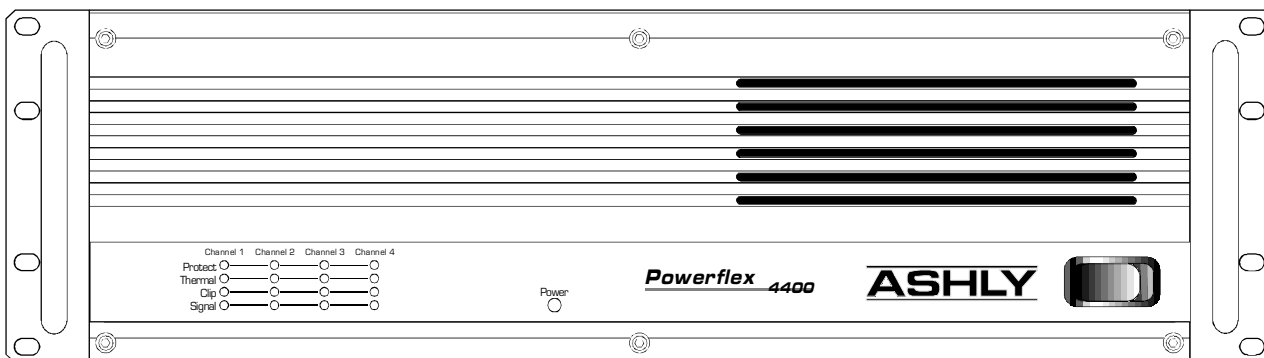
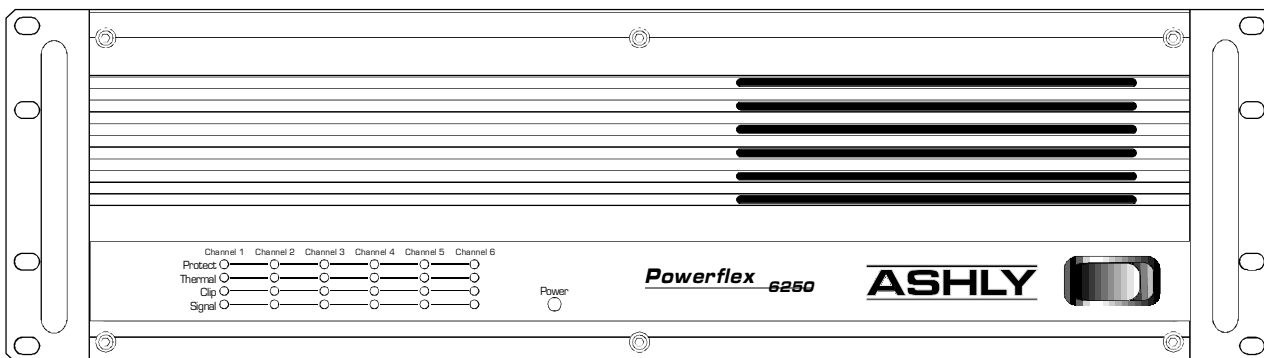


ASHLY

Powerflex™

Multi-Channel Power Amplifiers

Operating Manual



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Caution:

This power amplifier can produce dangerous output voltage levels, high power levels, and high sound pressure levels in loudspeakers. In order to minimize the risk of injury, damage, or hearing loss, please read the entire owner's manual before connecting to a sound system.



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance instructions in the literature accompanying the device.

TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER. NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

TO REDUCE THE RISK OF FIRE OR ELECTRICAL SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

TO REDUCE THE RISK OF FIRE, REPLACE ONLY WITH SAME TYPE FUSE. REFER REPLACEMENT TO QUALIFIED SERVICE PERSONNEL.

WARNING: THIS APPARATUS MUST BE EARTHED THROUGH THE SUPPLIED POWER LINE CORD

1. INTRODUCTION

The Ashly Powerflex amplifiers combine the efficiency of a MOSFET high-speed switching output stages with the sophistication of modern microprocessors and DSP technology to produce a multi-channel amplifier with unprecedented versatility and power in a single 3RU package.

Although similar to other amplifiers with class D output stages, Powerflex amplifiers employ internal microprocessor and DSP algorithms to optimize output switching characteristics and eliminate the usual harshness associated with high-frequency audio in standard class D amplifiers. This optimization results in a *spread-spectrum switched output* that varies with input amplitude and frequency, and minimizes radiated emissions by eliminating the single-frequency high-energy radiated interference normally associated with switching outputs. The use of a simple linear power supply removes another potential source of radio-frequency interference, an important consideration as racks become more and more heavily populated with digital signal processing equipment. A small switching supply using flyback topology provides an efficient power source for logic, protection, pre-amplifier and indicator circuits.

To assure reliable operation, the usual protection from excessive high-frequency, DC offset, and thermal overload is supplemented by power supply undervoltage, power supply overvoltage, and output overcurrent detection, all monitored and controlled by the latest in miniaturized microprocessor technology.

In sum, Ashly Powerflex amplifiers combine the best of the new digital technologies with the best of the traditional analog technologies to provide a product that will supply clean sound at full output from every channel while generating minimal heat, thus increasing the reliability of every other piece of equipment in a rack as well as preserving its own.

2. UNPACKING

As a part of our system of quality control, every Ashly product is carefully inspected before leaving the factory to ensure flawless appearance. After unpacking, please inspect for any physical damage. Save the shipping carton and all packing materials, as they were carefully designed to reduce to minimum the possibility of transportation damage should the unit again require packing and shipping. In the event that damage has occurred, immediately notify your dealer so that a written claim to cover the damages can be initiated.

The right to any claim against a public carrier can be forfeited if the carrier is not notified promptly and if the shipping carton and packing materials are not available for inspection by the carrier. Save all packing materials until the claim has been settled.

3. AC POWER REQUIREMENTS

3.1 Voltage Requirements

The Powerflex amplifiers can be operated from nominal 120VAC or 240VAC, 50/60Hz mains. This is user-configurable by changing the insert in the AC Inlet (See section 7.9). The power connector on the amplifier accepts a standard IEC-320 receptacle.

For nominal 120VAC operation, the power cord should be three-conductor, rated for at least 13A (16AWG). The line fuse should be type MDA, 12A.

For nominal 240VAC operation, the power cord should be three-conductor, rated for at least 10A (18AWG). The line fuse should be type MDA, 10A.

3.2 Current Requirements

1.) Idle (no audio):

Powerflex 6250	Powerflex 4400
120V: 0.81A	120V: 0.9A
240V: 0.42A	240V: 0.5A

2.) With typical audio inputs:

8Ω loads on all channels	
120V: 4A	120V: 4.6A
240V: 2A	240V: 2.3A
4Ω loads on all channels	
120V: 6.5A	120V: 7.0A
240V: 3.3A	240V: 3.5A

70 Volt systems - (Powerflex 6250 Only, 3 channels Bridged Mono)

120V: 6.5A
240V: 3.3A

Powerflex amplifiers consumes less than 12 amps when all channels operate at 1/8 power into rated (4 ohm) loads. This condition satisfies the UL, CSA and building electrical code requirements for a piece of audio equipment not to consume more than 80% of the current available when plugged into a grounded 15 amp outlet and operated at 1/8 of maximum power.

