IM592

November, 1999

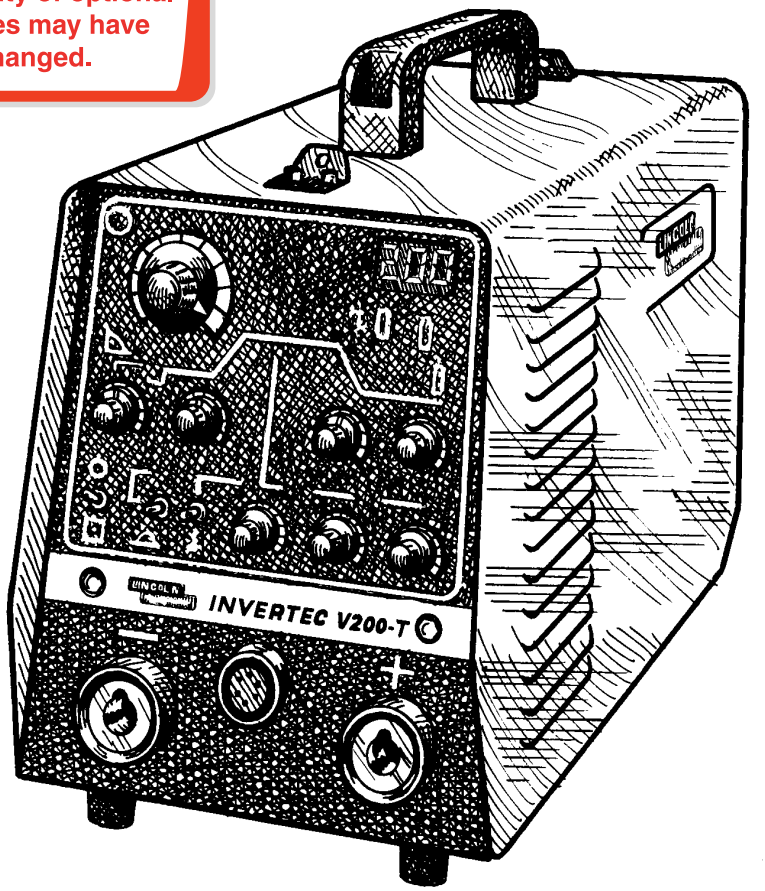
INVERTEC® V200-T

For use with machines having Code Numbers: **10463**

This manual covers equipment which is obsolete and no longer in production by The Lincoln Electric Co. Specifications and availability of optional features may have changed.

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.



OPERATOR'S MANUAL

LINCOLN® ELECTRIC

• World's Leader in Welding and Cutting Products •
• Sales and Service through Subsidiaries and Distributors Worldwide •
Cleveland, Ohio 44117-1199 U.S.A. TEL: 216.481.8100 FAX: 216.486.1751 WEB SITE: www.lincolnelectric.com

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.

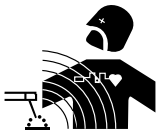
1.d. Keep all equipment safety guards, covers and devices in position and in good repair.Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.

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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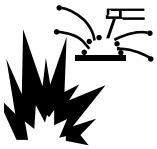


WELDING SPARKS can cause fire or explosion.

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.

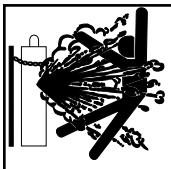
6.d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been “cleaned”. For information, purchase “Recommended Safe 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

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**.

Page

TECHNICAL SPECIFICATIONS - V200T TIG

INPUT - SINGLE PHASE ONLY		
Standard Voltage (1)	**Input Current at Rated Output**	**Code Number**
230/460/1/50/60	45/23 A @ 200 A, 33/16 A @ 150 A, 25/13 A @ 120 A	10463

RATED OUTPUT		
Duty Cycle (2)	**Amps**	**Volts at Rated Amperes**
20% Duty Cycle	200	28
60% Duty Cycle	150	26
100% Duty Cycle	120	25

OUTPUT		
Output Current Range	**Maximum Open Circuit Voltage**	**Type of Output**
1 - 200 A	80 V	DC

RECOMMENDED INPUT WIRE AND FUSE SIZES

	For DC TIG Welding at 200A/20% Duty Cycle Based on the 1996 U.S. National Electrical Code			
Input Voltage / phase/ Frequency	**Fuse (Super Lag) or Breaker Size**	**Input Ampere Rating on Nameplate**	**Type 75°C Copper Wire in Conduit AWG (IEC) Sizes**	**Type 75°C Copper Ground Wire in Conduit AWG (IEC) Sizes**
230/1/50/60	50	45	10 (5.2 mm^2)	10 (5.2 mm^2)
460/1/50/60	30	23	12 (4 mm^2)	12 (4 mm^2)

PHYSICAL DIMENSIONS				
	Height	**Width**	**Depth**	**Weight**
Power Source	10.04 in. 255 mm	7.48 in. 190 mm	17.32 in. 440 mm	Approx. 35 lbs. 16 kgs.

OPERATING TEMPERATURE	STORAGE TEMPERATURE
-20°C to +40°C	-25°C to +55°C

(1) Input voltage must be within ±10% of rated value.

(2) Duty Cycle is based on a 10 min. period.

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.**
- **Do not touch electrically hot parts.**
- **Always connect the V200-T to a power supply grounded per the National Electrical Code and any local codes.**

SELECT SUITABLE LOCATION

The Invertec will operate in harsh environments. Even so, it is important that simple preventative measures are followed in order to assure long life and reliable operation.

- The machine must be located where there is free circulation of clean air such that air movement in the back and out the sides 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.

STACKING

The Invertec V200-T cannot be stacked.

LIFTING AND MOVING

The Invertec V200-T has a lift handle on the top of the case and also comes with a lift-carrying strap for convience.

