AP116U-0516-1

POWER SUPPLY, TRANSISTOR DEVICES TYPE SPS-1070

BY COMMAND OF THE DEFENCE COUNCIL

L.T. Dunnett

Ministry of Defence

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AP 3158 Vol.2 Leaflet No.D6 (ARMY and RAF)

Issued Dec.73

FOR OFFICIAL USE ONLY

Status Indicating Relay: A status indicating relay is provided with double pole-double throw contacts which indicate the operating status of the power supply. The relay is actuated when the power supply is operating within predetermined voltage limits. The relay is deactuated when the power supply is operating outside of these limits or when the power supply is off.

Margin Adjust: Provision is made for remote programming the power supply up and down (margin adjust). Programming down is accomplished by shorting terminal TB1-9 (MV3) to terminal TB1-10 (MV4). Programming up is accomplished by shorting terminal TB1-8 (MV2) to terminal TB1-7 (MV1). The output change due to programming is .2 V.

Front Panel Controls:

Output Voltage Meter: 0 to 10 V

Output Current Meter: 0 to 50 A

Voltage Adjustment Potentiometer, Coarse and Fine: Set to desired output voltage as measured on the front panel meter or on the front panel test points.

Overvoltage Adjust: Normally factory-set to 6 V or may be adjusted in the field.

Current (Limit) Adjust: This is normally set at 45 A at the factory. This is done by loading the power supply to 45 A and turning the current limit adjust counterclockwise until the mode indicating lamp operates. The current limit adjust may be adjusted to lesser values in accordance with the operational requirements of the system by turning the current limit adjust counterclockwise with the system operating until the mode indicating lamp illuminates. The current limit adjust should then be turned clockwise approximately 1/8 of a turn until the mode indicator lamp extinguishes.

Test Points: Makes available the regulated output voltage.

Mode Indicator Lamp DS-1: When illuminated, indicates current limiting operation.

Circuit Breaker CB-1: For on-off operation and line protection.

AC-On Lamp DS-2: Indicates power is on and circuit breaker is on.

INSTRUCTION MANUAL - MODEL SPS-1070 POWER SUPPLY (LINK)

1. INTRODUCTION

The Model SPS-1070 power supply (Link P/N D697901) is shown in Figure 1 (D13225) and has the following specifications:

Input Voltage: 105 to 132 V, 47 to 63 Hz

Output Voltage: Adjustable 5 to 5.4 V @ 0 to 40 A

Regulation: Line: Less than .005% or 2 MV for 105-132 V AC line change

Load: Less than .005% or 2 MV for no load to (or from) full load changes

Ripple and Noise: .5 MV RMS - 3 MV p.p. max.

Overvoltage Protection: Response time 50 usec. The overvoltage is normally set to 8 V at the factory. It may be readjusted in accordance with the application as required.

Overload Protection: By electronic current limiting. The power supply will current limit at approximately 45A or less as adjusted by the operator. Under short circuit conditions, the load current will be reduced to a safe value and the power supply will automatically recover as soon as the overload or short circuit is removed.

Remote Programming: By external potentiometer, 1K, connected between terminals 7 and 8 to TB2.

Parallel Operation: Up to four units by interconnection between power supplies. See following section on rear panel connections.

Remote Sensing: Yes

Temperature Range: -20 to +65°C

Temperature Coefficient: .01%/°C

Size: Front panel is 19" wide by 3½" high; depth is 16-3/4" plus ¼" protrusion for terminal blocks and power connections.

Cooling: Cooling is by external forced air which may enter either on the left front side of the power supply or from the bottom surface of the power supply.

the on-off front panel circuit breaker CB-1. When the circuit breaker is actuated, power is applied to AC-on indicator lamp DS-2 and to the primary of transformer T1.

The main power secondary of transformer T1 (terminals 8, 9, 10) is rectified and filtered by the action of rectifiers CR3 and CR4 and filter capacitors C5 through C16. The voltage on these capacitors varies between 9 and 13 V in accordance with the line and load conditions.

The transistor configuration Q1, Q9, Q10 through Q19 is a Darlington-driven parallel pass transistor configuration which acts as the main regulator; i.e., the regulated output voltage appears on terminals E1 and E2. The pass transistor configuration is inserted between the unregulated output voltage appearing on the filter capacitors and the regulated output voltage appearing on the output terminals. The difference voltage is dropped across the pass transistors. This is accomplished by adjusting the drive signal from the regulator so that the output voltage remains constant independent of line and load conditions.

A control (bias) voltage is generated by an additional secondary of transformer T1 (terminals 5, 6, 7), full wave center tap rectifiers CR1 and CR2, and filter network R1-C1. The voltage on C1 is approximately 30 V. A control voltage is generated by the action of voltage dropping resistor R2 and zener diode CR5. The voltage on the cathode of CR5 is approximately 12 V more positive than the positive sense lead.

Rear Panel Connections:

J1 - Line cord connector (provided with the unit) to plug into the AC line. The two AC lines and ground connections are provided.

TB1-1: Normally open contact of status indicating relay.

TB1-2: C contact of status indicating relay.

TB1-3: Normally closed contact of status indicating relay.

TB1-4: Normally open contact of status indicating relay.

TB1-5: C contact of status indicating relay.

TB1-6: Normally closed contact of status indicating relay.

TB1-7)
TB1-8) Positive margin adjust.

TB1-9)
TB1-10) Negative margin adjust.

TB1-11: + output

TB1-12: + output sensing (should be jumpered to -11 or + output is remote sensing is used.)

TB1-13: - sensing (should be jumpered to minus sensing either locally or at the load.

TB1-14: - output.

TB1-15)
TB1-16) Normally shorted together. If parallel operation is required, the jumper from -15 to -16 should be removed on the slave units and TB1-15 should be connected to TB1-15 of the master unit.

E1: + output.

E2: - output.

