

MASTER LOAD™ 750

For use with equipment code number 10401.

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.

OPERATORS MANUAL



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⚠ WARNING

⚠ CALIFORNIA PROPOSITION 65 WARNINGS ⚠

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

The Above For Diesel Engines

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

The Above For Gasoline Engines

ARC WELDING CAN BE HAZARDOUS. PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS SHOULD CONSULT WITH THEIR DOCTOR BEFORE OPERATING.

Read and understand the following safety highlights. For additional safety information, it is strongly recommended that you purchase a copy of "Safety in Welding & Cutting - ANSI Standard Z49.1" from the American Welding Society, P.O. Box 351040, Miami, Florida 33135 or CSA Standard W117.2-1974. A Free copy of "Arc Welding Safety" booklet E205 is available from the Lincoln Electric Company, 22801 St. Clair Avenue, Cleveland, Ohio 44117-1199.

BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.



FOR ENGINE powered equipment.

1.a. Turn the engine off before troubleshooting and maintenance work unless the maintenance work requires it to be running.



1.b. Operate engines in open, well-ventilated areas or vent the engine exhaust fumes outdoors.



1.c. Do not add the fuel near an open flame welding arc or when the engine is running. Stop the engine and allow it to cool before refueling to prevent spilled fuel from vaporizing on contact with hot engine parts and igniting. Do not spill fuel when filling tank. If fuel is spilled, wipe it up and do not start engine until fumes have been eliminated.



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

1.e. In some cases it may be necessary to remove safety guards to perform required maintenance. Remove guards only when necessary and replace them when the maintenance requiring their removal is complete. Always use the greatest care when working near moving parts.

1.f. Do not put your hands near the engine fan. Do not attempt to override the governor or idler by pushing on the throttle control rods while the engine is running.

1.g. To prevent accidentally starting gasoline engines while turning the engine or welding generator during maintenance work, disconnect the spark plug wires, distributor cap or magneto wire as appropriate.



1.h. To avoid scalding, do not remove the radiator pressure cap when the engine is hot.



ELECTRIC AND MAGNETIC FIELDS may be dangerous

2.a. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding current creates EMF fields around welding cables and welding machines

2.b. EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.

2.c. Exposure to EMF fields in welding may have other health effects which are now not known.

2.d. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

2.d.1. Route the electrode and work cables together - Secure them with tape when possible.

2.d.2. Never coil the electrode lead around your body.

2.d.3. Do not place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side.

2.d.4. Connect the work cable to the workpiece as close as possible to the area being welded.

2.d.5. Do not work next to welding power source.

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ELECTRIC SHOCK can kill.

- 3.a. The electrode and work (or ground) circuits are electrically "hot" when the welder is on. Do not touch these "hot" parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.
- 3.b. Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.
- In addition to the normal safety precautions, if welding must be performed under electrically hazardous conditions (in damp locations or while wearing wet clothing; on metal structures such as floors, gratings or scaffolds; when in cramped positions such as sitting, kneeling or lying, if there is a high risk of unavoidable or accidental contact with the workpiece or ground) use the following equipment:**
- Semiautomatic DC Constant Voltage (Wire) Welder.
 - DC Manual (Stick) Welder.
 - AC Welder with Reduced Voltage Control.
- 3.c. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically "hot".
- 3.d. Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.
- 3.e. Ground the work or metal to be welded to a good electrical (earth) ground.
- 3.f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.
- 3.g. Never dip the electrode in water for cooling.
- 3.h. Never simultaneously touch electrically "hot" parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.
- 3.i. When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.
- 3.j. Also see Items 6.c. and 8.



ARC RAYS can burn.

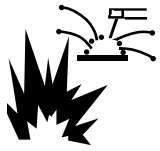
- 4.a. Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Headshield and filter lens should conform to ANSI Z87. 1 standards.
- 4.b. Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.
- 4.c. Protect other nearby personnel with suitable, non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.



FUMES AND GASES can be dangerous.

- 5.a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. **When welding with electrodes which require special ventilation such as stainless or hard facing (see instructions on container or MSDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and below Threshold Limit Values (TLV) using local exhaust or mechanical ventilation. In confined spaces or in some circumstances, outdoors, a respirator may be required. Additional precautions are also required when welding on galvanized steel.**
- 5.b. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.
- 5.c. Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.
- 5.d. Read and understand the manufacturer's instructions for this equipment and the consumables to be used, including the material safety data sheet (MSDS) and follow your employer's safety practices. MSDS forms are available from your welding distributor or from the manufacturer.
- 5.e. Also see item 1.b.

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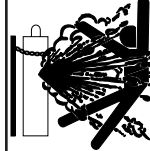


WELDING SPARKS can cause fire or explosion.

6.a. Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire.

Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.

- 6.b. Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situations. Refer to "Safety in Welding and Cutting" (ANSI Standard Z49.1) and the operating information for the equipment being used.
- 6.c. When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.
- 6.d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been "cleaned". For information, purchase "Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances", AWS F4.1 from the American Welding Society (see address above).
- 6.e. Vent hollow castings or containers before heating, cutting or welding. They may explode.
- 6.f. Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.
- 6.g. Connect the work cable to the work as close to the welding area as practical. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.
- 6.h. Also see item 1.c.



CYLINDER may explode if damaged.

7.a. Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.

- 7.b. Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.
- 7.c. Cylinders should be located:
 - Away from areas where they may be struck or subjected to physical damage.
 - A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.
- 7.d. Never allow the electrode, electrode holder or any other electrically "hot" parts to touch a cylinder.
- 7.e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- 7.f. Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.
- 7.g. Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-1, "Precautions for Safe Handling of Compressed Gases in Cylinders," available from the Compressed Gas Association 1235 Jefferson Davis Highway, Arlington, VA 22202.



FOR ELECTRICALLY powered equipment.

- 8.a. Turn off input power using the disconnect switch at the fuse box before working on the equipment.
- 8.b. Install equipment in accordance with the U.S. National Electrical Code, all local codes and the manufacturer's recommendations.
- 8.c. Ground the equipment in accordance with the U.S. National Electrical Code and the manufacturer's recommendations.

