van den Hul®

The Grail SX
User Manual

Contents

INTRODUCTION

Congratulations with your purchase of the van den Hul "The Grail SX" !

With this product you are the owner of one of the most innovative and advanced phonograph preamplifier's available at the moment. It delivers you fully balanced inputs and outputs.

"The Grail SX" is a really dulcet phonograph preamplifier, specifically designed bearing ultimate performance and reliability in mind.

Featurelist:

- a specific designed Phonograph preamplifier section, unique in the world
- balanced design for inputs and outputs
- inputs: three Phonograph inputs, two balanced for MC cartridges, one for MM (unbalanced)
- Phonograph RIAA - equalization with ***coils only,*** no sound impairing capacitors in filters
- special printed circuit board material with gold conducting paths
- special equipment foot made of selected wood avoids mechanical energy storage
- low noise moving coil input stage, less annoying noise even with low-output cartridges
- automatic adapting MC input stage for moving coil cartridges, no matching resistors needed
- possibility to compensate phonograph cartridge sensivity (level adjustment)
- strictly separated amplifier sections and circuit layout deliver a very natural soundstage
- power supply with Gyrators for each amplifier stage delivers very high noise cancellation
- the external power supply works with 120V and 240V mains voltage (reversible inside)

Designed to provide true high end audio, "The Grail SX" will deliver you outstanding sound quality with nearly every available modern phonograph cartridge.

SAFETY PRECAUTIONS

Use "The Grail SX" phonograph preamplifier only for the designated application range it was intended for.

If the mains power cable or the external power supply housing is damaged and/or inner wires can be touched, do not touch theses cables and do not use this power supply! ***Touching wires connected to mains live will harm your health seriously!*** In case of this kind of damage, do not touch the preamplifier or it's power supply and unplug the mains plug immediately. Bring the preamplifier to an authorized service point for repair.

To avoid risk of fire or electrical shock: do not use the preamplifier and it's external transformer in rooms with high humidity or in other wet environments. It may be used in dry places only. If any kind of fluids (water, drinks, soapsuds etc.) runs into the external power supply housing or into the preamplifier, please unplug the mains plug immediately and bring the preamplifier to an authorized service point for inspection.

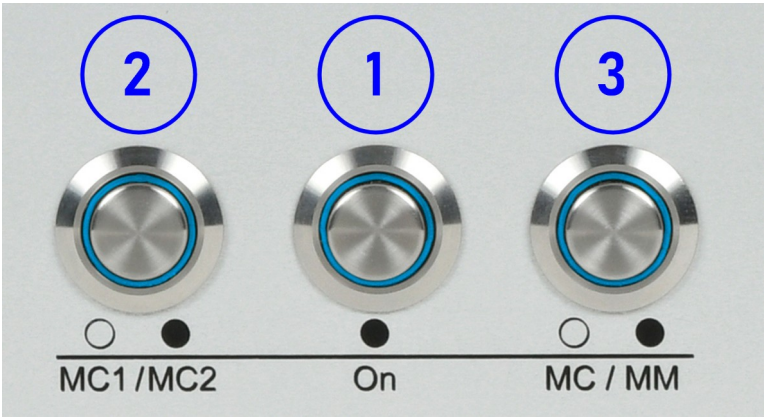
Do not allow children to play with the preamplifier and do not let them use it without your supervision. Keep the preamplifier and its power supply out of the reach of pets.

Keep away the preamplifier from hot surfaces and from open fire. Don't use it on top of another audio system parts that emit heat or electromagnetic fields and **do not cover cabinet slots of amplifier and the external power supply.**

CE
The Grail SX is in conformity with the actual required standards in accordance with 89/336/EWG.

