

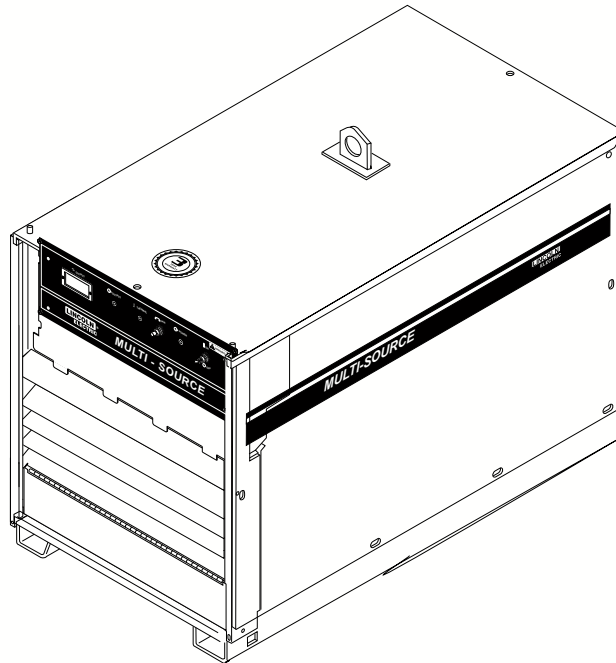
For use with machines Code 10668



This manual covers equipment which is no longer in production by The Lincoln Electric Co. Specifications and availability of optional features may have changed.

### Safety Depends on You

Lincoln arc welding 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.



Date of Purchase: \_\_\_\_\_  
Serial Number: \_\_\_\_\_  
Code Number: \_\_\_\_\_  
Model: \_\_\_\_\_  
Where Purchased: \_\_\_\_\_

## OPERATOR'S MANUAL



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- World's Leader in Welding and Cutting Products •
- Sales and Service through Subsidiaries and Distributors Worldwide •

Cleveland, Ohio 44117-1199 U.S.A. TEL: 216.481.8100 FAX: 216.486.1751 WEB SITE: [www.lincolnelectric.com](http://www.lincolnelectric.com)

## ⚠ WARNING

### ⚠ CALIFORNIA PROPOSITION 65 WARNINGS ⚠

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

The Above For Diesel Engines

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

The Above For Gasoline Engines

**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 W117.2-1974. 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.

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



1.b. Operate engines in open, well-ventilated areas or vent the engine exhaust fumes outdoors.



1.c. 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.

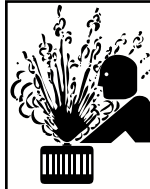
1.d. Keep all equipment safety guards, covers and devices in position and in good repair. Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.

1.e. 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.



1.f. 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.

1.g. 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.



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



### ELECTRIC AND MAGNETIC FIELDS may be dangerous

2.a. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding current creates EMF fields around welding cables and welding machines

2.b. EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.

2.c. Exposure to EMF fields in welding may have other health effects which are now not known.

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

2.d.1. Route the electrode and work cables together - Secure them with tape when possible.

2.d.2. Never coil the electrode lead around your body.

2.d.3. 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.

2.d.4. Connect the work cable to the workpiece as close as possible to the area being welded.

2.d.5. Do not work next to welding power source.

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## ELECTRIC SHOCK can kill.

- 3.a. 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.
- 3.b. 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.
- 3.c. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically "hot".
- 3.d. 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.
- 3.e. Ground the work or metal to be welded to a good electrical (earth) ground.
- 3.f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.
- 3.g. Never dip the electrode in water for cooling.
- 3.h. 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.
- 3.i. When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.
- 3.j. Also see Items 6.c. and 8.



## ARC RAYS can burn.

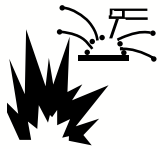
- 4.a. Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Headshield and filter lens should conform to ANSI Z87.1 standards.
- 4.b. Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.
- 4.c. 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.

- 5.a. 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 with electrodes which require special ventilation such as stainless or hard facing (see instructions on container or MSDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and below Threshold Limit Values (TLV) using local exhaust or mechanical ventilation. In confined spaces or in some circumstances, outdoors, a respirator may be required. Additional precautions are also required when welding on galvanized steel.**
- 5.b. 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.
- 5.c. Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.
- 5.d. Read and understand the manufacturer's instructions for this equipment and the consumables to be used, including the material safety data sheet (MSDS) and follow your employer's safety practices. MSDS forms are available from your welding distributor or from the manufacturer.
- 5.e. Also see item 1.b.

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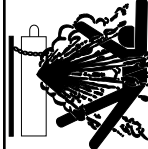


### WELDING SPARKS can cause fire or explosion.

6.a. 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.

- 6.b. 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.
- 6.c. 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.
- 6.d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure 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 (see address above).
- 6.e. Vent hollow castings or containers before heating, cutting or welding. They may explode.
- 6.f. Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuffless 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.
- 6.g. 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.
- 6.h. Also see item 1.c.



### CYLINDER may explode if damaged.

7.a. 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.

- 7.b. Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.
- 7.c. 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.
- 7.d. Never allow the electrode, electrode holder or any other electrically "hot" parts to touch a cylinder.
- 7.e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- 7.f. Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.
- 7.g. Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Association 1235 Jefferson Davis Highway, Arlington, VA 22202.



### FOR ELECTRICALLY powered equipment.

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

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## PRÉCAUTIONS DE SÛRETÉ

Pour votre propre protection lire et observer toutes les instructions et les précautions de sûreté spécifiques qui paraissent dans ce manuel aussi bien que les précautions de sûreté générales suivantes:

