

FAIRY AVIATION COMPANY OF AUSTRALASIA PTY. LTD.
SALISBURY, SOUTH AUSTRALIA

STACFAC
OPERATING INSTRUCTIONS
TYPE F - 123 - B^{XX}

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STAGPAC TYPE F-133-1
OPERATING INSTRUCTIONS
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1. DESCRIPTION.

1.1. General

Stacpac is a stabilized d.c. power supply for bench use. It is a development of the Commonwealth Scientific Industrial Research Organization. Units can be quickly fitted together in a vertical stack to provide increased voltage or current capacity, or to give several different output voltage levels convenient in the development of electronic circuitry.

1.2. Panel

1.2.1. Controls

Two controls appear on the panel. The output voltage setting knob and the interconnection switch.

The uniformly divided scale can be used to set the output voltage quickly and accurately.

1.2.2. Terminals

External connection to the unit is made by means of two sets of terminals. The regulated d.c. output is obtained from the left hand pair which are clearly marked for polarity, while 6.3V a.c. (unregulated) is available from the right hand pair for an external heater supply.

Both supplies are ungrounded.

1.2.3. Fuses

A mains fuse of 1.5A and a H.T. fuse of 150mA are provided on the front panel.

Shorting the H.T. output terminals blows the H.T. fuse (150mA) but causes no other damage.

A separate 5A fuse for the 6.3V external heater supply is provided at the back of the 6.3 volt terminals. This fuse can be replaced by removing the cover as described in 4.1.

1.2.4. Indicator Neon

The neon lamp indicates the presence of voltage across the output terminals and not that the unit is connected to the mains. This is the user's only direct check that the unit is functioning correctly.

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1.2.4. Indicator Neon (contd)

If it does not burn steadily or change its brilliance evenly with rotation of the voltage control, quantitative tests should be made.

1.3. Circuit (refer Fig. 2.)

The output supplies a voltage sensitive bridge consisting of a voltage reference tube (V5) and three resistive elements (R16, R4, R14). The bridge is balanced when the potential across it is 100V. A deviation from this figure produces an error signal which is applied differentially to the triodes V8a and V7b, amplified further by the cascode connected triode V8b and then fed via the cathode followers V6b and V6a to the grids of the series regulator valves (V2, V3 and V4 in parallel) to correct the deviation.

The stabilizer output voltage is increased from the minimum figure of 100 volts by inserting a resistance VR1 between the negative end of the bridge/amplifier combination and the common negative line. The drop across the resistor represents the voltage increase. Due to the substantially constant current properties of the bridge/amplifier combination over the working range of the unit, the increase in output voltage will be directly proportional to the resistance of VR1. A linear calibration for the output voltage scale is obtained by the use of a linear rheostat for VR1. The electrical length of the scale is adjusted with R19.

The diode connected valve V7a and the potentiometer VR2 are provided to compensate for possible unbalance of V7b and V8a caused by fluctuations of heater voltage.

1.4. Interconnection

Interconnection may be affected by placing any unit on top of another. The units are rigidly located by three pins which automatically register the electrical connectors at the same time. The a.c. mains is introduced through the top connector only, and supplies each unit of the stack. The cases are connected to the mains load earth. The three position switch on the right hand side of the front panel determines how a unit is connected to the one BELOW. The lowest unit must always be set to 'UNIT' or 'SERIES'.

OPERATING INSTRUCTIONSPage 3.2. SPECIFICATION

The performance figures for a single Stacpac unit are as follows:-

Voltage range	100 - 260 volts
Current Range	0 - 80 mA
Stability (load and line)	0.05%
Impedance	0.1 ohm
Ripple	1 mV (max.)
Mains Tolerance	± 10%
Drift (after warm up)	0.05% per hour
Nominal Mains Voltage	200 - 250 volts a.c.
Heater Supply	6.3V a.c. 2A (unstab.)
Max. Voltage to ground	+ 1,000 volts
Dimensions	6 $\frac{3}{4}$ " x 6 $\frac{1}{2}$ " 8 $\frac{1}{2}$ "
Weight	12 $\frac{1}{2}$ lb.

3. OPERATION3.1. Nominal Mains Voltage Adjustment

The primary tap of the transformer is set to 240 volts, and must be altered to suit the measured local mains voltage. Access to the transformer is described in 4.1.

3.2. General Procedure.

Stacpac is connected to the a.c. mains with the special load provided, which plugs into the seven pin connector on the top face. As no main switch is fitted to the unit, power must be switched on at a mains power point.

