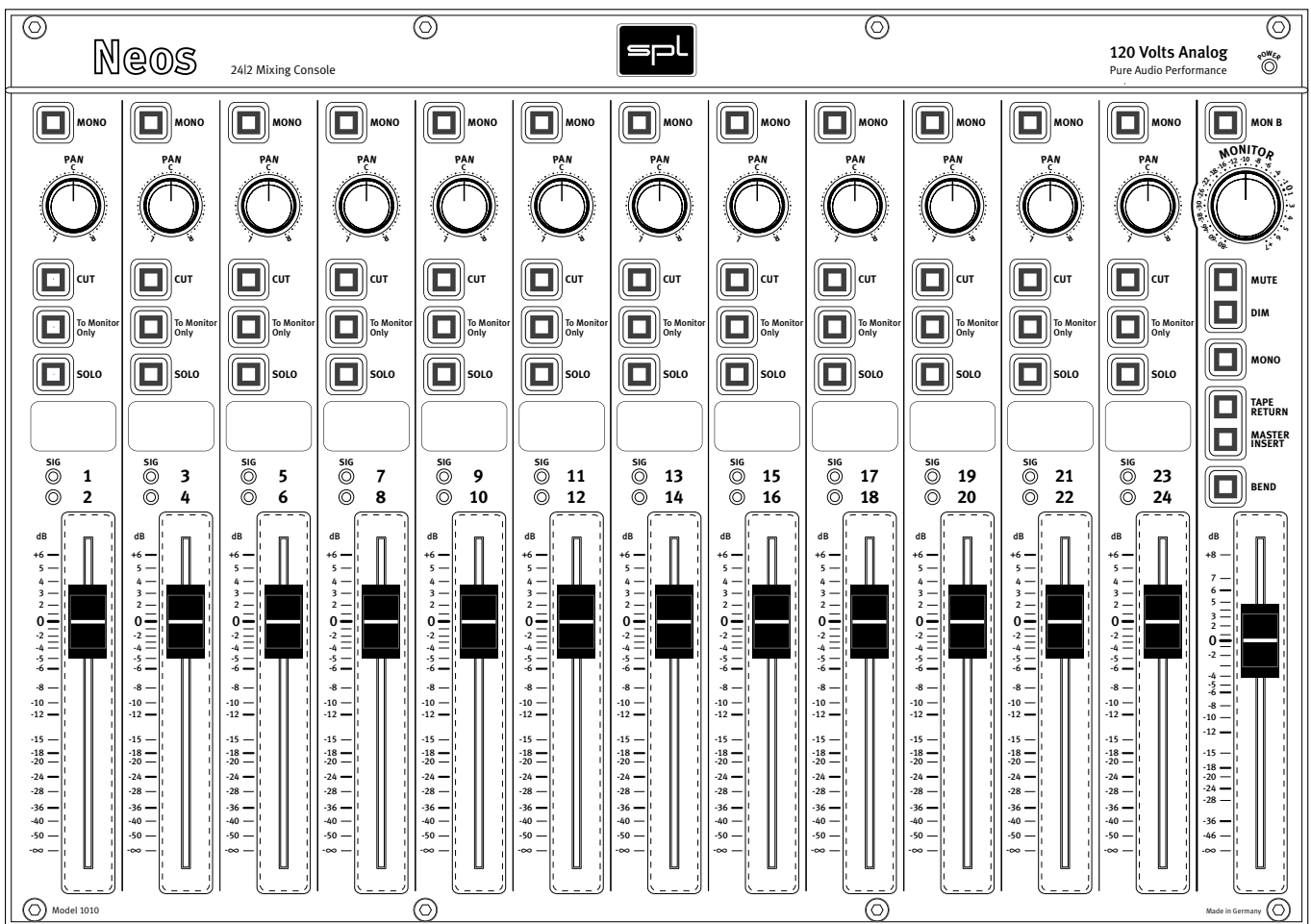


Manual



Neos Model 1010

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Version 1.0 – 6/2011

Developer: Wolfgang Neumann

This manual contains a description of the product. It in no way represents a guarantee of particular characteristics or results of use. The information in this document has been carefully compiled and verified and, unless otherwise stated or agreed upon, correctly describes the product at the time of packaging with this document.

Sound Performance Lab (SPL) continuously strives to improve its products and reserves the right to modify the product described in this manual at any time without prior notice.

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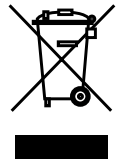
Declaration of CE Conformity

The construction of the Neos, Model 1010, is in compliance with the standards and regulations of the European Community.



Notes on Environmental Protection

At the end of its operating life, this product must not be disposed of with regular household waste but must be returned to a collection point for the recycling of electrical and electronic equipment. The wheelie bin symbol on the product, user's manual and packaging indicates that. The materials can be re-used in accordance with their markings. Through re-use, recycling of raw materials, or other forms of recycling of old products, you are making an important contribution to the protection of our environment. Your local administrative office can advise you of the responsible waste disposal point. WEEE Registration: 973 34988.



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IN THIS MANUAL A LIGHTNING SYMBOL WITHIN A TRIANGLE WARNS YOU ABOUT THE POTENTIAL FOR DANGEROUS ELECTRICAL SHOCKS – WHICH CAN ALSO OCCUR EVEN AFTER THE MACHINE HAS BEEN DISCONNECTED FROM A POWER SOURCE.



AN EXCLAMATION MARK (!) WITHIN A TRIANGLE IS INTENDED TO MAKE YOU AWARE OF IMPORTANT OPERATIONAL ADVICE AND/OR WARNINGS THAT MUST BE FOLLOWED. BE ESPECIALLY ATTENTIVE TO THESE AND ALWAYS FOLLOW THE ADVICE THEY GIVE.



The symbol of a lamp directs your attention to explanations of important functions or applications.



Attention: Do not attempt any alterations to this machine without the approval or supervision of SPL electronics GmbH. Doing so could nullify completely any and all of your warranty/guarantee rights and claims to user support.

Scope of Delivery and Packaging

The scope of delivery comprises the Neos console, 19" rack-mounting side brackets, the external power supply with fixed cable for connection to the Neos, the external power supply's power cord, the guarantee card and this manual.

Please keep the original packaging. In case of a service procedure the original packaging ensures a safe transport. It also serves as a safe packaging for your own transports if you do not use special transportation cases.



The High Voltage Console

Shortly after the turn of the millennium, SPL laid down new foundations for the improvement of analog audio signal processing. Thanks to new components, circuitries and manufacturing methods, we were able to increase the operating voltage enormously. Up to then, average operating voltage ranged from 30 to 36 volts (+/- 15 or 18 volts, considering that voltage supply is symmetrical). Maximum operating voltages reached 60 volts (+/- 30 volts). At the core of our new technology are the handmade OP-amps that operate at 120 volts (+/- 60 volts), which means that we have in fact doubled the highest levels ever reached until then.

The first products to integrate the 120-volt technology were exclusive, handmade custom solutions for major mastering studios. At the time, music production had already been uprooted by digital technology and the changes it brought with itself in terms of outfitting and workflow in music studios. Coincidentally, a new „mastering“ sector had already been established — both in terms of the actual process and the gear in studios. If traditional recording and mixing studios were on their way to digitalization, the most sophisticated mastering studios were and have always been kept on analog technology, including high-quality signal processors that can still make a difference compared to the widely available software solutions. But also technically demanding requirements such as superior sounding and designed switching and monitoring consoles were among the products we were able to offer. While analog technology was being heralded as dead, SPL was decisively going in the opposite direction: we were able to deliver analog products of the highest quality whose performance surpassed all previous specifications — regardless of whether it was in the analog or digital realm.

