

boschert SWITCHING POWER SUPPLIES

SERIES OL130



OL130

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The OL130 Series bridges the gap between our micro supplies and our larger OL150 Series. Tailored designs can provide up to 4A on each of the auxiliary outputs. The OL130 Series is an ideal choice for larger logic systems that include multiple display, input, or storage devices.

The OL130 can deliver up to 130 watts of output power through 4 outputs. It is 115VAC / 230VAC strappable and comes standard with an "L" bracket.

STANDARD FEATURES:

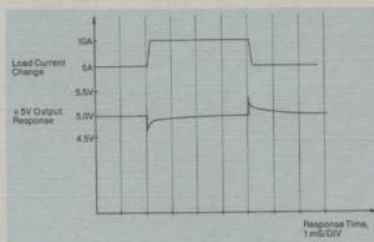
- Open Frame Construction
- Short Circuit Protection
- Automatic Short Circuit Recovery
- Overvoltage Protection (+ 5V output)
- Input Surge Current Protection (soft start)
- Input EMI Filtering
- 16 ms Holdup Time
- 20 KHz Switching
- "L" Mounting Bracket
- Output Fuse On - 5V output
- Barrier Strip Connector
- Brown-out Rated
- 115 VAC/230 VAC Strappable
- UL Recognized 4th qtr. '79

TAILORED OPTIONS:

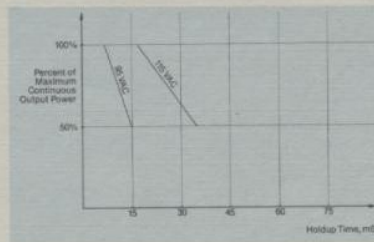
(Minimum order: 100 units)

- User-Specified Output Voltages and currents (see chart)
- 3 Terminal Regulated Outputs (- 5V and - 12V outputs)

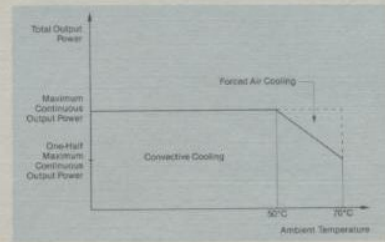
TYPICAL TRANSIENT RESPONSE TO STEP LOAD CHANGE



TYPICAL HOLDUP TIME AFTER LOSS OF INPUT POWER



TYPICAL THERMAL CHARACTERISTICS



Scan: Roland Huisman. Technischmuseum.nl

ELECTRICAL CHARACTERISTICS Note 1

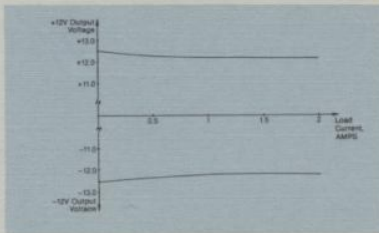
Parameter	Conditions	Limits
Centering (Initial Setting) <small>Note 2</small>	+ 5V output (adjustable) All outputs at 50% max rated load	4.75V min To OVP Trip Point
	Any other output (less than 40V) All outputs at 50% max rated load + 5V adjusted to 5.00V	± 5% max
	Any other output (greater than 40V) All outputs at 50% max rated load + 5V adjusted to 5.00V	± 2V max
Load Regulation <small>Note 3</small>	+ 5V output 60% ± 40% max rated load change R_{out} , ohms	± 1% max 0.002 typ
	- 5V output 60% ± 40% max rated load change R_{out} , ohms	± 1.5% 0.22 typ
	± 15V outputs 60% ± 40% max rated load change R_{out} , ohms	± 2.5% 0.20 typ
	± 24V and greater outputs 60% ± 40% max rated load change	± 2.5%
Cross Regulation <small>Note 4</small>	+ 5V output Change any output from 75% max rated rated load ± 25% max rated load	± 0.5% max
	Any other output Change + 5V output from 75% max rated load ± 25% max rated load	± 1.5% max
	Change some other (not + 5V) output from 75% max rated load ± 25% max rated load	± 0.5 max
Input Line Regulation <small>Note 5</small>	All outputs 95 VAC ≥ V_{in} ≥ 130 VAC 190 VAC ≥ V_{in} ≥ 260 VAC	± 0.2% max ± 0.2% max
Noise and Ripple (P.A.R.D.)	Any output Peak to Peak RMS	2% max 40 mV max
Input Voltage	OL130	95 VAC to 130 VAC 190 VAC to 260 VAC User Selectable
Input Surge Current <small>Note 6</small>	Cold start, peak current	32A max
Input Frequency Range		47 Hz to 440 Hz
Efficiency <small>Note 7</small>	At maximum continuous output power, nominal line input	70% typ
Hold up Time <small>Note 8</small>	Nominal input voltage, max output power	16 mS min
Overvoltage Protection Threshold <small>Note 9</small>	+ 5V output	6.25V ± 0.75V

