



OWNER'S MANUAL/OPERATING INSTRUCTIONS

MARK II® SERIES

RESISTANCE SPOT WELDER L-4000

WARNINGS & SAFEGUARDS FOR WELDING & CUTTING OPERATIONS

Important - Protect yourself and others! Remember that safety depends on you.

The operator, supervisor, and helper must read and understand all warning and safety information provided in these instructions and the power source manual used with this equipment. **Serious injury or death** could result if welding equipment is not properly installed, used, and maintained.

Training and proper supervision are most important for a safe work place. Installation, operation, repair work, and maintenance must be performed by qualified personnel. Retain these instructions for future use. Additional recommended safety and operating information is referenced in each section.



ELECTRICAL SHOCK CAN CAUSE INJURY OR DEATH

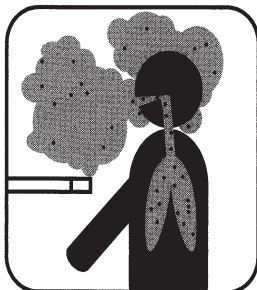
Electrical equipment must be installed and maintained in accordance with the National Electrical Code, NFPA 70, and all local codes. Maintain Electrode Holders, Work Clamp, Welding Cable, and Welding Machines in good, safe operating condition. Replace worn or damaged insulation. Do not try to repair or service equipment while the power is still on. Do not service or repair equipment unless you are trained and qualified to do so. The Electrode and Work (or Ground) circuits are electrically "HOT" when the trigger is pulled. At no time should you touch the Electrode and Electrical Ground at the same time with bare skin while

the trigger is pulled.

Always be sure the work cable makes a good electrical connection with the metal being welded.

Never touch electrically "HOT" parts of electrode holders.

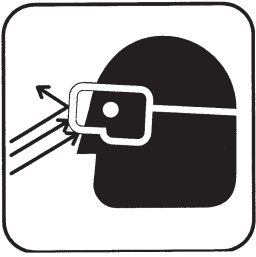
References: See Safety and Operating References A, F, H, and I.



SMOKE, FUMES, AND GASES CAN BE DANGEROUS TO YOUR HEALTH

Keep smoke, fumes, and gases from your breathing zone and the general area. Smoke, fumes, and gases from the welding process are of various types and strengths, depending on the kind of base metal being welded on. To ensure your safety, do not breathe these fumes or gases. Ventilation must be adequate to remove smoke, fumes, and gases during the welding procedure to protect operators and others in the immediate area.

References: See Safety and Operating References A, B, C, H, and I.



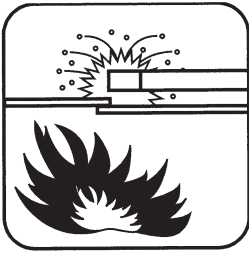
MOLTEN MATERIAL, AND SPARKS CAN CAUSE EYE AND SKIN INJURY

Always wear approved eye, ear and body protection. Remove any and all combustible material from the work area. Never attempt to weld without proper eye protection that conforms to federal guidelines.

Protect other nearby personnel from sparks. Use approved shielding curtains and appropriate goggles. Warn them not to watch the arc or expose themselves to arc rays, sparks, or molten material.

Always wear protective gloves which will not allow skin to come in contact with heat, or molten material. Wear ear plugs to protect ears from sparks.

References: See Safety and Operating References A, B, H, and I.



SPOT WELDING SPARKS CAN CAUSE FIRES AND EXPLOSIONS

Remove any and all combustible materials from the work area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Causes of fire and explosion are any combustibles reached by flying sparks or heated materials. Do not wear any gloves or clothing that has oil or a fuel type material on it. Always have a properly working and OSHA recognized Fire Extinguisher near and be sure everyone has proper training in its use.

All hollow spaces, cavities, and containers should be vented prior to welding for they may explode. Make sure proper steps have been taken to ensure that venting procedures will not form flammable or toxic vapors from substances inside containers.

References: See Safety and Operating References A, D, E, F, G, and H.

