MINIFLEX™ Portable High Vacuum Fume Extraction Unit

IM857

June, 2005

For use with equipment having K Number: **K2376-1**

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

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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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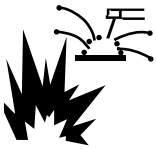


WELDING SPARKS can cause fire or explosion.

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.

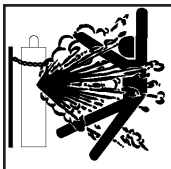
6.d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been “cleaned”. For information, purchase “Recommended Safe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

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.

Product _____

Model Number _____

Code Number or Date Code_____

Serial Number_____

Date Purchased_____

Where Purchased_____

Whenever you request replacement parts or information on this equipment, always supply the information you have recorded above. The code number is especially important when identifying the correct replacement parts.

On-Line Product Registration

- Register your machine with Lincoln Electric either via fax or over the Internet.

• For faxing: Complete the form on the back of the warranty statement included in the literature packet accompanying this machine and fax the form per the instructions printed on it.

• For On-Line Registration: Go to our **WEB SITE at www.lincolnelectric.com.** Choose "Quick Links" and then "Product Registration". Please complete the form and submit your registration.

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

⚠ WARNING

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

⚠ CAUTION

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

TABLE OF CONTENTS

TECHNICAL SPECIFICATIONS - MINIFLEX PORTABLE FUME EXTRACTOR (K2376-1)

INPUT	
Input Voltage	115/1/50/60
Rated Current Draw	15A
Power Rating	2.4 hp (1.2 hp per motor)
FILTER TYPE	
Stage One	Separate Mesh Screen Pre-filter
Stage Two	Integrated Mesh/Screen Pre-separator
Stage Three	LongLife-H™ Pretreated Cellulose Filter
Surface Area	130 sq. ft. (12 m^2)
Stage Four (Optional)	Activated Carbon Filter
Stage Five	HEPA (High Efficiency Particulate Air) Filter
Unit Efficiency	Up to 99.97%
OPERATING SOUND LEVEL	
<70 dB(A)	
AMBIENT CONDITIONS	
Min. Temperature	40° F (5° C)
Max. Operating Temperature	104° F (40° C)
Max Rel. Humidity	80%
OPERATING CAPACITY	
Extractor Type	High Vacuum, Low Volume
Airflow Rate	Low: 94 CFM (160 m^3/hr) High: 135 CFM (230 m^3/hr)

PHYSICAL DIMENSIONS			
HEIGHT	DIAMETER	INLET/OUTLET OUTER DIAMETER	WEIGHT
29.0” (730 mm)	16.5” (420 mm)	1-3/4” (45 mm)	38 lbs. (17 kg)

GENERAL DESCRIPTION

The Miniflex has been specifically designed for extracting and/or filtering welding fume. It is a high vacuum, low volume system that excels in the design and ease of handling. It can be completely disassembled in a matter of minutes for cleaning and maintenance. With an automatic start/stop function, the unit automatically turns on and off during welding via a current sensor located in the slot at the top of the unit. It can be used in confined spaces and other locations that are not accessible with other welding fume extractors. And with its standard set of wheels and optional wall-mounting bracket, it can be easily moved around or positioned off the work floor, out of the welder's working space.

Unit includes:
- 8 ft. (2.5 m) extraction hose with 1-3/4 in. (45 mm) O.D. hose adapter.
- Two sets of seals and carbon brushes.

ELECTRICAL INSTALLATION

⚠ WARNING

Plug in the Miniflex to a 115V single phase, grounded input suitable for 15 amp service.

