

This document is part of an integrated file. If separated from the file it must be subjected to individual systematic review.

Comments and criticisms on the AP-3A Power supply

✓ 1) The battery charge current is 3.9 (4) amps rather than 8 amps (Spec. 4.4.).
OK

2) The on/off time delay works erratically. It seems to increase as the AP-3A warm up; thus requiring a longer waiting period before the AP-3A will turn on.

Also, if you uncouple the AP-3A from the ac line without, first, shutting it off, the AP-3A will not immediately restart when it is plugged into the line and turned on.

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✓ 3) The noise interference due to the AP-3A is high, including aural noise.

Note, also, that when the AP-3A is plugged into the ac line (AP-3A switch off) the radiation due to the 30 volt supply and unijunction oscillator (which is on) is very high.

OK ✓ A) The ac line current is considerably higher than we measured with [redacted] meter (X2). STAT

OK ✓ (5) The most important defect of the AP-3A is that the AP-3A worked fine with a variac in the ac line, but when the AP-3A is plugged directly into the 117 volt line, the AP-3A cuts off when the AT-3 is held key closed or 10Y "on". The ac line current exceeds 5-7.5 amps.

(6) Have not determined that the circuit breaker in the primary circuit of the AP-3A serves any useful purpose.

4. AP-3A BATTERY CHARGING CURRENT RATE

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OPEN CIRCUIT POTENTIAL = 15.6 VDC.
SHORT CIRCUIT CHARGE CURRENT = 3.9 AMPS.

*This is
first
data
compiled by*

STAT

July 17 - 20 1962

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AP-3A RADIATED NOISE INTERFERENCE (SCREEN ROOM; RESISTOR LOAD)

AC INPUT - 115 VAC 60 CYCLES

TEST FREQ. MC.	EQUIVALENT RADIATION IN MICROVOLTS/METER	
	AP-3A "OFF"	AP-3A "ON"
0.15	26	80
0.25	70	150
0.30	15	110
0.40	280	800
0.50	400	640
0.60	160	280
0.80	48	140
1.0	16.0	100
2.0	5.0	60.0
4.0	4.0	4.2
5.0	6.8	11.0
7.0	6.0	20.0
8.0	6.0	9.5
10.0	5.6	5.6
12.0	5.6	5.6
14.0	3.6	3.6
16.0	3.6	3.6
18.0	6.4	6.4
20.0	6.8	6.8
22.0	5.0	5.0
24.0	2.6	2.6
25.0	2.4	2.4

TESTED BY: [illegible]

DATE: [illegible]

AP-3A RADIATED NOISE INTERFERENCE

INTERFERENCE (AT-3)

AP-3A LOAD = AT-3 TRANSMITTER

TEST FREQ	EQUIVALENT ELECTRIC FIELD RADIATION		
	MICROVOLTS / METER		
MC	AMBIENT	AP-3A "OFF"	AP-3A "ON" AT-3 BY "ON"
0.15	40	100	1200
0.25	40	400	2800
0.30	16	1700	3600
0.40	23	3400	22000
0.50	20	1000	4000
0.60	24	2200	5000
0.80	30	400	900
1.0	30	240	1300
2.0	100	160	2000
4.0	40	40	400
5.0	40	40	700
7.0	20	20	70
8.0	10	10	180
10.0	6	6	150
12.0	14	14	340
14.0	12	12	70
16.0	14	14	40
18.0	7	7	70
20.0	7	7	34
22.0	5	5	28
24.0	5	5	20
25.0	5	5	18

VARIATION OF AP-3A OUTPUT VOLTAGE VERSUS AC INPUT VOLTAGE, 60 CYCLES

AP-3A LOAD = 2 OHM RESISTOR

AC INPUT			DC OUTPUT	
VOLTS	APPROXIMATE		VOLTS	AC RIPPLE (MV)
	AMPS	WATTS		
70	3.63	100	11.2	182
75	3.82	110	12.0	210
90	4.07	130	12.5	63
100	4.17	140	12.5	20
110	4.25	140	12.6	13
115	4.29	150	12.6	12
120	4.33	150	12.6	9
140	4.42	150	12.6	9
150	4.55	150	12.6	7
160	4.7	150	12.6	6
180	5.0	150	12.6	6
200	5.3	150	12.6	6
220	5.6	180	12.6	9
240	5.85	180	12.6	12
260	5.7	180	12.6	17
270	5.6	190	12.6	9

3. AP-3A AC INPUT VOLTAGE
AND CURRENT VERSUS
INPUT VOLTAGE AMPLITUDE

AC INPUT VOLTS	AC LINE CURRENT AMPS AP-3A LOAD = AT-3 TRANSMITTER	
	IDY ON	KEY CLOSED
70	3.4	4.2
75	3.5	4.4
80	3.6	4.55
90	3.65	4.8
100	3.7	5.0
110	3.8	5.2
115	3.9	5.25
120	3.9	5.3
130	4.0	5.32
140	4.0	5.38
150	4.1	5.7
160	4.3	5.9
180	4.5	6.2
200	4.7	6.45
220	5.0	6.8
240	5.2	7.1
260	5.1	7.0
270	5.0	6.8

GR. VARIAC USED TO ADJUST THE
VOLTAGE APPLIED TO THE AP-3A.

