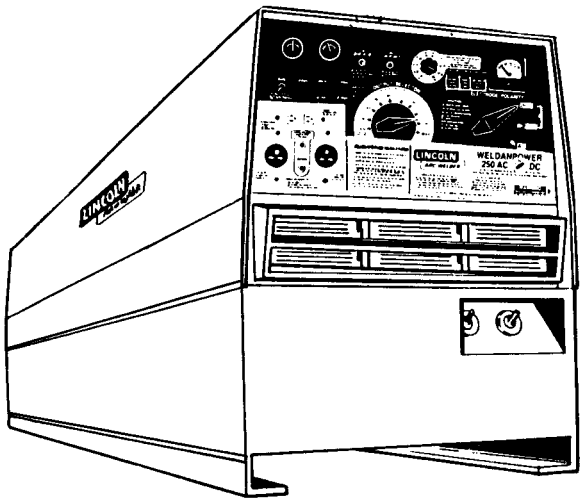
LINCOLN ELECTRIC

IM-317

May, 1987
IM317
Weldanpower 250 AC/DC
(Perkins)
9103; 9136; 9164

OPERATING MANUAL

WELDANPOWER® 250AC/DC-7KW



Unit shown with optional CV meter.

Perkins Diesel

Engine Driven

This manual covers equipment which is obsolete and no longer in production by The Lincoln Electric Co. Specifications and the availability of optional features may have changed.

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 welders are 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 THE INSIDE FRONT COVER. And, most importantly, think before you act and be careful.

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THE LINCOLN ELECTRIC COMPANY

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Cleveland, Ohio 44117-1199 U.S.A.

Arc Welding Safety Precautions

PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. READ AND UNDERSTAND BOTH THE SPECIFIC INFORMATION GIVEN IN THE OPERATING MANUAL FOR THE WELDER AND/OR OTHER EQUIPMENT TO BE USED AS WELL AS THE FOLLOWING GENERAL INFORMATION.

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

2. ELECTRIC SHOCK can kill.

   Protect yourself from possible dangerous electrical shock:

   a. The electrode and work (or ground) circuits are electrically "hot" when the welder is on. Never permit contact between "hot" parts of the circuits and bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.

   b. Always insulate yourself from the work and ground by using dry insulation. When welding in damp locations, on metal floors, gratings or scaffolds, and when in positions such as sitting or lying, make certain the insulation is large enough to cover your full area of physical contact with work and ground.

   c. 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.

   d. Ground the work or metal to be welded to a good electrical ground.

   e. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition.

   f. Never dip the electrode in water for cooling.

   g. 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.

   h. If using the welder as a power source for mechanized welding, the above precautions also apply for the automatic electrode, electrode reel, welding head, nozzle or semiautomatic welding gun.

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

   j. Also see Items 6c and 8.

3. FUMES AND GASES can be dangerous to your health.

   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 9b.

4. ARC RAYS can injure eyes and burn skin.

   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.

5. FIRE OR EXPLOSION can cause death or property damage.

   a. Remove fire hazards well away from the 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.

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

   c. Insulate yourself from work and ground using dry insulation. When welding in damp locations, on metal framework such as floors, gratings or scaffolds, and when in positions such as sitting or lying, make certain the insulation is large enough to cover your full area of physical contact with work and ground.

   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

LINCOLN® WELDERS

IM-179-G

OPERATING MANUAL

GASOLINE ENGINE AND ADJUSTMENT:

(For SA-200-F163 welders with an electronic idler see IM-277)

TIMING, CARBURETOR, GOVERNOR & IDLER

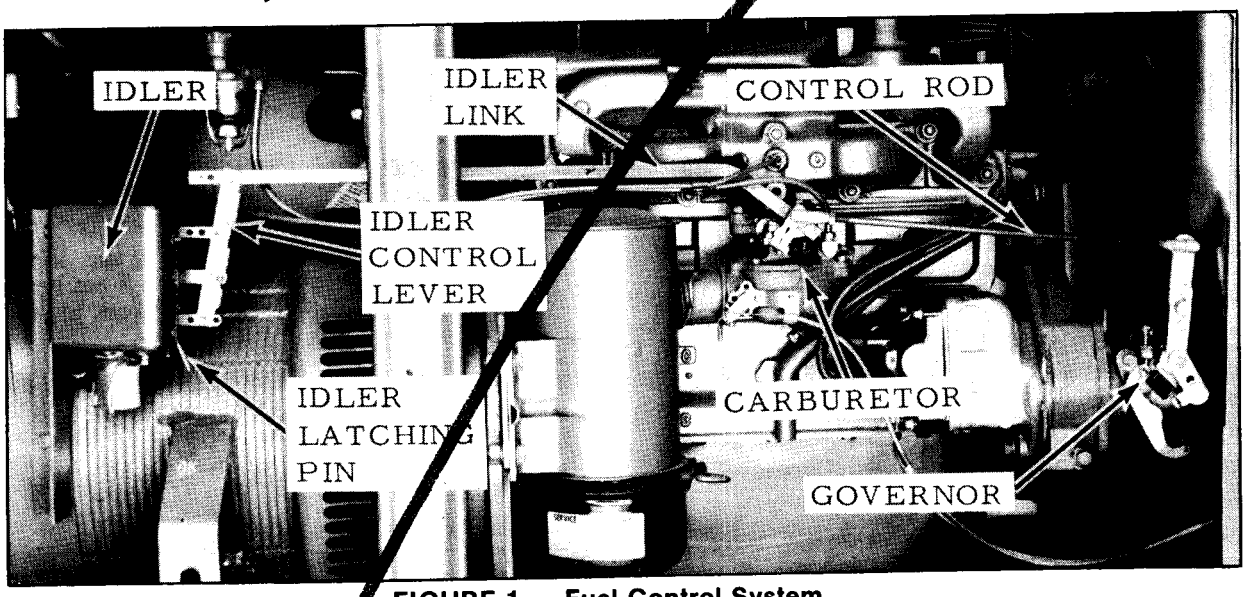

FIGURE 1.— Fuel Control System.

DO NOT COPY

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

GENERAL INSTRUCTIONS

This manual is designed to help a qualified mechanic time the engine and adjust the fuel control system. Inexperienced workmen can do more harm than good in attempting to make many of these adjustments. If in doubt, call the nearest Lincoln authorized Field Service Shop.

The engine fuel control system consists of three major parts — carburetor, governor and idler. To save fuel and reduce engine wear, the idler slows the engine to *low idle speed* when no welding is being done. When the arc is struck, the idler disengages allowing the governor to accelerate the engine to *load speed* for welding. When the arc is broken the governor keeps the engine operating at *high idle speed* until the idler takes over to reduce the speed.

NOTE: For air cooled engine carburetor and governor adjusting instructions, see the appropriate engine manufacturer's Operator's Manual. For idler adjustments, see pages 7 and 8.

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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 National Electrical Code, all local codes and the manufacturer's recommendations.

c. Ground the equipment in accordance with the 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.

PROPER GROUNDING DURING INSTALLATION

The 1985 National Electrical Code does not require this machine to be grounded under normal operating circumstances.

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 to which such requirements may apply to your particular situation and follow them explicity.

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 pipe going into the ground for at least ten feet and having no insulated joints, or to the metal framework of a building which has been effectively grounded. The National Electrical Code lists a number of alternate means of grounding electrical equipment. (If an older portable welder does not have a grounding stud, connect the ground to an unpainted frame screw or bolt.)

INSTALLATION, CONNECTION, AND MAINTENANCE OF BATTERY

To prevent EXPLOSION when:

a) Installing a new battery — disconnect the negative cable from the old battery first and connect the negative cable to the new battery last.

b) Connecting a battery charger — remove the battery from the welder by disconnecting the negative cable first, then the positive cable and battery clamp. When reinstalling, connect the negative cable last.

c) Using a booster — connect the positive lead to the battery first then connect the negative lead to the copper strap on the engine foot.

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 the engine is not running.

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

(S-17851)

OPERATION OF ENGINE WELDERS

WARNING: Operate internal combustion engines in open, well ventilated areas or vent engine exhaust fumes outdoors.

OPERATION OF ALL WELDERS

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

MAINTENANCE AND TROUBLESHOOTING WARNINGS

WARNING: Have qualified personnel do the maintenance and troubleshooting work. Turn the engine (or electrical power at the switchbox) off before working inside the machine. 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.

ATTENTION OWNERS OF ENGINE WELDERS

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

CAUTION WHEN INSPECTING THE COMMUTATOR AND BRUSHES

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.

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.

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WELDANPOWER® 250AC/DC-7KW
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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. Also see items 6c and 9c.

6. For Welding in General.

a. Droplets of molten slag and metal are thrown or fall from the welding arc. Protect yourself with 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 when in a welding area. Use glasses with side shields when near slag chipping operations.

b. 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.

c. Be sure the work cable is connected to the work as close to the welding area as practical. Work cables connected to the building framework or other locations some distance 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.

7. For Gas-Shielded Arc Welding.

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 keeps 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.

8. For Electrically Powered Equipment.

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

b. Make the electrical installation in accordance with the National Electrical Code, all local codes and the manufacturer's recommendations.

c. Properly ground the equipment in accordance with the National Electrical Code and the manufacturer's recommendations.

