

Luxman

VACUUM TUBE CONTROL AMPLIFIER

CL-1000

Owner's Manual

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Installation place

Install this unit in a location where good ventilation and heat radiation are assured.

Especially, installation of this unit where direct sunlight is present, where the temperature rises excessively high such as close to a heater, or where it is humid or dusty may cause a malfunction even if heat is efficiently released.

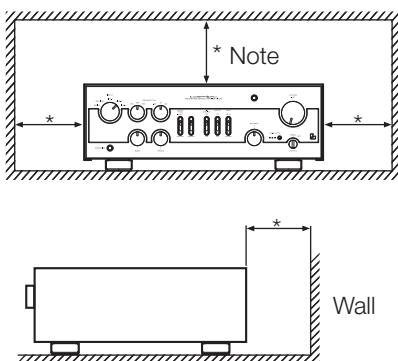
Therefore, do not install this unit in such places.

Ventilation holes

The ventilation holes of this product must not be blocked because this unit is a vacuum tube amplifier and generates considerable heat. If the amplifier is installed on a rack or the like, secure ample space for cooling and leave the door open. Do not pile up other things on the amplifier and never put articles on it. Failure to observe this may cause a malfunction.

Note:

For heat dispersal, do not install this equipment in a confined space such as a book shelf or similar unit.



Precautions in connecting with other components

When connecting this unit to input devices such as a CD player, an SACD player, a tuner, and an analog record player, be sure to turn off the power of this unit and all other connected devices. Failure to observe this may generate a strong noise resulting in speaker damage or cause a malfunction.

The pin-plug to be inserted in each input terminal of this unit shall be pushed in firmly. If the grounding terminal is inadequately connected, noises including hum may be generated, resulting in an adverse S/N ratio.

The sound is not generated shortly after the power supply is turned on.

This amplifier is equipped with a time muting circuit in order to separate the output circuit. Therefore, no sound will be generated shortly after the power supply is turned on.

If the volume control is set to a high sound level before the time muting circuit is canceled, a large sound is suddenly generated. Please be advised that the volume control shall be set to a low level at first and adjusted after the sound comes out of the speakers.

Repair and adjustment

When repairs and adjustments are needed, please consult with the dealer where you bought the unit.

Cleaning

For cleaning, use a piece of soft cloth to wipe the unit such as cleaning cloth. When the dirt is hard to remove, use a small amount of neutral detergent to wipe, and then wipe the unit with dry cloth. Do not use a solvent like benzine or thinner because such a substance can damage the exterior.

Safety caution

Caution

This unit is heavy. Be careful when unpacking, carrying, and installation.

This unit is a vacuum tube control amplifier. In the state of the unit in operation, the main body gets hot. Be careful not to touch it with your bare skin. For safety, do not use this product in a place where children or unchained animals are present.

Features of This Unit

LECUA

LUXMAN Electronically Controlled Ultimate Transformer Attenuator

The 34-contact transformer type attenuator in which FINEMET® core is used is switched with paired 34 pieces of relays. The transformer type attenuator can suppress the DC resistance generated in series with the signal transmission line.

FINEMET® manufactured by Hitachi Metals, Ltd. is used for the core material of the transformer type attenuator like MQ-300, and therefore, this attenuator features excellence in the audible frequency characteristic and little change in sound quality because of low permeability and low core loss in a wide band.

Minimization and the same length of the connection wires between the attenuator and relays at all the 34 contacts can make changes in sound quality due to sound levels minimize.

Vacuum tube amplification circuit

The attenuator driver circuit, tone control circuit, and flat amplifier circuit contain a vacuum tube manufactured by JJ Electronic (Slovakia) (E88CC x 6).

Vacuum tube, E88CC-JJ

E88CC is an SQ (abbreviation of Special Quality) tube whose characteristics are the same as those of the reliable tube and features low noise.

Phono equalizer circuit equipped in EXT-IN

The phono equalizer circuit that contains FET and an operational amplifier is used. MM, MC, or impedance can be selected in accordance with the cartridge to be used. The capacitor that we recommend can be also selected.

