

# DIAMOND PRO OPERATING MANUAL



DIAMOND 8.1 PRO  
DIAMOND 8.2 PRO  
DIAMOND 8.1 PRO ACTIVE  
DIAMOND 8.2 PRO ACTIVE



**!Warning** – read all operating and service instructions that accompany this appliance!

**!Varning** – läs alla användar- och serviceinstruktioner som medföljer enheten! **!Atenção** - leia todas as instruções de manutenção e de operação que acompanham este aparelho!

**!AVVERTENZA** – Leggere attentamente le istruzioni per il funzionamento e la manutenzione fornite con l'unità! **!Aviso:** Lea todas las instrucciones de funcionamiento y de mantenimiento que se adjuntan a este aparato!**Vaara** – lue kaikki laitteen mukana toimitetut käyttö- ja huolto-ohjeet! **!Advarsel** – læs alle betjenings- og serviceanvisninger, der følger med produktet! **!Waarschuwing** – lees alle bedienings- en onderhoudsinstructies die bij dit apparaat horen! **!Vorsicht** - Lesen Sie diese Bedienungsanleitung sorgfältig durch! **!Attention:** Lisez attentivement les instructions avant d'utiliser ce produit!

**FORSIKTIGHET:** För att minska risken för elstötar bör man inte ta bort enhetens ytterhölje (eller det bakre skyddshöljet). Reparationer får bara genomföras av kvalificerade servicetekniker.

**AVISO:** Para reduzir o risco de choque eléctrico, não remova a tampa (ou a cobertura traseira). O usuário não deve efectuar a manutenção. Deve pedir aos técnicos qualificados em manutenção.

**ATTENZIONE:** Per ridurre il rischio di scosse elettriche, non rimuovere la copertura (o il pannello posteriore). Le operazioni di manutenzione devono essere eseguite esclusivamente da personale qualificato.

**PRECAUCION:** Con el fin de reducir el riesgo de sacudidas eléctricas, no desmonte la tapa (o la tapa posterior). El mantenimiento no deberá ser realizado por el usuario, sino por el personal de mantenimiento cualificado.

**WARNING:** To reduce the risk of electric shock, do not remove cover (or back). No user servicing - qualified service personnel only.

**VAROITUS:** Tulipalo- ja sähköiskuvaaran vähentämiseksi älä irrota suojusta (tai takapaneel-ia). Älä huolla laitetta itse,anna huoltotyöt ammattitaitoisen huoltohenkilökunnan tehtäväksi.

**FORSIGTIG:** For at mindske risikoen for elektrisk stød må du ikke fjerne beklædningen (eller bagbeklædningen). Reparationer må kun udføres af kvalificeret servicepersonale.

**PAS OP:** Om de kans op elektrische schokken te minimaliseren, dient u de afdekklep (of achterkant) niet te verwijderen. Onderhoud dient alleen te worden uitgevoerd door gekwalificeerd personeel.

**VORSICHT:** Um die Gefahr eines elektrischen Schlages zu vermeiden darf die Abdeckung nicht entfernt werden. Die Wartung des Gerätes sollte qualifiziertem Fachpersonal vorbehalten bleiben.

**CAUTION:** Pour réduire les risques d'électrocution, ne pas démonter le capot. La manipulation doit être effectuée par un personnel agréé.

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## **Wharfedale Diamond 8.1 Pro, 8.2 Pro and Pro-Active Near Field Reference Monitors**

The function of a Reference Monitor Loudspeaker System is to provide an accurate sonic reference for the operator/engineer thus enabling value decisions to be made in the recording and mixing process. The purpose of these devices is not simply to sound exciting, or impressive - only to give an accurate and clean representation of the original sources and recording devices used. This must be done with the minimum destructive interaction with the room and consistently in a variety of environments. It is also essential that the Reference Monitor does not favor or exaggerate any part of the spectrum, but gives the engineer a reference for the real-world environment in which the program will be played and heard by the general public.

### **Using your Reference Monitor**

The Diamond Pro and Pro-Active Near Field Reference Monitor Loudspeaker Systems are accurate, low distortion, high quality, self amplified (Pro-Active version only) loudspeaker systems designed and optimized for recording and reference monitoring. In this application quantitative and qualitative decisions are made by the operator based upon many factors, all dependant on what is heard from the loudspeaker used as a monitor. For accurate decisions to be made at the time of recording in such areas as microphone choice, position, level and ambient space-positioning, and at mix-down, for level, eq, effects and spacial placement, the engineer must have reference source loudspeakers that are smooth and neutral, image accurately, have as low distortion as possible, and dynamic stability throughout the operating envelope.

