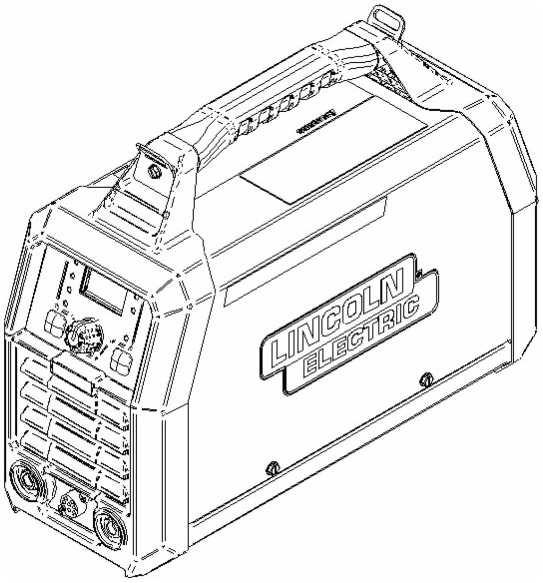
INSTRUCTION MANUAL

SPRINTER™ 180Si



For use with Product/Code Numbers:

13539

Save for future reference

Date Purchased

Code: (ex: 10859)

Serial: (ex: U1060512345)

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THE LINCOLN ELECTRIC COMPANY
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SAFETY INFORMATION

SAFETY DEPENDS ON YOU

Lincoln welding and cutting 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 OR CUT** containers or materials which previously had been in contact with hazardous substances unless they are properly cleaned. This is extremely dangerous.

- **DO NOT WELD OR CUT** 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 current creates EMF fields around welding cables and welding machines.
- 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

SPRINTER 180Si (K5453-1)

OUTPUT RANGE				
Input Power	**Welding Mode**	**Input Range**	**Output Range**	**Open Circuit Voltage (OCV)**
120 V 1 PHASE 60 Hz 230 V 1 PHASE 60 Hz	TIG (DC)	120 V	10-110 A	Uo=14 V High Frequency Up=12 Kv
		230 V	10-200 A	
	STICK (DC)	120 V	20-85 A	Uo=110 V Ur=14 V
		230 V	20-180 A	

TIG RATED OUTPUT: CURRENT/DUTY CYCLE[1]	
Input Voltage 120 V	110 A/40%
	70 A/100%
230 V	200 A/25%
	100 A/100%

STICK RATED OUTPUT: CURRENT/DUTY CYCLE[1]	
Input Voltage 120 V	85 A/40%
	50 A/100%
230 V	180 A/25%
	90 A/100%

RECOMMENDED BREAKER AND FUSE SIZES AND MAXIMUM EFFECTIVE CURRENT			
Input Voltage	**Fuse (Super Lag) Or Breaker Size[2] [3]**	**Effective Current Draw**	**Maximum Current Draw**
230 V	30 A	14 A	28 A
120 V	25 A	13.5 A	21 A

[1] Based upon 10 minute time period (i.e., for 60% duty cycle, it is 6 minutes on and 4 minutes off).

[2] Also called “inverse time” or “thermal/magnetic” circuit breakers; circuit breakers that have a delay in tripping action that decreases as the magnitude of current increases.

[3] To prevent nuisance breaker trips, refrain from operating at maximum output and exceeding rated duty cycle.

PHYSICAL DIMENSIONS			
Length	**Width**	**Height**	**Weight**
16.84 IN (428 MM)	6.43 IN (164 MM)	11.71 IN (298 MM)	19.5 lbs (8.8 Kg)

TEMPERATURE RANGE	
Operating Temperature Range	14° F ~ 104° F (-10° C ~ +40° C)
Storage Temperature Range	14° F ~ 104° F (-10° C ~ +40° C)

OTHER PARAMETERS
Protection Class
IP21S

SAFETY PRECAUTIONS

⚠ WARNING



Do not attempt to use this equipment until you have thoroughly read the engine manufacturer's manual supplied with your welder. It includes important safety precautions, detailed engine starting, operating and maintenance instructions, and parts lists.

⚠ WARNING



ELECTRIC SHOCK can kill.

Do not touch electrically live parts or electrode with skin or wet clothing.

Insulate yourself from work and ground.

Always wear dry insulating gloves.

⚠ WARNING



ENGINE EXHAUST can kill.

If used with engine power generators, use in open, well ventilated areas or vent exhaust outside.

⚠ WARNING



MOVING PARTS can injure.

Do not operate with doors open or guards off.

Keep away from moving parts.

See additional warning information at front of this operator's manual.

Only qualified personnel should install, use, or service this equipment.