3.3 AC Grounding Requirements

To reduce the risk of ground loop hum, all system ground references should originate at the same point in your AC power distribution. Do not remove the amplifier's ground pin, as it creates a potential shock hazard.

4. CABLE REQUIREMENTS

4.1 Input Cables

Be sure to use shielded cable whether balanced or unbalanced. Shielding which is properly grounded will protect the signal from outside electrical interference such as RF, fluorescent lighting, and computer/display emissions. As a general rule, unbalanced or single-ended (tip-sleeve) lines of less than 10 feet are satisfactory, but greater distances or noisy field environments require a balanced signal. Avoid running input lines in close proximity or parallel to long speaker lines, AC power cables, or power transformers, as this may generate hum or oscillation.

4.2 Output Cables

Powerflex amplifiers are capable of delivering high levels of output current, therefore the wire gauge used for speaker cables is particularly important. Inadequate wire gauge can add significant resistance to the speaker's own impedance, especially over long distances, reducing the power which is actually delivered to the speaker. It could also result in a decreased damping factor and possible fire hazard. Since power at the speaker load is of primary concern in system design, we have included a table to best determine appropriate wire gauge for your application. The following table lists the resistance per 100 feet of common copper wire gauges, and also gives the *percentage* of the speaker load power which would be lost in an arbitrary 100 ft run of different gauges of 2-conductor copper speaker wire.

Wire Gauge	$\Omega/100\text{ft}$	8Ω load	4Ω load
#8	.0605 Ω	0.8%	1.5%
#10	.1018 Ω	1.3%	2.5%
#12	.1619 Ω	2.0%	4.0%
#14	.2575 Ω	3.2%	6.4%
#16	.4094 Ω	5.1%	10.2%
#18	.6510 Ω	8.1%	16.3%

Table 4.1: Wire gauge resistance/power loss

This table expresses the power loss as a *percentage* of the load's power rather than the total amplifier output power in order to accurately determine power loss at other cable lengths. For example, if you plan to deliver 150 watts to an 8Ω load through 50 ft of 14 ga. cable, the

power loss in the cable would be *half* that of a 100 ft run of #14 wire as shown in the table, or 1.6% of 150W, which is an insignificant 2.4 watts. However, if you were to run 200 ft of 18 ga. cable to a 4Ω load, the loss would be twice that of the 100 ft run shown in the table, or 32.6% of 250W, which is 81.5 watts lost as heat. Always be sure to use adequate gauge speaker wire.

5. RACK-MOUNTING REQUIREMENTS

5.1 Mechanical

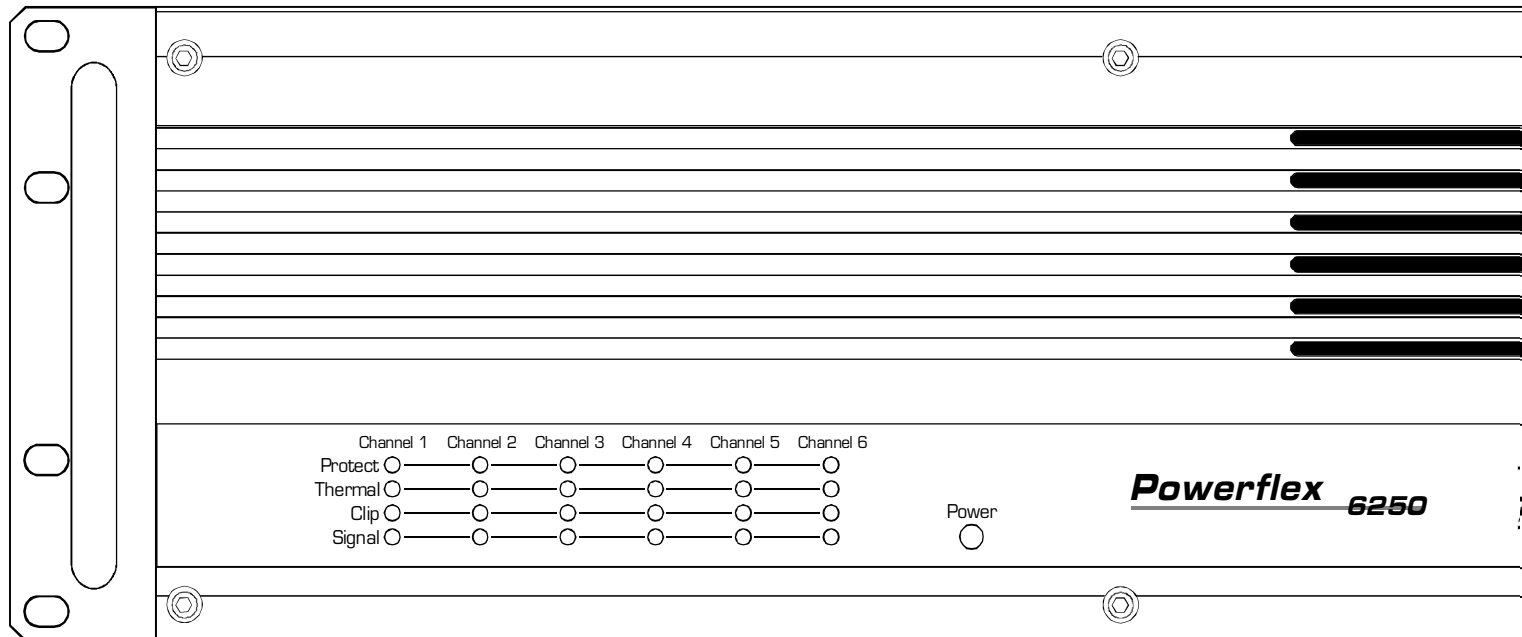
Powerflex amplifiers are designed to fit in standard 19-inch equipment racks. The front panel rack-mount ears are sufficiently strong for most applications, however if you desire further integrity for mobile racks, we recommend using the four additional holes in the back of the chassis for supplemental rear-mounting (see dimensional drawing for details).

5.2 Cooling

Be certain that both the front and back of the rack have unhindered access to free air flow. Fan direction is from front to back. It is not necessary to leave empty space above or below.

5.3 Grounding

In some installations where the sound system is sensitive to RF noise or system-induced oscillation, it may be necessary to ground the amplifier's chassis to the rack enclosure. This is accomplished using star type lockwashers on the four rack mounting screws. These star washers will penetrate through the amplifier's paint to adequately ground the chassis to the rack.



6. FRONT PANEL INDICATORS

6.1 Power Switch

When the unit is switched on there is a five second delay, during which time the PROTECT circuit will activate, disconnecting the speakers from the amplifier output. When turning off the amplifier, the load is removed instantly, and the protect LED will briefly turn on as the power supply discharges.

6.2 Signal Indicator

The signal present LEDs illuminate at an input level of about 13mVrms (-35.5dBu).

6.3 Clipping Indicator

The clipping LEDs illuminate at an input level of about 870mVrms (+1.0dBu), with all channels driven by 1KHz into 8Ω. This indicates that the signal processing circuitry has determined output levels to be approaching the available power supply rails and has begun to “soften” signal peaks. Actual onset of “hard” clipping depends on audio program and total load impedance and does not occur until the signal processing circuitry can no longer compensate, which means that signal integrity can be maintained even if the clipping indicators illuminate for short periods of time.

