LINCOLN® WELDERS

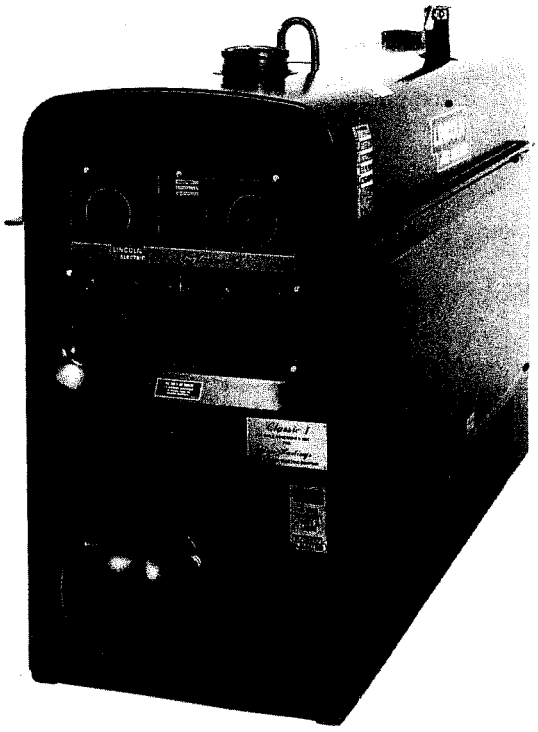
IM-471

OPERATING MANUAL

IM471
Classic I
9968; 9999
November, 1992

Classic I

DC ARC WELDER WITH CONTINENTAL TM27 GASOLINE ENGINE



This manual covers equipment which is obsolete and no longer in production by The Lincoln Electric Co. Specifications and availability of optional features may have changed.

(ABOVE CODE 9900)

SHIPPING DAMAGE CLAIMS

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.

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 OPERATING MANUAL AND THE ARC WELDING SAFETY PRECAUTIONS ON PAGES 2, 3 AND 4. And, most importantly, think before you act and be careful.

LINCOLN® ELECTRIC

THE LINCOLN ELECTRIC COMPANY
World's Leader in Welding and Cutting Products • Premier Manufacturer of Industrial Motors
Sales and Service through Subsidiaries and Distributors Worldwide
Cleveland, Ohio 44117-1199 U.S.A.

ARC WELDING SAFETY PRECAUTIONS

WARNING: PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH.

ELECTRIC SHOCK can kill.

1. 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.

   b. Insulate yourself from workpiece 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 Welder
   - DC Manual (Stick) Welder.
   - AC Welder with Reduced Voltage Control.

   c. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically "hot".

   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.

   e. Ground the work or metal to be welded to a good electrical (earth) ground.

   f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.

   g. Never dip the electrode in water for cooling.

   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.

   i. When working above floor level, protect yourself from a fall should you get a shock.

   j. Also see Items 4c and 6.

ARC RAYS can burn.

2. 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.

   b. Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.

   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.

3. 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 on galvanized, lead or cadmium plated steel and other metals which produce toxic fumes, even greater care must be taken.

   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.

   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.

   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.

   e. Also see item 7b.

WELDING SPARKS can cause fire or explosion.

4. 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. Have a fire extinguisher readily available.

   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.

   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.

   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 F4.1-80 from the American Welding Society (see address below).

e. Vent hollow castings or containers before heating, cutting or welding. They may explode.

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.

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.

h. Also see item 7c.

CYLINDER may explode if damaged.

5. 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.

b. Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.

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.

d. Never allow the electrode, electrode holder, or any other electrically "hot" parts to touch a cylinder.

e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.

f. Valve protection caps should always be in place and handtight except when the cylinder is in use or connected for use.

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.

6. a. Turn off input power using the disconnect switch at the fuse box before working on the equipment.

b. Install equipment in accordance with the U.S. National Electrical Code, all local codes and the manufacturer's recommendations.

c. Ground the equipment in accordance with the U.S. National Electrical Code and the manufacturer's recommendations.

FOR ENGINE powered equipment.

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

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

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.

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.

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.

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.

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.

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

HAVE ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR WORK performed by qualified people.

For more detailed 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.

PRÉCAUTIONS DE SÛRETÉ

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

Sûreté Pour Soudage A L'Arc

1. Protegez-vous contre la secousse électrique:
   a. Les circuits à l'électrode et à la piéce 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 vètements mouillés. Porter des gants secs et sans trous pour isoler les mains.
   b. Faire trés attention de bien s'isoler de la masse quand on soude dans des endroits humides, ou sur un plancher metallique, ou des grilles metalliques, 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'applicuent 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 ou on recoit 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 soliel, 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 protèger 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 lateraux 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 une endroit isolé de la masse. Un court-circuit accidental peut provoquer un èchauffement et un risque d'incendie.
8. S'assurer que la masse est connectée le plus prés 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 chaines de levage, câbles de grue, ou autres circuits. Cela peut provoquer des risques d'incendie ou d'echauffement des chaines 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 fumeés toxiques.
10. Ne pas souder en présence de vapeurs de chlore provenant d'opérations de dégraissage, nettoyage ou pistolage. La chaleur ou les rayons de l'arc peuvent réagir avec les vapeurs du solvant pour produire du phosgéne (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 chassis du poste conformement au code de l'électricité et aux recommendations du fabricant. Le dispositif de montage ou la piece 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 faires des travaux à l'interieur de poste, la debrancher à l'interrupteur à la boite de fusibles.
4. Garder tous les couvercles et dispositifs de sûreté à leur place.

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GENERAL DESCRIPTION

The Classic I is a heavy duty engine driven DC arc welding power source capable of providing DC constant current output for stick welding or DC TIG welding. With the addition of the optional K384 CV adapter, the Classic I will provide constant voltage output for running the LN-7* or LN-25 wire feeders.

The Classic I has a current range of 40-300 DC amps with output ratings as follows:

RATED OUTPUT	DUTY CYCLE
200A @ 28V	60%
200A @ 40V	60%

The units are also capable of providing 1.75 kw of 115 volt DC auxiliary power.

This unit uses the Continental TM27 industrial water cooled gasoline engine.

* Separate supply of 115V AC power required.

IMPORTANT SAFETY NOTE: EMF CONSIDERATIONS

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:

1. Route the electrode and work cables together. Secure them with tape when possible.
2. Never coil the electrode lead around your body.
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.
4. Connect the work cable to the workpiece as close as possible to the area being welded.
5. Do not work next to welding power source.