2. THEORY OF OPERATION

2.1 Regulator Action

A schematic diagram of the SPS-1070 is shown in Figure 2 (Drawing #D14286). AC power is applied to J1, which applies power to

Operation of the voltage regulator circuit is as follows: A reference voltage is generated by voltage dropping resistor R22 and zener diode CR8. The reference voltage across CR8 is reduced by the action of voltage divider network R23-R24 so that approximately 3.8 V appears on the base of transistor Q7. The output voltage is sensed by resistive divider network R27, R29, R61, and R60 (voltage adjust potentiometer). Transistors Q7 and Q8 operate as a differential error amplifier. When the output voltage is at the correct level, the voltage on the base of Q7 will approximately equal he voltage on the base of Q8. If the output voltage tends to rise, Q8 conducts more heavily, thereby reducing the conduction of Q7. The amplified error voltage appears on the collector of Q7 and is applied to the base of intermediate voltage amplifier transistor Q5. The error voltage is further amplified and inverted at the collector of Q5 and applied to the base of transistor Q2, which in turn drives the pass transistor configuration Q1, Q9, etc., through TB1-15 and -16. It will be noted that as the output voltage tends to increase, the collector of Q7 becomes more positive, thereby reducing the voltage on the collector of Q5, which in turn reduces the drive to Q2, Q1, etc., and reduces the output voltage in a regulatory fashion.

2.2 Overvoltage Protection

A voltage reference is generated by series dropping resistor R31 and zener diode CR10. The output voltage is measured by voltage divider network CR11-CR12, temperature compensation resistors R34, R33, R32 (overvoltage adjust). When the overvoltage condition is reached, transistor Q20 turns on, actuating the gate of SCR-1,

thereby shutting the power supply down. It will be noted that firing of SCR-1 removes the drive to the power supplies through resistor R59 so that once the overvoltage has fired, there is minimal current flowing in the system. The overvoltage may be reset by turning off the line power by circuit breaker CB-1 and re-applying it.

2.3 Current Limiting Circuit

Resistors R40 through R49 generate a voltage drop proportional to the load current. In addition, the base to emitter drops of transistor Q9 and the pass transistor configuration Q10, etc., are approximately proportional to the load current. Accordingly, the voltage on the base of Q9 is a direct indication of the load current flowing. This voltage is sensed by resistive divider R8-R7-R12 and applied to the base of transistor Q3 through resistor R9. Potentiometer R7 sets the maximum current capability adjust of the front panel current limit and is normally set at approximately 55 A. Front panel current limit adjust R28 is normally set at approximately 45 A, and bendback adjust R9 is normally set so that the short circuit current is between 20 and 30 A. When excessive current is drawn, the base of Q3 becomes positive (conducting through the emitter of Q3 to the base of Q4 to the emitter of Q4, which is tied to the positive output.) When transistor Q3 conducts, it shunts (limits) the drive signal to transistor Q2 and the power supply enters a current limiting mode of operation. As the load resistance is decreased in value (heavier load), the output voltage falls. Since R8-R7-R12 is essentially a voltage divider, less voltage on the base of Q9 is required to keep Q3 in conduction, and the current limit bendback characteristic illustrated in Figure 3 is achieved.

Current limit operation is indicated by lamp DS-1. When Q3 conducts, Q4 conducts, which in turn illuminates lamp DS-1.

2.4 Status Indicating Relay

Relay K1 is normally de-energized when the power supply is off and remains de-energized until the power supply reaches proper operating voltage. Zener diode CR13 serves as a separate reference for the over- and undervoltage indicating circuits. Differential amplifier transistors Q23 and Q24, in conjunction with resistive divider R38-R37-R36, measure the overvoltage status, and in the event of overvoltage, turns off transistor Q21. Differential amplifier transistors Q25 and Q26 and resistive divider network R57-R56-R55 (undervoltage adjust) measure the undervoltage status, and in the event of undervoltage, turn off transistor Q22. Hence, it will be noted that relay K1 can only be energized if the output voltage is between the over- and undervoltage limits previously defined. Relay K1 is shown on the schematic in its normally de-energized condition and hence, the contacts will change to the energized position when the output voltage is at the correct level.

2.5 Margin Adjust

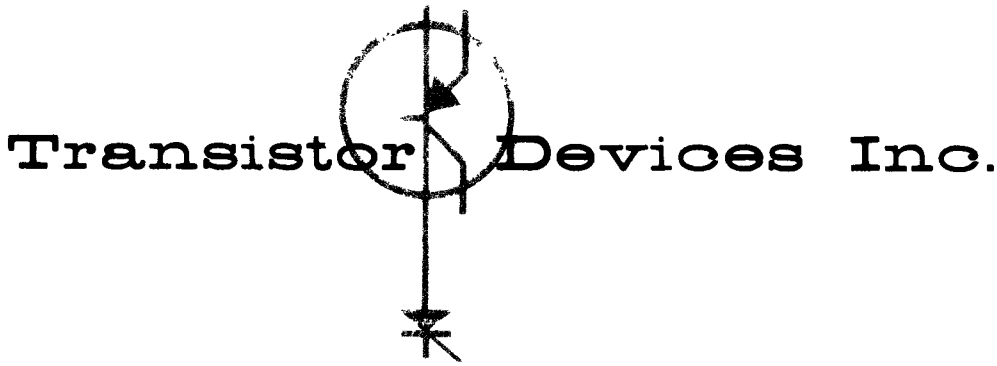
The margin adjust is for checking the performance of the utilization equipment. Margin adjust downward is accomplished by shorting terminals TB1-9 and -10 (MV3 and MV4) together, which places resistor R28 across the voltage divider sensing network and causes the regulator to shift downward in voltage. Positive margin adjust is accomplished by shorting terminals TB1-7 and -8 (MV1 and MV2) together, which places resistor R30 across resistor R29 and causes an upward change in the regulator for positive margin adjust testing.

