

# ***RED-D-ARC*** ***MX 350***

**IM697-B**

September, 2011

For use with machines having Code Numbers: **10799**  
**11149**  
**11855**

# **Red-D-Arc Welderentals®**

## ***OPERATOR'S MANUAL***

### ***Red-D-Arc Spec-Built Welding Equipment***

This **RED-D-ARC** welder is built to **RED-D-ARC Extreme Duty** design specifications by Lincoln Electric.

### ***Safety Depends on You***

This welder 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.

**reddarc.com**

**Airgas®**

***The Global Leader in Welder Rentals***

## ⚠ 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.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.



## 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 Z87.1 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 within applicable OSHA PEL and ACGIH TLV limits 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.**

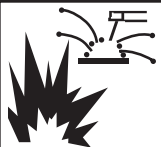
5.b. The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable OSHA PEL and ACGIH TLV limits.

5.c. 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.d. 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.e. 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.f. Also see item 1.b.



## WELDING and CUTTING 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.

6.i. Read and follow NFPA 51B "Standard for Fire Prevention During Welding, Cutting and Other Hot Work", available from NFPA, 1 Batterymarch Park, PO box 9101, Quincy, Ma 022690-9101.

6.j. Do not use a welding power source for pipe thawing.



## 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-1, "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

Refer to <http://www.lincolnelectric.com/safety> for additional safety information.

## PRÉCAUTIONS DE SÛRETÉ

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

### Sûreté Pour Soudage A L'Arc

1. Protégez-vous contre la secousse électrique:
  - a. Les circuits à l'électrode et à la pièce 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 vêtements mouillés. Porter des gants secs et sans trous pour isoler les mains.
  - b. Faire très attention de bien s'isoler de la masse quand on soude dans des endroits humides, ou sur un plancher métallique ou des grilles métalliques, 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 de fonctionnement.
  - 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 précautions pour le porte-électrode s'appliquent 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 où 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 soleil, 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 latéraux 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 un endroit isolé de la masse. Un court-circuit accidentel peut provoquer un échauffement et un risque d'incendie.
8. S'assurer que la masse est connectée le plus près 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 chaînes de levage, câbles de grue, ou autres circuits. Cela peut provoquer des risques d'incendie ou d'échauffement des chaînes et des câbles jusqu'à ce qu'ils se rompent.
9. Assurer une ventilation suffisante dans la zone de soudage. Ceci est particulièrement important pour le soudage de tôles galvanisées plombées, ou cadmiées ou tout autre métal qui produit des fumées 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 phosgène (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 conformément au code de l'électricité et aux recommandations du fabricant. Le dispositif de montage ou la pièce 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 faire des travaux à l'intérieur de poste, la débrancher à l'interrupteur à la boîte de fusibles.
4. Garder tous les couvercles et dispositifs de sûreté à leur place.

# Thank—

for selecting one of our **QUALITY** products. We want you to take pride in operating this product ••• as much pride as we have in bringing this product to you!

## CUSTOMER ASSISTANCE POLICY

The business of our company is manufacturing and selling high quality welding equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask us for advice or information about their use of our products. We respond to our customers based on the best information in our possession at that time. We are not in a position to warrant or guarantee such advice, and assume no liability, with respect to such information or advice. We expressly disclaim any warranty of any kind, including any warranty of fitness for any customer's particular purpose, with respect to such information or advice. As a matter of practical consideration, we also cannot assume any responsibility for updating or correcting any such information or advice once it has been given, nor does the provision of information or advice create, expand or alter any warranty with respect to the sale of our products.

We are a responsive manufacturer, but the selection and use of specific products sold by us is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond our control affect the results obtained in applying these types of fabrication methods and service requirements.

Subject to Change – This information is accurate to the best of our knowledge at the time of printing.

## 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.

Product \_\_\_\_\_

Model Number \_\_\_\_\_

Code Number or Date Code (if available) \_\_\_\_\_

Serial Number (if available) \_\_\_\_\_

Date Purchased \_\_\_\_\_

Where Purchased \_\_\_\_\_

Whenever you request replacement parts 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**.

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## TECHNICAL SPECIFICATIONS - RED-D-ARC MX350 (K1823-1)

### ELECTRICAL SPECIFICATIONS

	AMPS (DC+)	VOLTS (DC+)
Output Rating @ 50°C (122°F)	350	34
Input Rating @ 50°C (122°F)	165	80
Max. Input Range		50-113 (Peak)
Max. O.C.V.		78
Output Preset Range	30-350	15-40

### PHYSICAL DIMENSIONS

HEIGHT	WIDTH	DEPTH	NET WEIGHT
11.6 in 295 mm	10.0 in 254 mm	21.5 in 546 mm	59.5 lbs. 27.0 kg.

### TEMPERATURE RANGES

OPERATING TEMPERATURE RANGE	STORAGE TEMPERATURE RANGE
-40 to +122°F -20 to + 50°C	-40 to +185°F -40 to +85°C

RED-D-ARC MX350

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## PRODUCT DESCRIPTION

The RED-D-ARC MX350 converter (K1823-1) is part of a Multi-Weld system, ideally suited for construction site welding, which uses a single DC power source, as the only input supply, and provides independent full range control of up to 350A continuous with each converter arc for + polarity stick and wire processes, as well as for arc-air gouging. (See Figure 1).

The RED-D-ARC MX350 is a DC to DC converter which converts higher voltage/lower current input power to lower voltage/higher current output power with over 90% efficiency.

For example; a single 600A continuous rated 70-80v power source could supply up to five RED-D-ARC MX350 converters each wire welding at 300 amps, or about ten converters for stick welding at 150 amps, with 26-29v at the arcs.

The Arc Converter is a single "world" model built to IEC and CSA standards and meeting the specific needs inherent to construction site welding:

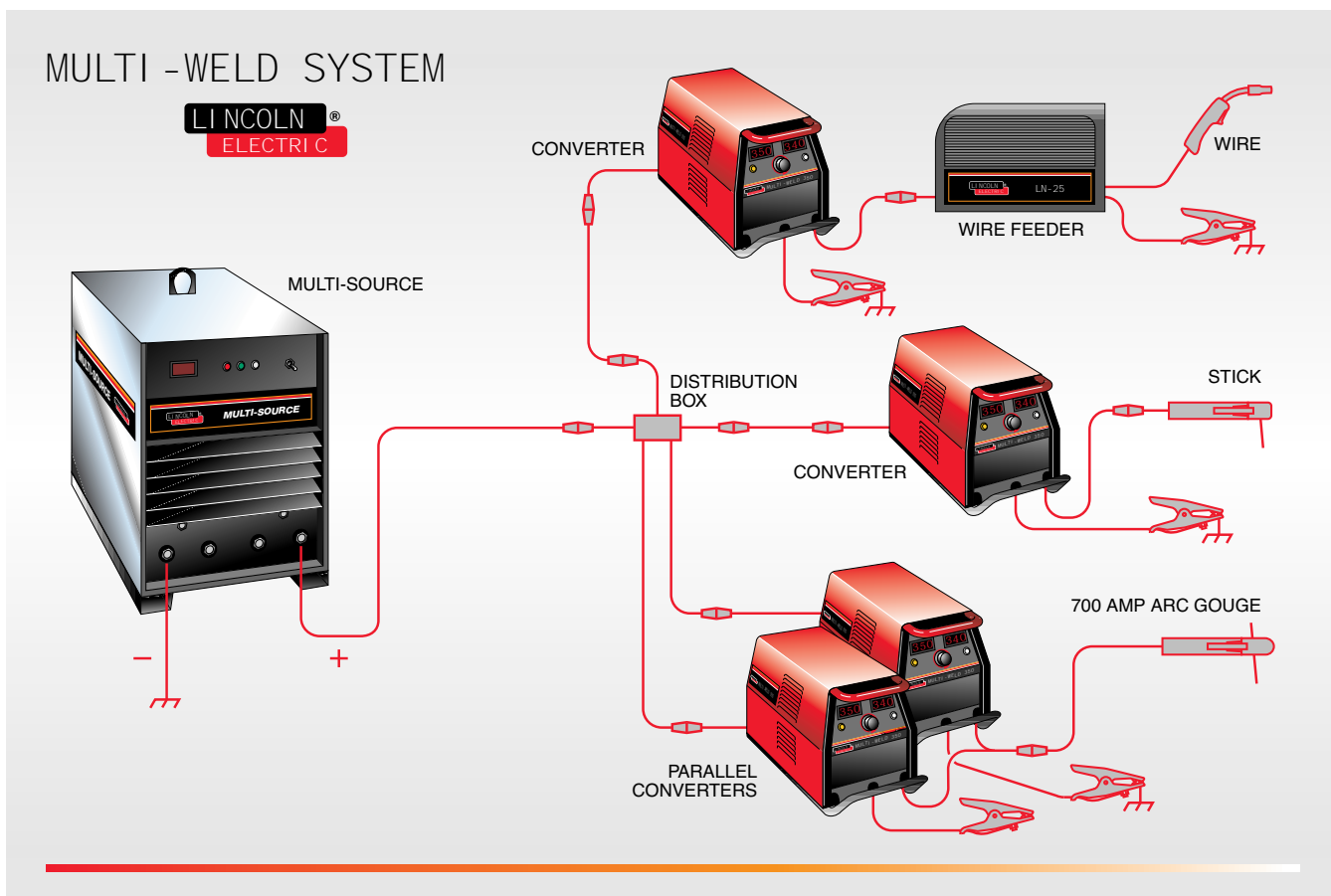
### Versatile

- Constant Current (CC) mode for stick and gouging. Includes Hot Start and Arc Force controls to optimize CC performance, and can be paralleled for higher capacity welding and arc gouging.
- Constant Voltage (CV) mode for positive polarity cored and solid wire welding with arc-powered feeders (such as the LN-25).

