

**INSTRUCTION  
MANUAL  
FOR.....**

Airborne DRVC1A

TYPE 71  
**Noise Generator  
Power Supply**

PART NUMBER 07111



**71 Revision A**

**AIRBORNE INSTRUMENTS LABORATORY**  
DEER PARK, LONG ISLAND, NEW YORK 11729

A DIVISION OF CUTLER-HAMMER



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FIGURE 1. AIL TYPE 71 NOISE GENERATOR POWER SUPPLY

## I. INTRODUCTION

The AIL Type 71 Noise Generator Power Supply, Part Number 07111 (hereinafter referred to as the Type 71), provides the high voltage necessary to fire argon and neon discharge tubes in noise generators (Figure 1). The output discharge current from these tubes can be adjusted to 250 mA with the INCREASE current control (1, Figure 2). Filament-type and cold cathode tubes can be operated from the Type 71.

Two 6-foot cables are supplied to connect the Type 71 to AIL Type 70 Noise Generators.

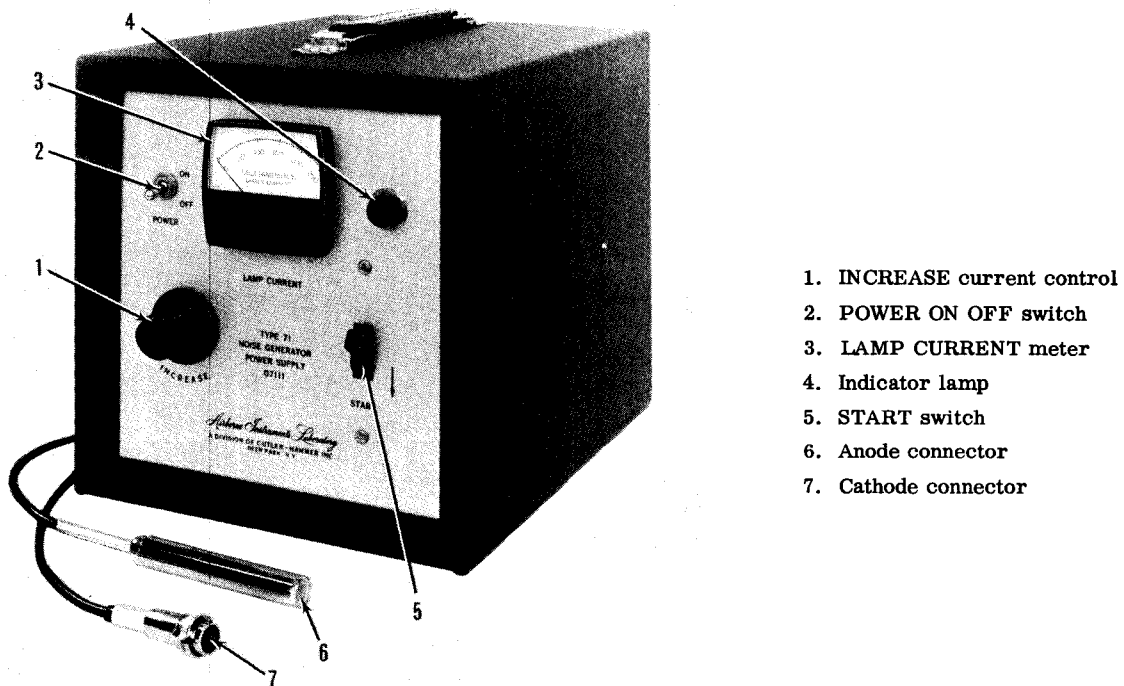


FIGURE 2. FRONT-PANEL CONTROLS AND INDICATORS

## II. SPECIFICATIONS

The specifications for the Type 71 are:

|                  |   |
|------------------|---|
| Part number      | 07111   |
| Size             | 9-1/4 in. high × 8-3/4 in. wide ×<br>10-1/2 in. deep                    |
| Weight           | 15 lbs  |
| Input*           | 115 or 230 V AC, 50-60 Hz, 50 W   |
| Output           | Spike voltage: 2000 V (nominal)<br>Discharge current variable to 250 mA |
| Duty             | Continuous for all currents up to 250 mA                                |
| Filament current | 200 mA maximum in START position  |

\* The Type 71 is factory wired for 115-V operation. To operate with 230 V slight modifications are necessary (Section IV).

