



Nagra PL-P Preamplifier Owner's Instruction Manual



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Congratulations

Congratulations

You have just purchased one of the best audiophile preamplifiers ever made!

The Nagra PL-P (*Préamplificateur à Lampes - Phono*) is designed to provide the highest quality of audio performance in an ultra-high resolution audio system, especially one with a competent vinyl LP playback source.

The Nagra PL-P was created by an engineering team with over 45 years of experience in designing world-class products for the professional audio, national security and military businesses. Since its inception in 1951, Nagra products continue to earn a reputation for delivering the best possible sonic and mechanical performance under many very difficult operating conditions. Numerous awards have been bestowed upon Nagra for its technical innovation, excellence in design and flawless construction.

In building the PL-P preamplifier, significant effort has been focused on building a product that is robust, easy to use and with sonic properties that will delight even the most demanding and critical audiophile.

Thank you for being our customer and enjoy your new Nagra PL-P preamplifier!

Warranty

Warranty

NAGRA/KUDELSKI certifies that this instrument was thoroughly inspected and tested prior to leaving our factory and is in accordance with the data given in the accompanying test sheet.

We warrant the products of our own manufacture against any defect arising from faulty manufacture for a period of three years (tubes only six months) from the date of delivery.

This limited warranty covers the repair of confirmed defects or, if necessary, the replacement of the faulty parts, excluding all other indemnities.

All freight costs, as well as customs duty and other possible charges, are at the customer's expense.

Our warranty remains valid in the event of emergency repairs or modification being made by the user. However, we reserve the right to invoice the customer for any damage caused by an unqualified person or a false manoeuvre by the operator.

We decline any responsibility for any and all damages resulting, directly or indirectly, from the use of our products.

Other products sold by KUDELSKI S.A. are covered by the warranty clauses of their respective manufacturers.

We decline any responsibility for damages resulting from the use of these products.

We reserve the right to modify the product, and/or the specifications without notice.

About your PL-P

You are about to experience music as never before with the Nagra PL-P preamplifier.

The PL-P is designed and hand-built entirely in Switzerland by Nagra engineers, using components of the highest quality from around the world.

- It uses 8 high-grade vacuum tubes and Nagra-made transformers to provide a variety of operating options.
- The power supply of the PL-P is designed to deliver quiet and stable performance suitable for the highest resolution audio system. It is completely isolated from AC line noises.
- The PL-P accepts a variety of input sources, including low-output moving-coil and moving-magnet phono cartridges, up to three line-level sources such as tuners, compact disk players and video tape recorders, as well as a fully integrated tape/signal processor loop.
- A traditional Nagra high-precision modulometer provides

a facility to accurately monitor, match and balance input and output levels as well as to optimize individual component performance.

- The outputs of the PL-P are directly coupled to the output vacuum tubes for the highest audio performance. There are two sets of connectors to allow bi-amp setups.
- The PL-P case is CNC-machined in hardened, anodized aluminium. It is designed to provide many years of service and to comply with all existing electrical safety and electromagnetic emission standards.

This manual describes the proper setup and use of the PL-P. Please read through the manual carefully before attempting to set up and use the PL-P. Mishandling and abuse of the PL-P leading to faulty operation is not covered under warranty.

Basic Operations



Photograph showing the Nagra PL-P, the PLP-CCC3 charger and two battery "batons"

Battery Operation of the PL-P

The PL-P is designed around a highly sophisticated power supply system which uses a combination of rechargeable power cells and an external AC power supply unit.

The PL-P is not designed to operate without internal batteries. The unit is not covered under warranty if damage occurs under these circumstances.

The components of the system are as follows:

- A battery compartment for 8 "D"-size power cells.
- A DC-to-DC converter module in front of the battery compartment which provides an extremely dynamic and noise-free power

source for powering the heater filaments and anodes of the vacuum tubes and other active electronic components.

This DC-to-DC converter contains very high operating voltages and is sealed at the factory for the protection of owners, users and untrained personnel. Unauthorized tempering with this module is extremely dangerous and could result in severe personal injury or even lethal consequences. Please refer all service to an authorized Nagra service agency.

- An external AC power supply unit, the PLP-CCC3, intelligently determines the charging requirements of the recharge-

able power cells within the PL-P and provides the appropriate charging rate to the unit at all times. It operates with input voltages from 94 to 264 VAC, 50 or 60 Hz.

The design of the PLP-CCC3 AC power supply originates from the same unit that works with the professional Nagra Digital Tape Recorder and is configured specifically to serve the unique requirements of the Nagra PL-P.

The PLP-CCC3 AC power supply unit is only to be used

with the PL-P when suitable rechargeable power cells such as the factory-supplied battery batons are properly installed in the PL-P. Using the PLP-CCC3 AC power supply unit with no recharge-able power cells, unsuitable recharge-able power cells or non-rechargeable power cells such as alkaline or carbon power cells, is extremely dangerous and may result in an explosion. The unit is not covered under warranty under these circumstances.

Battery Installation

A battery compartment at the rear of the PL-P is designed to hold 8 “D”-size power cells. The PL-P is delivered from the factory with 2 batons of rechargeable Nickel-Cadmium cells. In an emergency, other forms of rechargeable “D”-size power cells or alkaline power cells can also be used.

Access to the PL-P battery compartment is by removing the 4 hex screws securing the top plate, using the supplied ISO/Allen 2.5 mm key. Lift the top plate off the PL-P case carefully.

Before installing any batteries, ensure that the PL-P is powered off and not connected to the

PLP-CCC3 AC power supply unit.

To install the battery batons supplied from the factory, place the first baton in the bottom half of the battery compartment, with the positive end of the baton facing the right side of the PL-P, when viewed from the front. Place the second baton in the top half of the battery compartment, with the positive end of the baton facing the left side of the PL-P, when viewed from the front.

If batteries are incorrectly installed, the PL-P will not power up. The unit will not be damaged, it simply will not power up.

If individual power cells are to be installed in place of the batons, they can be placed a piece at a time following the same instruction above, with careful attention paid to aligning all power cells within a layer to orient toward the same direction.

All power cells in the bottom half of the battery compartment should have the positive end of all cells facing the right side of the PL-P,

when viewed from the front. Place the second layer of power cells in the top half of the battery compartment, with the positive end of all cells facing the left side of the PL-P, when viewed from the front.

Rechargeable battery batons supplied from the factory must be fully charged in the PL-P before use. See next section for full instructions.

Connecting the PLP-CCC3 AC Power Supply

Once the batteries are properly installed in the PL-P, the male Lemo connector of the PLP-CCC3 AC power supply unit can be connected to the female input socket, marked “Power Pack”, on the right side panel of the PL-P. The Lemo connector has a red dot that should be oriented to face upwards when inserting the connector into the socket. Fully seat the connector in the socket.

