hy-gain

ORDER NO. 602

INSTALLATION & OPERATION INSTRUCTIONS

DC POWER SUPPLY

HY-GAIN ELECTRONICS CORPORATION
Rural Route 3 . Lincoln, Nebraska 68505

SECTION I

DESCRIPTION

1.1 GENERAL

The Model 602 DC Power Supply is designed for use with the Hy-Gain Model 600 Bi-Linear Amplifier when used in a mobile installation. It is constructed on an all aluminum chassis with heat sinks for rapid transfer of heat from the heavy duty switching transistors. An internal thermal-switch has been provided to prevent damage to the unit by rendering it in inoperative during periods of high ambient temperature.

NOTE

The Model 602 DC Power Supply is for use on negative ground only automotive systems.

1.2 TECHNICAL SPECIFICATIONS

Size	8 1/2" x 6" x 4"
Weight	6 1/2 lbs.
Transistor Complement	4 each – GDC-50
Diode Complement	10 each – IN 5054
Input Voltage	12 to 14 VDC @ 40 to 60 amps.
Output Voltage	800 VDC @ 600 ma
	325 VDC @ 200 ma
	100 VDC @ 35 ma
	12 VDC @ 10 amps

SECTION II

UNPACKING

2.1 REMOVING FROM CARTON

Carefully remove the Power Supply from the packing carton. Examine it closely for signs of shipping damage. This equipment has been carefully packed for safe arrival IF PROPERLY HANDLED EN ROUTE.

2.2 IN CASE OF DAMAGE

The responsibility for safe delivery rests with the carrier. The responsibility in obtaining reimbursement for damage rests with YOU Prompt action on your part will speed adjustments. Our warranty in no way covers malfunction or damage which is a result of improper handling by a carrier. Under no circumstances should you return merchandise to your dealer before instigating the necessary forms. To do so can jeopardize your investment and the costs of necessary repairs may be a burden you will have to assume.

2.3 WARRANTY REGISTRATION

Fill out the enclosed Warranty Registration Card and mail to insure your warranty will be on file.

2.4 SHIPPING CARTON

Save the carton and packing material. You may need it at a later date for storage or shipment.

2.5 BENCH TEST

The system was fully tested prior to packing and operated perfectly in all respects. However, after satisfying yourself that there has been no mechanical damage during shipment, the manufacturer recommends bench test of the system prior to installation to insure no electrical damage occurred.

SECTION III

INSTALLATION

3.1 LOCATION CONSIDERATIONS:

The Model 602 Power Supply case design makes the unit substantially splash proof, but not completely water proof. It can be mounted where water will occasionally splash on it without harm. However, it should be mounted so that all cable entrances face to the rear to minimize water entry around the grommets.

The Model 602 Power Supply should be mounted in a position where there is good air movement. Air movement in the motor compartment is best near the front and poorest near the rear. Placement should be as far forward as possible. Do not place the unit on the fire wall under any circumstances. Many cars have sufficient space between the grill and radiator for installation of the Power Supply. However, if the unit is placed behind the grill; observe precautions regarding entrance of water.

For maximum cooling of the 602 Power Supply, it should be placed in the flatest possible position to transfer as much heat from the case to the automobile body. The mounting surface should be cleaned thoroughly before attachment of the Power Supply to insure good heat transfer.

The heavy primary power cables which are furnished with the Model 602 Power Supply cannot be lengthened or poor voltage regulation will result with possible damage to the Power Supply. This must also be taken into consideration when deciding placement of the unit.

3.2 REGULATOR TEST

Before connecting the primary power cables to the supply and the battery terminals, the voltage output of the generator or alternator should be checked. Turn on the car headlights for five minutes without starting the motor. This will discharge the battery slightly. Connect an accurate volt meter from the generator output terminal to ground and start the motor. WITH THE MOTOR AT A FAST IDLE, THE GENERATOR OR ALTERNATOR, OUTPUT VOLTAGE SHOULD NOT EXCEED 14.5 VOLTS. If it does, the automotive voltage regulator should be recalibrated for a maximum output voltage from the generator or alternator of 14.5 volts. If the generator output voltage is between 13.5 and 14.5 volts, the regulator will not need adjustment. (For regular adjustment, refer to the ship service manual for the automobile available from your car dealer.