9. For Engine Powered Equipment.

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

b. Operate the internal combustion 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, if possible, allow it to cool when 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. 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.

e. 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.

f. 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.

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

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.

2. Specifications

Model: WP-250 AC/DC-7KW
Type: K-1330-CV
Dimensions in. (mm)
H X W X L: 37.38 X 24.75 X 60.18 (949.4 X 628.7 X 1528.6)
Net Weight lbs. (kg) : 1010 (458.1)

2.1 General Machine Description

The Weldanpower® 250 AC/DC-7KW is designed to provide a maximum welding output of 250 Amps AC, 250 Amps DC at 25 volts or 7.0 KW of 115/230 volts, 60 hertz AC auxiliary power. The auxiliary power is suitable for temporary, standby or emergency power using the engine manufacturer's recommended maintenance schedule. The Weldanpower 250 AC/DC-7KW also provides a maximum constant voltage output of 200 Amps at 19 volts.

The unit is designed to meet a 75 dba at 23 feet noise level and be used with a broad range of AC and DC stick electrodes, some automatic applications, and AC power tools within the rating of the unit.

2.2 Recommended Processes and Equipment

2.2.1 AC and DC Variable Voltage (manual) Welding

AC - 45-250 amperes
DC - 45-250 amperes

100% Duty Cycle on all settings.

See Section 4.3.3.1 for electrode selection guide.

An Output Selector with 9 positions for V.V. stick welding.

An Output Control for fine current adjustment ... for demanding applications such as pipe or TIG welding.

2.2.2 Constant Voltage Welding

The CV tap permits the Weldanpower 250 AC/DC-7KW to be used with an LN-22 and .068 NR-211-MP Innershield electrode. Because of the range of voltage and output current available, this is the only Innershield electrode recommended. The CV tap is rated at 200 Amps 19 Volts at a 100% duty cycle. The typical voltage range available at 200 Amps is 15 to 19. At 100 Amps the voltage range is 18 to 22, and at 80 Amps the voltage range is 19 to 22.5. When CV welding, the output control is used for voltage adjustment.

The Weldanpower 250 AC/DC-7KW can also be used with some other wire feeders (such as the LN-7) which draw a small amount of current from the auxiliary power of the unit while welding. The limiting factors in using an LN-7 with the Weldanpower 250 AC/DC-7KW are:

1. Welding current and voltage must be within the rating of the machine.

2. The auxiliary power voltage into the wire feeder must remain above 98 volts while welding. The auxiliary power voltage is determined by a combination of the welding load and the setting of the "Output Control"; the higher the welding load, the higher (closer to 10 on the dial) the "Output Control" must be set.

When using an LN-7 with the Weldanpower 250 AC/DC-7KW, the K-240 contactor kit is required.

2.2.3 TIG Welding

The K-799 HI-FREQ™ can be used with this machine to provide high frequency arc stabilization and a gas valve for TIG welding. The 115 volt AC for the K-799 can come from either the 115V receptacle on this machine or from another source. To attach the K-799 to the top of the engine welder, mounting hardware is provided when "WP1" is added to the K-799 sales spec. When TIG welding, AC or DC may be used, but the Weldanpower must be derated to a maximum of 170 amps at 100% duty cycle.

2.3 Engine Specifications

Make:	Perkins Diesel
Model:	3.09
Cylinders:	3
Cycles:	4
Bore x Stroke, inch (mm):	2.83 x 2.83 (72 x 72)
Displacement, cu. in. (cc):	53.6 (879)
Horsepower (SAEJ1349 Gross):	22.2 at 3600 rpm
Lube Oil Capacity: Quarts (liter)	3.7 (3.5)
Lubrication:	Forced feed; full flow oil filter
Cooling System:	Water Cooled
Coolant Capacity: Quarts (liter)	5.4 (5.1)
Fuel System:	Indirect injection; fuel filter with integral fuel shutoff; lift pump
Fuel Capacity: Gallons (liter)	5 (18.93)
Governor:	Mechanical
Air Cleaner:	Heavy duty two stage dry cartridge type
Starting System:	12 volt battery and starter; pushbutton start switch; glow plugs; alternator and regulator battery charger; charging ammeter
Engine Idler:	Automatic electronic idler
Muffler:	Low noise muffler
Engine Protection:	Shutdown on high water temp.
Miscellaneous:	Oil pressure light; water temp. light, fuel level gauge
Operating Speed:	High idle: 3650 rpm Low idle: 1900 rpm Full load: 3500 rpm

3. Installation

3.1 Safety Precautions

3.1.1 Spark Arrester

Some federal, state or local laws may require that diesel engines be equipped with exhaust spark arresters when they are operated in certain locations where unarrested sparks may present a fire hazard. The standard muffler included with this welder does not qualify as a spark arrester. When required by local regulations a suitable spark arrester 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.

3.1.2 Location/Ventilation

WARNING:
Operate internal combustion engines in open, well-ventilated areas or vent engine exhaust fumes outdoors.

3.1.3 Machine Grounding

The National Electrical Code requires that this machine be grounded under certain operating circumstances.

Further, 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 to which such requirements apply to your particular situation and follow them explicitly. A machine grounding stud marked with the symbol ⏚ is provided below the welder control panel.

In general, if the machine is to be grounded it should be connected with a #10 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 a building which has been effectively grounded. The National Electrical Code lists a number of alternate means of grounding electrical equipment.

3.1.4 Undercarriage

The recommended undercarriage for use with this equipment for in-plant and yard towing by a vehicle * is Lincoln's K-768. 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 insure 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.

3.2 Installation of Equipment Required for Recommended Processes

3.2.1 TIG Welding

The K-799-WP1 Hi-Freq Unit includes an R.F. by-pass capacitor kit which must be installed for power source protection. Installation instructions are in the kit. (When using the Weldanpower 250 AC/DC-7KW with any other high frequency equipment, an R.F. by-pass capacitor **must** be installed. Order Kit T-12246.) To provide protection the welder grounding stud must be connected to ground. Also follow the grounding instructions given in the Hi-Freq Instruction Manual (IM-298). The K-799-WP1 includes mounting hardware for mounting to the Weldanpower 250 AC/DC-7KW.

3.2.2 Standby Power Connections

Suitable for temporary, standby or emergency power using engine manufacturer's recommended maintenance schedule.

The Weldanpower 250 AC/DC-7KW can be permanently installed as a standby power unit for a 230 volt-3 wire, 30 ampere service. Connections must be made by a licensed electrician who can determine how the 115/230 volt Weldanpower can be adapted to the particular installation and comply with all applicable electrical codes. The following information can be used as a guide by the electrician for most applications (refer also to the connection diagram shown in Fig. 1.

1. Install a double pole, double throw switch between the power company meter and the premises disconnect.

   Switch rating must be the same as or greater than the customer's premises disconnect and service over-current protection.

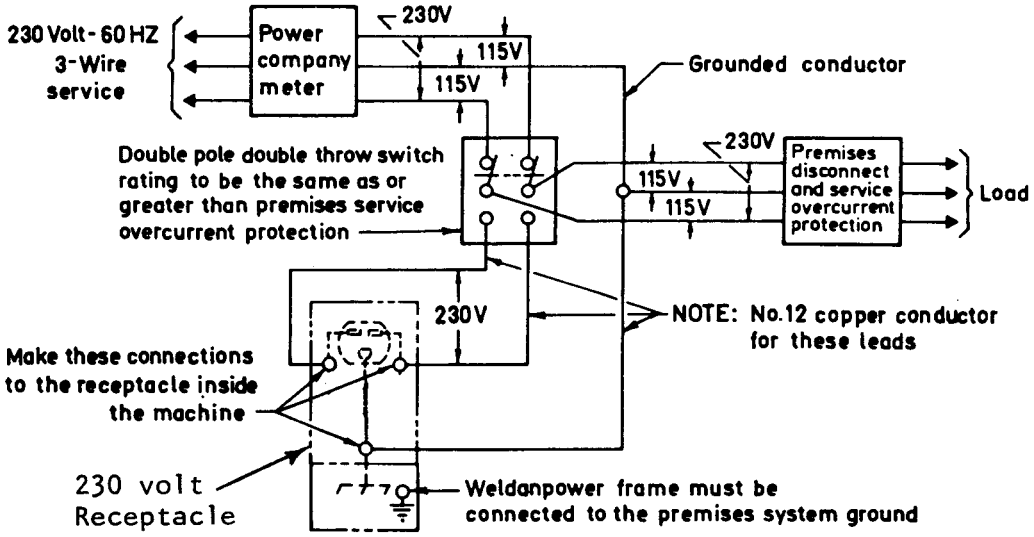
2. With the engine off remove the Weldanpower cover and make permanent connections from the Weldanpower 230 volt receptacle terminals to the switch installed in step 1.

Replace the Weldanpower cover after making the connections. An access hole should be made in the cover to bring out the conductors to the switch. Use caution to protect the lead from any sharp corners.

