User's Guide

DPS-2

Power on!

Linear High-End Audio Power Supply
Integrated HF and DC Mains Filter
12 Volt 30 Watts DC Output
Passive / Active Linear Filter
Ultra Low Noise µFilter
Sensor Technology
Overload and Overheating Protection
Short Circuit Proof
Undervoltage Detection
Status Display via LEDs
GND Lift

Important Safety Instructions

ATTENTION! Do not open chassis – risk of electric shock

The unit has non-isolated live parts inside. No user serviceable parts inside. Refer service to qualified service personnel.

Mains

- The device must be earthed – never use it without proper grounding
- Do not use defective power cords
- Operation of the device is limited to the manual
- Use same type of fuse only

Protection Class 1. Mains connection must have protective earth (PE).

To reduce the risk of fire or electric shock do not expose this device to rain or moisture. Prevent moisture and water from entering the device. Never leave a pot with liquid on top of the device. Do not use this product near water, i. e. swimming pool, bathtub or wet basement. Danger of condensation inside – don't turn on before the device has reached room temperature.

Installation

Surface may become hot during operation – ensure sufficient ventilation. Avoid direct sun light and do not place it near other sources of heat, like radiators or stoves. Leave some space between this device and others for ventilation.

Unauthorized servicing/repair voids warranty. Only use accessories specified by the manufacturer.

Read the manual completely. It includes all information necessary to use and operate this device.

User's Guide

DPS-2

- **General**

1. Introduction

Thank you for your confidence in the RME DPS-2. This top quality linear power supply convinces with a wealth of detailed solutions, features and - of course most important - a powerful and flawless output voltage. Still the DPS-2 remains unusually small and compact. As an ideal complement to the ADI-2 series, it has the same housing design, but also works perfectly with many other 12 Volt-based devices. With two outputs realized in different designs, the DPS-2 offers more technology and possibilities than any 'HiFi' power supply before.

This manual will guide you through all the functions, features, and other interesting facts about the DPS-2. Enjoy!

2. Package Contents

- DPS-2
- DC Sensor connection cable with lockable DC plug 2.1x5.5 mm, 1 m (3.3 ft)
- DC Sensor connection cable with DC plug 2.1x5.5 mm, 1 m (3.3 ft)
- Manual
- IEC Power cable, 1.5 m (4.9 ft)

3. Proper Use

- Mains voltage 230 volts or 115 volts, according to country, see label on the back
- Connection of a device that uses 12 volts and less than 2.5 amps (< 30 watts)
- DC plug: Positive inside, negative/GND outside

4. Brief Description and Characteristics

- Linear power supply with 60 VA audio toroidal transformer
- 1/4 19“ width, 1 HE height
- Massive steel housing with aluminium cooling inserts
- HF- and DC-filter on mains side
- Toroidal transformer with additional capacitive and magnetic shielding
- 30,000 µF filter bank with additional inductor (choke)
- Two DC outputs, alternatively usable
- Output Linear in classic analog technology
- Noise typical <50 µV
- Output µFilter with µFilter technology and sensor compensation
- Noise typical < 2 µV
- Overload protection
- Short circuit protection
- Overheating protection
- Undervoltage detection
- Status display via multicolor front LEDs
- LED AutoDark mode
- Low idle power consumption (1 watt)
- GND Lift switch to disconnect DC ground from PE (protective earth)
- GND terminal to ground other devices via PE connection

5. Connectors – Controls – Display

On the **front** of the DPS-2 there are 2 LEDs and a recessed switch.

The two **LEDs** indicate the status of the **µFilter** (left LED) and **Linear** (right LED) outputs. After switching the unit on, the two LEDs light up white. If a DC cable is plugged into one output, the other LED turns off. Error conditions are indicated by the color red.

In the default mode AutoDark the LEDs turn off after about 30 seconds. They will be active again for 30 seconds only at the next power-on, but also immediately if an error condition occurs (red). If a constant display of the operating state is desired, this can be done by pressing-in the **recessed switch** with a pen, the LEDs will then remain permanently active.

On the **back** of the DPS-2 you will find an IEC power jack with power switch and fuse holder, a ground terminal, the ground lift switch, and the two DC outputs µFilter and Linear.

For the **IEC C14 receptable**, the suitable mains cable is supplied. The integrated 2-pole mains switch carries out a complete mains disconnection when switched off.

The **protective earth** contact of the mains cable (PE) has a fixed connection to the housing and the **ground terminal**. However, the **Ground Lift** switch can be used to disconnect the ground of the DC output from PE, e.g. in case ground loops (hum noise) occur.

The two **sockets of the DC outputs** are lockable, the matching special cable with lockable 4-pin round plug is included. The cable ends in the widely used 5.5x2.1 mm DC plug, one lockable and one without locking.

! *RME devices use the lockable plug, but the socket on the device also fits the non-lockable one. Conversely, however, the lockable plug often makes insufficient contact in devices without such a socket. Therefore, the non-lockable plug should be used there.*

Note: After complete insertion of the lockable plug into the device to be powered, it must be turned 90° for locking. If the connected device fails when the cable is moved, the plug is NOT correctly inserted in the socket!

5.1 Connector Pinouts

DC Special Cable

The special DC cable with sensor leads has the standard 5.5x2.1 mm DC connector on one side, with and without locking plug.

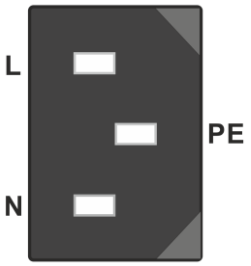
The connection to the DPS-2 is made via a Kycon KPP-4P connector, with 4 poles, shell and locking function.