3.3 MOUNTING

The Model 602 Power Supply is mounted by heavy sheet metal screws or bolts passed through the four holes in the bottom of the flange. The exact mounting position should be selected keeping in mind the considerations of paragraph 3.1.

The unit is furnished with a heavy duty power cable for connection to the Model 600 Bi–Linear Amplifier. This power cable includes a pre–wired 12 pin plug. After deciding upon the exact placement of the Power Supply, route the power cable from the the Model 600 Bi–Linear Amplifier to the Power Supply. Allow some slack in the power cable at the Power Supply. The excess cable may be cut off. Be sure to cut from the end that will connect the Power Supply and do not cut the power plug off.

To expose the terminal strip for connection of the power cable, you must remove six screws. Two on each end and one on each side to release the top cover. This will expose the terminal strip as seen in Figure 1. Insert the heavy power cable through the grommet adjacent to the terminal strip. After inserting the power cable into the Power Supply, strip the outer vinyl jack back approximately three inches and then remove 3/8 inch insulation from each individual wire. Connect the wires to the terminal strip following the wiring code shown below. It is recommended that the power cable wires be soldered to the lugs provided. By soldering the power cable wires in place, future trouble with corroded connections can be avoided.

No. 1 – Red.....+800 VDC @ 600 ma HIGH VOLTAGE
No. 2 – Blue.....+ 325 VDC @ 200 ma LOW VOLTAGE
No. 3 – Purple & Yellow Wires.....+12 VDC @ 6 amps FILAMENTS & TRANSISTORS
No. 4 – Orange.....–100 VDC @ 35 ma BIAS
No. 5 – Brown.....Relay Control Wire (Ground to turn supply ON)
No. 6 – Black & Green Wires.....Ground

After wiring the terminal strip, replace the top cover and secure the Model 602 Power Supply in operating position utilizing the four mounting holes in the bottom flange. Route the primary power cables from the supply to the battery.

CAUTION

NEVER connect the primary power cables to the starter solenoid or any other voltage source on the car. The primary power cable must always be connected directly to the battery terminals or clamps. Take care to insure that the polarity of the Power Supply power cables is not reversed when connecting to the battery.

After the primary power supply cables are installed, check to insure that the Model 600 Bi–Linear Amplifier is turned off and connect the power supply cable to the rear of the amplifier.

3.4 REMOTE CONTROL OF THE 600-602 WHEN MOBILE

The separate power supply concept provides maximum efficiency by utilizing the shortest low voltage high current power leads possible. By transforming the car's 12 volts to operating voltages near the battery and routing to the amplifier, power transmission losses are minimized.

If the power supply is mounted on the same chassis as the amplifier, the long 12 volt power leads required will cause a voltage drop of 2-3 volts. This will cause a loss of 20-30% in power. This loss is not encountered with a separate power supply and short 12 volt leads. Additionally, remote control problems are also easier because it is not necessary to switch the main 12 volt power leads.

To remotely control the 600-602 combinations. attach 2 wires, #18 AWG size, to terminals No. 5 and 6 of the 602 power supply connection strip. Route these wires to a remote control switch under the dash. Whenever the switch is closed, the primary control relay will close and turn-on the 600-602 combination. The 600 Linear can now be placed in any convenient location after tuning and setting the controls.

NOTE

The front panel power switch should be left in the "OFF" position when using a remote control switch.

SECTION IV

OPERATION

4.1 USAGE

Operation of the Model 602 Power Supply is controlled by the ON/OFF Switch of the Model 600 Bi–Linear Amplifier. When the Model 602 Power Supply is operating properly, there will be a slightly audible tone of approximately 400 cycles heard near the Power Supply. Due to the heavy power drain on the automotive electrical system by this Power Supply when operating only use it when the motor is in operation. Usage of the Power Supply without the engine in operation can cause damage to the transistors due to low voltage conditions.