### Sûreté Pour Soudage A L'Arc

1. Protégez-vous contre la secousse électrique:
  - a. Les circuits à l'électrode et à la pièce sont sous tension quand la machine à souder est en marche. Eviter toujours tout contact entre les parties sous tension et la peau nue ou les vêtements mouillés. Porter des gants secs et sans trous pour isoler les mains.
  - b. Faire très attention de bien s'isoler de la masse quand on soude dans des endroits humides, ou sur un plancher métallique ou des grilles métalliques, principalement dans les positions assis ou couché pour lesquelles une grande partie du corps peut être en contact avec la masse.
  - c. Maintenir le porte-électrode, la pince de masse, le câble de soudage et la machine à souder en bon et sûr état de fonctionnement.
  - d. Ne jamais plonger le porte-électrode dans l'eau pour le refroidir.
  - e. Ne jamais toucher simultanément les parties sous tension des porte-électrodes connectés à deux machines à souder parce que la tension entre les deux pinces peut être le total de la tension à vide des deux machines.
  - f. Si on utilise la machine à souder comme une source de courant pour soudage semi-automatique, ces précautions pour le porte-électrode s'appliquent aussi au pistolet de soudage.
2. Dans le cas de travail au dessus du niveau du sol, se protéger contre les chutes dans le cas où on reçoit un choc. Ne jamais enrouler le câble-électrode autour de n'importe quelle partie du corps.
3. Un coup d'arc peut être plus sévère qu'un coup de soleil, donc:
  - a. Utiliser un bon masque avec un verre filtrant approprié ainsi qu'un verre blanc afin de se protéger les yeux du rayonnement de l'arc et des projections quand on soude ou quand on regarde l'arc.
  - b. Porter des vêtements convenables afin de protéger la peau de soudeur et des aides contre le rayonnement de l'arc.
  - c. Protéger l'autre personnel travaillant à proximité au soudage à l'aide d'écrans appropriés et non-inflammables.
4. Des gouttes de laitier en fusion sont émises de l'arc de soudage. Se protéger avec des vêtements de protection libres de l'huile, tels que les gants en cuir, chemise épaisse, pantalons sans revers, et chaussures montantes.
5. Toujours porter des lunettes de sécurité dans la zone de soudage. Utiliser des lunettes avec écrans latéraux dans les

zones où l'on pique le laitier.

6. Eloigner les matériaux inflammables ou les recouvrir afin de prévenir tout risque d'incendie dû aux étincelles.
7. Quand on ne soude pas, poser la pince à un endroit isolé de la masse. Un court-circuit accidentel peut provoquer un échauffement et un risque d'incendie.
8. S'assurer que la masse est connectée le plus près possible de la zone de travail qu'il est pratique de le faire. Si on place la masse sur la charpente de la construction ou d'autres endroits éloignés de la zone de travail, on augmente le risque de voir passer le courant de soudage par les chaînes de levage, câbles de grue, ou autres circuits. Cela peut provoquer des risques d'incendie ou d'échauffement des chaînes et des câbles jusqu'à ce qu'ils se rompent.
9. Assurer une ventilation suffisante dans la zone de soudage. Ceci est particulièrement important pour le soudage de tôles galvanisées plombées, ou cadmiées ou tout autre métal qui produit des fumées toxiques.
10. Ne pas souder en présence de vapeurs de chlore provenant d'opérations de dégraissage, nettoyage ou pistelage. La chaleur ou les rayons de l'arc peuvent réagir avec les vapeurs du solvant pour produire du phosgène (gas fortement toxique) ou autres produits irritants.
11. Pour obtenir de plus amples renseignements sur la sûreté, voir le code "Code for safety in welding and cutting" CSA Standard W 117.2-1974.

## PRÉCAUTIONS DE SÛRETÉ POUR LES MACHINES À SOUDER À TRANSFORMATEUR ET À REDRESSEUR

1. Relier à la terre le châssis du poste conformément au code de l'électricité et aux recommandations du fabricant. Le dispositif de montage ou la pièce à souder doit être branché à une bonne mise à la terre.
2. Autant que possible, l'installation et l'entretien du poste seront effectués par un électricien qualifié.
3. Avant de faire des travaux à l'intérieur de poste, la débrancher à l'interrupteur à la boîte de fusibles.
4. Garder tous les couvercles et dispositifs de sûreté à leur place.

Mar. '93

# Thank You

for selecting a **QUALITY** product by Lincoln Electric. We want you to take pride in operating this Lincoln Electric Company product  
•• as much pride as we have in bringing this product to you!

## **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.

Please record your equipment identification information below for future reference. This information can be found on your machine nameplate.

Model Name & Number \_\_\_\_\_

Code & Serial Number \_\_\_\_\_

Date of Purchase \_\_\_\_\_

Whenever you request replacement parts for or information on this equipment always supply the information you have recorded above.

**Read this Operators Manual completely** before attempting to use this equipment. Save this manual and keep it handy for quick reference. Pay particular attention to the safety instructions we have provided for your protection. The level of seriousness to be applied to each is explained below:

### **⚠ WARNING**

This statement appears where the information **must** be followed **exactly** to avoid **serious personal injury** or **loss of life**.

### **⚠ CAUTION**

This statement appears where the information **must** be followed to avoid **minor personal injury** or **damage to this equipment**.

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## TECHNICAL SPECIFICATIONS - Multi-Source K1752-1

INPUT - THREE PHASE ONLY								
Standard Voltage/Frequency			Input Current at Rated Output 100% Duty Cycle					
380/415/50			99A					
400/60			98A					
440/50			79A					
460/60			83A					
550/50			66A					
575/60			69A					
RATED OUTPUT								
<b>Duty Cycle</b> 100% Duty Cycle @ 50°C (122°F)			60 Hz-40 kW					
			Amps			Volts at Rated Amperes		
			533			75		
			50 Hz-36 kW					
			Amps			Volts at Rated Amperes		
			475			75.8		
CURRENT RANGE				OCV				
0-650 A				Maximum Open Circuit Voltage 80V				
RECOMMENDED INPUT WIRE AND FUSE SIZES								
INPUT VOLTAGE	HERTZ	INPUT AMPERE RATING	TYPE 75°C COPPER WIRE IN CONDUIT AWG(IEC-MM <sup>2</sup> ) SIZES 50°C (122°F) Ambient	TYPE 90°C COPPER WIRE IN CONDUIT AWG(IEC-MM <sup>2</sup> ) SIZES 50°C (122°F) Ambient	TYPE 75°C COPPER WIRE IN CONDUIT AWG(IEC-MM <sup>2</sup> ) SIZES 40°C (104°F) Ambient	TYPE 90°C COPPER WIRE IN CONDUIT AWG(IEC-MM <sup>2</sup> ) SIZES 40°C (104°F) Ambient	TYPE 75°C GROUND WIRE IN CONDUIT AWG(IEC-MM <sup>2</sup> ) SIZES	FUSE (SUPER LAG) OR BREAKER SIZE (AMPS)
380-415	50	99	1/0 (70)	2 (35)	2 (35)	3 (35)	6 (16)	150 Amp
460	60	83	2 (35)	3 (35)	3 (35)	4 (25)	6 (16)	125 Amp
575	60	69	3 (35)	4 (25)	4 (25)	4 (25)	8 (10)	100 Amp
PHYSICAL DIMENSIONS								
HEIGHT		WIDTH		DEPTH		NET WEIGHT		
30.8 in 781 mm		22.2in 565 mm		41 in 1040 mm		992 lbs. 450.5 kg.		
TEMPERATURE RANGES								
OPERATING TEMPERATURE RANGE				STORAGE TEMPERATURE RANGE				
-40 to +122°F -40 to +50°C				-40 to +185°F -40 to +85°C				

MULTI-SOURCE





**⚠ WARNING****ELECTRIC SHOCK** can kill.

- Have an electrician install and service this equipment.
- Turn the input power off at the fuse box before working on equipment.
- Do not touch electrically hot parts.
- The Multi-Source power supply should not be used if the green Safe Output light is not lit. The machine is designed to open its input contactor if output voltage peaks exceed the limits set by certain approval agencies. If the Safe Output light is on, the output voltage is within its designed operating range.

