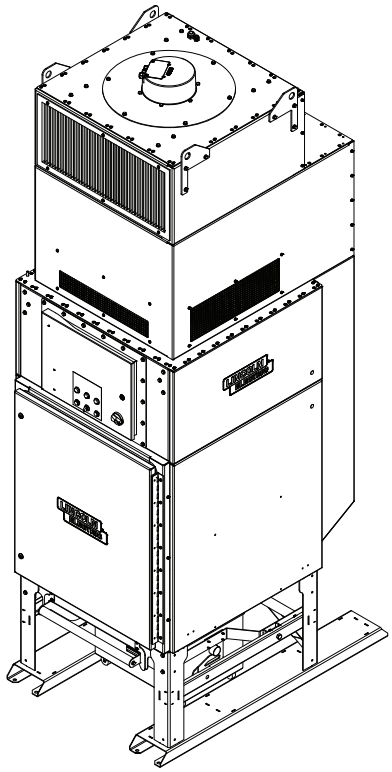
LINCOLN ELECTRIC

Operator's Manual

PRISM® CIRCULATOR® 4000



For use with machines having Code Numbers:

13232, 13592 - PRISM® CIRCULATOR® 4000, 460V
13233 - PRISM® CIRCULATOR® 4000, 230V
13523, 13593 - PRISM® CIRCULATOR® 4000, 460V, PTFE
13524 - PRISM® CIRCULATOR® 4000, 230V, PTFE
13622, 13624 - PRISM® CIRCULATOR® 4000, 575V
13623, 13625 - PRISM® CIRCULATOR® 4000, 575V, PTFE

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

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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.

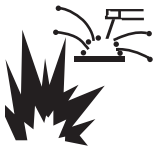
5.c. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

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 ˜ux 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 deÿciency. 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.

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 air˜ow

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 ofÿce.

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

FILTER CLEANING COMPRESSED AIR CONSUMPTION		
		Air Consumption CFM, (L/MIN)
		Cleaning Cycle
Pause Time (Sec)	5	51.6 (1464)
	10	25.8 (732)
	15	17.2 (488)
	20	**12.9 (366)**
	25	10.3 (293)
	30	8.6 (244)
	35	7.4 (209)
	40	6.5 (183)
	45	5.7 (163)
	50	5.2 (146)
	55	4.7 (133)
	60	4.3 (122)

NOTE: Compressed air must be clean and dry, and have a dew point of -40°F (-40°C).

FILTER CLASS (ACCORDING TO ASHRAE 52.2)	
KP4519-2 KP4519-3	MERV 16 NANO MERV 16 PTFE

AMBIENT CONDITIONS	
MINIMUM TEMPERATURE	-4°F (-20°C)
MAXIMUM TEMPERATURE	113°F (45°C)
MAXIMUM RELATIVE HUMIDITY	75%
MAXIMUM TEMPERATURE - 575V VARIANT	104˚ F (40˚ C)

K5140-1 AND K5140-3 - PRISM® CIRCULATOR® 4000, 460V	
Capacity	4000 SCFM @ 6.5"WG
Motor Power Nominal	7.6HP
Input Voltage Nominal +/- 10%	380-480V/3~/60Hz
Rated Current	9 A
Frequency	60 HZ
SUPPLY FUSE	Class J OR CC 15A/600V
Protection Class fan Motor	IP55
Sound Level	72db
Footprint (Dimensions)	45 X 65 (Inches)
Overall Height	147 (inches)
Overall Weight	1830 lbs
Filter	K5140-1 - Merv 16 Nano K5140-3 - Merv 16 PTFE
Number of Filters	4
Filter area	1280 Sq Ft
ALARM LEVEL	1500Pa (factory default)

K5140-2 AND K5140-4 - PRISM® CIRCULATOR® 4000, 230V	
Capacity	4000 SCFM @ 6.5"WG
Motor Power Nominal	8.6HP
Input Voltage Nominal +/- 10%	200-240V/3~/60Hz
Rated Current	19.5 A
Frequency	60 HZ
SUPPLY FUSE	Class J OR CC 30A/600V
Protection Class fan Motor	IP55
Sound Level	72db
Footprint (Dimensions)	45 X 65 (Inches)
Overall Height	147 (inches)
Overall Weight	1830 lbs
Filter	K5140-2 - Merv 16 Nano K5140-4 - Merv 16 PTFE
Number of Filters	4
Filter area	1280 Sq Ft
ALARM LEVEL	1500Pa (factory default)

K5140-5 AND K5140-6 - PRISM® CIRCULATOR® 4000, 575V	
Capacity	4000 SCFM @ 6.5"WG
Motor Power Nominal	7.6HP
Input Voltage Nominal +/- 10%	575V/3~/60Hz
Rated Current	9 A
Frequency	60 HZ
SUPPLY FUSE	Class J OR CC 15A/600V
Protection Class fan Motor	IP55
Sound Level	72db
Footprint (Dimensions)	45 X 65 (Inches)
Overall Height	147 (inches)
Overall Weight	1900 lbs
Filter	K5140-5 - Merv 16 Nano K5140-6 - Merv 16 PTFE
Number of Filters	4
Filter area	1280 Sq Ft
ALARM LEVEL	1500Pa (factory default)

INSTALLATION

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

Taller units should be built up on site

Filter units must be secured to the foundations

The foundations must have adequate load-bearing strength and be free of vibration

⚠ 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**
- **Aluminium 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 professional 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 under the influence of drugs, alcohol or medicine.**
- **Ensure the workspace is well-illuminated.**
- **Never install the product in front of entrances and exits which must be used for emergency services.**
- **Make sure that the workshop, in the vicinity of the product, contains sufficient approved fire extinguishers.**
- **Make sure the wall, ceiling or support system are strong enough to carry the product.**
- **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.
- Do not place in a confined space. Allow a minimum of 3 feet of clearance around machine at all times for maintenance requirements.

ENVIRONMENTAL AREA

Keep the machine inside and dry at all times. Do not place on wet ground or in puddles. Never place liquids on top of the machine.

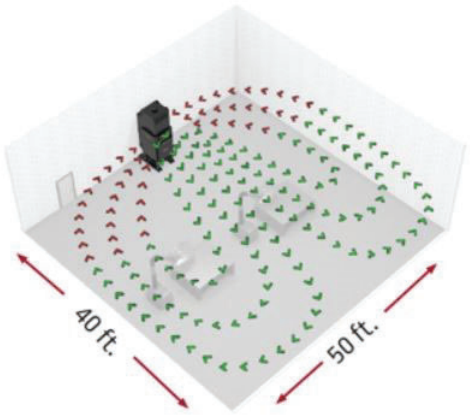
PRISM® CIRCULATOR® 4000 SYSTEM LAYOUTS

Each Prism® Circulator® 4000 unit is designed to filter 40,000 ft³ 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.

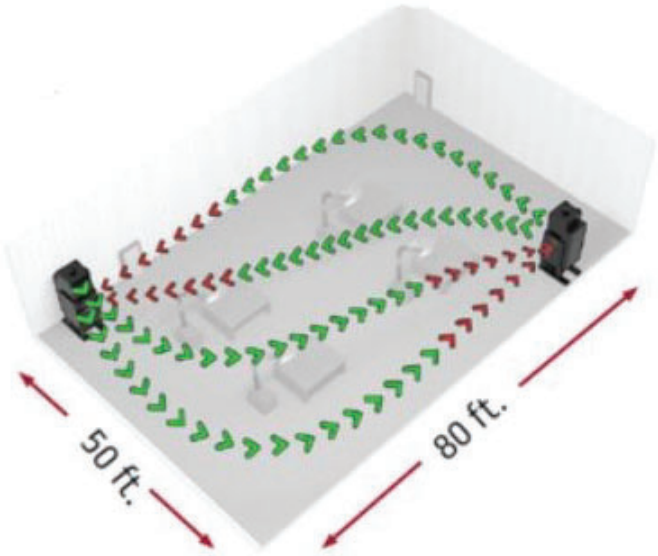
The Prism® Circulator® 4000 can be placed in high-dust and fume producing areas or placed strategically throughout the facility based on the airflow patterns. Follow these simple guidelines:

- Install circulator along the perimeter of shop, away from open doors and exhaust fans.
- Position near input power and compressed air.
- Do not place near radiant heat sources.
- Do not place in a confined space. Allow a minimum of 3 ft. (0.91 m) of clearance around the machine for maintenance.

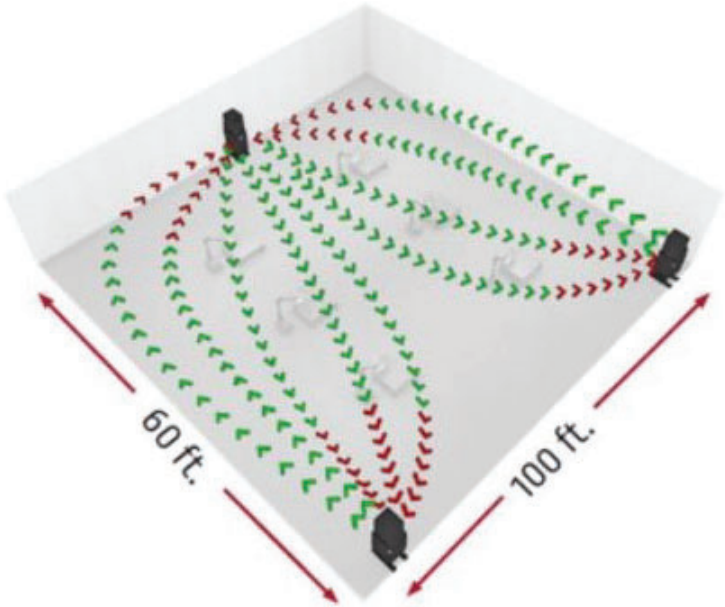
1) **One Circulator Unit**: One unit filters 2,000 sq. ft. (185.80 sq. m) every 10 minutes.



2) **Two Circulator Units**: Two units at opposite ends of the workspace, filter 4,000 sq. ft. (371.6 sq. m) every 10 minutes.



3) **Three Circulator Units**: Three units filter 6,000 sq. ft. (557.41 sq. m) every 10 minutes.



INSTALLATION OF PRISM® CIRCULATOR® 4000

⚠ WARNING

FALLING EQUIPMENT can cause injury

The installer is responsible for following federal, state and local safety codes and regulations.

NOTE: Use lifting sling or chains rated to 700 lbs. when used with corner lifting brackets on the fan section. Lift with fork truck or crane.

TOOLS NEEDED

- 5/16" Nutdriver
- 9/16" Nutdriver
- Ladder/Lift
- Drill

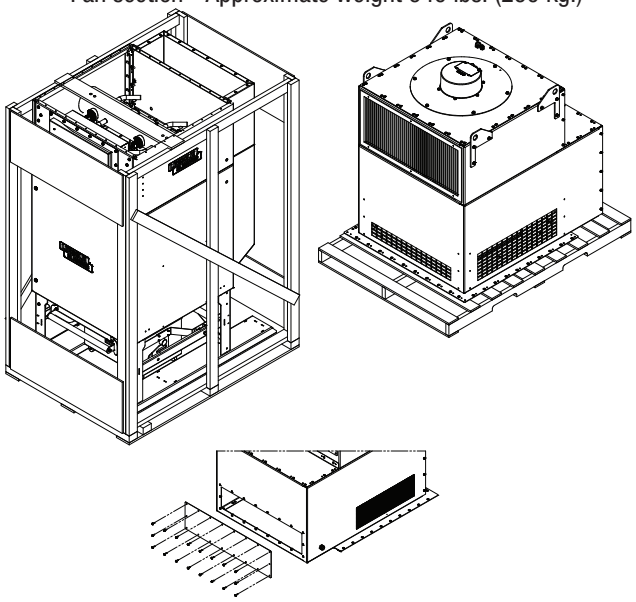
Step 1 - Unpacking the Unit

Remove the filter section from the pallet by removing the lag bolts & banding. Lift & move filter section using fork truck to open assembly area.