With the Lemo connector inserted, connect the IEC-specification power cord to the PLP-CCC3 AC power supply unit and to an approved AC power outlet. The proper operating range of the PLP-CCC3 AC power supply unit is as follows:

- Input Voltage 94-264 V, AC
- Frequency 50-60 Hz



Photograph showing the correct way to connect the PLP-CCC3 charger

When all connections are secure, the power switch on the PLP-CCC3 AC power supply unit can be turned on. Two LEDs on the PLP-CCC3 provide operating condition indication:

1. When the PLP-CCC3 is operating correctly and the internal batteries of the PL-P are being properly managed, the I- LED will light. The intensity of this LED indicates the rate of charging supplied to the PL-P. With the PL-P switched off, the LED will be at maximum intensity as the power cells are being charged at the rate of 400 mA. This rate of charge will fully replenish completely flat power cells in 12 hours. When the PL-P is turned on, then the I-LED will get dimmer. This serves as a quick check that everything is working normally.

An electronic counter inside the PL-P signals the PLP-CCC3 to enter this 12-hour, full-rate charging cycle every time the PL-P has been turned on and then off. This technique can be used to bring a new set of rechargeable batteries to full charge.

2. If the rechargeable power cells in the PL-P have not been correctly installed or are not being correctly managed, when the PLP-CCC3 is switched on, the U-LED will light. This indicates that a faulty condition

exists with the following possibilities:

- The male Lemo connector of the PLP-CCC3

is not properly connected and/or seated in the Power Pack socket of the PL-P.

- The rechargeable power cells in the PL-P are faulty and will not accept a charge.
- One of the internal fuses on the DC-to-DC converter circuit of the PL-P has blown. (Please refer to an authorized Nagra agency for the repair.)

3. If neither LEDs on the PLP-CCC3 are lit, the following conditions may exist:

- The power cord of the PLP-CCC3 is not connected properly to the AC power outlet.
- The internal fuse of the PLP-CCC3 AC power supply unit is faulty or blown.

To restore proper operating conditions, examine each point above and correct if necessary. If the condition persists, please return the PL-P and the PLP-CCC3 to an authorized Nagra service agency.



All rechargeable power cells benefit from periodic discharging to minimize the memory effect. To ensure a complete battery discharge, operate the PL-P without the PLP-CCC3 connected until the recharge-able power cells are completely flat and the PL-P

switches itself off. Recharge the power cells completely by reconnecting the power supply. Do not use the PL-P for a about 90 minutes while the recharging cycle is initiated. Normal operation can then resume.

Vacuum Tube Identification and Location

Each vacuum tube used in the PL-P has been burned-in for 12 hours, thoroughly tested with each tube being subjected to 400 measurements before final selection at the Nagra factory to ensure the highest level of performance. Two types of vacuum tubes used. They are:

- 12AT7 or ECC81
- 12AX7 or ECC83

Many variants of these vacuum tube types are available and may function in the PL-P.

However, proper selection and use of vacuum tubes other than those

supplied by Nagra is an owner responsibility.

If the PL-P is damaged due to the use of non-factory vacuum tubes, the warranty will be rendered null and void.

The PL-P is shipped from the factory with vacuum tubes installed in their proper locations. Since the unit may have been subjected to unexpected shock in transit, it is prudent to check that each vacuum tube is seated properly in its socket before operation, using a cotton glove (supplied in the Spare Tube Kit PLP-STK #55760).

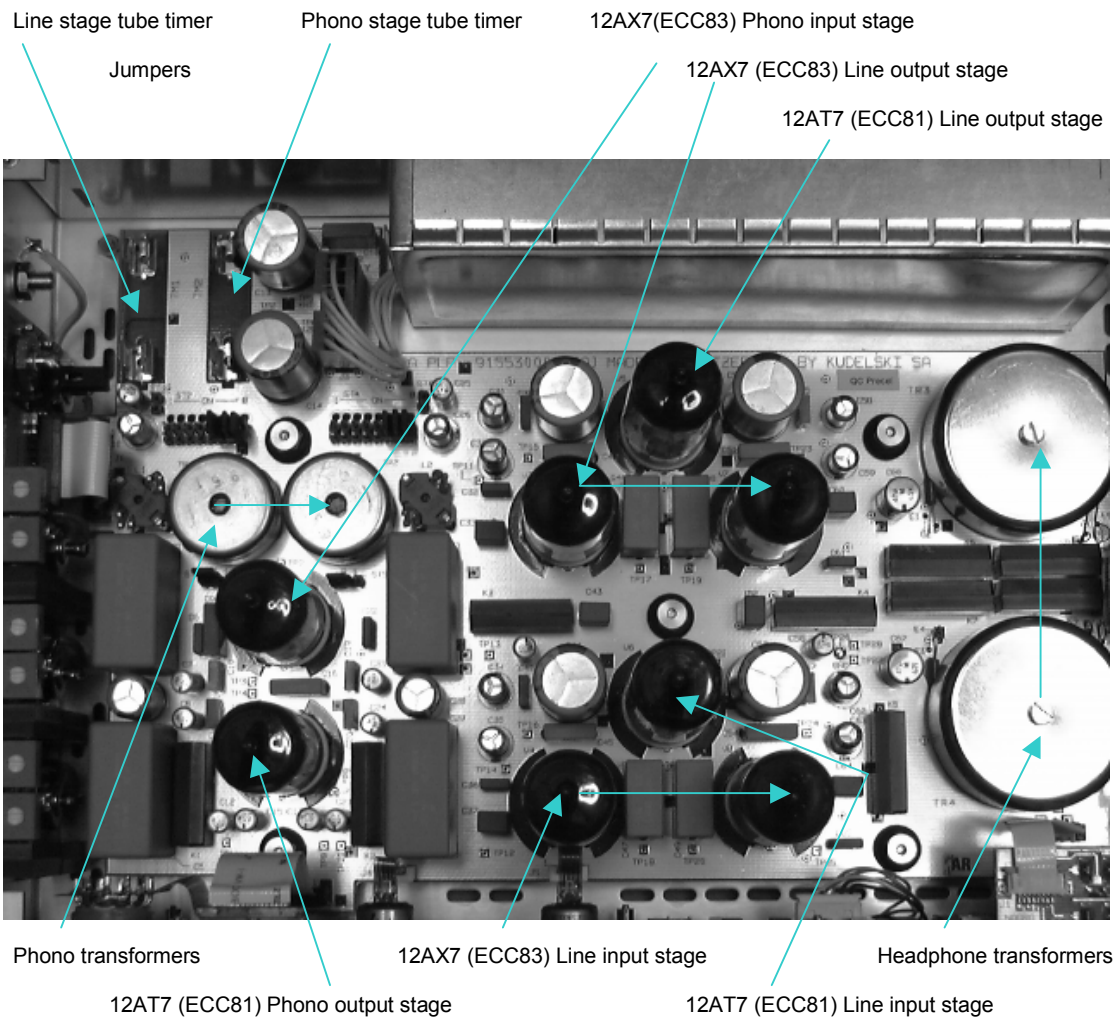
To seat each vacuum tube properly, ensure that the PL-P is powered off, disconnect the PLP-CCC3 AC power supply unit and remove the top plate. If the unit has just been powered off, please wait 5 minutes for the vacuum tubes to cool down before handling them. Wearing the glove supplied with the Spare Tube Kit, place two fingers around the flat top part of a vacuum tube to hold it firmly. Push the vacuum tube very gently in a downward, vertical motion until it is completely seated.

