

STABILISED POWER SUPPLIERS PS2/10 AND PS2/10A

Introduction

The PS2/10A differs from the PS2/10 in that it uses one transistor of a different type to increase the capacity of one of the power-supply circuits.

The sub-unit is assembled on a chassis type CH1/12B. It comprises a mains transformer, rectifier and voltage-stabilising circuits to provide 12-volt and 4-volt positive supplies and a 4-volt negative supply. A low-voltage 50-c/s output also is provided for test purposes. The mains transformer has an untapped primary winding for a nominal 225-volt input; stabilising of d.c. supplies is satisfactory over the range of mains voltages from 200 to 250.

Connections to the sub-unit are via a single connector.

General Specification*Mains-input Voltage*

Range 200 to 250 volts, a.c.

*Sensitivity to Brief Mains**Fluctuation*

Total excursion of d.c. output voltage is less than 2 per cent for a sudden change of ± 6 per cent in mains voltage.

Power Consumption 15 watts

Maximum Outputs

	PS2/10	PS2/10A	} With less than 2 mV of 100-c/s component
+12 volts	440 mA	440 mA	
+4 volts	90 mA	90 mA	
-4 volts	140 mA	250 mA	

0.45 V (p-p) 50-c/s sinusoidal a.c. into 75-ohm load.

Regulation Less than 2 per cent change of output voltage for 20 per cent change of input voltage

Output Resistances

12-volt and 4-volt negative supplies less than 0.1 ohm
4-volt positive supply less than 5 ohms

Maximum Ambient Temperature 40 degrees C.

Weight 5 lb.

Circuit Description

Circuit details of both versions of the supplier are given in Fig. 1. The mains transformer T1 has four secondary windings which supply 1 volt, 30 volts, 14 volts and 6.3 volts, assuming the mains supply voltage is 225 volts.

12-volt Supply (TR1, TR4, TR6)

The output of the 14-volt winding is rectified by bridge rectifier D9—D12 to provide the 12-volt output. The output of the 30-volt winding is rectified by D1—D4 and smoothed by R3 and C1, this supply being used with TR1 in a common-emitter amplifying stage forming part of the voltage-stabilising circuit. The supply is used also with TR2 in a similar stage associated with the 4-volt negative supply.

The TR1 emitter is connected to the junction of R6 and zener diode ZD1, and so is maintained at a constant voltage below that of the 12-volt positive terminal. The TR1 base is connected to the slider of RV2, a pre-set control placed between R11 and R12 to form a voltage-dividing chain. This control is for adjusting the operating conditions of TR1, and hence the voltage to which the 12-volt output is stabilised.

An attenuated version of any supply-voltage variation appears at the RV2 slider and is amplified by TR1. The TR1 collector is directly coupled to a compound emitter-follower, TR4 and TR6, the load for which is provided by apparatus depending on the 12-volt output. The output signal of the emitter-follower acts in opposition to the undesired voltage variation, thereby greatly reducing the effect of the change on the terminal voltage of the supply circuit.

4-volt Positive Supply (TR7)

This supply is taken from the emitter of TR7, connected across the 12-volt supply via R15 and R16. The TR7 base is held at a fixed value of 3.75 volts by its connection to series-connected resistors, R13 and R14, across the 12-volt supply.

4-volt Negative Supply (TR2, TR3, TR5)

The 6.3-volt winding of T1 is used with a bridge rectifier, D5—D8, to provide the 4-volt negative supply.

The emitter of TR2 is earthed and the base is connected to the slider of RV1, a pre-set control which is part of the voltage-dividing chain R9, RV1 and R10. RV1 is for adjusting the operating condition of TR1, and thus determines the voltage to which the supply is stabilised. The stabilising arrangement is essentially as for the 12-volt supply, with TR2 amplifying unwanted voltage changes and TR3 and TR5 working as a compound emitter-follower to apply correction. Note: Fig. 1 specifies the different TR2 types in the two versions of the equipment.

The positive side of the supply is earthed.

The object in connecting R9, RV1 and R10 between the 12-volt and -4-volt terminals of the supplier is to obtain stabilisation of the two supplies rather than of the 4-volt negative supply only. This arrangement is desirable because the 4-volt supply is sometimes used with the 12-volt supply to provide a 16-volt supply to transistor stages.

Test-signal Output

The 1-volt winding of T1 is connected to earth and via R1 to pin 4 of the plugging connector. Thus the terminal voltage can be much lower than the nominal value when heavy loading is used.