2.6 Miscellaneous Components

Resistor R13 is a bleeder resistor designed to prevent spillover due to leakage currents at no load. Resistor P11 is a load voltage compensating resistor which modifies the regulation in accordance with the load current for improved performance. Zener diode CR7 prevents conduction of transistor Q5 until the power supply builds up to rated voltage and hence, assures build-up. Meters M1 and M2 are the front panel ammeter and voltmeter, respectively.

3. COMPONENT LOCATION

The location of major components (chassis-mounted) is indicated on the outline and installation drawing of Figure 1. The smaller components are located on the printed circuit board, a layout of which is shown in Figure 4. The electrical parts list is given on the following pages.



CEDAR KNOLLS, NEW JERSEY 07927

85 HORSEHILL ROAD

INSTRUCTION MANUAL

TDI P/N SPS-1070

LINK P/N D697901

June 1970

AMENDMENT NO. 1

PAGE 3 SHOULD READ:

TB1-12 + Output Sensing (Must Be Connected To Possitive Output Either At The Power Supply Or At The Load)

TB1-13 - Output Sensing (Must Be Connected To Negative Output Either At The Power Supply Or At The Load)

SCHEMATIC DIAGRAM SHOULD BE:

R3	220 Ohms
R12	18K Ohms
R59	10 Ohms
R14	Reference Note 3

Note 3: To Be Selected In Range Of 680 Ohms To 1.5K Ohms

PARTS LIST SHOULD BE:

R3	220 Ohms	RC20GF221K
R12	18K Ohms	RC20GF183K
R59	10 Ohms	RC20GF100K

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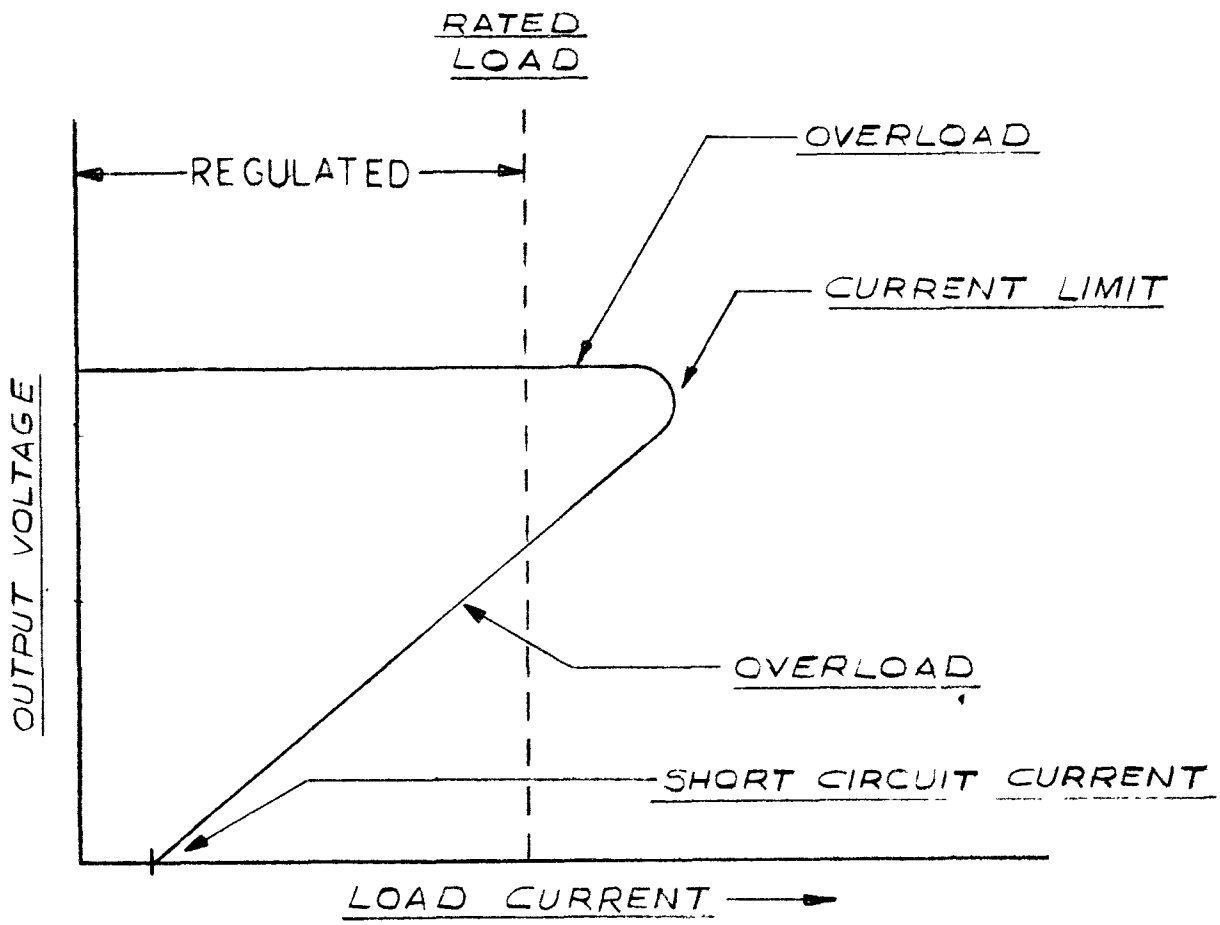
LIST OF ILLUSTRATIONS

