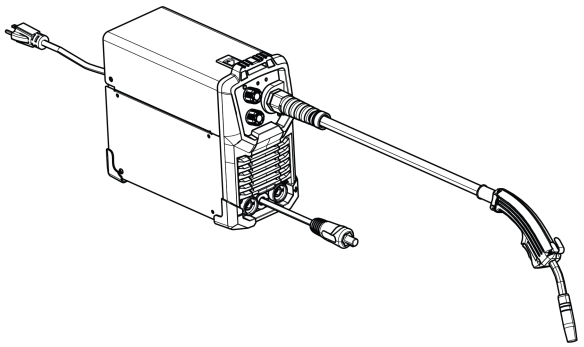
INSTRUCTION MANUAL

WELD-PAK® 90i MIG



For use with Product/Code Numbers:

13398, 13879

Save for future reference

Date Purchased

Code: (ex: 10859)

Serial: (ex: U1060512345)

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THE LINCOLN ELECTRIC COMPANY
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www.lincolnelectric.com

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CUSTOMER ASSISTANCE POLICY

SAFETY INFORMATION

SAFETY DEPENDS ON YOU

Lincoln welding, cutting, and heating equipment is designed and built with safety in mind. However, your overall safety can be increased by proper installation ... and thoughtful operation on your part. DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT WITHOUT READING THIS MANUAL AND THE SAFETY PRECAUTIONS CONTAINED THROUGHOUT. And, most importantly, think before you act and be careful.

⚠ DANGER

This statement indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

This statement indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

This statement indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

Notice: This statement indicates the possibility of damage to equipment if the potential risk is not avoided.

PLEASE EXAMINE CARTON AND EQUIPMENT FOR DAMAGE IMMEDIATELY

When this equipment is shipped, title passes to the purchaser upon receipt by the carrier. Consequently, claims for material damaged in shipment must be made by the purchaser against the transportation company at the time the shipment is received.

KEEP YOUR HEAD OUT OF THE FUMES



- **DON'T** get too close to the weld. Use corrective lenses if necessary to stay a reasonable distance away from the weld.
- **USE ENOUGH VENTILATION** or exhaust at the weld, or both, to keep the fumes and gases from your breathing zone and the general area.
- **IN A LARGE ROOM OR OUTDOORS** , natural ventilation may be adequate if you keep your head out of the fumes.
- **USE NATURAL DRAFTS** or fans to keep the fumes away from your face.
- **READ** and obey the Safety Data Sheet (SDS) and the warning label that appears on all containers of welding materials.

If you develop unusual symptoms, see your supervisor. Perhaps the welding atmosphere and ventilation system should be checked.

WEAR CORRECT EYE, EAR AND BODY PROTECTION



- **PROTECT** your eyes and face with properly fitted and with proper grade of filter plate (See ANSI Z49.1).
- **PROTECT** your body from welding spatter and arc flash with protective clothing including woolen clothing, flame-proof apron and gloves, leather leggings, and high boots.
- **PROTECT** others from spatter, flash, and glare with protective screens or barriers.
- **PROTECT** your eyes and face with welding helmet
- **IN SOME AREAS**, protection from noise may be appropriate.
- **BE SURE** protective equipment is in good condition.



- **AT ALL TIMES**, wear safety glasses in work area.

- **DO NOT WELD, CUT, OR HEAT** containers or materials which previously had been in contact with hazardous substances unless they are properly cleaned. This is extremely dangerous.

- **DO NOT WELD, CUT, OR HEAT** painted or plated parts unless special precautions with ventilation have been taken. They can release highly toxic fumes or gases.
- **PROTECT** compressed gas cylinders from excessive heat, mechanical shocks, and arcs; fasten cylinders so they cannot fall.
- **BE SURE** cylinders are never grounded or part of an electrical circuit.
- **REMOVE** all potential fire hazards from welding area.



- **ALWAYS HAVE FIRE FIGHTING EQUIPMENT READY FOR IMMEDIATE USE AND KNOW HOW TO USE IT.**

CALIFORNIA PROPOSITION 65 WARNINGS

⚠ WARNING



Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects, or other reproductive harm.

Always start and operate the engine in a well-ventilated area.

If in an exposed area, vent the exhaust to the outside.

Do not modify or tamper with the exhaust system.

Do not idle the engine except as necessary.

⚠ WARNING



This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code § 25249.5 et seq.)

For more information go to https://www.p65warnings.ca.gov

ARC WELDING CAN BE HAZARDOUS

PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS SHOULD CONSULT WITH THEIR DOCTOR BEFORE OPERATING.

Read and understand the following safety highlights. For additional safety information, it is strongly recommended that you purchase a copy of "Safety in Welding & Cutting - ANSI Standard Z49.1" from the American Welding Society, P.O. Box 351040, Miami, Florida 33135 or CSA Standard W117.2. A Free copy of "Arc Welding Safety" booklet E205 is available from the Lincoln Electric Company, 22801 St. Clair Avenue, Cleveland, Ohio 44117-1199.

BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.

FOR ENGINE POWERED EQUIPMENT



- Turn the engine off before troubleshooting and maintenance work unless the maintenance work requires it to be running.



- Do not add the fuel near an open flame welding arc or when the engine is running. Stop the engine and allow it to cool before refueling to prevent spilled fuel from vaporizing on contact with hot engine parts and igniting. Do not spill fuel when filling tank. If fuel is spilled, wipe it up and do not start engine until fumes have been eliminated.



- Keep all equipment safety guards, covers and devices in position and in good repair. Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.

- In some cases it may be necessary to remove safety guards to perform required maintenance. **REMOVE GUARDS ONLY** when necessary and replace them when the maintenance requiring their removal is complete. Always use the greatest care when working near moving parts.
- **DO NOT** put your hands near the engine fan. Do not attempt to override the governor or idler by pushing on the throttle control rods while the engine is running.
- To prevent accidentally starting gasoline engines while turning the engine or welding generator during maintenance work, disconnect the spark plug wires, distributor cap or magneto wire as appropriate.



- To avoid scalding, do not remove the radiator pressure cap when the engine is hot.



- Generator exhaust contains carbon monoxide. This is a poison you cannot see or smell.
- Using a generator indoors **CAN KILL YOU IN MINUTES**.
- **NEVER** use inside a home or garage, EVEN IF doors and windows are open.



