# LB-400-120
# LOAD BANK

**MANUAL CONTAINS**
**OPERATING INSTRUCTIONS**
**PARTS LIST**
**WIRING DIAGRAMS**
**SERVICE INSTRUCTIONS**

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**6306 Eastwood Ct.**
**Mequon, WI 53092**

# CAUTION

THIS LOAD BANK IS DESIGNED FOR THE TESTING AND SERVICING 115/200V 400HZ GROUND POWER UNITS. THESE GENERATORS HAVE THE POTENTIAL OF DELIVERING A LETHAL SHOCK. THIS LOAD BANK SHOULD BE USED ONLY BY TRAINED AND QUALIFIED PERSONNEL. THIS LOAD BANK IS DESIGNED FOR TEMPORARY USE ONLY. THE LOAD RESISTORS ARE ENERGIZED WHEN THE RATE SWITCH IS OFF, THEREFORE DO NOT INSERT ANY OBJECTS IN THE GRILL ASSEMBLY. DO NOT BLOCK THE AIR FLOW OR USE IF THE AIR FLOW IS REVERSED.

# MANUAL FOR LB-400-120 LOAD BANK

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# DESCRIPTION

1-1 PURPOSE OF LOAD BANK: The LB-400-120 is a portable load bank designed to be used for field servicing and testing aircraft ground power units. It can be used for checking cables after they have been replaced or repaired. On diesel generator sets it is helpful to run the generators at full load periodically to prevent wet stacking (carbon build-up in the engine). The load bank can also be shipped to different locations using the carrying case.

1-2 RATING OF LOAD BANK: The LB-400-120 is rated at 120 KW full loads. The load steps are 7.5KW, 15KW, 22.5KW, 30KW, 37.5KW, 45KW, 52.5KW, 60KW, 67.5KW, 75KW, 82.5KW, 90KW, 97.5KW, 105KW and 112KW. There is an adjustable step that allows for an additional load of 0KW to 8KW continuous. The load bank will run continuously at any load step.

1-3 LOAD BANK DESCRIPTION: The load bank is completely self-contained and needs no power source to operate other than the power unit. The different sides of the load bank are shown in fig. 1-1. The air enters the right side (fan side) and exits the left side.

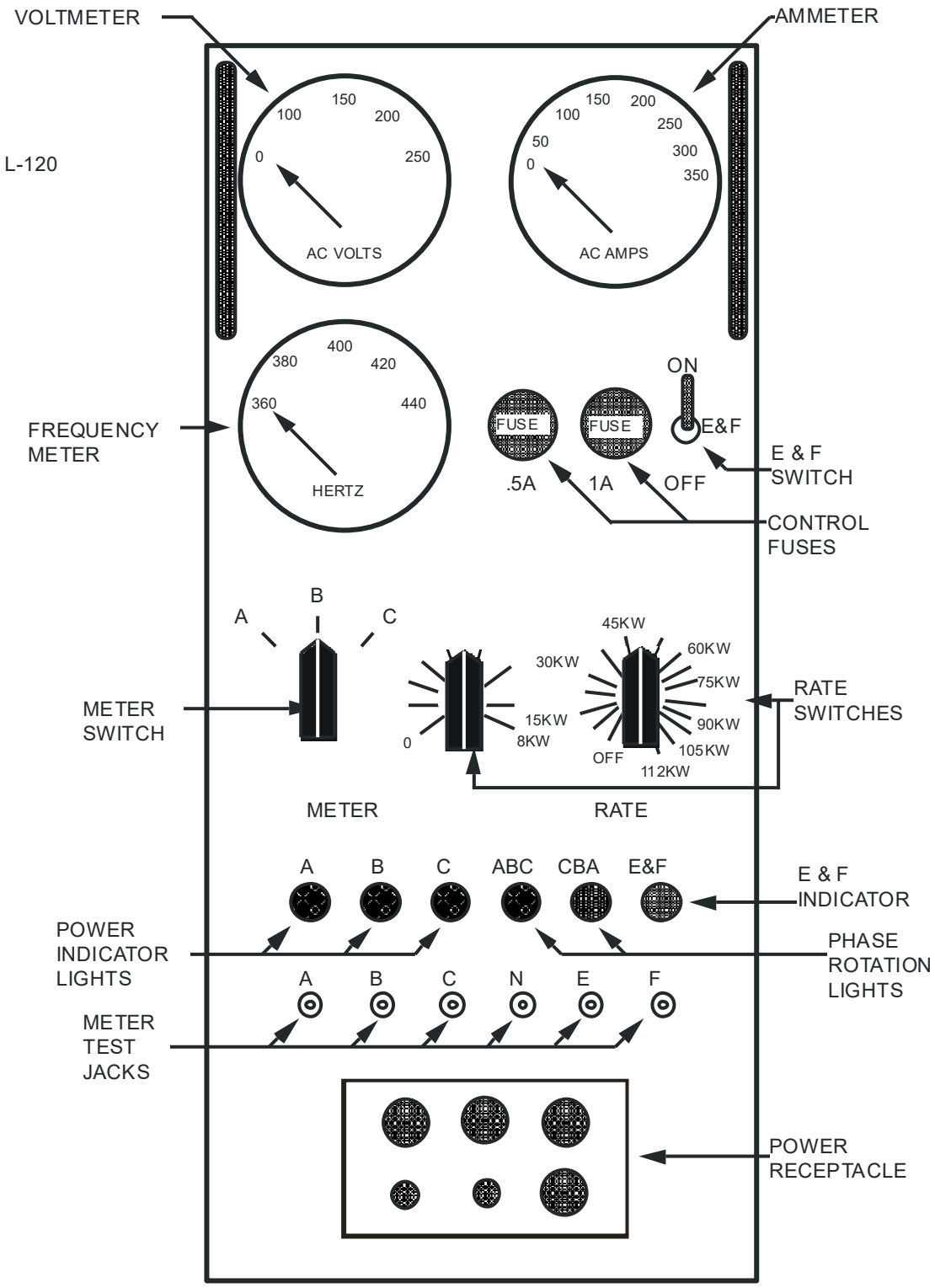
<<<< AIR FLOW <<<<

LEFT SIDE----------  ----- RIGHT SIDE (FAN SIDE)

FIGURE 1-1

LENGTH 22 IN.
WIDTH 8 IN.
HEIGHT 21 IN.
WEIGH 55 LBS.