In the unlikely event that vacuum tubes became unseated in transit, please refer to the following diagram to identify the vacuum tube required at each socket position and place them in the manner described above.

The PL-P is also furnished with two vacuum tube usage timers. They are mounted internally on the printed circuit board as per the following diagram. The one on the left corresponds with the two vacuum tubes used in the phono stage and the one on the right is for the vacuum tubes used in the line stage. When the power is turned on, these usage timers will individually time the usage of the vacuum tubes in their respective stages, up to the maximum limit of 5,000 power-on hours.

When either or both timers indicate close to the 5,000-hour maximum, vacuum tube replacement is recommended. We suggest that you use the Spare Tube Kit available from your authorized dealer, which includes Nagra-tested vacuum tubes as well as two new usage timers.

Tube, Jumpers and Timer Positions

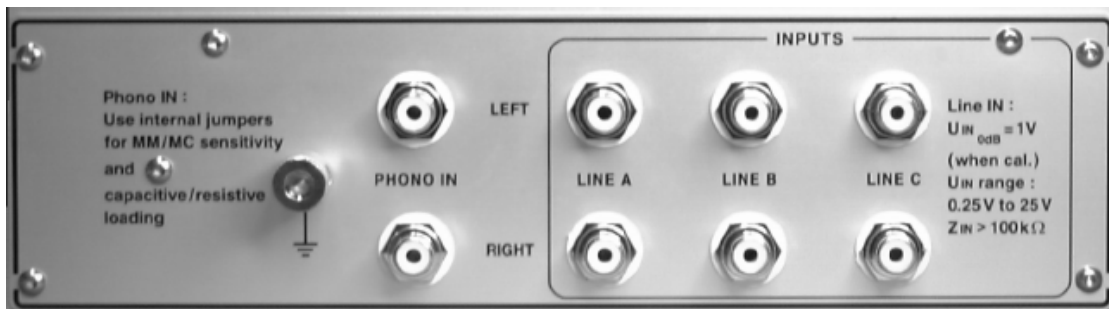


Burn-in Period

With the Nagra PL-P a period of about 250-300 hours of use will allow all components within the circuits to reach a level of operating equilibrium. At the end of this period, the mechanical and sonic performance of the PL-P will have

had an opportunity to reach its full performance potential. Serious audition and permanent installation options should only be evaluated after a complete burn-in has occurred.

Left Panel/Input Layout



The left panel consists of four sets of stereo input connectors:

- One set of input connectors for phono connection is configurable to accept either moving-coil or moving-magnet input.
- Three sets of input connectors for line-level connections are configurable to accept source inputs such as tuners, compact disk players or video tape recorders.

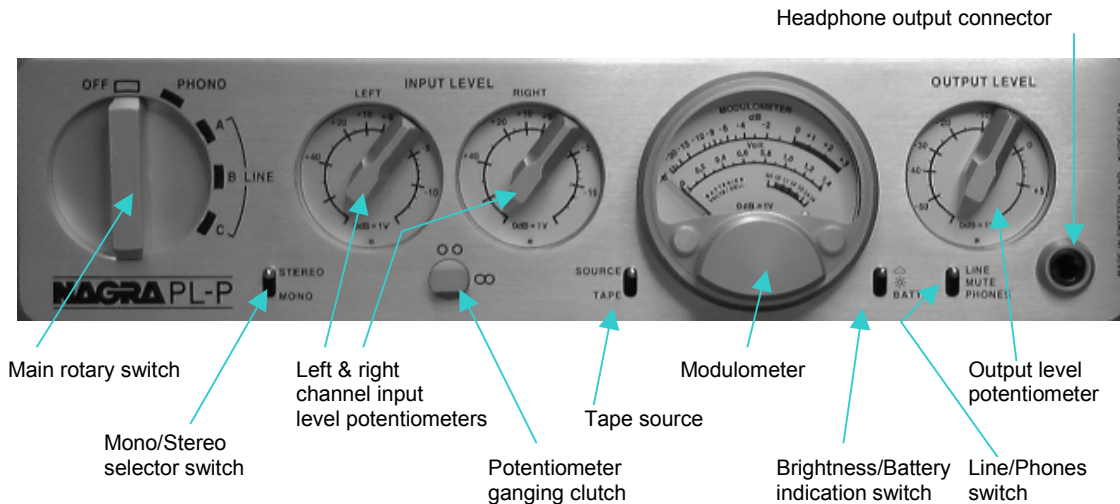
In addition, a technical ground post is provided for the connection of a

ground source to eliminate possible ground loops, which can lead to hum. This post can also be connected to a tone-arm ground wire where necessary.

To connect input sources, ensure that the PL-P is powered off and insert the corresponding connector into phono or line connectors.

Configuration guidance for each input source is covered in the Advanced Operations portions of this manual, under the “Input Customization” section.

Front Panel/Control Layout



The front panel consists of a variety of controls and a modulometer. Starting at the left of the front panel, they are:

1. *The Main Rotary Switch*

Powering the PL-P and input selection is provided through the main rotary switch on the left-hand side of the front panel. This 5-position rotary switch turns the PL-P on and off as well as facilitates selection of all input sources. The positions of this main rotary switch correspond with the following labels, clockwise from top to bottom:

- “OFF” - No power is supplied to any audio stages. However, the rechargeable power cell management system is always in operation and will draw less than 3 mA. A red stripe is printed on the backing plate in the space occupied by the switch handle to alert the user of having switched the unit from the “OFF” position.

- “PHONO” - Power is supplied to all active electronic stages. A 15-second mute function engages when the main rotary switch is activated to this position to eliminate unstable and surge voltages at the output stage. When switching between “PHONO” and “LINE A”, a 3-second mute will also be activated.
- “LINE A”, “LINE B”, “LINE C” - Power is supplied to line stage active electronics and the modulometer lamp (if switched on) only. The phono stage electronics will be turned off.

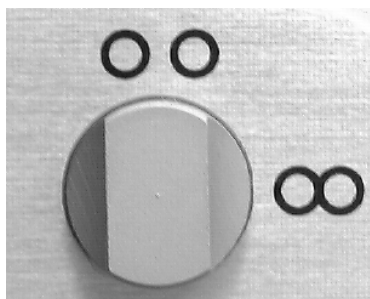
2. *Mono/Stereo Switch*

A toggle switch to the right of the main rotary switch on the front panel allows the selection of mono or stereo operation.

Used in conjunction with the left and right input potentiometer controls, this switch facilitates playback of information from either channel only or a variable mix of both channels in mono or stereo.

3. Left and Right Input Potentiometers

Input level gain for each channel can be controlled via the left and right input potentiometers on the front panel. The scales of the input



potentiometers are calibrated in logarithmic-scale and represent the amplification of the input amplifier, before the modulometer, for the corresponding channel.

A clutch is provided so the potentiometers can be used in tandem or changed independently.

With the button turned to “∞” position, both input potentiometers move in tandem; with the button turned to “oo” position, the input potentiometers move independently of each other.

4. Source/Tape Switch

A toggle switch to the right of the input potentiometers controls the tape loop or an external recorder or signal processor.