### Portable

- Arcs can be moved quickly with the light weight Converter that's easy to carry, or pull, and is small enough to fit through a 15" (38cm) diameter or 12" x 16" (31x 41cm) elliptical man-hole.
- Converter is powered by the welding cable from the DC power source, without the safety hazard of high AC input supply voltages.

Figure 1



- Converter welding controls are near the arc without long control cables, and a receptacle is provided for an optional remote for even closer user output control.

### Simple

- Easy installation with 10 ft. (3m) work clip lead and user preference quick-connect "pigtails" for input and electrode weld cables.
- Easy setup with only a few intuitive welding controls and lit displays; including a single Power/Mode switch with Input level light, and a single presettable Output Control with separate digital meters for Amps and Volts, featuring post-weld five second memory display.
- Easy Service with quick to replace cable "pig-tails" and "plug-in" assembly modules, including accessible PC boards and interchangeable "plug-n-play" panel instruments.

### Robust

- Capacity is rated for continuous operation at 350 amps in 50°C (122°F) ambient temperature, and can be paralleled to multiply CC mode output rating.
- Overload protection is provided with electronic limiting of output current, and with thermostat and over-voltage shutdown protection which automatically reset.
- Outdoor operation protected with sealed control and power electronics compartments, with sealed interconnections, housing "potted" circuit boards, and using "Central-Air" cooling with "Fan-As-Needed" for less dirt intake.
- Handling (and mishandling protection) is enhanced with light, but durably designed, aluminum construction with front to back, top and bottom, handles (also serving as "roll bar" and skid), and a sheetmetal shell attached with 1/4" steel threaded fasteners.

## RECOMMENDED EQUIPMENT AND PROCESSES

### MULTI-SYSTEM POWER SOURCE

The Multi-Source 40KW 80VDC buss power source (K1752-1) is recommended for use in the Multi-Weld system. However, other DC power sources capable of supplying the required system buss current, at above 60 volts, may be used. It is recommended that this power source have lower output inductance (choke) such as the Lincoln Electric DC-1000, DC-655 or DC-600 set for max. output in CC mode. The power source output VA capacity should be 10% greater than the sum of the max. VA of the converter arcs which may all be simultaneously welding or gouging:

$$\text{Power Source (Volts x Amps) capacity} > 1.1 \times \text{Sum of Converters' (Volts x Amps) arcs}$$

### DISTRIBUTION BOX

The Multi-Weld Distribution Box (K1736-1) is available for interconnection of the Multi-System using the same "pig-tail" connection method provided with the RED-D-ARC MX350 converter. Six cable strain-relief ports are provided for connection of up to (12) cables for distribution or "daisy-chain" inter-connection to other boxes. Four "pig-tail" leads (see below) are included with the Box.

### "PIG-TAIL" LEADS AND CONNECTORS

Accessory "pig-tail" leads and Twist-Mate connectors are available from Lincoln for extra connections to the RED-D-ARC MX350 or the Distribution Box:

Order No.	Description:
CL012705	22in.(56cm) long 2/0 (70mm <sup>2</sup> ) cable with 0.5in.(13mm) hole lug and cut-off ends.
K852-70	Twist-Mate male insulated plug for 1/0-2/0 (50-70mm <sup>2</sup> ) cable.
K852-95	Twist-Mate male insulated plug for 2/0-3/0 (70-95mm <sup>2</sup> ) cable.
K1759-70	Twist-Mate female insulated receptacle for 1/0-2/0 (50-70mm <sup>2</sup> ) cable.
K1759-95	Twist-Mate female insulated receptacle for 2/0-3/0 (70-95mm <sup>2</sup> ) cable.

**RED-D-ARC MX350**

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## REMOTE OUTPUT CONTROL OPTIONS

The RED-D-ARC MX350 is provided with a 3-pin remote receptacle.

## CV MODE WIRE WELDING

The Converter in CV mode was designed for use with an arc-powered wire feeder like the LN-25. The Converter output is always "hot" when the mode switch is not OFF, so it is recommended that the LN-25 model be equipped with the internal contactor in order to have a "cold" electrode when the gun trigger is released.

The CV mode recommended processes are positive (+) polarity wire welding within the output capacity of the Converter, including:

### Flux Cored Arc Welding (FCAW)

Innershield: NS3M (5/64"-3/32")  
NR305 (.068")

Outershield: OS-70 (1/16"-5/64")  
OS-71 (.045"-1/16")

MC-710 (.045"-5/64")

### Gas Metal Arc Welding (GMAW)

Carbon Steel: L50/56 (.030"-1/16")

## CC MODE STICK WELDING AND GOUGING

The CC mode recommended processes are positive (+) polarity stick and arc gouging within the output capacity of single, or paralleled, Converters; including:

### Shielded Metal Arc Welding (SMAW)

E6010/6011: FW5P/180 (3/32"-1/4") "fast-freeze"

E6013: FW37 (3/32"-3/16")  
"fill-freeze"

E7010/8010: SA85/70+ (3/32"-7/32")  
"fast-freeze" HT pipe

E7018/7028: JW LH70/3800 (3/32"-5/32") "low-hydrogen"

E7024/6027: JW1,3/2 (1/8"-5/16")  
"fast-fill"

### Arc Air Carbon (AAC)

Gouging: Carbons (5/32"-3/8")

## INSTALLATION

### QUICK-CONNECT "PIG-TAILS"

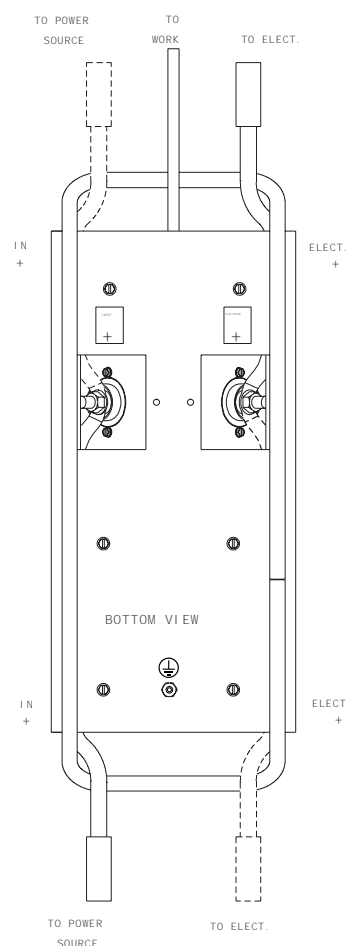
The RED-D-ARC MX350 is factory provided with two 21 in.(53 cm) long 2/0 AWG (70mm<sup>2</sup>) "pig-tail" cables with their 0.5"(13mm) hole lug ends routed through the "INPUT + "(on back) and "ELECTRODE + "(on front) cable channels of the Converter and attached to the bottom-accessed covered cable connection studs.

Attach the preferred standard user-provided Quick-connect terminal (such as Lincoln Twist-Mate or Tweco 2-MPC type) to the cut-off end of these cables. Use the female connector on the "ELECTRODE +" cable and the male connector on the "INPUT +" cable.

### ATTACHMENT AND ARRANGEMENT OF "PIG-TAILS"

To best suit the desired inter-connection of the Converters the "pig-tail" cables may be routed into the front cable channels, and/or into the back for single or double "pig-tail" cables to the bottom-accessed covered cable connection

FIGURE 1



RED-D-ARC MX350

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**To connect the "pig-tail" cables to the Converter:**

1. Stand the Converter vertically on its rear handle and skid to gain access to the bottom stud covers, then remove the two 0.25"(6.3mm) screws securing each cover and fold out the cover insulation.
2. Route the appropriate "pig-tail" cable lug ends under the skid rail (for strain-relief) through the desired front and/or rear corner channels to the exposed 0.5"(13mm) stud, and remove the flange nut with a .75"(19mm) wrench. Note: Input supply cable(s) must connect through "INPUT +" labeled channels, and output weld cable(s) must connect through "ELECTRODE +" labeled channels.
3. Slip the "pig-tail" cable lug(s) over the stud and re-secure the flange nut, making sure that lug(s) nowhere touch any sheetmetal of the stud housing, then fold back the cover insulation and replace the stud cover.

**⚠ WARNING****ELECTRIC SHOCK can kill.**

Be sure to follow the safety practice to use the female connector on the cable which would normally be electrically "hot" (supply lead) if disconnected when the system is energized, and the male on the normally "cold" (load lead) side. If

practical, shut off power before connecting or disconnecting terminals.

**WORK CONNECTION**


Each Converter in the Multi-Weld System must have its individual "Work" lead connected (clipped) to work. The #3 AWG (27mm<sup>2</sup>) Work clip lead must have clean metal connection to the work to complete the DC input supply and output power circuits of the RED-D-ARC MX350.

**⚠ WARNING****ELECTRIC SHOCK can kill.**

Do not disconnect the Work clip lead without first switching OFF the Converter panel switch. Failure to do so will allow the work lead clip to be electrically "hot" to work, and "hot" to

the electrode, through the circuit of the Converter for about 5 seconds until the input contactor opens.

