

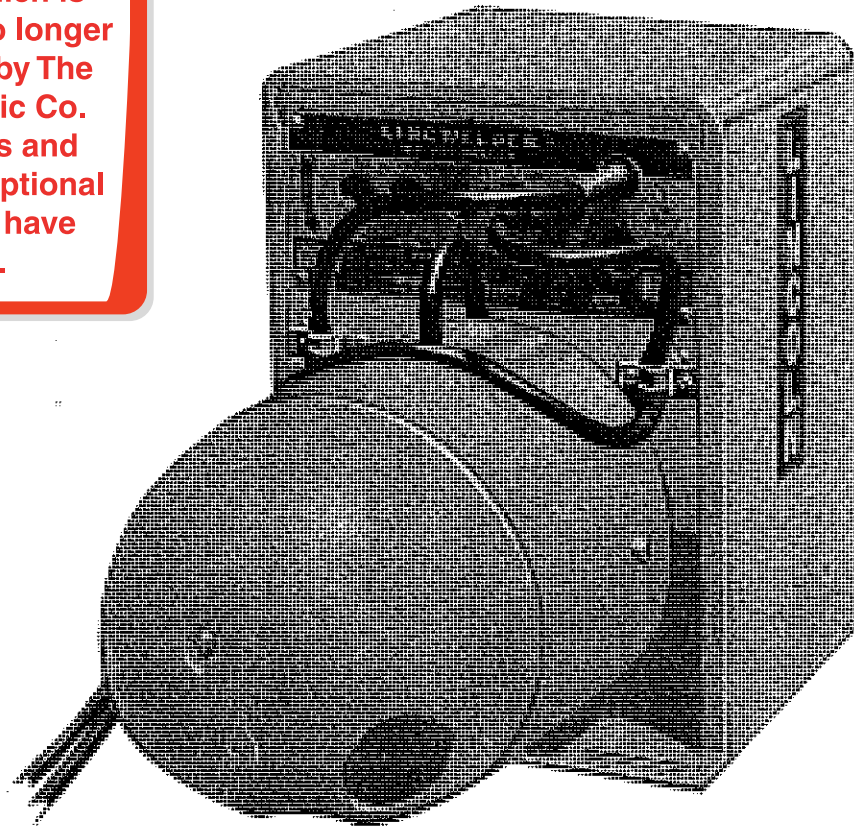
OPERATING MANUAL

LINCWELDER DC-180-BT

Belt Driven Arc Welder

IM146
Lincwelder DC-180-BT
1981; 2060; 2180; 2232; 2320;
2321; 3144; 3145; 4207

This manual covers equipment which is obsolete and no longer in production by The Lincoln Electric Co. Specifications and availability of optional features may have changed.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

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

CLEVELAND 17, OHIO

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UNCRATING THE WELDER

Upon arrival, the equipment should be carefully uncrated. The use of pinch bars or anything which might injure the mechanism, must be avoided. Read these instructions through completely once before attempting to follow any of the installation instructions. Notify the delivering carrier if damage claims must be filed.

POWER SUPPLY

The power supply should drive the welding generator at a speed close to 2400 RPM while welding. In no case should speed exceed 2500 RPM at no load. Too low a speed causes poor welding characteristics. The direction of rotation is marked on the nameplate.

MOUNTING

This welder has been mounted on many types of farm tractors. Here are the most popular mounting methods:

1. For Pulley Take-off at rear of Tractor

- a. Welder mounted to 3 point tractor draw bar. (See Fig. 1) -- Mount welder on steel plate or framework which can in turn be bolted to the draw bar of tractor. If draw bar is raised and lowered hydraulically, this adjustment can be used to set the tension on the pulley belts. If welder pivots on draw bar, its weight should be sufficiently over-hung so as to provide belt tension. Belts should be kept just tight enough to prevent them from slipping when you weld with the largest size electrodes. (See paragraph on Belt Tension.) If draw bar is fixed, use bolt adjustment furnished with welder to tighten belts.