In the last decade we have been able to keep up with the rapidly evolving developments in digital technology while pushing further our analog products. It was imperative to work on the foundations of the products' performance. Thus, if we consider that the basis of every circuit is directly related to a voltage/performance ratio, the operating voltage is crucial for the performance of any circuit. Given that audio technology is conceived to translate sound into voltage, doubling the formerly highest operating voltage available results in a great improvement, specially with regard to signal dynamics and the way they are processed. Technically speaking, a wider dynamic range also means that the gap between the actual signal and other undesired signals, such as noise and distortion, is larger — in the case of the Neos console, for example, this results in not hearing any noises at all, regardless of the situation.

Our measurements reveal the improvements the 120-volt technology offers in comparison to standard solutions (see „Technical Specifications“ on page 21). All these advantages are due to the oversized signal traces, the rigorous selection of every single element and, of course, the handmade components that contain no unnecessary audio processing parts (which are very common in mass-produced operation amplifiers). But the technical specifications and design say very little about the actual sound of an audio equipment. At the end of the day, an audio device has to prove itself in use in the hands of sound engineers and musicians. We can state with great satisfaction that our solution not only prevailed — ever since their introduction, our 120-volt products have passed all tests and proven worthy of the best.

The Neos is the first summing console based on the 120-volt technology. The basic concept behind it was to combine essential summing capabilities, including faders and panorama controls, with a complete and practical monitoring section — all in a compact design. Accordingly, it fulfills the highest expectations regarding sound quality in mixing and monitoring situations. Thus, the Neos was conceived with sound engineers that set great importance on artistic and musical production in mind and whose workflow does not rely primarily on undo and preset options. Nevertheless, the compact Neos can integrate seamlessly in computer-based environments providing the characteristic high-quality sound and handling of analog devices.

Concept

- 24 channel summing console with faders and panorama controls
- Ideal for DAW-based studios with emphasis on audio quality. .



Features

- Input path with 100-mm ALPS faders, Pan controls, Mono, Cut, Solo, and “To Monitor Only” push buttons, signal LEDs
- Master path with 100-mm ALPS faders, Inserts, Bend function (Limiting)
- Comprehensive monitoring section with Volume control, Tape Mix (DAW return), as well as Mute, Dim and Mono push buttons
- Input: three eight-channel DB25 connectors (balanced, TASCAM standard); balanced XLR connectors: Slave, Insert Return, Tape Return
- Output connectors (balanced XLR): Recording Out, Monitor A and Monitor B,
- Output connectors (unbalanced XLR): Alternative Out, Insert Send, Metering

Special Features

- Ultimate Mix and Monitoring Quality
- Compact design: 19"/7U
- Cascadable
- Hand made in Germany

Special Technical Features

- Unique 120-volt operating voltage. In comparison with common production mixers, the Neos mixing and monitoring console uses four times as much operating voltage. A higher voltage results in better performance: over 30 dB of headroom at the input, more than 122 dB of dynamic range, 92 dB signal-to-noise ratio over all channels.
- At the core of the 120-volt technology are our handmade, discrete op-amps with 116 dB signal-to-noise ratio and 34 dB of headroom. The 150 dB dynamic range covers a frequency range of up to 200 kHz. These key figures are way beyond the demands of current PCM digital formats with 24 bit/192 kHz sample rates and DSD digital formats with 1 bit and 256 fs. It is not expected for digital technology to evolve so much in the foreseeable future as to make the Neos a bottleneck in the signal processing path.
- All selected components for each unit are matched at the pre-production stage
- Important switching functions are performed via sealed relays
- Oversized signal traces, generous PCB layout for greater trace separation, star ground scheme, linear power supply

Important Security Advices

Please note and retain this manual. Carefully read and follow all of the safety and operating instructions before you use the machine. Be doubly careful to follow all warnings and special safety instructions noted in this manual and on the unit.

Connections: Only use the connections as described. Other connections can lead to health risks and equipment damage.

Water and humidity: Do not use this machine anywhere near water (for example near a wash basin or bath, in a damp cellar, near swimming pools, or the like). In such cases there is an extremely high risk of fatal electrical shocks!

Insertion of foreign objects or fluids: Never allow a foreign object through any of the machine's chassis openings. You can easily come into contact with dangerous voltage or cause a damaging short circuit. Never allow any fluids to be spilled or sprayed on the machine. Such actions can lead to dangerous electrical shocks or fire!



Opening the unit: Do not open the machine housing, as there is great risk you will damage the machine, or – even after being disconnected – you may receive a dangerous electrical shock!

Electrical power: Run this machine only from power sources which can provide proper power in the range from 100 to 250 volts. When in doubt about a source, contact your dealer or a professional electrician. To be sure you have isolated the machine, do so by disconnecting all power and signal connections. Be sure that the power supply plug is always accessible. When not using the machine for a longer period, make sure to unplug it from your wall power socket and from the guitar amp.

Cord protection: Make sure that your power and guitar amplifier signal cords are arranged to avoid being stepped on or any kind of crimping and damage related to such event. Do not allow any equipment or furniture to crimp the cords.

Power connection overloads: Avoid any kind of overload in connections to wall sockets, extension or splitter power cords, or to signal inputs. Always keep manufacturer warnings and instructions in mind. Overloads create fire hazards and risk of dangerous shocks!

Lightning: Before thunderstorms or other severe weather, disconnect the machine from wall power (but to avoid life threatening lightning strikes, not during a storm). Similarly, before any severe weather, disconnect all the power connections of other machines and antenna and phone/network cables which may be interconnected so that no lightning damage or overload results from such secondary connections.

Air circulation: Chassis openings offer ventilation and serve to protect the machine from overheating. Never cover or otherwise close off these openings. Never place the machine on a soft surface (carpet, sofa, etc.). Make sure to provide for a mounting space of 4-5 cm/2 inches to the sides and top of the unit when mounting the unit in racks or on cabinets.

Controls and switches: Operate the controls and switches only as described in the manual. Incorrect adjustments outside safe parameters can lead to damage and unnecessary repair costs. Never use the switches or level controls to effect excessive or extreme changes.

Repairs: Unplug the unit from all power and signal connections and immediately contact a qualified technician when you think repairs are needed – or when moisture or foreign objects may accidentally have gotten in to the housing, or in cases when the machine may have fallen and shows any sign of having been damaged. This also applies to any situation in which the unit has not been subjected to any of these unusual circumstances but still is not functioning normally or its performance is substantially altered. In cases of damage to the power supply and cord, first consider turning off the main circuit breaker before unplugging the power cord.

Replacement/substitute parts: Be sure that any service technician uses original replacement parts or those with identical specifications as the originals. Incorrectly substituted parts can lead to fire, electrical shock, or other dangers, including further equipment damage.

Safety inspection: Be sure always to ask a service technician to conduct a thorough safety check and ensure that the state of the repaired machine is in all respects up to factory standards.

Cleaning: In cleaning, do not use any solvents, as these can damage the chassis finish. Use a clean, dry cloth (if necessary, with an acid-free cleaning oil). Disconnect the machine from your power source before cleaning.

Placement

Place the unit on a level and stable surface or mount it into dedicated rack frames. The unit's enclosure is EMC-safe and effectively shielded against HF interference. Nonetheless, you should carefully consider where you place the unit to avoid electrical disturbances. It should be positioned so that you can easily reach it, but there are other considerations. Try not to place it near heat sources or in direct sunlight, and avoid exposure to vibrations, dust, heat, cold or moisture. It should also be kept away from transformers, motors, power amplifiers and digital processors.

Rack Mounting

Be sure that both above and below the machine you maintain a distance of 4-5 cm/2 inches in order to eliminate electromagnetic or high frequency interference from other equipment.

Moreover, this will ensure adequate air circulation to prevent overheating. Do NOT locate other machines that produce excessive heat below the unit. The rear side of the machine should be properly supported – especially when transport is involved.

Placement Of The External Power Supply

Do not place the external power supply on top of the Neos and vice versa. Place the external power supply on a level and stable surface only. We recommend a distance of at least 50 cm/20 inches to avoid any interferences between the external power supply and the Neos frame or other devices.

Choose a place that is easily accessible so that you can switch off the external power supply quickly in case of an emergency.