OUTPUT VOLTAGES AND MAXIMUM RATED LOADS Note 10

Model Number	Output #1		Output #2		Output #3		Output #4		Output #5		Output #6		Max Continuous Output Power <small>Note 11</small>
	V_{nom}	I_{max}	V_{nom}	I_{max}	V_{nom}	I_{max}	V_{nom}	I_{max}	V_{nom}	I_{max}	V_{nom}	I_{max}	
STANDARDS:													
OL130-3001	+ 5V @	15A	- 5V @	0.7A	+ 12V @	4A	- 12V @	2A	(N/A)		(N/A)		130 W
OL130-3022	+ 5V @	15A	+ 24V @	2A	+ 12V @	4A	- 12V @	2A	(N/A)		(N/A)		130 W
OL130-3023	+ 5V @	15A	- 5V @	0.7A	+ 15V @	4A	- 15V @	2A	(N/A)		(N/A)		130 W
OL130-3024	+ 5V @	15A	+ 24V @	2A	+ 15V @	4A	- 15V @	2A	(N/A)		(N/A)		130 W
TAILORED OPTIONS:													
			V_{max}	I_{max}	V_{max}	I_{max}	V_{max}	I_{max}	V_{max}	I_{max}	V_{max}	I_{max}	
OL130-XXXX	(+ 5V @	15A)	* @	4A	* @	4A	* @	4A	(N/A)		(N/A)		130 W

*User Specified

TYPICAL OUTPUT VOLTAGE CHANGE WITH LOAD



GENERAL SPECIFICATIONS

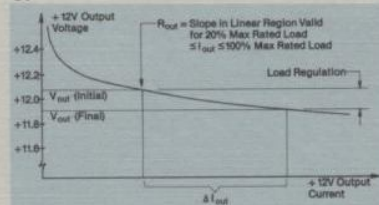
Parameter	Conditions	Limits
Shock and Vibration	The power supply shall withstand without degradation any reasonable shock and vibration found in the normal course of storage and operation, when properly packaged, handled, and installed. This includes transportation by a commercial carrier and operation in a non-mobile mainframe.	
Temperature Range	Operating Ambient (see thermal characteristics curve) Storage Ambient Semiconductor case never-exceed limit	0°C to +70°C -20°C to +85°C 110°C
Temperature Coefficients of Outputs	+5V output Any other output	0.02%/°C typ 0.05%/°C typ
Relative Humidity Range	Non-condensing	5% to 80%
Altitude	Operating (Note 12) Non Operating	10,000 ft. max 30,000 ft. max
Mean Time Between Failure	Calculated according to MIL-HDBK-217B	20,000 hr. min
Weight		

NOTES

1. The first four regulation parameters indicate the different components of total regulation error and how each one contributes. When specifying regulation for a tailored or custom supply, however, it is customary to specify a total regulation "band" with corresponding load range, i.e. "+12V ± 5%, 2A to 3A."

