IM770

September, 2002

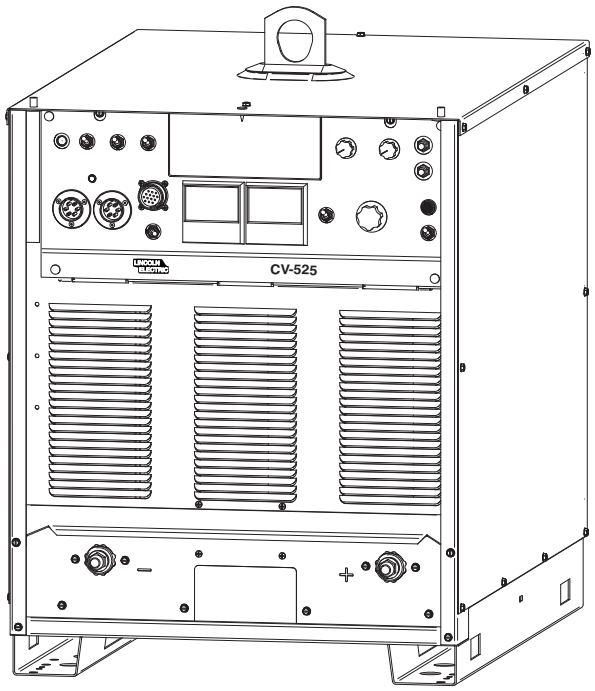
CV-525

For use with machines having Code Numbers: **A1677**

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

Safety Depends on You

Lincoln arc welding and cutting equipment is designed and built with safety in mind. However, your overall safety can be increased by proper installation ... and thoughtful operation on your part. **DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT WITHOUT READING THIS MANUAL AND THE SAFETY PRECAUTIONS CONTAINED THROUGHOUT.** And, most importantly, think before you act and be careful.



Date of Purchase:_____
Serial Number:_____
Code Number:_____
Model:_____
Where Purchased:_____

IEC 60974-1

IP 21S

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OPERATOR'S MANUAL

LINCOLN® ELECTRIC

• World's Leader in Welding and Cutting Products •
• Sales and Service through Subsidiaries and Distributors Worldwide •

The Lincoln Electric Company (Australia) Pty. Ltd. 35 Bryant Street, Padstow, Sydney 2211, Australia Phone: (02) 9772-7222 FAX: (02) 9792-1387

⚠ WARNING

⚠ CALIFORNIA PROPOSITION 65 WARNINGS ⚠

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

The Above For Diesel Engines

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

The Above For Gasoline Engines

ARC WELDING CAN BE HAZARDOUS. PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS SHOULD CONSULT WITH THEIR DOCTOR BEFORE OPERATING.

Read and understand the following safety highlights. For additional safety information, it is strongly recommended that you purchase a copy of "Safety in Welding & Cutting - ANSI Standard Z49.1" from the American Welding Society, P.O. Box 351040, Miami, Florida 33135 or CSA Standard W117.2-1974. A Free copy of "Arc Welding Safety" booklet E205 is available from the Lincoln Electric Company, 22801 St. Clair Avenue, Cleveland, Ohio 44117-1199.

BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.

FOR ENGINE powered equipment.

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

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

1.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.

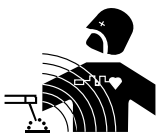
1.d. Keep all equipment safety guards, covers and devices in position and in good repair.Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.

1.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.

1.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.

1.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.

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



ELECTRIC AND MAGNETIC FIELDS may be dangerous

2.a. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding current creates EMF fields around welding cables and welding machines

2.b. EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.

2.c. Exposure to EMF fields in welding may have other health effects which are now not known.

2.d. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

2.d.1. Route the electrode and work cables together - Secure them with tape when possible.

2.d.2. Never coil the electrode lead around your body.

2.d.3. Do not place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side.

2.d.4. Connect the work cable to the workpiece as close as possible to the area being welded.

2.d.5. Do not work next to welding power source.

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ELECTRIC SHOCK can kill.

3.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.

3.b. Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.

In addition to the normal safety precautions, if welding must be performed under electrically hazardous conditions (in damp locations or while wearing wet clothing; on metal structures such as floors, gratings or scaffolds; when in cramped positions such as sitting, kneeling or lying, if there is a high risk of unavoidable or accidental contact with the workpiece or ground) use the following equipment:

- **Semiautomatic DC Constant Voltage (Wire) Welder.**
- **DC Manual (Stick) Welder.**
- **AC Welder with Reduced Voltage Control.**

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

3.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.

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

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

3.g. Never dip the electrode in water for cooling.

3.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.

3.i. When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.

3.j. Also see Items 6.c. and 8.

ARC RAYS can burn.

4.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. I standards.

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

4.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.

5.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 with electrodes which require special ventilation such as stainless or hard facing (see instructions on container or MSDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and below Threshold Limit Values (TLV) using local exhaust or mechanical ventilation. In confined spaces or in some circumstances, outdoors, a respirator may be required. Additional precautions are also required when welding on galvanized steel.**

5.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.

5.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.

5.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. MSDS forms are available from your welding distributor or from the manufacturer.

5.e. Also see item 1.b.

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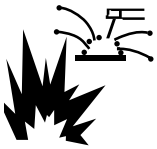


WELDING SPARKS can cause fire or explosion.

6.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. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.

6.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.

6.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.

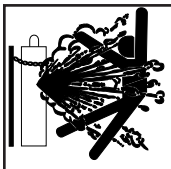
6.d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been “cleaned”. For information, purchase “Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances”, AWS F4.1 from the American Welding Society (see address above).

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

6.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.

6.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.

6.h. Also see item 1.c.



CYLINDER may explode if damaged.

7.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.

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

7.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.

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

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

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

7.g. Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-l, “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.

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

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

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

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PRÉCAUTIONS DE SÛRETÉ

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

Sûreté Pour Soudage A L'Arc

1. Protegez-vous contre la secousse électrique:

   a. Les circuits à l'électrode et à la piéce sont sous tension quand la machine à souder est en marche. Eviter toujours tout contact entre les parties sous tension et la peau nue ou les vétements mouillés. Porter des gants secs et sans trous pour isoler les mains.
   b. Faire trés attention de bien s'isoler de la masse quand on soude dans des endroits humides, ou sur un plancher metallique ou des grilles metalliques, principalement dans les positions assis ou couché pour lesquelles une grande partie du corps peut être en contact avec la masse.
   c. Maintenir le porte-électrode, la pince de masse, le câble de soudage et la machine à souder en bon et sûr état defonctionnement.
   d. Ne jamais plonger le porte-électrode dans l'eau pour le refroidir.
   e. Ne jamais toucher simultanément les parties sous tension des porte-électrodes connectés à deux machines à souder parce que la tension entre les deux pinces peut être le total de la tension à vide des deux machines.
   f. Si on utilise la machine à souder comme une source de courant pour soudage semi-automatique, ces precautions pour le porte-électrode s'applicuent aussi au pistolet de soudage.

2. Dans le cas de travail au dessus du niveau du sol, se protéger contre les chutes dans le cas ou on recoit un choc. Ne jamais enrouler le câble-électrode autour de n'importe quelle partie du corps.

3. Un coup d'arc peut être plus sévère qu'un coup de soliel, donc:

   a. Utiliser un bon masque avec un verre filtrant approprié ainsi qu'un verre blanc afin de se protéger les yeux du rayonnement de l'arc et des projections quand on soude ou quand on regarde l'arc.
   b. Porter des vêtements convenables afin de protéger la peau de soudeur et des aides contre le rayonnement de l'arc.
   c. Protéger l'autre personnel travaillant à proximité au soudage à l'aide d'écrans appropriés et non-inflammables.

4. Des gouttes de laitier en fusion sont émises de l'arc de soudage. Se protéger avec des vêtements de protection libres de l'huile, tels que les gants en cuir, chemise épaisse, pantalons sans revers, et chaussures montantes.

5. Toujours porter des lunettes de sécurité dans la zone de soudage. Utiliser des lunettes avec écrans lateraux dans les zones où l'on pique le laitier.

6. Eloigner les matériaux inflammables ou les recouvrir afin de prévenir tout risque d'incendie dû aux étincelles.

7. Quand on ne soude pas, poser la pince à une endroit isolé de la masse. Un court-circuit accidental peut provoquer un échauffement et un risque d'incendie.

8. S'assurer que la masse est connectée le plus prés possible de la zone de travail qu'il est pratique de le faire. Si on place la masse sur la charpente de la construction ou d'autres endroits éloignés de la zone de travail, on augmente le risque de voir passer le courant de soudage par les chaines de levage, câbles de grue, ou autres circuits. Cela peut provoquer des risques d'incendie ou d'echauffement des chaines et des câbles jusqu'à ce qu'ils se rompent.

9. Assurer une ventilation suffisante dans la zone de soudage. Ceci est particuliérement important pour le soudage de tôles galvanisées plombées, ou cadmiées ou tout autre métal qui produit des fumeés toxiques.

10. Ne pas souder en présence de vapeurs de chlore provenant d'opérations de dégraissage, nettoyage ou pistolage. La chaleur ou les rayons de l'arc peuvent réagir avec les vapeurs du solvant pour produire du phosgéne (gas fortement toxique) ou autres produits irritants.

11. Pour obtenir de plus amples renseignements sur la sûreté, voir le code "Code for safety in welding and cutting" CSA Standard W 117.2-1974.