Please mind the notes under “Power Connection” and “On And Off” on the next page.

Voltage Selector (External Power Supply)

Be very careful to check that the voltage selection switch is set to the correct local line voltage position before using the unit (230V position: 220-240V/50 Hz, 115V position: 110-120V/60 Hz)! When in doubt about a source, contact your dealer or a professional electrician.

BEFORE you connect electrical power make sure that the VOLTAGE selector setting reflects the correct local power line voltage.

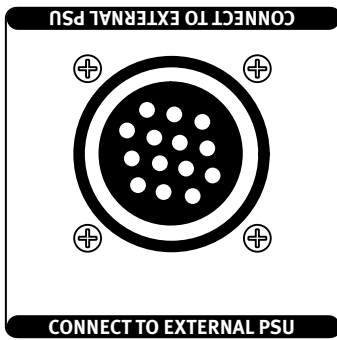
Power connection and fuse

Connect the power cord to the MAINS INPUT socket of the external power supply. Transformer, power cord and case connection conform to VDE, UL and CSA requirements.

The fuse is accessible from outside and placed right behind the flap right from the socket. Fuse ratings are 2 A slow blow (230 volts) or 4 A slow blow (115 volts).



Hook Up



Power Connection

The Neos is fed through the external power supply. Before connecting the power supply always make sure that the position of the voltage selector on the back of the RackPack corresponds to the voltage of your local power supply (115V position: 110-120V, 230 V position: 220-240V). In case of doubt please ask your dealer, a professional electrician or your local power supplier.

Before you connect the external power supply to the wall socket please switch its POWER button to OFF. Also turn off all devices that you may have already connected to the RackPack. If signal or power connections are changed in the future, always switch off power before.

Before you connect the external power supply to the wall socket you should connect it to the Neos (see illustration on page 12). The cable fixed to the external power supply with the multi-pin connector on the other end is made to connect to the Neos. It is not possible to connect it incorrectly; place the groove at the end of the plug on the spring at the socket on the Neos and tighten the screw.

After connecting the external power supply to the Neos and selecting the correct voltage on the external power supply, connect the power supply to the wall socket and then turn on the Neos with the POWER switch.



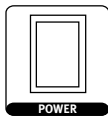
IMPORTANT: Never disconnect the external power supply from the Neos while the power is switched on. Always turn the external power supply off first and then wait approximately one minute to allow for any residual current to discharge. Now you may disconnect the multi-pin connector. Mind that residual current can damage the unit if you do not follow this procedure!

Please read and follow all security advices on pages 4 and 5.

Signal Connections



IMPORTANT: Before first connecting any other equipment – and in all other cases where you are connecting cables with or from other sources – you should be sure to shut the unit and all machines to be connected off (external power supply). Otherwise you risk to damage the unit, connected gear or your ears.



On/Off Switch

With the external power supply's Power switch you activate and deactivate the Neos, operational status is confirmed by the blue Power LED on the Neos front panel (top right corner).

On And Off

In switching on and off, you do not need to follow any particular sequence with connected devices in the periphery of the Neos. There is, however, the general rule for a chain of devices in the audio processing to always turn on power amplifiers last and to turn them off first. If specified sufficiently you can also switch the external power supply on and off through a multiway connector or other main switches.



GND Lift

The rear panel GND LIFT switch eliminates hum by separating the internal ground from the unit's housing ground. Hum can, for example, result when this unit's housing has a common ground connection with other devices that might have a different ground potential. The switch is usually deactivated to retain the shielding of the housing.

XLR Sockets

All signal connections are made via balanced or unbalanced XLR sockets. Pin wiring is shown in the diagram below. Inputs are always female and accept male connectors; outputs are always male. All in all, a comprehensible principle.

DB 25 Sockets

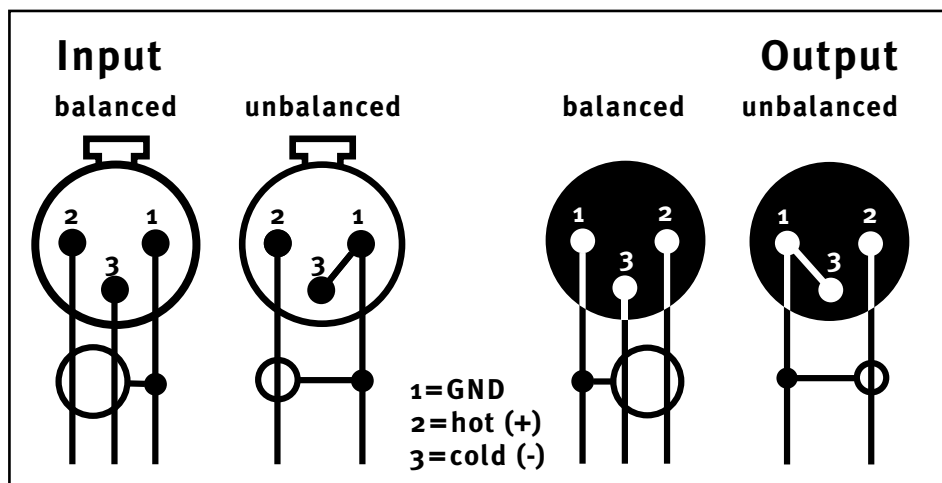
All 24 inputs are distributed on three eight-channel, female DB25 sockets. The connectors are balanced and adhere to the Tascam standard (details on page 12).

Balanced Connections

In balanced connections a reference signal with reversed polarity is transmitted additionally to the audio signal through a second wire. The ground signal is routed separately through a third wire. Input and output stages are drivers and receivers, and the receiving stage can suppress possible interferences by subtracting the difference between audio and reference signal. The Neos employs electronic balancing stages (no transformers).

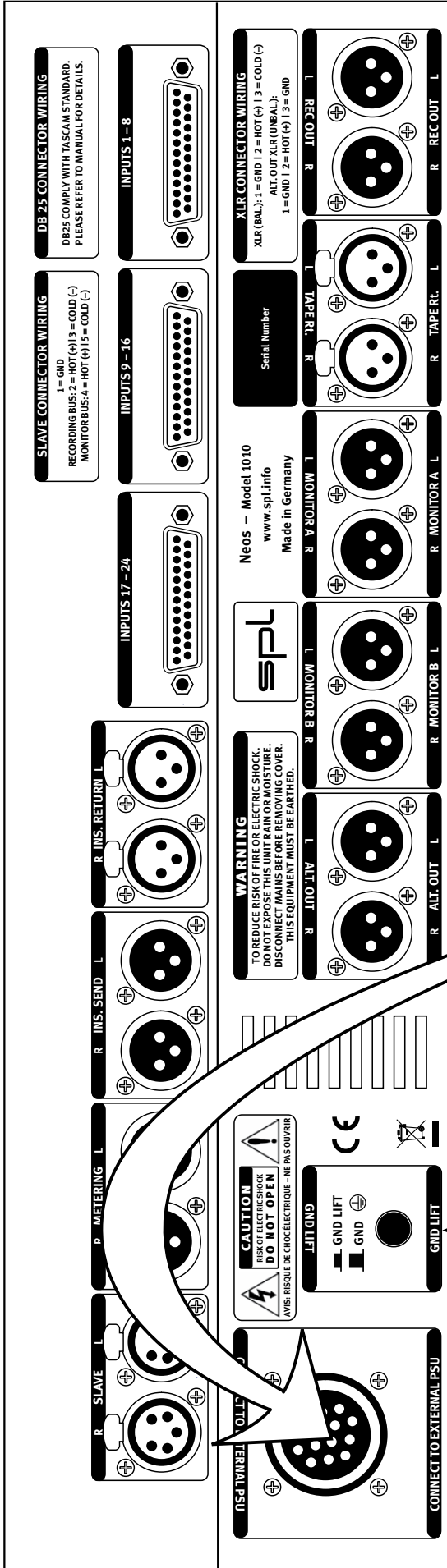
Unbalanced connections (TS and RCA connectors)

Unbalanced connections from and to RCA or 1/4" TS sockets can be made without adaptors to the balanced XLR sockets. The correct wiring is important. The diagram shows the pin configuration of the XLR sockets and how to correctly connect them for unbalanced connections:



Connections to RCA sockets are always unbalanced, a wiring to jack connectors can be both balanced (1/4" TRS/stereo jack) or unbalanced (1/4" TS/mono jack). We recommend to use individually configured cables from XLR to RCA or jack sockets instead of adaptors. You can get cables in any needed configuration from audio dealers. With the diagram above, the dealer can ensure to provide the appropriate cable for your application.