2. VARIATION OF AP-3A OUTPUT VOLTAGE
VERSUS AC INPUT VOLTAGE, 416 CYCLES.

AP-3A LOAD = AT-3 TRANSMITTER
TUNED TO 3.0 MC;
ANTENNA LOAD
RESISTOR - 53 OHMS

AP-3A POWER SUPPLY OUTPUT						
AC INPUT VOLT	DC OUTPUT VOLTS			AC RIPPLE (RMS) MILLIVOLTS		
	NO LOAD	IDY ON	KEY CLOSED	NO LOAD	IDY ON	KEY CLOSED
7.5	12.5	12.5	12.5	8.5	57.5	8.5
13.7	12.5	12.5	12.5	8.5	51.5	8.5
13.7	12.6	12.5	12.5	8.5	57	8.4

AC LINE CURRENT VARIANCE FROM

1.9 - 2.1 AMPS

AP-3A POWER SUPPLY TEST RESULTS

VARIATION OF AP-3A OUTPUT VOLTAGE
VERSUS AC INPUT VOLTAGE, 60 CYCLES.

AP-3A LOAD = AT-3 TRANSMITTER
TUNED TO 3.0 MC ;
ANTENNA LOAD
RESISTOR - 53 OHMS.

AP-3A POWER SUPPLY OUTPUT						
AC INPUT VOLTS	DC OUTPUT VOLTS			AC RIPPLE (RMS) MILLIVOLTS		
	NO LOAD	IDY ON	KEY CLOSED	NO LOAD	IDY ON	KEY CLOSED
70	12.4	12.2	11.6	2.3	90.0	132
75	↑	↑	12.0	↑	55.0	136
90	↑	↑	12.2	↑	37.5	82.0
100	↑	↑	↑	↑	34.5	61.0
110	↑	↑	↑	↑	33.5	53.5
115	↑	↑	↑	↑	33.4	51.0
120	↑	↑	↑	↑	33	50.0
140	↑	↑	↑	↑	32.5	47.0
160	↑	↑	↑	↑	32.5	45.0
180	↑	↑	↑	↑	32.5	44.0
200	↑	↑	↑	↑	32.5	44.0
220	↑	↑	↑	↑	32.5	43.5
240	↑	↑	↑	↑	25.0	36.0
260	↑	↑	↑	↑	25.0	36.0
270	↓ 12.4	↓ 12.2	↓ 12.2	↓ 2.3	25.0	36.0

AC AMPLITUDE NOT VARIED FROM 2.1 - 3.4 AMPS

3. AP-3A AC INPUT CURRENT AND
3. VERSUS AMPLITUDE OF AC
INPUT VOLTAGE

AC INPUT VOLTS	AC INPUT CURRENT AMPS
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70	3.63
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75	3.82
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80	4.07
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90	4.17
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100	4.25
-----	------

110	4.29
-----	------

115	4.29
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120	4.33
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140	4.42
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160	4.7
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180	5.0
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200	5.3
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220	5.6
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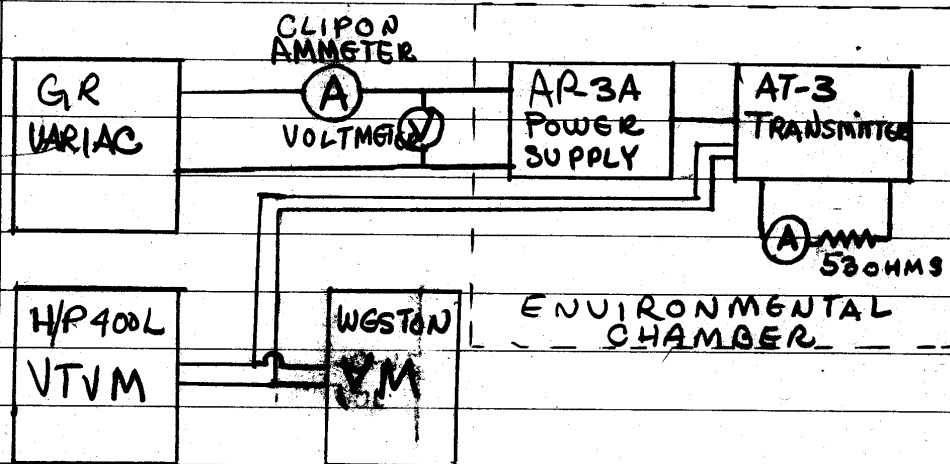
240	5.85
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260	5.7
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270	5.6
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5. AP-3A ENVIRONMENTAL TEST