The Diamond Pro and Pro-Active are designed understanding all these requirements, and perform exceptionally well in all aspects. You are encouraged to listen to favorite program materials and to compare the quality and balance to your current monitors. Mix down from recordings you have already made and listen to the results on the Diamonds as well as in your car, or on your home stereo system. It is important that an understanding of the entire recording process is gained through reference to these monitors and how the results of recording and mixing on these work in the “real world.” We are confident you will find these speakers not only revealing and transparent, but musical and involving. We hope through their revealing nature they will encourage more analytical thought in the choice and placement of microphones and the set-up and mapping and spatial character of your mix. This is true both for two channel (stereo) as it is in mixing for 5.1 multi-channel applications.

### **Use of a subwoofer**

Where possible it is strongly recommended that monitoring and mixing is done on a full range speaker, if possible, without the use of a sub woofer. Some caution must be exercised however. Full range, means covering the whole audible frequency spectrum. Nominally this is accepted as being 20-20kHz. Your Diamond reference monitors, whilst giving an unusually extended low frequency response, do not go down to 20Hz. A properly installed, appropriately crossed over and well performing sub can be very valuable in the mixing and dubbing process. The proper set-up of a sub woofer and bass management in general is not a simple process. Anomalies in the monitoring system tend to turn up as the inverse in the mix. Placement is critical. Given the bass management is done properly and the main speakers are set-up well, a subwoofer placed randomly in a control room could cause major problems. For example, the engineer could be sitting at a low frequency “null” or hole in the response. Sub woofers operating at 50Hz or lower are generating very long wavelengths. For example, at 40 Hz, the

wavelength is around 28ft (8.5m). It is quite possible that at these wavelengths from a single source/woofer both your ears could be in a phase hole. The room may be rattling and shaking, but you would not hear the direct sound only its effect on the space. The opposite is also true. The room and woofer interaction could generate a standing wave that would give up to 6dB of build up at your ears. Thus great care should be taken in placement to find the best location for the speaker. If possible two sub woofers of the same type should be placed asymmetrical-ly in the control room. You should also take into account the construction of the walls, floor and ceiling of the control room. . One way to hear how much you are losing is to play some good full range program and walk outside the control room. With the door closed, how much low frequency energy are you hearing leaking out? Is this desirable? Probably not, since it will annoy co-workers and neighbors and is costing you power and headroom in your system! Overall the best advice is to take care and time with your subwoofer placement and integration to the room and main channels. Do not simply position the subwoofer without due thought and be impressed with the sound and power. If you are setting up a monitoring system, it is critical that the sub is placed and integrated correctly or your product – your mix will suffer. It is suggested that three of four popular DVD's are auditioned with and without a sub in the system. You will find that often there are great differences in the amount of low frequency content on the tracks. For best results, use a reference disc with a response sweep up to 800Hz.

### **Use with CRT displays.**

The Diamond Pro and Pro Active reference monitors are magnetically shielded for use in close proximity to CRT displays as are found in many of today's production and dubbing systems so placement next to CRT monitor displays are possible.

### **5.1 Monitoring**

It is strongly recommended that for 5.1 Multi-channel monitoring, all 5 of the main channels should be the same loudspeaker. Critically, the three main "screen channels" should be the same, i.e. have the same sonic character and coverage. In a perfect world consumer 5.1 playback systems would also have the Left, Center, and Right channels all the same speaker.

It is important that professionals involved in source creation use the proper set-up and follow recommended practices for speaker placement and balance. This way your product – the recording, will playback properly on all types of replay system, both cinema, home theatre, car and other.

*Note: There are some variables found in these replay systems to be taken into account of in the monitoring environment. There are also different practices used in the creation and mixing of program materials. Stereo, 5.1, DVD-Audio etc can be quite different.*

For home cinema and motion picture exhibition the monitor levels and balance can generally be set-up with the Left, Center and Right "screen" channels having the same level. The Left and Right Surrounds are generally considered to be best when their summed output equals one of the screen channels. In other words, each of the surrounds is 3dB below any of the screen channels. This can vary in the real world where often all 5 of the main screen and surrounds are set at the same level.

