

## MODEL ZLC LINE CONDITIONER - OWNERS MANUAL

Thank you for purchasing the **model ZLC aka Zen Line Conditioner**. This product, like our amplifiers comes with a lifetime warranty to the original purchaser. **Please review the following information before you use your new conditioner:**

**What it is** - This product features a large Toroidal 1 to 1 transformer that de-couples both the line (hot) and the neutral from your house wiring, and ultimately the power grid feeding your neighborhood. By de-coupling yourself from the power grid in this way, you block the noise and harmonics on the grid that poisons the performance of your hi-fi and video equipment.

**Power Rating** - The ZLC is rated for 10 amps max with the recommended vibration free operation limited to 4 amps. Decware amplifiers either draw .75 amps for the small ones or 1.5 amps for the large ones. So the design works well with an amplifier, preamp and a couple source components plugged into it.

**Watts** - Many audio components are tagged with the voltage and wattage they consume from the wall outlet. You can use this information to figure out how many amps they draw by simply applying ohms law. If for example the component is listed to consume say 31 watts (typical American CD player), you would simply take the watts divided by the voltage to find how many amps it draws.  $31 \text{ watts} / 120 \text{ volts} = 0.25 \text{ amps}$  so it would take four CD players to use 1 full amp.

**Fuse** - The ZLC is factory supplied with 8 amp fuses located in the IEC connector for the removable power cord. Even though the unit is rated for 10 amps, we install an 8 amp fuse so that you will know when your getting close to 10 amps. The fuse size is 5x20mm and should be slow-blow.

**Switches** - There are a total of 6 switches on the front of the ZLC and each one is numbered. On the rear of the ZLC are 6 receptacles that are also numbered to correspond with the switches. You may use these switches to turn on/off the various components plugged into it, or leave them on and use the power switches on the components - it makes no difference whatsoever.

**Filtering** - The ZLC has some pretty aggressive filtering it's input - which in this case would be the power cord. This filtering is done inside a mu-metal grounded case so that the RF noise doesn't escape into the heavy steel chassis of the ZLC and contaminate the clean power. Additionally the clean power from the transformer is further enhanced by a cap rated at 5 times the voltage it will ever see so that it lasts indefinitely.

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**Spike and Surge suppression** - The ZLC has spike protection which can be further enhanced by turning off the switches to your components during storms. This is the same thing as un-plugging your components. The ZLC does not have surge suppression, nor does any power filter unless it is capable of generating its own voltage, such as a power-regenerator. Decware amplifiers do not need surge protection and will function without issues with voltages both higher and lower. Line sag, or “brown-outs” are in the same category and can not be controlled unless you have a power re-generator. Decware amplifiers do not need this type of protection either as they will operate with reduced voltages without incident. Modern day solid state electronics are virtually all built with highly regulated power supplies that can deal with both over-voltage and under-voltage situations.

**Power cord** - You must use a power cord that is rated for 10 amps at 120 volts, like the one supplied with your ZLC or an after-market audiophile power-cord rated at 10 amps or above like our popular model DCH-1.

**Grounds** - One of the secrets to the ZLC approach is that all your audio components will be sharing a single-point ground that when compared to having your components plugged into different places will in and of itself make a very audible improvement in sound quality, especially with fresh power cords.

The ground of the ZLC is directly connected to the ground of your wall outlet and bonded to the steel chassis for safety.

**Testing** - if you use a typical outlet tester, like the *Ideal model 61-501* that is so popular with the three lights you should be aware that all of it's tests will be null and void since the outlets on the ZLC are isolated. The way outlet testers are wired is to test wall outlets, not isolation transformers, so if you use one in the ZLC, you can expect one yellow light in the middle to light up when the receptacle is hot. The tester chart says that means you have an open ground, but in actuality you do not have an open ground.

**Voltage Indicator** - the ZLC features a voltage indicator on the rear. It's function is to show you that you have a good connection to power when you insert the power cord. It also displays the working voltage at your wall outlet within +/- 5% of the actual voltage.

**Front Panel Hole Plugs** - the ZLC has a series of plugged holes in the front panel to future-proof the chassis. These could be used for indicator lights, additional voltage meters and even a total current meter should the need arise. In the Zen tradition, we elected to keep things as perfectly simple as possible, keep the price down and get the job done.

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**Dynamics** - You may observe that your power amplifiers seem to have better dynamics plugged into the ZLC than they did when plugged directly into the wall outlet. This is because the massive Toroidal transformer inside can store and release a huge amount of energy which gives your amplifier the instantaneous peak power it needs to do the same.

**Maintenance** - There is no maintenance for this device other than to keep you power cords clean before you plug them into the unit. We find a touch of alcohol on a swab can clean and remove oils from the plugs and if they are not new and shiny, then some fine sandpaper, or scouring pad to shin up the prongs would be in order.

