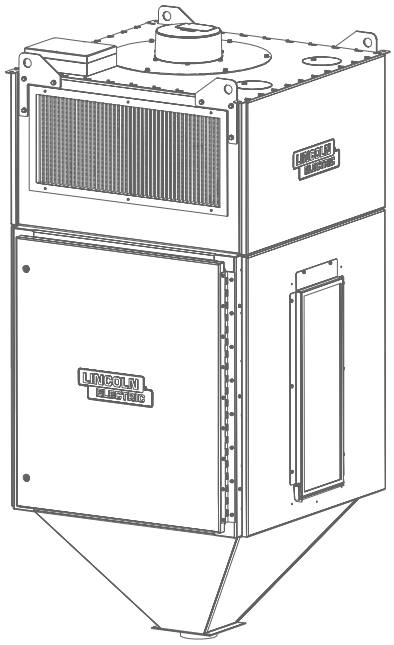
LINCOLN ELECTRIC

Operator's Manual

Prism® SUSPEND 4000



For use with machines having Code Numbers:

13249, 13250, 13251, 13252
13545, 13546

GENUINE LINCOLN PARTS™

Register your machine:
www.lincolnelectric.com/register

Authorized Service and Distributor Locator:
www.lincolnelectric.com/locator

Save for future reference

Date Purchased

Code: (ex: 10859)

Serial: (ex: U1060512345)

Need Help? Call 1.888.935.3877
to talk to a Service Representative

Hours of Operation:
8:00 AM to 6:00 PM (ET) Mon. thru Fri.

After hours?
Use "Ask the Experts" at lincolnelectric.com
A Lincoln Service Representative will contact you no later than the following business day.

For Service outside the USA:
Email: globalservice@lincolnelectric.com

IM10628-C | Issue Date Apr - 23

THE LINCOLN ELECTRIC COMPANY
22801 St. Clair Avenue • Cleveland, OH • 44117-1199 • U.S.A.
Phone: +1.216.481.8100 • www.lincolnelectric.com

THANK YOU FOR SELECTING A QUALITY PRODUCT BY LINCOLN ELECTRIC.

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.

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.

⚠ 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.

KEEP YOUR HEAD OUT OF THE FUMES.

DON'T get too close to the arc. Use corrective lenses if necessary to stay a reasonable distance away from the arc.

READ and obey the Safety Data Sheet (SDS) and the warning label that appears on all containers of welding materials.

USE ENOUGH VENTILATION or exhaust at the arc, or both, to keep the fumes and gases from your breathing zone and the general area.

IN A LARGE ROOM OR OUTDOORS, natural ventilation may be adequate if you keep your head out of the fumes (See below).

USE NATURAL DRAFTS or fans to keep the fumes away from your face.

If you develop unusual symptoms, see your supervisor. Perhaps the welding atmosphere and ventilation system should be checked.

WEAR CORRECT EYE, EAR & BODY PROTECTION

PROTECT your eyes and face with welding helmet properly fitted and with proper grade of filter plate (See ANSI Z49.1).

PROTECT your body from welding spatter and arc flash with protective clothing including woolen clothing, flame-proof apron and gloves, leather leggings, and high boots.

PROTECT others from splatter, flash, and glare with protective screens or barriers.

IN SOME AREAS, protection from noise may be appropriate.

BE SURE protective equipment is in good condition.

Also, wear safety glasses in work area **AT ALL TIMES.**

SPECIAL SITUATIONS

DO NOT WELD OR CUT containers or materials which previously had been in contact with hazardous substances unless they are properly cleaned. This is extremely dangerous.

DO NOT WELD OR CUT painted or plated parts unless special precautions with ventilation have been taken. They can release highly toxic fumes or gases.

Additional precautionary measures

PROTECT compressed gas cylinders from excessive heat, mechanical shocks, and arcs; fasten cylinders so they cannot fall.

BE SURE cylinders are never grounded or part of an electrical circuit.

REMOVE all potential fire hazards from welding area.

ALWAYS HAVE FIRE FIGHTING EQUIPMENT READY FOR IMMEDIATE USE AND KNOW HOW TO USE IT.

SECTION A: WARNINGS

CALIFORNIA PROPOSITION 65 WARNINGS

WARNING: Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects, or other reproductive harm.

- Always start and operate the engine in a well-ventilated area.
- If in an exposed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to www.P65 warnings.ca.gov/diesel

WARNING: This product, when used for welding or cutting, produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code § 25249.5 *et seq.)*

WARNING: Cancer and Reproductive Harm www.P65warnings.ca.gov

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. 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.

1.i. Using a generator indoors CAN KILL YOU IN MINUTES.

1.j. Generator exhaust contains carbon monoxide. This is a poison you cannot see or smell.

1.k. NEVER use inside a home or garage, EVEN IF doors and windows are open.

1.l. Only use OUTSIDE and far away from windows, doors and vents.

1.m. Avoid other generator hazards. READ MANUAL BEFORE USE.

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. 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 hardfacing (see instructions on container or SDS) 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 unless exposure assessments indicate otherwise. In confined spaces or in some circumstances, outdoors, a respirator may also 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.

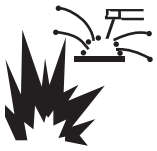
5.c. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

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 Safety Data Sheet (SDS) and follow your employer’s safety practices. SDS 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-I, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Association, 14501 George Carter Way Chantilly, VA 20151.

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.

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

As a rule of thumb, for many mild steel electrode, if the air is visibly clear and you are comfortable, then the ventilation is generally adequate for your work. The most accurate way to determine if the worker exposure does not exceed the applicable exposure limit for compounds in the fumes and gases is to have an industrial hygienist take and analyze a sample of the air you are breathing. This is particularly important if you are welding with stainless, hardfacing or Special Ventilation products. All Lincoln MSDS have a maximum fume guideline number. If exposure to total fume is kept below that number, exposure to all fume from the electrode (not coatings or plating on the work) will be below the TLV.

There are steps that you can take to identify hazardous substances in your welding environment. Read the product label and material safety data sheet for the electrode posted in the work place or in the electrode or flux container to see what fumes can be reasonably expected from use of the product and to determine if special ventilation is needed. Secondly, know what the base metal is and determine if there is any paint, plating, or coating that could expose you to toxic fumes and/or gases. Remove it from the metal being welded, if possible. If you start to feel uncomfortable, dizzy or nauseous, there is a possibility that you are being overexposed to fumes and gases, or suffering from oxygen deficiency. Stop welding and get some fresh air immediately. Notify your supervisor and co-workers so the situation can be corrected and other workers can avoid the hazard. Be sure you are following these safe practices, the consumable labeling and MSDS to improve the ventilation in your area. Do not continue welding until the situation has been corrected.

NOTE: The MSDS for all Lincoln consumables is available on Lincoln's website: www.lincolnelectric.com

Before we turn to the methods available to control welding fume exposure, you should understand a few basic terms:

Natural Ventilation is the movement of air through the workplace caused by natural forces. Outside, this is usually the wind. Inside, this may be the flow of air through open windows and doors.

Mechanical Ventilation is the movement of air through the workplace caused by an electrical device such as a portable fan or permanently mounted fan in the ceiling or wall.

Source Extraction (Local Exhaust) is a mechanical device used to capture welding fume at or near the arc and filter contaminants out of the air.

Ambient Extraction is a mechanical device used to capture and filter welding fume suspended in workplace air.

The ventilation or exhaust needed for your application depends upon many factors such as:

- Workspace volume
- Workspace configuration
- Number of welders
- Welding process and current
- Consumables used (mild steel, hardfacing, stainless, etc.)
- Allowable levels (TLV, PEL, etc.)
- Material welded (including paint or plating)
- Natural airflow

Your work area has adequate ventilation when there is enough ventilation and/or exhaust to control worker exposure to hazardous materials in the welding fumes and gases so the applicable limits for those materials is not exceeded. See chart of TLV and PEL for Typical Electrode Ingredients, the OSHA PEL

(Permissible Exposure Limit), and the recommended guideline, the ACGIH TLV (Threshold Limit Value), for many compounds found in welding fume.

Ventilation

There are many methods which can be selected by the user to provide adequate ventilation for the specific application. The following section provides general information which may be helpful in evaluating what type of ventilation equipment may be suitable for your application. When ventilation equipment is installed, you should confirm worker exposure is controlled within applicable OSHA PEL and/or ACGIH TLV. According to OSHA regulations, when welding and cutting (mild steels), natural ventilation is usually considered sufficient to meet requirements, provided that:

1. The room or welding area contains at least 10,000 cubic feet (about 22' x 22' x 22') for each welder.
2. The ceiling height is not less than 16 feet.
3. Cross ventilation is not blocked by partitions, equipment, or other structural barriers.
4. Welding is not done in a confined space.

Spaces that do not meet these requirements should be equipped with mechanical ventilating equipment that exhausts at least 2000 CFM of air for each welder, except where local exhaust hoods or booths, or air-line respirators are used.

Important Safety Note:

When welding with electrodes which require special ventilation such as stainless or hardfacing (see instructions on container or MSDS) or on lead or cadmium plated steel and other metals or coatings which produce hazardous fumes, keep exposure as low as possible and below exposure limit values (PEL and TLV) for materials in the fume using local exhaust or mechanical ventilation. In conned spaces or in some circumstances, for example outdoors, a respirator may be required if exposure cannot be controlled to the PEL or TLV. (See MSDS and chart of TLV and PEL for Typical Electrode Ingredients.) Additional precautions are also required when welding on galvanized steel.

BIBLIOGRAPHY AND SUGGESTED READING

ANSI Z87.1, Practice for Occupational and Educational Eye and Face Protection, American National Standards Institute, 11 West 42nd Street, New York, NY 10036.

Arc Welding and Your Health: A Handbook of Health Information for Welding. Published by The American Industrial Hygiene Association, 2700 Prosperity Avenue, Suite 250, Fairfax, VA 22031-4319.

NFPA Standard 51B, Cutting and Welding Processes, National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9146, Quincy, MA 02269-9959.

OSHA General Industry Standard 29 CFR 1910 Subpart Q. OSHA Hazard Communication Standard 29 CFR 1910.1200. Available from the Occupational Safety and Health Administration at http://www.osha.org or contact your local OSHA office.

The following publications are published by The American Welding Society, P.O. Box 351040, Miami, Florida 33135. AWS publications may be purchased from the American Welding society at http://www.aws.org or by contacting the AWS at 800-443-9353.

ANSI, Standard Z49.1, Safety in Welding, Cutting and Allied Processes. Z49.1 is now available for download at no charge at http://www.lincolnelectric.com/community/safety/ or at the AWS website http://www.aws.org.

AWS F1.1, Method for Sampling Airborne Particulates Generated by Welding and Allied Processes.

AWS F1.2, Laboratory Method for Measuring Fume Generation Rates and Total Fume Emission of Welding and Allied Processes.

AWS F1.3, Evaluating Contaminants in the Welding Environment: A Strategic Sampling Guide.

AWS F1.5, Methods for Sampling and Analyzing Gases from Welding and Allied Processes.

AWS F3.2, Ventilation Guide for Welding Fume Control

AWS F4.1, Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances.

AWS SHF, Safety and Health Facts Sheets. Available free of charge from the AWS website at http://www.aws.org.

LISTED BELOW ARE SOME TYPICAL INGREDIENTS IN WELDING ELECTRODES AND THEIR TLV (ACGIH) GUIDELINES AND PEL (OSHA) EXPOSURE LIMITS

INGREDIENTS	CAS No.	TLV mg/m³	PEL mg/m³
Aluminum and/or aluminum alloys (as Al)*****	7429-90-5	1.0	15
Aluminum oxide and/or Bauxite*****	1344-28-1	1.0	5**
Barium compounds (as Ba)*****	513-77-9	0.5	0.5
Chromium and chromium alloys or compounds (as Cr)*****	7440-47-3	0.5(b)	0.5(b)
Hexavalent Chromium (Cr VI)	18540-29-9	0.05(b)	.005(b)
Copper Fume	7440-50-8	0.2	0.1
Cobalt Compounds	7440-48-4	0.02	0.1
Fluorides (as F)	7789-75-5	2.5	2.5
Iron	7439-89-6	10*	10*
Limestone and/or calcium carbonate	1317-65-3	10*	15
Lithium compounds (as Li)	554-13-2	15	10*
Magnesite	1309-48-4	10	15
Magnesium and/or magnesium alloys and compounds (as Mg)	7439-95-4	10*	10*
Manganese and/or manganese alloys and compounds (as Mn)*****	7439-96-5	0.02	5.0(c)
Mineral silicates	1332-58-7	5**	5**
Molybdenum alloys (as Mo)	7439-98-7	10	10
Nickel*****	7440-02-0	0.1	1
Silicates and other binders	1344-09-8	10*	10*
Silicon and/or silicon alloys and compounds (as Si)	7440-21-3	10*	10*
Strontium compounds (as Sr)	1633-05-2	10*	10*
Zirconium alloys and compounds (as Zr)	12004-83-0	5	5

Supplemental Information:

(*) Not listed. Nuisance value maximum is 10 milligrams per cubic meter. PEL value for iron oxide is 10 milligrams per cubic meter. TLV value for iron oxide is 5 milligrams per cubic meter.

(**) As respirable dust.

(*****) Subject to the reporting requirements of Sections 311, 312, and 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and of 40CFR 370 and 372.

(b) The PEL for chromium (VI) is .005 milligrams per cubic meter as an 8 hour time weighted average. The TLV for water-soluble chromium (VI) is 0.05 milligrams per cubic meter. The TLV for insoluble chromium (VI) is 0.01 milligrams per cubic meter.

(c) Values are for manganese fume. STEL (Short Term Exposure Limit) is 3.0 milligrams per cubic meter. OSHA PEL is a ceiling value.

(****) The TLV for soluble barium compounds is 0.5 mg/m³.

TLV and PEL values are as of October 2013. Always check Safety Data Sheet (SDS) with product or on the Lincoln Electric website at http://www.lincolnelectric.com

TECHNICAL SPECIFICATIONS

GENERAL	
TYPE OF CLEANING	Pulse jet
DUTY CYCLE	100%
COMPRESSED AIR PRESSURE AND QUALITY	72 - 87 psi (5 - 6 bar) clean, dry and oil free

PRISM® SUSPEND 4000 AIR CONSUMPTION		
6 BAR / 87 PSI Recommended		1 valve cleans 2 filters per pulse (4 PULSES per CLEAN CYCLE)
On Time (msec)		**200**
		Compressed Air Consumption (cfm)
Off Time (Sec)	5	74.4 (20 sec per cycle)
	10	37.2 (40 sec per cycle)
	15	24.8 (60 sec per cycle)
	20	**18.6 (80 sec per cycle)**
	25	14.9 (100 sec per cycle)
	30	12.4 (120 sec per cycle)
	35	10.6 (140 sec per cycle)
	40	9.3 (160 sec per cycle)
	45	8.3 (180 sec per cycle)
	50	7.4 (200 sec per cycle)
	55	6.7 (220 sec per cycle)
	60	6.2 (240 sec per cycle)

1. Compressed air to be clean,dry, oil free, and have a dew point of -40°F (-40°C)
2. Boldface values are factory defaults
3. Off Time Default (pause time between pulses): 20 sec
4. On Time Default: 200ms
5. Compressed air pressure of 5 bar (72 psi) reduces consumption by 20% (approx.)
6. Filter cleaning functions detailed in section B
7. Compressed air consumption is not continuous. It is only required for length of cleaning cycle listed in parenthesis

FILTER CLASS (ACCORDING TO ASHRAE 52.2)	
KP4519-1	MERV 11
KP4519-2	MERV 16 NANO
KP4519-3	MERV 16 PTFE
KP4519-4	MERV 11 OIL RESISTANT
KP4519-5	MERV 16 NANO OIL RESISTANT

AMBIENT CONDITIONS	
MINIMUM TEMPERATURE	-4°F (-20°C)
MAXIMUM TEMPERATURE	113°F (45°C)
MAXIMUM RELATIVE HUMIDITY	75%

PRISM® SUSPEND 4000: AD2477-1 & AD2477-3	
INPUT VOLTAGE NOMINAL +/- 10%	380-480V/3~/50-60Hz (FAN) 115-230V/1~/50-60Hz (CONTROLS)
MAXIMUM CURRENT (NOMINAL)	9.4A max (FAN) 2A max (CONTROLS)
MOTOR POWER (NOMINAL)	7.6 HP
INSULATION CLASS FAN MOTOR	F
PROTECTION CLASS FAN MOTOR	IP55
FAN SUPPLY FUSE	Class J OR CC 15A/600V
ALARM LEVEL	1500Pa (factory default)

PRISM® SUSPEND 4000: AD2477-2 & AD2477-4	
INPUT VOLTAGE NOMINAL +/- 10%	200-240V/3~/50-60Hz (FAN) 115-230V/1~/50-60Hz (CONTROLS)
MAXIMUM CURRENT (NOMINAL)	19.5A max (FAN) 2A max (CONTROLS)
MOTOR POWER (NOMINAL)	8.6 HP
INSULATION CLASS FAN MOTOR	F
PROTECTION CLASS FAN MOTOR	IP55
FAN SUPPLY FUSE	Class J OR CC 30A/600V
ALARM LEVEL	1500Pa (factory default)

PRISM® SUSPEND 4000 WEIGHT

DEAD WEIGHT: 1251 lbs
TOTAL DESIGN LOAD: 2200 lbs

Dead Weight is the weight of the unit when mounted but not in service.

Total Design Load is the dead weight with the addition of dynamic operating live loads

PRISM® SUSPEND 4000 SOUND LEVEL

MAXIMUM AT 4000 CFM*: 81 dBA

*Measured 5.5 ft above floor with unit's outlet grille 8 ft above floor. Prism Suspend units are typically mounted with the outlet grille as high as 20 ft above the floor which significantly reduces the sound level at a height of 5.5 ft. For example, when the outlet grille is 13 ft above the floor, the maximum sound level at 5.5 ft is reduced to 77 dBA.