### **Stereo Near Field Monitoring set-up:**

Placement should be as much as possible for you and the two speakers to make the three corners of an equilateral triangle. The typical distance your head will be from (plus or minus reasonable movement back and forth) from the speaker position line, will dictate the width through some simple math, or experimentation. This places the speakers at 60 degrees.

Vertical set-up should allow the speaker central axis to point at head height. The Diamond is a well designed speaker that is relatively insensitive to the height of the listener. However, a

nominal central aim point is recommended. Again, experiment and find a comfortable median position. Height placement should ideally not be from below, nor typically too high. Be sensitive to early reflections from control surfaces. Careful placement can reduce the destructive effects of reflections, diffraction etc. Be aware of placements that can excite cavity resonances, and look for symmetry from left to right and across the main three screen channels.

### **5.1 set-up:**

The Left and Right monitors should be placed at 30 degrees either side of the center line of the set up. The rears should be placed at 110 degrees either side of this line.

The center should be the same distance from the central monitoring point as the left and right channels. This can be achieved through time delay in many processors or through set-up where possible. Levels to all channels should be either identical, or with the Left and Right Surround Channels down set 3dB.

### **Equalisation:**

Whether you have the skills or experience of equipment, it is still essential that EQ is used as a last resort, or as “icing on the cake” only. Take great care in the set-up and balance of your systems. Check all levels and placements. Fix flutter echoes, nulls/suck outs, and resonances at source. Then when the system is well integrated to the environment, consider EQ. Fix acoustic problems acoustically, and electrical problems electrically! Reflections should be tamed at source and not compensated destructively with an equalizer! Similarly resonances should be hunted down and cured at source. Take time, listen, look and analyze.

For these reasons, we do not generally recommend the equalization of monitoring systems. So called “Room EQ” is considerably less necessary with a good Near Field Monitoring (NFM) system. Since the whole principle of NFM is to remove the influence of room interactions through the placement of speakers close to the monitoring position, and thus the timing and level relationship of originating signal to any room reflections allows our built-in psycho-acoustic processing to “ignore” much of the room effect. Our standard, built-in Human Psycho-acoustic processor is extremely powerful, and is able to naturally ignore late arriving signals in favor of the originating source within certain time envelopes. These are generally 15ms and 10-15dB. In NFM applications the close proximity of the speakers means that any room returns are late, thus ignored! We designed the Diamond Pro to be a naturally balanced product, with smooth, low Q, changes in radiation pattern over its operating range. All the transducers were purpose built and integrated into the design as integral parts. The natural balance of the speaker is such that EQ is detrimental.

### **System:**

The Diamond Pro is a “full range” two way direct radiating, ported loudspeaker system in a compact and well damped enclosure. All components are specifically design for this system. The Pro-Active model is a bi-amplified with an active crossover. All components were designed for optimum performance as a system. Magnetic shielding is provided on the transducers to allow their use in close proximity to CRT displays.

### **Drivers:**

The Diamond Pro driver complement consists of a 1” or 25mm soft dome high frequency driver, and a 127mm woofer. The woofer uses a sophisticated Kevlar® cone material specially formed to give exceptional rigidity yet low mass. The extreme “bulletproof” strength of Kevlar® gives excellent low frequency stiffness for long excursions under very high drive levels from the voice coil, yet at the same time its low mass means the cone can remain truly pistonic at extended frequencies. Normal cones are a compromised through being made light in weight to

make the higher frequencies at crossover, but their light weight means the cone can break up when asked to stop and start over 4,000 times a second at typical crossover frequencies, with resultant “cone cry”,

### **Crossover:**

8.1 Pro: internal passive crossover, 2.2kHz

8.1 Pro: internal passive crossover, 2.0kHz

8.1 Pro-Active: internal active crossover, 2.0kHz

8.2 Pro-Active: internal active crossover, 1.9kHz

The inherent quality and correctness of the design of the Diamond components means that simple and elegant crossover designs can be used. The lack of cone break up at high frequencies means that steep and complex crossovers with their inherent phase distortions are avoided. Both the Active and the passive versions of the Diamond Pro are essentially the same. The crossover in the active model is at a slightly lower frequency allowing subtle improvement in vertical integration and stability of image and sonic character.