TILTING

Place the machine directly on a secure, level surface. The machine may topple over if this procedure is not followed.

ENVIRONMENTAL RATING

- The machine has a protection rating of IP23. Keep the machine dry when possible. Do not place it on wet ground or in puddles.

MACHINE GROUNDING AND HIGH FREQUENCY INTERFERENCE PROTECTION

The welder must be grounded. See your local and national electrical codes for proper grounding methods.

The high frequency generator, being similar to a radio transmitter, can be blamed for radio, TV and electronic equipment interference problems. These problems may be the result of radiated interference. Proper grounding methods can reduce or eliminate radiated interference.

Radiated interference can develop in the following four ways:

1. Direct interference radiated from the welder.
2. Direct interference radiated from the welding leads.
3. Direct interference radiated from feedback into the power lines.
4. Interference from re-radiation of “pickup” by ungrounded metallic objects.

Keeping these contributing factors in mind, installing equipment per the following instructions should minimize problems.

1. Keep the welder power supply lines as short as possible and enclose as much of them as possible in rigid metallic conduit or equivalent shielding for a distance of 50 feet (15.2m). There should be good electrical contact between this conduit and the welder case ground. Both ends of the conduit should be connected to a driven ground and the entire length should be continuous.
2. Keep the work and electrode leads as short as possible and as close together as possible. Lengths should not exceed 25 ft (7.6m). Tape the leads together when practical.
3. Be sure the torch and work cable rubber coverings are free of cuts and cracks that allow high frequency leakage.
4. Keep the torch in good repair and all connections tight to reduce high frequency leakage.
5. The work piece must be connected to an earth ground close to the work clamp, using one of the following methods:

a) A metal underground water pipe in direct contact with the earth for ten feet or more.

b) A 3/4" (19mm) galvanized pipe or a 5/8" (16mm) solid galvanized iron, steel or copper rod driven at least eight feet into the ground.

The ground should be securely made and the grounding cable should be as short as possible using cable of the same size as the work cable, or larger. Grounding to the building frame electrical conduit or a long pipe system can result in re-radiation, effectively making these members radiating antennas.

6. Keep cover and all screws securely in place.

7. Electrical conductors within 50 ft (15.2m) of the welder should be enclosed in grounded rigid metallic conduit or equivalent shielding, wherever possible. Flexible metallic conduit is generally not suitable.

8. When the welder is enclosed in a metal building, the metal building should be connected to several good earth driven electrical grounds (as in 5 (b) above) around the periphery of the building.

Failure to observe these recommended installation procedures can cause radio or TV and electronic equipment interference problems and result in unsatisfactory welding performance resulting from lost high frequency power.

INPUT CONNECTIONS

Be sure the voltage, phase, and frequency of the input power is as specified on the rating plate, located on the rear of the machine.

Supply line entry provision is in the case rear panel.

A power cord is provided and wired into the machine. Follow the power cord connection instructions. Incorrect connection may result in equipment damage.

The Invertec V200-T is internally connected for a 460 volt input. The input switch has a lock pin which restricts movement for 460 selection only. See figure A.1.

To connect the V200-T for 230 volt input, the following input reconnect needs to be completed.

1. Disconnect the machine from the input supply.
2. Remove the wraparound by removing the shoulder strap brackets and wraparound screws.
3. Provide access to the line switch by bending the insulation back.
4. When the insulation is bent back, two sleeved leads will become visible.
5. Remove the sleeving from both leads.
6. Connect the large lead to push-on terminal labeled "3" on the adjacent PC board.
7. Connect the small lead to terminal 15 of the line switch.
8. Reposition insulation to cover line switch.
9. Re-install wraparound.
10. Move the lock pin to allow switch movement for 230 V selection only.

Connect the green w/ yellow strip lead to ground per U.S. National Electrical Code. Connect the black and white leads to power.

Use reverse procedure to reconnect for 460V. Do not connect 460V when the switch is configured for 230V or damage **will** result.

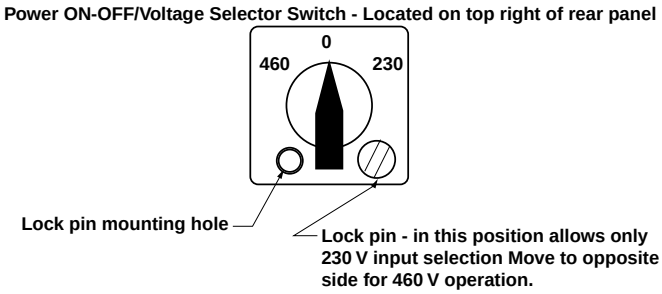


Figure A.1

INPUT FUSE AND SUPPLY WIRE

Refer to the ***Technical Specifications*** pages at the beginning of this chapter for the proper fuse sizes and supply cable sizes.

- Fuse the input circuit with recommended super lag fuses or delay type circuit breakers.

- Install the proper fuse in the fuse holder in the main disconnect panel.

OUTPUT CONNECTIONS

Figure A.2

OUTPUT CONNECTIONS

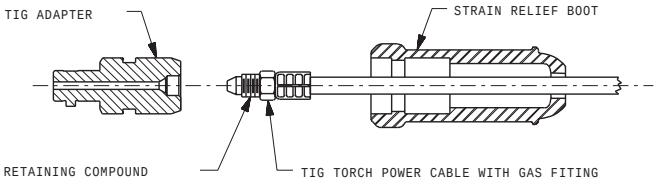
Refer to Figure A.2 for the location of the output terminals. A quick-disconnect system using Twist-Mate™ cable plugs is used for the welding cable connections. The electrode and work cables will require these plugs. Refer to the relevant instructions following for more information on connecting the machine for either welding process.