TIG AMPERAGE VALUES

	Material Thickness				
Material Type	24 Ga (0.024 in) (0.6 mm)	16 Ga (0.060 in) (1.5 mm)	12 Ga (0.105 in) (2.7 mm)	10 Gauge (0.135 in) (3.4 mm)	3/16" (4.8 mm)
Steel (DC-)	25-35 A	70-85 A	80-100 A	90-120 A	130-160 A*
Stainless Steel (DC-)	25-35 A	70-85 A	80-100 A	90-120 A	130-160 A*

***230 V Input Required**

	Material Thickness				
Material Type	24 Ga (0.024 in) (0.6 mm)	16 Ga (0.060 in) (1.5 mm) or 1/16" (0.62 in) (1.6 mm)	12 Ga (0.105 in) (2.7 mm) or 0.090" (2.3 mm)	10 Ga (0.135 in) (3.4 mm) or 1/8" (0.125 in) (3.2 mm)	3/16" (4.8 mm)
Suggested Tungsten Diameter	1/16" (1.6 mm)	3/32" (2.4 mm)	3/32" (2.4 mm)	3/32" (2.4 mm)	3/32" (2.4 mm)
Suggested Filler Metal Diameter	1/16" (1.6 mm)	1/16" (1.6 mm)	3/32" (2.4 mm)	3/32" (2.4 mm)	1/8" (3.2 mm)

STICK AMPERAGE VALUES

	Material Thickness			
Material Type	Stick Electrode Diameter	12 Gauge (0.105 in) (2.7 mm)	10 Gauge (0.135 in) (3.4 mm)	3/16" (4.7 mm)
Steel E6010/E6011/ E6013 (DC+)	3/32" (2.4 mm)	50-70 A	60-80 A	-
	1/8" (3.2 mm)	65-85 A	75-95 A	90-110 A*
	5/32" (4.0 mm)	90-110 A*	115-135 A*	130-150 A*
Steel E7018 (DC+)	3/32" (2.4 mm)	70-90 A	80-100 A	90-110 A*
	1/8" (3.2 mm)	90-110 A*	105-125 A*	115-135 A*
	5/32" (4.0 mm)	105-125 A*	115-135 A*	140-160 A*

***230 V Input Required**

E6010/E6011 - Deeper penetrating electrode that can be used in all positions. Frequently used for joining pipe.

E6013 - Shallower penetrating electrode that can be used in all positions. Commonly used for wide root openings, or conditions of poor fit up.

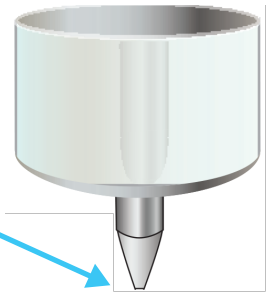
E7018 - Low hydrogen electrode used for joints involving high-strength (structural), high carbon, or low alloy steels. Smooth arc with medium arc penetration. Can be used in all positions.

TUNGSTEN - PURE TUNGSTEN IS NOT RECOMMENDED

Color	Tungsten Types	DC Polarity	Applications
Gold	1.5% Lanthanum	X	Good choice for welding titanium, nickel, copper, mild steel and stainless steel.
Blue	2% Lanthanated	X	Good all around choice for both AC and DC, in welding low alloyed & non-corroding steels, aluminum, magnesium, titanium, nickel, and copper.
Gray	2% Ceriated	X	
Chartreuse or Purple (E3®)	1.5% Lanthanum, 0.08% Zirconium, 0.08% Yttrium	X	

Tungsten Preparation

Tungsten should have a blunt tip.



SELECT SUITABLE LOCATION

⚠ CAUTION

This power source should not be subjected to rain or snow, nor should any parts of it be submerged in water. Doing so may cause improper operation as well as pose a safety hazard. The best practice is to keep the machine in a dry, sheltered area.

LOCATION AND VENTILATION

The welder should be located to provide an unrestricted flow of clean, cool air to the cooling air inlets and to avoid restricting the cooling air outlets. Also, locate the welder so that the engine exhaust fumes are properly vented to an outside area.

Locate the machine away from radio controlled machinery. Normal operation of the welder may adversely affect the operation of RF controlled equipment, which may result in bodily injury or damage to the equipment.

The EMC or RF classification of this equipment is Class A.

STACKING

The SPRINTER 180Si inverter machine CANNOT be stacked.

TILTING

⚠ CAUTION



The bottom of machine must always be placed on a firm, secure, level surface. There is a danger of the machine toppling over if this precaution is not taken.

Do not place or operate the machines on a surface with an incline greater than 15° from horizontal.

Place the welder where clean cooling air can freely circulate in through the rear louvers and out through the front side. Water, dirt, dust or any foreign material that can be drawn into the welder should be kept to a minimum. Failure to observe these precautions can result in excessive operating temperatures and nuisance shutdowns.

INPUT VOLTAGE

The machine can be connected to either 120 V ±10% or 230 V ±10% input voltage. The supplied 230 V to 120 V adapter must be used when connecting to 120 V power.

For an output amperage guide based on input voltage see TECHNICAL SPECIFICATIONS on page A-1 of this manual.

INPUT POWER CONNECTION

1. Before starting the installation, check with the local power company if there are any questions about whether your power supply is adequate for the voltage, amperes, phase, and frequency specified on the welder rating plate. Also be sure the planned installation will meet the U.S. National Electrical Code and local code requirements. This welder may be operated from a single phase line or from one phase of a two or three phase line. The center contact in the receptacle is for the grounding connection. A green wire in the input cable connects this contact to the frame of the welder. This ensures proper grounding of the welder frame when the welder plug is inserted into a grounded receptacle.
2. The power cord adapter supplied with the unit shall only be used with the SPRINTER 180Si unit.
3. The SPRINTER 180Si is shipped with a hardwired 230 V cord and a 120 V to 230 V input adapter.

