PS Series

Analogue PS8TDcontroller

 ***User Manual***

Declaration of conformity

This equipment has been tested and found to comply with the safety objectives and essential requirements of European (73/23/EEC and 89/336/EEC directives) and international Standards, by fulfilling the requirements of the following harmonized standards:

Electrical Safety (EU) : IEC 60065 (12/2001) Audio, video and similar electronic apparatus

Electrical Safety (US) : UL60065 Seventh Edition, dated June 30, 2003 category AZSQ, E241312.

Electrical Safety (CAN) : CSA-C22.2 N°60065:03 Edition, dated April 2003 category AZSQ7, E241312

Electrical Safety (Rest of the World) : CB test certificate DK-8371 based on IEC60065-2001 7nd ed. with all national deviations.

Radiated Emission (EU) : EN55103-1 (1996) Electromagnetic compatibility - Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use.

Radiated Emission (US) : FFC part15 class B

Radiated Emission (CAN) : This Class B digital apparatus complies with Canadian ICES-003.

RF Immunity (EU) : EN55103-2 (1996) Electromagnetic compatibility - Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use.

LISTED
Audio Equipment
10CE

Note: EMC conformance testing is based on the use of recommended cable types. The use of other cable types may degrade EMC performances.

IMPORTANT SAFETY INSTRUCTIONS

1) Read these instructions.
2) Keep these instructions.
3) Heed all warnings.
4) Follow all instructions.
5) Do not use this apparatus near water.
6) Clean only with dry cloth.
7) Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8) Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9) Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet. (US market)
10) Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11) Only use attachments/accessories specified by the manufacturer.
13) Unplug this apparatus during lightning storms or when unused for long periods of time.
14) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

Information about products that generate electrical noise :

NOTE: The United States Federal Communications Commission (in 47 CFR 15.105) has specified that the following notice be brought to the attention of users of this product:
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The user may find the following booklet, prepared by the Federal Communications Commission, helpful: How to identify and Resolve Radio/TV Interference Problems. This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4. Use of a shielded cable is required to comply within Class B limits of Part 15 of FCC Rules. Pursuant to Part 15.21 of the FCC Rules, any changes or modifications to this equipment not expressly approved by NEXO S.A. may cause, harmful interference and void the FCC authorization to operate this equipment.

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.

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

WARNING: To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

To avoid electrical shock, do not remove covers.
Dangerous voltages exist inside.
Refer all servicing to qualified personnel only.

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

WARNING ! This appliance is a CLASS 1 apparatus and must be earthed.

The green and yellow wire of the mains cord must always be connected to an installation safety earth or ground. The earth is essential for personal safety as well as the correct operation of the system, and is internally connected to all exposed metal surfaces. Additional recommendation for interconnection to other equipment can be found in the "Setting-Up Advice" section page 4.

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UNPACKING

Your Analogue PS8Tdcontroller has been fully tested and packed with great attention. Please ensure when you are unpacking it that no damage has occurred during the transport and that the carton contains the following items:

The Analogue PS8Tdcontroller

The PS series User Manual

The Analogue PS8TDcontroller User Manual (this manual)

The Female 6 pole sense connector

If any of the above equipment is missing or if the Analogue PS8Tdcontroller has been damaged please contact immediately your NEXO dealer.

Setting-Up Advice

Mains Power

WARNING ! THIS APPLIANCE MUST BE EARTHED.

The green and yellow wire of the mains cord must always be connected to an installation safety earth or ground. The earth is essential for personal safety as well as the correct installation of the system, and is internally connected to all exposed metal surfaces. Any rack framework into which this unit may be mounted is assumed to be connected to the same grounding circuit. (see also p.4)

NEXO TDcontrollers don't provide a mean to switch off the unit from the front panel. As they are intended to be rack mounted the back panel is not accessible during use. Therefore it is left to the user to provide a disconnection mean readily operable.

Voltage setting

NEXO TDcontrollers use a switch mode power supply (SMPS). This SMPS accepts universal AC power input voltages in the range 90V to 264V, and requires no manual adjustment for voltages in this range.

Mounting the TDcontroller in a rack (Grounding, shielding & safety issues)

The TDcontroller is intended for rack mounting. The only accessible part during use shall be the front panel of the TDcontroller. Any space above or under the TDcontroller shall be obstructed with a blank panel.

