Stabylex
Electronics Corporation

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Power Supply
Model SM50

June 27, 1996

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1.0 Introduction

1.1 Application --- The SM50 converts 115 VAC, 60 Hz. into 13.75 Volts DC and is capable of delivering a maximum of 50 Amps of current. It is a "linear" design. The SM50 ideal for powering automotive radios, stereos, tape players and other electronic devices that are sensitive to electromagnetic interference. The SM50 can also be used to power almost any type of 12-volt electronic or electrical equipment.

The SM50's design is ideal for parallel operation. The continuous current rating for a single SM50 is 50 amps, with pulsed current surge capabilities of 100 Amps to accommodate undistorted audio power at low audio frequencies. Two units in parallel are rated for double that of a single unit.

1.2 Description - Overall dimensions are shown in figure 1 (inches).

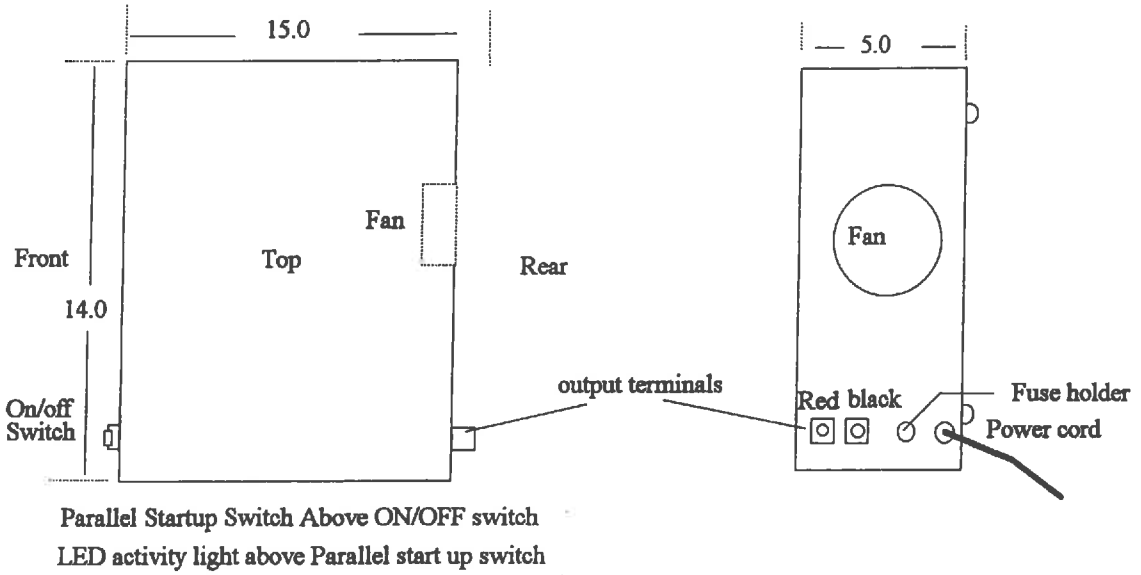


Figure 1. Dimensions in inches (not to scale)

1.2.1 The following important physical features of the SM50 are located as shown in Fig. 1 above:

a) The on/off input power switch is located in the lower right-hand side of the front panel.

b) The AC power cord and the AC input fuse are located at the lower left corner at the rear of the unit.

c) The DC output terminals (red and black connector blocks) are located at the upper left of the rear panel.

d) The parallel operation startup switch above the ON/OFF switch

e) Air exit ports are in four locations at the sides of the unit.

f) An LED, located above the parallel start up switch illuminates when output is present.

2.0 Connections

2.1 Connectors

a) The AC input power cord at the rear is for input of 115 VAC, 60 Hz..
b) There are two high-current "block" connectors for the routing of the 13.75-volt output current. The red block is for the connection of the positive output lead. The black block is for the negative output lead.

Each connector block has a contoured "set screw" for the assurance of a low resistance electrical contact with the output leads.

2.2 Output wiring - A red wire of minimum gauge #8 should be connected to the red output connector block.
A black wire of minimum gauge #8 should be connected to the black output connector block.

3.0 Cooling - The SM50 has a low noise 115 VAC fan. Care must be taken not to block either the air inlet to the fan or the exit ports on the sides of the unit.

4.0 Mounting

4.1 Location - SM50 is designed to be mounted horizontally.
4.2 Cooling - Sufficient clearance space (2 inches minimum recommended) is required at the fan side (back side) and at the sides of the SM50 for adequate air circulation.

5.0 Protection circuitry -

5.1 Output Overvoltage Protection - A sensing circuit monitors the output of the supply. When the output voltage exceeds approximately 17 Vdc, a relay coil is energized. The contacts of the relay short circuit the input line of the power supply through a series of varistors, resulting in a blown input fuse.

5.2 Turn On Time Delay - After turing on the main power switch, there will be a turn on time delay of one to three seconds before the power supply output voltage comes up.