When the switch is in the “SOURCE” position, input is sourced from the input connectorsthrough the main

rotary switch. When the switch is in the “TAPE” position, input is sourced from the “FROM EXT” connectors on the right side-panel.

5. Modulometer

A highly precise, Nagra-made modulometer provides a multitude of indications through 2 coaxial, internal pointers representing the left and right channels. The black indicator pointer represents the left channel and red is for the right channel. Suggested uses of this instrument are covered in the Advanced Operations portion of this manual, under “Using the Modulometer” section.

6. Modulometer Lamp / Battery Check Switch

This is a 3-position switch. The functions are as follows:

- In the upper position, it turns on the modulometer lamp.
- In the middle position, it turns off the modulometer lamp.
- When the PL-L is turned on, in the momentary lower position, the Volts per Cell reading of the internal power cells is shown.

7. Output Potentiometer

Output level gain for both channels are controlled via the output potentiometer.

The scale of the output potentiometer is calibrated in logarithmic-scale and represents the amplification of the output amplifier, after the modulometer, for both channels.

8. *Line/Mute/Phones Switch*

This is a 3-position switch. The functions are as follows:

- In the upper position, output is directed to the “LINE” output connectors on the right side-panel.
- In the middle position, output is muted for both “LINE” and “PHONES” connectors.

- In the lower position, output is directed to the “PHONES” connector for use with headphones.

9. *Headphone Connector*

This is a 1/4” stereo jack connector. The level is controlled using the output potentiometer. The normal audio outputs of the PL-P are muted when headphones are connected.

Right Panel/Output Layout



The right panel consists of two sets of stereo output connectors:

- Two sets of output connectors are available to feed power amplifiers for bi-amping applications.
- One set of input connectors and one set of output connectors are provided for connection to an analog tape recorder or an external analog signal processor. The level of the output connectors can be individually adjusted to match the level of other input sources such as phono, tuners, compact disk players or video tape recorders.

Before connecting to the power amplifier, ensure that the PL-P and the power amplifier are powered off. Insert the corresponding connectors into either one or both sets of the output connectors.

Configuration guidance for the tape loop output level is covered in the Advanced Operations portion of this manual, under the “Output Customization, Tape Loop Level Adjustment” section.

Advanced Operations

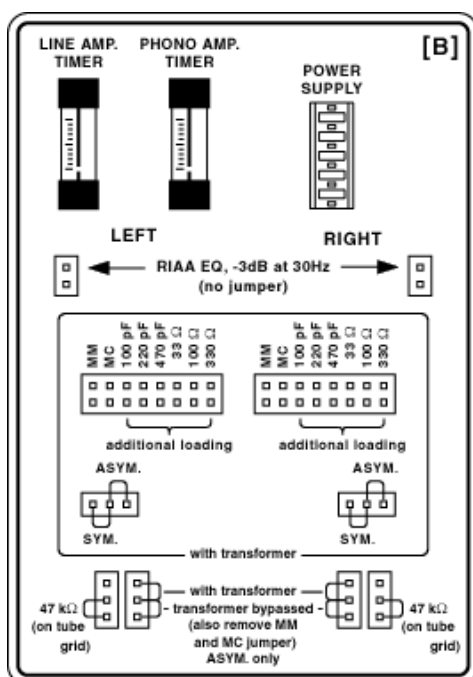
Advanced Operations

Input Customization

The inputs of the PL-P can be customized to suit specific installation requirements and listening preferences through modifying the positions of internal jumpers inside the PL-P case.

To gain access to the inside of the PL-P case, ensure that the PL-P is powered off, disconnect the PLP-CCC3 AC power supply unit and remove the top plate by removing the 4 hex screws using the supplied ISO/Allen 2.5 mm key. Lift the top plate off the PL-P case carefully. If the unit has just been powered off, please wait 5 minutes for the vacuum tubes to cool down before handling any item inside the PL-P case to avoid potential burns or injury.

Input customization options are as follows:



This diagram shows the different jumper positions for the various different options within the PL-P. To install a jumper, place it over BOTH of the pins of the corresponding selection so as to join them together.

The different jumpers within the PL-P can be used to set various different customization settings according to the installation and the user's preferences.

1. Moving-coil/Moving-magnet cartridge selection

Principally, there are three different solutions here, these being MM, MC (with an internal or associated transformer) or MC (without an internal or associated transformer). The first two solutions will give an output of several mV and the third will give only a fraction of this level. The Phono input of the PL-P is fitted with high precision transformers. These will allow the user either to adapt the input sensitivity without affecting the signal-to-noise ratio or, in the case where persistent hum is apparent, can make the phono input of the PL-P floating.

The three different solutions are as follows:

A high-output cartridge is used (MM or MC with associated transformer) and the internal transformer of the PL-P bypassed using jumpers ST4 and ST9 and removing MM or MC jumpers on ST2 and ST6. In this case you can use a high-impedance input of 470 kOhms or lower it to the standardized impedance of 47 Ohms by means of jumpers ST41 and ST91

- If earth loop problems cause permanent hum, the high-quality internal transformers can be used using jumpers ST4 and ST9 and with MM or MC jumpers on ST2 and ST6. Remember to remove the 47kOhms jumpers ST41 and ST91 if installed as the transformer presents a uniform 47 kOhms throughout the bandwidth. In this case either one or both channels can be grounded using jumpers ST3 and/or ST8.
- A low-output cartridge is used (MC without associated transformer) in which case the internal transformers of the PL-P should be used by means of ST4 or ST9 and with MM or MC jumpers on ST2 and ST6. Either channel can be grounded or the input can be left floating according to the installation using ST3 and/or ST8.

2. Moving-coil phono cartridge, additional resistive loading options

The PL-P offers the following resistive and capacitive loading options to optimize the performance of most available moving-coil phono cartridges. A specific value can be selected by installing the jumpers in

the appropriate position, as per the internal jumper diagram.

The resistive loading options available are:

- 33 Ohms
- 100 Ohms
- 330 Ohms
- 47 kOhms (without jumper installed)

These resistive loads can be combined in different combinations according to the jumper positions.

3. Moving-magnet phono cartridge, additional capacitive loading options

The PL-P offers the following capacitive loading options to optimize the performance of most available moving-magnet phono cartridges. A number of values can be selected by positioning various jumpers for each channel, as per the diagram on the previous page.

The capacitive loading options available are:

- 100 pF
- 220 pF
- 470 pF

These capacitive loadings can be combined depending on the positions of the jumpers.

4. RIAA Equalization options

The PL-P can be selected to work with one of two RIAA equalization curves by installing jumpers ST1 and ST7 in the appropriate locations inside the PL-P for the left and right channels respectively. Please refer to the jumper diagram.

With the internal jumpers removed, the EQ curve will conform to a 1978 RIAA addendum for the inclusion of a -3 dB rumble filter at 30 Hz.

With the internal jumpers installed, the EQ curve will not include the -3 dB rumble filter at 30 Hz. This setting is designed for use with extremely high-quality turntables where rumble is generally not a concern.

5. Line A, Line B and Line C input level adjustment

As supplied from the factory, all trim pots within the PL-P are set to represent 1.0 V sensitivity at 0 dB on the modulometer. However, adjustments can be made to accommodate specific installation requirements.