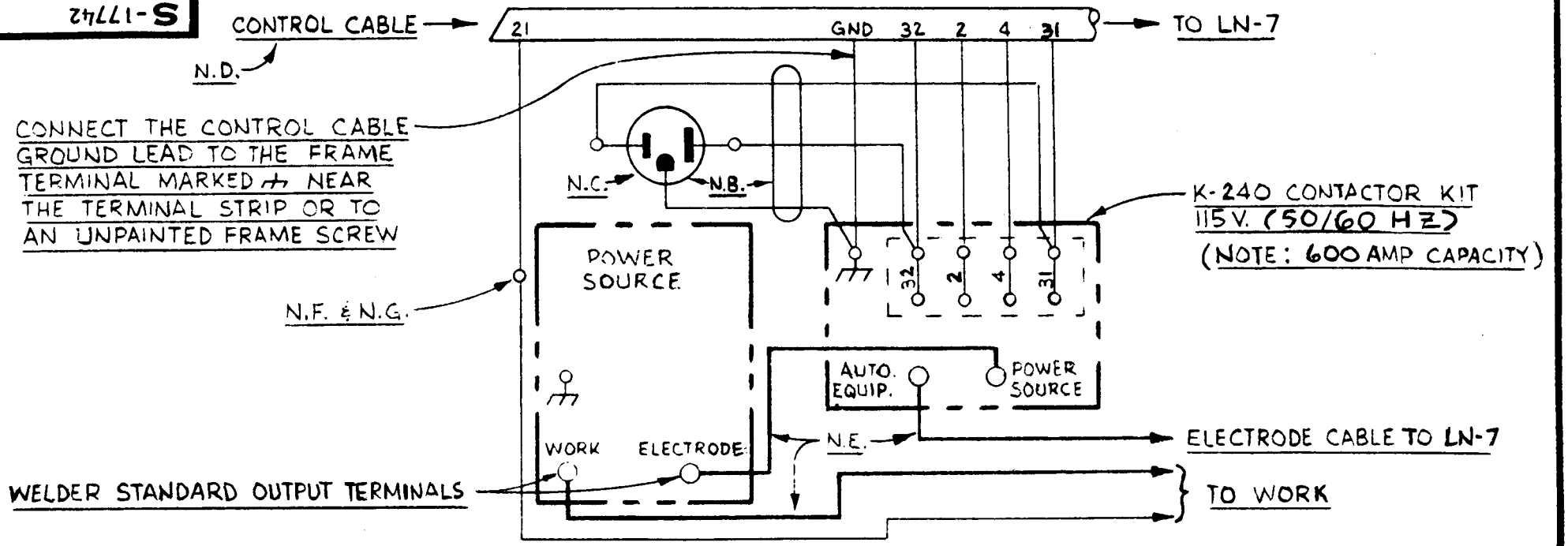
3. Properly ground the Weldanpower frame to the premises system ground.

4. Take necessary steps to assure load is limited to the capacity of the Weldanpower. Maximum rated load for the 230 volt auxiliary is 30 amperes. Loading above 30 amperes will reduce output voltage below the allowable -10% of rated voltage which may damage appliances or other motor-driven equipment.

CONNECTION OF W/P 250 AC/DC-7KW TO PREMISES SYSTEM



S-17742



10a

WARNING: Turn the power source off when making connections.

N.A. Use power source polarity switch to set for desired electrode polarity. Position the output selector switch on the power source to the CV position.

N.B. 3 conductor #16 power cord physically suitable for the installation and plug rated at 115 volts 15 amperes AC.

N.C. Plug into 115 volt AC receptacle on welder control panel or other 115 volt AC supply rated a minimum of 500 volt amperes.

N.D. Leads #21 and GND. do not appear on LN-7's with codes below 7026.

N.E. Welding cables must be of proper capacity for the current and duty cycle of immediate and future applications.

N.F. If LN-7 is equipped with a meter kit, extend lead 21 using #14 or larger insulated wire physically suitable for the installation. An S-16586- length remote voltage sensing work lead may be ordered for this purpose. Connect it directly to the work piece independent of the welding work cable. For convenience, this extended #21 lead should be taped to the welding work lead.

N.G. Tape up bolted connection where lead 21 is extended.

N.H. Idler switch on power source must be in high idle position.

CAUTION: Any speed up of the engine RPM by changing the governor setting or over-riding the throttle linkage will cause an increase in the AC auxiliary voltage. If this voltage goes above 140 volts, the LN-7 control circuit will be damaged. The engine governor setting is pre-set at the factory - do not adjust above RPM specifications listed in engine welder operating manual.

UNLESS OTHERWISE SPECIFIED TOLERANCE
ON HOLE SIZES PER E-2056
ON 2 PLACE DECIMALS IS ± .02
ON 3 PLACE DECIMALS IS ± .002
ON ALL ANGLES IS ± .5 OF A DEGREE
MATERIAL TOL' 'CE ("T") TO AGREE WITH PU' D STANDARDS

Ch'ge. Sht. No.			
3-24-84L			
3-7-86C			

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

SUBJECT Connection of LN-7 & K-240 Contactor Kit with 115 Volt AC Auxiliary Power and CV Output

SCALE

DR DATE 8-3-84 CHK. LE

REF. (S-17525) SHT. NO. S 742


Do
Not
Copy

3.3 Output Cables

With the engine off, connect the electrode and work cables to the studs provided. 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.

Listed below are copper cable sizes recommended for the rated current and duty cycle. Lengths stipulated are the distance from the welder to work and back to the welder again. Cable sizes are increased for greater lengths primarily for the purpose of minimizing cable drop.

		CABLE SIZES FOR COMBINED LENGTHS OF ELECTRODE AND WORK CABLES				
AMPS	% DUTY CYCLE	0-50 ft.	50-100 ft.	100-150 ft.	150-200 ft.	200-250 ft.
250	40	2	2	1	1	1/0
250	100	1	1	1	1	1/0

3.4 Pre-Operation Maintenance

Oil: Upon receipt of the welder, fill the crankcase with oil to the "full" mark on the dipstick. Pour oil into the fill tube slowly. Use the weight and type of oil recommended by the engine manufacturerin the Engine Operator's manual. Do not overfill.

Water: IMPORTANT - The engine is shipped without coolant. Fill the radiator with the following mixture:

1. Close the two water drain petcocks (one in radiator and one in engine
   block near oil filter).
2. Add 2.5 qt. (2.4 Liters) permanent type antifreeze.
3. Add balance with clean water (2.9 qt., 2.7 L.)

The total coolant capacity is 5.4 qt. (5.1 L.). The above concentration results in protection to approximately -22°F)-30°C.).

If frost protection is not required, then add 1.5 qt. (1.4 L.) of permanent type antifreeze and the balance with clean water. This concentration provides the proper protection against corrosion. See Engine Manual and antifreeze container for more details.

CAUTION: Do not exceed 50% concentration of antifreeze.
WARNING: Hot coolant can burn skin. Do not remove cap if radiator is hot.

Fuel: Fill the fuel tank with the grade of diesel fuel recommended in the engine Operator's Manual. Be sure the fuel valve on the fue' filter is in the open position (with the handle vertical, the fu valve is open).

Battery:

WARNING:
Use caution as the electrolyte is a strong acid that can burn skin and damage eyes.

Remove the insulating cap from the negative battery terminal. Replace and tighten negative battery cable terminal. NOTE; This machine is furnished with a wet charged battery; if unused for several months, the battery may require a booster charge. Be careful to charge the battery with the correct polarity.

4. Operating Instructions

4.1 Safety Precautions

4.1.1 Pipe Thawing

WARNING:
Although not specifically designed for the work, the output of arc welding machines is sometimes used to thaw frozen water pipes by electrical resistance heating of the pipe metal. Pipe thawing, if not done properly, can result in fire, explosio damage to wiring which may make it unsafe, damage to pipe. damage to the welder, or other hazards. Do not use a welder to thaw pipe before reviewing Lincoln bulletin E-695.1 (dated July, 1986 or later).

Use only AC setting on the Weldanpower 250AC/DC-7KW for thawing pipe. Do not use the maximum tap or the CV tap settings for pipe thawing.

4.1.2 Location/Ventilation

The welder should be located to provide an unrestricted flow of clean, cool air to the cooling air inlets and to avoid heated air coming out of the top of the welder recirculating back to the cooling air inlet. Also, locate the welder so that engine fumes are properly exhausted to an outside area.

4.1.3 Additional Safety Precautions

Always operate the welder with the hinged door closed and the side panels in place as these provide maximum protection from moving parts and insure proper cooling air flow.

Read carefully the Safety Precautions page in the Instruction Manual before operating this machine. Always follow these ar any other safety procedures included in this manual and in t engine Instruction Manual.

4.2 Engine Operation

4.2.1 Engine Control Function/Operation

"START" Pushbutton
Energizes the starter motor to crank the engine. Push and hold in to crank the engine; release as the engine starts. Do not press while engine is running since this can cause damage to the ring gear and/or starter motor.

"RUN-STOP" Switch
When placed in the "RUN" position, this switch energizes the fuel solenoid and other electric accessories. When placed in the "STOP" position, the flow of fuel to the injection pump is stopped to shut down the engine.

OIL PRESSURE LIGHT
The "Red" oil pressure light remains off with proper oil pressure. If light turns on, stop the engine and consult engine Operator's Manual. NOTE: The light should be on when "Run-Stop" switch is in the "Run" position with the engine not running.

WATER TEMPERATURE LIGHT
The "Red" water temperature light remains off under normal operating temperatures. If light turns on, the engine will shut down. Check for restrictions at the cooling air inlets (on control panel and rear of machine), the hot air exhaust, and the engine cooling system (consult the engine Operator's Manual). Check to see that the engine radiator fan is not damaged or the fan belt has not broken or cracked. Also check to be sure the welder loads are within the rating of the welder.