Rear Panel – Power Wiring Diagram



2

BEFORE switching on the external power supply, connect the external power supply and the Neos with the multi-pin power cord fixed to the external power supply.

3

NEVER disconnect the external power supply from the Neos while the power supply is still switched on.

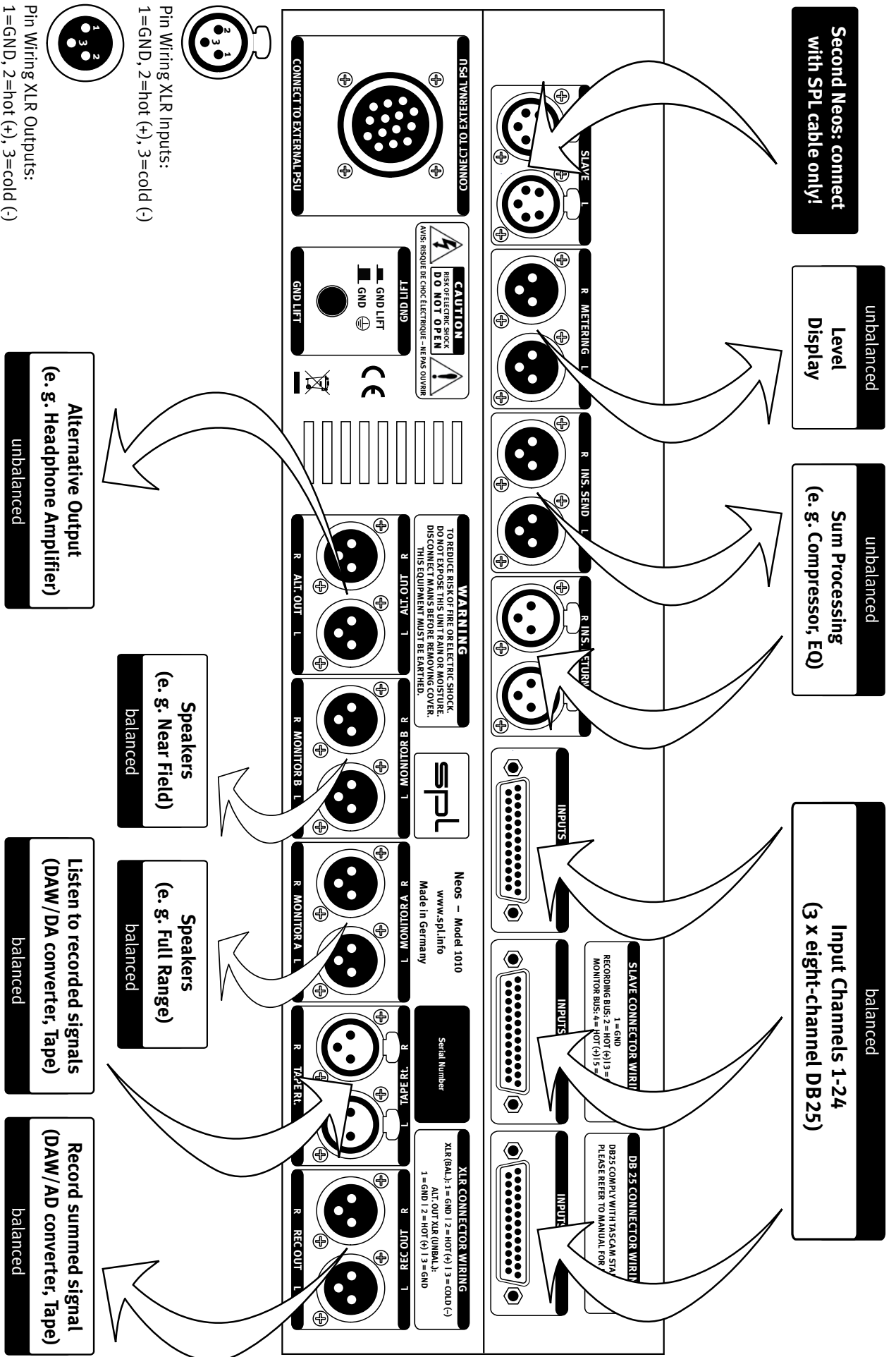
First switch off the external power supply and wait at least one minute before disconnecting. **Otherwise residual currents can cause serious damages!**

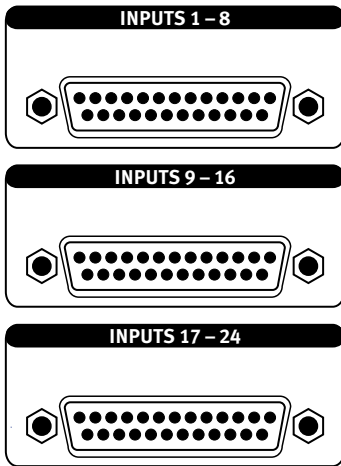
The rear panel GND lift switches eliminate hum by separating the internal ground from the unit's housing ground. If hum occurs, press the switches to activate GND lift.

1

Before you use the Neos, make sure that this voltage selector switch reflects the correct local power line voltage (115V position: 110-120V, 230 V position: 220-240V). In the drawing above the 230 V position is selected.

Rear Panel – Signal Wiring Diagram

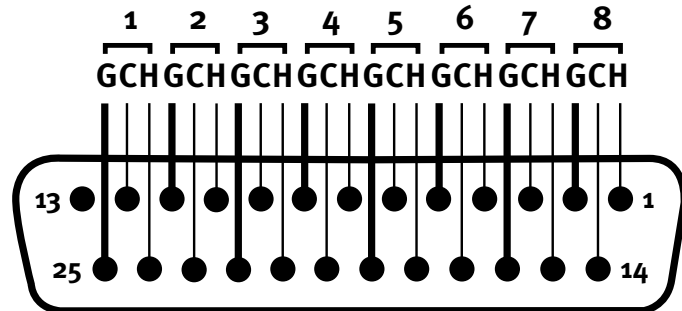




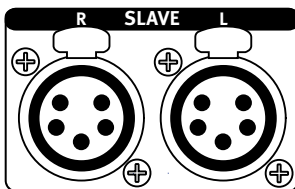
Inputs 1-8, 9-16, 17-24

The balanced DB25 input connectors are meant to connect the different signal sources. The Neos' 24 inputs are divided into three DB25 connectors. You can get ready-made XLR or jack snakes in your local specialized store.

The maximum input level of the DB25 inputs is $>30\text{dBu}$. The connectors are balanced and adhere to the Tascam standard according to the following pin assignment:



G=GROUND (GND), C=COLD (-), H=HOT (+)



Slave (additional input for additional Neos consoles)

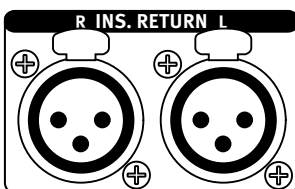
The Slave input allows the connection of additional Neos consoles. When two consoles are interconnected you have 48 channels at your disposal. You can connect an unlimited number of Neos with each other. The connector is based on a special 5-pin XLR format.

IMPORTANT: the interconnection of Neos consoles can only be established via a custom-made cable manufactured by SPL under request.

