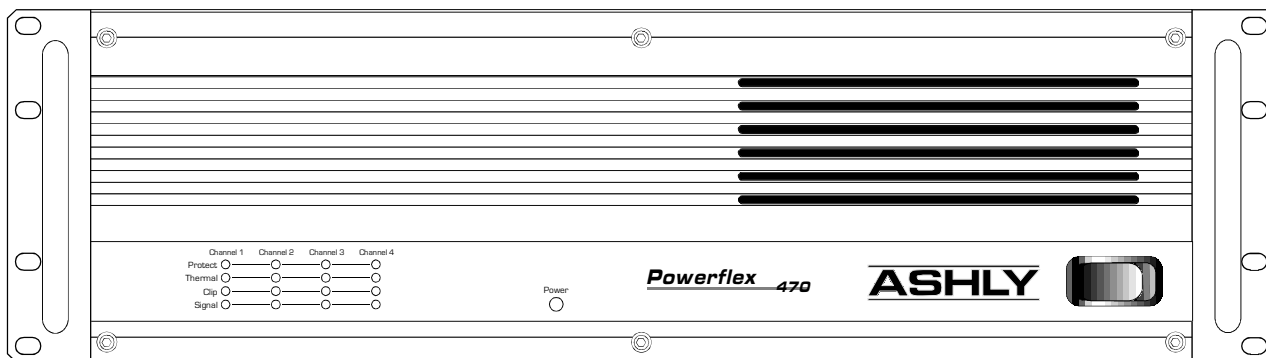
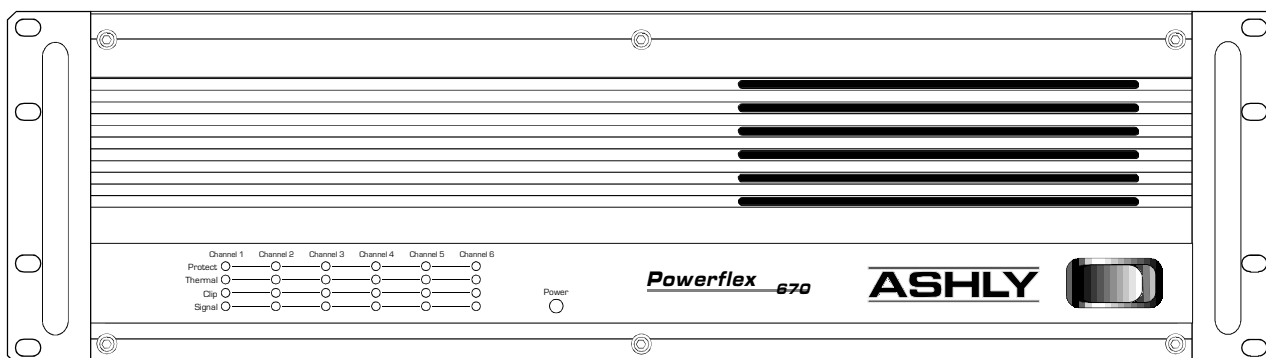


# ASHLY

## Powerflex™

### Multi-Channel 70V Power Amplifiers

## Operating Manual



### ASHLY AUDIO INC.

847 Holt Road Webster, NY 14580-9103 Phone: (585) 872-0010

Toll-Free: (800) 828-6308 Fax: (585) 872-0739

[www.ashly.com](http://www.ashly.com)

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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 equalateral 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 70V amplifiers combine the efficiency of a MOSFET high-speed switching output stage with the sophistication of modern microprocessors and DSP technology to produce a multi-channel 70V amplifier with unprecedented versatility and power in a single 3RU package.

Although similar to other amplifiers with class D output stages, 70V 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 70V 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

Powerflex 70V 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 7.7). 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):

120V: 0.9A

240V: 0.5A

#### 2.) With typical audio on all channels:

(Powerflex 670 with 200W loads, Powerflex 470 with 300W loads)

120V: 10A

240V: 5A

Powerflex 70V amplifiers consume less than 12 amps when all channels operate at 1/8 power into rated 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

It is recommended that the 70V speaker lines be terminated with spade lug terminals for connection to the powerflex amplifier's output screw terminals. Alternatively, bare stripped wire leads may be wrapped around the output screw terminals. The output screw terminals will accept spade lugs or stripped wire for wire sizes 10 to 22 gauge.

**CAUTION: THE POWERFLEX 70V AMPLIFIERS CAN PRODUCE DANGEROUS VOLTAGE LEVELS AT THE OUTPUT SCREW TERMINALS. ALWAYS UNPLUG THE AMPLIFIER BEFORE CONNECTING OR DISCONNECTING OUTPUT WIRES. THE AMPLIFIER SHOULD ALWAYS BE OPERATED WITH THE SCREW TERMINAL SAFETY COVER SECURELY IN PLACE.**

