worn.
2. Periodically clean dust, dirt, grease, etc. from your welder. Every six months, or as necessary, remove the cover panel from the welder and air-blow any dust and dirt that may have accumulated inside the welder.

## TROUBLESHOOTING

The following TROUBLESHOOTING table is provided as a guide to help resolve some of the more common problems that could be encountered. This table does not provide all possible solutions, only those possibilities considered to likely be common faults. The table consists of a TROUBLE or symptom, a POSSIBLE CAUSE for the symptom, and a POSSIBLE REMEDY for that symptom.

TROUBLE	POSSIBLE CAUSE	POSSIBLE REMEDY
Welder does not hum when turned on.	<ol style="list-style-type: none"> <li>1. No power at receptacle.</li> <li>2. Broken or damaged power cord.</li> <li>3. Faulty switch.</li> <li>4. Faulty transformer.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check circuit and fuses or circuit-breakers back at meter.</li> <li>2. Replace power cord.</li> <li>3. Switch needs to be replaced.</li> <li>4. Transformer needs to be replaced.</li> </ol>
Welder hums but will not weld.	<ol style="list-style-type: none"> <li>1. Inadequate power at receptacle.</li> <li>2. Inadequate current at the arc.</li> <li>3. Poor connections at the welder.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check power supplies.</li> <li>2. Check ground clamp cable and connection to work piece; check electrode cable and clamp at electrode.</li> <li>3. Check all welder internal connections.</li> </ol>
Welder gives shocks.	<ol style="list-style-type: none"> <li>1. Incorrect connections at power cord or receptacle. (HOT wire connected to ground terminal).</li> <li>2. Welder wired to 3-phase current.</li> </ol>	<ol style="list-style-type: none"> <li>1. Rewire power cord receptacle.</li> <li>2. Check power source.</li> </ol>
Welder heat setting difficult to adjust.	Dust or dirt moving inside transformer.	Clean shunt track.
Welder overheats – blows fuses	<ol style="list-style-type: none"> <li>1. Fan blade not turning or obstructed.</li> <li>2. Fan blades not turning.</li> <li>3. Fan turning too slowly – misaligned bearings.</li> <li>4. Wrong amperage fuse in fuse box.</li> </ol>	<ol style="list-style-type: none"> <li>1. Clear blade of obstruction.</li> <li>2. Replace fan motor.</li> <li>3. Replace fan motor.</li> <li>4. Replace with 50 amp fuse or breaker.</li> </ol>
Arc hard to strike.	<ol style="list-style-type: none"> <li>1. Wrong type of electrode or electrode too large.</li> <li>2. Base metal not grounded properly.</li> <li>3. Voltage from power line low due to heavy loads.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check electrode and verify size and type of electrode for application (see SELECTING THE ELECTRODE).</li> <li>2. Verify Grounding.</li> <li>3. Have power company verify voltage and increase if possible.</li> </ol>
Bead too thin in places.	Uneven speed in moving electrode across base metal.	Slow down; try to maintain steady rate of travel across the surface to be welded.
Bead too thick in places.	Holding the electrode too long in one place or moving it too slowly across the base metal.	Speed up; maintain a uniform rate of speed along the bead.
Ragged depressions at edge of weld.	Moving the electrode too rapidly or holding too short an arc.	Slow down, lengthen the arc slightly.
Overlapping beads.	Arc too long or rate of travel too fast.	Slow down.
Electrode sticks to work	Electrode is held in contact with base metal while arc is struck.	Move electrode away from the base metal immediately after the arc is struck.
Poor electrode performance. Electrodes sputter and stick.	<ol style="list-style-type: none"> <li>1. Damp electrodes.</li> <li>2. Wrong type of electrode</li> </ol>	<ol style="list-style-type: none"> <li>1. Store electrodes in a dry location.</li> <li>2. Use correct electrode (see SELECTING THE ELECTRODE).</li> </ol>

