

Force® Amplifier

Stereo Power Amplifier

- 280 watts per channel at 8 ohms; 450 watts per channel at 4 ohms; 650 watts per channel at 2 ohms at 1 kHz
- 900 watts per channel bridged at 8 ohms; 1,300 watts bridged at 4 ohms at 1 kHz
- State-of-the-art limiters driven by a sophisticated input/output comparator ensure freedom from amplifier clipping
- High-current Neutrik Speakon® output connectors for channels A, B and bridged operation for loss-free connections
- Active-balanced XLR-type input and paralleled XLR-type output connectors provide easy signal routing
- Rear-mounted dB-scaled detented level controls for easy control of gain

Description

The Electro-Voice Force® Amplifier is a very high-quality power amplifier designed to elicit excellent performance from any speaker system. Its low distortion and substantial headroom ensure that program material will be accurately amplified.

Each channel of the Force® Amplifier delivers more than 230-watts continuous average power into 8 ohms, 350 watts into 4 ohms and 450 watts into 2 ohms over the full audio frequency range. In the bridged mode, the amplifier can deliver more than 900 watts into 8 ohms and 1,300 watts into 4 ohms at less than 1% THD. The power supply with its large torodial transformer gives the amplifier impressive headroom and current output capability.

The Force® Amplifier contains 16 high-power output devices with 4,000 watts of dissipation capability. These devices are protected from overheating by two, three-speed temperature-sensitive fans. The fans are quiet enough to permit use of the Force® Amplifier in noise-sensitive applications such as recording studios and houses of worship.

The output devices are mounted to two large, extruded aluminum heat sinks that are engi-

neered to minimize thermal gradients and allow the amplifier to operate safely into low-impedance loads. The output devices have a maximum junction temperature of 200° C (392° F), so high operational temperatures present no problems. The output devices are mounted directly to the heat sinks without mica insulators to ensure better dissipation of heat.

The Force® Amplifier has sophisticated protection circuits that guard it and the load from problems. Protection circuits guard against overload, over-temperature, shorted outputs, radio-frequency interference and dc faults. The output devices are protected against damage from the reverse feeding of electrical energy (back EMF) from the load and are switched on via relays to avoid transients which could damage speakers.

The Force® Amplifier has built-in limiters to protect speakers from the deleterious effects of amplifier clipping. The limiter's action is controlled by very sophisticated input/output comparators which are designed to preserve the sonic integrity of the source.

The Force® Amplifier has electronically-balanced XLR-type input and signal output connectors that allow easy, problem-free connections and signal routing. The amplifier has