SPECIFICATIONS

MACHINE	CLASSIC I
Type	K6090-3, K6090-4
Model	SA-200 TM27
Engine	Continental TM27 Gasoline
No. of Cylinders	4
Cycle	4
Bore & Stroke (mm)	3.58 x 4.06 (91 x 103)
Horsepower at 1450 rpm	38
Operating Speeds (rpm) Full Load High Idle Low Idle	 1450 1550 1000
Capacity (Liters) Fuel Lubricating Oil Coolant	 15 gals. (57) 6 qts. (5.7) 9.3 qts. (8.8)
NEMA Output Rating Amperes Volts Duty Cycle	 200 28 60%
Lincoln Output Rating Amperes Volts Duty Cycle	 200 40 60%
Current Range	40-300 amps
Net Weight (kg)	1370 lbs. (621)
Dimensions H x W x D (mm)	40.94 x 24 x 65.58" (1040 x 610 x 1666)

PRE-OPERATION INSTALLATION

⚠ 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.

Safety Precautions

⚠ WARNING

Have qualified personnel do all electrical and mechanical installation. Be sure engine is off and allowed to cool before working on machine.

Exhaust Spark Arrester

Some federal, state, or local laws may require that engines be equipped with exhaust spark arresters when they are operated in certain locations where unarrested sparks may present a fire hazard. The standard mufflers included with these welders do not qualify as spark arresters. When required by local regulations, suitable spark arresters must be installed and properly maintained.

CAUTION: An incorrect arrester may lead to damage of the engine or its performance. Contact the engine manufacturer for specific recommendations.

Location / Ventilation

Always operate the welder with the doors closed. Leaving the doors open exposes moving parts, changes the designed air flow and may cause overheating.

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

Grounding

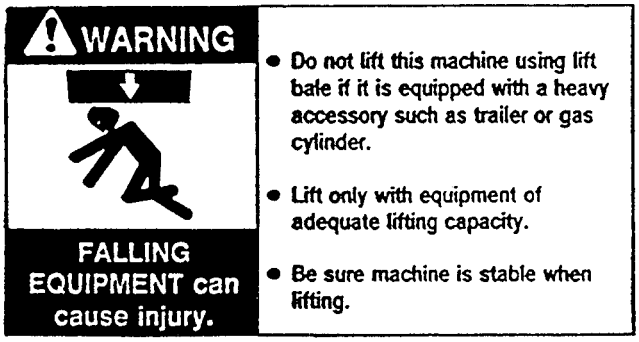
According to the United States National Electrical Code, the frame of this portable generator is not required to be grounded and is permitted to serve as the grounding means for cord connected equipment plugged into its receptacle.

Some state, local or other codes or unusual operating circumstances may require the machine frame to be grounded. It is recommended that you determine the extent of which

such requirements may apply to your particular situation and follow them explicitly. A machine grounding stud marked with the symbol ⏚ is provided on the welding generator frame foot. (If an older portable welder does not have a grounding stud, connect the ground wire to an unpainted frame screw or bolt.) In general, if the machine is to be grounded it should be connected with a #8 or larger copper wire to a solid earth ground such as a metal water pipe going into the ground for at least ten feet and having no insulated joints, or to the metal framework of the building which has been effectively grounded. The U. S. National Electrical Code lists a number of alternate means of grounding electrical equipment.

Lift Bail

A lift bail is provided for lifting with a hoist.



Undercarriages

If the user adapts a non-Lincoln undercarriage, he must assume responsibility that the method of attachment and usage does not result in a safety hazard nor damage the welding equipment. Some of the factors to be considered are as follows:

1. Design capacity of undercarriage vs. weight of Lincoln equipment and likely additional attachments.

2. Proper support of, and attachment to, the base of the welding equipment so there will be no undue stress to the framework.

3. Proper placement of the equipment on the undercarriage to ensure stability side to side and front to back when being moved and when standing by itself while being operated or serviced.

4. Typical conditions of use, i.e., travel speed; roughness of surface on which the undercarriage will be operated; environmental conditions; likely maintenance.

5. Conformance with federal, state and local laws. Consult applicable federal, state and local laws regarding specific requirements for use on public highways.

Polarity Control and Cable Sizes

With the engine off, route the electrode and work cables through the strain relief bracket on the base and connect to the studs located below the fuel tank mounting rail. (see size recommendations below) For positive polarity, connect the electrode cable to the terminal marked "Positive". For negative polarity, connect the electrode cable to the "Negative" stud. These connections should be checked periodically and tightened if necessary.

When welding at a considerable distance from the welder, be sure you use ample size welding cables.

RECOMMENDED COPPER CABLE SIZES			
		Cable Sizes for Combined Length of Electrode Plus Work Cable	
Amps	Duty Cycle	Up to 200 ft.	200 to 250 ft.
200	60%	1	1/0

Pre-Operation Maintenance

Oil

This unit is supplied from the factory with the engine crankcase filled with a high quality SAE 10W/30 oil. This oil should be acceptable for most typical ambient temperatures. Consult the engine operation manual for specific engine manufacturer's recommendations. Upon receipt of the welder, check the engine dipstick to be sure the oil is at the "full" mark. DO NOT OVERFILL.

NOTE: Check the oil level in the bath air cleaner.

Fuel

Fill the fuel tank with the grade of fuel recommended in the Engine Operator's Manual. Make sure fuel valve on the sediment bowl is in the open position.

Cooling System

The radiator has been filled at the factory with a 50-50 mixture of ethylene glycol antifreeze and water. Check the radiator level and add a 50-50 solution as needed. (See engine manual or antifreeze container for alternate antifreeze recommendations.)

Battery Charging

The Classic I is equipped with a wet charged battery. The charging current is automatically regulated when the battery is low (after starting the engine) to a trickle current when the battery is fully charged.

When replacing, jumping, or otherwise connecting the battery to the battery cables the proper polarity must be observed. The correct polarity is **negative** ground.

⚠ WARNING

GASES FROM BATTERY can explode.

BATTERY ACID can burn eyes and skin.

- Keep sparks, flame and cigarettes away from battery.
- Wear gloves and eye protection and be careful when boosting, charging, or working near battery.
- Follow instructions printed on battery.

