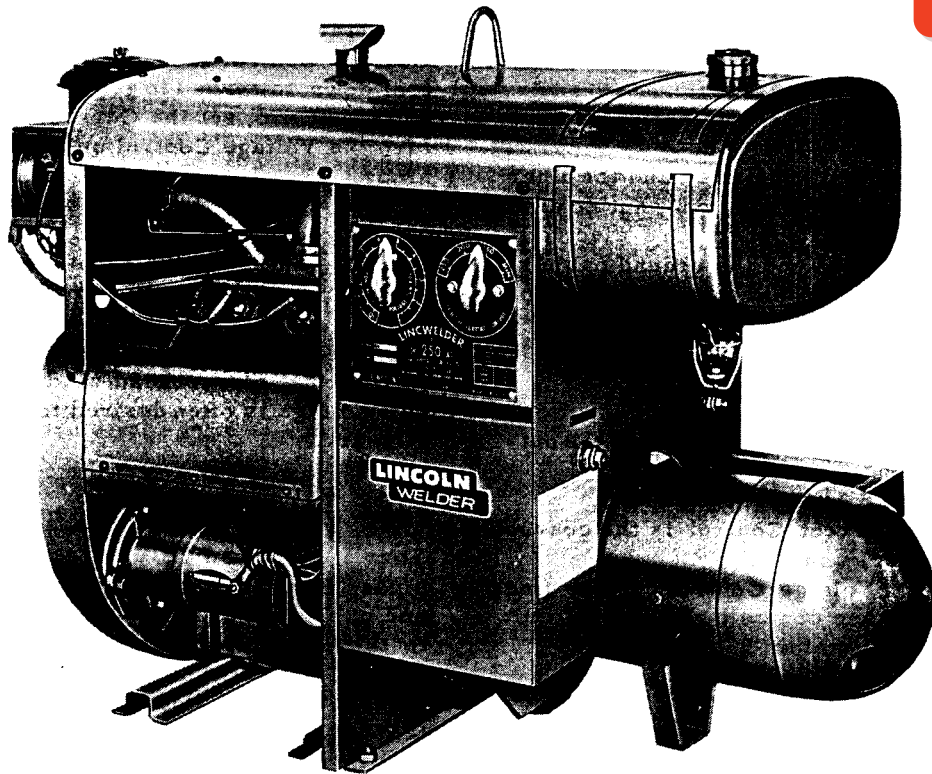


OPERATING MANUAL

"Lincwelder" DC-250-AS

With Wisconsin VF-4D 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This manual covers equipment which is obsolete and no longer in production by The Lincoln Electric Co. Specifications and availability of optional features may have changed.



THE LINCOLN ELECTRIC COMPANY

"World's Largest Manufacturer of Arc Welding Equipment and Electrodes"

Cleveland 17, Ohio

DAMAGE CLAIMS

When Lincoln 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.

STARTING THE ENGINE

See the Wisconsin engine operating manual supplied with your welder for detailed engine starting, operating and maintenance instructions.

NOTE: The engine is stopped by pushing the ignition switch in, or by holding the button on the side of the magneto down until the engine stops.

OUTPUT CABLE SIZES

Use #3 electrode and ground cables when welding up to 30 feet from the welder. If welding at substantially longer distances from the machine, use #2 or larger cables. Long cables of small diameter reduces the output at the point of welding.

WELDER OPERATION

Polarity Control

One output stud is marked "Positive" and the other stud is marked "Negative". If you want to weld with electrode positive, connect the electrode cable to the positive stud and the ground cable to the negative stud. If you want to weld with electrode negative, reverse the two cables. Tighten the weld nuts with a wrench.

Control of Welding Current

There are three controls which determine the output of the generator:

- (a) the throttle controls the engine speed,
- (b) the Selective Current Control is the coarse current adjuster, and
- (c) the Continuous Voltage Control is the fine current control and controls the open circuit voltage of the generator.

Throttle

The throttle is located on the engine control panel. It has the following control settings:

1. Low Idle - When welding is stopped for a few minutes, set the throttle on low idle position to conserve fuel and reduce engine wear.
2. Normal Welding - For all applications requiring under 200 amperes, set the throttle to the normal welding position.
3. High Current - For jobs that require more than 200 amperes, set the throttle to the high current position.