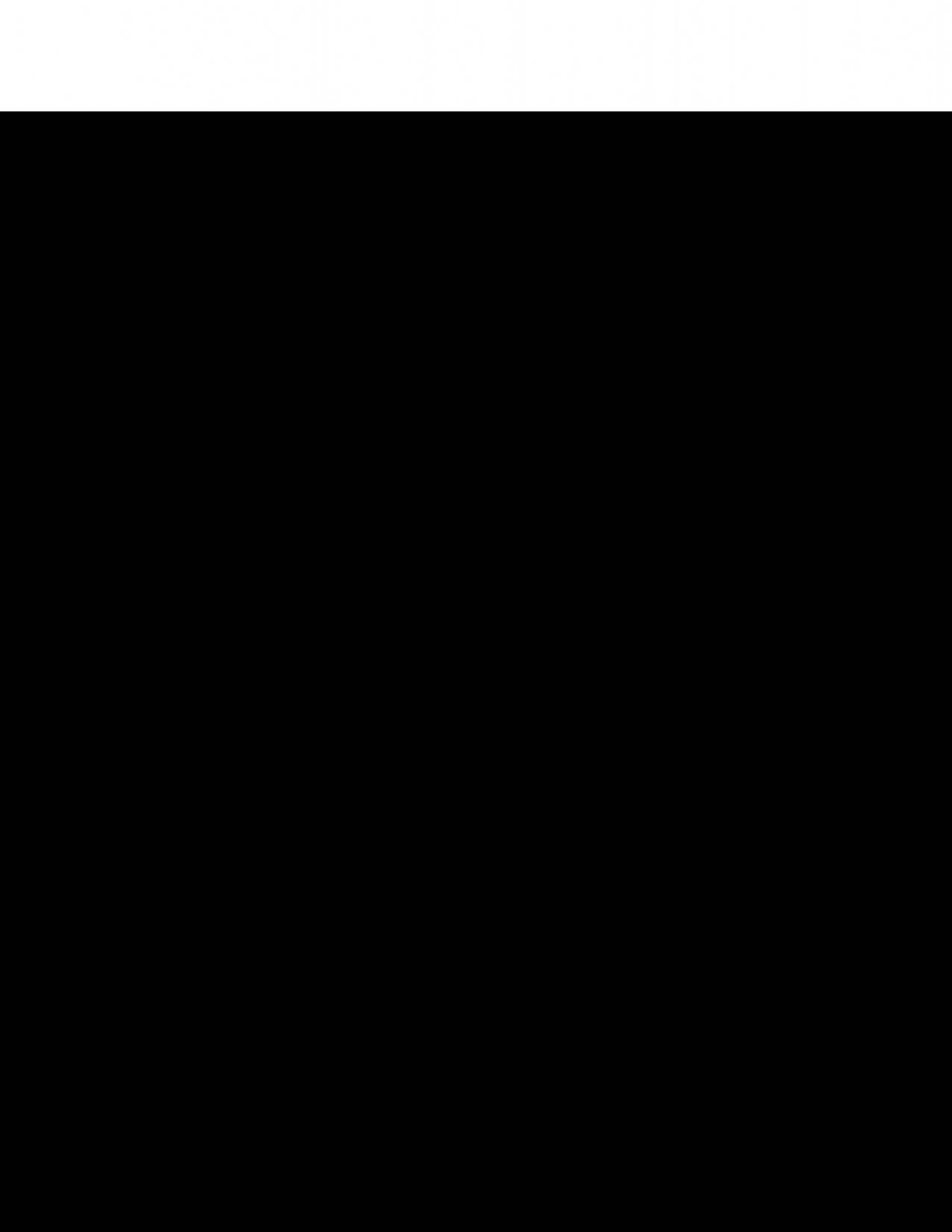
an input routing switch that allows selection of either normal dual-channel operation or parallel mono operation, which routes an input to both channels but still allows independent level control.

The Force® Amplifier professional Neutrik Speakon® output connectors provide sturdy, reliable connections and allow use of heavy wire for loss-free signal transmission. There are separate output connectors for channels, A and B, and for the bridge mode. The bridge mode connector is sealed with a plastic cover to prevent connection errors.

To prevent ground loops from occurring, the Force® Amplifier is equipped with a ground-lift switch. When the amplifier is operated in a rack with units of different ground potential, the switch may be adjusted to eliminate hum.

Separate potentiometers on the rear panel of the Force® Amplifier allow easy regulation of gain. There is easily readable nomenclature to ensure easily repeatable control settings.

The Electro-Voice Force® Amplifier is an excellent choice for high-quality professional sound system applications which require excellent sound quality, speaker protection



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and the highest level of construction quality and long-term reliability.

Architects' and Engineers' Specifications

The power amplifier shall be a dual-channel model of solid-state design employing high-power output devices in a true-complementary-symmetry output circuit. It shall be capable of operating from a 120/230/240-V, 50/60 Hz ac line. The power amplifier shall contain a limiter circuit driven by a high-quality input/output comparator to protect the load from damage by amplifier clipping. The amplifier shall meet various worldwide safety requirements including Underwriters' Laboratories UL-813 Standard, Canadian Standard, and CE-Standard.

The amplifier shall contain sensing circuitry to provide protection for the output transistors against over temperature, excessive output voltage, shorted loads, excessive phase shift and back-EMF current. The load shall be similarly protected against start-up/shut-down transients, low ac line voltage and dc.

Rear-mounted controls shall include detented level potentiometers for each channel, an input routing switch for selecting dual/stereo or parallel mono operation, a switch for selecting dual/stereo or bridged operation and a chassis groundlift switch. Rear-mounted input connectors shall include a 3-pin female XLR-type connector wired in parallel with a male 3-pin XLR-type output connector for signal routing. Output connectors shall be Neutrik Speakon NL4MP's for channels A and B, and another for bridged operation.

Front-panel indicators shall include power on, a protection indicator and separate signal present and limiter indicators for each channel. Front-panel controls shall include a power on switch.