REV.	A	REG. TOLERANCE DELETED	5/29/68



USED ON	ISSUE
DRAWN	DATE
[signature]	2-22-66
CHECKED	DATE

Transistor Devices Inc.
Mt. Tabor, New Jersey

BENDBACK SHORT CIRCUIT PROTECTION CHARACTERISTIC

CODE IDENT. NO.	SIZE	
09004	A	4449
SCALE		SHEET

QTY REQD	ITEM NO	NOMENCLATURE or DESCRIPTION	PART or IDENTIFYING NO	APPD MFR or EQUIV
	C 1	CAP. 39 MFD 60 V	CL67BK390MP3	QPL
	C 2	.01 MFD 200 V	CK06CW103K	QPL
	C 3	.1 MFD 200 V	75F3R2A104	G.E.
	C 4	39,000 MFD 10 V	86F11441	G.E.
	C 5	10,300 MFD 20 V	86F130M1	
	C 6			
	C 7			
	C 8			
	C 9			
	C 10			
	C 11			
	C 12			
	C 13			
	C 14			
	C 15			
	C 16	10,800 MFD 20 V	86F120M1	G.E.
	C 80	.1 MFD 200 V	75F3R2A104	G.E.
	C 81	CAP. 3.3 MFD 35 V	CS13BF335M	QPL
	CB 1	CIRCUIT BREAKER	7.5 A AM12M86	HEINIMAN
	CR 1	SILICON RECTIFIER	JAN 1N4245	QPL
	CR 2		1N4245	
	CR 3		1N1124	
	CR 4	SILICON RECTIFIER	1N1134	
	CR 5	ZENER DIODE, 12 V	1N963B	
	CR 6	SILICON RECTIFIER	1N645	
	CR 7	ZENER DIODE, 5.6 V	1N752A	
	CR 8	ZENER DIODE, 6.2 V	1N821	
	CR 9	SILICON RECTIFIER	1N1202A	
	CR 10	ZENER DIODE, 3.9 V	1N748	
	CR 11	SILICON RECTIFIER	JAN 1N645	QPL

*vendor item --- see source control or specification control drawings

	CODE IDENT NO	SIZE		
SPS - 1070	09004	A	PL	14362
	SCALE			SHEET 2 of 6

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVED
A		Retyped and corrected	1/10/69	E.D.
B		R3 was 2.2 K ECN-1427 Added Mfg.'s Part Nos. to C1, C2, C3, C80, R32, R60, R62, R63	9/15/69	Hall
C		Added C81 ECN-1470	3/9/70	I.Y.
D		R3 was 820 ECN-1630	3/11/70	I.Y.
E		TP1, TP2, AND TP3 wrong Part No. Added Handles, added Jumpers	5/12/70	A.A.
F		Handle 1264-1 was 1075-1	9/30/70	A.A.
G		R12 18K was R12 27K	10/13/70	RFB
H		R59 was 100 ECN-1768	2/3/71	AC
I		R80 was added	3/12/71	A.A.
J		R52 was 1 K	3/12/71	A.A.
K		C1 was CL65CK390MP3 ECN-2178	12/12/72	G.A.
L		R19 was 150	12/12/72	G.A.
M		Retyped and updated (no parts changed)	2/8/73	

USED ON	ISSUE
D-14286	
DRAWN	DATE
S. Krautner	2/8/73
CHECKED	DATE
APPD	DATE

Transistor Devices Inc.
Cedar Knolls, New Jersey

ELECTRICAL PARTS LIST

SPS-1070

CODE IDENT NO.	SIZE	
09004	A	14362

QTY REQD	ITEM NO	NOMENCLATURE or DESCRIPTION	PART or IDENTIFYING NO	APPD MFR or EQUIV
	C 1	CAP. 39 MFD 60 V	CL67BK390MP3	QPL
	C 2	.01 MFD 200 V	CK06CW103K	QPL
	C 3	.1 MFD 200 V	75F3R2A104	G.E.
	C 4	39,000 MFD 10 V	86F114M1	G.E.
	C 5	10,800 MFD 20 V	86F130M1	
	C 6			
	C 7			
	C 8			
	C 9			
	C 10			
	C 11			
	C 12			
	C 13			
	C 14			
	C 15			
	C 16	10,800 MFD 20 V	86F130M1	G.E.
	C 80	.1 MFD 200 V	75F3R2A104	G.E.
	C 81	CAP. 3.3 MFD 35 V	CS13BF335M	QPL
	CB 1	CIRCUIT BREAKER	7.5 A AM12M66	HEINIMAN
	CR 1	SILICON RECTIFIER	JAN 1N4245	QPL
	CR 2		1N4245	
	CR 3		1N1184	
	CR 4	SILICON RECTIFIER	1N1184	
	CR 5	ZENER DIODE, 12 V	1N963B	
	CR 6	SILICON RECTIFIER	1N645	
	CR 7	ZENER DIODE, 5.6 V	1N752A	
	CR 8	ZENER DIODE, 6.2 V	1N821	
	CR 9	SILICON RECTIFIER	1N1202A	
	CR 10	ZENER DIODE, 3.9 V	1N748	
	CR 11	SILICON RECTIFIER	JAN 1N645	QPL

*vendor item --- see source control or specification control drawings

REVISIONS

SYM	ZONE	DESCRIPTION	DATE	APPROVED
A		Retyped and corrected	1/10/69	E.D.
B		R3 was 2.2 K ECN-1427 Added Mfg.'s Part Nos. to C1, C2, C3, C80, R32, R60, R62, R63	9/15/69	Hall
C		Added C81 ECN-1470	3/9/70	I.Y.
D		R3 was 820 ECN-1630	3/11/70	I.Y.
E		TP1, TP2, AND TP3 wrong Part No. Added Handles, added Jumpers	5/12/70	A.A.
F		Handle 1264-1 was 1075-1	9/30/70	A.A.
G		R12 18K was R12 27K	10/13/70	RFB
H		R59 was 100 ECN-1768	2/3/71	AC
I		R80 was added	3/12/71	A.A.
J		R52 was 1 K	3/12/71	A.A.
K		C1 was CL65CK390MP3 ECN-2178	12/12/72	G.A.
L		R19 was 150	12/12/72	G.A.
M		Retyped and updated (no parts changed)	2/8/73	