Mar '95

PRÉCAUTIONS DE SÛRETÉ

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

Sûreté Pour Soudage A L'Arc

1. Protégez-vous contre la secousse électrique:
 - a. Les circuits à l'électrode et à la pièce sont sous tension quand la machine à souder est en marche. Eviter toujours tout contact entre les parties sous tension et la peau nue ou les vêtements mouillés. Porter des gants secs et sans trous pour isoler les mains.
 - b. Faire très attention de bien s'isoler de la masse quand on soude dans des endroits humides, ou sur un plancher métallique ou des grilles métalliques, principalement dans les positions assis ou couché pour lesquelles une grande partie du corps peut être en contact avec la masse.
 - c. Maintenir le porte-électrode, la pince de masse, le câble de soudage et la machine à souder en bon et sûr état de fonctionnement.
 - d. Ne jamais plonger le porte-électrode dans l'eau pour le refroidir.
 - e. Ne jamais toucher simultanément les parties sous tension des porte-électrodes connectés à deux machines à souder parce que la tension entre les deux pinces peut être le total de la tension à vide des deux machines.
 - f. Si on utilise la machine à souder comme une source de courant pour soudage semi-automatique, ces précautions pour le porte-électrode s'appliquent aussi au pistolet de soudage.
2. Dans le cas de travail au dessus du niveau du sol, se protéger contre les chutes dans le cas ou on recoit un choc. Ne jamais enrouler le câble-électrode autour de n'importe quelle partie du corps.
3. Un coup d'arc peut être plus sévère qu'un coup de soleil, donc:
 - a. Utiliser un bon masque avec un verre filtrant approprié ainsi qu'un verre blanc afin de se protéger les yeux du rayonnement de l'arc et des projections quand on soude ou quand on regarde l'arc.
 - b. Porter des vêtements convenables afin de protéger la peau de soudeur et des aides contre le rayonnement de l'arc.
 - c. Protéger l'autre personnel travaillant à proximité au soudage à l'aide d'écrans appropriés et non-inflammables.
4. Des gouttes de laitier en fusion sont émises de l'arc de soudage. Se protéger avec des vêtements de protection libres de l'huile, tels que les gants en cuir, chemise épaisse, pantalons sans revers, et chaussures montantes.
5. Toujours porter des lunettes de sécurité dans la zone de soudage. Utiliser des lunettes avec écrans latéraux dans les zones où l'on pique le laitier.
6. Eloigner les matériaux inflammables ou les recouvrir afin de prévenir tout risque d'incendie dû aux étincelles.
7. Quand on ne soude pas, poser la pince à un endroit isolé de la masse. Un court-circuit accidentel peut provoquer un échauffement et un risque d'incendie.
8. S'assurer que la masse est connectée le plus près possible de la zone de travail qu'il est pratique de le faire. Si on place la masse sur la charpente de la construction ou d'autres endroits éloignés de la zone de travail, on augmente le risque de voir passer le courant de soudage par les chaînes de levage, câbles de grue, ou autres circuits. Cela peut provoquer des risques d'incendie ou d'échauffement des chaînes et des câbles jusqu'à ce qu'ils se rompent.
9. Assurer une ventilation suffisante dans la zone de soudage. Ceci est particulièrement important pour le soudage de tôles galvanisées plombées, ou cadmiées ou tout autre métal qui produit des fumées toxiques.
10. Ne pas souder en présence de vapeurs de chlore provenant d'opérations de dégraissage, nettoyage ou pistologie. La chaleur ou les rayons de l'arc peuvent réagir avec les vapeurs du solvant pour produire du phosgène (gas fortement toxique) ou autres produits irritants.
11. Pour obtenir de plus amples renseignements sur la sûreté, voir le code "Code for safety in welding and cutting" CSA Standard W 117.2-1974.

PRÉCAUTIONS DE SÛRETÉ POUR LES MACHINES À SOUDER À TRANSFORMATEUR ET À REDRESSEUR

1. Relier à la terre le chassis du poste conformément au code de l'électricité et aux recommandations du fabricant. Le dispositif de montage ou la pièce à souder doit être branché à une bonne mise à la terre.
2. Autant que possible, l'installation et l'entretien du poste seront effectués par un électricien qualifié.
3. Avant de faire des travaux à l'intérieur de poste, la débrancher à l'interrupteur à la boîte de fusibles.
4. Garder tous les couvercles et dispositifs de sûreté à leur place.

Mar. '93

The load bank is an industrial test unit designed to be used indoors or outdoors (sheltered from moisture). However, because the nature of the load bank's function is the dissipation of electrical energy, electrical energy is transformed into heat by the resistor elements. The heat is removed from the load bank by airflow through the resistor elements. If there are any restrictions or stoppage of airflow, the load bank may overheat. For safe operation the following recommendations should be observed:

1. Read the manual before operating the Load Bank.
2. Run an approved ground wire from the Load Bank ground lug located on the connection panel to the frame of the power source. Run an approved ground wire from the power source frame to a good earth ground. Size ground wire in accordance with National Electrical Code and any local codes.
3. Do not bypass the airflow safety switch or temperature sensing switch to prevent nuisance tripping. The switches will drop out the load if insufficient cooling air is reaching the elements.
4. Replace any burned out lamps on the control panel. Each lamp is an indication that a system is active or has failed and is important to the operation of the unit and safety of the operator.
5. Maintenance should be performed with no power on the unit. The majority of troubleshooting can be performed with an ohmmeter. There are multiple sources of input power to the Load Bank. Insure each is disconnected.
6. Venting the heated air from the exhaust toward overhead cables, sprinkler systems, or into a room with insufficient volume or "Make-Up" air, is a potential hazard. The Load Bank should be used in a cool, well-ventilated area.
7. Allow cool room air to pass into the unit to cool the elements. Do not allow the unit to be placed where hot exhaust air can recirculate back through the unit causing a constant rise in cooling air temperature.
8. After running a load test, residual heat may be removed from the load bank by allowing the blower to operate for a few minutes after load is removed. This procedure is not required for load bank integrity, but it may guard operating personnel from possible burn injuries.
9. The operator should avoid coming in contact with the resistor elements or surrounding covers during and for some time after operation. These portions of the load bank become hot .
10. Do not allow objects to enter or block the air intake or exhaust of the load bank. A blockage would cause overheating. If an object enters the screens, it may cause damage to the resistor elements, possibly shorting them and causing shock and fire hazards.
11. Emergency Shutdown Procedure
 - A. In an emergency, shut down the MASTER LOAD switch, then the power source. The MASTER LOAD switch will allow disconnection of all load steps and still allow for the fan motor to run, cooling any heated elements.
 - B. The POWER ON/OFF switch will disconnect both load steps and fan motor. The power source EMERGENCY OFF switch should be located near the load system.
12. An approved electrical fire extinguisher should be on hand at all times.
13. It is the responsibility of the customer to take diligent care in installing the Load Bank. The National Electrical Code (NEC), sound local electrical and safety codes, and the Occupational Safety and Health Act (OSHA) should be followed when installing the equipment to reduce hazards to persons and property.
14. Flammable objects (cardboard, paper, etc.) must not be stored near the load bank
15. As part of your safety program, an initial inspection after receiving the unit(s) and periodic preventive maintenance and safety inspections should be conducted to insure the reliability and safety.

