

## PSI-10 NA

# REGULATED POWER SUPPLY MAINTENANCE MANUAL

**LIMITED**

**WARRANTY**

General Aviation Electronics, Inc. (Genave), warrants this product to be free from material defects for a period of 90 days from the date of purchase, provided the warranty registration card properly filled out is returned by the purchaser to Genave within 10 days after purchase. This warranty is limited to the original retail purchaser and is not extended to second owners of the product.

Our obligation under this warranty is limited to replacement of any parts (except periodic maintenance items such as bulbs, fuses, etc.) which, upon our examination, appear to us to be defective in materials or workmanship. The parts will be replaced within 45 days after receipt of the unit, provided the unit is delivered to the Factory (Customer Service Dept., General Aviation Electronics, 4141 Kingman Drive, Indianapolis, Indiana 46226) within 90 days after the date of purchase, shipping prepaid. All shipping costs and labor charges shall be born by the purchaser.

The owner may elect to have the unit repaired at an authorized Genave repair facility in which case Genave, within 45 days after receipt of the unit, will replace only those defective parts returned shipping prepaid to the Factory (Customer Service Dept., General Aviation Electronics, 4141 Kingman Drive, Indianapolis, Indiana 46226). Purchaser shall bear any and all other costs including but not limited to labor, transportation and freight.

This warranty does not apply to defects, malfunction, or breakage due to improper installation or to the servicing thereof by other than an authorized Genave dealer nor to units that have been damaged by lightning or other acts of God, excess current, or any units that have had serial number altered or removed. Abuse, misuse, tampering, submersion in water or willful destruction of the unit will also void this warranty.

This warranty gives you specific legal rights. You also have implied warranty rights. In the event of a problem with warranty service or performance, you may be able to go to a small claims court, a State court, or a Federal District court.

**Genave offers this warranty in lieu of any and all other guarantees or warranties, either EXPRESSED or IMPLIED, including but not limited to warranties of merchantability and/or fitness for a particular purpose. Any implied warranties are specifically and expressly limited to the 90-day period specified herein. Damages for breach of any warranties, either expressed or implied are limited to replacement of any defective parts as specified herein and any other incidental or consequential damages are expressly excluded.**

General Aviation Electronics, 4141 Kingman Drive, Indianapolis, Indiana 46226--Area 317-546-1111

## Genave

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# SECTION I

## GENERAL INFORMATION

### 1-1. GENERAL

The PSI-10NA power supply is a modified unit, designed especially for use with the Alpha 12 Aviation Transceiver for the State of Alaska. The unit will supply 13.75 volts DC for the transceiver, as well as keeping a "standby battery" charged. However, there is a practical limit to the amount of charge current the PSI-10NA can supply; therefore, it should be used only to keep a "standby battery" ready for use, but should NOT be expected to recharge a large battery after severe usage.

The PSI-10NA is designed for a maximum current of 8 amps with an approximate 50% duty cycle, such as may be experienced in various communications services. The supply is of all-solid-state design, and incorporates a dual-primary stepdown transformer which allows the unit to operate on either 120 or 240 VAC. A rear-panel-mounted, DPDT slide switch, S102, connects the primaries of T101 in parallel for operation on 120 volts, or in series for 240-volt operation.

The PSI-10NA power supply is enclosed in a two-piece, aluminum cover designed to protect the instrument from dust, moisture, and physical damage. A 15-pin female connector, which mates with most Genave transceivers, is provided to connect the power-supply output to the companion transceiver. A 2-pin connector provides a means of connecting the transceiver/power supply to a "standby battery."

### 1-2. CIRCUIT DESCRIPTION

A standard 3-prong plug applies 120 or 240 VAC input to the primaries of T101 through On-Off, S101; Fuse, F101; and Voltage Switch, S102. The 3rd (grounded) input wire connects the power supply

metal chassis to the electrical-system ground for safety purposes. S102 connects the dual-primaries of T101 in parallel for 120-volt operation, or in series for operation on 240-volts. See schematic diagram in Figure 1-1.

Secondary voltage from step-down transformer, T101, is applied to a solid-state, full-wave rectifier consisting of CR101 and CR102. This rectifier is inverted from the usual arrangement, in that the ends of the secondary winding are grounded through the diodes, and the positive output voltage is taken from the secondary center-tap. Connecting the diode anodes directly to ground results in improved thermal conduction.

A capacitive-input filter, utilizing a large value electrolytic capacitor, C-101, smooths the rectifier output and provides a low-impedance for the 120-Hz ripple voltage.

The heart of the PSI-10NA power supply is a new solid-state, adjustable voltage regulator, the LM396K. The LM396K, rated at 10 amps, is adjustable from 1.25V to 15V, and offers full overload protection. Included on the chip are current limiting and thermal overload protection. All overload protection circuitry remains fully functional, even if the adjustment pin is accidentally disconnected. The regulator needs only two external resistors, R101 and R102, to set the output voltage. IC101 is housed in a standard TO-3 case.