USE WITH NOZZLES AND HOSES

The Miniflex is not supplied with a nozzle. Nozzles and extra hoses can be ordered separately as options. The recommended nozzles and hoses are:
- Extraction Nozzles: EN 20 or 40 (K2389-5 and K2389-6)
- Nozzle Kits: NKT or NKC (K2389-3, K2389-4)
- Fume Exhaust Guns (See publication #13.10 and #12.110)
- Extraction Hoses:
  - 8ft. (2.5m) long x 1-3/4 in. (45mm) O.D. (K2389-9)
  - 16 ft. (5m) long x 1-3/4 in. (45 mm) O.D.(K2389-8)
- Hose-to-Hose Adapter (K2389-10)
- Hose Connection Outlet (K2389-2)

See section C and Miniflex brochure Publication E13.11 for more information.

Note: Recommended maximum hose length is 24 ft. (7.5 m) on extraction side of unit.

Consult Lincoln Electric Automation before using any other size or length of hose.

WALL MOUNTING BRACKET (If applicable)

The optional wall bracket provides an easy and practical way to free some floor space. It can be easily installed onto any sturdy wall. The bracket does not include any hardware, therefore the user must supply their own screws, anchors, etc. because of the different types of walls the bracket can be installed on.
Note: Wall construction should be sturdy enough to support Miniflex unit.

MOUNTING THE WALL BRACKET ON A WALL

1. Using the bracket and a level as a guide, mark the four holes at the desired location on the wall.
2. Drill holes at each location.
3. Set anchors and align bracket with holes.
4. Screw bracket into wall using appropriate screws.

FIGURE A.1

MOUNTING THE MINIFLEX ON A WALL BRACKET

1. The wheel side of the Miniflex should be facing the wall (see Figure A.1).
2. Push in the silver metal plate (see Figure A.2) while inserting the lip of the bracket between the top of the canister and the filter.
3. When the lip of the bracket is in place, release the silver plate to attach bottom portion of the Miniflex into the bracket.
4. Push in silver metal plate and pull up on Miniflex to release from wall bracket.

FIGURE A.2

Read and understand this entire section before operating your Miniflex.

SAFETY PRECAUTIONS

⚠ WARNING

Always operate this equipment with the filters installed and covers in place as these provide maximum protection from moving parts and insure proper vacuum operation and cooling air flow.

RECOMMENDED USES

The Miniflex is a small, portable filtration unit designed for light to medium duty weld applications and is used for extracting and/or filtering fumes that are released during the following welding processes:

- MIG/MAG solid wire (GMAW)
- MIG/MAG flux cored wire (FCAW)*
- Stick welding (SMAW)
- TIG (GTAW) welding

*For light flux-cored applications only.

Use of the product for extracting and/or filtering fumes and/or gases that are released from the following processes is not recommended:

- Welding applications with intensive use of Tip Dip (anti-spatter).
- Autogenic or plasma cutting spray/molten metal.
- Arc-air gouging.
- Welding that produces the release of a dense oil mist.
- Paint spraying.
- Extraction of hot gases (more than 104° F, 40° C.)
- Extraction of aggressive fumes (such as acids).
- Grinding aluminum and magnesium.
- Flame spraying.
- Extraction of cement, saw dust, wood dust, etc.
- Extracting cigarettes, cigars, tissues and other burning particles, objects and acids.
- Any dangerous situations where there is a risk of an explosion or fire.

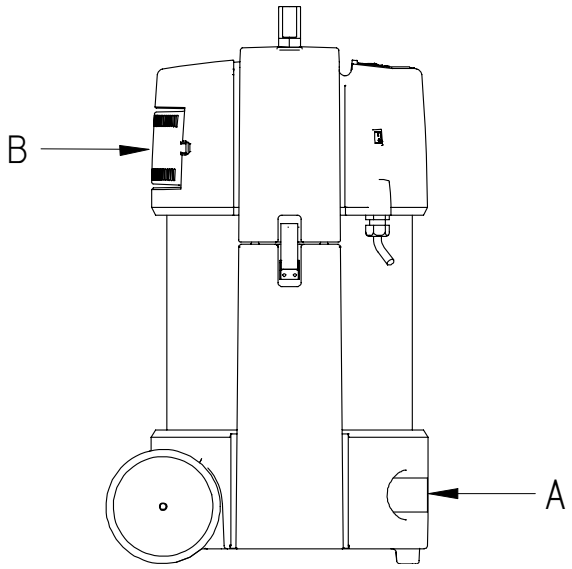
Note: The Miniflex does not filter any shielding gases. Gases pass through the filter. Miniflex used with optional carbon filter may reduce vapors and gases.