2. Centering is measured with 50% max rated load on each output, nominal line input, and the +5V output adjusted to 5.00V. This output can be adjusted from 4.75V to the point where the over-voltage protection trips. All other outputs will rise and fall proportionally as the +5V output is adjusted.

3.



Load regulation is measured by varying the load only on the output being considered, from 60% max rated load by ± 40% max rated load (i.e., to either 20% or 100% max

rated load). An effective first order approximation to the output change with load is a Thevenin equivalent voltage source. Using a known R_{out} , voltage change will be:

$$V_{out}(\text{final}) = V_{out}(\text{initial}) - \Delta I_{out} \times R_{out}$$

4. Cross regulation is determined by setting the measured output at 20% max rated load, and varying another output from 75% max rated load thru a 25% load change (i.e. from 75% to either 50% or 100% max rated load). The effects of load and cross regulation are not generally cumulative, but may act to cancel each other.

5. Line regulation is measured at full rated output power, varying the input voltage over its full range and measuring the effect on any output.

Minimum line input voltages are specified for a line impedance of roughly 1 ohm. Although Boschert supplies are designed to operate over a wide range of input voltages and impedances, holdup time and regulation may degrade at low line input voltage and higher values of line impedance. If there is any question, consult the factory.

6. Double these figures for 220V operation.

7. ± 5% depending on which outputs are loaded.

8. Holdup time increases with decreasing output power. For typical times, see the graph on the first page of this data sheet.

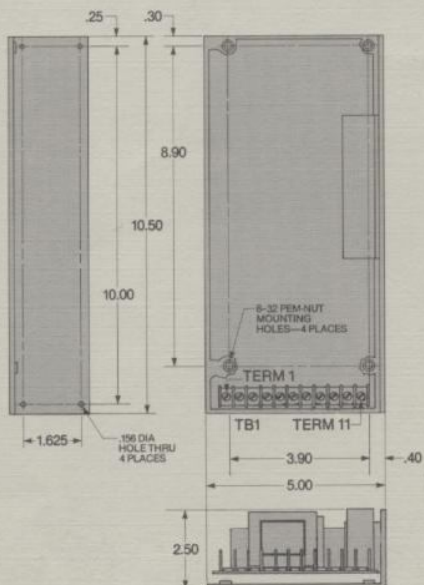
9. Overvoltage protection is standard on all +5V outputs.

10. All outputs have a common return. Separate returns available on a custom basis.

11. Maximum current cannot be drawn from all outputs simultaneously. At no time should the average power (excluding transients) exceed the maximum continuous output power rating. Above this point, the short circuit protection feature will begin to reduce output voltages and currents on all outputs. As a rule of thumb, derate all 4A outputs from 4A at 30°C ambient to 2A at 70°C ambient with no forced air. Outputs may be run at 4A at 70°C with forced air. The more exact rule is that device case temperatures should never exceed 110°C under any conditions.

12. Derate the free convection max ambient operating temperature linearly from 50°C at sea level to 35°C at 10,000 ft.

MECHANICAL SPECIFICATIONS



OL130-3001

OL 130-4022 B

TB1

Terminal 1	AC Input
Terminal 2	AC Input
Terminal 3	Chassis
Terminal 4	-12V
Terminal 5	+12V
Terminal 6	-5V
Terminal 7	Return
Terminal 8	Return
Terminal 9	Return
Terminal 10	+5V
Terminal 11	+5V

+24V

Connector

TB1

Beau, Inc.