**CASE GROUNDING**

As shipped, the case of the RED-D-ARC MX350 is isolated from all of the DC input and output welding terminals, and is equipped with a grounding terminal screw (.31" / 7.9mm) marked with the symbol  located on the bottom rear of the Base assembly. ( Refer to the bottom view figure.) In order to comply with CSA and UL case grounding specifications, this terminal is provided for connection to weldment work which must be properly grounded per methods meeting local and national electrical codes. Refer to "Safety in Welding, Cutting and Allied Processes", ANSI Z49.1 (US) and W117.2 (Canada).

Since any case fault would only involve the DC welding circuit, the size of the grounding lead should have the capacity to ground the potential fault current without burning open. Use at least #6AWG (13mm<sup>2</sup>), but need not exceed the size of the input cable supplying the RED-D-ARC MX350.

Connect the RED-D-ARC MX350 grounding lead to the work piece separately from the Work clip. If the same clip is used for both ground and work connection, the RED-D-ARC MX350 case will be electrically "hot" to the work if the clip is removed without first switching OFF the panel switch. ( Refer to the Work clip WARNING above).

## INTER-CONNECTION OF CONVERTERS

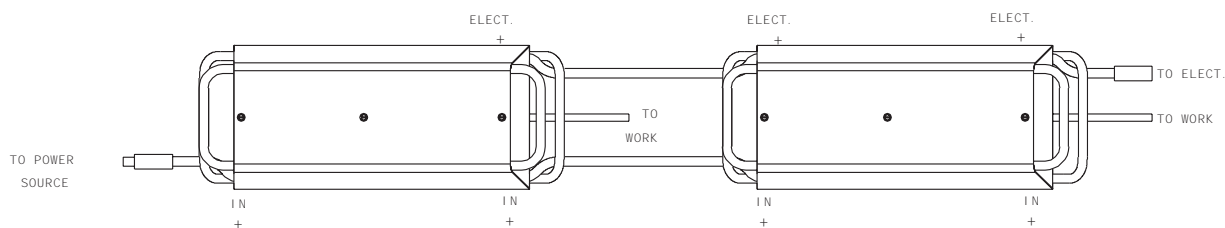
The input and electrode cables of the RED-D-ARC MX350 Converters may be inter-connected in a RED-D-ARC MX350 System using any combination of Distribution Box(es) (see Figure 1), paralleling (CC mode only) and "daisy-chaining" (see Figure 2) which best fits the field application setup within the capacity of the power source supplying the system:

Power Source (Volts x Amp) capacity > 1.1 x Sum of Converters' (Volts x Amps) arcs

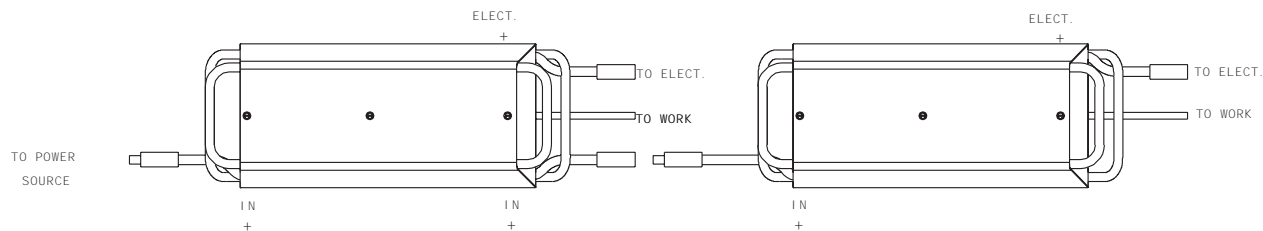
For Converters (operating at rated output) less than 200ft. (61m) from the power source, the following minimum cable sizes are recommended for the indicated quantity of Converters supplied by the input cable run to keep cable temperature and voltage drop within acceptable limits: (See Table.1)

**Figure 2**

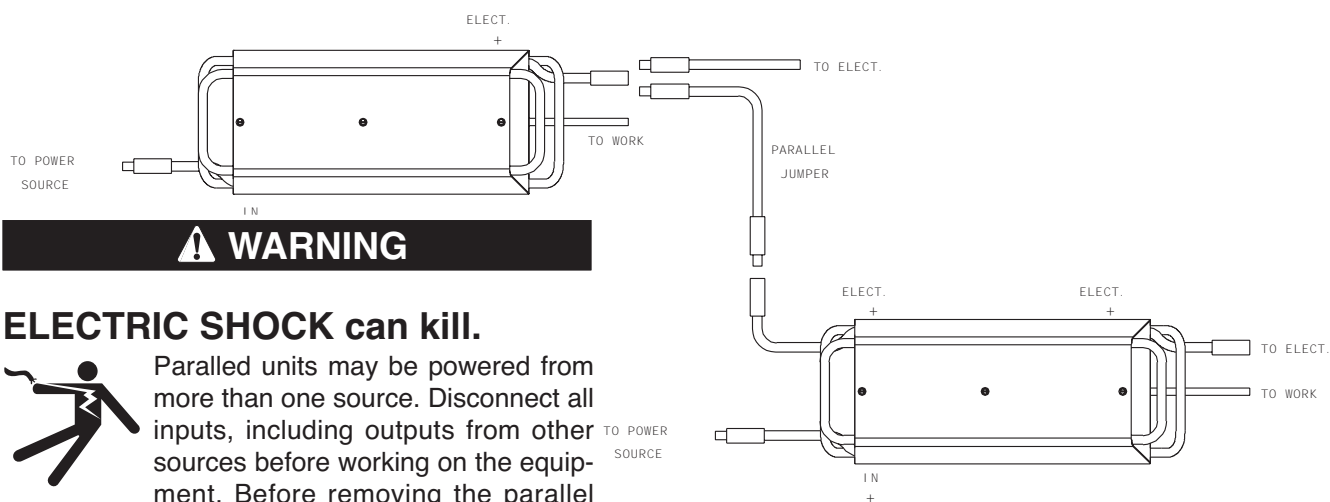
### FIXED PARALLEL OPERATION



### DAISY CHAIN OPERATION



### SEPARABLE PARALLEL OPERATION



## ⚠ WARNING

### ELECTRIC SHOCK can kill.



Paralled units may be powered from more than one source. Disconnect all inputs, including outputs from other sources before working on the equipment. Before removing the parallel jumper be sure both Converters are switched OFF. If not, the male side of the first disconnection will be electrically "hot" to work.

-----

**RED-D-ARC MX350**

**Red-Arc  
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Table .1

Converters on Cable	Cable Size AWG (mm <sup>2</sup> )
1	1/0 (50)
2	2/0 (70)
3	3/0 (95)
4	4/0 (120)
5	2x3/0 (2x95)

The output "Electrode" cable should be 2/0 AWG (70mm<sup>2</sup> ) if sized for rated output up to 200 ft.(61m) from the Converter. If paralleled, the output cable to the arc should be 4/0(120mm<sup>2</sup>).

## ⚠ WARNING

### ELECTRIC SHOCK can kill.



Do not disconnect the Work clip lead without first switching OFF the Converter panel switch. Failure to do so will allow the work lead clip to be electrically "hot" to work, and "hot" to the electrode, through the circuit of

the Converter for about 5 seconds until the input contactor opens.

## CONNECTION FOR NEGATIVE POLARITY WELDING (See Figure 2A)

A RED-D-ARC MX350 may be used for Negative (straight) polarity CV (Innershield) or CC processes if connected per the diagram shown below:

## ⚠ CAUTION

No more than one RED-D-ARC MX350 may be connected to a power source for Negative Polarity welding. Multiple units connected to the same power source may cause damage to the RED-D-ARC MX350.

This connection method will only permit using one RED-D-ARC MX350 arc on one power source, and cables have to be run to the RED-D-ARC MX350 from both (+) and (-) output studs of the power source. This is required so that the (-) electrode has a return path to both the RED-D-ARC MX350 and the Power Source, just like the normal (+)polarity connection has a (-) return path to both the RED-D-ARC MX350 (through the Work Clamp) and to the Power Source (through work connections). Both cable sizes are the same, with capacity as recommended for normal (+) connection.

If the power source itself can not perform the CV negative welding process, the RED-D-ARC MX350 is basically serving very well as a process converter (ei; CV from a CC power source), as well as a remote output control. The advantage is that the same equipment (RED-D-ARC MX350's and CC Power Sources) are used for all weld process applications.

## POWER SOURCE SETUP

Refer to the Instruction Manual provided with the Multi-Source power source, or other DC power source being used, for input power supply connections, output connections and controls setup.

In general:

1. Connect the positive (+) output connection terminal to the input supplying the RED-D-ARC MX350 system, and the negative (-) output connection terminal to the work. (see Figure 1).
2. If not using a Multi-Source power source;
  - a. If an inductance control, or tap, is selectable, use lowest inductance.
  - b. Use CC (Constant Current) mode, for maximum supply voltage.
  - c. Set panel output control to maximum, for maximum current capacity.
  - d. Activate output with the "output terminals on" switch, or jumper (2-4 on LE Co terminal strips).