Maximum sound level is only reached when filters are at end of life and fan speed reaches 100%. Typical operating ranges produce sound levels 5-10 dBA below maximum.

INSTALLATION

GENERAL DESCRIPTION

The Prism® Suspend 4000 is an ambient zero footprint fan/filtration unit designed to hang from the roof or mount to a wall. When multiple units are strategically located in a workspace, they function in a push/pull manner to filter out suspended weld fume from the air.

The fan pulls air with particulate through the filters. When pressure over the filter reaches a preset point, the internal self cleaning mechanism cleans the filter cartridges with compressed air shots, resulting in particulate dropping into a dustbin below the unit.

THE INTENDED PURPOSE

Extraction of fumes that are released in the course of using welding equipment for cutting and joining non-alloy and alloy steels, including highalloy chromium/nickel steels with a nickel and chromium content of ≥ 30%

TRANSPORT AND ERECTION

⚠ ATTENTION

Instruct all persons whose presence is not required to stay out of the hazard area

Do not stand under or next to the load when it is being lifted up or set down

Transport the unit or erection components on the pallets provided, and secure them against falling over or slipping.

Transport them with a suitable pallet truck or forklift truck

The PRISM® SUSPEND 4000 must be secured to the roof or wall in a manner approved by a structural engineer licensed in the governing jurisdiction.

⚠ ATTENTION

- **The installer is responsible for following federal, state and local safety codes and regulations.**
- **Before drilling, verify locations of existing gas, water or electrical conduits.**

⚠ WARNING

Excluded Uses!

- **Welding fumes containing oil**
- **Aluminum dust**
- **Burning or incandescent materials**
- **Cigarettes**
- **Aggressive media**
- **Water and moisture**
- **Explosive gases and/or dust mixtures**
- **Dusts with toxic characteristics other than welding fumes**
- **The installation of this product is exclusively reserved to authorized, well-trained and qualified electrical and mechanical contractors.**
- **Inspect the product and check it for damage. Verify the functioning of the safety features.**
- **Electrical connection to be executed in accordance with local requirements. Ensure compliance with the EMC regulatory arrangements.**
- **Check the working environment. Do not allow unauthorized persons to enter the working environment.**
- **Protect the product against water and humidity.**
- **Use common sense. Stay alert and keep your attention to your work. Do not use the product when you are**
- **Ensure the workspace is well-illuminated.**
- **Never install the product over entrances and exits which must be used for emergency services.**
- **Make sure that the workshop, in the vicinity of the**
- **The PRISM® SUSPEND 4000 must be secured to the roof or wall in a manner approved by a structural engineer licensed in the governing jurisdiction.**
- **Air containing particles such as chromium, nickel, beryllium, cadmium, lead etc., which is a health hazard, should never be recycled. This air must always be brought outside the working area.**

SELECT SUITABLE LOCATION

- Do not place equipment near radiant heat sources that could raise the ambient temperature around the unit above the max rating stated in the Technical Specifications section.
- Do not place in a confined space. Allow a minimum of 4 feet of clearance around sides and front of machine at all times for proper operation and maintenance requirements.

ENVIRONMENTAL AREA

Keep the machine inside and dry at all times.

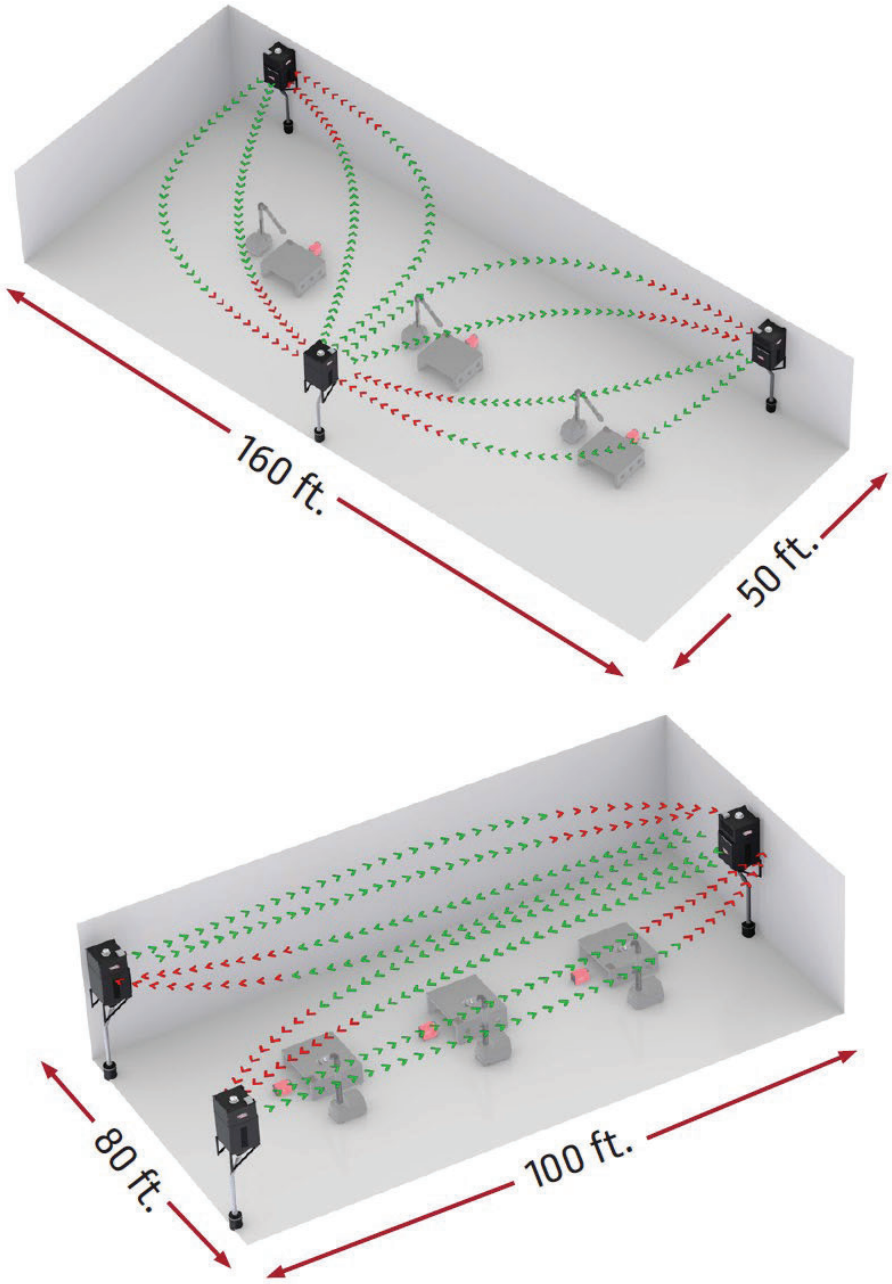
GENERAL PRISM® SUSPEND 4000 SYSTEM LAYOUTS

Each Prism Suspend 4000 unit is designed to filter 40,000 ft^3 of workspace at a rate of 6 air changes per hour. In many applications, multiple units can be strategically located to push and pull air across a workspace to efficiently clean the ambient air. The units are designed to be hung from roof structures or walls and do not require floor space.

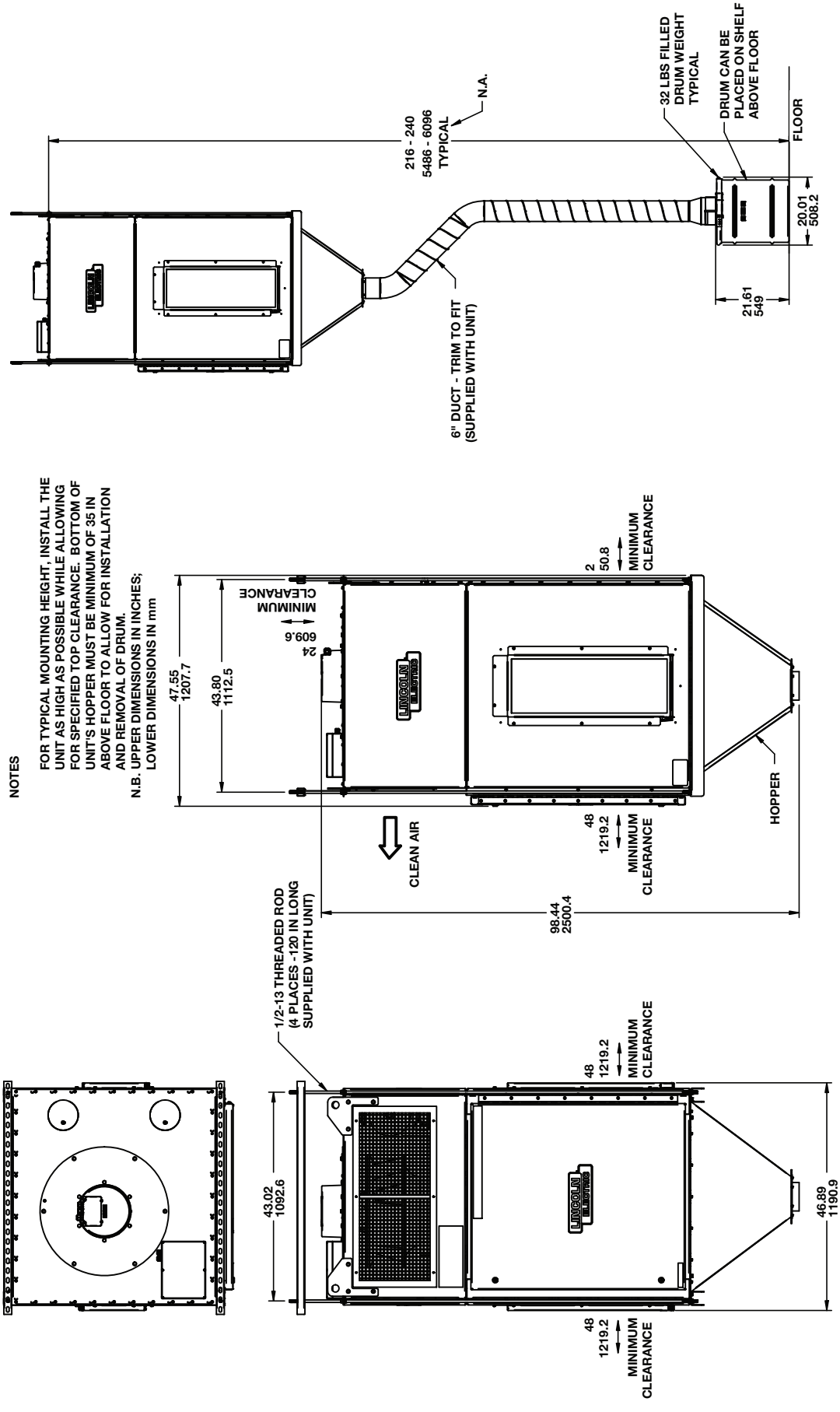
Since each workspace is unique, Lincoln Electric works with each customer to determine the most effective layout for their application. Considerations include:

- **Workspace dimensions**
- **Obstructions such as cranes and other equipment**
- **Building construction capabilities to hang or wall mount the units**
- **Fume generating locations within the workspace**

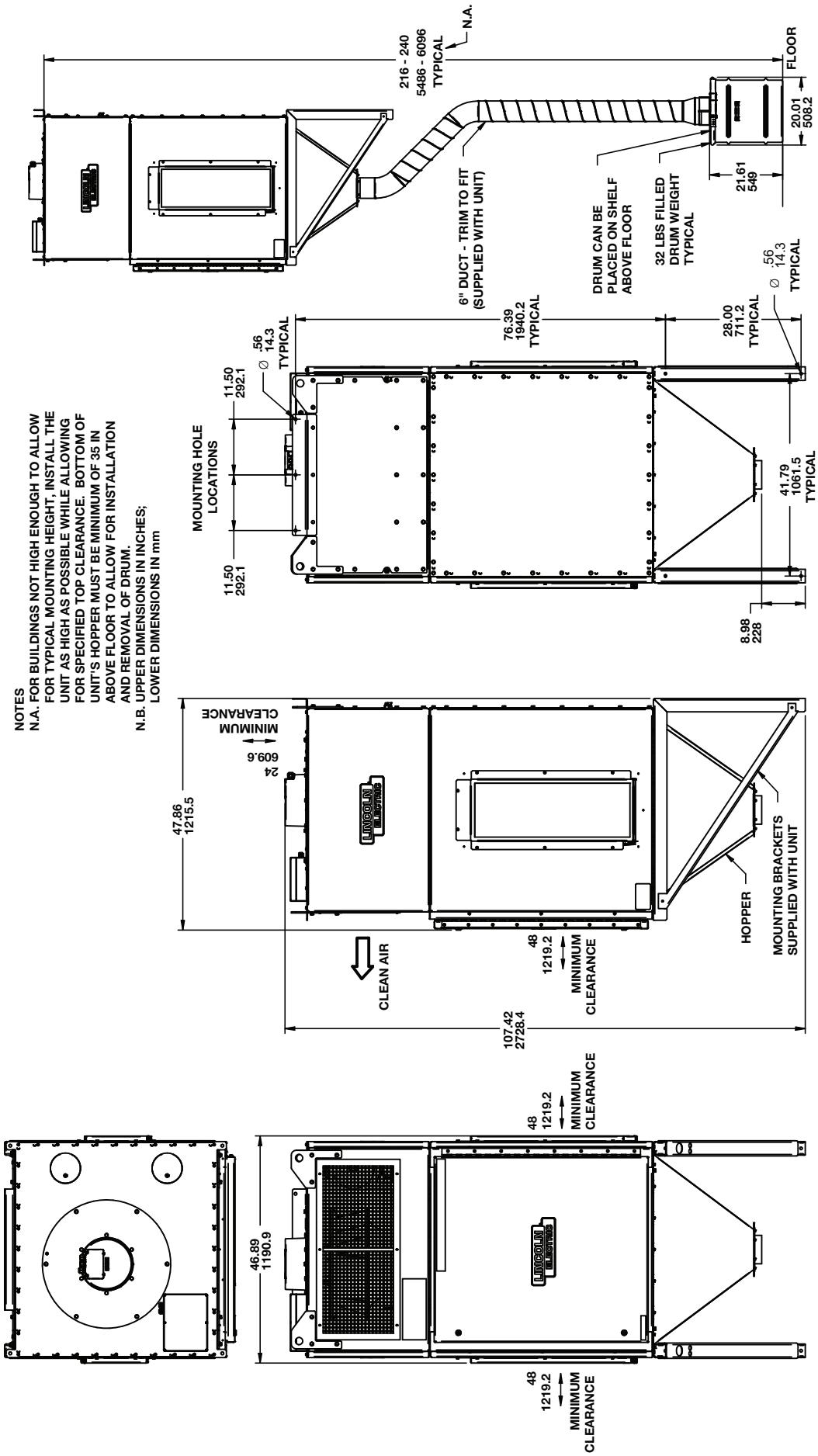
Layout possibilities include but are not limited to the following:



HANGING MOUNT



WALL MOUNT


NOTES
N.A. FOR BUILDINGS NOT HIGH ENOUGH TO ALLOW FOR TYPICAL MOUNTING HEIGHT, INSTALL THE UNIT AS HIGH AS POSSIBLE WHILE ALLOWING FOR SPECIFIED TOP CLEARANCE. BOTTOM OF UNIT'S HOPPER MUST BE MINIMUM OF 35 IN ABOVE FLOOR TO ALLOW FOR INSTALLATION AND REMOVAL OF DRUM.
N.B. UPPER DIMENSIONS IN INCHES; LOWER DIMENSIONS IN mm
216 - 240
5486 - 6096
TYPICAL
N.A.
FLOOR
20.01
508.2
21.61
549
6" DUCT - TRIM TO FIT
(SUPPLIED WITH UNIT)
DRUM CAN BE
PLACED ON SHELF
ABOVE FLOOR
32 LBS FILLED
DRUM WEIGHT
TYPICAL
Ø .56
14.3
TYPICAL
76.39
1940.2
TYPICAL
28.00
711.2
TYPICAL
MOUNTING HOLE
LOCATIONS
11.50
292.1
41.79
1061.5
TYPICAL
8.98
228
MINIMUM
CLEARANCE
24
609.6
47.86
1215.5
CLEAN AIR
48
1219.2
MINIMUM
CLEARANCE
HOPPER
MOUNTING BRACKETS
SUPPLIED WITH UNIT
107.42
2728.4
46.89
1190.9

INSTALLATION OF PRISM® SUSPEND 4000

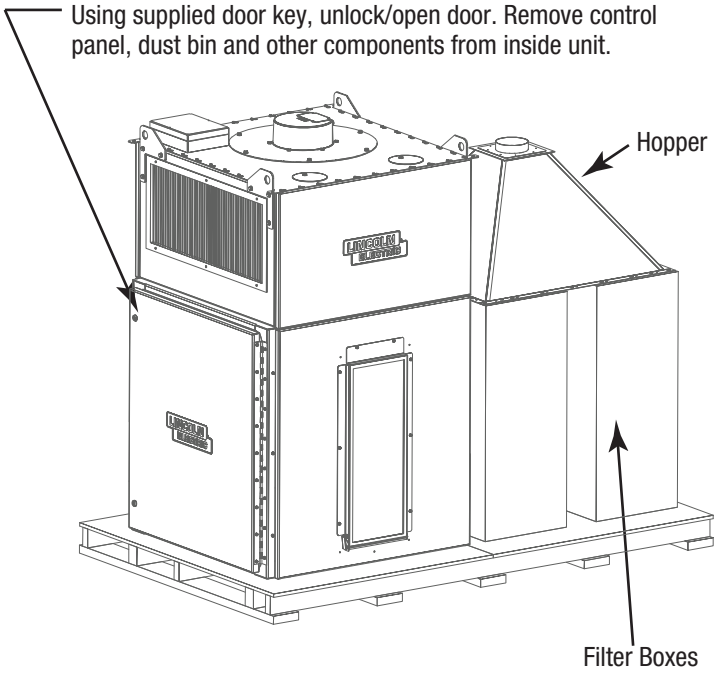
TOOLS NEEDED

- 5/16" Nutdriver
- 3/8" Nutdriver
- 1/2" Nutdriver
- 9/16" Nutdriver
- 9/16" Box Wrench
- Appropriate Hoist and Rigging
- Liquid Sealant
- Strip Foam Gasket
- Miscellaneous Hand Tools
- Ladder/Lift
- Drill or Impact
- 1/4" Drill Bit