- **ONLY** use **OUTSIDE** and far away from windows, doors and vents.
- Avoid other generator hazards. **READ MANUAL BEFORE USE**.

ELECTRIC AND MAGNETIC FIELDS MAY BE DANGEROUS



- Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding and heating current creates EMF fields around cables and equipment.
- EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.
- Exposure to EMF fields in welding may have other health effects which are now not known.

All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

- Route the electrode and work cables together - Secure them with tape when possible.
- Never coil the electrode lead around your body.
- Do not place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side.
- Connect the work cable to the workpiece as close as possible to the area being welded.
- Do not work next to welding power source.

ELECTRIC SHOCK CAN KILL



- The electrode and work (or ground) circuits are electrically “hot” when the welder is on. Do not touch these “hot” parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.
- Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.

In addition to the normal safety precautions, if welding must be performed under electrically hazardous conditions (in damp locations or while wearing wet clothing; on metal structures such as floors, gratings or scaffolds; when in cramped positions such as sitting, kneeling or lying, if there is a high risk of unavoidable or accidental contact with the workpiece or ground) use the following equipment:

- Semiautomatic DC Constant Voltage (Wire) Welder.
- DC Manual (Stick) Welder.
- AC Welder with Reduced Voltage Control.
- In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically “hot”.
- Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.
- Ground the work or metal to be welded to a good electrical (earth) ground.
- Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.
- Never dip the electrode in water for cooling.

- Never simultaneously touch electrically “hot” parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.
- When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.
- **Also see** WELDING AND CUTTING SPARKS CAN CAUSE FIRE OR EXPLOSION **and** FOR ELECTRICALLY POWERED EQUIPMENT

ARC RAYS CAN BURN



- Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Headshield and filter lens should conform to ANSI Z87.1 standards.
- Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.
- Protect other nearby personnel with suitable, non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.

FUMES AND GASES CAN BE DANGEROUS



Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone.

- **When welding hardfacing (see instructions on container or SDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and within applicable OSHA PEL and ACGIH TLV limits using local exhaust or mechanical ventilation unless exposure assessments indicate otherwise. In confined spaces or in some circumstances, outdoors, a respirator may also be required. Additional precautions are also required when welding on galvanized steel.**
- The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable OSHA PEL and ACGIH TLV limits.
- Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.
- Shielding gases used for welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.
- Read and understand the manufacturer’s instructions for this equipment and the consumables to be used, including the Safety Data Sheet (SDS) and follow your employer’s safety practices. SDS forms are available from your welding distributor or from the manufacturer.
- Also see FOR ENGINE POWERED EQUIPMENT

WELDING AND CUTTING SPARKS CAN CAUSE FIRE OR EXPLOSION



- Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.
- Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situations. Refer to **“Safety in Welding and Cutting” (ANSI Standard Z49.1)** and the operating information for the equipment being used.

- When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.
- Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to ensure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been “cleaned”. For information, purchase “Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances”, **AWS F4.1** from the American Welding Society.
- Vent hollow castings or containers before heating, cutting or welding. They may explode.
- Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuff-less trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.
- Connect the work cable to the work as close to the welding area as practical. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.
- **Read and follow NFPA 51B** “Standard for Fire Prevention During Welding, Cutting and Other Hot Work”, available from NFPA, 1 Batterymarch Park, PO box 9101, Quincy, MA 022690-9101.
- **DO NOT** use a welding power source for pipe thawing.

CYLINDER MAY EXPLODE IF DAMAGED



- Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.
- Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.

Cylinders should be located:

- Away from areas where they may be struck or subjected to physical damage.
- A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.
- Never allow the electrode, electrode holder or any other electrically “hot” parts to touch a cylinder.
- Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.
- Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-l, “Precautions for Safe Handling of Compressed Gases in Cylinders,” available from the Compressed Gas Association, 14501 George Carter Way Chantilly, VA 20151.

FOR ELECTRICALLY POWERED EQUIPMENT



- Turn off input power using the disconnect switch at the fuse box before working on the equipment.
- Install equipment in accordance with the U.S. National Electrical Code, all local codes and the manufacturer’s recommendations.
- Ground the equipment in accordance with the U.S. National Electrical Code and the manufacturer’s recommendations.

BATTERY HANDLING, STORAGE, AND DISPOSAL



Batteries can be flammable substances such as lithium or other organic solvents, which may result in overheating, rupture, or combustion. Failure to follow the battery manufactures instructions may result in fire, personal injury, and damage to property if used improperly.

- DO NOT short circuit, disassemble, deform, or heat batteries.
- DO NOT attempt to recharge batteries unless they are specifically marked as "rechargeable".
- DO NOT use or charge the battery if it appears to be leaking, deformed or damaged in any way.
- Store in a cool location. Keep batteries away from direct sunlight, high temperature, and high humidity.
- Immediately discontinue use of the battery if, while using, charging, or storing the battery, the battery emits an unusual smell, feels hot, changes color, changes shape, or appears abnormal in any other way.
- Keep batteries out of reach of children, should a child swallow a battery, consult a physician immediately.
- Recycle or dispose of batteries in accordance with local and federal laws.