OPERATING INSTRUCTIONS

The Miniflex provides enough suction for one fume gun or small suction nozzle. Do not attach more than one fume gun or suction nozzle to the Miniflex unit.

1. Connect the extraction hose at one side to the air inlet of the machine (Figure B.1, Item A) and at the other side to the welding torch or small suction nozzle.
2. Lay the work cable of the welding machine into the slot on top of the machine (Figure B.2, Item A) (when using Automatic Start/Stop mode).
3. Start up the machine by pressing the switch, located on the side of the machine.
4. At the top of the unit, there is a High/Low button and an Automatic Start/Stop Button (see Page B-2 for further instructions).

FIGURE B.1



Recommended Positioning: Upright

For optimal performance, unit is designed to operate in upright position.

⚠ CAUTION

If unit is operated in an upright or horizontal position, air inlet and outlet (Figure B.1, Items A and B) must be free from obstruction.

HIGH AND LOW MODE

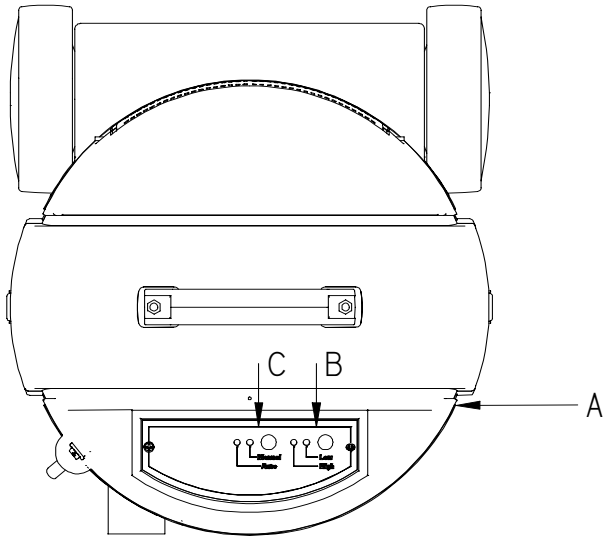
- In high mode, both motors are working at 100% capacity, extracting 135 CFM (230 m^3/hr), (Figure B.2, Item B).

- In low mode, both motors operate at 70% capacity, extracting 94 CFM (160 m^3/hr).

MANUAL VS. AUTOMATIC START/STOP OPERATION

- Use the Automatic Start/Stop feature to extend the life of the carbon brushes.
- In the "auto" setting (Figure B.2, Item C), the unit automatically starts and stops when the work cable of the welding machine is positioned in the slot located on top of the machine (see Figure B.2, item A). The unit continues to operate for 15 seconds after welding is completed before automatically shutting off.
- In the manual setting, the unit runs continuously .

FIGURE B.2



GENERAL OPTIONS / ACCESSORIES

The following options/accessories are available for your MINIFLEX Portable Fume Extractor from your local Lincoln Distributor. See Miniflex brochure Publication E13.11.

EN 20 Extraction Nozzle - Order K2389-5
The EN 20 nozzle is designed for a wide array of welding applications. With its funnel extraction opening and magnetic mounting stand, it gives the welder a great amount of versatility. Includes a 1-3/4 in. O.D. hose adapter.

EN 40 Extraction Nozzle - Order K2389-6
The EN 40 extraction nozzle is designed for stick electrode applications. With its L-shaped tube and an elongated slotted opening, the EN 40 nozzle is designed to coincide with the time it takes the welder to use one stick electrode. This design alleviates the welder from having to continuously reposition the nozzle. Magnetic mounting stand and 1-3/4 in. O.D. hose adapter are included.