6.4 Thermal Status Indicator

The thermal LEDs illuminate when the temperature of any one of the heat sink extrusions reaches 85 to 90°C. Both channels of the affected amplifier module will shut off until the measured temperature drops below about 70°C. The amplifier should be able to maintain proper

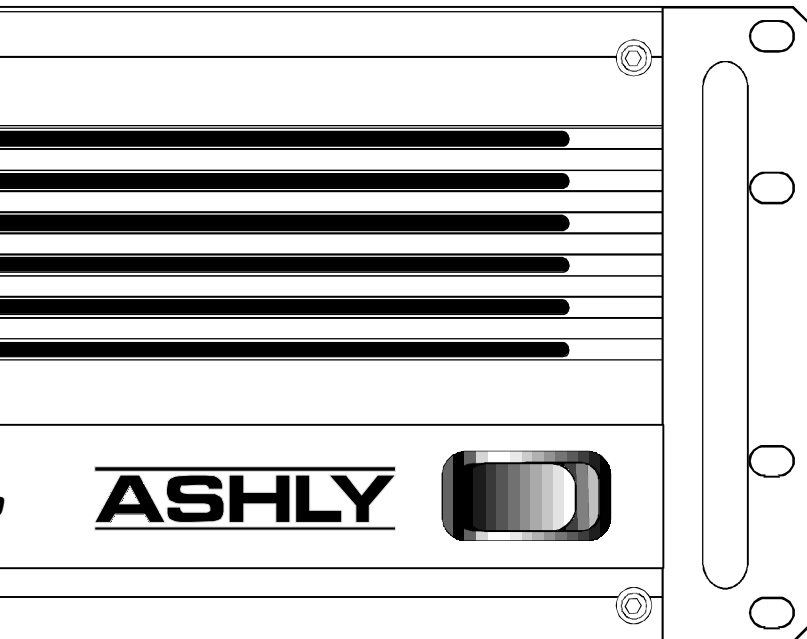
operation at an ambient room temperature of 50°C (122°F) or less with typical audio program and all channels driven into 4Ω.

6.5 Protect Indicator

The protect LEDs illuminate when the fault monitoring microprocessor has determined that one of the following conditions exists:

- Power supply undervoltage
- Power supply overvoltage
- Output overcurrent
- Heat sink overtemperature
- Unacceptable DC output content
- Unacceptable high frequency output content
- AC power interruption

Because the signal processing module used in Powerflex amplifiers processes two channels simultaneously, a fault in one channel will result in a protect condition for both channels processed by the same module, ex. channels 1-2, 3-4, and 5-6 (6250 only). Thus there will never be a case where only one of the amplifier channels is shown in protect mode. When a pair of protect LED's are illuminated, internal relays have removed the channel pair's speaker loads from the amplifier output and connected the speakers to ground. If the fault is isolated to one module (channel pair), the other channels will remain unaffected.



* Powerflex 6250 shown - Powerflex 4400 only has channels 1-4.

7. REAR PANEL FEATURES

7.1 Input Connectors

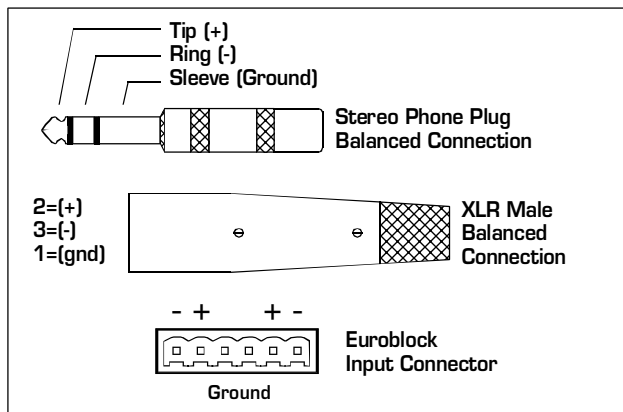
The Powerflex inputs use 1/4" tip-ring-sleeve (TRS) phone jacks, balanced XLR jacks, and balanced two piece "Euroblock" style connectors. The three types of connectors are wired in parallel and may be used balanced or unbalanced. Use the euro-block connectors to daisy-chain multiple amps together. Input XLR jacks are pin 2 hot (+), meaning that a positive voltage applied to pin 2 will result in a positive output voltage across the speaker terminals. Pin 2 of the XLR jack is equivalent to the tip of the 1/4" TRS jack.

Balanced Inputs

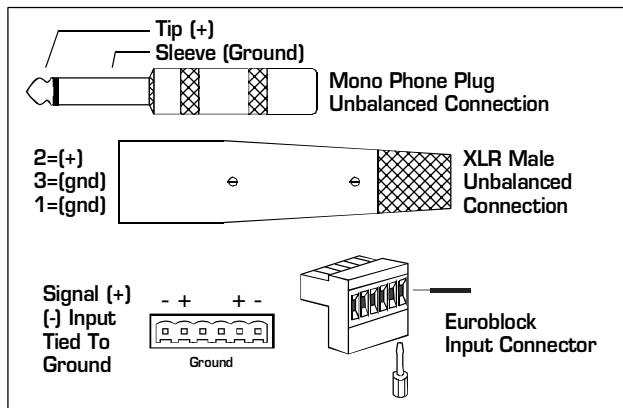
It is recommended that balanced input connections be used whenever possible to take full advantage of the amplifier's common mode rejection properties, and to reduce ground-loop problems. The (+) signal is on pin 2 of the XLR, and the tip of the phone jack. The (-) signal is on pin 3 of the XLR, and the ring of the phone jack. If a hum problem persists, try connecting a balanced signal to the Euroblock input with the input cable's shield lifted at the amplifier end of the cable (ie. no ground connection), *but connected to ground at the signal source*. This eliminates potential ground currents through the input cable yet preserves the benefits of shielding.

Unbalanced Inputs

If an unbalanced XLR input connection is used, pin 3 should be connected to input ground (pin 1). If the 1/4" input jack is used unbalanced, the use of a mono (tip-sleeve) plug will automatically tie the (-) connection to input ground. *Note: Never float the (+) or (-) input connection when using an unbalanced source.* If connecting an unbalanced signal to the Euroblock input, connect the signal to (+) and the cable shield to both (-) and ground.