FOR LASER EMITTING EQUIPMENT



- Hazardous Class 4 (IV) laser products emit invisible, infrared laser radiation which can permanently damage the eye's retina and/or cornea, burn skin, and pose a fire risk. End users shall assign a qualified Laser Safety Officer (LSO) who has the certifications required by applicable law/standards, have a documented Laser Safety Program and have a Laser Controlled Area (LCA) that confirms to ANSI Z136.1 & Z136.9.
- Do not operate laser before end user's LSO has completed a risk assessment and all the prescribed Risk Mitigations measures have been fully implemented. Ensure the laser is operated/ demonstrated safely by trained personnel and that the environment surrounding the laser welding cell or laser-controlled area is safe for people nearby when the laser is in operation.
- Never point the laser at yourself or others. Never look directly into a laser aperture, even if wearing full eye protection.
- All persons inside LCA must wear proper PPE to avoid eye or skin exposure to laser radiation. The end user's LSO shall select proper PPE including, but not limited to, heat-resistant gloves, flame-resistant clothing, laser safety eye wear and laser-safe helmets that conform to ANSI Z136.1 Optical Density requirements for the wavelength and output power of the laser in use. Standard safety glasses and welding helmets DO NOT provide adequate protection from laser beam hazards. Always inspect PPE for damage or improper fit before use.
- Only qualified persons shall install, operate or service this unit per ANSI Z136.1 standards and your LSO's instruction. Read and follow all labels and manuals before installing, operating, or servicing hand held any laser welding equipment.
- Do not operate outside of a LCA, or if the laser protective housing is modified or damaged, or if safety interlocks have been bypassed or otherwise defeated. Inspect all equipment and LCA for damage or tampering prior to use.
- Reflected beams from the laser can damage eyes and skin and can pose a fire risk. Prior to use, the LCA should be assessed by the LSO to understand the surfaces where hazardous reflected beams can exist. Never position yourself or flammable material in the anticipated laser beam path and take extra precautions when working on reflective materials like aluminum and stainless steel.
- Follow all standards, individual facility or building regulations, and national, state, and local codes.

DEALER LOCATOR & PRODUCT REGISTRATION

Register your machine:

https://www.lincolnelectric.com/register

Authorized Service and Distributor Locator:

https://www.lincolnelectric.com/locator

ADDITIONAL SAFETY INFORMATION

Refer to http://www.lincolnelectric.com/safety for additional safety information

INSTALLATION

TECHNICAL SPECIFICATIONS

K5256-1 Weld-Pak® 90I MIG

OUTPUT CURRENT RANGE	WIRE FEED SPEED
30 - 120 A	0 - 200 IPM
OPEN CIRCUIT VOLTAGE	**SUITABLE WIRE DIAMETER**
49 V (RMS)	0.025”, 0.030”, 0.035”
INPUT CIRCUIT	**GROSS WEIGHT**
120 VAC	15 LBS (7 KGS)
DUTY CYCLE	**IPS RATING**
30% @ 80 A	IP21S

THERMAL PROTECTION

The machine has a maximum output duty cycle of 30%. If the duty cycle is exceeded, a thermal protector will shut off the output until the machine cools to a normal operating temperature. This is an automatic function of the machine and does not require user intervention.

REQUIRED ACCESSORIES

- Helmet
- Jacket
- Gloves

SAFETY PRECAUTIONS

Read this entire installation section before you start installation.

Do not attempt to use this equipment until you have thoroughly read all installation, operating and maintenance information supplied with your equipment. They include important safety precautions and detailed operating and maintenance instructions.

⚠ WARNING



ELECTRIC SHOCK can kill.

Only qualified personnel should perform this installation.

Do not touch electrically live parts.

Always connect the machine to an earthed mains supply.

SELECT SUITABLE LOCATION

Place the welder where clean cooling air can freely circulate in and out of the front & rear louver vents. Dirt, dust or any foreign material that can be drawn through vents into welder must be kept to a minimum. Failure to observe these precautions can result in excessive operating temperatures which can lead to plant failure.

GRINDING

Do not direct grinding particles towards the welder. An abundance of conductive material can cause plant failure.

STACKING

This machine cannot be stacked.

TRANSPORT - UNLOADING

Never underestimate the weight of equipment, never move or leave suspended in the air above people. The machine should be lifted and carried by the provided strap, or by cradling the machine. The machine should not be carried by the input, cord, output cables, or welding gun. Utilize proper lifting techniques when carrying or lifting the machine to prevent injury.

⚠ WARNING



Falling Equipment can cause injury.

Never lift welder with gas bottle attached.

Never lift above personnel.

TILTING

Machine must be placed on a secure level surface.

ENVIRONMENTAL RATING

The welding power source carries the IP21S rating. It may be used in normal industrial and commercial environments. Avoid using in areas where water / rain is around.

Read and follow the 'Electric Shock Warnings' in the safety section if welding must be performed under electrically hazardous conditions such as welding in wet areas or water on the work piece.

⚠ WARNING



ELECTRIC SHOCK can kill.

This welder must be grounded to earth.

⚠ CAUTION



The high frequency generator being similar to a radio transmitter may cause interference to radio, TV and other electronic equipment.

These problems may be the result of radiated interference. Proper grounding methods can reduce or eliminate this.

Radiated interference can develop in the following ways.

1. Direct interference from welder power source.
2. Direct interference from the welding leads.
3. Direct interference radiated from feedback into power lines.
4. Interference from re-radiation by un-grounded metallic objects.

Keeping these contributing factors in mind, installing equipment as per following instructions should minimize problems.

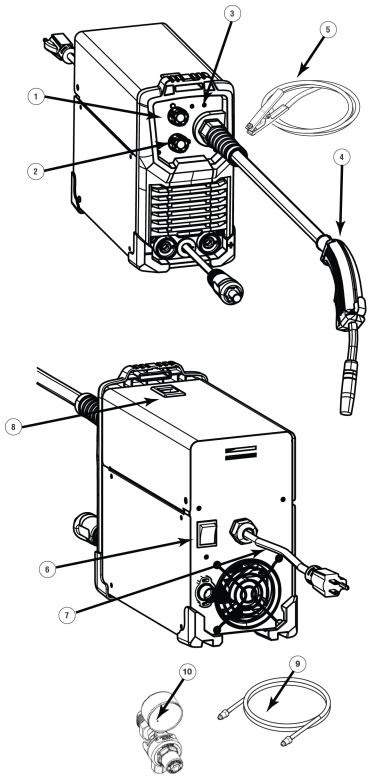
1. Keep the welder input power lines as short as possible and enclose as much of them as possible in metal conduit or equivalent shielding. There should be a good electrical contact between this conduit and ground (Earth).
2. Keep the work and electrode leads as short as possible. Tape the leads together where practical.
3. Be sure the torch and earth leads rubber coverings are free from cuts and cracks that allow welding power leakage.
4. Keep earth lead connection to work in good condition - Clean area on workbench where earth clamp is situated on a regular basis.

INPUT POWER CONNECTIONS

The machine has one input connection, the power input cable. The power input cable is located on the rear.

The Weld-Pak® 90I MIG is provided with a 120 V cable, 6.0 ft. (1.8 m) in length, with a 15 Amp 5-15P plug molded onto the cord.