OUTPUT CONNECTION FOR STICK WELDING

First determine the proper electrode polarity for the electrode to be used. Consult the electrode data for this information. Then connect the output cables to the output terminals corresponding to this polarity. For instance, for DC(+) welding, connect the electrode cable (which is connected to the electrode holder) to the "+" output terminal and the work cable (which is connected to the work clamp) to the "-" output terminal. Insert the connector with the key lining up with the keyway, and rotate approximately 1/4 turn clockwise; until the connection is snug. Do not over tighten.

OUTPUT AND GAS CONNECTION FOR TIG WELDING

This unit does not include a TIG torch, but one may be purchased separately and used with these units to do TIG (GTAW) welding. The Lincoln LA-9 (K859-1 or K859-5 only with no gas valve) or LA-17 and LA-17V (K860-1 or K860-5 without gas valve and K860-9 or K860-13 with gas valve) are recommended for use with these machines for this purpose; however, any similar TIG torch can be used. To attach the Twist-Mate Plug to a Lincoln Torch, slide the rubber boot onto the torch cable (enlarge the boot opening if necessary), screw the fitting on the torch cable into the brass connector snugly and slide the boot back over the brass connector.



Turn the Power Switch "OFF". Connect the torch cable quick connect plug into the DC- Output Receptacle on the front of the welder and turn it clockwise until it is tight. This is a quick connect terminal and also provides the gas connection for the shielding gas to the torch.

⚠ WARNING

To avoid receiving a high frequency shock, keep the TIG torch and cables in good condition.

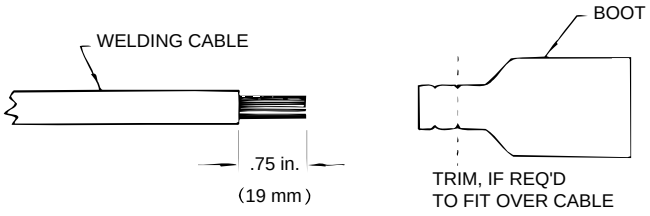
Next, connect the work cable (which is connected to the work clamp) to the "+" output terminal in the same way.

The machine can easily be switched between stick and TIG welding at any time by simply swapping the stick (electrode) and TIG (torch) cables, and reversing the connection polarity if required.

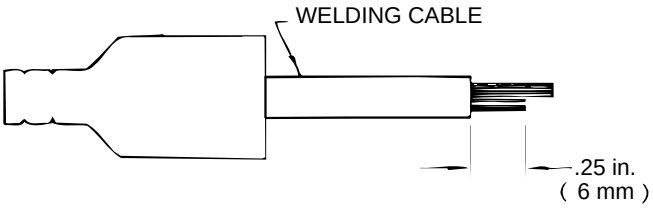
QUICK DISCONNECT PLUG (FOR WORK CABLE)

A quick disconnect system is used for the welding cable connections. The electrode and work cables need to have a plug attached.

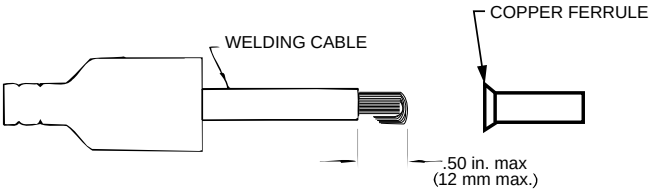
1. Cut off welding cable lug, if present.
2. Remove .75 in. (19mm) of welding cable insulation.
3. Slide rubber boot onto cable end. The boot end may be trimmed to match the cable diameter. Use soap or other nonpetroleum-based lubricant to help slide the boot over the cable, if needed.



4. Cut 45-50% of the copper strands back 1/4" (6 mm).

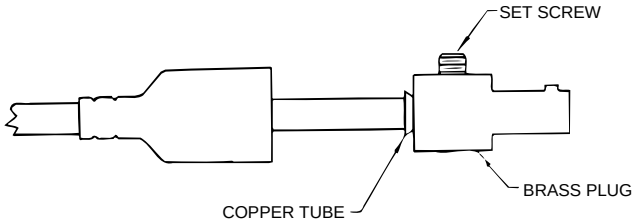


5. Fold copper strands over cut strands and insert into ferrule.



6. Slide the copper ferrule into the brass plug.

7. Tighten set screw to collapse copper tube. Screw must apply pressure against welding cable. The top of the set screw will be well below the surface of the brass plug after tightening.

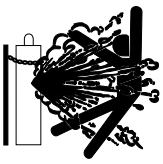


8. Slide rubber boot over brass plug. The rubber boot must be positioned to completely cover all electrical surfaces after the plug is locked into the receptacle.

SHIELDING GAS CONNECTION

An adjustable gas pressure regulator and flow gage should be obtained. Obtain the necessary inert shielding gas (usually argon). Connect the cylinder of gas with the pressure regulator and flow gage. Install the gas hose between the regulator and gas inlet (located on the low left rear of the welder). The gas inlet has a 5/16-18 right hand female thread; CGA #032.

⚠ WARNING



CYLINDER could explode if damaged.

- Keep cylinder upright and chained to a support.
- Keep cylinder away from areas where it could be damaged.
- Never allow the torch to touch the cylinder.
- Keep cylinder away from live electrical circuits.
- Maximum inlet pressure 150 psi.

REMOTE CONTROL CONNECTION

A remote control receptacle is provided on the lower center case front of the welder for connecting a remote control to the machine. Refer to the Optional Accessories section of this manual for available remote controls.

Read and understand this entire section before operating your machine.

SAFETY INSTRUCTIONS

⚠ WARNING

ELECTRIC SHOCK can kill.

- Do not touch electrically live parts such as output terminals or internal wiring.
- Insulate yourself from the 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, CUTTING and GOUGING SPARKS can cause fire or explosion

- Keep flammable material away.
- Do not weld, cut or gouge on containers that have held combustibles.

ARC RAYS can burn.

- Wear eye, ear and body protection.