Figure 2A

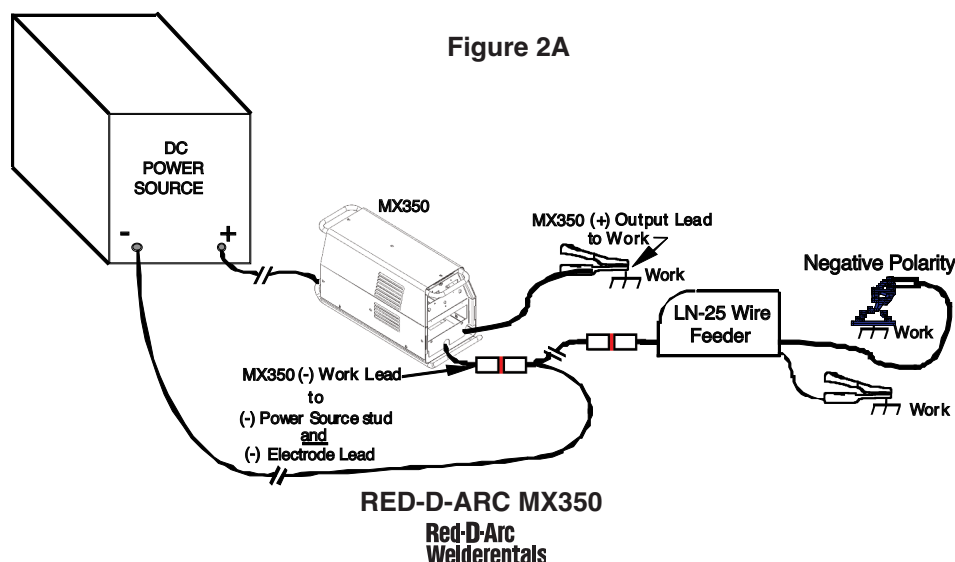
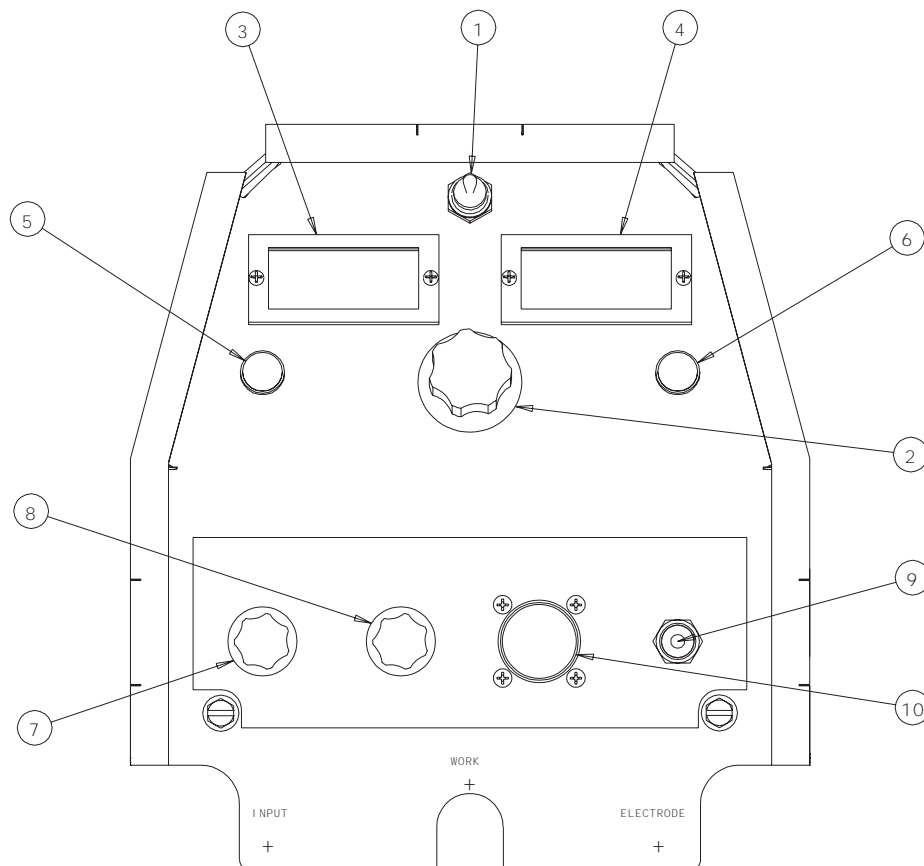




Figure 3

The numbered items of Figure 3, above, match the numbered items described below:



## FRONT PANEL CONTROLS

These few instruments are basic to the operation and monitoring of the Converter. They are intuitively laid out so that the panel's left side is weld current related, and the right side is weld voltage related:

**(1) Input Power/ Mode Switch** has three positions:

Center is OFF which shuts off input power to the Converter.

- Neither displays nor output is on if in OFF position.

Left is on for CC (constant current) welding mode.

- Only AMPS digital meter is lit displaying the preset current setting.
- Output will be on at o.c.v. (open circuit voltage).

Right is on for CV (constant voltage) welding mode.

- Only VOLTS digital meter is lit displaying the preset voltage setting

- Output will be on at the output voltage setting.

**(2) Output Control** has 3-3/4 turn resolution with slip-clutch to prevent control pot damage.

In CC mode it presets AMPS (30-350A range) when not welding, and adjusts actual arc current while welding.

In CV mode it presets VOLTS (15-40v range) when not welding, and adjusts actual arc voltage while welding.

**(3) AMPS Digital Meter** is a 3-1/2 digit LED meter which displays:

Preset Amps in CC mode when not welding.

"Blank" in CV mode when not welding.

Actual Amps while welding in both CC and CV modes.



Average Amps for about 7 seconds after welding stops in CC and CV modes only.

- The 5 second memory display is indicated by the display's left-most decimal point blinking, and is interrupted if arc is restarted.

Accuracy of Actual Amps is within 3%, and typically within 10 amps of Preset.

- An Actual Amps meter calibration adjustment trimmer is provided. ( See MAINTENANCE section).

Two front screws secure the meter bezel which holds a replaceable spatter shield lens (Lincoln part no. T14807-9).

- (4) VOLTS Digital Meter** is a 3-1/2 digit LED meter which displays:

Preset Volts in CV mode when not welding.

"Blank" in CC mode when not welding.

Actual Volts while welding in both CV and CC modes.

Average Volts for about 7 seconds after welding stops in CV and CC modes only.

- The 7 second memory display is indicated by the display's left-most decimal point blinking, and is interrupted if arc is restarted.

Accuracy of Actual Volts is within 3%, and typically within 1 volt of Preset.

- An Actual Amps meter calibration adjustment trimmer is provided. ( See MAINTENANCE section).

Two front screws secure the meter bezel which holds a replaceable spatter shield lens.

- (5) Thermal Shutdown (yellow) Light** turns on if output is shutdown because internal overheating has occurred. (See OVER TEMPERATURE SHUTDOWN in this section).

- (6) Input Voltage (green) Light** indicates appropriate level of input supply voltage:

"On" for adequate input voltage over 50v for CC or CV mode.

"Off" for inadequate input voltage under 50v, no input or Power Switch OFF.

**Note:** If green light is "blinking" the input voltage may be drifting above and below the 50 V level due to loads on supply and cables. This may also cause the input contactor to "chatter".

## RECESSED PANEL CONTROLS

These instruments are recessed behind a screw secured hinged cover panel, and are not typically required for normal operator access. They may be left covered, as factory set, or setup as desired with or without the hinged cover secured:

- (7) Hot Start Control** is provided to enhance arc starting in both CC and CV modes with an extra output "boost" at the arc strike that returns to the setting level in less than a second (about 0.30 sec. in CC mode, and 0.045 sec. in CV mode). This extra Hot Start amplitude is adjustable from "0" (no extra) to "10" (100% of setting extra), with the factory set "5" (center) position typically good for most weld starting. However, "0" may provide smoother starting for fine wire CV MIG.

- (8) Arc Force Control** is only functional in the CC mode with Stick/Gouge slope. (See below). Arc Force prevents "sticking" of the electrode by providing extra weld current if the arc voltage drops below about 14v. This extra weld current is adjustable from "-10" (no extra) to "+10" (60% of setting extra), with the factory set "0" (center) position typically good for most welding.

- (9) CC Slope Switch** is provided to enhance stick welding on "fast-freeze" type electrodes (such as E6010 and E7010) typically used on pipe welding applications for fast root pass vertical down "drag" technique (not "whipping"). If using this type of application improved operating appeal may be obtained if the CC Slope is switched from the factory set STICK / GOUGE position to the PIPE position.

**Note:** The PIPE position uses a "drooping" type slope (~22v/100A), so preset current (not actual current) accuracy may be affected if arc length voltage is not maintained at the typical 28v used for these electrodes. Typically this error should not be more than about 10 A.

- (10) Remote Control Receptacle** is provided to permit the use of an optional Remote output control to provide operator control even closer to the arc.

Connecting the Remote's plug to this receptacle automatically transfers output control from the panel Output Control (item (2) above) to the Remote pot control, which will function the same, but with only single-turn resolution.

Disconnecting the Remote's plug from this receptacle automatically transfers output control back to the panel Output Control (item (2) above).

## PARALLELED CONVERTERS

RED-D-ARC MX350 converters that are paralleled (see INTER-CONNECTION OF CONVERTERS in the INSTALLATION section) must each be set up in the same manner in order to manage the arc current drawn from each:

- 1) Set to CC mode with CC SLOPE switch set to STICK/GOUGE.
- 2) Preset Output Controls of both paralleled Converters to  $\sim 1/2$  desired total Amps.

If arc current from each Converter gets too out of balance (primarily a problem if trying to use CV mode) the hotter running Converter could go into current-limiting and/or Thermal shutdown (See OVER-TEMPERATURE SHUTDOWN in the INSTALLATION section), which might then overload the other, or at least interrupt the operator's process. However, no damage will occur to the Converters.

## REMOTE CONTROL OF PARALLELED CONVERTERS

### (FOR CC STICK/GOUGE MODE ONLY)

Full Range remote control can be accomplished with a separate optional Remote output control (see INSTALLATION section) connected to each Converter. The current contribution of each Converter will depend on its remote output setting.