ENGINE DRIVEN GENERATOR

The machine is designed to operate on engine driven generators as long as the auxiliary can supply adequate voltage, frequency and power as indicated in TECHNICAL SPECIFICATIONS on page A-1 of this manual. The auxiliary supply of the generator must also meet the following conditions:

Frequency: 60 Hz for 100-240 V Input.

Generator Minimum: 8 kW

It is important to check these conditions because many engine driven generators produce high voltage spikes. Operation of this machine with engine driven generators not conforming to these conditions is not recommend and may damage the machine and is also NOT covered by warranty.

⚠ WARNING



ELECTRIC SHOCK can kill.

Keep the electrode holder and cable insulation in good condition.

Do not touch electrically live parts or electrode with skin or wet clothing.

Insulate yourself from work and ground.

Turn the input line Switch on the machine “Off” before connecting or disconnecting output cables or other equipment.

⚠ CAUTION



For secure electrical connection, the power source output sockets connecting cable plugs must be tightened. Damage may occur to the output socket or welding performance maybe compromised.

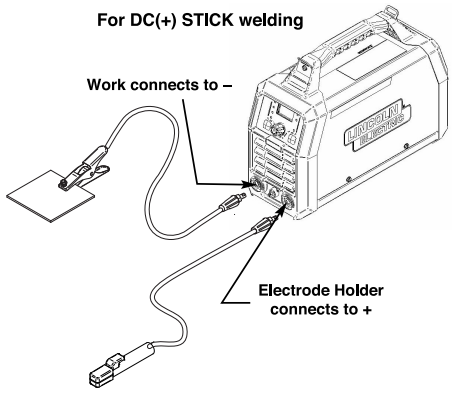
To avoid interference problems with other equipment and to achieve the best possible operation, route all cables directly to the work. Avoid excessive lengths and do not coil excess cable.

OUTPUT CONNECTIONS

A quick disconnect system using twist mate cable plugs is used for the welding cable connections. Refer to the following sections for more information on connecting the machine for operation of STICK WELDING on page A-7 or TIG WELDING (GTAW) on page A-8 .

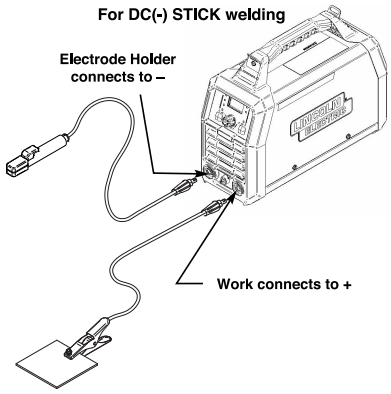
STICK WELDING

First determine the proper electrode polarity for the electrode to be used. Consult the electrode data for this information. Then connect the output cables to the output terminals of the machine for the selected polarity. Shown here is the connection method for DC (+) welding. (See Figure to the Right)



Connect the welding cable to the (+) terminal and the work clamp to the (-) terminal. Insert the connector with the key lining up with the key way and rotate approximately 1/4 turn clockwise. Do not over tighten.

For DC (-) stick welding, switch the cable connections at the machine so that the welding cable is connected to (-) and the work clamp is connected to (+). (See Figure to the Right)



TIG WELDING (GTAW)

The machine has a built in gas solenoid so a TIG Torch with a one piece power/gas cable can be quickly attached.

Connect the torch cable to the (-) terminal of the machine and the work clamp to (+) terminal - refer to Figures below. Insert the connector with key lining up with the key way and rotate approximately 1/4 turn clockwise. Do not over tighten. Also connect the trigger male connector to the female 8-pin connector on the case front.

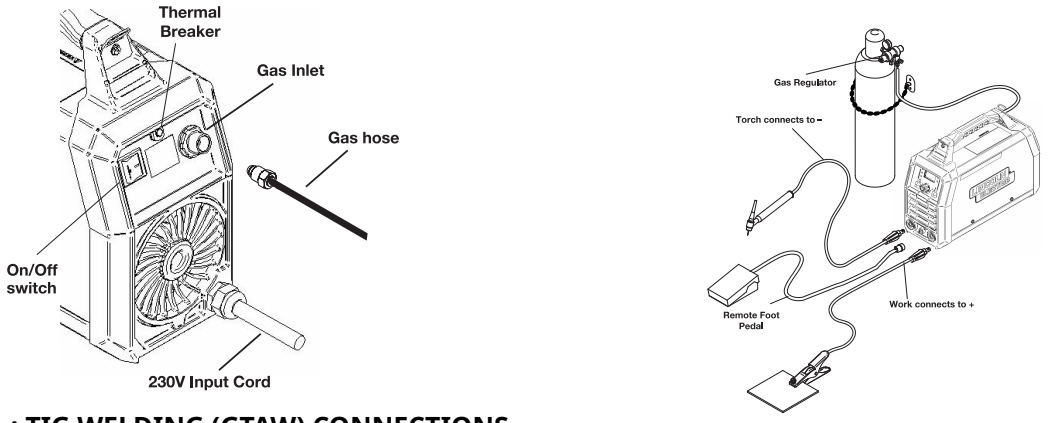


Figure 1 : TIG WELDING (GTAW) CONNECTIONS

STRIKING ARC OF TIG OPERATION

Ensure the foot pedal connector is firmly tightened to the front of the machine. Press the foot pedal to start the arc & increase pressure to increase welding current. Current can be increased to the maximum value set on the front of the machine.

