



professional sound products

INSTALLATION & OPERATIONS MANUAL

**PA-SERIES POWER AMPLIFIERS
PA-4020B**

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Important Notices

PLEASE READ THIS PAGE BEFORE OPERATING YOUR IRP® professional sound products L.P. POWER AMPLIFIER

Introduction

Your new IRP professional sound products power amplifier has been designed and constructed to provide years of reliable, trouble-free operation. Please take a few moments to read the following information before installing your new power amplifier. Adherence to these simple instructions will ensure that your new power amplifier will provide you with the service and performance that you have come to expect from IRP products.

Read all instructions prior to connecting any ac power to your power amplifier

Ac Power Conditions

The Power Amplifier described in this manual and which is intended for distribution in North America is shipped from the factory setup for operation from 115 volt, 60Hz power mains. The unit can be rearranged for operation on 230 volt 50Hz if required. The power amplifier should be connected to an ac line source of the type described in this manual or as indicated on the rear of the unit.

Ventilation

When the unit is installed in an equipment rack without forced air cooling, a maximum ambient temperature of 45°C (113°F) should not be exceeded. Refer to Mounting Section for further details.

Protection from Water Damage

The PA-4020B is enclosed in a chassis, which is devoid of ventilation holes. Consequently, it is by-and-large impervious to happenstance's where liquid or other corrosive elements can be introduced into the interior of the chassis. However, the external connections on the rear panel of the amplifier could be adversely effected by exposure to water or other liquids. Hence, as a general

precaution, the unit should not be operated in a location where it might be subjected to water or other spilled liquids.

Grounding

The power amplifier is intended to be mounted in a metallic enclosure which should be grounded in accordance with NEC (National Electrical Code) prescribed procedures. When used in locations other than the USA, adhere to local codes and standards for specifics.

Do not make any modifications that will defeat the grounding provisions of the unit.

Operating Controls

There are no user operating controls within the interior of the chassis. Do not remove the chassis cover. Potentially lethal electrical circuits may be exposed when the cover is removed.

Service Information

Only qualified service personnel should service the power amplifier when:

- The power cord or line connection plug is frayed or otherwise damaged
- Unit has been exposed to spilled liquids
- The amplifier does not appear to be operating properly or there is a noticeable change in performance
- The unit has been dropped or the enclosure has been damaged

Refer all service work to a qualified electronics technician. Contact the factory or your authorized IRP dealer for further information

Removal of the cover, or other unauthorized tampering may result in a voiding of the warranty

FCC Compliance

Warning

This equipment generates and uses radio frequency energy and if not installed and used properly, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna
- Relocate the amplifier with respect to the receiver
- Move the amplifier away from the receiver
- Plug the amplifier into a different electrical outlet so that the amplifier and the receiver are on different electrical branch circuits

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems". This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

Product Description

The PA-4020B Power Amplifier is IRP professional sound products' latest version of the legendary DH-4020. The PA-4020B features improvements designed to address the needs of today's systems integrators. The front panel graphics have been redesigned to match the appearance of the other power amplifiers in the PA-Series product line.

This new unit employs a dual monaural design for improved reliability; the PA-4020B output power rating has been increased significantly. However, the single rack space mount characteristic has been retained. With convection cooling and a fully enclosed chassis, the inherent problems of fan noise and susceptibility to environmental problems such as dust, smoke and liquids have been reduced to near negligible levels.

Designed for the Global Market, IRP decided that the PA-4020B must be one of the most easily specified and installed amplifiers available. This is reflected in its overall design and feature set. The amplifier is able to operate on 120 or 240 volt ac power at 50 to 60Hz.

With convection cooling, when idling, the unit draws very little power, thus producing remarkably little heat. Inasmuch, as it utilizes signal dependent switching power supplies, the highly efficient PA-4020B has one of the lowest idle currents of any power amplifier available to the Audio Industry.

This highly stable discrete power amplifier has a power handling rating of 180 watts per channel into 8 ohms and 250 watts each channel into 4 ohms. In mono-bridged mode it will provide 450 watts to an eight ohm load. Both bipolar amplifier sections employ switchable transient current limiters and a turn on delay for speaker protection.