WARNING: Engine coolant is hot and under pressure - allow to cool before removing radiator cap.

"IDLER CONTROL" SWITCH
Has three positions as follows:

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

2. In the "Automatic Idle " 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 welding or power load is not re-started before the end of the time delay, the idler reduces the engine to low idle speed.

d. The engine will automatically return to high idle speed when the welding load or power load is re-applied.

3. In the "Low Idle" position, the idler is on and the engine runs at low idle speed. (This position is used mainly for starting and warming up the engine).

NOTE:
When welding on the "Constant Voltage" tap or with the K-799 Hi-Freq., the Idler Control switch must be placed in the "high idle" position. The idler does not function properly when "Constant Voltage" welding or TIG welding.

"GLOW PLUG" PUSHBUTTON
Depress to activate glow plugs to preheat engine for starting. (See Starting Instructions.)

WARNING:
Under no conditions should ether or other starting fluids be used with the glow plugs.

BATTERY CHARGING AMMETER
Displays the current going from the battery charging alternator into the battery. It is normal for the charging current to be high after starting or when the battery is "low" on charge.

"FUEL LEVEL" GAUGE
Displays the level of fuel in the 5 gallon fuel tank.

4.2.2 Starting/Shutdown Instructions

Be sure all Pre-Operation Maintenance has been performed. (See Section 3.4.)
Remove all loads connected to the AC power receptacles to start the engine, set the "Idler Control" switch in the "Low Idle" position. Place the "Run-Stop" switch in the "Run" position. Press the "Glow Plug" pushbutton for 10-30 seconds and then press the "Start" button. Release both buttons when the engine starts.

NOTE:
Extreme cold weather may require longer glow plug operation.

If engine fails to start in 30 seconds, place run-stop control in stop position to reset engine protection system (when equipped). Wait 30 seconds before repeating above procedure.

If the unit is equipped with the optional engine protection system (low oil pressure) and the engine is not running within 60 seconds from the time the "Run-Stop" switch was placed in the "Run" position, the "Run-Stop" switch must be recycled. That is, it must be placed in the "Stop" position and then again in the "Run" position when ready to start the engine. The reason for this is that the optional protection system has a magnetic switch with a built-in time delay of 60 seconds, and it must sense oil pressure within that period. If no oil pressure is developed within the 60 seconds, the protection system will shut off the fuel supply.

Allow engine to warm up for 5-10 minutes on "Low Idle" before switching to "High Idle" or "Automatic Idle".

When an engine is started for the first time, some of the oil will be needed to fill the passages of the lubricating system. Therefore, on initial starting, run the engine for about five minutes and then stop the engine and recheck the oil. If the level is down, fill to the full mark again.

COLD WEATHER STARTING

With a fully charged battery and the proper weight oil, the engine will start satisfactorily down to +10°F.

Starting below +10°F may require winter grade diesel fuel and longer glow plug operation.

If the engine must be started below -5°F, other starting aids (such as heaters) may be necessary.

WARNING:

Under no conditions should ether or other starting fluids be used.

STOPPING THE ENGINE

Remove all welding and auxiliary power loads and allow engine to run at "Low Idle" speed for a few minutes.

Stop the engine by placing the "RUN-STOP" switch in the stop position.

4.2.3 Angle of Operation

Engines are designed to run in the level condition which is where the optimum performance is achieved. The maximum angle of operation for the Perkins engine is 15 degrees continuously in any direction. If the engine is to be operated at an angle, provisions must be made for checking and maintaining the oil level at the normal (FULL) oil capacity in the crankcase.

When operating the welder at an angle, the effective fuel capacity will be slightly less than the specified 5 gallons.

4.3 Welder Operation

4.3.1 Duty Cycle

The Weldanpower 250AC/DC-7KW is rated at 100% duty cycle on all welding taps and auxiliary power.

4.3.2 Control Function/Operation

"OUTPUT SELECTOR" Switch
A ten position switch with designated welding currents as follows: CV, 50, 65, 80, 95, 115, 140, 170, 200 and MAX (The MAX. tap provides 250 Amps AC and 250 Amps DC, the CV tap provides a maximum of 200 Amps D.C. for constant voltage welding.)

CAUTION:
Never change the "OUTPUT SELECTOR" Switch setting while welding. This will cause severe damage to the switch.

"ELECTRODE POLARITY" Switch
A three position switch with designated welding polarities as follows: AC, DC+ and DC-.

CAUTION:
Never change the "Electrode Polarity" Switch setting while welding. This will cause severe damage to the switch.

"OUTPUT CONTROL"
Provides welding current adjustment between the Output Selector Switch settings in the CC range and welding voltage control with the Output Selector in the CV mode.

WELDING VOLTMETER (FACTORY INSTALLED OPTION)
The optional Welding Voltmeter displays the welding voltage at the output terminals. The Voltmeter only functions with the Output Selector set on CV.

4.3.3 Procedure Adjustment

4.3.3.1 Constant Current (Manual) Welding

Connect welding cables to the "TO WORK" and "ELECTRODE" studs. Start the engine and set the idler switch to the desired operating mode. Set the output selector switch to the desired welding current, the electrode polarity switch to the desired polarity and the machine is ready for welding. A fine adjustment of the welding current can be made with the "Output Control. The following electrode guide will show the recommended electrodes and settings for this machine. (See Table 1.)

TABLE I

ELECTRODE GUIDE *

ELECTRODE TYPE	ELECTRODE POLARITY	ELECTRODE SIZE				
		3/32	1/8	5/32	3/16	7/32
Fleetweld 5P	DC+	50-75	75-130	95-175	140-225	200-250
Fleetweld 35	AC	50-85	75-120	90-160	120-200	150-250
Fleetweld 37	AC	75-105	110-150	160-200	205-250	
Fleetweld 57	AC		110-150	150-200	200-250	
Fleetweld 180	AC	40-90	60-120	115-150		
LH-70	DC+	70-100	90-150	120-190	170-250	
LH-73	AC	70-90	95-135	140-200		
LH-75	DC+	70-110	95-160	120-190	180-250	
LH-78	DC+	85-110	110-160	130-200	180-250	
Jetweld 1	AC	65-120	115-175	180-240		
Jetweld 3	AC	65-120	115-175	180-240		

* See latest Weldirectory M210 for other electrodes which may be satisfactory (above based on 6/87).

NOTE: The maximum current listed of 250 amperes is actually less than the maximum rating of many large electrodes in the above

chart. The 250 ampere limit provides adequate welding capability within the rating of the Weldanpower 250.

It is recommended that the "Output Selector" switch be set for the closest desired VV welding current and then a fine adjustment be made with the "Output Control". In this way, the "Output Control" will be towards its maximum setting (10) and will give the best arc stability and maximum auxiliary power. Some arc instability may be experienced when the "Output Control" is set towards the low end of its control (1).

4.3.3.2 Semiautomatic Welding (CV)

Connection of the WP250AC/DC-7KW to the LN-22

a. Shut the welder off.

b. Connect the electrode cable from the LN-22 to the electrode terminal of the welder. Connect the work lead to work terminal of the welder.

c. Position the welder "Electrode Polarity" switch to the desired polarity, either DC(-) or DC(+).

d. Position the "Output Selector" switch to the CV position.

e. Place the idler switch in the high idle position. The engine idling device does not function when welding in the CV mode.

f. Attach the single lead from the LN-22 control box to the work using the spring clip on the end of the lead. This is only a control lead - it carries no welding current.

g. Adjust wire feed speed at the LN-22 and adjust the welding voltage with the "Output Control" at the welder.

WARNING:
The electrode is always electrically "hot" when the power source is on and the circuit is complete.

Connection of the WP250AC/DC-7KW to the LN-7 with K-240 Contactor Kit

a. Shut the welder off.

b. Connect the LN-7 and the K-240 Contactor Kit per instructions on the appropriate connection diagram.

c. Place the idler switch in the high idle position. The engine idling device does not function when welding in the CV Mode.

d. The welding range is limited to the recommended processes given in the following table. If the "Output Control" is adjusted to obtain lower welding voltages outside the recommendations, the Contactor Kit or the LN-7 may malfunction due to the auxiliary power voltage falling below 98 volts.

The table below shows the electrode and process which can be used wit the LN-22 and the LN-7/K-240 combination.

WIRE FEEDER	ELECTRODE SIZE	ELECTRODE TYPE	WFS IN/MIN
LN-22 or LN-7 & K-240	.068	NR-211-MP	55-90

4.3.3.3 Auxiliary Power

Start the engine and set the idler control switch to the desired operating mode. Voltage is now at the receptacle for auxiliary power.

115 Volt Circuit: Up to 60 Amps can be drawn in combination from one 20 Amp duplex and one 50 Amp single grounding type receptacle. Entire 115 volt circuit is protected by a 60 Amp circuit breaker.

230 Volt Circuit: 30 Amps can be drawn from a 30 Amp single grounded type receptacle. The 230 volt circuit is protected by a 30 Amp circui breaker.

Note: Output rating in watts is equivalent to Volt-amperes at unity power factor. Output Voltage within ±10% at all loads up to rated capacity.

The auxiliary power receptacles should only be used with three wire grounded type plugs or approved double insulated tools with two wire plugs.