USED ON	ISSUE
D-14286	

DRAWN	DATE
S. Krautner	2/8/73
CHECKED	DATE
APPD	DATE

Transistor Devices Inc.
Cedar Knolls, New Jersey

ELECTRICAL PARTS LIST

SPS-1070

CODE IDENT NO.	SIZE	
09004	A	14362

QTY REQD	ITEM NO	NOMENCLATURE or DESCRIPTION	PART or IDENTIFYING NO	APPD MFR or EQUIV
	Q 15	TRANSISTOR	JAN 2N3055	QPL
	Q 16			
	Q 17			
	Q 18			
	Q 19		2N3055	
	Q 20		2N2907A	
	Q 21		2N2907A	
	Q 22		2N2907/2N4037	
	Q 23		2N1613	
	Q 24		2N1613	
	Q 25		2N1613	
	Q 26	TRANSISTOR	JAN 2N1613	QPL
	R 1	RES. 100 1 W 10%	RC32GF100K	QPL
	R 2	560 2 W 10%	RC42GF561K	
	R 3	220 1/2 W 10%	RC20GF221K	
	R 4	1 K 1/2 W 10%	RC20GF102K	
	R 5	100 1/2 W 10%	RC20GF101K	
	R 6	100 1/2 W 10%	RC20GF101K	
	R 7	VAR. 10 K	RV5LAYSB103A	
	R 8	VAR. 10 K WW	RA20LASB103A	
	R 9	RES. VAR. 10 K	RV5LAYSB103A	QPL
	R 10	SHUNT METER	50A-50MV	EMPRO
	R 11	RES. SELECT IN TEST		QPL
	R 12	18 K 1/2 W 10%	RC20GF183K	
	R 13	27 2 W 10%	RC42GF270K	
	R 14	SELECT IN TEST		
	R 15	10 K 1/2 W 10%	RC20GF103K	
	R 16	1 K 1/2 W 10%	RC20GF102K	
	R 17	8.2 K 1/2 W 10%	RC20GF822K	
	R 18	8.2 K 1/2 W 10%	RC20GF822K	
	R 19	120 1/2 W 10%	RC20GF121K	
	R 20	RES. 270 1/2 W 10%	RC20GF271K	QPL

*vendor item --- see source control or specification control drawings

QTY REQD	ITEM NO	NOMENCLATURE or DESCRIPTION	PART or IDENTIFYING NO	APPD MFR or EQUIV
	CR 12	SILICON RECTIFIER	JAN 1N645	QPL
	CR 13	ZENER DIODE, 6.2 V	1N821	
	CR 14	SILICON RECTIFIER	1N1184	
	CR 15	SILICON RECTIFIER	JAN 1N1184	QPL
	DS 1	LAMP, INDICATOR	327	QPL
	DS 2	LAMP, INDICATOR	NE51	QPL
	XDS 1	LAMP HOLDER	359-8430-0971-502	DIALITE
	XDS 2	LAMP HOLDER	95-0408-09-142	DIALITE
	J 1	CONNECTOR	7486+7484	HUBBEL
	K 1	RELAY	T154-CC-6V, 52-2	ALLIED RELAY
	M 1	METER 0-10 V	MR26W010DCVVR	QPL
	M 2	METER 0-50 A	MR26W050DCAAR	QPL
	Q 1	TRANSISTOR	JAN 2N3055	QPL
	Q 2		2N1613	
	Q 3		2N1613	
	Q 4		2N1613	
	Q 5		2N1613	
	Q 6		2N2907/2N4037	QPL
	Q 7		2N1613	
	Q 8		2N1613	
	Q 9		2N3055	
	Q 10		2N3055	
	Q 11			
	Q 12			
	Q 13			
	Q 14	TRANSISTOR	JAN 2N3055	QPL

*vendor item --- see source control or specification control drawings

	CODE IDENT NO	SIZE		
SPS - 1070	09004	A	PL	14362
	SCALE			SHEET 3 of 6

QTY REQD	ITEM NO	NOMENCLATURE or DESCRIPTION	PART or IDENTIFYING NO	APPD MFR or EQUIV
	R 21	RES. 5.6 K 1/2 W 10%	RC20GF562K	QPL
	R 22	1.5 K 2 W 1% WW	RW79U150IF	QPL
	R 23	1 K 2 W 1% WW	RW79U100IF	
	R 24	1.5 K 2 W 1% WW	RW79U150IF	
	R 25	1 K 1/2 W 10%	RC20GF102K	
	R 26	560 1/2 W 10%	RC20GF561K	
	R 27	274 2 W 1% WW	RW79U2740F	
	R 28	1 K 1/2 W 10%	RC20GF102K	
	R 29	909 2 W 1% WW	RW79U9090F	
	R 30	5.6 K 1/2 W 10%	RC20GF562K	
	R 31	470 1/2 W 10%	RC20GF471K	
	R 32	VAR. 1 K WW	RA20LASB102A	
	R 33	120 1/2 W 10%	RC20GF121K	
	R 34	560 1/2 W 10%	RC20GF561K	
	R 35	100 1/2 W 10%	RC20GF101K	
	R 36	VAR. 500	RA20LASB501A	
	R 37	1.2 K 1/2 W 10%	RC20GF122K	
	R 38	1 K 1/2 W 10%	RC20GF102K	
	R 39	330 1/2 W 10%	RC20GF331K	QPL
	R 40	.1 5 W	PW5	IRC
	R 41			
	R 42			
	R 43			
	R 44			
	R 45			
	R 46			
	R 47			
	R 48			
	R 49	.1 5 W	PW5	IRC
	R 50	4.7 K 1/2 W 10%	RC20GF472K	QPL
	R 51	1.2 K 1/2W 10%	RC20GF122K	
	R 52	RES. 820. 1/2 W 10%	RC20GF821K	QPL