Only qualified personnel should operate this equipment. Observe all safety information throughout this manual.

GENERAL DESCRIPTION

The Invertec V200-T is an industrial 200 amp arc welding power source which utilizes single phase input power, to produce constant current output. The welding response of this Invertec has been optimized for stick (SMAW) and TIG (GTAW). The unit is ideal for industrial applications where portability is important.

OPERATIONAL FEATURES

The Invertec provides continuous total range output current adjustment. Additionally, a “hot start” system has been built into the welding current control, and provides a higher striking current to assist ignition of the arc.

WELDING CAPABILITY

The Invertec V200-T is rated at 200 amps, 28 volts, at 20% duty cycle on a ten minute basis. It is capable of higher duty cycles at lower output currents. It is capable of 120 amps, 25 volts at at 100% duty cycle. If the duty cycle is exceeded, a thermal protector will shut off the output until the machine cools.

LIMITATIONS

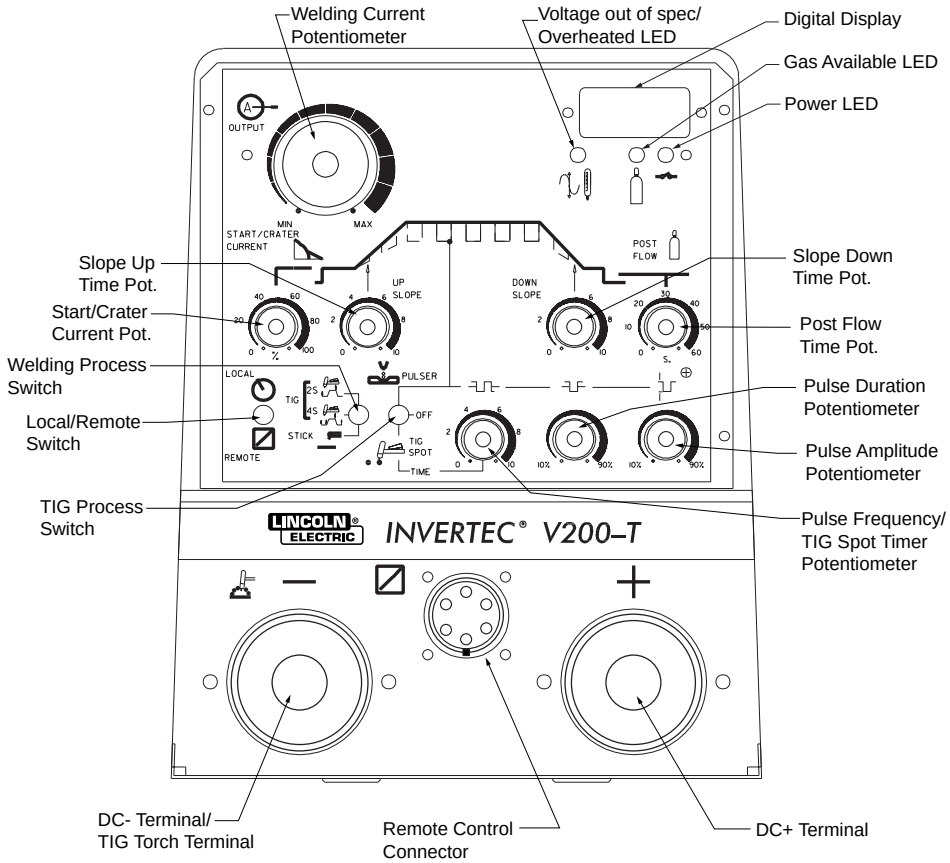
The V200-T is not recommended for pipe thawing.

The V200-T should not be powered from the auxiliary power supply of an engine welder. Special protection circuits may operate causing loss of output.

CONTROLS AND SETTINGS

All operator controls and adjustments are located on the case front of the V200-T machine. Refer to Figure B.1 and the corresponding explanations.

FIGURE B.1 — CASE FRONT CONTROLS.



Power Switch/Voltage Selector Switch - Controls the power input to the machine. This rotating switch is used to turn the machine on and off as well as to select the input voltage. The switch is located on the top right rear panel. When power is applied to the machine the **Power LED** is on.

Welding Current Potentiometer - Potentiometer used to set the value of the current required by the welding process. This current setting will be displayed on the **Digital Display**. When an Amptrol is used to remotely control the welding current, this setting controls the maximum welding current when the Amptrol is fully depressed.

Voltage out of spec/ Overheated LED - This LED will light up when:

A) The input supply voltage is not within limits pre-set for correct operation.*
B) The machine is overheated as detected by the internal thermostat.

* Note that input voltages that exceed 20% of nominal may cause internal damage to the machine.

Output Terminals - These quick disconnect terminals provide connection points for the TIG Torch and work cables or electrode and work cables. For TIG welding, connect the torch to the DC- terminal and the work cable to the DC+ terminal. For stick welding positive polarity connect the electrode cable to the positive terminal and the work cable to the negative terminal. To weld negative polarity reverse the electrode and work cables.

Remote Control Connector - This receptacle will accept a Lincoln Foot Amptrol, Hand Amptrol or Arc Start Switch. See the ACCESSORIES section for available options.

Start/Crater Potentiometer - This potentiometer is used to adjust the START CURRENT and CRATER CURRENT for TIG welding only. This potentiometer also adjusts the ARC FORCE when in STICK welding mode.

Slope Up and Slope Down Time Potentiometers - These potentiometers are used to adjust the Slope Up and Slope Down Times respectively for TIG welding only. The adjustable range for both timers is 0 to 10 sec.

Post Flow Time Potentiometer - This potentiometer is used to adjust the gas postflow after the arc is extinguished when using a TIG process. The postflow time is 0 - 50 sec.