#### 5. RACK-MOUNTING REQUIREMENTS

##### 5.1 Mechanical

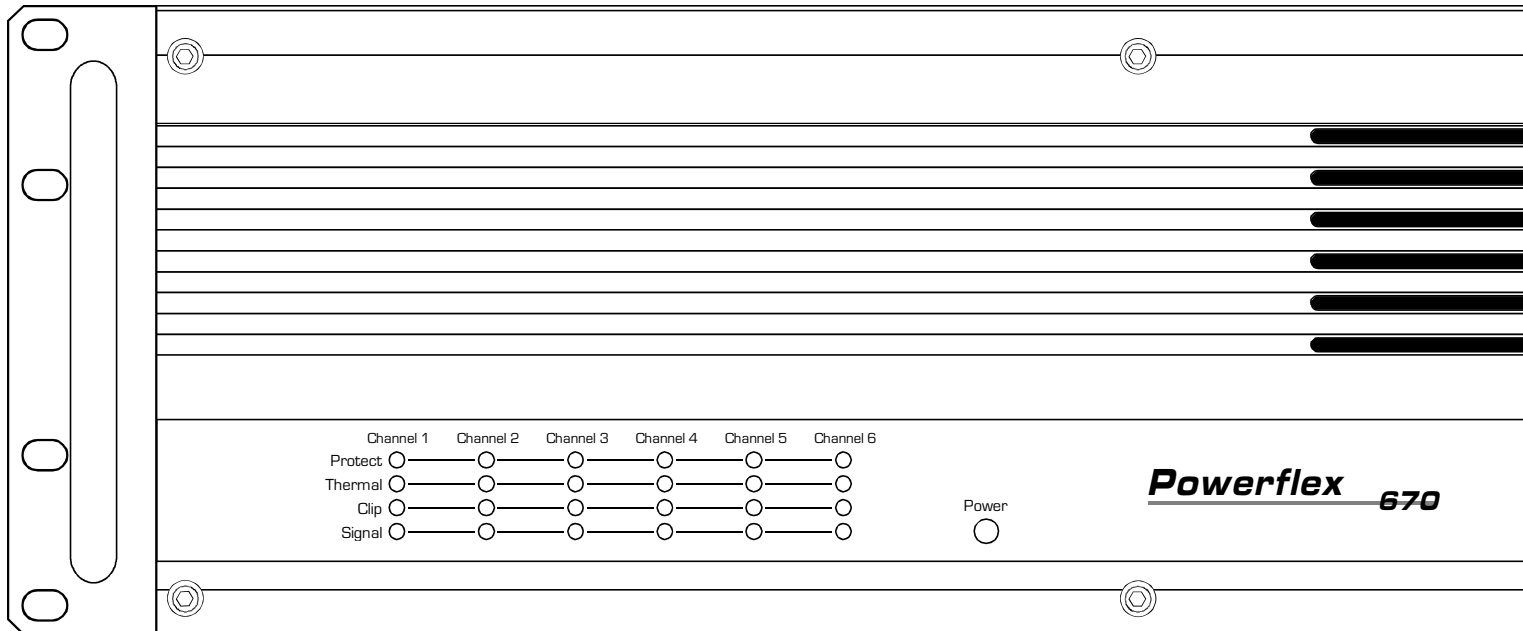
Powerflex amplifiers are designed to fit in standard 19-inch equipment racks. The front panel rack-mount ears are sufficiently strong for most applications, however if you desire further support, we recommend using the four additional holes in the back of the chassis for supplemental rear-mounting (see 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 14mVrms (-35dBu).

### 6.3 Clipping Indicator

The clipping LEDs illuminate at an input level of about 870mVrms (+1.0dBu), with all channels driven by 1KHz into rated load. 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

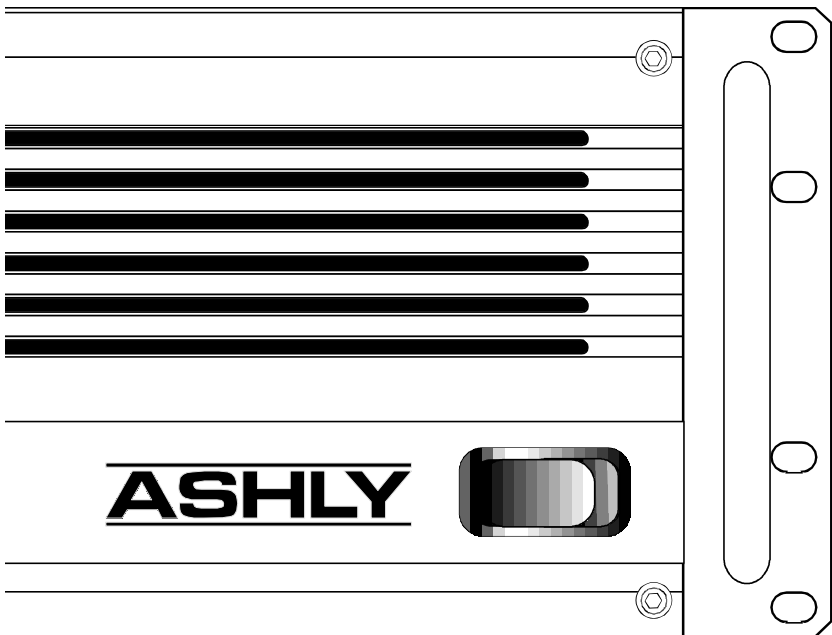
shut off until the measured temperature drops below about 70°C. The amplifier should be able to maintain proper operation at an ambient room temperature of 50°C (122°F) or less with typical audio program and all channels driven into rated loads.