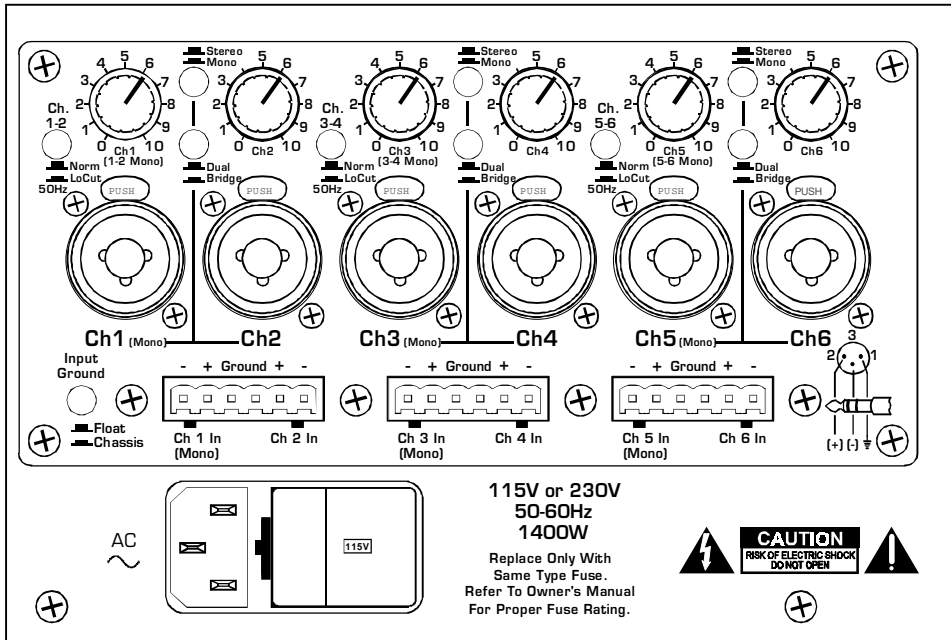


Balanced Audio Connections



Unbalanced Audio Connections

*
Powerflex 6250 shown - Powerflex 4400 only has inputs 1-4.



7.2 Input Ground Switch

This switch separates internal circuit ground from the chassis ground on all inputs. Ground connections from an incoming signal are always connected to internal circuit ground, but float from the chassis ground as long as the switch is out. *Unless there are special circumstances which require the circuit ground and chassis ground to be connected, it is best to leave this switch out.*

7.3 Multi-Channel Operation

The Powerflex 6250 is essentially three stereo amplifiers in one chassis, for a total of up to six separate channels. Similarly, the Powerflex 4400 is essentially two stereo amplifiers in one chassis, for a total of up to four separate channels. Thus, the following references to Stereo, Mono, or Bridged operation is with regard to *each pair* of channels in the amplifier. For example, Channel 1 and Channel 2 together can provide stereo, mono, or bridged operation, completely independent of Channels 3-4 or Channels 5-6 settings (6250 only).

7.4 50Hz Low Cut Switch

Each pair of channels has a 50Hz second order (12 dB per octave) low-cut filter option which is applied to both channels within the pair. When the switch is pressed, the audio signal is -3dB at 50Hz, -15dB at 25 Hz, -27dB at 12.5Hz, etc.

7.5 Input Level Controls

Input Level Controls attenuate input signal from 0dB down to $-\infty$. For best performance, Ashly recommends that the level controls be operated at full level (0 dB attenuation).

In STEREO mode, each level control corresponds directly to the input signal on its respective channel.

In MONO Mode, the input signal connected to channels 1, 3, or 5 are used to drive channels 2, 4, or 6 respectively, and the level controls for channels 1, 3, and 5 likewise control channels 2, 4, and 6. *When switched to Mono mode, channels 2, 4, or 6 level controls become inactive.*

In BRIDGED mode, the level controls function the same as in mono mode.

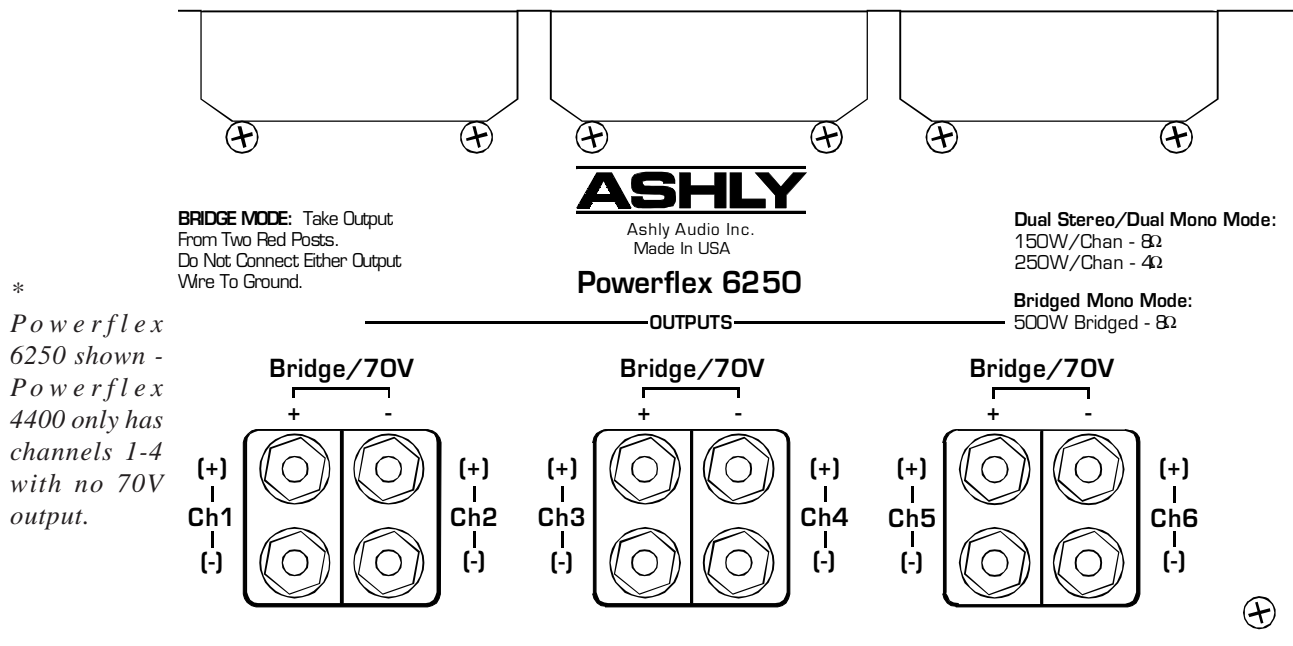
7.6 Stereo/Mono Switch

Powerflex amplifiers are comprised of two (4400) or three (6250) stereo amplifiers, each operating independently of the others, with Stereo/Mono switching available for each channel pair. If this switch is set to Stereo mode, the channel pair operates as two discrete amplifiers, each with its own input connection and level control.

Switching to Mono mode allows one input (channel 1, 3, or 5) to drive both channels of a stereo channel pair. Pressing the Mono switch disables the channel pair's other input connection, as well as its level control. The first channel's input and level control now determines the signal to both channels.

7.7 Dual Channel/Bridge Mode Switch

Bridging a power amplifier is the process whereby two channels are supplied the same signal, with the second channel's phase inverted 180°. The speaker is then connected across the (+) output connections of each channel, resulting in twice the power to the speaker that either channel could deliver by itself. *Since in Bridge Mode both connections have voltage present, never connect or touch either speaker wire to ground.* In the Powerflex 6250, use Bridge mode for 70V applications as well.



*
Powerflex 6250 shown - Powerflex 4400 only has channels 1-4 with no 70V output.