When two or more Neos are interconnected, the stereo output signal is summed, so instead of summing 24-in-2 channels you have 48 (or more) channels summed into one stereo signal. The connection has no set direction, which means the sum signal of all channels is always present in the outputs (Rec Out, Monitor A and B, and Alt Out) of all interconnected Neos. Therefore, all recording media should be normally connected to only one Neos — but there are many connection possibilities open with all other units involved.

The slave function applies only to the sum of the stereo output signals pre-Master path. Generally speaking, the Neos considered the "Master" will be the one to which the monitor speakers are connected. All switching functions of the Master path can be applied to the totality of channels which have been summed. All switching functions of a single input path apply only to the corresponding Neos unit. In this respect, each Neos is to be considered and operated independently. For example, the Solo function of any input path: to listen to an isolated channel you have to depress the corresponding Solo switch; however, the channels of the other interconnected Neos consoles are not muted. A practical solution for this would be to activate a solo function in your DAW that would affect all channels.

Other interesting possibilities arise when two or more Neos units are connected to the monitoring system along with other gear. There are many individual solutions available, which we will be more than happy to discuss with you.



Ins. Return (Insert Return)

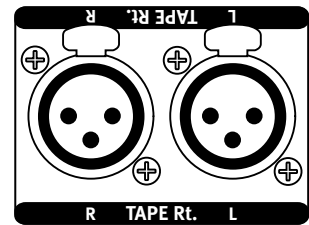
Use the Master Insert loop to add external signal processors to the Neos' internal processing. Connect the Master Insert's returning signal, i.e. the output signal of the external processor, to the Ins. Return input.

The maximum level these unbalanced inputs can handle is $>24\text{dBu}$. To activate the Insert function use the Master Insert push button in the Master path (for more information see Control Elements, Master Insert, on page 19).

Tape Rt. (Tape Return)

The Tape Return function allows you to bring back the recorded signal to the Neos in order to listen to it. Connect to the Tape Rt. input the output signal of the DA converter or tape machine.

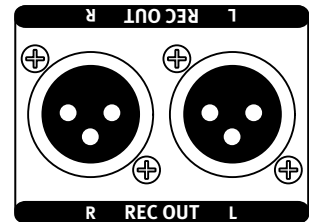
The maximum level these balanced inputs can handle is > 30 dBu. To activate the input use the Tape Return push button in the Master path (for more information see Control Elements, Tape Return, on page 19).



Rec Out (Recording Output)

The output signal of the Neos is available at the Rec Out so you can record the final mixdown. This where the AD and tape machines ought to be connected.

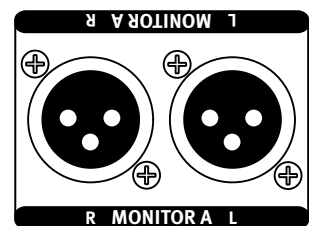
The maximum level delivered by the Rec Outputs is > 24 dBu.



Monitor A and Monitor B

The balanced Monitor A and Monitor B outputs are meant to feed power amps or active monitor speakers. The two separate outputs allow the use of two different monitor speakers. Generally speaking, Monitor A is always active. To switch to Monitor B use the Mon B push button on the Maser path.

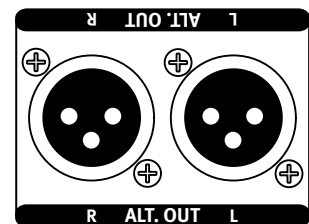
The maximum level delivered by the Monitor B output is > 24 dBu.



Alt. Out (Alternative Output)

At these outputs you have a copy of the Rec Out signal. The Alternative Outputs can be used to connect a headphones preamplifier.

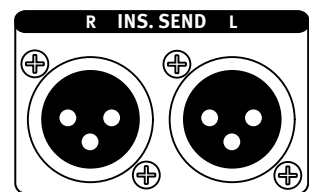
The maximum level delivered by the unbalanced Alt Outputs is > 24 dBu.



Ins. Send (Insert Send)

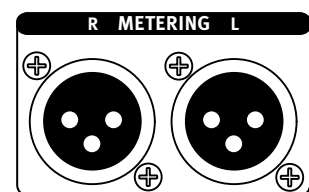
Use the Master Insert loop to add external signal processors to the Neos' internal processing. Connect the inputs of external signal processors to the unbalanced Ins. Send outputs. To activate the Insert function use the Master Insert push button in the Master path (for more information see Control Elements, Master Insert, on page 19).

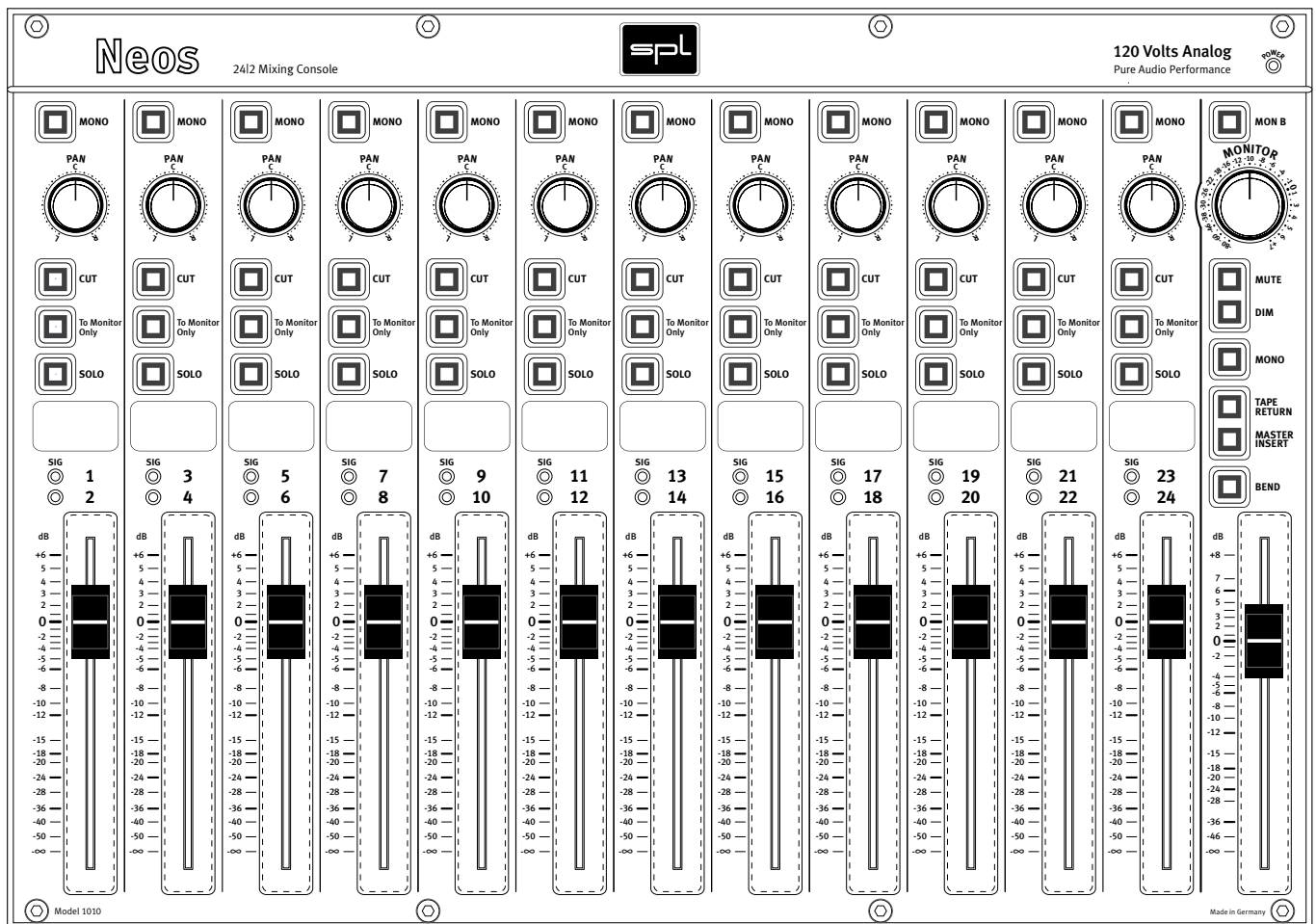
The Send outputs deliver > 24 dBu.