### **Tips for enhancing sound quality even further**

**Tip** - If you plan to use audiophile power cords then it is advisable to get one for the ZLC as well.

**Tip** - The wall outlet that you plug the ZLC into should be either hospital grade, or industrial grade and preferably new.

**Tip** - Most houses are wired with one outlet in a room feeding the next so that several outlets are chained together to form a circuit. Considering that probably all consumer grade residential outlets are made in China and problem in and of itself, compounded by the experience level of the electrician who installed the outlets there is a reasonable chance that the electrical connections between each outlet may be loose. This would create noise, spikes, inconsistent performance based on temperature and humidity - all things an audiophile needs like a hole in the head. This is why many audiophiles have a dedicated circuit for the stereo wired in there home feed a single box of outlets. If you can't do that, then you can have someone replace all the outlets in your room with hospital grade making sure all the connections in the chain are fresh and tight.

**Tip** - You can use the numbered switches to help you remember the ideal sequence to turn on and off your stereo equipment by plugging-in those items in a specific order. Amplifiers should always be turned on LAST and turned off FIRST. So you could plug your source into outlet 1, your preamp into outlet 2, and your amp into outlet 3 and then turn them on in that exact order. When you turn them off, start with 3 and work backwards.

**Tip** - Never plug the ZLC into an extension cord, power strip, or anything other than a high quality wall outlet. More than a tip, consider it a strong suggestion.

Thank you,

Steve Deckert

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## TROUBLESHOOTING BLOWN FUSES OR BREAKERS

The Zen Line Conditioner is unique when compared to similar products because it uses a highly efficient and hum-free TOROIDAL isolation transformer instead of the usual square E-Core models. This comes with a BIG advantage over standard E-Core transformers in that you can have 10 AMPS of current with ZERO vibration or hum. With an E-Core, 4AMPS is as high as you can go without getting strong mechanical 50/60 cycle vibration.

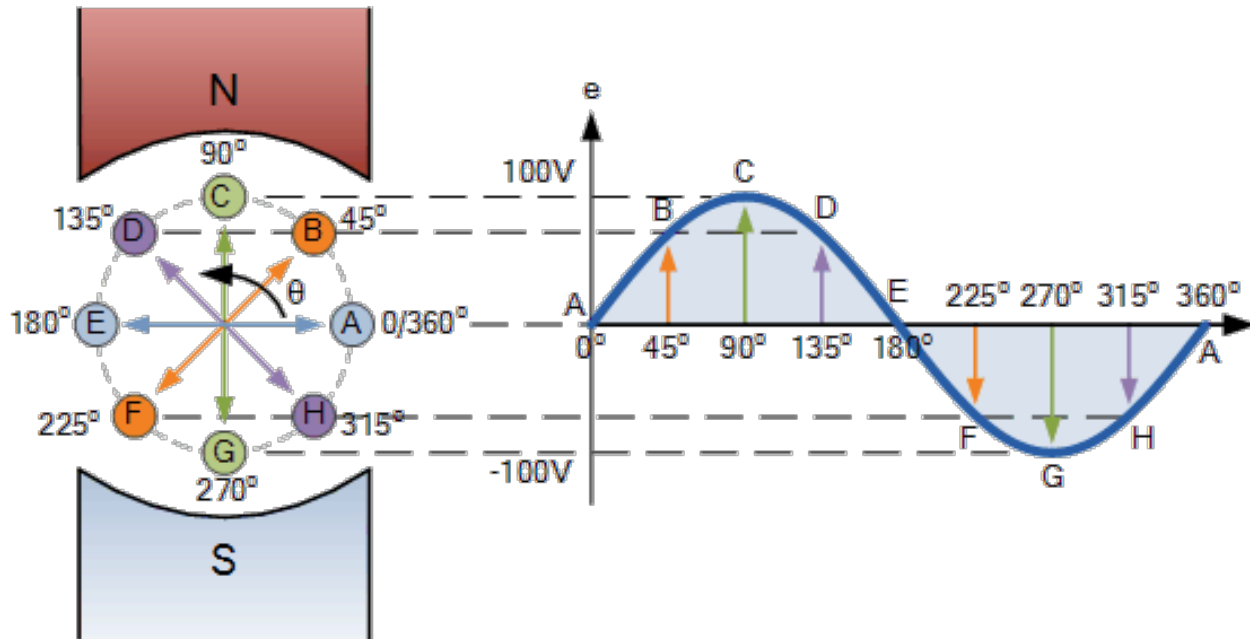
The nearly perfect efficiency of the TOROIDAL transformer comes with one caveat.... Turn-on surge can range from nothing to many times it's rated current depending on when it comes on relative to the AC cycle.