INSTALLATION AND USE

Frontside

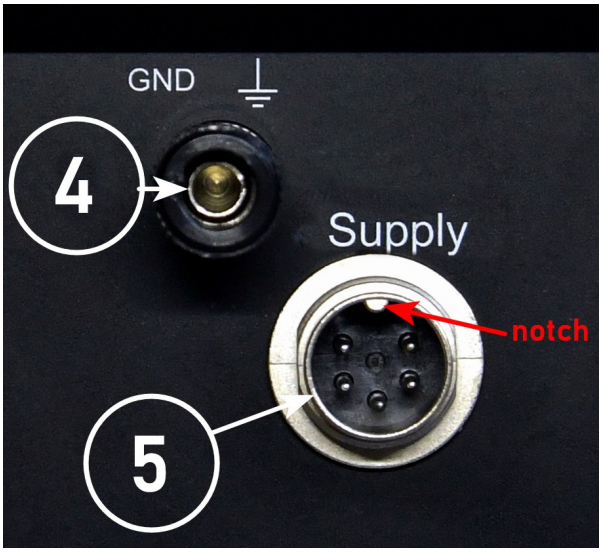


Items:

#1 Power-on switch and power on indicator (blue LED)
LED lights up when preamplifier is under power
#2 Toggle switch for MC1or MC2 input. MC1 is chosen, when LED is off.*
#3 Toggle switch for MC or MM input. MC is chosen, when LED is off.*

*** always turn main volume down to minimum (muting) before switching any inputs (MC1/MC2 or MC/MM) to avoid any thumb or pop noises !**

Rear side overview



Items:

#4) Ground connector for turntable ground (tonearm, motor-base etc.)
#5) DC power supply connector, to connect with the external power supply.
(use no other power supply than the dedicated one for "The Grail SX")

Items:
#6a MC1, phonograph cartridge input for low to medium output level MC cartidges, input available as balanced ***or*** as unbalanced input.
You can not use these inputs (bal./unbal.) both at the same time, that means MC1 is connectible balanced **or** unbalanced, not simultaneausly
#6b Second MC input MC2, available as balanced input.
#7 MM phonograph cartridge input, also for high level output MC systems
#8 Preamplifier output connectors

Remark:
Outputs are constructed for balanced and unbalanced connectors at one go. That means both outputs can be used simultaneausly. Mixed input/output mode is also possible, for example "balanced in" and "unbalanced out" can be carried out (and vice versa), as well as "balanced in" and "balanced out"

External Power supply:

Items:
#1 Power switch for mains power
#2 Fuse holder (Fuse: 2x 0,8A slow acting for 230V mains, and 2x 1,25A for 120Vmains). Voltage selector inside of power supply as a switch
#3 Mains power connector for standardized IEC power connector
#4 Power supply connector, connect to "The Grail" preamplifier

Connection of the preamplifier:

Some words in front: "The Grail" is a high quality preamplifier that delivers you the finest possible sound. But it can do this only if you use the right cables – using cheap, bad sounding cables will seriously degrade the sonic benefits you can get from "The Grail". Save your investment - use the best cables you can afford, e.g. cables from the ***van den Hul*** cable line. They will deliver you the best possible sound available at this moment.
In general: keep away the amplifier from electromagnetic fields of any kind to avoid any hum signals introduced to the audio chain. Keep away the Grails power supply from the Grail SX amplifier at least 1Meter (appr. 3,5ft.), more is better.

Power supply:

Switch the main switch of the external power supply to position 'OFF' (symbol "o") during the installation process. Connect the power supply with its power cable to your mains wall outlet. **Be sure the internal adjusted mains voltage matches to your mains voltage, to avoid damages to the Grail !** The voltage selector is a slide switch inside the power supply cabinet. **Attention! Before opening the power supply cabinet be sure to disconnect from mains (pull the power plug from power outlet) !** For more information about this topic take a look at page 12.

Now connect the round-shaped low voltage connector sitting at the end of the cable coming from the power supply, to the preamplifier's rear side DC supply input socket (#5 of the picture showing the rear side of the preamplifier). Watch out to align with the connectors notch.