The power amplifier shall meet the following performance specifications: rated output power from 20-20,000 Hz at less than 0.2% THD, each channel 230 watts into 8 ohms, 350 watts into 4 ohms and 450 watts into 2 ohms. In bridged mode at 1 kHz, the amplifier shall deliver 900 watts into 8 ohms and 1,300 watts into 4 ohms. Hum and noise shall be at least 103 dB (A weighted) below rated output power; damping factor shall be greater than 300 at any frequency up to 1 kHz in any mode with an 8-ohm load; THD (total harmonic distortion) shall be less than 0.05% at 1 kHz at rated output power; crosstalk shall be greater than -80 dB at 1 kHz at rated output power; transient intermodulation distortion (DIM 30), shall be less than 0.03%. Dimensions shall be 132.5 mm (5.25 in) high x 483 mm (19.0 in) width x 385.5 mm (15.7 in) deep. Net weight shall be 16 kg (35.2 lb). Color shall be light gray.

The power amplifier shall be the Electro-Voice Force® Amplifier.

Limited Warranty

Electro-Voice products are guaranteed against malfunction due to defects in materials or workmanship for a specified period, as noted in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual, beginning with the date of original purchase. If such malfunction occurs during the specified period, the product will be repaired or replaced (at our option) without charge. The product will be returned to the customer prepaid. **Exclusions and Limitations:** The Limited Warranty does not apply to: (a) exterior finish or appearance; (b) certain specific items described in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual; (c) malfunction resulting from use or operation of

the product other than as specified in the product data sheet or owner's manual; (d) malfunction resulting from misuse or abuse of the product; or (e) malfunction occurring at any time after repairs have been made to the product by anyone other than Electro-Voice Service or any of its authorized service representatives. **Obtaining Warranty Service:** To obtain warranty service, a customer must deliver the product, prepaid, to Electro-Voice Service or any of its authorized service representatives together with proof of purchase of the product in the form of a bill of sale or receipted invoice. A list of authorized service representatives is available from Electro-Voice Service at 600 Cecil Street, Buchanan, MI 49107 (800/234-6831 or FAX 616/695-4743). **Incidental and Consequential Damages Excluded:** Product repair or replacement and return to the customer are the only remedies provided to the customer. Electro-Voice shall not be liable for any incidental or consequential damages including, without limitation, injury to persons or property or loss of use. Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitation or exclusion may not apply to you. **Other Rights:** This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Electro-Voice Electronics are guaranteed against malfunction due to defects in materials or workmanship for a period of three (3) years from the date of original purchase. Additional details are included in the Uniform Limited Warranty statement.

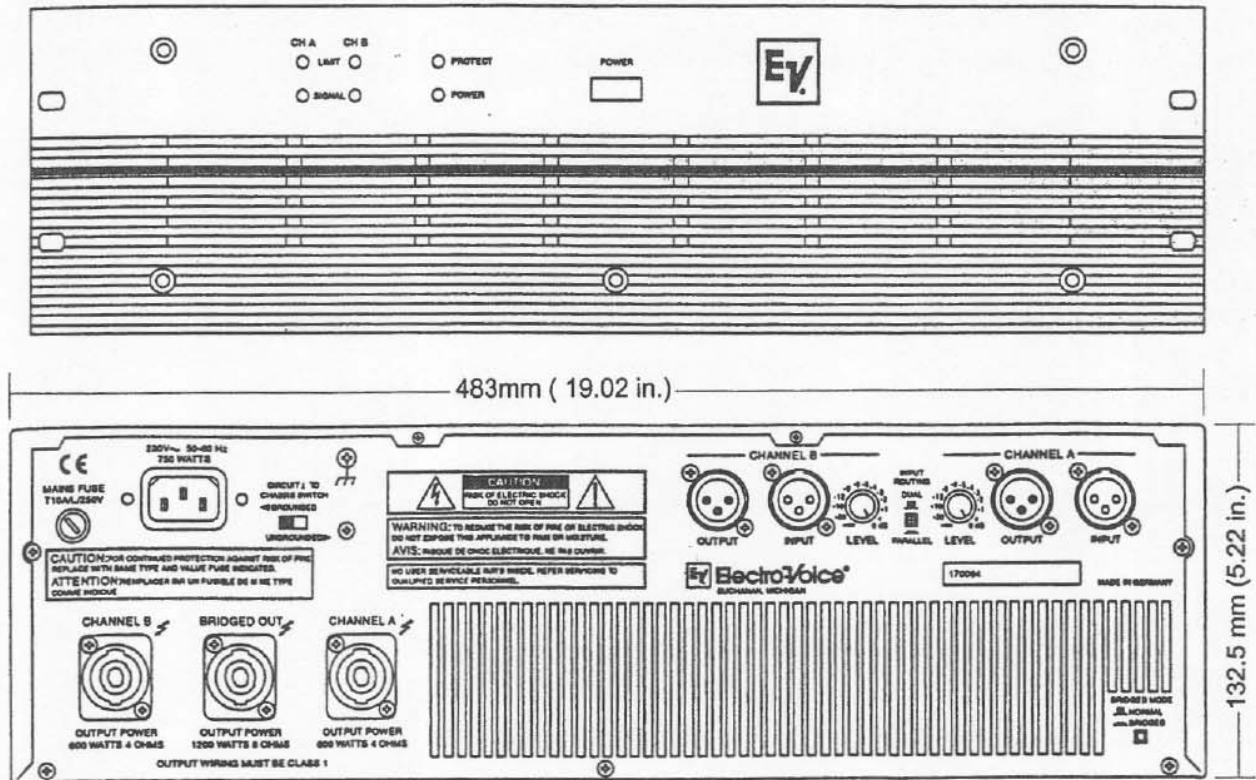
For warranty repair or service information, contact the service repair department at: 616/695-6831 or 800/685-2606.