Below is a sign wave of AC Voltage like that found in your wall outlet. In the example below the voltage is 200 volts AC. Also shown on this graph is the phase of the sign wave over time.

You can see the sign wave starts at A (0 degrees) and by the time it gets to E (180 degrees) it has completed one positive cycle and now will be doing the same thing as a negative cycle until it gets to 360 degrees at which point it simply starts over at 0 degrees.

If you happen to plug your ZLC into the wall at the exact point where the voltage is zero, like in A and E in the diagram below, you will either blow a fuse or blow a breaker in your breaker panel.

If this happens don't panic, just try again. The odds of turning your unit on at 0 or 180 are exactly 1 in 120. Despite those odds, it is not uncommon to have it happen more than once. If it does happen more than once, follow the procedure on the next page to get yourself up and running.



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### **START UP PROCEDURE if your blowing fuses or breakers.**

- 1) turn off all 6 switches on the front of your ZLC to reduce any load from your equipment.
- 2) Make sure the fuses in the ZLC are not blown. Both fuses must be in tact. *The ZLC uses two fuses, one on each AC line to increase safety and improve fidelity as two fuses will impede the sound only half as much as one fuse.*
- 3) If the breaker in you house didn't blow, then go ahead and install the power cord and plug it into the wall outlet. This should get you going.
- 4) If you blow another fuse or the breaker in the house blows, replace the fuse, and turn-off any larger items on the circuit that might be drawing lots of current.
- 5) Plug in the ZLC with the house breaker still turned off (or tripped). Turn on the breaker.
- 6) If the breaker trips, wait a minute or two for it to cool, and turn-it on again. Simply repeat until it stays on. If it took more than twice, you probably have a weak breaker at which point installing a fresh one could only improve the sound quality in your system.

The ZLC has no power switch, so once it is plugged-in it just stays on all the time, so no worries about frequently blowing breakers.

### **WHY THIS IS IMPORTANT**

It's important to understand WHY the ZLC is designed with this potential minor irritation... in a word SOUND. From the IEC connector, to the dual fuse supply, to the industrial grade receptacles and of course the massive TOROIDAL transformer, this device is all about sound quality.

It would be easy to put an in-rush current limiting circuit on the input of this perfect device but it would require the following: A low voltage power supply, a solid state IC, small electrolytic capacitors and a relay. The relay would have a coil and contacts that degrade with each switch closure. This would soft-start the ZLC and eliminate any possibility of blowing fuses or breakers on start-up. It would also compromise the sound quality by passing the current through switch contacts. This is why the ZLC has not ON/OFF switch, because those contacts will eventually deteriorate. Not enough to quit functioning, but certainly enough to compromise sound quality.

The soft-start circuit would be certain to eventually fail, and drag our product into the norm like everyone else who is using large toroidal transformers for similar applications. We aren't interested in selling you a new one... the latest model, or upgrades. We are interested in making it perfect with no moving parts or contacts so the sound quality is the same in 40 years as it is when it's new. Our products carry a lifetime warranty, so we don't build in failure points like is so common in the industry.

### **RANDOM HUM ISSUE**

The ZLC has no hum. It is stone quiet up to it's recommended load, which is 4 amps. That said, it CAN hum if there is DC riding on your AC line or the load exceeds 4 amps. DC can be caused by heaters or blow-driers turned on low. The low setting on these devices uses a diode to cut the power in half, but at the same time injects DC into your AC line and your neighbors.

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Transformers do not like DC, and will always groan, vibrate, and or hum if they see any at all. A perfect transformer like a TOROIDAL will do it even more. This means it is possible to hear your ZLC go from stone quiet one evening, to suddenly humming loud enough to hear across the room! As soon as the device causing the DC is turned off, the humming will instantly stop. In many cases you may not find anything in your own home that caused it, but you should understand it is possible for even a neighbor to be causing it by doing something as simple as blow-drying their hair.

This does not mean there is anything wrong with your ZLC or that it is taking on any damage. It simply means that your ZLC is telling you "HEY, there is DC on your line right now!" None of this DC passes through the ZLC so your equipment is protected, whereas before the ZLC it was not.

Since small transformers do the same thing (hum with DC on the line) but at a hugely reduced level compared to the massive transformer in the ZLC, you don't usually hear the hum. This is a problem because you can be certain during this time your stereo will sound bad and you will not be able to figure out why.

The ZLC lets you hear when DC is on the line while at the same time keeps it out of your gear.

### **INPUT VOLTAGE READING**

The input voltage gauge is accurate to within 5% meaning it could be off by as much as 4 to 6 volts. It is only intended as an indicator of power and a way to monitor if the power fluctuates up or down during the day.