NOTE: This machine has a 30% duty cycle at the rated output of 250 amperes. Duty cycle is based on a 10 minute period. Therefore, the welder can be loaded at 250 amperes for 3 minutes out of every 10 minute period. Can use higher duty cycle at lower currents. See nameplate.

Selective Current Control

The Selective Current Control is the coarse current adjustment for your welder. There are four positions indicated on the control dial. The numerical value assigned to each position is the center of the current range available at that particular setting. For each setting there is a maximum and minimum current available through the adjustment of the Continuous Voltage Control.

Continuous Voltage Control

The Continuous Current Control is the fine current control of your welder. Through this control, it is possible to obtain the exact current you desire. With this control it is also possible to vary the open circuit voltage and thereby change the arc characteristics to suit different welding applications.

There is sufficient overlapping of the current ranges obtained with the Current Control so the Voltage Control may be used to vary the arc characteristics. High voltage for a soft arc. Low voltage for a forceful digging arc.

To obtain 175 amps and a forceful arc, set the Current Control at 200 and turn the Voltage Control down towards 1 to get 175 amps. For 175 amps and a soft arc, set the Current Control to 150 and turn the Voltage Control up towards 10 to get 175 amps.

For most welding you will get the best welding characteristics by using a lower setting on the Current Control and a higher setting on the Voltage Control. This will give you a soft arc and high open circuit voltage to prevent pop outs. However, for vertical or overhead welding, a low open circuit voltage is often desired to give a snappy digging arc.

PIPE THAWING

Your welder can be used to thaw frozen water pipes. Securely connect the electrode cable to one end of the frozen pipe. Connect the ground cable to the other end of the pipe. Set the Current Control at 150 and the Voltage Control at 1. Set the throttle in the Normal Welding position and run the welder until water starts to flow. Time for thawing depends upon temperature, pipe material and size of pipe.

ELECTRIC STARTER AND IDLER (OPTIONAL)

Installation

The self starter is installed at the factory. It includes a dry charged battery. Fill the battery with the electrolyte per the instructions included with the battery.

The idler is a separate accessory which reduces engine wear and conserves fuel by reducing the engine to a low idle speed when not welding. It can be installed at the factory or in the field. Idler operation and maintenance instructions are included in IM-179 supplied with the idler.

NOTE: The carburetor and governor adjusting instructions in IM-179 were written primarily for Lincoln water cooled engine driven welders. See your Wisconsin engine manual for the corresponding instructions for your engine.

Operation

To start the engine, pull the ignition switch out and push the starter button. These switches are located on the engine control panel. Choke as necessary (see the Wisconsin engine manual). If the battery is dead, start the engine by hand cranking.

Current for charging the battery is taken from the welding generator. See the drawing S-11472 on page 7 for the charging circuit wiring diagram. The circuit includes resistors to limit the charging current and a silicon diode to prevent the battery from discharging back through the generator when the machine is not running.

If you are undercharging the battery, it cranks the engine slower at each start. If you are overcharging the battery, you have to add water frequently. Overcharging tends to shorten battery life.

The charging rate switch on the engine control panel controls the charging rate. Actual charging current is indicated by the ammeter also located on the control panel. The charging rate switch nameplate indicates when to set the switch on high or low. At the high setting the charging rate is about 3 amperes when the engine is running at full speed. At the low setting the charging rate is about 1-1/2 amperes when the engine is running at full speed. The ammeter reads zero when the engine is stopped.

If you operate the welder with the battery disconnected, tape the battery leads to avoid damaging the charging circuit.

Maintenance

The ammeter is the best indicator of any trouble in the charging circuit. The ammeter should indicate the charging current when the engine is running and should read zero with the engine stopped. Any other combination of readings indicates trouble.

Meter Readings		Possible Causes
Engine Operating	Engine Stopped	
Charge	Discharge	1. Shorted diode.
Zero	Zero	1. Diode blown. 2. Open lead in circuit. 3. Welder generator output polarity reversed. (Rare.) Call nearest Field Service Shop to correct.
Charge	Charge	1. Battery connected backwards.
Zero	Charge	1. Battery connected backwards and welder generator output polarity reversed. (Rare.) Call nearest Field Service Shop to correct.

COMMUTATOR AND BRUSHES

The commutator and brushes are inspected by removing the end cover. Do not remove or replace the end cover while the welder is running.