The current rating of any plug used with the system must be at least equal to the current load through the associated receptacle. Do not attempt to connect power receptacles in parallel.

Most 1.5 HP motors can be started if there is no load on the motor or other load connected to the machine, since the full load current rating of a 1.5 HP motor is approximately 20 amperes (10 amperes for 230 volt motors). The motor may be run at full load when plugged into only one side of the duplex receptacle. Larger motors through 2 HP can be run provided the receptacle rating as previously stated is not exceeded. This may necessitate 230 V operation only.

It must be noted that the above auxiliary power ratings are with no welding load. Simultaneous welding and power loads are permitted by following Table II. The permissible currents shown assume that curren is being drawn from either the 115 volt or 230 volt supply (not both a the same time). Also, the "Output Control" is set at "10" for maximum auxiliary power.

TABLE II

Welding Output AC/DC	Permissible Power	Permissible Auxiliary Current in Amperes @ 115 V -or- @ 230 V	
200-MAX,CV*	None*	0	0
170	2000	17	8.5
140	4200	36	18
115	5300	46	23
95	6000	52	26
80	6500	56	28
50-65	7000	60	30

* When the LN-7 and the K-240 are being used on the CV tap, sufficient power is available for these two units. See section 2.2.2.

See Section 3.2.2 for installation as a standby power unit.

4.3.4 Operation of Options/Accessories

4.3.4.1 TIG Welding

The Weldanpower 250AC/DC-7KW may be used with the K-799-WP1 High Frequency Generator (Code Numbers above 8400). The combined package will permit TIG Welding up through 170 Amps.

The K-799-WP1 should be used with the Weldanpower 250AC/DC-7KW on high idle to maintain satisfactory operation. See K-799 Operating Manual (IM-298) for details on the K-799's operation.

4.4 Break-in Period

The engine used to supply power for your welder is a heavy-duty, industrial engine. It is designed and built for rugged use. It is very normal for any engine to use small quantities of oil until the break-in is accomplished. We suggest checking the oil level twice a day during the break-in period (about 50 running hours).

IMPORTANT: IN ORDER TO ACCOMPLISH THIS BREAK-IN, THE UNIT SHOULD BE SUBJECTED TO MODERATE LOADS, WITHIN THE RATING OF THE MACHINE. AVOID LONG IDLE RUNNING PERIODS. REMOVE LOADS AND ALLOW ENGINE TO COOL BEFORE SHUT DOWN.

5. Maintenance

5.1 Safety Precautions

WARNING:
Have a qualified technician do the maintenance and trouble shooting work. Turn the engine off before working inside the machine. 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.

Read the Safety Precautions in front of this manual and the engine instruction manual before working on this machine.

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.

5.2 Routine Maintenance

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

2. If the fuel supply runs out while the fuel pump is operating, air may be entrapped in the fuel distribution system. If this happens, bleeding of the fuel system may be necessary. See the engine Operator's manual.

3. Refer to the engine maintenance section in the engine Operator's manual for routine engine maintenance.

4. Air Filter
   The air filter canister is located behind the engine door on the right side of the welder. Turn the slotted head of the latch (at the bottom of the door) 90° (clockwise on the right-hand latch, counterclockwise on the left-hand latch) to open.

   The air filter element is a dry cartridge type. It can be cleaned and re-used; however, damaged elements should not be washed or re-used. Remove loose dirt from element with compressed air or water hose directed from inside out. Compressed Air: 100 psi maximum with nozzles at least one inch away from element. Water Hose: 40 psi maximum without nozzle.

   Soak element in a mild detergent solution for 15 minutes. Do not

soak more than 24 hours. Swish element around in the solution to help remove dirt. Rinse elements from inside out with a gentle stream of water (less than 40 psi) to remove all suds and dirt. Dry element before re-use with warm air at less than 160°F. Do not use a light bulb to dry the element.

Inspect for holes and tears by looking through the element toward a bright light. Check for damaged gaskets or dented metal parts. Do not re-use damaged elements. Protect element from dust and damage during drying and storage.

5. Both English and Metric fasteners are used on this welder.

5.3 Periodic Maintenance

1. Blow out the welder and controls with low pressure air periodically. In particularly dirty locations this may be required once a week.

2. Throttle Control parts must be kept clean and lubricated.

3. Refer to engine Operator's manual for periodic engine maintenance.

4. A slight amount of darkening and wear of the slip rings and brushes is normal. Brushes should be inspected when a general overhaul is necessary.

5. When replacing, jumping, or otherwise connecting the battery to the battery cables, the proper polarity must be observed. Failure to observe the proper polarity could result in damage to the charging circuit. The positive battery cable is designated with a "P" stenciled on the terminal lug of the cable and the negative battery cable has an "N" stenciled on the terminal lug of the cable.

6. Nameplates - Whenever periodic 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 replacement item number.

7. With the engine off, check for correct functioning of the water temperature light by jumping the terminal on the water temperature switch (#220), on the starter side of the engine, to the engine block. The water temperature light should come on. Check lightbulb and wiring if light fails to turn on.

5.4 Troubleshooting

TROUBLE	CAUSE	WHAT TO DO
A. No welder or power output	1. Flashing circuit fuse blown.	1. Replace with a new 8 amp "Slow-Blow" fuse.
	2. Open lead in flashing or field circuit.	2. Check for opens in leads #224,#227,#228, #219,#200,#205,#5 & #4 in field and flashing circuits.
	3. Faulty rotor.	3. Lift brushes and check rotor continuity between slip rings.
	4. Faulty rheostat (R4).	4. Rheostat resistance should be approx. 10 ohms when set at 1.
	5. Faulty stator field winding.	5. Disconnect lead #4 at D2 and check for continuity between leads #4 and #5.
	6. Faulty field rectifier (D2).	6. Replace with known good one.
	7. Faulty flashing diode (D3).	7. Replace with known good one.
	8. Open in misc. leads.	8. Refer to wiring diagram & check related leads.
B. Battery does not stay charged	1. Faulty battery	1. Replace with new battery.
	2. Faulty charging system	2. Refer to engine Operator's Manual for charging system service.

TROUBLE	CAUSE	WHAT TO DO
C. Engine will not idle down to low speed.	1. Idler switch on High Idle.	1. Set switch on Automatic Idle or Low Idle.
	2. External load on welder or auxiliary power	2. Remove all external loads and short circuits.
	3. a) No voltage present between terminals #213 & #5. (Voltage should be 12 VDC.)	3. a) Check for broken leads #213, #5 and and #224.
	b) Battery disconnected.	b) Battery must be connected for idler operation.
	4. No open circuit voltage on the auxiliary power receptacles.	4. Check for generator buildup.
	5. No voltage present between terminals #3 & #5. (Voltage should be 120 VAC.)	5. Check for broken leads #3 and #5.
	6. K-799-WP1 Hi-Freq Kit connected to Weldanpower	6. Use K-799-WP1 with Weldanpower on high idle.
	7. Idler solenoid fuse blown	7. Replace with a new 8 Amp "Slow-Blow" fuse.
	8. Faulty wiring in solenoid circuit	8. Check for broken leads #222, 221, 229, 215 & 5.
	9. Idler solenoid position out of adjustment.	9. Adjust solenoid as necessary. The solenoid must be adjusted so that the solenoid shaft seats fully, otherwise the solenoid will be damaged.
	10. Idler relay (CR2) faulty.	10. Check and replace relay if faulty.
	11. Faulty idler solenoid.	11. Check and replace solenoid if faulty.
	12. Faulty idler P.C. board.	12. Replace P.C. board with known good one.

TROUBLE	CAUSE	WHAT TO DO
D. Engine will not go to high idle when attempting to weld.	1. No voltage signal from the idler transformer	1. Check idler transformer operation. Check for broken leads #217,#216, R2 and #2.
	2. No open circuit voltage on output studs.	2. Check generator output.
	3. Welding on CV tap.	3. Use on high idle only.
	4. Faulty idler P.C. board.	4. Replace P.C. board with known good one.
E. Engine will not go to high idle when using auxiliary power.	1. No voltage signal from the idler current transformer.	1. Check idler current transformer operation. Check for broken leads #218, #3, and #5 on the idler current transformer.
	2. Auxiliary power load less than 1 Amp.	2. Idler will not function with less than 1 Amp load. Set idler switch to high idle.
	3. Faulty idler P.C. board.	3. Replace P.C. board with known good one.
F. Engine goes to low idle but does not stay at low idle.	1. Idle speed set too low.	1. Adjust solenoid linkage to set speed at 1900 RPM.
	2. Idler solenoid not seating properly.	2. Adjust solenoid as necessary. The solenoid must be adjusted so that the solenoid shaft seats fully, otherwise the solenoid will be damaged.
	3. Faulty solenoid.	3. Replace solenoid with known good one.