Step 1 – Unpack the Unit

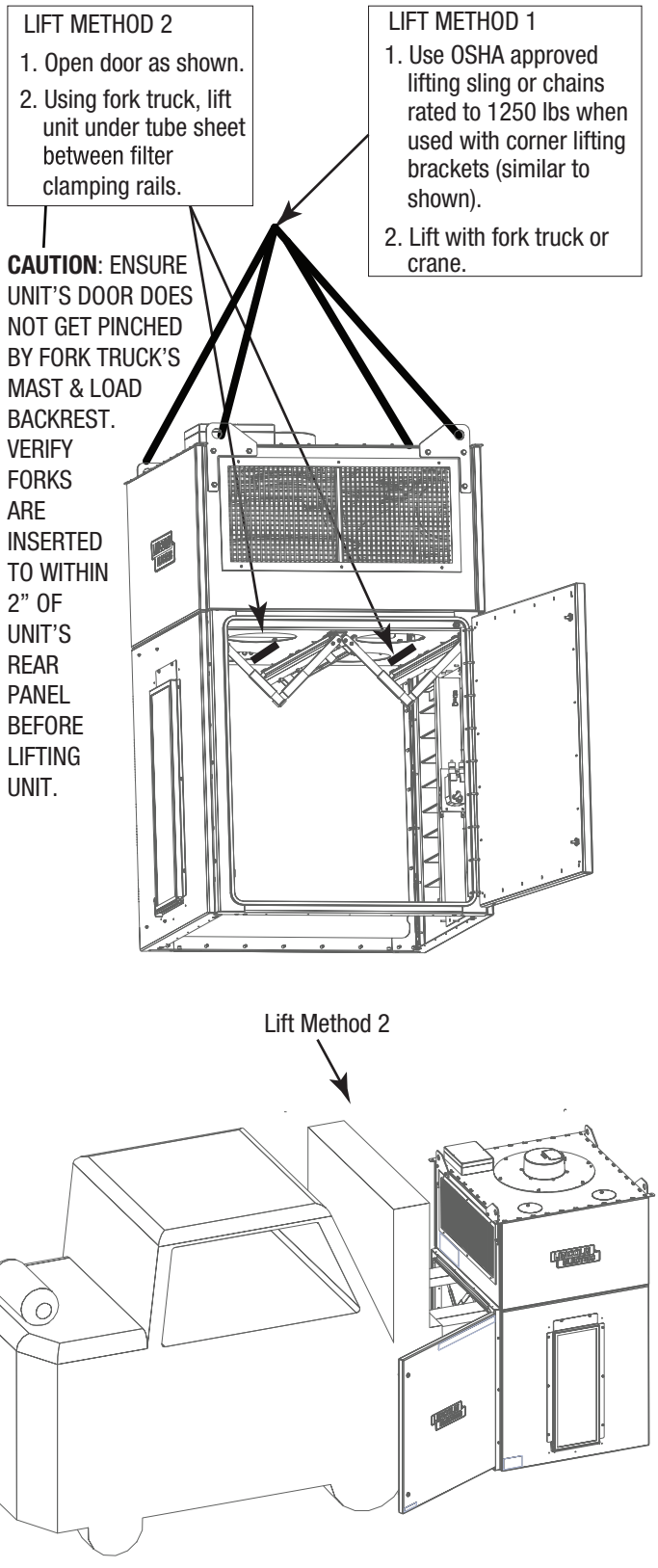
Place pallet near intended installation location and unpack in preparation for assembly.

FIGURE A.1



Step 2 – Hoist the Unit for Hopper Assembly and Installation

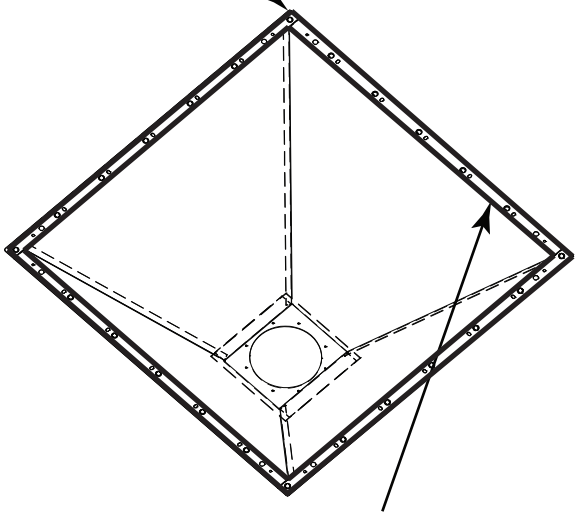
FIGURE A.2



Step 3 – Prepare the Hopper for Assembly

FIGURE A.3

1. Apply strip foam gasket (supplied in dust bin carton) completely around top of hopper flange as shown. Apply strip foam gasket on both sides of bolt holes and overlap in corners.

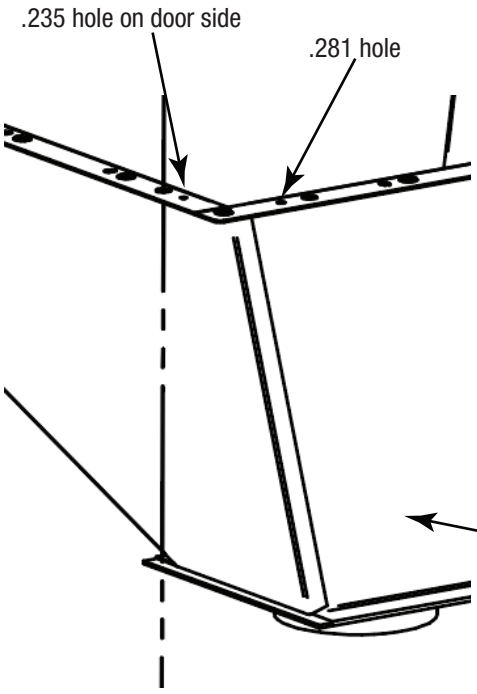


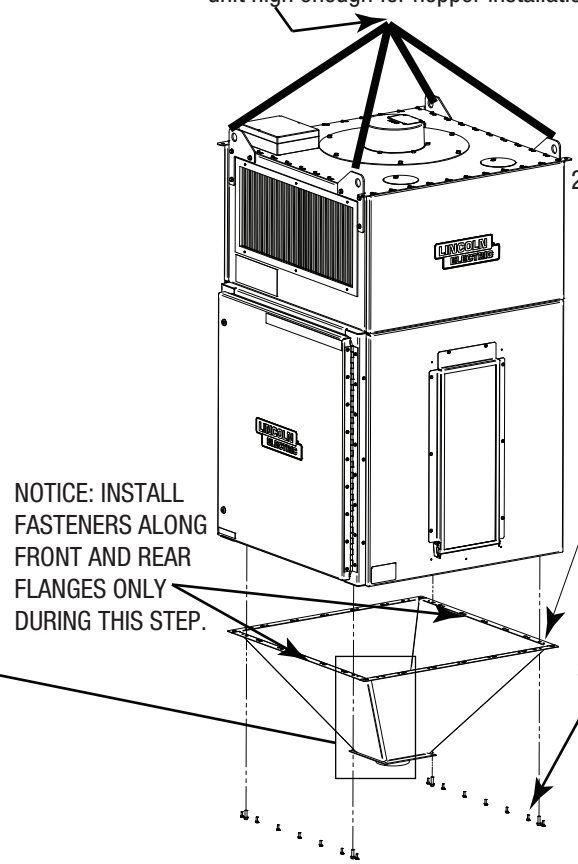
2. Apply a bead of liquid sealant (supplied in dust bin carton) between foam strips.

Step 4 – Assemble the Hopper

FIGURE A.4

1. Using one of the two recommended methods, lift unit high enough for hopper installation as shown.





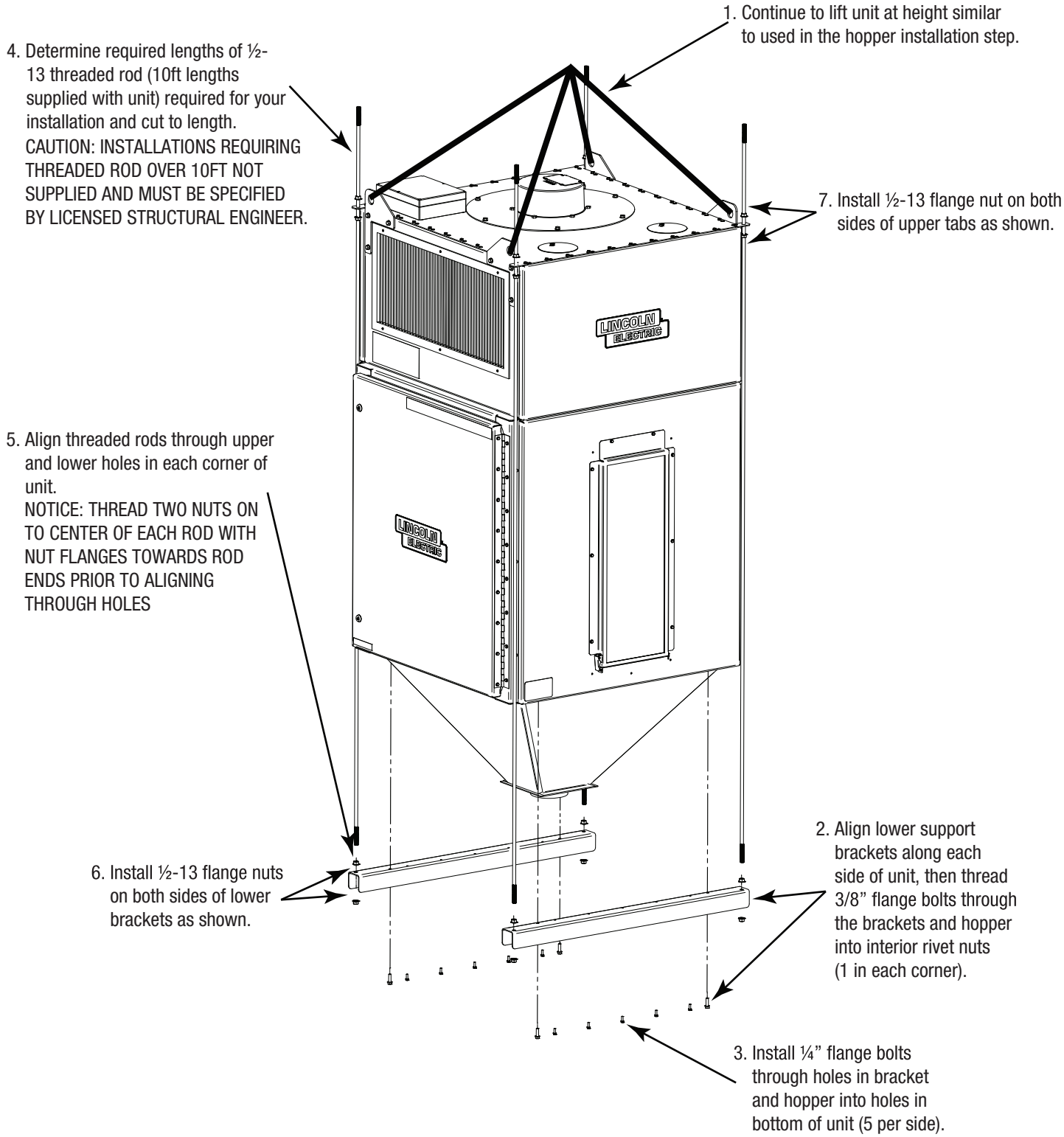
2. Orient hopper under unit as shown with corner 0.235 holes on door side of unit, then thread 3/8" flange bolts from under hopper into interior rivet nuts (1 in each corner). NOTE: If hopper is rotated 90° from described position, interior 1/4-20 nuts will be required for the four corner 1/4-20 bolts.

NOTICE: INSTALL FASTENERS ALONG FRONT AND REAR FLANGES ONLY DURING THIS STEP.

3. Install ¼" ˜ange bolts from under hopper into holes in bottom of unit (7 per side).

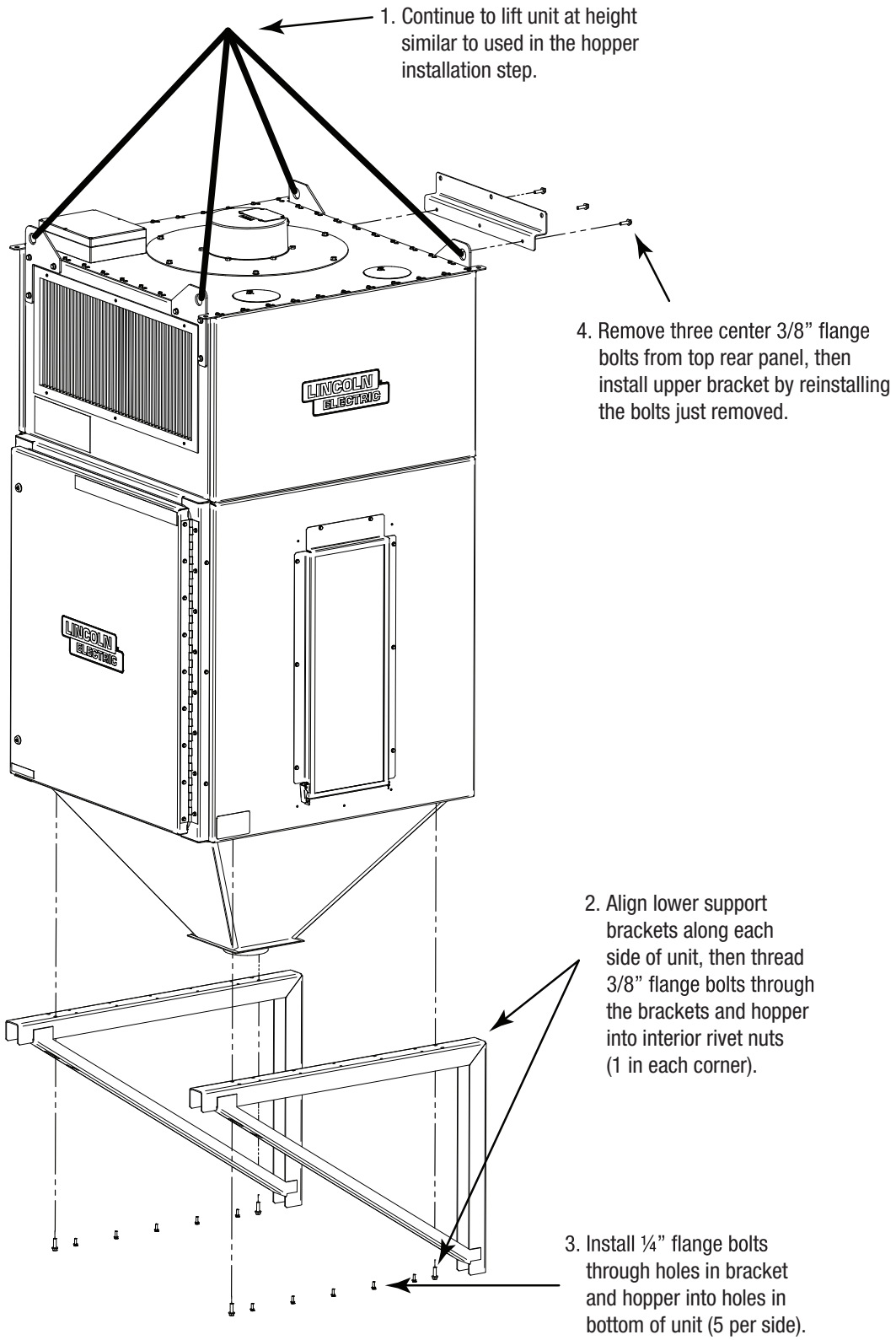
Step 5a – HANGING MOUNT ONLY - Install the Suspension Brackets and Threaded Rods

FIGURE A.5a



Step 5b – WALL MOUNT ONLY - Install the Wall Mount Brackets

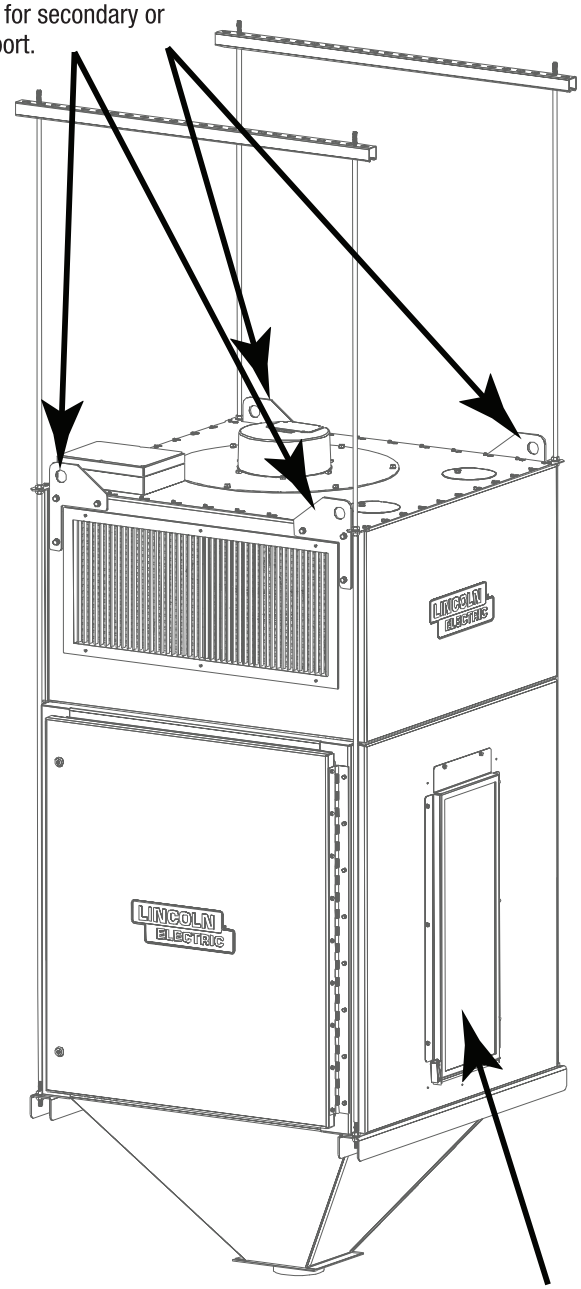
FIGURE A.5b



Step 6a – (HANGING MOUNT ONLY) - Hanging Mount To Typical Buildings

FIGURE A.6a

WARNING!
Do not use corner brackets for primary mounting support of this unit. They are only intended for hoisting unit during installation and for secondary or redundant support.