*vendor item --- see source control or specification control drawings

	CODE IDENT NO	SIZE		
SPS-1070	09004	A	PL	14362
	SCALE			SHEET 5 of 6

QTY REQD	ITEM NO	NOMENCLATURE or DESCRIPTION	PART or IDENTIFYING NO	APPD MFR or EQUIV
	R 53	RES. 1 K 1/2 W 10%	RC20GF102K	QPL
	R 54	330 1/2 W 10%	RC20GF331K	
	R 55	VAR. 500	RA20LASB501A	
	R 56	1.5 K 1/2 W 10%	RC20GF152K	
	R 57	1 K 1/2 W 10%	RC20GF102K	
	R 58	4.7 K 1/2 W 10%	RC20GF472K	
	R 59	10 1/2 W 10%	RC20GF100K	
	R 60	VAR. 10 K	RA20LASB103A	
	R 61	2.7 K 1/2 W 10%	RC20GF272K	
	R 62	1 K VAR.	RA20LASB102A	
	R 63	VAR. 1 K	RA20LASB102A	
	R 64	1 K 1/2 W 10%	RC20GF102K	
	R 80	RES. 220 1/2 W 10%	RC20GF221K	QPL
	T 1	TRANSFORMER	B-13848	TDI
		HANDLES (2 per Unit)	1264-1	CAMBION
		JUMPERS (2 per Unit)	604J	KULKA
	TB 1	TERMINAL BLOCK	699-2104-16-GDI-30F	KULKA
	TP 1	TEST POINT (RED)	111-102	JOHNSON
	TP 2	TEST POINT (BLK)	111-103	JOHNSON
	TP 3	TEST POINT (VIO)	111-112	JOHNSON
	SCR 1	SILICON CONTROLLED RECT.	C45 F	G.E.

*vendor item --- see source control or specification control drawings

	CODE IDENT NO	SIZE		
SPS - 1070	09004	A	PL	14362
	SCALE			SHEET 6 of 6

Transistor Devices Inc.
Mt. Tabor, New Jersey

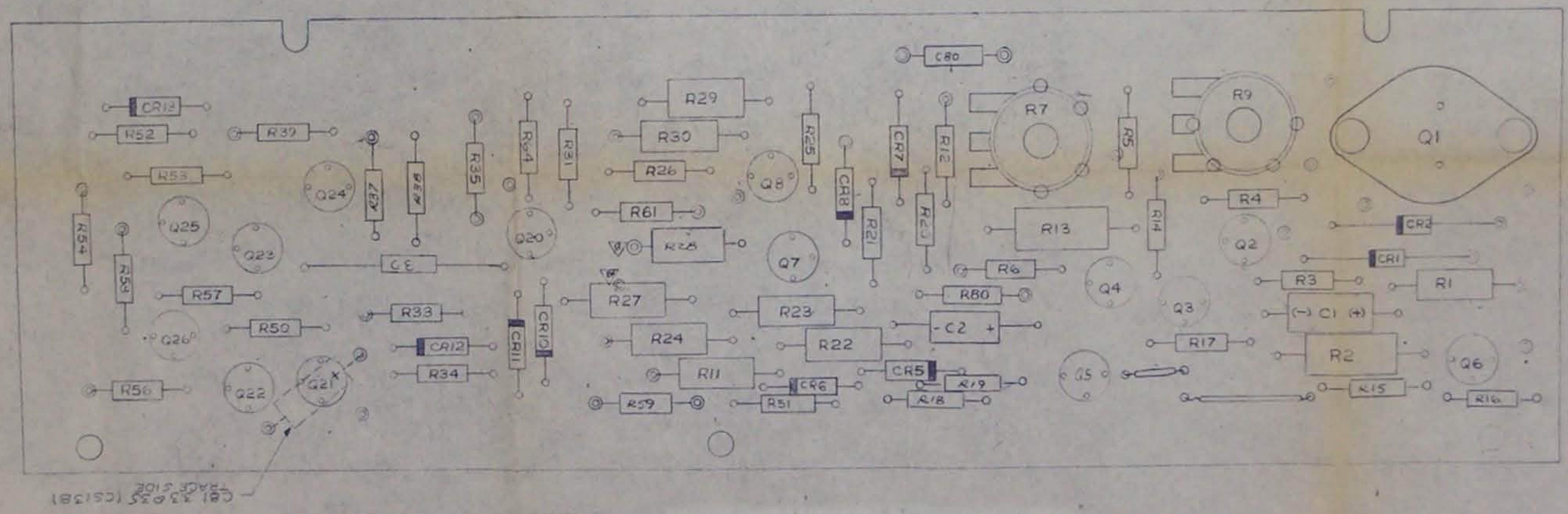
COMPONENT LAYOUT FOR P.C. BOARD (D-14336)
MODEL SPS-1070

CODE IDENT 09004 | SIZE D | 14353

SCALE 2:1

FINISH: SOLDER WIPE

MATERIAL: 1/8 (.125 THK) EPOXY BOARD 2 OZ. COPPER (1 SIDE)



BOARD SIZE 11.50 × 3.31 × .125 THK.