NKT Nozzle Kit - Order K2389-3 for NKT
The NKT nozzle kit provides extraction capacity to standard welding torches. It is designed for mounting the extraction hose on top of the welding gun. Hose dimension is 8 ft. (2.5 m) x 1 in. (25 mm) O.D. Includes a 1-3/4 in. (45 mm) O.D. hose adapter.

NKC Nozzle Kit - Order K2389-4 for NKC
The NKC nozzle kit provides extraction capacity to standard welding guns by circular extraction which attaches and wraps around the gun nozzle. Hose dimension is 8 ft. (2.5 m) x 1 in. (25 mm) O.D. Includes a 1-3/4 in. (45 mm) O.D. hose adapter.

Fume Guns
To extract welding fumes, Lincoln Electric's 250XA and 400XA Magnum fume GMAW guns and the 350A, 500A, 250A FCAW-SS fume guns can be connected to the Miniflex and its extraction hose.
For 250XA-400XA Magnum Guns, see publication #E13.10
For 350A, 400A, 250 FCW-SS Guns, see publication E12.110

Other Nozzles
A variety of other nozzles are offered. Contact your local Lincoln Electric representative for more details.

Extraction Hoses
Order K2389-8 for the 16 ft x 1-3/4 in. hose and Order K2389-9 for the 8 ft x 1-3/4 in. hose.
For longer hose applications, flexible high temperature hoses with spring steel reinforcement are optional. Two optional hose lengths are 8 ft. (2.5 m) x 1-3/4 in. (45mm) O.D. and 16 ft. (5 m) x 1-3/4 in. (45 mm) O.D. The optional extraction hoses can be used to connect to or replace the hose already included with Miniflex base unit. To ensure effective performance level, it is recommended that a maximum hose length of 24 ft. (7.5 m) be used on extraction side of the Miniflex. Two hose adapter ends are included.

Hose-to-Hose Adapter - Order K2389-10
To connect 1-3/4 in. hoses together, a 2 in. (50mm) hose-to-hose adapter screws over hose ends, providing a tight connection and seal.

Hose Connection Outlet - Order K2389-2
The hose connection outlet replaces the Miniflex outlet cover and can be used to exhaust or dispose of welding fume particles, for example when welding stainless or galvanized steel.

Activated Carbon Filter - Order K2389-1
To reduce the recirculation of odors or vapors into the environment, the optional activated carbon filter can be placed on top of the Miniflex's LongLife-H™ main filter.

Wall Mounting Bracket - Order K2389-7
The wall-mounting bracket allows for the Miniflex to be placed off the work floor and on the wall, out of the welder's workspace.

SAFETY PRECAUTIONS

⚠ WARNING

ELECTRIC SHOCK can kill.
- **Unplug Miniflex before changing filter or replacing carbon brushes.**

ROUTINE MAINTENANCE

- The aluminum collection pan should be inspected, cleaned and emptied on a monthly basis.
- The pre-separator (located on the bottom of the main filter) should be inspected and cleaned on a monthly basis, using an industrial vacuum cleaner.
- The pre-filter should be inspected and cleaned on a bi-monthly basis, using compressed air or an industrial vacuum cleaner.
- Frequency of cleaning and emptying depends on a number of factors such as the type of welding process and the frequency of use.
- The main filter should be checked every month to ensure that there is no damage.
- The seals of the main filter should be checked every 12 months.

Refer to Figure D.1 on page D-3 for the following instructions.

EMPTYING THE ALUMINUM COLLECTION PAN

1. Remove electrical cord of Miniflex unit from electrical outlet.
2. Loosen the side clips (A).
3. Remove the top cover (B) from the machine.
4. Remove LongLife-H™ Filter (C) by lifting the filter out of the bottom compartment of the unit.
5. Remove pre-filter (H)
6. Empty the collection pan (D) and dispose of waste properly*.
7. Replace the pre-filter and the LongLife-H™ Filter to the bottom unit and reattach top cover by fastening the side clips (A).