SAFETY AND OPERATING REFERENCES

- A) ANSI Z49.1, "Safety in Welding and Cutting"
- B) ANSI Z87.1, "Practice for Occupational and Educational Eye and Face Protection"
- C) ANSI Z88.2, "Standard Practice for Respiratory Protection" ANSI: American National Standard Institute, 1430 Broadway, New York, NY 10018
- D) AWS F4.1, "Recommended Safe Practices for Welding and Cutting Containers" AWS: The American Welding Society, P.O. Box 351040, 550 NW Lejeune Rd., Miami, FL 33135
- E) NFPA 51B, "Fire Prevention in Cutting and Welding Processes"
- F) NFPA-70, "National Electrical Code" NFPA: National Fire Protection Association, Batterymarch Park, Quincy, MA 02269
- G) GGA P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders" CGA: Compressed Gas Association, 1235 Jefferson Davis Hwy., Arlington, VA 22202
- H) Code of Federal Regulations (OSHA) 29 CFR 1910 US: U.S. Government Printing Office, Washington, DC 20402
- I) CSA Standard W117.2, "Safety in Welding, Cutting and Allied Processes" CSA: Canadian Standards Association, 178 Rexdale Blvd., Rexdale, Ontario, Canada M9W 1R3

HOW TO OPERATE AND GET THE MOST OUT OF YOUR LENCOSPOT® MARK II®

WARNING: Operators wearing any type of heart pace-maker should consult a physician before operating or being in area during operation of this equipment.

Follow disarming procedures recommended by automotive manufacturers for electrical and air bag systems.

HOOK-UP

Bolt the Flat Side of the cable lugs to the welder terminals, making sure bolts and nuts are tight; insert the 3-prong control line plug into the receptacle on the front panel. Connect **Mark II®** Welder 50 foot power cable to main power source . . . 208/230 volt, single phase, 60/50Hz, fused for 50 amps.

POWER MAIN SWITCH

It is an off-on switch which will save you steps. If you do not need to use the **Mark II®** Welder for a while, turn it off.

PANEL INSTALLATION -

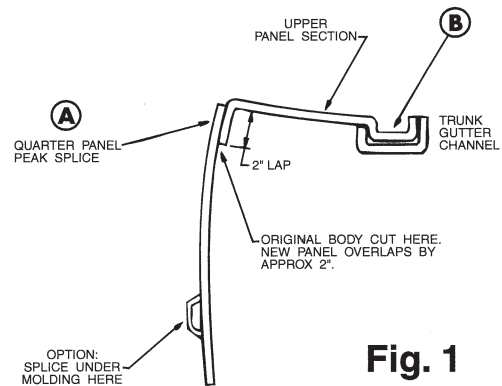
Three Steps to Easy Panel Installation:

- 1. Cutting Away the Damaged Area** - Select the easiest place to splice the new panel (the peak edge, underneath the molding strip, or all the way to the trunk gutter rail). Cut away the damaged area with a good cutter in order not to physically distort the edge. *STRIP THE PAINT OFF THE CAR BODY TO THE BARE METAL WITH A GRINDER ALONG THE SEAM TO BE WELDED.* Cut the replacement panel to overlap the original body stock by about two inches.
- 2. Preparation for Welding - Clean Metal Means Good Welds.** Strip off the primer coat on both sides of the new panel, along the weld seam with a wire brush. This short preparation time of about 10 minutes is all that is needed to obtain the high speed spot welding that cuts installation and finishing time in half. If the panel has a rust preventative film coating instead of primer, merely wipe off both sides of the weld seam with a clean cloth and some thinner.
- 3. Spot Welding Operation** - Figure 1 and Figure 2 show two basic types of welding joints common to almost every panel job.

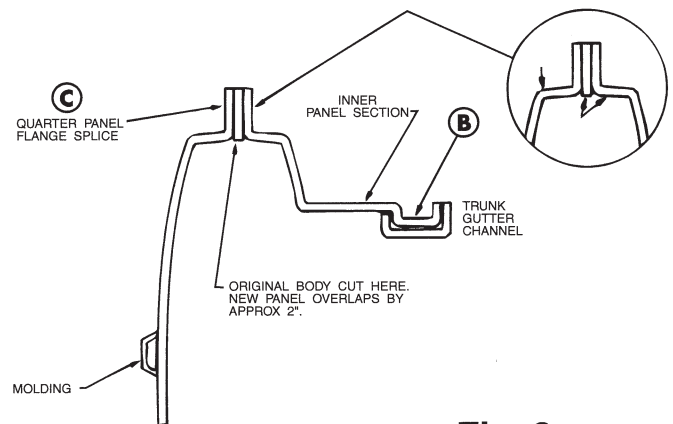
The **Mark II®** offers complete distortion-free flexibility