The brushes are properly adjusted when the welder arrives. No particular attention is required to keep the brushes in good condition. As the brushes wear within 1/8 inch of the pigtail, they must be replaced with new ones. One complete set of brushes should always be kept on hand. Lincoln brushes have a bearing face specially curved to fit the commutator surface. These brushes are fitted by lightly stoning the commutator while the armature rotates at full speed. This operation is complete when the brushes make positive contact over the entire contact face. Visually inspect the brushes to make sure they are fully seated. After stoning blow out the carbon dust with low pressure air. DO NOT SHIFT THE BRUSHES.

The commutator requires practically no attention. It should be cleaned periodically with a clean rag, or while running with a piece of fine sandpaper. Never use emery cloth or paper for this purpose.

BEARINGS

The generator is equipped with double-shield ball bearing having sufficient grease to last indefinitely under normal conditions. Where the welder is used constantly or in excessively dirty locations, it may be necessary to add 1/2 ounce of grease per year.

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

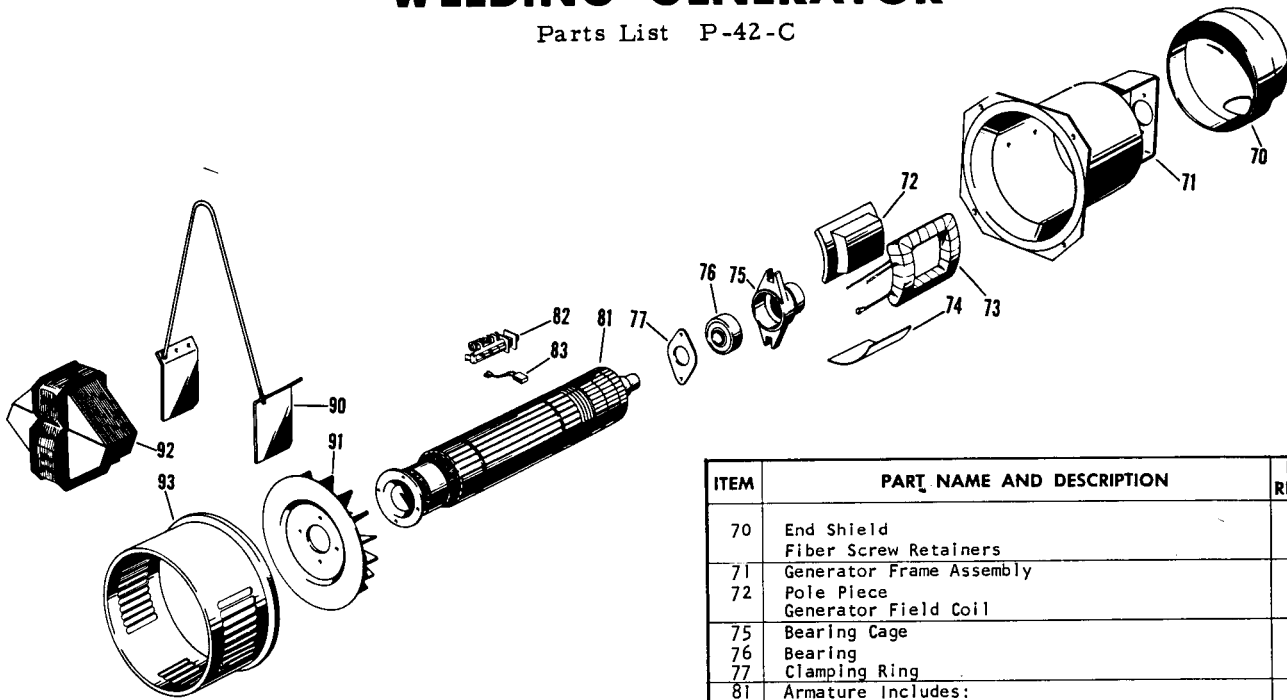
MAINTENANCE INSTRUCTIONS

1. Blow out the welder and controls with low pressure air periodically. In particularly dirty locations, this may be required once each week.
2. Replace the engine crankcase oil every 50 hours of operation.
3. Clean the oil bath air filter every 50 hours of normal operation.
4. Governor and carburetor joints and the throttle shaft must be kept clean and lubricated.
5. Refer to the Wisconsin engine manual for engine maintenance and trouble shooting instructions.

SEE THE BACK COVER FOR INSTRUCTIONS ON HOW TO ORDER SPARE PARTS. ALWAYS GIVE THE WELDER CODE NUMBER WHEN ORDERING PARTS.