To prevent EXPLOSION when:

- INSTALLING A NEW BATTERY—disconnect negative cable from old battery first and connect to new battery last.
- CONNECTING A BATTERY CHARGER—remove battery from welder by disconnecting negative cable first, then positive cable and battery clamp. When reinstalling, connect negative cable last. Keep well ventilated.
- USING A BOOSTER—connect positive lead to battery first then connect negative lead to copper strap on engine foot.

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IMPORTANT: To prevent ELECTRICAL DAMAGE WHEN:
a) Installing a new battery.
b) Using a booster.
Use correct polarity—Negative Ground.

To prevent BATTERY DISCHARGE, if you have an ignition switch, turn it off when engine is not running.

To prevent BATTERY BUCKLING, tighten nuts on battery clamp until snug.

OPERATION

⚠ WARNING

ELECTRIC SHOCK can kill.

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

ENGINE EXHAUST can kill.

- Use in open, well ventilated areas or vent exhaust outside

MOVING PARTS can injure.

- Do not operate with doors open or guards off
- Stop engine before servicing
- Keep away from moving parts

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

Starting the Continental TM27 Engine

Put the "Idler Control" switch in the "High Idle" position, the ignition switch in the "ON" position, and start the engine. Allow it to run at high idle speed for several minutes to warm the engine. Cold engines tend to run at a speed too slow to supply the voltage required for proper idler operation.

Running the engine with proper oil pressure, lights a green light on the control panel. If this light flickers or goes off, stop the engine immediately. Locate and correct the cause of low oil pressure before restarting the engine. Run the engine for five minutes to check for proper operation. Stop the engine and check the oil level. If the oil level is down, fill to the "Full" mark again.

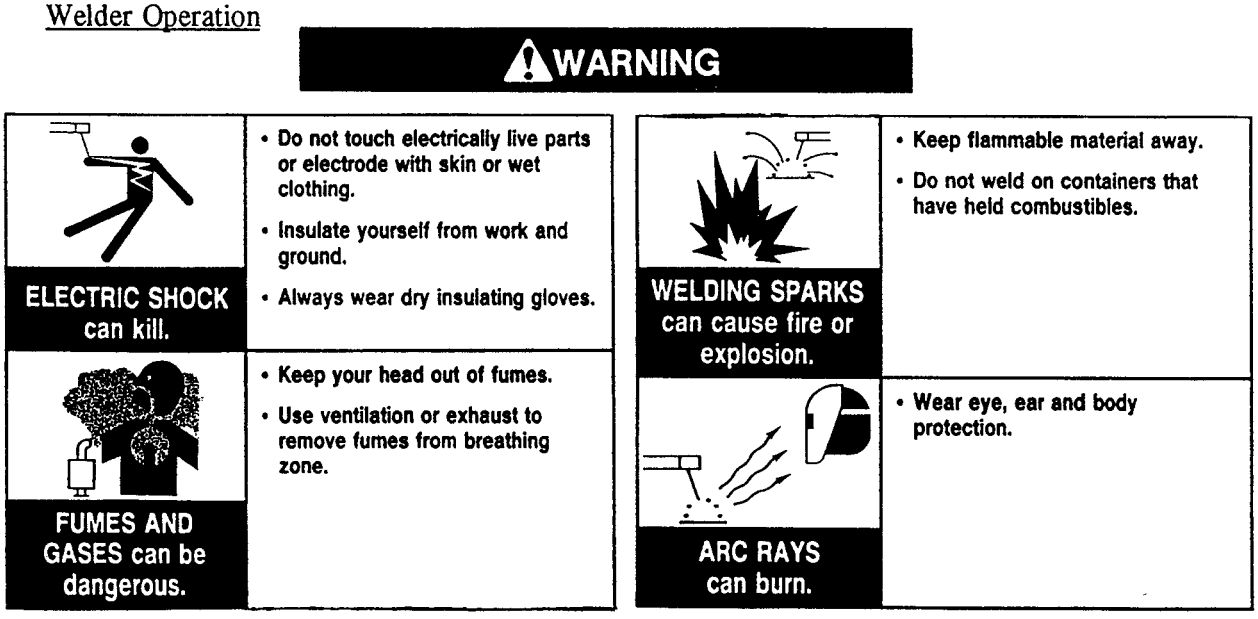
Operate the welder with the doors closed. Leaving the doors open changes the designed air flow and can cause overheating.

At the end of each day's welding, refill the gasoline tank to minimize moisture condensation in the tank. Also, running out of gas tends to draw dirt into the fuel system. Check the crankcase oil and radiator water level.

When hauling the welder between job sites, close the fuel feed valve on the sediment bowl by turning the handle from left to right. Failure to turn the fuel off when traveling can cause carburetor flooding and difficult starting at the new job site.

The fan belt tends to loosen after about the initial 50 hours of operation. Check and tighten, if necessary. Check and tighten all internal and external connections as needed.

Welder Operation



Duty Cycle

The NEMA output rating of the Classic I is 200 amperes at 28[1] arc volts on a 60% duty cycle (consult specifications in Troubleshooting Section for alternate ratings). Duty cycle is based on a ten minute period; thus, the welder can be loaded at rated output for six

minutes out of every ten minute period.

(1) The Lincoln "plus output" rating at 60% duty cycle is 200 amperes at 40 volts.

Control of Welding Current

CAUTION: DO NOT TURN THE "CURRENT RANGE SELECTOR" WHILE WELDING because the current may arc between the contacts and damage the switch.

The "Current Range Selector" provides five overlapping current ranges. The "Fine Current Adjustment" adjusts the current from minimum to maximum within each range. Open circuit voltage is also controlled by the "Fine Current Adjustment permitting control of the arc characteristics.

A high open circuit voltage setting provides the soft "buttering" arc with best resistance to pop-outs preferred for most welding. To get this characteristic, set the "Current Range Selector" to the lowest setting that still provides the current you need and set the "Fine Current Adjustment" near maximum. For example: to obtain 175 amps and a soft arc, set the "Current Range Selector" to the 190-120 position and then adjust the "Fine Current Adjustment" for 175 amps.

When a forceful "digging" arc is required, usually for vertical and overhead welding, use a higher "Current Range Selector" setting and lower open circuit voltage. For example: to obtain 175 amps and a forceful arc, set the "Current Range Selector" to the 240-160 position and the "Fine Current Adjustment" setting to get 175 amps.

Some arc instability may be experienced with EXX10 electrodes when trying to operate with long arc techniques at settings at the lower end of the open circuit voltage range.