The rated output of the Weld-Pak® 90I MIG is available when connected to a 20 A branch circuit. When connected to a branch circuit with lower capacity, lower welding current and duty cycle must be used.



1. Adjustment for Voltage
2. Adjustment for Wire feed speed
3. Power and protection LEDs
4. Gun - MIG, FCAW
5. Work Clamp & Cable
6. Power Switch
7. Power Input Cable
8. Spool cover latch
9. Gas Hose
10. Gas Regulator

CODE REQUIREMENTS FOR ELECTRICAL INPUT CONNECTIONS

⚠ WARNING

This welding machine must be connected to a power source in accordance with applicable electrical codes.

The National Electrical Code provides standards for amperage handling capability of supply conductors based on duty cycle of the welding source.

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

⚠ WARNING

Do not connect the machine to an input power supply with a rated voltage that is greater than 125 volts.

Do not remove the power cord ground prong.

EXTENSION CORD USAGE

If an extension cord is required, use one that is rated for the application and is 3 conductor #14 AWG (2.1 mm^2) or larger. The recommended maximum lengths are 25 ft (7.5 m) if #14 AWG (2.1 mm^2) is used and 50 ft (15 m) if #12 AWG (3.3 mm^2) is used.

FLUX-CORED (INNERSHIELD) WELDING

The recommended electrode for the flux-cored, self-shielded process is 0.035” (0.9 mm) diameter Lincoln Innershield NR-211-MP on 1 lbs. (.5 kg) spools.

MIG (SOLID-CORE) WELDING

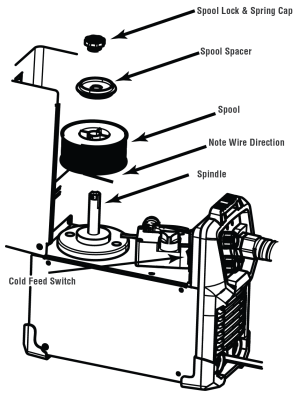
The recommended electrode for MIG process is 0.030" (0.8 mm) diameter Lincoln SuperArc L-56 on 2 lb. (1 kg) spools.

WIRE LOADING AND THREADING

Turn machine power switch to the OFF (“O”) position before working inside the wire feed enclosure.

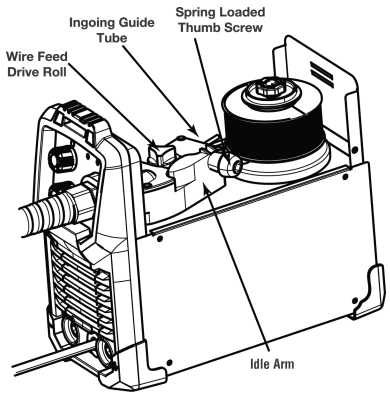
Make sure that the wire feed drive roll and the contact tip of the gun match the diameter and type of wire used.

1. Push the spool onto the spindle so that the wire feeds off the bottom of the spool, toward the drive roll.
2. Push the spool spacer onto the spindle, against the spool.
3. Slide the spring onto the spool, then press on the spool lock, turning it clockwise to lock the spool assembly onto the spindle.



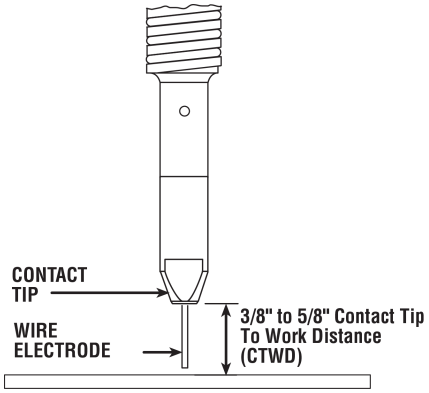
WIRE THREADING DETAILS

4. Release the spring loaded thumb screw and rotate the idle roll arm away from the wire feed drive roll. Ensure that the visible, stenciled size on the drive roll side facing you matches the wire size being used.
5. Carefully detach the end of the wire from the spool. Maintain tension on the wire to prevent the spool from unwinding and do not release the wire until after step 8.
6. Cut the bent portion of wire off and straighten the first 4" (100 mm).
7. Thread the wire through the incoming guide tube, over the drive roll, and into the gun liner.
8. Close the idle roll arm and turn down the thumbscrew until the idler roller presses down firmly on the wire. (Now you may release the welding wire). Make sure the wire is positioned in the groove of the drive roll.
9. The spring loaded thumbscrew on the idle roll arm adjusts the pressure on the wire. Adjust pressure by turning the thumbscrew to prevent spool overrun, but still allow smooth and easy wire feeding. Start with the pressure set to an intermediate value. Readjust, if necessary. If the drive roll slips while feeding wire, the pressure should be increased until the wire feeds properly.



WIRE STICKOUT

10. Remove the contact tip and nozzle from the gun.
11. Turn the machine ON (“I”).
12. Straighten the gun cable assembly.
13. Depress the cold feed switch and feed welding wire through the gun and cable. (Point the gun away from yourself and others while feeding wire). Release the cold feed switch after wire appears at the end of the gun.
14. Turn off the machine.
15. Replace the nozzle and contact tip. Refer to Figure to the Right. Cut the wire off so that 3/8” to 5/8” (10 - 15 mm) protrudes from the end of the tip.
16. Turn on the machine. The machine is now ready to weld.



POWER UP SEQUENCE

1. Check that the electrode polarity is correct for the process being used. Refer to Table 1 :POLARITY AND RECOMMENDED SETTINGS on page B-4 for polarity selection. Then turn the power switch ON. The fan will come on and stay on until power to the machine is removed.
2. Use the adjustment knobs to set the parameters specified by the Procedure Decal for your desired welding condition.
3. Remove the contact tip, then feed the wire through the liner to the gun tip. Replace the contact tip then cut the wire within approximately 3/8" (10 mm) from the end of the contact tip.
4. If shielding gas is to be used, turn on the gas supply - the provided gas regulator is factory set for MIG welding.
5. When using an lnnershield electrode, the gas nozzle may be removed and replaced with the gas-less nozzle. This will provide increased visibility and eliminate the possibility of the gas nozzle overheating.
6. Connect the work cable to the metal to be welded. The work clamp must make a good electrical contact with the piece being welded. The work must also be grounded as stated in "Arc Welding Safety Precautions".