On the inside left of the PL-P case is a printed circuit board which is connected to the input connectors of Line A, Line B and Line C.

Directly above each pair of connectors are a pair of trim pots, designed to be adjusted using the supplied miniature blue jeweler's screwdriver.

There are three pairs of trim pots in total.

Each pair of trim pots can be used to adjust the level of its corresponding input. With a clockwise turn of the white adjustment screw in the center of the trim pot, the input level is increased; with a counterclockwise, the level is decreased.

This adjustment technique is used to balance the levels to avoid variations across Phono, Line A, Line B and Line C.

Used in conjunction with the modulometer, as described below, the user can also maximize system performance by selecting the optimum operating range for each input source and the PL-P.

Using the modulometer

Description

The PL-P is equipped with a highly precise multiple-purpose Nagra modulometer. It has 2 coaxial pointers, the black representing the Left Channel and the red representing the Right Channel. The face of the instrument is graduated with 3 scales and can be illuminated by 2 internal LEDs.

The modulometer is a precision instrument with very special pointer ballistics.

A modulometer is different from a VU or a PPM meter. They share a common purpose of indication, and a brief description of each follows:

- **Modulometer**
The modulometer measures the peak value of the signal, irrespective of the form or the level, and takes into consideration the strongest positive or negative value. It is equipped with a memory, so that with very brief signals, the

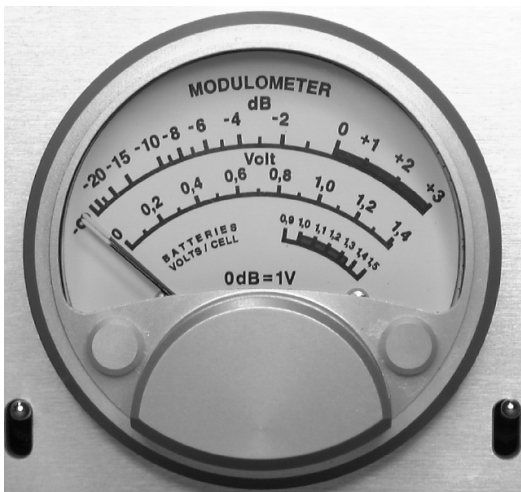
pointer advances and stays for a sufficient time in order for

The modulometer measures signals that can affect systems prone to overloading such as amplifiers and radio transmitters. It shows signal peaks that would saturate - an average value of the signal is of little value in preventing system overload. In particular, while monitoring spikes, indications from the modulometer are always exact, no matter how long the duration of the spike may be.

a reading to be taken.

- VU Meter
On the contrary versus the modulometer, the VU meter has the same rise and fall time. It indicates the accurate physiological sound level with a good balance between speech and music. It is used a lot in sound post-production houses. It's not at all adapted for the PL-P.

Modulometer Calibration and its Use



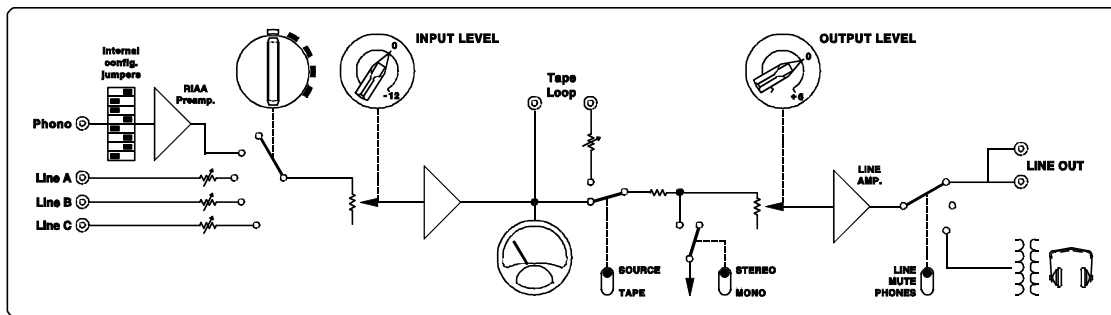
There are 3 scales and 1 legend printed on the face of the instrument:

- Logarithmic-scale markings in relative dB from -20 dB to $+3$ dB indicating the output level present at the tape loop output connectors.
- Linear-scale markings in absolute voltage from 0 to 1.4 V corresponding to the -20 dB to $+3$ dB scale referenced to 1.0 V at the tape loop output connectors.
- Adjusting the Line A, Line B and Line C internal level-matching trim pots.
- Selecting moving-coil phono or moving-magnet phono input with internal jumpers.
- Selecting to bypass the moving-coil phono transformer.
- Adjusting the input level potentiometer to reach:

1. a proper level for maximizing signal-to-noise performance,
 2. a proper balance between left and right channels,
 3. recorded level differences between various recordings.
- Adjusting the tape loop internal level-matching trim pots.
 - With the correct adjustment of the power amplifiers input, it can be used to measure the output level of the amplifier as well as a very precise indication in the event of saturation.
 - Checking the reserve of the internal power cells.

With both input and output potentiometers set at “0” on their respective scales, a 1.0 V input signal at Line A, Line B or Line C input connectors will register 0 dB on the modulometer scale and produce a 1.0 V output signal at the output connectors.

Block Diagram



Output Customization, Tape Loop Input Adjustment

The PL-P is equipped with a tape loop for connection to the inputs and outputs of tape recorders or other external signal processing equipment.

To select operations using the tape loop, select the “TAPE” position on the Source/Tape switch on the front panel.

On the inside right of the PL-P case is a printed circuit board which is connected to the input and output connectors of the tape loop. Above and next to the connectors, marked “FROM EXT” on the right side-panel, is a pair of trim pots, which are designed to be adjusted using the supplied miniature jeweler’s screwdrivers.

This pair of trim pots is used to adjust the level of the tape loop input. With a clockwise turn of the white adjustment screw in the center of the trim pot, the input level is increased; with a counterclockwise, the level is decreased.

This adjustment technique is used to balance the levels to avoid variations between the source and tape output levels. Used in conjunction with the modulometer, as described above, the user can also maximize system performance by selecting the optimum operating range for the tape loop input and the PL-P.

Hum

The exceptional audio performances of your PL-P allow you to re-discover the pleasure of listening to vinyl LPs, and will give you hours of exceptional listening pleasure. However, you can only benefit from the total quality of your PL-P if it has been correctly installed.

The cables that connect the phono cartridge of the turntable to the PL-P carry extremely low-level signals, and any error in the connection of the system is likely to create hum caused by AC ground loops. To deal with this, the PL-P is designed to cover a number of technical points, which should be well understood in order to achieve an optimal configuration. Before going into details, the first step is to be sure that all the various units in the system (turntable, PL-P, amplifier, CD-player, etc.) are powered correctly.

As a preamble, we will explain the hurdle. Any wire has an electrical resistance, and all currents passing through a resistance create a drop in voltage. Depending upon where the voltage drop occurs, you will be confronted with more or less AC hum.

Normally, the AC network that powers your equipment is made up of three separate conductors, these being the ground/earth, the neutral and the phase, the latter two allow the passage of energy to the device being powered. The latter two wires are not floating; the phase wire, which should not be touched for risk

of electric shocks, carries a high alternating potential (110 V or 220 V), whereas the neutral wire is very close to the ground/earth and can normally be touched (in principle!) without any risk. Normally these two wires carry an identical current, one being the return of the other.