Pinout

Kycon KPP-P4		DC Connector	Function µFilter	Function Linear
Pin	**Cable**	**Pin**		
1	**Red**	**Outer (-)**	**GND**	**GND**
2	**Brown**	**Inner (+)**	**+12 V**	**+12 V**
3	**Green**	**Outer (-)**	**Sense GND**	**GND**
4	**Black**	**Inner (+)**	**Sense +12 V**	**+12 V**
Shell	**Pin 1**		**Plug detection**	**Plug detection**

Mains Socket

The mains socket (C14) is wired according to the standard, with the outer conductor (phase) at the top and the neutral conductor at the bottom. Internally, the primary is connected in a way that results in a lower leakage voltage (and thus leakage current) in the absence of a protective contact: 50 V AC instead of 136 V AC, 17 µA instead of 45 µA (values for 230 V mains).



In practice, however, this is irrelevant, since the DPS-2 must not be operated ungrounded, i.e. without protective contact/PE. And with this, both leakage voltage and leakage current are no longer measurable.

6. Installation and First Time Operation

- Plug the enclosed DC power cable into the Linear or µFilter output. The flat side of the 4-pin round plug is on top.
- Connect the other side of the DC cable to the device to be powered (e.g. ADI-2 DAC).
- Plug the enclosed power cable into the power socket of the DPS-2.
- Insert the power plug of the power cable into a mains socket.
- Switch on the DPS-2 using the rear power switch.

Now one LED should light up white within a few seconds. Then the connected device can also be switched on and should start properly.

7. Operating the Power Supply

Power switch rear: Switching the power supply on and off, with full power disconnection.

Recessed front switch: Deactivates the AutoDark mode, the LEDs then remain permanently on.

GND Lift rear: Connects and disconnects PE to the ground of the DC connection. Three states can occur when operating the switch:

- Nothing changes.
- A humming or buzzing noise becomes audible. In this case, the device connected to the DPS-2 is already connected to PE via another power supply unit or via other devices, and a ground loop is created by the double grounding. Solution: Reset the switch.
- A humming or buzzing noise disappears. In this case, either a ground loop is interrupted or a leakage current is diverted to PE via the DPS-2. The latter can be the case if another device is working in conjunction with an unearthed switching power supply.

8. Hotline – Troubleshooting

The device becomes very warm

- As long as the LEDs do not indicate an error condition, this is normal. A linear power supply has a much lower efficiency than a switching power supply, the difference between consumed (AC) and delivered (DC) power is released as heat and transferred to the housing for heat dissipation. The higher the current demand of the connected device, the higher the heat generation.
- Operate the device as a free-standing unit
- Do not operate the unit on top of or below other heat sources. Always place the device next to another device - or further away.
- Do not cover ventilation slots
- Do not place on a cloth or pillow - the underside should remain free for unhindered airflow.

The LED lights up red, the connected device does not get any power.

- The device has overheated. It will work again after cooling down
- The device has been permanently overloaded - too high current demand
- Short circuit at the output - disconnect DC cable, check if LED turns white
- If the LED remains red even after cooling down and removing the DC cables, the DPS-2 is defective. Please contact your dealer or the RME sales department.

The DPS-2 can no longer be switched on, the LEDs remain dark.

- The DPS-2 has two fuses, see Tech Specs. These are located in the fuse holder, which is accessible from the rear, between the power switch and the power socket. To remove them, press the small tabs at the top and bottom, and at the same time use a small screwdriver to pry out the center of the holder from the side of the power socket.

  Whereas previously the second fuse mostly served as a backup, the DPS-2 uses both fuses for even better protection (separate fusing of both AC supply lines).

! Replace fuses only with the same type (voltage/current)! Never bridge fuses - danger to life!

I can't decide whether Linear or µFilter sounds better

- Unfortunately we cannot help you there.

I'm confused by the various output current specifications - what power does the power supply deliver?

A power supply must be able to supply the specified rated power permanently, i.e. for many hours. Due to the compact design of the DPS-2, the maximum possible current leads to thermal shutdown after a longer period of time. Therefore, the device is defined with 2.5 A rated current (30 watts), which it can do permanently and at elevated outdoor temperatures. However, the DPS-2 can also deliver 3.5 A (42 watts) without problems - just not over very long periods of time.

In the ADI series, the ADI-2/4 Pro SE with its complex electronics, 21 relays and Balanced headphone output is the unit with the highest current requirement. It can be used perfectly with the DPS-2 (which was designed exactly for this purpose). It should also be noted that audio requires less current on average than for short-time peaks. And for these the DPS-2 delivers even significantly more than 3.5 A.

User's Guide

DPS-2

Technical Reference

9. Technical Specifications

9.1 AC Mains (Primary)

- Standard input voltage: 115 V or 230 V, set by internal connector
- Input voltage range: 95 V – 130 V or 200 V – 260 V
- Power consumption idle: 1.6 watt
- Power consumption typical, 2 A load on Linear: 38.5 watts
- Power consumption typical, 2 A load on µFilter: 39.8 watts
- Fuses for 230 V: 2 x 250 V / 0.63 A slow blow, size: 5x20 mm
- Fuses for 115 V: 2 x 250 V / 1.2 A slow blow, size: 5x20 mm

9.2 DC Linear – Secondary

- Maximum output voltage: 12.2 V @ 0 A
- Minimum output voltage: 11.5 V @ 3 A
- Continuous output current: 2.5 A
- Continuous output power: 30 watts
- Maximum output current: 4 A
- Short circuit current: < 0.3 A
- Noise @ 1 A, AES17: 30 µV, 3 µV A-weighted
- Noise @ 1 A, 100 kHz bandwidth: 30 µV, 4 µV A-weighted
- Noise @ 2 A, AES17: 111 µV, 14 µV A-weighted
- Noise @ 2 A, 100 kHz bandwidth: 111 µV, 14 µV A-weighted
- Output impedance including cable: 0.22 Ohm
- Load Regulation (0/1/2 A): 3.63 %
- Overload protection: > 5 A
- Overheating protection: > 80 °C (176 °F)
- Undervoltage detection: < 9.5 V