6. Parts List

Code: 9103
Engine Spec.: M-14987

Wiring Diagram: L-7193
Winding Spec. Sheet: S-17604
Instruction Manual: IM-317

PART NAME	PART NO.	NO. REQUIRED
Engine Components		
Starter Motor	++	1
Glow Plug	++	3
Alternator	++	1
Regulator	++	1
Glow Plug Indicator	++	1
Radiator Fan	++	1
Fan Spacer	S-18028	1
Muffler	M-14771	1
Muffler Bracket	S-18025	1
Muffler Gasket	++	1
Oil Filter	++	1
Fuel Filter Cartridge	++	1
Fuel Line (Return line)	++	1
Radiator	G-1725	1
Lower Radiator Hose	M-15111	1
Upper Radiator Hose	++	1
Hose Clamp (Large)	++	2
Radiator Cap	S-9970-1	1
Drain Cock	T-9956-1	1
Hose Clamp (Small)	++	2
Air Cleaner As'bly - Includes	M-15026	1
Air Cleaner Element	Donaldson #P10-2745	1
Mounting Band	S-17919	2
Air Cleaner Outlet Hose	M-15029	1
Air Intake Hose	M-14768	1
Hose Clamp	S-10888-4	3
Mounting Bracket	S-17927	
Battery	M-9399-4	1
(+) Battery Cable	S-8070-45	1
(-) Battery Cable	S-8070-28	1
Ground Strap	S-15017-9	1
Battery Clamp Bracket	M-8223-5	1
Battery Clamp Hook	T-8818-11	2

++ See Perkins parts list or service shop for information on engine parts.

PART NAME	PART NO.	NO. REQUIRED
Radiator Mountings		
Radiator Mount Assembly	M-15062	1
Lower Fan Guard	S-17962	1
Upper Fan Guard	S-17964	1
Right Radiator Support	S-17963	1
Left Radiator Support	S-17939	1
Rubber Mount	T-12065	2
Right Radiator Baffle	M-15025-2	1
Left Radiator Baffle	M-15025-1	1
Engine & Alternator Mount		
Engine Foot	S-17570	2
Rubber Mount (Engine)	T-11991-1	2
Rubber Mount (Alternator)	T-11991-2	1
Rubber Mount Retainer	S-16228	3
Welder Components		
Stator	L-7177	1
Rotor	L-7174	1
Bearing	M-9300-8	1
Blower	M-11881-9	1
Key	M-8776-31	1
Disc Clamping Bar	S-17895	3
Coupling Disc	M-15012	1
Rotor Clamping Ring	S-17896	1
Reactor	M-14752	1
Choke	M-14769	1
Rectifier Assembly	L-7027	1
Brushholder Left	S-17229	1
Brushholder Right	S-17230	1
Brushholder Spring	T-6887	2
Brush	T-14724	2
Brushholder Bracket	S-17882	1
Enclosure		
Base & Lift Bail Assembly	L-7017-2	1
Base Floor	L-7187	1
Lift Bail Baffle	L-7023	1

PART NAME	PART NO.	NO. REQUIRED
Engine Intake Baffle As'bly.	M-15063	1
Contains:		
Engine Intake Baffle	L-7238	1
Acoustical Foam	M-15045-22	1
Acoustical Foam	M-15045-23	1
Acoustical Foam	M-15045-24	1
Lower Rear Panel As'bly.	M-15047-2	1
Contains:		
Lower Rear Panel	M-15047-1	1
Acoustical Foam	M-15045-1	1
Upper Rear Panel As'bly.	S-17600	1
Contains:		
Upper Rear Panel	L-7010	1
Acoustical Foam	M-15045-19	1
Roof As'bly. Contains:	L-7030-2	1
Roof Welded As'bly.	L-7030-1	1
Acoustical Foam	M-15045-8	1
Acoustical Foam	M-15045-13	1
Acoustical Foam	M-15045-14	1
Acoustical Foam	M-15045-15	1
Acoustical Foam	M-15045-16	1
Door As'bly. (Right) Contains:	M-14746-2	1
Door Welded As'bly	M-14746-1	1
Acoustical Foam	M-15045-6	1
Door Latch As'bly.	T-14838	2
Door Support	S-17669*	2
Case Side As'bly. (Left)	L-7240-2	1
Contains:		
Case Side	L-7214	1
Acoustical Foam	M-15045-2	1
Acoustical Foam	M-15045-10	1
Acoustical Foam	M-15045-11	1

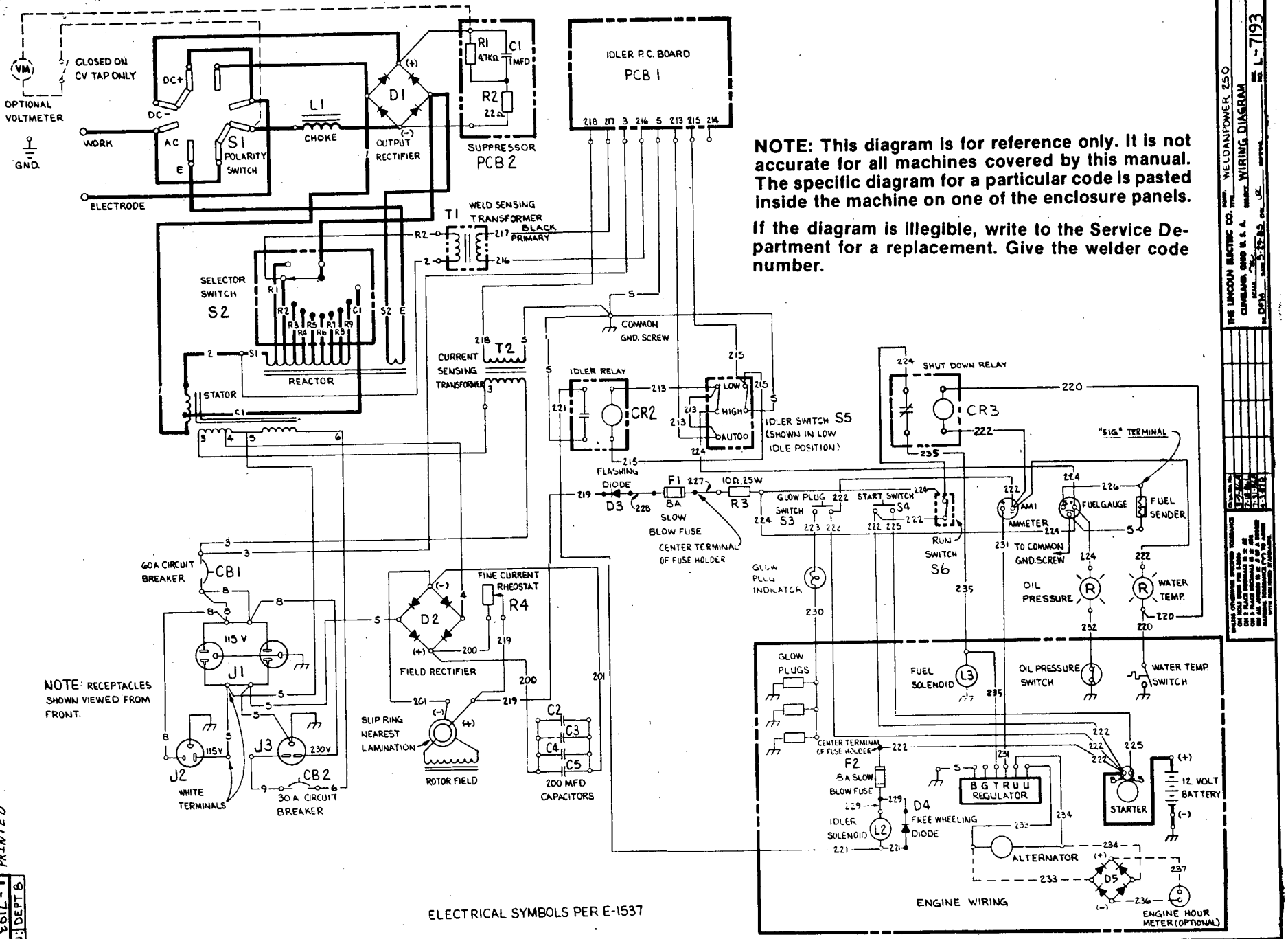
* For parts order, send one T-15081 kit (one kit replaces two S-17669 door supports.)

