MANSON ENGINEERING INDUSTRIAL LTD.

SERVICE MANUAL
FOR
SPS-8250/9250

10/2003 Rev. 1.0

CONTENTS

SPS-8250/SPS-9250 SWITCH MODE POWER SUPPLY

USER'S MANUAL

INTRODUCTION

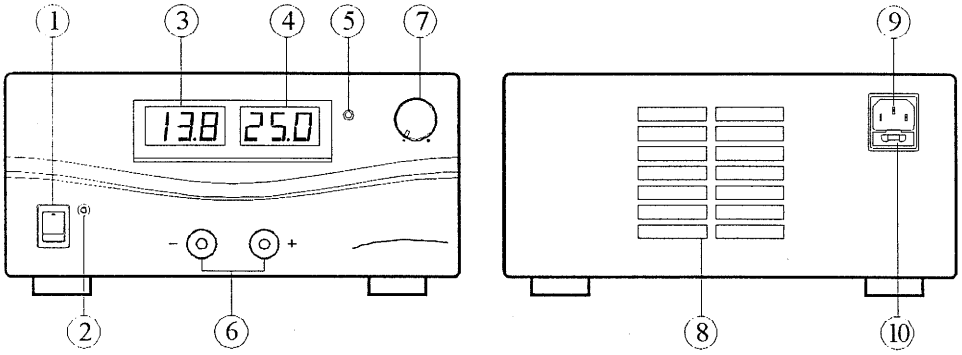
The SPS-8250/SPS-9250 Switching Mode DC Power Supply provides high power output with its small size and lightweight. It is suitable for a variety of uses, especially for DC operated radio equipment source from an AC outlet and providing variable voltages of 3V to 15V under 25A continuous operation.

Please read through this operation instruction carefully and follow the instructions to prevent from abuse or misuse. This manual must be kept for reference at anytime in need.

FEATURES

1. Lightweight and Small Size: Switching mode power supply has the advantages of lightweight and small size. Comparing with linear mode power with the same power output, it is much lighter and smaller.
2. High Efficiency: The unit is operated with efficiency over 80% under the best condition.
3. Overload Protection: The current foldback circuitry is adopted to prevent from overload. The overload indicator will be lighted up when the unit is overloaded.
4. Over Temperature Protection: The over temperature circuitry is functioned when the unit is over a certain high temperature to prevent the unit from damage by the high temperature. When the circuitry is functioned, the output voltage and current will drop down to a safety value and the overloaded indicator will be lighted up.
5. Over Voltage Protection: The over voltage circuitry protect the unit and the loading equipment from damage by abnormal high output voltage.
6. High RFI Stability: The high protection circuitry against RFI (Radio Frequency Interference) provides a stable operation.
7. Variable Voltage Output: The variable range of output voltages from 3V to 15V enables good fits with various uses.

PANEL DESCRIPTION



1. On/Off Switch
2. Power Indicator
3. Voltmeter
4. Ammeter
5. Overload Indicator
6. Output Terminal
7. Output Voltage Adjustment knob
8. Cooling Fan Air Intake Window
9. Power Input Connector
10. Fuse Holder

Note: The fixed 13.8Vdc output selection switch is placed at the bottom of unit. It used to select the output voltage to fixed 13.8V or adjustable output 3-15V (controlled by adjustment knob).

INSTALLATION

1. Make grounding the unit to prevent from electric shock at high voltage caused by leakage or lightning.
2. **DO NOT** place the unit in high humid, dusty and/or sunshiny places.
3. Place the unit in a location where allows free air circulation.
4. **DO NOT** place the unit close the TV sets or CRT monitor.

5. Couple with an AC outlet directly, as source via distribution cables may heat plugs and cable.
6. Put the unit horizontally for accurate meter readings.

Note: For Indoor Use Only.