Audio signal connections:

Connect your high-level (control) preamplifier with a pair of high quality cables with balanced XLR or alternative unbalanced RCA-Phonoplug (Cinch) connectors to the phonograph preamplifier "The Grail". The receptacles at the rear side of "The Grail" are named "Out" ; connect them to a free high-level input of your control amplifier, e.g. "Aux" or "Line".

Connect the cables coming from your turntable either with the input connectors "MC" or "MM" of "The Grail". Also connect the common ground cable to the ground/earth connector of "The Grail" (#4 on the picture of the rear side of the preamplifier). If you have more ground cables, e.g. coming from your system rack, connect them to this ground connector as well.

Input selector switch
Set the switch "MM/MC" to same as your chosen input. ***Caution: turn volume to minimum before switching.***
Corresponding to the choosen MC input set the switch "MC1 / MC2" into the correct position. ***Caution: turn volume to minimum before switching.***

Attention: please turn your volume control (level potentiometer) on frontside of your control amplifier to the left side (position "muted"). **Switch on** the external power supply with the mains switch at the rear side of the power supply. Now please push the "On" button at the frontplate of "The Grail SX". It will take appr. 15 seconds and the preamplifier releases the output signal. During this time all internal bias points become stable and the preamplifier is ready for listening.
That's it! Put a record on your turntable, choose the desired volume and **enjoy the music!**

Choosing the right input / Impedance matching

Because of you have several inputs at the rear side of "The Grail" you have the choice between them – but which one to take ?
There are various phonograph cartridges on the market. Roughly said, they divide into two groups:

1) Moving coil (MC) cartridges
   and
2) Moving magnet (MM) cartridges - to this group belongs also the "moving iron" (MI) systems. For theses type of cartridges there is only the unbalanced input (Cinch) available!

MC cartridges again divide into two groups:
a) low-output types
   and
b) high-output types

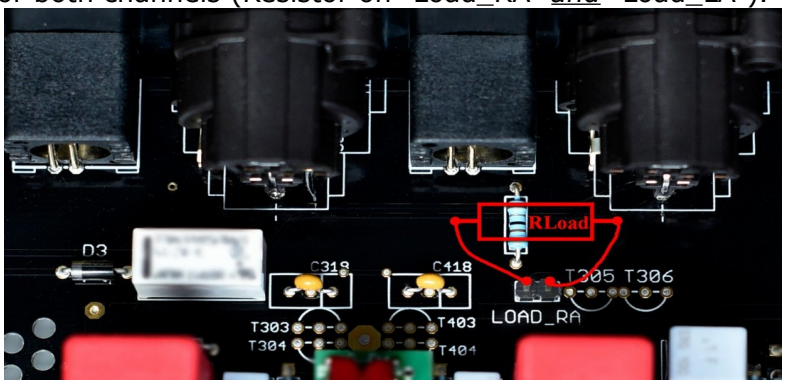
In practise:

for the real high-output MC systems please use "The Grail's" input "MM". Why? Now, this input is more then only a plain MM system input – it is also dedicated to "high-output" MC systems. This way you avoid any overdrive of your preamplifier's input. This input is available only as unbalanced input.

If you have a low-output or standard-output MC system please use "The Grail's" input "MC". It was especially designed for low and medium output MC systems. ***And this input has a remarkable feature: it matches the input impedance for your MC cartridge automatically.***
Simply connect your MC system to "The Grail's " MC input and forget about impedance matching and all the rest – just enjoy the music !