# CONTROL PANEL LAYOUT



1-4 CONTROL DESCRIPTION: The following is a description of the controls on the control panel (see figure 1-2 on page 2.

VOLT METER - A 250 volt meter used to measure the line to neutral voltage on the power cable. A, B, or C phase can be selected using the meter selector switch. The meter should read approximately 115 volts. A 200 volt reading would indicate a line and neutral cable switched on the power unit or cable.

AMMETER - A 350 amp ammeter used to measure the load being used by the load bank. It monitors a phase.

FREQUENCY METER - A 360 - 440 HZ meter used to measure the frequency of the power unit.

CONTROL FUSE - A .5A and 1A fuse used in the control circuit and E & F interlock circuit.

E & F SWITCH - Switch is used to turn off or on the 28V power supply that powers the E & F circuit, fans and the control circuit in the load bank.

METER SWITCH - Switch used to select A, B, or C phase on the voltmeter.

RATE SWITCHES - Switches used to select the desired rate on the load bank. The rates are as follows:

RATE SWITCH

| | | |
|---|---|---|
| 1. | 7.5KW | balanced load |
| 2. | 15KW | balanced load |
| 3. | 22.5KW | balanced load |
| 4. | 30KW | balanced load |
| 5. | 37.5KW | balanced load |
| 6. | 45KW | balanced load |
| 7. | 52.5KW | balanced load |
| 8. | 60KW | balanced load |
| 9. | 67.5KW | balanced load |
| 10. | 75KW | balanced load |
| 11. | 82.5KW | balanced load |
| 12. | 90KW | balanced load |
| 13. | 97.5KW | balanced load |
| 14. | 105KW | balanced load |
| 15. | 112KW | balanced load |

THE MIDDLE RATE SWITCH WILL ADD A LOAD OF 0KW TO 8KW.

POWER INDICATOR LIGHTS - These lights will light to indicate power on A, B, and C phase. All three lights should be on.

PHASE ROTATION LIGHTS - These lights indicate ABC or CBA phase rotation. The ABC light will be on when the phase rotation is correct. Do not operate if the red CBA light is on.

E & F CABLE INTERLOCKS INDICATOR - The light will be on when the interlock circuit between the E & F in the cable is complete.

METER TEST JACKS - This provides a place to connect an external meter. There is a test jack for each cable pin.

POWER RECEPTACLE - The power cable from the ground power unit is plugged into the load bank through this receptacle. This is a standard aircraft receptacle.

# OPERATION

2-1 SETTING UP THE LOAD BANK - Place the load bank in an area free from fuel, oil, or any other flammable substance. The load bank should be positioned so that any strong wind or air currents will flow with the air flow of the load bank.

2-2 APPLYING POWER - The load bank should be connected to a ground power unit with an output of 115 / 200V (115V line to neutral / 200V line to line). Make sure that the power unit is off before connecting the cable to the load bank. Plug the power cable plug in to the load bank. The load bank may be tilted on the back feet in order to make it easier to plug the cable in. Return the load bank to the bottom feet before applying power. Turn on the E & F switch, turn the rate switches to OFF on the load bank. If the ground power unit has a test bank / aircraft switch, leave it in the aircraft position. Turn on the output of the ground power unit.

2-3 CHECKING THE POWER - check the following:

A. The air flow should be as indicated by the air flow arrow.
B. the 3 amber A, B, C lights should be on.
C. The voltmeter should read 115V on A, B, and C phase. A 200V reading would indicate A line and neutral cable reversed.
D. The amber ABC light should be on. A red CBA light would indicate reversed phase rotation. DO NOT operate if the phase rotation is reversed.
E. the E & F light should be on. If the light is not on; this would indicate a lose or broken interlock cable.
F. The frequency meter should read approximately 400HZ.
G. The ammeter should read 0A.

2-4 APPLYING THE LOAD - If the above steps checked OK, the load steps listed below may be turned on as needed to select up to 120KW.

MAIN RATE SWITCH

| | | | |
|---|---|---|---|
| A. Step 1 is | 7.5KW balanced load | I. Step 9 is | 67.5KW balanced load |
| B. Step 2 is | 15KW balanced load | J. Step 10 is | 75KW balanced load |
| C. Step 3 is | 22.5KW balanced load | K. Step 11 is | 82.5KW balanced load |
| D. Step 4 is | 30KW balanced load | L. Step 12 is | 90KW balanced load |
| E. Step 5 is | 37.5KW balanced load | M. Step 13 is | 97.5KW balanced load |
| F. Step 6 is | 45KW balanced load | N. Step 14 is | 105KW balanced load |
| G. Step 7 is | 52.5KW balanced load | O. step 15 is | 112KW balanced load |
| H. Step 8 is | 60KW balanced load | | |

MIDDLE RATE SWITCH

ADJUSTABLE FROM 1KW to 8KW steps.

Check to see that the voltage and frequency does not drop beyond acceptable limits under load. Return the rate switch to the off position.