**LOCATION**

Place the power supply where clean cooling air can freely circulate in through the front louvers and out through the rear louvers. Dirt, dust or any foreign material that can be drawn into the welder should be kept at a minimum. Failure to observe these precautions can result in excessive operating temperatures and nuisance shut-downs.

**STACKING****⚠ WARNING****FALLING EQUIPMENT** can cause injury.

- Two Multi-Source machines can be stacked.
- Lift only with equipment of adequate lifting capacity.
- Be sure machine is stable when lifting.
- Do not stack more than two high.
- Do not stack the Multi-Source on top of any other machine.

• Follow these guidelines when stacking:

1. Select a firm, level surface capable of supporting the total weight of up to two machines (1984 pounds/901 kilograms).
2. Set the bottom machine in place.
3. Stack the second machine on top of it by aligning the two holes in the base rails on the second machine with the two pins on top at the front of the bottom machine.

Note: The machines must be stacked with the Case Front of each machine flush with each other.

**INPUT AND GROUNDING CONNECTIONS**

**Note: A qualified electrician should connect the input power supply leads.**

Input conductor is brought into the machine input box area through a hole in the rear panel sized to accommodate 2" (trade size) conduit and fittings. This is more than adequate for the largest conductors required.

Conductors must be lugged to attach to the three 3/8" studs on the input reconnect panel and the 5/16" ground stud marked with the symbol  $\oplus$ . The input voltage supplied determines the position required for the reconnect panel jumper. The three ranges on the standard machine are 380-415, 440-460 and 550-575. The machine is rated for 50 and 60 Hz operation. See the Input Connection Diagram located on the inside of Case Back Input Access Door.

The conductor and fuse sizes in the Technical Specification Section (A-1), are per the 1999 National Electrical Code. The sizes are in American Wire Gauge (and the next largest standard metric size in mm<sup>2</sup>). National and local codes must be consulted before connecting a machine.

Protect the input circuit with the super lag fuses or delay type circuit breakers listed in the Technical Specification Section (A-1). (They are also called inverse time or thermal / magnetic circuit breakers.)

Use of fuses or circuit breakers with a lower amp rating than recommended can result in nuisance tripping caused by inrush current even when machine is not being used for welding at high output currents.

Machines may be paralleled for increased output. The S20428 Paralleling Kit permits paralleling of two Multi-Source power supplies for supplying currents of up to 1000 amps, 100% duty cycle.

MULTI-SOURCE



## OUTPUT CABLES, CONNECTIONS AND LIMITATIONS

The Multi-Source has two parallel connected output studs for positive and negative connections. Each one is rated to carry the full output current. For its maximum rated current at 100% duty cycle a minimum size of 4/0 AWG is recommended.

### Connection of Electrode and Work Leads to Output terminals.

1. Set the POWER ON/OFF Toggle Switch to OFF.
2. Raise the hinged cover protecting the output terminals.
3. Insert the electrode lead up through the elliptical hole in the machine base below the positive output terminal. Pull through enough cable to reach the output terminal.
4. Connect electrode lead to the terminal .
5. Tighten the output terminal nut with a wrench.
6. Connect the work lead to the negative output terminal following steps 3-5.
7. Lower the cover to protect the output terminals.

## RECOMMENDED EQUIPMENT AND PROCESSES

The only recommended use for the Multi-Source is to power the Multi-Weld welders. It is conceivable that the machine could be used as a constant voltage DC power supply up to its rating of 40,000 watts (36,000 watts on 50Hz) output. Its output is stable with a wide range of inductive, resistive and capacitive loads but each application would have to be tested. The output is peak voltage regulated and at light resistive loads (maximum ripple) the average voltage deviates from peak voltage the most.

### MULTI-SOURCE

The Multi-Source 40kW (36kW on 50Hz) 80VDC buss power source (K1752-1) is recommended for use in the Multi-Weld system. The number of Multi-Weld Converters that may be connected to a single Multi-Source Power Source is determined by the following formula:

$$\text{Power Source (Volts x Amps) capacity} > 1.1 \times \text{Sum of Converters' (Volts x Amps) arcs}$$

## RECOMMENDED EQUIPMENT / INTERFACE

The Multi-Weld 350 (K1752-1) is the recommended means by which to control the Multi-Source power supply. Connections between Multi-Source and Multi-Weld may be easily made using Twist-Mate male and female connectors and the K1736-1 Distribution Box. The Multi-Weld 350 has multi-process capability and may be used manual and semi-automatic processes. When a wire feeder is required an LN-25 (K449) is recommended.

### EQUIPMENT LIMITATIONS

The number of Multi-Weld 350s, the procedures used and the combined duty cycle of the arcs are only limited by the 40,000 (36,000 watts on 50Hz) watt rating of the Multi-Source supply. The machine is IP-23S rated and is designed for outdoor applications.

### DISTRIBUTION BOX

The Multi-Weld Distribution Box (K1736-1) is available for interconnection of the Multi-System using the same "pig-tail" connection method provided with the Multi-Weld 350 converter. Six cable strain-relief ports are provided for connection of up to (12) cables for distribution or "daisy-chain" inter-connection to other boxes. Four "pig-tail" leads (see below) are included with the Box.

### "PIG-TAIL" LEADS AND CONNECTORS

Accessory "pig-tail" leads and Twist-Mate connectors are available from Lincoln for extra connections to the Multi-Weld 350 or the Distribution Box:

Order No.	Description:
CL012705	22in.(56cm) long 2/0 (70mm <sup>2</sup> ) cable with 0.5in.(13mm) hole lug and cut-off ends.
K852-70	Twist-Mate male insulated plug for 1/0-2/0 (50-70mm <sup>2</sup> ) cable.
K852-95	Twist-Mate male insulated plug for 2/0-3/0 (70-95mm <sup>2</sup> ) cable.
K1759-70	Twist-Mate female insulated receptacle for 1/0-2/0 (50-70mm <sup>2</sup> ) cable.
K1759-95	Twist-Mate female insulated receptacle for 2/0-3/0 (70-95mm <sup>2</sup> ) cable.