The input and output connections for this amplifier will accommodate virtually any permanent or portable application. The rear panel is arrayed with XLR, Neutrik® Speakon, binding posts and removable screw terminal connectors. Few power amplifiers available offer as much flexibility, power handling, and quality performance as the IRP PA-4020B.

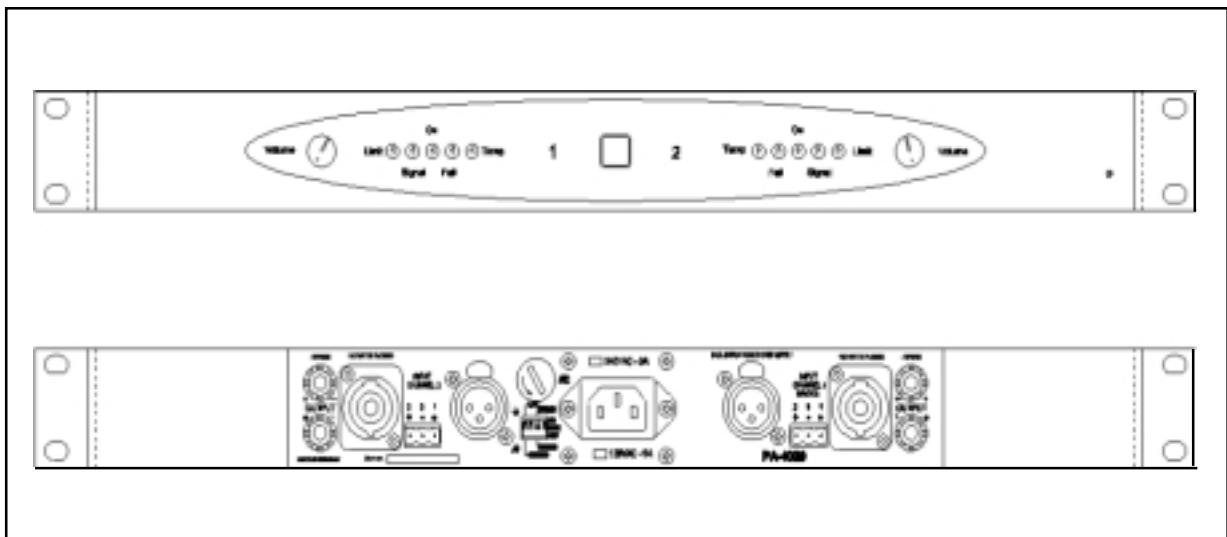


Fig. 1: Front & Rear Panel Views

Specifications

Frequency response:
+0, -1dB — 20Hz to 20kHz

Maximum input level:
+20dBv

Maximum output level:
+20 dBm

Input impedance:
100kW

Input sensitivity:
1V_{RMS}

Distortion:
.02% THD

Input signal filter:
40kHz, to limit input slew rate to avoid SID/
TIM distortion

Channel crosstalk:
-85dB

Output impedance:
4, 8, and 16W

Signal to Noise ratio:
>105dB below rated output, 20Hz to 20kHz

Slew rate:
20V/μsec

Damping factor:
>100

Overload recovery:
<10μsec. With no recovery anomalies

Dc output offset:
±10 mV or less

Input/Output connectors:
XLR type, Neutrik Speakon, binding post,
removable screw clamp connectors

Front panel controls and indicators:
Channel level controls (2)
Power on/off switch
Power on indicator 2 leds (green)
Temperature indicator 2 leds (yellow)
Failure indicator 2 leds (red)
Signal indicator 2 leds (green)
Current Transit Indicator 2 leds (yellow)

Rear panel controls and indicators:
Input channel connector 2 removable screw
clamp connectors, 2 XLR type 3-pin connec-
tor

Output channel connectors, each channel, two
4-way binding posts each 2 Speakon
connectors
1 Ground lift switch
1 Bridge mode switch
1 Ac line fuse
1 3-pole, grounded, male IEC connector

Maximum audio power output:
(see table)

Ac Power requirements:
120/240V ±10%, 50/60Hz (draws <20 watts
on idle, 300 watts at 200 watt output)