Balanced input circuit

A dedicated super permalloy transformer is equipped in the input circuit.

Balance output circuit

A dedicated super permalloy transformer is equipped in the output circuit.

PHASE INVERT function

The phase can be switched in accordance with the polarity of the balanced input or output device to be connected to this unit.

The phase of the unbalanced output of this unit can also be switched.

ARTICULATOR function

Clear sound can be reproduced thanks to demagnetization and tuning of the attenuator transformer.

After the power is turned on, the attenuator transformer is automatically demagnetized during the mute function activated. This operation can be conducted even manually with the use of the ARTICULATOR switch.

A signal is generated by the internal oscillator, this signal is gradually decreased, and then the attenuator transformer is demagnetized. If the internal oscillator is not in use, the power of it is turned off. Therefore, the oscillator does not interfere with the audio circuit at the normal use.

Eliminating resistance of audio signal line

Elimination of the resistance generated in series with the audio signal line from input to output allows sound quality degradation to be reduced and superior sound reproduction to be realized. (Resistance is present when phono equalizer is activated and the LINE STRAIGHT switch is set to off)

Tone control

LUX type tone control circuit is used, which is a classic style. This unit is also equipped with the bass/treble tone control function that can select the turnover frequency from three positions to allow the tone quality to be finely adjusted.

Wooden top cover

A U-shaped wooden top cover is used, which matches with classic design.

Gloss coating finish with rosewood color is applied on walnut veneer.

Highly stable power supply

Highly stable power supply circuit that combines a large-capacity EI-core-type power transformer with customizable block capacitors.

Schottky barrier diodes

By using Schottky barrier diodes, manufactured by KYOCERA (former Nihon Inter Electronics Corporation), this unit achieves higher DC conversion efficiency in the rectifier circuit and much less switching noise.

Original LUXMAN's OFC wiring

Our original un-plated OFC wiring with spirally wrapped shielding is used for all internal connections to ensure smooth, pure signal transmission.

Loopless chassis structure

This unit features a loop-less chassis, independently constructed to eliminate increases in ground impedance caused by chassis current.

Input/output terminals

RCA terminal made of copper alloy and XLR terminal manufactured by Neutrik.

Selector relay

Selector relay with high sound quality used in the key point of LUXMAN amplifier, which enhances the separation and crosstalk performances.

Floating structure

Every block of the vacuum tube has a floating structure to reduce microphonic noise.

Cast-iron insulator

This unit is equipped with gradation cast-iron insulators that cuts out unnecessary external vibration and strongly supports the weight of this unit.

Low cut, monaural

This unit has a low cut switch to suppress woofer fluctuation caused by a warped analog record and a monaural switch that is useful at monaural record playback.

Two lines of unbalanced output

This unit has two lines of output terminals that are useful for wiring in the bi-amplifier structure in which two power amplifiers are used. (two lines always output)

Two lines of balanced output

This unit has two lines of output terminals that are useful for wiring in the bi-amplifier structure in which two power amplifiers are used. (two lines always output)

Custom-made parts

LUXMAN's original high sound quality oil capacitors are used.