*Check with local authorities for regulations governing the proper disposal of used filters and particulate matter.

⚠ WARNING

The particulate matter collected in the unit may be dangerous to your health. Take necessary precautions so that you and your fellow workers do not breathe dust and particulate. Wear a suitable respirator when disposing of the particulate. Follow local Environmental regulations for disposal of filters and particulate matter.

REPLACING THE FILTERS

The main filter and the HEPA filter cannot be cleaned and therefore they have to be replaced periodically. It is recommended to replace all filters at one time.

⚠ WARNING

A saturated filter often contains dust and dirt particles which could form a health hazard upon inhalation. When replacing the filters, always wear a high-quality and approved face mask or respirator. Wrap the filters in a properly closed plastic bag and dispose of it in compliance with local regulations.

Replace the filters in case of damage or when the extraction capacity has become insufficient due to the amount of particulate in the filter.

Periodic check of filters is required to maintain optimal performance and life of unit. Filter performance/life is dependent on variables such as:
-Welding application/processes
-Oil involved in weld processes
-Dust/grinding particulate
-Proper usage and maintenance

Note: There is no filter clog indicator on this machine model.

Refer to Figure D.1 on page D-3 for the following filter instructions.

Replacing/Cleaning the Pre-filter
1. Remove electrical cord of Miniflex unit from electrical outlet.
2. Loosen the side clips (A).
3. Remove the top cover (B) from the unit.
4. Remove LongLife-H™ Filter (C).
5. Remove the pre-filter (H).
6. Clean pre-filter with industrial vacuum cleaner or replace if necessary. Use caution and proper personal protection equipment when cleaning pre-filter.
7. Reposition the pre-filter (H) and LongLife-H™ Filter (C) and reassemble unit.

Replacing the LongLife-H™ Filter with Integrated Aluminum Mesh Pre-separator

1. Remove electrical cord of Miniflex unit from electrical outlet.
2. Loosen the side clips (A).
3. Remove the top cover (B) from the machine.
4. Remove LongLife-H™ Filter (C).
5. Check the main filter seals (D) before replacing the filter. If the seals need to be replaced, contact your Lincoln Electric representative.
6. Place the new filter (mesh pre-separator side down) into the bottom section and reassemble unit.

Replacing the HEPA Filter

1. Remove electrical cord of Miniflex unit from electrical outlet.
2. Remove the outlet cover (E) by loosening the two screws.
3. Remove the HEPA filter (F).
4. Place a new HEPA filter in the correct position (open side at the top).
5. Remount the outlet cover by fastening the two screws. Make sure that the outlet cover is in the right position; the open side of the HEPA filter should correspond with the smallest opening of the outlet cover.

⚠ CAUTION

ATTENTION: Taking out the HEPA filter will cause the seals to deform. For this reason, never replace an old HEPA filter with a used HEPA filter, but always replace it with a new one.

Replacing the Carbon Filter (if applicable)

1. Remove electrical cord of Miniflex unit from electrical outlet.
2. Loosen the side clips (A).
3. Remove the top cover (B) from the machine.
4. Place carbon filter directly on top of LongLife-H™ Filter, either side up.
5. Replace top cover (B).

CARBON BRUSHES

The carbon brushes in both motors should be replaced after approximately 500-700 hours depending on usage.

Note: Two sets of carbon brushes and seals are included with unit.

⚠ CAUTION

Carbon brush life depends on how unit is operated, i.e. continuous operation or automatic start/stop mode. If carbon brushes are not replaced, damage to motors may result.

Carbon Brush Replacement

Refer to Figure D.1 on page D-3 for the following instructions.