in panel installation from a splice panel or full installation all the way into the trunk gutter rail. **FIGURE ONE** shows a panel peak splice welded at "A". Since the upper panel section was not damaged, the peak splice is easily spot welded and finished. The same splice operation can often be done at the molding. If the upper panel had been badly damaged, the replacement panel could be installed as a unit and spot welded at the trunk gutter rail at "B". **FIGURE TWO** is a flange type joint welded at "C" which shows how a lower body panel can easily be joined to an undamaged inner section. Use vise grips to hold the panel in place and spot weld close to the vise grip jaws, where the fit-up is tight. Move the vise grips along as you go, or use enough to clamp the panel every six inches.

LENCOSPOT MARK II® OPERATION



**Fig. 1
LAP JOINT**



**Fig. 2
FLANGE JOINT**

1. Turn the power main switch to ON position.
2. Set the timer on 2 and adjust the control upward depending on material thickness variations and local line voltage conditions.
3. *PUSH BOTH ELECTRODES AGAINST THE PANEL AND APPLY MODERATE PRESSURE TO CLOSE ANY GAPS.*
4. Press the weld button on the switch handle and *HOLD IT DOWN* until the welding cycle stops automatically.
5. Release your finger from the weld button and move to the next spot.
6. Repeat the above for each weld cycle.

ELECTRODE TIPS

A-144: These tips are used for normal panel replacement procedures. Place an A-144 tip in each holder and weld — two spots at a time.

A-145: This thin shank tip is used when spot welding drip rails, trunk gutters, and other areas that are too narrow for the normal tip. Use the same procedure for welding as the A-144 tips.

A-203: The swivel ground tip is used with the other A-200 series special tips to complete the circuit so that one spot at a time can be made.

A-200: The stud welding tip is a hollow tip used for welding No. 10 round head screws to a panel. These studs can then be used for pulling dents, hanging upholstery, etc. Insert the stud into the hollow of the A-200 tip, butt the head of the stud against the metal, and weld.

A-201: The A-201 is a blunt, heat creating tip used with the swivel ground to heat shrink stretched sheet metal. Position the metal shrinking tip against the top of the high spot. Pull the trigger, remove the tip immediately from the spot and cool the metal with a wet cloth.

A-202: A slotted tip which accepts standard USS 1/4" washers. This tip welds the washers into the dent or crease to provide access for a pull tool. This is a better alternative than drilling holes for pulling. Place a washer in the slot of the tip. Position the washer in the crease to be pulled and weld. After pull is made, the washer may be easily twisted off the panel.

SPK SERIES TIPS AND ACCESSORIES

The **SPK-102** Long Stud Welding Tip is a hollow tip used for welding 2" long x .090 diameter nail type studs. These studs are used for pulling dents with a slide hammer. Insert the stud into the hollow of the tip, butt the head of the stud against the metal and weld. The **SPK-103** Mold Rivet Welding Tip is used to weld molding rivets which are used in the installation of molding on several of today's new cars. This special tip has a magnet in it to hold the molding rivet in place before welding. Just put the special molding rivet welding tip in one electrode and a ground tip in the other, insert rivet and you are ready to weld. You may weld two mold rivets at a time if you so desire.

The **SPK-109** Long Welding Stud is 2" long x .090 diameter and is designed to be used with the SPK-102 Long

Stud Welding Tip. (100 per package)

The **SPK-110** Lenco Molding Rivets are designed to be used in the installation of molding on several of today's new cars and are used with the SPK-103 Mold Rivet Welding Tip. (100 per package)

DRESSING THE TIPS

The fastest way to dress the tips is to use the PTS-100 Tip Sharpener. Place the tip sharpener over the electrodes as you would a pencil sharpener. Apply pressure and twist the sharpener several revolutions to the right. The hardened tool steel bit will quickly sharpen the copper tip to its original 1/8" diameter. Use a file to dress the face of the welding tip. *KEEP THE TIPS DRESSED TO 1/8" DIAMETER FOR CONSISTENT WELDING RESULTS.*

REMOVING THE TIPS

Tap the side of the copper electrode body gently several times with a bumping hammer to loosen the taper fit. Tips are then normally loose enough to remove by hand. *UNDER NO CIRCUMSTANCES SHOULD YOU ATTEMPT TO REMOVE THE TIPS BY TURNING THEM IN THE ELECTRODE.* The tips are held in with a NO. 1 Morris Taper (No. 4 RW) and any attempt to turn them will gall the inside of the electrode which will cause poor contact between the tip and electrode or ruin the electrode.

