



# COMBO

## OPERATING GUIDE

**WARNING:** To prevent electrical shock or fire hazard, do not expose this appliance to rain or moisture.



## GENERAL DESCRIPTION

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The new Combo amp is the latest in our series of single unit amplifiers and provides the performer with unmatched versatility in an amp of this size or power range. The Combo is intended primarily for bass and its advanced features enable a tremendous range of equalization, as well as avoidance of distortion through use of an advanced compression circuit designed to control speaker/power amp overload.

The circuitry of the Combo is all new, from input to output, and features the latest in high speed integrated circuits and discrete power devices. All inputs and outputs of the Combo are transient protected by silicon diodes, thus preventing destruction of the FET input stages or damage to the line amp or power amplifier. The Combo features an advanced five-section equalization system with true parametric middle controls. The parametric middle, combined with the more conventional shelving type low and high controls, provide very nearly anything one might need without the undue complexity of graphic equalizers or parametric equalization on low and high frequencies as well as mids. The extremes of the frequency band (low and high) are generally not the main determining factors in the tonality of most stringed instruments. The all important mid-range is virtually the sole determining factor in the various "sounds" available from the various stringed instruments and amplifiers. We have, therefore, elected to use parametric equalization in the mid range only. The parametric middle includes controls for setting the frequency and the bandwidth, as well as the mode to provide either boost or cut. The new super low-noise preamp features operational amplifiers incorporating field effect transistors for the input stage, thus creating an extremely quiet preamp with tremendous gain and dynamic range. As with most Peavey amplifiers, we have included both pre and post gain controls to enable the performer to vary the dynamics of this very versatile amplifier.

One of the very distinct problems encountered in single unit bass amps in the past is the decided lack of speaker enclosure performance due to the small size, as well as inadequate performance from the built-in power amplifier. With these limitations in mind, we designed an entirely new output system featuring an advanced compression circuit enabling the performer to avoid the distortion and overdriving problems encountered in the past. Our compression circuit is completely new and we feel it is the best available for this type of application. In order to keep the complexity down, we have included a simple on/off switch that enables the compression feature to be disabled at the option of the player. An internal LED indicates compression operation. The Combo features a line amplifier to provide a preamp output capable of driving any known accessory device and, of course, it is fully transient protected.

The rugged 130-Watt RMS power stage features four heavy-duty silicon power devices attached to a massive aluminum heatsink for durability under the most demanding playing conditions. The extremely compact enclosure features  $\frac{3}{4}$ " wall thickness and is ported to achieve the best possible performance from the built-in, extremely heavy-duty 15" speaker.

## FRONT PANEL

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### INPUTS

The Combo features both a high gain (A) and a low gain (B) (-6 dB) to enable the Combo to accept signals of varying levels and also to facilitate using two instruments into the amp's signal channel. The high gain (A) input is the one normally used. If the output signal from your instrument or its associated electronics is overloading the high gain (A) input, then the low gain (B) input should be used. Because of the unique switching circuitry, A and B inputs automatically are gain balanced when two instruments are inserted into both A and B.

### PRE GAIN

The pre gain control determines the amount of gain generated in the input preamp. Please understand that this control determines the *sensitivity* and not the power output of the amplifier. The control settings in no way can be related to the power the amp is delivering to the speakers because of a number of other factors such as the input signal amplitude, setting of the post gain control, etc.

### EQUALIZATION

The equalization circuitry of the Combo is extremely versatile as well as reasonably simple to operate. Because we have included parametric middle equalization, some knowledge and operating experience is necessary to obtain maximum benefit from this versatile feature.

## **LOW EQUALIZATION CONTROL**

The low equalization control is of the active shelving type, capable of producing either a boost or a cut of the low frequencies. Vertical (straight up or 12:00 o'clock) settings produce a flat response, while counterclockwise settings produce a cut, and clockwise settings produce a boost. It should be noted that because this circuit is active, significant amounts of boost are available. One should avoid overboosting the lows since this will tend to require excessive amounts of power from the amplifier and might tend to overdrive the system at high boost (clockwise) settings.

## **PARAMETRIC MIDDLE EQUALIZATION CONTROL**

A parametric equalizer is capable of three distinct equalization functions: (1) It features the ability to vary the center frequency of its action over a considerable range; (2) It is capable of determining the bandwidth ("Q") of the peak or notch; i.e., it features a circuit wherein the boost or cut action can be varied from a sharp notch or peak of a broad hill or valley centering around the selected frequency; (3) A third control determines whether the selected frequency is either boosted or cut and how much.

(1) **FREQUENCY CONTROL.** This control determines the center frequency of the peak or notch.

(2) **BANDWIDTH CONTROL.** This control determines whether the boost or cut effect is either sharp or broad ("Q").

(3) **MODE CONTROL.** The mode control operates very similar to the low and high equalization controls since in the vertical (straight up or 12:00 o'clock) position, no effect is produced, while counterclockwise settings produce a cutting effect and clockwise settings produce a boosting effect. Care should be taken not to overboost since this effectively increases the gain at the selected frequency and could overdrive the power amp and/or speaker.