9.3 DC µFilter - Secondary

- Output voltage: 12.0 V
- Continuous output current: 2.5 A
- Continuous output power: 30 watts
- Maximum output current: 3.5 A
- Short circuit current: <0.1 A
- Noise @ 0 - 3 A, AES17: < 2 µV, < 1 µV A-weighted
- Noise @ 0 - 3 A, 100 kHz bandwidth: <3 µV, < 2 µV A-weighted
- Output impedance including cable: 0.012 ohm
- Load Regulation (0/1/2 A): 0.20 %
- Overload protection: > 3.2 A
- Overheating protection: > 80 °C (176 °F)
- Undervoltage detection: < 9.5 V

9.4 General

- Dimensions (WxHxD): 130 x 44 x 205 mm, 5.1“ x 1.7“ x 8.1“
- Weight: 1.89 kg (4.17 lbs)
- Temperature range: +5 °C up to +40°Celsius (41 °F up to 112 °F)
- Relative humidity: < 75%, not condensing

10. Technical Background

10.1 Differences Linear and Switched Power Supplies (LPS, SMPS)

A **linear power supply** (LPS) consists of a transformer, rectifier and capacitor, as well as a voltage regulator for a constant output voltage. The voltage regulator also significantly reduces the residual ripple voltage after rectification. A large part of the power loss occurs at the voltage regulator, since its input voltage must be significantly higher than the desired output voltage for various reasons - a linear power supply cannot be easily implemented with so-called low drop regulators, because the mains voltage can vary by more than 20%.

Advantages: Very clean output voltage possible. No generation of high frequency switching noise. No issues with leakage current (although the effect also exists with linear power supplies).

Disadvantages: Low efficiency, therefore high power loss and high heat dissipation. High weight due to very large transformer. High risk of magnetic stray field due to large transformer, including the generation of magnetically excited ground loops. Reacts strongly to fluctuations in mains voltage. Comparatively expensive.

A **switched mode power supply** (SMPS) consists of a rectifier and capacitor. The very high DC voltage obtained in this way is chopped at high frequency and fed to a transformer, which provides galvanic isolation and divides the voltage. Additional filtering and stabilization on the output side is also common.

Advantages: Very small and light. Very high efficiency (> 80%), very low heat dissipation. No generation of large and low frequency magnetic fields, thus no magnetic ground loop excitation. Accepts any input voltage between 100 and 240 volts, therefore does not react to fluctuations in mains voltage. Comparatively inexpensive.

Disadvantages: Output voltage does not have low-frequency noise, but often has high-frequency noise due to switching technology. Leakage current of up to 200 µA is typical. In ungrounded systems it causes various effects, from hum-buzzing to mild electric shock (> 90 V AC on housing parts).

Our conclusion
Both systems have their advantages and disadvantages, and both can be significantly improved in detail to eliminate some of the drawbacks. Example:

Linear power supply: Efficient magnetic shielding of the transformer. Use of a quality transformer that does not go into magnetic saturation early, causing generation of an even more interfering stray field. Use of passive pre-filtering (choke) and a floating voltage regulator to reduce power dissipation. Use of a highly efficient switching regulator on the secondary side for minimum power dissipation despite fixed output voltage (this is not comparable to a switching power supply, e.g. there is no comparable leakage current generated).

All this can be found in the DPS-2!

Switching power supply: Grounding of the DC side via a high impedance resistor to PE of the primary side eliminates all effects of leakage current. Additional LF and HF filters on the output side reduce noise.

The additional grounding with resistor is a feature of RME's new switching power supplies with IEC socket, which RME successively adds to the devices. Additional filters are available with the *LNI-2 DC*, which includes galvanic isolation and the complete µFilter technology. It can be used behind any normal 12 V power supply and dramatically improves DC stability and ripple/noise.

10.2 AC HF and DC Filter

HF Filter
Unfortunately, the effectiveness of filters on the mains side, i.e. AC, is only wishful thinking in many cases. For technical reasons, filters which start just above 50 to 60 Hz (the frequency of the mains voltage) and work effectively are practically not feasible. They usually act only in the Megahertz range, and serve the opposite direction - to prevent interference of a switching power supply from reaching the mains.

With high inductance chokes, cutoff frequencies of e.g. 10 kHz can be achieved, but by the time these are effectively lowered, one is already at 100 kHz - far outside the audible range. However, if audible interference from the mains occurs in a system, it is usually also present in the mains at low frequencies. Here it is often necessary to eliminate the error at a completely different place, like wrong or bad ground connection, unfavorable multiple connections (aka ground loop), interference in unfiltered analog inputs etc.

But we don't want to talk you out of such filters at all. At some point you might stumble upon a situation where such a filter helps (or would have helped). Besides, we know the *Peace of Mind* effect ourselves very well. And that's why the DPS-2 doesn’t just contain the usual RF type of filter, but instead boasts a 2-stage AC HF filter on the mains side, which significantly reduces both differential and common-mode interference from the mains from about 3 kHz up.

DC Filter
The situation is somewhat different with DC filters. Certain devices load the mains AC voltage of 230 V unevenly, which can cause a DC component of a few volts in the mains net. This can lead to an occasional acoustic humming noise in large transformers - such as in power amplifiers. This can be very annoying, and is definitely something that should not occur with the DPS-2. Fortunately, there is a comparatively simple remedy in the form of a DC filter, which eliminates this DC component - the transformer remains silent. Such a filter is simple, it consists of only a few components.