FIGURE A.1

Unit ships on 2 pallets in 2 sections:

- Filter section - Approximate weight 1190 lbs. (540 kg.)
- Fan section - Approximate weight 640 lbs. (290 kg.)

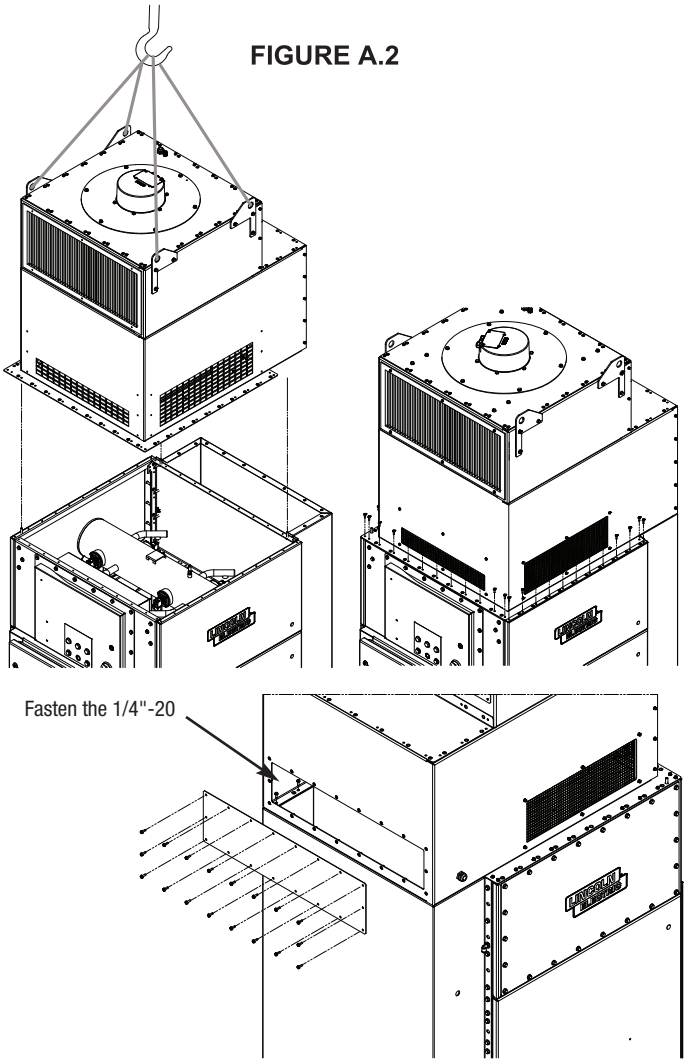


Step 2 - Fan section Installation (FIG A.2)

Remove the rear panel from fan section as shown.
NOTE-Don't drag the top section it will damage the sealing gasket.

- Lift the fan section using appropriately rated lifting sling/chain through lifting brackets. Align the fan section with 3 guide bolts at rear and sides of the filter section. Do not drag the fan section as it will damage the sealing gasket.
- Secure the fan section using ¼" thread forming bolts at 35 places from hardware kit. Install 3/8" nuts on to guide bolts at 1 place.
- Fasten the fan section at inside locations using ¼" thread forming bolts at 11 places. Install 3/8" nuts on to the guide bolts inside at 2 places.
- Reinstall the rear panel reusing the existing hardware at 18 places.

FIGURE A.2



Step 3 – Fan Control Connection (FIG-A.3)

- Remove the side access panel as shown.
- Connect the mating connector from fan section and controls.
- Connect the pressure tube from controls with quick connect below the fan section.
- Reinstall side access panel reusing the existing 3/8" thread forming bolts at 22 places.

FIGURE A.3

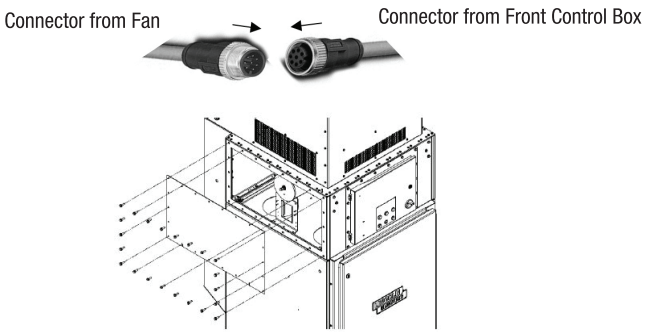
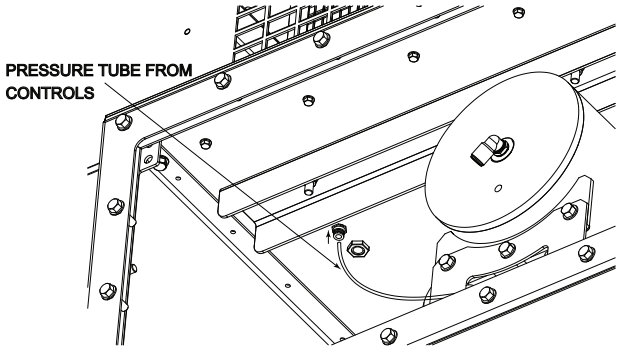


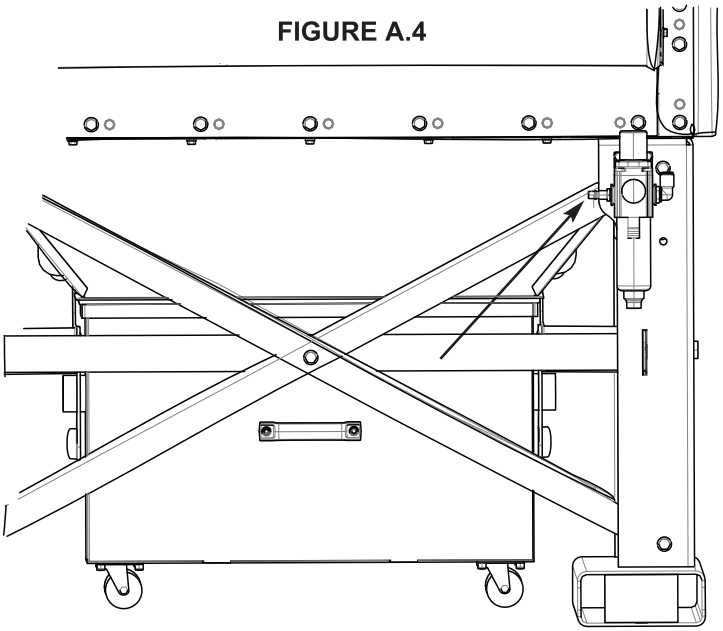
FIGURE A.3 (continued)



Step 4 – Compressed Air Connection

- Connect Compressed air source to fitting (ISO 6150 B profile - 1/4"). Adjust regulator pressure to) 5-6 bar(72-87psi)

FIGURE A.4



Step 5 – Connect Control Cable

- Connect the Prism® Circulator® control cable to 115V outlet. Note- Check the voltage rating on the yellow lanyard decal on the cable. It is also compatible with 230V single phase.

FIGURE A.5

Step 6 – Mount the Plug on to the fan cable based on the available outlet standard

Motor cable with the unit is 20ft long.

Note - Check the voltage rating on the yellow Lanyard decal on the cable.

Prism® Circulator® 4000 models have 460V or 230V three phase specific fans. Verify the fan voltage of the purchased model, then identify the appropriate plug (not included) for the outlet to be used and install the plug to the fan cable.

- Prism® Circulator® 4000 can be connected directly to a power disconnect.
- 460V units require a 15A fused circuit.
- 230V units require a 30A fused circuit.
- 575V unit uses auto transformer to reduce the Voltage to 460V.

FIGURE A.6

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 unit 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.

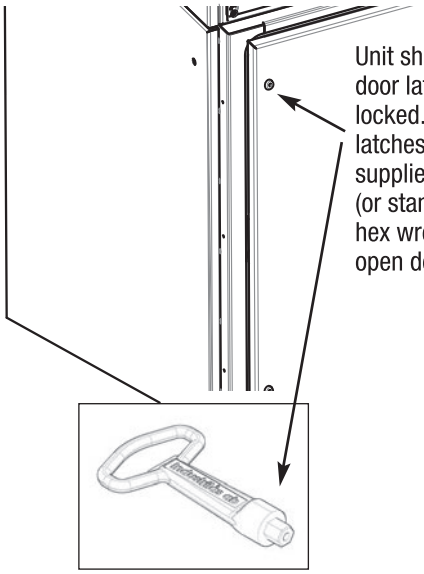
Step 5 - Install Filters (See section D for filter replacement instructions)

⚠ 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

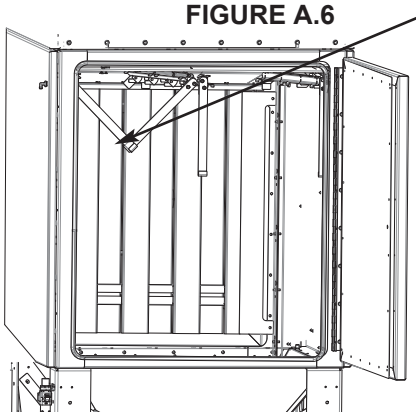
FIGURE A.5



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

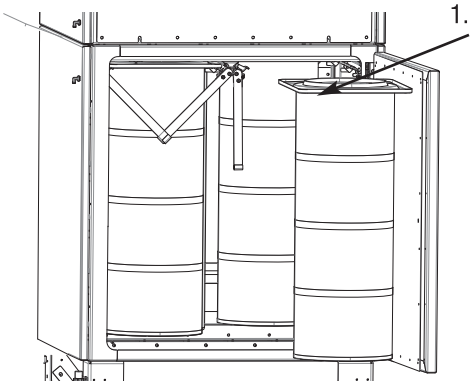
FIGURE A.6



1. Unclasp handles for filter installation.

c. Install new filters.

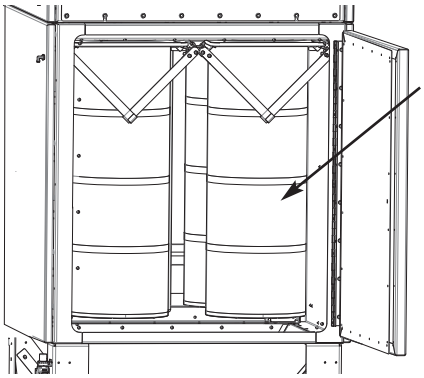
FIGURE A.7



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

d. Reclasp filter handles.