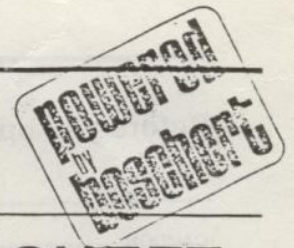
Part #72-5-11C

boschert SWITCHING
POWER
SUPPLIES

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Sunnyvale, California 94086
408/732-2440 TWX 910-339-9241

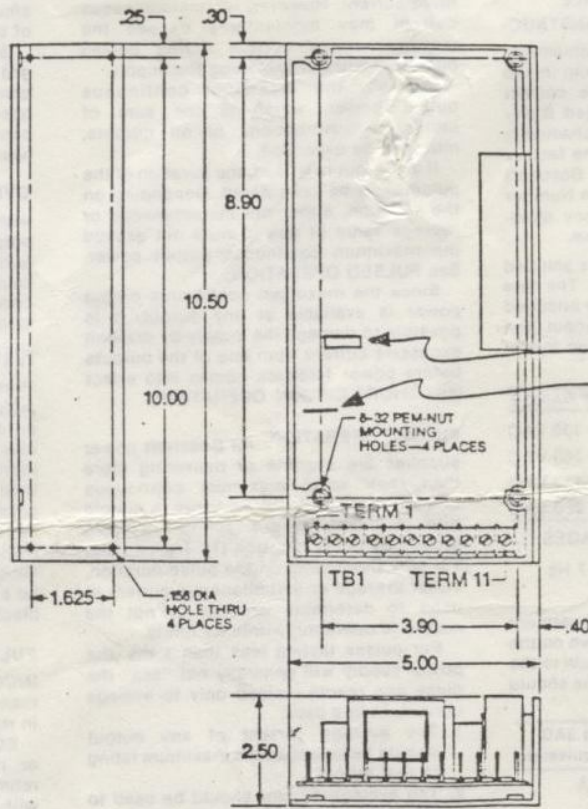


SWITCHING
POWER
SUPPLIES



PINOUT SPECIFICATION/FACT SHEET

PIN ORIENTATION



+5V Adjustment Pot
115/220 Strap
(Remove for 220)

PIN		VOLTAGE	MODEL NO.
1, 2	INPUT	115VAC	0L130-3022 ² -4022 R
10, 11	OUTPUT #1	+5V	MFG. ASSEMBLY NO. 10451
6	OUTPUT #2	+24V	
5	OUTPUT #3	+12V	
4	OUTPUT #4	-12V	
3	OUTPUT #5	Chassis Gnd	
	OUTPUT #6		
7, 8, 9	RETURN		
	NOT USED		

MATING CONNECTOR None - screw terminal connector

AUTOMATIC SHORT CIRCUIT RECOVERY
 AUTOMATIC SHORT CIRCUIT SHUT DOWN

Before you operate your power supply, please read these instructions carefully ...

CAUTION: DANGEROUS VOLTAGES ARE PRESENT IN THIS POWER SUPPLY. PLEASE READ THESE INSTRUCTIONS CAREFULLY TO MINIMIZE SHOCK HAZARD. DO NOT TOUCH ANY ELECTRICAL OR MECHANICAL COMPONENTS WHILE THE SUPPLY IS ON. HANDLE ONLY BY THE L BRACKET FRAME. TO PREVENT DAMAGE TO THE SUPPLY, INTERRUPT AC POWER BEFORE DISCONNECTING ANY POWER CABLE.

UNPACKING AND RETURN INSTRUCTIONS: After receiving your shipment, carefully open the container and make sure that the supplies are the correct type, quantity and are not damaged. If any supplies are electrically or mechanically faulty, they can be returned to the factory for repair. Contact Marketing at Boschert first to get a Return Authorization Number before shipment! If you have any questions, call your local representative.

OPERATION: The power supply is shipped complete and ready to operate. The line input voltage placard is generally attached to the supply. If it is not, the input line voltage can be determined by the model number (see Table I).

MODEL NUMBER	LINE INPUT RANGE
OLXXX-1XXX	95 VAC — 130 VAC
OLXXX-2XXX	190 VAC — 260 VAC
OLXXX-3XXX	95 VAC — 130 VAC
OLXXX-4XXX	190 VAC — 260 VAC

Table I — INPUT LINE VOLTAGES

(NOTE: Frequency range is 47 Hz to 440 Hz in all cases.)