The quality toroidal transformer of the DPS-2 was tested in the RME lab with DC as well as with different, highly disturbed mains signals (phase cut, modulated frequencies etc.) - no acoustic reactions could be detected. A precisely wound toroidal core, clean assembly, and the moulding of the entire transformer lead to exemplary behavior. Due to the low effort required, we implemented a DC filter anyway, and can now guarantee an absolutely hum- and noise-free operation of the DPS-2 in any situation.

10.3 DC Generation

As shown detailed in the block diagram in chapter 11, the DC voltage is generated by a toroidal transformer, whose output is converted from an AC voltage to a DC voltage by a rectifier and large capacitors. A total of 20,000 µF was given to this part of the circuit. This is usually followed directly by a voltage regulator, which ensures a constant output voltage and reduces the ripple of the DC voltage.

In the DPS-2, however, the next step is passive filtering of the DC voltage with a large inductor (coil or choke) and another 10,000 µF. This significantly reduces the ripple. This pre-filtered voltage then supplies both the Linear and µFilter circuitry via the DC bus.

10.4 Linear

The pre-filtered DC voltage (see chapter 10.3) is further cleaned by a hybrid voltage regulator. The circuit implemented in the DPS-2 has its own power supply to optimally regulate mains voltage and load variations. The hybrid design limits the output voltage to 12.2 Volt. As long as the output current does not load the circuit too much, it works like a normal voltage regulator with a fixed reference. If the pre-filtered output voltage drops due to high load, the circuit switches to floating mode. The voltage regulator then does not switch off or become ineffective. Instead, the DC voltage continues to be cleaned with a low-pass function, and the filter automatically moves with the falling voltage. The advantage here is that the power dissipation at the voltage regulator remains manageable.

The output Linear is completely analog in the sense of a linear power supply. The output voltage changes only slightly under load, noise is <100 µV, a factor of 50 below that of normal power supplies (typically 5 mV).

To put this into perspective: The 111 µV (0.1 mV) measured at 2 amps corresponds to a level of -79.1 dBV. Related to 12 V (+21.6 dBV), the ripple voltage is 100.7 dB lower. With less current draw, even more so.

Of course, this output is provided with thermal overload protection and short-circuit proof by current limiting and monitoring. An LED on the front panel indicates undervoltage, overload and short-circuit as an error condition by lighting up in red.

10.5 µFilter

The pre-filtered DC voltage (see chapter 10.3) feeds a special switching regulator with very high efficiency (which is similarly used in the ADI-2 series) for a very stable and load-independent output voltage. The biggest advantage of such a design is the reduction of power dissipation, which in typical linear power supplies converts half of the unused transformer power into heat. This also saves the DPS-2 large heat sinks.

The switching regulator is followed by RME's *µFilter* (micron filter), with a number of surprising features. First of all, the µFilter is a discrete Ultra Low Noise linear regulator with an extremely low noise output (a few µV, hence the name µFilter). Since it is supplied with a constant +13 volts by the switching regulator, it has a comparatively low power dissipation to deal with.

To push voltage stabilization to the extreme, the µFilter has a 2-wire sensor technology, directly connected to the 5.5x2.1 mm DC connector of the supplied special 4-wire cable. This sensor function on ground and positive line guarantees +12.0 V at the end of the cable, both at no load and at 3.0 A load, and therefore achieves a sensationally low output impedance and low load regulation (in percent - the smaller the value the better).

From soft start to thermal overload and short circuit protection, everything that makes a power supply safe is also found here.

This output works quasi load-independent, always reaching maximum performance. The measured 2.3 µV @ 2.5 A correspond to -112.8 dBV. Broadband noise is thus a whopping 134.4 dB lower than DC.

The µFilter output also shows its status via an LED on the front panel: Undervoltage on the AC and DC side, overload and short circuit on the output side.

10.6 Leakage Current

Leakage current and leakage voltage are terms that only became generally known with the introduction of switching power supplies. Almost all of these include an interference suppression measure in the form of a capacitor connecting the primary and secondary sides. This results in a high-impedance AC voltage at the DC output of typically half the line voltage. High impedance means harmless, since no large current can flow. But current and voltage can easily be measured even with cheap multimeters, and often felt. Be it the famous vibration when stroking the lid of a MacBook, or a tingling sensation on sharp case edges, which already feel like a slight electric shock.

The leakage current can also be clearly audible, as a buzzing noise, depending on the device configuration and where and how the current flows. The main problem here is rather one of the power supply manufacturers, because they have denied a remedy as simple as useful to the audio industry for many years: if a power supply is not operated ungrounded (2-pin mains plug) but grounded (3-pin IEC socket) the leakage current flows off directly at the source. And therefore has no negative effects on the audio equipment anymore, so it remains inaudible. Nevertheless, manufacturers have refused to provide grounded versions of their small wall warts for many years.

There are also more cleverly designed – and quite expensive - switching power supplies with lower leakage current, mostly for the medical sector. If the leakage current drops from an effective 50 µA to 5 µA, that sounds like a lot. But in dB this is -20 dB. And not enough to make an audible interference signal inaudible. In this case unfortunately better does not mean good enough.

A less known fact is that linear power supplies also have leakage current which remains unnoticed, because it has no negative effects there for various reasons. One reason is that linear power supplies are usually grounded via the earth contact (which also helps with switching power supplies, see above). Another reason is that the typical capacitance between primary and secondary side is mainly caused by capacitive coupling in the transformer. And this turns out to be lower than the one in typical switching power supplies, even more so if you use a transformer with an additional shield winding between primary and secondary (as in the DPS-2). The leakage current of a transformer also consists of the original sine wave of the mains voltage, i.e. a comparatively clean 50 Hz, while in a switching power supply numerous harmonics are added due to the regulation function, which makes the leakage current really audible in the first place.