Note: High Frequency Arc Start is present for 1/2 second after foot pedal is pressed. To start the arc, position the tungsten 1/2 inch or less from the work piece and then press the pedal. The foot pedal is optional for touch-start TIG.

THERMAL PROTECTION

Thermostats protect the machine from excessive operating temperatures. Excessive temperatures may be caused by a lack of cooling air or operating the machine beyond the duty cycle and output rating. If excessive operating temperature should occur, the thermostats will prevent output voltage or current.

THERMAL BREAKER

If the current conducted through the breaker exceeds breaker rating for an extended period of time, the breaker will open and require manual reset. (See Figure 1 : TIG WELDING (GTAW) CONNECTIONS on page A-8)

POST FLOW

The SPRINTER 180Si has built-in post flow to protect the tungsten and weldment from contamination. The post flow time is dependent on the amperage set on the front of the machine and can be seen in this table.

• 10-29 Amps	3 seconds
• 30-49 Amps	4 seconds
• 50-69 Amps	5 seconds
• 70-89 Amps	6 seconds
• 90-109 Amps	7 seconds
• 110-129 Amps	8 seconds
• 130-149 Amps	9 seconds
• 150-200 Amps	10 seconds

MACHINE GROUNDING AND HIGH FREQUENCY INTERFERENCE PROTECTION

The welder must be grounded. See your local and national electrical codes for proper grounding methods.

The high frequency generator, being similar to a radio transmitter, can be blamed for radio, TV and electronic equipment interference problems. These problems may be the result of radiated interference.

Proper grounding methods can reduce or eliminate radiated interference.

Radiated interference can develop in the following four ways:

1. Direct interference radiated from the welder.
2. Direct interference radiated from the welding leads.
3. Direct interference radiated from feedback into the power lines.
4. Interference from re-radiation of “pickup” by ungrounded metallic objects.

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

1. Keep the welder power supply lines as short as possible and enclose as much of them as possible in rigid metallic conduit or equivalent shielding for a distance of 50 feet (15.2 m). There should be good electrical contact between this conduit and the welder case ground. Both ends of the conduit should be connected to a driven ground and the entire length should be continuous.
2. Keep the work and electrode leads as short as possible and as close together as possible. Lengths should not exceed 25 ft (7.6 m). Tape the leads together when practical.
3. Be sure the torch and work cable coverings are free of cuts and cracks that allow high frequency leakage.
4. Keep the torch in good repair and all connections tight to reduce high frequency leakage.
5. It is recommended that the work piece should be connected to an earth ground close to the work clamp, using one of the following methods:

   a) A metal underground water pipe in direct contact with the earth for ten feet or more.

   b) A 3/4” (19 mm) galvanized pipe or a 5/8” (16 mm) solid galvanized iron, steel or copper rod driven at least eight feet into the ground.

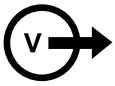
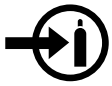
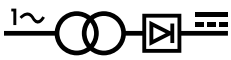
   The ground should be securely made and the grounding cable should be as short as possible using cable of the same size as the work cable, or larger. Grounding to the building frame electrical conduit or a long pipe system can result in re-radiation, effectively making these members radiating antennas.
6. Keep cover and all screws securely in place.
7. Electrical conductors within 50 ft (15.2 m) of the welder should be enclosed in grounded rigid metallic conduit or equivalent shielding, wherever possible. Flexible metallic conduit is generally not suitable.

8. Electrical conductors within 50 ft (15.2 m) of the welder should be enclosed in grounded rigid metallic conduit or equivalent shielding, wherever possible. Flexible metallic conduit is generally not suitable.

Failure to observe these recommended installation procedures can cause radio or TV and electronic equipment interference problems and result in unsatisfactory welding performance resulting from lost high frequency power.

OPERATION

GRAPHIC SYMBOL USED IN THE MANUAL OR BY THIS MACHINE

	INPUT POWER	U_p	PEAK VOLTAGE		ON
U_r	REDUCED OPEN CIRCUIT VOLTAGE		OFF	U_0	OPEN CIRCUIT VOLTAGE
	HIGH TEMPERATURE	U_1	INPUT VOLTAGE		CIRCUIT BREAKER
U_2	OUTPUT VOLTAGE		POSITIVE OUTPUT	I_1	INPUT CURRENT
	NEGATIVE OUTPUT	I_2	OUTPUT CURRENT		INPUT POWER
	PROTECTIVE GROUND		DIRECT CURRENT		WARNING OR CAUTION
	OUTPUT VOLTAGE		EXPLOSION		SINGLE PHASE
	DANGEROUS VOLTAGE		INPUT GAS		SHOCK HAZARD
	SINGLE PHASE INVERTER		TIG TORCH	$*U_p$	PEAK VOLTAGE
	STICK ELECTRODE HOLDER	S	TYPE S WELDING POWER SOURCE		REFER TO OPERATOR'S MANUAL
VRD™	VOLTAGE REDUCTION DEVICE	A	OUTPUT AMPERAGE	 PULSE/SEC	PULSES PER SECOND DC TIG

GENERAL DESCRIPTION

The SPRINTER 180Si is a portable TIG and Stick welding machine that lets hobbyists, fabricators, and craftsmen explore their creativity. It is designed to help expand your welding expertise. As your skills and confidence grow, you can take advantage of the SPRINTER 180Si's additional functionality. No matter your skill level, you won't be disappointed using this machine. The SPRINTER 180Si provides smooth and stable Stick DC and DC TIG welding on steel, stainless steel and chrome-molly. A user-friendly interface enables the operators to set it, forget it and weld.