## **HIGH EQUALIZATION CONTROL**

The high equalization control is of the active shelving type, capable of producing either a boost or cut of the high frequencies. Its operation is similar to the low and parametric mode controls in that a vertical (straight up or 12:00 o'clock) position produces a flat response, while counterclockwise positions yield cut and clockwise settings yield boost. It's a good idea to avoid extreme boosting of high frequencies since this encourages emphasis of residual preamp noise and also tends to make the amp sound strident and to unduly emphasize string noises, etc.

## **POST GAIN CONTROL**

The post gain control is the "master gain" control for the Combo and is used to set the sensitivity of the internal power amplifier. Its action is conventional and experimentation will illustrate its function. Please be aware that extremely low settings of the post gain control will require extremely high settings of the pre gain control with subsequent loss of dynamic range in the input preamp. This may be desirable in some situations to create distortion effects in the input circuitry. However, with bass instruments, it's generally desirable to maximize dynamic range in the input preamp because of the strong output signals generated by most bass instruments.

## **COMPRESSION**

The Combo is a small, reasonably powerful amplifier that features a 130-Watt RMS power amplifier coupled to a high-efficiency speaker in a relatively small enclosure. Conventional single unit amplifiers have traditionally been larger "piggy back" amplifiers that were just tied together in one enclosure with the resulting package being extremely large and little, if any, more portable than their two-piece versions. In order to maximize performance in the small Combo package, we have built in a very sophisticated and effective compression circuit. The compression effect enables us to maximize the performance of the amp/speaker combination. We have determined through much research that the compression circuitry should prevent the power amp/speaker combination from running out of headroom (clipping) and should be as simple as possible to avoid undue complication for the user. Our compression circuit is very effective and is controlled by a simple on/off switch. Because of the dynamics and the percussive nature of plucked strings, it is quite common to activate the compressor as indicated by the limit LED (light emitting diode) at reasonably low output levels. One should not be concerned that the limit LED indicates compression virtually constantly during a performance since this is what it was designed to do; i.e., to maximize the dynamics available from the amp within its power output capabilities. The compression effect may be switched off by the toggle switch on the front panel. We have not included other controls since we have optimized attack time of the compression circuit for musical instruments and compression is activated only when clipping is imminent. The post gain acts as a master volume control, thus rendering a compression threshold unnecessary.

## PREAMP OUTPUT

The preamp output features a high level (2 Volts into 600 Ohms) output from the preamp circuitry for driving auxiliary units or other signal processing units. This is a two-position jack. Plugging into the first position of this jack will allow a preamp signal out and will not disconnect power amp/speaker. Plugging all the way into the second position will mute the speaker. This situation is desirable for certain applications.

## PILOT LIGHT

The pilot light indicates when the electrical supply is switched on and is actually delivering power to the amplifier.

## REAR PANEL

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### FUSE

The fuse is located within the cap of the fuseholder and must be replaced with one of the proper type and value if it should fail. It is necessary that the proper type and value fuse be used to avoid damage to the equipment and to prevent voiding the warranty. If your unit repeatedly blows fuses, it should be taken to a qualified service center for repair.

### POWER SWITCH

On domestic units, the power switch is of the three-position type with the center position being "OFF". This switch has two "ON" positions, one of which is used to ground the amplifier properly. One of the "ON" positions will yield the lowest amount of residual hum or "popping" when instrument is touched and this is the position that should be used.

On export models, we utilize a simple on/off switch that does not have multiple "ON" positions since the grounding (earthing) conditions vary with the different electrical systems of North America versus other nations.

### LINE CORD

For your safety, we have incorporated a three-wire line (mains) cable with proper grounding facilities. It is not advisable to remove the ground pin under any circumstances. If it is necessary to use the amp without proper grounding facilities, suitable grounding adaptors should be used. Much less noise and greatly reduced shock hazard exists when the unit is operated with the proper grounded receptacles.

### SPEAKER OUTPUTS

The speaker outputs are wired in parallel and consist of two standard 1/4" phone jacks. One of these jacks is used to connect the internal speaker, leaving the other for external speaker systems. It should be noted that the internal speaker presents an optimum 4 Ohm load to the amplifier and care should be utilized when plugging in extension speakers to avoid grossly mismatching the amplifier.

## COMBO SPECS

<b>OUTPUT POWER:</b> 135 Watts RMS @ 1% THD into 4.0 Ohms 150 Watts RMS @ 5% THD into 4.0 Ohms
<b>TOTAL AVAILABLE GAIN:</b> 55 dB (EQ Flat)
<b>MINIMUM INPUT VOLTAGE FOR RATED OUTPUT:</b> 40 MV
<b>PREAMP OUTPUT:</b> 2.0 Volts RMS into 600 Ohms
<b>DISTORTION (PREAMP OUTPUT):</b> Less than 0.2% THD at 2.0 Volts RMS output

Due to our efforts for constant improvement, specifications are subject to change without notice.

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