PRÉCAUTIONS DE SÛRETÉ POUR LES MACHINES À SOUDER À TRANSFORMATEUR ET À REDRESSEUR

1. Relier à la terre le chassis du poste conformement au code de l'électricité et aux recommendations du fabricant. Le dispositif de montage ou la piece à souder doit être branché à une bonne mise à la terre.

2. Autant que possible, l'installation et l'entretien du poste seront effectués par un électricien qualifié.

3. Avant de faires des travaux à l'interieur de poste, la debrancher à l'interrupteur à la boite de fusibles.

4. Garder tous les couvercles et dispositifs de sûreté à leur place.

Mar. '93

ELECTROMAGNETIC COMPATIBILITY (EMC)

Conformance

Products displaying the CE mark are in conformity with European Community Council Directive of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility (89/336/EEC). It was manufactured in conformity with a national standard that implements a harmonized standard: EN 50 199 Electromagnetic Compatibility (EMC) Product Standard for Arc Welding Equipment. It is for use with other Lincoln Electric equipment. It is designed for industrial and professional use.

Introduction

All electrical equipment generates small amounts of electromagnetic emission. Electrical emission may be transmitted through power lines or radiated through space, similar to a radio transmitter. When emissions are received by other equipment, electrical interference may result. Electrical emissions may affect many kinds of electrical equipment; other nearby welding equipment, radio and TV reception, numerical controlled machines, telephone systems, computers, etc. Be aware that interference may result and extra precautions may be required when a welding power source is used in a domestic establishment.

Installation and Use

The user is responsible for installing and using the welding equipment according to the manufacturer s instructions. If electromagnetic disturbances are detected then it shall be the responsibility of the user of the welding equipment to resolve the situation with the technical assistance of the manufacturer. In some cases this remedial action may be as simple as earthing (grounding) the welding circuit, see Note. In other cases it could involve constructing an electromagnetic screen enclosing the power source and the work complete with associated input filters. In all cases electromagnetic disturbances must be reduced to the point where they are no longer troublesome.

Note: The welding circuit may or may not be earthed for safety reasons according to national codes. Changing the earthing arrangements should only be authorized by a person who is competent to assess whether the changes will increase the risk of injury, e.g., by allowing parallel welding current return paths which may damage the earth circuits of other equipment.

Assessment of Area

Before installing welding equipment the user shall make an assessment of potential electromagnetic problems in the surrounding area. The following shall be taken into account:

a) other supply cables, control cables, signaling and telephone cables; above, below and adjacent to the welding equipment;
b) radio and television transmitters and receivers;
c) computer and other control equipment;
d) safety critical equipment, e.g., guarding of industrial equipment;
e) the health of the people around, e.g., the use of pacemakers and hearing aids;
f) equipment used for calibration or measurement;
g) the immunity of other equipment in the environment. The user shall ensure that other equipment being used in the environment is compatible. This may require additional protection measures;
h) the time of day that welding or other activities are to be carried out.

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ELECTROMAGNETIC COMPATIBILITY (EMC)

The size of the surrounding area to be considered will depend on the structure of the building and other activities that are taking place. The surrounding area may extend beyond the boundaries of the premises.

Methods of Reducing Emissions

Mains Supply
Welding equipment should be connected to the mains supply according to the manufacturer s recommendations. If interference occurs, it may be necessary to take additional precautions such as filtering of the mains supply. Consideration should be given to shielding the supply cable of permanently installed welding equipment, in metallic conduit or equivalent. Shielding should be electrically continuous throughout its length. The shielding should be connected to the welding power source so that good electrical contact is maintained between the conduit and the welding power source enclosure.

Maintenance of the Welding Equipment
The welding equipment should be routinely maintained according to the manufacturer s recommendations. All access and service doors and covers should be closed and properly fastened when the welding equipment is in operation. The welding equipment should not be modified in any way except for those changes and adjustments covered in the manufacturers instructions. In particular, the spark gaps of arc striking and stabilizing devices should be adjusted and maintained according to the manufacturer s recommendations.

Welding Cables
The welding cables should be kept as short as possible and should be positioned close together, running at or close to the floor level.

Equipotential Bonding
Bonding of all metallic components in the welding installation and adjacent to it should be considered. However, metallic components bonded to the work piece will increase the risk that the operator could receive a shock by touching these metallic components and the electrode at the same time. The operator should be insulated from all such bonded metallic components.

Earthing of the Workpiece
Where the workpiece is not bonded to earth for electrical safety, not connected to earth because of its size and position, e.g., ships hull or building steelwork, a connection bonding the workpiece to earth may reduce emissions in some, but not all instances. Care should be taken to prevent the earthing of the workpiece increasing the risk of injury to users, or damage to other electrical equipment. Where necessary, the connection of the workpiece to earth should be made by a direct connection to the workpiece, but in some countries where direct connection is not permitted, the bonding should be achieved by suitable capacitance, selected according to national regulations.

Screening and Shielding
Selective screening and shielding of other cables and equipment in the surrounding area may alleviate problems of interference. Screening of the entire welding installation may be considered for special applications.[1]

[1] Portions of the preceding text are contained in EN50199: "Electromagnetic Compatibility (EMC) product standard for arc welding equipment."

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Thank You —— for selecting a **QUALITY** product by Lincoln Electric. We want you to take pride in operating this Lincoln Electric Company product ••• as much pride as we have in bringing this product to you!

Please Examine Carton and Equipment For Damage Immediately

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.

Please record your equipment identification information below for future reference. This information can be found on your machine nameplate.

Model Name & Number _____

Code & Serial Number _____

Date of Purchase _____

Whenever you request replacement parts for or information on this equipment always supply the information you have recorded above.

Read this Operators Manual completely before attempting to use this equipment. Save this manual and keep it handy for quick reference. Pay particular attention to the safety instructions we have provided for your protection. The level of seriousness to be applied to each is explained below:

⚠ WARNING

This statement appears where the information **must** be followed **exactly** to avoid **serious personal injury** or **loss of life**.

⚠ CAUTION

This statement appears where the information **must** be followed to avoid **minor personal injury** or **damage to this equipment**.

TABLE OF CONTENTS

TECHNICAL SPECIFICATIONS CV-525 KA1454-1, KA1454-2

INPUT - THREE PHASE ONLY

Standard Voltage	Input Current at Rated Output			
	100% Duty Cycle	60% Duty Cycle	50% Duty Cycle	45% Duty Cycle
380-415V/50/60Hz (KA1454-1)	45	47	48	49
220/380-415/440V/50/60Hz (KA1454-2)	77/45/39	81/47/40	83/48/41	84/49/42

RATED OUTPUT

Duty Cycle	Amps	Volts at Rated Amperes
100% Duty Cycle	400	34
60% Duty Cycle	450	36.5
50% Duty Cycle	500	39
45% Duty Cycle	525	40.25

OUTPUT

Current Range	Maximum Open Circuit Voltage	Auxiliary Power
60-525	46	36VAC-10Amps for Gas Regulator use only

RECOMMENDED INPUT WIRE AND FUSE SIZES

INPUT VOLTAGE	FREQUENCY Hz	INPUT AMPERE RATING ON NAMEPLATE	TYPE 75°C COPPER WIRE IN CONDUIT AWG(IEC-MM²) SIZES 40°C (104°F) Ambient	TYPE 75°C GROUND WIRE IN CONDUIT AWG(IEC-MM²) SIZES	TYPE 75°C (SUPER LAG) OR BREAKER SIZE (AMPS)[1]
380-415V	50/60	50	6 (16)	8 (10)	100A
220/380-415/440V	50/60	86/50/43	4(25)/6(16)6(16)	6(16)/8(10)/8(10)	175A/100A/80A

PHYSICAL DIMENSIONS

HEIGHT	WIDTH	DEPTH	WEIGHT
27.5 in 699 mm	22.25 in 565 mm	32.0 in 813 mm	385 lbs. 175 kg.

[1]Also called “inverse time” or “thermal/magnetic” circuit breakers; circuit breakers which have a delay in tripping action that decreases as the magnitude of the current increases.

Read entire installation section before starting installation.

SAFETY PRECAUTIONS

⚠ WARNING

ELECTRIC SHOCK can kill.
•Only qualified personnel should perform this installation.
•Turn the input power OFF at the disconnect switch or fuse box before working on this equipment.

- **Turn the Power switch on the CV-525 "OFF" before connecting or disconnecting output cables, wire feeder or remote connections, or other equipment.**
- **Do not touch electrically hot parts.**
- **Always connect the Idealarc CV-525 grounding terminal (located on the welder near the reconnect panel) to a good electrical earth ground.**

SELECT SUITABLE LOCATION

The machine should be located in a clean, dry place where there is free circulation of clean air such that air movement in through the front and out through the back will not be restricted. Dirt and dust that can be drawn into the machine should be kept to a minimum. Failure to observe these precautions can result in excessive operating temperatures and nuisance shutdown of the machine.

APPLICATION LIMITATIONS

There are no provisions on the CV-525 for paralleling, and outdoor operations without rain sheltering is not recommended.

STACKING

⚠ WARNING

FALLING EQUIPMENT can cause injury.
• Do not lift this machine using lift bale if it is equipped with a heavy accessory such as trailer or gas cylinder.