2-5 SHUTTING DOWN - After turning the rate switches off, allow the load bank to cool down before turning the power unit off. Turn the power unit off and disconnect the power cable plug.

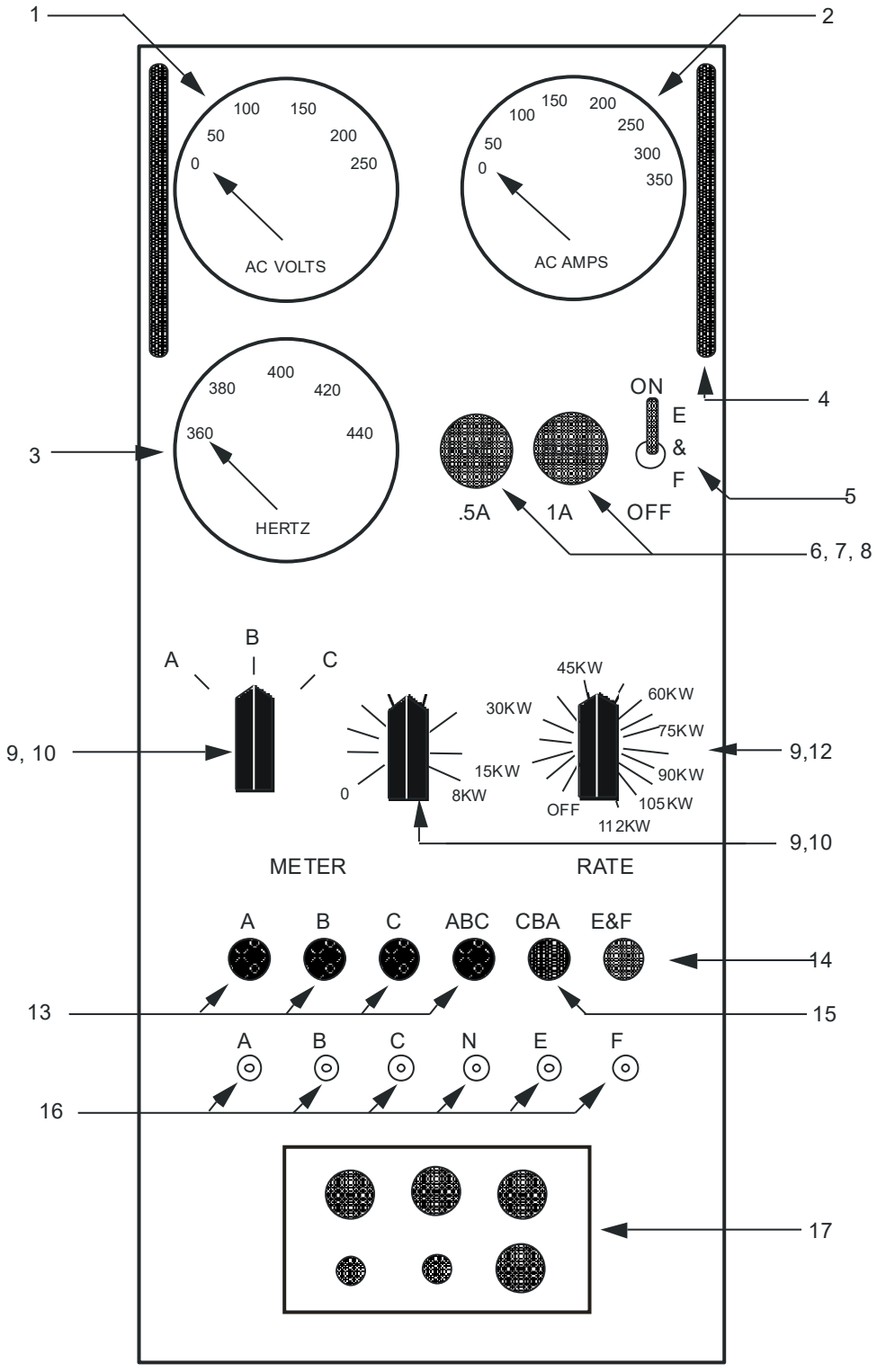
# PARTS INFORMATION

The following pages list the parts used in the load bank. All of the major parts are shown. Wire, screws, bolts, and small miscellaneous hardware are not listed. Parts that are purchased from a vendor will show a vendor name. These names refer to the vendor list is on page 8. Parts manufactured for or by EEPS Load Banks will not show a vendor name.

A part number can be found by first locating the part on a drawing. After finding the part use the number to refer to the parts list on the opposite page. Each part will have a drawing number, EEPS Load Banks part number, description and the number used for each load bank.

Parts should be ordered by supplying the machine model number, part number and the description.

# CONTROL PANEL PARTS



CONTROL PANEL PARTS
FIGURE 3-1

| DRAWING NUMBER | PART NUMBER | DESCRIPTION VENDOR NO. | NUMBER USED |
|---|---|---|---|
| 1 | MR-31 | 0 - 250V VOLT METER | 1 |
| 2 | MR-35 | 0 - 350 A AMMETER | 1 |
| 3 | MR-45 | 360 - 440 HERTZ FREQUENCY METER | 1 |
| 4 | HD-25 | HANDLE<br>V-VEMALINE PRODUCTS (LR 185-32) | 2 |
| 5 | SW-22 | TOGGLE SWITCH DPST<br>V-NEWARK ELECTRONICS | 1 |
| 6 | FH-10 | FUSE HOLDER<br>V-BUSMANN (HKP-HH) | 2 |
| 7 | FS-05 | .5A GLASS FUSE<br>V-BUSMANN | 1 |
| 8 | FS-02 | 2A GLASS FUSE<br>V-BUSMANN | 1 |
| 9 | KN-11 | POINTER KNOB | 3 |
| 10 | SW-13 | ROTARY SWITCH 3POSITION 1POLE<br>V-CENTRALAB (PA2043) | 1 |
| 11 | RH-25 | 3POLE 25KΩ RHEOSTAT | 1 |
| 12 | SW-18 | ROTARY SWITCH 18POS 4POLE | 1 |
| 13 | LT-10 | 115V AMBER LIGHT | 4 |
| 14 | LT-28 | 28V GREEN LIGHT | 1 |
| 15 | LT-15 | 115V RED LIGHT | 1 |
| 16 | TP-10 | METER TEST JACKS | 6 |
| 17 | RP-40 | RECEPTACLE 6PIN<br>V-ANDERSON (4631B) | 1 |