# SPARE PARTS LIST

Forney 235FI AC • 230V • Arc Welder

No.	FORNEY P/N	ITEM DESCRIPTION
01	85014	GREEN PILOT-LAMP 220V L=230 1 PC PACK
02	85113	KNOB D.45 FOR BLACK SWITCH + INDEX
03	85303	HAND-WHEEL R=65 +KNOB
04	85115	RIGHT UPPER PANEL FORNEY 235 AC
05	85074	MAGNETIC SHUNT 25X39 X172 2 PC PACK
06	85132	REGULAT. SCREW +WASHER L=180 FIL.M8 1PC
07	85133	SHUNT YOKE D.15 L=107 1PC PACK
08	85128	SWITCH 32 A A 3202
09	85123	UPPER HOLE CAP (HANDLE HOLES)
10	85111	D.120 GROMMET + D.40 BUSH KIT
11	85130	FUSE HOLDER PTF/70 6,3A 250V
12	85129	FUSE 5X20 T 2A 250V 10PCS PACK
13	85011	EARTH CLAMP 300A ZINC-COATED 1 PC PACK
14	85137	EARTH CABLE 25 MM2 MT.2,15
15	85135	WELDING CABLE 25MMQ MT. 3
16	85127	ELECTRODE HOLDER EH-IT01 300A 1PC PACK
17	85114	FRONT AND BACK PANEL FORNEY 235 AC
18	85050	FAN C30 220V 60HZ 175 1PC PACK
19	85138	TRANSFORMER 1PH MMA 60HZ 230V 60X115 AL
20	85230	CABLE CLAMP+RING NUT HOLED.20 2PCS PACK
21	85116	BACK PANEL FORNEY 235 FI AC
22	85121	CABLE CLAMP HOLE D.30
23	85120	INPUT CABLE ST3XAWG10 2,5M+50A-PLUG 1PC
24	85124	LOWER HOLE CAP D.15-21,5
25	00329	KIT WHEELS AND HANDLE 235FI AC - AC/DC

\* The first column above (No.) correspondes to the Spare Parts Diagram on the following page.