1. Remove electrical cord of Miniflex unit from electrical outlet.
2. Remove top cover (B) of Miniflex unit by releasing the side clips (A) on both sides of unit.
3. To remove the housing plate at bottom of top cover, place top cover with housing plate facing upward. Remove 8 screws holding the housing cover plate using a Phillips head screwdriver. Remove two bolts holding the housing cover plate in place. An 8 mm socket is required. After removing 8 screws and 2 bolts, use a flat blade screwdriver to remove housing cover plate.

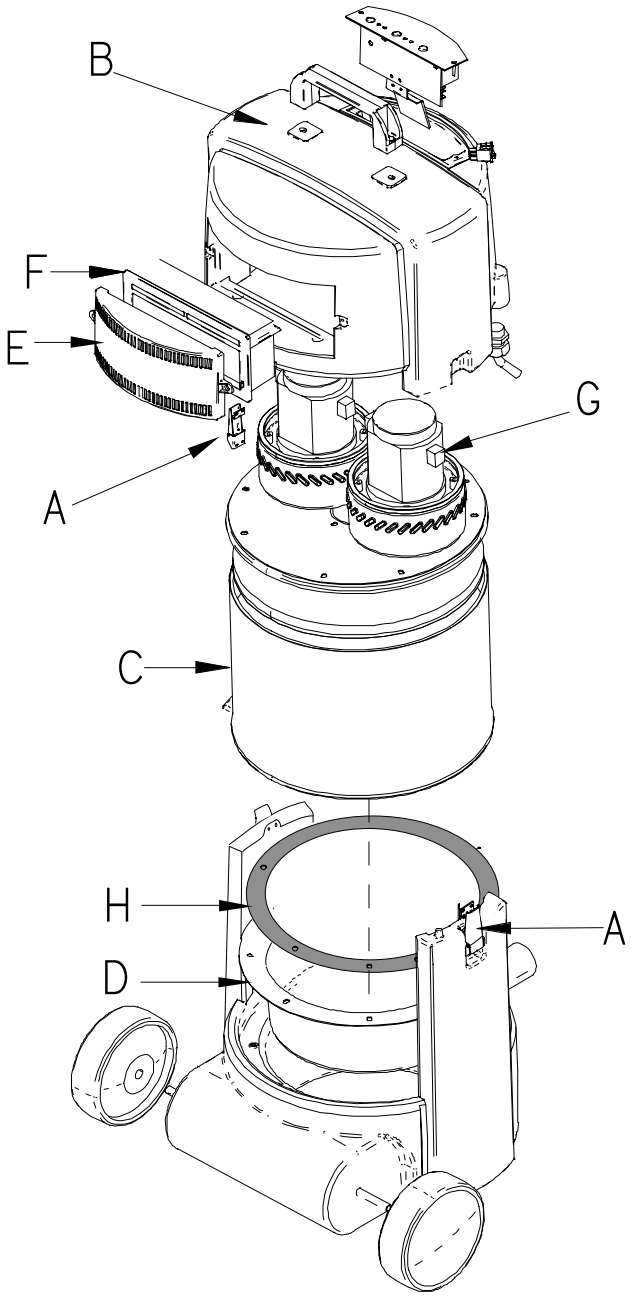
⚠ CAUTION

To avoid motors from dislodging, the Miniflex top cover (B) must remain facing upward after removing housing cover plate.

---

4. Slowly pull one motor out at a time, until sufficient room is allowed to remove and inspect carbon brushes (G).
5. Disconnect yellow and black wires from each motor connection terminal. Remove carbon brushes by using a flat head screwdriver.
6. To insert new carbon brushes, carbon side of brush must be inserted first into plastic housing with brass connection terminal in upright position to connect yellow and black wires. After inserting new carbon brushes, connect yellow and black wires.
7. Reposition motors and reattach housing cover plate.
8. Place top cover on Miniflex unit using the two side clips.
9. Operate unit to make sure carbon brushes have been properly installed.