INTERIOR PARTS LAYOUT

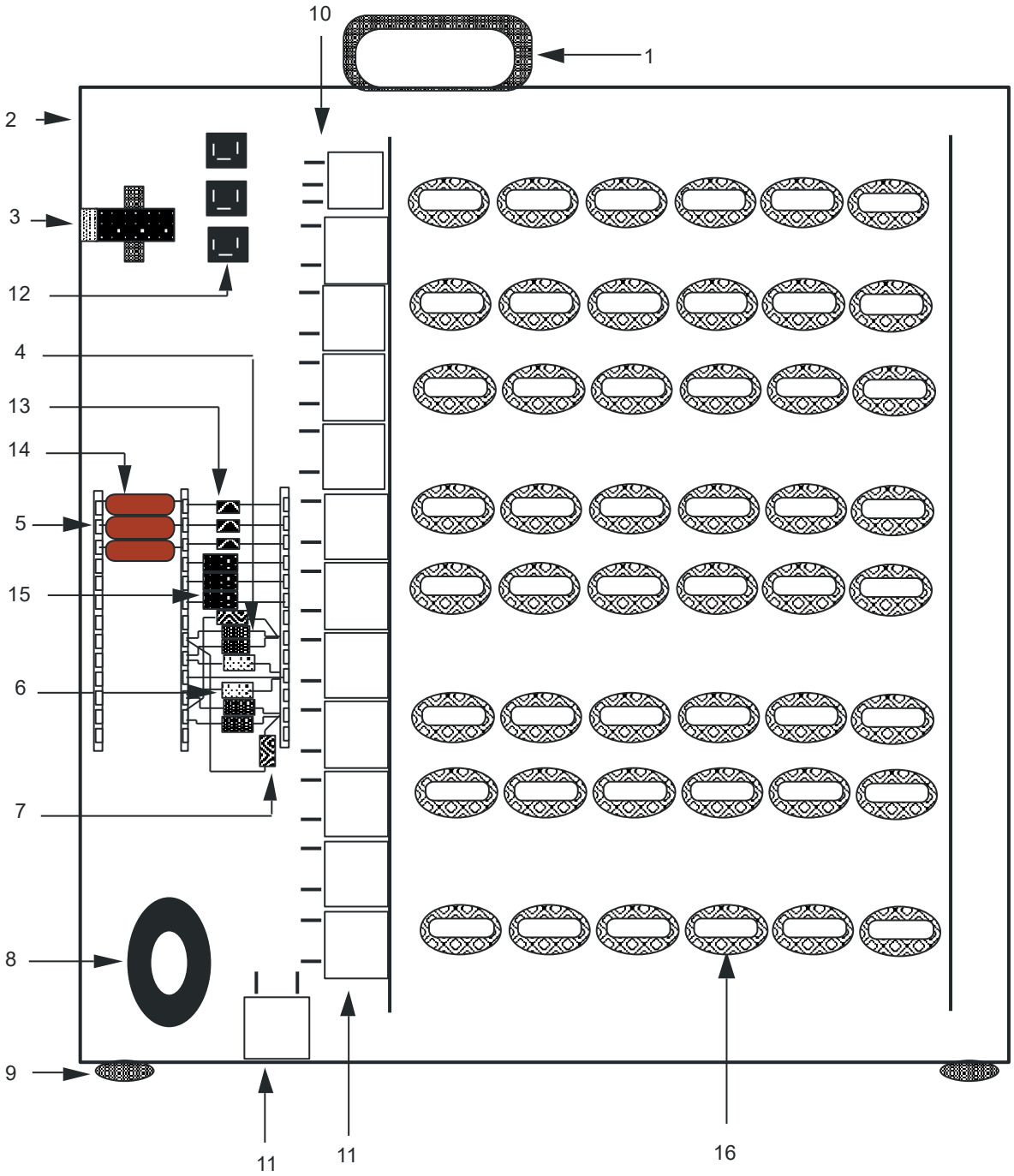



FIGURE 3 - 2

LB-400-120 INTERIOR
PARTS

FIGURE 3-2

| DRAWING NUMBER | PART NUMBER | DESCRIPTION VENDOR NO. | NUMBER USED |
|---|---|---|---|
| 1 | HD-10 | FOLDING HANDLES<br>V- VEMALINE PRODUCTS (EM 155-32) | 1 |
| 2 | BX-57 | 20" X 21" X 8" ALUM BOX | 1 |
| 3 | TR-26 | 28V POWER SUPPLY 1.5A 400HZ | 1 |
| 4 | RC-56 | 56KΩ RESISTOR | 4 |
| 5 | TM-10 | TERMINAL STRIP | 2 |
| 6 | RC-18 | 180KΩ RESISTOR | 2 |
| 7 | CP-47 | .0047 MFD 600V CAPACITOR | 2 |
| 8 | CT-35 | 350:5 CURRENT TRANSFORMER | 1 |
| 9 | FT-10 | GLIDES | 8 |
| 10 | RY-32 | 24VDC 3PDT RELAY 30A (DELTROL) | 1 |
| 11 | RY-25 | 24VDC 2P RELAY 25A , FLANGE MOUNT | 15 |
| 12 | TC-20 | TRIAC, 20A | 3 |
| 13 | DC-02 | DIAC, 2A | 3 |
| 14 | CP-12 | .124MFD 600V CAPACITOR | 3 |
| 15 | RC-18 | 180Ω RESISTOR | 3 |
| 16 | LR-05 | 5.0Ω RESISTOR | 48 |
| * | GL-24 | RESISTOR GRILL | 2 |