For technical assistance, contact Technical Support at 800/234-6831 or 616/695-6831, M-F, 8:00 a.m. to 5:00 p.m. Eastern Standard Time.

Specifications subject to change without notice.

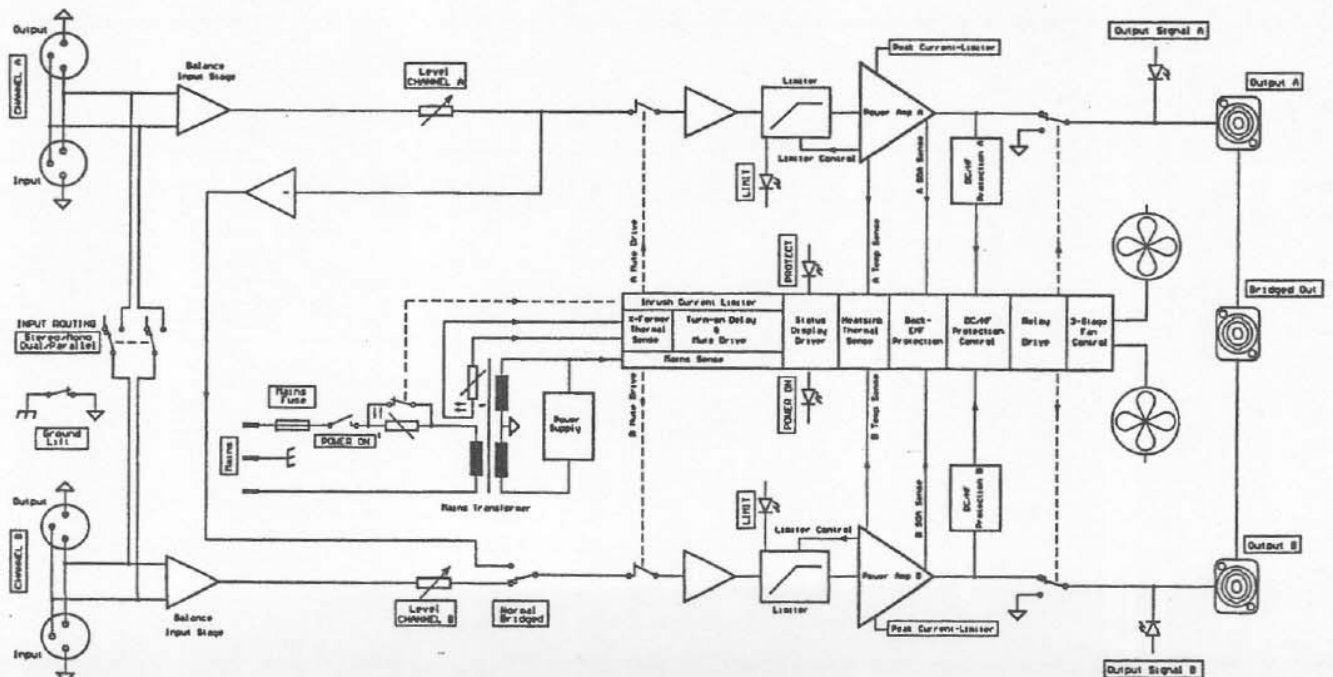
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Figure 1—Front and Rear Panels



Force® Stereo Power Amplifier

Figure 2—Block Diagram



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Specifications

Conditions:

1. 0 dBu = 0.775 V rms.
2. Dual-mode ratings are for each channel both operating, unless noted.
3. 120-volt ac line voltage maintained throughout testing.