Partial Range remote control can be accomplished with a single Remote Control connected to the output Converter with the input Converter preset with its panel Output Control to below the minimum desired output range. The Remote Control, connected to the output Converter, will control its output to add to the preset level.

## TRANSPORTING AND STORAGE OF THE RED-D-ARC MX350

### CABLE HANDLING

The input and electrode cables are easily disconnected from the quick-connect "pig-tails", and the Work lead can be reeled around the RED-D-ARC MX350 case cradled by the base skid handles, to which the clip can be secured.

### TRANSPORTING

The Converter may be carried by one or two persons using the front and rear top and bottom handles. It can also be set vertically on a two wheel cart, or horizontally

## STORAGE

The RED-D-ARC MX350 may be set on a floor, or shelf, horizontally on its skid, or vertically standing on its rear top and bottom handles.

## PROTECTION FEATURES

The RED-D-ARC MX350 design features electronic protection systems to help assure reliable operation even under adverse conditions. These systems include:

### FAN AS NEEDED (F.A.N.)

The cooling fan will turn on when the arc starts and remain on for about a minute after the arc is out to cool down the power components.

This feature electronically controls the fan so it does not run continuously when the power switch is turned on. This will minimize the amount of contaminate and clogging debris which may be drawn into the Converter, in addition to the "Central-Air" system design which intakes lower velocity air through the higher side louvers and blows out through the lower back louvers with higher velocity.

## OVER-VOLTAGE PROTECTION

### Average Input Voltage Protection

The RED-D-ARC MX350 input contactor will open if the average input supply voltage is above 113VDC, and will automatically reclose if the voltage drops back below. During Over-Voltage Shutdown the panel displays will be as appropriate for the non-welding mode.

### CAUTION

(See FRONT PANEL CONTROLS in this section).

**When the contactor recloses the output of the Converter will reactivate. Switching OFF input power prevents unexpected reactivation.**

### Peak Input Voltage Protection

The Chopper PC Board will stop switching and interrupt the machine output whenever the input voltage across the input capacitors exceeds their 150 volt rating. The Thermal Shutdown (yellow) panel light will be lit when this protection is activated (Refer to OVER-TEMPERATURE SHUTDOWN Section), and resets when the voltage level drops below the protection level. The input contactor also opens during this shutdown, until reset.

This feature protects internal components of the Converter from excessive voltage levels.

## OVER-CURRENT PROTECTION

The max. output current of the RED-D-ARC MX350 is electronically limited, to protect internal power components, so as not to exceed about 375 amps average and 500 amps peak. When the current load starts to exceed these limits the output is reduced (lower voltage) to sustain these max. levels, until the current is reduced. even to a shorted output.

Prolonged output at this max. current limit level may eventually overheat the Converter's internal power components causing over-temperature shutdown. (See following section).

Short circuit protection is also provided to reduce max. output current to about 200 amps if the output voltage is reduced, by loading or current limiting (see above), to below 14 volts for over 7 seconds (indicating a shorted output). The output current must be interrupted to reset this reduced protective level.

## OVER-TEMPERATURE SHUTDOWN

A second over-load protection switch in the Imbalance Protector Module was added to RED-D-ARC MX350 models with codes 10736, and higher. This module senses for an imbalance of current between the paralleled Chopper boards by sensing the differential choke voltage. If this voltage exceeds 1v for a sustained time the Imbalance Protector will also activate over-temperature shut down to protect the higher current Chopper board from over heating.

Machines with code 11149, or higher, which use the G4662-[ ] Peripheral PC Board, also include Peak Input Voltage Protection that also lights the the Thermal Shutdown (yellow) panel light if the unit output is shutdown (See OVER-VOLTAGE PROTECTION Section.).

### CAUTION

**When the thermostat resets the output of the Converter will reactivate. Switching OFF input power prevents reactivation, but also shuts off the cooling fan which prolongs the reset time.**

-----

During Over-Temperature Shutdown the panel displays will be as appropriate for the non-welding mode. (See FRONT PANEL CONTROLS in this section), except the fan will remain running and the Thermal Shutdown (yellow) Light will be lit until reset. Typically, If shutdown occurs repeatedly below 300 amps output with fan running, imbalance of the Chopper board current may likely be the cause.

## SAFETY PRECAUTIONS

### ⚠ WARNING

Have qualified personnel do the maintenance work.

Always use the greatest care when working near moving parts.

If a problem cannot be corrected by following the instructions, take the machine to the nearest Lincoln Field Service Shop.



**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.

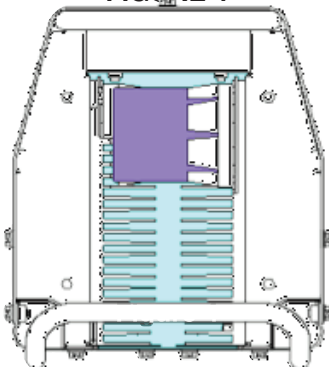
## MAINTENANCE

The only maintenance which may be required for the RED-D-ARC MX350 is to clean out any accumulated dirt and debris which could contaminate internal components, or obstruct proper cooling of the power components resulting in premature over-temperature shut-down.

The recommended cleaning procedure is as follows:

1. Be sure to disconnect the Converter's input cable to remove its input power.
2. Remove the four screws securing the rear louver panel, and remove the panel to expose the cooling tunnel heatsinks. (See Figure 4 below):

**FIGURE 4**



3. Holding the unit by the front handles, so the back is facing down, shake the loose debris out of the unit. Raking out the heatsink fins may be necessary for jammed debris.
4. If necessary, remove the case wraparound cover and using the skid handles to hold upside down carefully dump out any remaining loose debris, or carefully blow out using low pressure air.
5. Reassemble the cleaned out Converter by reversing the above steps.

## DIGITAL METER CALIBRATION

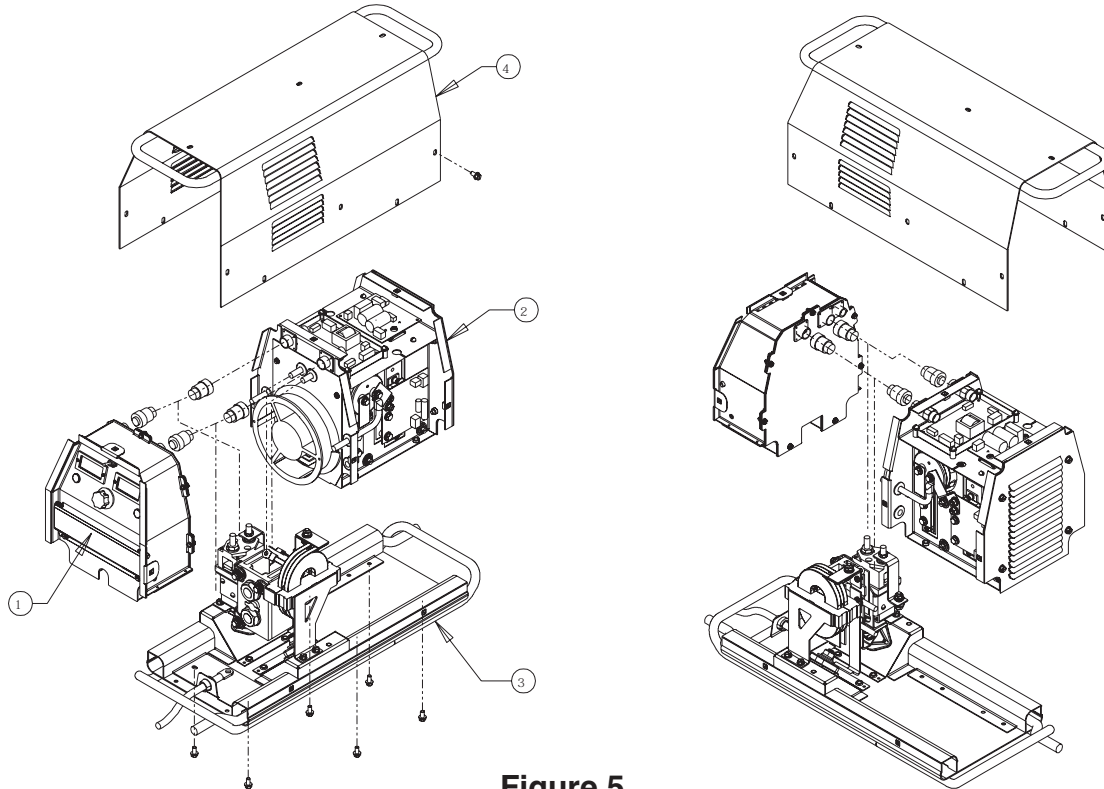
If calibration of either digital meter is ever necessary, meter calibration adjustment trimmers are provided on the Weld Control PC board inside the Control Module (see Figure 5). Calibration must be done with an Output current load, so meters are displaying Actual (not Preset) values. It is recommended that the calibration levels be near the rating plate values, for best accuracy, and compared to "master" meters with better than 2% accuracy.

The accuracy of Actual **AMPS** meter should be within 3% of the welding amps monitored. The **AMPS** meter trimmer (R561) is located near the center of the Weld Control PC board just below the **VOLTS** meter trimmer (R562). Clockwise rotation of the trimmer adjustment screw will decrease the meter reading.