## SAFETY PRECAUTIONS

### ⚠ WARNING



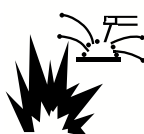
#### ELECTRIC SHOCK can kill.

- Do not touch electrically live parts or electrode with skin or wet clothing.
- Insulate yourself from work and ground.
- Always wear dry insulating gloves.



#### FUMES AND GASES can be dangerous.

- Keep your head out of fumes.
- Use ventilation or exhaust to remove fumes from breathing zone.



#### WELDING SPARKS can cause fire or explosion.

- Keep flammable material away.
- Do not weld on closed containers.



#### ARC RAYS can burn eyes and skin.

- Wear eye, ear and body protection.

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

## GENERAL DESCRIPTION

The Multi-Source is designed to supply power to the Multi-Weld welders. It has a wide range three phase AC input and can be operated on 50 or 60 Hz. The Multi-Source output peak voltage regulates against wide changes in output loading and input line voltage variations to supply a consistently stable voltage high enough to allow the Multi-Welds to provide good manual electrode capability.

Primary input voltage taps are selected by a single movable link on the reconnect panel. Main transformer auxiliary windings power the firing circuit and fan motor. The control auxiliary transformer has a single, wide range primary and is not reconnectable.

The Fan As Needed feature is activated by an output current of 20 Adc or a thermostat on the main transformer iron.

An independent safety circuit on the Control board monitors the voltage peaks and opens the input contactor if the limit is exceeded. The green Safe Output light indicates when the machine output voltage is within the safe operating range.

Other indicator lights include the amber Thermal light that signals when the long term output current limit has been exceeded. This limit is determined by a thermostat sensing the temperature of the negative output lead from the secondary coils. The white Power light indicates when the Control board is energized. The three lights are high intensity LEDs for improved visibility in daylight.

The Output Power display uses high intensity LEDs to indicate the percentage of full rated output the machine is supplying.

Two additional thermostats protect the machine in the case of fan failure or blocked air flow. The SCR heat sink thermostat responds first to loss of air flow at normal output loads. This thermostat will disable the machine output. The transformer iron rear thermostat senses that the lamination (and thus the coil insulation) is over heating (which can happen even if the output is disabled). This thermostat will interrupt power to the Control board causing the input contactor to open until the iron cools.

The only user controls are an on-off toggle Power switch that energizes the machine and a 10 A circuit breaker protecting the fan auxiliary against short circuits.

## DESIGN FEATURES - ALL MODELS

### SPECIFICATIONS, DESIGN FEATURES AND ADVANTAGES

Case parts are predominantly stainless steel, the PC boards are potted in trays, the controls are sealed, all machine coils are copper and the whole transformer is varnish dipped to maximize environmental withstand capability. The coils are all conservatively rated for long life.

The Multi-Source output regulates against wide changes in output loading and input line voltage variations to supply a consistently stable voltage high enough to allow the Multi-Welds to provide good manual electrode capability.

MULTI-SOURCE



**FACTORY INSTALLED OPTIONS /  
ACCESSORIES**

There are no factory installed options.

**FIELD INSTALLED OPTIONS /  
ACCESSORIES**

- K1735-1 Multi-Weld 350, Multi-process controller.
- K857, K857-1 Remote Control, Control Multi-Weld remotely (25 or 100 ft.).
- K1736-1 Distribution Box, Connects up to 10 Multi-Welds.
- K449 LN-25, Across the arc wire feeder.
- K1788-1 Roll Cage, Protect power source, facilitate moving, store cable.
- K1806-1 Multi-Weld Four Pack, Mounting / lift rack for M-S and four M-Ws.
- K1807-1 Multi-Weld Eight Pack, Mounting / lift rack for M-S and eight M-Ws.
- S20428 Paralleling Kit, Allows two machines to equally share double load.

## SAFETY PRECAUTIONS

### WARNING

Have qualified personnel do the maintenance work. Always use the greatest care when working near moving parts.

If a problem cannot be corrected by following the instructions, take the machine to the nearest Lincoln Field Service Shop.

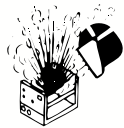
#### ELECTRIC SHOCK can kill.



- Do not touch electrically live parts or electrode with skin or wet clothing.
- Insulate yourself from work and ground.

- Always wear dry insulating gloves.

#### EXPLODING PARTS can cause injury.



- Failed parts can explode or cause other parts to explode when power is applied.

- Always wear a face shield and long sleeves when servicing.

See additional warning information throughout this operator's manual.

## ROUTINE MAINTENANCE

The Multi-Source needs no routine maintenance. The fan bearings are sealed units.

## PERIODIC MAINTENANCE

Periodically the machine may be cleaned with low pressure compressed air to insure that all cooling passages are open and that conductive foreign material has not built up inside.

## MACHINE CALIBRATION SPECIFICATION

The Multi-Source digital display is controlled by a current sensing circuit on the Control board. The display reads 100 when machine output is a little over 40 kW. To recalibrate the display, the machine output may be loaded with Multi-Weld welders or resistive grids or a combination of both to obtain an output of 533 Adc as read by a calibrated standard ammeter. Trimmer resistor R49 may be adjusted to cause the display to read 100.