- **Lift only with equipment of adequate lifting capacity.**
- **Be sure machine is stable when lifting.**
- **Do not stack more than three high.**
- **Do not stack the CV-525 on top of any other machine.**

The units may be stacked three high by observing the following safety precautions.

A. Make sure the first or bottom unit is setting on a level, well supported surface.

B. The units must be stacked with their fronts flush, making sure the two holes in the base rails of the unit being stacked on top are over the two holes located on the top front corners of the unit it is being stacked on. Fasten the units together with 8mm diameter bolts, nuts and lockwashers through these holes.

C. Remove fastening bolts before lifting unit off stacks.

INPUT POWER CONNECTIONS

By removing the rear access panel the three phase input power is connected to the three line terminals on the input contactor, and the earth grounding lead to the grounding terminal on the input box floor marked with the ⏚ symbol.

⚠ CAUTION

Failure to follow these instructions can cause immediate failure of components within the machine.
When powering welder from a generator be sure to turn off the welder first, before generator is shut down in order to prevent damage to welder.

OUTPUT CABLE CONNECTIONS

The output terminals are marked "+" and "-". The CV 525 provides stud connection for cable lugs.

OUTPUT CABLES

CABLE SIZES FOR COMBINED LENGTH OF ELECTRODE AND WORK CABLE

CABLE LENGTHS	MACHINE LOAD	
	400A (100% DUTY CYCLE)	500A (50% DUTY CYCLE)
UP TO 50 ft (15m)	3/0 85 mm²	2/0 67 mm²
50 to 100 ft (15-30 m)	3/0 85 mm²	2/0 67 mm²
100-150 ft (30-46 m)	3/0 85 mm²	3/0 85 mm²
150-200 ft (46-61 m)	3/0 85 mm²	3/0 85 mm²
200-250 ft (67-76 m)	4/0 107 mm²	4/0 107 mm²

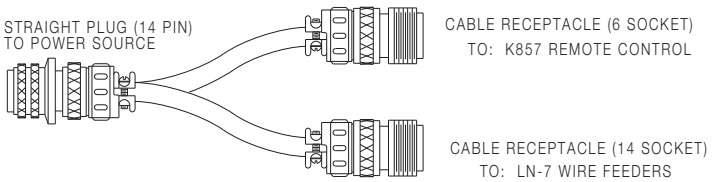
INSTALLATION OF FIELD INSTALLED OPTIONS

REMOTE OUTPUT CONTROL (K857 WITH K864 ADAPTER OR K775)

Extreme caution must be observed when installing or extending the wiring of a remote control. Improper connection of this unit can lead to loss of control and/or poor welding. Only the green lead can and should be grounded to the machine case. When extending the standard remote control, make sure the leads are the same and the splice is waterproof. Be very careful not to ground the cable when in use and don't let the lugs touch against the case.

The K857 has a 6-pin MS-style connector. The K857 requires a K864 adapter cable which connects to the 14-pin connector on the machine.

REMOTE CONTROL ADAPTER CABLE (K864)



A "V" cable 12" (.30m) long to connect a K857 Remote Control (6 pin connector) with a wire-feeder (14-pin connector) and the machine (14-pin connector). If a remote control is used alone the wire-feeder connection is then not used.

⚠ WARNING

ELECTRIC SHOCK can kill.

• Turn the power switch of the welding power source "OFF" before installing plugs on cables or when connecting or disconnecting plugs to welding power source.

CAPACITOR DISCHARGE CIRCUIT (K828-1)

This circuit mounts inside the CV-525 and is Recommended when:

1) CV-525 is used in conjunction with any LN-23P or older LN-8 or LN-9 semiautomatic wire-feeder. Eliminates possible arc flash re-start of weld when trigger interlock is used. Not required with current LN-8 (above Code 8700), or LN-9's with serial numbers above 115187 (manufactured after 12/83), or any LN-9 having an L6043-1 Power PC Board.

2) CV-525 is used with an LN-22 equipped with an older K279 Contactor-Voltage Control Option. Eliminates electrode overrun when gun trigger is released. Not required when later K279 (above Code 8800) is used.

3) CV-525 is used with any semiautomatic wire-feeder and possible small spark, if electrode touches work just after gun trigger is released, is objectionable.
Install per M17060 instructions included with the Kit.

Installation of Equipment Required for Recommended Processes

Note: Only one wire feeder should be connected to the CV-525 power source. If two or more are connected to the CV-525 power source it will not work properly.

WIRE FEEDER CONTROL CABLE CONNECTIONS

For control cable with WF-L(14-pin) connector:

Connect control cable to WF-L connector on the front panel of the machine labeled WF-L. See the appropriate connection diagram for the exact instructions for the wire feeder being used. Refer to “115VAC and 42VAC Auxiliary Power and Control Connections” section for connector pin functions.

A cover (Lincoln Electric Part Number S17062-3) is available for the unused WF-L connector to protect it against dirt and moisture.

CONNECTION OF CV-525 TO LN-22 OR LN-25

a) Turn off all power.

b) Connect a jumper between pins “C to D” in WF-L connector plug, (a K484 14-pin jumper plug is available).

c) Connect the electrode cable to the output terminal of polarity required by electrode. Connect the work lead to the other terminal.

d) Place the OUTPUT CONTROL Switch at “LOCAL” position unless a Remote Control is connected to the CV-525.

NOTE: The output terminals are energized at all times.

The Feeder Ready LED will stay off when a wire feeder is connected to the WF-L connector.

CONNECTION OF CV-525 TO ARCWELD AWF FEEDERS, OR PANASONIC STYLE / OTC STYLE WIRE FEEDERS.

a) Turn off all power.

b) Connect the ARCWELD AWF or Panasonic Style wire feeder to WF-AWF/P receptacle. Connect OTC style wire feeder to WF-O receptacle.

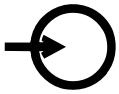
c) Place the output control switch to the “REMOTE” position.

d) Turn on the input power. The Feeder Ready LED should lit up if one of the wire feeders listed in step (b) is connected correctly to the CV-525.

MEANINGS OF GRAPHIC SYMBOLS

The CV-525 nameplate has been designed to use international symbols in describing the function of the various components. Below are the symbols used.

POWER ON-OFF SWITCH

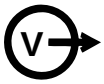


Input (Power)

On

Off

OUTPUT CONTROL DIAL



Output Voltage Control (Export Model)