Impedance matching for high-output MC systems connected to the "MM" input

These lines are dedicated to the skilled users only – if in doubt, always consult your dealer! **Remark: The MM input is available only as unbalanced (Cinch) type!**
At first: most of the time an impedance matching is unnecessary – do yourself a favour and listen to it first before unpacking your soldering iron – most the time high output MC Systems sound perfect without impedance matching when running at the balanced input. But if it is necessary, impedance matching is easy done: stick to the cartridge manufacturers recommendation for your cartridge.
In case you use the unbalanced input, put the resistor to the pinhead connectors "LOAD_RA" and "LOAD_LA" on the printed circuit board of the Grail preamplifier. Don't forget to connect resistors for both channels (Resistor on "Load_RA" *and* "Load_LA").

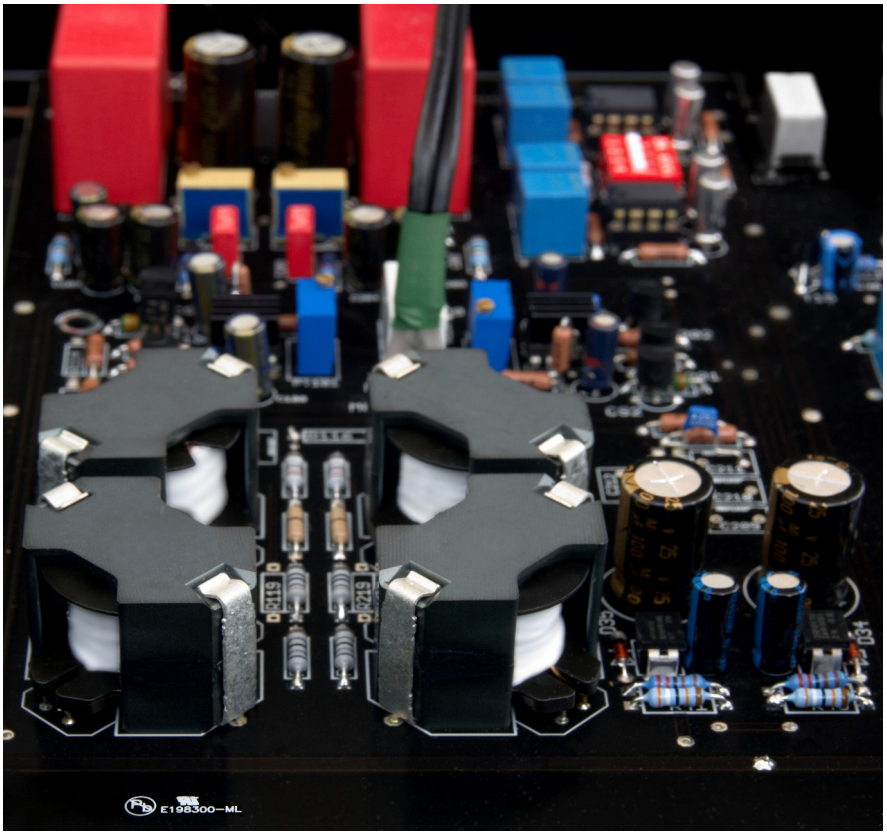


Impedance matching for MM and MI systems connected to the "MM" input
These lines are dedicated to the skilled users only – if in doubt, always consult your dealer!

What about the impedance matching of MM or MI systems? *Normally, everything should be fine.* "The Grail's" input impedance is 47Kilo-Ohms (47000 Ohms), this is the standardized value for MM/MI cartridge inputs. Just connect your cartridge and enjoy the music!

In *very* few cases the the input capacitance of the combination " *turntable signal cable + preamplifier input* " is not high enough. As mentioned, this is rather uncommon. Normally the input capacitance is just right or even slightly too high (if way too high, use a better and shorter cable, ask your dealer!) But in case the input capacitance is to low, you may get an aggressive and too "bright" sound.