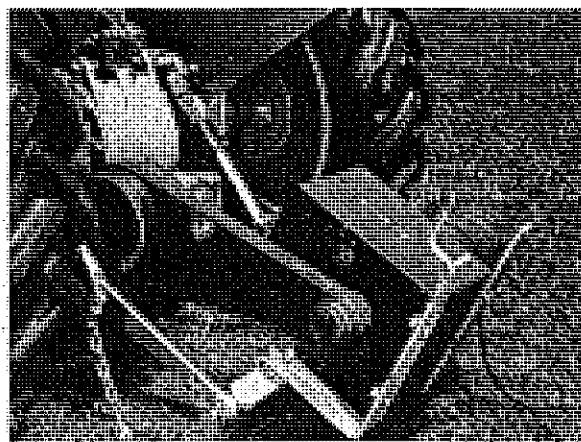


Fig. 1. Welder mounted on draw bar of tractor. Driven by pulley take-off.

2. For Pulley Take-off at Side of Tractor

- a. Welder mounted rigidly to tractor (See Fig. 2) -- Bolt a framework capable of supporting welder to front end of tractor frame. Tighten belt by bolt adjustment furnished with welder. Flat belts may be used in this method. Be sure welder rotates in the proper direction.

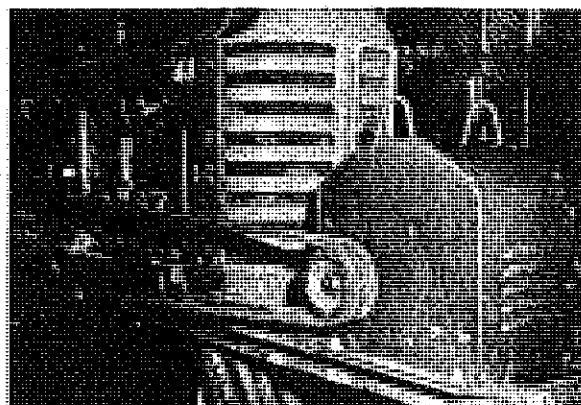


Fig. 2. Welder mounted on front end of tractor.

3. Welder mounted on Trailer and Driven by "Power Take-off" (See Fig. 3) -- Welder should be mounted on a fixed framework either on or off a trailer but power take-off shaft will now drive a large pulley which will in turn be connected by short belts to the pulley on the welder. Belt tension will have to be maintained by adjustment bolt.

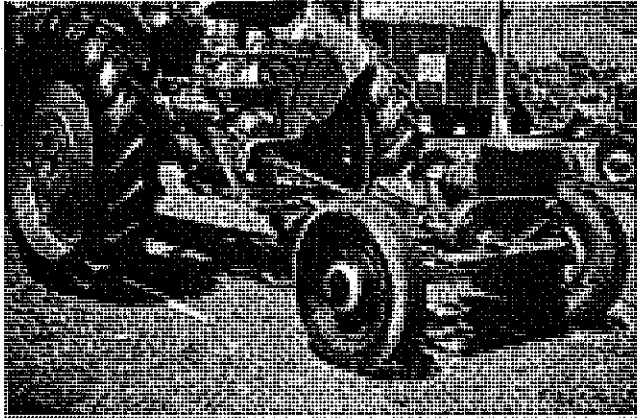


Fig. 3. Welder driven by power take-off.

CHOICE OF BELTS AND PULLEYS

You may use either a flat belt or V-belts to drive your welder. A standard flat belt, five or six inches wide may be used if the distance between your pulleys is at least five feet. Anti-slip belt dressing will improve traction.

If you use V-belts, we recommend three, or preferably four, type "B" belts. A special V-belt pulley should be purchased for the welder shaft. The bore or "hole" in the pulley should be $1\frac{3}{8}$ " in diameter, and the key-way must be $\frac{3}{8}$ " x $\frac{3}{16}$ ". V-belt pulleys are measured by "pitch" diameter. This is the outside diameter of the pulley minus the thickness of the V-belt.

To prevent belt slippage, your welder must have a pulley on the welder shaft that is no smaller

than a pitch diameter of $3\frac{3}{8}$ ". The pulley on the driving shaft must be big enough to operate the welder at a constant speed of approximately 2500 RPM.