FIGURE A.8

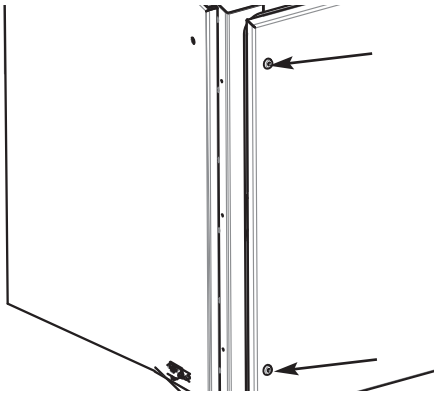


1. Reclasp filter handles to lift filters to their sealed position.
2. Close and latch door.

Step 6 - 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.9



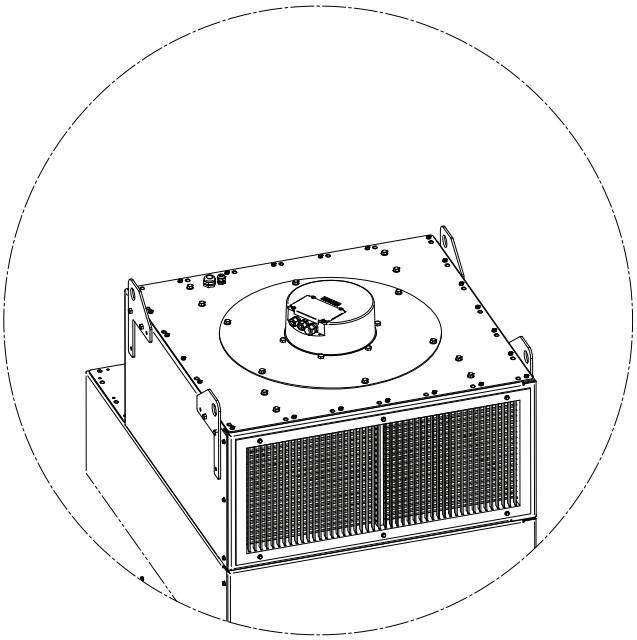
OPERATION

Outlet Vanes:

To optimize system performance of the Prism® Circulator® 4000, position the vanes and regulate the air flow as follows:

- Adjust grille vanes to direct airflow at the welding fume layer without obstruction.
- Adjust grille vanes to direct airflow towards the area with the highest concentration of welding fume.

FIGURE B.1



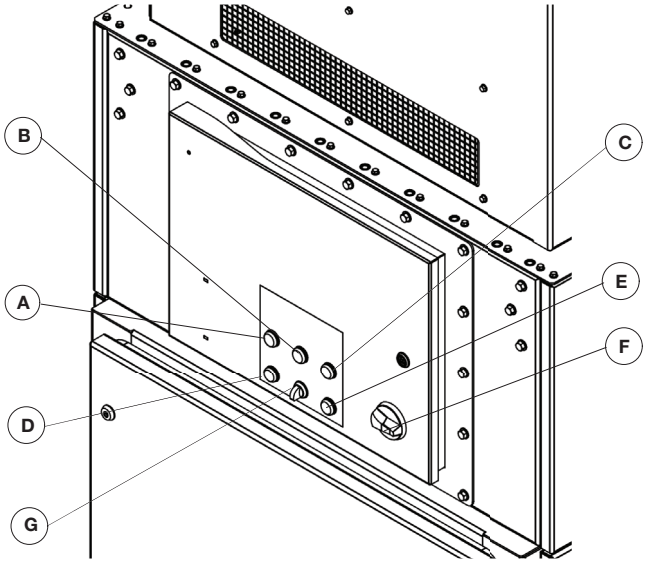
There are vertical & horizontal vanes in the fan exhaust. This can be adjusted individually to the required airflow direction.

Refer below Air flow chart for the throw distance details based on different fan speed.

Fan Speed	Airflow CFM (m^3/hr)	Max Throw Distance ft (m)
Low	2000 (3398)	70 (21.3)
Medium	3000 (5097)	90 (27.4)
High	4000 (6796)	120 (36.6)

CONTROL

FIGURE B.1

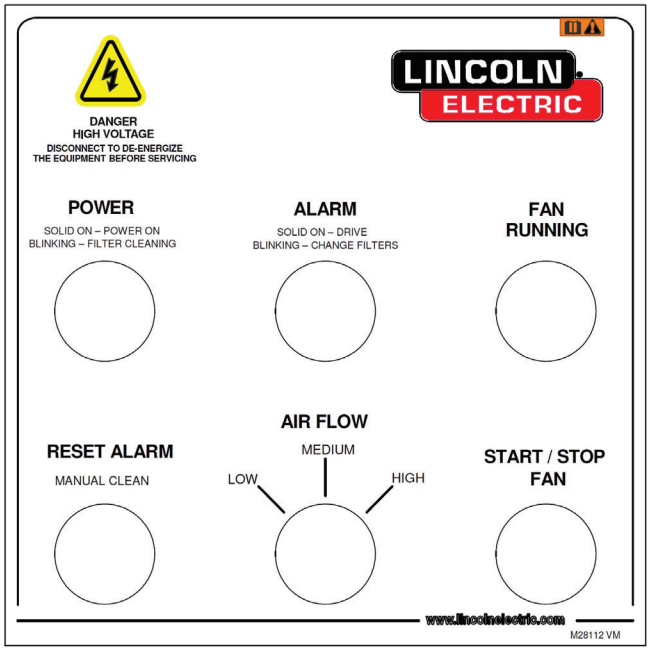


A. Power On (Light)
B. Alarm (Light)
C. Fan Running (Light)
D. Reset Drive Alarm (Switch)
E. Start/Stop fan (Switch)
F. Main Switch - Input Power
G. Air Flow (Switch)

Display System Control Panel

FIGURE B.2

FIGURE B.3



A. **POWER** 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 two potential issues with the unit. Blinking light indicates the filter differential pressure has surged above the maximum DP Alarm set point for two hours continuously and the filter should be changed. Solid light indicates that the EC motor drive has faulted.

C. **FAN RUNNING** Light (green): indicates the unit is operational and fan is running.

D. **RESET DRIVE ALARM** Button: When **RESET DRIVE ALARM** PUSH BUTTON pressed long for more than 4 seconds, the system TRIGGERS MANUAL CLEANING .

E. **START/STOP FAN** Button: When Fan Start PUSH BUTTON pressed momentary, fan turns ON/OFF.

F. **AIR FLOW** (Switch): Regulates the fan speed. Fan speed can be set to Low, Medium and High.

CONTROL FUNCTIONS

1) Start/Stop Fan feature activated by push button on cabinet front.
2) Remote Start/Stop Fan feature activated by an external switch or remote control.
3) Filter cleaning is triggered as follows:
   a. When fan is running, the filter pressure exceeds the set filter pressure SetFtPr, with adjustable delay. This kind of cleaning is referred as ONLINE cleaning.
   b. When the fan is turned off after running minimum period of time, the cleaning cycle triggered is referred as OFFLINE cleaning.
   c. By pressing RESET ALARM/ manual clean push button for 5 seconds; a manual cleaning cycle is triggered.
4) Offline cleaning
   a. Offline filter pressure cleaning active at three levels of filter pressure drop (low, medium, high). Each level gradually increases filter cleaning.
   b. Low pressure default value is 400Pa, with a range of 300Pa to 1000Pa. Medium pressure default value is 600Pa, with a range of 500Pa to 1200Pa. High pressure default value is 800Pa, with a range of 700Pa to 1400Pa.
   c. When the fan is running the filter pressure is monitored. Once a level is reached, the system will wait for the fan to shut down before offline cleaning begins. Aside from hearing air blasts cycling to each filter, the white light will flash as a visual indication that the unit is cleaning. The white light will return to steady once the cleaning cycle is completed. Each valve starting from the top is pulsed with compressed air. The default pulse time is 250ms. After the first valve is pulsed, the next one is delayed. This delay is the valve pulse timer at work, and the default delay time is 20 seconds. The delay allows the air accumulators within the filter bank to charge. During offline cleaning, the fan runs at 20% speed. The fan turns off automatically once the offline cleaning cycles are completed.
   d. When all the filters have been pulsed, the cleaning cycle has completed. At the low pressure limit the cleaning cycle is 2X. At the medium pressure limit the cleaning cycle is 4X. And at the high pressure limit the cleaning cycle is 6X. Each level cleans the filter more aggressively but takes longer to clean when the fan is off.
5) Online cleaning is activated with the Delta P pressure drop settings. Default level is 1000Pa with a range of 100Pa-2500Pa. When the fan is running, and the Delta P level has been reached, the Power On white light will flash and filter cleaning will start from the top. The same pulse and pause times from the offline cleaning are used. Online cleaning will not stop until the filter pressure falls below the Delta P level while fan is running.
6) The Delta P Alarm default is set at 1500Pa. When the alarm is active, the red Alarm light will blink on the main control cabinet. At this time filter should be ordered from Lincoln Electric.

OPERATION

1. FAN RUNNING:

When fan is turned on, PID controller in the PLC will look for Duct pressure reference and to the set air flow in CFM. Air flow can be set to Low, Medium and High using front selector switch.

The default setting of duct pressure based on selection switch position:

1. High- 4000 CFM. Range(3500-6000CFM)
2. Medium- 3000 CFM. Range(2500-3500CFM)
3. Low- 2000 CFM. Range(0-3500CFM)

2. CLEANING:

When filter pressure exceeds the filter limit pressure, then ONLINE cleaning is initiated. The filter pressure reading will be taken once the fan speed stabilized to provide set air flow delivery.

If user presses the RESET DRIVE ALARM PUSH BUTTON for more than 4 seconds, it initiates MANUAL CLEANING process:

1. Cleaning pulses are generated based on pause time, pulse time and number cycles.

2. The fan will continue to be ON if online cleaning. It will be turned OFF if Offline cleaning.

3. PRE-COATED FILTER:

1. The product has function to inhibit cleaning when new filters installed with pre-coating till the pre-coat hours crossed.

2. There is an hour counter to count the number of hours the fan run from the date of filter change.

3. The pre-coat hours can be adjusted using PLC display, default is 0 hours.

4. DATALOG:

1. The product has function log following data into SD card mounted on PLC

   a) Time stamp

   b) Filter pressure

   c) Duct pressure

   d) % Fan Speed

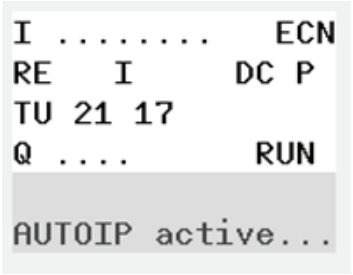
   e) Set point pressure

2. Data log intervals can be adjusted, default set is 30 seconds (adjustable 10-255 second)

PLC DISPLAY:

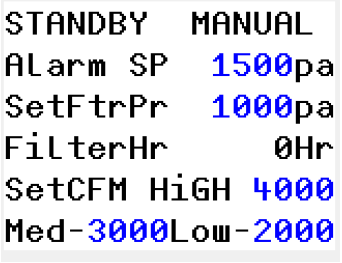
1. Following screens in PLC will display the system status

a) Home screen



The above is PLC default screen indicating the current IO status. By pressing left arrow <- key, the system enters application specific custom screens.

STANDBY MODE:



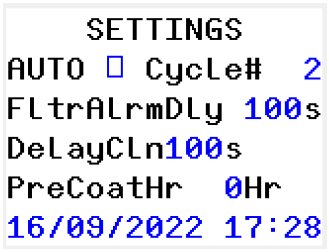
AlarmSP- Alarm set pressure, which is filter pressure limit if crossed, will indicate Alarm by flashing red Alarm Lamp on front panel.

SetFltPr- Set filter pressure, is limit for differential pressure across filter, if exceed above this set limit will trigger cleaning cycle.

FilterHR- This is time count for filter used hours, normally need to reset to 0 when fiter is changed.