INSERTING TIPS

Wipe the NO. 1 Morris Taper (No. 4 RW) clean and use the STSW Brush to clean the inside of the electrode. This will clean out any metal filings and corrosion that may have built up inside the electrode. Press the tips in with *HAND PRESSURE ONLY. DO NOT HAMMER THE TIPS INTO THE HOLDER BODY.* Never insert a "cold" tip into a hot holder body. You should be able to hold the copper electrode body with bare hands before inserting a cold tip.

If by accident you should burn a hole in the panel, it is likely that some steel will be fused to the copper tips. Remove the fused steel by nipping the tips' ends with pliers or diagonal cutters. Redress tip with Lenco Tip Sharpener PTS-100 before continuing.

The tips will normally last about 10 months to a year. Reorder new tips from your Mark II® distributor.

CABLE CONNECTION

Keep bolts tightened at the welder cable connection. Good contact means good welds.

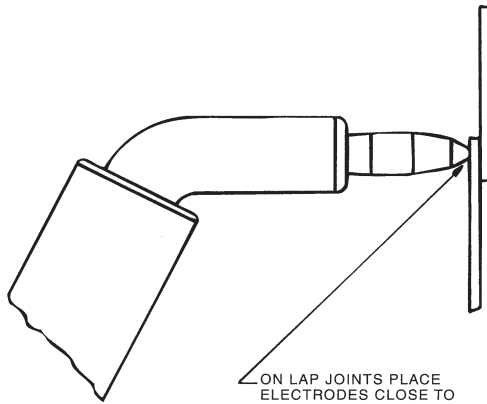
WELDER CAPACITY

The Mark II® is designed to spot weld automotive gauge body metal - 20 gauge material. This is the area where the major part of today's auto body shop costs are involved. It is only the metal thickness of the top piece that governs the resistance. The bottom sheet or piece of metal that is welded to can be any thickness.

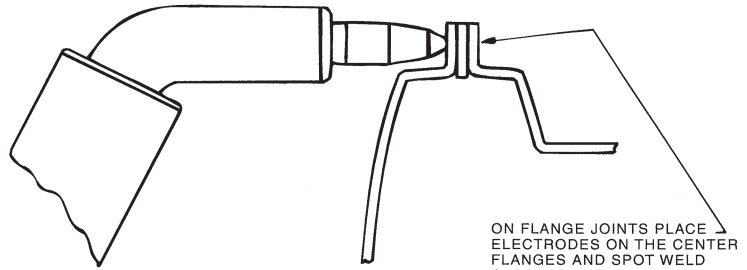
HELPFUL WELDING HINTS

Use vise grips on all flange joint and drip rail applications

BEST POSITION OF ELECTRODES FOR WELDING



ON LAP JOINTS PLACE ELECTRODES CLOSE TO TOP EDGE FOR A TIGHT SEAM THAT REDUCES FINISHING TIME.



ON FLANGE JOINTS PLACE ELECTRODES ON THE CENTER FLANGES AND SPOT WELD CLOSE TO VICE GRIP JAWS.

to bring the parts closely together. Weld near the vise grip jaws where the fit-up is tight.

A few sheet metal screws can be used on lap joints to position the panel for spot welding. Make sure that the paint has been removed from the joints.

On long splice jobs, start in the middle of the panel and spot weld in one direction; for example, from the middle of the panel to the door post. Start again in the middle and complete the panel welds to the tail light area. This is an additional aid in eliminating distortion.

Removal of burrs on the newly cut panel ensures getting good metal-to-metal contact when body pressure is applied to the electrodes. Burrs and dents cause an air space between mating parts and prevent positive metal contact.

PATCH PANELS

If patch panels are cut from sheet metal to cover rust areas, be certain to make the patch big enough to extend beyond the rust area into good body metal.