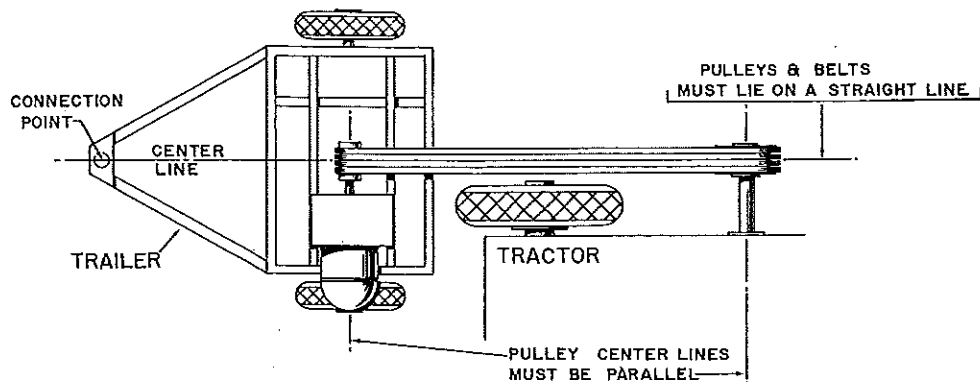
It is best to figure out pulley sizes by following these instructions:

1. Determine the revolutions per minute of your power take off pulley or shaft, or other source of power by referring to your tractor or engine instruction book.
2. Secure a pulley or you may already have pulleys you want to try for either the drive shaft or the welder shaft. Measure the pitch diameter, if you use a V-belt, or the normal diameter if you are using a flat-belt pulley. If you are measuring the welder shaft pulley, BE SURE that the diameter is at least $3\frac{3}{8}$ ".
3. If you already have the welder-shaft pulley, multiply its diameter by 2500, and divide the result by the revolutions per minute of your power supply. The answer will be the proper pitch diameter of the driving pulley.
4. If you already have the driving pulley, multiply its pitch diameter by the revolutions per minute of your power supply, and divide the result by 2500, which will give you the pitch diameter of the welder shaft pulley.

FOR EXAMPLE: If you select a $3\frac{3}{8}$ " pulley for the welder shaft, and your power take-off is operating at a normal speed of 550 RPM, you'll find that a driving pulley with a $15\frac{1}{2}$ " pitch diameter will operate your welder at the proper speed of approximately 2500 RPM.

BELT TENSION

For satisfactory pulley operation, the generator and drive shafts should be not less than two feet apart. The drive belts should be kept just tight enough to prevent slipping when you weld with the largest electrode.



This welder gives best results when the generator shaft revolves at approximately 2400 revolutions per minute while welding. This usually means it must run about 2500 RPM with no load. Proper tension on the belt will help achieve this speed. On a normal installation where V-belt pulleys are about three feet apart, the belts should be tight enough so that they can be depressed only between one-quarter and one-half inch when your thumb is placed on it half way between the two pulleys.

Too much tension may injure the belts, or may cause overheating with damage to the welder bearing. If the belts overheat, or "squeal", increase the tension to eliminate slippage. The use of any good anti-slip belt dressing will greatly improve traction, especially where flat belts are used.

