

50 VOLT POWER SUPPLIER PS2/39

Introduction

The PS2/39 accepts a mains input and provides a stabilised d.c. output of 3.5 amps at 50 volts. The unit incorporates an electronic overload-protection circuit and provides buzzer and lamp indications when this circuit is actuated. Remote indications of the state of the unit can be provided if required.

The complete power supplier occupies a PN3/23 chassis; it consists of two plug-in units mounted on CH1/12B chassis and a fixed transformer and choke assembly.

General Specification

<i>Mains Input</i>	200—250 V, 50 Hz, single phase
<i>D.C. Output</i> (for $\pm 6\%$ variation of mains input)	50 $\pm 1/2$ V at 3.5 A
<i>Fault-Indication Outputs</i>	± 6 V or 0 V relative to negative output at 40 mA
<i>Output Impedance</i>	0.25 ohms
<i>Stabilisation</i>	0.75 V, no load to full load
<i>Ripple</i>	less than 75 mV on full load
<i>Overload Trip Current</i>	4.5 A
<i>Overload Trip Time</i>	100 μ s
<i>Operating Temperature</i>	20°C to 45°C
<i>Weight</i>	35 lbs.
<i>Index Pegs</i>	
Unit 1	14 and 21
Unit 2	14 and 23

Circuit Description

The circuit diagram is shown in Fig. 1. Transistors TR1 to TR5 form a conventional stabilising circuit the output from which constitutes the 50-volt output of the unit.

Transistors TR6 and TR7 form a bistable multivibrator which functions as an overload protection circuit. Normally TR6 is conducting and TR7 is cut off but, as the current taken by the load increases, so the voltage drop across the sensing resistor R1 increases. Eventually, at a load current determined by the setting of the *Sensitivity* control RV2, transistor TR6 cuts off and TR7 conducts. The fall in the collector potential of TR7 is applied via diode D7 to the base of TR4 in the stabiliser circuit, TR4 cuts off and the stabiliser output is reduced to zero. The speed of operation of the protection circuit is such that an overload will not damage the transistors in the stabiliser circuit. The *Sensitivity* control is normally set so that the bistable circuit changes state when a current of 4.5 amps flows in R1.

The bistable circuit is returned to its normal state by pressing pushbutton SA; SA2 resets the circuit while SA1 breaks the output connection and ensures that, if the fault is still present in the load, the power transistors are not damaged during the resetting process.

During normal operation transistors TR10 and TR11 conduct, the green lamp ILP1 on the front panel is lit and transistor TR12 is cut off. Zero-volt and 6-volt indication outputs are provided from the collectors of TR11 and TR12 respectively. When the cut-out operates the fall in the collector potential of TR7 cuts-off transistors TR10 and TR11, and drives TR12 into conduction. As a result the green lamp on the front panel is extinguished, the red lamp is lit and the remote indication voltages on pins 1 and 2 of SKT B are reversed.

Normally, transistors TR8 and TR9 in the buzzer-driver circuit are cut off. However, when the cut-out operates and TR7 conducts, the resulting voltage drop is applied via diode D22 to the base of TR8. Transistors TR8 and TR9 are

TABLE 1

<i>Normal Operation (with 3A load)</i>				<i>Cut-out Tripped</i>		
<i>Transistor</i>	<i>Emit-ter</i>	<i>Base</i>	<i>Collec-tor</i>	<i>Emit-ter</i>	<i>Base</i>	<i>Collec-tor</i>
TR1	51.0	51.5	57	0	-0.75	82
TR2	51.0	51.5	57	0	-0.75	82
TR3	51.5	52.0	71	-0.75	-0.3	80
TR4	52.0	52.5	72	-0.3	0	80
TR5	26.0	27.0	52.5	0	0	0
TR6	0	0.6	0	0	-0.1	58
TR7	-2.2	-4.1	66	-0.8	-0.1	-0.7
TR8	36.0	40.0	0	27.0	26.5	16.5
TR9	0	0	63	10.5	10.5	11.0
TR10	0.2	0.8	0	0	-5.2	6.0
TR11	0	0.2	0	0	0	6
TR12	0	-0.6	6.2	0	0.5	0

driven into conduction, whereupon 50 volts is applied to the buzzer in the collector circuit of TR9 and an audible warning of the fault is given.

Maintenance

When fault finding it may be preferable to isolate the various sections of the unit; for example, the protection circuit can be made inoperative by disconnecting D7. Care must be taken to ensure that overloads are not applied to the circuit while D7 is disconnected.

Typical voltages present at the transistor electrodes, both during normal operation and during the cut-out condition, are given in Table 1. All the voltages given are with respect to the negative output terminal and are measured with an Avometer Model 8.

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