Increase / Decrease of Output Voltage

OUTPUT CONTROL "LOCAL-REMOTE" SWITCH

Remote Output Voltage Control

Local Output Voltage Control

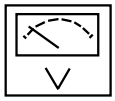
CIRCUIT BREAKER

Circuit Breaker

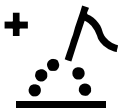
THERMAL PROTECTION LIGHT

High Temperature

VOLTMETER SWITCH



Voltmeter



Positive Electrode

Negative Electrode

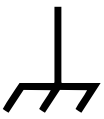
WARNING IDENTIFICATION

Warning Identification

EARTH GROUND CONNECTION

Signifying the Earth (Ground) Connection

CHASSIS GROUND CONNECTION

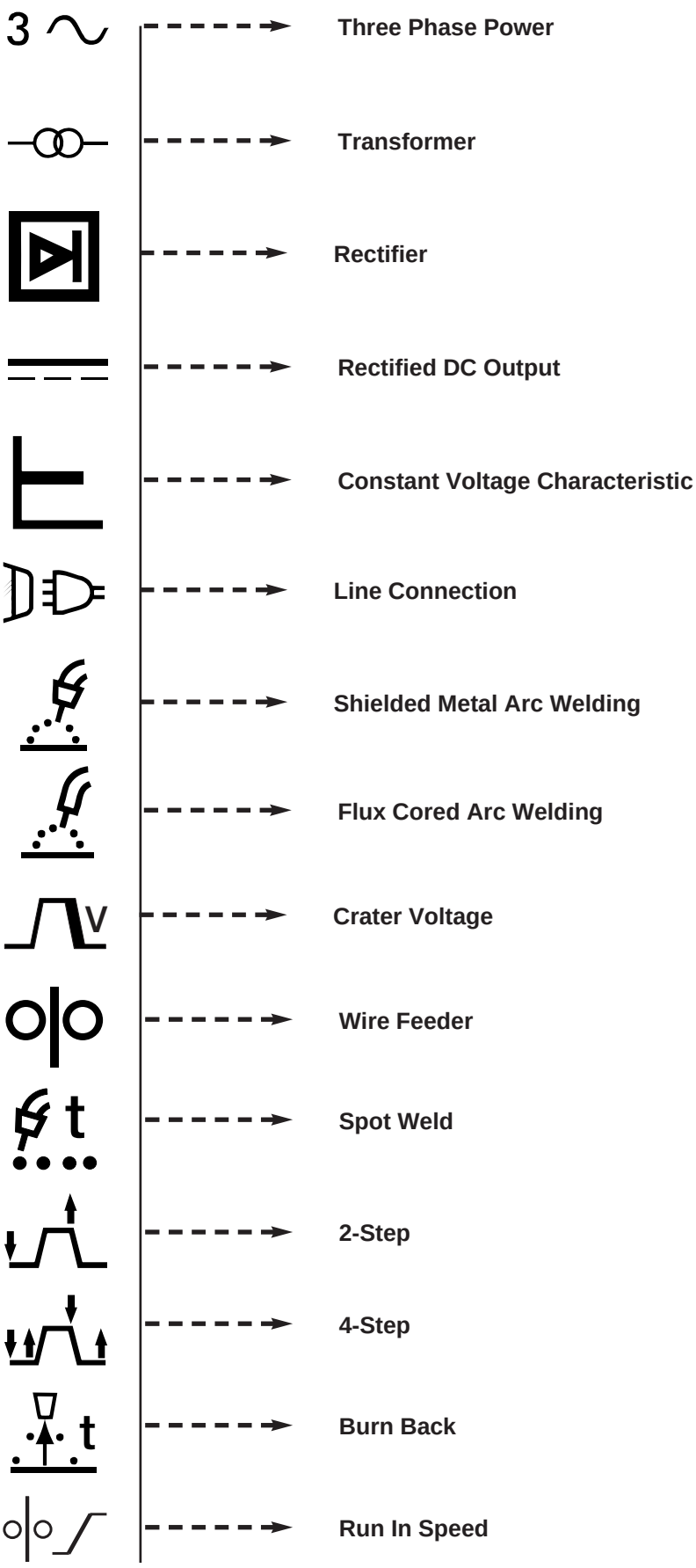


Signifying the Chassis (Ground) Connection

SYMBOLS USED ON NAMEPLATES, AREAS ON THE MACHINE AND IN THIS MANUAL

Gas Purge

Crater Current


3
Three Phase Power
Transformer
Rectifier
Rectified DC Output
Constant Voltage Characteristic
Line Connection
Shielded Metal Arc Welding
Flux Cored Arc Welding
V
Crater Voltage
Wire Feeder
t
Spot Weld
2-Step
4-Step
t
Burn Back
Run In Speed

SAFETY PRECAUTIONS

Read and understand this entire section before operating the machine.

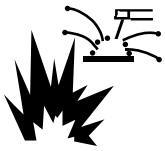
⚠ WARNING

ELECTRIC SHOCK can kill.

- Do not touch electrically live parts or electrode with skin or wet clothing.
- Insulate yourself from work and ground.
- Always wear dry insulating gloves.

FUMES AND GASES can be dangerous.

- Keep your head out of fumes.
- Use ventilation or exhaust to remove fumes from breathing zone.



WELDING SPARKS can cause fire or explosion

- Keep flammable material away.
- Do not weld on containers that have held combustibles.

ARC RAYS can burn.

- Wear eye, ear and body protection.

Observe additional Safety Guidelines detailed throughout this manual.

GENERAL DESCRIPTION

The CV-525 is an SCR controlled DC power source with a single range potentiometer control of the voltage output. The primary voltage is 380-415VAC 50/60Hz for single input voltage machine and 220/380-415/440V 50/60Hz for triple input voltage machine. The power source complies with IEC 60974-1 requirements.

The CV-525 base model is shipped with a standard control panel and an advanced control panel is available as field-installed option. The main new feature of this product is it works with Arcweld AWF wire feeders, Panasonic and OTC style cable-driven wire feeders as well as Lincoln's standard wire feeders. Control functions like Gas Purge, 2T/4T trigger, and Crater Fill Settings are part of the front Panel for Arcweld AWF wire feeders. The control functions on the optional panel include Spot Weld ON/OFF and Timer, Run-in Speed Setting, and Burn-back Timer.

CV-525 interface with Panasonic style or OTC style wire feeder through two different 6-pin connectors labeled as WF-AWF/P and WF-O. Cold inch, wire feed speed and arc voltage can be set on their feeder control panel. Cold inch, wire feed speed, arc voltage and gas purge can all be set remotely on the feeder control panel of the Arcweld AWF wire feeder. The plug-in of a Panasonic style or OTC style wire feeder will be auto-sensed and indicated with the feeder ready light on the front panel.

A receptacle of 36VAC auxiliary power and a circuit breaker are located at the back of the machine for gas heaters.

RECOMMENDED PROCESSES & EQUIPMENT

The CV-525 is recommended for use with all the procedures of solid wire Gas Metal-Arc, cored wire outershield GMA as well as Innershield process within its capacity of 60 to 525 amps.

This power source is designed to work with Lincoln's Automatic wire feeders and semiautomatic wire feeders with the control cable having a 14 pin Amphenol connector. It is also designed to work with the cable-driven Panasonic style, OTC style wire feeders and the Arcweld AWF wire feeder AWF-2 and AWF-4.

ARC CHARACTERISTICS

Through the unique combination of the transformer, three phase semiconverter rectifier, capacitor bank, and output choke design, in conjunction with the solid state control system, an outstanding constant voltage welding performance is achieved with a fixed pinch setting optimized for the most popular arc characteristics.

INPUT CONTACTOR

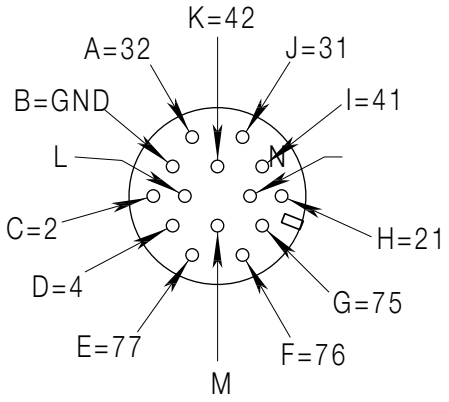
The power source is equipped with an input contactor.

115 VAC and 42 VAC AUXILIARY POWER AND CONTROL CONNECTIONS

14-Pin Connector

The power source is equipped to furnish nominally 115 volt AC and 42 volt AC auxiliary power for operating wire feeding equipment, etc. The auxiliary power is available at the 14-pin MS-style connector receptacle on the control panel 115V AC is available at receptacle pins A and J. 42V AC is available at receptacle pins I and K. The 115V AC and the 42V AC are isolated circuits and each is protected by a 10 amp circuit breaker. A toggle switch on the control panel selects 115V AC or 42V AC to the receptacle.

FRONT VIEW OF 14-PIN CONNECTOR RECEPTACLE



PIN	LEAD NO.	FUNCTION
A	32	115 VAC (Export Model Only)
B	GND	Chassis Connection
C	2	Trigger Circuit
D	4	Trigger Circuit
E	77	Output Control
F	76	Output Control
G	75	Output Control
H	21	Work Connection
I	41	42 VAC
J	31	115 VAC (Export Model Only)
K	42	42 VAC
L	---	---
M	---	---
N	---	---

REMOTE CONTROL CONNECTIONS

Remote control connections are available both at a 14-pin connector receptacle located on the control panel for standard Lincoln wire feeders and the two 6-pin receptacles for Asian style wire feeders.

GAS HEATER CONNECTOR

A standard 3-pin receptacle located on the rear panel for supplying 36VAC to a gas heater. A 10 amp circuit breaker which is also located on the rear panel protects this circuit.

OUTPUT CONNECTIONS

The output terminals are recessed on the case front and labeled "**+**" and "**-**". The CV-525 provides stud terminals for output cables.

INPUT CONNECTIONS (See Table B.1)

The three input lines are brought in through the rear panel of the power source and attached to the input contactor. Removal of the removable access panel makes the contactor accessible for the input cable connections.

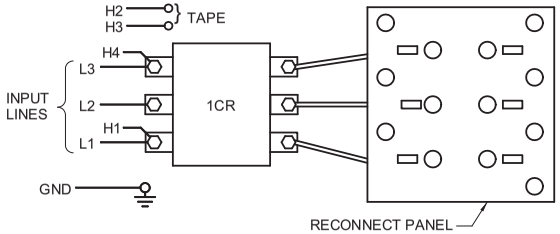
INPUT LINE VOLTAGE COMPENSATION

The power source is equipped with input line voltage compensation as standard. For a line voltage fluctuation of ±10% the output will remain essentially constant. This is accomplished through the feedback network in the control circuit.

TABLE B.1

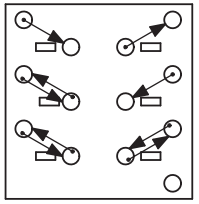
INPUT SUPPLY CONNECTION DIAGRAM

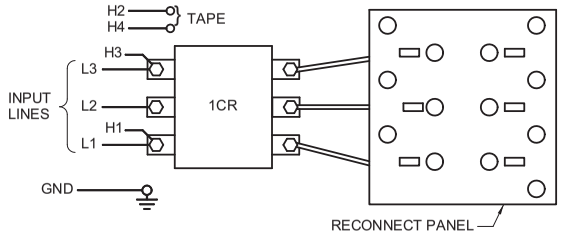
CAUTION: ALL INPUT POWER MUST BE ELECTRICALLY DISCONNECTED BEFORE TOUCHING PANEL. NOTE: MACHINES ARE SHIPPED FROM FACTORY CONNECTED FOR HIGHEST VOLTAGE.



CONNECTION FOR 460 VOLTS 50/60Hz.

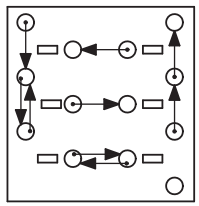
1/ ON RECONNECT PANEL, LOOSEN ALL HEX BOLTS, PULL BACK MOVABLE LINKS, AND ROTATE LINKS TO THEIR NEW POSITIONS. POPSITION EACH LINK BETWEEN THE WIRE TERMINAL AND HEX BOLT, PUSH THE LINK COMPLETELY FORWARD, SECURELY TIGHTEN ALL HEX BOLTS. DO NOT REMOVE HEX BOLTS AT ANY TIME.
2/ CONNECT L1, L2 & L3 INPUT SUPPLY LINES & H1 & H4 CONTROL TRANSFORMER LEADS TO INPUT SIDE OF 1CR STARTER AS SHOWN.
3/ INSULATE THE UNUSED H2, H3 LEAD TERMINALS WITH ADEQUATE TAPE TO PROVIDE AT LEAST 600V. INSULATION.
4/ CONNECT TERMINAL MARKED ⏚ TO GROUND PER NATIONAL ELECTRICAL CODE.