Dimensions:
19 in. x 1.75 in. x 14 in.
(48.3 cm x 4.45 cm x 35.56 cm)
W x H x D

Heat sinking:
two, single-piece, finned, aluminum extrusion
extends full depth on both sides of chassis

Operating temperature range:
0 to +85°C

Finish:
Thermosetting black paint/anodized

Cooling:
Passive cooling. No fans or ventilation holes;
adequately cooled by natural convection

Table 1: Output Power versus Impedance

MODE	IMPEDANCE	POWER OUTPUT
DUAL CHANNEL	4 OHMS	250 W
DUAL CHANNEL	8 OHMS	180 W
DUAL CHANNEL	16 OHMS	125 W
BRIDGED MODE	4 OHMS	450 W

NOTE

Power Output is average per channel, 20Hz to 20kHz. with less than .02% THD. In Dual Channel Mode, both channels driven.

Initialization

Unpacking

Your new IRP professional sound products L.P. PA-4020B Power Amplifier has been carefully packed and shipped to you in an approved shipping container.

Open and unpack the unit on a clean, firm flat surface

Remove the power amplifier from the die-cut cardboard fillers and the line cord from the accessory bag. The unit is shipped from the factory with the front-panel (faceplate) installed.

Inspect the unit for shipping damage immediately upon receipt. If any damage is found, promptly notify the shipping company. Only the consignee (you) can initiate a claim with the shipping carrier for shipping damage. In the event of shipping damage, be sure to save the shipping carton for inspection by the carrier's agent.

Retain all packaging materials for use in the event that the unit has to be moved or shipped at some future time. To avoid damage and/or scratching, transport units to the job-site in their shipping containers.

Product Inspection

Examine the rear panel of the device.

Appearing adjacent to the IEC power line receptacle are two screened labels reading 240VAC-3A at the top of the receptacle and 120VAC-6A below the receptacle. Make sure your unit is marked with a ✓ in the appropriate box.

Verify that the two (green) screw-clamp connectors are inserted into the amplifier input connection receptacles and that they have not been dislodged in shipment.

Examine the dipswitch carefully for possible shipping damage. Verify that the Bridge/Stereo switch is in the proper position for the intended service.

Mounting

The PA-4020B is intended for mounting in a standard 19" equipment cabinet and will occupy 1-RU (1.75") of rack space. The unit is attached to the equipment rack by using four mounting screws inserted through the rack lug spaces at the front of the amplifier chassis. To avoid scratching the faceplate, it is recommended that a fiber washer be installed between the screwhead and the faceplate.

Your PA-4020B amplifier has no ventilation holes in the chassis; hence it is fairly impervious to the possibility of dust, dirt or other contaminants entering the chassis interior. However, like all other electronic equipment, it should be mounted in a conditioned space to insure that it is operating in a stable temperature and dust-free environment.

Grounding

Equipment racks (cabinets) and the components installed therein should be properly grounded in accordance with National Electrical Code (NEC) and all other applicable codes and standards. The third prong (green wire) of the ac line cord should not be relied upon to provide proper grounding.

Audio Signal Conditions	LOAD IMPEDANCE		
	4 Ohms/chnl 8 Ohms bridged	8 Ohms/chnl 16 Ohms bridged	>16 Ohms/chnl >32 Ohms bridged
Typical Audio >15dB Peak/Average Ratio	1	1	1
Moderately Compressed Audio 10dB to 20dB Peak/Average Ratio	2	1	1
Highly Compressed Audio <10dB Peak/Average Ratio	3*	2	1

For best performance and to insure that the installation is free of ground loops that can create obnoxious noise and hum problems, a technical ground for the audio equipment should be installed. In such a grounding system, the audio electronic equipment is grounded at one point only and with reference to the ac power connection to the building (service entry). Depending upon the size of the facility and the distance between the equipment rack(s) and the service entry, a relatively large ground conductor may be required to establish a solid ground.

Do not rely on the building conduit/raceway to provide a proper ground
Variance of ground potential between the audio equipment and the service entry should be <.25 Ohms.