WELDING GENERATOR

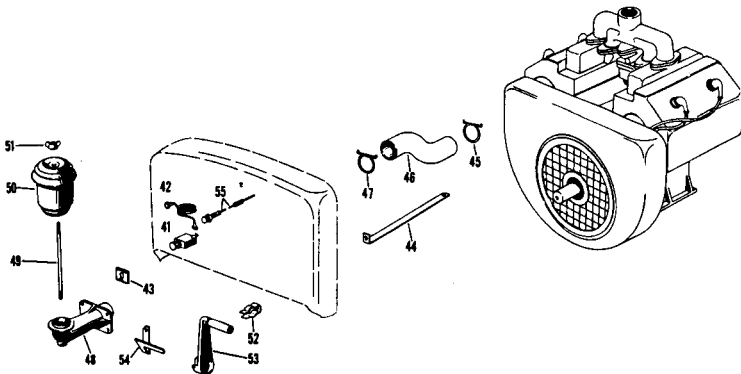
Parts List P-42-C



ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
70	End Shield	1
	Fiber Screw Retainers	2
71	Generator Frame Assembly	1
72	Pole Piece	2
	Generator Field Coil	2
75	Bearing Cage	1
76	Bearing	1
77	Clamping Ring	1
81	Armature Includes:	1
	Armature Coil	1
	Screw, Armature To Coupling	6
	Screw Locking Clip	3
82	Brush Holder, Code 3116 And Below	2
	Old Style Brush Holder Parts	See P-37-G
82	Brush Holder, Code 3128 And Higher	2
	New Style Brush Holder Parts	See P-25-N
83	Brush	8
90	Lift Bale Assembly	1
91	Fan Assembly	1
	Key, Coupling Hub	1
92	Stabilizer	1
93	Connecting Ring	1