CAUTION: DO NOT attempt to set the "Current Range Selector" between the five points designated on the nameplate.

These switches have a spring loaded cam which almost eliminates the possibility of setting this switch between the designated points.

Idler Operation

Start the engine with the "Idler" switch in the "High" positioin. Allow it to run at high idle speed for several minutes to warm the engine. See specifications for operating speeds.

The idler is controlled by the "Idler" toggle switch on the welder control panel. The switch has two positions as follows:

1. In the "High" position, the idler is off, and the engine high speed is controlled by the governor.

2. In the "Auto" position, the idler operates as follows:

a. When welding or drawing power for lights or tools (approximately 100-150 watts minimum) from the receptacles, the engine operates at full speed.

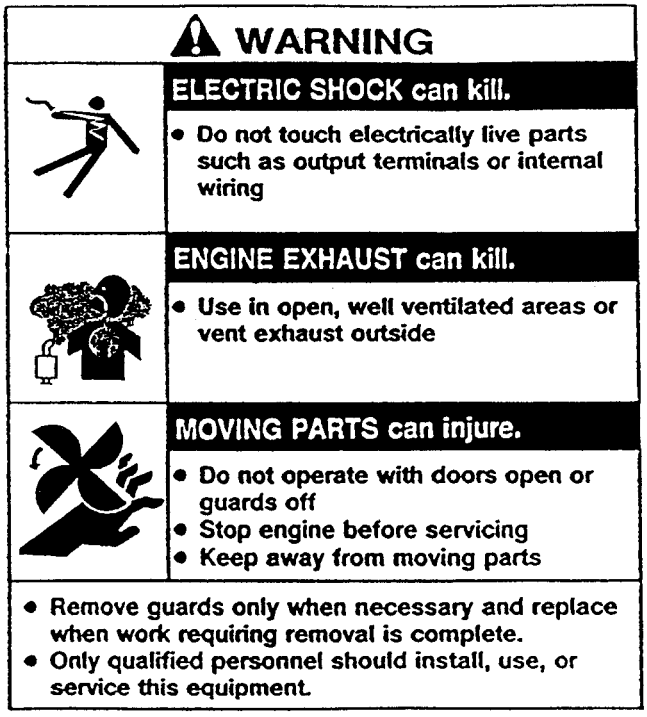
b. When welding ceases or the power load is turned off, a preset time delay of about 15 seconds starts. This time delay cannot be adjusted.

c. If the welder or power load is not re-started before the end of the time delay, the idler reduces the engine to low idle speed.

Auxiliary Power

1.75 kw of 115 volt DC auxiliary power is available at the receptacle located below the nameplate.

MAINTENANCE



General Instructions

1. Blow out the welder and controls with an air hose at least once every two months. In particularly dirty locations, this cleaning may be necessary once a week. Use low pressure air to avoid driving dirt into the insulation.

2. "Current Range Selector" contacts should not be greased. To keep the contacts clean, rotate the current control through its entire range frequently. Good practice is to turn the handle from maximum to minimum setting twice each morning before starting to weld.

3. Change the crankcase oil and oil filter after the first 50 hours of operation and thereafter at regular intervals using the proper grade of oil. See the recommendations in the engine Operation Manual.

4. Inspect the air filter daily. (More often in dusty conditions). Clean or replace as necessary. The filter should never be removed while the engine is running The air filter element part number is Donaldson # XLP182050 or Nelson # 70206N.

5. When necessary, remove the sediment bowl from beneath the gas tank and clean out any accumulated dirt and water. Replace the fuel filter in the fuel line as needed. In an emergency, the fuel filter can be back-flushed for continued use until a replacement can be obtained.

6. Fan belts tend to loosen after the first 50 hours of operation. Check engine Operation Manual and tighten if necessary. DO NOT OVERTIGHTEN.

7. Put a drop of oil on the "Current Range Selector" shaft at least once every month.

8. Keep governor and carburetor toggles and butterfly valve shaft clean and lubricated.

9. See the engine manufacturer's Operation Manual for detailed engine maintenance and troubleshooting instructions.

Cooling System

The Classic I is equipped with a pressure radiator. Keep the radiator cap tight to prevent loss of coolant. Clean and flush the cooling system periodically to prevent clogging the passage and overheating the engine. When antifreeze is needed, always use the permanent type. Capacity = 9.3 qts.

Bearings

This welder is equipped with a double-shielded ball bearing having sufficient grease to last indefinitely under normal service. Where the welder is used constantly or in excessively dirty locations, it may be necessary to add one-half ounce of grease per year. A pad of grease one inch wide, one inch long, and one inch high weighs approximately one-half ounce. Over-greasing is far worse than insufficient greasing.

When greasing the bearings, keep all dirt out of the area. Wipe the fittings completely clean and use clean equipment. More bearing failures are caused by dirt introduced during greasing than from insufficient grease.

Commutator and Brushes

The generator brushes are properly adjusted when the welder is shipped. They require no particular attention. DO NOT SHIFT THE BRUSHES or adjust the rocker setting.

Periodically inspect the commutator and brushes by removing the covers. DO NOT remove or replace these covers while the machine is running.

Commutators require little attention. However, if they are black or appear uneven, have them cleaned by an experienced maintenance man using fine sandpaper or a commutator stone. Never use emery cloth or paper for this purpose.

Replace brushes when they wear within 1/4" of the pigtail. A complete set of replacement brushes should be kept on hand. Lincoln brushes have a curved face to fit the commutator. Have an experienced maintenance man seat these brushes by lightly stoning the commutator as the armature rotates at full speed until contact is made across the full face of the brushes. After stoning, blow out the dust with low pressure air.

WARNING: Uncovered rotating equipment can be dangerous. Use care so your hands, hair, clothing, or tools do not catch in the rotating parts. Protect yourself from particles that may be thrown out by the rotating armature when stoning the commutator.

Arcing or excessive exciter brush wear indicates a possible misaligned shaft. Have an authorized Field Service Shop check and realign the shaft.

Idler Maintenance

⚠ WARNING

MOVING PARTS can injure.

- Do not attempt to override the governor or idler by pushing on the throttle control rods while the engine is running.
- If a problem cannot be corrected by following the instructions, take the machine to the nearest Lincoln Field Service Shop.
- If fan guards are missing from a machine, obtain replacements from a Lincoln Distributor.