CAUTION

1. **DO NOT** use the unit for the equipment requiring higher current input than the designed value otherwise damages the unit.
2. **DO NOT** use the unit for the lamps or motorized equipment, which require high current input at starting and it may damage the unit.
3. **DO NOT** replace the fuse before ceasing problems and *the assigned value of fuse* must be used in place.
4. If the external flexible cable or cord of this transformer is damaged, it shall be replaced by a special cord or assembly available from the manufacturer or his service agent.

SAFETY PRECAUTIONS

1. **NEVER** remove the metal cover of the power supply while AC power is connected.
2. **NEVER** touch the unit when your hands are wet.
3. **NEVER** operate the unit if foreign materials such as metallic objects, water, or other debris have fallen inside. Contact your dealer for check and repair.
4. **NEVER** operate the unit that was being damaged, as the voltage regulation circuitry may have been disabled. The resulting high voltage could damage your equipment.
5. **NEVER** allow foreign objects to touch the DC Power Output Terminals.
6. If you have the need to inspect the interior of the unit, let it to cool down completely, as some components may be enough to burn your hand in the event of component failure.
7. **NEVER** block the cooling fan air intake window.

CONNECTION AND OPERATION

1. Make sure the AC power source fits the input of voltage unit labeled and plug it in the AC outlet.
2. Turn ON the unit and adjust the output voltage to match with the input voltage of the equipment. Then turn OFF the unit.
3. Connect the equipment to the unit. Red (+) is connected to the positive polarity input of the equipment and Black (-) is connected to the negative polarity input of the equipment.
4. First turn ON the unit and then turn the equipment ON.
5. When and operation is finished, turn off the equipment first and then turn OFF the unit.

SPECIFICATIONS

	SPS-8250	SPS-9250
OUTPUT VOLTAGE:	3-15Vdc Adjustable or Fixed 13.8Vdc (Switch Select)	
OUTPUT CURRENT:	25A	
RIPPLE AND NOISE:	$5mV_{r.m.s}$	
LINE REGULATION:	50mV (±10% Variation)	
LOAD REGULATION:	200mV (0~100% Load)	
POWER SOURCE:	230Vac/50Hz~ (or On Request)	
METER TYPE:	Analog	Digital LED
DIMENSION (W×H×D):	220 × 110 × 230 (mm)	
WEIGHT:	Approx. 2.6Kg	

Manson Engineering Industrial Limited
Unit A1, 12/F Yip Fung Industrial Building, 28-36 Kwai Fung Crescent,
Kwai Chung, N.T., Hong Kong.
Telephone: (852)2428-7802 Fax: (852)24892369

7673-8250-0000

MANSON ENGINEERING INDUSTRIAL LTD.

PRELIMINARY PRODUCTION SPECIFICATION
DC REGULATED POWER SUPPLY

MODEL: SPS-8250-000	REV 1.0	DATE: 30-04-2001
DESCRIPTION: 3-15V 25A SWITCHING MODE POWER SUPPLY		
INPUT VOLTAGE: 190~254 VAC	FREQUENCY: 50 Hz	
ENVIRONMENT TEMPERATURE: 25 ^{0}C		

	MIN.	TYP.	MAX.	UNIT
Rated Output Voltage Range	3		15	V
Max. Output Voltage	15.1		16.1	V
Min. Output Voltage			3	V
Fixed Output Voltage	13.5	13.8	14.3	V
Output Current (continue)		25		A
Protection Current (start point)	29	31	32	A
Over Voltage Protection	16	16.5	17	V
Voltage Regulation:				
Load (0~100% load)			200	mV
Line (190~254 Vac Variation)			50	mV
Ripple & Noise (r.m.s.)		2	5	mV
Ripple & Noise (peak to peak)		30	50	mV
No Load Input Current			300	mA
Full Load Input Current			2.2	A
Power consumption at 15V 25A			480	W
Withstanding Test(10mA 60sec.) Input V.S Output, Input V.S Housing	2.1			KV
Insulation Resistance (500 VDC) Input V.S Output, Input V.S Housing	100			MΩ
Power Factor	97			%
Efficiency:				
Loading 13.8V 25A	79	80		%
Loading 15V 25A	80	82		%
Meter Accuracy:				
Voltmeter			±7	%FS
Ammeter			±7	%FS
Fuse		3.15		A

REMARKS:

1. Rated load is 15V 25A.
2. Insulation resistance is measured as INPUT vs. HOUSING.
3. High frequency interference test (sample 3%)
   Test frequency : 1. 437 MHz (5W) 2. 144 MHz (5W)
   Result : No function have been affected. Output Voltage ≤ ± 0.5V Variation.