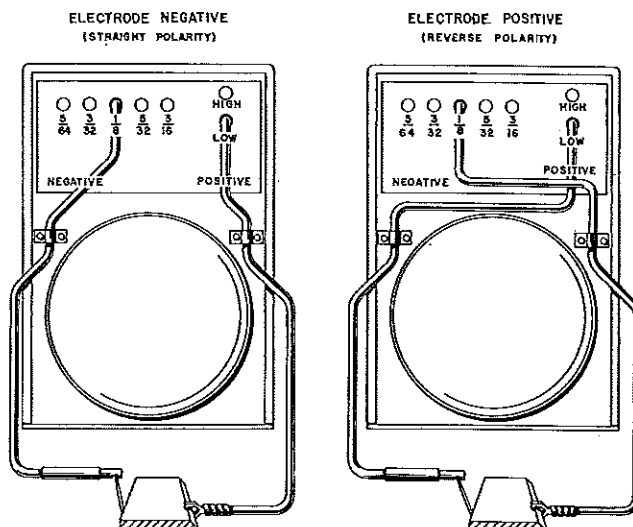
SPECIAL PRECAUTIONS

1. Be sure that the welding generator and the tractor or engine are held together rigidly so that neither machine can shift or slide. If any such movement should occur, belt damage and poor welder operation might result.
2. Always keep the pulleys in line, and see that the belts are centered on the pulleys. (See sketch on bottom of preceding page.)
3. When mounting pulleys on the shaft, avoid excessive pounding. Severe blows on the shaft may cause damage to the bearing on the other end.
4. When your welder is mounted on a trailer and the trailer is connected at a single point to a fixed object, the connection point should be in line with the belts and pulleys. (See sketch on bottom of preceding page.)

WELDER OPERATION

The electrode and ground cables should be plugged into the receptacles on the welder output panel. The five left hand receptacles are "negative" and the two right hand "positive". Some types of welding rods require electrode positive and others electrode negative. Therefore, see table for the particular welding electrode (rod) being used to determine whether electrode lead is to be plugged into "negative" or into "positive". (See sketches in the next column.)

In adjusting the welding current to suit a particular rod (say Fleetweld 47), select the negative receptacle that corresponds to the rod size being used and then try both "HIGH" and "LOW" positive taps to determine the best heat for the particular application. This should be the point where arc is easiest to strike and maintain with good fusion and a minimum amount of spatter.



Electrode sizes marked on the nameplate refer to the diameter of the metal part of the electrode and not to the diameter over the coating which may vary for various types of electrodes. A tap will generally give proper welding characteristics for the rod size specified on the nameplate but there is nothing to prevent using a 5/32 rod on either the 3/16 tap or the 1/8 tap if a special result is desired.

CHOICE OF ELECTRODE SIZE AND CURRENT

The output of this machine is ample for all electrode sizes up to and including 3/16". Some 3/16" rods can be easily used on the 5/32" tap.

It is usually possible to use several different electrode sizes and current settings to weld any given thickness of material. The table lists the usual combination for each plate thickness. Experience might indicate that you may prefer to use a higher or lower current or smaller electrode on certain applications.

TABLE 1

Approximate thickness of material to be welded	Electrode size (Wire Diameter)	Receptacle to be used
1/32"	1/16 or 5/64	5/64
1/16"	5/64 or 3/32	5/64
3/32"	3/32 or 1/8	3/32
1/8"	1/8 or 5/32	1/8
3/16"	1/8 or 5/32	1/8 - 5/32
1/4" & Over	5/32 or 3/16	5/32 - 3/16

RECOMMENDED ELECTRODES

LINCOLN Electrode (Welding rod)	Polarity for Best Results	Application
Fleetweld 180	Positive	All Purpose - All Position
Fleetweld 37	Negative	Slag Removal Bead Appearance
Abrasoweld	Positive	Hardsurfacing
Ferroweld	Positive	Welding Cast Iron

In addition to the above rods, it is also possible to use a carbon arc with this welder for brazing. With the plug for the electrode holder plugged in to the NEGATIVE TAP, use a 1/8 inch or 5/32 inch sharply pointed carbon in the holder. A filler rod should be used in these applications. The 5/64 output tap should give the necessary heat for the carbon.

See books entitled "Welding Helps for Farmers", \$1.00, and "Arc Welding Lessons for School and Farm Shop", \$1.00, for applications of these rods.

MAINTENANCE

COMMUTATOR AND BRUSHES. The commutator and brushes are inspected by removing the commutator shield. Do not remove or replace the shield while the welder is running.

The brushes on the welder generator are properly adjusted when the welder arrives. No particular attention is required to keep the brushes in good condition. As the brushes wear out, they must be replaced with new ones and one complete set of brushes should always be kept on hand.

The new Lincoln brushes have a bearing face specially curved to fit the commutator surface. These brushes are seated by lightly stoning the commutator while the armature rotates at full speed. The operation is complete when the brushes make positive contact. After stoning, blow out the sand and carbon dust with low pressure air.