The rack is a free grounding and shielding structure and it provides extra shielding. Therefore, it is desirable that the screws used to fix the TDcontroller in the frame or rack provide an electrical contact between the chassis of the TDcontroller and the rack.

The primary reason for grounding is safety. Conformance to the applicable requirements of the authorities having jurisdiction is, of course, mandatory. However, grounding also has an impact on electromagnetic compatibility. From the EMC point of view, it is desirable to have a low impedance ground network, as a current flowing in the ground network will then produce low voltage in the network. A low impedance network can be obtained using a multipoint ground scheme, with as many closed ground loops as is economically possible.

Fuse

The fuse provided in the unit will not blow during normal operation. If the fuse blows the TDcontroller has malfunctioned. This fuse must only be changed by NEXO certified service personnel. In any case do not replace the fuse with a non-certified NEXO fuse, as this will invalidate the NEXO warranty.

CAUTION!

This servicing instruction is for use by qualified service personnel only. To reduce the risk of electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.

Recommendations for wiring the sense lines

The impedance of the sense inputs of the TDcontroller are high, so currents are low and therefore light duty cable can be used. If the TDcontroller is housed in the amplifier racks an unshielded cable may be used.

If the TDcontroller is located remotely - at the mixing position - a shielded cable is recommended, without using the shield as a conductor. The cable must be well protected from public access, as it carries potentially dangerous amplifier voltage.

When one of the channels is not being used and the corresponding sense line is disconnected, cross talk onto the inactive sense line may in some cases produce signals capable of causing the inadvertent illumination of the Sense LED on that channel; although this has no effect on the internal operation of the TDcontroller, it can be cured by short-circuiting the terminals of the inactive sense line.

Recommendations for wiring the audio outputs

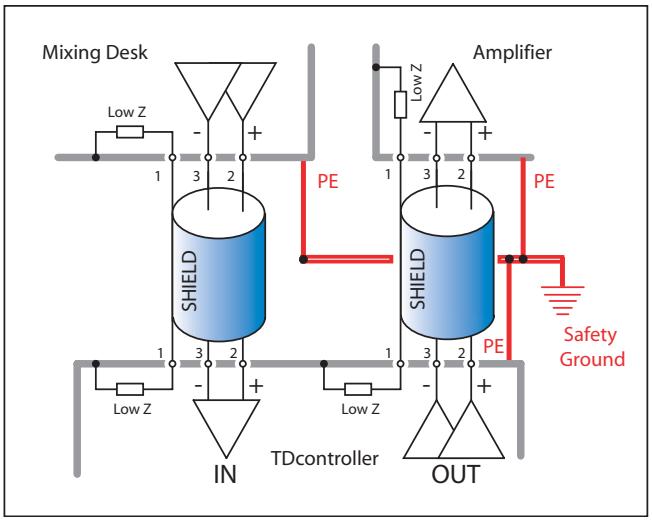
The output stages can drive several amplifiers in parallel; however it is not advisable to work with loads of less than 1kOhm(and strictly forbidden to drive less than 600Ohms). It is best to check the impedance characteristics of the amplifier inputs - supplied by the manufacturer - to check how many amplifier channels can be paralleled. Where precise information is not available (and taking 10kOhm as the minimum value possible), ten channels in parallel per output is a sensible maximum.

Electromagnetic environments

The emission (this word describes all types of electromagnetic noise radiated by the equipment) requirements which have been applied to Nexo's TDcontrollers are the stringent requirements of the "Commercial and light industrial environment" of the product family EMC standard for emission.

The immunity (this word describes the ability to cope with electromagnetic disturbance generated by other items and natural phenomena) requirements that we have considered exceed those applicable to the "Commercial and light industrial environment" of the product family EMC standard for immunity. In order to provide a further safety margin, we recommend that you do not operate the TDcontrollers in the presence of electromagnetic interference exceeding half of the limits found in this standard.

These two EMC standards are those applicable to pro-audio equipment for the implementation of the "EMC directive".