Pulse Frequency/TIG Spot Timer Potentiometer - This potentiometer is used to adjust the Pulse Frequency when the **TIG Process Switch** is in the PULSER position and to adjust the TIG Spot Time when the **TIG Process Switch** is in the TIG SPOT position. The Pulse Frequency range available is 300 Hz to 0.5 Hz. The Pulse Frequency on the V200-T is actually adjusted in terms of the pulse period, which is the inverse of the frequency. Increasing the knob (cw), increases the period and because of their inverse relationship, decreases frequency. Therefore, at the maximum period setting (fully cw, or “10”) the frequency is at minimum (0.5 Hz) and at the minimum period setting (fully ccw or “0”) the frequency is at maximum (300 Hz). The spot time range is adjustable up to 10 sec.

Pulse Duration Potentiometer - This potentiometer is active only when the **TIG Process Switch** is in the PULSER position. It controls pulse duration or length of time for pulse within the selected pulse frequency (see above). Use this potentiometer to select the relative amount of peak and background current for the selected overall frequency.

Pulse Amplitude Potentiometer - This potentiometer is active only when the **TIG Process Switch** is in the PULSER position at that time it controls pulse amplitude or height. Use this potentiometer to adjust the background current as a percentage of the peak (or maximum) current level.

TIG Process Switch - This switch is used to select the type of TIG process to be performed. In the PULSER position - Pulsed TIG welding, in the OFF position - continuous TIG welding and in the TIG SPOT position - spot TIG welding.

Welding Process Switch - This switch is used to select the type of welding process to be performed. In the 2S position - Two step TIG welding, in the 4S position - 4 step TIG welding and in the STICK position - Stick welding. See the section on 2 step and 4 step explanation later in this section.

LOCAL/REMOTE Switch - This switch is used to select where current can be adjusted. In the LOCAL position current is controlled by the **Welding Current Potentiometer**. In the REMOTE position any hand or foot amptrol connected to the **Remote Control Connector** will control the current setting. In both modes, however, the current potentiometer on the case front sets the maximum welding current available.

Gas Available LED - This LED will light when gas is available in the TIG welding modes only.

Power LED - Indicates inverter is ON. After 5 minutes without use, the inverter will go into a sleep mode and the LED will go off. Any activity on the output will immediately “Wake” the inverter up, the LED will come back on and normal operation will resume.

OPERATING STEPS

WELDING IN TIG MODE

1. Connect the TIG torch and cable quick connect plug to the DC- output receptacle. This receptacle also contains an integral gas connection for the torch. Connect the work cable to the DC+ receptacle and to the work piece.

2. Set the **Welding Process Switch** to "2S" when using a hand or foot amptrol. When using an arc start switch, "2S or "4S" can be used.

3. Set the **TIG Process Switch** to the desired position.

4. Connect an optional Amptrol or Arc Start Switch to the **Remote Control Connector**.

5. Turn on the cylinder gas valve and adjust the flow regulator to obtain desired flow.

6. Turn the power switch to "230" or "460" as appropriate for your input voltage. NOTE: There will be a 0.5 second gas flow when the power is turned on.

7. Set the Current Control on the control panel to the maximum desired amps.

8. Depress the Amptrol or Arc Start Switch to energize the torch and establish an an arc with the work piece.

NOTE: When the **TIG Process Switch** is set to "2S" or "4S" TIG position, depressing the remote control will start a 0.5 second gas pre-flow before energizing the TIG torch. When the remote control is released the TIG torch is de-energized and gas flow will continue for the set post flow time (0 - 50 sec.).

REMOTE CONTROL OPERATION

A Foot Amptrol™ is optional with the V200-T for remote current control while TIG welding. An optional Hand Amptrol may also be used. An optional Arc Start Switch may be used to start and stop the welding if no remote control of the current is desired. Refer to the Accessories section of this manual.

Both the Hand and Foot Amptrol work in a similar manner. For simplicity, the following explanation will refer only to "Amptrols", meaning both Foot and Hand models. The term "minimum" refers to a foot pedal in the "up" position, as it would be with no foot pressure, or a Hand Amptrol in the relaxed position, with no thumb pressure. "Maximum" refers to a fully depressed Foot Amptrol, or a fully extended Hand Amptrol.

When the welder is in TIG modes activating the Amptrol energizes the electrode terminal and varies the output welding current from its minimum value of 1 amp, to the maximum value set by the Current Control on the control panel. This helps eliminate accidental high current damage to the work piece and/or tungsten, and gives a fine control of the current. When the welder is in the stick mode a remote control has no effect and is not used.

It is important to note that, in some cases, the tungsten will not start an arc at the minimum current because the tungsten may be too large or cold. To start an arc reliably, it is important to depress the Amptrol far enough so that the machine output current is near the tungsten operating range. For example, a 3/32" tungsten may be used on DC- to weld the full range. To start the weld, the operator may have to turn the current control up and depress the Amptrol approximately 1/4 of the way down. Releasing the Amptrol to its minimum position may not start the arc. Also if the current control is set too low, the arc may not start. In most cases, a large or cold tungsten will not readily establish an arc at low currents. This is normal. In DC-, the V200-T will start a 3/32, 2% thoriated tungsten electrode at 15 amperes provided the electrode tip is properly grounded and not contaminated.

WELDING IN STICK MODE

1. Put the electrode holder and cable quick connect plug into the proper receptacle for the electrode polarity desired. Turn clockwise until tight. Connect the work clamp to the other receptacle and the work piece.

2. Set the **Welding Process Switch** to “STICK”.

3. Set the **Local/Remote** Switch to “Local”.

4. Place the electrode in the electrode holder.

5. Turn the **Power Switch** to the proper input voltage setting to turn on the welder.

⚠ WARNING

In Stick Mode the output terminal and electrode will be electrically hot whenever the power switch is turned on.