PRISM® SUSPEND 4000 can be hung from many roof structures. Typical roof structures include:
1. Steel Bar Joist
2. Steel Wide Flange Beam
3. Steel Channel Beam
4. Light Gage Roof Purlin

WARNING!
- Existing building structure types and framing considerations vary greatly from building to building, therefore each installation of this unit (including but not limited to the building structure, brackets, hardware and any other structural supports) shall be approved by a structural engineer licensed in the governing jurisdiction. Subsequent building alterations or addition of other nearby high vibration equipment may require follow up analysis by the licensed structural engineer. Unapproved installations can result in falling equipment leading to severe personnel injury or death.
- High seismic locations may require special reinforcement and additional lateral support. Follow governing local building codes for inspection requirements following any significant event. Significant events include but are not limited to seismic and other impacts to the unit or structural mounts.
- Do not store other material on top of or hang anything from unit.
- Do not allow personnel under unit during service and maintenance procedures

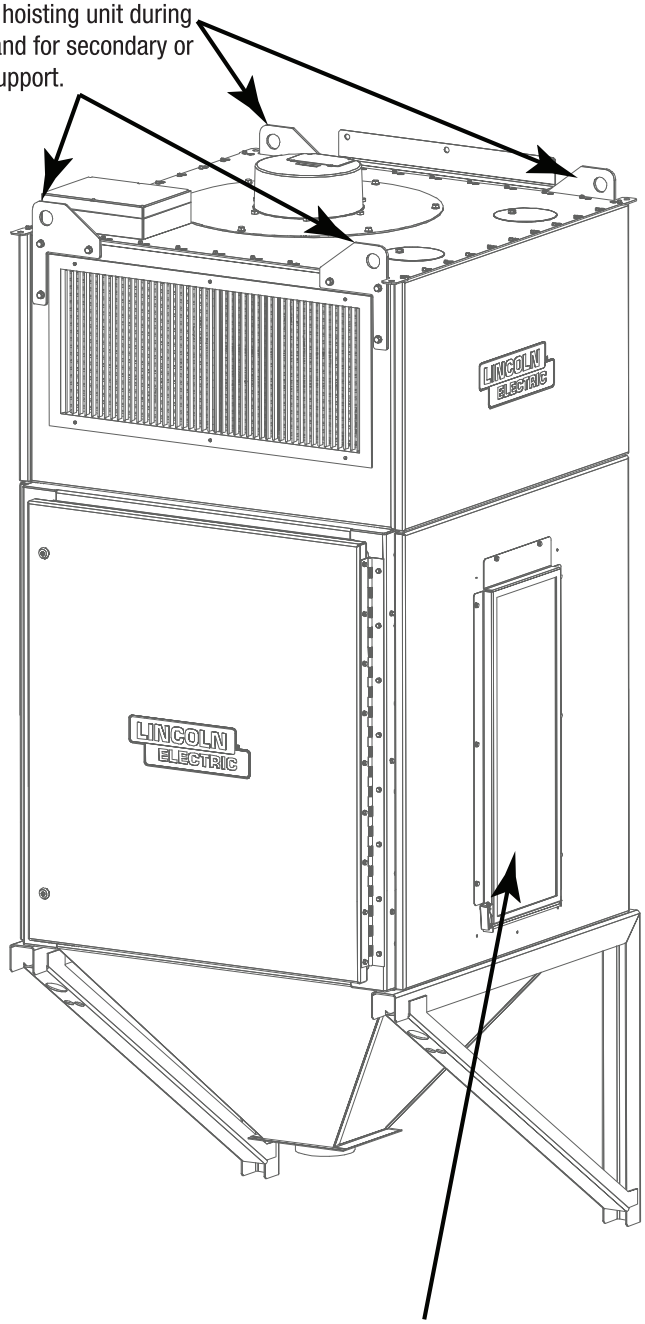
NOTICE!
- Do not locate other heat generating equipment nearby that could raise the ambient temperature around the unit above the max rating stated in the Technical Specifications section.
- For unit to meet designed operation efficiency, do not allow other equipment to obstruct the free flow of air to the side intakes and from the front fan exhaust.
- Refer to the maintenance section for recommended procedures to ensure unit functionality and safety throughout the life of the product. For most unit maintenance procedures, ensure access to front and sides of unit using OSHA approved access equipment.

WARNING!
Do not operate without the side intake pre-filters installed in their housings. For maximum protection, prevent sparks from reaching within 3 feet of unit's side intakes.

Step 6b – (WALL MOUNT ONLY) - Hanging Mount To Typical Buildings

WARNING!
Do not use corner brackets for primary mounting support of this unit. They are only intended for hoisting unit during installation and for secondary or redundant support.

FIGURE A.6b



WARNING!
Do not operate without the side intake pre-filters installed in their housings. For maximum protection, prevent sparks from reaching within 3 feet of unit's side intakes.

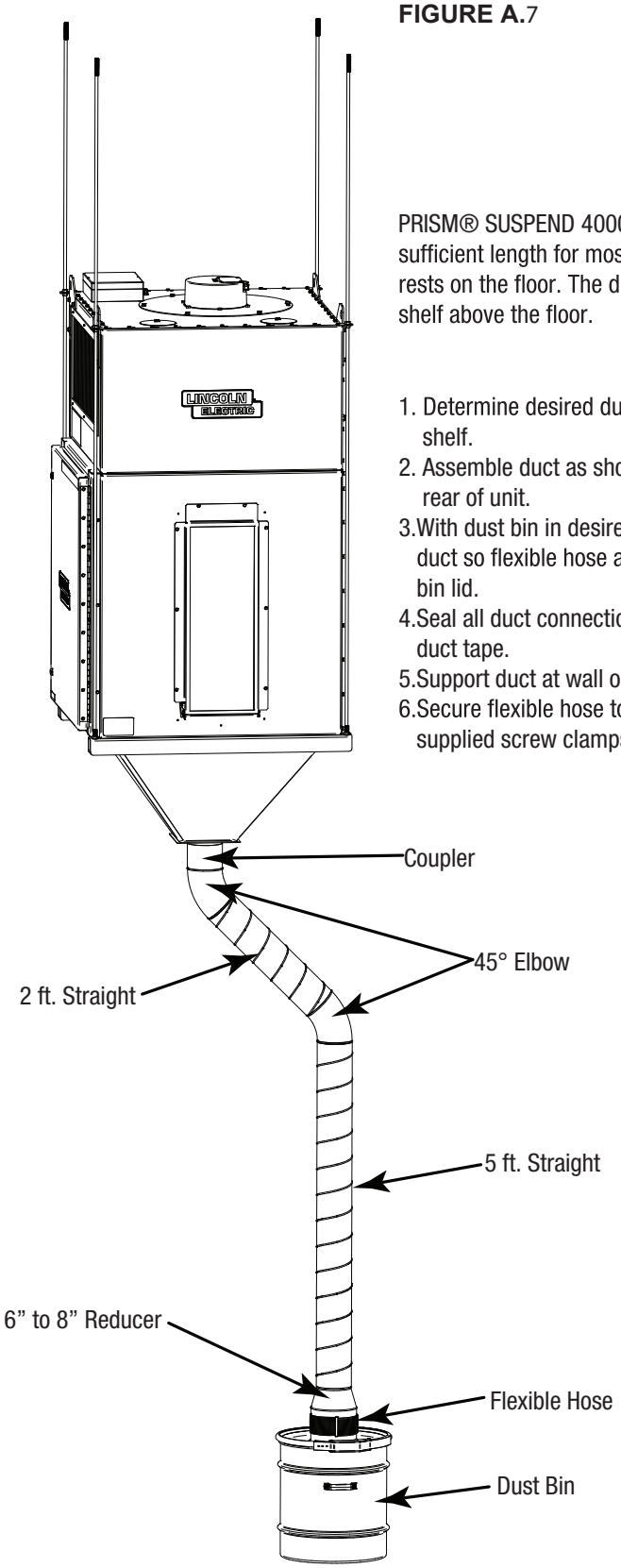
PRISM® SUSPEND 4000 can be mounted to many existing masonry and concrete walls.

WARNING!
- Existing building structure types and framing considerations vary greatly from building to building, therefore each installation of this unit (including but not limited to the building structure, brackets, hardware and any other structural supports) shall be approved by a structural engineer licensed in the governing jurisdiction. Subsequent building alterations or addition of other nearby high vibration equipment may require follow up analysis by the licensed structural engineer. Unapproved installations can result in falling equipment leading to severe personnel injury or death.
- High seismic locations may require special reinforcement and additional lateral support. Follow governing local building codes for inspection requirements following any significant event. Significant events include but are not limited to seismic and other impacts to the unit or structural mounts.
- Do not store other material on top of or hang anything from unit.
- Do not allow personnel under unit during service and maintenance procedures

NOTICE!
- Do not locate other heat generating equipment nearby that could raise the ambient temperature around the unit above the max rating stated in the Technical Specifications section.
- For unit to meet designed operation efficiency, do not allow other equipment to obstruct the free flow of air to the side intakes and from the front fan exhaust.
- Refer to the maintenance section for recommended procedures to ensure unit functionality and safety throughout the life of the product. For most unit maintenance procedures, ensure access to front and sides of unit using OSHA approved access equipment.

Step 7 – Duct To Dust Bin Assembly

FIGURE A.7

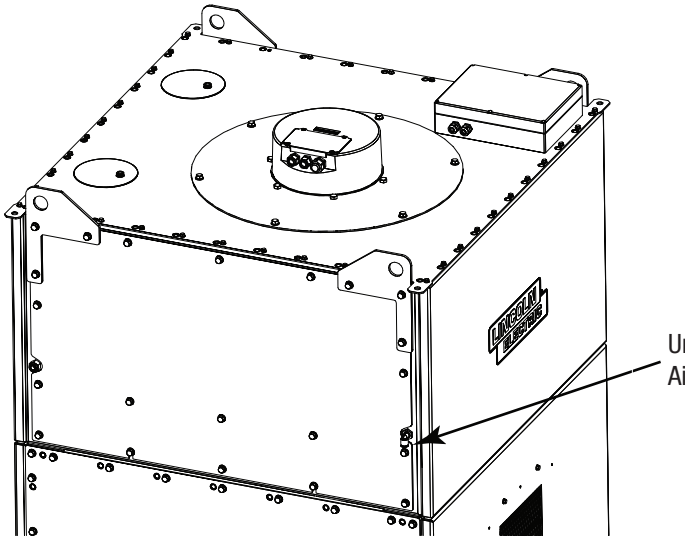


PRISM® SUSPEND 4000 supplied with 6” ductwork of sufficient length for most installations where the dust bin rests on the floor. The dust bin can also be placed on a shelf above the floor.

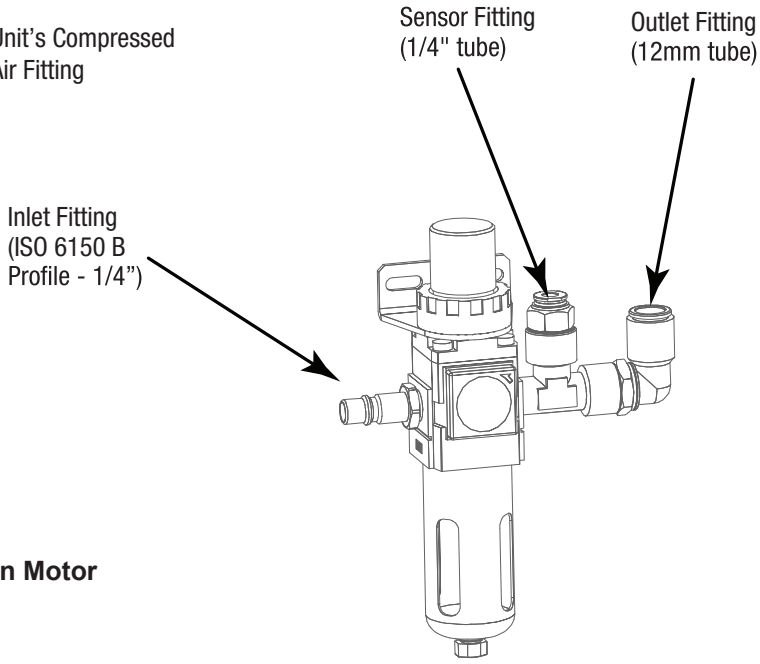
1. Determine desired dust bin location on floor or on a shelf.
2. Assemble duct as shown which aligns dust bin with rear of unit.
3. With dust bin in desired location, shorten 5ft straight duct so flexible hose allows for easy removal of dust bin lid.
4. Seal all duct connections with liquid duct sealant or duct tape.
5. Support duct at wall or other support structure.
6. Secure flexible hose to reducer and dust bin lid with supplied screw clamps.

Step 8 – Compressed Air Connection

FIGURE A.8



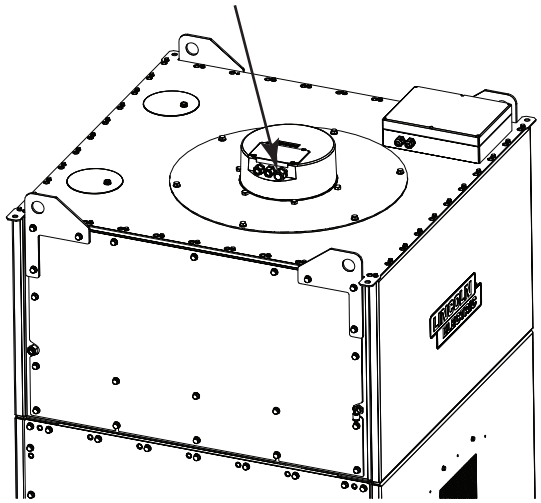
1. Mount the compressed air regulator in an appropriate location within reach of the tubing connected to the unit's rear compressed air fitting. Connect the 12mm tubing to the regulator's outlet fitting and the 1/4" tubing to the regulator's sensor fitting.
2. Connect compressed air source to regulator's inlet fitting (ISO 6150 B PROFILE-1/4"). Adjust regulator pressure between 5- 6 bar (73 - 87psi). For best filter cleaning performance, set regulator to 6 bar (87psi).



Step 9 – Connect Power to Fan Motor

FIGURE A.9

Run power to fan per local building code and connect power wires to fan motor per the fan motor instructions.