Remedy:
You can do the same as with the matching of the high output MC system – but this time you use no resistors but instead high-quality(**!**) capacitors like Polystyrene type capacitors and solder them into the connectors, just as described before. Reasonable capacitor values may vary from 47pF up to 330pF ("pF" means "pico Farad" = 10^{-12} F). Always start with the small values (47pF) and then listen to it for screening. If not satisfying, take the next higher value (e.g. 100pF) and again listen to it. If even an additional 330pF will not bring the desired results, take a look at the cartridge installation: is it proper mounted under your tonearm? Check the alignment of the cartridge with a good alignment protractor. Also check the tracking force, stick to the cartridge manufacturers recommendation for your cartridge.
Hint: keep in mind that your cable has an inherently capacity and the input of "The Grail" has also a 50pF input capacitance. So you only have to add the missing part of the recommended total capacitance, given by the cartridge manufacturer.

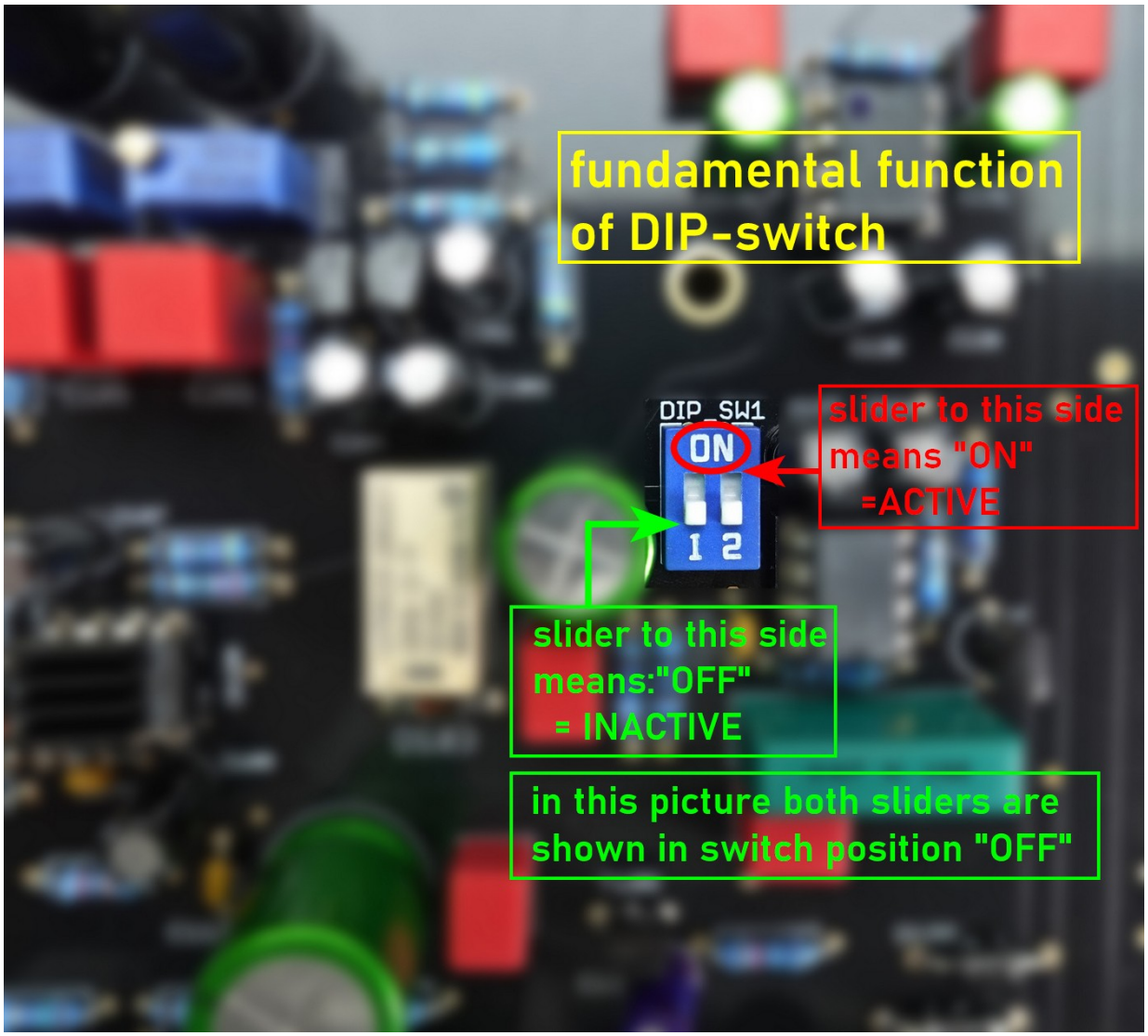