1. The solenoid plunger must work freely because binding can cause engine surging. If surging occurs, be sure the plunger is properly lined up with the carburetor lever. Dust the plunger about once a year with graphite powder.

2. When any service is done, reassemble the rubber bellows on the solenoid plunger with the vent hole on the lower side.

3. Proper operation of the idler requires good grounding of the printed circuit board (through its mounting), reed switch, and battery.

4. If desired, the welder can be used without automatic idling by setting the "Idler Control" switch to the "High Idle" position.

Nameplates

Whenever routine maintenance is performed on this machine, or at least yearly, inspect all nameplates and labels for legibility. Replace those which are no longer clear. Refer to the parts list for the replacement item number.

TROUBLESHOOTING

⚠ WARNING

MOVING PARTS can injure.

- **Have qualified personnel do maintenance and troubleshooting work.**
- **If possible, turn the engine off and disconnect the battery before working inside the machine.**
- **Remove guards only when necessary to perform maintenance, and replace them when the maintenance requiring their removal is complete.**
- **If fan guards are missing from a machine, obtain replacements from a Lincoln Distributor. (See Operating Manual Parts List.)**

TROUBLE	CAUSES	WHAT TO DO
1. Machine fails to hold the "heat" constantly.	A. Rough or dirty commutator. B. Brushes may be worn down to limit. C. Field circuit may have variable resistance connection or intermittent open circuit due to loose connection or broken wire. D. Electrode lead or work lead connection may be poor. E. Wrong grade of brushes may have been installed on generator. F. Field rheostat may be making poor contact and overheating.	A. Commutator should be turned or cleaned. B. Replace brushes. C. Check field current with ammeter to discover varying current. This applies to both the main generator and exciter. D. Tighten all connections. E. Use Lincoln brushes. F. Inspect and clean the rheostat.
2. Welder starts but fails to generate current.	A. Generator or exciter brushes may be loose or missing. B. Exciter may not be operating. C. Field circuit of generator or exciter may be open. D. Exciter may have lost excitation. E. Series field and armature circuit may be open-circuited.	A. Be sure that all brushes bear on the commutator and have proper spring tension. B. Check exciter output voltage with voltmeter or lamp. C. Check for open circuits in rheostat, field leads, and field coils. Check rectifier bridge. D. Flash fields.** E. Check circuit with ringer or voltmeter.
3. Welding arc is loud and spatters excessively.	A. Current setting may be too high. B. Polarity may be wrong.	A. Check setting and current output with ammeter. B. Check polarity. Try reversing polarity or try an electrode of the opposite polarity.
4. Welding current too great or too small compared to indication on the dial.	A. Exciter output low causing low output compared to dial indication. B. Operating speed too low or high.	A. Check exciter field circuit. B. Adjust speed screw on governor for 1550 rpm operating speed.
5. Arc continuously pops out.	A. "Current Range Selector" switch may be set at an intermediate position.	A. Set the switch at the center of the current range desired.
6. Engine fails to start.	A. Out of fuel. B. Clogged fuel system. C. Choke not closing tightly. D. Ignition switch shorted or open E. Moisture or carbon on spark plugs. F. Defective distributor	A. Fill with at least 75 octane gasoline. B. Check all lines to carburetor. C. Loosen choke cable screw and slack off choke wire. D. Replace E. Remove plugs, clean and adjust gap to 0.032". F. Replace.

TROUBLE	CAUSES	WHAT TO DO
7. Low oil pressure. Light not lit when engine running.	A. Oil too light. B. Oil too low. C. Defective oil pressure switch or light.	A. Drain; refill with proper grade. B. Fill to "Full" mark on bayonet gage. Do not overfill. C. Replace.
8. Lack of power.	A. Carbon deposits causing pre-ignition. B. Incorrect timing.	A. Run engine under full load for a short time. B. Time ignition.*
9. Overheating.	A. No water in radiator or clogged cooling system. B. Late timing. C. Improper valve clearance. D. Fan belt too loose.	A. Check throughout for dirty or broken hoses, clogged radiator, or defective water pump. B. Time ignition.* C. Adjust valve tappets (cold settings). D. Adjust for 3/4" to 1" deflection.

Intake	Exhaust
.014	.018

10. Knocking.	A. Poor grade of gasoline. B. Spark advanced too far.	A. Use at least 75 octane gasoline. B. Retime ignition.*
11. Surging.	A. Governor and carburetor toggles and butterfly valve shaft lever are dirty and sticking. B. Dirty air filter. C. Governor spring adjusting screw misadjusted. D. Governor control rod wrong length.	A. Clean and lubricate. Replace toggles if worn. B. Remove and clean according to instructions on unit. C. Adjust screw just enough to eliminate surge.* D. Adjust length of control rod so that there is from 1/32" to 1/16" clearance between the stop pin and the stop when the engine is shut off and the regulator expanded.*
12. Large decrease in speed.	A. Misadjusted governor spring adjusting screw.	A. Adjust screw until speed does not drop more than 100 rpm ±25 rpm when arc is struck. If surge occurs, eliminate it with the control rod. If high idle speed changes, readjust the high idle speed screw.*
13. Unable to strike an arc.	A. Idle speed screw is misadjusted.	A. Idle speed is set too low so idler fails to operate when arc is struck. Adjust low idle speed screw for 1325-1375 rpm.*
14. Engine runs irregularly.	A. Carburetor set too lean.	A. Adjust carburetor adjusting screw so engine will run smoothly at idle speed.*
15. Engine fails to pick up speed when arc is struck.		A. Check the idler.