The CFM set values can be adjusted for High, Medium and Low using selector switch positions.

By pressing left arrow on PLC will navigate to subsequent screens



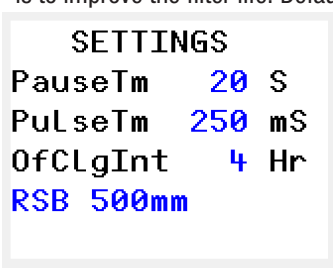
AUTO: By checking this check box will make the system to enter into AUTO mode. ON OFF time defined by the scheduler screen.

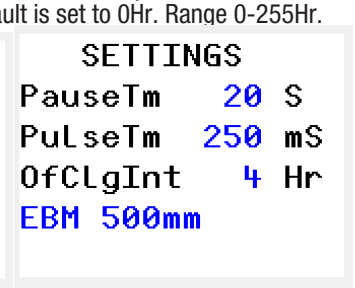
CLngCycle#- is used to set number of online cleaning cycles per one trigger, it is default set at 2.

FLtrAlarmDly- When filter pressure exceeds the alarm set point Alarm indication will be activated after this set delay. Default delay is 100 seconds adjustable 0-255 second.

DelayCLn- Initial delay for online cleaning. Default delay is 100 seconds adjustable 0-255 second. Set CFM air flow point when airflow selector switch points to high.

PrecoatHr- Pre-coat hour, variable set to inhibit cleaning till the set hours crossed after new installation with pre-coated filter, this is to improve the filter life. Default is set to 0Hr. Range 0-255Hr.

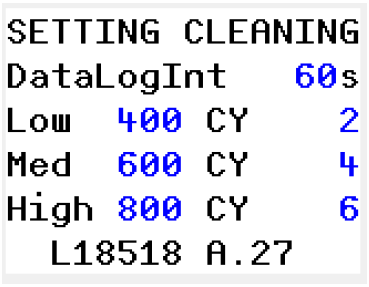




PauseTm- It is adjustable time between two solenoid pulses, default is 20 second, adjustable 10 to 120 second.

PulseTm- Adjustable pulse duration for Solenoids, default is set to 200 millisecond adjustable 100 to 1500 millisecond.

OfCLgInt is scheduled offline cleaning interval, default value is 4 hour, the system will do offline cleaning in this interval if the pressure is more than minmum offline cleaning threshold.



The data logger will save following parameters in SD card at internals indicated in DataLogInt.

DataLogInt is set at default 60 second and it is adjustable 10 to 255 second.

Number of cleaning cycles during offline cleaning is based on maximum filter pressure during fan running.

Number of cleaning cycles during offline cleaning is based on maximum filter pressure during fan running.

L18518 X.XX indicates the current software version.

FAN RUNNING:

```
FanRunningManual
FiltrPr       0pa
DuctPr        0pa
FanSpeed      0%
SetSpeed MEDIUM
SetFltPr 1000 pa
```

The above screen appears during Fan running to indicate following:

FanRunningManual: this to indicate fan is running in manual mode. In auto mode FanRunning Auto will be displayed.

FiltrPr: Filter differential pressure in Pascal, measured across filter.

DuctPr: Duct pressure in Pascal.

FanSpeed: Fan running speed in % of full speed.

SetSpeed: Using selector the airflow levels can be set to Low, Medium and High.

SetFltPr- Set filter pressure, is limit for differential pressure across filter, if exceed above this set limit will trigger cleaning cycle.

FAN RUNNING:

Fan running when alarm active with RED background.

```
FanRunning
FiltrPr   1515pa
DuctPr       0pa
SetSpeed  MEDIUM
     Alarm
SetFlrPr  1000pa
```

The above screen appears during Fan running to indicate following:

FanRunningManual: this to indicate fan is running in manual mode. In auto mode FanRunning Auto will be displayed.

FiltrPr: Filter differential pressure in Pascal, measured across filter.

DuctPr: Duct pressure in Pascal

FanSpeed: Fan running speed in % of full speed

SetSpeed: Using selector the airflow levels can be set to Low, Medium and High.

SetFltPr- Set filter pressure, is limit for differential pressure across filter, if exceed above this set limit will trigger cleaning cycle

Online cleaning

```
ONLINE CLEANING
PulseTm    200mS
Pause Tm    20 S
CleanCy#     2
Pulse#  2 of   8
12/10/2021 23:19
```

PulseTm: Indicates solenoid on time.

Pause Tm: Time delay between two cleaning pulses.

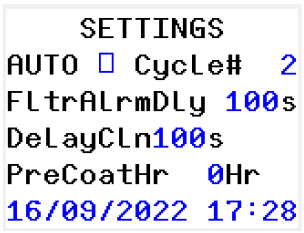
CleanCy#: Number of cleaning cycles

Pulse#: elapsed number of pulse and total number of cycles.

```
ONLINE CLEANING
RemainClnTm  151
MaxClnTm     165
SPEED SET   4095
SPEED %        0
20/09/2022 11:27
```

```
OFFLINE CLEANING
RemainClnTm  452
MaxClnTm     485
SPEED SET    840
SPEED %        0
20/09/2022 11 34
```

AUTO MODE:



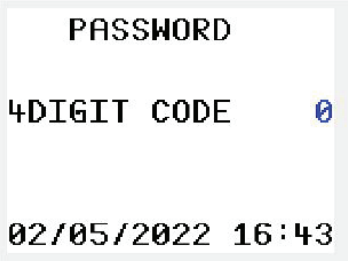
AUTO mode can be set by selecting the check box in Settings display as shown in this screen.

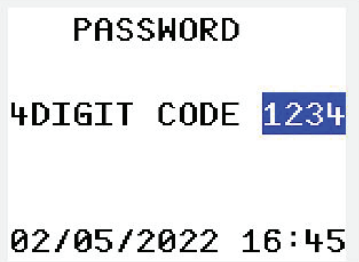
During this mode, the Fan ON OFF will be based on timings set in Weekly timer set. Follow the below process to set ON OFF time.

When in Standby Mode press OK push button.

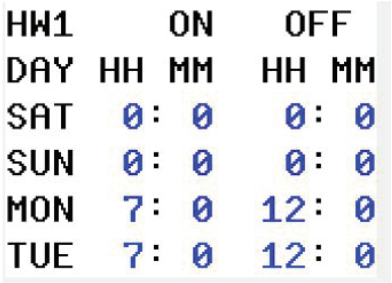
By entering password 1234 user can access to change Auto mode time schedule as shown.

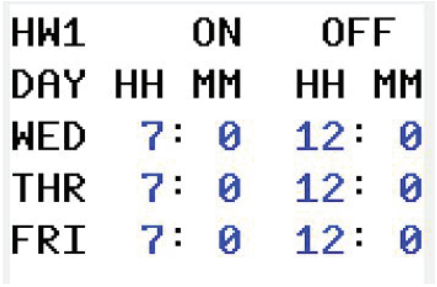
ON OFF TIME SCHEDULE: Auto ON OFF time can be set using two HW timers. The default HW1 TIMER is set to turn ON from Monday to Friday 7:00 and off at 12:00 hr. Also The default HW1 TIMER is set to turn ON from Monday to Friday 13:00 and off at 17:00 hr. Use ALT key to enter edit mode and update the values using directional arrow keys.

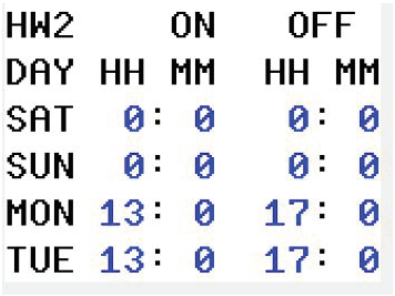


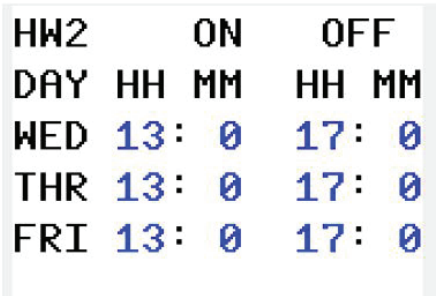


Select HW1 by scrolling using down push button.





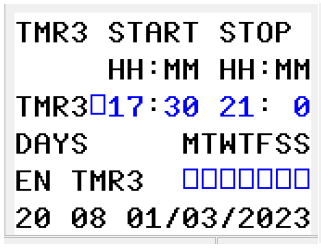


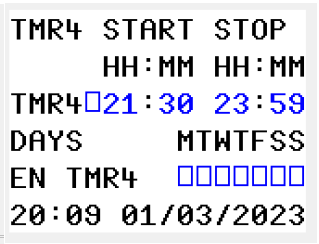


TMR3 and TMR4 are used to set two more shift operation. Select the TMRX with corresponding latch will turn ON the fan between Start and Stop time periods on selected days of the week.

NOTE:The timer works between 0hr to 24hr (If crosses midnight 12 need to set another timer)

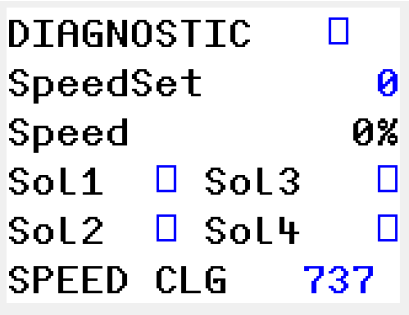
Example: If we want to set between 17:00Hr to 02:00Hr, then need to set TMR3 17:00Hr to 24:00Hr and them TMR4 00:00Hr to 02:00Hr.





DIAGNOSTIC MODE:

This will help to set Speed Set to check the fan motor operation, it is set to 0 to 4096, which is equivalent to 0 to 100% fan speed. Aout will show the actual speed in %.



Selecting Solenoid check boxes with activate corresponding solenoids, by which the operation of solenoids can be tested.

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 filter cartridges, 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.**

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® Circulator® 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® Circulator® 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.

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. ***

MONTHLY

- **Check particulate collection drum and dispose of particulate if necessary.**
- **Check and log filter pressure.**
- **Check incoming pressure**

EVERY 6 MONTHS

- **Ensure that the Cubic Feet per Minute (CFM) is operating to the engineered specifications based on the individual system ***

UNIT HOUSING

- **Clean housing with a non-aggressive detergent.**
- **Inspect and clean (with a non-aggressive detergent) the filter control box.**

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.**

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.**

REPLACING FILTER CARTRIDGES OR EMPTYING DUSTBINS

Shut off the compressed air feed and empty the pressure tank(s) of air by opening the drain valve on the bottom of the tank.

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

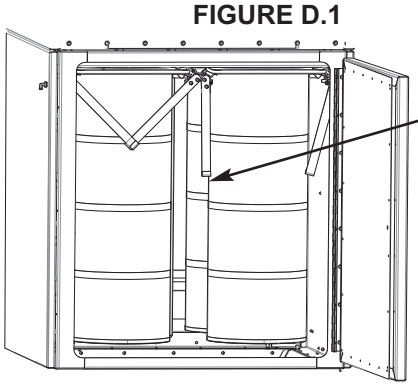
⚠ WARNING

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

Verify power has been switched off at the control panel, then unlock door latches using the supplied hex tool or any standard 5/16" hex wrench.

a. Unclamp handles and lower filters.