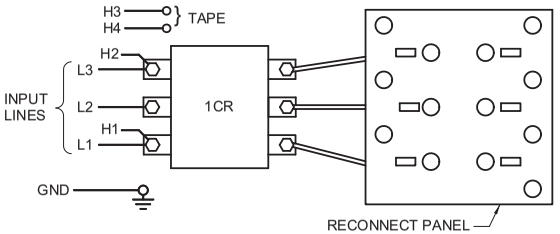

LINK POSITIONS



CONNECTION FOR 380-415 VOLTS 50/60Hz.

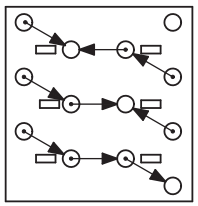
1/ ON RECONNECT PANEL, LOOSEN ALL HEX BOLTS, PULL BACK MOVABLE LINKS, AND ROTATE LINKS TO THEIR NEW POSITIONS. POPSITION EACH LINK BETWEEN THE WIRE TERMINAL AND HEX BOLT, PUSH THE LINK COMPLETELY FORWARD, SECURELY TIGHTEN ALL HEX BOLTS. DO NOT REMOVE HEX BOLTS AT ANY TIME.
2/ CONNECT L1, L2 & L3 INPUT SUPPLY LINES & H1 & H4 CONTROL TRANSFORMER LEADS TO INPUT SIDE OF 1CR STARTER AS SHOWN.
3/ INSULATE THE UNUSED H2, H4 LEAD TERMINALS WITH ADEQUATE TAPE TO PROVIDE AT LEAST 600V. INSULATION.
4/ CONNECT TERMINAL MARKED ⏚ TO GROUND PER NATIONAL ELECTRICAL CODE.


LINK POSITIONS



CONNECTION FOR 230 VOLTS 50/60Hz.

1/ ON RECONNECT PANEL, LOOSEN ALL HEX BOLTS, PULL BACK MOVABLE LINKS, AND ROTATE LINKS TO THEIR NEW POSITIONS. POPSITION EACH LINK BETWEEN THE WIRE TERMINAL AND HEX BOLT, PUSH THE LINK COMPLETELY FORWARD, SECURELY TIGHTEN ALL HEX BOLTS. DO NOT REMOVE HEX BOLTS AT ANY TIME.
2/ CONNECT L1, L2 & L3 INPUT SUPPLY LINES & H1 & H4 CONTROL TRANSFORMER LEADS TO INPUT SIDE OF 1CR STARTER AS SHOWN.
3/ INSULATE THE UNUSED H3, H4 LEAD TERMINALS WITH ADEQUATE TAPE TO PROVIDE AT LEAST 600V. INSULATION.
4/ CONNECT TERMINAL MARKED ⏚ TO GROUND PER NATIONAL ELECTRICAL CODE.


LINK POSITIONS

FOR TRANSFORMER LEAD CONNECTIONS REFER AS3324


MOVABLE LINK POSITIONS INDICATED BY ARROWED LINE

THE LINCOLN ELECTRIC CO., AUSTRALIA (PTY.LTD.)	A18-9-02M	AM3237-1

CV-525

SOLID STATE OUTPUT CONTROL

The output of the welder is electronically controlled by SCR's instead of mechanical contactors, providing extra long life for highly repetitive welding applications.

SOLID STATE CONTROL SYSTEM

The Control PC Board is located behind the control panel which hinges down for easy access to the board. The Snubber PC Board is mounted on the back of the case front. The feeder interface board and the motor drive board are located next to the control PC board.

MACHINE COOLING

The fan pulls air in through the louvered front of the machine over the internal parts and exhausts out the louvered rear of the machine. The fan motor is fully enclosed, has sealed ball bearings, requires no lubrication, and operates when the power switch is turned on.

CASE FEATURES

The machine depth is 813mm. The low profile case facilitates installation of the machine under a workbench and stacking the machines three high to conserve floor space.

The case front incorporates a recessed hinged control panel where all the machine controls are mounted. This recessed panel protects the controls and minimizes the possibilities of accidental contact. This control panel can be easily opened to permit access to the enclosed section which PC boards. The output lead terminals are also recessed to avoid any object or person accidentally coming in contact with an output terminal.

The individual case sides are removable for easy access for internal service or inspection. These are removable even though the machines are stacked three high.

The case rear, top section, is equipped with a removable access panel. This provides easy access to the input contactor, easy connection and reconnection of input leads, and easy access for service or inspection.

Although the machine is designed for use in rain-sheltered environments, the transformer and choke assembly are dipped in a special corrosion resistant epoxy paint.

A permanent lifting hook is located at the top of the machine and is positioned so that it acts as nearly as possible through the center of gravity. This lift hook is so positioned that it fits without interference under the base of the second machine when stacking.

PARALLELING

There are no provisions on the CV-525 to permit paralleling.

DIODE OPTION (Factory installed only)

The CV-525 Diode option is required to utilize the cold start and cold electrode sensing features of the NA-3, NA-5 or NA-5R. When this option is not used with an NA-3, NA-5 or NA-5R, see the CV-525 / NA-3, CV-525 / NA-5 or CV-525 / NA-5R connection diagram for instructions on how to disable this circuit. If the circuit is not disabled, the wire cannot be inched down.

MACHINE & CIRCUIT PROTECTION (THERMAL PROTECTION LIGHT)

The power source is thermostatically protected with proximity thermostats against overload or insufficient cooling. One thermostat is located on the nose of the center bottom primary coil and a second thermostat is attached to the lead connecting the secondaries. Both thermostats are connected in a series with the 2-4 circuit. If the machine is overloaded, the primary thermostat will open, the output will be zero, and the thermal protection light will be on; the fan will continue to run. The secondary thermostat will open either with an excessive overload or insufficient cooling. The output will be zero and the protection light will be on; the fan will continue to run. When the thermostats reset the protection light will be off.

The power source is also protected against overloads on the SCR bridge assembly through an electronic protection circuit. This circuit senses an overload on the power source and limits the output to 550 amps by phasing back the SCR's.

Protection is provided to protect the circuitry from accidental grounds. If the customer accidentally "grounds" 75, 76, or 77 to the positive output lead, the output will be reduced to a low value, thus preventing any damage to the machine. If the ground occurs between 75, 76, 77 and the negative output lead, one of the PC board "self-restoring" fuses will blow, preventing any machine damage. After the ground is cleared, the fuses automatically reset within a few seconds.

POWER SOURCE OPERATION

When using a CV-525 power source with wire feeders, there will be a small spark if the electrode contacts the work or ground within several seconds after releasing the trigger.

When used with some wire feeders with the electrical trigger interlock in the ON position, the arc can restart if the electrode touches the work or ground during these several seconds.

The power source is also protected against overloads on the SCR bridge assembly through an electronic protection circuit. This circuit senses an overload on the power source and limits the output to 550 amps by phasing back the SCR's.

Duty Cycle and Time Period
The CV-525 is rated at the following duty cycles:

Duty Cycle*	Amps	Volts
100%	400	34
60%	450	36.5
50%	500	39
45%	525	40.25

* Based upon a 10 minute time period. (i.e., for 60% duty cycle, it is 6 minutes on and 4 minutes off).

Overloading the power source may result in opening of an internal protective thermostat as indicated by the amber thermal protection light turning on.

STARTING THE MACHINE

The POWER toggle switch at the extreme right side of the control panel in the " I " position energizes and closes the three phase input contactor from a 115 volt auxiliary transformer. This in turn energizes the main power transformer.

The machine is de-energized when the POWER switch is in the "0" position.

The white light next to the POWER switch indicates when the input contactor is energized.

CONTROL SETTINGS & DESCRIPTIONS

The CV525 basic front panel contains following control features: power on/off switch, local/remote select switch, 2 step/4 step select switch, gas purge switch, 42V/115V select switch, voltmeter switch, 42V and 115V circuit breakers, local output potentiometer, and crater current and crater voltage potentiometers. Displays include analog current & voltage meters, pilot light, thermal light and feeder ready light. The three feeder receptacles are for Lincoln's existing wire feeders, ARCWELD AWF wire feeder/Panasonic style and OTC style wire feeders. The control components are described below:(See Figure B.1)

1. POWER ON/OFF SWITCH
   The power ON/OFF switch controls the input contactor through a 115V power supply of the auxiliary transformer.

2. Pilot Light
   The white neon pilot light indicates if the power source input contactor is closed.

3. 42VAC CIRCUIT BREAKER
   The 42VAC auxiliary power is protected with a 10 Amp circuit breaker in series.

4. 115VAC CIRCUIT BREAKER
   The 115VAC auxiliary power is protected with a 10 Amp circuit breaker in series.

5. CRATER VOLTAGE CONTROL
   Crater voltage can be set with this potentiometer on the power source. This function can also be used as dual procedure during welding.