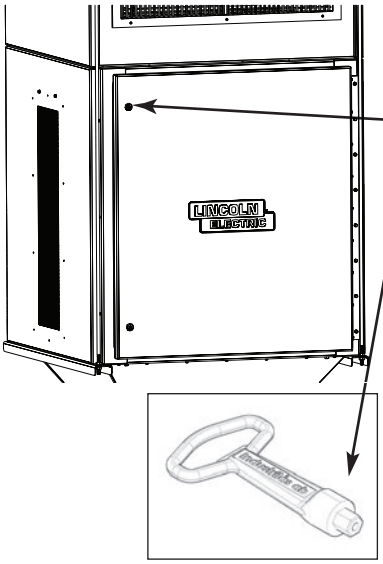
Step 10 - Install Filters (See section D for filter replacement instructions)

⚠ WARNING

Before opening door, unit must be off and the power switch on the side of the control panel turned to the off position.

a. Unlock door latches

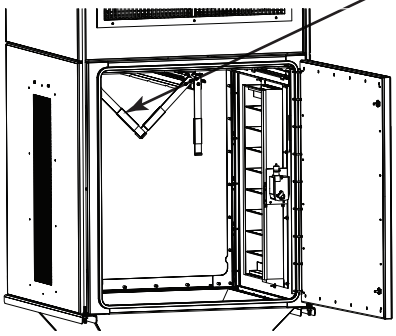
FIGURE A.10a



Unit ships with door latches locked. Unlock latches using the supplied hex tool (or standard 5/16" hex wrench), then open door.

b. Unclamp filter handles

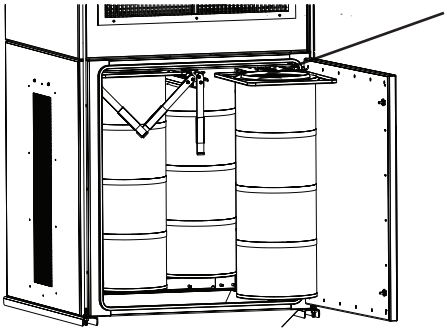
FIGURE A.10b



1. Unclasp handles for filter installation.

c. Install new filters

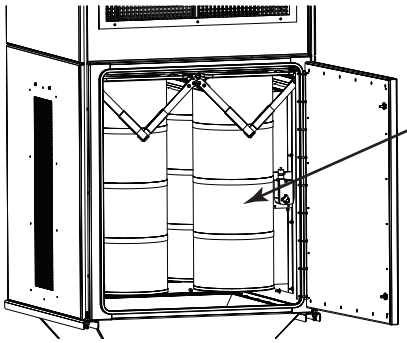
FIGURE A.10c



1. Slide filters into unit as shown, making sure they are pushed against rear of unit.

d. Reclasp filter handles

FIGURE A.10d

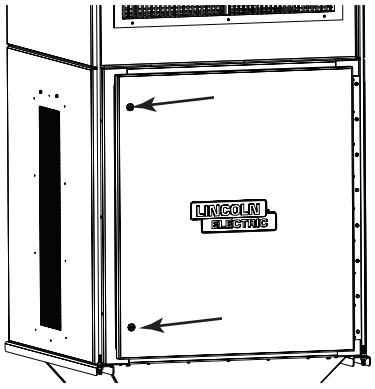


1. Reclasp filter handles to lift filters to their sealed position.
2. Close and latch door.

Step 11 - lock door

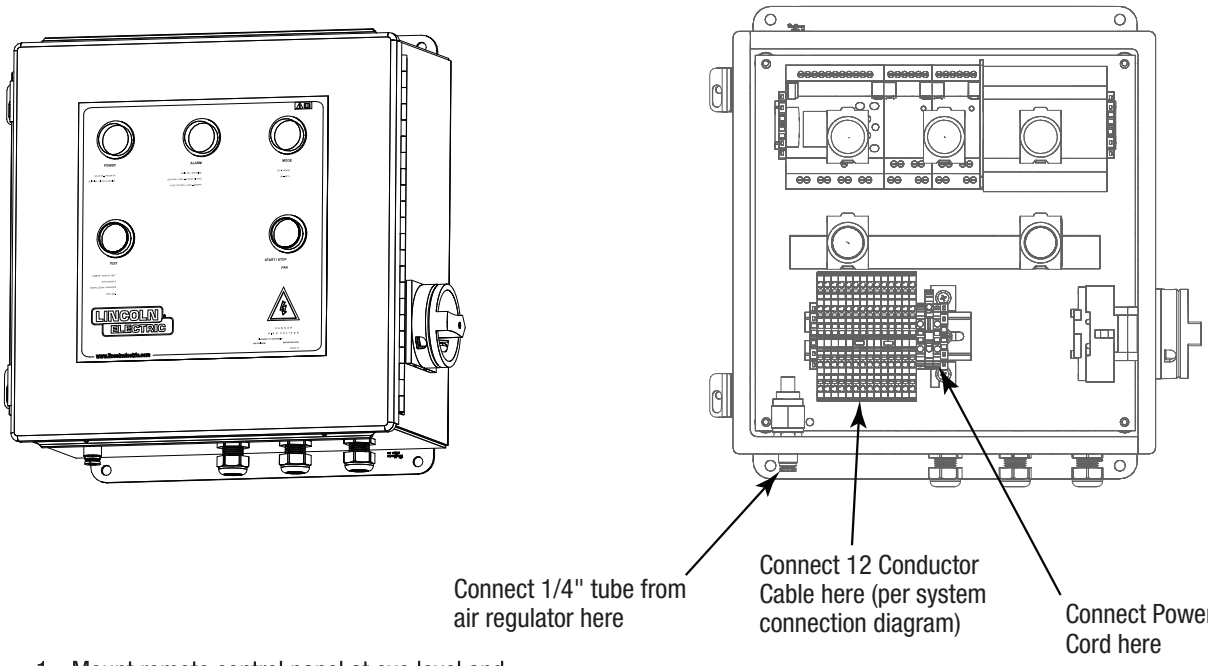
To prevent accidental door opening during unit operation, lock door latches using the supplied hex tool (or standard 5/16" hex wrench.

FIGURE A.11



Step 12 – Remote Control Panel Installation

FIGURE A.12



1. Mount remote control panel at eye level and within 21ft of the top of the unit after it is installed.
2. Connect power cable to power terminal block inside panel.
3. Connect 12 conductor cable from sensor box on top of unit to lower terminal block inside panel per the system wiring diagram at the end of this manual.
4. Install 1/4" air tube that runs along 12 conductor cable into fitting on bottom of panel.

Step 13 - Airflow Directional Control

Airflow direction from the Prism Suspend outlet grille can be controlled by angling the grille's outlet vanes. The grille's inner vanes are preset for airflow direction to be horizontal (straight out front). In most cases, this is acceptable unless there is a nearby obstruction. In those cases, angling the inner vanes to direct airflow over the obstruction is preferred.

Horizontal (left/right) control is made by angling the grille's outer vanes. Airflow can be set so there is one uniform airflow path for maximum throw distance. Flow direction can also be split so half is directed to the left and half to the right. This is most typically used on long/narrow buildings where units are spaced farther apart on opposite walls.

Optimum setting of the airflow direction can be recommended by your Lincoln Electric Sales Specialist. Following are the Prism Suspend throw distances.

PRISM SUSPEND 4000 THROW CHART

Fan Speed	Airflow CFM (m^3/hr)	*GRILLE VANES	**Max Throw Distance ft (m)
HIGH	4000 (6796)	UNIFORM	120 (36.6)
		SPLIT	80 (24.4)
MEDIUM	3000 (5097)	UNIFORM	90 (27.4)
		SPLIT	55 (16.8)
LOW	2000 (3398)	UNIFORM	70 (21.3)
		SPLIT	40 (12.2)

* UNIFORM = ALL GRILLE VANES AT SAME ANGLE FOR ONE UNIFORM AIRFLOW PATH
SPLIT = GRILLE VANES ANGLED TO CREATE SPLIT "V" AIRFLOW PATH
** AT TERMINAL VELOCITY OF 80 ft/min (0.4 m/s)

ELECTRICAL CONNECTIONS

Make all electrical connections compatible to your local city / state code.

⚠ WARNING

ELECTRIC SHOCK can kill.

- **Only qualified personnel should perform this installation.**
- **Turn the input power OFF and unplug the machine from the receptacle before working on this equipment.**
- **Insulate yourself from the work and ground.**
- **Always connect the Prism® 4 to a power supply grounded according to the National Electrical Code and local codes.**

⚠ WARNING

All electrical wiring which includes primary, secondary and control wiring must be done by certified/licensed electrician.

ELECTROCUTION HAZARD.

Disconnect mains before servicing. Failure to do so could result in serious personal injury or death.

Do not attempt installation of this unit unless you are familiar with the necessary tools, equipment, utility connections and potential hazards. Installation should be performed only by a qualified service provider. Failure to do so could result in reduced performance of the unit, serious personal injury or death.

OPERATION

Safety Precautions

⚠ WARNING

Only use the product for the welding processes described in the General Description. Avoid using the product for extracting and/or filtering fumes and gases which are released during the following (welding) processes:

Never use the product for:

- **oxy-fuel cutting**
- **aluminium laser cutting**
- **oil mist**
- **paint mist**
- **extraction of hot gases (more than 80°C/176°F continuously)**
- **grinding aluminium and magnesium**
- **flame spraying**
- **extraction of cement, saw dust, wood dust, grit etc.**
- **explosive environments or explosive substances/gases**

(This list is not comprehensive.)

If the product is used in above situations it could result in potential fire hazard, non-compliance with local regulations and reduction in product performance and life.

USERS

The use of this product is exclusively reserved to authorized, well-trained and qualified users. Temporary personnel and personnel in training can only use the product under supervision and responsibility of skilled engineers.

⚠ WARNING

Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable federal, state and/or local regulations and guidelines (i.e. OSHA PEL and ACGIH TLV limits in the U.S.).

INTENDED USE

The product has been designed as a filtration unit for dry dust and fumes. Using the product for other purposes is considered contrary to its intended use. The manufacturer accepts no liability for any damages or injury resulting from such use. The product has been built in accordance with state-of-the-art standards and recognized safety regulations.

Only use this product when in technical perfect condition in accordance with its intended use and the instructions explained in the user manual.

MODIFICATIONS

Modifications of (parts of) the product is not allowed.

RESTRICTIONS

The Lincoln Electric system may only be used for filtration of fumes and dust generated by some dry processing industries. Max 80°C (176°F) gas temperature.

⚠ WARNING

- **During use, always use Personal Protective Equipment (PPE) to avoid injury. This also applies for persons who enter the work area.**
- **Check the working environment. Do not allow unauthorized persons to enter the working environment.**
- **Protect the product against water and humidity.**
- **Make sure the room is always sufficiently ventilated; this applies especially to confined spaces.**

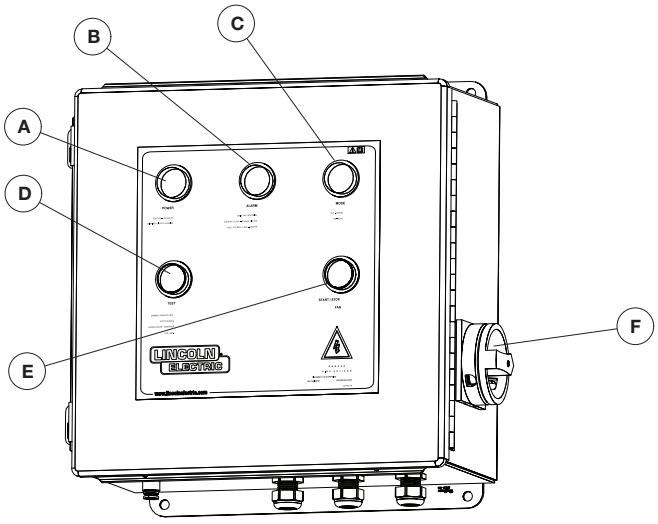
⚠ WARNING

Saturation or clogging of the filter cartridge results in a decrease of the extraction capacity which could result in a higher localized concentration of welding fumes.

The PRISM® Suspend 4000 controls will automatically maintain airflow via a PID loop controlling the electrically commutated fan motor so that it keeps the fan inlet cone pressure consistent. The PID setting to maintain the required pressure and therefore airflow is set during installation of the unit. For changes to this setting contact Lincoln Electric Service.

CONTROL

FIGURE B.1



A. Power On / Filter Cleaning (Light)
B. Alarm (Light)
C. Auto Run Mode (Light)
D. Test (Switch)
E. Fan Start/Stop (Lighted Switch)
F. Main Switch - Input Power

Functions

A. POWER / FILTER CLEANING Light (white): indicates the unit has power, is online, and available for operation. Blinking light indicates that filter cleaning is in progress.

B. ALARM Light (red): indicates one of four potential issues with the unit.

1. A solid red light indicates an EC motor drive fault.
2. A flashing red light (2 seconds on; 2 seconds off), indicates the filter pressure is above the maximum DP alarm set point and the filters should be changed.
3. A flashing red light (0.1 seconds on; 2 seconds off) indicates insufficient supply of compressed air to unit and filters will not clean properly during a cleaning cycle.
4. A flashing red light (2 seconds on; 0.1 seconds off) indicates an air intake damper malfunction.

C. AUTO RUN MODE Light (green): A solid green light indicates unit's auto run mode is active and unit will start and stop based on the programmed schedule.

D. TEST Switch: When a damper alarm fault is indicated, one press of this push button will trigger a damper test. If damper test passes, the fault is cleared. Review the Troubleshooting Section for further information on this feature. Pressing this button for more than 4 seconds will trigger a manual cleaning.

E. FAN START/STOP Lighted Switch (green): With white power light on and fan off, pressing this button will start fan and turn on the green light. If filter cleaning is in process (indicated by flashing white light), pressing of this button is ignored. Pressing this button while unit is in Auto Run Mode will manually start/stop the fan, but auto mode will take over at the next scheduled start/stop time.

NOTE - Reference control panel label for wiring specifications.

NOTE - Land power ground wire should be longer than all other wires

SOFTWARE FUNCTIONS

The Prism® Suspend 4000 is controlled by a PLC with the following software functions:

1) FAN START/STOP -
Fan start/stop is controlled by push button on front of the control panel when in manual mode OR by weekly timer schedule when in auto run mode. When in auto run mode, fan can still be stopped/started with the push button, but will be temporary until the next scheduled start/stop time is reached.

2) FAN OPERATION -
When the electrically commutated fan is running, the PID controller in the PLC references internal "duct" pressures to control fan airflow output. Users can set the desired airflow on the PLC screen (default is 4000 cfm). Fan output is limited during a filter cleaning cycle and when a damper malfunction is detected.

3) AUTOMATIC FILTER CLEANING -
Filter cleaning is dependent upon the differential pressure across the filters and the cleaning threshold set point. The Prism® Suspend 4000 Adaptive Cleaning Technology first initiates filter cleaning at 500 Pa and the threshold gradually increases to a maximum of 1500 Pa at which point a filter change automatically resets the threshold to 500 Pa.
Filter differential pressure is measured after the fan speed has stabilized. When initiated, the automatic cleaning cycle consists of the following steps:

A) Fan speed slows.
B) Inlet dampers close.
C) When damper actuator switch confirms dampers are closed, fan speed rises to preset cleaning threshold.
D) Pulses of compressed air are generated and controlled with the following parameters that can be changed by the user-
(1) Pause Time (default 20 sec)
(2) Pulse Time (default 200 ms)
(3) Number of cycles (default 2 for total of 4 pulses)
E) After cleaning pulses complete, fan speed slows.
F) Unit runs at steady state to allow dust to settle.
G) Dampers open.
H) Fan restarts to meet airflow set point.

NOTE: A cleaning cycle can be manually initiated by pressing the TEST button for more than 4 seconds.

4) ALARMS -

The PLC will trigger an alarm in the following cases:

A) The filter change alarm set at 1500 Pa is indicated with a flashing red light (two seconds on / two seconds off). Early alert to order filters is indicated when flashing light shuts off within 2 minutes of unit restart after filter cleaning. When flashing light remains constant, filter change is required to maintain normal unit operating performance. This alarm will automatically reset after filters are changed and unit restarted.

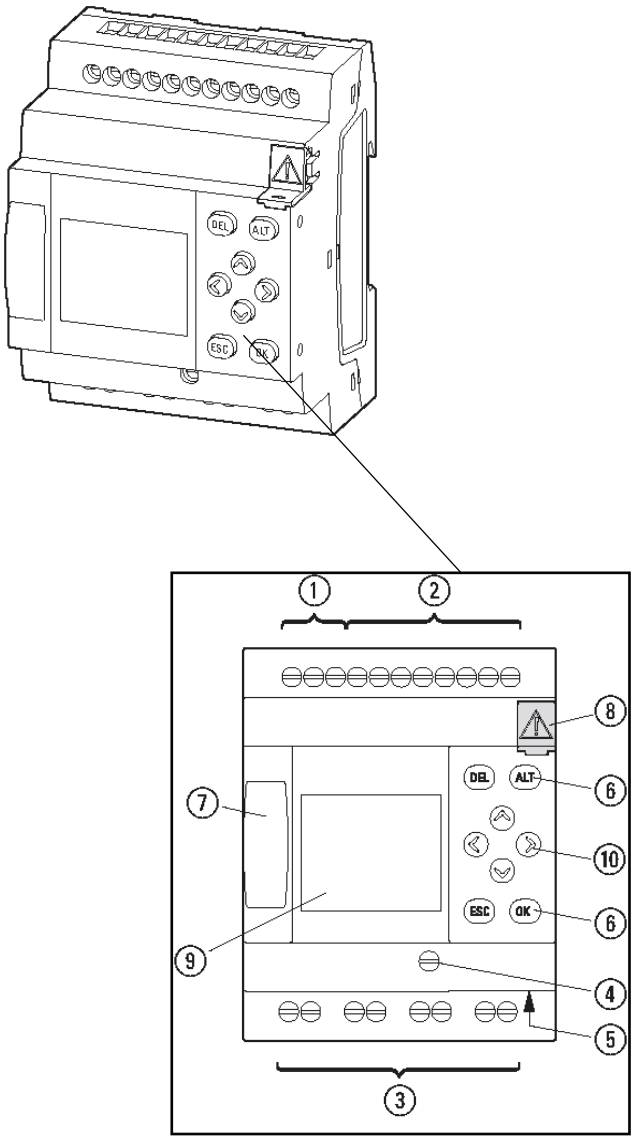
B) Intake damper malfunction is indicated with a flashing red light (two seconds on / 0.1 seconds off). Two damper malfunctions can trigger this light. When dampers close for filter cleaning, the actuator switches must provide a "high" signal to the PLC (AuxIn1 & AuxIn2) to indicate dampers are fully closed. If this signal is not received within 1 minute, unit will enter "LIMP" mode. When dampers are supposed to be open (all times except for filter cleaning), the actuator switches must provide a "low" signal to the PLC to indicate dampers have opened (moved from the closed position). If one damper fails to open, the unit will enter "Limp" mode which limits fan speed to 50%. If both dampers fail to open, the fan will not run. When unit is running in "Limp" mode, the unit will not run the filter cleaning cycle. Once dampers have been repaired, press the TEST button to initiate damper testing. If the test is passed, unit will automatically resume normal operation.
C) EC fan motor malfunction is indicated with a solid red light. The light will turn off when the malfunction has been resolved.
D) Insufficient supply of compressed air is indicated with a flashing red light (0.1 seconds on / 2 seconds off). This alarm is triggered if air pressure falls below 5 bar (73 psi) at the air regulator and the unit will not initiate filter cleaning in this state. For best filter cleaning performance, set the air regulator at 6 bar (87 psi).