Continuous Rated Output Power (20 – 20,000 Hz at less than 0.2% THD, both channels driven per EIA RS-490),

Dual Mode, 2 Ohms:

450 watts

Bridged Mode, 4 Ohms:

900 watts

Dual Mode, 4 Ohms:

350 watts

Bridged Mode, 8 Ohms:

700 watts

Dual Mode, 8 Ohms:

230 watts

Continuous Rated Output Power (1 kHz, 1% THD, both channels driven per EIA RS-490),

Dual Mode, 2 Ohms:

650 watts

Bridged Mode, 4 Ohms:

1,300 watts

Dual Mode, 4 Ohms:

450 watts

Bridged Mode, 8 Ohms:

900 watts

Dual Mode, 8 Ohms:

280 watts

Maximum Single Channel Output Power (1 kHz burst, 20 ms on, 480 ms off, per IHF-A),

2 Ohms:

720 watts

4 Ohms:

640 watts

8 Ohms:

340 watts

Power Bandwidth (+0, -1 dB, reference 1 kHz), Any Mode, 4 Ohms:

10 – 50,000 Hz

Frequency Response (+0, -3 dB, reference 1 kHz/1 watt):

13 – 45,000 Hz

Input Sensitivity, 1 kHz, Dual Mode for 500 watts into 4 Ohms:

0 dBu (775 mV)

Input Impedance (per channel, 20 – 20,000 Hz), Balanced:

20,000 ohms

Total Harmonic Distortion (at rated output power, measurement bandwidth 80 kHz):

<0.05%

IMD (SMPTE) (60 Hz/7 kHz, typical, at rated power):

<0.08%

DIM 30 (composite square-sine wave bandwidth-limited to 30,000 Hz):

<0.03%

Slew Rate, Any Mode:

25 V/microsecond

Damping Factor, Any Mode, (at 100 Hz / 1 kHz):

>300 / >200

Amplifier Protection:

Audio limiters; over-temperature; dc, excessive hf, excessive back-EMF; in-rush current limiters; shorted loads; peak current limiters

Load Protection:

Start-up/shutdown transients; dc fault; Low ac line voltage; nonlinear signal limiters

Cooling System:

Front-to-rear airflow with two 3-speed fans

Output Topology

True complementary symmetry with ungrounded collectors (no mica insulators for better heat transfer)

Output Devices,

Total Number: 16 devices

P_d (max) Rating: 250 watts

I_c (collector current): 20 amps dc

T_j (max): 200° C (392° F)

Controls and Switches,

Rear:

Two calibrated level controls; input routing (Dual/Parallel); chassis ground switch (Grounded/Ungrounded); bridged mode switch (Bridged/Normal)

Front:

Power switch (On/Off)

Front-Panel Indicators:

Two LED's per channel (4 total) for signal present and limiter on, protect indicator and power on

Connections,

Input:

3-pin female XLR-type connectors for each channel in parallel with a 3-pin male XLR-type output connector for easy signal routing; the XLR connectors are wired according to the IEC 268 standard: pin 1 shield, pin 2 positive, pin 3 negative

Output:

Neutrik Speakon NL4MP for channels A, B and for bridged mode

Power:

16-gauge 3-wire IEC standard removable power cable

Operating Voltage:

120 V, 60 Hz ac

Power Consumption (both channels operating in dual mode at 1/8 maximum output power at 4 ohms:

690 watts

Dimensions, (see Figure 1),

Height:

132.5 mm (5.25 in)

Width:

483 mm (19.0 in)

Depth:

385.5 mm (15.17 in)

Color:

Light gray

Net Weight:

33.0 lb (15 kg)

Electro-Voice®

600 Cecil Street, Buchanan, MI 49107

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