## 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.

#### **Step 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.

#### **Step 2. POSSIBLE CAUSE.**

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

#### **Step 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.

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

### CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
Machine input contactor does not operate. (White Power light off)	<ol style="list-style-type: none"> <li>1. Supply line fuse is blown.</li> <li>2. Contactor power circuit has an open lead.</li> <li>3. Broken power lead.</li> <li>4. T2 internal thermal breaker open</li> <li>5. Defective POWER ON/OFF Switch (S1).</li> <li>7. Control circuit diode bridge open</li> <li>8. Transformer iron rear thermostat open.</li> </ol>	<p>If all recommended possible areas of misadjustment have been checked and the problem persists, <b>Contact your local Lincoln Authorized Field Service Facility.</b></p>
(White Power light on)	<ol style="list-style-type: none"> <li>1. Open input contactor coil.</li> <li>2. Defective Control Board.</li> <li>3. Contactor moving iron binding.</li> </ol>	
Machine input contactor operates, but no output when trying to weld.	<ol style="list-style-type: none"> <li>1. Electrode or work lead loose or broken.</li> <li>2. Open main transformer (T1) primary or secondary circuit.</li> <li>3. Firing P.C. board not connected or is faulty.</li> <li>4. Firing board not getting enable signal.</li> </ol>	
Machine does not have maximum output.	<ol style="list-style-type: none"> <li>1. One input fuse blown.</li> <li>2. One phase of main transformer (T1) open.</li> <li>3. Faulty Control or Firing P.C. boards.</li> <li>4. Faulty SCR bridge.</li> <li>5. Input voltage too low.</li> </ol>	
Machine has output only momentarily after contactor closes. Output returns momentarily every 75 seconds.	<ol style="list-style-type: none"> <li>1. Machine has either an internal or external short circuit on the output.</li> <li>2. Faulty Control PC board.</li> </ol>	
Machine has output only momentarily, contactor opens immediately after closing. (Green Safe Output light off)	<ol style="list-style-type: none"> <li>1. Output voltage peaks are too high because input voltage too high.</li> <li>2. Output voltage peaks are too high because output filter circuit not working.</li> <li>3. Output voltage peaks are too high because control circuit isn't sensing output voltage.</li> <li>4. Control board faulty.</li> <li>5. Output SCR shorted.</li> </ol>	
Machine output doesn't stay on. (Amber Thermal light on, fan running, digital Output display reads greater than 100).	<ol style="list-style-type: none"> <li>1. Machine is overloaded.</li> </ol>	

 **CAUTION**

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

MULTI-SOURCE



Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
Machine output doesn't stay on. (Amber Thermal light on, fan running, digital Output display never reads greater than 100)	<ol style="list-style-type: none"> <li>1. Cooling air blocked or limited.</li> <li>2. Faulty output lead thermostat, SCR heat sink thermostat or connecting leads.</li> <li>3. Ambient cooling air too hot.</li> </ol>	<p>If all recommended possible areas of misadjustment have been checked and the problem persists, <b>Contact your local Lincoln Authorized Field Service Facility.</b></p>
Machine output doesn't stay on. (Amber Thermal light on, fan not running, digital Output display never reads over 100)	<ol style="list-style-type: none"> <li>1. Faulty cooling fan or wiring.</li> <li>2. Faulty wiring in shunt circuit. (Digital Output display reads near zero.)</li> <li>3. Faulty Control board.</li> <li>4. 115 Vac winding on main transformer not providing voltage.</li> <li>5. Fan circuit breaker on front control panel is tripped.</li> </ol>	
Machine will not shut off.	<ol style="list-style-type: none"> <li>1. Input contactor (CR1) contacts are frozen.</li> <li>2. Defective POWER switch (S1).</li> </ol>	

 **CAUTION**

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

MULTI-SOURCE





Observe all Safety Guidelines detailed throughout this manual

## PC BOARD TROUBLESHOOTING GUIDE - FIRING P.C. BOARD

- LEDs 1 through 9 must be lit when the Multi-Source is turned on and the Control board is sending an enable signal to the Firing board (pin 7 in P8 is low in reference to common at pin 12 in P5).
- LEDs 7, 8, and 9 indicate AC power being supplied to the P.C. board from auxiliary windings on the main transformer (T1). If a LED is not on, turn the machine off and unplug P8 from the firing board. Turn the machine back on and check the following voltages:
- If all voltages are present, turn power off, and plug P5 back into J5. Turn power back on. If LEDs 7, 8 or 9 are still not lit, replace Firing PCB.
- If voltages were not present, check the circuit back through the external dropping resistors to the auxiliary windings for a possible open resistor or wire.
- LEDs 1 through 6 indicate gate signals are being sent to the main SCRs 1 through 6 respectively. If LED2 on the Control board is bright, along with LEDs 7, 8, and 9 on Firing board, and LEDs 1 through 6 are unequal in brightness, check to make sure lead 231 between Control board and Firing board is not broken. (If lead 231 is removed while the machine output is at open circuit, the output voltage peaks may be unregulated and cause the over-voltage protection circuit to open the input contactor. The over-voltage protection circuit may be disabled by disconnecting lead 222D at the negative output stud or at pin 1 of P2. NOTE: The machine may not be used for welding with the protection circuit disabled.
- If one or more of LEDs 1 through 6 are off, LEDs 7, 8, and 9 are on and the voltage on lead 231 from the Control board (pin 13, P5 to pin 12, P5) is 3 to 13Vdc replace the Firing PCB.

LED that was off	Check AC voltage between	Voltage should be approximately
7	P8 pins 2 & 1 (wires 283,284)	32Vac
8	P8 pins 4 & 3 (wires 285,286)	32Vac
9	P8 pins 6 & 5 (wires 287,288)	32Vac

### CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

MULTI-SOURCE



Observe all Safety Guidelines detailed throughout this manual

## PC BOARD TROUBLESHOOTING GUIDE - CONTROL P.C. BOARD

1. The white Power light on the machine control panel indicates that the Control board power supply is being supplied by rectified secondary voltage from the Control transformer (T2) by way of the Power switch and transformer iron rear thermostat.
2. LED1 indicates machine output voltage. At normal output voltages, LED1 will be brightly lit.
3. LED2 indicates the level of the control signal to the Firing board. The brightness of LED2 is inversely proportional to machine output because the control signal increases as the machine output decreases.
4. LED3 lights when the current amplifier senses an output current over about 10 amps and sends a signal to turn the cooling fan on. If LED3 is on but the fan is not, there could be a problem with the fan motor or the fan motor drive circuit (see LED6).
5. LED4 says that some signal, either thermostat, output current or output over-current is calling for the fan to operate.
6. LED5 tells us that the current signal from the shunt is too high. If LED5 is lit for 5-8 seconds, the enable signal to the Firing board is made high to shut off the output SCRs. In the case of a short duration current overload, LED5 may only be briefly lit because, in normal operation, the machine output immediately goes to zero. Once disabled, the output will remain off for about 75 seconds.
7. LED6 indicates that the input to the fan motor opto triac driver has been energized. LED6 should be on as long as the fan motor runs. LED6 and the fan motor will be on for about 5 minutes after LED4 goes off.
8. LED7 will light when the shorted SCR circuit activates. A positive voltage on the negative output stud (AC instead of DC on the output studs) will activate a circuit causing the input contactor to open. This circuit is active only when the enable signal to the Firing board is high (the output is off). The contactor will remain open (and the white Power light will remain on) until the Power switch is turned off (or the input power to the machine is otherwise removed) for about 1 second and then turned on again.
9. The green Safe Output light on the control panel when the machine output voltage is present and safe. It lights when the machine output is between 40 Vdc and 113 volts peak.
10. The yellow Thermal light on the front panel lights when the open thermostat signal is sent to the fan control and output disable circuits.