# SPARE PARTS LIST DIAGRAM

## Forney 235FI AC • 230V • Arc Welder

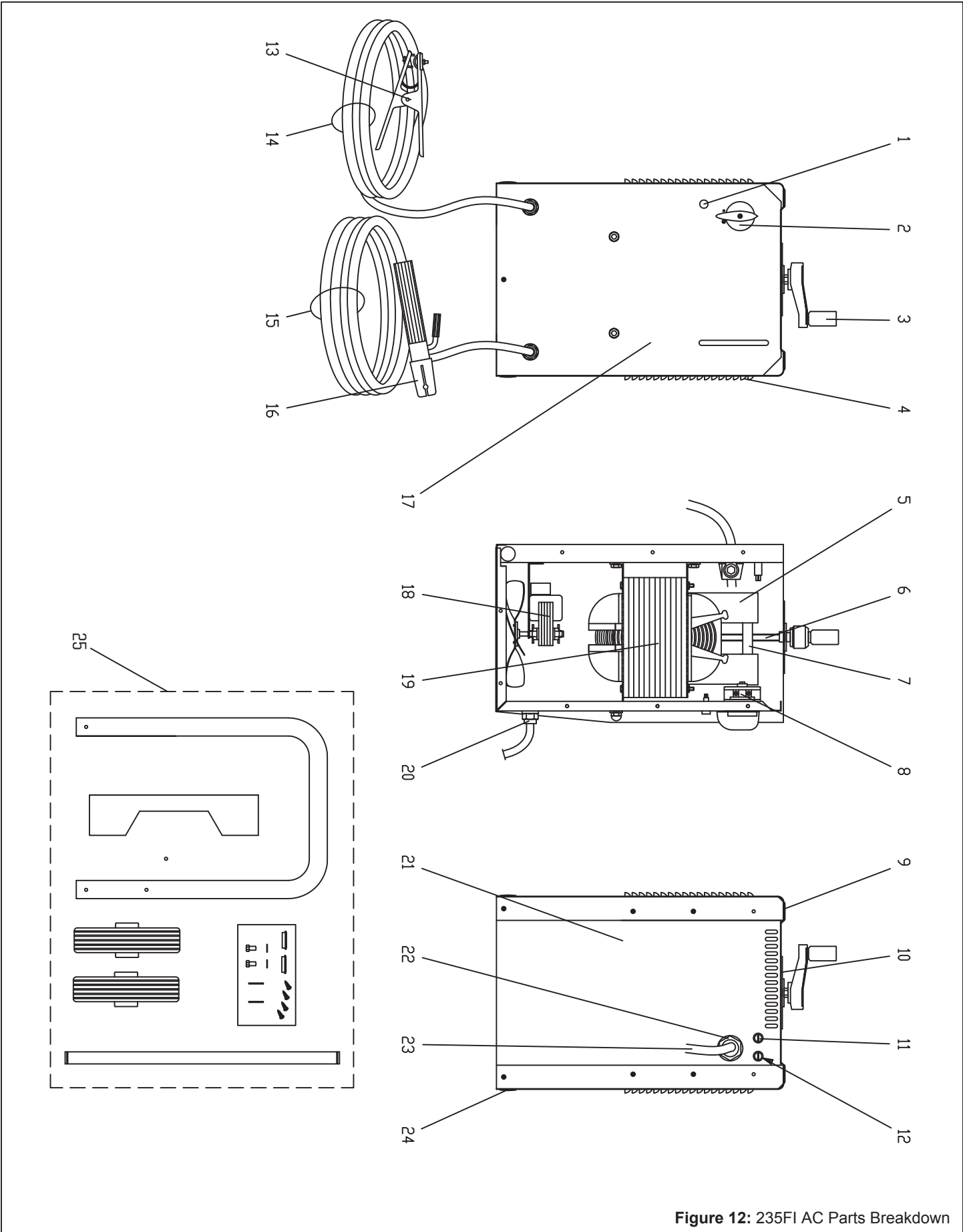
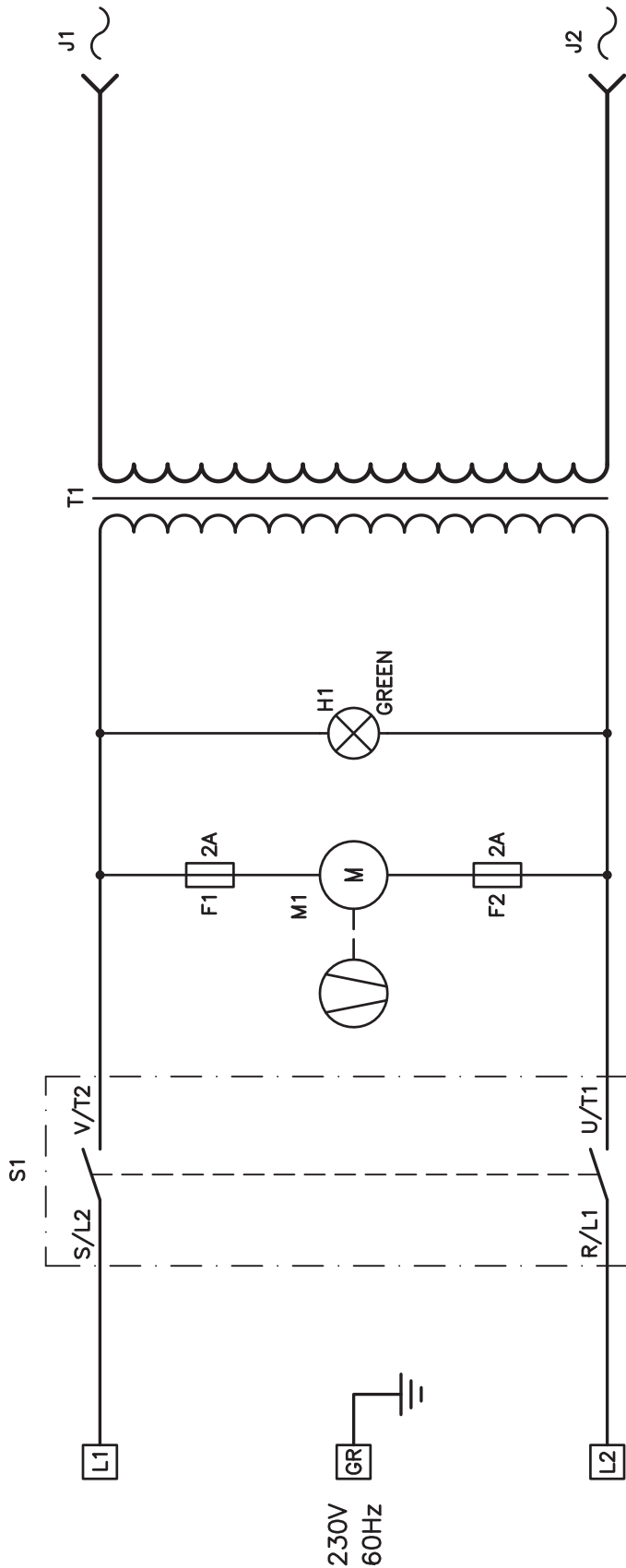