Metering

Use the unbalanced Metering output to connect VU or PPM meters in order to monitor the signal of the Rec. Outputs. The nominal level is calibrated to 0dB. The maximum level delivered by the Metering Outputs is > 24 dBu.





Overview

The control elements of the Neos console are distributed horizontally across the input paths and Master path.

The Master path is on the far right. This section houses the processing functions and control elements of the output signal, as well as all monitoring functions.

To the left are the twelve stereo input paths. In the input paths is where the level and panorama settings, as well as some other functions, of the signals to be mixed is adjusted.

In principle there are only two different types of paths. Thus, it is almost absurd to even think of a learning curve to actually start working with the Neos — instead, we could say there is one single learning step, which is almost self-explanatory just by reading the names of the functions involved.

Control Elements Input Path

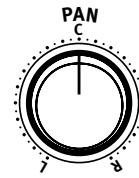


Mono

The Neos offers 24 input channels in total. Two channels make up what we call an input path. Input paths work generally in stereo. When working with mono signals (vocals, instruments recorded on one single channel, etc.) you use only one of the channels of the input path. Depress the Mono push button on the corresponding path to place the signal in the center of the stereo panorama, instead of hard left. That way you can use the Pan control to place the signal wherever you want in the stereo field.

Pan

Use the Pan control to place the signal in the stereo field of the sum signal. Both mono and stereo signals can be placed continuously in the stereo field anywhere from hard left (L) to center (C) and hard right (R).



Cut

Use the Cut push button to mute the input signal of the corresponding channel. The input signal is withdrawn from the mix and therefore is not available anymore in the sum or monitor signals.



To Monitor Only

Use this push button to assign the corresponding input path exclusively to the monitoring bus. This function is based upon standard voltage circuitry with a max. I/O level of $+20\text{ dBu}$. To Monitor Only overrides the Cut function on the monitoring bus. If both push buttons are engaged, the signal will be heard but not mixed. This can be very convenient, for example, when you need to only play back a stereo signal.



Solo

The Solo push button mutes all other channels, i.e. the only channel that is heard is the one with Solo engaged. The Solo function relates only to the monitor bus, it does not affect the mix signal.



This function is based upon standard voltage circuitry with a max. I/O level of $+20\text{ dBu}$. If you activate several Solo buttons, you hear all channels with active Solo button. Compared to the usual play back, there are two main differences: The signal is always switched to mono, and the Solo function is carried out in PFL mode (*Pre Fader Listening*). This means the signal is routed to Solo before the fader with a fixed level. Faint signals are well audible, too – your fader settings, eventually found after longer work, do not have to be altered.

Label Field

Use this space to label the channels any way you want. The easiest and most practical way to label the channels is to use a pencil given that they are easily readable, do not hurt the surface and can be easily erased. If you prefer stickers, use removable ones or adhesive tape.



SIG LEDs

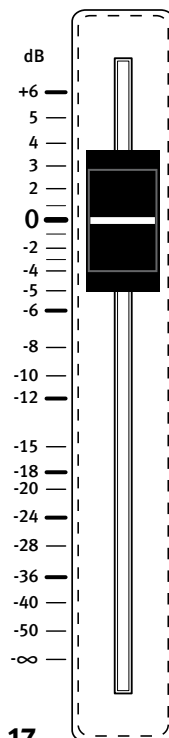
The Signal LEDs turn on when the input level surpasses -10 dBu. This allows checking whether the feed signal is actually being sensed when using complex connections. On the other side, it also allows you to monitor the signal level.



Fader

The faders are meant to control the signal level. Each fader controls both channels of a single input path; when in mono mode this applies to the channel in use. The level ranges from +6dB to $-\infty$.

The ALPS fader with dust cover has a generous 100 mm travel. The fader control curve is optimal for mixing applications and has been matched to the human hearing response, which means it is not linear. The range with the smoothest and finest response ranges from 0 to +6dB. But the range from 0 dB to around -15 dB also has a very high resolution.

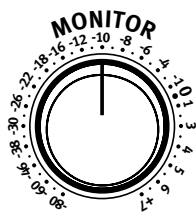


** All other stages are capable of processing higher input levels (> 30 dB). If the stages of these monitoring functions are overloaded, the recording and master monitoring signals are not affected. Reduce the fader setting of the respective channel if necessary.*



Mon B

Use the Master path's top-most push button to activate the Monitor B output. Monitor output A will be muted. Usually you would have two different sets of monitor speakers connected. With the Monitor B push button you can choose the set you want to listen to. However, you can always connect a headphones preamp to one of the Monitor outputs. Take into account that you should always calibrate both Monitor outputs to always have the same level — even if you use headphones. In this last case, adjust the level so that when you set 0 dB in the headphones preamp volume control and the Neos Monitor control you get the same sound pressure level as you would with monitor speakers in the listening position. Apart from being able to compare sound pressure levels between different monitor speakers, this also avoids any unpleasant volume differences when switching from one monitoring set to the other. Once you are done calibrating the headphones preamp, always adjust the volume level on the Neos without modifying the preamp's level control. Please refer to “Calibrate” on this page.



Monitor

Use the Monitor control to set the listening volume. This control affects Monitor outputs A and B. The potentiometer used is a “Big Blue” ALPS (RK27). This type of potentiometers are well-known for their high overload capacity, even response and a very smooth rotation with enough resistance but without being stiff. The Monitor control uses a relative dB scale referenced to the input level. The 0 dB mark is approximately at the 2-o'clock position, which means that when set to this position the input level is “as is” (the amplification factor is 1 or “Unity gain”). The control range extends from -80 dB to +7 dB. The control's sensitivity is maximal at normal listening levels, due to a higher resolution, from -18 dB to +7 dB, with the highest resolution above 0 dB.

Monitoring with the Neos

Just like the summing section, the Neos monitoring section also benefits from the 120-volt technology. This means that the consciously sound-oriented design and highest quality components result in superb technical specifications providing the ultimate listening quality. When the best conditions are given for analog signals to be played back, the desire for the cleanest and most neutral monitoring is also satisfied. Technical evidence suggests that signal disturbances are far below audible limits and sometimes even near to measuring limits. What is left is sound — unaltered and unlimited, within what is technically feasible. You actually listen to music instead of a “Controller” and its characteristics.



Calibration

Considering that even the slightest level variation of 0.5 dB can produce differences in the perception of sound quality, it is of utmost importance to be able to make precise comparisons with several loudspeakers or headphones. That is the reason why one of the basics of monitoring is the calibration of loudspeakers and headphones. Power amplifiers and active loudspeakers have to be adjusted to the reference level measured at the listening point. The calibration is made with a sound level meter (or SPL meter; in this case SPL stands for Sound Pressure Level). The SPL meter can also be used to measure headphones when placed between the cups. Recommended calibration procedures and other exciting information on monitoring are incorporated into Bob Katz's “K-System,” where monitoring, metering, and leveling are defined and standardized as an integrated process (Level Practices Part One and Two, by Bob Katz, Digital Domain, Inc., www.digido.com).

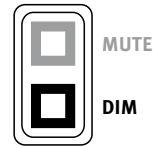


Mute

Use the Mute control to momentarily turn off both Monitor outputs without having to modify the level settings.

Dim

Dim reduces 20 dB the listening volume of both monitor outputs. This setting can be used, for example, to compare the same mix at two different listening levels without having to modify the Volume control. 20 dB is a value which has been accepted in the industry as a standard.



Mono

The mono switch sums the two channels that make up the stereo signal. The mono signal is played back on both channels. The mono function allows checking the mono compatibility of a mix, i.e. which signals are too faint or disappear completely when played back in mono. Even if this test is not as important today as it used to be, it is still essential for radio mixes and vinyl productions.