Prior to commencing an installation, the design of a well thought-out grounding plan can eliminate most problems with interfering RFI (radio frequency interference) and EMI (electromagnetic interference). A properly conceived and implemented grounding plan can save untold grief and expense in trying to correct problems 'after-the-fact'.

Internal Equipment Rack Wiring

For best performance and minimum interference, internal rack wiring should be spaced with a minimum of 4 inches (10 cm) between conductors having varying signal levels. That is, ac wiring, input audio wiring, intermediate level audio and output audio wiring should be separated by a minimum of 4 inches from each other. Varying signal levels and/or ac wiring should never be bundled or tie-wrapped in a common riser.

Audio Input Connections

All input connections are made on the rear panel of the PA-4020B Power Amplifier. Each channel is equipped with a 3-pin, screw-clamp, barrier-strip type connector and a 3-pin, XLR-type connector. Choose which type of connector you plan to use and connect accordingly. Connections may be made to either the terminal strip or to the XLR-type connector; but not to both.

Both types of connectors have their respective pins marked 1,2 and 3. Connections should be made using the AES standard as follows:

Pin 1 – ground (shield)

Pin 2 – high (+) audio signal

Pin 3 – low (-) audio signal

Use two conductor, shielded cable for all audio input lines.

Shields should be connected to ground at their source end and not at the power amplifier.

Cable between the source and the power amplifier should not exceed 18 inches (.5 meters).

Do not locate audio input cables closer than 4 inches (10 cm) from output, intermediate, or ac wiring. See Grounding in the preceding Mounting Section.

Determine whether the power amplifier will be used in dual-channel mode or in the bridged mode. In the dual-channel mode, connections are made to both channel 1 and channel 2. If the unit is to be used in bridged mode, connection is made to channel 1 only. Make sure the bridge/stereo selector switch is in the proper position for the service intended.

See figure 2 for connection information:

Audio Output Connections

All output connections are made on the rear panel of the PA-4020B Power Amplifier. Each channel is equipped with a 2-conductor Neutrik Speakon connector and a pair of 4-way binding posts. Choose which type of connector you plan to use and connect accordingly. Connections should be made to either the Neutrik connector or to the 4-way binding posts; but not to both.