CAUTION

NEVER start the motor with the Power Supply in operation.

4.2 OPERATING CONSIDERATIONS

Power Supply damage is most likely to occur by continuing operation or usage after driving the vehicle for a considerable period of time and then stopping and turning off the motor. The temperature rise within the motor compartment is rapid and will cause transistor failure or operation of the thermal relay. Under such conditions the Power Supply should be turned off until the car is moving again or until the motor compartment has cooled down. The majority of transistor failures are traceable to usage of the equipment after extended driving periods while the car has stopped for refueling, etc.

NOTE

A special Thermal Relay has been included in this unit to offer the user maximum protection from temperature failure of components, especially transistors. If a nominal temperature of 176 degrees is exceeded, this protective device will open the primary relay K1 and render the supply inoperative until the temperature drops to a safer level, at which time it will automatically reactivate the supply.

Loss of operation during a transmission due to this relay is certainly more desirable than loss of operation due to transistor failure. Proper mounting in a well ventilated area will prevent loss of operation due to either of the above causes, barring other factors of unusual natural heat.

The 602 power supply is further protected from over load damage by a fuse in the negative return load of the high and low voltage sections. This fuse is located on the side opposite the primary 40 amp fuse. It is a size AGC 0.5 amp fuse. Failure of this fuse while tuning up or operating indicates an overload which could cause 602 power supply failure or secondary component failure.

WARNING

DO NOT use a larger fuse. Use only type AGC 0.5 amp. An occasional fuse failure is much less inconvenient than transistor or torroid transformer failure.

Use only AGU-40 fuses in the primary Power Supply line. A higher amperage fuse will not protect the supply from damage.

4.3 TROUBLE SHOOTING

In most cases, when the 40 ampere fuse blows, it indicates a strong probability of a shorted transistor. However, sometimes a surge can blow a fuse without damage occuring and a new fuse should be installed and tried before further investigation is made. If the supply operates normally, then it indicates no damage was done. If it instantly blows the new fuse, it is most likely an indication of a bad transistor, a short in the primary cables, or a short in the power cable.

NOTE

The following checks can be made to isolate various problems that might be encountered and speed servicing in the field. However, we suggest that no work be done in the field unless you anticipate completing the work in the field.

Should a fuse blow instantly, it indicates a high current short in the 12VDC line. Either in the supply, the power cable to the amplifier, or in the amplifier itself. The first step should be to unplug the power cable from the amplifier, remove the top cover from the power supply for access to the terminal strip and with the aid of a short jumper wire, connect terminal No. 5 in the supply to the car frame. This will normally start the supply (replace fuse blown in above test). If the supply does start when shorting terminal No. 5 to the frame and the voltage output is as it should be, it would indicate the short is in the Bi–Linear Amplifier. If the supply blows another fuse, you can isolate the cable as a source by disconnecting all cable wires at the supply terminal strip and again starting the supply by jumping terminal No. 5 to the car frame (replace the blown fuse). If the supply operates normally, then the trouble is in the cable. If another fuse is blown the trouble is in the supply. Remove the supply and very carefully look for components that might be touching the case and causing a short. If none are observed, then it is reasonably certain the trouble is a bad transistor

When a bad transistor is the conclusion of the tests made, it can be verified with a simple VOM test, using a low ohm scale which will read 5 ohms or less. To make the test, disconnect the two wires to the lugs of the transistor (use long nose pliers to hold the lugs near the case and prevent overheating the transistor) and measure resistance between the two lugs. It should be at least 3 ohms. A bad transistor will show a direct short. If good, immediately reconnect the wires, taking care not to reverse them, use the pliers again for a heat sink. Check the other transistors and replace the one found shorted. While replacing the defective transistor, always check the four 1.5 ohm/5 watt base drive resistors for proper value. If all transistors are found to be good, it would indicate a short circuit in the other power supply components, such as a diode, capacitor or toroid transformer.