6. CRATER CURRENT CONTROL
   Crater current can be set with this potentiometer on the power source. This function can also be used as dual procedure during welding.

7. VOLTMETER SWITCH
   The voltage switch connects either the "+" stud or the "-" stud to the remote work sensing lead (#21) of the automatic or semiautomatic equipment.

8. 2-STEP / 4-STEP TRIGGER SWITCH
   The output is on only when trigger is pressed in 2-step Mode operation. 4-Step trigger mode eliminates the need to hold the gun trigger closed while welding. The second trigger-pull in 4-step mode also activates the crater current and crater voltage settings.

9. GAS PURGE SWITCH
   Gas Purge energizes the gas solenoid valve in the Arcweld AWF, Panasonic style or OTC style wire feeder.

10. THERMAL PROTECTION LIGHT
    The amber thermal protection light indicates if either of the two protective thermostats has opened. Output power will be removed when the light is ON.

11. FEEDER READY LIGHT
The feeder ready light (green) will illuminate steady (READY) when a wire feeder is correctly plugged into one of the six pin connections labeled as WF-AWF/P, WF-O and there is NO system fault. Otherwise, it will "BLINK" to indicate an average current shutdown fault or a ground loop protection fault has occurred, or no light if there is no wire feeder plugged into the six pin connections.

12. WF-AWF/P FEEDER CONNECTION
This connection is a 6-pin receptacle for a Wire Feeder - (ARCWELD AWF wire feeder or Panasonic style feeder cable connection)

13. WF-O FEEDER CONNECTION

This connection is a 6-pin receptacle for a Wire Feeder - (OTC style feeder cable connection)

14. WF-L FEEDER CONNECTIONS
This connection is a Lincoln standard 14-pin receptacle for a Wire Feeder - (Lincoln standard feeder cable connection)

15. 42V/115V SELECT SWITCH
The 42V/115V select switch provides the 115VAC or 42VAC auxiliary power to the 14-pin receptacle one at a time in order to satisfy the creepage distance requirement of IEC 60974-1. It should be selected based on the input voltage requirement of the wire feeder.

16. ANALOG CURRENT METER
The analog current meter is a standard component on the CV525 indicates the output current.

17. Analog Voltage Meter
The analog voltage meters is a standard component on the CV525 indicates the output voltage.

18. LOCAL/REMOTE OUTPUT CONTROL SWITCH
This switch selects the control mode of the output voltage, either at the power source "LOCAL" or at the wire feeder/remote control box "REMOTE".

19. ARC VOLTAGE CONTROL
Arc voltage can be set from the power source through the 10K potentiometer, which is calibrated from 1 to 10.

OPTIONAL CONTROL PANEL
The following optional control features are not included with the CV525, but come with a optional control panel. The optional kit has these controls mounted on a panel that are easily connect to the feeder interface PC Board with one connector.

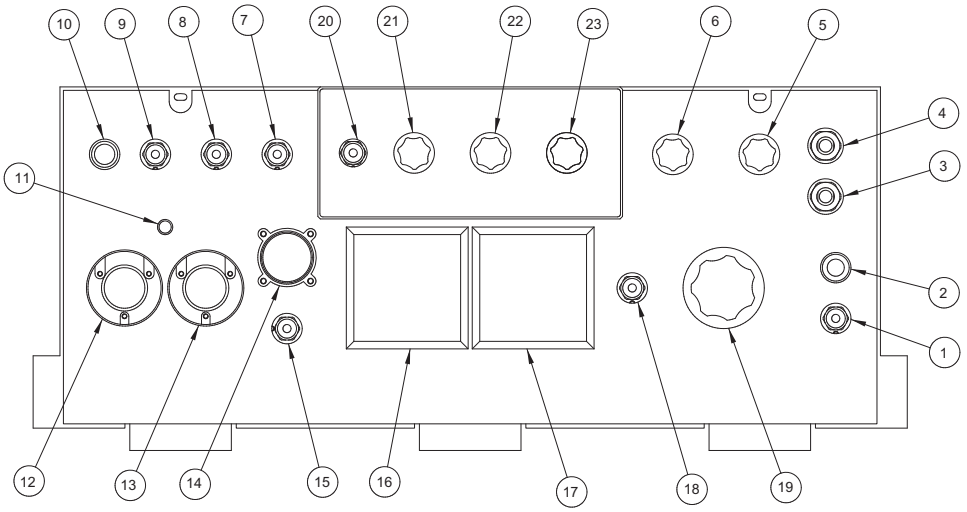
20. SPOT WELD ON/OFF SWITCH
Spot weld feature allows a single timed weld cycle each time the gun trigger is held closed. The Spot Weld ON/OFF switch turns these controls "ON" or "OFF"

21. SPOT WELD TIMER CONTROL
The Spot Weld Timer Control adjusts the spot weld duration between 0.25 – 5 seconds. The control is calibrated from 1 to 10.

22. RUN-IN SPEED CONTROL
The Run-In Speed Control allows having a slower wire speed before the arc strikes for starting optimization. The control is calibrated from 1 to 10, which corresponds to the percentage of the wire speed feed preset at the wire feeder. 10 would be 100% of the preset wire feed speed, 5 would be 50% of the preset wire feed speed and 1 would be the minimum wire feed speed of the feeder.

23. BURN-BACK TIMER CONTROL
Burn-Back function provides a time delay between stopping the wire feed and turning off the arc power at the end of the weld. It allows the wire to be burned off and prevents it from sticking in the weld. The delay is adjustable from 0.05 to 0.5 second with the Burn-Back Timer Control, depending on wire size and process. The control is calibrated from 1 to 10.

FIGURE B.1



CONTROL FEATURES ON FEEDER INTERFACE BOARD

1. ADJUSTABLE PRE-FLOW TIMES -The pre-flow time can be set through R540 Pre-flow trimmer on the board as 0.05 - 1 second. The factory pre-set value of the pre-flow time is 0.2 seconds.

2. ADJUSTABLE POST-FLOW TIMES -The post-flow time can be set through R496 Postflow trimmer on the board as 0.05 - 5 seconds. The factory pre-set value of the postflow time is 2 seconds.

3. ADJUSTABLE BURN-BACK TIME-The burn-back time can be set through R539 Burn-back trimmer on the board as 0.05 – 0.5 second when the optional control board is not installed. Otherwise it is disabled. The factory Pre-set value of the burn-back time is 0.5 seconds.

See Figure B.2 for trimmer location.

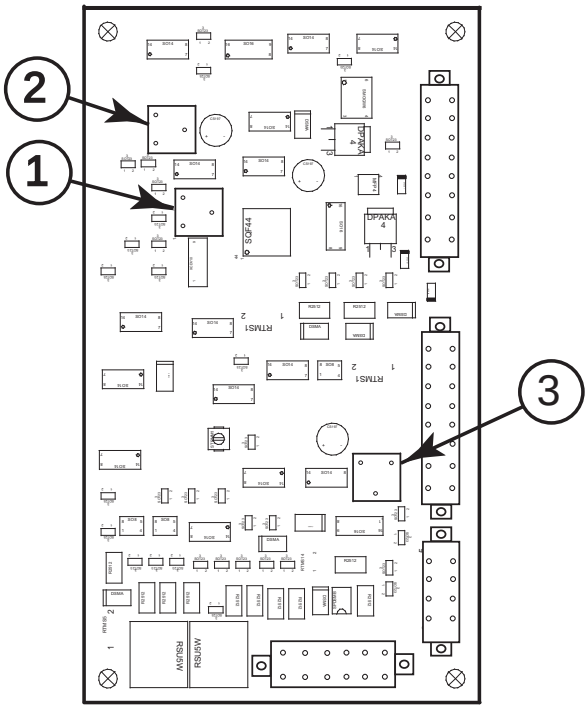


FIGURE B.2

4. FIXED RUN-IN SPEED
   The run-in speed will be 50% of the WFS presetting when the optional control board is not installed. Otherwise it is disabled.

5. FIXED BURN-BACK OUTPUT LEVEL
   The voltage output is reduced to 67% of the preset level during burn-back time. It minimizes the ball size at the front of the wire.

The CV-525 can be used to power any of the following Lincoln Wire feeders:

SEMI-AUTOMATIC WIRE FEEDERS

- LN-9*
- LN-7 GMA*
- LN-742
- LN-7
- Arcweld AWF-2
- Arcweld AWF-4
- Panasonic-style wire feeder
- OTC-style wire feeder
- LN-9 GMA
- LN-23P
- LN-25
- LN-8

AUTOMATIC WIRE FEEDERS#

- NA-3
- NA-5
- NA-5R

"Cold starting for sub-arc cannot be used. (It must be jumpered out. See Auto Feeder manual)

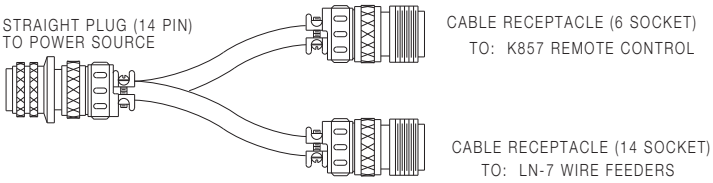
FIELD INSTALLED OPTIONS

REMOTE OUTPUT CONTROL K857 WITH K864 ADAPTER)

The K857 has a 6-pin MS-style connector. The K857 requires a K864 adapter cable which connects to the WF-L(14-pin) connector on the CV-525.