SHIELDING GAS (FOR MIG ARC WELDING PROCESSES)

Customer must provide cylinder of appropriate type shielding gas for the process being used.

A gas flow regulator, for Argon Blend gas, and an inlet gas hose are factory provided with the welding machine. When using 100% CO_2 an additional adapter will be required to connect the regulator to the gas bottle.

⚠ WARNING



CYLINDER may explode if damaged.

Keep cylinder upright and chained to support.

Keep cylinder away from areas where it may be damaged.

Never lift welder with cylinder attached.

Never allow welding electrode to touch cylinder.

Keep cylinder away from welding or other live electrical circuits.

Install Shielding gas supply as follows:

1. Set the gas cylinder on a flat surface and secure the cylinder to a sturdy structure to prevent the cylinder from falling over.
2. Remove the cylinder cap. Inspect the cylinder valves and regulator for damaged threads, dirt, dust, oil, or grease. Remove dust and dirt with a clean cloth.

   DO NOT ATTACH THE REGULATOR IF OIL, GREASE, OR DAMAGE IS PRESENT! Inform your gas supplier of this condition. Oil or grease in the presence of high pressure oxygen is explosive.

⚠ WARNING



BE SURE TO KEEP YOUR FACE AWAY FROM THE VALVE OUTLET WHEN “CRACKING” THE VALVE.

Never stand directly in front of or behind the flow regulator when opening the cylinder valve. Always stand to one side.

The user should distance his or her body from the valve outlet when “cracking” the valve.

3. Stand to one side away from the outlet and open the cylinder valve for an instant. This will eradicate any dust or dirt which may have accumulated in the valve outlet.
4. Attach the flow regulator to the cylinder valve and tighten the union nut(s) securely with a wrench.

   Note: If connecting to 100% CO_2 cylinder, an additional regulator adapter must be installed between the regulator and cylinder valve. If adapter is equipped with a plastic washer, be sure it is seated for connection to the CO_2 cylinder.
5. Attach one end of the inlet gas hose to the outlet fitting of the flow regulator, the other end to the welding machine’s rear fitting, and tighten the union nuts with a wrench.
6. While standing to one side, open the cylinder valve slowly a fraction of a turn. When the cylinder pressure gauge pointer stops moving, open the valve fully.

⚠ WARNING



BE SURE TO KEEP YOUR FACE AWAY FROM THE VALVE OUTLET WHEN “CRACKING” THE VALVE.

Never stand directly in front of or behind the flow regulator when opening the cylinder valve. Always stand to one side.

7. The flow regulator is fixed for MIG welding.

⚠ WARNING



BUILDUP OF SHIELDING GAS may harm health or kill.

Shut off shielding gas supply when not in use.

PROCEDURE FOR CHANGING DRIVE ROLL

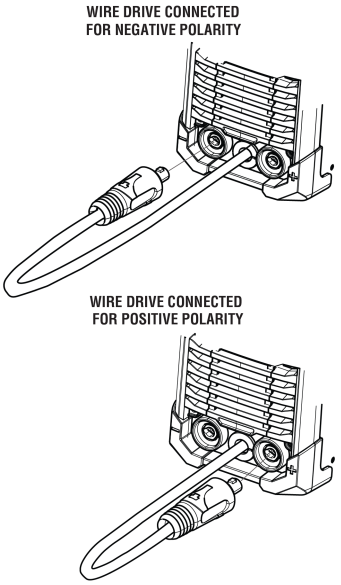
1. Turn off the power source.
2. Release the pressure arm up, allowing the tensioner to spring open.
3. Remove the drive roll retaining cap by turning and remove the drive roll.
4. Remove and reinstall the drive roll based on wire to be used.

   Note: Be sure the contact tip in the gun matches the wire diameter.

"SEE WIRE LOADING AND THREADING SECTION"

OUTPUT POLARITY CONNECTIONS

The welding machine features a short lead protruding from the front of the machine, the lead can be used to configure the wire drive polarity. For FCAW and MIG this lead MUST be connected to either the positive output stud or negative output stud. Connecting the lead to the positive stud will electrically connect the wire drive to positive polarity; the work clamp would then connect to the negative stud. Ensure connector is tightly locked into place by rotating clockwise.



OPERATION

GRAPHIC SYMBOLS USED IN THIS MANUAL OR BY THIS MACHINE

Read and understand this entire section before operating your CrossLinc Remote.

	**INPUT POWER**	U_0	**OPEN CIRCUT VOLTAGE**		**ON**
U_1	**INPUT VOLTAGE**		**OFF**	U_2	**OUTPUT VOLTAGE**
	HIGH TEMPERATURE	I_1	**INPUT CURRENT**		**CIRCUIT BREAKER**
I_2	**OUTPUT CURRENT**		**WIRE FEEDER**		**PROTECTIVE GROUND**
	**POSITIVE OUTPUT**		**WARNING OR CAUTION**		**NEGATIVE OUTPUT**
	**EXPLOSION**		**INVERTER**		**DANGEROUS VOLTAGE**
	INPUT POWER		**SHOCK HAZZARD**		**DIRECT CURRENT**

SAFETY PRECAUTIONS

Do not attempt to use this equipment until you have thoroughly read all operating and maintenance manuals supplied with your equipment and any related welding machine it will be used with. They include important safety precautions, operating and maintenance instructions and parts lists.

⚠ WARNING



ELECTRIC SHOCK can kill.

Do not touch electrically live parts such as output terminals or internal wiring.

Insulate yourself from the work and ground.

Always wear dry insulating gloves.

⚠ WARNING



WELDING SPARKS can cause fire or explosion.

Keep flammable material away.

Do not weld upon containers which have held combustibles.

⚠ WARNING



ARC RAYS can burn.

Wear eye, ear and body protection.