Figure 12: 235FI AC Parts Breakdown

# WIRING DIAGRAM

Forney 235FI AC • 230V • Arc Welder



F1-F2	FUSE	SICHERUNG	FUSIBLE	FISIBILE
H1	POWER ON PILOT LAMP	NETZKONTROLLAMPE	LAMPE TEMOIN DE RESEUR	LAMPADA DI RETE
M1	FAN	VENTILATOR	VENTILATEUR	VENTILATORE
S1	SWITCH ON - OFF	UMSCHALTER ON - OFF	COMMUTATEUR ON - OFF	COMMUTATORE ON - OFF
T1	TRANSFORMER	TRANSFORMATOR	TRANSFORMATEUR	TRASFORMATORE

Figure 13: 235FI AC Wiring Diagram

# SPARE PARTS LIST

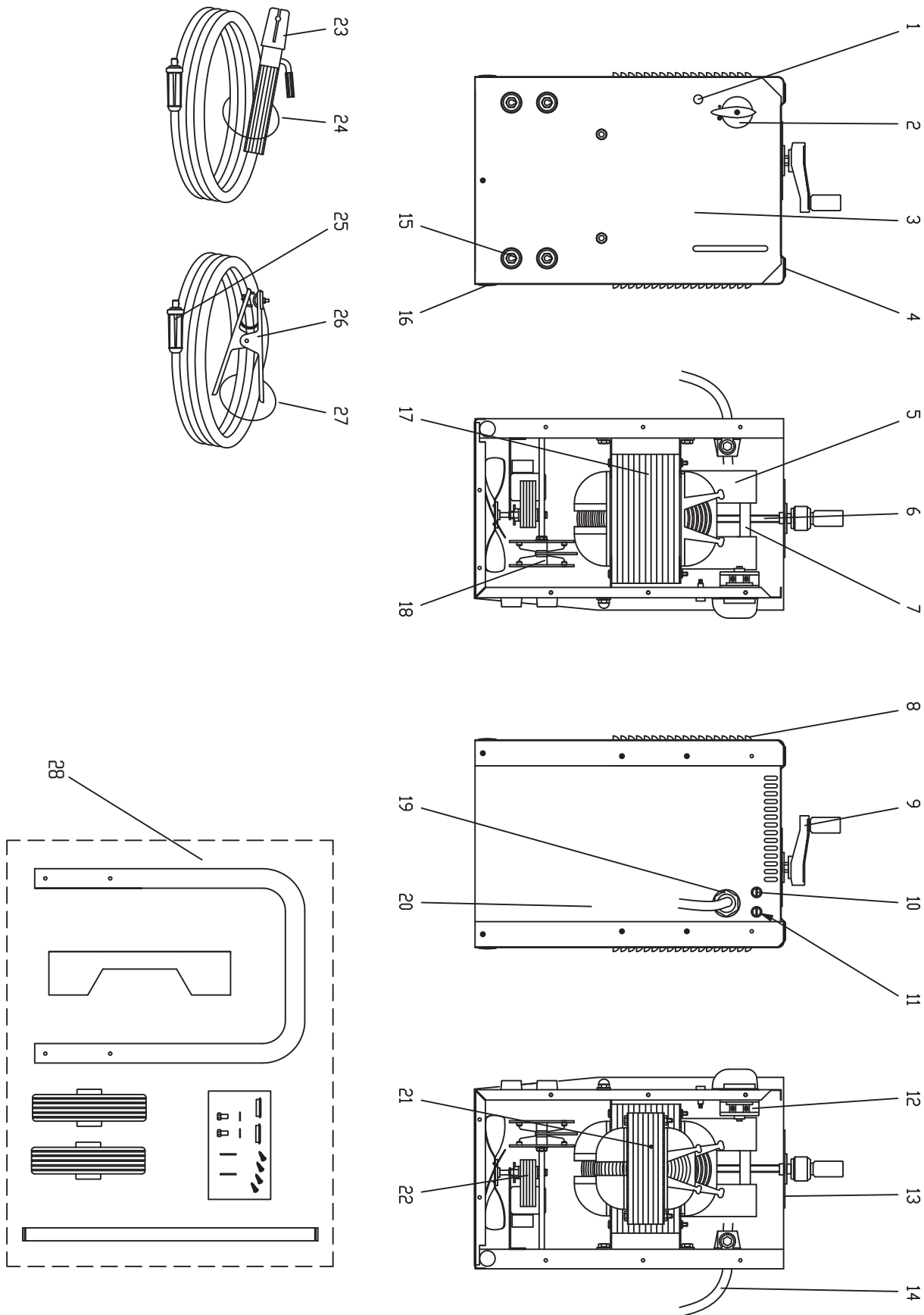
Forney 235FI AC/DC • 230V • Arc Welder

No.	FORNEY P/N	ITEM DESCRIPTION
01	85014	GREEN PILOT-LAMP 220V L=230 1 PC PACK
02	85113	KNOB D.45 FOR BLACK SWITCH + INDEX
03	85117	FRONT AND BACK PANEL FORNEY 235FI AC/DC
04	85123	UPPER HOLE CAP (HANDLE HOLES)
05	85074	MAGNETIC SHUNT 25X39 X172 2 PC PACK
06	85132	REGULAT. SCREW +WASHER L=180 FIL.M8 1PC
07	85133	SHUNT YOKE D.15 L=107 1PC PACK
08	85118	RIGHT UPPER PANEL FORNEY 235 AC/DC
09	85303	HAND-WHEEL R=65 +KNOB
10	85130	FUSE HOLDER PTF/70 6,3A 250V
11	85129	FUSE 5X20 T 2A 250V 10PCS PACK
12	85128	SWITCH 32 A A 3202
13	85111	D.120 GROMMET + D.40 BUSH KIT
14	85120	INPUT CABLE ST3XAWG10 2,5M+50A-PLUG 1PC
15	85009	FEM.DINSE PLUG 25SQMM CX30 (1 PC PACK)
16	85124	LOWER HOLE CAP D.15-21,5
17	85112	TRANSFORMER COMPLETE 250 AC/DC 60HZ 230V
18	85131	RECTIFIER
19	85121	CABLE CLAMP HOLE D.30
20	85119	BACK PANEL FORNEY 235 FI AC/DC
21	85110	WINDING + "E" CORE LAMINATIONS 235 AC/DC
22	85050	FAN C30 220V 60HZ 175 1PC PACK
23	85127	ELECTRODE HOLDER EH-IT01 300A 1PC PACK
24	85134	WELDING CABLE 25MM2 3M EH-IT01/DN25 1PC
25	84963	DINSE PLUG 25MM2 1 PC PACK
26	85011	EARTH CLAMP 300A ZINC-COATED 1 PC PACK
27	85136	EARTH CABLE 25SQMM MT.2
28	00329	KIT WHEELS AND HANDLE 235FI AC - AC/DC

\* The first column above (No.) correspondes to the Spare Parts Diagram on the following page.