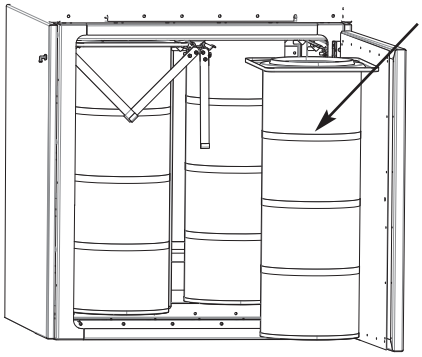
FIGURE D.1



1. Unlock door latches using the supplied hex tool or any 5/16” hex wrench, then open door.
2. Unclasp handles to lower ÿlters for removal

b. Remove filters.

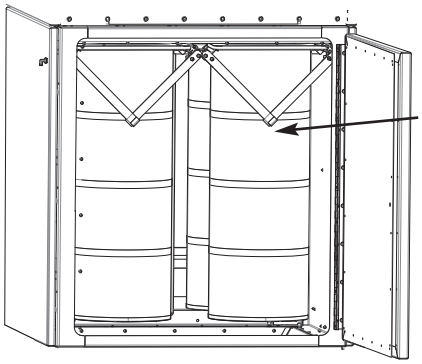
FIGURE D.2



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 cleaner that meets OSHA guidelines for Cr6 housekeeping.

c. Install new filters.

FIGURE D.3

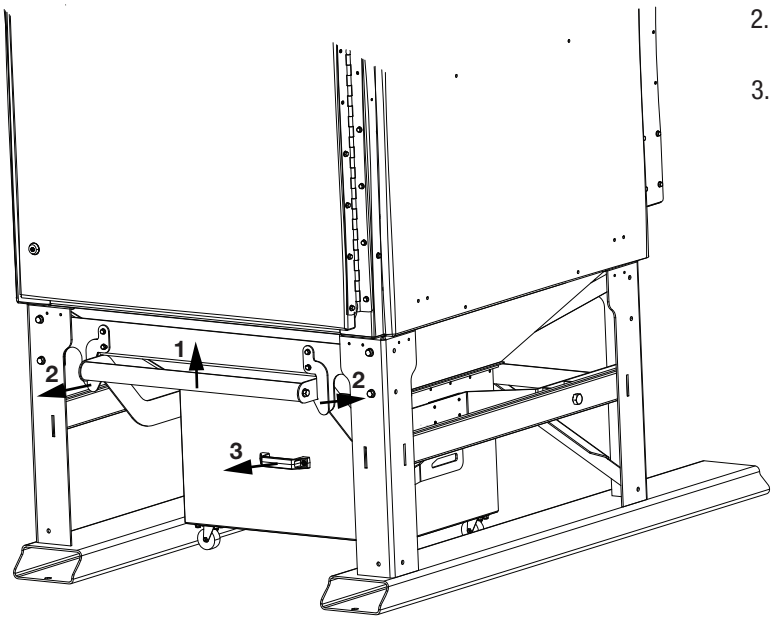


1. Install new filters, making sure they are pushed against rear of unit.
2. Reclasp filter handles to lift filters to their sealed position.
3. Re-lock door latches using the supplied hex wrench or any standard 5/16" hex wrench.

REMOVING AND INSTALLING THE DUST BIN

a. Removing the dust bin.

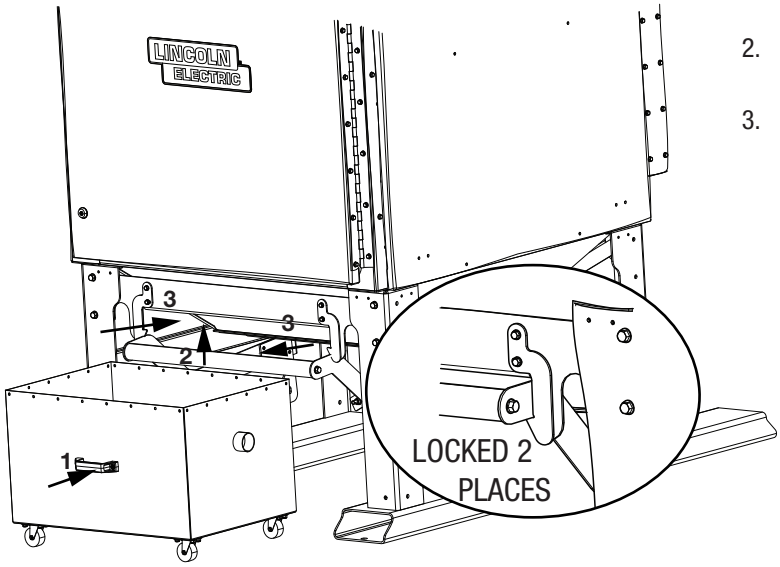
FIGURE D.7



1. Lift handle.
2. Rotate left and right latches outward and let handle drop down.
3. Pull dust bin out from under machine.

b. Installing the dust bin.

FIGURE D.8



1. Center the dust bin and push it into the machine until it stops.
2. Lift the handle and allow the left and right latches to rotate inward.
3. Release the handle and ensure both latches are engaged with the handle, and the handle is locked into place.

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	1. Turn on main switch. 2. Check power supply. 3. Check the fuse.
Cleaning cycle is not functioning.	1. Possible loose / no connection between control box and tank valves. 2. Possibly no or low compressed air.	1. Verify the correct input voltage is being applied. 2. Verify that all fuses and circuit breakers are not blown/tripped. 3. Verify compressed air is present and with adequate pressure.
Cleaning valve fails to open. Cleaning valve fails to close.	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 - compressed air pressure to be 87 PSI (6 BAR). 5. Use diagnostic display to check individual solenoid valve 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.
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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. Wrong DP reading reported by sensor. 2. Incorrect duct air velocity.	1. The Differential Pressure sensor PD1 is read by PLC1, after confirming solid electrical and tubing connections you can tap into the readings with a "T" fitting with a 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. 2. Verify the fan air flow is not too low. Measure and adjust as necessary.
The air flow is diminished.	1. Filter may be clogged.	1. Replace filter if necessary. 2. 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. 3. 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. Empty the collection drum. 2. Calibrate or re-zero the duct pressure sensor, if the output is still bad change the duct pressure sensor. 3. 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 grille 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.
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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. Outlet(s) are blocked. 2. Filter cartridge is clogged.	1. Replace filter if necessary. 2. If all recommended possible areas of misadjustment have been checked and the problem persists, Contact your local Lincoln Authorized Field Service Facility. 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), polluting the facility.	1. Outlets blocked. 2. Filter cartridge clogged.	1. Remove obstructions from the outlet opening(s) and/or connected ductwork. 2. Replace filter cartridge.
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 (one second on / one second off).	1. Press alarm reset and investigate ECM Fan fault issue. 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.
Fan does not start running	No power No run signal to fan on terminal block location #51 Motor defective Controller defective	Determine cause for loss of power at fan and repair. For 575V model - Check the auto transformer function. Check speed signal voltage to fan on terminal block #51 and at Ain1U in the fan motor housing. Repair as needed. Repair/Replace fan motor. Check the power for fan and fuse for proper 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.
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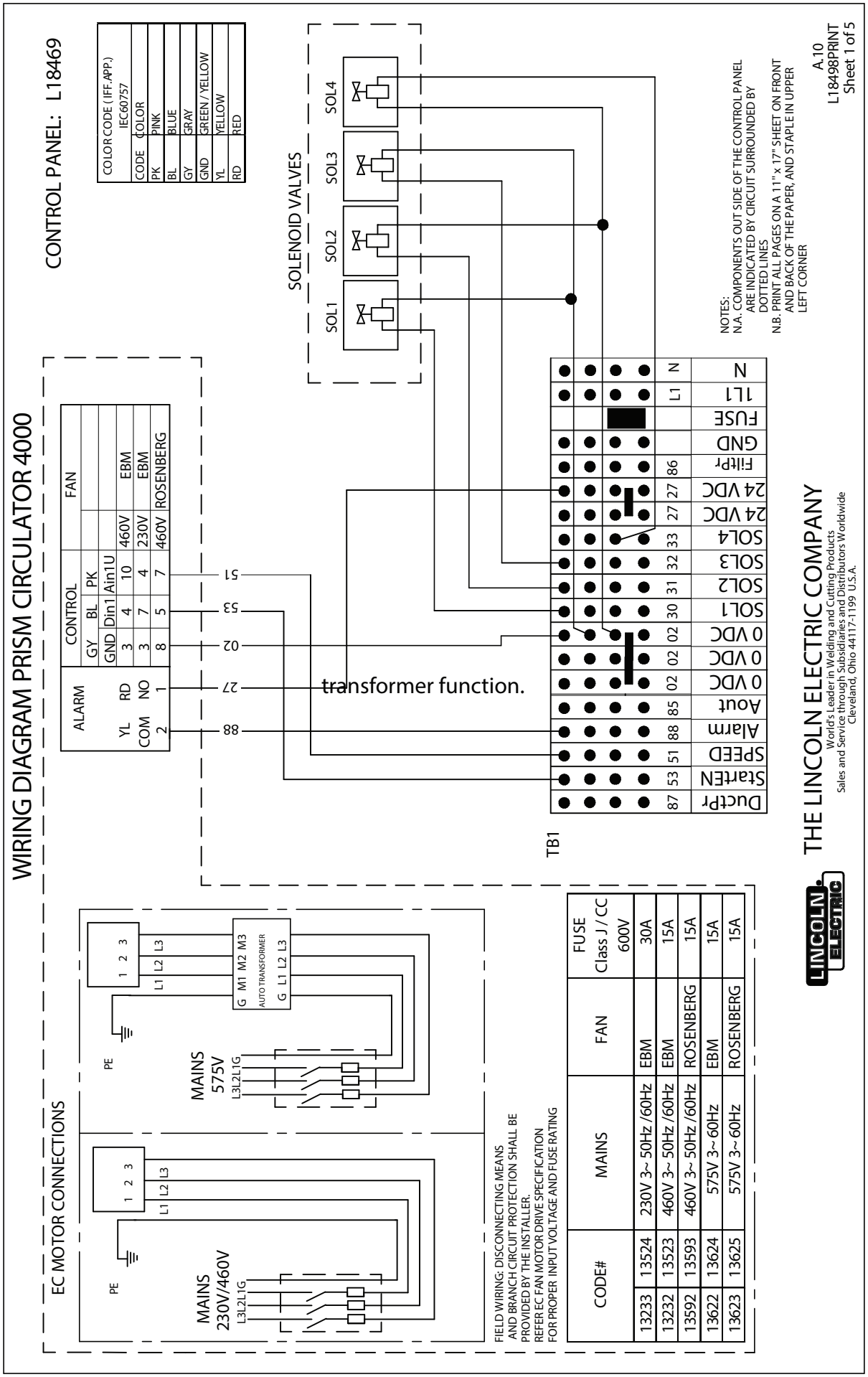
WIRING DIAGRAM PRISM CIRCULATOR 4000
CONTROL PANEL: L18469
COLOR CODE (IFF APP.)
IEC60757
CODE COLOR
PK PINK
BL BLUE
GY GRAY
GND GREEN / YELLOW
YL YELLOW
RD RED
SOLENOID VALVES
SOL1
SOL2
SOL3
SOL4
ALARM
YL COM
RD NO
CONTROL
GY GND
BL Din1
PK Ain1U
FAN
460V EBM
230V EBM
460V ROSENBERG
51
53
02
27
88
transformer function.
TB1
N
L1
FUSE
GND
FiltPr
24 VDC
24 VDC
SOL4
SOL3
SOL2
SOL1
0 VDC
0 VDC
0 VDC
Aout
Alarm
SPEED
StartEN
DuctPr
87 53 51 88 85 02 02 02 30 31 32 33 27 27 86
NOTES:
N.A. COMPONENTS OUT SIDE OF THE CONTROL PANEL ARE INDICATED BY CIRCUIT SURROUNDED BY DOTTED LINES
N.B. PRINT ALL PAGES ON A 11" x 17" SHEET ON FRONT AND BACK OF THE PAPER, AND STAPLE IN UPPER LEFT CORNER
A.10
L18498PRINT
Sheet 1 of 5
EC MOTOR CONNECTIONS
MAINS
230V/460V
L3L2L1G
PE
1 2 3
L1 L2 L3
MAINS
575V
L3L2L1G
AUTO TRANSFORMER
G M1 M2 M3
G L1 L2 L3
FIELD WIRING: DISCONNECTING MEANS AND BRANCH CIRCUIT PROTECTION SHALL BE PROVIDED BY THE INSTALLER.
REFER EC FAN MOTOR DRIVE SPECIFICATION FOR PROPER INPUT VOLTAGE AND FUSE RATING
CODE# MAINS FAN FUSE Class J / CC 600V
13233 13524 230V 3~ 50Hz /60Hz EBM 30A
13232 13523 460V 3~ 50Hz /60Hz EBM 15A
13592 13593 460V 3~ 50Hz /60Hz ROSENBERG 15A
13622 13624 575V 3~ 60Hz EBM 15A
13623 13625 575V 3~ 60Hz ROSENBERG 15A
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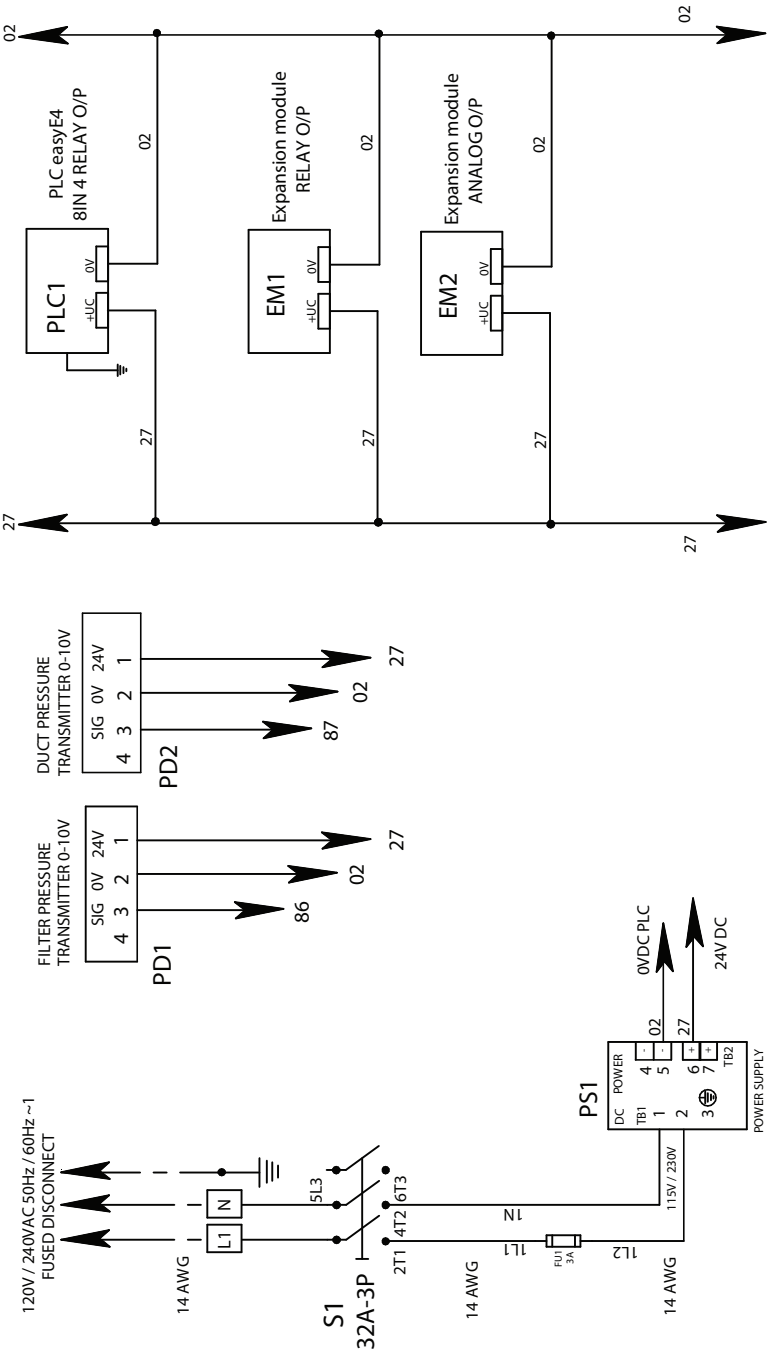
THE LINCOLN ELECTRIC COMPANY
World's Leader in Welding and Cutting Products
Sales and Service through Subsidiaries and Distributors Worldwide
Cleveland, Ohio 44117-1199 U.S.A.