In resistance welding, the output cables are purposely bound together to deliver more power to the weld. If the bands should become cut, tape the cables so that they are always bound together. You will always make good welds, panel after panel, if four conditions are always met:

1. Clean metal
2. Good fit-up
3. Proper time setting
4. Correct tip diameter

BURN THROUGH

Burn through is caused by one of the following:

1. Paint was not removed from the mating panels.
2. There were air gaps between

the mating metal parts.

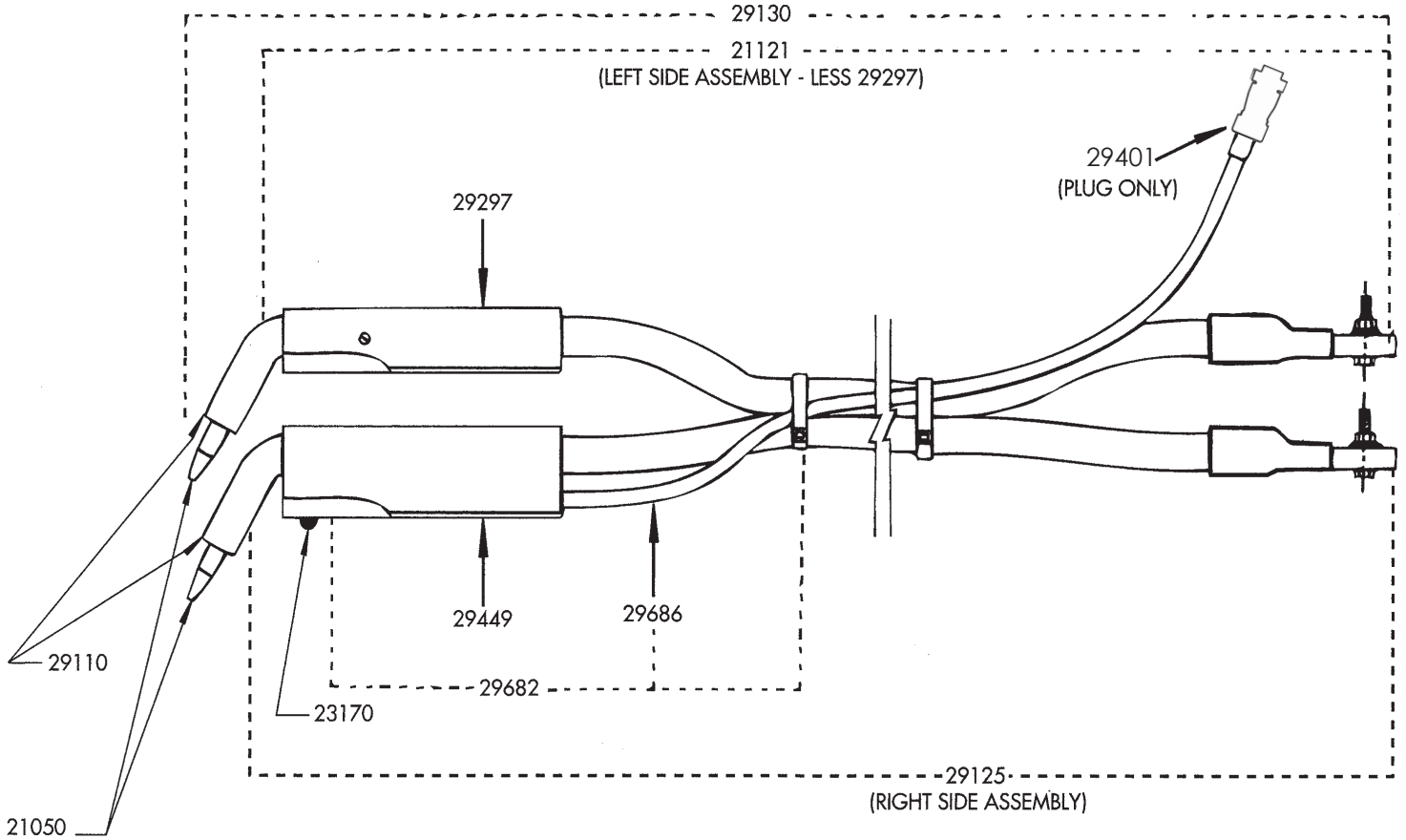
3. The timer setting was too high for the thickness of the metal being welded.
4. The welding tips were removed from the work before the welding cycle was completed.
5. The tip diameters were not equal.