WARNING



ELECTRIC SHOCK can kill.
Personal injury from electrical shock may result if all sources of power are not disconnected before servicing. Only qualified personnel should Install, Operate and Service this equipment.

Thank You

for selecting a **QUALITY** product by Lincoln Electric. We want you to take pride in operating this Lincoln Electric Company product
••• as much pride as we have in bringing this product to you!

Please Examine Carton and Equipment For Damage Immediately

When this equipment is shipped, title passes to the purchaser upon receipt by the carrier. Consequently, Claims for material damaged in shipment must be made by the purchaser against the transportation company at the time the shipment is received.

Please record your equipment identification information below for future reference. This information can be found on your machine nameplate.

Product _____

Model Number _____

Code Number or Date Code _____

Serial Number _____

Date Purchased _____

Where Purchased _____

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

On-Line Product Registration

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

- For faxing: Complete the form on the back of the warranty statement included in the literature packet accompanying this machine and fax the form per the instructions printed on it.
- For On-Line Registration: Go to our **WEB SITE at www.lincolnelectric.com**. Choose "Quick Links" and then "Product Registration". Please complete the form and submit your registration.

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

⚠ WARNING

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

⚠ CAUTION

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

MASTER LOAD 750



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TECHNICAL SPECIFICATIONS – MASTER LOAD 750**INPUT – POWER**

120 VOLT, 15 A, 60 Hz , SINGLE PHASE

LOAD CAPABILITY

750 Amps @50V AC or DC (in incrementing fixed steps of 25, 25, 50, 50, 100, 250, 250)

PROTECTION FUSES

Control Circuit 15 amp

Voltmeters 3 amp

COOLING BLOWER

82 dBA at 3 ft

MAXIMUM COOLING AIR TEMPERATURE

120°F (50° C)

PHYSICAL DIMENSIONS

Height
34.75 in
883 mm

Width
24 in
610 mm

Depth
28.5 in
724 mm

MASTER LOAD 750



SAFETY PRECAUTIONS

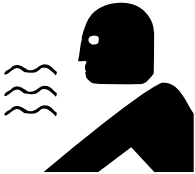
Before installation, read and observe all safety precautions throughout this manual.

WARNING



ELECTRIC SHOCK can kill.

- Turn the input supply power OFF at the disconnect switch or fuse box before working on this equipment.
- Do not touch electrically hot parts.



HOT EXHAUST can burn skin.

- Allow resistance elements to cool before working near them.



ROTATING FAN can cause injury.

- Do not touch moving fan components.

GENERAL DESCRIPTION

The Master Load 750 Load Bank is designed for electrically loading and testing power sources. The unit is designed for production line and job site use.

The total loading capability of the Master Load 750 is in fixed steps of 25, 25, 50, 50, 100, 250, 250 Amps @ 50V AC or DC, totaling 750 Amps. Using the toggle switches on the control panel, any combination of the available load steps may be selected to achieve a desired load.

CONTROL UNIT

The loads described above are controlled from an integral control panel.

1. CONTROL POWER ON/OFF switch - Applies power to the load bank and starts the blower. The CONTROL POWER indicator lights when power is applied.
2. BLOWER FAIL indicator - Indicates an air failure condition or insufficient cooling airflow.
3. MASTER LOAD ON/OFF switch - Allows instantaneous connection and disconnection

of all switched ON load steps.

4. LOAD STEPS switches - Connect and disconnect load steps. Values are shown above each switch.
5. Analog Meters - Monitors DC volts, DC amps, AC volts, and AC amps applied to the load bank.

ENCLOSURE

CAUTION

The outside dimensions of the Master Load 750 Load Bank are listed on Technical Specifications page at the beginning of this section of the manual. The Load Bank is mounted on casters. One set of casters has lockable wheels.

Do not allow the Load Bank to be placed where hot exhaust air can recirculate back through the unit causing a constant rise in cooling air temperature.

The Master Load 750 Load Bank contains a blower (approximately 82dBA at 3 ft.) which provides the necessary cooling air for the load elements. An exhaust temperature sensor is provided to monitor the exhaust temperature. This switch is electrically interlocked with the load application circuit. If an unsafe temperature is detected in the exhaust of the Load Bank, the BLOWER FAIL light comes on and the load is disconnected from the resistive elements.

Air to cool the load elements enters the screened intakes located on one end of the Load Bank. The air passes over the resistive elements and is then discharged through the screened opening at the other end of the Load Bank.

The Load Bank also contains fuses for short circuit protection. The control circuit is protected with a 15 amp fuse while the voltmeters are protected with 3 amp fuses.

WARNING

Do not operate the Load Bank with any screen or cover removed. This may expose the operator to high voltage and rotating fan blades.

CAUTION

Do not exceed the voltage rating of load resistive circuit configuration.

MASTER LOAD 750



BEFORE INSTALLATION

Inspect the Load Bank for obvious damage such as broken wires, broken or dented panels, cracked ceramic insulators, or any other component breakage that may have occurred in shipment.

LOCATION

The Master Load 750 is a portable, indoor, outdoor Load Bank, and should be installed in a dry, cool, well-ventilated area. Cool air must be continually available and the hot exhaust air must be dissipated, not recirculated through the unit. Install the Load Bank so that the inlet and exhaust panels have unrestricted airflow clearance.

⚠ CAUTION

Installation must prevent hot exhaust air from recirculating into the air intake. Inlet air temperatures exceeding 120° F (50° C) may cause damage to the Load Bank. After installation, test the unit at full load and verify that the inlet air temperature does not exceed 120° F (50° C).

AIRFLOW CONSIDERATIONS

Even with an ample supply of cooling air, the load bank may overheat if it is not properly installed. There are two types of airflow problems that should be avoided:

1. **Recirculating Airflow** - If the hot, exhausted air is permitted to recirculate through the load bank, the air will reach such a high temperature and low density that it will no longer cool the resistance elements. A load bank should not be installed so close to any surface as to reflect the exhausted air back to the air intake. When two or more load banks are being used, care must be taken in positioning the units so that the exhausted air of one unit does not feed the air intake of another.
2. **Restriction of Cooling Air** - Any obstruction located within 8 feet (2.4 m) of the inlet and exhaust screens will restrict the load bank's airflow. Airflow is also restricted when two or more load banks have air inlets positioned too close to each other. This competition for cooling air causes a low pressure area, restricting adequate airflow.