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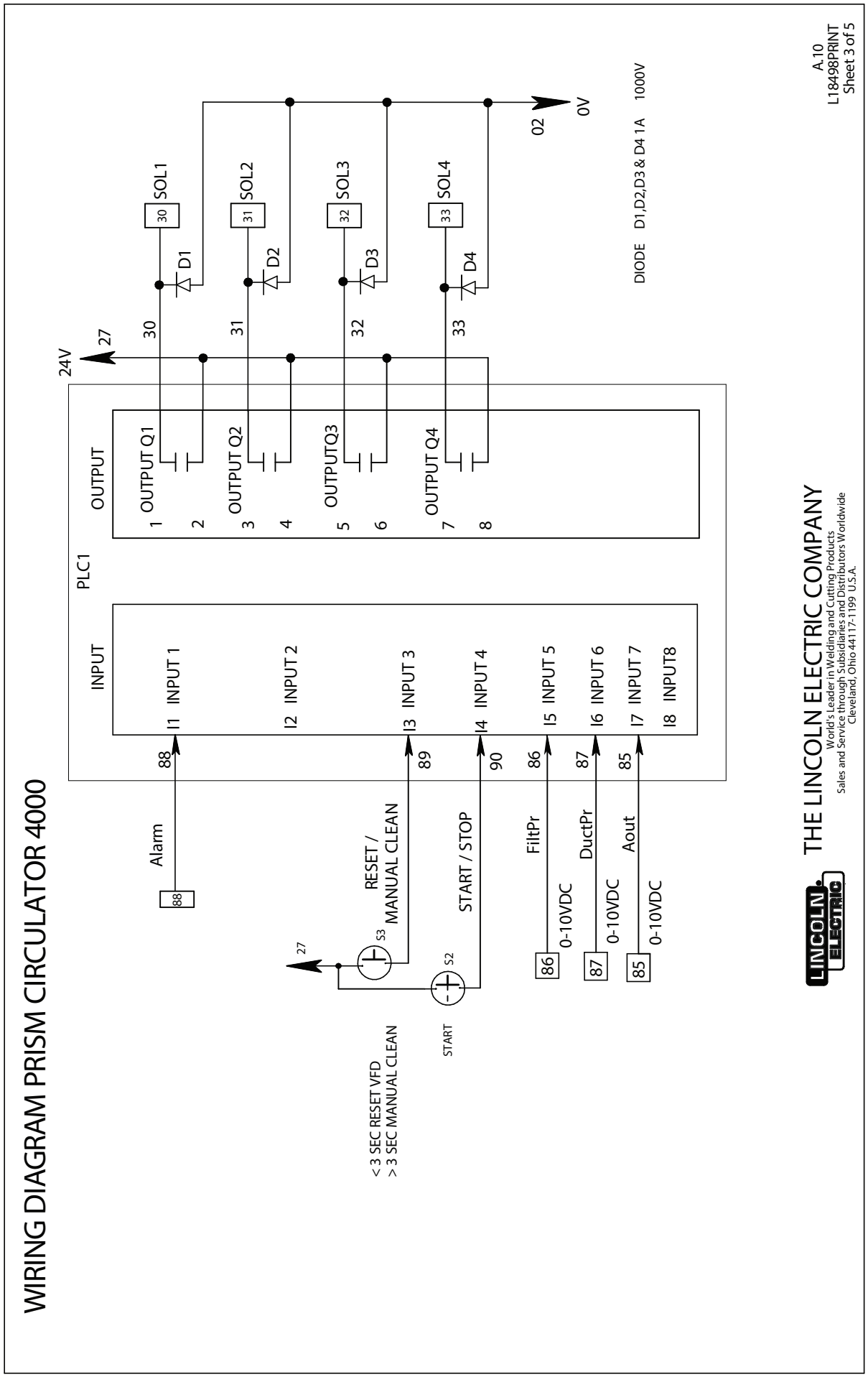
Sheet 2 of 5


WIRING DIAGRAM PRISM CIRCULATOR 4000
PLC1
INPUT
OUTPUT
24V
27
0V
02
OUTPUT Q1
OUTPUT Q2
OUTPUTQ3
OUTPUT Q4
SOL1
SOL2
SOL3
SOL4
D1
D2
D3
D4
DIODE D1,D2,D3 & D4 1A 1000V
INPUT 1
INPUT 2
INPUT 3
INPUT 4
INPUT 5
INPUT 6
INPUT 7
INPUT8
Alarm
RESET / MANUAL CLEAN
START / STOP
FiltPr
DuctPr
Aout
0-10VDC
S2
S3
START
< 3 SEC RESET VFD
> 3 SEC MANUAL CLEAN
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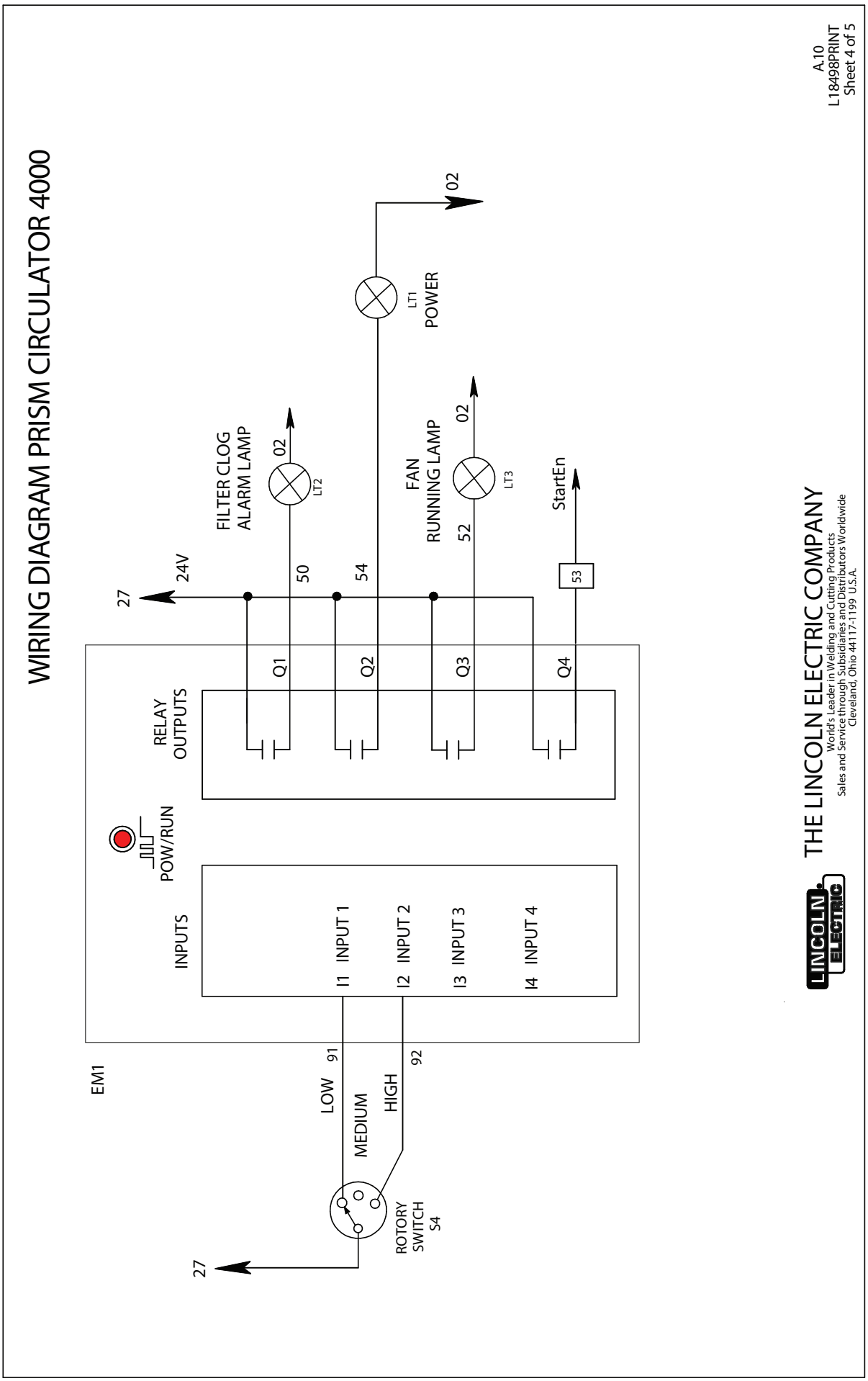
Sheet 3 of 5