Tape Return

Connect the outputs of the recording device (D/A converter, computer, tape machine, etc.) to the Tape Return inputs (see also page 13 “Tape Return”). That way you can listen to the mixdown recorded and compare it to the output signal of the Neos with a simple button. Even if it is not very common to have signals recorded on tape anymore, we decided to use the traditional and most common term used for this application.



Master Insert

Use the Master Insert push button to connect external processors to the Neos via the Send/Insert Return connectors. The insert affects the sum signal on the master path.

Common signal processors used at this stage are equalizers and compressors.



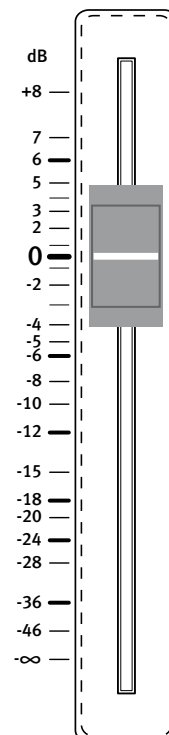
Bend

The Bend function activates a multi-stage, passive diode limiter that can level out curves and limit signal peaks. The diodes used are made of germanium and silicon. While the former have smoother curves, silicon diodes are a bit harder. The Bend diode network is designed in a way that the processing becomes more aggressive the higher the signal level is. The processing range starts at -6 dB and extends almost 20 dB. When level differences are small processing is barely noticeable, however dynamic material will produce more distinct results. The interaction between the Bend limiter and the input channels and master signal saturation can be very interesting. Since limiting is intensified by higher levels, you can achieve clearer targeted or overall limiting effects. Typical applications are found in rock and pop music whenever the signal sound needs to be fatter or the coloration of the diodes is desired. With transient-rich signals it can also have an impact on rhythmic and timing (percussion instruments, piano, plucked strings, etc.). In a more general sense, the Bend function also works as a protection device by limiting signal peaks before they reach the converter.



Fader

Use the fader to set the level of the sum signal for recording. The level ranges from +8 dB to $-\infty$. The 0 dB point is shifted slightly compared to the input faders in order to allow for up to +8 dB of gain. There are roughly two saturation methods: either the input channels are saturated while the sum signal is kept at moderate levels, or the input channel signals are kept moderate while the sum signal is saturated. Both approaches are valid, the pros and cons depend on the music genre and other signal processing applied. The Neos certainly offers the best design and technical conditions for every approach.





Integration Examples and Channel Assignment

A common way to feed the 24 channels of the Neos would be to use three eight-channel D/A converters. As a rule, one converter is defined as the main converter and the two others are connected in chain. As long as the converters have the same DB25 connectors the connection is straight forward and the channel assignment corresponds to the one in the DAW's setup.

A high-quality two-channel converter might be the best option to record the signal of the Neos' Rec. Out. The A/D stage could also be integrated through the S/PDIF inputs of the main converter. The recorded signal can be routed to the two-channel converter through the S/PDIF outputs of the main converter, whose D/A output would then be connected to the Tape Return of the Neos.

If the analog outputs of the converter are available as separate XLR and jack connectors, a clever channel assignment could save converter channels. Typical sessions have usually four mono channels (vocals, snare, kick, and bass) while the rest of the elements are available as stereo stems in the DAW (keyboards, guitars, backing vocals, overheads, toms, etc.). In this scenario you can make the final mixdown with the Neos. Nevertheless, do take into consideration that the more channels available for a production, the better.

Here is an example of such a session: once again we have three eight-channel converters, however this time they have separate outputs connected via eight XLR/jack-to-D25 snake cables. In the DAW, route the four mono channels to outputs 5, 6, 7, and 8 of the first converter. Afterwards, connect the converter outputs with the Neos DB25 inputs 1, 3, 5, and 7. That way, the mono signals are now controlled by the first faders of the Neos — and considering that the input paths are stereo, whenever you use mono signals one of the channels is free (in this example, DB25 outputs 2, 4, 6, and 8). All other stereo stems from the DAW should be routed to the Neos through the two other converters. On the first converter you still have four output channels left, which you can use for the Tape Return input of the Neos and a headphones mix.

Inputs & Outputs

Electronically balanced instrumentation amplifiers

Sockets	Inputs: DB25/TASCAM, XLR Outputs: XLR
Input Impedance	10 kOhm balanced/20 kOhm unbalanced
Output Impedance	75 Ohm balanced/75 Ohm unbalanced
Nominal Input Level	+4 dBu
Maximum Input Level	› +30 dBu (30 dBu = limit of measuring equipment)
Maximum Output Level	› 24 dBu

Measurements

Frequency Range (-3 dB)	10 Hz to › 200 kHz		
Phase	1kHz: 0°/10kHz: -4,5°/ 20kHz: -8.30°		
Common Mode Rejection Ratio (Rec. Out, Insert Send, Monitor A/B)	› 60 dB		
THD	Rec. Out	Insert Send	Monitor A/B
10Hz	0.0011%	0.0011%	0.0016%
100Hz	0,00060%	0.0009%	0.0016%
1000Hz	0.00090%	0.0013%	0.0020%
5000Hz	0.0032%	0.003%	0.004%
10kHz	0.0028%	0.0018%	0.0027%
22kHz	0.00054%	0.00050%	0.0005%
<i>(Generator output 24dBu, inputs terminated with 40 dBu)</i>			
Signal to Noise Ratio (A-weighted)	Rec. Out	Insert Send	Monitor A/B
	92 dBu	92 dBu	88 dB
<i>(22 Hz - 22 kHz, inputs terminated with 40 dBu)</i>			
Dynamic range	› 122 dB		

Power Supply

Linear power supply with toroidal transformer

Operational Voltage	+/- 60 Volt (120 Volt)
Power Consumption (stand by)	230 Volt/50Hz : 0.420 A, 75W, 97,8 VA
Fuses	230 V AC, 50 Hz: 315 mA 115 V AC, 60 Hz: 630 mA
Voltage Selector	115 V/230 V

Dimensions and Weight

Front panel including rack brackets	19"/7 U (483 x 310 mm)
Front panel without rack brackets	440 mm
Housing (W x H x D)	483 x 235 x 330 mm, depth incl. sockets 355 mm
Further Dimensions <i>on page 22</i>	
Weight	14.1 kg/ca. 31.08 lbs

Dimensions and Weight External Power Supply

W x H x D	154 x 67 x 236 mm
Gewicht	3 kg/6.61 lbs

Notes:

0 dBu = 0,775 V. All measurements at unity gain.

Specifications are subject to change without notice.

Copy Master Recall Settings



Neos

2412 Mixing Console

SPL

120 Volts Analog
Pure Audio Performance

Made in Germany

Model 1010

Artist: _____

Album/Gig: _____

Title: _____

Engineer: _____

Track(s)/Groups: _____

Date: _____

Channel	MONO	PAN	C	R	L	CUT	To Monitor Only	SOLO	SIG	dB
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>
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3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>
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MON B