The following table contains some interesting measurements of this effect. Tested was the DPS-2, and the switching power supplies ATS12040 (grounded, included with the ADI-2/4 Pro) and ATS12024 (ungrounded, RME standard power supply) for comparison.

Measurements and comparison of associated parameters

Measurement	**DPS-2***	**ATS-12040 IEC**	**ATS-12024 Euro**
Capacitance AC to DC	570 pF	960 pF	930 pF
Leakage current RMS	0 µA	34 µA	-
Same primary unearthed	7 µA**	55 µA***	60 µA***
Leakage voltage RMS	0 mV AC	50 mV AC	-
Same primary unearthed	27 V AC	109 V AC	111 V AC
PE wire resistance	<0.1 Ohm	1 kOhm	-

Notes
*GND Lift not active, DC GND connected to PE
Capacitance AC to DC: measured with P/N shorted to DC +/- shorted, 50 Hz
Leakage voltage and leakage current RMS: True RMS multimeter, DC GND to PE
PE wire resistance: measured from housing to power connector of the shipped power cord
** Optimal AC polarity *** Polarity doesn't matter

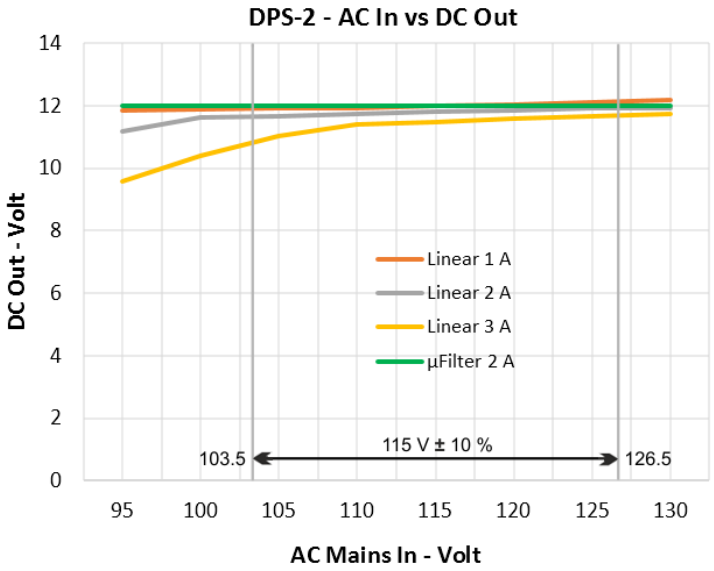
10.7 Power Diagrams and Measurements

Influence of mains input voltage on DC output voltage

The operation of a linear power supply is strongly dependent on the level of the applied mains voltage. Unfortunately, the mains voltage worldwide is never exactly 230 Volts, or 115 V. It varies greatly from country to country. To address this, a power supply should typically work in a range between 105 to 120 V, in some countries even higher, but also lower in some places. A device designed for 115 volts should work perfectly in a range of 115V ± 10%, i.e. 103.5 to 126.5 volts mains voltage.

The diagram shows the DC output voltage at the Linear and µFilter outputs at mains AC voltages of 95 to 130 Volts, with a constant current load of up to 3 Amps. The Linear output limits the maximum output voltage to 12.2 Volts. At higher loads, the output voltage drops below 12 Volts, but is still filtered. This 'soft' analog response matches the intended behavior for Linear.

As expected, the µFilter output delivers exactly 12 Volts in every situation.



As seen here, the DPS-2 also operates outside the expected ± 10%. (Note: See German manual for a 230 V based diagram).

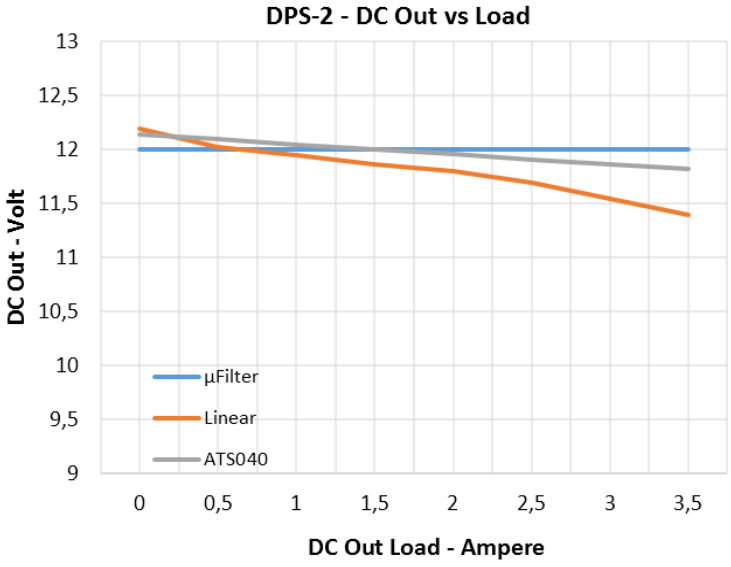
Influence of load on DC output voltage

A more detailed analysis of the available output voltage and current is provided in the following diagram, which shows the output voltage with increasing load. Here, too, the soft behavior of the Linear output becomes visible at high current demand.

µFilter, on the other hand, stays at exactly 12.0 Volt, no matter what load is present.