REMOTE CONTROL ADAPTER CABLE (K864)

A "V" cable 12" (.30m) long to connect a K857



Remote Control (6 pin connector) with a wire-feeder (14-pin connector) and the machine (14-pin connector). If a remote control is used alone the wire-feeder connection is then not used.

UNDERCARRIAGES (K817P, K841)

For easy moving of the machine, optional undercarriages are available with polyolefin wheels (K817P) or a platform undercarriage (K841) with mountings for two gas cylinders at rear of welder.

Install per instructions provided with undercarriage.

SAFETY PRECAUTIONS

⚠ WARNING

ELECTRIC SHOCK can kill.

- Only qualified personnel should perform this maintenance.
- Turn the input power OFF at the disconnect switch or fuse box before working on this equipment.
- Do not touch electrically hot parts.

GENERAL MAINTENANCE

1. The fan motor has sealed bearings which require no service.
2. In extremely dusty locations, dirt may restrict the cooling air causing the welder to run hot with premature tripping of thermal protection. Blow out the welder with low pressure air at regular intervals to eliminate excessive dirt and dust build-up on internal parts.
3. Periodically check the welding cables. Inspect for any slits or punctures. Also make sure that all connections are tight.

HOW TO USE TROUBLESHOOTING GUIDE

⚠ WARNING

Service and Repair should only be performed by Lincoln Electric Factory Trained Personnel. Unauthorized repairs performed on this equipment may result in danger to the technician and machine operator and will invalidate your factory warranty. For your safety and to avoid Electrical Shock, please observe all safety notes and precautions detailed throughout this manual.

This Troubleshooting Guide is provided to help you locate and repair possible machine malfunctions. Simply follow the three-step procedure listed below.

Step 1. LOCATE PROBLEM (SYMPTOM).
Look under the column labeled "PROBLEM (SYMPTOMS)". This column describes possible symptoms that the machine may exhibit. Find the listing that best describes the symptom that the machine is exhibiting.

Step 2. POSSIBLE CAUSE.
The second column labeled "POSSIBLE CAUSE" lists the obvious external possibilities that may contribute to the machine symptom.

Step 3. RECOMMENDED COURSE OF ACTION
This column provides a course of action for the Possible Cause, generally it states to contact your local Lincoln Authorized Field Service Facility.

If you do not understand or are unable to perform the Recommended Course of Action safely, contact your local Lincoln Authorized Field Service Facility.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your Local Lincoln Authorized Field Service Facility for technical troubleshooting assistance before you proceed.

Observe all Safety Guidelines detailed througout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENTS(S)	RECOMMENDED COURSE OF ACTION
PROBLEMS		
Input contactor (CR1) chatters.	1. Faulty input contactor (CR1). 2. Low line voltage.	If all recommended possible areas of misadjustments have been checked and the problem persists, **contact your local Lincoln Authorized Field Service Facility.**
Machine input contactor does not operate.	1. Supply line fuse blown. 2. Contactor power circuit dead. 3. Broken power lead. 4. Wrong input voltage. 5. Open input contactor coil. 6. POWER “I/O” switch (S1) not closing.	
Machine input contactor operates, but no output when trying to weld.	1. Circuit between #2 (C) and #4 (D) is not being closed. 2. Electrode or work lead loose or broken. 3. Open main transformer (T1) primary or secondary circuit. 4. Defective Control PC Board. 5. Primary or secondary thermostats open.	
Output control not functioning on the machine.	1. Output Control “Local-Remote” switch (S2) in wrong position. 2. Faulty Output Control switch. 3. Faulty Output Control potentiometer. 4. Leads or connections open in control circuit. 5. Faulty Control PC Board.	

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your Local Lincoln Authorized Field Service Facility for technical troubleshooting assistance before you proceed.

Observe all Safety Guidelines detailed througout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENTS(S)	RECOMMENDED COURSE OF ACTION
PROBLEMS		
Machine has low output and no control.	1. Output Control “Local-Remote” switch (S2) in wrong position. 2. Output Control switch faulty. 3. Open in feedback circuitry. 4. Faulty Control PC Board. 5. Output control potentiometer circuit open (Lead 75).	If all recommended possible areas of misadjustments have been checked and the problem persists, **contact your local Lincoln Authorized Field Service Facility.**
Machine does not have maximum output.	1. One input fuse blown. 2. One phase of main transformer open. 3. Faulty Control PC Board. 4. Output control potentiometer defective. 5. Output control potentiometer Leads 210, 211, or 75 open.	
Machine will not shut off.	1. Input contactor contacts frozen. 2. Defective Power “I/O” switch, (S1).	
Variable or sluggish welding arc.	1. Poor work or electrode connection. 2. Welding leads too small. 3. Welding current or voltage too low. 4. Defective main SCR bridge.	

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your Local Lincoln Authorized Field Service Facility for technical troubleshooting assistance before you proceed.

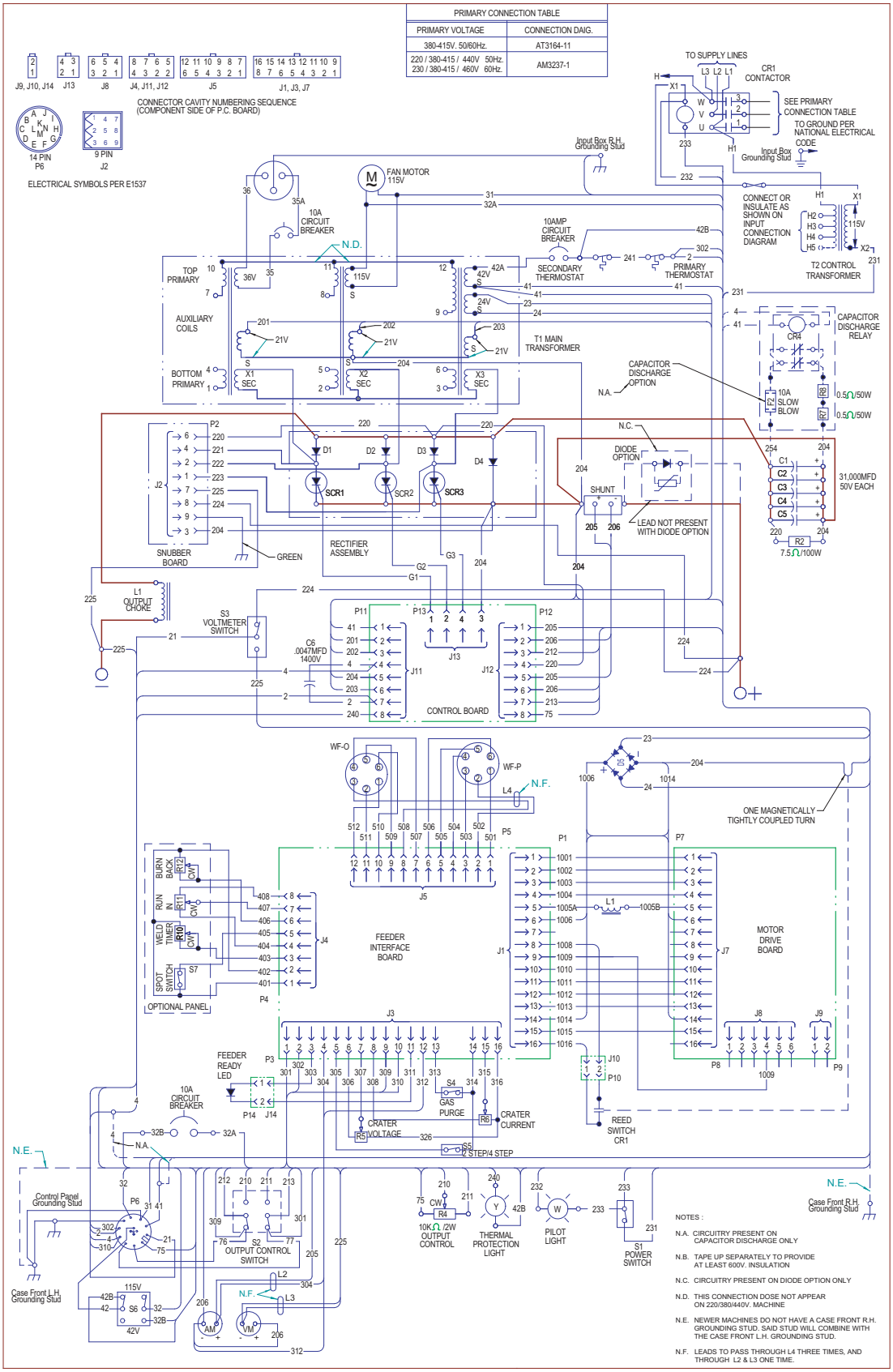
Observe all Safety Guidelines detailed througout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENTS(S)	RECOMMENDED COURSE OF ACTION
PROBLEMS		
Output control not functioning on “Remote” control.	1. Output Control switch in wrong position. 2. Faulty Output Control switch. 3. Faulty remote control potentiometer. 4. Leads or connections open in control circuit. 5. Faulty Control PC Board.	If all recommended possible areas of misadjustments have been checked and the problem persists, **contact your local Lincoln Authorized Field Service Facility.**
Poor arc striking with semiautomatic or automatic wire feeders.	1. Poor work connection. 2. Improper procedures. 3. Defective Control PC Board.	
Poor arc characteristics.	1. Defective Control PC Board. 2. Capacitor(s) in output circuit failed. A failure is indicated if the small vent plug on top of a capacitor is raised or blown out.	
Feeder Ready Light blinks.	1. Either ground loop fault or average current shunt fault occurs. 2. Check if there is any control lead in the wire feeder shorted to the work piece. 3. Check if the motor leads shorted or the motor stalled.	
Feeder Ready Light is not lit.	1. WF-L connection is being used with a Lincoln Electric wire feeder. 2. An AWF wire feeder, a Panasonic-style or a OTC-style wire feeder is being plugged into the wrong 6-pin connection.	