Input Connections

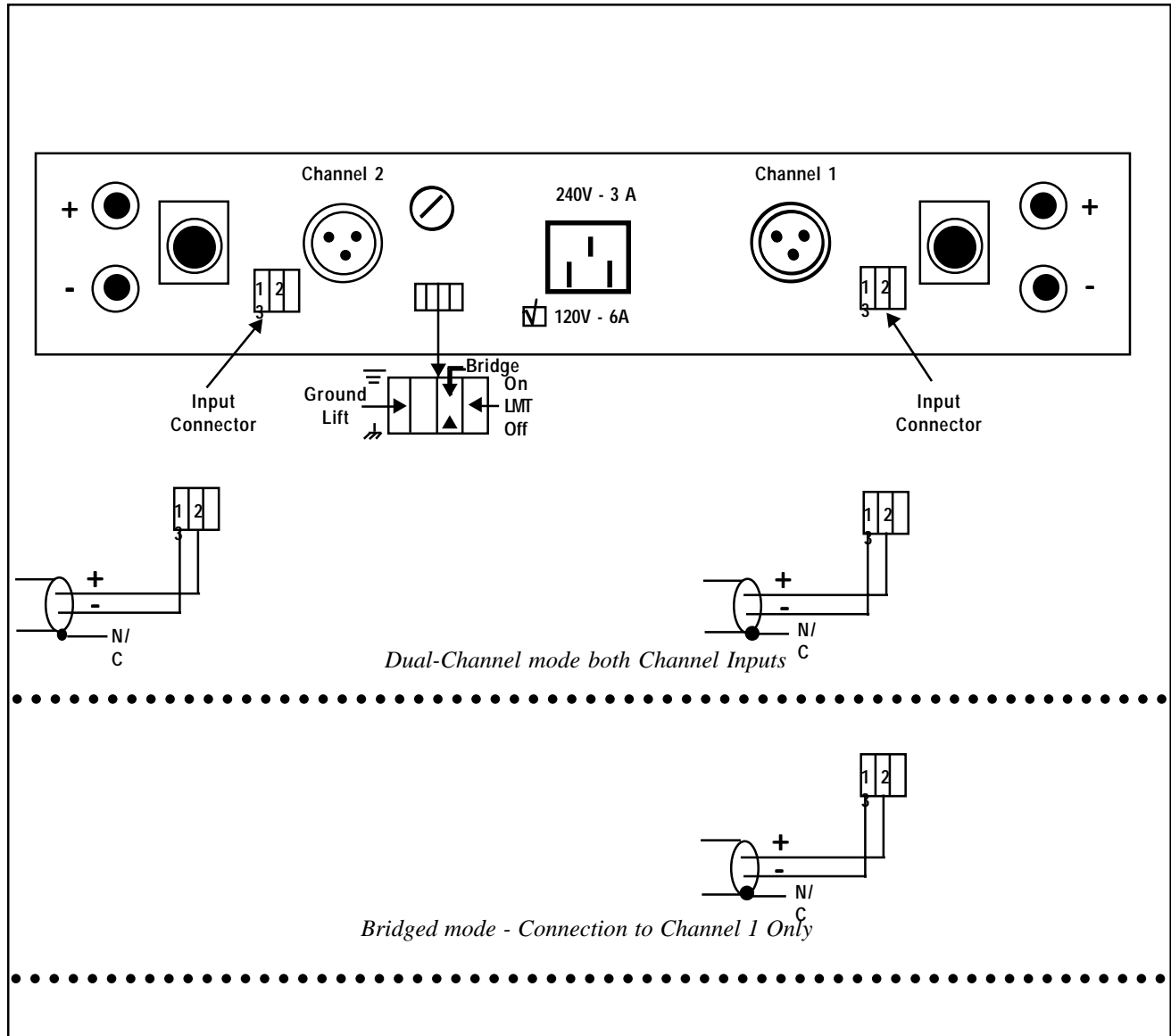


Figure 2 Rear Panel Input Connections

Output Connections

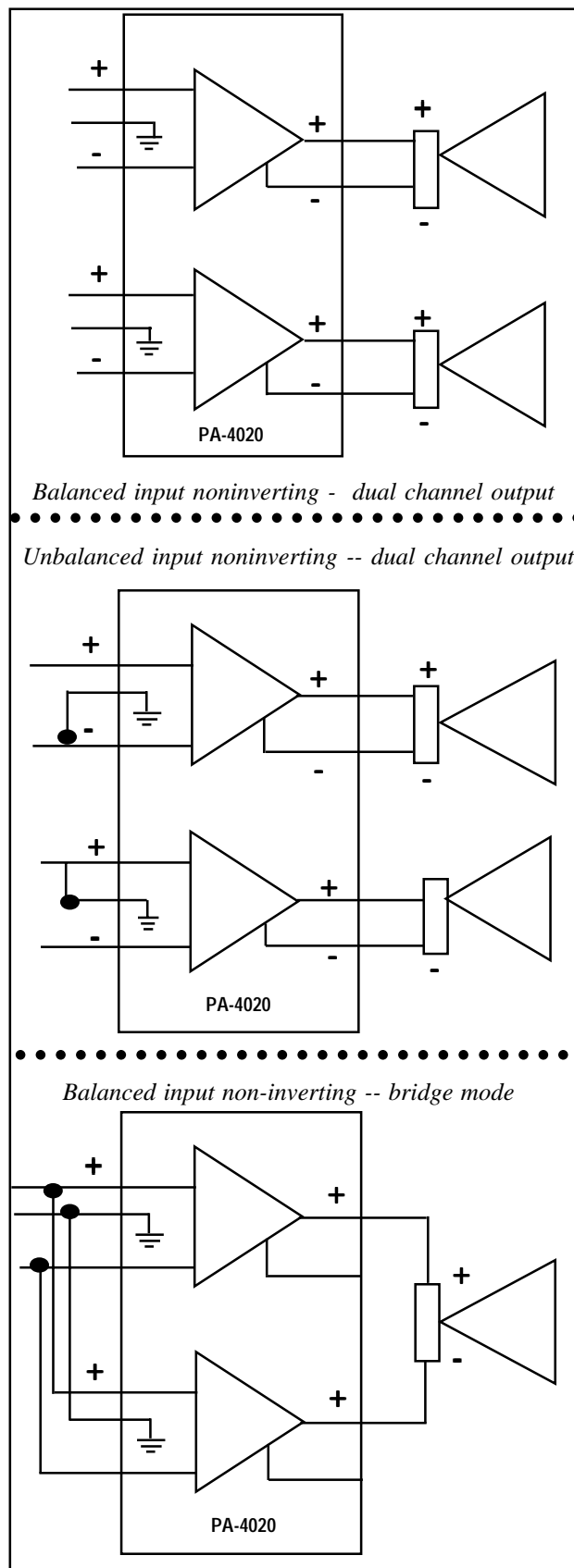
Use class two wiring and sufficiently sized speaker cable wire to minimize signal loss.