ENGINE CONTROLS

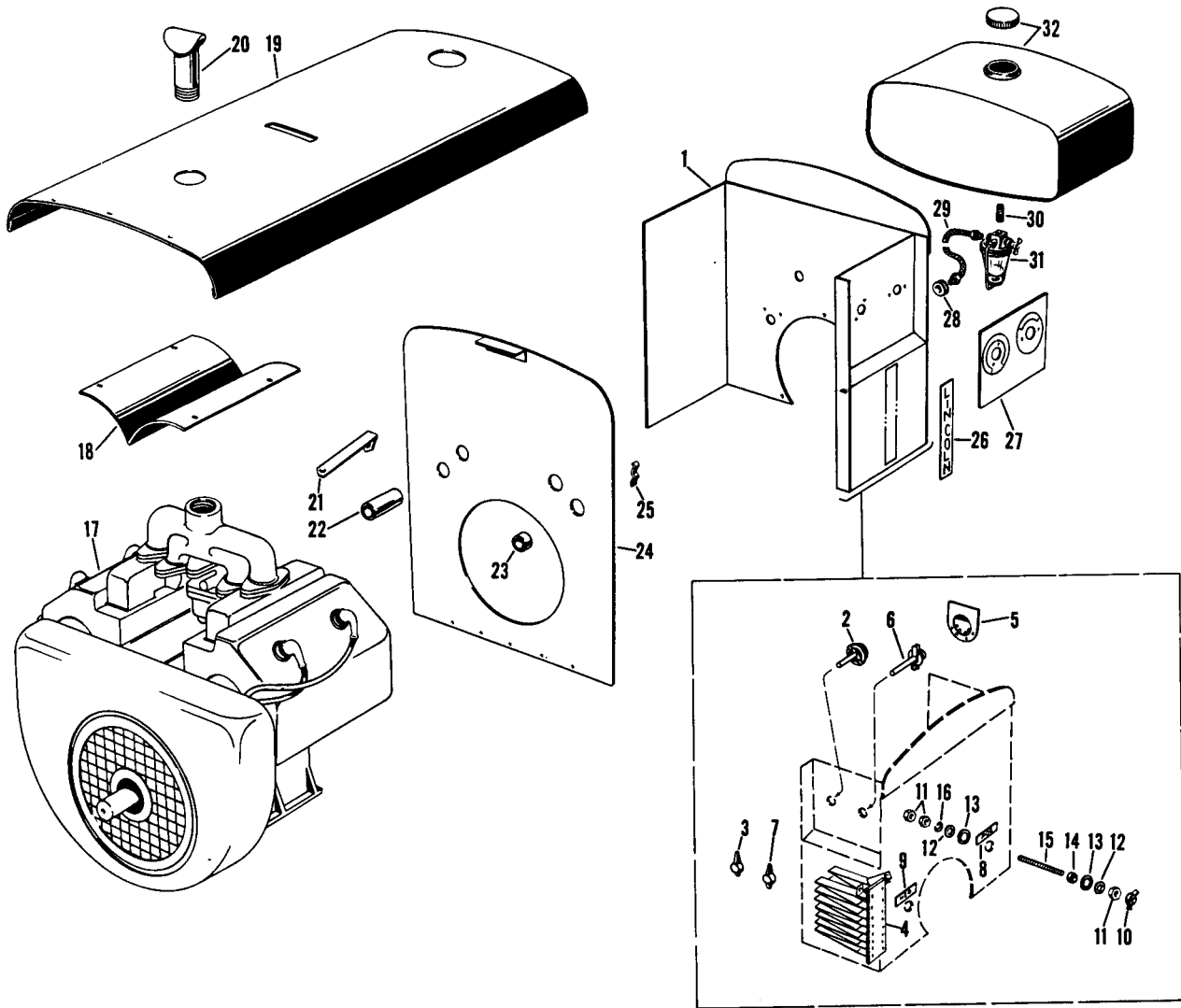
Parts List P-42-E



ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
41	Ignition Switch	1
42	Lead Assembly, Ignition Switch	1
43	Plate, Ignition Switch	1
44	Support, Front Panel	1
45	Hose Clamp	1
46	Hose	1
47	Hose Clamp	1
48	Elbow, Air Filter	1
49	Stud, Air Filter Mounting	1
50	Air Filter	1
51	Wing Nut	1
52	Clip, Crank	1
53	Crank	1
54	Bracket, Crank	1
55	Choke	1

WELDER CONTROLS AND GENERAL ASSEMBLY

Parts List P-42-D

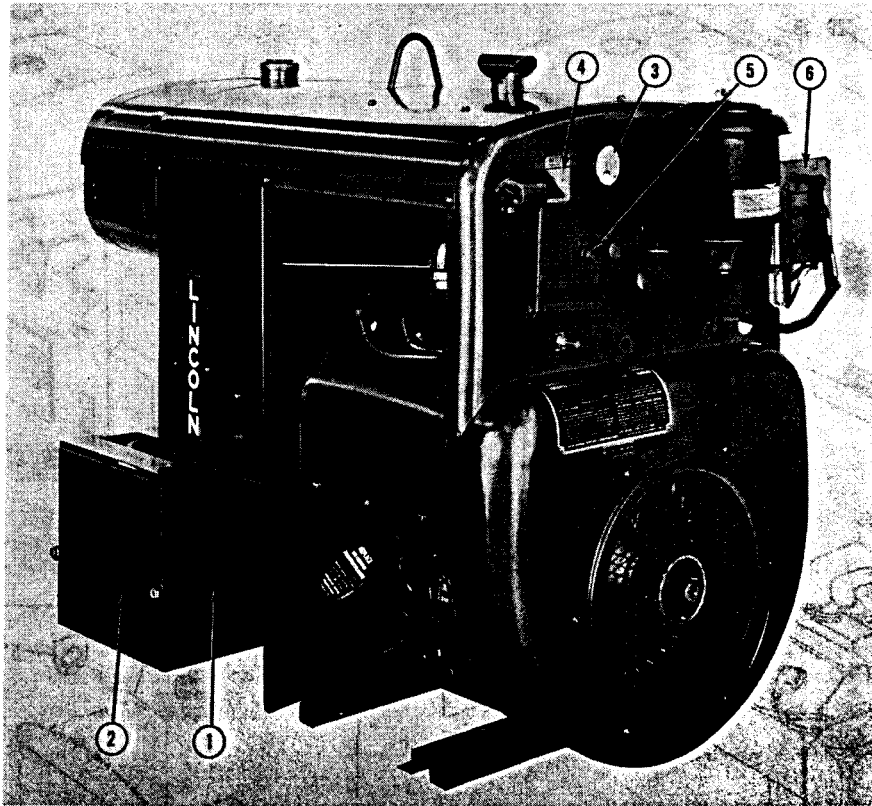


ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
1	Control Panel Assembly, Including Items 1 To 17	1
2	Center Panel	1
3	Rheostat	1
4	Handle, Rheostat	1
5	Grid Assembly	1
6	Selector Switch Assembly Includes: Stationary Contact Assembly Rotor Assembly	1
7	Handle, Selector Switch	1
8	Positive Marker	1
9	Negative Marker	1
10	Marker Rivets	4
11	Stud Assembly Includes: Weld Nut	2
12	Nut	3
13	Plain Washer	2
14	Insulation Washer	2
15	Insulating Bushing	1
16	Stud	1
	Lockwasher	1