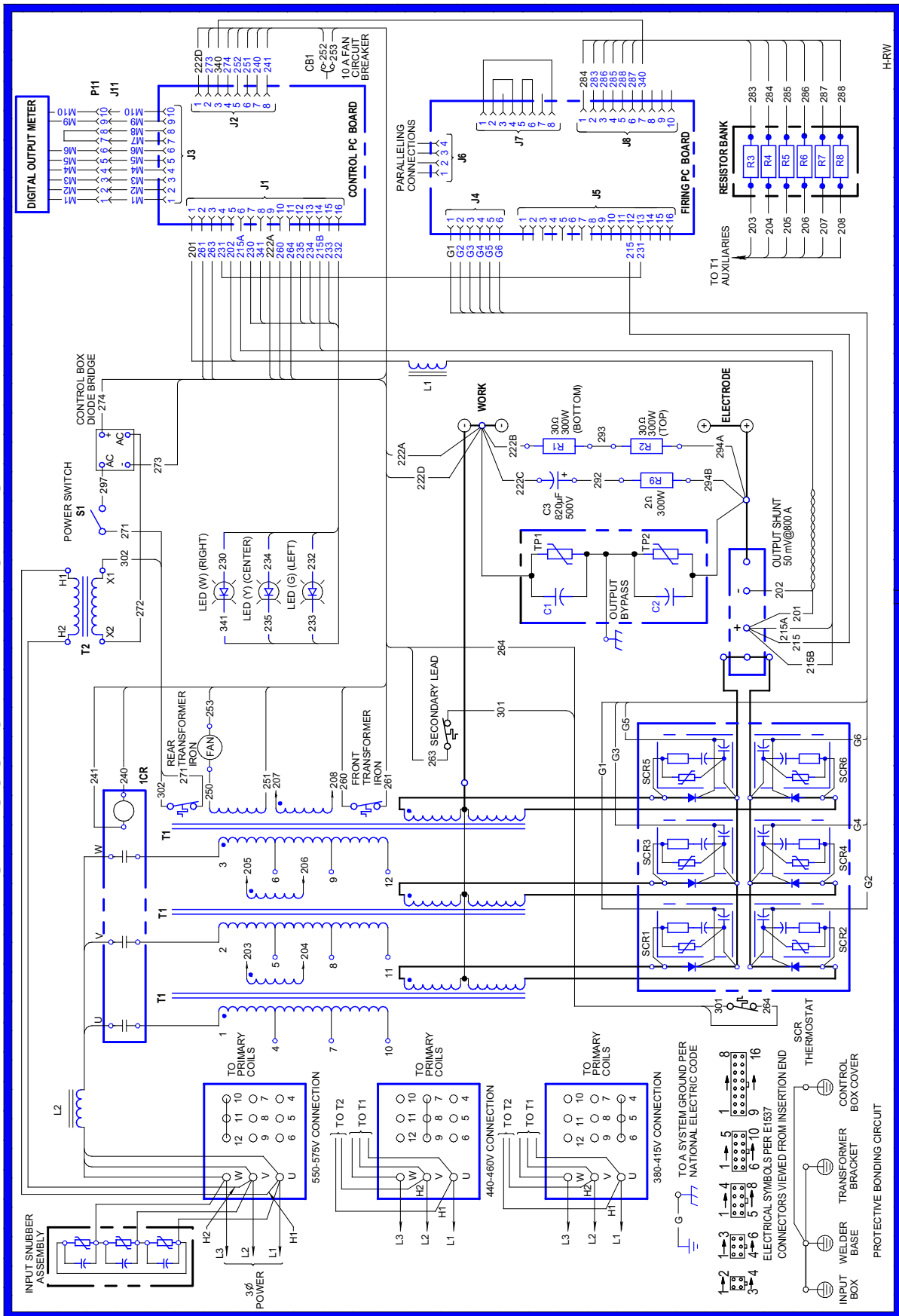
### CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