### **Cables and Connections:**

Always use high quality cables and connectors in hooking up audio equipment, especially in speaker connection where higher current is likely to be seen. There are a number of high quality cables available on the market that give measurably better performance whether in low level signal, or high current voice coil level use. Connectors should be of high quality wherever possible. The Diamond Pro passive monitor features a Neutrik Speakon™ type connection. This type of connector is specifically designed to give low resistance, high quality connection with bare metal wiping contacts.

On the Diamond Pro-Active we recommend using the XLR type connector where possible for superior security of connection and better contact.

### **A/C Connection.**

Make sure your power is clean and properly grounded. Experience shows that superior sound quality can be attained through the use of “stiff” A/C power circuitry. Short runs of good conductor diameter cabling. For high level usage take the time to monitor your power voltage. Poor A/C wiring to the studio will show the voltage dropping momentarily during high power transients. The effect of poor A/C distribution in your studio can be heard as soft or weak bass and often noisy and hum through poor grounding.

### **Amplifier/s:**

The Diamond Pro-Active has two independent power amplifiers built in -designated and optimized for each of the specific duties. The low frequency amplifier is designed to output 60 Watts RMS to match the woofer. The high frequency power amplifier outputs 40 Watts. Both amplifiers are carefully designed to provide enhanced headroom with extremely graceful overload characteristics. The net effect of the holistic nature of the design of each amplifier combined with its paired driver is apparent and usable output is well beyond the power levels implied in the specifications.

## **Installation and Application**

### **Position & Mounting:**

The Diamond Pro passive monitor is front ported to allow positioning close to the wall. Two or three inches/50-75mm clearance is sufficient to allow normal operation.

The Diamond Pro-Active has the input and power connections on the rear, but most

importantly the heat sink assembly. Make sure the heat sink has sufficient clearance to allow reasonable airflow. This will, to some extent, be dependant on the power levels and duty cycles under which one is operating the system.

### **EQ-LF:**

In the real world, as opposed to the theoretical, loudspeakers operate and interact with the space in which they are used. It is important to understand the low frequency reinforcement that occurs as a result of the relationship of the speaker to walls etc. At the lower frequencies (and therefore longer wavelengths), loudspeakers are typically less and less directional. The smaller the speaker enclosure and the smaller the woofer (typically the higher the frequency) the system becomes 360 degree radiating. The net effect is that the low frequencies get boosted more and more when we place a speaker against a wall, or on a desktop.

### **Bass Filter:**

The most important thing to understand is the need to compensate for this potential build up, in the most simple and elegant way. On the rear panel of your Diamond Pro-Active you will see a switch marked "Bass Filter". This is carefully and specifically designed to control the typical low frequency build-up caused by the speaker's interaction with the room/space. The Bass Filter is a simple and graceful 6dB per octave filter that cuts the bass energy progressively at the same rate as the loudspeaker directs energy to a wider angle. Look at the application and think of the walls or desktop in terms of a low frequency mirror affecting the bass spectrum. If you believe you are likely to get considerable low frequency boosting it is recommended that you use the bass filter. Again, experimentation is important. *Remember: Too much bass out put in your monitor will likely cause you to reduce the amount of energy in the low frequencies that you place on tape or on to your recording medium. Too little lows in your monitor with create the opposite effect. Listen and experiment.* Use program material you are familiar with and "play" with the positions and settings to get the best you can.

### **Portrait or Horizontal Mounting:**

The preferable method of mounting a two way loudspeaker is in the vertical. This is typically because our ears are on the sides of our head and thus we are more sensitive to horizontal position and relationships. The positional offset of the drivers when the speaker is mounted horizontally can result in a phase hole in the response when the listener is offset from the centerline. The Diamond Pro is an exceptionally good loudspeaker in regards to its vertical and horizontal performance and far less susceptible to this problem, however, it is still recommended that the speakers are mounted vertically. The compactness of the speaker also means there is little advantage in mounting it horizontally unless height restrictions are exceptionally tight.

### **Console Top Mounting:**

Care should be taken to reduce as much as possible the clearly audible effects of sound bouncing off the control surface of the mixer or console. Experiment and find an optimal position. Once set up on your console's meter bridge try putting a thick sound absorbing blanket temporarily on the console. Listen to the difference. If it is significant, try elevating the monitors slightly and progressively to reduce the splashback of the surface. Again, set the speakers up and listen, place the blanket on the reflecting surface and listen again. The less the difference the better. But stop before you elevate the speakers too much.