DEH/0365

1V50c/1
TEST
SIGNAL

From DC679755.4
Part's list DA8798

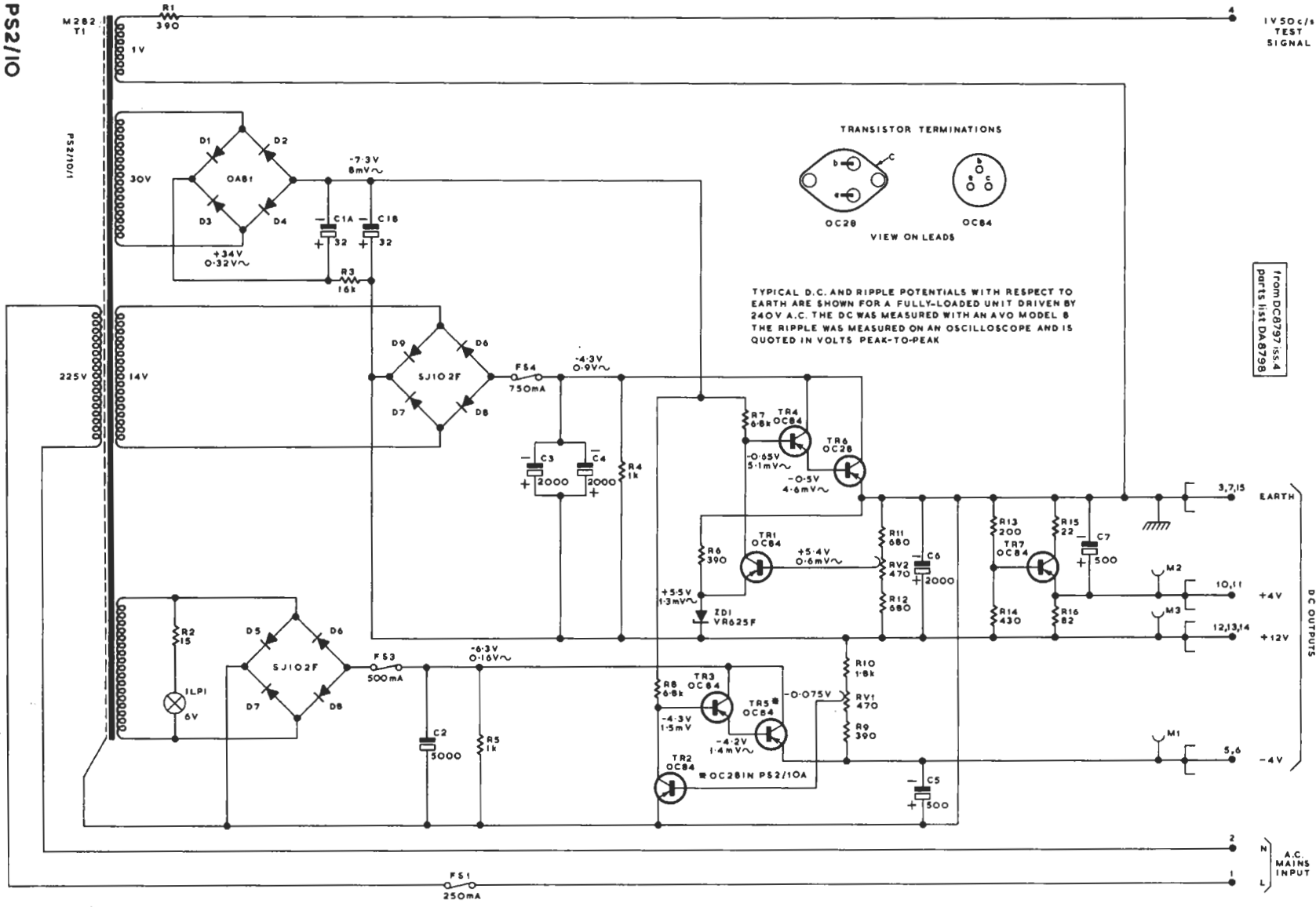


Fig.1 Circuit of the PS2/10 and PS2/10A

PS2/10

M282
T1

PS2/10/1

225V

R1 390
1V

D1 D2
D3 D4
OAB1
+34V
0.32V~

-7.3V
8mV~
C1A 32
C1B 32
R3 16k

D9 D6
D7 D8
SJ102F

F54
750ma
-4.3V
0.9V~
C3 2000
C4 2000
R4 1k

R7 TR4
68k OC84
-0.65V
5.1mV~
TR6 OC28
-0.5V
4.6mV~

R6 TR1
390 OC84
+5.4V
0.6mV~