MULTI-SOURCE

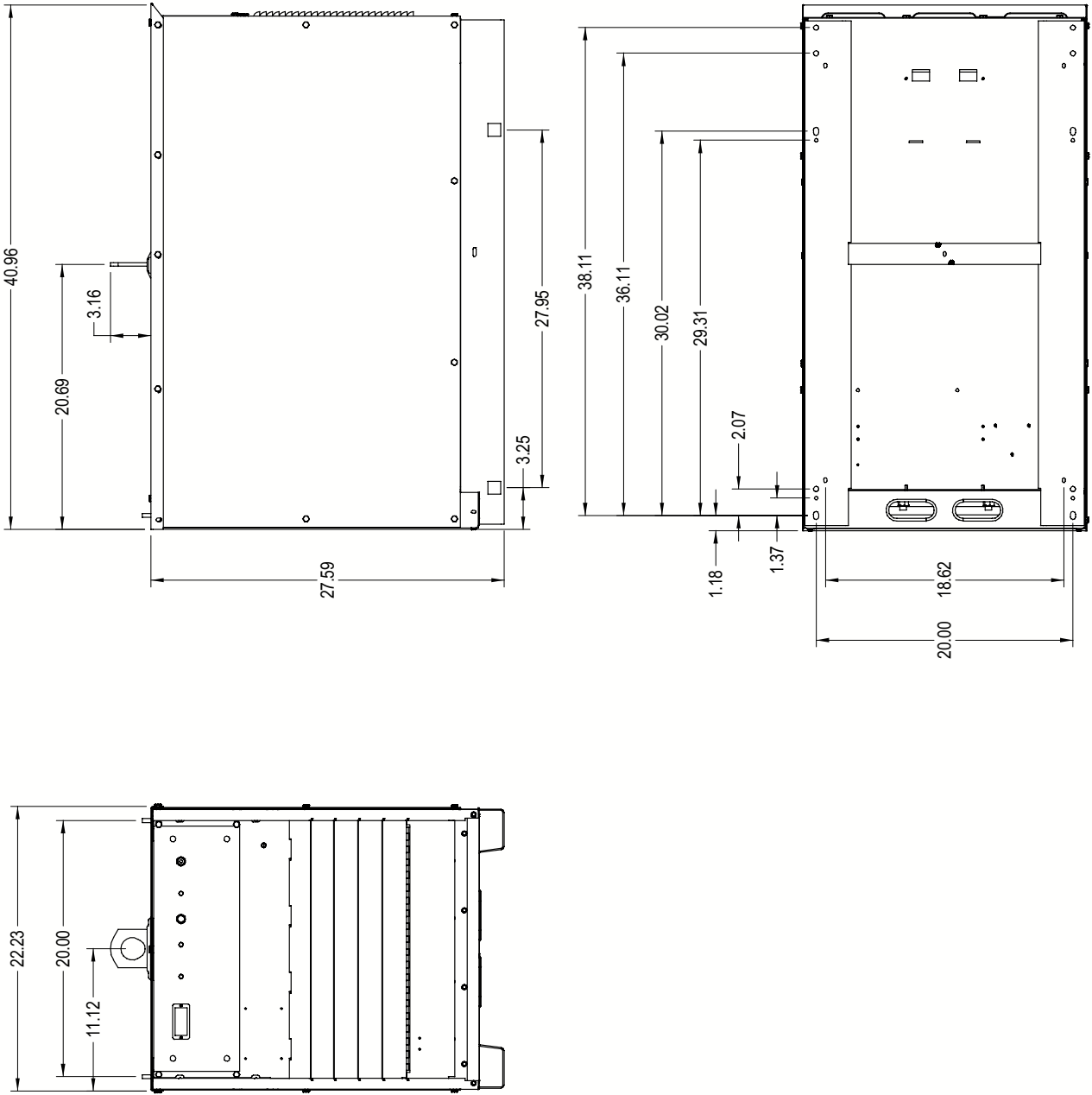


MULTI-SOURCE WIRING DIAGRAM



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..

MULTI-SOURCE DIMENSION PRINT



A M19588

# NOTES

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# NOTES

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<b>WARNING</b>	<ul style="list-style-type: none"> <li>● Do not touch electrically live parts or electrode with skin or wet clothing.</li> <li>● Insulate yourself from work and ground.</li> </ul>	<ul style="list-style-type: none"> <li>● Keep flammable materials away.</li> </ul>	<ul style="list-style-type: none"> <li>● Wear eye, ear and body protection.</li> </ul>
Spanish <b>AVISO DE PRECAUCION</b>	<ul style="list-style-type: none"> <li>● No toque las partes o los electrodos bajo carga con la piel o ropa mojada.</li> <li>● Aíslese del trabajo y de la tierra.</li> </ul>	<ul style="list-style-type: none"> <li>● Mantenga el material combustible fuera del área de trabajo.</li> </ul>	<ul style="list-style-type: none"> <li>● Protéjase los ojos, los oídos y el cuerpo.</li> </ul>
French <b>ATTENTION</b>	<ul style="list-style-type: none"> <li>● Ne laissez ni la peau ni des vêtements mouillés entrer en contact avec des pièces sous tension.</li> <li>● Isolez-vous du travail et de la terre.</li> </ul>	<ul style="list-style-type: none"> <li>● Gardez à l'écart de tout matériel inflammable.</li> </ul>	<ul style="list-style-type: none"> <li>● Protégez vos yeux, vos oreilles et votre corps.</li> </ul>
German <b>WARNUNG</b>	<ul style="list-style-type: none"> <li>● Berühren Sie keine stromführenden Teile oder Elektroden mit Ihrem Körper oder feuchter Kleidung!</li> <li>● Isolieren Sie sich von den Elektroden und dem Erdboden!</li> </ul>	<ul style="list-style-type: none"> <li>● Entfernen Sie brennbares Material!</li> </ul>	<ul style="list-style-type: none"> <li>● Tragen Sie Augen-, Ohren- und Körperschutz!</li> </ul>
Portuguese <b>ATENÇÃO</b>	<ul style="list-style-type: none"> <li>● Não toque partes elétricas e electrodos com a pele ou roupa molhada.</li> <li>● Isole-se da peça e terra.</li> </ul>	<ul style="list-style-type: none"> <li>● Mantenha inflamáveis bem guardados.</li> </ul>	<ul style="list-style-type: none"> <li>● Use proteção para a vista, ouvido e corpo.</li> </ul>
Japanese <b>注意事項</b>	<ul style="list-style-type: none"> <li>● 通電中の電気部品、又は溶材にヒフやぬれた布で触れないこと。</li> <li>● 施工物やアースから身体が絶縁されている様にして下さい。</li> </ul>	<ul style="list-style-type: none"> <li>● 燃えやすいものの側での溶接作業は絶対にしてはなりません。</li> </ul>	<ul style="list-style-type: none"> <li>● 目、耳及び身体に保護具をして下さい。</li> </ul>
Chinese <b>警告</b>	<ul style="list-style-type: none"> <li>● 皮膚或濕衣物切勿接觸帶電部件及鎢條。</li> <li>● 使你自己與地面和工件絕緣。</li> </ul>	<ul style="list-style-type: none"> <li>● 把一切易燃物品移離工作場所。</li> </ul>	<ul style="list-style-type: none"> <li>● 佩戴眼、耳及身體勞動保護用具。</li> </ul>
Korean <b>위험</b>	<ul style="list-style-type: none"> <li>● 전도체나 용접봉을 젖은 헝겊 또는 피부로 절대 접촉치 마십시오.</li> <li>● 모재와 접지를 접촉치 마십시오.</li> </ul>	<ul style="list-style-type: none"> <li>● 인화성 물질을 접근시키지 마십시오.</li> </ul>	<ul style="list-style-type: none"> <li>● 눈, 귀와 몸에 보호장구를 착용하십시오.</li> </ul>
Arabic <b>تحذير</b>	<ul style="list-style-type: none"> <li>● لا تلمس الاجزاء التي يسري فيها التيار الكهربائي أو الألكترود بجسد الجسم أو بالملابس المبللة بالماء.</li> <li>● ضع عازلا على جسمك خلال العمل.</li> </ul>	<ul style="list-style-type: none"> <li>● ضع المواد القابلة للاشتعال في مكان بعيد.</li> </ul>	<ul style="list-style-type: none"> <li>● ضع أدوات وملابس واقية على عينيك وأذنيك وجسمك.</li> </ul>

**READ AND UNDERSTAND THE MANUFACTURER'S INSTRUCTION FOR THIS EQUIPMENT AND THE CONSUMABLES TO BE USED AND FOLLOW YOUR EMPLOYER'S SAFETY PRACTICES.**