### 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 (670 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 670 shown - Powerflex 470 only has channels 1-4.

## 7. REAR PANEL FEATURES

### 7.1 Input Connectors

The Powerflex 70V amplifier inputs use balanced two piece "Euroblock" connectors for easy installation. It is recommended that balanced signals be used whenever possible to take full advantage of the amplifier's common mode rejection properties, and to reduce ground-loop problems.

If there is a persistent hum problem, try connecting a balanced signal to the Euroblock input with the Input Ground switch pushed out (ie. no input 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.

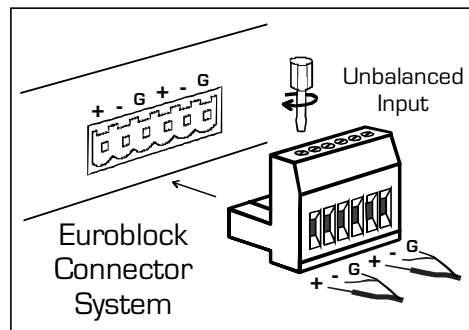
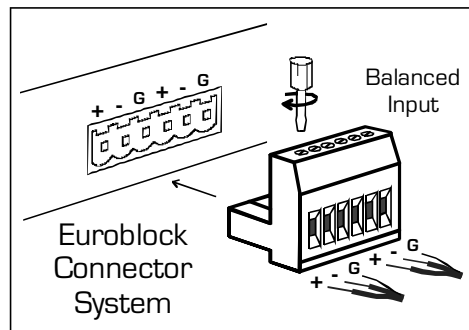
*If using an unbalanced (single ended) source, do not leave unconnected the (+) or (-) input connection. Connect the signal to (+) and the cable shield to both (-) and ground. If hum persists, connect the cable shield only to the (-) input.*

### 7.2 Input Ground Switch

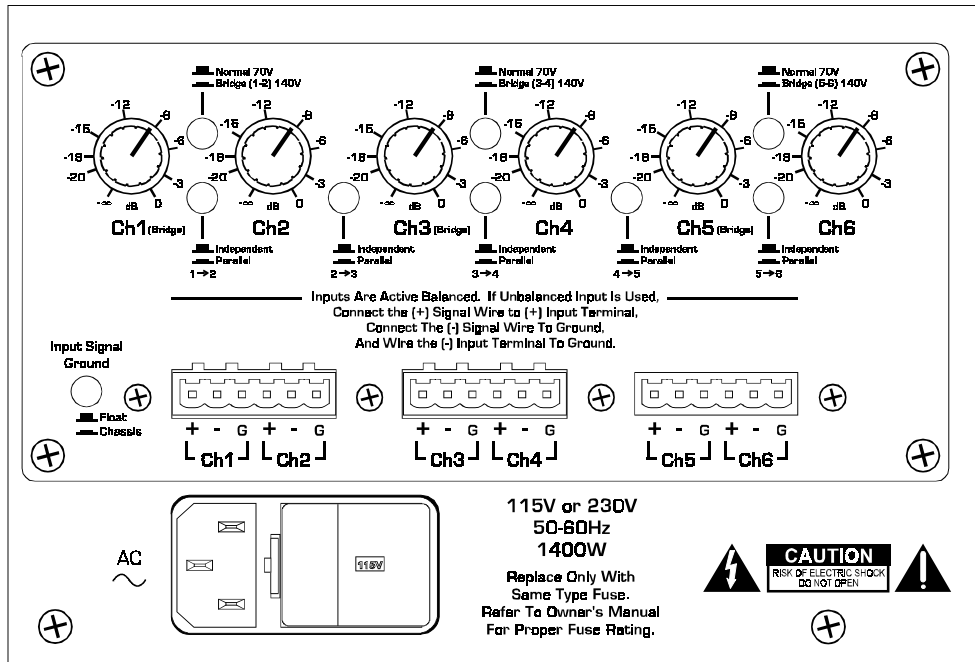
This switch is used to disconnect the input cable ground from chassis. The amplifier's internal signal ground is always referenced to earth ground so that the amplifier output never floats. Unless there is a ground loop induced hum problem in the audio system, it is recommended that the Input Ground switch be left in to connect the input cable ground to the amplifier's chassis.

### 7.3 Independent/Parallel Mode Switch

Each input channel can be switched to provide the input signal to the next higher-numbered channel. This makes possible a variety of input channel routing configurations to be done internally to the amplifier. If the Independent/Parallel switch is in the out position (independent mode), the input signal is fed only to the connected channel. When the Independent/Parallel switch is pushed in (parallel mode), the input signal is fed to the next higher-numbered channel before it's level control. By depressing all Independent/Parallel switches and feeding a signal into



Powerflex 670 shown - Powerflex 470 only has inputs 1-4.



channel 1, a single input channel connection can supply all amplifier channels with the same signal before their level controls. This is useful in multi-zone applications where each zone level can be controlled separately and only one input connection is needed.