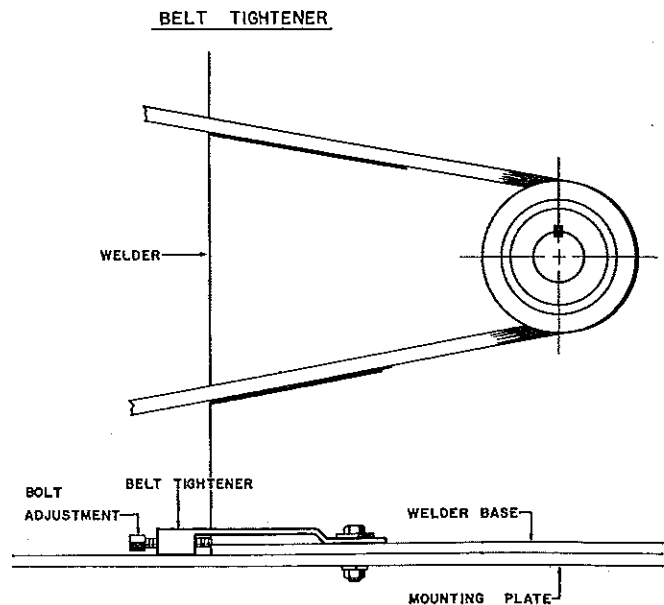
Brushes with a flat face must be sanded in before they can be used on the machine. This is accomplished by removing the old brush from the holder, placing the new brush in position with a piece of medium sandpaper (never use emery cloth) placed under the brush. A second person should hold the brush in its normal position by a slight pressure of the fingers. The sandpaper then should be drawn back and forth under the brush with the

back of the sandpaper held closely in contact with the commutator. This will wear the brush down to the curve of the commutator. When the end of the brush has the proper curve, the operation is complete. Care should be exercised to blow all of the carbon dust away from the commutator.

The commutators require practically no attention. They should be cleaned from time to time with a clean rag, or while running, with a piece of fine sandpaper.

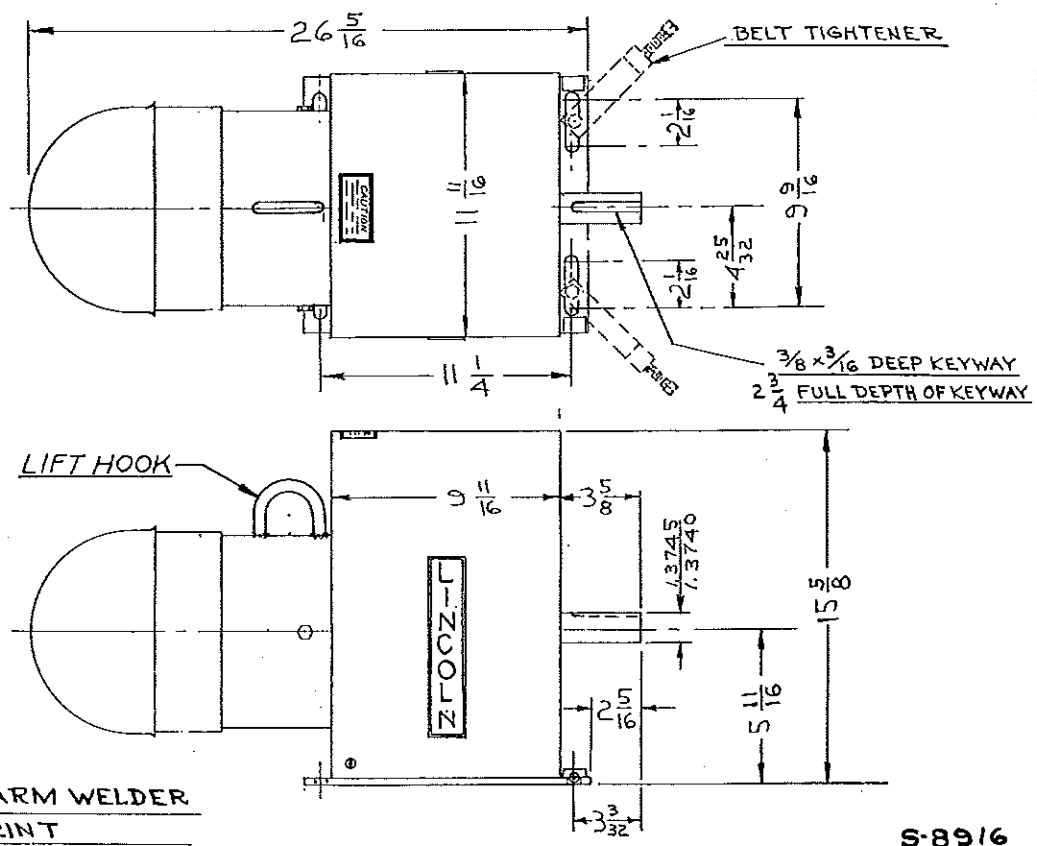
CAUTION: NEVER USE EMERY CLOTH OR PAPER FOR THIS PURPOSE. DO NOT SHIFT THE BRUSH HOLDER POSITION.