5) AUTO MODE SCHEDULE -
To enable auto run mode, unit must be in standby mode. Toggle to the password screen by hitting the left arrow key. Enter the password (1234), then arrow to the first schedule screen (HW1). Press the ALT button to highlight the "enable" box. Press the down arrow to add check mark, then hit the OK button. Unit will automatically start if current time falls within scheduled on time. Fan can be turned off manually while in auto mode by pressing the fan start/stop button.
There are two timers available to control on/off function of the unit. Each timer has 7 days to set on - off times for. To set the schedule, follow these steps:
Follow auto mode enable menu steps to access schedule menus.

A) The two timers are labeled HW1 and HW2.
B) Set the number of timers needed. For example, if Monday from 6am to 5pm on time is desired, set the parameters as follows -
(1) DAY = MON
(2) ON = 6:00
(3) OFF = 17:00
C) For timers that are not needed, set the timers so ON=00:00 and the OFF=00:00.

PLC NAVIGATION

FIGURE B.2



PLC Controls (See Figure B.3):

1. Power Supply
2. Input Points
3. Outputs
4. Ethernet Connection Functional Earth
5. Ethernet Socket
6. Pushbuttons
7. Slot For microSD Memory Card
8. Covering Cap
9. Display
10. Cursor Buttons

SCREEN NAVIGATION

ALT Button - Push to change parameters while in standby mode (fan not running).

ARROW Buttons - Push left arrow to navigate through settings screens. Use all arrows to move cursor position and change values.

OK Button - Push to enter menu screen. The menu screen includes clock update, daylight saving time and SD card options. This button also accepts/saves revised parameters.

ESC Button - Push to exit a menu.

STARTUP

The following points are to be checked and implemented before the filter unit is put into operation:

Electricity - Check for connection to a proper three phase line voltage connection to the fan for proper performance. Ensure supply lines to the unit are properly fused and all local electrical codes are followed.

Pneumatics - Check that the compressed air is connected. Compressed air should be clean, dry and oil free and within a pressure range of 5 - 6 bar (73 - 87 psi). For best filter cleaning, set pressure regulator at 6 bar (87 psi).

SET POINTS

Default values enable basic unit operation. Each value should be given consideration for optimized operation, and can be adjusted with continued use and experience using the equipment. Consult Lincoln Electric Field Service to shorten the learning curve.

ADJUSTING PARAMETERS

A) The following parameters can be adjusted from the main standby screen (with fan off)

1. Airflow (SetAirFL): Default is 4000 CFM which is normal for most applications
2. Filter Change Alarm Setpoint (Alarm SP): Default is 1500 pa
3. Filter Cleaning Threshold (SetFltrPr): Default for clean filters is 500 pa
4. Filter Hours (FilterHr)
5. Date/Time (also see DATE/CLOCK ADJUSTMENT)

B) The following parameters are password (1234) accessible and should only be adjusted by maintenance and service personnel.

1. Auto Schedule (see Auto Mode Schedule under software functions)
2. Rounds of Cleaning Pulses (CleaningCyc#): Default is 2
3. Data Logging on SD Card (DATALOG)
4. Data Logging Interval (INT): Default is 29sec
5. Fan Type (EBM500, EBM450, RSB500)

DATE/CLOCK ADJUSTMENT

1. To adjust the PLC's date and clock settings with the unit in standby mode, press OK, then arrow down to SET CLOCK and press OK. Select SET CLOCK again by pressing OK. Change the date and time, then hit the ESC button to exit.
2. Daylight Savings Time can be set by selecting DST in the SET CLOCK menu. USA locations with daylight savings time can select US at this menu.

PERFORMANCE MONITORING

The following system performance data can be viewed from the FAN RUNNING screen

1. Filter Differential Pressure (FiltrPr)
2. Duct Pressure (DuctPr): This is a function of the airflow setting
3. Fan Speed % (FanSpeed)
4. Airflow Setpoint (SetAirFL)
5. Filter Cleaning Threshold (SP)
6. Time

ACCESSORIES

REPLACEMENT FILTER OPTIONS

- **KP4519-1** spun bond polyester filter cartridge
- **KP4519-2 (Standard)** MERV 16 high efficiency nano fiber filter cartridge
- **KP4519-3** MERV 16 high efficiency thermal bonded PTFE membrane filter cartridge
- **KP4519-4** MERV 11 spun bond polyester filter cartridge with oil resistant technology
- **KP4519-5** MERV 16 high efficiency nano fiber filter cartridge with oil resistant technology
- **KP4052-1** Pre-Filter (set of 2 filters)

All filters should be replaced at the same time; all should be of the same type. Replacement filters include dust mask, gloves and plastic bag (for spent filter).

MAINTENANCE

⚠ WARNING

Have qualified personnel do the maintenance work. Turn the power off before working inside the machine. 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.

If a problem cannot be corrected by following the instructions, contact your local Lincoln Electric representative for service options or contact Lincoln Electric Customer Service.

ELECTRIC SHOCK can kill.

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

FUMES and GASES can be dangerous.

- **Use in open, well ventilated areas or vent exhaust outside.**

MOVING PARTS can injure.

- **Do not operate with doors open or guards off.**
- **Stop before servicing.**
- **Keep away from moving parts.**

⚠ WARNING

Dismantling and disposal

- **Only a qualified electrician may disconnect the machine or the electrical system**
- **Before dismantling it the machine must be disconnected from the power supply and from the external compressed air supply**
- **Before dismantling it, clean the equipment**
- **The dismantling area must be cleaned afterwards**
- **During dismantling work, the working area must be adequately ventilated; this can be achieved by provision of a mobile ventilation unit**
- **During dismantling work, wear appropriate personal protective equipment. We recommend half-face breathing masks to DIN EN 141/143, protection class P3**
- **The pollutants and dust, together with the dirty filtercartridges, must be properly disposed of in a professional manner in accordance with statutory instructions, using the plastic sack disposal system supplied**

⚠ ATTENTION

Maintenance should only be performed by authorized, qualified and trained persons (skilled) using appropriate work practices.

⚠ WARNING

When cleaning equipment or replacing filter use personal protection equipment (PPE) such as gloves, respirators and protective clothing to protect against overexposure to particulate. It is recommended that a vacuum cleaner or wet methods be used to clean up any loose particulate that is present in the extraction arm. It is necessary to use a vacuum cleaner with HEPA rated filtration.

⚠ WARNING

- **Observe the maintenance intervals given in this manual. Overdue maintenance can lead to high costs for repair and revisions and can render the guarantee null and void.**
- **During service, maintenance and repair jobs, always use Personal Protective Equipment (PPE) to avoid injury. This also applies to persons who enter the work area during installation.**
- **Always use tools, materials, lubricants and service techniques which have been approved by the manufacturer. Never use worn tools and do not leave any tools in or on the product.**
- **Safety features which have been removed for service, maintenance or repairs, must be put back immediately after finishing these jobs and it must be checked that they still function properly.**
- **Use sufficient climbing gear and safety guards when working on a higher level than 6 feet.**
- **Ensure the workspace is well illuminated.**
- **Prevent all personnel from entering area under unit during maintenance and service activities.**

MALFUNCTIONS AND EMERGENCIES EFFECTING THE FILTER UNIT

Fire

- In the event of fire, an approved extinguisher for fire classes A, B and C should be used
- The manufacturer must be contacted.

ESCAPE OF NOXIOUS SUBSTANCES OR RADIATION

- The Prism® Suspend 4000 contains no noxious substances.
- If the filter ruptures, welding fumes can be released into the building; welding activities must be suspended and the Prism® Suspend 4000 repaired.

PERIODIC MAINTENANCE

The product has been designed to function without problems for many hours with minimal maintenance. In order to ensure this, some simple regular maintenance and cleaning activities are required which are described in this section. If you observe the necessary caution and carry out the maintenance at regular intervals, any problems that occur will be detected and corrected before they lead to a total breakdown.

The indicated maintenance intervals can vary depending on the specific working and ambient conditions. Therefore it is recommended to thoroughly inspect the complete product once every year other that the indicated periodic maintenance.

Follow OSHA protocols and your company's JHA safety procedures when servicing this equipment. Keep personnel from entering work area under unit and tether tools and anything else that could fall to the floor.

The maintenance activities in Table D.1 indicated by [*] can be carried out by the user; other activities are strictly reserved for well trained and authorized service engineers.

TABLE D.1 – PERIODIC MAINTENANCE

COMPONENT	ACTION	EVERY MONTH	EVERY 3 MONTHS	EVERY 6 MONTHS
Control Panel	*Clean inside using an industrial vacuum cleaner.		X	
Drum	*Check levels of dust and dirt particulate. Empty if necessary.	X	X	X

* Frequency depends on welding or cutting process.

MAINTENANCE SCHEDULE

NOTE: * REQUIRES Lincoln Electric factory authorized service technician.

AS NEEDED

- Replace filters (see filter replacement instructions).
- Inspect and test functionality of the filter media cleaning system. *
- Program and verify system performance. *
- Follow governing local building codes for inspection requirements following any significant event. Significant events include but are not limited to seismic and other impacts to the unit or structural mounts.

MONTHLY

- Check particulate collection drum and dispose of particulate if necessary.
- Check and log filter pressure.
- Check fan speed.
- (Hanging mount): Visually inspect secondary support cables are not taut. Taut cables can be an indication of primary support failure.

EVERY 3 MONTHS

- Inspect and clean or replace pre-filters installed on the sides of the unit.

EVERY 6 MONTHS

- Ensure that the Cubic Feet per Minute (CFM) is operating to the engineered specifications based on the individual system *
- Clean inlet dampers as specified under the INLET DAMPERS maintenance section.

YEARLY

- Inspect unit for proper operation and function, address any issues found.
- Fan motor temperature is within normal ranges, a hand held IR temp meter is a good tool for this. High motor temps indicate bearing or winding issues and predict a failure. This can also apply to the electrical power connections to the unit- elevated temps on junction boxes and wire terminations are precursors to problems.
- (Hang mount): Verify primary and secondary support brackets and hardware remain properly in place with no signs of loosening.
- (Wall mount): Verify wall mount brackets, wall anchors and other hardware remain in place with no signs of loosening.
- Inspect external unit components, including but not limited to the door hinge, side intake housing and all hardware.

EVERY 5 YEARS

- Inspect condition of unit mounting. This includes but is not limited to the building structure, brackets, hardware and any other structural supports. Address any issues found.

MOTOR/FAN HOUSING

⚠ WARNING

Observe safety precautions when working on the inside of the fan box or control panel. Removing power and observing LOTO (Lockout-Tagout) procedures as required.

- **Check the integrity of the fan housing and tighten all bolts and screws if necessary.**
- **Clean housing with a non-aggressive detergent.**

- **Check fan motor blades for encrusted particles and clean if necessary.**
- **Inspect and clean control panel with a non-aggressive detergent.**
- **Check inlets and outlets for tears or wear.**

CONTROL PANEL

- **Check for functionality of control panel fan.**
- **Inspect and clean any buildup or dirt on fan blade impellers in control panel.**
- **Inspect and replace control panel filters if necessary.**

INLET DAMPERS

- **Clean all visible dirt from damper surfaces. Use non-oil based solvent if needed**
- **Clean visible dirt from damper linkage and bearings. Lubricate if necessary using a graphite based lubricant.**

Dampers are located inside the filter housing. For best access, remove the front filters by following the Replacing Filter Cartridge procedure.

REPLACING FILTER CARTRIDGES OR EMPTYING DUSTBINS

Shut off the compressed air feed and empty the pressure tank of air by opening the drain valve on the back of the unit.

NOTE: The power must always be switched off at the circuit-breaker or by the line fuses. Protective gloves and mask should always be worn.

⚠ WARNING

Take necessary precautions so that you and your fellow workers are not overexposed to particulate. Wear suitable personal protection equipment, such as gloves, respirator, eye glass and protective clothing when disposing of the filter and particulate.

Check with local waste management or local agency(ies) for assistance in the disposal of filter. If filter has collected certain types of particulate which local agencies define as hazardous waste, filter may be classified as hazardous waste and will need to be disposed in accordance with federal, state and local regulations - which could vary from state to state and between local municipalities within the state.

Use protective gloves. If not carried out with the necessary caution, may cause serious personal injury.

Use breathing protection. If not carried out with the necessary caution, may cause serious personal injury.

- Maintenance work and functional testing should be performed regularly to TRGS 560 section 5, paragraph 9 and to TRGS 528.
- During maintenance the machine must be deenergized and secured against switching on again.
- The maintenance area must be cleaned afterwards.
- During maintenance work the working area must be adequately ventilated; this can be achieved by provision of a mobile ventilation unit.
- During maintenance, appropriate personal protective equipment should be worn. We recommend half-face breathing masks to DIN EN 141/143, protection class P3.
- The dust and the dirty filter cartridges must be properly disposed of in accordance with statutory instructions, using the plastic sack disposal system supplied.

REPLACING FILTER CARTRIDGES

⚠ WARNING

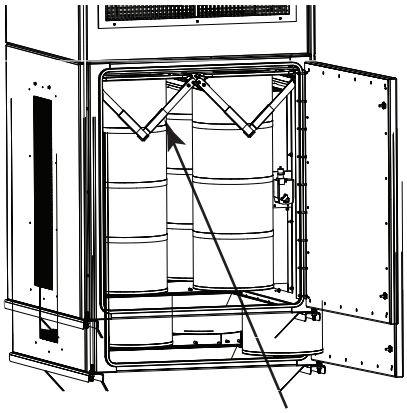
Before opening door, unit must be off and the power switch on the side of the control panel turned to the off position.

PREPARATION FOR FILTER REMOVAL

1. Verify power has been switched off at the control panel.
2. Cover equipment below door opening to protect against falling dust.
3. Unlock door latches using the supplied hex tool or any standard 5/16" hex wrench.
4. Slowly open door, then brush accumulated dust off door gasket (at bottom of door) into unit's hopper.
5. To best prevent falling dust, clean inner door surface and surrounding door gasket with an industrial vacuum cleaner that meets OSHA guidelines for Cr6 housekeeping.
6. Follow steps A - C for filter replacement

a. Unclamp handles and lower filters.

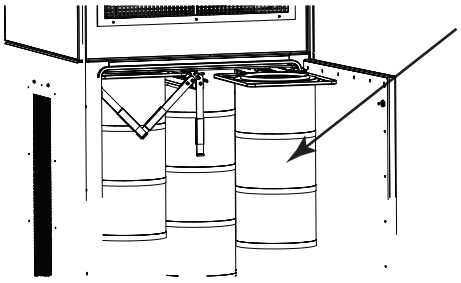
FIGURE D.1



1. Unclasp handles to lower filters for removal.
2. Slide bag (supplied with new filters) over each dirty filter before removal.

b. Remove filters.

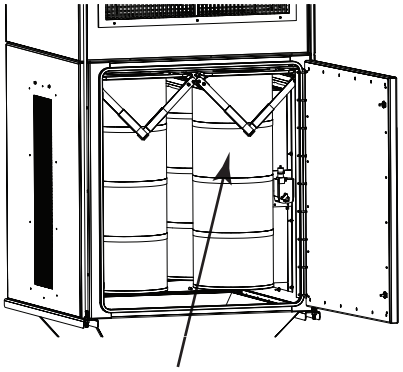
FIGURE D.2



1. Slide filters out of unit through the door opening as shown.
2. If required by federal, state and/or local regulations and guidelines, conceal filter cartridge in appropriate bag, e.g. plastic bag.
3. Dispose of the filter cartridge in accordance with all federal, state and/or local guidelines.
4. Clean the filter compartment with an industrial vacuum clener that meets OSHA guidelines for Cr6 house-keeping.

c. Install new filters.

FIGURE D.3



1. Install new filters, making sure they are pushed against rear of unit.
2. Reclasp filter handles to lift filters to their sealed position.
3. Re-lock door latches using the supplied hex wrench or any standard 5/16" hex wrench.

PRE-FILTER REPLACEMENT

- Remove pre-filters located in housings accessible on the outside of the intake dampers. Unlatch bottom bracket to allow filter to slide out the bottom.
- Pre-Filters can be cleaned using detergent and water but should be replaced if they can no longer be thoroughly cleaned. Pre-filters must be kept clean to ensure maximum life of the four internal cartridge filters.

TROUBLESHOOTING GUIDE

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(S).

The second column labeled “POSSIBLE AREA(S) OF MISADJUSTMENTS” 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 Areas of Misadjustment(s).

Service and Technical Support

For information about specific adjustments, maintenance or repair jobs which are not dealt with in this manual, please contact Lincoln Electric Automation Department 888-935-3878.

Make sure you have the following data on hand:

- product name
- serial number
- purchase order (number + date) for warranty verification

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

Observe all Safety Guidelines detailed throughout this manual

Observe all Safety Guidelines detailed throughout this manual		
PROBLEMS (SYMPTOMS)	**POSSIBLE CAUSE**	**RECOMMENDED COURSE OF ACTION**
FUNCTION PROBLEMS		
White Power On light does not light up.	1. Main Switch is in off position 2. No power supply 3. Fuse(s) defective	Turn on main switch 1.Check power supply. 2.Check for normal component operation. 3.Are green power lights illuminated on PLCs and components? If not, replace.
Cleaning cycle is not functioning.	1. Possible damper malfunction 2. Possibly no or low compressed air 3. Possible bad connection between control box and junction box. 4. Possible bad electrical connection. NOTE: Cleaning cycle only runs when filter pressure is above the setpoint as indicated on the PLC screen.	1. Verify that the Fan running LED (Green) and the white power on light is illuminated. 2. Verify the correct input voltage is being applied. 3. Verify that all fuses and circuit breakers are not blown/tripped. 4. Verify compressed air is present and with adequate pressure.
Cleaning valve fails to open.	1. The pulsation cycle may be faulty. 2. Possible dirt in the housing of the valve. 3. Possible incorrect flow direction on the cleaning valves. 4. Possible incorrect control voltage for the magnetic valves.	1. Verify that the pulsation cycle is OK, that it's within the parameters recommended by Lincoln Electric. 2. Clean the housing of the valve. 3. Verify that the airflow directions on the cleaning valves are in accordance with the airflow. 4. Verify that the cleaning system is working properly - 87 PSI (6 BAR) 5. Verify 24VDC signal on terminal block locations 30 & 31 when cleaning cycle is in process as shown on the PLC screen.
Cleaning valve fails to close.	1. The pulsation cycle may be faulty. 2.Possible dirt in the housing of the valve. 3. Possible incorrect control voltage for the magnetic valves.	1. Verify that the pulsation cycle is OK, that it's within the parameters recommended by Lincoln Electric. 2. Clean the housing of the valve. 3. Verify that the cleaning system is working properly - 87 PSI (6 BAR) 4. Verify 0VDC signal on terminal block locations 30 & 31 except when PLC screen indicates a pulse has occurred.