Prepared by: Zoe

Approved by: Kenneth Cheng 3/5/01

MANSON ENGINEERING INDUSTRIAL LTD.

PRODUCTION SPECIFICATION
DC REGULATED POWER SUPPLY

MODEL: SPS-9250-000	REV 1.0	DATE: 30-04-2001
DESCRIPTION: 3-15V 25A SWITCHING MODE POWER SUPPLY		
INPUT VOLTAGE: 190~254 VAC	FREQUENCY: 50 Hz	
ENVIRONMENT TEMPERATURE: 25 ^{0}C		

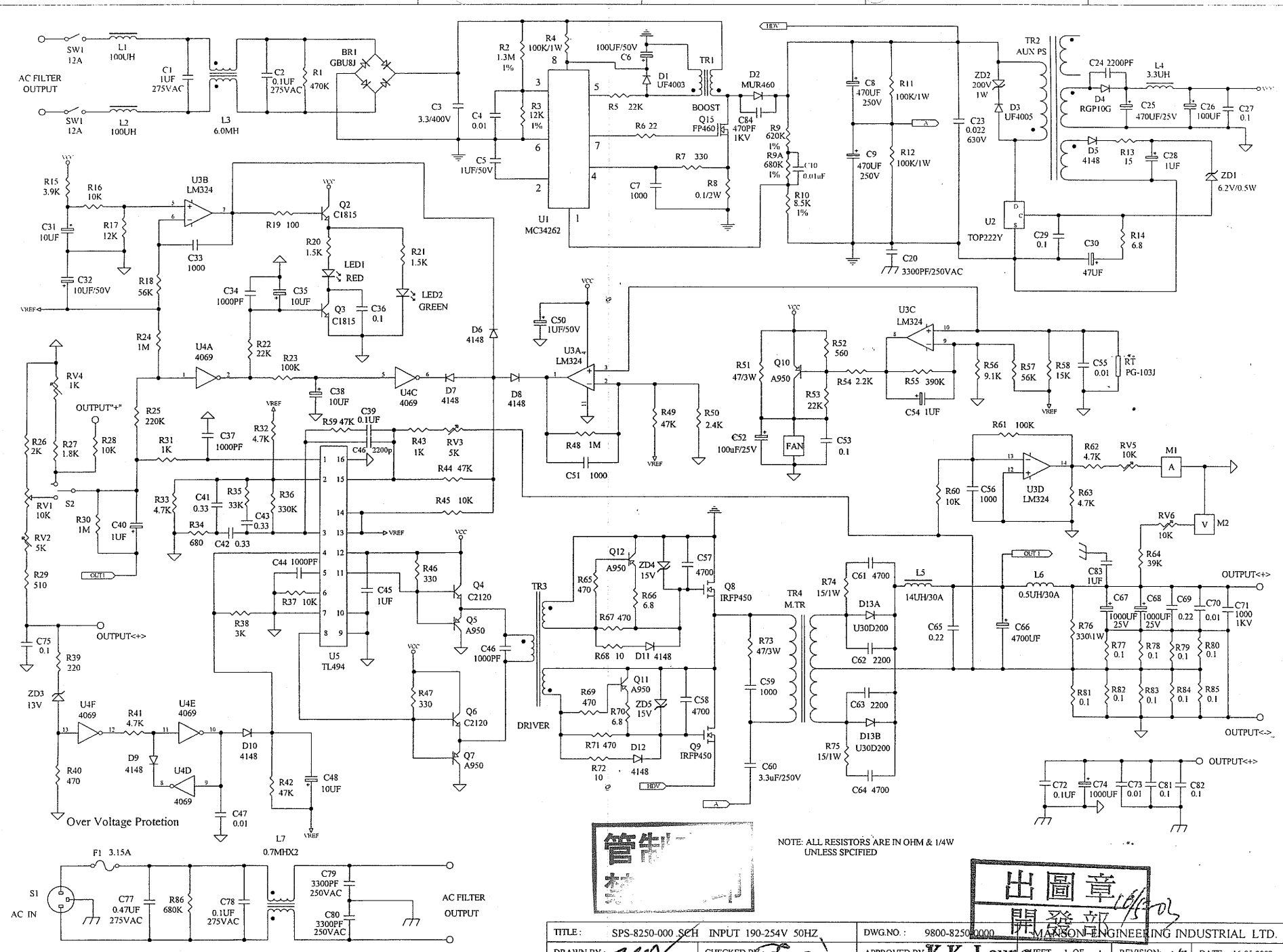
	MIN.	TYP.	MAX.	UNIT
Rated Output Voltage Range	3		15	V
Max. Output Voltage	15.1		16.1	V
Min. Output Voltage			3	V
Fixed Output Voltage	13.5	13.8	14.3	V
Output Current (continue)		25		A
Protection Current (start point)	29	31	32	A
Over Voltage Protection	16	16.5	17	V
Voltage Regulation:				
Load (0~100% load)			200	mV
Line (190~254 Vac Variation)			50	mV
Ripple & Noise (r.m.s.)		2	5	mV
Ripple & Noise (peak to peak)		30	50	mV
No Load Input Current			300	mA
Full Load Input Current			2.2	A
Power consumption at 15V 25A			480	W
Withstanding Test(10mA 60sec.) Input V.S Output, Input V.S Housing	2.1			KV
Insulation Resistance (500 VDC) Input V.S Output, Input V.S Housing	100			MΩ
Power Factor	97			%
Efficiency:				
Loading 13.8V 25A	79	80		%
Loading 15V 25A	80	82		%
Meter Accuracy:				
Voltmeter			±1%+1	Dight
Ammeter			±1%+1	Dight
Fuse		3.15		A