#### 7.4 80Hz Low Cut Filter

Each input channel has an internally selectable 12dB/octave 80Hz high pass filter. This filter is useful when driving low quality 70V step-down transformers which typically saturate (high distortion and low impedance) at low frequencies. The amplifier is factory configured with this filter bypassed.

To enable the 80Hz high pass filter for a given channel, a qualified service technician can remove the input panel and reposition one of six jumpers labeled "HPF" on the top circuit board assembly, each near their respective channel's level control. When the filter is engaged, the respective channel's frequency response will be -3dB at 80Hz, -12dB at 40Hz, and -24dB at 20Hz.

#### 7.5 Input Level Controls

The Input Level controls attenuate the input signals from 0dB to -infinity (OFF). For best headroom performance, it is recommended that the Input Level controls always be operated at full level (0dB attenuation). Each channel's level is controlled by its respective Input Level control regardless of being in Independent or Parallel mode. However, when a Normal/Bridge switch is depressed, the odd numbered channel's level control will control both the even and odd numbered channels.

#### 7.6 Normal/Bridge Switch

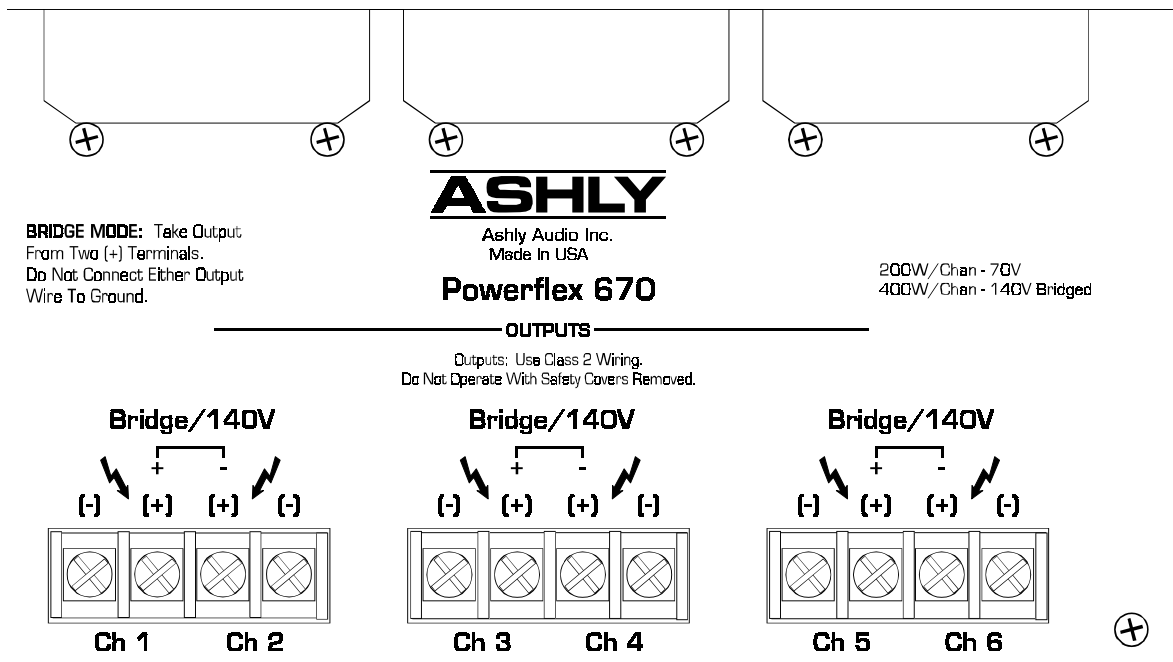
The Normal/Bridge switch is used to operate two adjacent channels (1 and 2, 3 and 4, 5 and 6 on the PF670) in bridge mode to drive 140V lines. Pressing a Normal/Bridge switch in (Bridge mode) disables the even-numbered channel's input connector and level control and internally routes the odd numbered channel's input signal to the next higher even-numbered channel with the phase inverted 180 degrees. The odd-numbered channel level then controls both channel levels equally. The output of two bridged channels is then taken from the two (+) output screw terminals of the respective channels to provide twice the power at 140 volts.

#### 7.7 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.





Powerflex 670 shown - Powerflex 470 only has channels 1-4

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.*

### 7.8 Speaker Outputs

The Speaker outputs are provided on screw terminal barrier strips with security covers. The output screw terminals will accept spade lugs or stripped wire for wire sizes 10 to 22 gauge.

**CAUTION: THE POWERFLEX 70V AMPLIFIERS CAN PRODUCE DANGEROUS VOLTAGE LEVELS AT THE OUTPUT SCREW TERMINALS. THE AMPLIFIER SHOULD ALWAYS BE OPERATED WITH THE SCREW TERMINAL SAFETY COVER SECURELY IN PLACE. TO CONNECT OR DISCONNECT 70V OUTPUT WIRES, ALWAYS UNPLUG THE AMPLIFIER BEFORE REMOVING THE OUTPUT SCREW TERMINAL SAFETY COVER.**

In bridge mode, the speaker output connections are taken from the two (+) screw terminals where the odd-numbered channel (+) output is the positive connection and the even-numbered channel (+) output is the negative connection.