The heart of "The Grail": the "***Coils-Only"*** deemphasis network

Level matching

To compensate the various level differences between all your audio sources, “The Grail” gives you the possibility to change the amplification factor.
This amplification factor variation is also meaningful, if you use a quite “super-low”output voltage MC cartridge, or your high output voltage MC system is just at the “low side” of it's kind and you would like to use it at the MM input of “The Grail”.
Also conceivable: your complete audio chain has a quite low amplification factor and you use speakers with low sensivity.
In all this cases it is meaningful to adjust the amplification factor of your phonograph preamplifier.

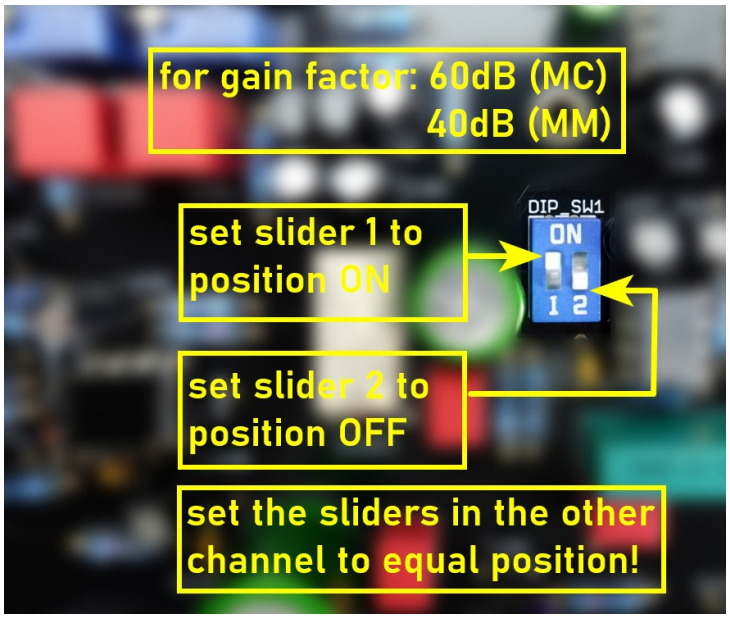
With “The Grail” this is easy done. Simply remove the four Allen key screws of it's top plate. Remove the top plate and take a look inside of the preamplifier: you will find 2 small switches, in form of a single DIP-switch, one for each channel. Please take a look at the pictures below, they explain the procedure (color of the switch may be red or blue in your amplifier).