REMARKS:

1. Rated load is 15V 25A.
2. Insulation resistance is measured as INPUT vs. HOUSING.
3. High frequency interference test (sample 3%)
   Test frequency : 1. 437 MHz (5W) 2. 144 MHz (5W)
   Result : No function have been affected. Output Voltage ≤ ± 0.5V Variation.

Prepared by: ZJ ZQ

Approved by: Kenneth Cheng 3/5/01


AC FILTER OUTPUT
SW1 12A
L1 100UH
SW1 12A
L2 100UH
C1 1UF 275VAC
L3 6.0MH
C2 0.1UF 275VAC
R1 470K
BR1 GBU8J
C3 3.3/400V
C4 0.01
C5 1UF/50V
R2 1.3M 1%
R3 12K 1%
R4 100K/1W
100UF/50V C6
D1 UF4003
TR1
BOOST
R5 22K
R6 22
Q15 FP460
C84 470PF 1KV
R7 330
C7 1000
R8 0.1/2W
U1 MC34262
D2 MUR460
R9 620K 1%
R9A 680K 1%
C10 0.01uF
R10 8.5K 1%
HDV
C8 470UF 250V
C9 470UF 250V
R11 100K/1W
R12 100K/1W
C20 3300PF/250VAC
C23 0.022 630V
ZD2 200V 1W
D3 UF4005
TR2 AUX PS
C24 2200PF
L4 3.3UH
D4 RGP10G
C25 470UF/25V
C26 100UF
C27 0.1
D5 4148
R13 15
C28 1UF
ZD1 6.2V/0.5W
U2 TOP222Y
C29 0.1
C30 47UF
R14 6.8
R15 3.9K
R16 10K
U3B LM324
C31 10UF
R17 12K
C32 10UF/50V
R18 56K
R19 100
Q2 C1815
R20 1.5K
LED1 RED
R21 1.5K
LED2 GREEN
C33 1000
C34 1000PF
C35 10UF
Q3 C1815
C36 0.1
VREF
R24 1M
R22 22K
R23 100K
U4A 4069
C38 10UF
U4C 4069
D7 4148
D6 4148
D8 4148
C50 1UF/50V
U3A LM324
R48 1M
C51 1000
R49 47K
R50 2.4K
U3C LM324
R51 47/3W
Q10 A950
R52 560
R53 22K
R54 2.2K
C52 100uF/25V
FAN
C53 0.1
R55 390K
C54 1UF
R56 9.1K
R57 56K
R58 15K
C55 0.01
RT PG-103J
RV4 1K
OUTPUT"+"
R25 220K
R26 2K
R27 1.8K
R28 10K
RV1 10K
S2
RV2 5K
R29 510
R30 1M
C40 1UF