CHARECTERISTICS

- To ensure a high success rate of arc starting. The power source incorporates a high frequency arc start circuit for TIG.
- A smooth stable arc on DC polarity.
- Good stick welding capabilities for outdoor work or thicker materials.

PROCESSES

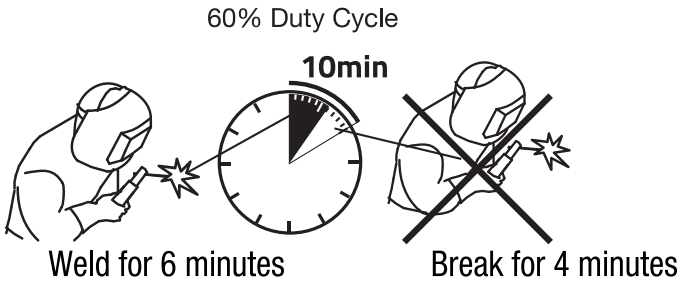
- STICK DC
- DC TIG

WELDING CAPABILITY

Please see TECHNICAL SPECIFICATIONS on page A-1 for rated outputs for the SPRINTER 180Si inverter machine. It is capable of higher duty cycles at lower output currents.

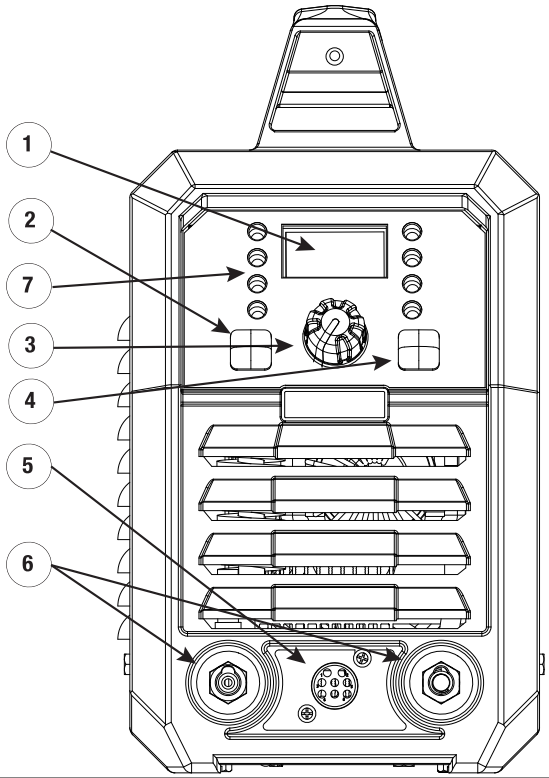
If the duty cycle is exceeded, a thermal protector will shut off the output until the machine cools.

A Duty Cycle of 60% example is:



CASE FRONT CONTROLS

The front panel includes a “Process Mode Button," and "Settings" button and one encoder knob.



Item	Description
1	Digital Display
2	Process Select/Reset/VRD
3	Encoder Knob
4	Pulse Adjustment
5	Remote Connector
6	Welding Output Receptacle
7	Status Lights

*Resetting

Pressing the Process Button in TIG mode for 5 seconds will reset the settings to factory default.

DIGITAL DISPLAY

Current (A)

Pulses per Second (PPS)

STAUS LIGHTS

Output voltage - Illuminates when output voltage is present on the output receptacles.

VRD - VRD is active in Stick when welding is not occurring. VRD can reduce the potential for hazardous electric shock. Press the process mode button for 5 seconds to activate/ deactivate VRD while the machine is in stick mode.



Thermal Trip - illuminates or flashes when a thermal trip is present or there is an Over voltage/Under voltage problem.

PROCESS MODE BUTTON

Selecting the Mode button allows access to change the setting from 6010 Stick, Stick, Lift TIG or HF TIG (this last mode only present with foot pedal attached) see INSTALLATION on page A-1 for polarity setup.

SETTINGS BUTTON (PULSE FREQUENCY)

The Settings button will allow the user to gain access to Pulse Frequency for TIG welding.

TIG

1. Pressing the Settings button to gain access to the Pulse setting. Use the main encoder knob to make a change to the pulse setting (0f-100 PPS), which is set to “Off” as a default setting. The pulse setting automatically regulates the output current between the peak amperage setting, and a background amperage setting that is equal to 50% of the peak amperage setting.
2. Pressing this button a third time will return to the amperage control setting.

In the event that no selection is made within any setting for five seconds, the setting will exit and return to the amperage control setting.

ERROR CODES

The following error codes will appear on the Digital Display during the conditions listed.

F01: Overheat; The machine has thermally tripped; allow the machine to cool before continuing to weld.

F02: Over voltage or Under voltage; The supply voltage connected to the machine is greater than 250 VAC or less than 90 VAC. Review supply voltage.