The third wire, the ground/earth, allows all the chassis of all the equipment in the installation to be linked together. It constitutes a security in the event that one of the pieces of equipment has a break in the isolation of the phase.

In principle, this wire carries no current, and therefore according to the theory above, there should not be any difference in potential between different points along its length. Unfortunately, this is not always the case.

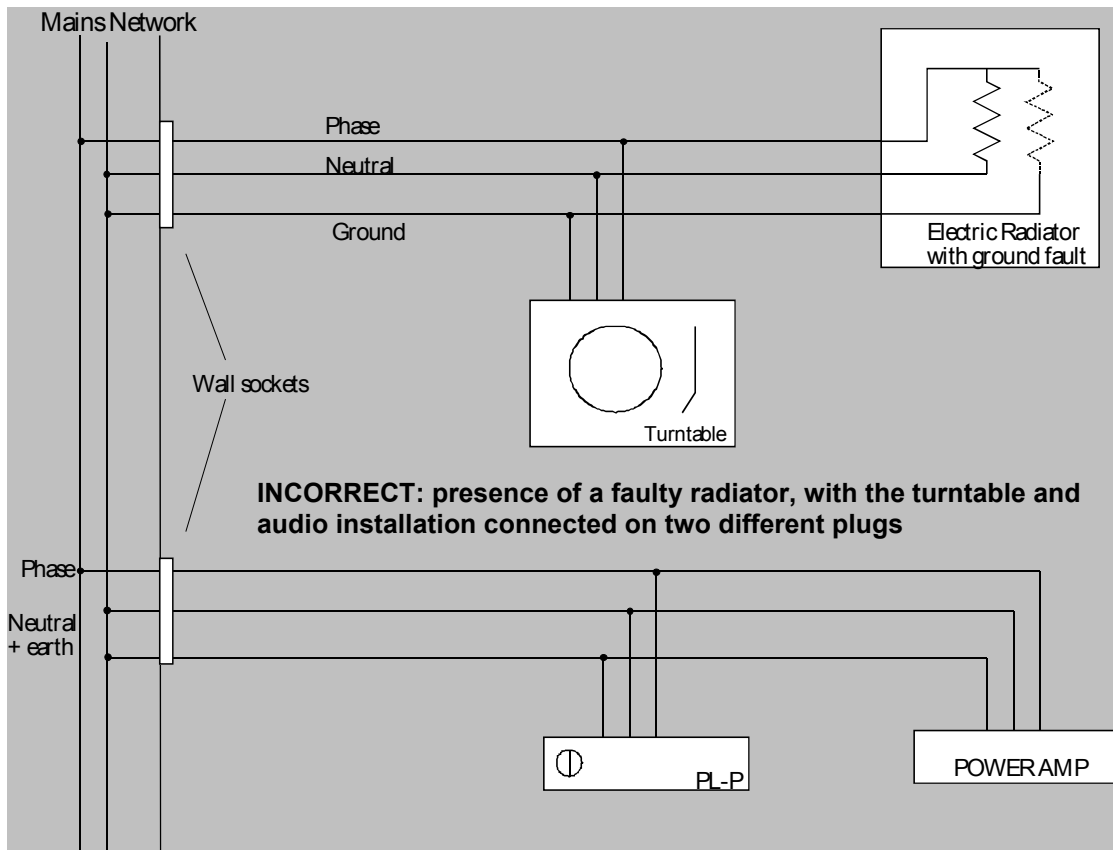
In fact, the demands of modern regulatory standards regarding high-frequency protection, create a significant circulating current along the length of this wire.

In addition, it is possible that various pieces of equipment connected to your AC network, without being defective, present an earth problem, which in itself causes a loop current within this precious earth wire. Finally there is the most frequent case, where the neutral and the earth wires are one, and cause these currents to be carried throughout your installation, causing in most cases terrible AC hum.

If you find yourself confronted with a situation similar to that shown

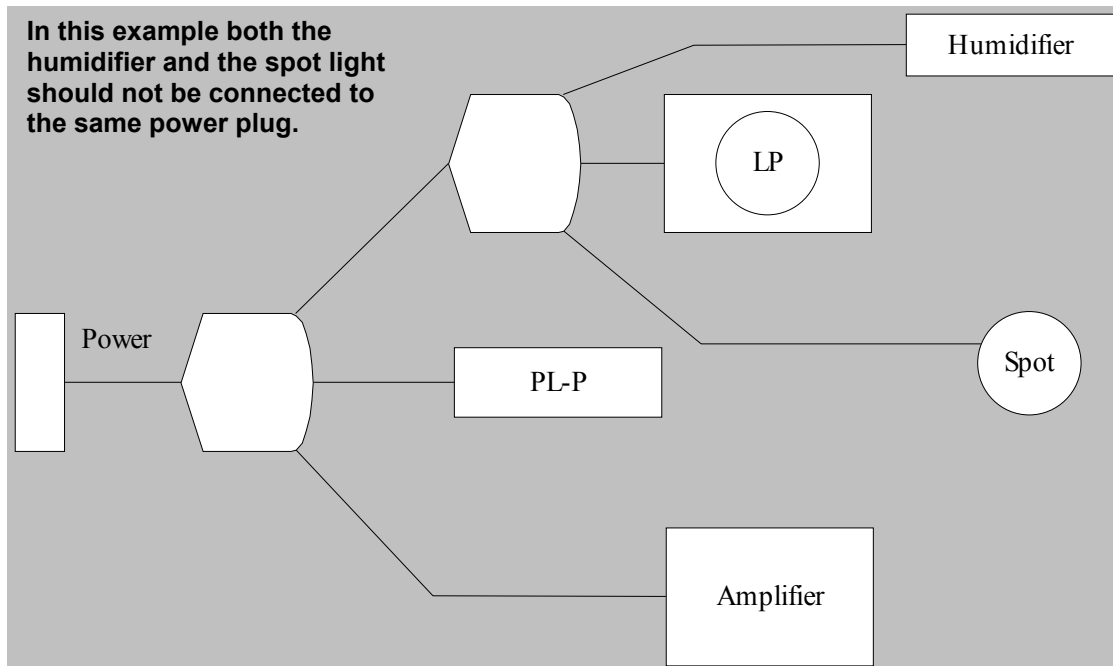
below, you have every chance that
you will be listening to the mains

hum rather than your favorite piece
of music!