# SPARE PARTS LIST DIAGRAM

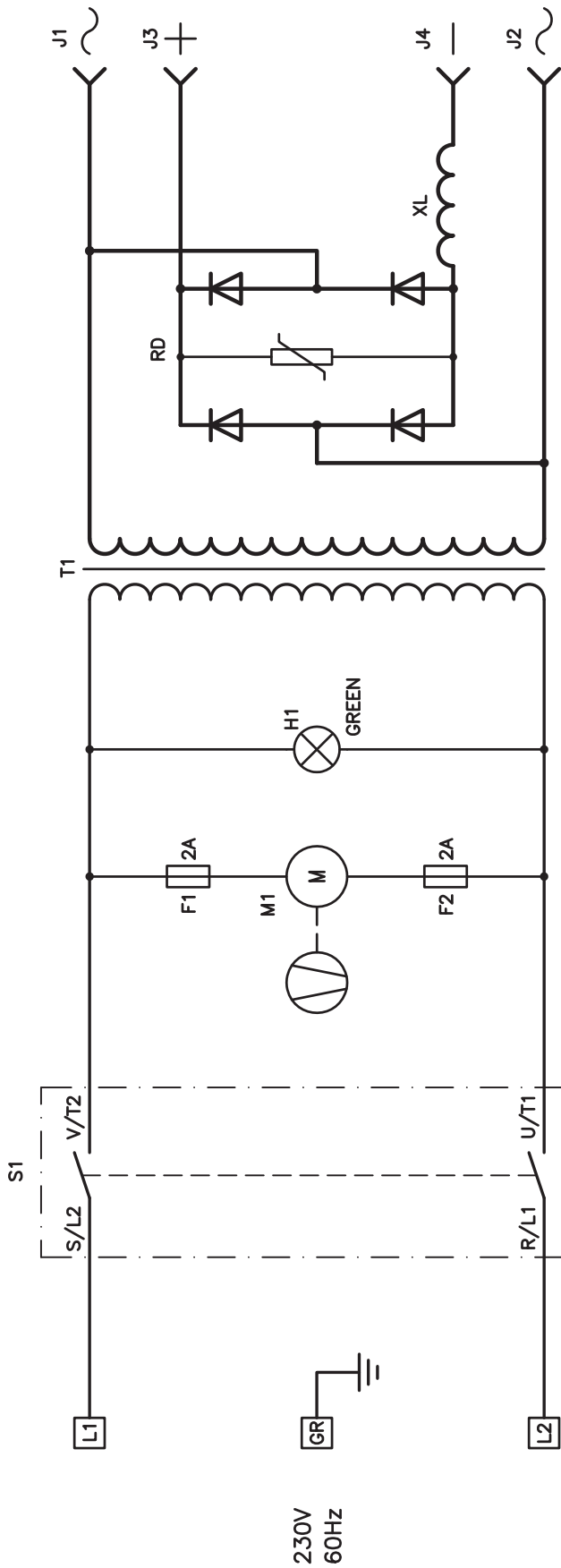
## Forney 235FI AC/DC • 230V • Arc Welder



**Figure 14:** 235FI AC/DC Parts Breakdown

# WIRING DIAGRAM

Forney 235FI AC/DC • 230V • Arc Welder



F1-F2	FUSE	SICHERUNG	FUSIBLE	FISIBILE
H1	POWER ON PILOT LAMP	NETZKONTROLLAMPE	LAMPE TEMOIN DE RESEUR	LAMPADA DI RETE
M1	FAN	VENTILATOR	VENTILATEUR	VENTILATORE
RD	RECTIFIER	GLEICHRICHTER	REDRESSEUR	PONTE RADDRIZZATORE
S1	SWITCH ON - OFF	UMSCHALTER ON - OFF	COMMUTATEUR ON - OFF	COMMUTATORE ON - OFF
XL	CHOKE	IMPEDANZ	IMPEDANCE	IMPEDEZA
T1	TRANSFORMER	TRANSFORMATOR	TRANSFORMATEUR	TRASFORMATORE