F09: Output Short Circuit; A short is detected between the output receptacles.

ACCESSORIES AND OPTIONS

ACCESSORIES

TIG Torch Options

- PTA-17F Flexible Head with 12.5’ cable.
- K1622-7 - 10-25 Dinse Connector with gas pass through.

Parts Kits

Parts Kits provide all the torch accessories you need to start welding. Parts Kits provide collets, gas lens, a back cap, alumina nozzles and tungsten’s in a variety of sizes, all packaged in an easy to carry re-closable box.

- KP4760-HD - Caliber Torch Parts for .040” to 3/32” Tungsten.

K5482-1 Twist mate Work Lead Assembly
Includes Twist Mate connector. 12.5 ft cable length.

K5483-1 Twist mate Electrode Holder Assembly
Includes Twist Mate connector. 12.5 ft cable length.

K4361-1 Foot Pedal for TIG Welding
Required for HF TIG operation and optional for Lift TIG operation.

K5549-1 Carrying Case
For transporting and storing the machine and cables.

MAINTENANCE

SAFETY PRECAUTIONS

⚠ WARNING



ELECTRIC SHOCK CAN KILL.

For safety while maintaining the machine, please shut off the supply power and wait for 5 minutes, until capacitor voltage drops to safe voltage.

All service work should be conducted by an authorized Lincoln Electric field service agent.

⚠ WARNING



To avoid receiving a high frequency shock, keep the TIG torch and cables in good condition.

ROUTINE AND PERIODIC MAINTENANCE

In order to guarantee the arc welding machine works efficiently and safely, it must be maintained regularly. Refer to the maintenance items in the following table.

MAINTENANCE ITEMS	
Daily Examination	• Check for correct operation of the control knob and buttons on the front of the power source. • If the switch is not operational, replace immediately. • Check the function of the LED display. If it doesn't work, maintain or replace the display PCB. • Check to see if fan is operating normally. If the fan is not rotating and obstruction is not present then replace the fan. • Check the output terminals for overheating, if so change output terminals. Ensure welding lead plugs are connected tightly. • Check welding leads and power cord for damage. If damaged replace parts.
Monthly Examination	Use a gentle dry compressed air to clean the inside of arc welding machine. Especially for removing dust from heat sinks, and PCB components.

OVERLOAD PROTECTION

THERMOSTATIC PROTECTION

This welder has thermostatic protection from excessive duty cycles, overloads, loss of cooling, and excessive ambient temperatures. When the welder is subjected to an overload, or inadequate cooling, the thermostats will open. This condition will be indicated by the illumination or while welding of the yellow Thermal Shutdown Light on the front panel. The fan will continue to run to cool the power source. Post flow occurs when TIG welding is shut down, but no welding is possible until the machine is allowed to cool and the yellow Thermal Shutdown Light goes out.