⚠ WARNING

It is important to install the Load Bank properly. Installation errors may result in a catastrophic failure.

The over temperature switch, a protective device in the load bank, will guard against some of these problems. If protective circuitry prevents application of the load, determine the source of the problem. **DO NOT DISABLE THE OVER TEMPERATURE SWITCH.** This causes a safety hazard and voids our warranty. The following installation instructions are critical to the safe operation of the Load Bank. Refer to the **Load Bank Safety** section of this manual.

POWER REQUIREMENTS

The Load Bank requires a 120 volt, single phase, 60 Hz, 15 amp source of power for operation of the control panel and cooling fan. A power cord for control power is provided with the Load Bank. Connect the power cord to a grounded 120 volt source.

Load power is connected to the Load Bank through receptacles on the side of the Load Bank labeled L1 and L2.

⚠ WARNING



Do not energize the Load Bank with the top cover removed. Make sure the top cover panel is securely fastened to the frame.

Cables to the Load Bank should be of adequate size to handle the maximum rated current according to the National Electrical Code and any local codes. A ground stud is provided and must be connected to the frame of the power source, which in turn must be connected to a good earth ground.

⚠ WARNING

Never exceed the rated voltage as this will cause the Load Bank to overheat.

Lower voltages and different frequencies may be applied to the load circuit of the Load Bank. Frequency change causes no derating of the load; however, the applied KW with a lower voltage is computed by using the following formula:

$$KW_{\text{Applied}} = KW_{\text{Rated}} \times \frac{(\text{Voltage Applied})^2}{(\text{Voltage Rated})^2}$$

MASTER LOAD 750



PURPOSE AND USE OF CONTROLS

1. POWER ON/OFF switch - Turns on cooling fan and powers remainder of control circuit. Red light shows POWER ON.
2. BLOWER FAIL indicator - The purpose of the BLOWER FAIL lamp is to warn the operator and remove the load to the load bank in case of an air failure or improper cooling of the load elements.
3. MASTER LOAD ON/OFF switch - The MASTER LOAD switch connects power to all load steps, thus allowing all load steps which are actuated to load at the same time. It is also a master load disconnect.
4. LOAD STEPS switches - The load in amps is marked above each actuating switch. A load step may be turned ON or OFF before or during a test but will load the unit only when the MASTER LOAD switch is ON. **NOTE:** For DC loads, if the polarity is not correct the load step switches will not activate the load.
5. ANALOG METERS - Monitors load characteristics DC and AC, Volts, and Amps.

LOAD BANK OPERATION

All tests start with control panel switches in the OFF position.

⚠ CAUTION

Before energizing any load, verify that load voltage does not exceed rated voltage of load bank.

The unit is energized by turning the POWER switch ON. This also energizes the cooling fan motor.

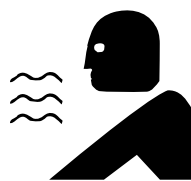
⚠ CAUTION

Do not attempt operation if fan is not running. Fan inlet and exhaust must be unrestricted. The operation of the fan is vital to the safe operation of this Load Bank. If BLOWER FAIL indicator light comes on and stays on for more than a few seconds without the load dropping out, shut off the POWER switch at once. Remove all power to the unit and check for proper operation of fan safety circuit. Failure to correct cooling air loss condition will result in destruction of the Load Bank. Refer to the **Load Bank Safety** section of this manual.

OPERATING INSTRUCTIONS

1. Connect Load Bank to 120 volts, single phase, 60 Hz power source.
2. Connect a wire from the Load Bank frame ground stud to power source frame.
3. Connect power source frame to a good earth ground.
4. Connect appropriate power source leads to Load Bank.
5. With POWER and MASTER LOAD switches in the OFF position, start the generator.
6. Place the POWER switch in the ON position. The red POWER lamp will light.
7. Position the LOAD STEPS switches for the desired load.
8. Turn on the MASTER LOAD switch to apply desired load. Load steps may be added or deleted at any time.
9. Use analog meters to monitor applied load.
10. After running tests, remove the load by turning off the MASTER LOAD switch. Residual heat may be removed from the Load Bank by allowing the blower to run a few minutes after load is removed. Although not required for maintaining Load Bank integrity, this procedure may guard operating personnel from possible burn injuries.

⚠ WARNING



DO NOT touch the exhaust screen during operation. The screen will become hot from the exhausted heat and may cause a serious burn. Refer to the **Load Bank Safety** section of this manual.

DO NOT allow objects to enter or block screens.

11. Place the POWER switch to the OFF position.
12. Shut down all power sources to the Load Bank.
13. Disconnect the power source cables to the Load Bank.

MASTER LOAD 750



SAFETY PRECAUTIONS

Before servicing, read and observe all safety precautions throughout this manual.

WARNING



ELECTRIC SHOCK can kill.

- Only qualified personnel should perform this maintenance.
- Turn the input supply power OFF at the disconnect switch or fuse box before working on this equipment.
- Do not touch electrically hot parts.
- Allow resistance elements to cool before working near them.
- Do not touch moving fan components.



4. Inspect for loose hardware or loose connections. Tighten where required.
5. Inspect all connections for oxidation or corrosion. Clean the connection or replace the hardware where required.
6. Inspect all magnetic contactors to make sure that the contacts are not severely pitted or corroded. The contacts must move freely and be properly seated.
7. Clean all dirt and debris out of the load bank. This can be accomplished by blowing the inside of the unit with clean, dry compressed air (not to exceed 40 PSI). Eye protection should be worn when cleaning the Load Bank with compressed air.
8. Inspect all the wiring for any sign of insulation failure.
9. Replace all access panels and screens. Tighten all the fastening hardware securely.
10. Check the indicator lamps on the control panel.

ROUTINE AND PERIOD MAINTENANCE

DAILY

1. Remove any restrictions to airflow through the Load Bank.
2. Check the screens to make sure that no objects have blocked or entered the openings.
3. Verify that the airflow is in the proper direction.
4. Assure that there is no recirculation of the exhaust air through the Load Bank.

THREE MONTHS OR 500 HOURS

1. Remove access panels and screens.
2. Inspect the load resistors for mechanical breakdown which is demonstrated by excessive sagging of the elements. Replace with new resistor elements as required.
3. Inspect for broken ceramic insulators. Replace with a new ceramic insulator if any cracks are found.

ANNUALLY

The blower motor should be lubricated according to the motor manufacturers' requirements and specifications on the motor nameplate.