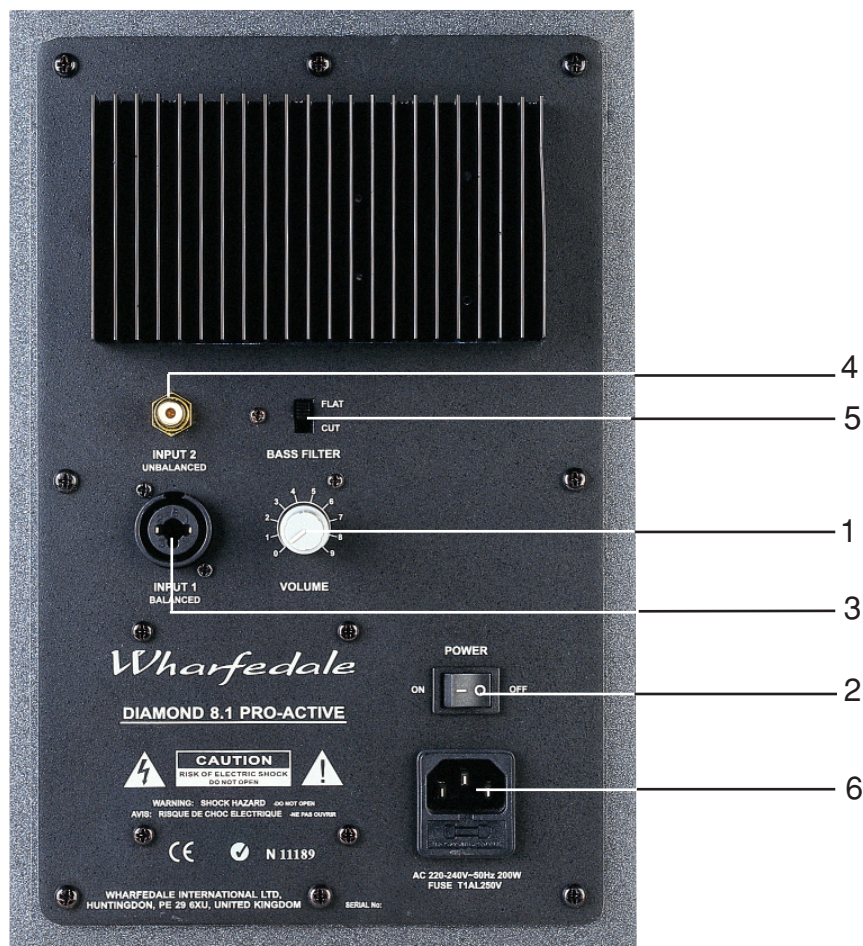
## Stand Mounting:

Depending on the application stand mounting in (near to) free space is one of the most neutral positions for monitors. Of course it is not always possible to take advantage of the isolation from floor, wall and countertop effects that stands can allow. But combinations of short stand and console can be used to advantage.

## Center Speaker Mounting and Positioning:

Ideally the center speaker is just that; mounted in the center! However, the type and size of display can seriously effect one's options for position. The shielding of the Diamond Pro allows it to be placed close to and either over or under the CRT display. Plasma, projection, rear projection etc. all offer different advantages and options. The closer one is to the monitor, the more critical the angles become. At a reasonable distance the imaging and integration of a speaker is improved when compared to being very close. Experimentation will establish the best distance and position when based upon a reasonable understanding of the requirements and standards.

## Controls & Indicators: Rear Panel



1. **Volume Control:** Adjusts the input level to the internal amplifiers.
- 2: **Power On/Off Switch**
3. **Input 1 Balanced**
4. **Input 2 Unbalanced**
5. **Bass Filter Switch:** Flat or Cut
6. **AC Input**

Models	8.1 Pro	8.2 Pro
Type	2 WAY	2 WAY
Usable frequency response	50Hz-24kHz	45Hz-24kHz
Peak SPL @ 1m, short term IEC noise source	106dB	108dB
Sensitivity	86dB	86dB
Power Handling (Watts)	100 W	100 W
Recommended amp power	30-150W	30-200W
Impedance nominal	4Ω	4Ω
Drive Units	5"LF, 1" HF	6.5" LF, 1" HF
System Magnetic Shielding	Yes	Yes
Crossover frequency	2.2K	2.2K
Input connectors	1 x phono speakon type /jack combo	
Input connectors (active)	1 x phono (unbalanced)	1 x XLR-1/4 jack combo balanced
Active ie slew rate, distortion	10v/micro s	10v/ micro s
Finish	IRIDIUM color laminate	IRIDIUM color laminate
Dimensions H x W x D (mm)	295 x 198 x 252	364 x 212 x 257
Dimensions of Active H x W x D (mm)	295 x 198 x 280	364 x 212 x 322
Weight (each kg)	5.2kg	6.2kg
Weight of active unit (each kg)	7.5kg	8.0kg