6. Adjust the Current Control to the desired amps.

7. Strike an arc and weld.

NOTE: When the **Welding Process Switch** is set to “STICK” the output is always on when the power switch is on. A remote control has no effect on the welding current and the gas flow and high frequency TIG arc starter are disabled.

RECOMMENDED ELECTRODE AMPERAGE RANGES - INVERTEC V200-T

The Invertec V200-T is rated from1 - 200 Amps.

SMAW Process

ELECTRODE	POLARITY	3/32"	1/8"	5/32"
Fleetweld 180	DC+	40 - 80	55 - 110	105 - 135
Fleetweld 37	DC+	70 - 95	100 - 135	145 - Max
Fleetweld 47	DC-	75 - 95	100 - 145	135 - Max
Jet-LH MR	DC+	85 - 110	110 - 160	130 - Max
Blue Max Stainless	DC+	40 - 80	75 - 110	95 - 110
Red Baron Stainless	DC+	40 - 70	60 - 100	90 - 140

Mild steel procedures are based on recommended procedures listed in C2.10 8/94 and the maximum rating of the Invertec V200-T
Jet-LH MR procedures are based on Jet-LH 78 MR
Blue Max procedures are based on C6.1 6/95
Red Baron Procedure are based on ES-503 10/93

GTAW Process

Electrode Polarity	DC-		Approximate Argon Gas Flow Rate C.F.H. (l/min.)	
Electrode Tip Prepration	Sharpened			
Electrode Type	EWTh-1, EWCe-2 EWTh-2, EWLa-1 EWG			
Electrode Size (in.)			Aluminum	Stainless Steel
.010	Up to 15 A.		3-8 (2-4)	3-8 (2-4)
.020	Up to 15 A.		5-10 (3-5)	5-10 (3-5)
.040	Up to 80 A.		5-10 (3-5)	5-10 (3-5)
1/16	Up to 150 A.		5-10 (3-5)	9-13 (4-6)
3/32	Up to MAX. A.		13-17 (6-8)	11-15 (5-7)
1/8	X		15-23 (7-11)	11-15 (5-7)

Tungsten electrodes are classified as follows by the American Welding Society (AWS):

Pure	EWP	green
+1% Thoria	EWTh-1	yellow
+2% Thoria	EWTh-2	red
+2% Ceria	EWCe-2	orange
+1.5% Lanthana	EWLa-1	black
+0.15 to 0.40% Zirconia	EWZr	brown

Ceriated Tungsten is now widely accepted as a substitute for 2% Thoriated Tungsten in AC and DC applications.

EXPLANATION OF 2 STEP AND 4 STEP MODES

(See figure B.2 and the explanations that follow)

2 STEP

2 Step mode can be used with either an arc start switch or a hand or foot amptrol. The welding cycle begins when the torch switch is held closed and ends when the switch is released.

4 STEP

4 Step mode should only be used with an arc start switch. The welding cycle begins when the torch switch is pressed and then released. The cycle is ended by a further press and release of the switch.

The pre-gas flow is followed by an increase in the welding current from the level set by the **Start/Crater Current Potentiometer,** to the value on the display set with the **Welding Current Potentiometer**. The rate of increase is determined by the setting of the **Slope Up Time Potentiometer**.

The slope out phase begins with the release of the torch switch in the **2 STEP** mode or with a second press of the switch in the **4 STEP** mode.

During this phase, the welding current falls to the crater current set on the **Start/Crater Current Potentiometer**. The speed at which the welding current decreases is determined by the setting of the **Slope Down Time Potentiometer**.

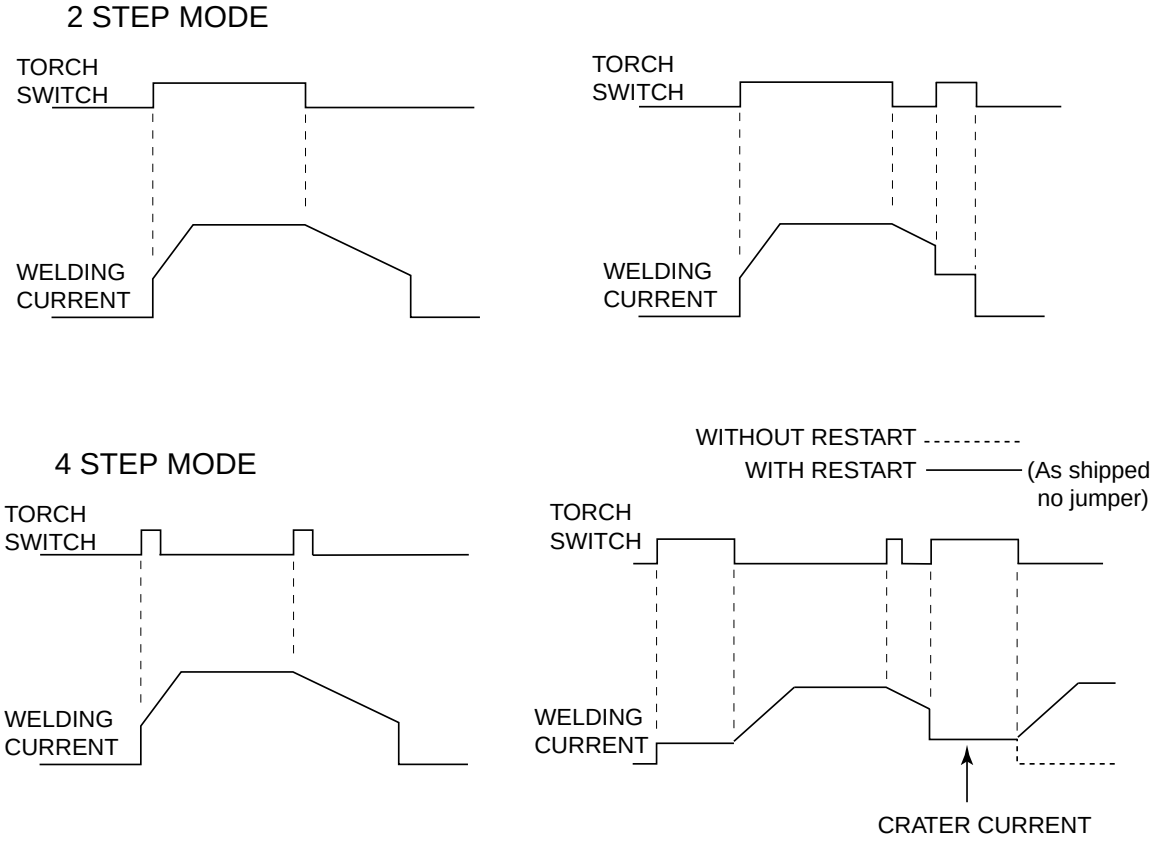
The power source comes equipped with a restart capability. Any change required in the restart timing can only be made by an authorized service center. (See Figure B.2 - 4 Step Mode).