⚠ WARNING

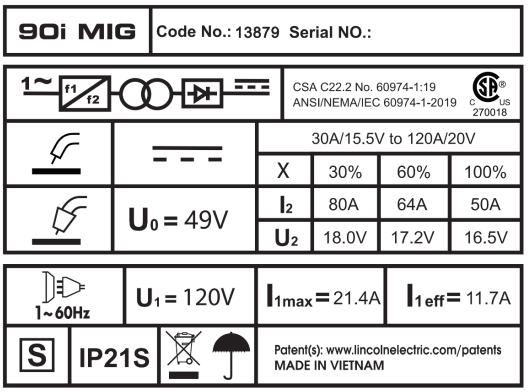


FUMES AND GASES can be dangerous.

Although the removal of the particulate matter from welding smoke may reduce the ventilation requirement, concentrations of the clear exhausted fumes and gases may still be hazardous to health. Avoid breathing concentrations of these fumes and gases. Use adequate ventilation when welding. See ANSI Z49.1, "Safety in Welding and Cutting", published by the American Welding Society.

PRODUCT SUMMARY

The Weld-Pak® 90I MIG is a constant voltage DC welding machine rated for 80 amps, 18.5 volts at a 30% duty cycle. The Weld-Pak® 90I MIG unit is intended for fabrication, maintenance, home, and auto body shops. The unit features a portable and rugged case. The user interface features two knobs, one for voltage and one for wire feed speed. The Weld-Pak® 90I MIG is designed for the North American market and operates on 120 V single phase 60 Hz power. An overview of the machines input and output capabilities are listed on the rating plate shown here.



The machine comes with the following accessories:

- WP150L gun (set for gas-less)
- Work cable with clamp
- Spare contact tips
- Gas regulator and gas hose
- Gas nozzle
- Procedure Chart and literature

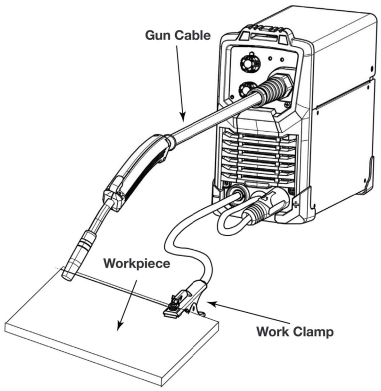
PREMIUM FEATURES INCLUDE

1. Inverter power source - more efficient to operate, provides smoother weld characteristics than traditional welders.
2. Infinite welding voltage to allow fine tuning of weld characteristics.
3. 30% Duty cycle at 80 Amps.
4. Lightweight and portable - Ideal for maintenance and mobile welders.

OPERATING MACHINE

Once you have set machine up as per instructions, refer to Table 1 :POLARITY AND RECOMMENDED SETTINGS on page B-4 and the Procedure Decal located on the inside of the wire drive compartment door of your machine for setup information, consumables, and quick tips for welding.

1. Select welding voltage (power), based on the material thickness of the work piece, required on front panel.
2. Select wire feed speed required on 'wire speed' knob.
3. Ensure you are wearing the correct safety clothes & equipment for welding. (I.E. Welding mask, gloves, apron etc.)



4. Connect the work clamp to the metal to be welded. The work clamp must make good electrical contact to the work piece. The work piece must also be grounded as stated in Arc Welding Safety Precautions in the beginning of this manual.
5. Based on the weld joint type and orientation of the weld joint, position the gun into the joint at the correct angle.
6. To begin welding, raise your hand shield or lower your helmet to protect your eyes and pull the trigger.
7. While welding, travel at a constant speed and maintain an electrode stick-out of 3/8".
8. To stop welding, release the gun trigger.
9. When no more welding is to be done, turn off the machine.

Table 1 :POLARITY AND RECOMMENDED SETTINGS

MIG GUN POLARITY = POS			RECOMMENDED SETTINGS FOR WELDING						
Nozzle	Contact Tip	Drive Roll	75 / 25 Gas Mix with L-56 Wire		24 ga 0.6 mm	20 ga 0.9 mm	18 ga 1.2 mm	16 ga 1.6 mm	14 ga 2.1 mm	1/8" ga 3.2 mm
KH725	KH710	KP4364 -035 set to 0.025 smooth	0.025 L-56	Voltage	5	6	7	5.5	--	--
				WFS	7	8	8	10	--	--
KH725	KH711	KP5373 -035 set to 0.030 smooth	0.030 L-56	Voltage	--	3.5	4.5	5	5.5	--
				WFS	--	6.5	8	9	10	--
KH725	KH712	KP5373 -035 set to 0.035 smooth	0.035 L-56	Voltage	--	4	5	5.5	6.5	8
				WFS	--	4.5	5.5	6.5	8	10

FLUX-CORED GUN POLARITY = NEG			RECOMMENDED SETTINGS FOR WELDING						
Nozzle	**Contact Tip**	**Drive Roll**	**No Gas with NR-211 Wire**		**20 ga 0.9 mm**	**18 ga 1.2 mm**	**16 ga 1.6 mm**	**14 ga 2.1 mm**	**1/8" ga 3.2 mm**
KH726	KH710	KP4364-035 set to 0.030 / 0.035 knurled	0.030 NR-211	Voltage	1.5	2.5	3	4	6
				WFS	3.5	5	7	8	10
KH726	KH711		0.035 NR-211	Voltage	--	2	3	4	6
				WFS	--	3	4.5	6	10