5.3 Over-temperature protection - A thermal cutout switch protects the SM50 against damage due to overheating caused by reduced airflow or fan failure. In the event of an overtemperature condition, this internal switch opens and shuts down the supply's output (but not the fan). After this occurs, a time delay of several minutes is required to allow the fan to cool the SM50 until its internal temperature reduces, causing the switch to reset.

5.4 Over-current protection - The SM50 has an output-current-limit circuit that reduces the output voltage if the user tries to draw more than 55 amps. The current limit circuit is of the "foldback" type, which reduces the output current as the output voltage is reduced. This circuit protects against short term overloads and short circuits on the output. If short circuit or overload conditions persist for more than a few seconds, a peep circuit shuts the regulator in the supply off. Subsequently it turns the regulator back on on a timed and periodic basis to determine if the overload has been removed. If load normalcy has been restored, the peep circuit returns the supply to continuous operation.

6.0 Parallel Operation - The SM50 has been designed to allow the outputs of two or more SM50 units to be paralleled for high current applications.

6.1 Output current rating -- Each SM50 is rated for 50 amps continuous output current. For two units operated in parallel the continuous current rating is 100 amps.

6.2 **To parallel multiple SM50 supplies**

a) Wiring - For parallel operation, the positive connectors (red block) Likewise, their negative connectors (black blocks) are wired together. The wires between blocks must be 8 gauge or heavier to enable good current sharing between units. The red and black wires that carry the combined currents from all units should be the equivalent of 8/K gauge. (where K equals the number of paralleled units). For best current sharing the output wires should be routed separately from each SM50 to the common load. Both red wires should be of equal length and gauge. The same is true for the black wires.

Caution -- Do not let any wires touch the heatsinks at the rear of the SM50 unless the wires have a temperature rating of at least 105^{0}C.

b) Startup or turn on in a parallel configuration.

Because the timers in the overload detection peep circuits (section 5.4) are not synchronized in paralled supplies, it is necessary to momentarily disable the peep circuits in all but any one of the paralled units. This is achieved by depressing the pushbutton switches below the LED's for a period of 2 to 3 seconds after all the supplies are turned on. This needs to be done in all but one of the paralled supplies. e.g. if you are paralleling 3 supplies, depress the pushbuttons on two of them. The pushbutton switch is clearly marked with an accompanying label which reads as follows:

"Parallel Startup Switch-When N units are operated in parallel, the startup switches on N-1 units should be depressedfor 2 to 3 seconds during turn on to ensure maximum current capacity."

b) Splitting the load - An alternative to paralleling the outputs of two units, is the method of splitting the load. If the load is comprised of two separate loads of near equal currents, for example, 25 amps and 35 amps, then it may be desirable to separate the loads and the power supplies feeding them. On the other hand, if the load currents are very different, for example, 15 amps and 40 amps, then the preferred method is to parallel the outputs of the two SM50 supplies.

c) When paralleling SM50s, it is recommended that the AC input power cord of each SM50 be plugged into a separate AC outlet. **Never use a "splitter" (use of a single plug or extension cord that has two outlets). Extension cords can be used as long as the each extension cord has 14 gauge or heavier wire size and a separate extension cord is used for each SM50.**

e) Reverse connections - Due to the nature of the SM50 design there is no inherent

protection against reverse voltage polarity application to the output power supply terminals. For this reason, **DO NOT REVERSE** the wires to either SM50 when hooking them up for parallel operation. For the same reason do not attempt to produce a 24-volt output by series connecting the outputs of two SM50s.

Caution: When two SM50 units have their outputs wired in parallel, the user should ensure that both SM50s are plugged in and that the on/off switch in each SM50 is in the "on" position. Otherwise one SM50 will try to support the entire load.

7.0 Trouble shooting -- The nature of the SM50 design gives it a low internal parts count. If for any reason, the output should disappear then one should perform the following steps.

Symptom #1 - No voltage at output. Fan is turning.

1st Suspected cause: Thermal switch may have shut down the output due to an overload or blocked airflow.

Recommended actions:

a) Check for obstruction to either fan inlet or for objects on top of the unit that are blocking the exit air ports.

b) Remove some of the load. Do this by turning off one or more of the electronic devices powered by the SM50. Wait a few minutes. If the supply does not recover then return it to the distributor for repair.

Symptom #2 - No output and the fan is not turning.

Recommended actions :

a) Make sure that the on/off switch on the front panel of the SM50 is in the "on" position. Make sure the SM50's AC power cord is plugged in . Switch the power cord to different AC outlet or take other steps ensure that the SM50 is plugged into a live outlet. If AC wall outlet is dead, then check for a tripped circuit breaker or blown fuse of the wall outlet..

b) Check for a blown input AC fuse in the fuse holder located on the rear panel of the SM50, located immediately above the AC power cord. If the fuse is blown, then replace the fuse with a 12 amp, 250-Volt fuse. If the fuse blows a 2nd time within a day or so then consider return of the unit for repair.