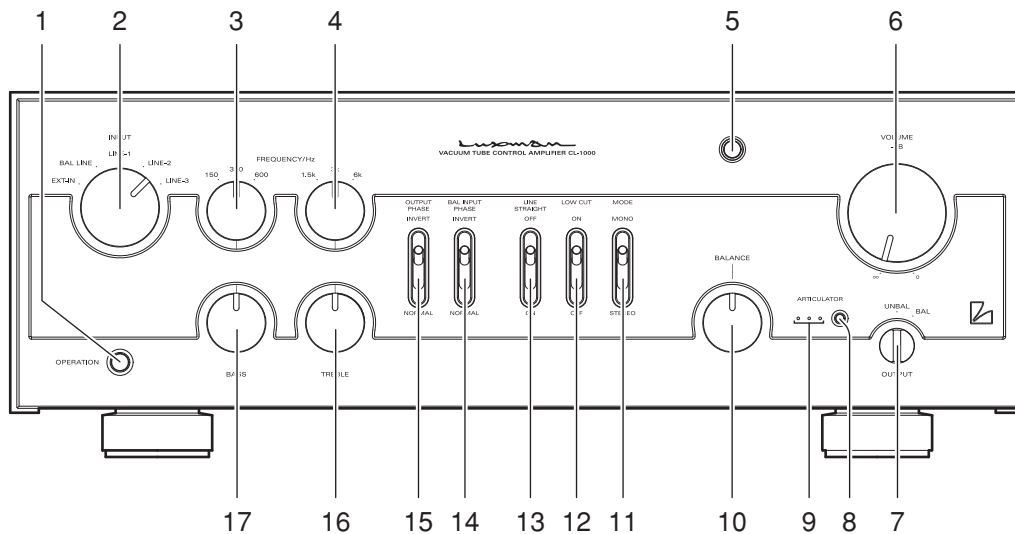
Highly reliable design

Prolonged life and highly reliable design have been achieved by providing operating conditions of vacuum tubes with some allowance.

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- FINEMET® is a registered trademark of Hitachi Metals, Ltd.
 - The described company names and product names are trademarks or registered trademarks of each company.
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Names and Functions

Front panel



1. Operation switch (OPERATION)

Toggles the power on and off.

When wiring or connection is performed, be sure to turn off this switch. When turning on the power switch again after turning the unit off, wait for more than one minute.

2. Input selector (INPUT)

Selects an input device from the devices such as a CD player, an SACD player, a tuner, and an analog player connected to each input terminal.

This selector has five positions consisting of LINE-1, LINE-2, LINE-3, BAL LINE and EXT-IN that correspond to each input terminal on the rear panel. To select an input source, set the selector to the position of the input source to be played back.

The EXT-IN is used for PHONO input.

3. Low frequency selector switch (FREQUENCY/Hz)

Toggles to select frequencies from 150 Hz, 300 Hz, 600 Hz. For example, when 150 is selected, the frequencies of 150 Hz and lower can be adjusted by the tone control for bass.

4. High frequency selector switch (FREQUENCY/Hz)

Toggles to select frequencies from 1.5 kHz, 3 kHz, 6 kHz. For example, when 1.5 k is selected, the frequencies of 1.5 kHz and higher can be adjusted by the tone control for treble.

5. Pilot light

This switch turns on and off the power. When connecting the input/output terminals, be sure to turn off this switch. This light blinks during mute.

6. Volume control (VOLUME)

Adjusts the sound volume.

There are 34-step changes between ∞ and 0 (-dB).

Sound is not generated when this control is rotated counterclockwise to the end. The sound volume gradually becomes higher as the control is rotated clockwise.

7. Output selection switch (OUTPUT)

Switches the output between unbalanced output and balanced output. Both outputs cannot be activated at the same time.

- Unbalanced output (UNBAL)
Outputs a sound signal from LINE-1 and LINE-2.
- Balanced output (BAL)
Outputs a sound signal from BAL LINE-1 and BAL LINE-2.

8. Articulator switch (ARTICULATOR)

Articulator means tuning, and this function performs demagnetization by using an internal oscillator.

Pressing this button starts demagnetization and the articulator indicator is displayed. The demagnetization operation takes approximately 30 seconds. No sound is outputted during the period.

The transformer attenuator, LECUTA, is demagnetized, and accordingly, lush sound expression is resuscitated.

Setting the volume position to 9 to 10 demagnetizes the output transformer thanks to the articulator function.

CAUTION:

After completion of the articulator, the mute function is canceled. Therefore, be careful with the playback sound volume.

9. Articulator indicator

The progress level of the articulator is displayed with the LED.