## III. CONTROL FUNCTIONS

The functions of the controls and indicators are:

| <u>Nomenclature</u>      | <u>Index No.<br/>(Figure 2)</u> | <u>Function</u>                                |
|--------------------------|---------------------------------|--|
| INCREASE current control | 1                               | Varies discharge current of gas discharge tube |
| POWER ON OFF switch      | 2                               | Turns power on and off                         |
| LAMP CURRENT meter       | 3                               | Indicates discharge current                    |
| Indicator lamp           | 4                               | Indicates presence of input power              |
| START switch             | 5                               | Controls firing of gas discharge tube          |

#### IV. OPERATING INSTRUCTIONS

To operate the Type 71, proceed as follows:

1. Connect the cathode connector (7, Figure 2) to the cathode end of the noise generator being used. Insert the cathode connector in line with the axis of the noise generator. To prevent damage to the noise lamp, be sure that the tube pins line up with the connector. The nut retaining spring must seat flush against the connector mount, without excessive pressure, before the locknut is tightened.
2. Push the anode connector (6) into position at the anode end of the noise generator.
3. Connect the line cord to a primary power source.
4. To fire the lamp, place the POWER ON OFF switch (2) to ON; the indicator lamp (4) should light. Push the START switch (5) down and then release it. This generates a high-voltage pulse between the anode and the cathode of the tube and ionizes the gas.

#### CAUTION

A high-voltage pulse is generated when the START switch (5) is released. The connectors to the signal generator must be in place before the switch is operated. Check all connectors after each setup.

5. After the discharge tube fires, the LAMP CURRENT meter (3) will indicate the discharge current. Adjust the INCREASE current control (1) to the proper setting for the particular noise generator used. (This information is given in the instruction handbook for the noise generator.)
6. Turn off the discharge by placing the POWER ON OFF switch (2) to OFF.

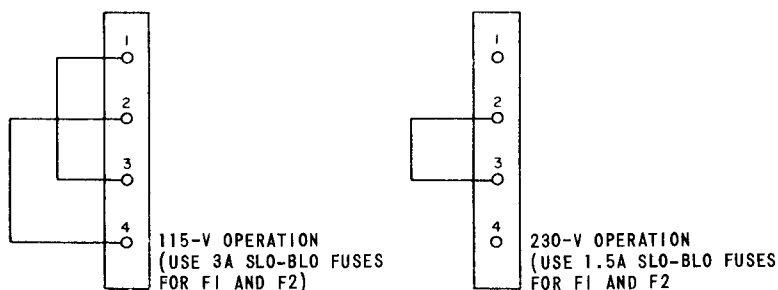
The Type 71 is factory wired for 115-V operation. To operate it with a 230-V input, the primary of T1 must be changed from parallel operation

to series operation. To do this, rewire the input terminal strip (Figure 3) as follows:

1. Remove the black and red-black wire from the terminal with the red wire.
2. Remove the black-yellow and green-black wires from the terminal with the yellow wire.
3. Tie the black-yellow and red-black wires to the end terminal.
4. Connect the black wire to the terminal with the red wire.
5. Connect green-black wire to terminal with the yellow wire.
6. Replace F1 (1.5 A) with a 3/4-A slow blow fuse.

#### NOTE

This procedure is applicable to instruments with serial numbers under 900. For units with serial numbers 900 and above, remove the two jumpers from the input terminal strip and replace one jumper between terminals 2 and 3 as shown here.