HOW TO USE TROUBLESHOOTING GUIDE

WARNING

This Troubleshooting Guide is designed to be used by qualified service 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, please observe all safety notes and precautions detailed in the Safety Sections of this manual to avoid electrical shock or danger while troubleshooting this equipment.

This Troubleshooting Guide is provided to help you locate and repair possible problems.

Step 1. LOCATE PROBLEM (SYMPTOM)

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

Step 2. Check Possible Causes

The second column labeled "POSSIBLE CAUSES/REMEDIES" lists typical possibilities that may contribute to the machine symptom. Perform these checks and remedies in the order listed.

Step 3.

If you have exhausted all of the recommended checks in step 2, contact the Lincoln Electric Customer Service Department.

CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact the Lincoln Electric Service Department for technical troubleshooting assistance before you proceed. Call 216-383-2531 or 1-800-833-9353.

MASTER LOAD 750



Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSES/REMEDIES
1. Load bank main power fails to come on.	<ul style="list-style-type: none"> a. Main switch or circuit breaker is not closed. b. Unit is not connected according to the Schematic/Interconnection diagram. c. Terminals may be damaged. d. Fuses may be blown. (Check and replace as required.) ¹. e. Fuse may be blown in load bank control circuit. (Check and replace as required.) ¹. f. Dirty or loose connection at main power switch.
2. Blower motor does not operate.	<ul style="list-style-type: none"> a. Main switch or circuit breaker may not be closed. b. Power may not be connected to load bank blower circuit. c. External power supply may be inadequate. d. Control Circuit fuse may be blown. (Check and replace as required.) ¹. e. Main power switch may be faulty. f. Check for loose or broken connections.

¹. When checking fuses for continuity, be sure to remove all fuses from clips (in fuse block or disconnect switch). Test each fuse individually, out of circuit.

 **CAUTION**

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact the Lincoln Electric Service Department for technical troubleshooting assistance before you proceed. Call 216-383-2531 or 1-800-833-9353.

MASTER LOAD 750



Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSES/REMEDIES
3. BLOWER OVER TEMPERATURE indicator lights are on, but the blower is operating.	<ul style="list-style-type: none"> a. Airflow restrictions present at load bank intake or exhaust. b. Maximum rating of the load bank may have been exceeded.
4. Fan blade is broken or not turning.	<ul style="list-style-type: none"> a. Fan blade motion may be obstructed. b. Fan blade may be loose at hub or is not keyed properly.
5. Load step(s) cannot be energized.	<ul style="list-style-type: none"> a. Check to see if over temperature indicator is lit. (See problem 3.) b. A blower failure may exist. (See problem 2.) c. Master load switch may be faulty. d. Control power may be inadequate. e. Fuse may be blown in load bank control circuit. (Check and replace as required).¹ f. Load step switch may be faulty. g. Load step contactor may be inoperative. h. Load step resistor may be open. i. Output polarity connection is incorrect. Verify correct polarity connection to the load bank.

¹. When checking fuses for continuity, be sure to remove all fuses from clips (in fuse block or disconnect switch). Test each fuse individually, out of circuit.

 **CAUTION**

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact the Lincoln Electric Service Department for technical troubleshooting assistance before you proceed. Call 216-383-2531 or 1-800-833-9353.

MASTER LOAD 750



Observe all Safety Guidelines detailed throughout this manual

PROBLEMS (SYMPTOMS)	POSSIBLE CAUSES/REMEDIES
6. Contactor "chattering" exists.	a. Contacts and/or core may be dirty. b. Check for loose or faulty connections to the contactor coil. c. Control circuit line voltage may be too low.
7. Load bank or load step does not give rated load.	a. Applied load voltage may be either derated or inadequate. b. Contactor may not be closing properly. c. Load step resistor element may be open.

1. When checking fuses for continuity, be sure to remove all fuses from clips (in fuse block or disconnect switch). Test each fuse individually, out of circuit.