The pin-out and location of adjustment potentiometer and fuses are shown on the reverse side of this form. In addition to the fuse on the PC board, the input line should be fused according to Table II.

Model	Littlefuse 3AG Series or Equivalent
OL25 thru OL65	1-1/2A
OL130 thru OL153	3A
OL200 thru OL400	6-1/4A

Table II — LINE FUSE REQUIREMENTS

The supply can be operated completely unloaded without damaging the supply. Unless otherwise specified, it is advisable to load the outputs with at least 20% of their maximum rated current before measuring any output voltage.

ADJUSTING OUTPUT VOLTAGE: The +5V output is equipped with a voltage adjustment potentiometer which will allow adjustment over the range of 4.75V to the point where the OVP trips. All auxiliary voltages are not adjustable, and move proportionally with the +5V adjustment. This adjustment is set at the factory with all outputs at 50% rated load. Location of

the potentiometer is shown on the front side of this sheet.

MAXIMUM RATINGS: There are two limitations to the amount of power delivered by the outputs. First, the maximum rated current of any individual output must not be exceeded.

If the output is pulsed, the average current must not exceed the maximum rated current. However, the instantaneous current may momentarily exceed the maximum rated current during pulsed operation without damaging the supply.

Second, the maximum continuous output power, which is the sum of individual contributions of all outputs, must not be exceeded.

If an output is pulsed, the duration of the pulse must be considered. Depending on the duration, either the instantaneous or average value of power must not exceed the maximum continuous output power. See PULSED OPERATION.

Since the maximum continuous output power is available at any output, it is possible to damage the supply by drawing excessive current from one of the outputs before power foldback comes into effect (see SHORT CIRCUIT OPERATION).

PULSED OPERATION: All Boschert power supplies are capable of delivering more than their rated maximum continuous output power on a pulsed basis. A simple rule of thumb divides pulses into two groups by pulse duration (T): $T \leq 1\text{ms}$ and $T > 1\text{ms}$. Depending on the pulse duration, either average or instantaneous current is used to determine whether or not the supply is operating within its limits.

For pulses lasting less than 1 ms, the power supply will generally not "see" the pulse and reacts instead only to average current. In this case:

1. The average current of any output should be less than the maximum rating of that output.
2. The average current should be used to calculate that the total output power is less than the maximum continuous output power.

For pulses lasting more than 1 ms, the power supply will attempt to deliver the instantaneous current demanded by the load. In this case:

1. The average current of any output should be less than the maximum rating of that output.
2. The instantaneous current should be used to calculate that the total output power is less than about 1.2 times the maximum continuous output power. Otherwise, the supply may go into power foldback.

SHORT CIRCUIT OPERATION: In the event of a short, an excessive amount of output power is sensed by the primary circuitry,

activating a foldback circuit which reduces all output voltages and currents to a very low value. With most supplies, removing the short will automatically restore the outputs. Some supplies have a shutdown circuit. For these supplies, any short lasting longer than 5 seconds will disable the supply and line power must be interrupted for approximately 60 seconds to reset this circuit. (If the supply includes shutdown, it is indicated on the front side of this sheet.)

Since the actual foldback power point is greater than the rated maximum continuous output power, be careful not to operate the supply beyond its maximum continuous output power rating. Excessive heating could damage the supply.

OVERVOLTAGE PROTECTION: A failure within the power supply which causes any output to rise will trip the OVP on the +5V output. This will crowbar the output, causing the supply to go into its short-circuit mode, protecting the power supply load. (See SHORT CIRCUIT OPERATION.)

TEST AND TROUBLE SHOOTING HINTS:

There are three separate grounds in this supply, one of which floats at the AC line potential. Therefore, when using an oscilloscope or other piece of test gear, the instrument must be isolated from the AC line! Also, keep probe leads short and place with care to avoid ground loop problems. A maintenance manual including theory of operation, troubleshooting procedures and schematics may be purchased from Boschert. (Signed non-disclosure agreement required.)