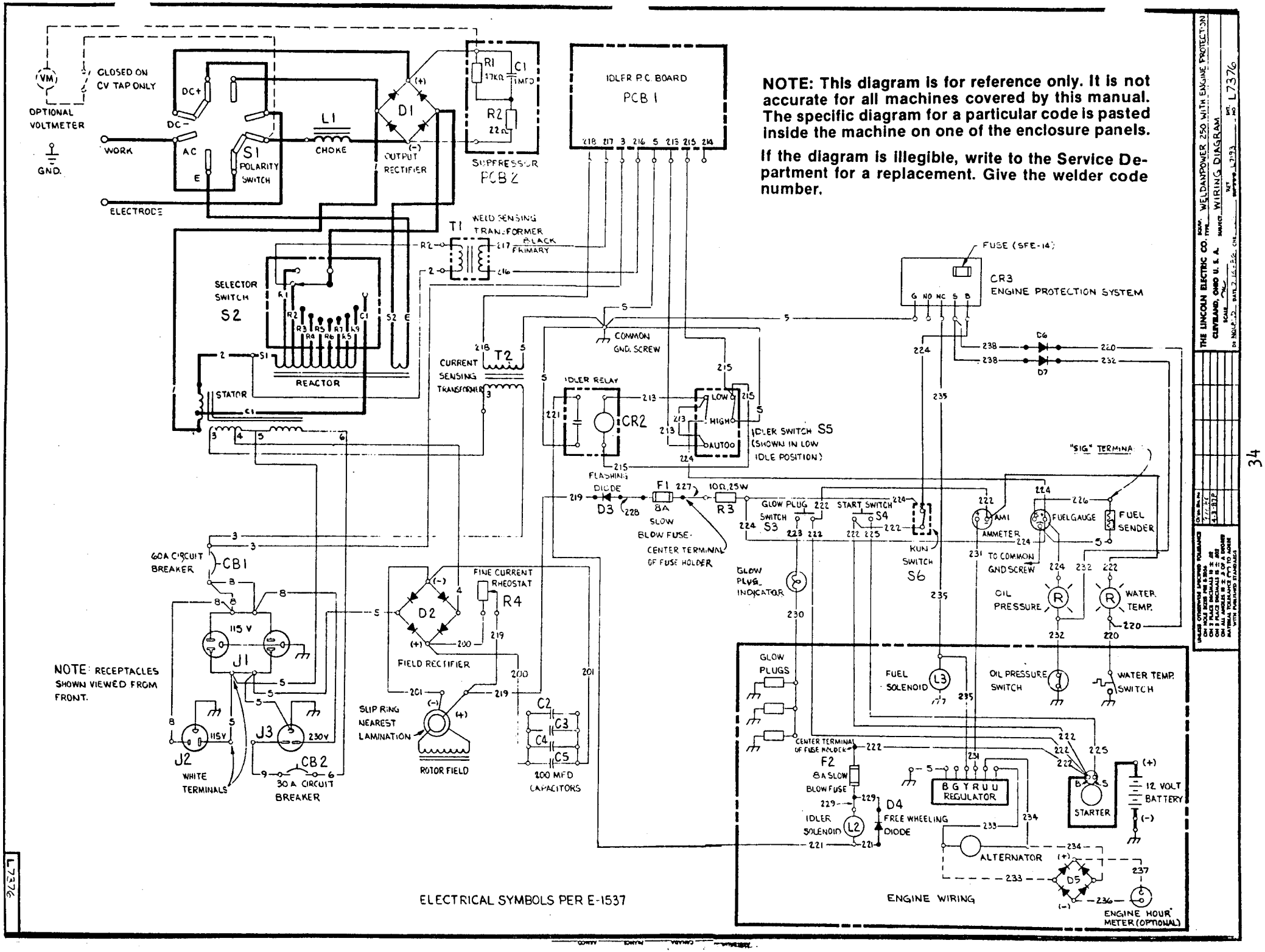
PART NAME	PART NO.	NO. REQUIRED
Case Side As'bly. (Right)	L-7240-1	1
Contains:		
Case Side	M-14745	1
Acoustical Foam	M-15045-2	1
Acoustical Foam	M-15045-12	1
Air Baffle As'bly. Includes:	M-14760-2	1
Air Baffle Welded As'bly.	M-14760-1	1
Acoustical Foam	M-15045-9	1
Case Front As'bly. Includes:	G-1666-1	1
Case Front As'bly.	L-7033-2	1
Case Front	G-1662	1
Louver As'bly.	M-14782	1
Acoustical Foam	M-15045-3	1
Duplex Receptacle (115V)	S-15767	1
Single Receptacle (115V)	S-17575	1
Single Receptacle (230V)	S-17575-1	1
Polarity Switch	M-14032-4	1
Switch Handle	S-16664-6	1
Selector Switch	M-10830-12	1
Switch Handle	M-13989	1
Oil Pressure Light	T-13534-3	1
Water Temperature Light	T-13534-3	1
Ammeter	S-7514-6	1
Fuel Gauge	S-17585	1
Idle Switch	T-10800-12	1
Start Button, Glow Plug Button	S-13146-1	2
Circuit Breaker (115V)	T-12287-13	1
Circuit Breaker (230V)	T-12287-12	1
Rheostat	T-10812-100	1
Rheostat Knob	T-10491	1
Nameplate	G-1708	1
Run Switch	T-10800-4	1
Output Stud Panel, contains:	M-14751	1
Output Stud Panel	M-14750	1
"Electrode" Marker	T-3961	1
"To Work" Marker	T-3962	1
Output Stud	M-13900	2
Flange Nut	T-3960	2

PART NAME	PART NO.	NO. REQUIRED
Fuel System		
Fuel Tank includes Cap #T-14905	L-7028	1
Fuel Level Sender	M-14767	1
Hose Elbow (feed)	T-13776	1
Hose Elbow (return)	T-14914	1
Hose Clamp	T-13777-1	6
Hose Clamp (return line)	T-13777-4	1
Fuel Line (tank to lift pump)	T-10642-107	1
Fuel Line (lift pump to filter)	T-10642-108	1
Fuel Line (filter to injection pump)	T-10642-121	1
Fuel Tank Strap	S-17586	2
Fuel Tank Support Rail	M-14744	2
Fuel Tank Drip Pan, includes:	S-17601	1
Fuel Tank Pan	M-14743	1
Acoustical Foam	M-15045-5	1
Automatic Idler System		
Idler P.C. Board As'bly.	L-6325	1
Current Transformer	M-13695-6	1
Idler Transformer	T-14504	1
Idler Relay	S-14293-14	1
Idler Solenoid As'bly. contains:	M-14787	1
Solenoid	S-17584	1
Rod	T-14942-1	1
Arm	S-10509-131	1
Pivot Pin	T-9751-1	2
Pin Clip	T-9744	2
Idler Arm	S-17926	1
Spring	T-11862-3	1
Diode As'bly.	T-13622-2	1
Miscellaneous		
Capacitors	T-11577-53	4
Full Wave Bridge	T-13637-1	1
Grommet	S-10255-14	2
Suppressor As'bly.	S-14559	1
Flashing Diode As'bly.	T-13894-3	1
Grommet	S-10255-2	1
Fuse Holder	S-10433	2

PART NAME	PART NO.	NO. REQUIRED
Miscellaneous (cont'd.)		
Fuse (8 Amp "Slow-Blow")	T-10728-16	2
Flashing Resistor	S-10404-19	1
Cover Seal	S-12934	1
Fuel Tank Gasket	S-10437-B	1
Grommet	S-10255-3	1
Oil Fill Gasket	S-10437-D	1
Rectifier Baffle As'bly includes:	S-17602	1
Rectifier Baffle	M-14762	1
Acoustical Foam	M-15045-7	1
Warning Nameplate	S-16722-2	1
Acoustical Fiberglass		
Inside Roof (Top)	M-15028-2	1
Inside Roof (Muffler Side)	M-15028-1	1
Optional Items		
Voltmeter	S-10486-4	1 (+)
Micro Switch	T-12485	1 (+)
Switch Actuator	T-14797	1 (+)
Micro Switch Mtg. Bracket	S-17603	1 (+)
Selector Switch (Cancel M-10830-12)	S-18037	1 (+)
Nameplate with Voltmeter Option (Cancel G-1708)	G-1708-1	1 (+)

+ These parts are for factory installed voltmeter option.