FAN PANEL PARTS LAYOUT

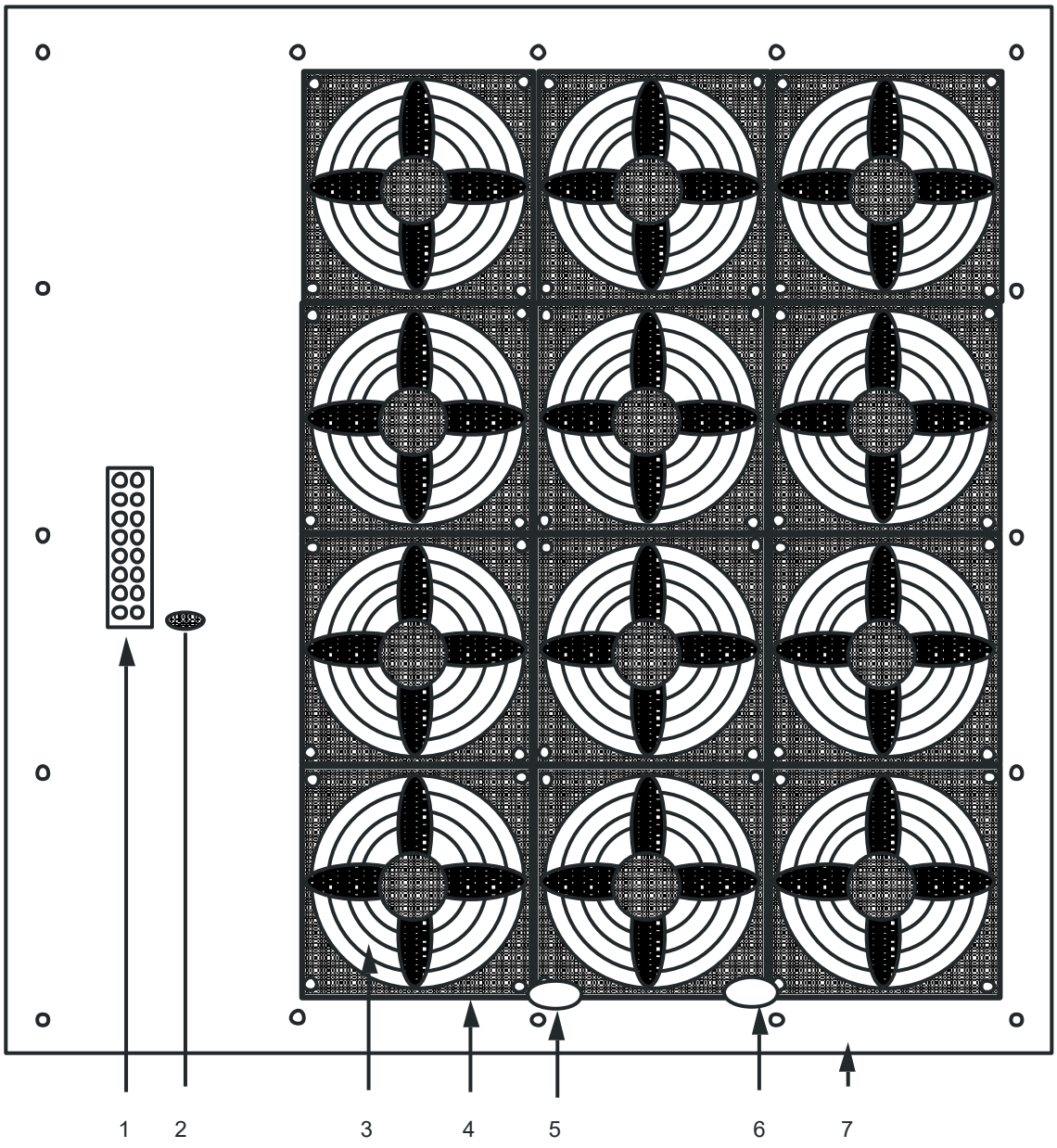



FIGURE 3 - 3

FAN PANEL PARTS
FIGURE 3-3

| DRAWING NUMBER | PART NUMBER | DESCRIPTION VENDOR NO. | NUMBER USED |
|---|---|---|---|
| 1 | TM-20 | 8 POSITION TERMINAL STRIP<br>V- NEWARK ELECTRONICS | 1 |
| 2 | SW-12 | TILT SWITCH | 1 |
| 3 | GL-10 | FAN GRILL | 12 |
| 4 | FN-40 | 200V 400HZ 3P FAN | 12 |
| 5 | TS-17 | THERMAL SWITCH<br>V-GEMLINE (L-175) | 1 |
| 6 | TS-15 | THERMAL SWITCH<br>V-GEMLINE (L-155) | 1 |
| 7 | FP-57 | ALUM. FAN PANEL | 1 |

# VENDOR LIST

The following is a list of vendors for parts shown in the parts list.