Analogue signal cables

Analogue signals should be connected to the input and output ports of the TDcontroller via shielded twisted pair or starquad cable fitted with XLR connectors on the TDcontroller side. We recommend the use of low transfer impedance cables with a braided shield and a transfer impedance below 10 mΩ/m. For the sense inputs, the noise requirements are not as stringent, and any kind of twisted pair cable will be

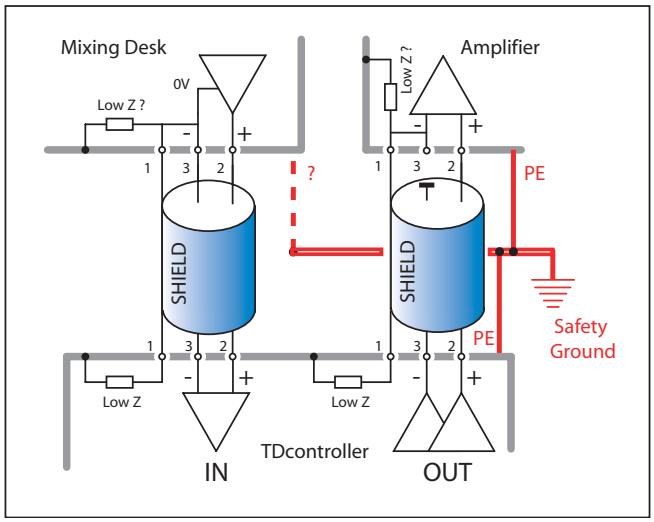
adequate.

The TDcontroller is intended to be used with symmetrical (balanced) sources (for instance a mixer) and symmetrical loads (for instance a power amplifier (see figure). You can see that the TDcontroller provides a low impedance path between pin 1 of its XLR connectors and its chassis. The TDcontroller can sustain high current in pin 1 without degradation of output noise. We recommend that the sources and loads you use have the same desirable characteristics.

It is sometimes claimed that connecting cable shield at both ends creates ground loops, and that the current flowing in such loops will produce noise. This is not the case for most professional audio equipment. In short, there are two kinds of loops in which voltages are present: the loops formed by signal wires, and the loops formed by grounded conductors, among which are protective earth conductors (PE) and signal cable shields.

When a cable shield is grounded at both ends, a loop is closed, and the resulting current causes a reduction of the voltage induced on signal lines. This effect is what the cable shield is intended to produce, since this is how it protects your signal from magnetic fields.

If you are using an asymmetrical (unbalanced) source, it is best to use a shielded twisted pair and to connect wire 3 of the cable to the shield at the source output end (see figure). This technique prevents noise currents flowing on the return path of the signal. If you are using an amplifier with an asymmetrical (unbalanced) input, it is best to use a shielded twisted pair, and to connect wire 3 at the TDcontroller end only, as shown in Fig. 2. This keeps a good capacitance balance for the signal, however noise currents flow on the return path of the signal. (Note that this is only acceptable for a short cable).



If you are using a symmetrical (balanced) source or amplifier which is prone to become noisy when a current of less than 100 mA at the mains frequency (50 Hz or 60 Hz) is sourced into pin 1 of its XLR connectors, you might consider opening the ground loops.

TDcontroller USER GUIDE

Read before use

The Analogue PS8TDcontroller is designed to be used with PS8 and LS400 speaker cabinets. Its main functions are:

To optimize the response of the system

When operating with the LS400 Sub-bass system (optional), splitting the stereo (2 channel) signal into 2 frequency bands (PS8 main system and LS400 Sub-bass system)

Active protection of the cabinets by dynamic audio signal processing (Temperature and Displacement servo control)

Reduction of amplifier overload (Peak limiter function)

PS TDcontrollers also feature:

Stereo operation (2 independent channels) for the main system

Global switchable output level according to amplifier gain

Adjustable level on the Sub-bass channel

High CMRR input stage and High current drive output

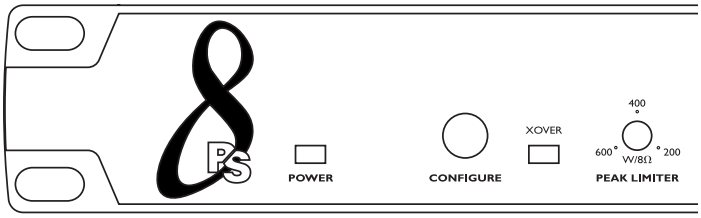
Compensation of power compression effects on the system response curve.

The Analogue PS8TDcontroller is designed to be inserted between the Audio source (console, preamplifier, etc.) and the power amplifier.

Front Panel

Most front panel functions and indicators are located inside 2 distinct windows: left-hand areas relate to functions and indicators dedicated to the optional Sub-bass section, while right-hand window contains indicators concerning servo control operation for the PS8 cabinets.
For more technical details about servo control operation and internal electronic processing, please refer to section “TDcontroller REFERENCE GUIDE.” Page 12.