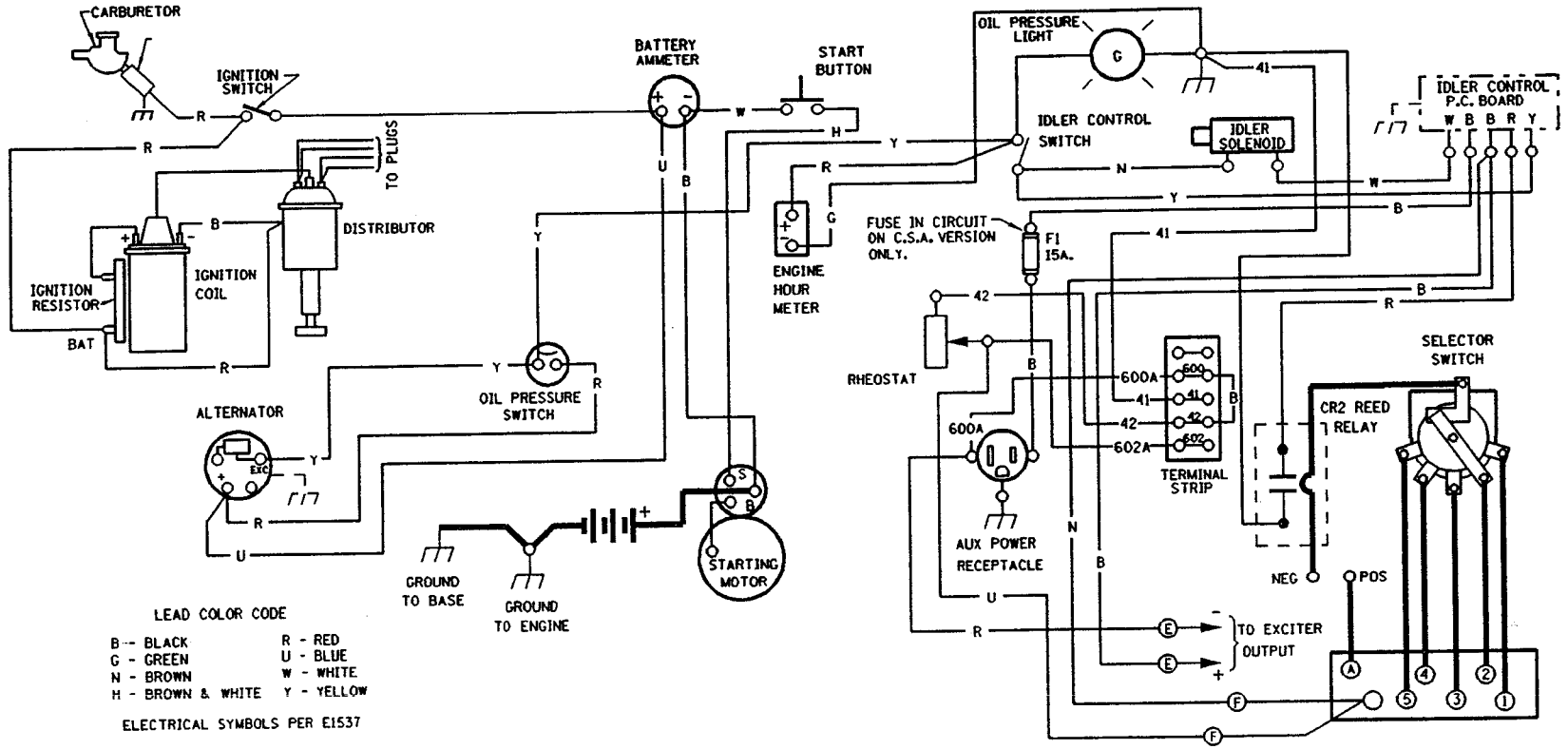
* See engine manual.
** Flashing the fields.

Flashing the exciter field consists of passing current through the fields using an external source of 6 to 125 volts of DC power from a storage battery or DC generator. If using a DC generator, keep the generator turned off except when actually applying the flashing current. To flash the fields:

1. Turn the welder off. Raise one exciter brush off the commutator.
2. On Lincoln welders, attach the positive lead from the external DC source to the right hand brushholder.
3. Carefully holding an insulated section of the negative lead from the DC source, touch its lug or clamp to the left hand brushholder for five seconds. Pull it away quickly to minimize arcing.

Remove the lead from the right hand brushholder, replace the brush on the commutator, start the welder and the generator voltage should build up.

CLASSIC I WIRING DIAGRAM

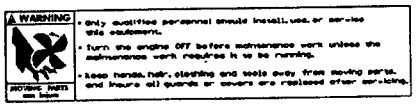


LEAD COLOR CODE

B - BLACK	R - RED
G - GREEN	U - BLUE
N - BROWN	W - WHITE
H - BROWN & WHITE	Y - YELLOW

ELECTRICAL SYMBOLS PER E1537

GENERAL MAINTENANCE INSTRUCTIONS FOR ENGINE DRIVEN ARC WELDING POWER SOURCES

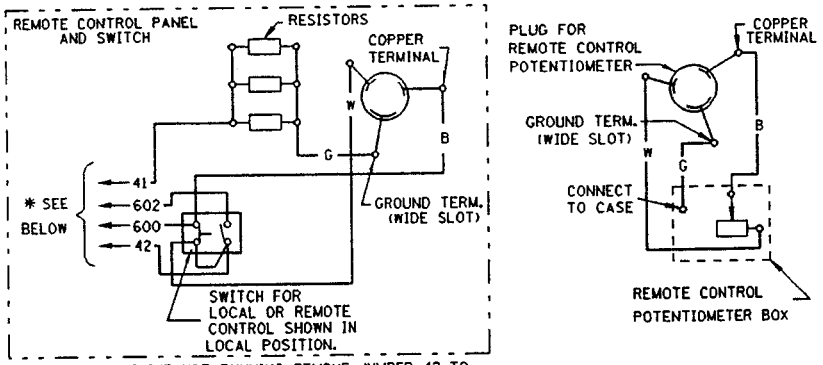


MAINTENANCE INSTRUCTIONS

DAILY CHECKS:
- -ELECTRODE AND WORK CONNECTIONS ARE TIGHT.
- -ROTATE THE CURRENT CONTROL TWICE TO CLEAN CONTACTS.
- -ALL EQUIPMENT IN SERVICEABLE CONDITION.
- -ENGINE OIL, COOLANT, AIR CLEANER AND FUEL STRAINER ARE AT PROPER OPERATING LEVEL AND CLEAN.

AS REQUIRED:
- -BLOW DUST FROM THE MACHINE USING CLEAN LOW PRESSURE AIR.
- -CLEAN COMMUTATORS OR SLIP RINGS WITH FINE SANDPAPER--NOT EMERY CLOTH. SEE THE OPERATING MANUAL FOR INSTRUCTIONS.
- -REPLACE BRUSHES BEFORE THE PIGTAIL IS WITHIN .25" OF THE COMMUTATOR. SEE THE OPERATING MANUAL FOR INSTRUCTIONS.
- -GREASE MAY BE ADDED TO BEARINGS NO MORE THAN ONCE A YEAR. SEE INSTRUCTIONS IN THE OPERATING MANUAL.