WIRING DIAGRAM PRISM CIRCULATOR 4000
A.10
L18498PRINT
Sheet 4 of 5
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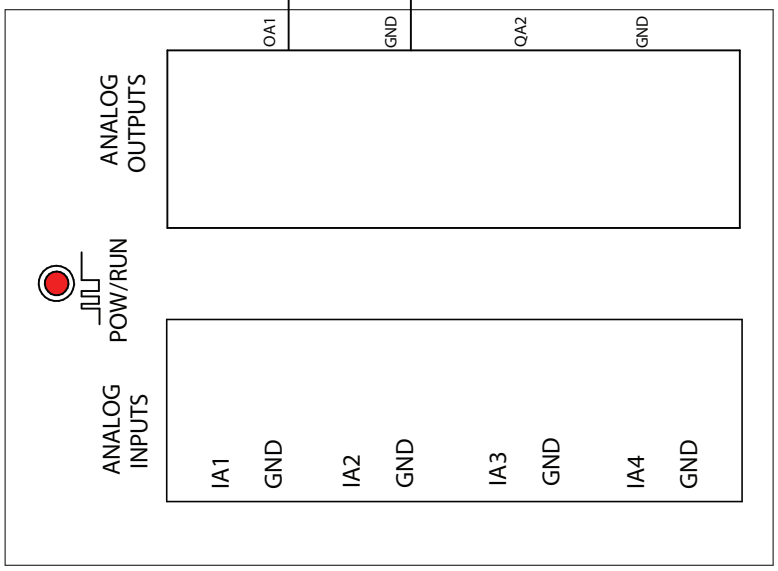
EM1
INPUTS
POW/RUN
I1 INPUT 1
I2 INPUT 2
I3 INPUT 3
I4 INPUT 4
RELAY OUTPUTS
Q1
Q2
Q3
Q4
27
24V
50
54
52
53
02
FILTER CLOG ALARM LAMP
LT2
FAN RUNNING LAMP
LT3
LT1 POWER
StartEn
LOW
MEDIUM
HIGH
91
92
ROTORY SWITCH S4

WIRING DIAGRAM PRISM CIRCULATOR 4000



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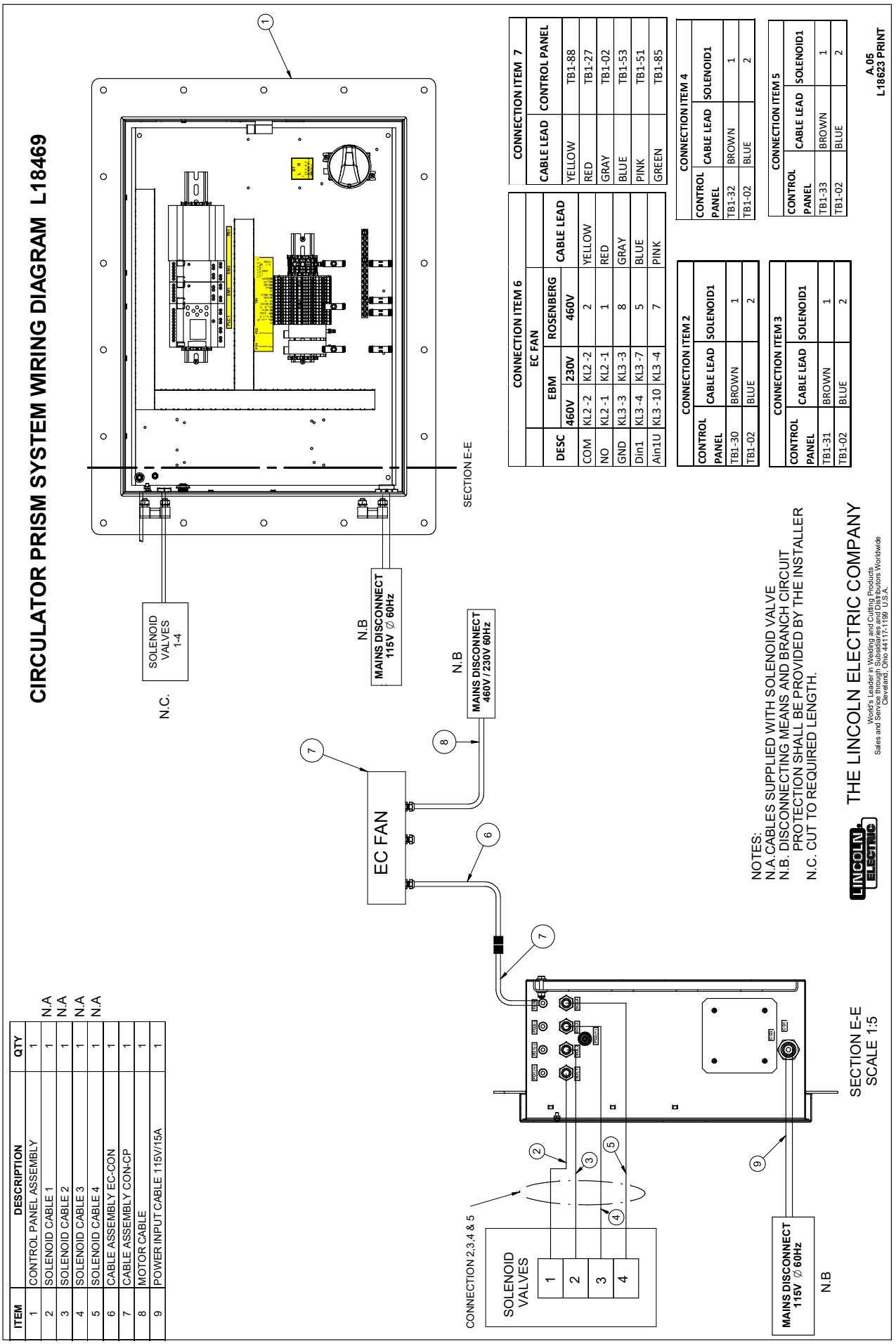
A.10
L18498PRINT
Sheet 5 of 5



ITEM	DESCRIPTION	QTY	
1	CONTROL PANEL ASSEMBLY	1	
2	SOLENOID CABLE 1	1	N.A
3	SOLENOID CABLE 2	1	N.A
4	SOLENOID CABLE 3	1	N.A
5	SOLENOID CABLE 4	1	N.A
6	CABLE ASSEMBLY EC-CON	1	
7	CABLE ASSEMBLY CON-CP	1	
8	MOTOR CABLE	1	
9	POWER INPUT CABLE 115V/15A	1	

CONNECTION ITEM 6				
	EC FAN			
	EBM		ROSENBERG	CABLE LEAD
DESC	460V	230V	460V	
COM	KL2 -2	KL2 -2	2	YELLOW
NO	KL2 -1	KL2 -1	1	RED
GND	KL3 -3	KL3 -3	8	GRAY
Din1	KL3 -4	KL3 -7	5	BLUE
Ain1U	KL3 -10	KL3 -4	7	PINK

CONNECTION ITEM 7		
CABLE LEAD	CONTROL PANEL	
YELLOW	TB1-88	
RED	TB1-27	
GRAY	TB1-02	
BLUE	TB1-53	
PINK	TB1-51	
GREEN	TB1-85	

CONNECTION ITEM 2		
CONTROL PANEL	CABLE LEAD	SOLENOID1
TB1-30	BROWN	1
TB1-02	BLUE	2

CONNECTION ITEM 4		
CONTROL PANEL	CABLE LEAD	SOLENOID1
TB1-32	BROWN	1
TB1-02	BLUE	2

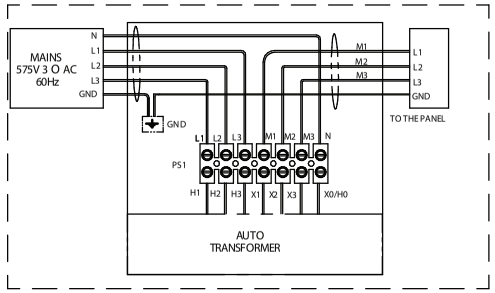
CONNECTION ITEM 3		
CONTROL PANEL	CABLE LEAD	SOLENOID1
TB1-31	BROWN	1
TB1-02	BLUE	2

CONNECTION ITEM 5		
CONTROL PANEL	CABLE LEAD	SOLENOID1
TB1-33	BROWN	1
TB1-02	BLUE	2

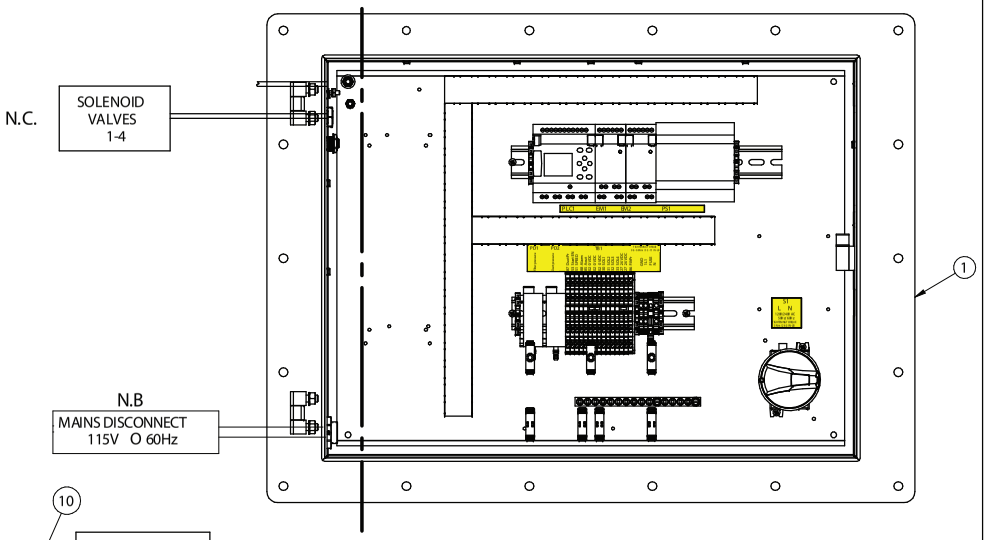
CIRCULATOR PRISM SYSTEM WIRING DIAGRAM L18469