VENDOR

Anderson Power Products
145 Newton St.
Boston MA. 02135

Allied Electronics, Inc.
3425 Corporate Way, Suite A
Duluth, Ga. 30136

Bussmann Manufacturing
Distributed by Allied

Control Design Supply
1939-F Parker CT
Stone Mountain, GA. 30087

Cutler-Hammer
Distributed by Peerless

EBM Industries, Inc.
Distributed by Peerless

E.F. Johnson
Distributed by Peerless

Electric Supply Co.
433 Bishop St.
Atlanta, Ga. 30325

Gemline Products, Inc.
12472 Edison Way
Garden Grove, Ca. 92641

Merrill Manufacturing Corpation
236 South Genesee Street
Merrill, WI. 54452

Peerless Radio Corporation
3101 towercreek Pkwy, Suite 590
Atlanta, GA. 30339

SSAC, Inc. Electronics Corp.
Distributed by Control Design

Vemaline Products
333 Strawberry Field Rd.
Warwick, RI. 02887

# GENERAL SERVICE

There is no regular maintenance required on the load bank. There are no adjustments inside the load bank. It should however be checked periodically for defective fans, burned out light bulbs, and defective meters.

To remove the fan panel, remove the screws around the outer edge.

The meters can be removed and replaced from the front panel.

The fan grills should be kept free of any trash.

Do not place any objects in the fan or resistor grill.

FAN REPLACEMENT

The following are steps to take to replace a defective fan.

1. Remove the screws holding the fan panel to the load bank.

2. Remove the seven wires on the terminal strip comming from the load bank

3. Drill out the rivets holding the fan (four on each side).

4. Lift up the fan and cut the wires to the fan. Attach the new fan wires to the cut wires and use the cut wires to pull the new wires to the terminal strip. Remove the old wires from the terminal strip and install the new fan wires.

5. Rivet the new fan back to the fan panel and install the fan guard.

6. Install the seven wires back on the terminal strip and place the fan panel back on the load bank. Make sure that the wires are on the proper terminals.

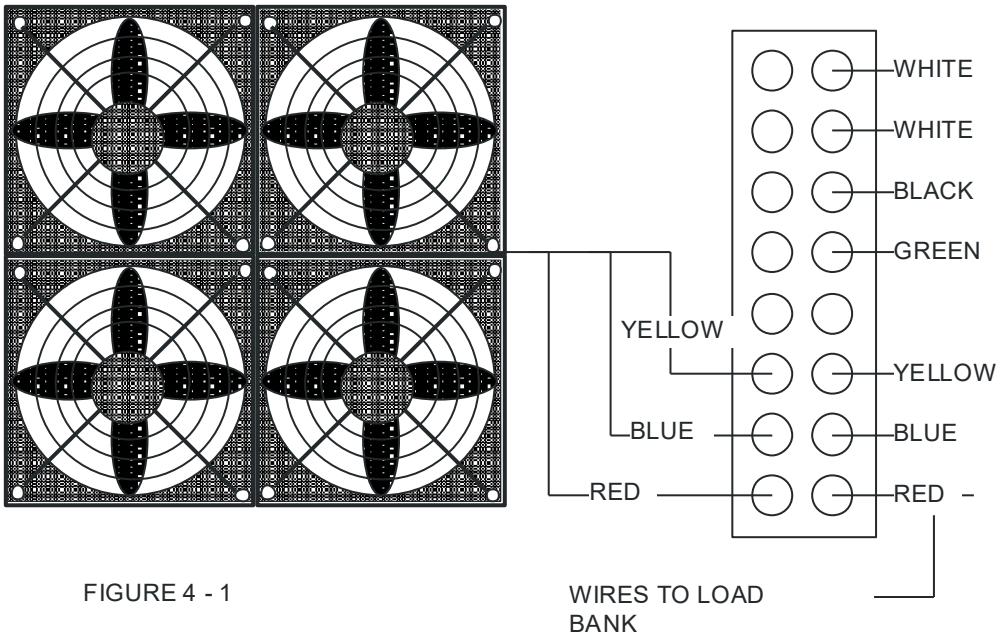
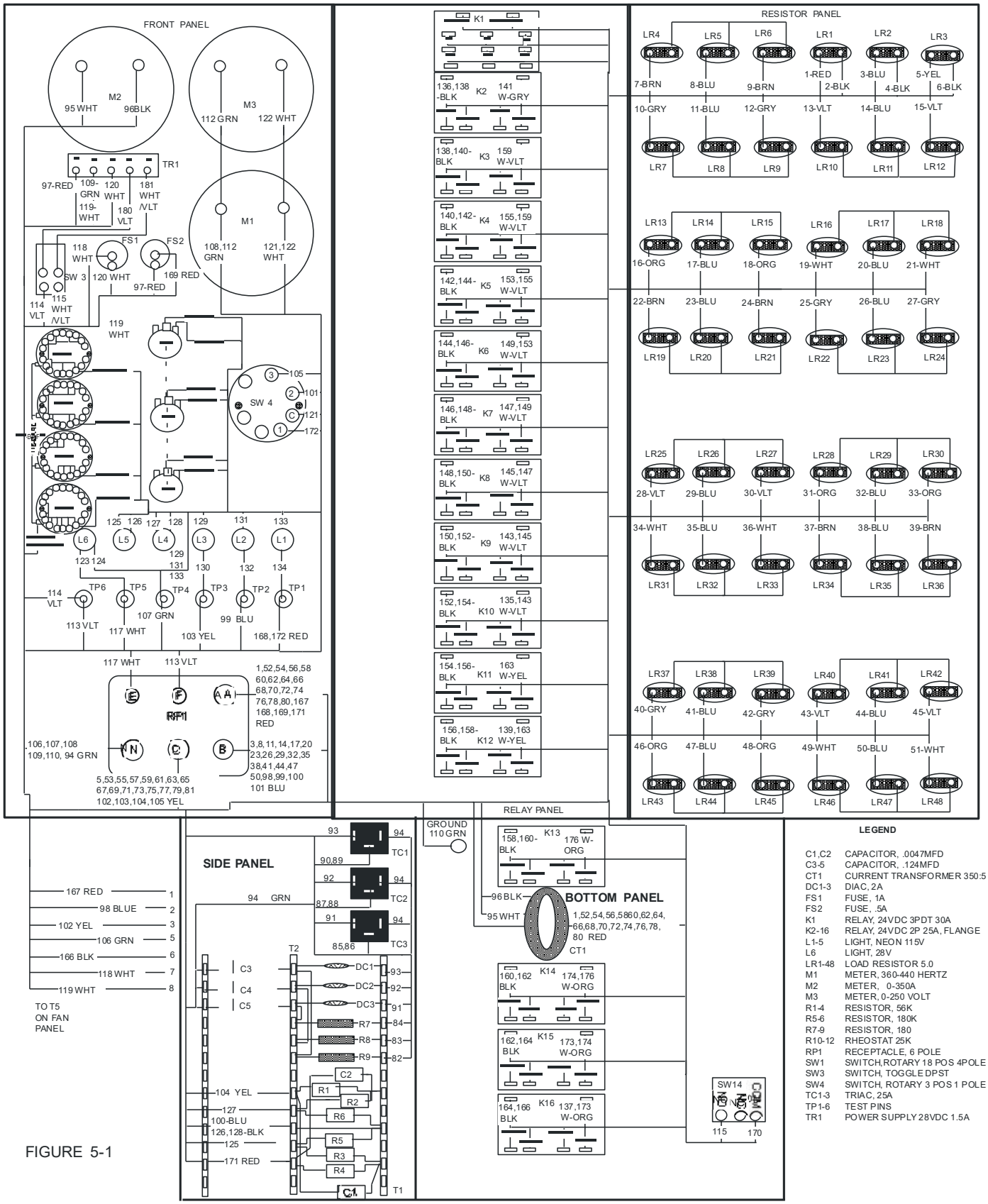