A minimum load current of 10 mA is required to prevent the regulator from dropping out of regulation under some conditions, and R103 assures at least this minimum amount of current in the PSI-10NA.

C102 lowers the high-frequency output impedance to eliminate any tendency to oscillate.

LED CR103 indicates that unit is supplying output voltage, and R104 limits current through CR103 to a safe value.

A 12-volt battery may be connected to P102, a 2-pin plug, to provide emergency back-up for the AC power supply. If output of regulator IC101 drops below approximately 12 volts, CR104 is back-biased and turns OFF; then, the "standby battery" automatically powers transceiver. CR104 is an isolating diode which prevents "standby battery" from discharging through R101/R102, R103, and CR103/R104 when IC101 does not supply normal output voltage. When output of IC101 returns to normal, CR104 is again forward-biased and the AC supply powers radio and also provides charge current for the battery.

J101 is a 15-pin receptacle which mates with rear plug on Alpha 12. Pin 15 connects +13.75 VDC to transceiver, and pin 13 is the ground connection. Pin 2 is jumpered to pin 10 on J101 to allow use of internal speaker in Alpha 12 transceiver. An external speaker may be used by removing this jumper, and connecting pin 2 to one speaker lead and connecting remaining speaker lead to pin 7 (ext. speaker ground) on J101.

### 1-3. SPECIFICATIONS

**Output Voltage:** 13.70 VDC  $\pm$ .50V, from 0 to 8 amps (MAXIMUM)

**Duty Cycle:** Intermittent, approx. 50% transmit, and 50% receive.

**Charge Current:** Should not exceed approx. 1 amp.

**Size:** 11.25" (28.6 cm) D  
6.50" (16.5 cm) W  
2.75" (7.0 cm) H

### 1-4. OPERATION

The PSI-10NA AC power supply is designed to be "stacked" with a Genave transceiver, such as the Alpha 12. The usual arrangement is to set the transceiver on top of the PSI-10NA power supply;

then, fasten the units together with the brackets and four 1/4 - 20 x 1/2" Truss-head screws (furnished).

Prior to connecting power supply to AC source, BE SURE the slide switch, located on rear panel of PSI-10NA, is set to agree with the voltage source being used (120 or 240 VAC). A "narrow-blade" screwdriver or key will facilitate setting the slide switch. See Figure 1-0.

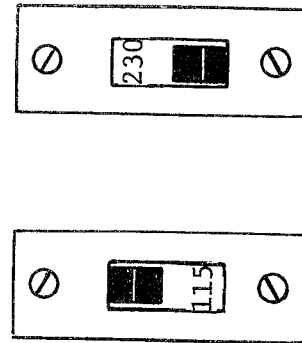
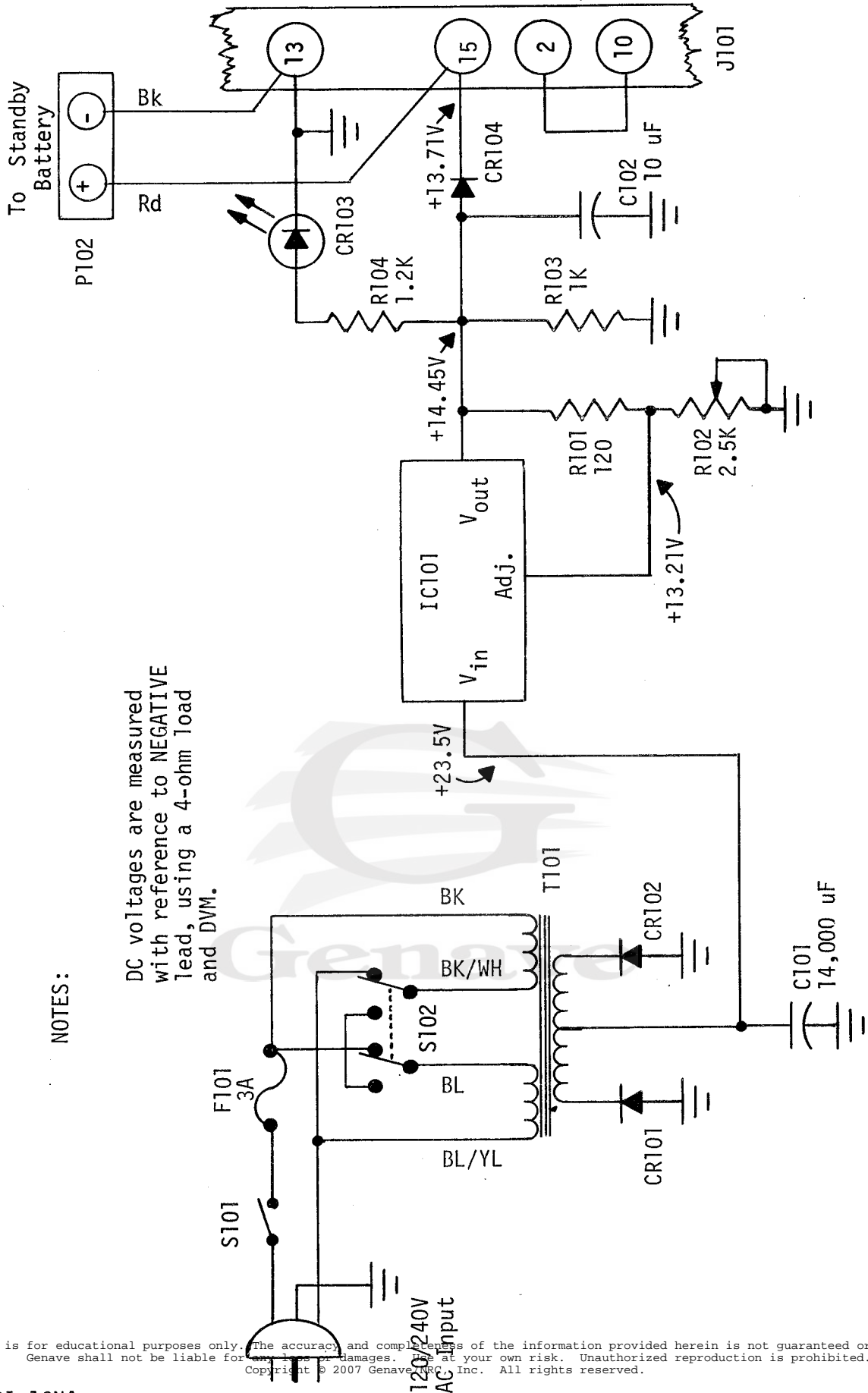