If the power amplifier will be used to drive a constant voltage (70.7V) transmission line, accessory output transformers will be required. When the PA-4020B is used with constant voltage transformers, it will provide 180 watts at 70.7 volts from each channel. In bridged mode, the PA-4020B will drive two output transformers to produce 350 watts at 70.7 volts.

When used in a constant voltage mode, the sound system should have a high pass filter (low frequency cut) to prevent saturation of the constant voltage transformers. A second order (12dB/octave) Butterworth filter at 40Hz or higher frequency is recommended. A first order (6dB/octave) filter may be used if it is placed at 80Hz or higher frequency.

See figure 3, 4 and 5 for connection information

Fig. 3 Output Connections



Output Connections

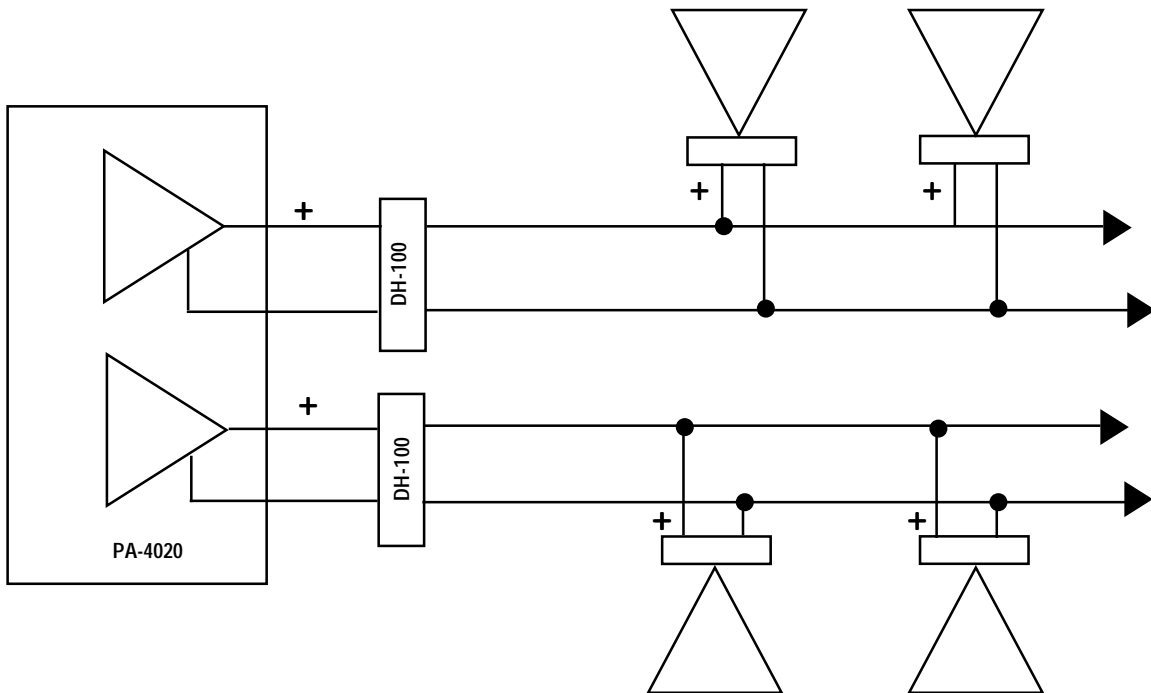


Fig. 4 Dual-Channel mode -- Constant Voltage 100 watts per Channel Output

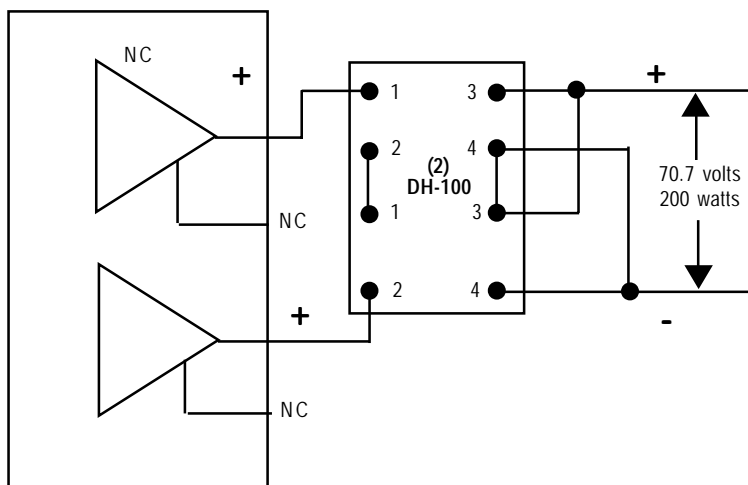


Fig. 5 Bridged mode -- Constant Voltage 200 watts Total Output

Trouble Shooting

Service and Maintenance

The PA-4020B contains no user serviceable parts. No routine maintenance is required. Inoperative units should be returned to the factory for exchange or repair.

See procedure for return of defective materials.

If the PA-4020B thermal LED remains lit even after the amplifier has cooled down, a dc offset/load protection cycle has occurred. Cycle the on/off switch to reset the device.

One Year Standard Warranty

IRP professional sound products L.P. warrants to the original purchaser each product manufactured by it to be free from defect in material and workmanship for a period of one year from date of sale to original purchaser, and agrees to remedy any such defect, or to furnish a new part in exchange for any part of any product of its manufacture which, under normal installation, use and service, discloses such defect provided such part or product is returned by the original purchaser to the IRP factory within one year from the date of sale, with all transportation charges prepaid, and provided that the IRP examination discloses that it is defective.