WARNING

If the emitter current equalizing wires, R9-R12, have been damaged, do not replace with any other size and length wire or improper current distribution will cause transistor failure again. Use 6" of #22 AWG wire only.

If the fuse does not blow and the lamp and filaments light, but the power supply does not start oscillating, the type #1495 bulb should be checked to insure the filament has not burned out. The type #1495 is an aircraft lamp available from most aircraft repair shops. If not locally available, type #1458 can be substituted, but the filament is not as rugged as the type #1495.

SECTION V
SERVICE INFORMATION

5.1 RETURNING EQUIPMENT FOR SERVICE:

DO NOT ship equipment to the Manufacturer without prior authorization. We prefer to send special shipping labels which will avoid the delay of unexpected shipment.

If time is extremely important, wire or call for approval and we will rush labels to you. When a shipment is expected, even the time of sending the labels is less than that lost when an unexpected shipment is received.

It is VERY IMPORTANT that the shipment be well packed and fully insured. Damage claims must be settled between you and the carrier and will greatly delay any returns. Proper packing normally avoids this trouble.

ALL SHIPMENTS MUST BE SENT TO US PREPAID. We do not accept collect shipments. All returns should be made in our standard cartons only — so save your carton when unpacking the unit. When a shipment is returned it will be handled in one of three ways . . . .

1—Where all service is in warranty the shipment will be returned prepaid by a carrier of our choice.

2—If there are any charges not covered by warranty we will hold the shipment and advise you of costs, which you can then send.

3—Or, upon your written authorization, we will ship C. O. D. for any charges not covered by warranty, then the carrier will collect these charges and the transportation costs on arrival. Unclaimed or refused C. O. D. shipments will not be reshipped until payment of service and transportation charges is received. Shipment will then be made collect for reshipment transportation charges. Unclaimed equipment automatically becomes the property of the Manufacturer 60 days after date of refusal or return and will be disposed of for payment of charges due.

NOTE

We WILL NOT ship by means of a carrier that will not fully insure the shipment. Some carriers have a $200.00 limit. The exception to this is when there is no other means (APO-FPO-etc.) of shipment than parcel post, and then we will ship by this means with your written agreement that you assume any loss over that which the carrier will insure. C. O. D. shipments cannot be made to APO-FPO addresses.

5.2 REPLACEMENT PARTS ORDERING:

All replacement parts orders must be prepaid or C. O. D. only.

Replacement part price quotes will be furnished on request for those who desire prepaid shipment or cannot accept C. O. D. shipments.

5.3 SHIPPING ADDRESS:

All requests, inquiries, warranty claims or equipment returns should be made to:

Hy-Gain Electronics Corporation
Rural Route 3
Lincoln, Nebraska 68505

Attn: Customer Service Manager

SECTION VI
WARRANTY

Hy-Gain Electronics Corporation warrants each new product manufactured to be free from defects in material and workmanship and agrees to remedy any such defect, or to furnish a new part, in exchange for any part of any unit which under normal installation, use, and service discloses such defect within ninety days from the date of purchase by original owner. The unit serial number must be registered by the original owner at the time of purchase to validate the warranty.

This warranty does not extend to any of our products which have been subjected to mis-use, neglect, accident, incorrect wiring not our own, improper installation or to use in violation of instructions furnished by us. Nor does it extend to units which have been repaired or altered outside of our factory nor to accessories used therewith not of our own manufacture, nor to any cases where the serial number has been removed, defaced, or changed.

Hy-Gain Electronics Corporation reserves the right to make any changes deemed necessary or desirable without advance notice or incurring any obligation to make like changes in units prevously manufactured or sold.

This warranty does not cover transportation or installation costs that may be incurred. Hy-Gain Electronics Corporation's sole liability is the remedy of any defect for ninety days. Hy-Gain Electronics Corporation is not responsible for personal injury or property damage resulting from improper or careless installation not intended by the manufacturer.

No person is authorized to assume for us any other liability in connection with the sale of our products.

All warranties are void and terminated one year after the last unit of its type and design has been manufactured by us.