The **Mark II®** Welder must be plugged into a 208/230 volt, single phase, 60/50Mz, fused for 50 Amps.

In case the **Lencospot Mark II®** does not operate, check the main fuse box of the building wiring to see if the main circuit fuses are not blown.

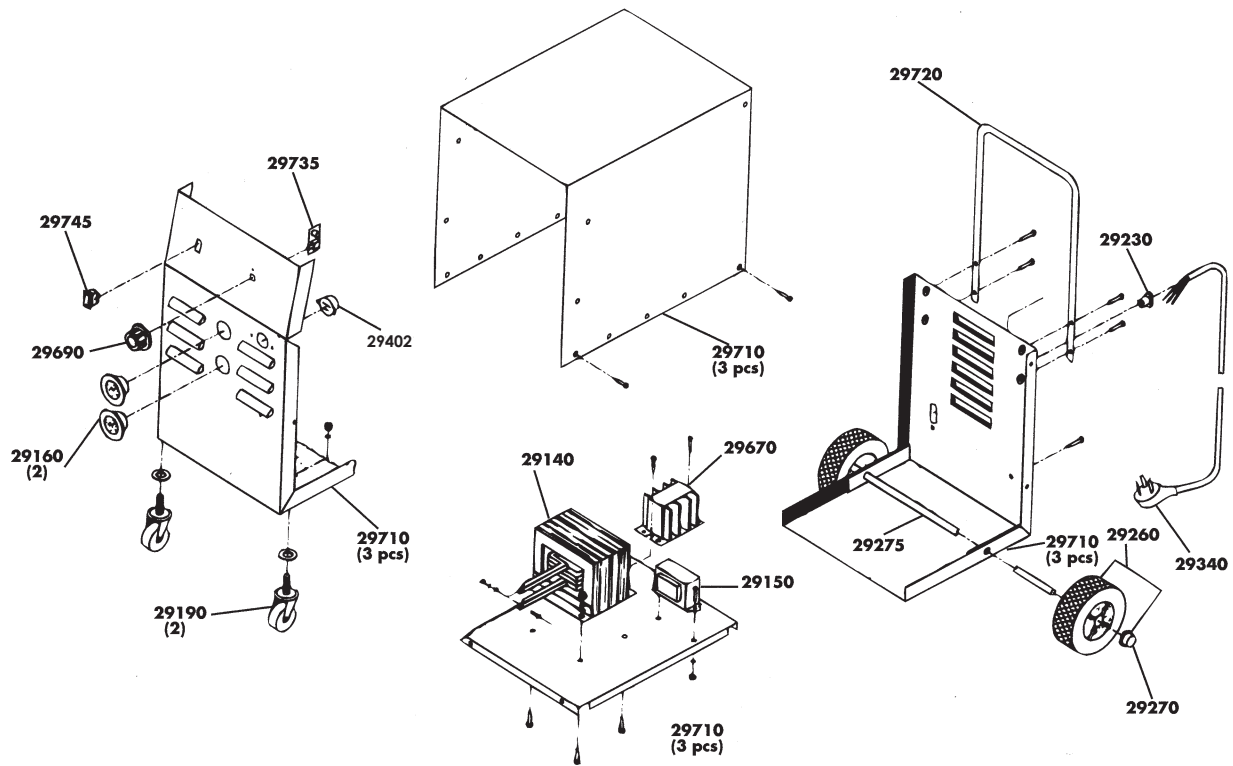
PARTS DIAGRAM AND ORDERING INFORMATION FOR A-260 CABLE ASSEMBLY

(COMPLETE ASSEMBLY)