**CAUTION: NEVER CONNECT THE TWO (+) SCREW TERMINALS TOGETHER OR CONNECT A (+) SCREW TERMINAL TO A (-) SCREW TERMINAL.**

### 8. SELF-PROTECTION FEATURES

Powerflex 70V 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** - Possible causes would be total load on the outputs exceeding recommendations (remove some speakers), 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** - 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 7 amperes 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 two-speed fan will switch 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 (above 20kHz) in the output at high amplitudes can cause speaker damage and will trigger a HF protect fault.

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 670 is essentially three stereo amplifiers in one chassis, *each* with Independent, Parallel, and Bridge mode, while the Powerflex 470 is two stereo amplifiers (four channels), but with more power per channel than the 670. *Note: The Powerflex 670 is used for the following application details, but the 470 is used in a similar fashion, to a maximum of four channels.*

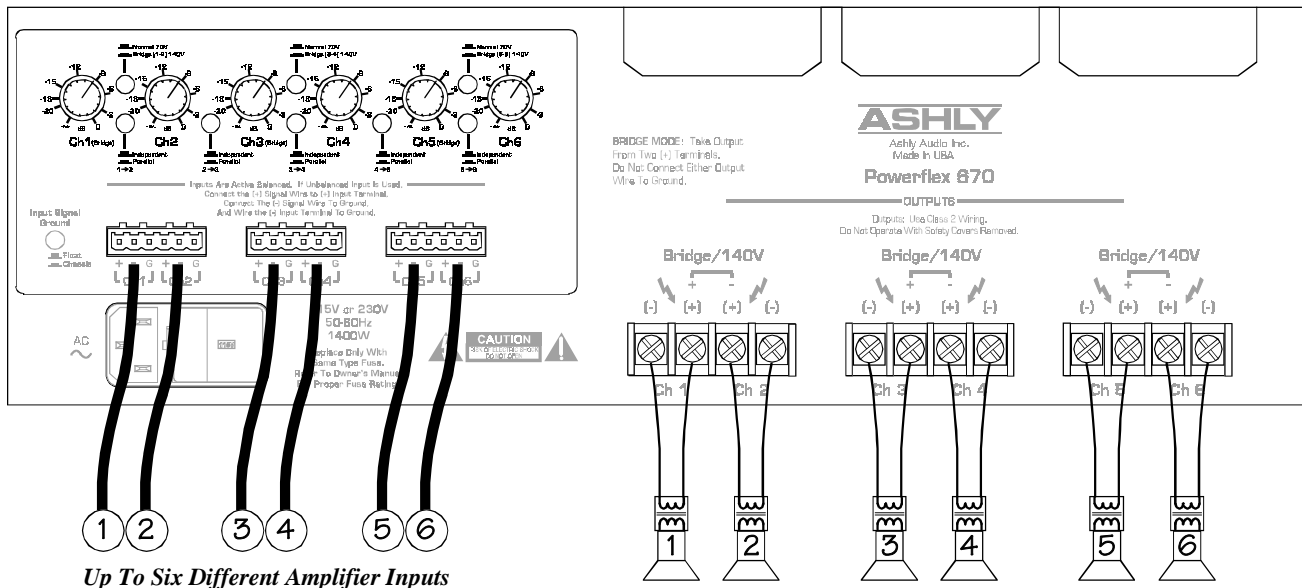
## 9.1 Independent Channel 70V System

### Input Section:

- Up to Six Different Inputs
- Independent/Parallel Switches - Out
- Normal/Bridge Switches - Out
- Levels Controls - Used Per Input Channel