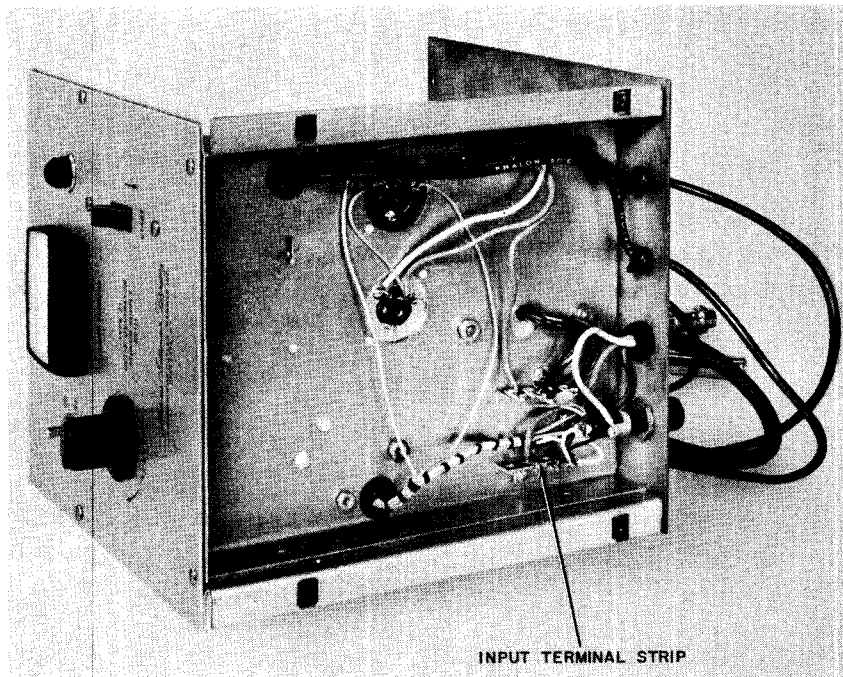


FIGURE 3. INPUT TERMINAL STRIP



the AC supply line. An isolation transformer (T1) is used together with a conventional type of half-wave voltage-doubler circuit. Silicon rectifiers are used. LAMP CURRENT meter M1 (in series with a 4-henry choke and the anode) indicates gas discharge current in the gas tube. R1 (variable) and R7 (fixed) are also in series with the anode and act as current limiters. The 0.006- $\mu$ f capacitor (C1) across the START switch minimizes arcing when the switch is operated.

With POWER ON OFF switch (S2) in the ON position, various DC voltages are generated. The input AC voltage to the Type 71 is rectified by the silicon-rectifier circuit. The resulting DC voltage is filtered by two 40- $\mu$ f electrolytic capacitors (C2 and C3). When spring-loaded START switch (S1) is released, a spike of about 2000 V is generated across the tube. The generation of spike voltage facilitates firing the gas discharge tube. The high spike voltage is a result of the sudden change in current in the choke when the START switch is released. The current through the choke (L1) then discharges through the limiting resistors and the anode; thus, the gas in the tube is ionized.

## VI. MAINTENANCE

The preventive and corrective maintenance procedures outlined in this section should be followed to obtain maximum service from the equipment. The preventive maintenance procedure consists of performing voltage measurements at significant points in the circuit, measuring the start-voltage spike, and checking the lamp discharge current. A Tektronix Type 512 oscilloscope, or equivalent, must be used to measure the start-voltage spike. A noise generator must be used to check the discharge current. The maintenance procedure consists of troubleshooting the equipment and repairing and replacing defective components. A schematic diagram (Figure 4) and Replaceable Parts List (VII) are provided for this purpose.

### A. VOLTAGE MEASUREMENTS

#### NOTE

All measurements made with 115 V AC input.

Use a DC voltmeter to measure the DC voltage from the points indicated on the schematic diagram to ground. The values obtained under no-load conditions should be as specified.

| <u>Point</u> | <u>Volts DC</u> |
|--------------|-----------------|
| A            | 0               |
| B            | 160             |
| C            | 320             |
| D            | 320             |
| E            | 320             |

### B. START-SPIKE MEASUREMENT

To measure the start-spike voltage, proceed as follows:

1. Short circuit the two pins of the cathode connector.

2. Connect a high voltage oscilloscope probe such as the Tektronix P6013, to the anode connector.
3. Wrap a piece of hook-up wire around the high-voltage (anode) lead at least three turns. Connect one end of this wire to the trigger input jack of the oscilloscope to synchronize the oscilloscope to the spike. The other end of the wire is not terminated.
4. Adjust the oscilloscope for a sweep rate of 10,000  $\mu\text{sec}/\text{cm}$ .
5. Connect the power plug to a 115-V AC source.
6. Set the POWER ON OFF switch (2, Figure 2) to ON.
7. Close the spring-loaded START switch (5) and release it. Measure the spike voltage amplitude on the oscilloscope as the START switch (5) is operated.
8. Multiply the oscilloscope reading by the probe attenuation (typically 1000) to obtain the spike voltage (2000 V nominal).

#### C. CHECK OF LAMP-START AND LAMP-DISCHARGE CURRENT

Set up the Type 71 and a noise generator for normal operation. After the gas-discharge tube fires, turn the INCREASE current control (1) to the maximum clockwise position and observe the LAMP CURRENT meter (3). It should indicate more than 250 mA. With the lamp still fired, turn the INCREASE current control (1) to the maximum counterclockwise position. The meter should now indicate less than 150 mA. For high line voltage or special noise tubes, a series resistor of appropriate power ratings can be used to obtain lower output currents with no reduction in firing capability.