The Powerflex 6250 is capable of three channels of bridged output, while the Powerflex 440 is capable of two channels of bridged output. To use bridged mode, first press MONO from the Stereo/Mono switch on the channel pair to be bridged. This sends the same audio signal to both channels. Then press BRIDGE from the Dual/Bridge switch on the channel pair to be bridged. This inverts the phase of the input signal to the second channel. These two channels are now operating together in Bridged Mono mode, and the output must be taken from the two red binding posts corresponding to the bridged channel pair. Observe polarity by noting which red binding post is (+) and which is (-)

7.8 Speaker Outputs - Binding Posts

Dual binding posts provide connections for the speaker outputs. In addition to using the banana-type plug, the binding posts have a slotted entry-way for wire-crimped spade terminals. In BRIDGE/70V mode, the channel 1, 3, or 5 red binding post is the (+) in-phase speaker output terminal and the channel 2, 4, or 6 red binding post becomes the (-) out-of-phase speaker terminal.

CAUTION! NEVER CONNECT THE TWO RED BINDING POSTS TOGETHER OR CONNECT EITHER RED BINDING POST TO A BLACK BINDING POST!

7.9 AC Inlet

Powerflex amplifiers can be configured by the customer for operation at either 115VAC or 230VAC mains. Switching from one to the other simply requires the following steps:

- 1.) Unplug the amplifier from the wall and remove the power cord from the rear of the amplifier.
- 2.) Using a small screwdriver as a lever, unlatch the fuse holder in the AC inlet and remove it.
- 3.) Remove the voltage selection insert and rotate until the new nominal mains voltage level indication (115 or 230) is on top and properly oriented for reading.
- 4.) Replace the voltage selection insert in the AC inlet, making sure that it is plugged in all the way.
- 5.) Replace the fuse with the appropriate size (see #6 below), and press the fuseholder back into the AC inlet until it latches.
- 6.) Using a power cord of the appropriate size and with the appropriate terminations, plug the cord into the rear of the amplifier and then into the wall. The Powerflex amplifier is now ready for use at the new mains voltage.

If the mains voltage is 110-125VAC, the required fuse is MDA 12, 250V, and the required power cord is 3-wire grounded, 13 Amp (16AWG) minimum.

If the mains voltage is 220-250VAC, the required fuse is MDA 10, 250V, and the required power cord is 3-wire grounded, 10 Amp (18AWG) minimum.

8. SELF-PROTECTION FEATURES

Powerflex amplifiers contain circuitry to self-protect during extreme fault conditions. These fault conditions are:

- 1.) *Power supply undervoltage*
- 2.) *Power supply overvoltage*
- 3.) *Output overcurrent*
- 4.) *Heat sink overtemperature*
- 5.) *Unacceptable DC or high frequency output content*
- 6.) *AC power interruption*

Except for AC power interruption, the detection of any fault will result in the activation of protection circuitry on a particular module, which consists of two channels. That is, a short circuit on the output of channel 1 will result in both channel 1 and channel 2 entering protect mode. This is because the signal processing module, which processes both channels simultaneously, does not distinguish between the two channels within a channel pair when processing a fault.

An AC power interruption will result in all channels entering protect mode simultaneously, just as if the amplifier is being turned off.

In all cases, the amplifier will restart the signal processing module after a short delay and will reconnect the speakers after several seconds if no further fault conditions exist. This allows the servo circuitry to bring any residual DC offsets to zero before speakers are connected.

Specific conditions resulting in a fault are as follows:

8.1 Power supply undervoltage - less than about 55 volts on the either supply rail. Possible causes would be total load on the outputs exceeding recommendations (remove some speakers - 4 Ω load min, 8 Ω min bridged), low AC mains voltage (reduce extension cord length or increase wire size, or switch to an AC mains circuit more capable of supporting the amplifier's power requirements), or improper AC inlet mains voltage setting (make sure nominal AC mains voltage matches the number in the viewing window on the AC inlet).

8.2 Power supply overvoltage - more than about 92 volts on either supply rail. Possible causes would be high AC mains voltage (change to an AC mains circuit with voltage within the amplifier's stated requirements) or improper AC inlet mains voltage setting (make sure nominal AC mains voltage matches the number in the viewing window on the AC inlet).

8.3 Output overcurrent - more than 15 to 20 amps being drawn from any output. Possible causes would be total load on the affected output exceeding recommendations (disconnect some speakers), or a short circuit on one of the outputs driven by the affected module (inspect speaker wiring for proper connection).

The above conditions are checked by the signal processing module on a switching cycle by switching cycle basis and are therefore monitored as often as a million or more times a second, allowing protection well before destructive conditions have time to cause part failure.

8.4 Heat sink overtemperature - a measured heat sink extrusion temperature of more than 85 to 90 degrees C. The three-speed fan will switch to medium speed at an extrusion temperature of 45 to 50 degrees C, and to high speed at a temperature of 70 to 75 degrees C. The overtemperature fault will clear itself when the measured temperature is below about 70 degrees C. The fan will operate at low speed below about 50 degrees C.

8.5 Unacceptable DC or high frequency output content - a DC offset in the output signal of more than a few hundred millivolts indicates module failure, and will trigger a DC protect fault. High frequency (20kHz to 100kHz) in the output at high amplitudes can cause speaker damage and causes a fault condition more or less rapidly as frequency and amplitude vary.

These two conditions (DC and HF) are tested by the same circuit so the exact cause cannot be isolated. If the fault condition persists after disconnecting all inputs and outputs from the amplifier, there is probably a module failure requiring service. *Note: the self-testing circuit may take as long as 30 seconds to recover from this fault, so be sure to give the amplifier enough time to reset itself.* If after 30 seconds the module has recovered, begin plugging in one input and output at a time in an effort to isolate a system high-frequency or oscillation problem.

8.6 AC power interruption - a dropout (or brown-out of sufficient magnitude) of more than one half mains line cycle and less than one whole cycle in duration.

9. TYPICAL APPLICATIONS

The Powerflex 6250 is essentially three stereo amplifiers in one chassis, *each* with dual stereo, dual mono, and bridged mono capabilities, while the Powerflex 4400 is two stereo amplifiers (four channels), but with more power per channel than the 6250. The ability to easily mix and match various configurations is what puts the "flexibility" in Powerflex. Input connections can be 1/4" phone plug, XLR, or hard-wired with two-piece Euroblock connectors, while speaker outputs can be either "banana" type plugs or wire crimped spade terminals. *Note: The Powerflex 6250 is used for the following application details, but the 4400 is used in a similar fashion, to a maximum of four channels.*

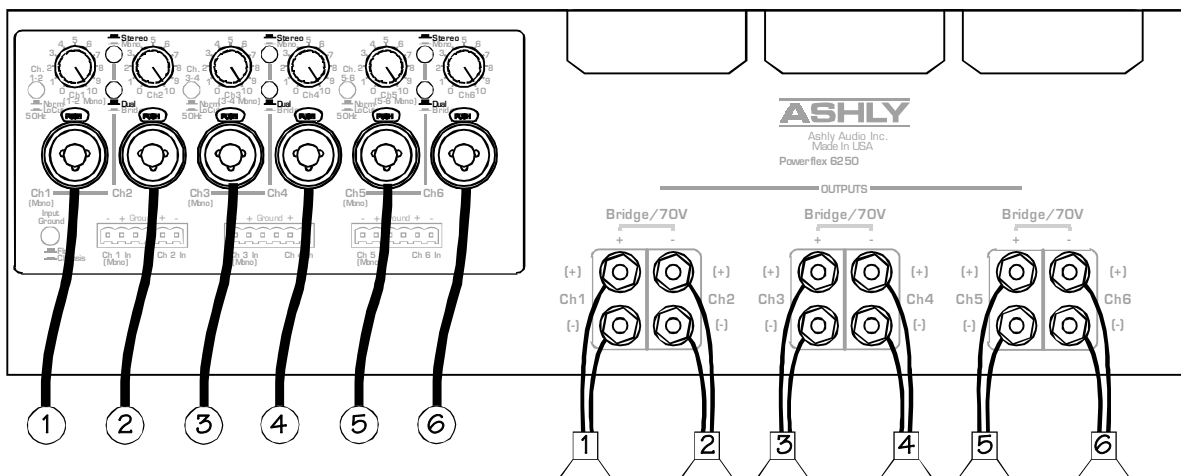
9.1 Individual Channel Setup

Six Channel Setup (dual stereo)