### Possible Application:

Multiple Zone 70V Systems where each zone has different audio program



Up To Six Different Amplifier Inputs

Speaker Outputs - Up To Six Different Outputs

Maximum Power Output Per Channel = 200W/ch for 670, 300W/ch for 470

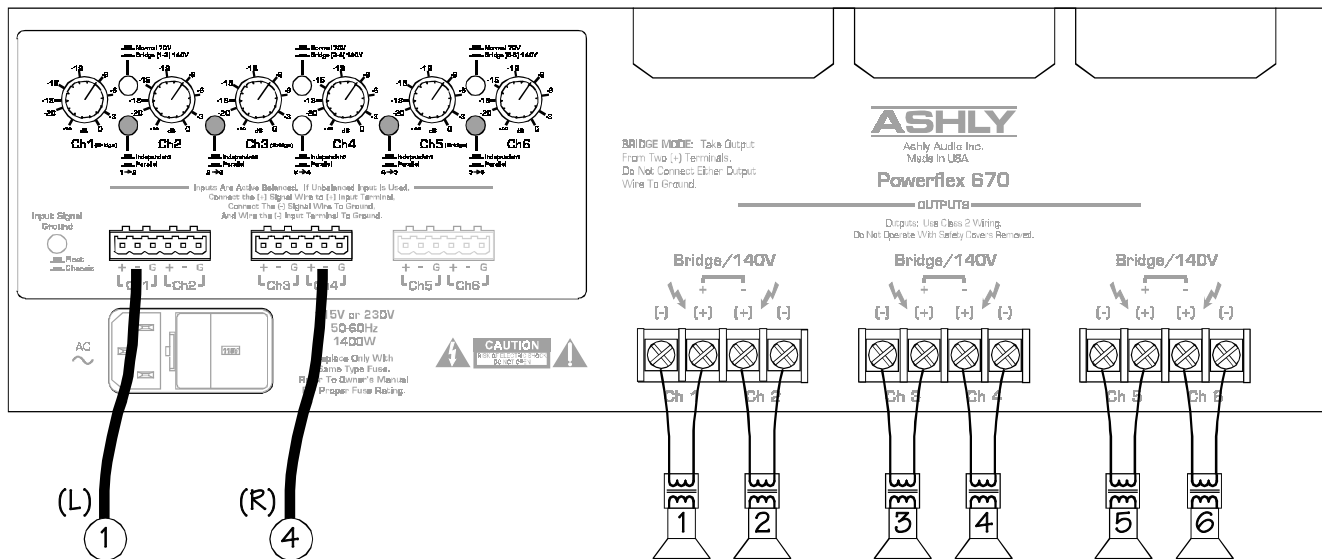
## 9.2 Parallel Channel Stereo 70V System

### Input Section:

- Stereo Inputs Into Channels 1 and 4
- Independent/Parallel Switches - All IN except Ch3-Ch4
- Normal/Bridge Switches - Out
- Levels Controls - Ch 1, 2,3 for (L), Ch 4, 5, 6 for (R)

### Possible Application:

Three Stereo Zones



Amplifier Inputs:  
An Input Can be Parallel Connected to the Next Highest Channel by Pressing the Independent/Parallel Switch In.

Zone 1 (L) Zone 2 (L) Zone 3 (L) Zone 1 (R) Zone 2 (R) Zone 3 (R)

Maximum Power Output Per Channel = 200W/ch for 670, 300W/ch for 470

### 9.3 Bridged 140V System

**Input Section:**

Up to Three Different Inputs

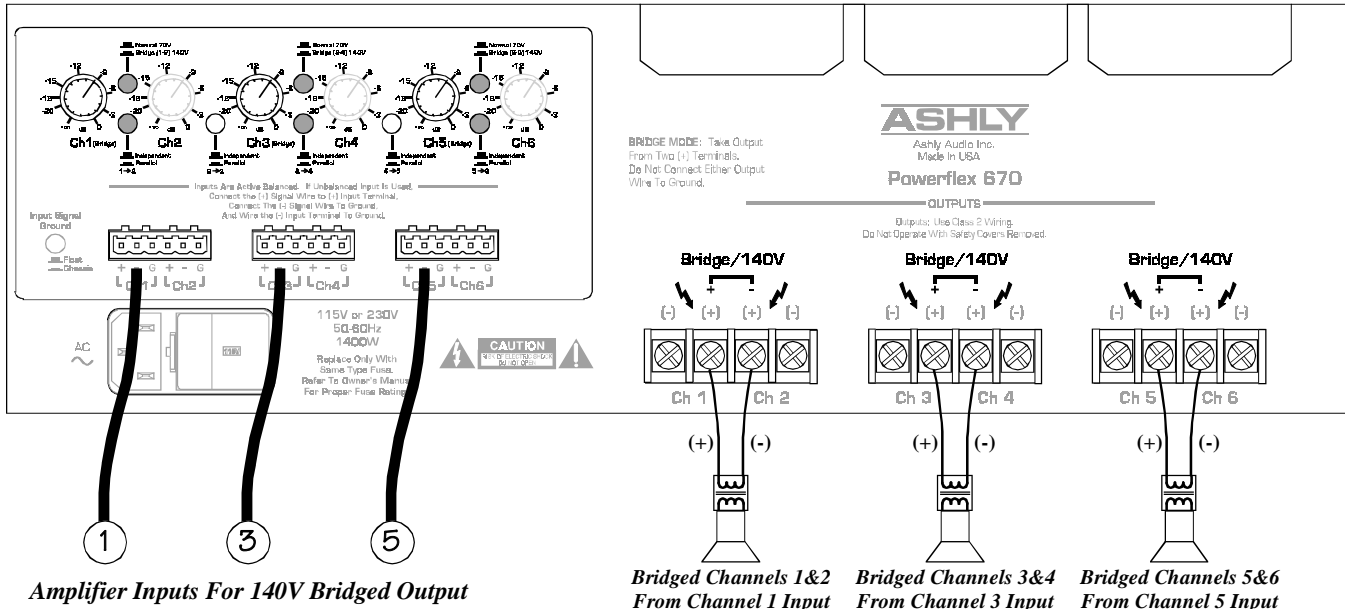
Independent/Parallel Switches - 1 → 2 IN, 3 → 4 IN, 5 → 6 IN