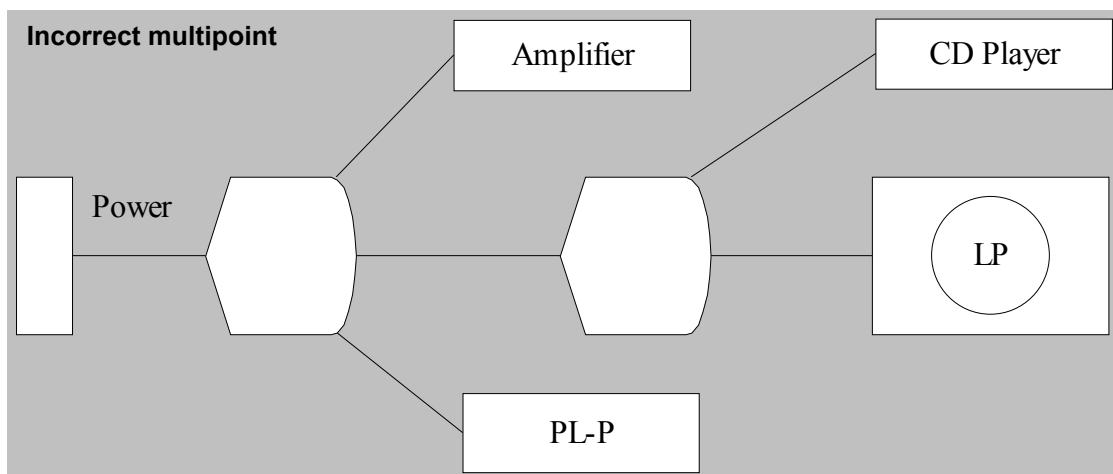


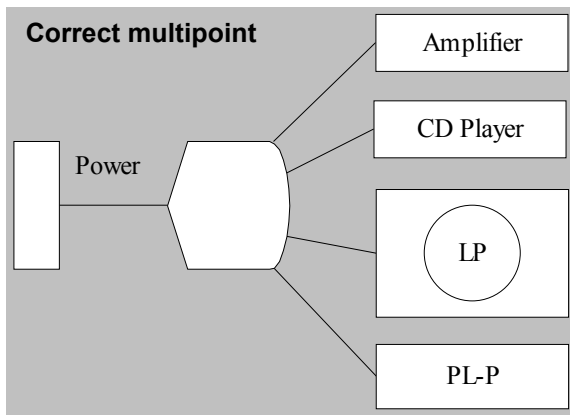
Once the theory above is understood, the recommendations which are to follow may seem somewhat evident. For those who have not followed to this point, simply pay careful attention to the following elementary rules.

1. Power your entire installation from one single wall socket, and avoid connecting any equipment which is not linked to the installation to this power source (i.e. spot lights, etc).

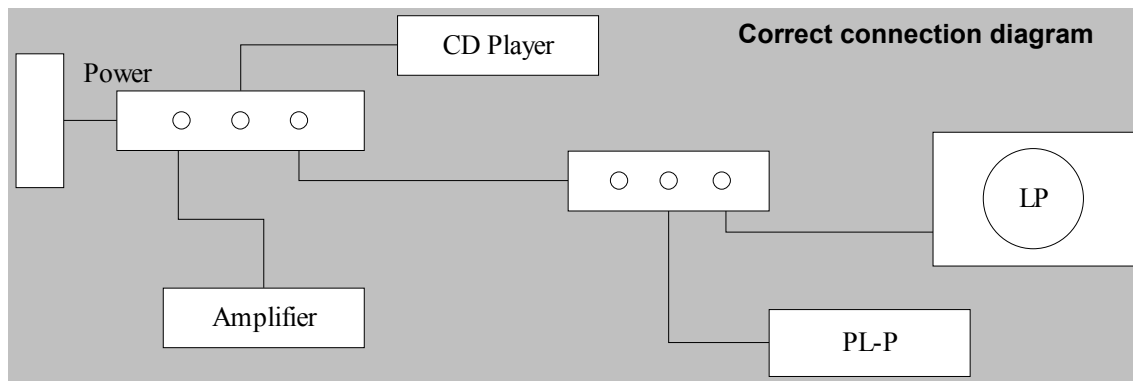


2. From your single power socket, try as much as possible to use “single point” connection rather than multi point (see below).





3. A third solution, which is equally viable, is to connect the individual units to the wall connector starting with the highest power consumers and finishing with the lowest power consumer and equally the units using high-level audio signals together and those with lower levels together, as indicated in the diagram below.



Connection of your PLP

Once if the points mentioned above are respected, the connections between the PL-P and the amplifier as well as those connected to the line inputs of the PL-P should cause no problems.

Only the connection to the turntable must be done with great care. The feeble signal levels coming from the cartridge of the tone-arm can easily be disturbed if the installation is not correct.

In order to overcome all the possible configurations for the installation of your PL-P, it offers a certain number of different possibilities:

1xEarth connector which is securely fixed to the metal chassis of the PL-P.

2xPhono input connectors which are NOT connected to the chassis of the PL-P.

2xInternal jumpers, allowing one or other of the phono connectors to the chassis.

2xInput transformers which act not only as impedance matching in the MC position but also render the two inputs floating.

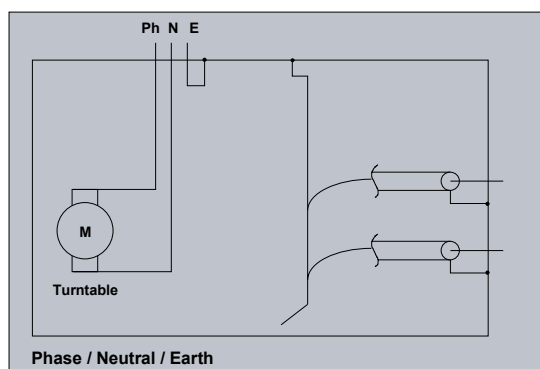
2xInternal jumpers allowing the input transformers to be bypassed if desired.

The location of the jumpers used to change the resistive and capacitive loadings of the cartridge, or the activation of the RIAA rumble filter are not covered in this section.

The configuration of the jumpers mentioned below depend purely on the construction of the turntable.

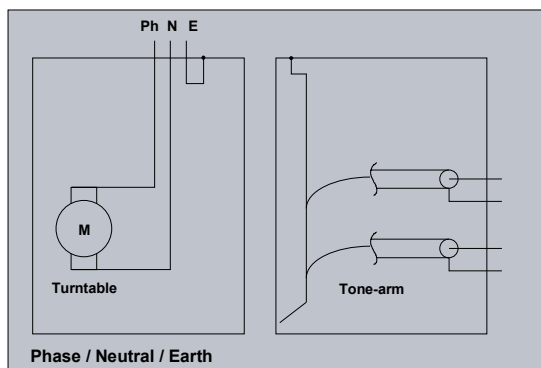
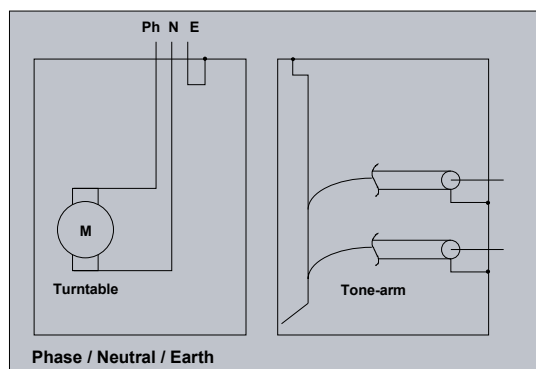
The following situations may be confronted:

A. The turntable is a single block unit.



All the various parts of the unit are connected to the chassis and in turn to the earth wire. (This includes the metal parts of the tone-arm as well as the TWO shielding wires of the signal wires coming from the cartridge.)