This welder is equipped with a double-shield ball bearing having sufficient grease to last 3 years under average conditions. It, however, is well to add one-half ounce of grease each year. A pad of grease one inch wide, one inch long and one inch high weighs approximately one-half ounce. Overgreasing is far worse than insufficient greasing.



Turning bolt adjustment slides unit on mounting plate and tightens belt. If flat belt is used, this adjustment may not be sufficient to take up the slack in belt caused by frictional heating. An idler pulley is useful on such applications to take up the slack.

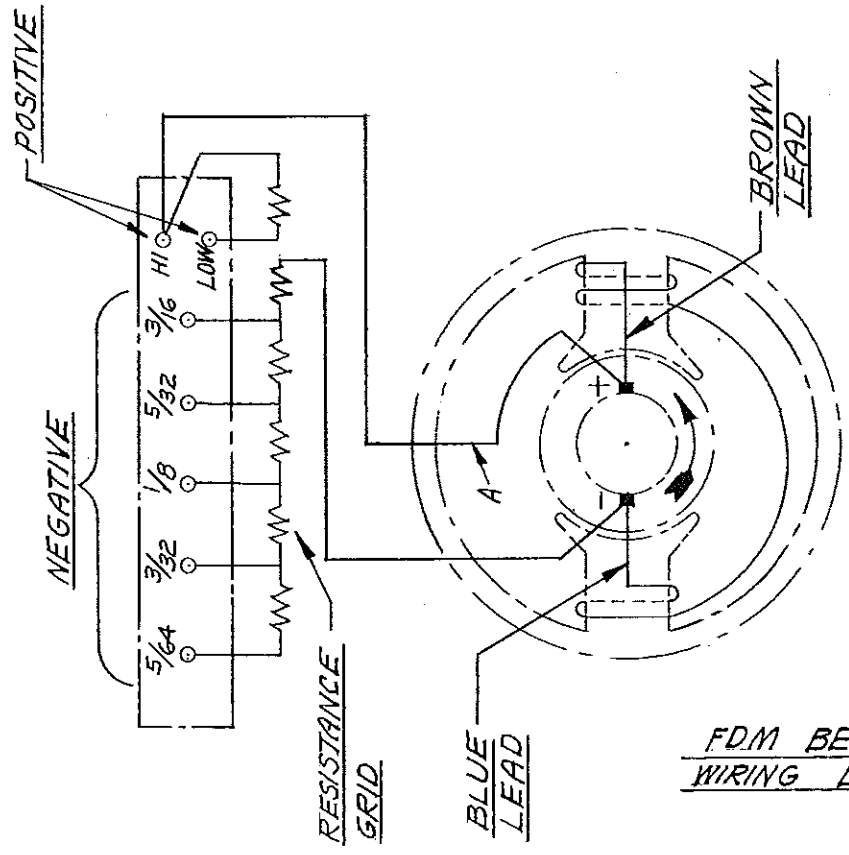
9168-S



FDM BELTED FARM WELDER
DIMENSION PRINT

S-8916

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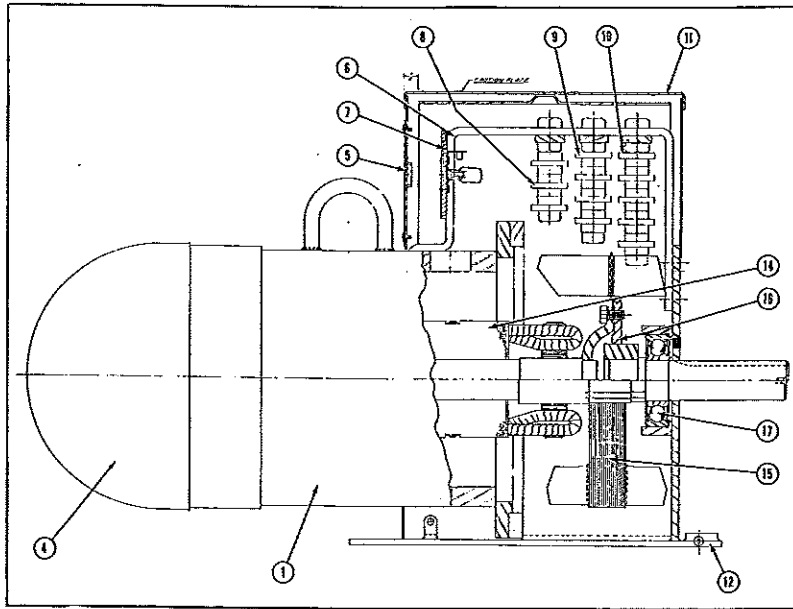


FDM BELTED
WIRING DIAGRAM

CLOCKWISE ROTATION - FACING DRIVING END

WIRING DIAGRAM FOR FDM BELTED WELDERS

T 10090



SEE THE BACK COVER FOR INSTRUCTIONS ON HOW TO ORDER PARTS

Always give the machine code number when ordering parts.

Parts List P-45-C

output panel

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
1	Generator Frame	1
2	Main Coil and Pole Piece Assembly, Includes -	
	Note 1	1
	Coil	1
	Pole Piece	1
3	Main Coil and Pole Piece Assembly, Includes -	
	Note 1	1
	Coil	1
	Pole Piece	1
4	Generator End Cover	1
	Bearing, Commutator End	1
	Bearing Cage	1
	Rocker Clamping Ring	1
	Spacer, Code No. 1981 Only	1
	Brushholder	2
	Brushes	8
5	Nameplate	1

ITEM	PART NAME AND DESCRIPTION	NO. REQ'D.
6	Grid Assembly, includes	1
7	Clip Panel, includes	1
	Clips	7
8	Resistor Assembly, Ground Section	1
9	Resistor Assembly, 2nd Electrode Section	1
10	Resistor Assembly, 1st Electrode Section Case Assembly	1
12	Base Assembly and Bracket	1
13	Belt Tightener, includes	1