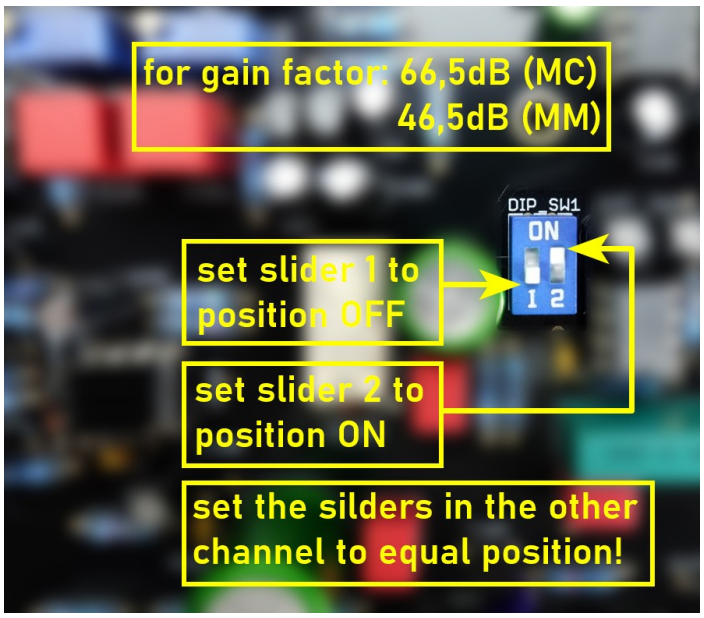


Simply choose the desired amplification factor by pushing the respecting levers to the “on” position.
Basically: the higher the “dB” figure, the higher the amplification factor and as a result the louder the music signals will be.

In general: always set switches equal on both channels

Don't overdo: choose only an amplification factor that is really necessary. Taking amplification factors much higher then necessary will result in a reduced overdriving capability (headroom) of the preamplifier and more background noise. Delivery condition for gain is 60dB (MC) and 40dB (MM), that means DIP switch slider 1 in position "ON" and slider 2 in position "OFF".





Some final hints:

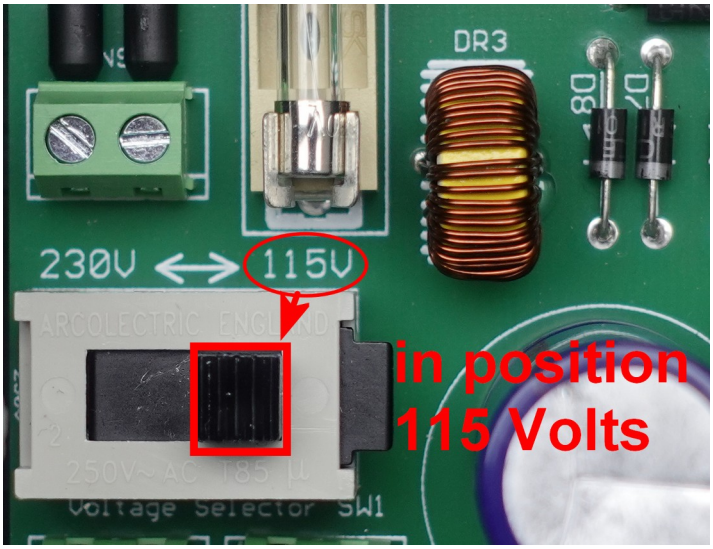
As all electronic audio devices, "The Grail" has a pre-aging period when bought as a brand new device. Normally this ends after appr.100 hours of **listening to music**. During this time the sonic quality raises to it's maximum.

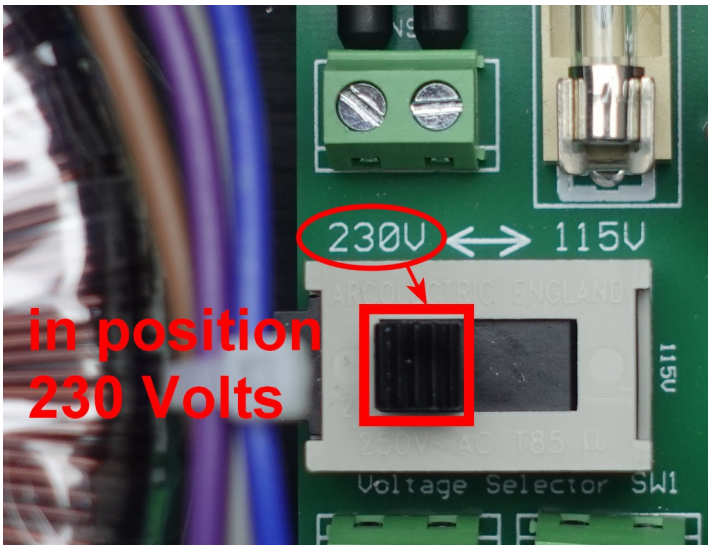
If you have a holiday and you leave your house for days, switch off your preamplifier (as well as the rest of your audio chain) completely. Safe energy for the future of our planet! In case of a holiday trip you switch off your cooking plate too, don't you ?