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

Observe all Safety Guidelines detailed throughout this manual

Observe all Safety Guidelines detailed throughout this manual		
PROBLEMS (SYMPTOMS)	**POSSIBLE CAUSE**	**RECOMMENDED COURSE OF ACTION**
FUNCTION PROBLEMS		
Filter replacement alarm does not function.	1. Side inlet pre-filters clogged. 2. Wrong DP reading reported by sensor. 3. Incorrect duct air velocity.	1. Clean or replace side inlet pre-filters 2. The Differential Pressure sensor PD1 is read by the PLC, after confirming solid electrical and tubing connections you can tap into the readings with a "T" fitting and hand held manometer to confirm its readout matches the real DP. Calibrate or re-zero the sensor if needed. Change it if it doesn't operate properly. 3. Verify the fan airflow is not too low. Measure and adjust as necessary.
The air flow is diminished.	1. Side pre-filters may be clogged. 2. Four cartridge filters may be clogged.	1. Clean or replace side intake pre-filters. 2. Replace four cartridge filters. 3. Make sure your duct pressure sensor PD2 is giving a proper reading into the PLC. Fan speed is controlled via this input feeding into a PID control loop. 4. If all recommended possible areas of mis-adjustment have been checked and the problem persists, Contact your local Lincoln Authorized Field Service Facility. 1-888-935-3878.
Particulate is emitting from the collection drum.	1. Collection drum is full. 2. Possible bad seal and clamp on the collection drum.	1. Clean or replace side intake pre-filters. 2. Replace four cartridge filters. 3. Make sure your duct pressure sensor PD2 is giving a proper reading into the PLC. Fan speed is controlled via this input feeding into a PID control loop. 4. If all recommended possible areas of mis-adjustment have been checked and the problem persists, Contact your local Lincoln Authorized Field Service Facility. 1-888-935-3878.
There is an abnormal amount of weld fume in the work zone.	1. Check to make sure the machine is powered on. 2. Check outlet grill airflow directional control. 3. Verify fan speed on PLC screen. 4. Make sure your duct pressure sensor PD2 is giving a proper reading into the PLC. Fan speed is controlled via this input feeding into a PID control loop.	1. Calibrate or re-zero the duct pressure sensor, if the output is still bad change the duct pressure sensor. 2. If all recommended possible areas of mis-adjustment have been checked and the problem persists, Contact your local Lincoln Authorized Field Service Facility. 1-888-935-3878.

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

Observe all Safety Guidelines detailed throughout this manual

Observe all Safety Guidelines detailed throughout this manual		
PROBLEMS (SYMPTOMS)	**POSSIBLE CAUSE**	**RECOMMENDED COURSE OF ACTION**
FUNCTION PROBLEMS		
Poor suction.	1. Inlet dampers are partially or fully closed. 2. Outlet is blocked. 3. Filter cartridge is clogged. 4. Side intake pre-filters are clogged.	1.Test intake dampers as detailed in the electrical section. Repair as necessary and retest to resume normal operation. 2. Replace filters if necessary. 3. Clean or replace side intake pre-filters. 4. If all recommended possible areas of mis-adjustment have been checked and the problem persists, contact your local Lincoln Authorized Field Service Facility at 1-888-935-3878.
Dust or smoke coming out of the outlet opening(s). Pollution of the facility.	1. Filter cartridge is damaged. 2. Sealing on filter cartridge is damaged.	1. Replace the filter cartridge.
Dust or smoke coming out of the inlet opening(s). Pollution of the facility.	1. Outlets blocked. 2. Filter cartridge clogged. 3. Inlet dampers not fully closed during cleaning cycle.	1. Remove obstructions from the outlet grill. 2. Replace filter cartridge. 3. Test intake dampers as detailed in the electrical section. Repair as necessary and retest to resume normal operation.

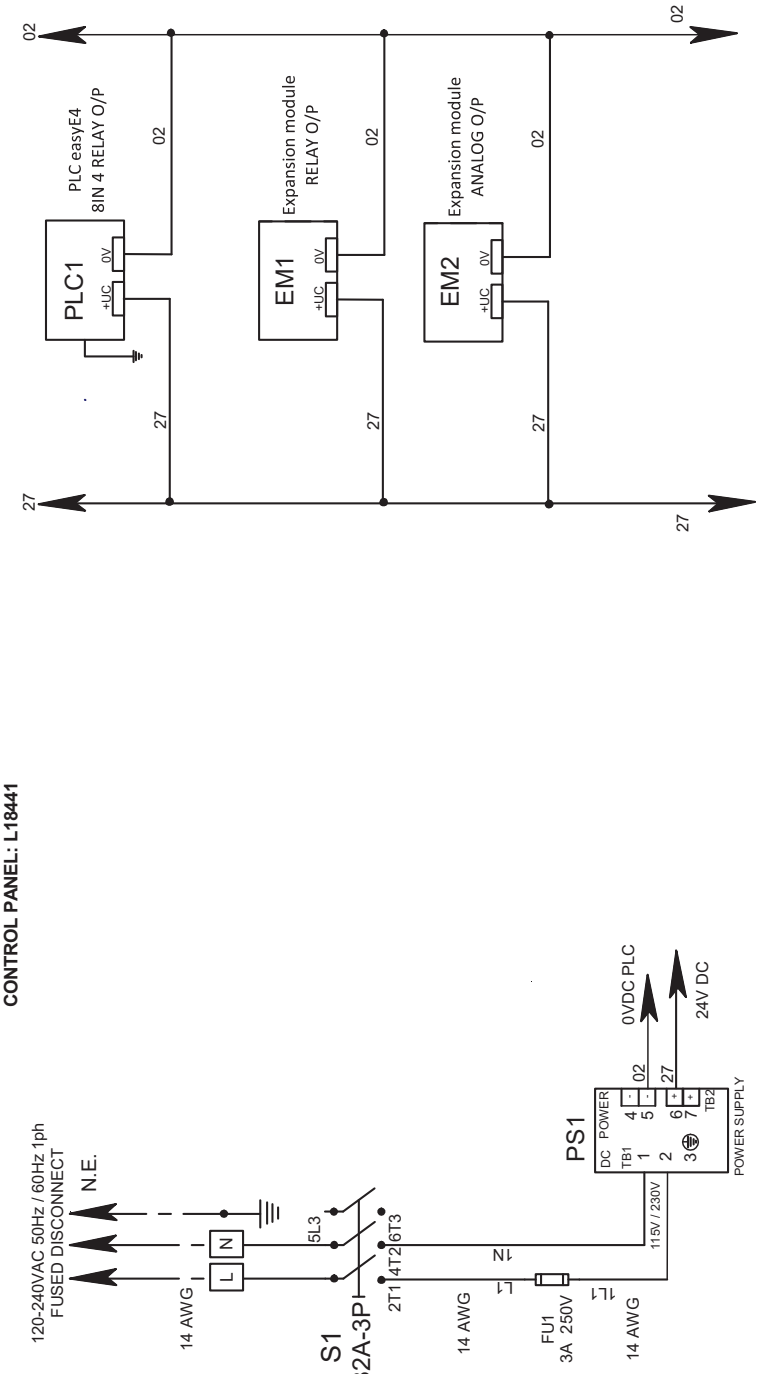
If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your Lincoln Authorized Service Facility for technical troubleshooting assistance before you proceed.
WWW.LINCOLNELECTRIC.COM/LOCATOR

Observe all Safety Guidelines detailed throughout this manual

Observe all Safety Guidelines detailed throughout this manual		
PROBLEMS (SYMPTOMS)	**POSSIBLE CAUSE**	**RECOMMENDED COURSE OF ACTION**
FUNCTION PROBLEMS		
Alarm - Red Alarm LED lights.	1. Red alarm light is on solid if controls know there is a fault with the ECM Fan. 2. Red alarm light is flashing if the filter DP alarm set point is reached (two seconds on / two seconds off). 3. Red alarm light is flashing when there is an insufficient supply of compressed air for filter cleaning (0.1 seconds on / 2 seconds off). 4. Red alarm light is flashing if the inlet dampers have malfunctioned (two seconds on / 0.1 seconds off).	1. Investigate ECM Fan fault issue. Alarm will reset when issue is resolved. 2. If the Differential Pressure read by the sensor is higher than your DP Alarm set point your alarm light will be on and flashing and the unit most likely has already passed your online cleaning set point (default of which is 1500 Pa). Filters need to be changed if this DP reading is correct and your set point is realistic. 3. Compressed air supply needs to be sufficient to maintain pressure between 5 - 6 bar (73 - 87 psi) at air regulator. A 30 second buffer allows for tank refill after filter cleaning pulse. 4. Repair cause of damper malfunction. If dampers fully open and fully close using the TEST button, the problem is with the actuator switches. If dampers do not move properly, the actuator motor or damper mechanism is at fault. • To diagnose which damper is causing the alarm, press the TEST button. • When dampers fully close, check terminal block circuits 53 and 91 on the main control panel. They should both read 24V when dampers are closed. • Identify the circuit that does not read 24V, then look at the wiring ID labels at the damper connectors inside the filter box to match up to the circuit and identify the faulted damper . • If the damper at fault moves correctly, the fault may be corrected by turning the actuator switch adjustment next to the actuator's shaft clamp one or two clicks clockwise. • Retest dampers by pushing the TEST button. If the problem is corrected, the unit will resume normal operation. • If the alarm remains after the dampers are tested, verify 24V on wire 27 at the damper's connector. If there is 0V on wire 27, fix that circuit, otherwise replace the actuator.
Fan does not start running	1. No fan power (240V or 480V) 2. No run signal to fan on terminal block location #51. 3. Fan motor defective. 4. Both intake dampers remain closed.	1. Determine cause for loss of power at fan and repair. 2. Check speed signal voltage to fan on terminal block #51 and at Ain1U in the fan motor housing. Repair as needed. 3. Repair/Replace fan motor. 4. Repair damper functionality.

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

L18443 - MAIN CONTROL PANEL DIAGRAM (1 of 4)



NOTES:
N.A. DISCONNECTING MEANS AND BRANCH CIRCUIT PROTECTION SHALL BE PROVIDED BY THE INSTALLER
N.B. THE DOTTED LINES INDICATE CONNECTION TO EXTERNAL COMPONENTS

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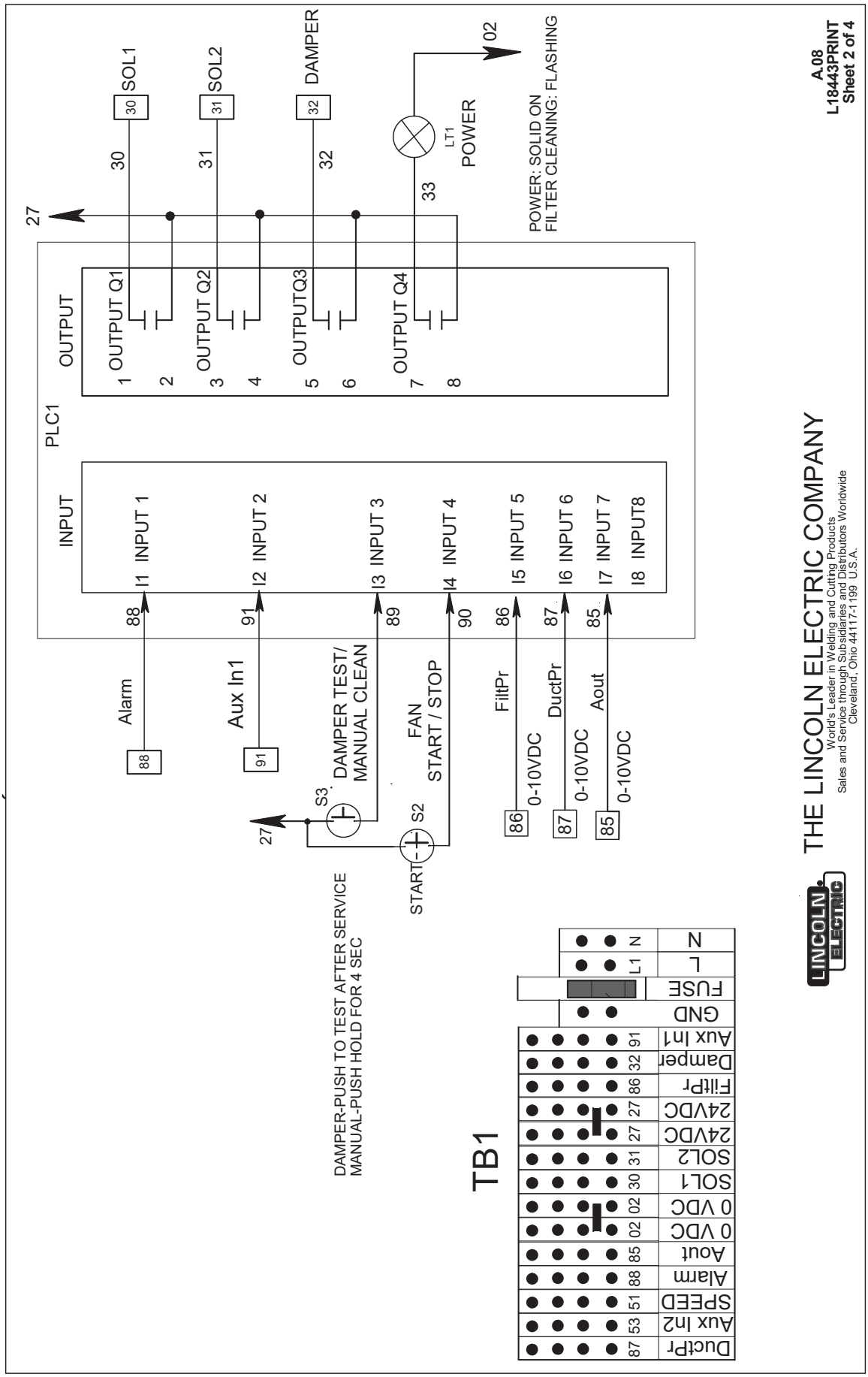
L18443 - MAIN CONTROL PANEL DIAGRAM (2 of 4)
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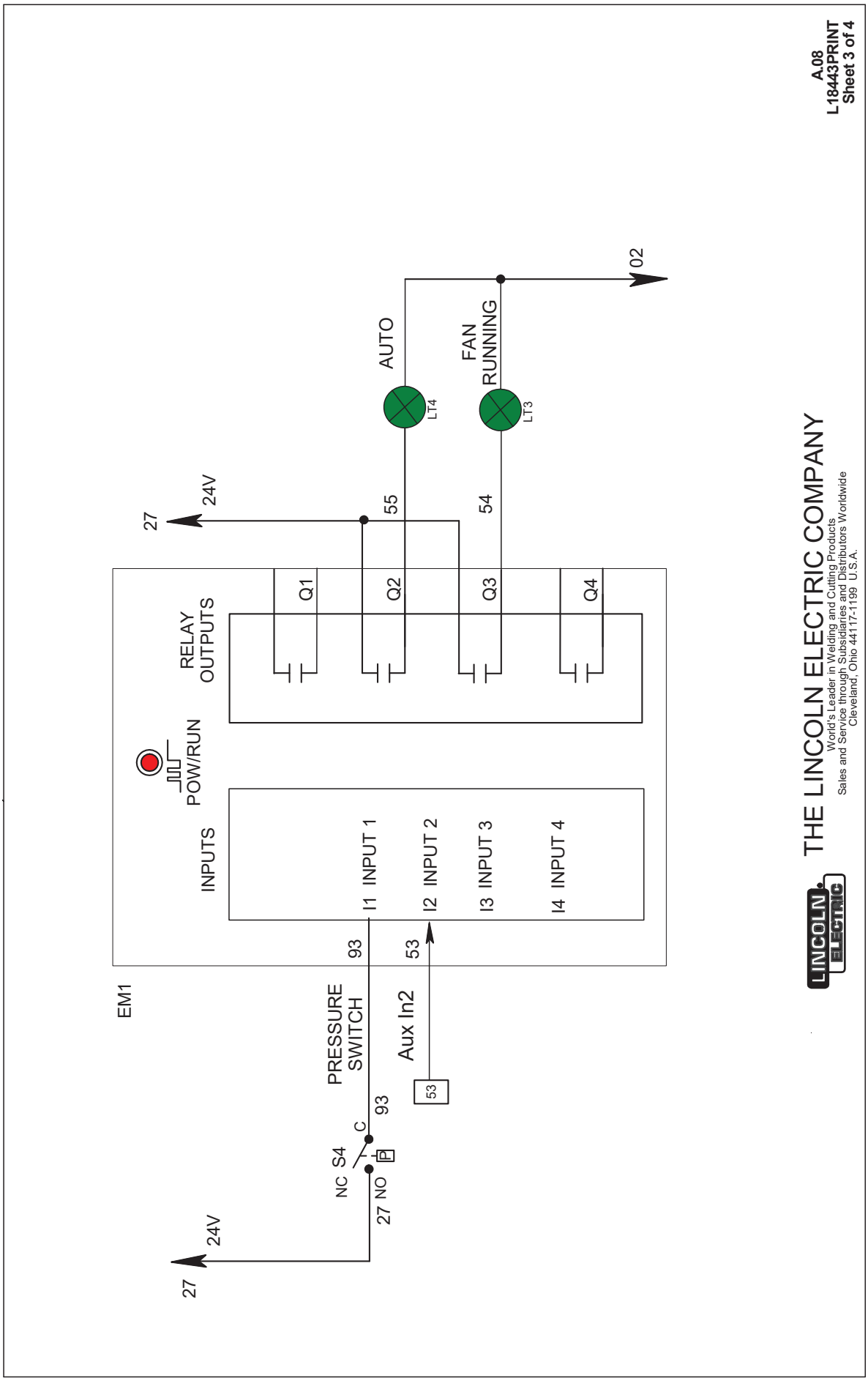
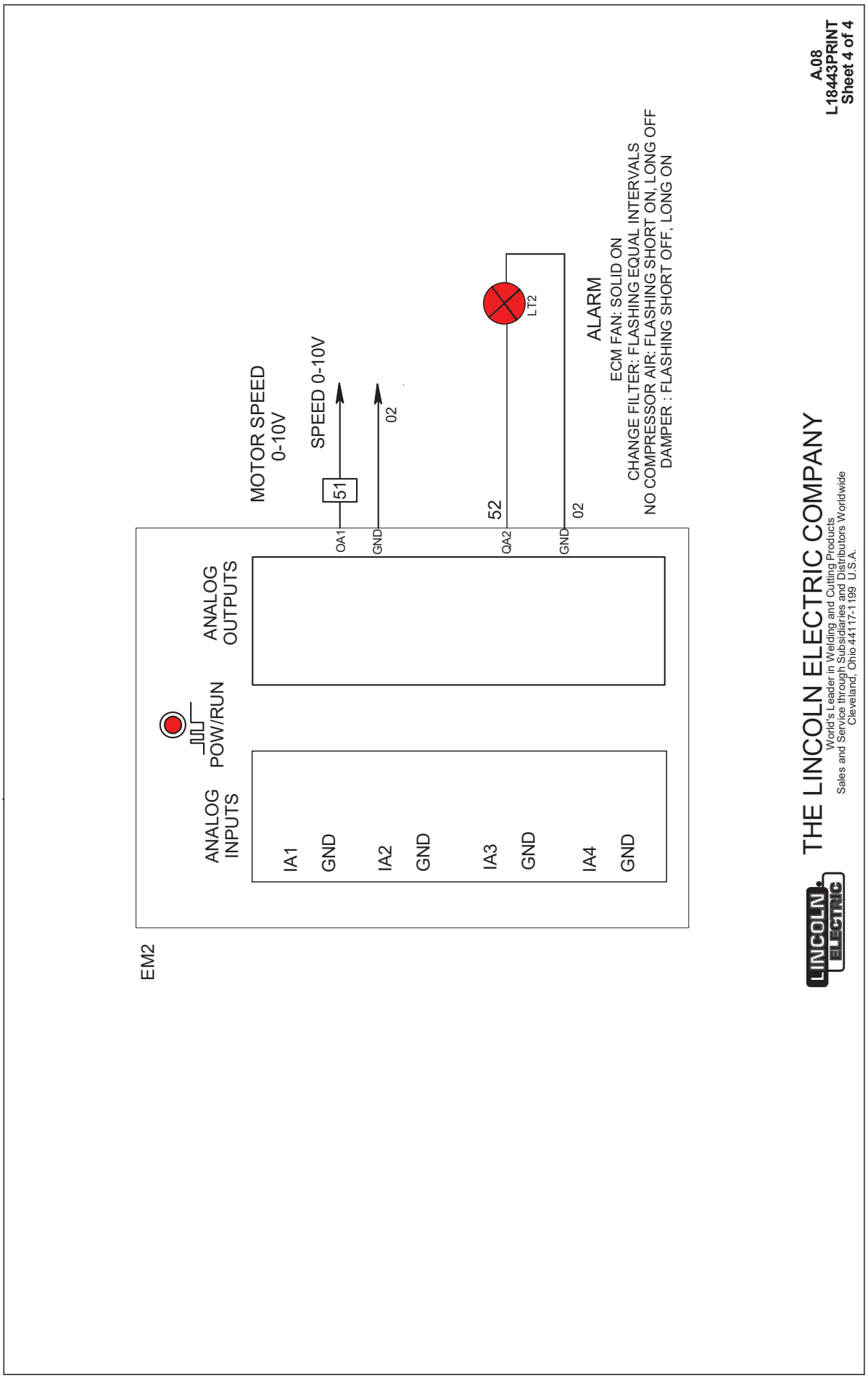
LINCOLN ELECTRIC
PLC1
INPUT
OUTPUT
INPUT 1
INPUT 2
INPUT 3
INPUT 4
INPUT 5
INPUT 6
INPUT 7
INPUT8
OUTPUT Q1
OUTPUT Q2
OUTPUTQ3
OUTPUT Q4
SOL1
SOL2
DAMPER
POWER
LT1
POWER: SOLID ON
FILTER CLEANING: FLASHING
Alarm
Aux In1
DAMPER TEST/
MANUAL CLEAN
FAN
START / STOP
FiltPr
DuctPr
Aout
0-10VDC
S3
S2
START
DAMPER-PUSH TO TEST AFTER SERVICE
MANUAL-PUSH HOLD FOR 4 SEC
TB1
DuctPr
Aux In2
SPEED
Alarm
Aout
0 VDC
0 VDC
SOL1
SOL2
24VDC
24VDC
FiltPr
Damper
Aux In1
GND
FUSE
L
N
L1
N