C39 0.1UF
R59 47K
C37 1000PF
R32 4.7K
R31 1K
C46 2200p
R43 1K
RV3 5K
R44 47K
R45 10K
R33 4.7K
C41 0.33
R35 33K
R36 330K
C43 0.33
R34 680
C42 0.33
C44 1000PF
R37 10K
R38 3K
U5 TL494
R46 330
Q4 C2120
Q5 A950
C45 1UF
R47 330
Q6 C2120
Q7 A950
C46 1000PF
TR3
DRIVER
Q12 A950
ZD4 15V
C57 4700
R65 470
R66 6.8
R67 470
R68 10
D11 4148
Q11 A950
ZD5 15V
C58 4700
R69 470
R70 6.8
R71 470
R72 10
D12 4148
Q9 IRFP450
Q8 IRFP450
R73 47/3W
C59 1000
C60 3.3uF/250V
TR4 M.TR
R74 15/1W
C61 4700
D13A U30D200
C62 2200
C63 2200
D13B U30D200
R75 15/1W
C64 4700
L5 14UH/30A
C65 0.22
L6 0.5UH/30A
C66 4700UF
C83 1UF
R61 100K
R62 4.7K
RV5 10K
M1
A
U3D LM324
R60 10K
C56 1000
R63 4.7K
RV6 10K
V
M2
R64 39K
C67 1000UF 25V
C68 1000UF 25V
C69 0.22
C70 0.01
C71 1000 1KV
R76 330/1W
R77 0.1
R78 0.1
R79 0.1
R80 0.1
R81 0.1
R82 0.1
R83 0.1
R84 0.1
R85 0.1
OUTPUT<+>
OUTPUT<->
C72 0.1UF
C74 1000UF
C73 0.01
C81 0.1
C82 0.1
OUT1
R39 220
C75 0.1
ZD3 13V
U4F 4069
R41 4.7K
U4E 4069
D10 4148
D9 4148
U4D 4069
R40 470
R42 47K
C48 10UF
C47 0.01
Over Voltage Protetion
L7 0.7MHX2
F1 3.15A
S1
AC IN
C77 0.47UF 275VAC
R86 680K
C78 0.1UF 275VAC
C79 3300PF 250VAC
C80 3300PF 250VAC
AC FILTER OUTPUT
NOTE: ALL RESISTORS ARE IN OHM & 1/4W UNLESS SPCIFIED
出圖章
開發部
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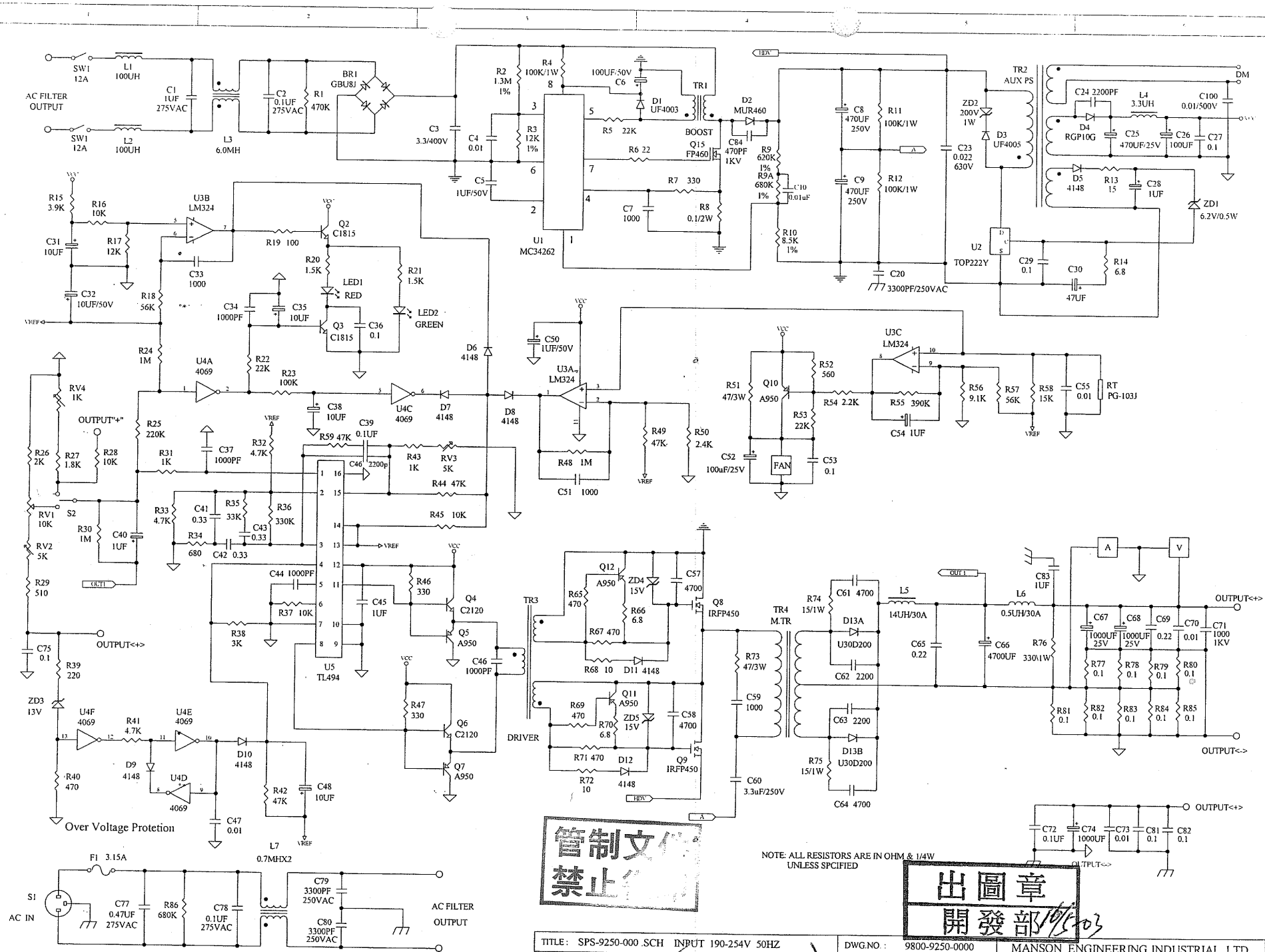
DWG.NO.: 9800-825000000
MAXSON ENGINEERING INDUSTRIAL LTD.
DRAWN BY:
CHECKED BY:
APPROVED BY K.K. Leung
SHEET 1 OF 1
REVISION: 15
DATE: 16-05-2003