This warranty does not extend to any IRP product which has been subject to misuse, neglect, accident, incorrect wiring by others, improper installation, or to use in violation of instructions furnished by IRP, nor to products on which the serial or identifying numbers have been removed, defaced or changed, nor to accessories used therewith not of IRP manufacture.

IRP's obligation under this warranty as to any products or parts approved by IRP for remedy or exchange is limited, at its option, to replacing such products or parts in kind without charge to the original purchaser, or to crediting the original purchaser with the purchase price of the returned defective products.

This warranty is in lieu of all other warranties, express or implied, and no representative of IRP or any other person is authorized to assume for IRP any other liability in connection with the sales of its product.

Return Procedures

Should you encounter any problems with your IRP product, be sure to contact either your local authorized IRP dealer or the IRP factory before taking it anywhere for repairs. We will help you to identify and locate any specific malfunctions, possibly avoiding needless shipment, or we will instruct you as to the speediest method for authorized repair.

If you must send your IRP product to the factory for repair, be sure to contact the IRP Sales Department for a Return Authorization Number.

Include the following information with the returned product:

1. Your complete name and return shipping address
(PO box numbers are not acceptable)
2. The model number, serial number and the Return Authorization Number.
(RA # must appear on the outside of the shipping container)
3. A complete and detailed description of any and all problems you experienced with the product

Never ship the unit in any shipping carton other than the original or a replacement supplied by IRP. Ship to us only by a reputable carrier. Be sure to insure the package for full replacement value. IRP cannot be held responsible for any damage incurred during shipment

If you need further assistance please contact us at the address and communication numbers as shown on the rear cover of this manual.



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