The accuracy of Actual **VOLTS** meter should be within 3% of the welding volts monitored. The **VOLTS** meter trimmer (R562) is located near the center of the Weld Control PC board just above the **AMPS** meter trimmer (R561). Clockwise rotation of the trimmer adjustment screw will decrease the meter reading. The "master" voltmeter should be connected as close as possible to the "**ELECTRODE +**" stud and "**WORK-**" lead bolt, for best accuracy.

## SERVICE

The RED-D-ARC MX350 was designed for easy service using quick to replace components, and assembly modules which could be simply swapped out at the job site to minimize down time, and so more prolonged troubleshooting and repair of the module may be done later on the service bench.



**Figure 5**

The above, Figure 5, shows the three assembly modules of the Converter which are covered with the Case Wraparound (item (4)):

**Control Module (item (1))** is removed from the Base Module assembly by removing the two bottom accessed screws and disconnecting the three sealed harness plugs from the receptacles on the back of the Control box.

This module is a sealed enclosure containing replaceable electronic components:

- Sealed back cover which mounts the internal "potted" Control and Peripheral PCB's.
- Front panel with "plug-n-play" instruments which individually plug to the Control PCB.
- Interchangeable "potted" digital meters with front replaceable spatter shield lenses.
- Harness lead receptacles that connect to Base Module harness lead plugs.

**Tunnel Module (item (2))** is removed from the Base Module assembly by removing the four bottom accessed screws and disconnecting the two sealed harness plugs and power leads.

**Note:** Removal of Control Module improves access to disconnect Tunnel Module power leads.

This module assembly includes:

- Heatsinked power switching (IGBT) boards and isolated diodes.
- Capacitors and potted power supply boards.
- Fan and sheetmetal bulkhead tunnel and component enclosure.
- Harness lead receptacles and power leads that connect to Base Module.

**Base Module (item (3))** is the mounting and connection platform for the other modules.

This module assembly includes:

- Base sheetmetal with input / output connection chambers with "pigtail" leads.
- Input contactor, input diodes heat sink assembly and work clip lead.
- Output chokes and current shunt.
- Lead harness sealed plugs connect to Tunnel and Control Module receptacles.



## HOW TO USE TROUBLESHOOTING GUIDE

### WARNING

Service and Repair should only be performed by 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 Authorized Field Service Facility.

If you do not understand or are unable to perform the Recommended Course of Action safely, contact your local 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 Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

**RED-D-ARC MX350**

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Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
Machine completely dead: Input contactor does not pull in, meters are off.	<ol style="list-style-type: none"> <li>1. Check cable connections from (+) Input and Work to power source for loose or faulty connection.</li> <li>2. Input voltage may be too low. Measure input voltage to machine, should be 50 – 113 VDC.</li> <li>3. The power switch may be faulty.</li> <li>4. The DC Buss Power Supply PCB or its connections may be faulty.</li> <li>5. The Analog Control Power Supply PCB may be faulty.</li> <li>6. The Weld Control PCB may be faulty.</li> </ol>	<p>If all recommended possible areas of misadjustment have been checked and the problem persists, <b>Contact your local Authorized Field Service Facility.</b></p>
Meter turns on but input contactor does not pull in. Machine has no output:	<ol style="list-style-type: none"> <li>1. Check input voltage, should be less than 113 VDC.</li> <li>2. Remote receptacle output switching enabled. Check if jumper is open on plug P21. (Refer to wiring diagram).</li> <li>3. The contactor or supply voltage to contactor coil may be faulty.</li> <li>4. The connections at PCB connectors inside the control box may be faulty.</li> <li>5. The Peripheral PCB may be faulty.</li> <li>6. The Weld Control PCB may be faulty.</li> </ol>	
Thermal light comes on. No output:	<ol style="list-style-type: none"> <li>1. Thermal shut down. Wait until machine cools down and thermal light goes out. Do not overload machine.</li> <li>2. The thermostat or imbalance protector or Peak Input Voltage Protection (if present) or their connections may be faulty.</li> </ol>	

### CAUTION

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

RED-D-ARC MX350

**Red-D-Arc**  
Welderrentals



Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
Meter turns on, input contactor pulls in, thermal light is off. Machine has no output:	<ol style="list-style-type: none"> <li>1. The output cable connections may be faulty. Check (+) Electrode and Work cable connections.</li> <li>2. The connections at control box plugs, chopper boards plugs, or Analog Control Power Supply PCB connectors may be faulty.</li> <li>3. Inputs to Chopper PCB or Chopper PCB may be faulty.</li> <li>4. The Analog Control Supply PCB may be faulty.</li> <li>5. The connection at PCB connectors inside the control box may be faulty.</li> <li>6. The Weld Control PCB may be faulty.</li> </ol>	<p>If all recommended possible areas of misadjustment have been checked and the problem persists, <b>Contact your local Authorized Field Service Facility.</b></p>
Preset is not adjustable: <b>Note: Panel control is disabled if Remote is plugged in.</b>	<ol style="list-style-type: none"> <li>1. The output control potentiometer or its connections may be faulty.</li> <li>2. The Weld Control board or its connections may be faulty.</li> </ol>	
Preset range is not right:	<ol style="list-style-type: none"> <li>1. A faulty or missing plug P3 at connector J3 of Weld Control PCB.</li> <li>2. The Weld Control board or its connections may be faulty.</li> </ol>	
None of the meters comes on in CC or CV settings:	<ol style="list-style-type: none"> <li>1. The Analog Control Power Supply PCB or its connections may be faulty.</li> <li>2. The Weld Control PCB or connections to meters may be faulty.</li> <li>3. Faulty meters.</li> </ol>	
Meter comes on in only one of the CC or CV settings:	<ol style="list-style-type: none"> <li>1. The Weld Control PCB or connections to meters may be faulty.</li> <li>2. Faulty meters.</li> </ol>	

### CAUTION

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

Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
The meter is not accurate:	<ol style="list-style-type: none"> <li>1. The Analog Control Power Supply PCB or its connections may be faulty.</li> <li>2. The Weld Control PCB may be faulty.</li> </ol>	<p>If all recommended possible areas of misadjustment have been checked and the problem persists, <b>Contact your local Authorized Field Service Facility.</b></p>
Fan does not run when turning machine on:	<ol style="list-style-type: none"> <li>1. Fan does not normally run until machine is welding. See Instruction Manual.</li> </ol>	
Fan does not run when welding:	<ol style="list-style-type: none"> <li>1. Faulty Supply voltage to fan, normal is 40 VDC.</li> <li>2. Replace fan if supply voltage to fan is good.</li> <li>3. The Weld Control PCB may be faulty.</li> </ol>	
No control, very high output current:	<ol style="list-style-type: none"> <li>1. Check input &amp; output cables. Check connections at (+) Input stud &amp; (+) Electrode stud, make sure they don't short to case.</li> <li>2. Faulty shunt lead connection.</li> <li>3. Faulty output control potentiometer or its connections.</li> <li>4. Faulty Weld Control PCB.</li> </ol>	
No control, maximum output current stays around 200A:	<ol style="list-style-type: none"> <li>1. Check output cables. Check connections at (+) Electrode stud and Work.</li> <li>2. Faulty voltage feedback connection. Check continuity from lead #401 at C1 to lead #301 at pin 1 of P22 (refer to wiring diagram).</li> <li>3. Faulty Weld Control PCB.</li> </ol>	
No control :	<ol style="list-style-type: none"> <li>1. Faulty output control potentiometer or its connections.</li> <li>2. Faulty connections at Weld Control PCB connectors.</li> <li>3. Faulty Weld Control PCB.</li> </ol>	

### CAUTION

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

RED-D-ARC MX350

**Red-D-Arc**  
Welderrentals

Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE AREAS OF MISADJUSTMENT(S)	RECOMMENDED COURSE OF ACTION
Current changing with arc length in Stick welding:	<ol style="list-style-type: none"> <li>1. Check the CC Slope switch on the recessed panel, it should be set at Stick/Gauge position for Stick welding.</li> <li>2. Faulty CC Slope switch or connections.</li> <li>3. Faulty Weld Control PCB.</li> </ol>	<p>If all recommended possible areas of misadjustment have been checked and the problem persists, <b>Contact your local Authorized Field Service Facility.</b></p>
Poor performance on "fast-freeze" type electrodes such as E6010, E7010:	<ol style="list-style-type: none"> <li>1. Check the CC Slope switch on the recessed panel, it should be set at Pipe position.</li> <li>2. Faulty CC Slope switch or connections.</li> <li>3. Faulty connections on Weld Control PCB connectors.</li> <li>4. Faulty Weld Control PCB.</li> </ol>	
Bad starting:	<ol style="list-style-type: none"> <li>1. Adjust Hot Start setting on the recessed panel.</li> <li>2. Check Hot Start potentiometer and connections. The Hot Start and Arc Force potentiometers are interchangeable, switch them to check out.</li> </ol>	
Electrode "stubbing":	<ol style="list-style-type: none"> <li>1. Adjust Arc Force setting on the recessed panel.</li> <li>2. Check Arc Force potentiometer and connections. The Hot Start and Arc Force potentiometers are interchangeable, switch them to check out.</li> </ol>	

### CAUTION

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

RED-D-ARC MX350

**Red-D-Arc**  
Welderrentals

**CONTROL BOX FRONT PANEL (VIEWED FROM REAR)**

**CONTROL BOX BACK PANEL (VIEWED FROM PCB SIDE)**

**TUNNEL ASSEMBLY (VIEWED FROM PCB SIDE)**

**COVERED PANEL (VIEWED FROM REAR)**

**PERIPHERAL PCB**

**ANALOG SUPPLY PCB**

**DC BUSS POWER SUPPLY PCB**

**CHOPPER PCB (LEFT)**

**CHOPPER PCB (RIGHT)**

**HEAT SINK CONNECTION (LEFT)**

**HEAT SINK CONNECTION (RIGHT)**

**WELD CONTROL PCB**

**OUTPUT CONTROL**

**REMOTE RECEPTACLE**

**PANEL RECEPTACLE CAVITY NUMBERING SEQUENCE (VIEWED FROM LEAD SIDE OF RECEPTACLE)**

**PCB CONNECTOR CAVITY NUMBERING SEQUENCE (VIEWED FROM COMPONENT SIDE OF P.C. BOARD)**

**NOTES:**

N.B. R-XXX DENOTES A RED LEAD NUMBERED XXX

**GENERAL INFORMATION:**

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED

RESISTORS - OHMSWATT UNLESS OTHERWISE SPECIFIED

ALL SWITCH WIRING VIEWED FROM REAR OF SWITCH

NOTE: SINCE COMPONENTS OR CIRCUITS OF A PRINTED CIRCUIT BOARD ARE NOT SHOWN, THE DIAGRAM MAY NOT SHOW THE EXACT COMPONENTS OR CIRCUITS OF A PARTICULAR BOARD.