Input Section:
 Up to Six Different Inputs
 Stereo/Mono Switches - Out
 Dual Bridge Switches - Out
 Levels Controls - Used Per Input Channel

Possible Applications:
 Multiple Zone Systems
 Three Pairs Of Studio Monitors
 Multiple Stage Monitors
 25V Distributed Systems (6250 Only)

Multi-Media Systems
Surround Sound
Three Way Bi-Amplification
Stereo Tri-Amplification



Up To Six Different Amplifier Inputs

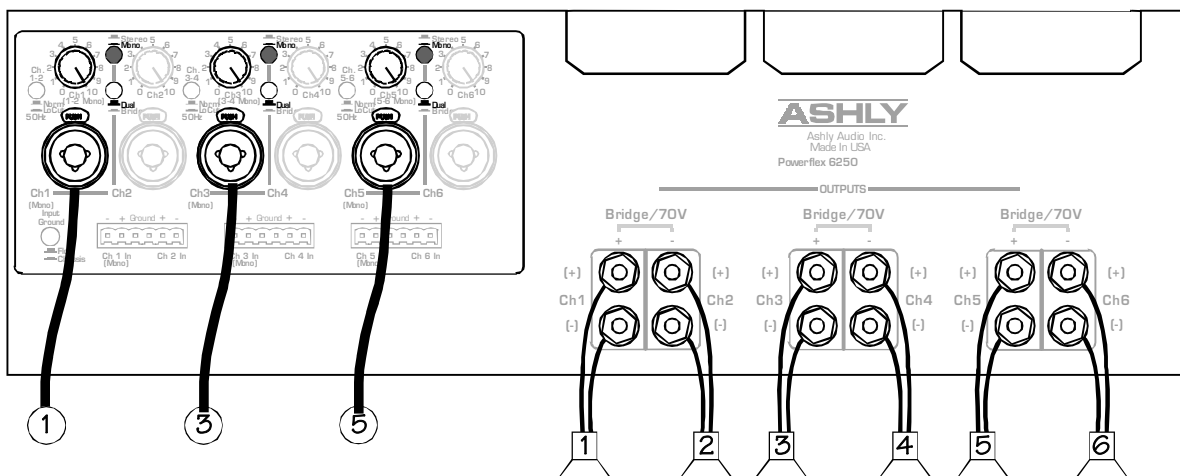
Speaker Outputs - Up To Six Different Outputs
 Minimum Speaker Load Per Channel = 4Ω

9.2 Dual Mono Setup

Dual Mono Setup

Input Section:
 Up to Three Different Inputs
 Stereo/Mono Switches - In
 Dual Bridge Switches - Out
 Levels Controls - Only Channels 1, 3, or 5 Used

Possible Applications:
 Multiple Zone Systems
 Three Different Stage Monitor Mixes
 Dual-Mono FOH Tri-Amplification



Amplifier Inputs
 (An Input Can Be Parallel Connected
 To Other "Non-Partner" Channels by
 Hard-Wire Jumping the Euroblock Connectors)

Channels 1 & 2 From Channel 1 Input
 Channels 3 & 4 From Channel 3 Input
 Channels 5 & 6 From Channel 5 Input
 Minimum Speaker Load Per Channel = 4Ω

9.3 Bridged Mono Setup

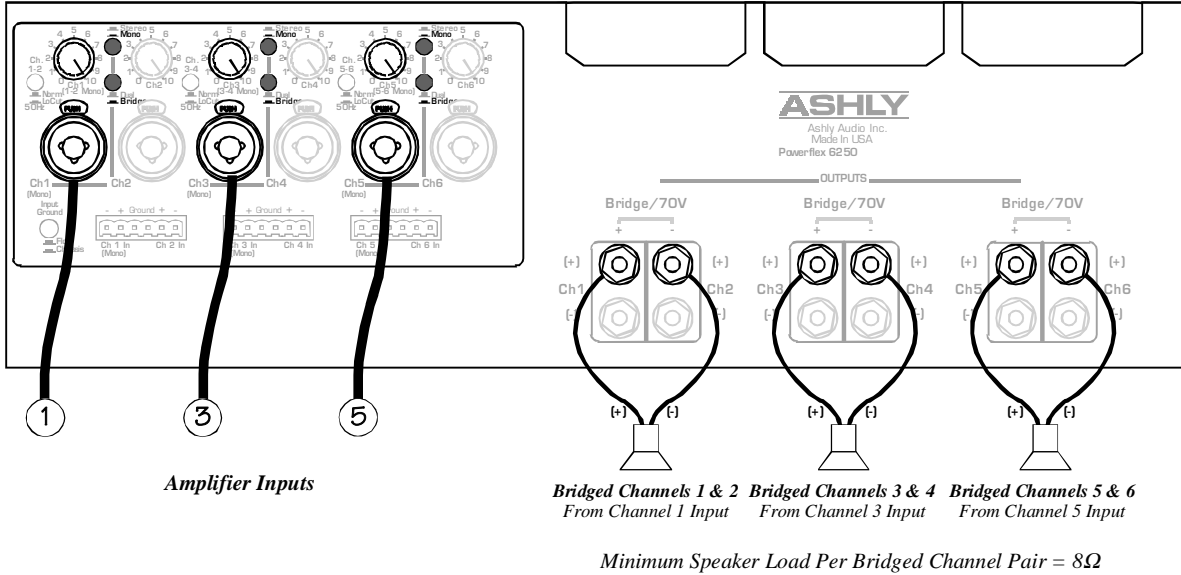
Bridged Mono Setup

Input Section:

Up to Three Different Inputs
Stereo/Mono Switches - In
Dual/Bridge Switches - In
Levels Controls - Only Channels 1, 3, or 5 Used