	Arm	1
	Adjusting Screw	1
14	Armature, includes	1
	Armature Coil Spec	1
15	Flywheel, Code No. 2321 and Above	1
	Commutator	1
16	Coupling Assembly, Code No. 2232 and Below	1
17	Bearing	1
	Note 1: Use one item 2 and one item 3. Coils are marked so they can be distinguished.	

NOTE: The rotation direction of these welders can be changed from clockwise to counter clockwise or vice versa. To do this, order a new set of brushholders for the rotation you want. Reconnect per the appropriate diagram (See page 6 for clockwise; write for counter clockwise diagram.)

HOW TO ORDER REPLACEMENT PARTS

All parts should be ordered from Authorized Field Service Shops or branch offices. The "Field Service Directory" listing all Authorized Field Service Shops geographically is supplied with each machine or is available upon request. These shops stock GENUINE replacement parts and have factory trained men to service your machine.

In ordering replacement parts give the following information:

- (a) From the machine nameplate - Machine model, code number and serial number.
- (b) From the Instruction Manual - Part name, item number, quantity required, and the number of the parts list used to get this information. To obtain this information refer to the pictures of the machine shown in this manual and find the required part and its item number. Get the part name and quantity required from the accompanying parts list.

All items in the parts lists which are indented in the parts name column are integral parts of the assembly which they are listed immediately under. If the entire assembly is required, do not order the indented items as they will be supplied as part of the assembly. The indented parts may be ordered separately if only parts of the assembly are required.