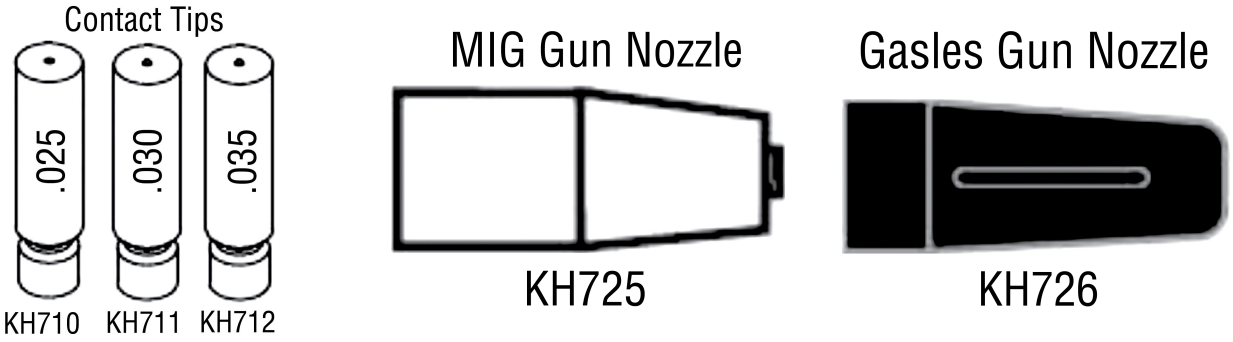
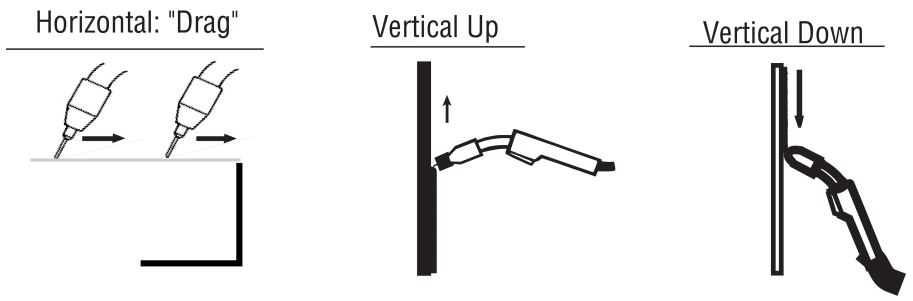
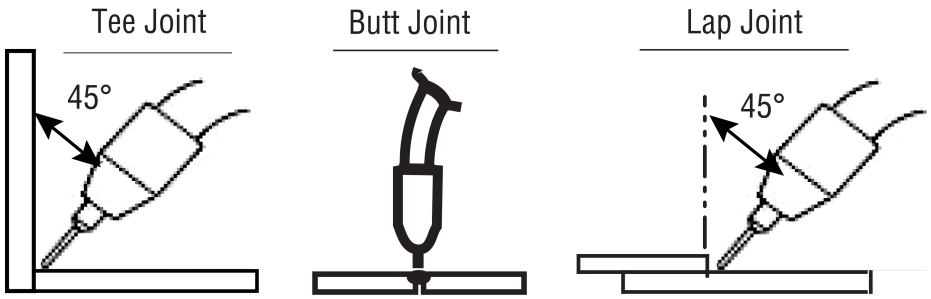
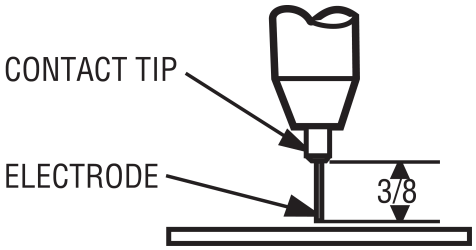


Table 2 :LOADING THE WIRE

Loading The Wire	Remember: Remove the contact tip prior to loading wire. Keep tension on the wire to prevent unspooling.
	1. Cut off the bent portion of the wire and straighten the first 4" for feeding into rolls and gun. **2.** Release spring loaded pressure arm and rotate the Idle Roll Arm away from Drive Roll. **3.** Thread wire through the guide tube, over drive roll and into gun liner. Close Idle Roll arm.
Wire Feed Tension	The suggested Wire Feed Speed settings in the table below are based on a midrange wire tension setting. The tension may be changed if required to improved wire feeding; however, the WFS setting may have to be adjusted from the values in the table below.
Helpful Hints	Weld at a Steady Pace. Do NOT weave the arc, neither forward, backward, or sideways. Remove Slag with the Chipping Hammer to expose weld. For Horizontal Weld Joints, remember: "Drag if there's Slag". Refer to Manual for Troubleshooting Poor Weld Quality.

Direction of Welding AND Angle of Gun relative to Weld Direction	
Proper Gun Angles for common Weld Joint Types	
Electrical Stickout	Maintain an electrode Stick-out of 3/8" while welding. 

⚠ WARNING

Use of this unit on thicker materials than recommended may result in welds of poor quality. The welds may appear to be fine, but may lack the fusion or bonding necessary to give a strong weld. This is called "Cold Casting" or "cold lapping" and is somewhat similar to a cold solder joint. Weld failure may result.

MAINTENANCE

SAFETY PRECAUTIONS

⚠ WARNING



ELECTRIC SHOCK can kill.

Turn the input power OFF at the welding power source before installation or changing drive rolls and / or guides.

Do not touch electrically live parts.

When inching with the gun trigger, electrode and drive mechanism are "hot" to work and ground and could remain energized several seconds after the gun trigger is released.

Do not operate with covers, panels or guards removed or open.

Only qualified personnel should perform maintenance work.

ITEMS REQUIRING NO MAINTENANCE

- Drive Motor and Gearbox - Lifetime lubrication
- Wire Reel Spindle - Do NOT lubricate shaft

ROUTINE PERIODIC MAINTENANCE

- **BEFORE EACH USE** - Check over machine and accessories for any obvious condition that may prevent safe performance or operation. Repair or replace items as necessary to correct any abnormal condition.

AFTER 5 MINUTES OF WELDING OR WHEN SPATTER ACCUMULATES ON THE CONTACT TIP:

- **CLEANING TIP AND NOZZLE** - With the power switch in the off position, keep the contact tip and nozzle clean to avoid arc bridging between them. Bridging can result in a shorted nozzle, poor welds and an overheated gun. Hint: Anti-stick spray or gel, available from a welding supplier, may reduce buildup and aid in spatter removal.

TROUBLESHOOTING

HOW TO USE TROUBLESHOOTING GUIDE

⚠ WARNING



Service and Repair should only be performed by Lincoln Electric Factory Trained Personnel. Unauthorized repairs performed on this equipment may result in danger to the technician and machine operator and will invalidate your factory warranty. For your safety and to avoid Electrical Shock, please observe all safety notes and precautions detailed throughout this manual.

This Troubleshooting Guide is provided to help you locate and repair possible machine malfunctions. Simply follow the three-step procedure listed below.

1. **LOCATE PROBLEM (SYMPTOM)**

   Look under the column labeled “PROBLEM (SYMPTOMS)”. This column describes possible symptoms that the machine may exhibit. Find the listing that best describes the symptom that the machine is exhibiting.

2. **POSSIBLE CAUSE**

   The second column labeled “POSSIBLE CAUSE” lists the obvious external possibilities that may contribute to the machine symptom.