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your Local Lincoln Authorized Field Service Facility for technical troubleshooting assistance before you proceed.

CV-525 WIRING DIAGRAM



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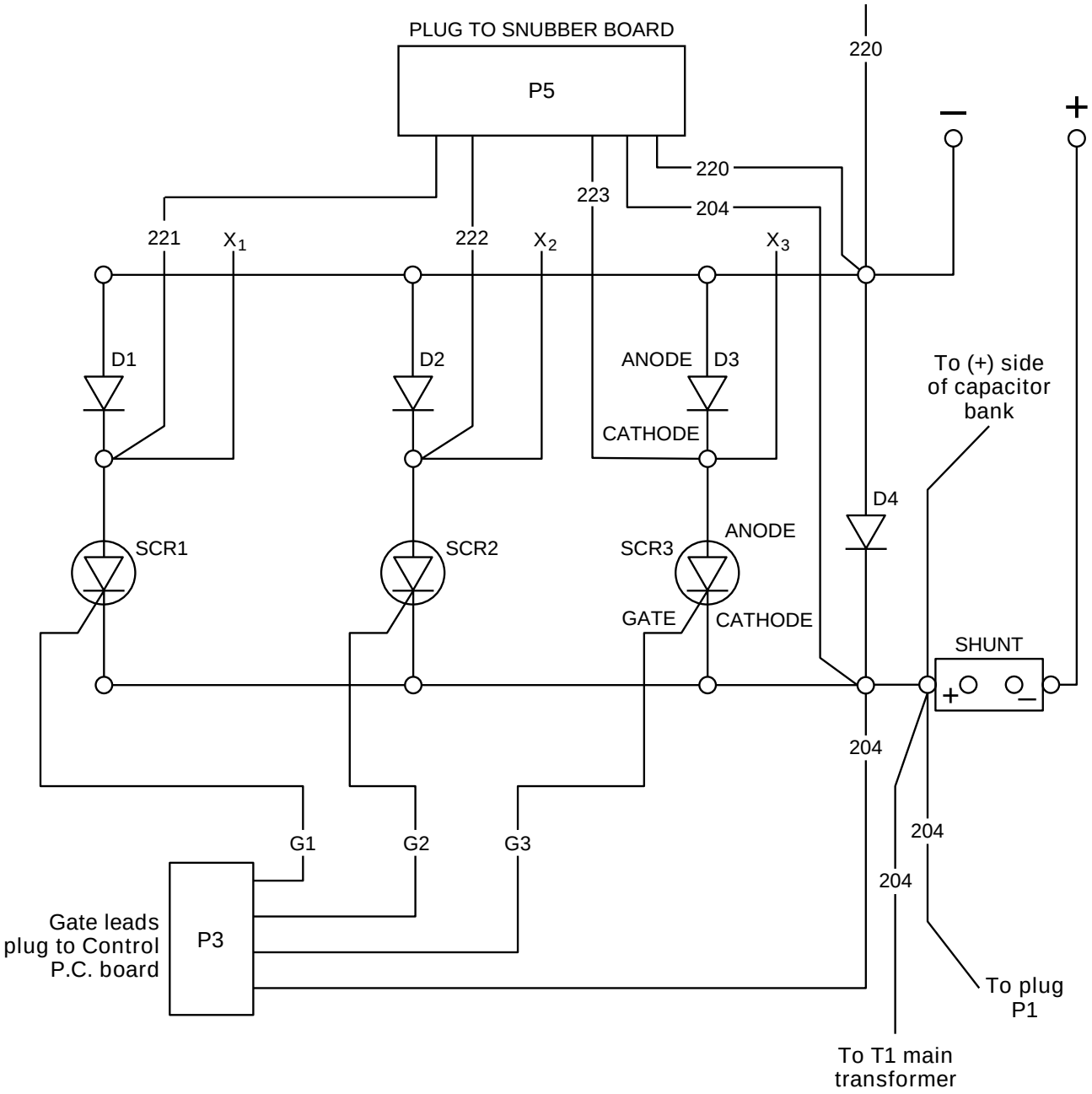
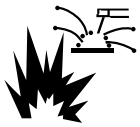
POWER RECTIFIER BRIDGE
DIAGRAM 1



			
WARNING	● Do not touch electrically live parts or electrode with skin or wet clothing. ● Insulate yourself from work and ground.	● Keep flammable materials away.	● Wear eye, ear and body protection.
Spanish AVISO DE PRECAUCION	● No toque las partes o los electrodos bajo carga con la piel o ropa mojada. ● Aislese del trabajo y de la tierra.	● Mantenga el material combustible fuera del área de trabajo.	● Protéjase los ojos, los oídos y el cuerpo.
French ATTENTION	● Ne laissez ni la peau ni des vêtements mouillés entrer en contact avec des pièces sous tension. ● Isolez-vous du travail et de la terre.	● Gardez à l'écart de tout matériel inflammable.	● Protégez vos yeux, vos oreilles et votre corps.
German WARNUNG	● Berühren Sie keine stromführenden Teile oder Elektroden mit Ihrem Körper oder feuchter Kleidung! ● Isolieren Sie sich von den Elektroden und dem Erdboden!	● Entfernen Sie brennbarres Material!	● Tragen Sie Augen-, Ohren- und Körperschutz!
Portuguese ATEN**ÇÃ**O	● Não toque partes elétricas e electrodos com a pele ou roupa molhada. ● Isole-se da peça e terra.	● Mantenha inflamáveis bem guardados.	● Use proteção para a vista, ouvido e corpo.
Japanese 注意事項	● 通電中の電気部品、又は溶材にヒフやぬれた布で触れないこと。 ● 施工物やアースから身体が絶縁されている様にして下さい。	● 燃えやすいものの側での溶接作業は絶対にしてはなりません。	● 目、耳及び身体に保護具をして下さい。
Chinese 警 告	● 皮肤或濕衣物切勿接觸帶電部件及銲條。 ● 使你自己與地面和工件絕緣。	● 把一切易燃物品移離工作場所。	● 佩戴眼、耳及身體勞動保護用具。
Korean 위 험	● 전도체나 용접봉을 젖은 헝겁 또는 피부로 절대 접촉치 마십시요. ● 모재와 접지를 접촉치 마십시요.	● 인화성 물질을 접근 시키지 마시요.	● 눈, 귀와 몸에 보호장구를 착용하십시요.
Arabic تحذير	● لا تلمس الاجزاء التي يسري فيها التيار الكهربائي أو الالكترود بجلد الجسم أو بالملابس المبللة بالماء. ● ضع عازلا على جسمك خلال العمل.	● ضع المواد القابلة للاشتعال في مكان بعيد.	● ضع أدوات وملابس واقية على عينيك وأذنيك وجسمك.

READ AND UNDERSTAND THE MANUFACTURER'S INSTRUCTION FOR THIS EQUIPMENT AND THE CONSUMABLES TO BE USED AND FOLLOW YOUR EMPLOYER'S SAFETY PRACTICES.

SE RECOMIENDA LEER Y ENTENDER LAS INSTRUCCIONES DEL FABRICANTE PARA EL USO DE ESTE EQUIPO Y LOS CONSUMIBLES QUE VA A UTILIZAR, SIGA LAS MEDIDAS DE SEGURIDAD DE SU SUPERVISOR.

LISEZ ET COMPRENEZ LES INSTRUCTIONS DU FABRICANT EN CE QUI REGARDE CET EQUIPMENT ET LES PRODUITS A ETRE EMPLOYES ET SUIVEZ LES PROCEDURES DE SECURITE DE VOTRE EMPLOYEUR.

LESEN SIE UND BEFOLGEN SIE DIE BETRIEBSANLEITUNG DER ANLAGE UND DEN ELEKTRODENEINSATZ DES HERSTELLERS. DIE UNFALLVERHÜTUNGSVORSCHRIFTEN DES ARBEITGEBERS SIND EBENFALLS ZU BEACHTEN.

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

LEIA E COMPREENDA AS INSTRUÇÕES DO FABRICANTE PARA ESTE EQUIPAMENTO E AS PARTES DE USO, E SIGA AS PRÁTICAS DE SEGURANÇA DO EMPREGADOR.

使う機械や溶材のメーカーの指示書をよく読み、まず理解して下さい。そして貴社の安全規定に従って下さい。

請詳細閱讀並理解製造廠提供的説明以及應該使用的銀捍材料，並請遵守貴方的有関勞動保護規定。

이 제품에 동봉된 작업지침서를 숙지하시고 귀사의 작업자 안전수칙을 준수하시기 바랍니다.

اقرأ بتمعن وافهم تعليمات المصنع المنتج لهذه المعدات والمواد قبل استعمالها واتبع تعليمات الوقاية لصاحب العمل.

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