Symptom #3 - Output voltage is low.

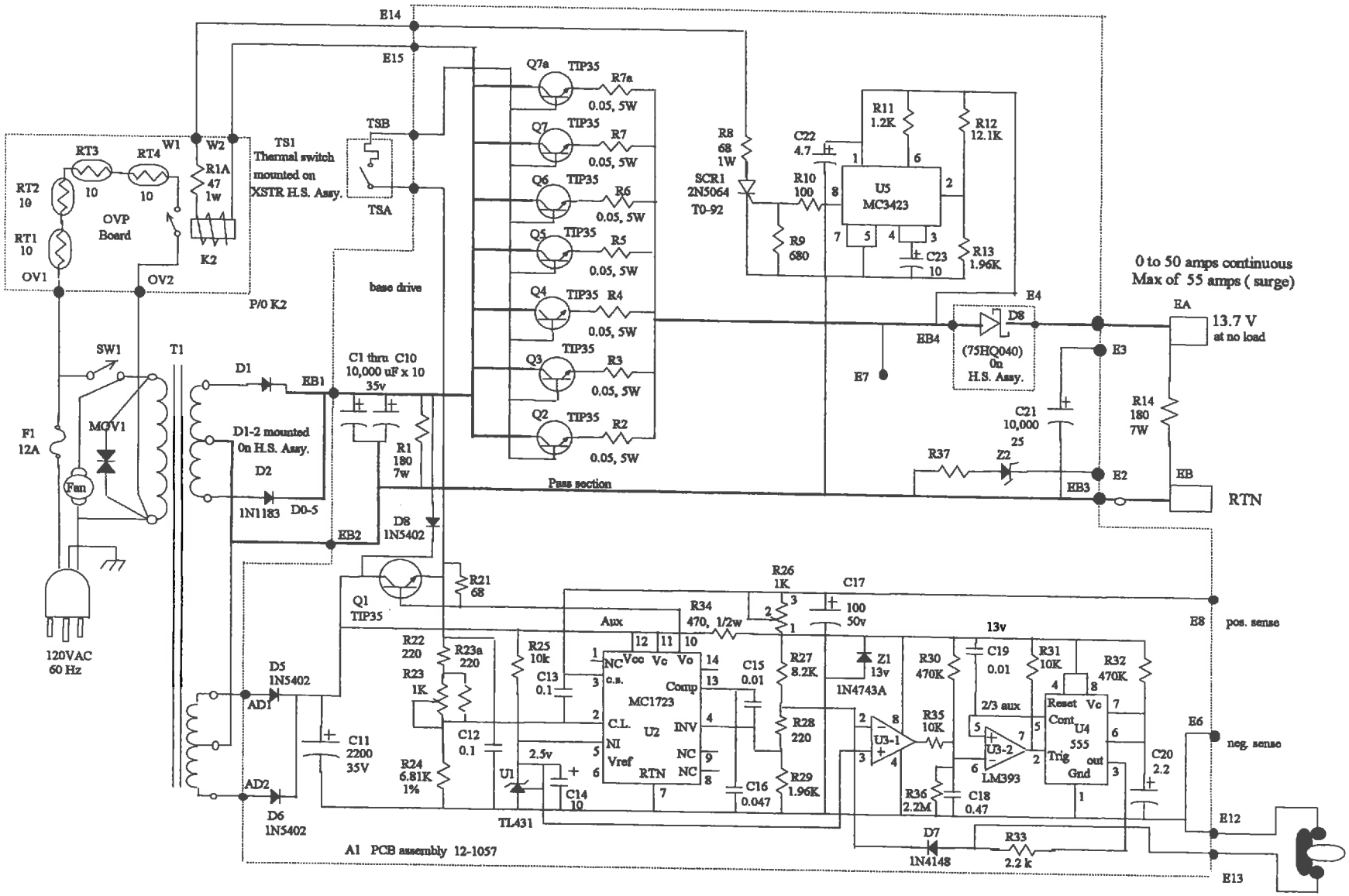
Suspected cause: The SM50 is in "foldback" current limit. Corrective action is to reduce the load on the output. Check for a short across the output.

The schematic in this manual will enable experienced power-electronics technicians to repair the supply.

8.0 Warranty and Service

The SM50 comes with a 1 year warranty covering parts and labor. The warranty is described in the warranty card enclosed with this unit. In order to take advantage of the SM50 warranty, please detach and mail the tear off portion of your warranty card within 10 days of purchase to Stabylex Electronics Corporation.
For more information regarding repair and warranty contact:

Stabylex Electronics Corporation
Bldg. #2, Massena Industrial Park
Massena, NY 13662
Tel: 1-888-769-5453



Highest Ref. Des.
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Ref. Des. Not used
R15-20, D3,D4

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