Lighting of the neon after about 15 seconds indicates that voltage is present at the output terminals. If minimum drift characteristics are required, the unit should be allowed to reach thermal equilibrium.

3.3. Unit Operation

When Stacpac is operated as a single unit, the Interconnection Switch can be set to either "SERIES" or "UNIT" position.

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3.4. Multiple Operation

When a power supply is required with a higher voltage or current capacity than that obtainable from a single Stacpac, units may be interconnected in series-parallel arrangements by the Interconnection Switch. Multiple 'UNIT' operation is also possible. The function of the switch is described in the following paragraphs.

3.4.1. 'SERIES'

In the 'SERIES' position, the negative terminal is internally connected to the positive terminal of the unit below, and power can be drawn from any pair of terminals providing that the total current drain does not exceed 90mA for any one unit. The voltage controls adjust the voltage between their respective terminals as with a single unit.

3.4.2. 'UNIT'

Interconnected Stacpacs with their switches in the 'UNIT' position still operate from the same mains input, but the output terminals of each are not connected internally. They may be connected externally by the user.

For example:- by connecting both negative terminals of two Stacpacs to earth, the two positive outputs could be varied independently between 100 and 260 volts; alternatively, by connecting the two positive terminals together, the differential voltage appearing between the negative terminals may be used for bias purposes either positive or negative. If it is desired to draw an appreciable current from such a differential arrangement, an external load must be used to ensure that both units, have a net positive drain.

3.4.3. 'PARALLEL'

In this position, both positive and negative output terminals are connected to the retrospective terminals of the unit below, and the single output voltage is controlled by the LOWER unit. This is accomplished by making the amplifier of the 'PARALLEL' unit inoperative and connecting its series regulator valves to the amplifier of the unit below. Each parallel unit adds 90mA to the maximum permissible current drain.

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4. MAINTENANCE

4.1. Access

Loosen the knurled screw on the top of the instrument, ease the top of the case upwards by lifting the rear locating pin and slide the perforated cover towards the rear. The valves and heater compensation potentiometer VR2 are now accessible.

The unit can be further dismantled as follows:-

- (a) Remove the knurled screw.
- (b) Place the unit on its back (panel uppermost) with the base towards the operator.
- (c) Unscrew and remove the four screws, the bottom two first.
- (d) Remove the case by pulling straight up until clear of the transformer, then keep the base in the same plane and turning the case, lay it panel downwards on the left side of the chassis. Every portion of the unit is now accessible, and operation for voltage checks (para. 4.4.) etc. is possible.

4.2. Replacement Items

The items which may require replacement with normal usage of the instrument are valves and electrolytic condensers. These are listed as under:-

<u>DESCRIPTION.</u>	<u>NO. USED IN EACH UNIT</u>
Valve Type 6V4.	1
" " 6M5.	3
" " QS83/3 OR. 83A1	1
" " 12AX7.	3
Condenser 16 mfd. 525V.P.	2
" 24 mfd. 350V.P.	2
" 8 mfd. 525V.P.	2

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4. MAINTENANCE (contd.)

4.3. Valve Pin Voltages.

The following table gives a typical set of voltage readings. The measurements are made with the output at 100 volts (no load) between the valve pins specified and the negative output terminal.

<u>METER</u>	<u>RANGE</u>	<u>VALVE PIN</u>	<u>VOLTS</u>
Avo Model 6	AC1000	V1-1	395
(20,000 ohms	"	V1-7	395
per volt)	DC1000	V1-3	530
	"	V2-7	525
	DC250	V2-2	78
	"	V2-3	100
	DC100	V5-4	17.5
	"	V6-2 & 8	74
	"	V6-3	78
	"	V7-1 & 2	17
	"	V7-3	17.5
	"	V7-6	100
	"	V7-7	17.2
	"	V7-8	18.5
	"	V8-2	18
	"	V8-3	18.5
	"	V8-7	46.5
V.T.V.M.	10V.	V2-7	1V r.m.s.

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REFERENCES.