Normal/Bridge Switches - All IN

Levels Controls - Only Channels 1, 3, or 5 Used

**Possible Application:**

140V system where each zone has different audio program



Amplifier Inputs For 140V Bridged Output

Bridged Channels 1&2 From Channel 1 Input  
Bridged Channels 3&4 From Channel 3 Input  
Bridged Channels 5&6 From Channel 5 Input

Maximum Power Output Per Bridged Channel Pair = 400W for 670, 600W for 470

### 9.4 Parallel Channel MultiZone 70V System

**Input Section:**

One Input on Channel 1

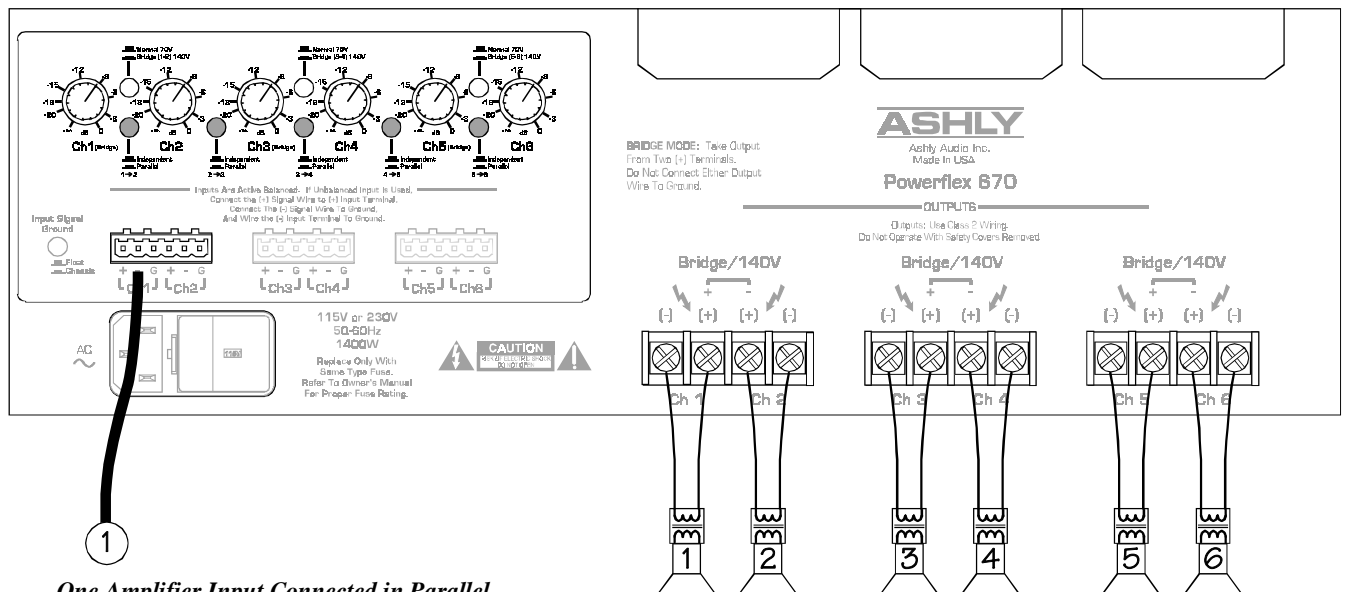
Independent/Parallel Switches - All In

Normal/Bridge Switches - All Out

Levels Controls - All Used

**Possible Application:**

Multiple zone 70V system where each zone has the same audio program but separate level controls



One Amplifier Input Connected in Parallel With The Other Five Input Channels

Speaker Outputs - Up To Six Different Outputs From Channel 1 Input  
Maximum Power Output Per Channel = 200W/ch for 670, 300W/ch for 470

## 10. DESIGN THEORY

Powerflex 70V 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 80Hz, 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 18.2 for a total system voltage gain of 50. 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 Load:** The Powerflex 70V amplifier may go into self-protect at high output levels if the actual speaker load power is greater than the specified output power of the amplifier. Some speaker loads may consume more power at frequency extremes than their nominal power rating. Alternatively, too many speaker loads may be connected in parallel on the 70V line.