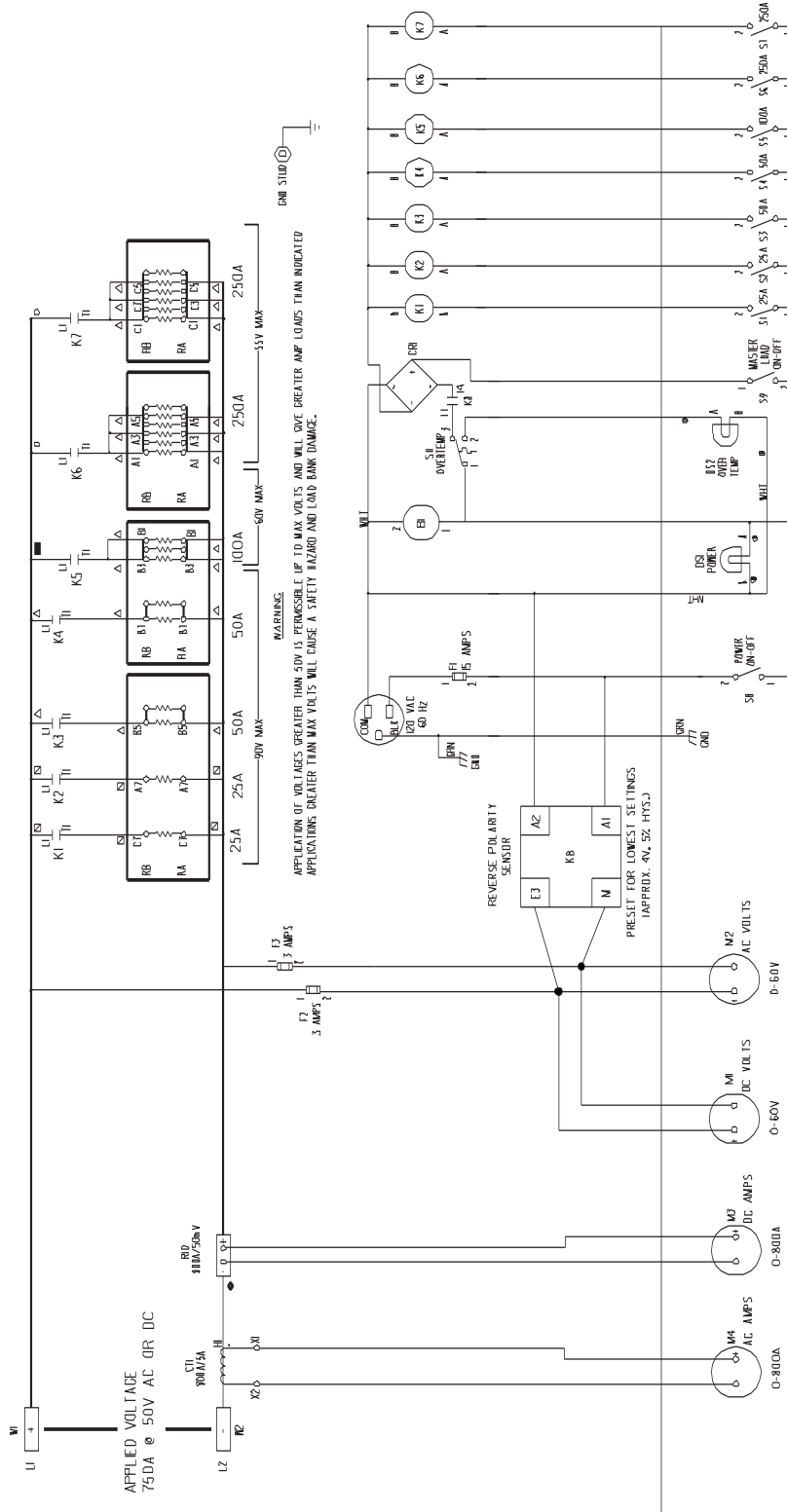
 **CAUTION**

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact the Lincoln Electric Service Department for technical troubleshooting assistance before you proceed. Call 216-383-2531 or 1-800-833-9353.

MASTER LOAD 750

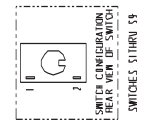


MASTERLOAD 750 - WIRING DIAGRAM



3-5-97
D26300

C23055
CONTROL PANEL



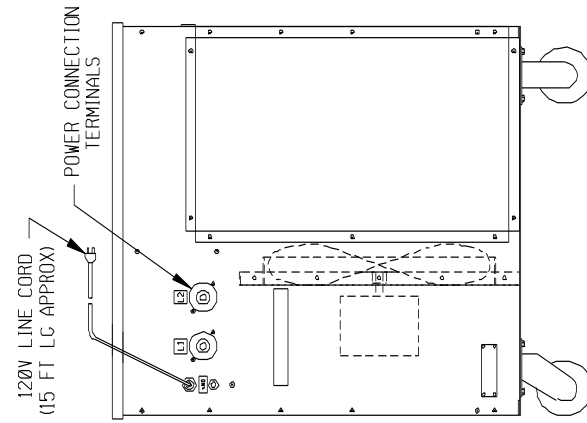
- 3- ITEM MAY BE DAMAGED IF SUBJECTED WITH A REVERSE POLARITY ON THE N.C. CONTACT.
- 2- WIRE DS18 B32, WHT WRES, TO TERMS WITH ONE LUC PHOSPHOR
- 1- WIRE CODE: UNLESS OTHERWISE NOTED ALL WIRE IS BLACK.
- ALL UNNUMBERED CONDUIT WIRING TO BE "16 AWG GPN 35000DS".
- INDICATES #22 AWG GPN 35000DS
- INDICATES #18 AWG GPN 35000DS
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UNLESS OTHERWISE SPECIFIED THE ABOVE NOTES APPLY

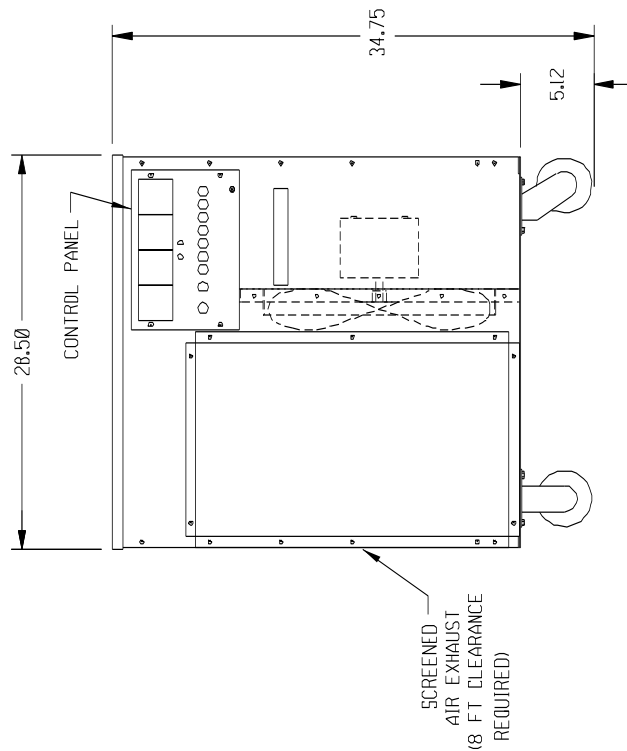
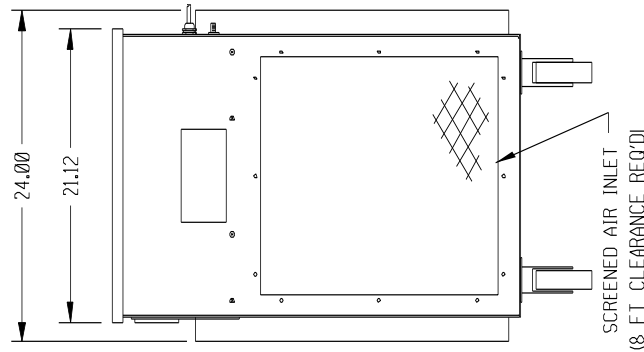
MASTER LOAD 750