REMOTE CONTROL (OPTIONAL)



* WITH MACHINE NOT RUNNING, REMOVE JUMPER 42 TO 600 AT THE TERMINAL STRIP. CONNECT THESE LEADS TO THE CORRESPONDING NUMBERS AT THE TERMINAL STRIP.

LINCOLN® ELECTRIC

CLEVELAND, OHIO U.S.A.

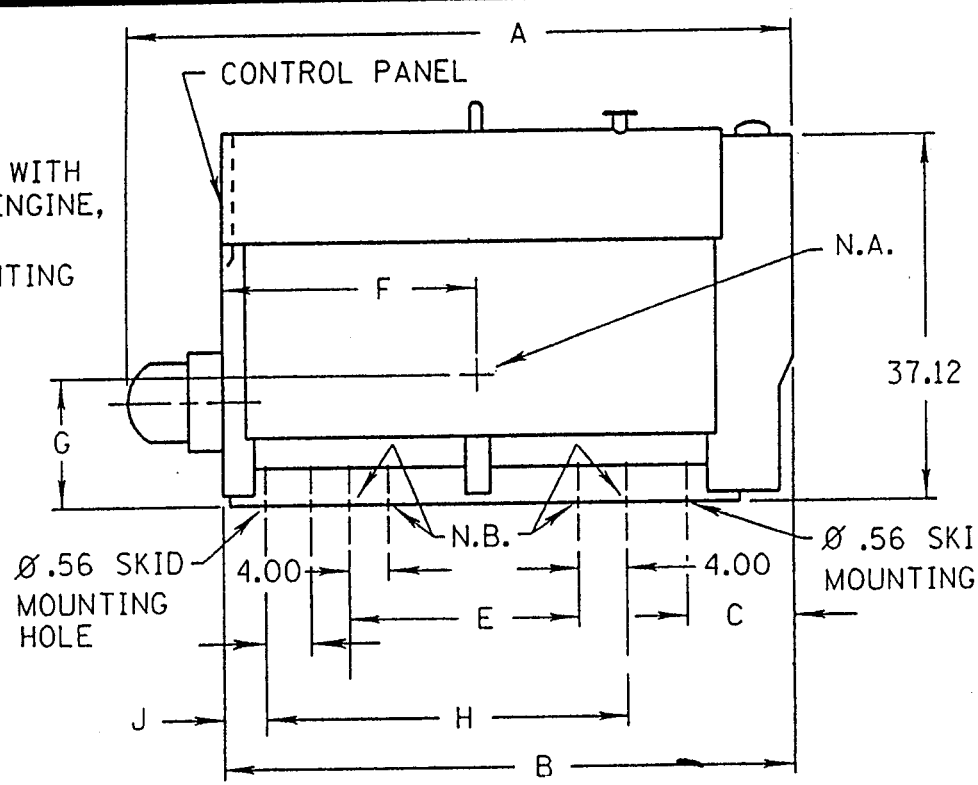
L8983

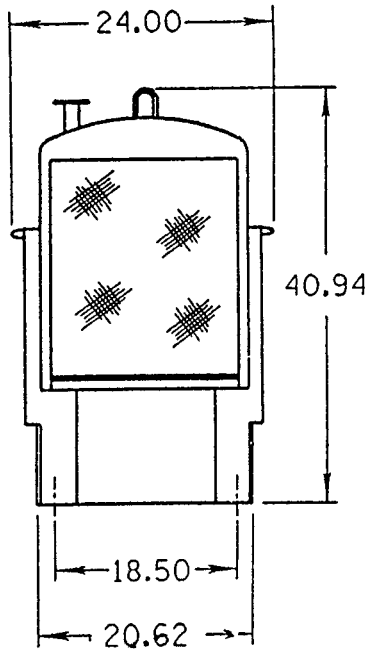
S10766

NOTES:

N.A. CENTER OF GRAVITY WITH OIL AND WATER IN ENGINE, BUT NO FUEL.

N.B. Ø.56 TRAILER MOUNTING HOLES.





ALL DIMENSIONS IN INCHES

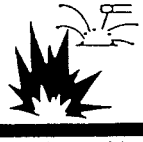
PART NO.	WELDER	A	B	C	D	E	F	G	H	J	K
S10766-7	CLASSIC I (TM27 ENGINE)	67.50	57.70	8.70		23.00	27.94	12.82	41.66	3.25	

UNLESS OTHERWISE SPECIFIED TOLERANCE
ON HOLE SIZES PER E2056
ON 2 PLACE DECIMALS IS ±.02
ON 3 PLACE DECIMALS IS ±.002
ON ALL ANGLES IS ±.5 OF A DEGREE
MATERIAL TOLERANCE ("t") TO AGREE WITH PUBLISHED STANDARDS.

Chg. Sht No.	
12-13-91G	
8-24-79H	5-1-92A
12-4-81M	
1-26-90F	
2-1-91	
9-27-91	

THE LINCOLN ELECTRIC CO.
CLEVELAND, OHIO U.S.A.

EQUIP. TYPE ENGINE WELDERS
SUBJECT DIMENSION PRINT
SCALE NONE DATE 4-9-90
DR FI LP CHK FV REF. SUP'S'D'G 6-11-81
SHT. NO. S10766

			
WARNING	• Do not touch electrically live parts or electrode with skin or wet clothing. • Insulate yourself from work and ground.	• Keep flammable materials away.	• Wear eye, ear and body protection.
Spanish **AVISO DE PRECAUCION**	• No toque las partes o los electrodos bajo carga con la piel o ropa mojada. • Aislese del trabajo y de la tierra.	• Mantenga el material combustible fuera del área de trabajo.	• Protéjase los ojos, los oídos y el cuerpo.
French **ATTENTION**	• Ne laissez ni la peau ni des vêtements mouillés entrer en contact avec des pièces sous tension. • Isolez-vous du travail et de la terre.	• Gardez à l'écart de tout matériel inflammable.	• Protégez vos yeux, vos oreilles et votre corps.
German **WARNUNG**	• Berühren Sie keine stromführenden Teile oder Elektroden mit Ihrem Körper oder feuchter Kleidung! • Isolieren Sie sich von den Elektroden und dem Erdboden!	• Entfernen Sie brennbarres Material!	• Tragen Sie Augen-, Ohren- und Körperschutz!
Portuguese **ATENÇÃO**	• Não toque partes elétricas e electrodos com a pele ou roupa molhada. • Isole-se da peça e terra.	• Mantenha inflamáveis bem guardados.	• Use proteção para a vista, ouvido e corpo.
Japanese **注意事項**	• 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。 • 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。	• 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。	• 目、耳及び身体に保護具をして下さい。
Chinese **警 告**	• 皮肤或湿衣物切勿接触带電部件及銲条。 • 使你自己與地面和工件絶緣。	• 把一切易燃物品移離工作場所。	• 佩戴眼、耳及身體勞動保護用具。
Korean **위 험**	• 전도체나 용접봉을 젖은 헝겁 또는 피부로 절대 접촉치 마십시요. • 모재와 접지를 접촉치 마십시요.	• 인화성 물질을 접근 시키지 마시요.	• 눈, 귀와 몸에 보호장구를 착용하십시요.
Arabic **تحذير**	• لا تلمس الاجزاء التي يسري فيها التيار الكهربائي أو الالكترود بجلد الجسم أو بالملابس المبللة بالماء. • ضع عازلا على جسمك خلال العمل.	• ضع المواد القابلة للاشتعال في مكان بعيد.	• ضع أدوات وملابس واقية على عينيك وأذنيك وجسمك.