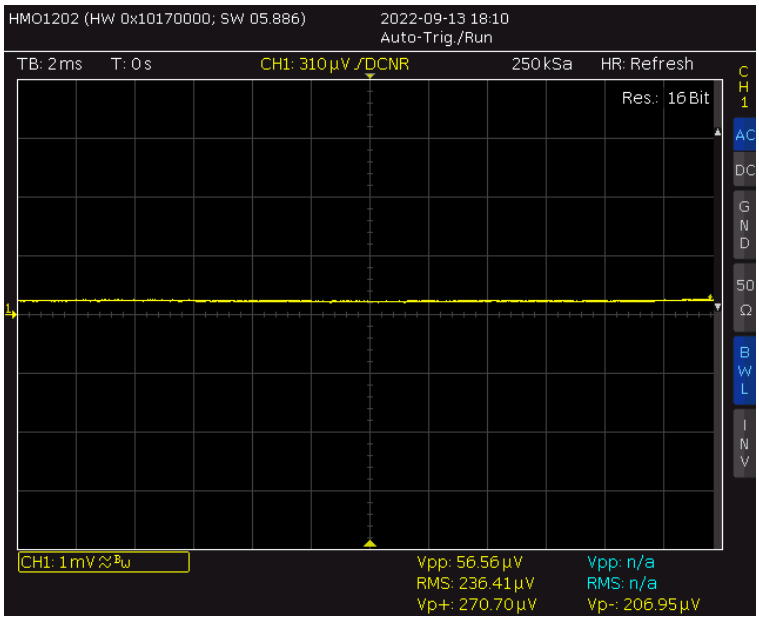
The measurement was done with a fixed input voltage of 115 V.

The diagram also shows the 40 Watt switching power supply included with the ADI-2/4 Pro. The drop of the output voltage under load is due to the resistance of the DC cable, which – unlike the output µFilter of the DPS-2 - is not sensor-corrected.