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

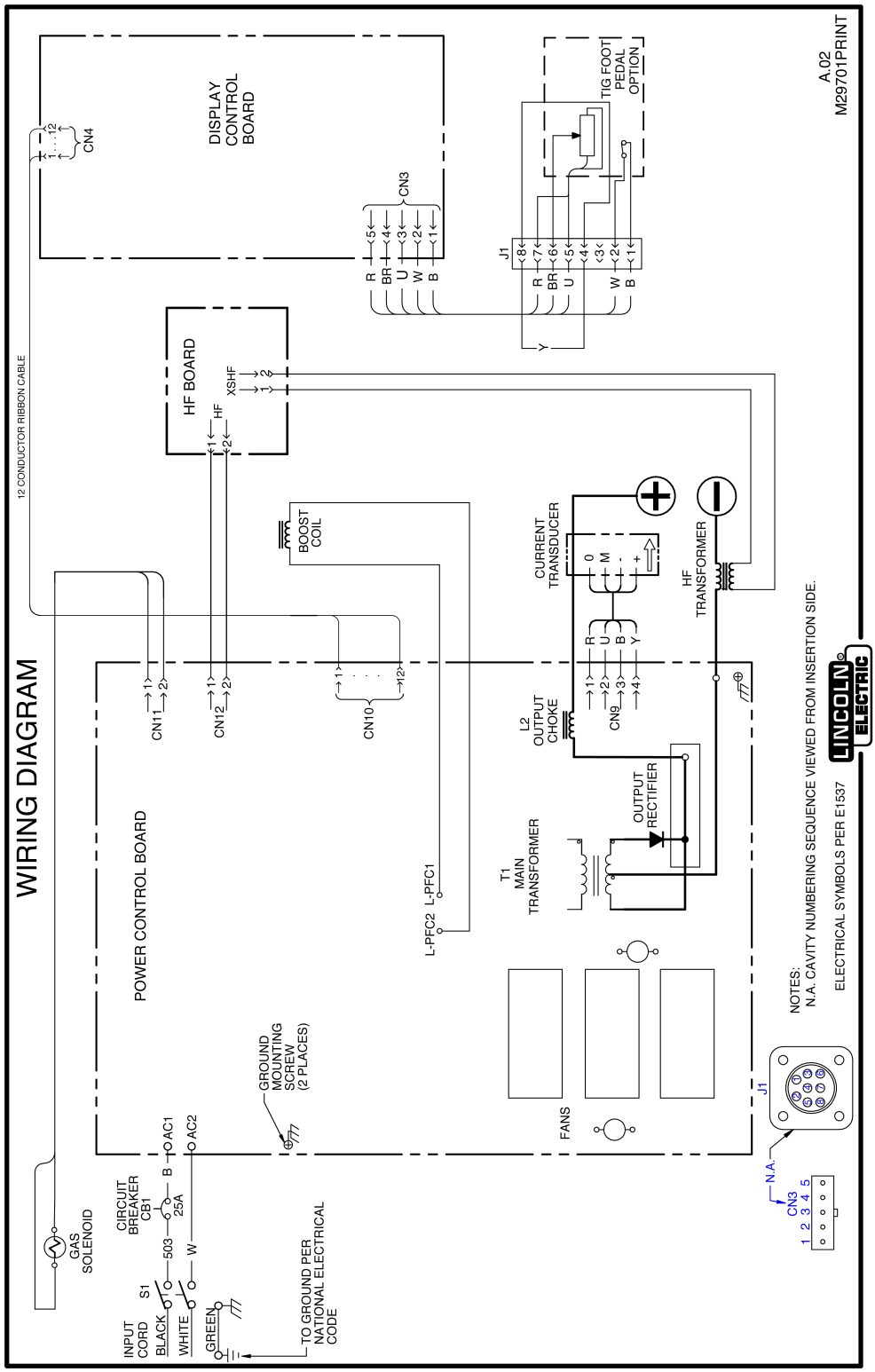
PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENTS(S)	RECOMMENDED COURSE OF ACTION
Machine is Dead - No Output - No Fan.	**1.** Make certain that the input power switch is in the “ON” position and machine is plugged in. **2.** Check the input voltage at the machine. Input voltage must match the rating plate and voltage connection. Refer to the INSTALLATION on page A-1 of this manual. **3.** Blown or missing fuses in input line.	If all recommended possible areas of misadjustments have been checked and the problem persists, **Contact your local Lincoln Authorized Field Service Facility**.
Fan runs - No output from machine in either Stick or TIG modes.	**1.** Check for proper input voltages per nameplate and voltage reconnection. **2.** Check to make sure cables are firmly connected.	
Fan runs - No output from machine in either Stick or TIG modes and the yellow light on the control panel is on or flashing while welding.	Welding application may have exceed the recommended duty cycle. Allow the unit to run until the fan cools the unit and the yellow light goes out.	
Machine does not respond (no gas flow, no high frequency and no open circuit voltage) when arc start switch or Amptrol is activated - fan is working.	**1.** Machine MUST be in TIG Mode. **2.** The Amptrol may be defective. Check for continuity between pins “D” and “E” on cable connector when Amptrol is depressed.	
Machine regularly over heats - thermostat opens, Yellow light on front panel illuminates or flashes. The fan runs but machine has no output.	**1.** Welding application may exceed recommended duty cycle. Reduce the duty cycle. **2.** Dirt and dust may have clogged the cooling channels inside the machine. Blow out unit with clean, dry low pressure air. **3.** Air intake, brickwork and exhaust louvers may be blocked due to inadequate clearance around machine.	

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENTS(S)	RECOMMENDED COURSE OF ACTION
Machine output is intermittently lost.	**1.** Check Amptrol for proper operation and loose connections. **2.** Check for proper input voltage and proper voltage reconnection.	If all recommended possible areas of misadjustments have been checked and the problem persists, **Contact your local Lincoln Authorized Field Service Facility**
Arc “Flutters” when TIG welding.	**1.** Tungsten electrode may be too large in diameter for the current setting. **2.** Tungsten not prepared properly - should have slight blunt. **3.** Gas shielding may be insufficient. Increase gas flow; reduce tungsten stick out beyond gas cup. **4.** Check for contaminated gas or leaks in the gas line, torch, or connections. **5.** If a helium blend is used as a shielding gas, then reduce the percentage of helium.	
Arc “Pulsates” when TIG welding.	**1.** Check to see if the Pulse feature is active.	
Black areas along weld bead.	**1.** Clean any oily or organic contamination from the work piece. **2.** Tungsten electrode may be contaminated. Replace or sharpen. **3.** Check for contaminated gas or leaks in the gas line, torch, or connections. **4.** Gas shielding may be insufficient. Increase gas flow; reduce tungsten stick out beyond gas cup.	
Weak high frequency - machine has normal welding output.	**1.** Check for poor connections in the welding circuit. **2.** Gas shielding may be insufficient. Increase gas flow; reduce tungsten stick out beyond gas cup. **3.** Check for work and torch cables in poor condition allowing high frequency to “Leak Off”. **4.** Keep cables as short as possible.	