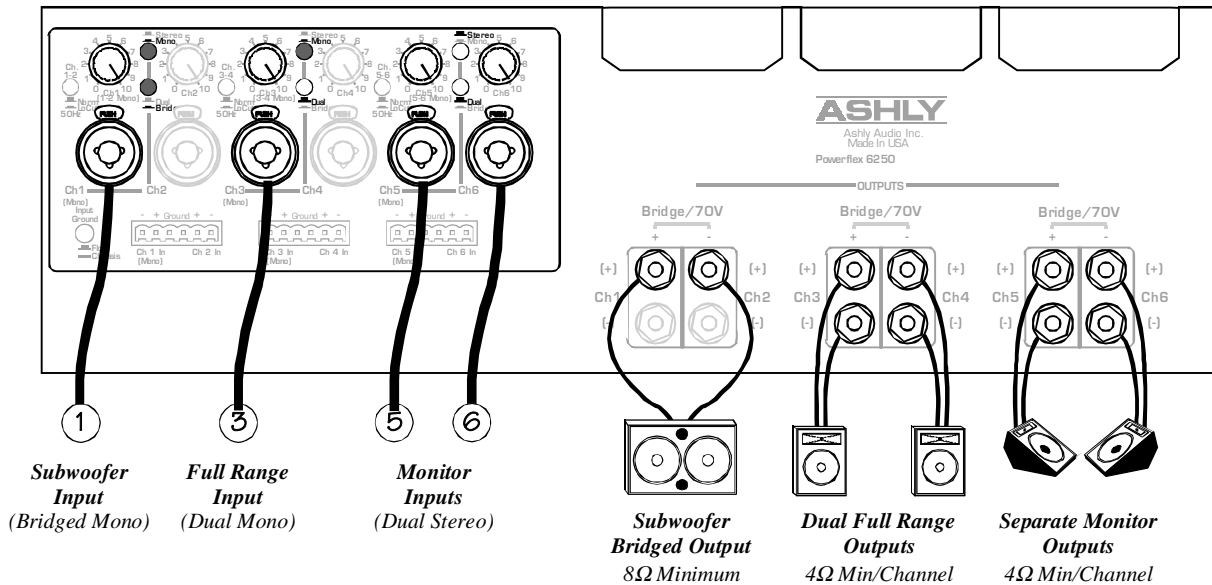
Possible Applications:

70 Volt Constant Voltage Systems (6250 Only)
Subwoofers
High Powered Monitors
High Powered Full Range PA Speakers



9.4 Typical PA Setup

Typical "Flex" PA Setup



10. DESIGN THEORY

Powerflex amplifiers are based on stereo driver modules that use digital processing to generate a spread-spectrum switching pattern between about 200KHz and 1.5MHz, depending on input signal amplitude and frequency. This overcomes the self-limiting and inherent weakness in traditional class D fixed-frequency PWM amplifiers, and produces an output with THD+N numbers comparable to class A and class AB linear amplifiers. (see *Specification Notes* at end of this section)

In Powerflex amplifiers, the input signal is received by a single operational amplifier configured as a difference amplifier to reduce common-mode effects from sources located at a distance. This difference amplifier has a gain of 2.74 which allows the use of less gain later in the system, improving overall system noise performance.

The amplified signal, based on the position of various selector switches, either bypasses or is processed by a two-pole high-pass filter with rolloff at 50Hz, and then passes through the attenuating potentiometer. The attenuated signal is buffered and passed to the amplifier module along with a zero-volt reference.

The amplifier module receives the attenuated signal with a unity gain differential amplifier to eliminate common-mode interference picked up within the amplifier chassis. The signal is then added to a small DC offset signal opposite in polarity to any DC offset on the Powerflex output bridge and adjusted by the digital processing module as described above. The digital processing module, which also generates FET drive signals, has a voltage gain of 11.7 for a total system voltage gain of 32. The drive signals generated by the processing module are fed to a pair of high-current MOSFET transistors, and the switched output of these transistors is filtered and applied to the speaker outputs. Fault conditions such as overvoltage, undervoltage, and output overcurrent are measured by the module and therefore affect a stereo pair of channels regardless of whether the fault actually exists on both channels processed in the module. Since every action applied to protect the digital processing module affects both channels being processed, other fault conditions are not separated by channel, but rather by amplifier module.

Specification Notes: Due to its spread spectrum output switching pattern, the output signal of a Powerflex amplifier contains significant dynamic frequency content* far outside the audio band, which makes no difference to audible performance, but which makes heavily bandwidth-limited** measurement of amplifier noise and distortion characteristics mandatory.

*variable 200KHz to 1.5MHz

**greater than 48dB/octave above 22kHz

11. TROUBLESHOOTING TIPS

11.1 No Audio Output

1.) Power LED not lit:

Line fuse is blown or power outlet is dead.

IF LINE FUSE IS BLOWN, REPLACE ONLY WITH SAME TYPE AND RATING FUSE.

2.) Power LED is lit but Protect LEDs stay on:

Amp module is in protect mode. Speakers have been disconnected from amplifier output and connected to ground until the protect fault is corrected. See section 8 for a complete explanation of protect fault conditions. Output overcurrent, overvoltage and undervoltage faults will reset in about eight seconds once the fault condition is removed, while excessive DC offset or high frequency faults take about 30 seconds to reset.

Speaker Impedance: The Powerflex amplifier may go into self-protect at high output levels if the actual speaker load impedance is much less than 4 ohms. To calculate speaker impedance for a given combination of direct-coupled speakers, use Ohm's law as applied to series and/or parallel resistor networks, where each speaker (for this purpose) can be thought of as a single resistor, using DC resistance measurements.

Simply stated, speakers connected in series will add together their impedance. Conversely, two speakers connected in parallel will result in half the impedance, three parallel speakers a third the impedance, four speakers a fourth, and so on, assuming the speaker impedances are all the same. *Don't use mismatched impedances in parallel.* When using paralleled speakers, the available amplifier power for that channel is evenly divided among speakers, so 100 watts driving two parallel speakers of equal impedance provides 50 watts to each speaker, etc. Combining series/parallel speaker connections is common practice, but if not sure, contact your dealer or Ashly tech support.

3.) Thermal LED and Protect LEDs stay on:

Amp module is in thermal protect mode and needs to cool. The fan will continue to run while in thermal protect, and other modules will continue to function. See section 8.4 for details.

4.) Power LED lit but no Signal LED activity

There is no input signal applied or input level controls are turned down.

11.2 Distorted Sound

1.) *Clip LED is flashing regularly*

Amplifier is being overdriven. Turn down the input level control, or reduce the output level from the signal source.

2.) *Clip LED is not flashing at all*

Amplifier input signal may be exceeding input headroom, which is greater than +12dBu, or 3.4V rms (measured using continuous 1kHz sine wave). Incoming signal level higher than +12.8 dBu will cause distortion in the amplifier. *Turning down the input level controls will not eliminate distortion if the input headroom is exceeded.* Turn down the output level of the device driving the amplifier instead.

Additionally, an input signal may already be distorted before it gets to the amp. Check to see if a piece of equipment in the signal chain before the amp is clipping. For best performance, the amplifier should be operated with input levels fully CW. Also check for damaged speaker drivers that could cause distorted sound.