#### 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

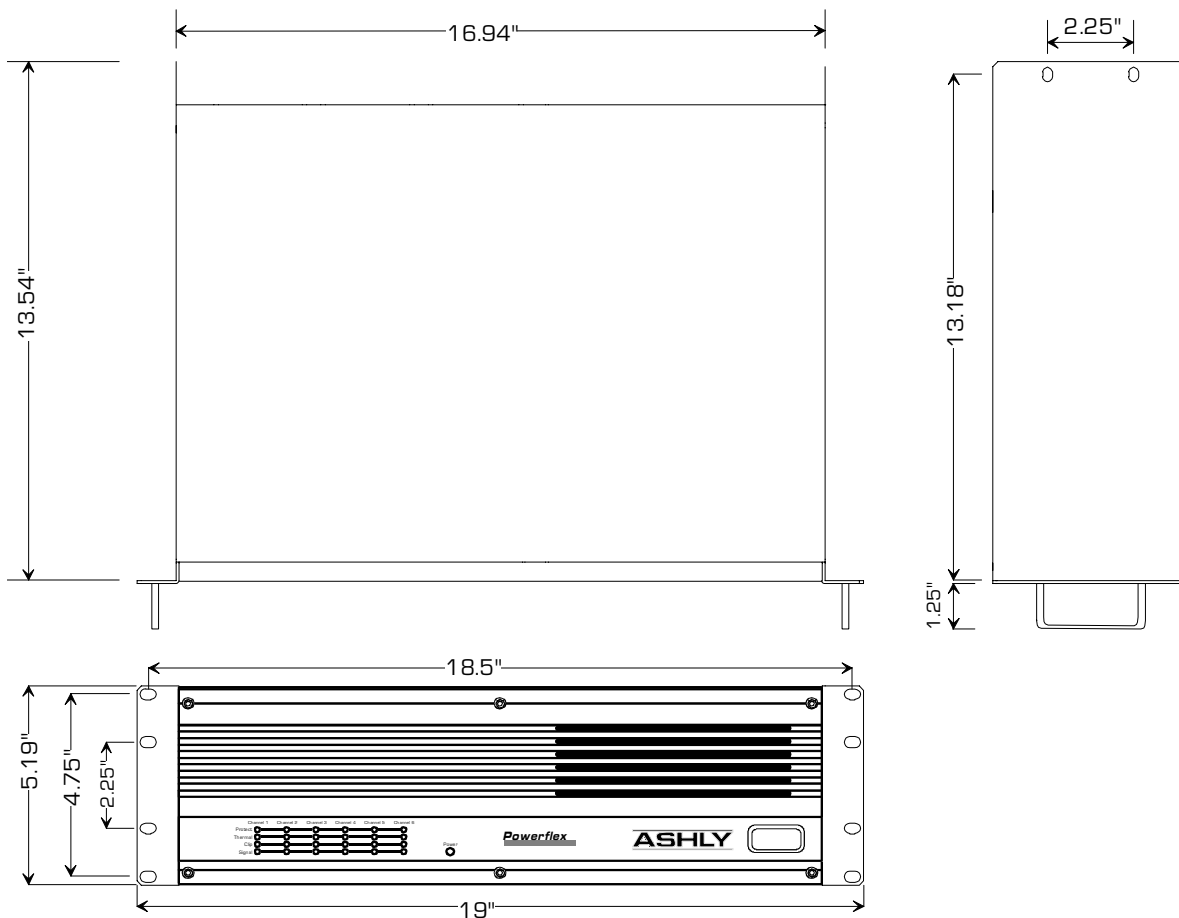
Be sure that the power cord's 3-prong plug is connected to a properly earth-grounded outlet. Lifting the grounding third prong may not improve hum or buzz and can create a potential shock hazard.

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. The Input Signal Ground switch may be pressed out to disconnect the signal source equipment signal ground from the amplifier.

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	
	<b>Powerflex 670</b>	<b>Powerflex 470</b>
70V:	300 Watts RMS	300 Watts RMS
140V Bridged (1 Channel)	600 Watts RMS	600Watts RMS

	Rated Per Channel, All Channels Driven	
	<b>Powerflex 670</b>	<b>Powerflex 470</b>
70V:	200 Watts RMS†	250 Watts RMS†
140V Bridged	400 Watts RMS	500Watts RMS

**\*\*THD** (20Hz-20KHz, all channels driven full power):  
< 0.2%

**\*\*IMD** (SMPTE 60Hz/7KHz 4:1)  
@ rated load: < 0.2% (throughout power range)

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

**Full Power Input Sensitivity:**

	<b>Powerflex 670</b>	<b>Powerflex 470</b>
	1.4Vrms(5.1dBu)	1.4Vrms (5.1dBu)

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

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

**Voltage Gain:** 50X (34.0dB)

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

**High Pass Filter:** 80Hz, 12dB/octave, internal select

**Connections**

Input: Balanced Euroblock  
Output: Screw Terminal, 10 gauge wire max

**Frequency Response:**

±0.5dB (20Hz-20kHz, full power, 2 channels)  
±1.5dB (20Hz-20kHz, full power, all channels)

**Power Requirement:**

110-125VAC, 220 - 250VAC50/60Hz

**Typical Idle Current**

	<b>Powerflex 670</b>	<b>Powerflex 470</b>
	120V: 0.9A	120V: 0.9A
	240V: 0.5A	240V: 0.5A

**Current with Typical Audio Program Material**

(all Channels driven)

	<b>Powerflex 670</b>	<b>Powerflex 470</b>
	120V: 10A	120V: 10A
	240V: 5A	240V: 5A

**Cooling:** Forced Air, Thermal Sensitive  
2-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

	<b>Powerflex 670</b>	<b>Powerflex 470</b>
<b>Weight:</b>		
Net	47 lb	45 lb
Shipping	54 lb	52 lb

**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 \_\_\_\_\_



ASHLY AUDIO INC. 847 Holt Road Webster, NY 14580-9103  
Phone: (585) 872-0010 Fax: (585) 872-0739  
Toll Free (800) 828-6308  
[www.ashly.com](http://www.ashly.com)

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