FULL YEAR WARRANTY: BOSCHERT INCORPORATED warrants power supplies manufactured by it to be free from defects in material and workmanship.

BOSCHERT INCORPORATED will repair or replace any such product which is returned to BOSCHERT INCORPORATED with transportation charges prepaid within ONE YEAR from the original date of invoice from BOSCHERT INCORPORATED, where BOSCHERT INCORPORATED examination discloses a defect in material or workmanship and no misuse, improper operation, unauthorized repair or modifications of the power supply are in evidence.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED, OR STATUTORY, INCLUDING THE WARRANTY OF MERCHANTABILITY AND THE WARRANTY OF FITNESS OR SUITABILITY FOR A PARTICULAR PURPOSE.

In no event will BOSCHERT INCORPORATED be liable for special, incidental or consequential damages.

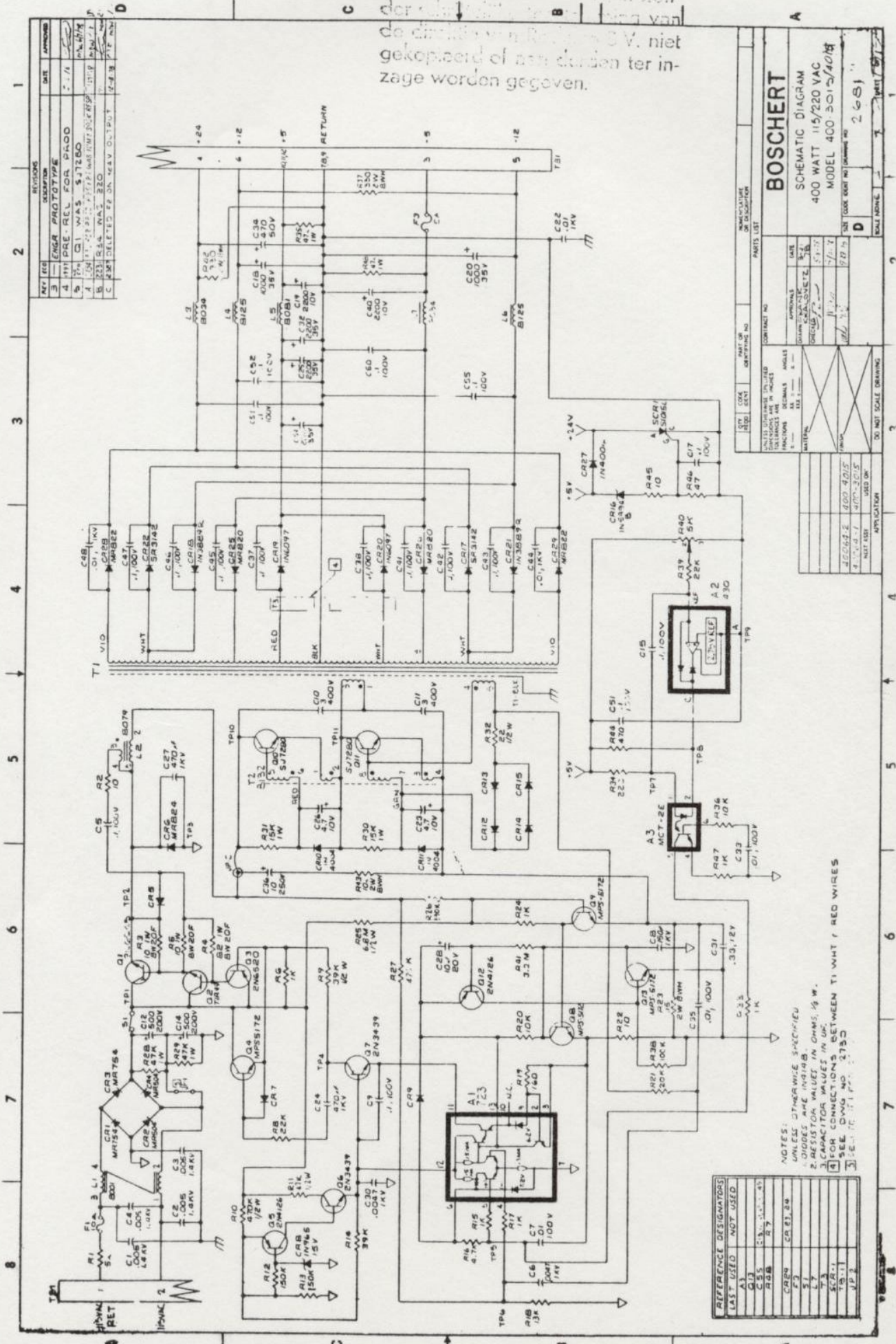
This is the entire extent of BOSCHERT INCORPORATED liability for a defective or inoperative power supply.