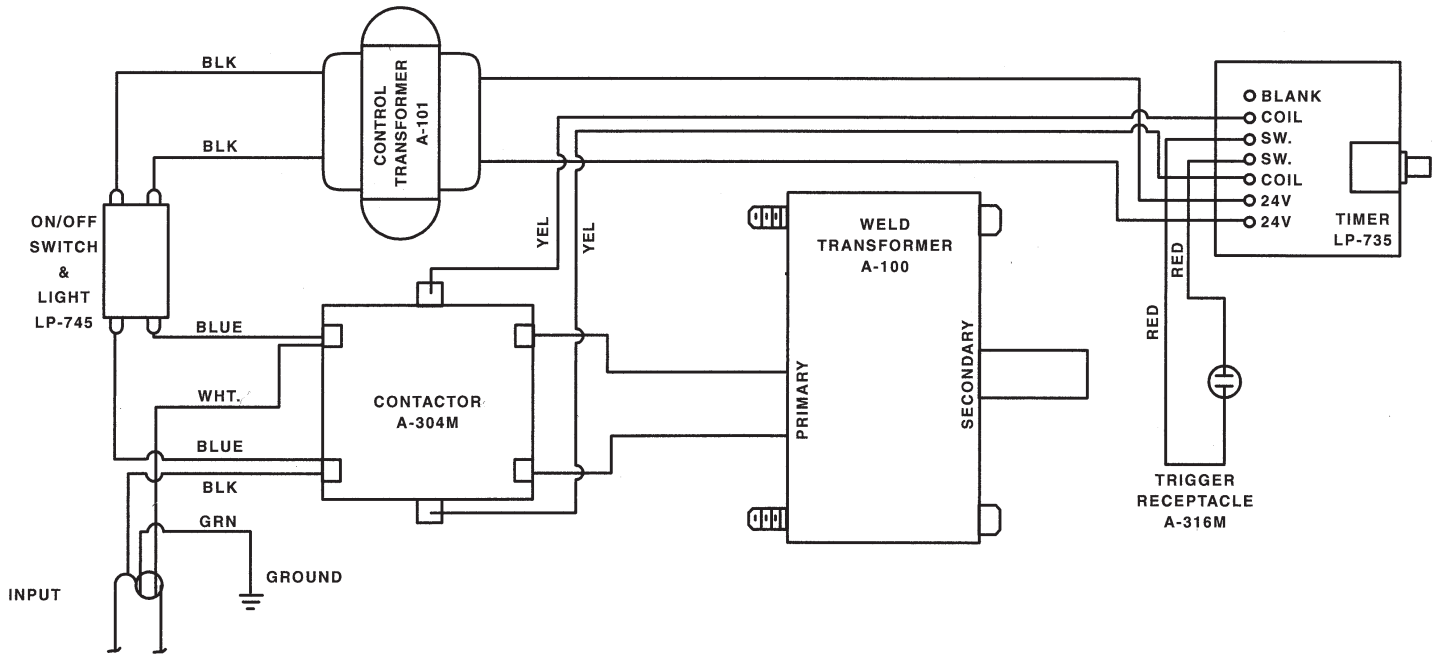
PART#	ITEM DESCRIPTION
29130	A-260 CABLE ASSEMBLY
21121	A-181 PARTIAL CABLE ASSY
29297	A-162 HANDLE - SWITCHLESS SIDE
29401	A-401 PLUG, MALE 3-PIN
29449	LP-449 HANDLE
29686	A-193 CONTROL CORD WITH PLUG
29682	A-183 SWITCH ASSY W/HANDLE
23170	LAS-170 SWITCH, PUSHBUTTON
29125	A-260 RIGHT SIDE CABLE ASSY
29110	A-198 COPPER ELECTRODE
21050	A-144 TIP, REGULAR - 2 PACK

PARTS DIAGRAM AND ORDERING NUMBERS FOR L-4000



PART NO.	ITEM DESCRIPTION
29745	LP-745 SWITCH,"ON-OFF" & LIGHT
29735	LP-735 TIMER CONTROL ASSY
29690	A-340M TIMER INDICATOR KNOB
29402	A-402 PANEL RECEPTCLE, F 3-PIN
29160	A-102 BUSHING
29190	A-109 FRONT CASTER
29710	A-349M CABINET
29140	A-100 POWER TRANSFORMER
29670	A-304M CONTACTOR
29150	A-101 CONTROL TRANSFORMER 120V
29720	A-363M HANDLE - L-4000
29230	A-146 STRAIN RELIEF
29275	A-152 AXLE
29260	A-150 REAR WHEEL WITH HUB CAP
29340	A-186 POWER CABLE 50'
29270	A-151 HUB CAP

L-4000 WIRING DIAGRAM



LENCO AUTOMOTIVE EQUIPMENT
FOR TECHNICAL ASSISTANCE CALL: (800) 747-4743

NLC, Inc. 319 W. Main Street • Jackson, MO 63755 • Phone: (573) 243-3141 • Fax: (573) 243-7122