SYM	ZONE	DESCRIPTION	DATE	APPROVED
C		ADDED C81 ECN 1470		
B		ELIMINATED R10, R53, R18, R13, R15, R16, R38, R37, R28, C5, CR9, ADDED C CHANGED BOARD SIZE WAS 11.50 x 3.38 ECN 1061, 1463		
A				

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPROVED
A		[illegible]		
B		[illegible]		
C		ADDED C.B. ECN 470		
D		R3 WAS [illegible] ECN 1030		
E		R12 1K WAS 27K ECN 1730		
F		[illegible]		

T1 B-13948
CR1 1N4245
CR2 1N4245
CR3 1N1184
CR4 1N1184
DS2 NE51
AC ON
CB1 7.5A
J1
GRD.
105-130V 47-63Hz
C5 - C16 10,800 20V (12) PARALLEL
CURRENT BALANCE
R63 1K
Q1 2N3055
Q2 2N1613
MAX CURRENT R7 10K
R8 10K WW CURRENT ADJUST
BENDBACK ADJ. R9 10K
Q3 2N1613
Q4 2N1613
R14 NOTE 3
Q6 2N4037
MODE DS1 327
Q5 2N1613
R10 50A 50MV METER SHUNT
R11 NOTE 2
Q9 THRU Q19 ARE 2N3055
CR9 1N1202
CR5 1N963B
CR6 1N645
CR7 1N752A
CR8 1N821
V ADJUST COARSE
V. ADJUST FINE
Q7 Q8 (2) 2N1613
SCR1 C45F
Q20 2N4037
Q21 2N4037
Q22 2N4037
CR10 1N748A
CR11 1N645
CR12 1N645
CR13 1N821
CR14 1N1184
CR15 1N1184
K1 6VDC
OVERVOLTAGE ADJUST
OVERVOLTAGE STATUS
UNDERVOLTAGE STATUS
Q23 Q24 (2) 2N1613
Q25 Q26 (2) 2N1613
C4 59,000 10V
TP1
TP2
M2 0-10V
PART OF K1
TB1
3 NC
2 C
1 NO
6 NC
5 C
4 NO
REL
15
16
PAR
9 MV3
10 MV4
11 +V
E1 +V
12 +SENS
13 -SENS
7 MV1
14 -V
E2 -V
8 MV2
+5V

NOTES:
1. UNLESS OTHERWISE NOTED:
ALL RESISTANCE VALUES ARE IN OHMS ±10% ½W;
ALL CAPACITANCE VALUES ARE IN MICROFARADS.
2. SELECT IN TEST.
3. R14 TO BE SELECTED IN RANGE OF 680 TO 1.5K

OUTPUT
5.2V ± 0.2V
0-40A

ITEM	REQD.	PART NO.	DESCRIPTION	MATERIAL	SPECIFICATION	VENDOR OR APPD. EQUIV.

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES
FRACTIONS ±
DECIMALS
2 PLACE ±
3 PLACE ±
ANGLES ±
SURFACES ✓ MICRO INCHES

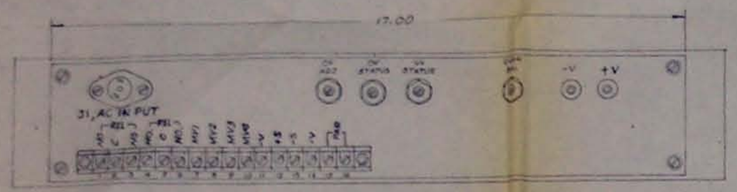
DR R.A. CHRISMAN DATE 8/2/68
CHK
APPD [illegible] 3-11-70
APPD

Transistor Devices Inc.
Mt. Tabor New Jersey

SCHEMATIC DIAGRAM
POWER SUPPLY
MODEL SPS-1070

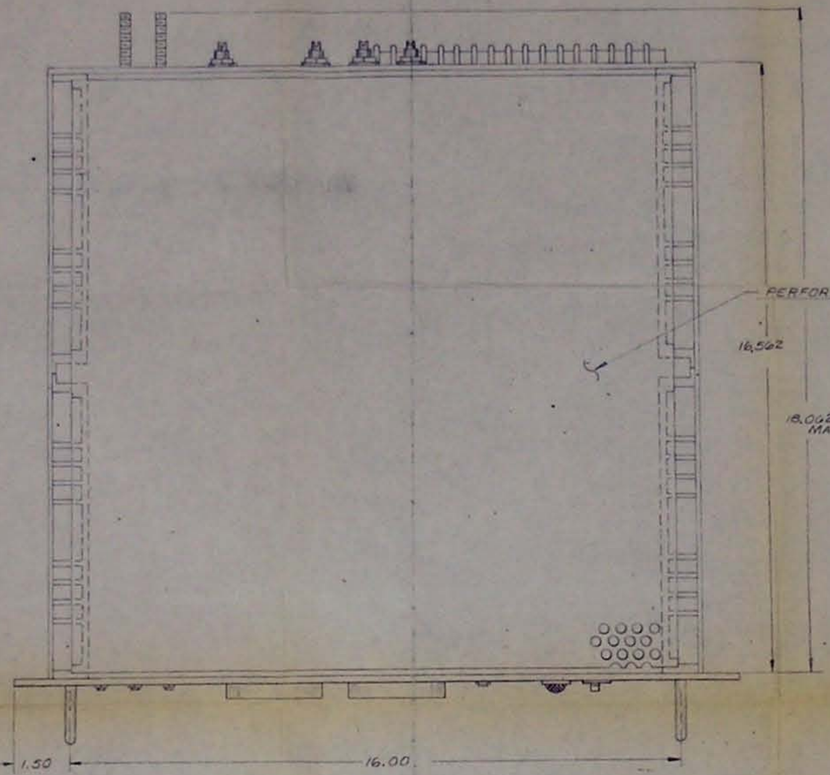
FINISH
MATERIAL
NEXT ASSEMBLY
MODEL
CODE IDENT 09004
SIZE D
14286
SCALE
SHEET OF

REVISIONS					REV.
SYM	ZONE	DESCRIPTION	DATE	APPROVED	
A		REVISED & REDRAWN	9/1/68	SS	
B		UPDATED TO AGREE WITH UNIT IN PRODUCTION.	11/3/72		