B. In the second case, the tone-arm is mounted on a separate base with respect to the platter, and is therefore isolated from it completely; however, the TWO shieldings of the signal cables coming from the cartridge are connected together and in turn they are connected to the metal part of the tone-arm.

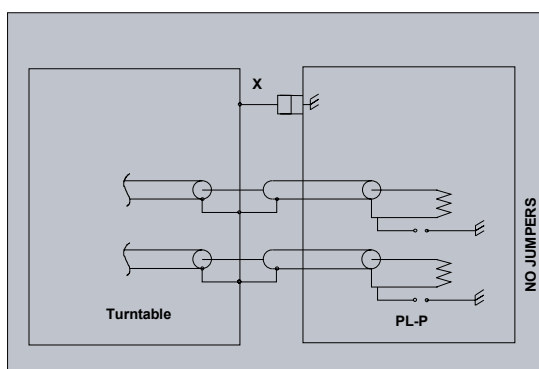


C. In the third case the tone-arm is mounted apart (as in B). However, the shielding wires from the cartridge are floating and are not connected together, or to the metal parts of the tone-arm.

For the three cases mentioned above (A, B and C) we suggest that you set up your according to the three

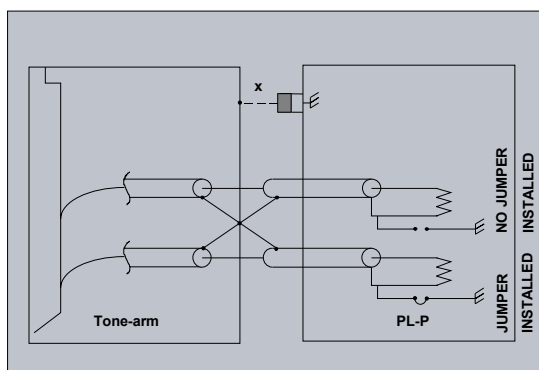
descriptions below (A1, B1 and C1).

A1. *Single-block turntable*



If hum still exists, then verify that the two main power cords (of the PL-P and the turntable) are connected to the mains supply, as close as possible to each other as suggested above in the connection explanation. Floating the earth lead from the turntable may also be tried, as long as the earth connection "X" above is correctly installed.

B1. The **tone-arm is mounted separately** from the turntable, but the two **shieldings are connected together**.

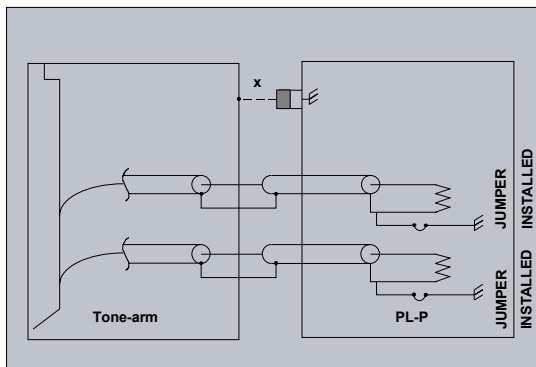


In this case be sure that only ONE of the two jumpers is installed. If you install both jumpers, you will immediately have hum again which will be louder or quieter depending on the distance left between the two cables linking the tone-arm with the PL-P. This is explained by the fact that doing this will form a loop which will pickup magnetic flux from adjacent equipment.

This flux will create, by induction, a current in the two audio cables. The voltage, at the end of each of these cables, will superimpose itself unfortunately onto the signal coming from the cartridge. By removing one of the jumpers, the loop is broken, and the current is prevented from being generated. From this experience we can see that it is beneficial to keep the two signal cables as close together as possible.

In principle the connection “X” between the two chassis has no effect in this case. However, this will create a sensitive loop which could induce hum on the channel which is connected to ground.

C1. The tone-arm is mounted separately and ***the outputs are floating***



In this third case, both the jumpers are installed and the link between the two chassis “X” is obligatory.

For those who have a high-output MM cartridge fitted to the tone-arm, you can bypass the input transformers if desired (see jumpers section). If this is the case you lose the facilities of floating solutions mentioned above.

Specifications

Specifications

Electrical

Phono stage

Moving coil

Sensitivity	0.1	mV	
Loading	0.1 ~ 47kΩ		
S/N ratio	74	dB	0.5 mV, A-weighted

Moving magnet

Sensitivity	0.5	mV	
Loading	47 ~ 837pF		
S/N ratio	80	dB	5.0 mV, A-weighted

Measurement conditions:

Input potentiometers at maximum position, Output potentiometer at 0 dB position.

Line stage

Input impedance	>100	kΩ	
Output impedance	60	Ω	
S/N ratio	> 88	dB	A-weighted
Bandwith	22 ~ 60kHz		+0/-1 dB
Distorsion	< 0.02	%	1 V out, no load at 1 kHz
	< 0.1	%	1 V out, 600Ω load
	< 0.1	%	1 V out, 3kΩ.load

Measurement conditions :

All potentiometers at 0 dB position

Physical

Tubes

Phono stage	1	12 AT 7 / ECC 81
	1	12 AX 7 / ECC 83
	1	5,000-hour usage timer
Line stage	2	12 AT 7 / ECC 81
	4	12 AX 7 / ECC 83
	1	compteur → 5,000 heures

Source d'alimentation

« D » size Nickel-Cadmium
rechargeable power cells 4 Ah
Recharged via PLP-CCC3 AC power
supply unit

Dimensions

Width	12.2"	310 mm
Depth	10.0"	254 mm
Height	3.0"	76 mm

Weight

9 lbs 13 oz.	4.45 kg	with 8 « D » cells
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**DÉCLARATION DE CONFORMITÉ
DECLARATION OF CONFORMITY**



FABRICANT: NAGRA - KUDELSKI, 1033 Cheseaux SUISSE
MANUFACTURER: NAGRA-KUDELSKI, 1033 CHESEAUX, SWITZERLAND

APPAREIL : PL-P et PLP-CCC3
MODEL: PL-P and PLP-CCC3

**NORMES GÉNÉRIQUES APPLICABLES :
APPLICABLE GENERIC NORMS:**

EN 50081-1 (92) pour les émissions
For Emissions
EN 50082-1 (92) pour l'immunité
For Immunity

Par la présente nous déclarons l'équipement conforme aux exigences de protection de la Directive européenne 89/336/CEE relative à la compatibilité électromagnétique pour environnement commercial et l'industrie légère.

We hereby declare that the equipment conforms to the requirements of the European guidelines 89/336/CEE referring to the electromagnetic compatibility for commerce and light industry.

Avertissement.

Cet appareil appartient à la classe A de la norme EN 50081-1 (92). Dans un environnement résidentiel, il peut provoquer des brouillages radioélectriques. Dans ce cas, il peut être demandé à l'utilisateur de prendre des mesures appropriées.

Warning.

This unit falls within the Class A of the norm EN 50081-1 (92). In a residential area it may cause radio interference. In this event the user may be required to take the necessary precautions.

Other electrical regulatory certification pending.

Cheseaux 1^{er} trimestre 1997 Cheseaux

1st quarter 1997

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