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KONFIDENTIEEL

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REVISIONS

REV	REASON	DATE	APPROVED
1	ENG PROTOTYPE	1/74	
2	PRE REL FOR PROD	1/74	
3	REV 2	1/74	
4	REV 3	1/74	
5	REV 4	1/74	
6	REV 5	1/74	
7	REV 6	1/74	
8	REV 7	1/74	
9	REV 8	1/74	
10	REV 9	1/74	
11	REV 10	1/74	
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93	REV 92	1/74	
94	REV 93	1/74	
95	REV 94	1/74	
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98	REV 97	1/74	
99	REV 98	1/74	
100	REV 99	1/74	
101	REV 100	1/74	

BOSCHERT
SCHEMATIC DIAGRAM
400 WATT 115/220 VAC
MODEL 400-3013/1018

REFERENCE DESIGNATORS

LAST USED	NOT USED
A1	
A2	
A3	
A4	
A5	
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- NOTES:
- UNLESS OTHERWISE SPECIFIED
 - DIODES ARE 1N4148
 - RESISTOR VALUES IN OHMS, % W.
 - CAPACITOR VALUES IN UF.
 - FOR CONNECTIONS BETWEEN T1, WHT / RED WIRES
 - SEE DWG NO. 2750
 - REV. 10-11-74

REVISIONS

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72	REV 71	1/74	
73	REV 72	1/74	
74	REV 73	1/74	
75	REV 74	1/74	
76	REV 75	1/74	
77	REV 76	1/74	
78	REV 77	1/74	
79	REV 78	1/74	
80	REV 79	1/74	
81	REV 80	1/74	
82	REV 81	1/74	
83	REV 82	1/74	
84	REV 83	1/74	
85	REV 84	1/74	
86	REV 85	1/74	
87	REV 86	1/74	
88	REV 87	1/74	
89	REV 88	1/74	
90	REV 89	1/74	
91	REV 90	1/74	
92	REV 91	1/74	
93	REV 92	1/74	
94	REV 93	1/74	
95	REV 94	1/74	
96	REV 95	1/74	
97	REV 96	1/74	
98	REV 97	1/74	
99	REV 98	1/74	
100	REV 99	1/74	

DO NOT SCALE DRAWING

REV	DATE	BY	CHKD
1	1/74		
2	1/74		
3	1/74		
4	1/74		
5	1/74		
6	1/74		
7	1/74		
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35	1/74		
36	1/74		
37	1/74		
38	1/74		
39	1/74		
40	1/74		
41			

DANGER
HIGH VOLTAGE

50- 110/220V
SELECTABLE

POWER SUPPLY (400) 735-2640
22R 82P2 W 3A
1044

WARNING FOR CONTINUED
PROTECTION AGAINST FIRE
REPLACE ONLY WITH SAME
TYPE AND RATINGS OF FUSE

assy 10451-02 rev X

5A 250V