READ AND UNDERSTAND THE MANUFACTURER'S INSTRUCT ION 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.

			⚠
• Keep your head out of fumes. • Use ventilation or exhaust to remove fumes from breathing zone.	• Turn power off before servicing.	• Do not operate with panel open or guards off.	**WARNING**
• Los humos fuera de la zona de respiración. • Mantenga la cabeza fuera de los humos. Utilice ventilación o aspiración. para gases.	• Desconectar el cable de alimentación de poder de la máquina antes de iniciar cualquier servicio.	• No operar con panel abierto o guardas quitadas.	Spanish **AVISO DE PRECAUCION**
• Gardez la tête à l'écart des fumées. • Utilisez un ventilateur ou un aspirateur pour ôter les fumées des zones de travail.	• Débranchez le courant avant l'entretien.	• N'opérez pas avec les panneaux ouverts ou avec les dispositifs de protection enlevés.	French **ATTENTION**
• Vermeiden Sie das Einatmen von Schweißrauch! • Sorgen Sie für gute Be- und Entlüftung des Arbeitsplatzes!	• Strom vor Wartungsarbeiten abschalten! (Netzstrom völlig öffnen; Maschine anhalten!)	• Anlage nie ohne Schutzgehäuse oder Innenschutzverkleidung in Betrieb setzen!	German **WARNUNG**
• Mantenha seu rosto da fumaça. • Use ventilação e exhaustão para remover fumo da zona respiratória.	• Não opere com as tampas removidas. • Desligue a corrente antes de fazer serviço. • Não toque as partes elétricas nuas.	• Mantenha-se afastado das partes moventes. • Não opere com os painéis abertos ou guardas removidas.	Portuguese **ATENÇÃO**
• ヒュームから頭を離すようにして下さい。 • 換気や排煙に十分留意して下さい。	• 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下さい。	• パネルやカバーを取り外したままで機械操作をしないで下さい。	Japanese **注意事項**
• 頭部遠離煙霧。 • 在呼吸區使用通風或排風器除煙。	• 維修前切斷電源。	• 儀表板打開或沒有安全罩時不準作業。	Chinese **警 告**
• 얼굴로부터 용접가스를 멀리하십시요. • 호흡지역으로부터 용접가스를 제거하기 위해 가스제거기나 통풍기를 사용하십시요.	• 보수전에 전원을 차단하십시요.	• 판넬이 열린 상태로 작동치 마십시요.	Korean **위 험**
• ابعد رأسك بعيداً عن الدخان. • استعمل التهوية أو جهاز ضغط الدخان للخارج لكي تبعد الدخان عن المنطقة التي تتنفس فيها.	• اقطع التيار الكهربائي قبل القيام بأية صيانة.	• لا تشغل هذا الجهاز اذا كانت الاغطية الحديدية الواقية ليست عليه.	Arabic **تحذير**

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，並請遵守貴方的有関勞動保護規定。

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.

LIMITED WARRANTY

STATEMENT OF WARRANTY:

The Lincoln Electric Company (Lincoln) warrants to the original purchaser (end-user) of new equipment that it will be free of defects in workmanship and material.

This warranty is void if Lincoln finds that the equipment has been subjected to improper care or abnormal operation.

WARRANTY PERIOD:

All warranty periods date from the date of shipment to the original purchaser and are as follows:

Three Years:
Transformer Welders
Motor-generator Welders
Semiautomatic Wire Feeders
Plasma-cutting Power Source
Engine Driven Welders (except engine and engine accessories) with operating speed under 2,000 RPM

Two Years:
Engine Driven Welders (except engine and engine accessories) with operating speed over 2,000 RPM

All engine and engine accessories are warranted by the engine or engine accessory manufacturer and are not covered by this warranty.

Equipment not listed above such as guns and cable assemblies, automatic wire feeders and field installed optional equipment is warranted for one year.

TO OBTAIN WARRANTY COVERAGE:

You are required to notify Lincoln Electric, your Lincoln Distributor, Lincoln Service Center or Field Service Shop of any defect within the warranty period. Written notification is recommended.

WARRANTY REPAIR:

If Lincoln's inspection of the equipment confirms the existence of a defect covered by this warranty, the defect will be corrected by repair or replacement at Lincoln's option.

WARRANTY COSTS:

You must pay the cost of shipping the equipment to a Lincoln Service Center or Field Service Shop as well as return shipment to you from that location.

IMPORTANT WARRANTY LIMITATIONS:

- Lincoln will not accept responsibility for repairs made without its authorization.
- Lincoln shall not be liable for consequential damages (such as loss of business, etc.) caused by the defect or reasonable delay in correcting the defect.
- Lincoln's liability under this warranty shall not exceed the cost of correcting the defect.
- This written warranty is the **only** express warranty provided by Lincoln with respect to its products. Warranties implied by law such as the Warranty of Merchantability are limited to the duration of this limited warranty for the equipment involved.

WARRANTY SUPERSEDED
SEE IMWS 1

LINCOLN® ELECTRIC

THE LINCOLN ELECTRIC COMPANY

World's Leader in Welding and Cutting Products • Premier Manufacturer of Industrial Motors
Sales and Service through Subsidiaries and Distributors Worldwide
Cleveland, Ohio 44117-1199 U.S.A.

Eff. 11/92

Litho in U.S.A.