MASTERLOAD 750 - DIMENSION PRINT



2-22-96
SB2561

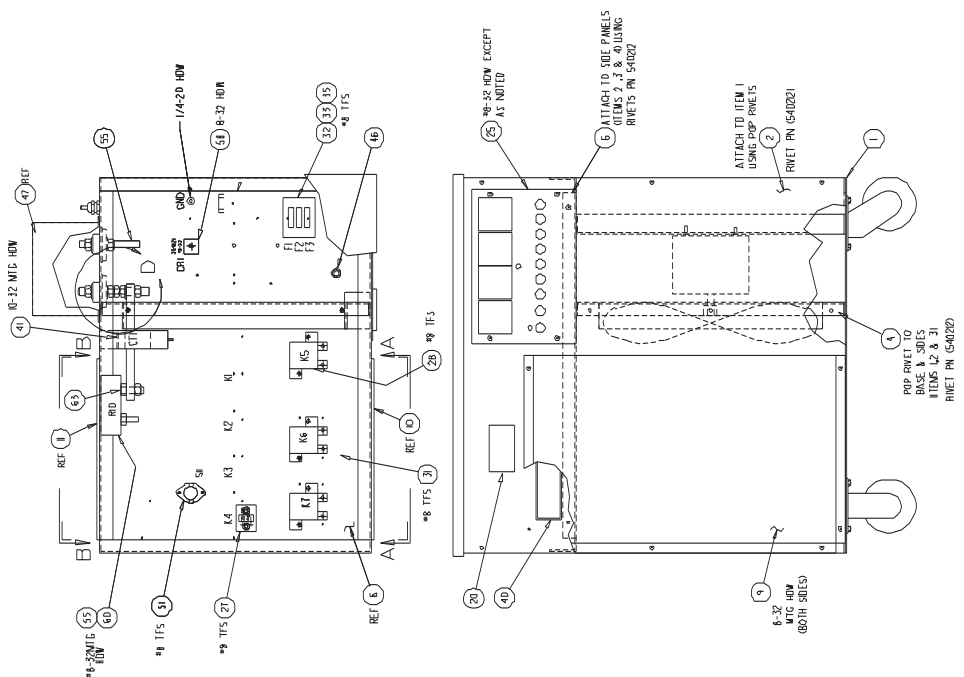
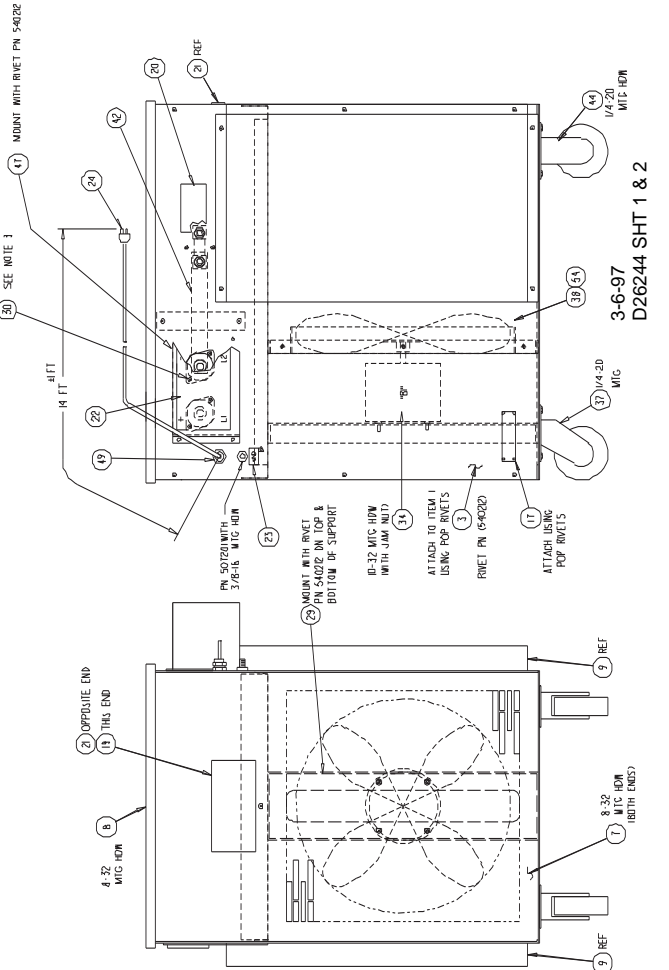
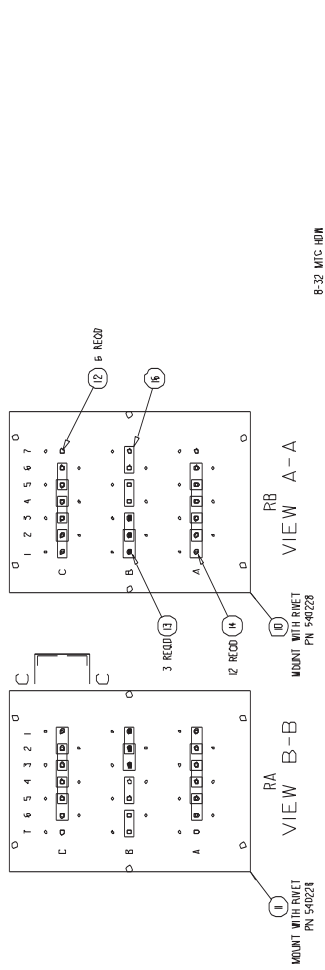
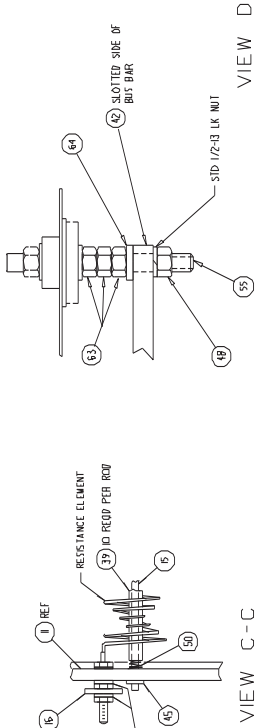


ALL DIMENSIONS ARE APPROX.

MASTER LOAD 750



MASTERLOAD 750 - GENERAL ASSEMBLY



MASTER LOAD 750



Indicates a change this printing.

Use only the parts marked "x" in the column under the heading number called for in the model index page.