R11 680
R12 680
C6 2000

R13 TR7
200 OC84
R15 22
C7 500
R14 430
R16 82

R8 TR3
68k OC84
-4.3V
1.5mV~
TR5 OC84
-4.2V
1.4mV~
R9 390
R10 18k
R1 470

TR2 OC84
OC28IN PS2/10A
-0.075V
C5 500

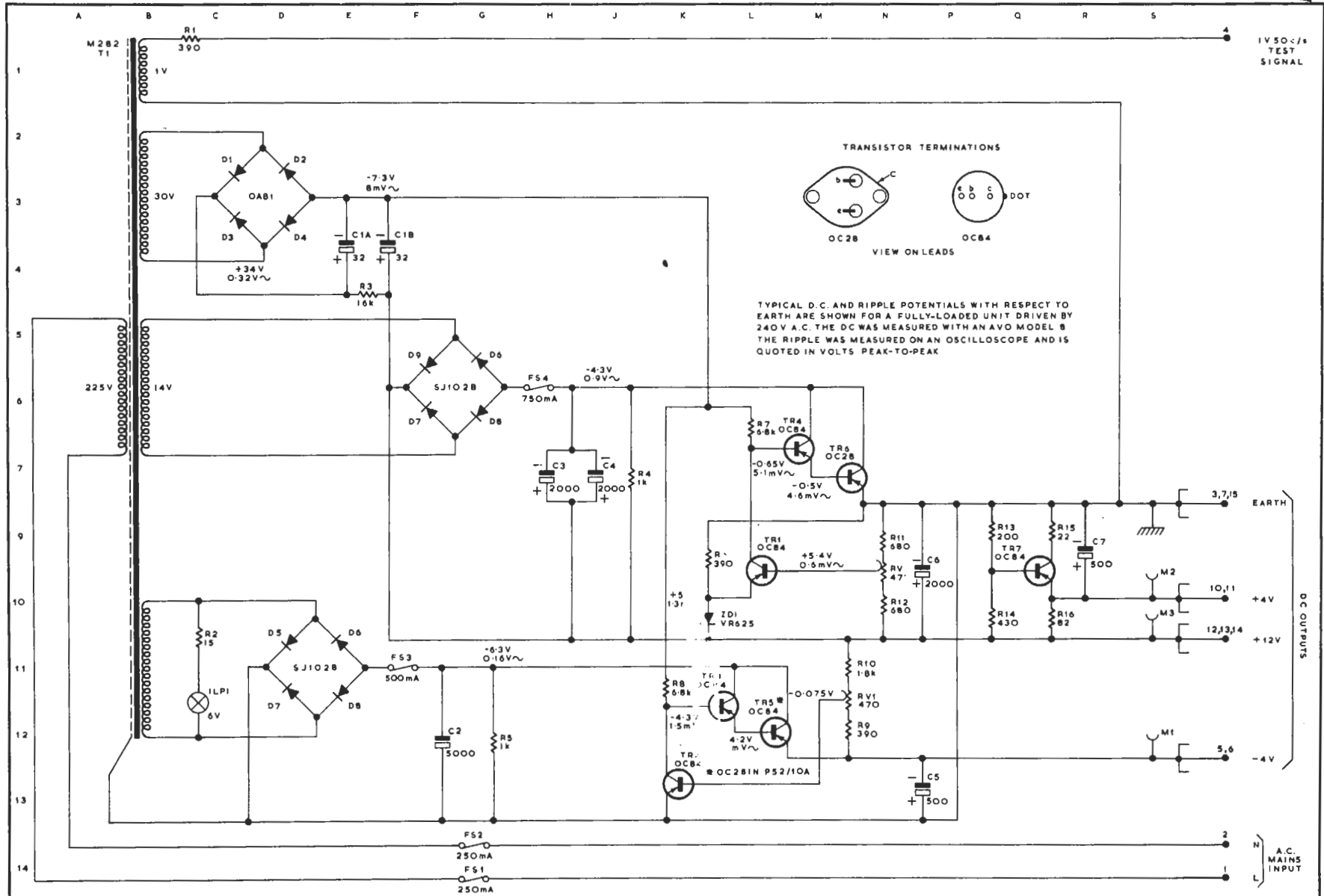
F51
250ma

3,7,15
EARTH
+4V
+12V

M2
M3
10,11
12,13,14

2
1
N
A.C. MAINS INPUT

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STABILISED POWER SUPPLIES PS2/10 & PS2/10A: CIRCUIT