SETUP:



METHOD:

- (1) SETUP AP-3A POWER SUPPLY AND AT-3 TRANSMITTER IN ENVIRONMENTAL CHAMBER. ALLOW EQUIPMENT TO SOAK 16 HOURS AT 50°C .
- (2) WITH 250 VOLTS AC APPLIED TO THE AP-3A, OPERATE AT-3 WITH "IDY ON" FOR ONE HOUR.
- (3) MEASURE AMPLITUDE AND AC RIPPLE CONTENT OF THE VOLTAGE APPLIED TO THE AT-3.
- (4) REPEAT THE TEST PROCEDURE AT -20°C .

AP-3A ENVIRONMENTAL TEST RESULTS (CONTINUED)

TEMPERATURE = 50°C		AC INPUT = 270	
TIME	AP-3A POWER SUPPLY OUTPUT		
MIN	DC VOLTS	AC RIPPLE (MILLIVOLTS)	
	AFTER MODIFICATION #1, TEST WAS RESTARTED. AC INPUT = 270 VOLTS		
3	12	39	
19	12.3	51	
33	12.3	57	
37	AP-3A INOPERATING		
41	RESET TO 270 VOLTS; AP-3A "ON".		
42	12.3	47.5	
	AP-3A ALLOWED TO SOAK 16 HOURS AT 50°C TEST WAS, AGAIN, RESTARTED		
0	AC INPUT SET TO 250 VOLTS AP-3A TURNED "ON".		
3	12.5	38.5	
15	12.5	38.2	
30	12.6	50	
39	12.5	56	
	AP-3A INOPERATING. MODIFICATION #2 - REPLACED CIRCUIT BREAKER THRESHOLD CONTROL CIRCUIT DIODE (IN 536) WITH DIODE (IN 457). TEST RESTARTED.		
0	AC INPUT SET TO 215 VOLTS		
15	12.5	42	

AP-3A ENVIRONMENTAL TEST RESULTS (CONTINUED)

TEMPERATURE = 50°C		AC INPUT = 115-270 VOLTS
TIME	AP-3A POWER SUPPLY OUTPUT	
MIN.	DC VOLTS	AC RIPPLE (MILLIVOLTS)
10	AC INPUT SET TO 250 VOLTS	
16	12.5	42
30	12.7	56
45	12.7	59
60	12.7	58.5
75	12.8	58

THE AP-3A POWER SUPPLY
CASE TEMPERATURES MEASURED
140-165 °F DURING THE TESTS.

AP-3A ENVIRONMENTAL TEST RESULTS

THE FOLLOWING TEST RESULTS REPRESENT AN ACCOUNT OF AP-3A OPERATION AT -20°C.

TEMPERATURE = -20°C | AC INPUT = 250 VOLTS

TIME MIN.	AP-3A POWER SUPPLY OUTPUT	
	DC VOLTS	AC RIPPLE (MILLIVOLTS)
	AP-3A SOAKED 16 HOURS PRIOR TO TEST.	
0	AP-3A TURNED ON	
1	11.9	140
	AP-3A ERRATIC; SHUTS ON/OFF.	
15	AP-3A STABILIZED	
15	12.3	50
30	12.4	47
45	12.4	46
60	12.4	44
75	12.4	44

AP-3A ENVIRONMENTAL TEST RESULTS

THE TEST WAS RUN ON AP-3A OPERATION AT 50°C IN ORDER TO TAKE ACCOUNT OF THE CIRCUIT MODIFICATIONS MADE BY THE REPRESENTATIVE ON THE AP-3A.

STAT

TEMPERATURE = 50°C | AC INPUT = 220 VOLTS

AP-3A POWER SUPPLY OUTPUT

MIN.	DC VOLTS	AC RIPPLE (MILLIVOLTS)
0	12.2	47
7	12.4	49
8	AP-3A INOPERATING. RESET AC INPUT TO 220 VOLTS. AP-3A TURNED ON.	
15	12.3	55.5
19	12.4	60
20	12.4	60
23	12.4	66
	AP-3A INOPERATING. RESET AC INPUT TO 260 VOLTS. AP-3A SHUT OFF	
	MODIFICATION #1 - REPLACED 0.1 MFD CAPACITOR WITH 0.22 MFD CAPACITOR IN THE TIME CONSTANT CIRCUIT OF THE PHASE CONTROL	