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
18	Deflector Plate	1
19	Roof	1
20	Exhaust Pipe Assembly	1
21	Support, Center Panel	1
22	Spacer	1
23	Spacer	1
24	Center Panel Clip, Fuel Line	1
25	Clip, Fuel Line	1
26	LINCOLN Transfer	2
27	Nameplate	2
28	Grommet, Fuel Line	1
29	Fuel Line	1
30	Bushing, Fuel Filter	1
31	Fuel Strainer	1
32	Fuel Tank With Filler Cap	1

ELECTRIC STARTER AND IDLER (OPTIONAL)

Parts List P-42-F

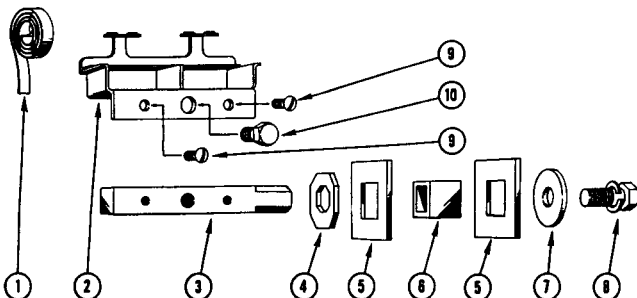


ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
1	Battery Case	1
2	Battery Case Front, Includes:	1
	Pad	2
	Negative Battery Cable	1
	Positive Battery Cable	1
3	Ammeter	1
4	Charging Rate Switch	1
	Charging Rate Switch Nameplate	1
5	Start Button	1
	Solenoid	1
	Insulating Washer, Solenoid Mounting	2
	Insulator, Solenoid Mounting	2
	Silicon Diode	1
	Resistor	1

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
	Idler	1
	Idler Parts	See-IM-179
	Throttle Rod	1
	Throttle Rod Clip	1
	Pivot Pin, Carburetor Link	1
	Pivot Pin, Idler Arm	1
	Spring Clip	2
	Carburetor Link	1
	Inverted Flare Tube Connector	1
	Vacuum Line	1
	Carburetor Clevis	1
	Spring	1

BRUSH HOLDER - NEW STYLE

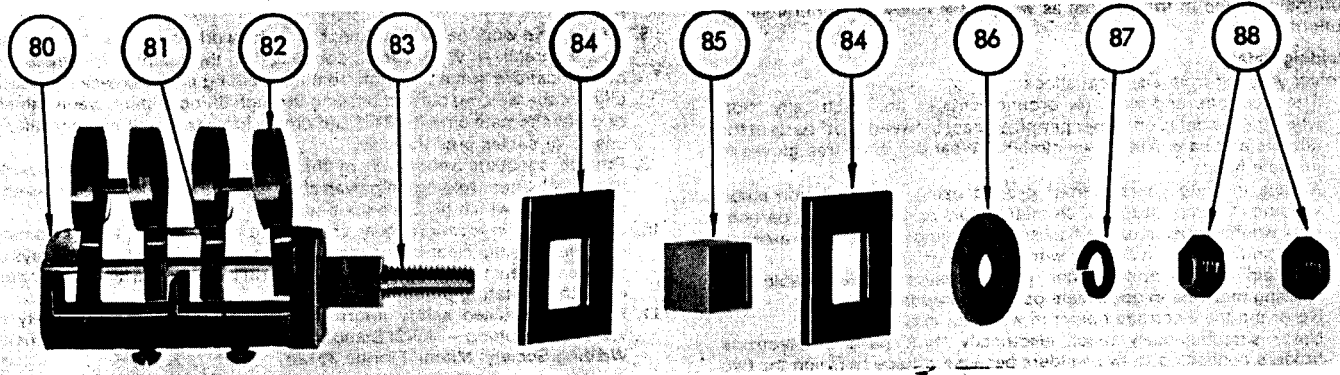
Parts List P-25-N



ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
	Brushholder Assembly Includes:	1
1	Spring	4
2	Brushholder Bracket	1
3	Stud	1
4	Stud Washer	1
5	Insulating Washer	2
6	Insulating Bushing	1
7	Plain Washer	1
8	Sems Hex Head Cap Screw	1
9	Round Head Cap Screw	1
10	Hex Head Cap Screw	1