3. **RECOMMENDED COURSE OF ACTION**

   This column provides a course of action for the Possible Cause, generally it states to contact your local Lincoln Authorized Field Service Facility.

⚠ CAUTION



If you do not understand or are unable to perform the Recommended Course of Action safely, contact your local Lincoln Authorized Field Service Facility.

Observe all additional safety guidelines detailed throughout this manual.

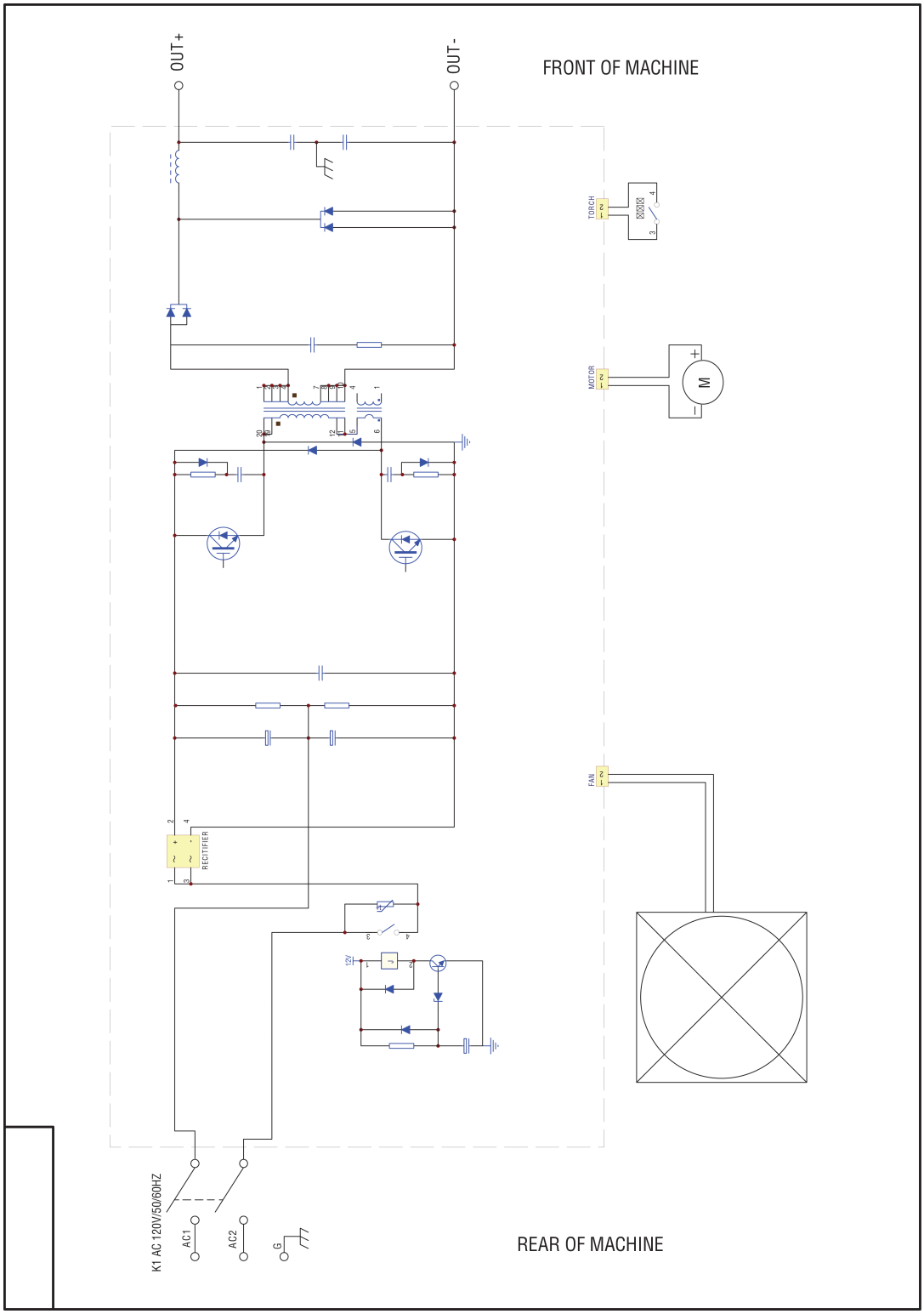
TROUBLESHOOTING GUIDE

Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
Bead is too thick (intermittently).	**1.** Travel speed is slow and / or inconsistent. **2.** Output heat range is too high.	**1.** Increase and maintain a constant travel speed. **2.** Turn the voltage down.
Bead does not penetrate base metal.	**1.** Travel speed is inconsistent. **2.** Output heat range is too low.	**1.** Decrease and maintain a constant travel speed. **2.** Turn the voltage up.
Wire sputters and sticks to workpiece.	**1.** The wire is damp. **2.** Wire feed speed (WFS) is too fast.	**1.** Change to dry wire. Be sure wire is stored in a dry location. **2.** Reduce WFS.
Edge of weld has ragged depressions.	**1.** Travel speed is too fast. **2.** WFS is too fast. **3.** Output heat range is too high.	**1.** Reduce travel speed. **2.** Reduce WFS. **3.** Set the Low - High Heat Range switch to Low or the Fine Heat Adjustment to (1).

APPENDIX

WIRING DIAGRAM



CUSTOMER ASSISTANCE POLICY

CUSTOMER ASSISTANCE POLICY

The business of Lincoln Electric is manufacturing and selling high quality welding equipment, automated welding systems, consumables, and cutting equipment. Our challenge is to meet the needs of our customers, who are experts in their fields, and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or technical information about their use of our products. Our employees respond to inquiries to the best of their ability based on information and specifications provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment, or to provide engineering advice in relation to a specific situation or application. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or communications. Moreover, the provision of such information or technical information does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or technical information, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose or any other equivalent or similar warranty is specifically disclaimed.

Lincoln Electric is a responsive manufacturer, but the definition of specifications, and the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

WELD FUME CONTROL EQUIPMENT

The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable OSHA PEL and ACGIH TLV limits.

PARTS LIST

Content/Details may be changed or updated without notice. For most current Instruction Manuals, go to PARTS.LINCOLNELECTRIC.COM.