1. C. Billington and E. Chakanovskis, Electronic Engineering, August, 1957 p. 374-6, A Voltage Stabilizer Principle.

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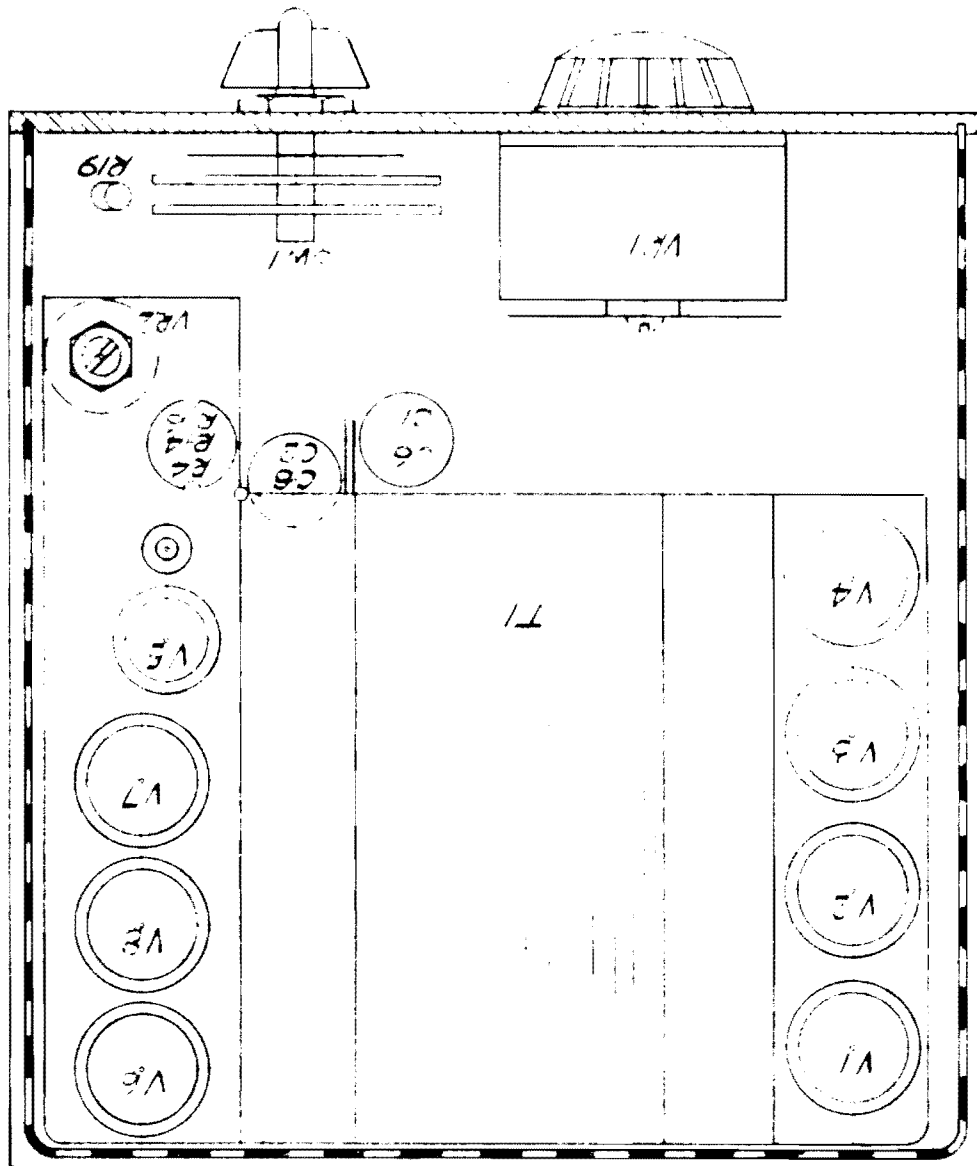