OR QUANTITY OF COMPONENTS HAVING A COMMON CODE NUMBER.

**CONTROL BOX FRONT PANEL (VIEWED FROM REAR)**

ON/OFF & MODE SELECT S1  
202A OFF 202 231 219  
218 217 202B

CC CV  
224 222 223  
TIN TERMINAL

**VOLT**  
202B 202A 202 231 219 218 217

**AMP**  
222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

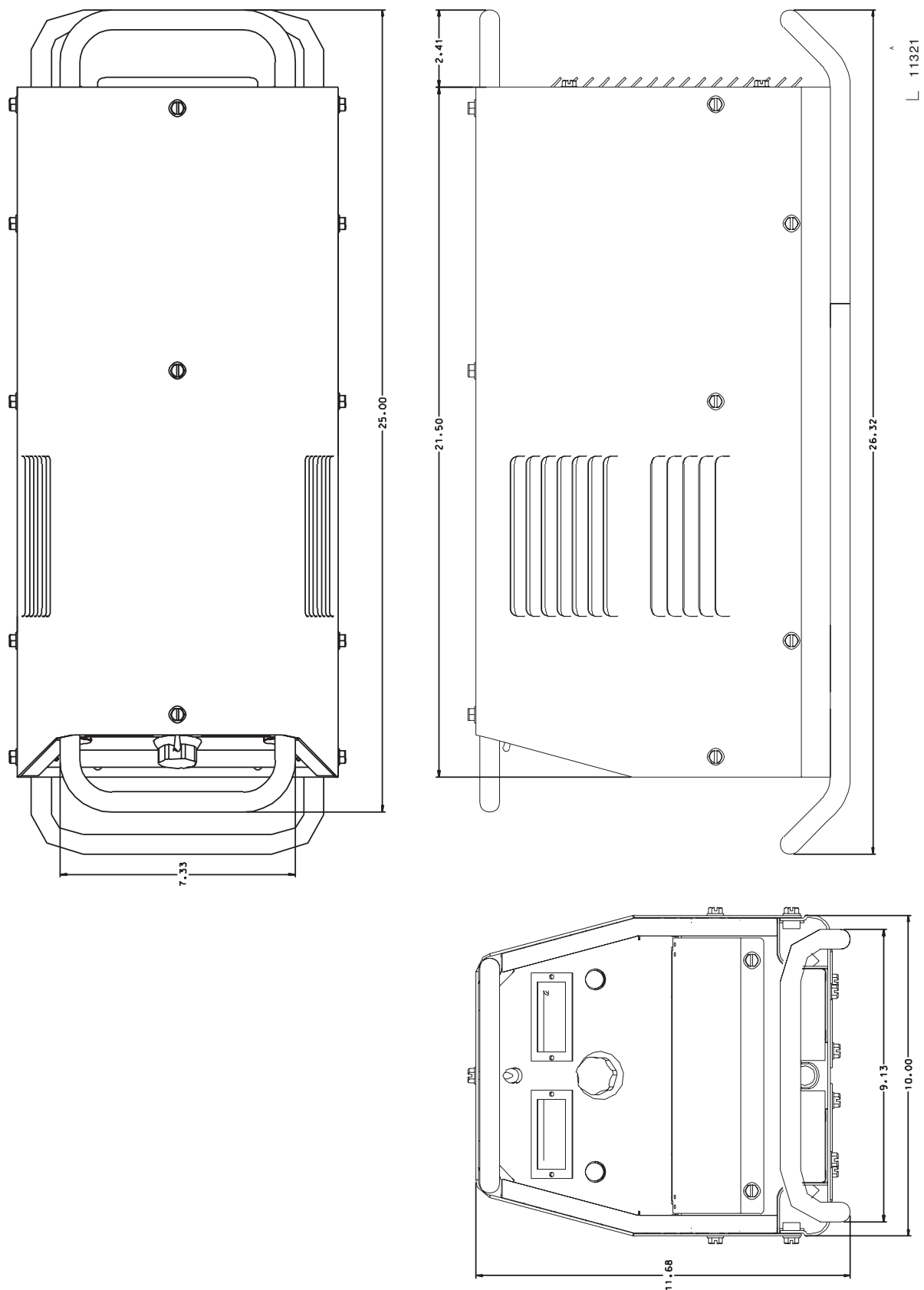
**CONTROL BOX BACK PANEL (VIEWED FROM PCB SIDE)**

PANEL PLUGS P21 J21  
PANEL RECEPTACLES J21  
P22 J22  
P23 J23  
P24 J24  
P25 J25  
P26 J26  
P27 J27  
P28 J28  
P29 J29  
P30 J30  
P31 J31  
P32 J32  
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P97 J97  
P98 J98  
P99 J99  
P100 J100

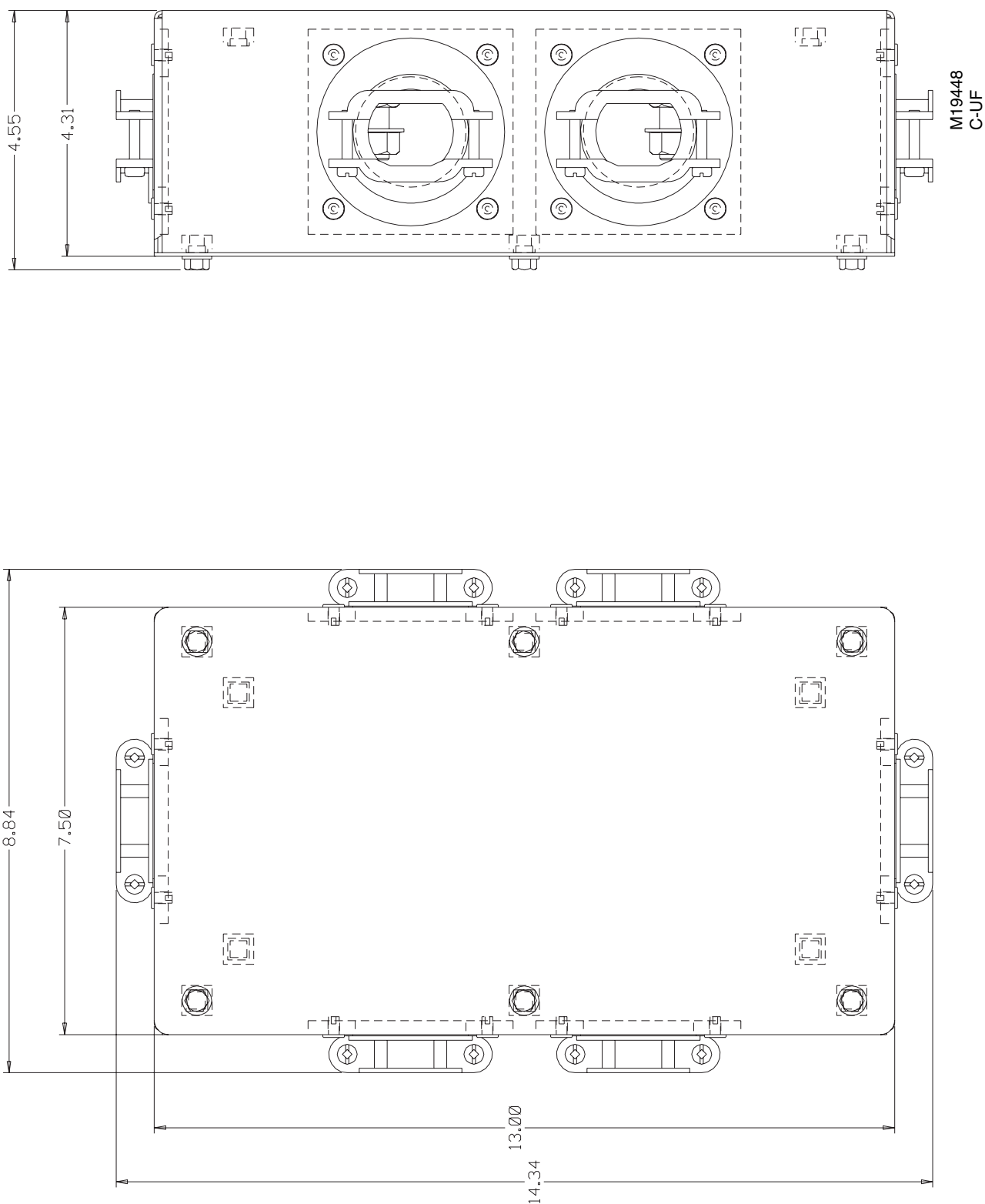
**TUNNEL ASSEMBLY (VIEWED FROM PCB SIDE)**