Turning the LS400 channel Overlap / Crossover

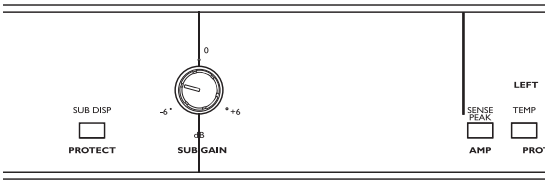


Pushing the CONFIGURE button modifies the high pass filtering. It does not affect the sub output, which will always be a filtered sub signal. (This is therefore not a Sub on/off button). In the « Overlap » position, the PS8 is exploited to its maximum capability.

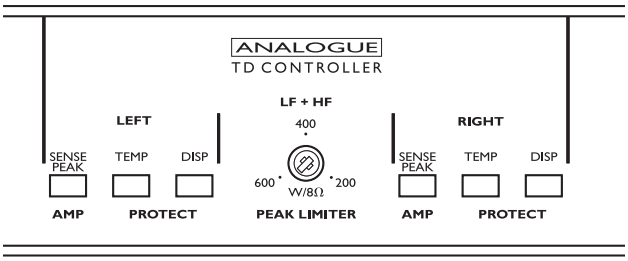
This position should be used if the system is being used without a LS400. It can also be used with the LS400; In this case, there will be a boost in the crossover area. The « Cross over » position is generally recommended when using the LS400.

Adjusting the LSub level (Sub Level)

The potentiometer adjusts the level of the LS400 channel, a range of 12 dB allows a variety of configurations and application conditions to be accommodated. Center position of the knob is calibrated for 1 LSub used with 2 distant PS.



Amplifier & Protection indicator



The bicolor green/red AMP LED indicates signal presence at the sense input of the concerned channel, allowing visual confirmation of the return connection of the Sense cables from the amplifier output. The LED is flashing red, when the Peak limiter is acting, reducing excessive peak voltage or levels capable of overloading the channel amplifier.

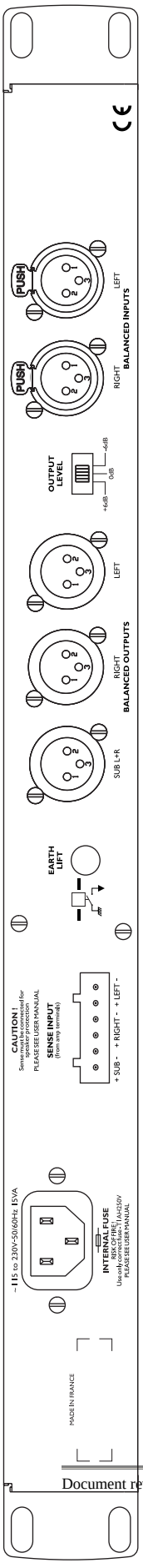
The yellow VLF LED indicates that displacement protection for the LS400 are engaged on the Sub-bass channel. The temperature protection is not monitored.

On each side of the PS main system window, yellow TEMP and DISP LEDs indicate when protection has been activated (temperature or displacement control) for the LF (the HF drivers temperature protection is not monitored).

Peak Limiter adjustments

The Analogue PS8TDcontroller features two independent peak limiter trims (one for the LS400 amplifier section, one for the PS8s amplifier section), which allows the peak limiter to be set to limit the maximum power of the amp (without affecting the protections threshold). The peak limiter has no real cabinet protection functions; it must be tuned to avoid overdriving the amp that in turn can generate obvious clipping noise.

To set the peak limiter to the correct value, either turn the trimmer clockwise until the red LED lights at the same time as the amp's clipping LED, or use the graduation (power value given for 8 load).



Rear Panel

Audio Inputs

The audio inputs are two 3-pin female XLR connectors located in the area labeled BALANCED INPUTS. Signal is applied between pins 2 and 3, pin 1 is connected to ground. When the Controller is linked to a signal source with balanced outputs, the XLR connections are simply wired pin to pin (1 to 1, etc.). As a result of the balanced nature of the outputs (and providing that balancing is respected by way of the connection to the amplifier), there is no hot or cold pin - the Analogue PS8TDcontroller being neutral regarding the polarity of the signal.