SAFETY PRECAUTIONS

When using a welder, as with all machinery, certain safety precautions should be observed:

- (1) Protect the arms and hands from rayburns and hot slag by wearing good leather gloves whenever welding.
- (2) Wear a good shield fitted with the proper safety lenses to protect your eyes from sparks and arc flash.
- (3) Use extreme care whenever chipping slag that chips do not fly and hit your eyes or those of your helper.
- (4) Although, with rated input, this welder will have a maximum output voltage well within prescribed safety limits, carelessness can result in a serious accident. Be Careful.
 - (a) Ground the welder frame.
 - (b) Use a well constructed, properly insulated electrode holder connected to the welder by insulated welding cable.
 - (c) Make certain the work is well connected to the ground cable, as close to the point of welding as possible. This is particularly important when standing on wet ground or a metal framework. Under such conditions be sure you are well insulated from the ground by dry gloves and rubber soled shoes.
 - (d) The electrode holder should be used for welding and not for lighting cigarettes.
- (5) Provide adequate ventilation for welder.

GUARANTEE

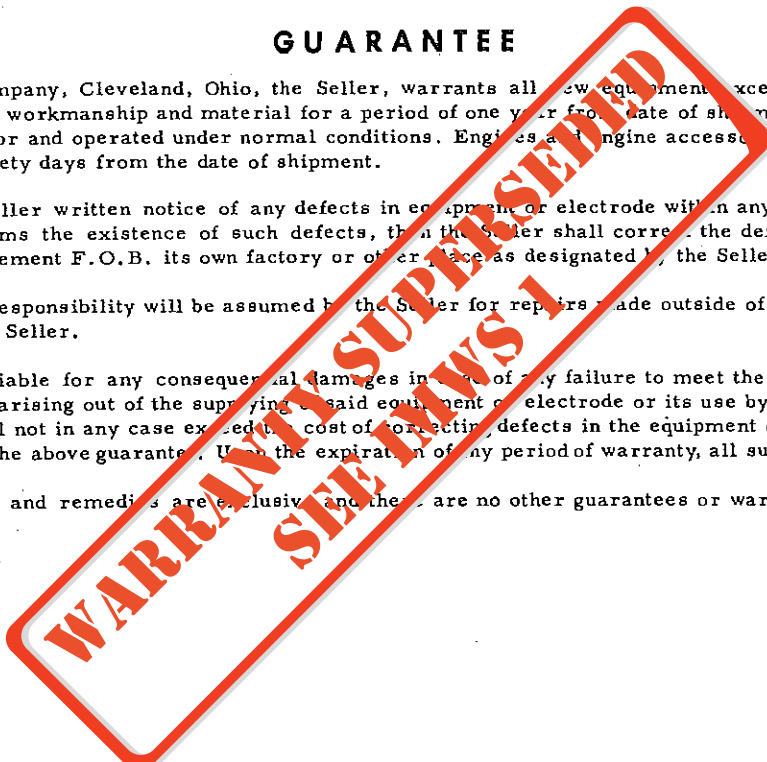
The Lincoln Electric Company, Cleveland, Ohio, the Seller, warrants all new equipment except engines and accessories thereof, against defects in workmanship and material for a period of one year from date of shipment, provided the equipment has been properly cared for and operated under normal conditions. 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 or electrode within any period of warranty and the Seller's inspection confirms the existence of such defects, then the Seller shall correct the defect or defects at its option, either by repair or replacement F.O.B. its own factory or other place as designated by the Seller.

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 there are no other guarantees or warranties either expressed or implied.



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CLEVELAND 17, OHIO



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LINCOLN ELECTRIC CO., (Australia) Pty., Ltd., Padstow, N. S. W.

LINCOLN ELECTRIC CO., of Canada, Ltd., Leaside, Toronto 17, Canada

LA SOUDURE ELECTRIQUE LINCOLN, Grand Quevilly, Seine-Maritime, France

Export Representatives

ARMCO INTERNATIONAL - DIV. OF ARMCO STEEL CORP., Middletown, Ohio, U.S.A.