BRUSH HOLDER - OLD STYLE

Parts List P-37-G

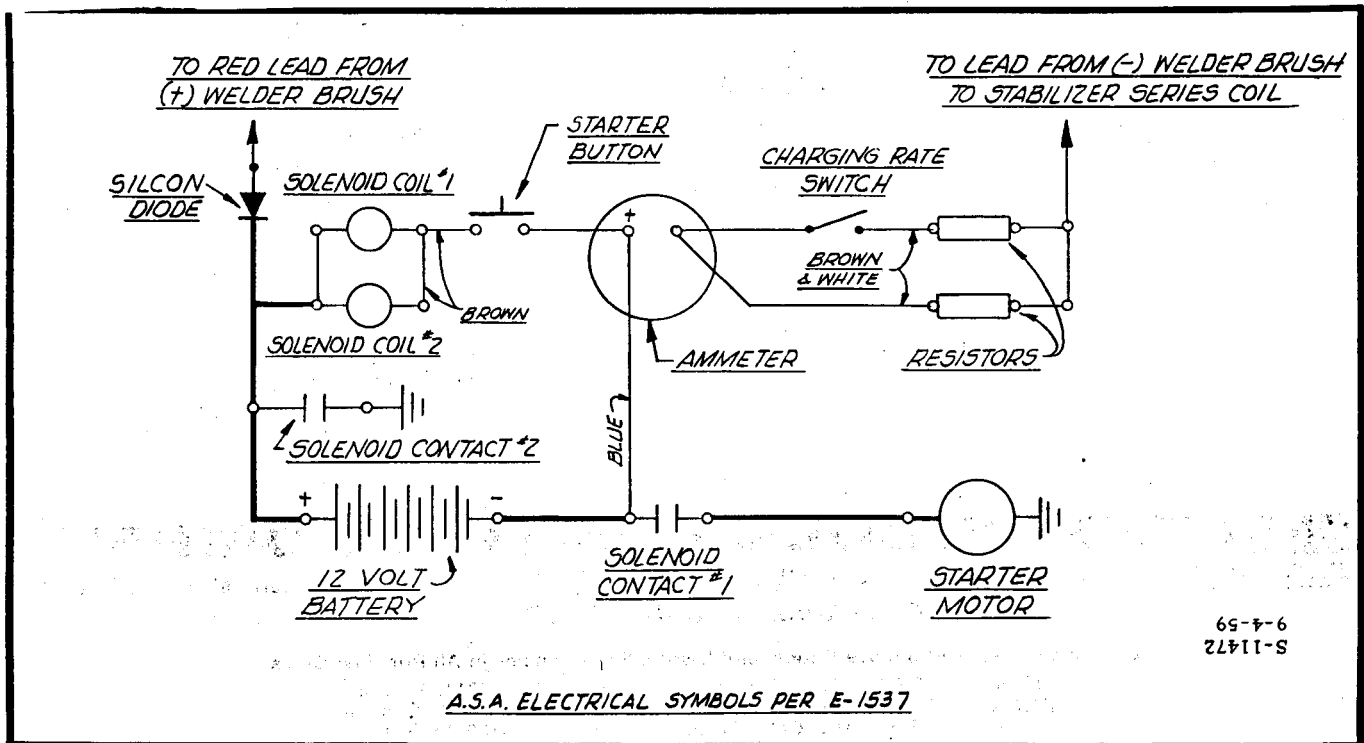


ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
80	Brushholder Assembly, Includes All Below	2
	Spring Clip	1
81	Round Head Screw	2
82	Spring	4
83	Brushholder Stud	1

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
84	Insulating Washer	2
85	Insulating Bushing	1
86	Brass Washer	1
87	Lockwasher	1
88	Brass Jam Nut	2

NOTE: New and Old style Brush holders are interchangeable. However, both Brush holders on one machine must be the same type.

ELECTRIC STARTER WIRING DIAGRAM



SAFETY PRECAUTIONS

For your own protection read and observe all instructions and specific safety precautions included in this manual as well as the following general safety precautions.