In the **TIG-SPOT** mode the **UP/ DOWN-SLOPE** controls and the **PULSER** function are disabled.
The welding cycle takes an "ON-OFF" type shape with the welding current jumping very rapidly from 0 to the nominal value.

PULSER FUNCTION

Pulsed welding is selected by using the **TIG Process Switch**. In this mode the output is modulated to produce a series of current pulses. By this means precise control of heat input and penetration can be achieved on critical applications. The pulse frequency, duration and amplitude may be adjusted by means of the respective potentiometers.

FIGURE B.2 2 Step and 4 Step Modes



OPTIONAL ACCESSORIES

K870 - Foot Amptrol™ for TIG welding. When the V200-T's Output Control is in the "REMOTE" position, the foot Amptrol energizes the output and controls the output remotely. The Foot Amptrol connects directly to the 6 pin Amphenol.

K812 - Hand Amptrol™ for TIG welding. When the V200-T's Output Control is in the "Remote" position, the hand Amptrol energizes the output and controls the output remotely. The Hand Amptrol connects directly to the 6 pin Amphenol.

K814 - Arc Start Switch - Energizes the output for TIG welding if remote output control of the amperage is not desired. It allows on/off TIG welding at the current set by the Current Control on the control panel. When using the Arc Start Switch set the Output Control to the "LOCAL" position.

Magnum® LA-9 and LA-17/LA-17V TIG Torches - The following standard Magnum® TIG torches with one-piece cable may be used with the Invertec V200-T.

• K859-1	LA-9	12.5 ft	medium back cap
• K859-5	LA-9	25 ft	medium back cap
• K860-1	LA-17	12.5 ft	long back cap
• K860-5	LA-17	25 ft	long back cap
• K860-9	LA-17V	12.5 ft	long back cup;w/gas valve
• K860-13	LA-17V	25 ft	long back cup;w/gas valve

NOTE: Each torch requires a quick connector plug (S22529-1) and strain relief boot (M17255) be installed onto the cable. Collets, collet bodies, and nozzles are not included and must be ordered separately.

CABLE PLUGS

K852-70 - Cable Plug Kit for 1/0-2/0 cable. Attaches to welding cable to provide quick disconnect from machine.

Quick Connect Plug (S22529-1) and Strain Relief Boot (M17255) - One of each is shipped with the welder to connect the Magnum LA-9 torch. If you do not care to interchange these parts between torches (one of each is required to connect Magnum LA-9 or LA-17/LA-17V TIG torches with one-piece cable to the V200-T) you may order additional sets. The quick connect plug provides connection for both gas and welding current.

TIG Torch Parts Kits - Parts kits are available for the LA-9 and LA-17/LA-17V TIG torches. These kits include back cap, collets, collet bodies, nozzles and tungstens.
Order KP507 for LA-9 torches
Order KP508 for LA-17/LA-17V torches
See publication E12.150 for parts kits breakdown.
Cut Length Consumables - TIG welding filler metals are available for welding stainless steel, mild steel, aluminum and copper alloys. See publication C9.10.

SAFETY PRECAUTIONS

WARNING

ELECTRIC SHOCK can kill.

- Have an electrician install and service this equipment.
- Turn the input power off at the fuse box, disconnect supply lines and allow machine to sit for five minutes minimum to allow the power capacitors to discharge before working inside this equipment.
- Do not touch electrically hot parts.

INPUT FILTER CAPACITOR DISCHARGE PROCEDURE

WARNING

The machine has internal capacitors which are charged to a high voltage during power-on conditions. This voltage is dangerous and must be discharged before the machine can be serviced. Discharging is done automatically by the machine each time the power is switched off. However, you must allow the machine to sit for at least 5 minutes to allow time for the process to take place.

ROUTINE MAINTENANCE

1. Perform the following preventive maintenance procedures at least once every thousand hours of use. It is good practice to keep a preventive maintenance record; a record tag attached to the machine works best.
2. Remove the machine cover (requires a 3 mm hex key) after allowing the minimum 5 minute power off requirement to let the input capacitors discharge.

WARNING

Failure to observe this discharge time requirement could result in severe electrical shock hazard.

3. Keeping the machine clean will result in cooler operation and higher reliability. Be sure to clean the following areas with a low pressure air stream.
   - Printed circuit boards
   - Power switch
   - Fan blades
   - Louvers
   - Heat sink fins
   - Output terminals
4. Examine capacitors for leakage or oozing. If any leakage is noticed, take the unit to an authorized Lincoln Field Service Shop.
5. Examine the case for breakage. Repair or replace the case as required. Keep the case in good condition to ensure that high voltage parts are protected and correct spacings are maintained.
6. Install machine covers and fasteners.