FIGURE 4 - 1

# LB-400-120 INTERIOR WIRING




**LEGEND**

| | |
|---|---|
| C1,C2 | CAPACITOR, .0047MFD |
| C3-5 | CAPACITOR, .124MFD |
| CT1 | CURRENT TRANSFORMER 350:5 |
| DC1-3 | DIAC, 2A |
| FS1 | FUSE, 1A |
| FS2 | FUSE, .5A |
| K1 | RELAY, 24VDC 3PDT 30A |
| K2-16 | RELAY, 24VDC 2P 25A, FLANGE |
| L1-5 | LIGHT, NEON 115V |
| L6 | LIGHT, 28V |
| LR1-48 | LOAD RESISTOR 5.0 |
| M1 | METER, 360-440 HERTZ |
| M2 | METER, 0-350A |
| M3 | METER, 0-250 VOLT |
| R1-4 | RESISTOR, 56K |
| R5-6 | RESISTOR, 180K |
| R7-9 | RESISTOR, 180 |
| R10-12 | RHEOSTAT 25K |
| RP1 | RECEPTACLE, 6 POLE |
| SW1 | SWITCH,ROTARY 18 POS 4POLE |
| SW3 | SWITCH, TOGGLE DPST |
| SW4 | SWITCH, ROTARY 3 POS 1 POLE |
| TC1-3 | TRIAC, 25A |
| TP1-6 | TEST PINS |
| TR1 | POWER SUPPLY 28VDC 1.5A |