#### Active units only:

Usable frequency range	50Hz-24kHz	45Hz-24kHz
Drive units	5" LF, 1" HF	6.5" LF, 1" HF
Crossover frequency	2.0K	1.9K
Output SPL ((from peak power) IEC weighted noise @ 1m)	106dB	108dB
Bi-amplifier power (LF/HF)	60W LF + 40W HF	60W LF + 40W HF
Input sensitivity	0.775V RMS (0 dBu)	0.775V RMS (0 dBu)
Amplifier system distortion at	0.1% @ 50W	0.1% @ 50W
System Magnetic Shielding	Yes	Yes
Signal to noise ratio	100dB	100dB

#### Mains voltage:

Voltage operating range at:		
230V setting	205-250V	205-250V
115V setting	100-130V	100-130V

#### Power consumption:

Idle	22W	22W
Full output	130W	130W

#### Maintenance:

The high quality finish on your Diamond Pro is generally not in need of any care or attention. Do not use abrasives or abrasive materials to clean the enclosure since the finish may be marred. Never use water on or near electrical equipment.

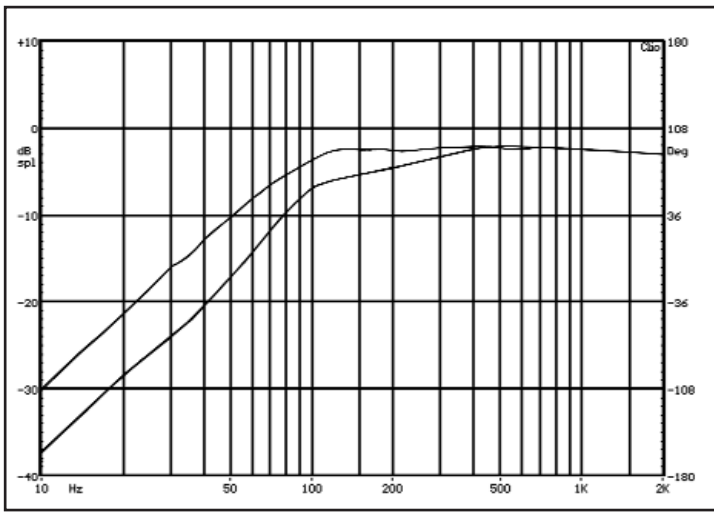
The Diamond Pro-Active heat sink must be checked for clearance from obstructions, lint – fluff or anything that might cause overheating.

#### Safety:

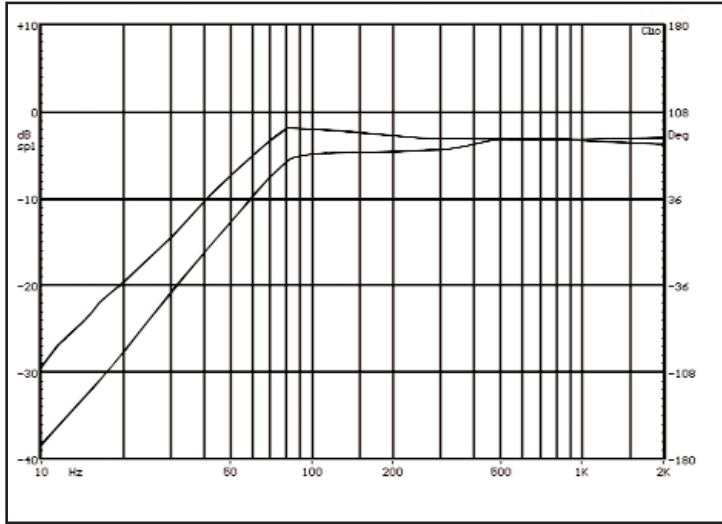
Always use grounded A/C power. Take care to mount and operate your equipment in a safe manner. Avoid exposure to rain and water.

#### Accessories:

Diamond Pro Series Subwoofer.



Diamond 8.1 Pro Active free air with/without bass cut



Diamond 8.2 Pro Active free air with/without bass cut.

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