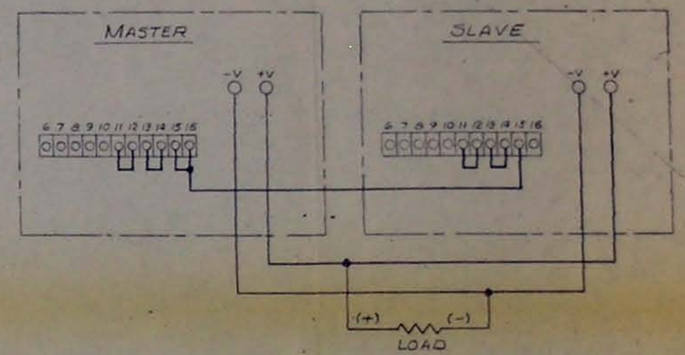


BOTTOM

REAR PANEL



AUTOMATIC LOAD SHARE PARALLELING



BALANCE CURRENTS WITH BALANCE CONTROL AT MAXIMUM LOAD

1.0 GENERAL REQUIREMENTS:

1.1 SCOPE: THIS DRAWING DEFINES AN ALL TRANSISTORIZED POWER SUPPLY WITH OVERLOAD PROTECTION AND METERED PANEL.

2.0 APPLICABLE DOCUMENTS:

2.1 FEDERAL STANDARD 595.

3.0 ELECTRICAL REQUIREMENTS:

3.1 INPUT: 105-130 VAC, 47-65 CPS.

3.2 OUTPUT: 5.2 AT 40 AMPS.

3.3 LOAD: 0-40

3.4 IMPEDANCE DC - INT, OHMS: .001

3.5 AC LINE CURRENT 105 VOLTS: 6.5

3.6 REGULATION LINE: 0.005% OR 3 MV, FOR 105-130 VAC LINE CHANGE.

3.7 REGULATION LOAD: 0.005% OR 3 MV, FOR NO LOAD TO FULL LOAD.

3.8 RIPPLE: LESS THAN 3.5 MV RMS; TOTAL RIPPLE AND NOISE LESS THAN 2 MV P-P OR 0.01%.

3.9 STABILITY: 0.01% OR 3 MV, FOR 8 HOURS AFTER 30 MIN. WARM-UP.

3.10 TEMPERATURE COEFFICIENT: 40.01% & 100 @ 71/°C.

3.11 RECOVERY TIME: 50 MICROSECONDS TO WITHIN 0.05% OF 25 MV OF OUTPUT VOLTAGE, FOR 100% LOAD CHANGE IN RATED LOAD.

3.12 OVERLOAD PROTECTION: ADJUSTABLE FROM 105% TO 125% OF RATED LOAD.

3.13 AC POWER INPUT PROTECTION: FRONT PANEL FUSE

3.14 VOLTAGE ADJUSTMENT RANGE: RESOLUTION AND ADJUSTABILITY 0.01% OR 5 MV

3.15 PARALLELING: AUTOMATIC LOAD SHARE PARALLELING WITH BALANCE CONTROL OF UP TO FOUR UNITS.

4.0 MECHANICAL REQUIREMENTS:

4.1 CONSTRUCTION AND DIMENSIONS: AS SHOWN ON DRAWING

4.2 FINISH

4.2.1 PAINTED PER FEDERAL STANDARD 595, NO 26440

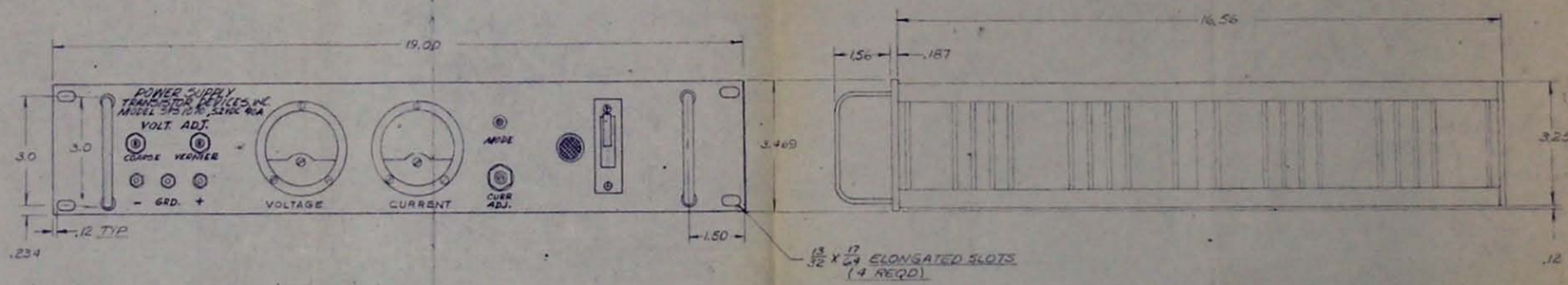
4.2.2 SILKSCREEN BLACK, 1/8 INCH CHARACTERS

5.0 ENVIRONMENTAL REQUIREMENTS:

5.1 OPERATING TEMPERATURE RANGE: 0°C TO 50°C

5.2 STORAGE TEMPERATURE: -55°C TO 85°C

6.0 MARKING: EACH UNIT SHALL BE IDENTIFIED WITH THE MANUFACTURER'S NAME OR SYMBOL, PART NUMBER, AND LOT CODE NUMBER.



LINK PART No. 697901

ITEM	REQD.	PART NO.	DESCRIPTION	MATERIAL	SPECIFICATION	VENDOR OR APPD. EQUIV.

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES: FRACTIONS ±.015; DECIMALS 2 PLACE ±.030, 3 PLACE ±.015; ANGLES ±1°

SURFACES: √ MICRO INCHES

FINISH

MATERIAL

NEXT ASSEMBLY | MODEL

DR SONCRANT 4/11/68

CHK

APPD

APPD

Transistor Devices Inc.
Mt. Tabor New Jersey

POWER SUPPLY
OUTLINE DRAWING SPS 1070
5.2VDC @ 40A

CODE IDENT 09004 | SIZE D | 13225 REV A

SCALE | SHEET OF