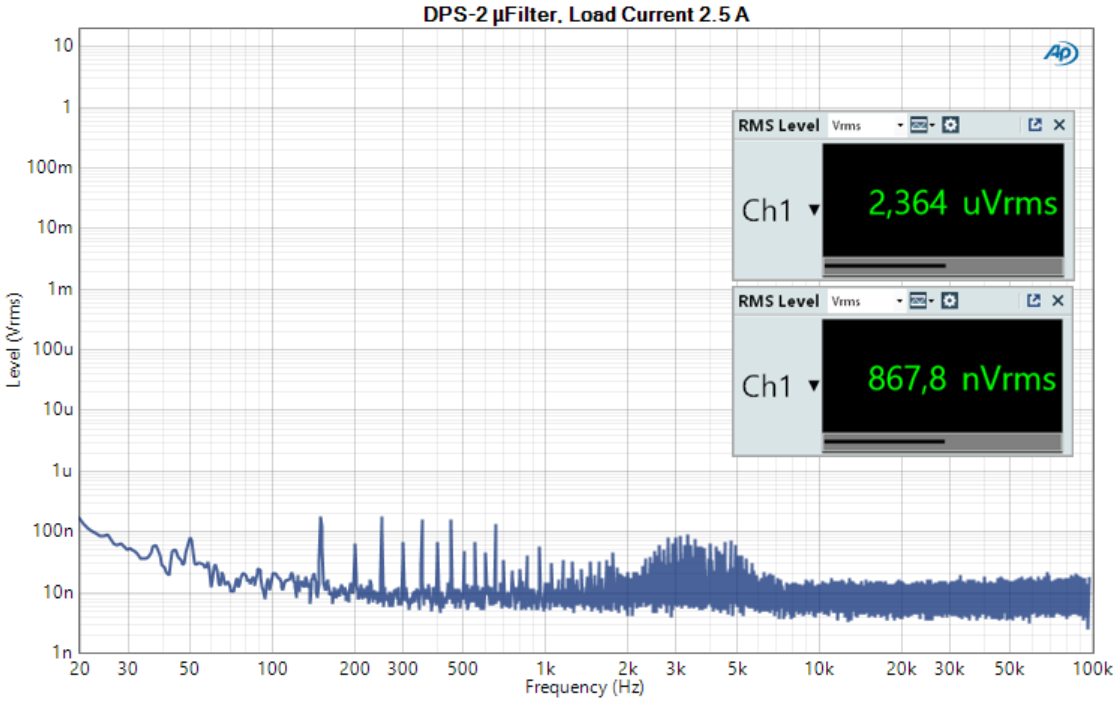
Measurements

Oscilloscope at the output Linear, output current 2 Amps / 24 Watt

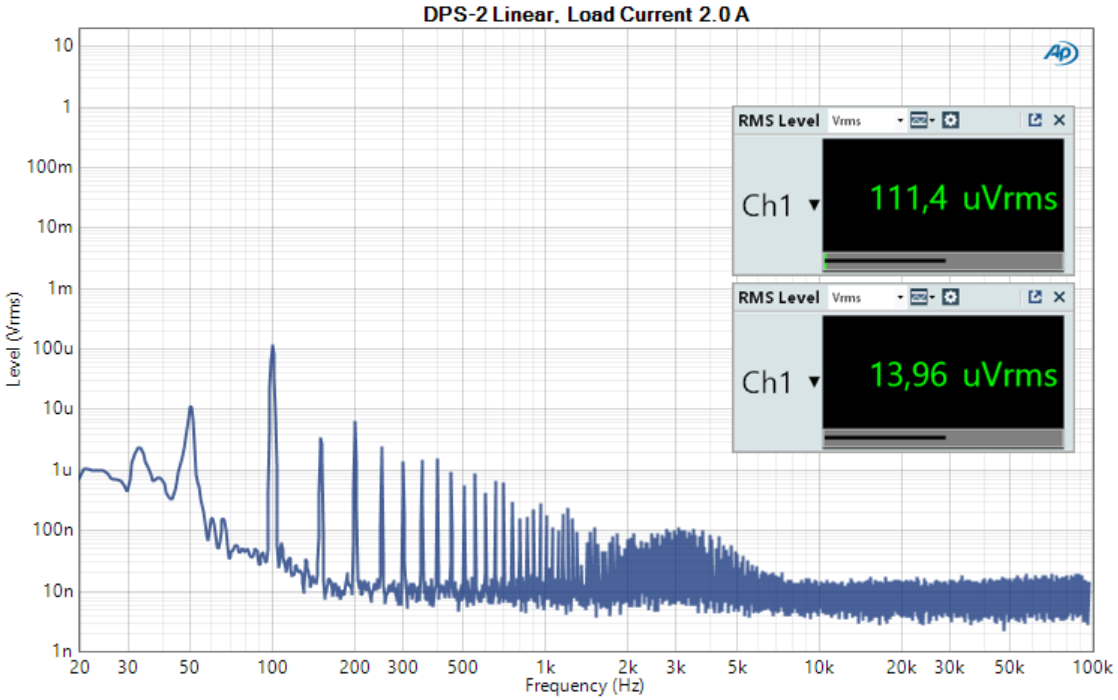


The screenshot of the oscilloscope shows – nothing. Reason: Measuring a high quality power supply with an oscilloscope is useless in most cases, because it cannot resolve and display the small ripples and noise less than 1 mV (milli-volts). Therefore the following measurements were made with a measurement system that can perform analysis down to 1 µV (millionth of a volt), a thousand times higher resolution.

Output µFilter, output current 2.5 amps / 30 watts
Measured values rms unweighted and A-weighted, Bandwidth 100 kHz



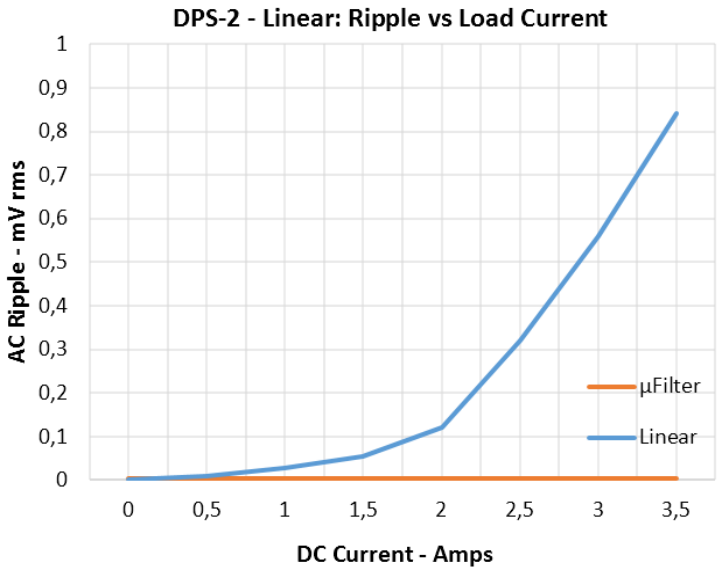
Output Linear, output current 2 amps / 24 watt
Measured values rms unweighted and A-weighted, Bandwidth 100 kHz



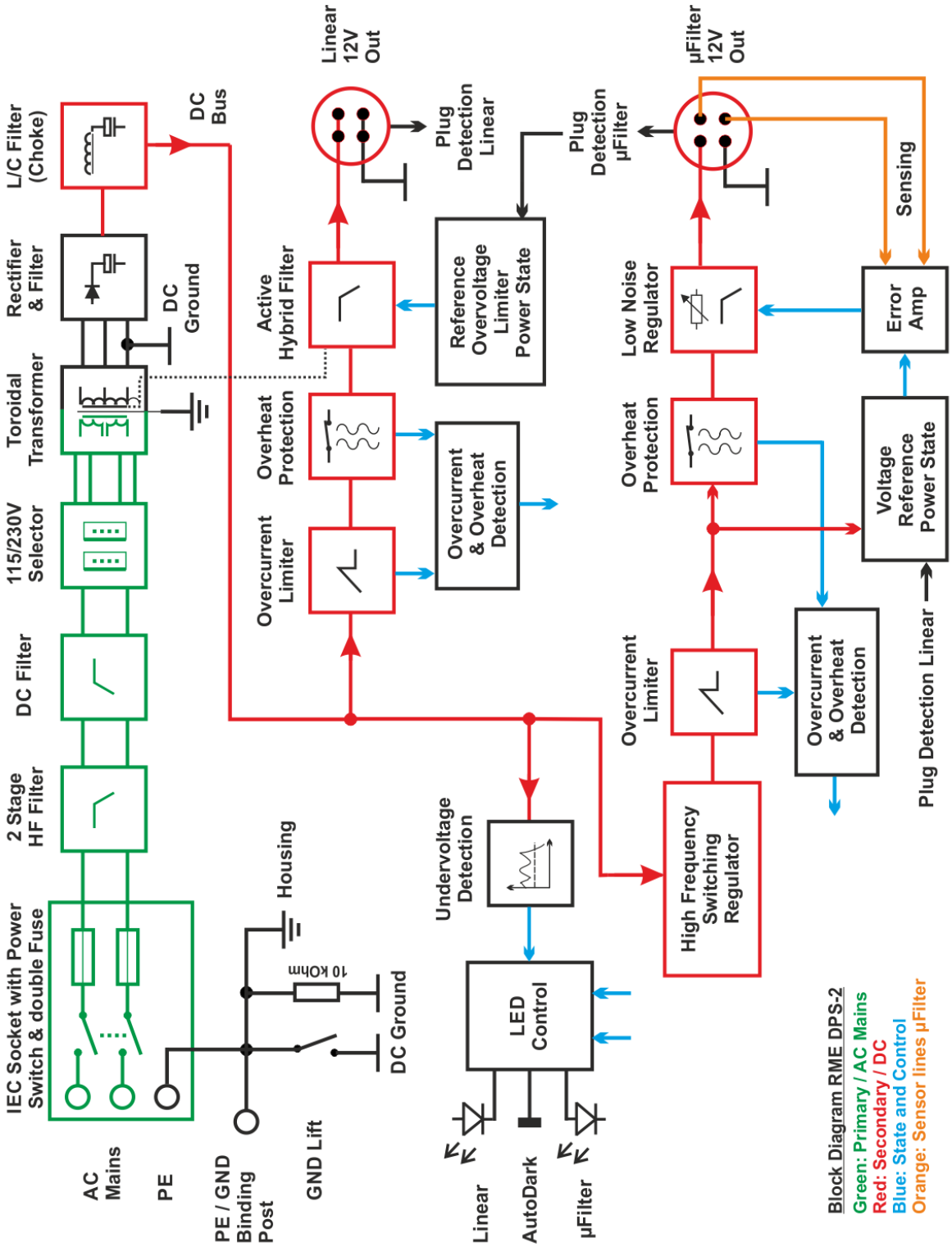
As mentioned, the output Linear is designed differently. The ripple voltage of the rectification depends on the currently delivered current. The above measurement shows at 2 amps a 50 Hz component of 111 µV, or 0.1 mV (millivolts). With a linear scale for the range 0 to 12 volts, this would not be visible at all - the logarithmic scale used here works like a magnifier for a zoomed view into the lower range.