NOTE: This diagram is for reference only. It is not 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 welder code number.
THE LINCOLN ELECTRIC CO. CLEVELAND, OHIO U.S.A.
WELDANPOWER 250
WIRING DIAGRAM
E L-7193
OPTIONAL VOLTMETER
CLOSED ON CV TAP ONLY
GND.
WORK
ELECTRODE
DC+
DC-
AC
E
S1 POLARITY SWITCH
L1 CHOKE
D1 OUTPUT RECTIFIER
R1 47KΩ
C1 1MFD
R2 22Ω
SUPPRESSOR PCB 2
IDLER P.C. BOARD PCB 1
T1 WELD SENSING TRANSFORMER
BLACK PRIMARY
SELECTOR SWITCH S2
REACTOR
STATOR
T2 CURRENT SENSING TRANSFORMER
COMMON GND. SCREW
IDLER RELAY
CR2
IDLER SWITCH S5 (SHOWN IN LOW IDLE POSITION)
LOW
HIGH
AUTO
SHUT DOWN RELAY
CR3
"SIG" TERMINAL
FLASHING DIODE D3
F1 8A SLOW BLOW FUSE
CENTER TERMINAL OF FUSE HOLDER
10Ω 25W R3
GLOW PLUG SWITCH S3
START SWITCH S4
RUN SWITCH S6
AMMETER
FUEL GAUGE
FUEL SENDER
TO COMMON GND. SCREW
GLOW PLUG INDICATOR
OIL PRESSURE
WATER TEMP.
60A CIRCUIT BREAKER CB1
115 V
J1
J2
J3
115V
230V
WHITE TERMINALS
30 A CIRCUIT BREAKER CB2
D2 FIELD RECTIFIER
FINE CURRENT RHEOSTAT R4
SLIP RING NEAREST LAMINATION
ROTOR FIELD
C2 C3 C4 C5 200 MFD CAPACITORS
NOTE: RECEPTACLES SHOWN VIEWED FROM FRONT.
GLOW PLUGS
FUEL SOLENOID L3
OIL PRESSURE SWITCH
WATER TEMP. SWITCH
F2 8A SLOW BLOW FUSE
IDLER SOLENOID L2
D4 FREE WHEELING DIODE
B G Y R U U REGULATOR
STARTER
12 VOLT BATTERY
ALTERNATOR
D5
ENGINE HOUR METER (OPTIONAL)
ENGINE WIRING
ELECTRICAL SYMBOLS PER E-1537
PRINTED
T.I.N.: DEPT 8
E-7193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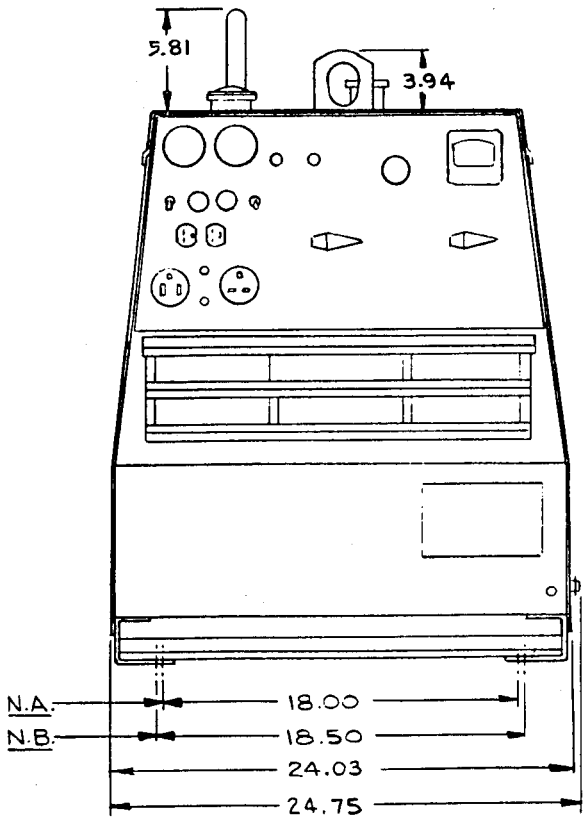
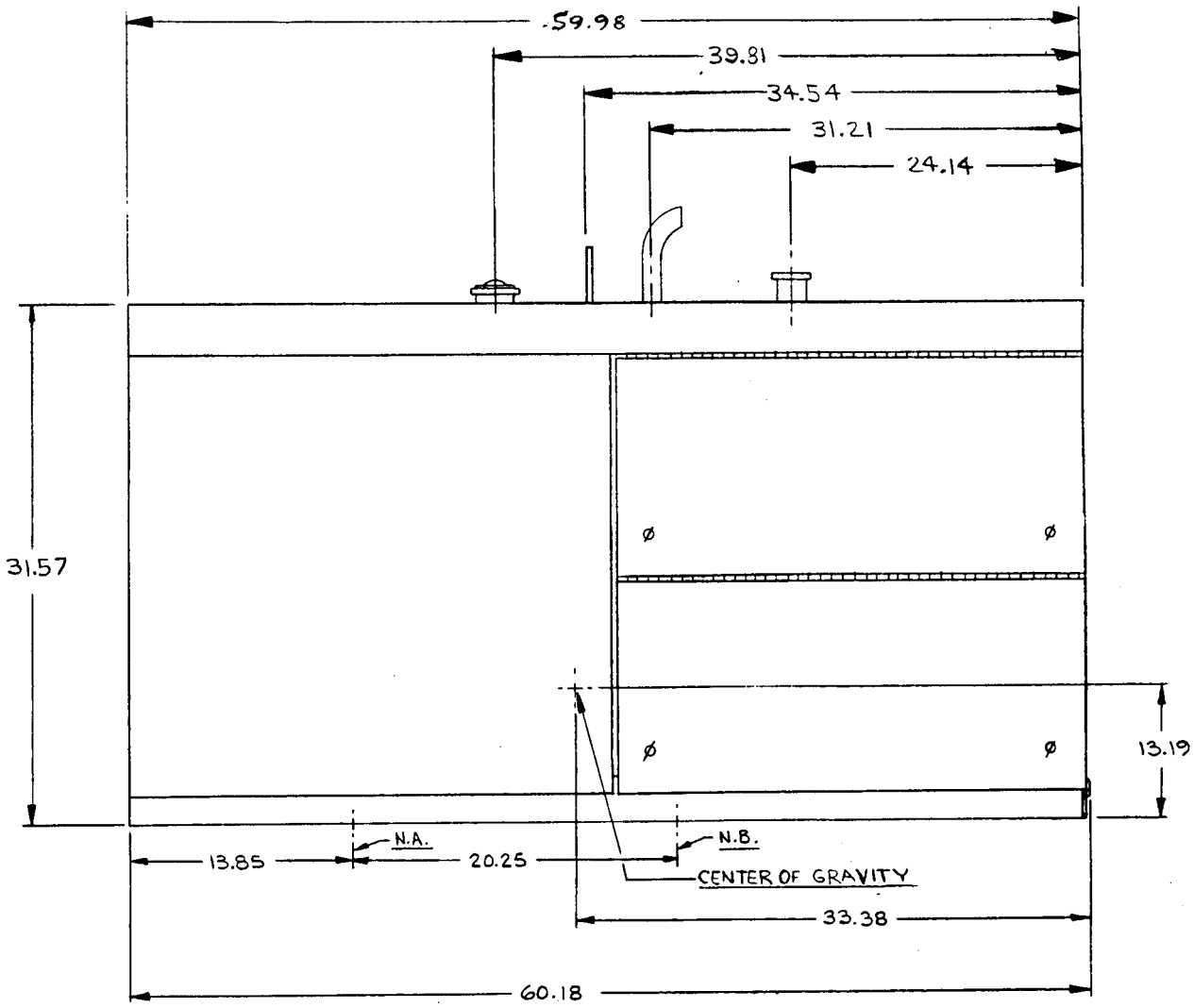
IDLER P.C. BOARD
PCB 1
SUPPRESSOR
PCB 2
CLOSED ON CV TAP ONLY
OPTIONAL VOLTMETER
GND.
WORK
ELECTRODE
DC+
DC-
AC
E
S1 POLARITY SWITCH
L1 CHOKE
D1 OUTPUT RECTIFIER
R1 17kΩ
C1 1MFD
R2 22Ω
T1 WELD SENSING TRANSFORMER
BLACK PRIMARY
SELECTOR SWITCH S2
REACTOR
STATOR
T2 CURRENT SENSING TRANSFORMER
COMMON GND. SCREW
IDLER RELAY
CR2
IDLER SWITCH S5
(SHOWN IN LOW IDLE POSITION)
LOW
HIGH
AUTO
FLASHING DIODE D3
F1 8A SLOW BLOW FUSE
CENTER TERMINAL OF FUSE HOLDER
R3 10Ω, 25W
GLOW PLUG SWITCH S3
START SWITCH S4
RUN SWITCH S6
GLOW PLUG INDICATOR
AMMETER
FUEL GAUGE
FUEL SENDER
TO COMMON GND SCREW
OIL PRESSURE
WATER TEMP.
FUSE (SFE-14)
CR3 ENGINE PROTECTION SYSTEM
D6
D7
60A CIRCUIT BREAKER CB1
115 V
J1
NOTE: RECEPTACLES SHOWN VIEWED FROM FRONT.
D2 FIELD RECTIFIER
FINE CURRENT RHEOSTAT R4
SLIP RING NEAREST LAMINATION
ROTOR FIELD
C2 C3 C4 C5
200 MFD CAPACITORS
J2 WHITE TERMINALS
J3 230V
CB2 30 A CIRCUIT BREAKER
GLOW PLUGS
FUEL SOLENOID L3
OIL PRESSURE SWITCH
WATER TEMP. SWITCH
CENTER TERMINAL OF FUSE HOLDER
F2 8A SLOW BLOW FUSE
IDLER SOLENOID L2
D4 FREE WHEELING DIODE
B G Y R U U REGULATOR
STARTER
12 VOLT BATTERY
ALTERNATOR
D5
ENGINE HOUR METER (OPTIONAL)
ELECTRICAL SYMBOLS PER E-1537
ENGINE WIRING
THE LINCOLN ELECTRIC CO. CLEVELAND, OHIO U.S.A.
WELDANPOWER 250 WITH ENGINE PROTECTION
WIRING DIAGRAM
L7376
34
L7376

M15194

N.A. DIMENSIONS OF MOUNTING HOLES UNDER THE WELDER END.

N.B. DIMENSIONS OF MOUNTING HOLES UNDER THE ENGINE END.





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UNLESS OTHERWISE SPECIFIED TOLERANCE ON HOLE SIZES PER E-2056 ON 2 PLACE DECIMALS IS ± .02 ON 3 PLACE DECIMALS IS ± .002 ON ALL ANGLES IS ± 3° OR A DEGREE MATERIAL TOLERANCE ("X") TO AGREE WITH PUBLISHED STANDARDS	Ch'ge Sht. No 7-18-86 7-29-86M 1-9-87F	THE LINCOLN ELECTRIC CO. CLEVELAND, OHIO U. S. A. EQUIP. TYPE WELDANPOWER 250 SUBJECT DIMENSION PRINT SCALE 1/4 DR. T.P. DATE 4-3-86 CHK. J.V. SUP'S'D'G. SHT. NO. M15194

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 bear 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 Largest Manufacturer of Arc Welding Products • Manufacturer of Industrial Motors
Sales and Service Worldwide
Cleveland, Ohio 44117-1199 U.S.A.
Toronto M4G 2B9 – Canada • Sydney 2211 – Australia • Rouen 76120 – France

May 1987 Ram

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Litho in U.S.A.