Arc Welding Safety

1. Protect yourself from 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 ground using dry insulation when welding in damp locations, on metal floors or gratings, and particularly when in positions (such as sitting or lying) where large areas of your body can be in contact with possible grounds.
 - c. Maintain the electrode holder, ground clamp, welding cable and welding machine in good, safe operating condition.
 - d. Never dip the electrode holder in water for cooling.
 - e. 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.
 - f. If using the welder as a power source for mechanized welding, these precautions for the electrode holder also apply for the automatic nozzle or semiautomatic welding gun.
2. When working above floor level, protect yourself from a fall should you get a shock. Never wrap the electrode cable around any part of your body.
3. Arcburn may be more severe than sunburn. Therefore:
 - a. Use a good shield fitted 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.
 - b. Use suitable clothing to protect your skin and that of your helpers from the arc rays.
 - c. Protect other nearby personnel with suitable non-flammable screening.
4. 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 and high shoes.
5. Always wear safety glasses when in a welding area. Use glasses with side shields when near slag chipping operations.
6. Remove fire hazards from the area or cover them to prevent the welding sparks from starting a fire.
7. When not welding, place the holder where it is insulated from the ground

system. Accidental grounding can cause overheating and create a fire hazard.

8. 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.
9. Provide adequate ventilation in the welding area. This is particularly important when welding on galvanized, lead or cadmium plated steel and other metals which produce toxic fumes.
10. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat or the rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.
11. For more detailed safety information, purchase a copy of "Safety in Welding & Cutting — ANSI Standard Z49.1" for \$5.00 from the American Welding Society, Miami, Florida 33125.

Engine Welder Operation and Maintenance Safety

1. Ground the frame of the welder in accordance with the National Electrical Code and the manufacturer's recommendations. The fixture or metal being welded must also be connected to a good electrical ground.
2. Whenever possible, turn the machine off before doing trouble shooting and maintenance work.
3. Keep all safety guards, covers and devices in position and good repair.
4. Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.
5. Operate internal combustion engines in open, well-ventilated areas or vent the engine exhaust fumes to the outside.
6. Do not add fuel near an open flame or when the engine is running. Stop the engine, and if possible, allow it to cool to prevent spilled fuel from igniting on contact with hot engine parts or electrical sparks.
7. 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.
8. To avoid scalding, do not remove the radiator pressure cap when the engine is hot.
9. Observe special precaution mentioned in the specific operating manual for the engine.

HOW TO ORDER REPLACEMENT PARTS

Order parts only from Lincoln offices or from the Authorized Field Service Shops listed in the "Service Directory". Give the following information:

- (a) From the nameplate — machine model, code, and serial number.
- (b) From this manual — part name, item number, quantity required and the

number of the list used to get this information.

Any items indented in the "Parts Name" column are included in the assembly under which they are listed. The indented items may be ordered separately. If the entire assembly is needed, do **not** order the indented parts.

GUARANTEE

The Lincoln Electric Company, the Seller, warrants all new equipment except engines and accessories thereof against defects in workmanship and material for a period of one year from date of shipment, provided the equipment has been properly cared for, and operated under normal conditions. Engines and engine accessories are warranted free from defects for a period of ninety days from the date of shipment.

If the Buyer gives the Seller written notice of any defects in equipment, electrode or flux within any period of warranty and the Seller's inspection confirms the existence of such defects, then the Seller shall correct the defects or defects at its option, either by repair or replacement F.O.B. its own factory or other place as designated by the Seller. The remedy provided Buyer herein for breach of Seller's warranty shall be exclusive.

No expense, liability or responsibility will be assumed by the Seller for repairs

made outside of the Seller's factory without written authority from the Seller.

The Seller shall not be liable for any consequential damages in case of any failure to meet the conditions of any warranty. The liability of the Seller arising out of the supplying of said equipment or electrode or its use by the Buyer, whether on warranties or otherwise, shall not in any case exceed the cost of correcting defects in the equipment or replacing defective electrode in accordance with the above guarantee. Upon the expiration of any period of warranty, all such liability shall terminate.

The foregoing guarantees and remedies are exclusive and except as above set forth there are no guarantees or warranties with respect to engines, accessories, equipment or electrodes, either express or arising by operation of law or trade usage or otherwise implied, including without limitation the warranty of merchantability, all such warranties being waived by the Buyer.

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