AC FILTER OUTPUT
SW1 12A
L1 100UH
L2 100UH
L3 6.0MH
C1 1UF 275VAC
C2 0.1UF 275VAC
R1 470K
BR1 GBU8J
C3 3.3/400V
C4 0.01
C5 1UF/50V
R2 1.3M 1%
R3 12K 1%
R4 100K/1W
R5 22K
R6 22
R7 330
R8 0.1/2W
C6 100UF/50V
C7 1000
D1 UF4003
TR1
BOOST
Q15 FP460
C84 470PF 1KV
D2 MUR460
U1 MC34262
R9 620K 1%
R9A 680K 1%
R10 8.5K 1%
C10 0.01uF
C8 470UF 250V
C9 470UF 250V
R11 100K/1W
R12 100K/1W
C20 3300PF/250VAC
C23 0.022 630V
TR2 AUX PS
ZD2 200V 1W
D3 UF4005
C24 2200PF
L4 3.3UH
C100 0.01/500V
D4 RGP10G
C25 470UF/25V
C26 100UF
C27 0.1
D5 4148
R13 15
C28 1UF
ZD1 6.2V/0.5W
U2 TOP222Y
C29 0.1
C30 47UF
R14 6.8
DM
R15 3.9K
R16 10K
U3B LM324
C31 10UF
R17 12K
C32 10UF/50V
C33 1000
R18 56K
R19 100
Q2 C1815
R20 1.5K
R21 1.5K
LED1 RED
LED2 GREEN
Q3 C1815
C34 1000PF
C35 10UF
C36 0.1
R22 22K
R23 100K
R24 1M
U4A 4069
U4C 4069
C38 10UF
D6 4148
D7 4148
D8 4148
C50 1UF/50V
U3A LM324
R48 1M
C51 1000
R49 47K
R50 2.4K
R51 47/3W
Q10 A950
R52 560
R53 22K
R54 2.2K
C52 100uF/25V
FAN
C53 0.1
U3C LM324
R55 390K
C54 1UF
R56 9.1K
R57 56K
R58 15K
C55 0.01
RT PG-103J
RV4 1K
OUTPUT"+"
R25 220K
R26 2K
R27 1.8K
R28 10K
RV1 10K
S2
RV2 5K
R29 510
OUT1
OUTPUT<+>
C75 0.1
R39 220
ZD3 13V
Over Voltage Protetion
U4F 4069
R41 4.7K
U4E 4069
D10 4148
D9 4148
U4D 4069