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENTS(S)	RECOMMENDED COURSE OF ACTION
High frequency “spark” is present at tungsten electrode, but operator is unable to establish a welding arc. Machine has normal open circuit voltage (refer to TECHNICAL SPECIFICATIONS on page A-1 in this manual).	**1.** The tungsten electrode may be contaminated. Replace or sharpen. **2.** The current control may be set too low. **3.** The tungsten electrode may be too large for the process. **4.** If a helium blend is used as a shielding gas, then reduce the percentage of helium. **5.** Tungsten is too far from the workpiece when starting.	If all recommended possible areas of misadjustment have been checked and the problem persists, **Contact your local Lincoln Authorized Field Service Facility**
No high frequency.	**1.** Ensure gas flow is present and cables are connected.	
No gas flow when Amptrol is activated in the TIG Mode. Machine has output - fan runs. A “Click” can be heard indicating that the gas solenoid valve is operating.	**1.** Gas supply is empty or not turned on. **2.** Flow regulator may be set too low. **3.** Gas hose may be pinched. **4.** Gas flow may be blocked with dirt. **5.** Consult your local welder/gas distributor.	
The end of the tungsten electrode melts away.	**1.** The welding current is too high for the electrode type and/or size. **2.** Check Polarity.	
Stick electrode “Blasts Off” when arc is struck.	**1.** Weld current may be set too high for electrode size. Reduce current control setting, or use a larger diameter electrode.	
Stick electrode “sticks” in the weld puddle.	**1.** The weld current may be set too low. Increase the current control setting or use a smaller diameter electrode.	

APPENDIX

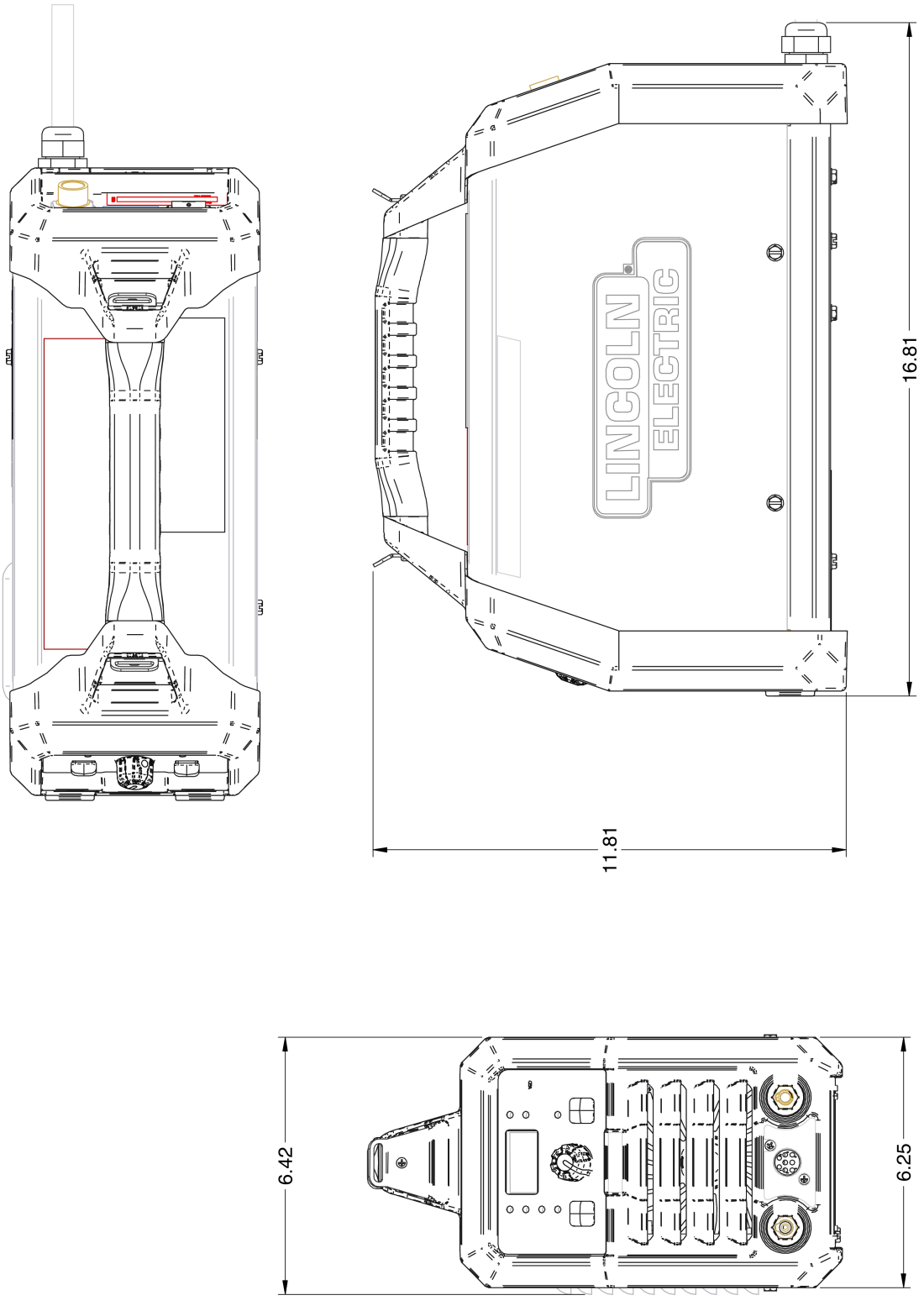
WIRING DIAGRAM



NOTE: This diagram is for reference only. It may not be accurate for all machines covered by this manual. The specific diagram for a particular code is pasted inside the machine on one of the enclosure panels. If the diagram is illegible, write to the Service Department for a replacement. Give the equipment code number.

DIMENSIONS

DIMENSIONAL PRINT



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.