11.3 Hum or Buzz Noise

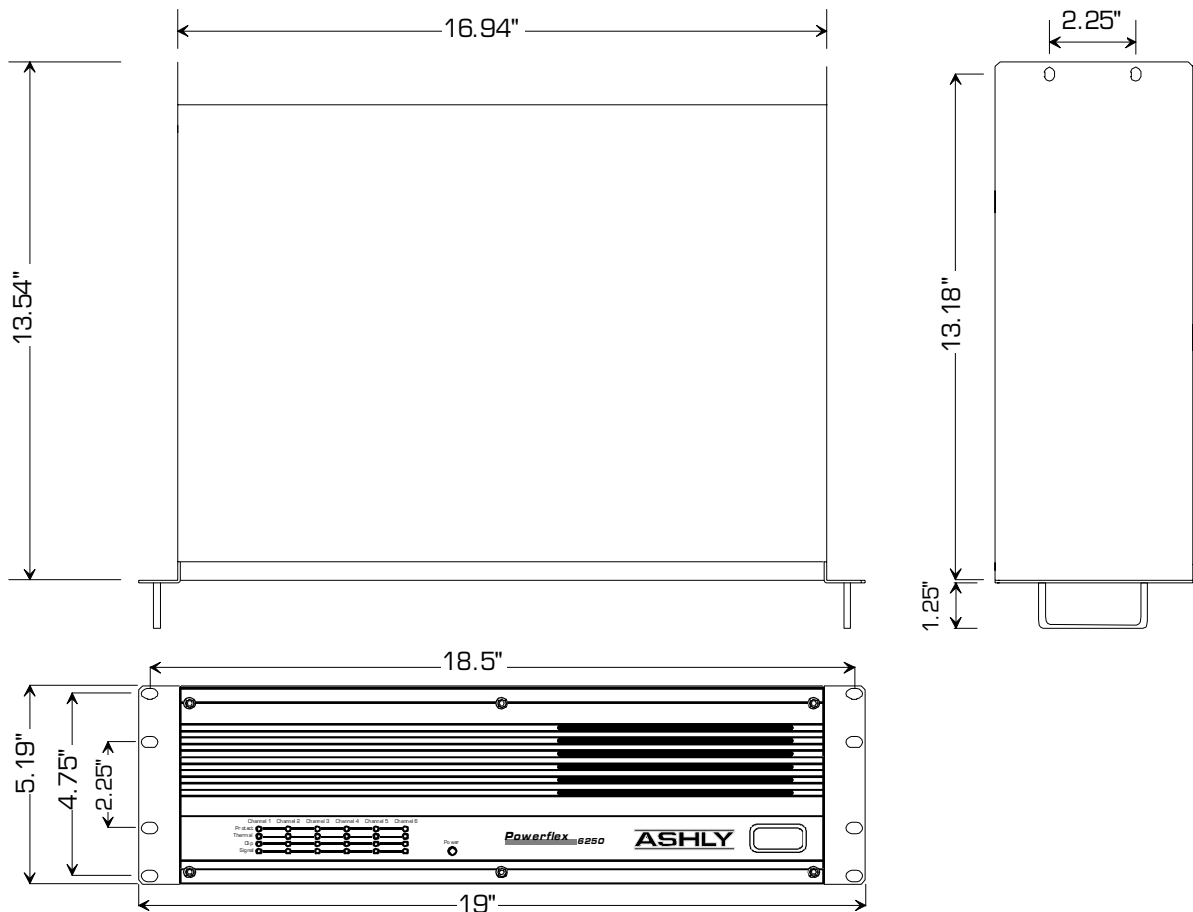
Be sure that the power cord's 3-prong plug is connected to a properly earth-grounded outlet. Lifting the grounding third prong may not improve hum or buzz and can create a potential shock hazard.

Hum is usually caused by ground currents flowing between different pieces of equipment. Ground currents can be minimized by using a single point AC ground for the sound system, and by using balanced connections with quality cable throughout the audio path.

Buzz, as well as certain audible high frequency tones, can be caused by environmental emissions such as lighting dimmers, neon lights, or computer equipment. Use balanced connections, and try moving the amplifier, wiring, lighting, or other equipment to different locations to isolate the source of the noise.

Sections 3.3, 5.3, 7.1, and 7.2 further discuss issues related to grounding and noise problems.

12. POWERFLEX DIMENSIONS



13. SPECIFICATIONS

***Power Output**

(Maximum Average Power, 0.1% THD, 1KHz)

Rated Per Channel, Two Channels Driven		
	Powerflex 6250	Powerflex 4400
4 ohm:	250 Watts RMS	400 Watts RMS
8 ohm:	150 Watts RMS	275 Watts RMS
25V (6250 only)	150 Watts RMS	*
Mono Bridged (1 Channel)		
8 ohm:	500 Watts RMS	800Watts RMS
70V (6250 only)	500 Watts RMS	*

Rated Per Channel, All Channels Driven		
	Powerflex 6250	Powerflex 4400
4 ohm:	250 Watts RMS†	400 Watts RMS†
8 ohm:	150 Watts RMS	275 Watts RMS
25V (6250 only)	150 Watts RMS	*
Mono Bridged (3 channels)		
8 ohm:	500 Watts RMS	800Watts RMS
70V (6250 only)	500 Watts RMS	*

Input Impedance: 10K ohm balanced, 37K ohm unbalanced

High Pass Filter: 50Hz, 12dB/octave

****Total Harmonic Distortion** (20Hz - 20KHz @ 8 ohms): <0.2%

****IMD**

(SMPTE 60Hz/7KHz 4:1)
 @ 8 ohms: <0.2% (throughout power range)
 (IHF) @ 8 ohms: <0.1% (throughout power range)

****Hum and Noise:** -100dB from full output (A-weighted)

Full Power Input Sensitivity:

Powerflex 6250	Powerflex 4400
1.05V RMS (2.6dBu)	1.25V RMS (4.15dBu)

Frequency Response:

8 ohm: ±0.5dB 20Hz-20kHz
 4 ohm: ±1.5dB 20Hz-20kHz

Voltage Gain: 32X (30.1dB)

Crosstalk: < -80dB (20Hz - 1KHz)

Signal Present Signal Sensitivity: 13mV RMS (-35.5dBu)

Power Requirement: 110-125VAC, 220 - 250VAC
 50/60Hz

Typical Idle Current

Powerflex 6250	Powerflex 4400
120V: 0.81A	120V: 0.9A
240V: 0.42A	240V: 0.5A

Current with Typical Audio Program Material (4 ohm load - all Channels)

Powerflex 6250	Powerflex 4400
120V: 6.5A	120V: 7.0A
240V: 3.3A	240V: 3.5A

Connections

Input: XLR - 1/4" (Pin 2: Hot, Tip: Hot), Euroblock
 Output: 5-Way Binding Post

Cooling: Forced Air, Thermal Sensitive 3-Speed Fan, Front Inlet/Rear Outlet

Dimensions: 19"L x 5.25"H x 16.5"D

Construction: All-Steel Chassis, Extruded Aluminum Front Panel

Weight: 45lbs

Specification conditions: 120VAC mains at 60Hz, 25° C

* Continuous power limited by power line capacity

**Non-conventional amplifiers require bandwidth limiting for all distortion and noise measurements.

† Signal peaks in audio programming may trigger protection circuitry at low line voltages. Specifications are subject to change or improvement without notice.

14. WARRANTY INFORMATION

We thank you for your expression of confidence in Ashly products. The unit you have just purchased is protected by a limited five year warranty. To establish the warranty, you must first complete and mail the warranty card attached to your product.

Fill out the information below for your records.

Serial Number _____
 Dealer _____
 Date of Purchase _____
 Dealer's Address _____

 Dealer's Phone _____
 Salesperson _____



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