R40 470
R42 47K
C48 10UF
C47 0.01
L7 0.7MHX2
R31 1K
C37 1000PF
R32 4.7K
C39 0.1UF
R59 47K
C46 2200P
R43 1K
RV3 5K
R44 47K
R45 10K
R33 4.7K
C41 0.33
R35 33K
R36 330K
C43 0.33
R34 680
C42 0.33
R30 1M
C40 1UF
U5 TL494
C44 1000PF
R37 10K
R38 3K
C45 1UF
R46 330
Q4 C2120
Q5 A950
R47 330
Q6 C2120
Q7 A950
C46 1000PF
TR3
DRIVER
Q12 A950
ZD4 15V
C57 4700
R65 470
R66 6.8
R67 470
R68 10
D11 4148
Q11 A950
ZD5 15V
C58 4700
R69 470
R70 6.8
R71 470
D12 4148
R72 10
Q9 IRFP450
Q8 IRFP450
R73 47/3W
C59 1000
C60 3.3uF/250V
TR4 M.TR
R74 15/1W
C61 4700
D13A U30D200
C62 2200
R75 15/1W
C63 2200
D13B U30D200
C64 4700
L5 14UH/30A
C65 0.22
L6 0.5UH/30A
C66 4700UF
R76 330/1W
C83 1UF
A
V
OUTPUT<+>
C67 1000UF 25V
C68 1000UF 25V
C69 0.22
C70 0.01
C71 1000 1KV
R77 0.1
R78 0.1
R79 0.1
R80 0.1
R81 0.1
R82 0.1
R83 0.1
R84 0.1
R85 0.1
OUTPUT<->
C72 0.1UF
C74 1000UF
C73 0.01
C81 0.1
C82 0.1
OUTPUT<+>
OUTPUT<->
F1 3.15A
S1
AC IN
C77 0.47UF 275VAC
R86 680K
C78 0.1UF 275VAC
C79 3300PF 250VAC
C80 3300PF 250VAC
AC FILTER OUTPUT
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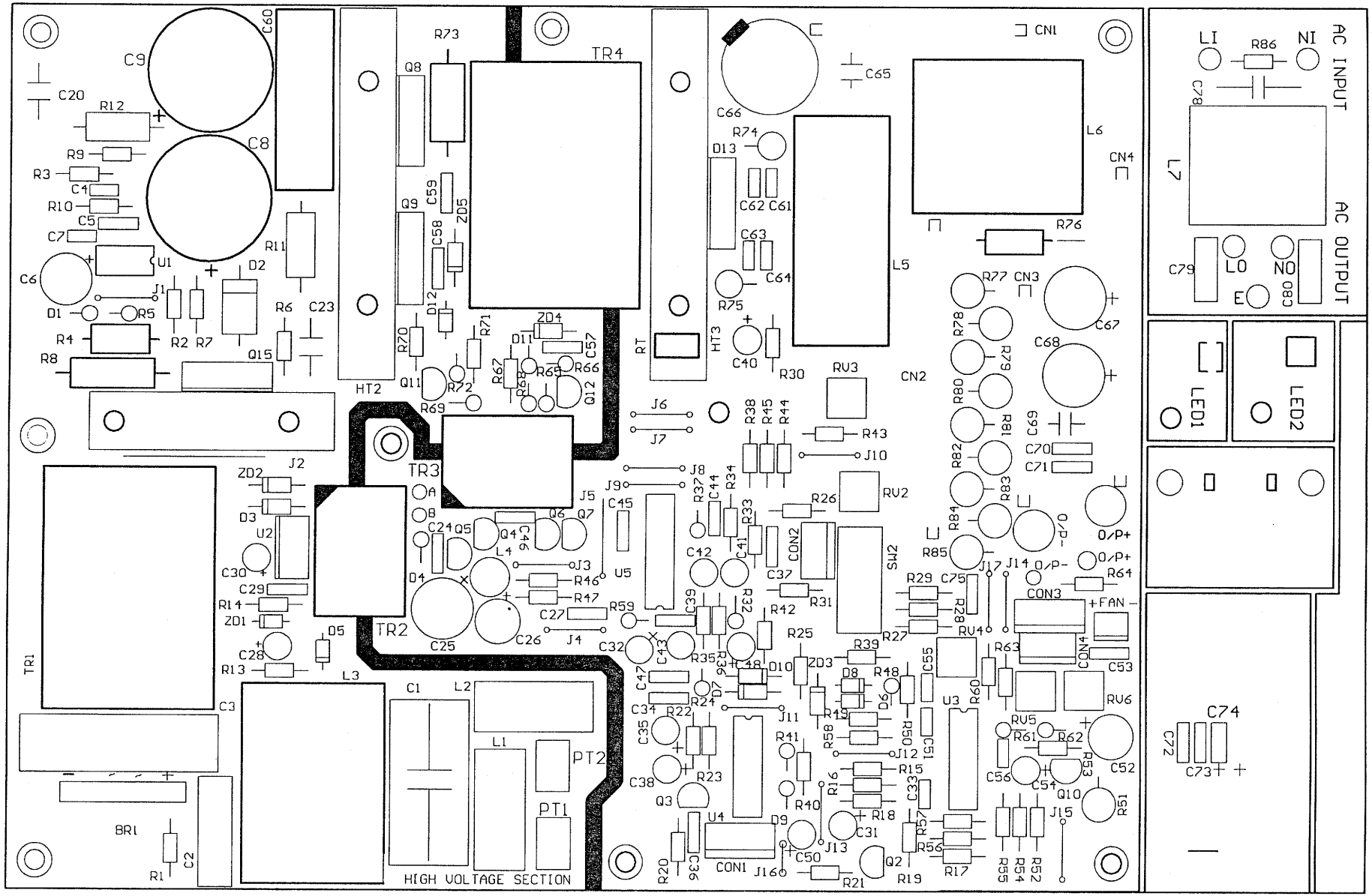
APPROVED BY K.K. Leung
SHEET 1 OF 1
REVISION:
DATE: 16-05-2003

PCB SILKSCREEN



MODEL : SPS-8250/9250

Main PCB component side

Mauson