* Recommended Spare Part

ITEM	DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
1	Base, Load Bank	M18720	1	X								
2	Side Panel, (Left)	M18720-1	1	X								
3	Side Panel, (Right)	M18720-2	1	X								
4	Venturi, Fan	M18720-3	1	X								
5	Rail (For Relay K8 Mtg.)	M18720-62	1	X								
6	Pan, Relay	M18720-5	1	X								
7	Panel, Screened	M18720-6	2	X								
8	Cover, Load Bank	M18720-7	1	X								
9	Cover, Res Element	M18720-8	2	X								
10	Terminal Board {RB}	M18720-9	1	X								
11	Terminal Board {RA}	M18720-10	1	X								
12	Resistance Element	M18720-11	6	X								
13	Resistance Element	M18720-12	3	X								
14	Resistance Element	M18720-13	12	X								
15	Rod, Element Support	M18720-14	21	X								
16	Bus Link	M18720-15	28	X								
17	Plate Identification	M18720-16	1	X								
18	Relay (K8)	M18720-61	1	X								
19	Label Warning	M18720-58	1	X								
20	Label Warning	M18720-59	2	X								
21	Label Warning	M18720-60	1	X								
22	Plate, Designation (L1,L2,+,-)	M18720-21	1	X								
23	Plate, Designation (GND)	M18720-22	1	X								
24	Line Cord {P1}	M18720-23	1	X								
25	Control Panel	M18720-24	1	X								
26	Schematic/Wiring Diagram	M18720-25	1	X								
27	Relay {K1-K4}	M18720-26	4	X								
28	Relay {K5}	M18720-27	1	X								
29	Support, Motor	M18720-28	1	X								
30	Terminal Connector {W1, W2}	S16656-4	2	X								
31	Relay {K6, K7}	M18720-29	2	X								
32	Fuseholder {XF1 - XF3}	M18720-30	1	X								
33	Fuse, 15A {F1}	M18720-31	1	X								
34	Motor, 1/4 HP, 120V {B1}	M9983-4	1	X								
35	Fuse, 3A {F2.F3}	M18720-32	2	X								
36	--											
37	Caster, Swivel	M18720-34	2	X								
38	Impeller, Fan	M18720-35	1	X								
39	Tube, Steatite	M18720-36	210	X								
40	Molding	M18720-37	AR	X								
41	Transformer, Current {CT1}	M18720-38	1	X								
42	Bus Bar	M18720-39	1	X								
43	--											
44	Caster, Rigid	M18720-41	2	X								
45	Pin, Spring Clip	M18720-42	42	X								
46	Grommet	M18720-43	1	X								
47	Cover	M18720-63	1	X								
48	Nut, Jam	M18720-64	1	X								

Indicates a change this printing.

Use only the parts marked "x" in the column under the heading number called for in the model index page.

* Recommended Spare Part

ITEM	DESCRIPTION	PART NO.	QTY.	1	2	3	4	5	6	7	8	9
49	Bushing, Seal	M18720-44	1	X								
50	Spring	M18720-45	42	X								
51	Switch, Temp {S11}	M18720-46	1	X								
52	--											
53	Nut Assembled Washer	M18720-47	84	X								
54	Threadlocker	M18720-48	AR	X								
55	Stud	M18720-49	4	X								
56	--											
57	--											
58	Semiconductor, Rectifier {CR1}	M18720-52	1	X								
59	--											
60	Shunt, 800A. 50MV {R10}	M18720-53	1	X								
61	Wire, Electrical 2 AWG	M18720-54	75ft.	X								
62	--											
63	Nut #1/2 - 13	M18720-56	4	X								
64	Washer, Flat, 1/2	M18720-57	1	X								
65	--											

NOTES

NOTES

NOTES

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

			
<ul style="list-style-type: none"> ● Keep your head out of fumes. ● Use ventilation or exhaust to remove fumes from breathing zone. 	<ul style="list-style-type: none"> ● Turn power off before servicing. 	<ul style="list-style-type: none"> ● Do not operate with panel open or guards off. 	WARNING
<ul style="list-style-type: none"> ● Los humos fuera de la zona de respiración. ● Mantenga la cabeza fuera de los humos. Utilice ventilación o aspiración para gases. 	<ul style="list-style-type: none"> ● Desconectar el cable de alimentación de poder de la máquina antes de iniciar cualquier servicio. 	<ul style="list-style-type: none"> ● No operar con panel abierto o guardas quitadas. 	Spanish AVISO DE PRECAUCION
<ul style="list-style-type: none"> ● Gardez la tête à l'écart des fumées. ● Utilisez un ventilateur ou un aspirateur pour ôter les fumées des zones de travail. 	<ul style="list-style-type: none"> ● Débranchez le courant avant l'entretien. 	<ul style="list-style-type: none"> ● N'opérez pas avec les panneaux ouverts ou avec les dispositifs de protection enlevés. 	French ATTENTION
<ul style="list-style-type: none"> ● Vermeiden Sie das Einatmen von Schweißrauch! ● Sorgen Sie für gute Be- und Entlüftung des Arbeitsplatzes! 	<ul style="list-style-type: none"> ● Strom vor Wartungsarbeiten abschalten! (Netzstrom völlig öffnen; Maschine anhalten!) 	<ul style="list-style-type: none"> ● Anlage nie ohne Schutzgehäuse oder Innenschutzverkleidung in Betrieb setzen! 	German WARNUNG
<ul style="list-style-type: none"> ● Mantenha seu rosto da fumaça. ● Use ventilação e exaustão para remover fumo da zona respiratória. 	<ul style="list-style-type: none"> ● Não opere com as tampas removidas. ● Desligue a corrente antes de fazer serviço. ● Não toque as partes elétricas nuas. 	<ul style="list-style-type: none"> ● Mantenha-se afastado das partes moventes. ● Não opere com os painéis abertos ou guardas removidas. 	Portuguese ATENÇÃO
<ul style="list-style-type: none"> ● ヒュームから顔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。 	<ul style="list-style-type: none"> ● 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。 	<ul style="list-style-type: none"> ● パネルやカバーを取り外した状態で機械操作をしないで下さい。 	Japanese 注意事項
<ul style="list-style-type: none"> ● 頭部遠離使用。 ● 在呼吸區使用通風或排煙設備。 	<ul style="list-style-type: none"> ● 維修前切斷電源。 	<ul style="list-style-type: none"> ● 當裝置打開或沒有安全罩時不準作動。 	Chinese 警告
<ul style="list-style-type: none"> ● 얼굴로부터 용접가스를 멀리하십시오. ● 호흡지역으로부터 용접가스를 제거하기 위해 가스제거기나 통풍기를 사용하십시오. 	<ul style="list-style-type: none"> ● 보수전에 전원을 차단하십시오. 	<ul style="list-style-type: none"> ● 판넬이 열린 상태로 작동하지 마십시오. 	Korean 위험
<ul style="list-style-type: none"> ● نود رأسك بعيداً عن الدخان. ● استخدم التهوية أو جهاز منطد للدخان للخارج. ● لكن أبعد الدخان عن المنطقة التي تنفس فيها. 	<ul style="list-style-type: none"> ● قطع التيار الكهربائي قبل القيام بأية صيانة. 	<ul style="list-style-type: none"> ● لا تعمل هذا الجهاز إلا كانت الأغطية الحامية الوالدية 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。

請詳閱圖說並理解製造廠提供的說明以及廠家使用的鍍焊材料，並請遵守貴方的有關勞動保護規定。

이 제품에 등본된 작업지침서를 숙지하시고 귀사의 작업자 안전수칙을 준수하시기 바랍니다.

الرجاء بتعمن وإلهم تعليمات المصنع المنتج لهذه المعدات والمواد قبل استعمالها وتبع تعليمات الوقاية لصالح العمن.



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