**SE RECOMIENDA LEER Y ENTENDER LAS INSTRUCCIONES DEL FABRICANTE PARA EL USO DE ESTE EQUIPO Y LOS CONSUMIBLES QUE VA A UTILIZAR, SIGA LAS MEDIDAS DE SEGURIDAD DE SU SUPERVISOR.**

**LISEZ ET COMPRENEZ LES INSTRUCTIONS DU FABRICANT EN CE QUI REGARDE CET EQUIPMENT ET LES PRODUITS A ETRE EMPLOYES ET SUIVEZ LES PROCEDURES DE SECURITE DE VOTRE EMPLOYEUR.**

**LESEN SIE UND BEFOLGEN SIE DIE BETRIEBSANLEITUNG DER ANLAGE UND DEN ELEKTRODENEINSATZ DES HERSTELLERS. DIE UNFALLVERHÜTUNGSVORSCHRIFTEN DES ARBEITGEBERS SIND EBENFALLS ZU BEACHTEN.**



			
<ul style="list-style-type: none"> <li>● Keep your head out of fumes.</li> <li>● Use ventilation or exhaust to remove fumes from breathing zone.</li> </ul>	<ul style="list-style-type: none"> <li>● Turn power off before servicing.</li> </ul>	<ul style="list-style-type: none"> <li>● Do not operate with panel open or guards off.</li> </ul>	<b>WARNING</b>
<ul style="list-style-type: none"> <li>● Los humos fuera de la zona de respiración.</li> <li>● Mantenga la cabeza fuera de los humos. Utilice ventilación o aspiración para gases.</li> </ul>	<ul style="list-style-type: none"> <li>● Desconectar el cable de alimentación de poder de la máquina antes de iniciar cualquier servicio.</li> </ul>	<ul style="list-style-type: none"> <li>● No operar con panel abierto o guardas quitadas.</li> </ul>	Spanish <b>AVISO DE PRECAUCION</b>
<ul style="list-style-type: none"> <li>● Gardez la tête à l'écart des fumées.</li> <li>● Utilisez un ventilateur ou un aspirateur pour ôter les fumées des zones de travail.</li> </ul>	<ul style="list-style-type: none"> <li>● Débranchez le courant avant l'entretien.</li> </ul>	<ul style="list-style-type: none"> <li>● N'opérez pas avec les panneaux ouverts ou avec les dispositifs de protection enlevés.</li> </ul>	French <b>ATTENTION</b>
<ul style="list-style-type: none"> <li>● Vermeiden Sie das Einatmen von Schweißrauch!</li> <li>● Sorgen Sie für gute Be- und Entlüftung des Arbeitsplatzes!</li> </ul>	<ul style="list-style-type: none"> <li>● Strom vor Wartungsarbeiten abschalten! (Netzstrom völlig öffnen; Maschine anhalten!)</li> </ul>	<ul style="list-style-type: none"> <li>● Anlage nie ohne Schutzgehäuse oder Innenschutzverkleidung in Betrieb setzen!</li> </ul>	German <b>WARNUNG</b>
<ul style="list-style-type: none"> <li>● Mantenha seu rosto da fumaça.</li> <li>● Use ventilação e exaustão para remover fumo da zona respiratória.</li> </ul>	<ul style="list-style-type: none"> <li>● Não opere com as tampas removidas.</li> <li>● Desligue a corrente antes de fazer serviço.</li> <li>● Não toque as partes elétricas nuas.</li> </ul>	<ul style="list-style-type: none"> <li>● Mantenha-se afastado das partes moventes.</li> <li>● Não opere com os painéis abertos ou guardas removidas.</li> </ul>	Portuguese <b>ATENÇÃO</b>
<ul style="list-style-type: none"> <li>● ヒュームから頭を離すようにして下さい。</li> <li>● 換気や排煙に十分留意して下さい。</li> </ul>	<ul style="list-style-type: none"> <li>● メンテナンス・サービスに取りかかる際には、まず電源スイッチを必ず切ってください。</li> </ul>	<ul style="list-style-type: none"> <li>● パネルやカバーを取り外したまま機械操作をしないで下さい。</li> </ul>	Japanese <b>注意事項</b>
<ul style="list-style-type: none"> <li>● 頭部遠離煙霧。</li> <li>● 在呼吸區使用通風或排風器除煙。</li> </ul>	<ul style="list-style-type: none"> <li>● 維修前切斷電源。</li> </ul>	<ul style="list-style-type: none"> <li>● 儀表板打開或沒有安全罩時不準作業。</li> </ul>	Chinese <b>警告</b>
<ul style="list-style-type: none"> <li>● 얼굴로부터 용접가스를 멀리하십시오.</li> <li>● 호흡지역으로부터 용접가스를 제거하기 위해 가스제거기나 통풍기를 사용하십시오.</li> </ul>	<ul style="list-style-type: none"> <li>● 보수전에 전원을 차단하십시오.</li> </ul>	<ul style="list-style-type: none"> <li>● 판넬이 열린 상태로 작동치 마십시오.</li> </ul>	Korean <b>위험</b>
<ul style="list-style-type: none"> <li>● ابعد رأسك بعيداً عن الدخان.</li> <li>● استعمل التهوية أو جهاز ضغط الدخان للخارج لكي تبعد الدخان عن المنطقة التي تتنفس فيها.</li> </ul>	<ul style="list-style-type: none"> <li>● أقطع التيار الكهربائي قبل القيام بأية صيانة.</li> </ul>	<ul style="list-style-type: none"> <li>● لا تشغيل هذا الجهاز اذا كانت الاغطية الحديدية الواقية ليست عليه.</li> </ul>	Arabic <b>تحذير</b>

**LEIA E COMPREENDA AS INSTRUÇÕES DO FABRICANTE PARA ESTE EQUIPAMENTO E AS PARTES DE USO, E SIGA AS PRÁTICAS DE SEGURANÇA DO EMPREGADOR.**

使う機械や溶材のメーカーの指示書をよく読み、まず理解して下さい。そして貴社の安全規定に従って下さい。

請詳細閱讀並理解製造廠提供的說明以及應該使用的銀焊材料，並請遵守貴方的有閣勞動保護規定。

이 제품에 동봉된 작업지침서를 숙지하시고 귀사의 작업자 안전수칙을 준수하시기 바랍니다.

اقرأ بتمعن وافهم تعليمات المصنع المنتج لهذه المعدات والمواد قبل استعمالها واتبع تعليمات الوقاية لصاحب العمل.



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