This diagram shows the increase of the ripple voltage of the Linear output, depending on the output current. In the practice-relevant range 0 A to 2 A, this remains below 0.1 mV. But even at 3.5 A, it would still be negligible at under 0.9 mV.

The µFilter output shows its clear superiority here - it has neither ripple voltage nor other interference of any appreciable magnitude. Output voltage and current are as pure as those of a powerful battery.



11. Block Diagram DPS-2



User's Guide

DPS-2

Miscellaneous

12. Accesories

There are several items available for the DPS-2:

Part Number	Description
DClock1	4-pin DC cable with lockable connector, length 1 m
DCunlock1	4-pin DC cable with non-lockable connector, length 1 m

13. Warranty

Each individual DPS-2 undergoes comprehensive quality control and a complete test before shipping. The usage of high grade components should guarantee a long and trouble-free operation of the unit.

If you suspect that your product is faulty, please contact your local retailer. Do not open the device by yourself as it may get damaged. It has been sealed with tamper-evident material, and your warranty is void if those seals have been damaged.

Audio AG grants a limited manufacturer warranty of 6 months from the day of invoice showing the date of sale. The length of the warranty period is different per country. Please contact your local distributor for extended warranty information and service. Note that each country may have regional specific warranty implications.

In any case warranty does not cover damage caused by improper installation or maltreatment - replacement or repair in such cases can only be carried out at the owner's expense.

No warranty service is provided when the product is not returned to the local distributor in the region where the product had been originally shipped.

Audio AG does not accept claims for damages of any kind, especially consequential damage. Liability is limited to the value of the DPS-2. The general terms of business drawn up by Audio AG apply at all times.

14. Appendix

RME news, driver updates and further product information are available on RME's website:

https://www.rme-audio.com

Worldwide distribution: Audio AG, Am Pfanderling 60, D-85778 Haimhausen, Tel.: (49) 08133 / 918170

Support via e-mail: support@rme-audio.com

List of international supporters: https://www.rme-audio.de/support.html

RME user forum: https://forum.rme-audio.de

Trademarks

All trademarks, registered or otherwise, are the property of their respective owners. RME, DIGICheck and Hammerfall are registered trademarks of RME Intelligent Audio Solutions.. DPS-2, ADI-2 DAC and ADI-2 Pro are trademarks of RME Intelligent Audio Solutions.

15. Declaration of Conformity

CE

This device has been tested and found to comply with the limits of the European Council Directive on the approximation of the laws of the member states relating to electromagnetic compatibility according to RL2014/30/EU, and European Low Voltage Directive RL2014/35/EU.

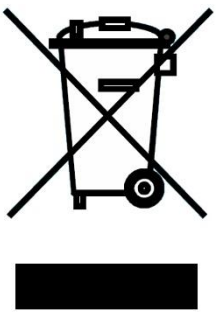
Proper Use

The DPS-2 is designed to power devices such as preamps, DACs, and AD/DA converters that operate at typically 12 volts and require less than 2.5 amps of current (< 30 watts), and whose DC jack inner terminal is positive. Operation with differently specified devices may lead to a defect of the DPS-2 or the connected devices.

RoHS

This product has been soldered lead-free and fulfils the requirements of the RoHS directive RL2011/65/EU.

Note on Disposal



According to the guide line RL2012/19EU (WEEE – Directive on Waste Electrical and Electronic Equipment), valid for all european countries, this product has to be recycled at the end of its lifetime.

In case a disposal of electronic waste is not possible, the recycling can also be done by Audio AG.

For this the device has to be sent **free to the door** to:

Audio AG
Am Pfanderling 60
D-85778 Haimhausen
Germany

Shipments not prepaid will be rejected and returned on the original sender's costs.

FCC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

> Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Responsible Party in USA:
Synthax United States, 6600 NW 16th Street, Suite 10, Ft Lauderdale, FL 33313
T.:754.206.4220

Trade Name: RME, Model Number: DPS-2

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.