TORS ARE $\pm 10\%$

OTHERWISE STATED

STACPAO

TYPE F-105-B *



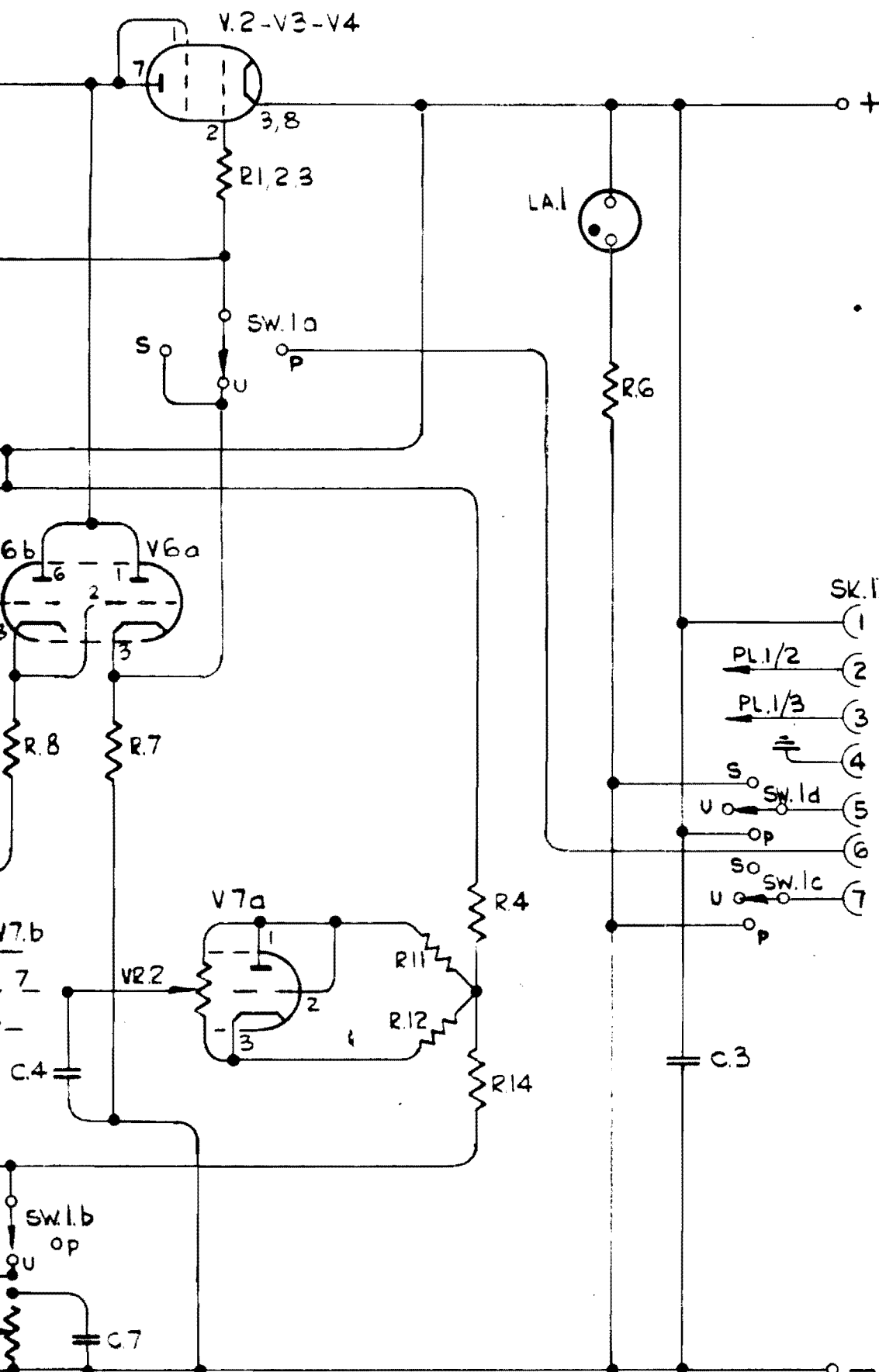
MAJOR COMPONENT LOCATIONS

PLAN VIEW

FAIRY AVIATION CO. OF ASIA, LTD.
SALISBURY, STRAIGHT

FIG. 1

NOTE/ ALL RESISTORS ARE $\frac{1}{2}$ WATT $\pm 10\%$
UNLESS OTHERWISE STATED.



F.3	5.0 A
F.2	150 mA
F.1	1.5 A
T.1	100 mA
L.1	1 HV 70 Ω
SK.1	7 PIN SOCKET
PL.1	7 PIN PLUG
SW.1	3 POSY 4 CIRCUIT
VR.2	10K LINEAR
VR.1	19.8K $\pm 2\%$ W.W.
LA.1	NE.51
V6-V7-V8	12 AX 7
V.5	QS 83/3 or 83A1
V2-V3-V4	6 M 5
V1	6 VP
C.8	24 μ F - 350 VP
C.7	8 μ F - 525 VP
C.6	16 μ F - 525 VP
C.5	.002 μ F - 400 V
C.4	.05 μ F - 400 V
C.3	8 μ F - 525 VP
C.2	24 μ F - 350 V
C.1	16 μ F - 525 VP
R20-R21	680 K
R.19	ADJUST ON TEST.
R17-R18	680 K
R16	5.6K-WW-1%
R15	180K
R14	3.5K-WW-1%
R.13	39 K
R11-R12	6.8 K
R9-R10	1.2 MEG.
R.8	1.3 MEG 5% HS.
R.7	220 K
R.6	470 K
R.5	2.2 MEG
R.4	18.6K-WW-1%
R1-R2-R3	2.2 K
ITEM	VALUE.

— STACPAC —

TYPE F-135-B **

FIG.2 CIRCUIT DIAG.