Figure 1-0. 120/240 VAC Switch

With power supply connected to appropriate AC source and to transceiver, place PSI-10NA front-panel power switch to its ON position. A red LED, immediately to right of power switch, will glow, indicating that supply is operating. Then, operate radio as given in the Alpha 12 Owner's Manual.

### 1-5. MAINTENANCE

Typical voltage readings for the PSI-10NA power supply are given in Figure 1-1. The DC voltages are measured with reference to the NEGATIVE lead, using a 4-ohm resistive load and a DVM. Adjust R102 for 13.7 VDC across load resistor. If a "standby battery" is used, the charging current to the battery should be measured; it should NOT BE MORE than 1 amp while PSI-10NA is supplying normal current to the Alpha 12 transceiver. If necessary, re-adjust R102.



NOTES:

DC voltages are measured with reference to NEGATIVE lead, using a 4-ohm load and DVM.

Figure 1-1. PSI-10NA Schematic

# PARTS LIST

<u>Reference Number</u>	<u>Part Number</u>	<u>Description</u>
<u>CAPACITORS</u>		
C101	1540206	Elect. 14,000 uF, 35V
102	1550007	Tant., 10 uF, 20%, 35V
<u>DIODES</u>		
CR101, 102, 104	4810044	6 Amp, 100 PIV
103	3900030	LED, red lamp
<u>FUSES</u>		
F101	5140016	Fuse, 3AG 3 Amp.
<u>CONNECTORS</u>		
J101	2100252 2100254	Connector, Female Terminal, Female (For J101)
<u>INTEGRATED CIRCUITS</u>		
IC101	---	LM396K, Adjustable Regulator (National Semiconductor)
<u>RESISTORS</u>		
R101	4700014	Comp., 120 ohm, 10%, 1/2W
102	4760017	Pot., Mini, 2.5K, 30%
103	4700025	Comp., 1K, 10%, 1/2W
104	4700026	Comp., 1.2K, 10%, 1/2W

<u>Reference Number</u>	<u>Part Number</u>	<u>Description</u>
<u>SWITCHES</u>		
S101	5100132	Switch, SPST, (OAK 25-B-C)
102	5100138	Switch, DPDT, Slide
<u>TRANSFORMERS</u>		
T101	5600090	Special, 120/240V Primary
<u>MISCELLANEOUS</u>		
---	2510380	Panel, Front
---	2510379	Panel, Rear
---	2510128	Siderail, Chassis
---	2510129	Siderail, Chassis
---	2510401	Cover, Metal Bottom
---	2510402	Cover, Metal Top
---	2510386	Handle, Mounting Bracket
---	2820010	Washer, Nylon
---	2508751	Washer, Friction
---	9050003	Bumper
---	6070066	Grommet, Heyco SR-4P-4 (for J101 cable)
---	6070067	• Grommet, Heyco SR-5-N4 (for power cord)
---	6010030	Cable, Power Cord
---	2500201	Cover, Transistor (For IC101)
---	5140019	Fuseblock

<u>Reference Number</u>	<u>Part Number</u>	<u>Description</u>
<u>MISCELLANEOUS (Cont'd)</u>		
P102	2100246	Plug, Molex, 1625-2P
	2100248	Terminal, Male, Molex 1560-TL
J102	2100245	Recept, Molex, 1625-2R
	2100247	Terminal, Female, Molex 1561-TL