#### D. REPAIR

If it is necessary to return the equipment to the manufacturer for repairs, please write to the AIL Microwave Instruments Sales Department, Comac Road, Deer Park, New York. Give complete information concerning the nature of the failure and how the equipment was used when failure occurred. Also provide the type and serial numbers of the unit. After receipt of this information, special instructions will be supplied concerning the return of the equipment. All equipment should be packed and shipped in accordance with these instructions, with transportation charges prepaid. A failure report should accompany shipment of the equipment. Sufficient packaging material should be used to prevent in-transit damage.

## VII. REPLACEABLE PARTS LIST

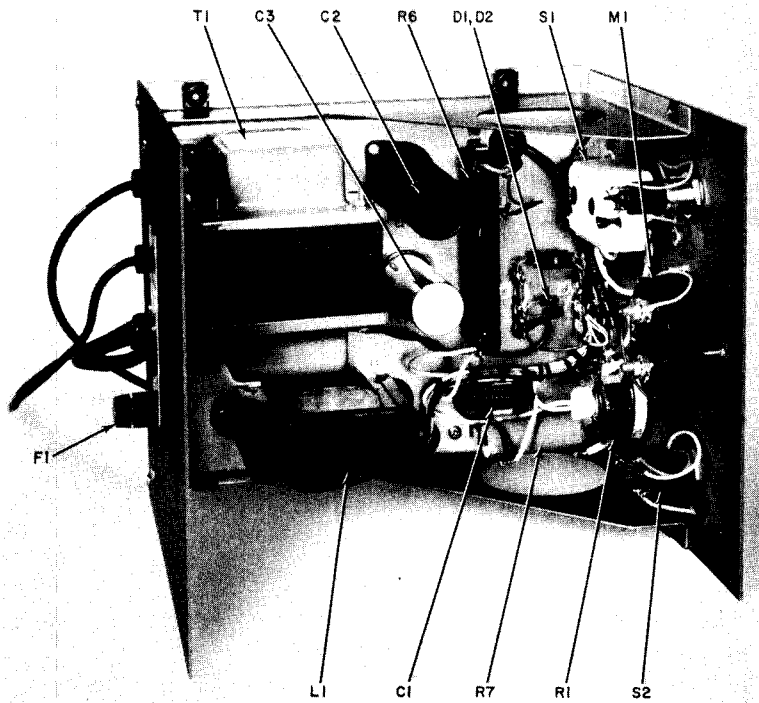


FIGURE 5. COMPONENT LAYOUT

| <u>Symbol<br/>(Figure 5)</u> | <u>Description</u>                              | <u>Suggested<br/>Manufacturer</u> | <u>Part<br/>Number</u> |
|------------------------------|---|-----------------------------------|------------------------|
| C1                           | Capacitor, paper, 0.006 $\mu$ f,<br>1600 V DC   | Sprague                           | MB-D6                  |
| C2, 3                        | Capacitor, electrolytic, 40 $\mu$ f<br>450 V DC | C-D                               | UPT4045T               |
| C4                           | Capacitor, ceramic, 0.001 $\mu$ f,<br>600 V     | Centralab                         | DD2-102                |
| D1 2                         | Rectifier, silicon                              | Texas Instru-<br>ments            | 1N2071                 |
| F1                           | Fuse, slow blow, 1.5 A                          | Bussman                           | MDL                    |
| I1                           | Lamp, indicator, neon                           | GE                                | NE-51                  |

| <u>Symbol<br/>(Figure 5)</u> | <u>Description</u>                          | <u>Suggested<br/>Manufacturer</u> | <u>Part<br/>Number</u> |
|------------------------------|---|-----------------------------------|------------------------|
| J1                           | Connector assembly, cathode                 | AIL                               | 07003                  |
| J2                           | Connector assembly, anode                   | AIL                               | 07003                  |
| L1                           | Choke, 4 H                                  | Triad                             | C-15X                  |
| M1                           | Meter, mA                                   | AIL                               | 113202                 |
| R1                           | Resistor, variable, 1000 $\Omega$ ,<br>50 W | Ohmite                            | 0326                   |
| R2, 3                        | Resistor, fixed, 10 $\Omega$ , 2 W          | Allen-Bradley                     | RC42GF100J             |
| R7                           | Resistor, fixed, 1000 $\Omega$ , 50 W       | Ohmite                            | 0405                   |
| R6                           | Resistor, fixed, 300 $\Omega$ , 25 W        | Ward-Leonard                      | 25F300WL               |
| S1                           | Switch, tumbler                             | AH & H                            | 1629                   |
| S2                           | Switch, toggle                              | Cutler-Hammer                     | 8363K7                 |
| T1                           | Transformer, power                          | Triad                             | N67A                   |