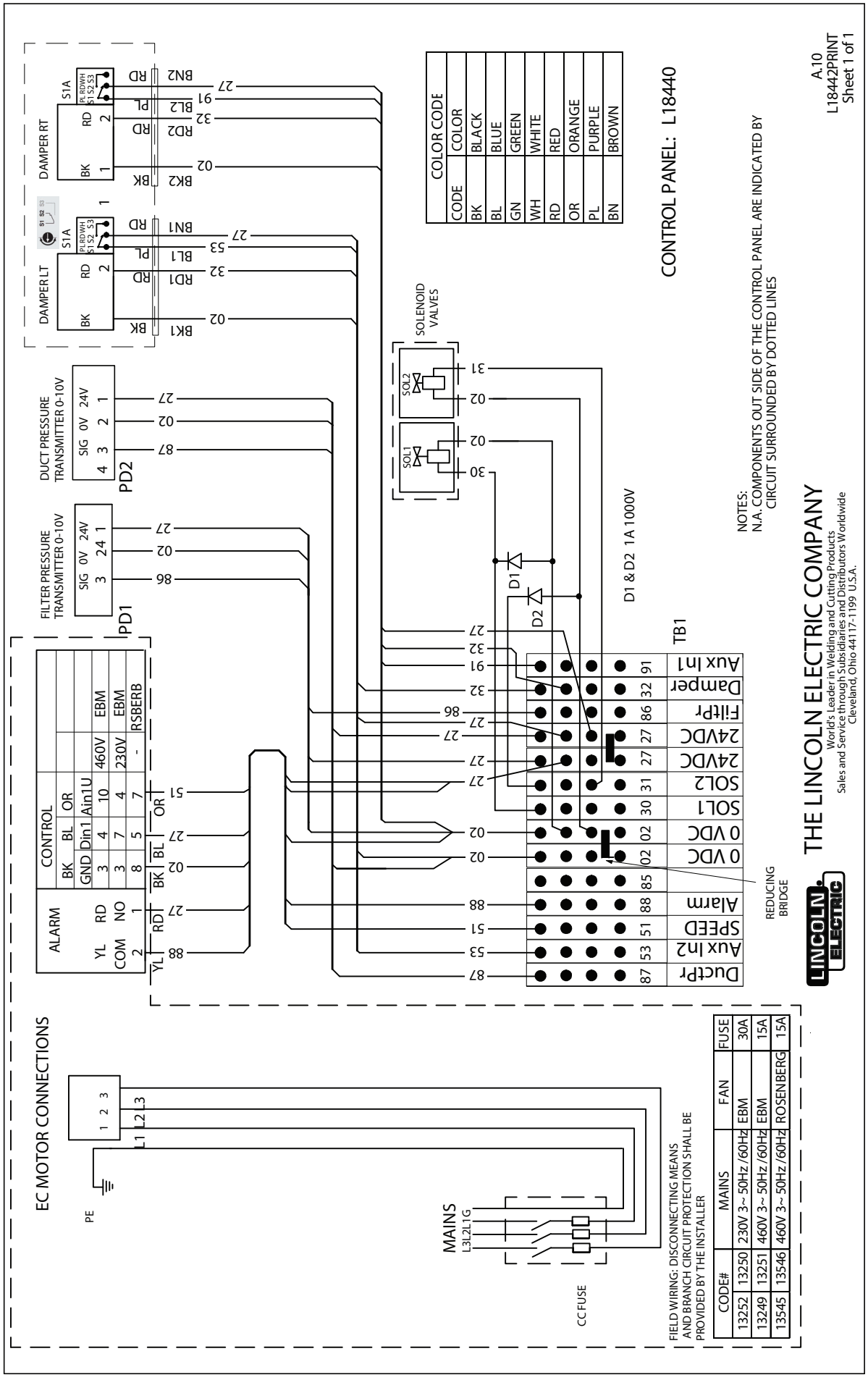
L18443 - MAIN CONTROL PANEL DIAGRAM (3 of 4)



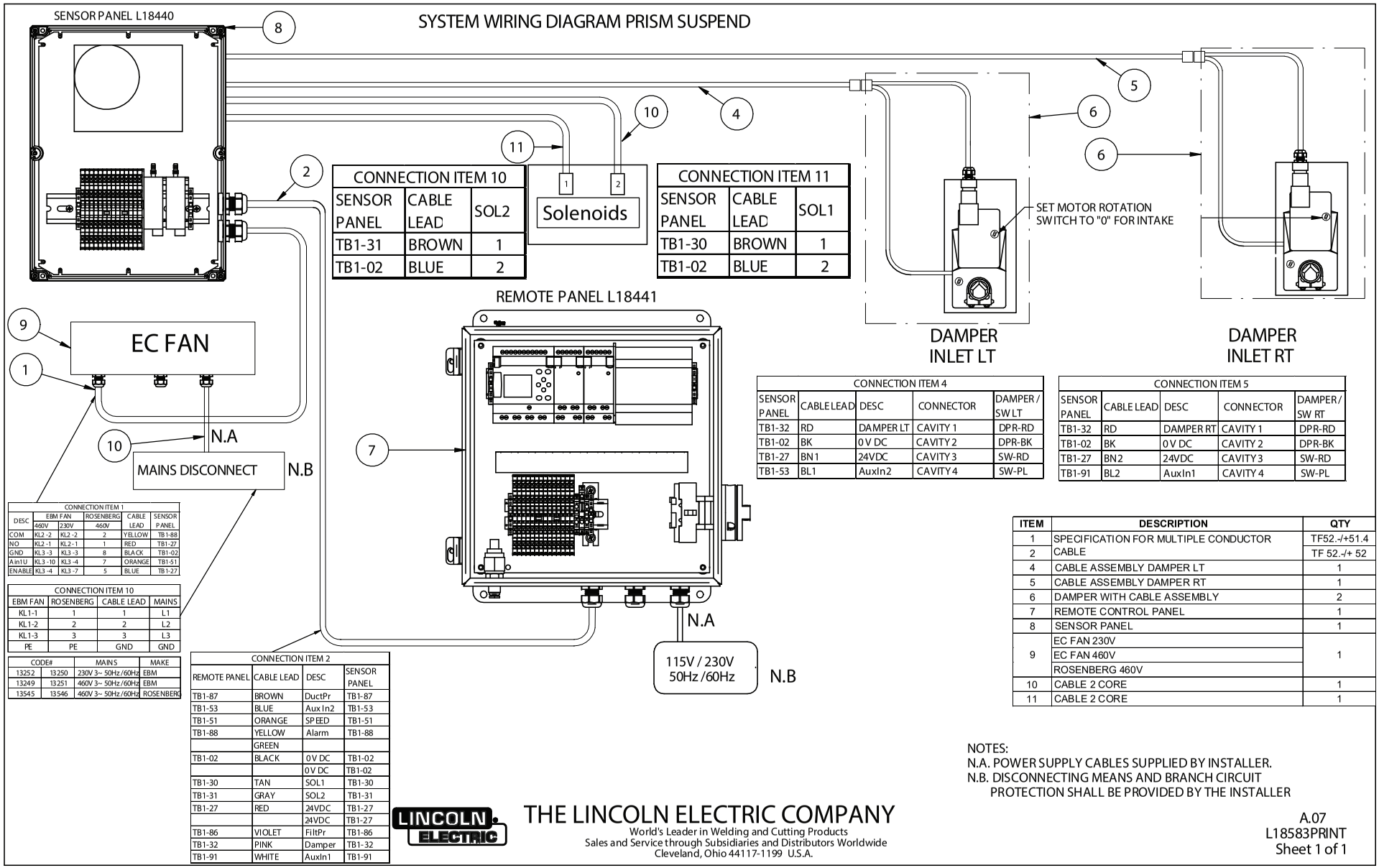
L18443 - MAIN CONTROL PANEL DIAGRAM (4 of 4)



L18442 - SENSOR CONTROL PANEL DIAGRAM



L18583 - SYSTEM DIAGRAM



CONNECTION ITEM 10		
SENSOR PANEL	CABLE LEAD	SOL2
TB1-31	BROWN	1
TB1-02	BLUE	2

CONNECTION ITEM 11		
SENSOR PANEL	CABLE LEAD	SOL1
TB1-30	BROWN	1
TB1-02	BLUE	2

CONNECTION ITEM 4				
SENSOR PANEL	CABLE LEAD	DESC	CONNECTOR	DAMPER / SW LT
TB1-32	RD	DAMPER LT	CAVITY 1	DPR-RD
TB1-02	BK	0 V DC	CAVITY 2	DPR-BK
TB1-27	BN1	24VDC	CAVITY 3	SW-RD
TB1-53	BL1	AuxIn2	CAVITY 4	SW-PL

CONNECTION ITEM 5				
SENSOR PANEL	CABLE LEAD	DESC	CONNECTOR	DAMPER / SW RT
TB1-32	RD	DAMPER RT	CAVITY 1	DPR-RD
TB1-02	BK	0 V DC	CAVITY 2	DPR-BK
TB1-27	BN2	24VDC	CAVITY 3	SW-RD
TB1-91	BL2	AuxIn1	CAVITY 4	SW-PL

CONNECTION ITEM 1					
DESC	EBM FAN		ROSENBERG	CABLE LEAD	SENSOR PANEL
	460V	230V	460V		
COM	KL2 -2	KL2 -2	2	YELLOW	TB1-88
NO	KL2 -1	KL2 -1	1	RED	TB1-27
GND	KL3 -3	KL3 -3	8	BLACK	TB1-02
Am1U	KL3 -10	KL3 -4	7	ORANGE	TB1-51
ENABLE	KL3 -4	KL3 -7	5	BLUE	TB1-27

CONNECTION ITEM 10			
EBM FAN	ROSENBERG	CABLE LEAD	MAINS
KL1-1	1	1	L1
KL1-2	2	2	L2
KL1-3	3	3	L3
PE	PE	GND	GND

CODE#		MAINS	MAKE
13252	13250	230V 3~ 50Hz/60Hz	EBM
13249	13251	460V 3~ 50Hz/60Hz	EBM
13545	13546	460V 3~ 50Hz/60Hz	ROSENBERG

CONNECTION ITEM 2			
REMOTE PANEL	CABLE LEAD	DESC	SENSOR PANEL
TB1-87	BROWN	DuctPr	TB1-87
TB1-53	BLUE	AuxIn2	TB1-53
TB1-51	ORANGE	SPEED	TB1-51
TB1-88	YELLOW	Alarm	TB1-88
	GREEN		
TB1-02	BLACK	0 V DC	TB1-02
		0 V DC	TB1-02
TB1-30	TAN	SOL1	TB1-30
TB1-31	GRAY	SOL2	TB1-31
TB1-27	RED	24VDC	TB1-27
		24VDC	TB1-27
TB1-86	VIOLET	FiltPr	TB1-86
TB1-32	PINK	Damper	TB1-32
TB1-91	WHITE	AuxIn1	TB1-91

ITEM	DESCRIPTION	QTY
1	SPECIFICATION FOR MULTIPLE CONDUCTOR	TF52.-/+51.4
2	CABLE	TF 52.-/+ 52
4	CABLE ASSEMBLY DAMPER LT	1
5	CABLE ASSEMBLY DAMPER RT	1
6	DAMPER WITH CABLE ASSEMBLY	2
7	REMOTE CONTROL PANEL	1
8	SENSOR PANEL	1
9	EC FAN 230V EC FAN 460V ROSENBERG 460V	1
10	CABLE 2 CORE	1
11	CABLE 2 CORE	1

NOTES:
N.A. POWER SUPPLY CABLES SUPPLIED BY INSTALLER.
N.B. DISCONNECTING MEANS AND BRANCH CIRCUIT PROTECTION SHALL BE PROVIDED BY THE INSTALLER

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

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

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

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

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

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

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

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

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

이 제품에 동봉된 작업지침서를 숙지하시고 귀사의 작업자 안전수칙을 준수하시기 바랍니다.

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

CUSTOMER ASSISTANCE POLICY

The business of The Lincoln Electric Company is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric 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. Lincoln Electric is not in a position to warrant or guarantee such advice, and assumes 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.

Lincoln Electric is a responsive manufacturer, but the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric 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 refer to www.lincolnelectric.com for any updated information.

WELD FUME CONTROL EQUIPMENT

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.

THE LINCOLN ELECTRIC COMPANY
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