PANEL PLUGS P20 J20  
PANEL RECEPTACLES J20  
P21 J21  
P22 J22  
P23 J23  
P24 J24  
P25 J25  
P26 J26  
P27 J27  
P28 J28  
P29 J29  
P30 J30  
P31 J31  
P32 J32  
P33 J33  
P34 J

**G4674**

**DIMENSION PRINT - MX350 CONVERTER**

## DIMENSION PRINT FOR DISTRIBUTION BOX





## NOTES

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## NOTES

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<ul style="list-style-type: none"> <li>● Keep your head out of fumes.</li> <li>● Use ventilation or exhaust to remove fumes from breathing zone.</li> </ul>	<ul style="list-style-type: none"> <li>● Turn power off before servicing.</li> </ul>	<ul style="list-style-type: none"> <li>● Do not operate with panel open or guards off.</li> </ul>	<b>WARNING</b>
<ul style="list-style-type: none"> <li>● Los humos fuera de la zona de respiración.</li> <li>● Mantenga la cabeza fuera de los humos. Utilice ventilación o aspiración para gases.</li> </ul>	<ul style="list-style-type: none"> <li>● Desconectar el cable de alimentación de poder de la máquina antes de iniciar cualquier servicio.</li> </ul>	<ul style="list-style-type: none"> <li>● No operar con panel abierto o guardas quitadas.</li> </ul>	Spanish <b>AVISO DE PRECAUCION</b>
<ul style="list-style-type: none"> <li>● Gardez la tête à l'écart des fumées.</li> <li>● Utilisez un ventilateur ou un aspirateur pour ôter les fumées des zones de travail.</li> </ul>	<ul style="list-style-type: none"> <li>● Débranchez le courant avant l'entretien.</li> </ul>	<ul style="list-style-type: none"> <li>● N'opérez pas avec les panneaux ouverts ou avec les dispositifs de protection enlevés.</li> </ul>	French <b>ATTENTION</b>
<ul style="list-style-type: none"> <li>● Vermeiden Sie das Einatmen von Schweißrauch!</li> <li>● Sorgen Sie für gute Be- und Entlüftung des Arbeitsplatzes!</li> </ul>	<ul style="list-style-type: none"> <li>● Strom vor Wartungsarbeiten abschalten! (Netzstrom völlig öffnen; Maschine anhalten!)</li> </ul>	<ul style="list-style-type: none"> <li>● Anlage nie ohne Schutzgehäuse oder Innenschutzverkleidung in Betrieb setzen!</li> </ul>	German <b>WARNUNG</b>
<ul style="list-style-type: none"> <li>● Mantenha seu rosto da fumaça.</li> <li>● Use ventilação e exaustão para remover fumo da zona respiratória.</li> </ul>	<ul style="list-style-type: none"> <li>● Não opere com as tampas removidas.</li> <li>● Desligue a corrente antes de fazer serviço.</li> <li>● Não toque as partes elétricas nuas.</li> </ul>	<ul style="list-style-type: none"> <li>● Mantenha-se afastado das partes moventes.</li> <li>● Não opere com os painéis abertos ou guardas removidas.</li> </ul>	Portuguese <b>ATENÇÃO</b>
<ul style="list-style-type: none"> <li>● ヒュームから頭を離すようにして下さい。</li> <li>● 換気や排煙に十分留意して下さい。</li> </ul>	<ul style="list-style-type: none"> <li>● 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して下さい。</li> </ul>	<ul style="list-style-type: none"> <li>● パネルやカバーを取り外したまま機械操作をしないで下さい。</li> </ul>	Japanese <b>注意事項</b>
<ul style="list-style-type: none"> <li>● 頭部遠離煙霧。</li> <li>● 在呼吸區使用通風或排風器除煙。</li> </ul>	<ul style="list-style-type: none"> <li>● 維修前切斷電源。</li> </ul>	<ul style="list-style-type: none"> <li>● 儀表板打開或沒有安全罩時不準作業。</li> </ul>	Chinese <b>警告</b>
<ul style="list-style-type: none"> <li>● 얼굴로부터 용접가스를 멀리하십시오.</li> <li>● 호흡지역으로부터 용접가스를 제거하기 위해 가스제거기나 통풍기를 사용하십시오.</li> </ul>	<ul style="list-style-type: none"> <li>● 보수전에 전원을 차단하십시오.</li> </ul>	<ul style="list-style-type: none"> <li>● 판넬이 열린 상태로 작동치 마십시오.</li> </ul>	Korean <b>위험</b>
<ul style="list-style-type: none"> <li>● ابعد رأسك بعيداً عن الدخان.</li> <li>● استعمل التهوية أو جهاز ضغط الدخان للخارج لكي تبعد الدخان عن المنطقة التي تتنفس فيها.</li> </ul>	<ul style="list-style-type: none"> <li>● اقطع التيار الكهربائي قبل القيام بأية صيانة.</li> </ul>	<ul style="list-style-type: none"> <li>● لا تشغل هذا الجهاز اذا كانت الاغطية الحديدية الواقية ليست عليه.</li> </ul>	Arabic <b>تحذير</b>

**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說明以及應該使用的銀焊材料，並請遵守貴方的有關勞動保護規定。

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.

<b>WARNING</b>	<ul style="list-style-type: none"> <li>Do not touch electrically live parts or electrode with skin or wet clothing.</li> <li>Insulate yourself from work and ground.</li> </ul>	<ul style="list-style-type: none"> <li>Keep flammable materials away.</li> </ul>	<ul style="list-style-type: none"> <li>Wear eye, ear and body protection.</li> </ul>
Spanish <b>AVISO DE PRECAUCION</b>	<ul style="list-style-type: none"> <li>No toque las partes o los electrodos bajo carga con la piel o ropa mojada.</li> <li>Aíslese del trabajo y de la tierra.</li> </ul>	<ul style="list-style-type: none"> <li>Mantenga el material combustible fuera del área de trabajo.</li> </ul>	<ul style="list-style-type: none"> <li>Protéjase los ojos, los oídos y el cuerpo.</li> </ul>
French <b>ATTENTION</b>	<ul style="list-style-type: none"> <li>Ne laissez ni la peau ni des vêtements mouillés entrer en contact avec des pièces sous tension.</li> <li>Isolez-vous du travail et de la terre.</li> </ul>	<ul style="list-style-type: none"> <li>Gardez à l'écart de tout matériel inflammable.</li> </ul>	<ul style="list-style-type: none"> <li>Protégez vos yeux, vos oreilles et votre corps.</li> </ul>
German <b>WARNUNG</b>	<ul style="list-style-type: none"> <li>Berühren Sie keine stromführenden Teile oder Elektroden mit Ihrem Körper oder feuchter Kleidung!</li> <li>Isolieren Sie sich von den Elektroden und dem Erdboden!</li> </ul>	<ul style="list-style-type: none"> <li>Entfernen Sie brennbares Material!</li> </ul>	<ul style="list-style-type: none"> <li>Tragen Sie Augen-, Ohren- und Körperschutz!</li> </ul>
Portuguese <b>ATENÇÃO</b>	<ul style="list-style-type: none"> <li>Não toque partes elétricas e electrodos com a pele ou roupa molhada.</li> <li>Isole-se da peça e terra.</li> </ul>	<ul style="list-style-type: none"> <li>Mantenha inflamáveis bem guardados.</li> </ul>	<ul style="list-style-type: none"> <li>Use proteção para a vista, ouvido e corpo.</li> </ul>
Japanese <b>注意事項</b>	<ul style="list-style-type: none"> <li>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。</li> <li>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。</li> </ul>	<ul style="list-style-type: none"> <li>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。</li> </ul>	<ul style="list-style-type: none"> <li>目、耳及び身体に保護具をして下さい。</li> </ul>
Chinese <b>警告</b>	<ul style="list-style-type: none"> <li>皮肤或湿衣物切勿接触带电部件及焊条。</li> <li>使你自己与地面和工件绝缘。</li> </ul>	<ul style="list-style-type: none"> <li>把一切易燃物品移离工作场所。</li> </ul>	<ul style="list-style-type: none"> <li>佩戴眼、耳及身体劳动保护用具。</li> </ul>
Korean <b>위험</b>	<ul style="list-style-type: none"> <li>전도체나 용접봉을 젖은 형갑 또는 피부로 절대 접촉치 마십시오.</li> <li>모재와 접지를 접촉치 마십시오.</li> </ul>	<ul style="list-style-type: none"> <li>인화성 물질을 접근시키지 마십시오.</li> </ul>	<ul style="list-style-type: none"> <li>눈, 귀와 몸에 보호장구를 착용하십시오.</li> </ul>
Arabic <b>تحذير</b>	<ul style="list-style-type: none"> <li>لا تلمس الاجزاء التي يسري فيها التيار الكهربائي أو الألكترود بجسد الجسم أو بالملابس المبللة بالماء.</li> <li>ضع عازلا على جسمك خلال العمل.</li> </ul>	<ul style="list-style-type: none"> <li>ضع المواد القابلة للاشتعال في مكان بعيد.</li> </ul>	<ul style="list-style-type: none"> <li>ضع أدوات وملابس واقية على عينيك وأذنيك وجسمك.</li> </ul>

**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.**



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