REPLACEMENT OF INTERNAL FUSE

The Invertec has additional protection provided to some circuits through an internal fuse. For replacement of that fuse proceed as follows:

1. Turn off the power to the unit and remove the input plug.
2. Allow the machine to stand for 5 minutes to let the input capacitors discharge.
3. Remove the machine cover.
4. Replace the blown fuse with a new 0.5A 500V slowblow fuse.

NOTE: If the fuse blows again after power is restored, the cause could be an internal breakdown in the power unit. In this case, take the unit to an authorized Lincoln Field Service Shop.

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 you local Lincoln Authorized Field Service Facility.

If you do not understand or are unable to perform the Recommended Course of Action safely, contact you 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.

TROUBLESHOOTING

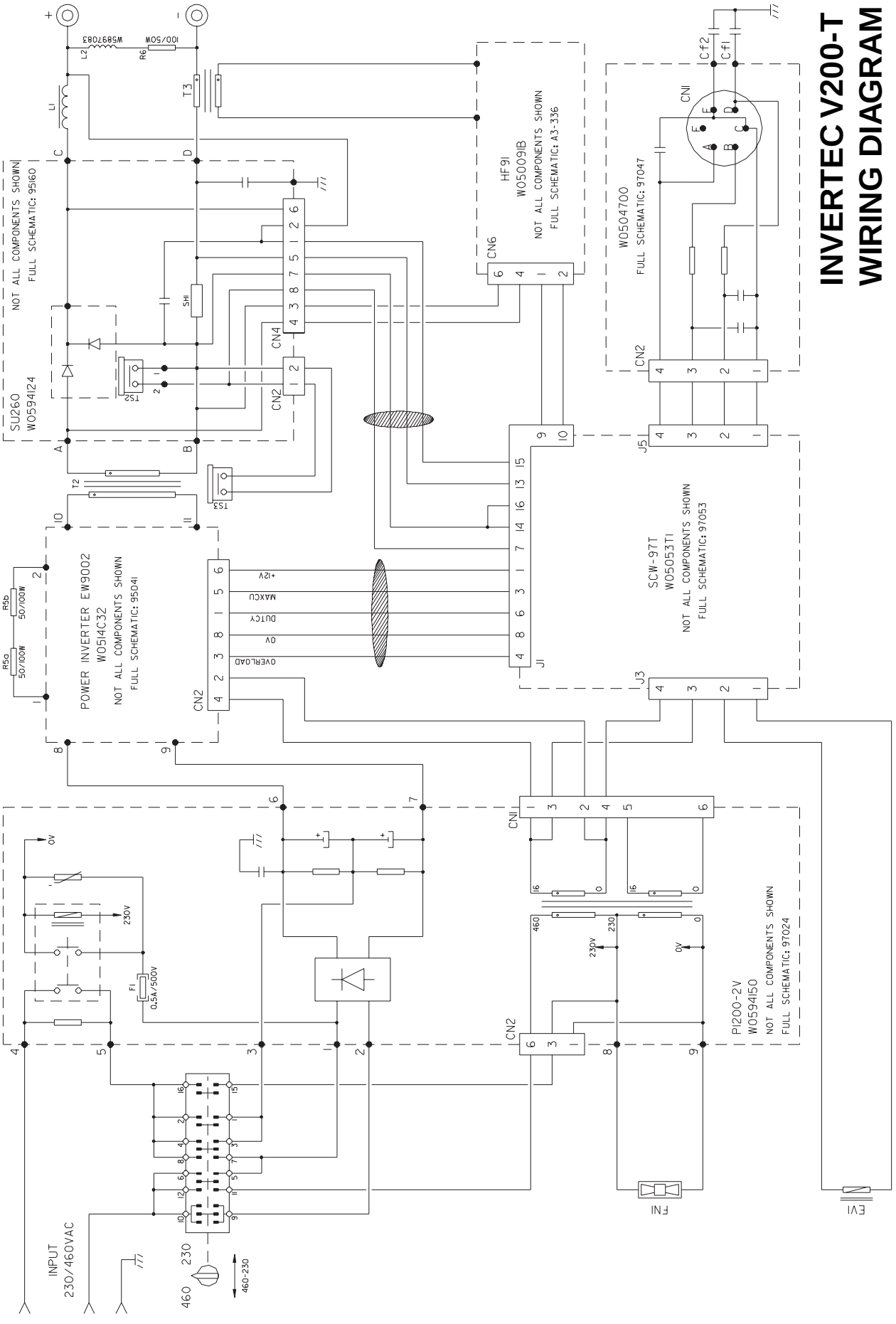
E-2

Observe all Safety Guidelines detailed throughout this manual

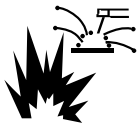
PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENTS(S)	RECOMMENDED COURSE OF ACTION
		If all recommended possible areas of misadjustment have been checked and the problem persists, **Contact your local Lincoln Authorized Field Service Facility.**
The machine is dead - no output - no fan.	1. The input power switch must be in the ON position. 2. Make sure the input voltage is correct for the machine. 3. Check continuity of the 0.5-amp slow blow fuse located on the P.C. Board.	
No output but the fan operates normally.	1. The machine may be overheated. Check the thermal indicator light. Wait for the machine to cool and the thermostats to reset.	
Output turns on momentarily, then switches off.	1. Check the input voltage. Make sure the input voltage is correct for the machine.	
No output - Main input fuses open, indicating excessive current draw.	1. Inspect input leads for possible shorts or grounds or mis-connections. 2. Install new fuses and reapply power. If fuses open again, consult a 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.



NOTE: This diagram is for reference only. It may not be accurate for all machines covered by this manual. The specific diagram for a particular code is pasted inside the machine on one of the enclosure panels. If the diagram is illegible, write to the Service Department for a replacement. Give the equipment code number..

			
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 **ATENÇÃO**	● 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 **ATENÇÃO**
● 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 제폼에 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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