ITEM	DESCRIPTION	QTY	
1	CONTROL PANEL ASSEMBLY		
2	SOLENOID CABLE 1	1	N.A
3	SOLENOID CABLE 2	1	N.A
4	SOLENOID CABLE 3	1	N.A
5	SOLENOID CABLE 4	1	N.A
6	CABLE ASSEMBLY EC-CON		
7	CABLE ASSEMBLY CON-CP		
8	MOTOR CABLE	1	
9	POWER INPUT CABLE 115V/15A		
10	SUPPLY CABLE	1	
11	TRANSFORMER, AUTO, 575V TO 480V, 3 PHASE, 15KW	1	

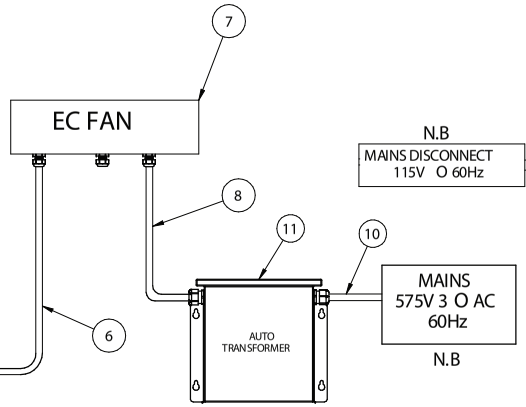
FOR 575V ONLY

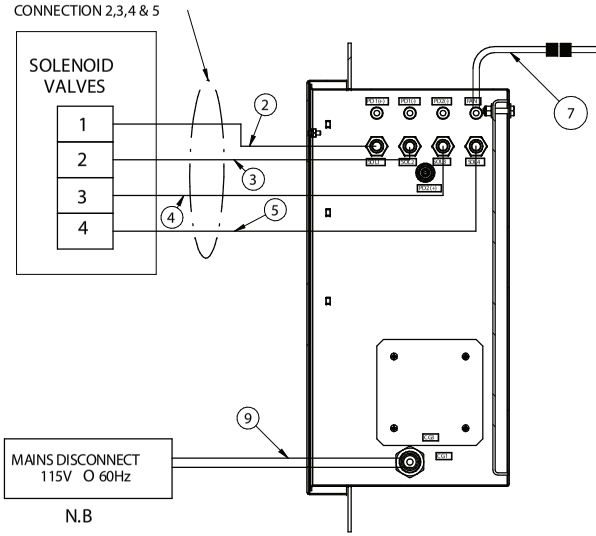


TRANSFORMER INSIDE CONNECTIONS

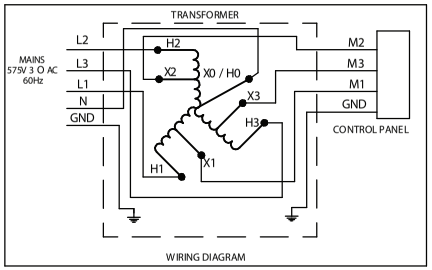


SECTION E-E





SECTION E-E
SCALE 1:5



NOTES:
N.A.CABLES SUPPLIED WITH SOLENOID VALVE
N.B. DISCONNECTING MEANS AND BRANCH CIRCUIT PROTECTION SHALL BE PROVIDED BY THE INSTALLER
N.C. CUT TO REQUIRED LENGTH.

CONNECTION ITEM 6				
	EC FAN			
DESC	EBM		ROSENBERG	CABLE LEAD
	460V	230V	460V	
COM	KL2 -2	KL2 -2	2	YELLOW
NO	KL2 -1	KL2 -1	1	RED
GND	KL3 -3	KL3 -3	8	GRAY
Din1	KL3 -4	KL3 -7	5	BLUE
Ain1U	KL3 -10	KL3 -4	7	PINK

CONNECTION ITEM 7	
CABLE LEAD	CONTROL PANEL
YELLOW	TB1-88
RED	TB1-27
GRAY	TB1-02
BLUE	TB1-53
PINK	TB1-51
GREEN	TB1-85

CONNECTION ITEM 2		
CONTROL PANEL	CABLE LEAD	SOLENOID1
TB1-30	BROWN	1
TB1-02	BLUE	2

CONNECTION ITEM 4		
CONTROL PANEL	CABLE LEAD	SOLENOID1
TB1-32	BROWN	1
TB1-02	BLUE	2

CONNECTION ITEM 3		
CONTROL PANEL	CABLE LEAD	SOLENOID1
TB1-31	BROWN	1
TB1-02	BLUE	2

CONNECTION ITEM 5		
CONTROL PANEL	CABLE LEAD	SOLENOID1
TB1-33	BROWN	1
TB1-02	BLUE	2

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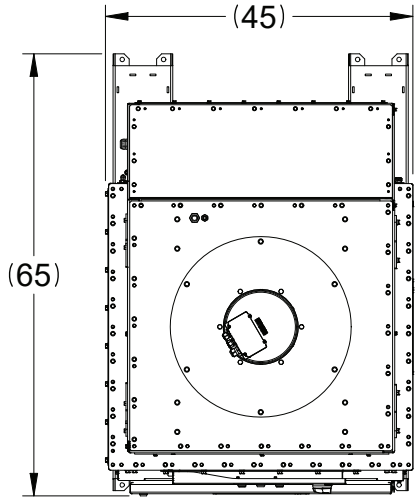
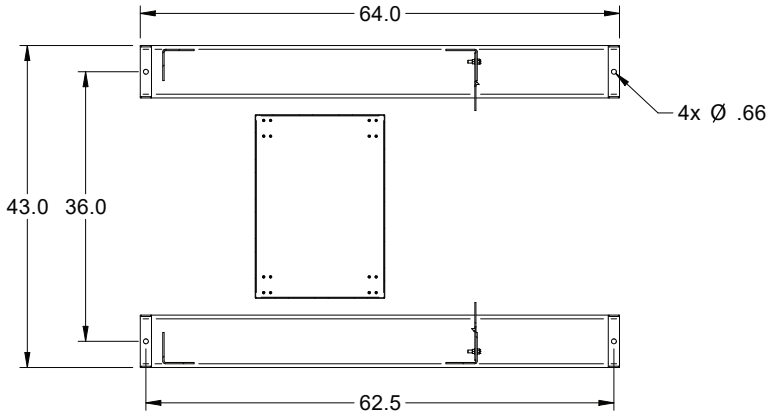
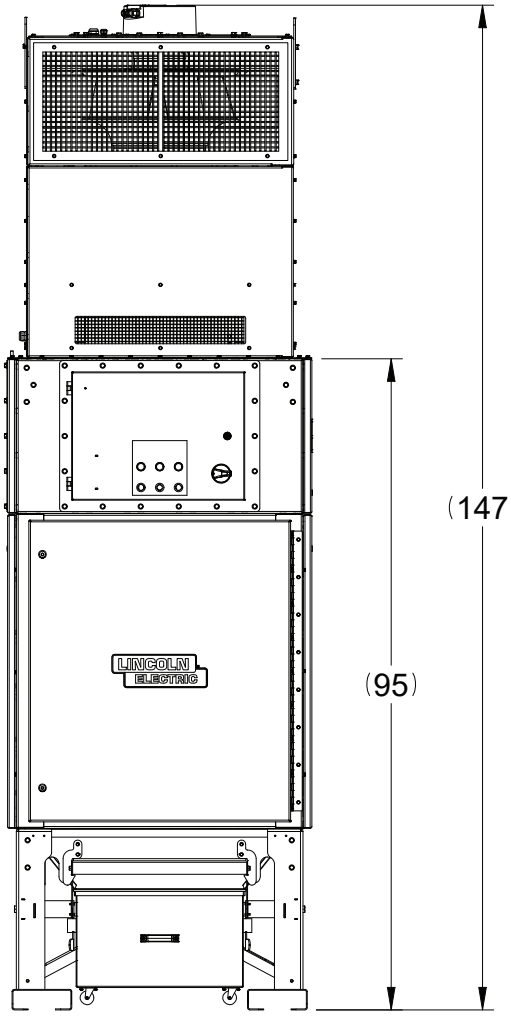
A.02
L18623-1 PRINT

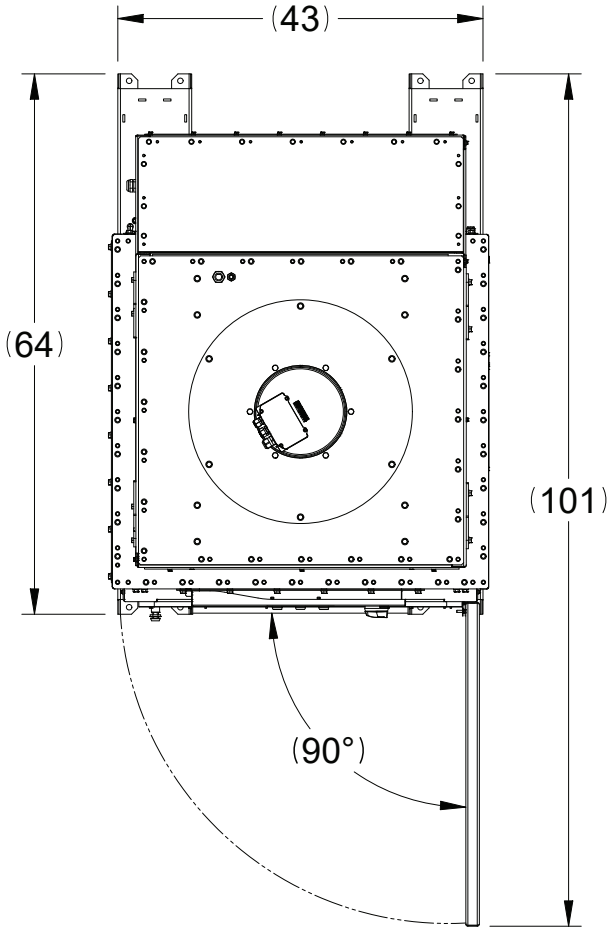
K5140-1, K5140-2, K5140-3 AND K5140-4





LAG BOLT MOUNTING DETAILS





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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ゝ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 Lincoln Electric is manufacturing and selling high quality welding equipment, automated welding systems, consumables, and cutting equipment. Our challenge is to meet the needs of our customers, who are experts in their fields, and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or technical information about their use of our products. Our employees respond to inquiries to the best of their ability based on information and specifications provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment, or to provide engineering advice in relation to a specific situation or application. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or communications. Moreover, the provision of such information or technical information does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or technical information, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose or any other equivalent or similar warranty is specifically disclaimed.

Lincoln Electric is a responsive manufacturer, but the definition of specifications, and 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.

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