Output Level Switch

The 3-position output level switch is used to match the processor gain to the amplifier gain for optimum signal to noise ratio. The three gain values available are +6, 0 or -6 dB. For minimum noise floor the -6dB setting should be chosen, for maximum headroom the +6dB position should be used.

Audio Outputs

The audio outputs are the three 3-pin male XLRs located in the area labeled BALANCED OUTPUTS. The channel corresponding to each output connector is identified by the labels Left, Right and Sub L+R (mono Sub-bass).

Signal is applied between pins 2 and 3, pin 1 is connected to ground.

When used with an amplifier with balanced inputs, the wiring of the output XLR is simply pin to pin (1 to 1, etc.), the polarity of the signal being preserved if the source connected to the input is also balanced (see previous section).

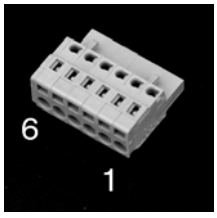
Sense inputs

The sense inputs of the three channels (left, right and SUB) are arranged on a six-pole barrier strip set into the rear panel within the area labeled SENSE INPUT. The Sense inputs are intended for connection to the output signals of the amplifiers driving one cabinet of each the channels being used.

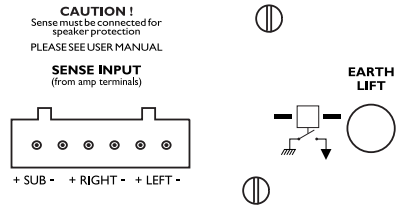
Connection is made via the female part - removable - of the connector (supplied with the Controller) as outlined below:

Channel	Amplifier Output Terminal		Barrier strip connector
PS8 Left	- (black)	⇨	pin 1 (figure)
	+ (red)	⇨	pin 2
PS8 Right	- (black)	⇨	pin 3
	+ (red)	⇨	pin 4
LS	- (black)	⇨	pin 5
	+ (red)	⇨	pin 6

Input sense connection **MANDATORY** for proper operation of the servo-control system, the cabinets will NOT BE PROTECTED if the sense lines are unconnected.



Earth Lift



The push button labeled « Earth Lift » allows connection (depressed position), or disconnection (out position) between the signal ground and the mains earth, which is itself linked to the chassis. Using this button may help to eliminate hum due to ground loops created in the system.

Sub jumper

In certain applications you may wish to disable the mono summation (but keep the 6dB gain boost) on the sub channel. By moving an internal jumper inside the unit (require the opening of the PSTDcontroller), the sub channel will only use the Right input (with 6dB gain to keep the same sub level when the mono summation is enabled).

Please contact your NEXO dealer for more information concerning this setting.

TDcontroller REFERENCE GUIDE

Linear section

The characteristics of the linear section are independent of signal level, as opposed to the servo control functions described in next paragraph.

Subsonic and VHF filtering

Low and high-pass filters are used to remove signals out of the usable frequency range, eliminating sub- and ultra-sonic components that could possibly degrade the performance of the Controller and amplifiers. These filters are optimized to realize the overall target system response.

Equalizing acoustical response

This equalization section provides the required correction to obtain a flat system response, as the cabinets are acoustically designed for maximum efficiency in the whole frequency range. Active rather than passive attenuation allows amplifier voltages to be lowering for a given output SPL and therefore increases the maximum SPL achievable with the same amplifier.

Active equalization also extends system bandpass, especially at low frequencies where acoustical performance is limited by cabinet size.

PS / LSub Cross-Over

From input signals summed together, the resulting mono signal is low-pass filtered to feed the Sub-bass channel. When the channel is turned on (LSub On), main channels (Left & Right) high-pass filters are reconfigured to filter out signal components below the crossover frequency. Slopes and other filter characteristics are optimized using techniques optimized for the actual acoustical data of each driver.

Servo Control section

Servo control of the PS TDcontroller is intended to work with amplifier return signals present at the Sense inputs (monitored by front panel LEDs).

VCAs and VCEQs

Each of the 3 Audio channels (Left, Right and Sub-bass) contains two voltage controlled elements driven by servo signals:

One operates on the whole frequency range (wide band VCA).

The other element works selectively as a dynamic equalizer (LF-VCEQ).

Depending on the nature and origin of the servo signals, either one or the 2 combined elements is used to process the Audio signal. This feature allows more efficient processing while reducing audible effects.