Figure 15: 235FI AC/DC Wiring Diagram

# Forney 5/3/1 Limited Warranty

Effective August 1st, 2009

1. **Limited Warranty:** Subject to the terms and conditions below, Forney Industries, Inc., Fort Collins, Colorado, warrants to its original retail purchaser that the new Forney equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by Forney. This is in lieu of all other warranties, express or implied.
2. **Notification:** Please call 1-800-521-6038 with your warranty questions. You can also visit [www.forneywelding.forneyind.com](http://www.forneywelding.forneyind.com) for additional information about your new welder.
3. **Length of Warranty:** Within the warranty periods listed below, Forney will repair or replace any warranted parts or components that fail due to defects in material or workmanship. Warranty is effective from the date of original retail purchase. Warranty duration is as follows:
  - a) **5 years:** Original main power rectifiers transformers, stabilizers and reactors.
  - b) **3 years:** Switches and Controls.
  - c) **1 year:** Lead assembly and accessories.
4. **Non-Applicable Parts:** Forney's limited warranty shall not apply to consumables such as contact tips, cutting nozzles, felt wire cleaner, drive rollers, gas diffusers, plasma torch tips and electrodes, weld cables, tips and parts that fail due to normal wear. In addition, this warranty does not extend to any damage caused by the untimely replacement or maintenance of any of the previously listed consumable parts.
5. **Warrantor:**

Forney Industries  
1830 LaPorte Avenue  
Fort Collins, CO 80521  
1-800-521-6038  
[www.forneywelding.forneyind.com](http://www.forneywelding.forneyind.com)
6. **Purchaser / Warranty:** The original purchaser of the Forney Industries product. The warranty is not transferable. Forney Industries products are intended for purchase and use by persons trained and experienced in the use and maintenance of welding equipment.
7. **What is not covered under the warranty:**
  - a) Implied warranties, including those of merchantability and fitness for a particular purpose are limited in duration to this express warranty. After this period, all risks of loss, from whatever reason, shall be on the purchaser.
  - b) Any incidental, indirect, or consequential loss, damage, or expense that may result from any defect, failure or malfunction of the Forney product.
  - c) Any failure that results from accident, purchaser's abuse, neglect or failure to operate products in accordance with instructions provided in the owner's manual(s) supplied with the product.
  - d) Pre-delivery service, i.e. assembly and adjustment.
8. **Claim:** In the event of a warranty claim under this warranty, the exclusive remedies shall be, at Forney Industries sole option:
  - a) Repair; or
  - b) Replacement; or
  - c) Where authorized in writing by Forney Industries, the cost of repair or replacement at an authorized Forney Industries Service Center; or
  - d) Payment of or credit for the purchase price less reasonable depreciation based on actual use upon the return of the goods at the customer's risk and expense.
8. **Purchaser will:**
  - a) Contact Forney's Customer Service at 1-800-521-6038 within 30 days of the defect or failure.
  - b) Provide dated proof of purchase (typically a purchase receipt).
  - c) Provide the serial number. Registering your welder at [www.forneywelding.forneyind.com](http://www.forneywelding.forneyind.com) will speed up this process.
  - d) Deliver or ship welder to a Forney authorized Service Center. Freight &/or packaging costs, if any, must be borne by the purchaser.

# FORNEY ACCESSORIES



Electrodes (Sticks)



Auto Darkening Helmets  
Cat. Nos. 55698 & 55699



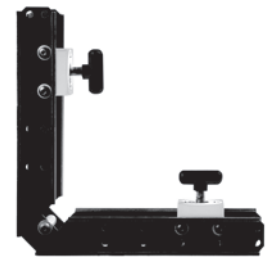
Electrode Holder  
Cat. No. 56205



Wire Brushes  
Cat. No. 70520



Magswitch® Ground Clamp  
Cat. No. 58559



Magswitch® 90° Angle Square  
Cat. No. 58565



Chipping Hammer  
Cat. No. 70601



Leather Welding Sleeves  
Cat. No. 57200



Grinding Wheel  
Cat. No. 71876

Leather Waist  
Welding Apron  
Cat. No. 57202

Flame Retardant Coveralls  
Cat. No. 57182



Gloves  
Cat. No. 55203



11-1/2" X 27-1/2"  
3-Level Portable  
Welder Cart  
Cat. No. 00332

**Forney Industries**  
1830 LaPorte Ave.  
Fort Collins, CO 80521

1-800-521-6038  
www.forneyind.com

**Forney**  
INDUSTRIES, INC.