MONITOR

MUTE

DIM

MONO

TAPE RETURN

MASTER INSERT

BEND

dB

+8

7

6

5

4

3

2

0

-2

-4

-5

-6

-8

-10

-12

-15

-18

-20

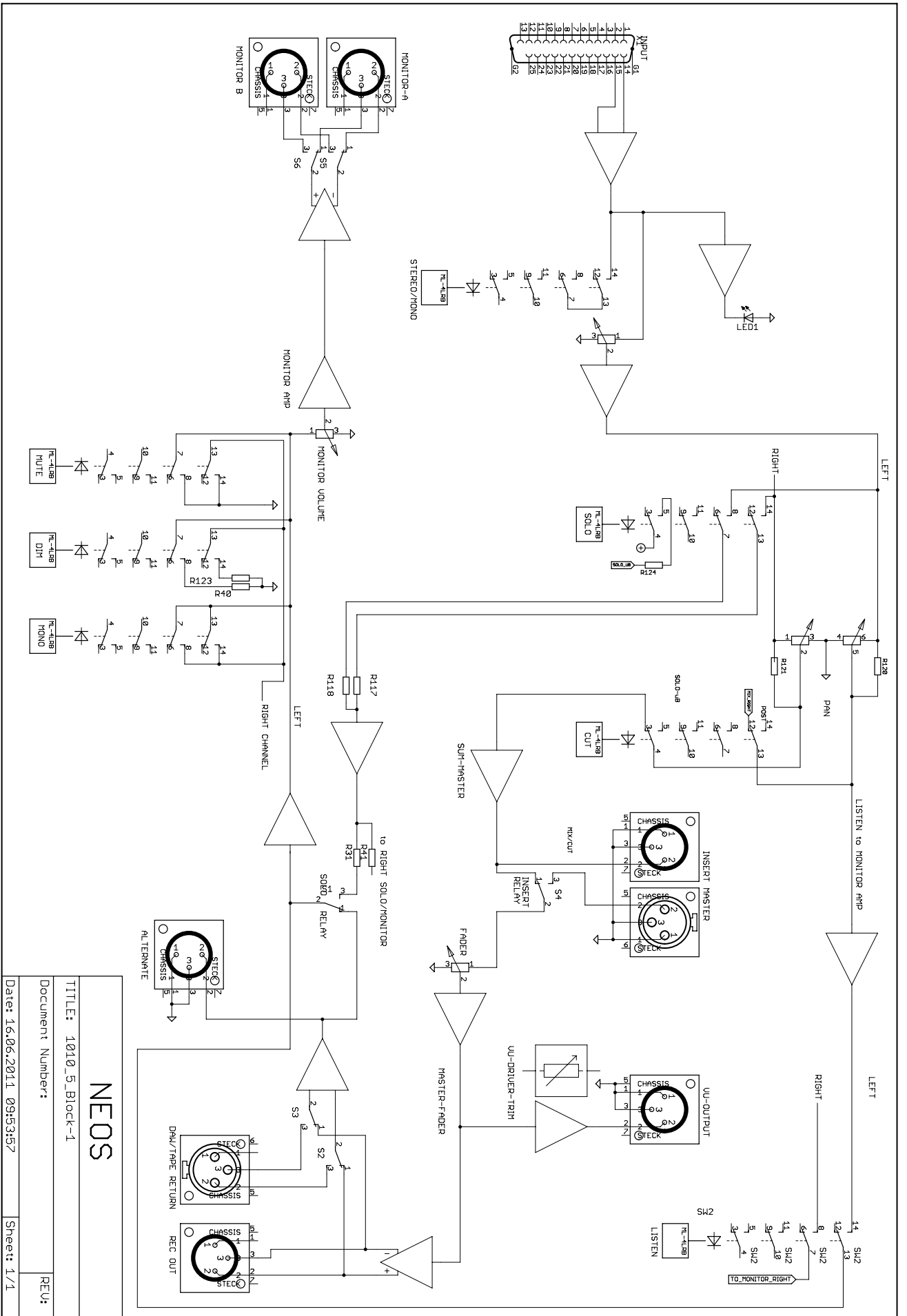
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-28

-36

-46

-∞



NEOS

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Document Number:

REV:

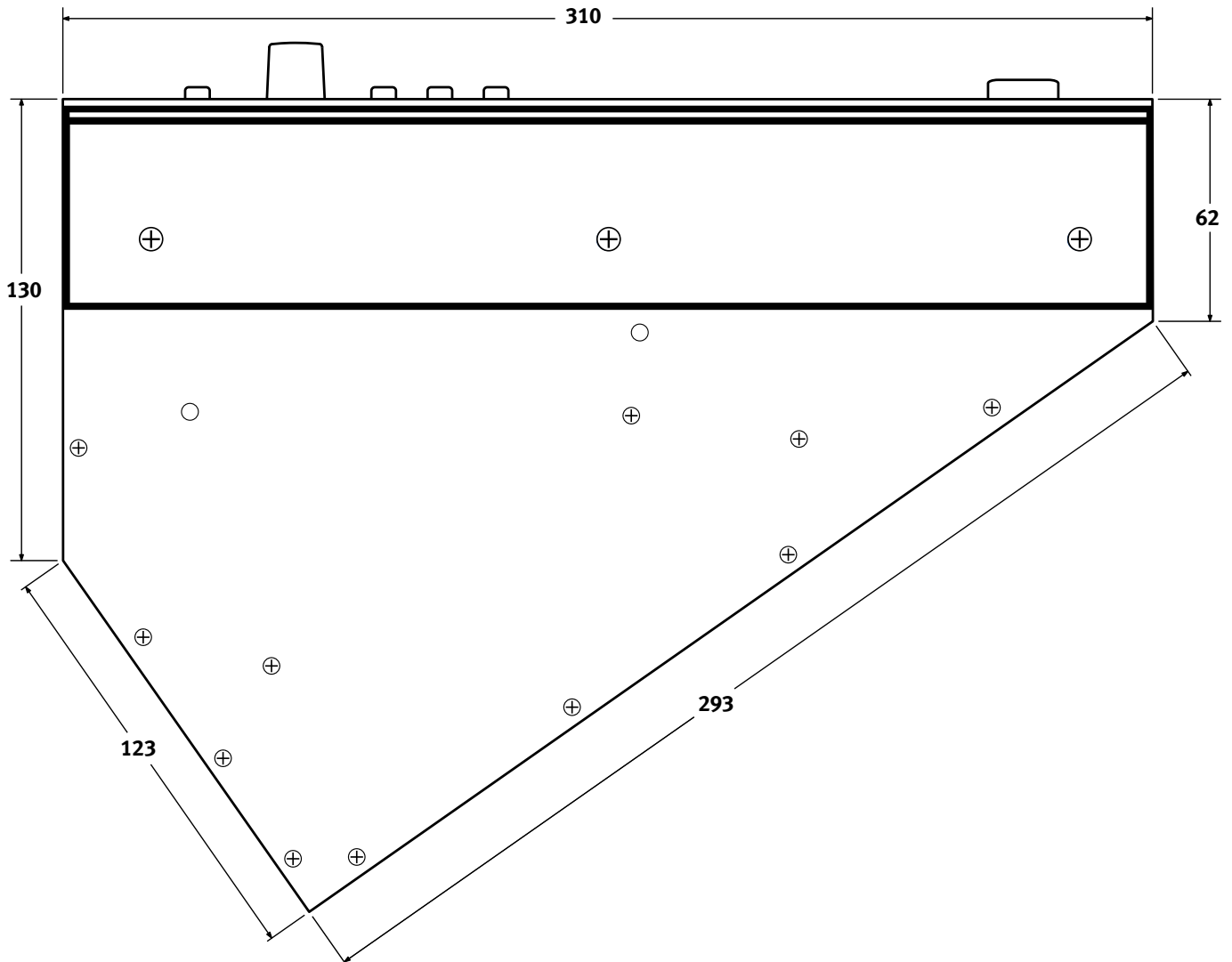
Date: 16.06.2011 09:53:57

Sheet: 1/1

Mounting Dimensions

Dimensions and Weight

Front panel including rack brackets	19 Zoll/7 HE (483 x 310 mm)
Front panel without rack brackets	440 mm
Housing (W x H x D)	483 x 235 x 330 mm, Depth w, Sockets 355 mm
<i>Further dimensions see diagram (in millimeters)</i>	
Weight	14,1 kg



The Neos comes with 19" rack-mounting side brackets. As you can see here, the holes on the side of the housing allow for two rack-mounting positions (0 and 10 degrees).

The bracket holes have been designed in order to allow for an easy flush mounting in vertical or horizontal racks. If it were needed, the brackets can always be adjusted in order to flush mount the device in the rack. Do consider that all installations, specially without a rack system, ought to be performed by a specialist and always taking into account the maximum load capacity.