Changing the power supplies mains voltage

You can set the mains voltage of the power supply to 114/120Volts or to 230/240Volts with a slide switch inside the power supply cabinet. Factory setting is 230/240Volts.
Attention! Before opening the power supply cabinet be sure to disconnect from mains (pull the power plug from power outlet) ! Never actuate the voltage selector switch when the power supply is connected to the mains wall outlet!

Remove the four Philips screws from the top lid and remove the lid. Set the voltage selector switch to the mains voltage at your location (take a look at the pictures). Replace top lid and insert screws and reconnect the power supply to the Grail SX and the wall plug and switch on the power supply.





PROBLEM SOLVING

In case of a malfunction, take a look at some things:

1) The power switch of "The Grails" power supply is in "on" position? Is the proper mains voltage set (120V or 240V)? Are all other amplifiers switched on (control amplifier, power amplifier)? Is the corresponding input channel of the control amplifier chosen ? Volume knob is not at the left latch (minimum)?

2) Is the wiring of all components in the audio chain correct? No "fallen off" connectors?

3) Are the fuses in the external power supply blown up? You can open the fuse holder (item No.2 of the picture of the rear side of the external transformer box) and take out the fuse. If it is blown, replace it with a fuse of the same kind and value. **Fuse type: T800mA slow acting, size 5x20mm** (for 230Volt mains version) or **T1,25A slow acting, size 5x20mm** (for the 120Volt mains version). These are the fuses on the primary side of the transformer. Another fuse, on the secondary side of the transformer, is on the printed circuit board of the external power supply (1,25A slow acting) If a fuse blows up again, please unplug the mains plug and bring the preamplifier to an authorized service point for repair.

4) Is the fuse in the main cabinet of the preamplifier "The Grail" blown up? You can open the preamplifier housing by removing the four Allen key screws of it's top plate. Remove the top plate. The fuse is located near the DC supply connector. Take out the fuse and look if it is blown. If so, replace it with a fuse of the same kind and value. **Fuse type: 1A slow acting, size 5x20mm.**
If this fuse blows up again, please unplug the mains plug and bring the preamplifier and its power supply to an authorized service point for repair.

TECHNICAL SPECIFICATIONS

Mains power:	120Volts or 240Volts, 50/60Hz
Power consumption:	appr. 15 Watts
Temperature operating range:	from 15deg. Celsius up to 35deg. Celsius room temperature. No condensation permitted Use only in dry rooms
Max. undistorted output voltage (< 1%):	15Vss for MM signal path, 8,5Vss for MC signal path
Output impedance:	330 Ohms at RCA Cinch, 20 Ohms at balanced out
Input sensivity values:	given for 250mV RMS resp. 0,707Vss output level on amplifier output
Signal to noise:	> = 80dB(A) at lowest amplification factor
Input voltages	at denoted input to achieve 250mV output level
MM input:	
at amplification factor 32dB:	6,2 mV
at amplification factor 40dB:	2,5 mV
at amplification factor 46,5dB:	1,2 mV
Input impedance:	47KOhm / 50pF
MC input:	
at amplification factor* 52..56dB:	0,62 mV
at amplification factor* 60..64dB:	0,25 mV
at amplification factor* 66,5..70,5dB:	0,12 mV

* = true amplification factor varies with source impedance of MC cartridge about appr. 4dB

Input impedance:	autom. matching from appr. 10 Ohms up to 400 Ohms
Weight:	13,5Kg (appr. 29,8lbs) without the ext. power supplies
Size (WxHxL, incl. feet):	475 x 95 x 335mm