Figure D.1



A. Side Clips
B. Top Cover
C. LongLife-H™ Filter
D. Main Filter Seals
E. Outlet Cover
F. HEPA Filter
G. Carbon Brushes
H. Pre-filter

HOW TO USE TROUBLESHOOTING GUIDE

⚠ WARNING

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

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

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

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

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

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

⚠ CAUTION

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

TROUBLESHOOTING

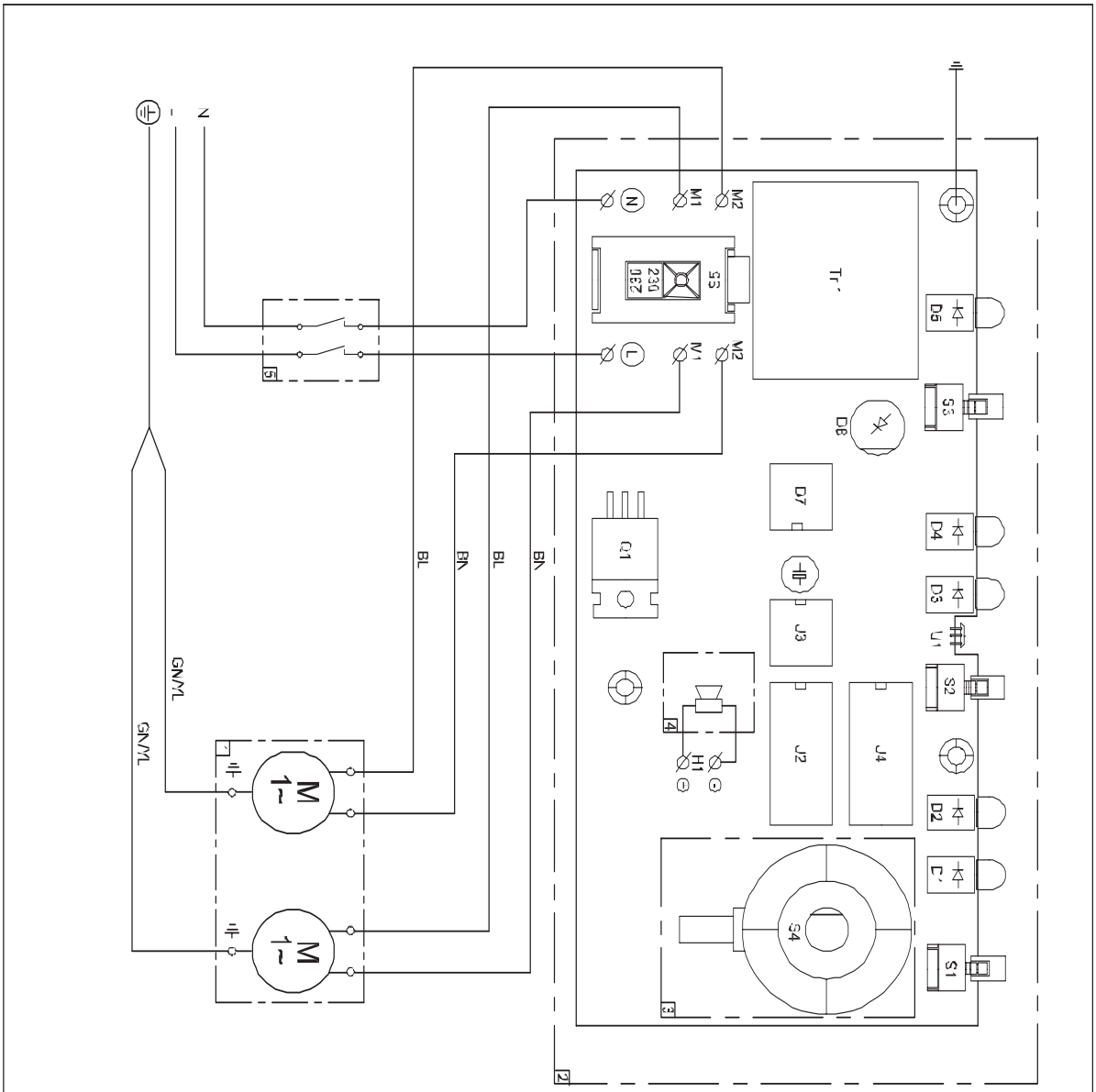
E-2

Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
Motor does not start.	1. Ensure 115 VAC input power is available. 2. Circuit breaker tripped. Reset circuit breaker (See Electrical Maintenance). 3. Carbon brushes worn. Check brushes, replace if necessary.	If all recommended possible areas of misadjustment have been checked and the problem persists, **Contact your local Lincoln Authorized Field Service Facility.**
Motor stops automatically.	1. Thermal protection is activated. Check that the cooling underneath the top cover and/or the outlet are not obstructed.	
Poor suction.	1. Leakage. Check hose connections, hose integrity. 2. Filter dirty. Replace both LongLife-H™ Filter and HEPA filter. 3. Pre-filter dirty. Check pre-filter and replace or clean using an industrial vacuum cleaner. Use caution and proper personal protection equipment when cleaning pre-filter. 4. Improper application. Check hose diameter and maximum length 24 ft. (7.5 m), check filter for oily conditions. 5. Brushes worn in one of the motors. Replace brushes in both motors.	
Unit will not sense current.	1. Welding current too low. Loop cable two or three times on current sensor. 2. Current sensor or PC board damaged. Replace sensor or PC board.	