FIGURE 5-1

# FAN PANEL WIRING

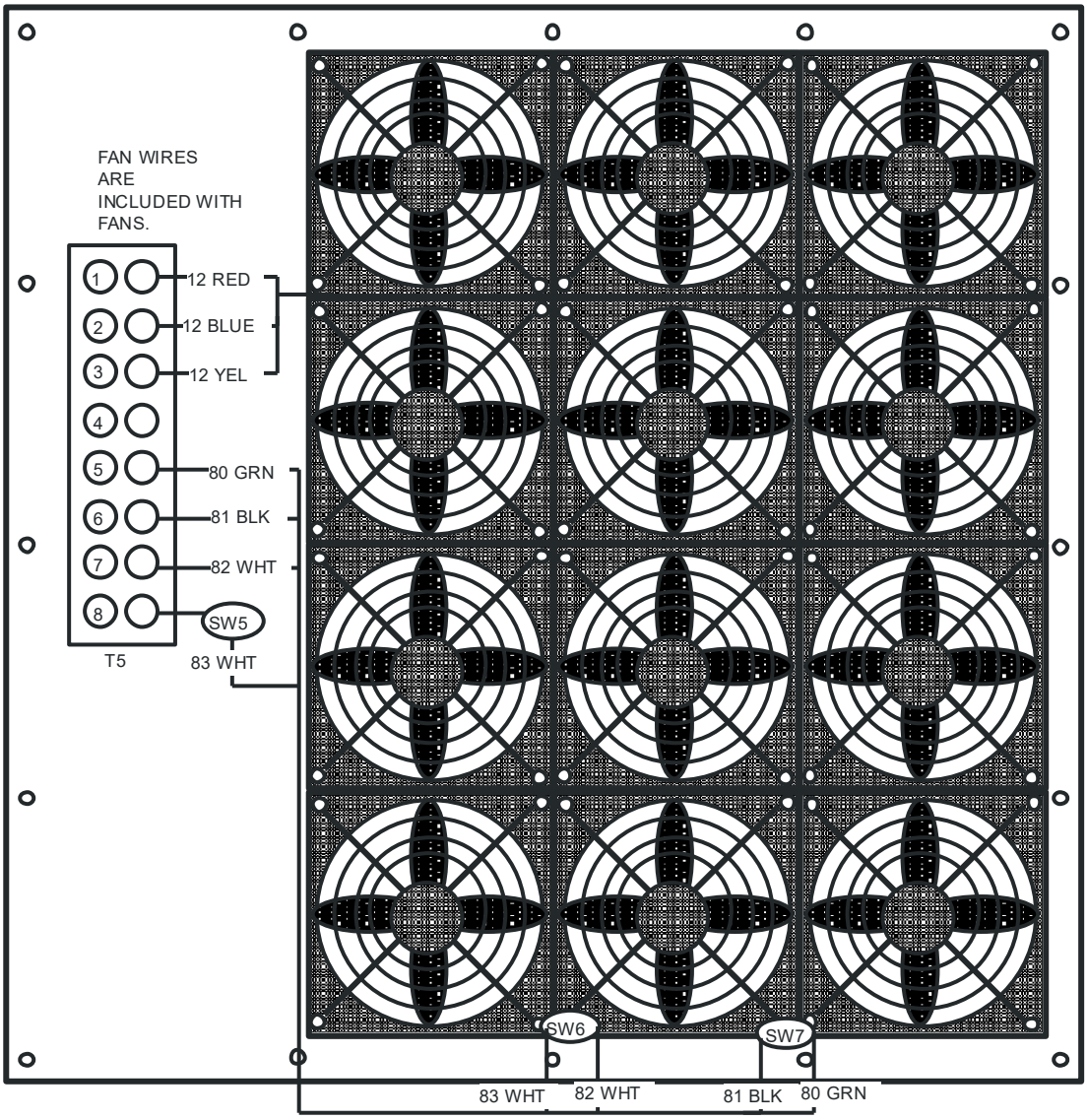



FIGURE 5 - 2

# LB-400-120 SCHEMATIC

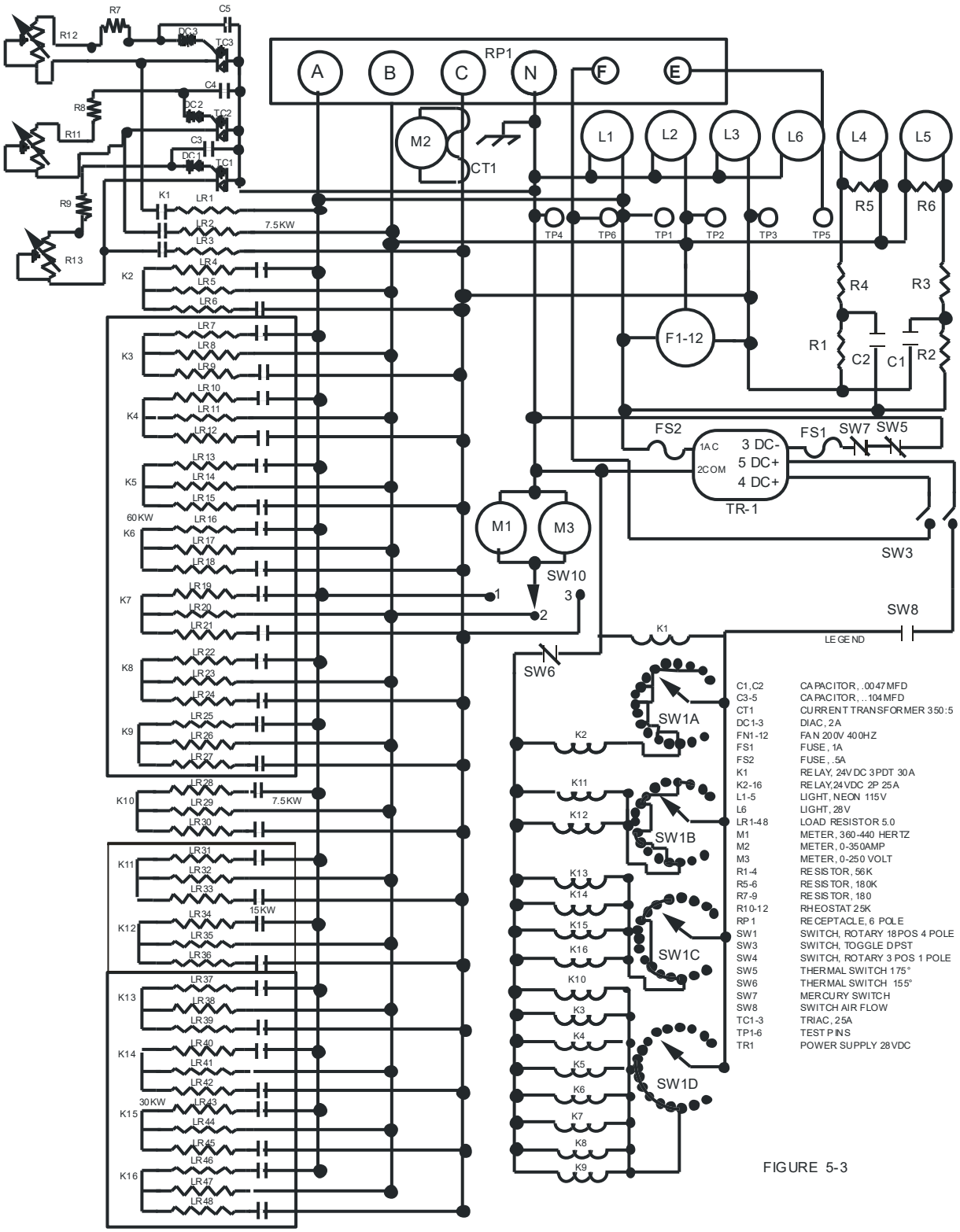



FIGURE 5-3