Displacement control

The signal from the sense input is fed through a shaping filter producing a signal proportional to the voice coil displacement. This control signal is compared to a fixed value and if exceeded, the LF-VCEQ is

activated with very short attack time to reduce speaker excursion.

Temperature control

Sense input is fed to a shaping filter to create a voltage proportional to the instantaneous voice-coil current. The signal is integrated over time to simulate heat buildup in the specific driver. When the resulting voltage exceeds a preset threshold, the VCA is activated to limit the voice coil temperature within its safety range.Power compression is also simulated by lowering the high frequencies when temperature protection is acting on the bass loudspeaker.

Dynamic control

To reduce audible « pumping » effects due to very long time constants of temperature detection signals, an alternate integration is also processed with a shorter time constant. Whilst anticipating the temperature protection and reducing its unwanted effects, action of this signal also improves dynamics control.

Peak Limiter

The above mentioned devices provide reliable protection against potential speaker over-heating and over-excursion. Nevertheless driving the cabinets at very high peak voltages (with oversized amplifiers) as well as delivering distorted signals might be dangerous for the speakers. The Peak limiter is both useful for:

Maintaining good sound quality at high levels (it will reduce amplifier distortion).

Increasing protection reliability (limiting peak voltages to levels that speakers can permanently withstand, and reducing the occurrence of subsonic signals delivered by overloaded amps)

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Specifications

PRODUCT FEATURES	
Audio Inputs	Two differential non floating L&R Audio inputs, 50 kOhm. Two XLR-3F connectors.
Sense Inputs	Three Amplifier Sense Inputs (PS8 L&R, LS400). 400 kOhm. 6 Pole Removable Strip Terminal
Audio Outputs	Two L&R PS8 Audio outputs. Balanced, non floating, 51 Ohm. Two XLR-3M. One Mono (L+R) LS400 Audio output. Balanced, non floating, 51 Ohm. One XLR-3M.
Controls	Gain switch (back panel), 3 positions : -6 / 0 /+6dB. Peak Limiter trimmer (600W-200W/8 Ohms) Sub Overlap / Crossover switch & Sub Gain Control (-/+ 6dB).
Indicators	LF speakers Protect Yellow LED's (Temp. & Disp), Power ON (green), Amp Sense & Peak LED's (green/Red)
Dimensions	1U 19" Rack. 165mm (6.5") Depth
Weight :	2.9 kg (6.6 lbs) net
SPECIFICATIONS	
Output Section	+22 /+16/+10 dBm typ. into 600 Ohm load. Back Panel switch on +6/0/-6dB respectively.
Input Section	Maximum input Level : 22dBu. CMRR 90dB @ 1kHz typ.
THD+N	0.05% @ 1kHz Typ. for +10dBm Output
Noisefloor	-90 /-96 /-100 dBV for +6 /0 /-6dB switch position (22 Hz - 22 kHz, UnWeighted)
Dynamic Range	111 dB UnWeighted (THD+N at-60dBr sine wave @1kHz rel.max. output)
Crosstalk	104dB
Filtering & EQ.	L&R: 12dB/oct Low Pass, 12dB/oct High pass (crossover or overlap), 4 Parameter EQs. All factory tuned
Protections	VCA temp. (SUB,LF & LF), VCEQ disp. (SUB & LF), Peak Limiter (all chanels), Power compression regulation
Power Supply	100-250 Volts (continuous operation), 50/60Hz. Power 9W. Peak Inrush current 0.5A. Earth-Lift.
Conformity	Comply with safety objective of 73/23/EEC & 89/336/EEC directives. (EN60065-1998, EN55103-1996) CB scheme, cULus certifications in progress
SYSTEM OPERATION	
Applicable Products	The PS8 TDController is precisely matched to the PS8 & LS400 cabinets and includes sophisticated protection systems. Use of either product without a properly connected Controller will result in poor sound quality and may damage the components.
Subbass	Active two-way operation of the PS8 Loudspeaker with the LS400 Subwoofer is included in the PS8TD.
SHIPPING AND ORDERING	
Packaging	PS8TDs are packaged one per box and shipped singly or with a pair of PS8s.
Shipping Weight & Volume	1 x PS.8UTD = 3.4 kg (7.5 lbs) 0.02 cu m (0.71 cu ft)

As part of a policy of continual improvement, NEXO reserves the right to change specifications without notice.

USER NOTES

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