Unit automatically cycles between low and high speeds.	1. Check connections from PC board to motors. 2. Control panel/PC board damaged. Replace control panel and PC board.	

⚠ CAUTION

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

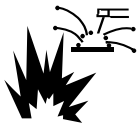


#	Description	Article	Remarks
1	Motor set	9840251030	115 V 60 hz.
1	Motor set	9840251040	200-230 V 50-60 hz.
2	PCB CDM PHV	9325701020	200-230/115 V 50 60 hz.
3	Pressure switch PHV	9322250610	Only for EIA
4	Buzzer PHV	9360000040	Only for EIA
5	Main switch	9320050130	Only for USA

Color code (if: appl.)	
Code	Color
BK	Black
BN	Brown
BL	Blue
GN	Green
GN/YE	Green/Yellow
WH	White
RD	Red
GR	Grey
OR	Orange

Datum : 13-10-2004 Rev : 3
Mode : 3~ V 200-230/115 V 1~ 50-60 ~z.
Electrical Diagram: 05170000540

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.

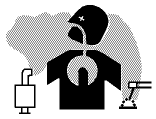
			
WARNING	● Do not touch electrically live parts or electrode with skin or wet clothing. ● Insulate yourself from work and ground.	● Keep flammable materials away.	● Wear eye, ear and body protection.
Spanish **AVISO DE PRECAUCION**	● No toque las partes o los electrodos bajo carga con la piel o ropa mojada. ● 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前には、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**
●頭部遠離烟雾。 ●在呼吸区使用通风或排风来排除烟雾。	●维修前切断电源。	●在安装打开或没有安全罩时不操作。	Chinese **警 告**
● 얼굴로부터 흄(연기)을 멀리하십시오. ● 호흡지역으로부터 흄(연기)을 제거하기 위해 가스제거기나 통풍기를 사용하십시오.	● 보수전에 전원을 차단하십시오.	● 판넬이 열린 상태로 작동하지 마십시오.	Korean **위 험**
● ابعد رأسك بعيداً عن الدخان. ● استعمل التهوية أو جهاز شفط لدخان للخارج لكي تبعد الدخان عن المنطقة التي تتنفس فيها.	● اقطع التيار الكهربائي قبل القيام بأية صيانة.	● لا تشغل هذا الجهاز اذا كانت الأغطية الحمايية 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商提供的說明以及廠家使用的銲接材料，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.

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