- ○ ○ Internal signal oscillating
- ○ Signal gradually decreasing
- Stop of oscillation circuit and power-off
- ⦿ End (light off)

10. Balance control (BALANCE)

Adjusts the balance of sound volume between right and left channels. Rotating the control counterclockwise gradually cuts the volume of the right channel, rotating the control clockwise gradually cuts the volume of the left channel. This knob shall be set to the center position under normal conditions, and rotated to make adjustment if necessary.

11. Mode switch (MODE)

Changes the output mode.

- MONO : Mixes the signals from right and left channels.
- STEREO : Provides normal stereophonic playback.

12. Low cut switch (LOW CUT)

Toggles the low-frequency cutoff function on and off.

- OFF : Provides the normal state.
- ON : Cuts low frequencies below 30 Hz at a -6 dB/octave slope.

* This is useful when the woofers of speakers vibrate due to the warped record during record playback.

13. Line straight switch (LINE STRAIGHT)

Bypasses the tone control circuit and balance control circuit.

OFF : Enables the low-frequency band and high frequency band to be adjusted with the tone control (TONE CONTROL) and enables the balance control (BALANCE) of the right channel and left channel to be adjusted.

ON : Bypasses the tone control circuit and balance control circuit. When the line straight switch is set to on, the tone control (TONE CONTROL) and balance control (BALANCE) cannot be adjusted.

14. Balanced input phase inversion switch (BAL INPUT PHASE)

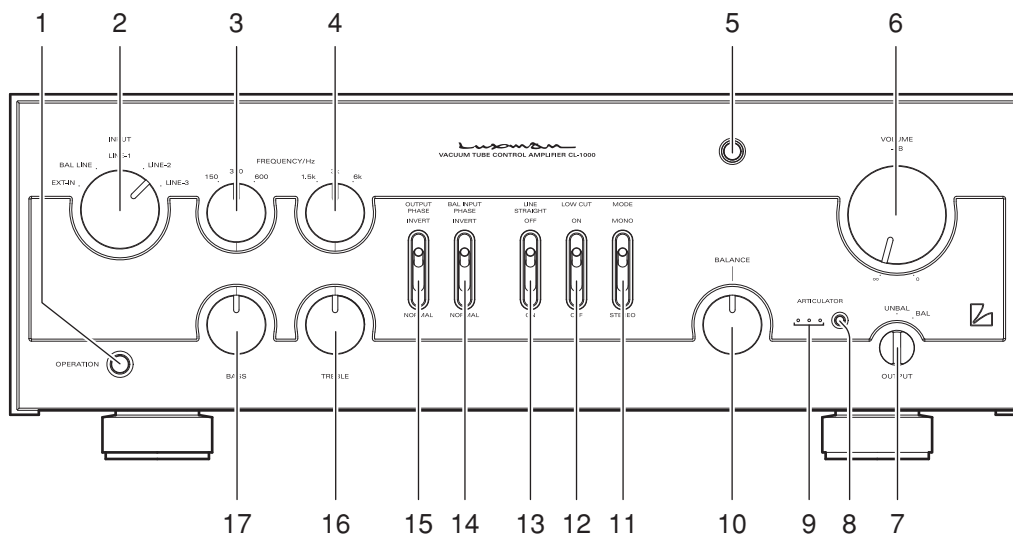
Switches the phase when the balance input terminal is used.

The phase shall be corresponding to the phase of the input device.

- NORMAL : ① GROUND
② COLD (-)
③ HOT (+)
- INVERT : ① GROUND
② HOT (+)
③ COLD (-)

Names and Functions

Front panel



15. Output phase inversion switch (OUTPUT PHASE)

Inverts the phases of the unbalanced output and balanced output. The phase shall be matched with the phase of the input device such as a power amplifier.

When the output mode is set to the balanced output (BAL):

- NORMAL : ① GROUND
 ② COLD (-)
 ③ HOT (+)

- INVERT : ① GROUND
 ② HOT (+)
 ③ COLD (-)

When the output mode is set to unbalanced output (UNBAL):

- NORMAL : Normal phase
 INVERT : Reversed phase

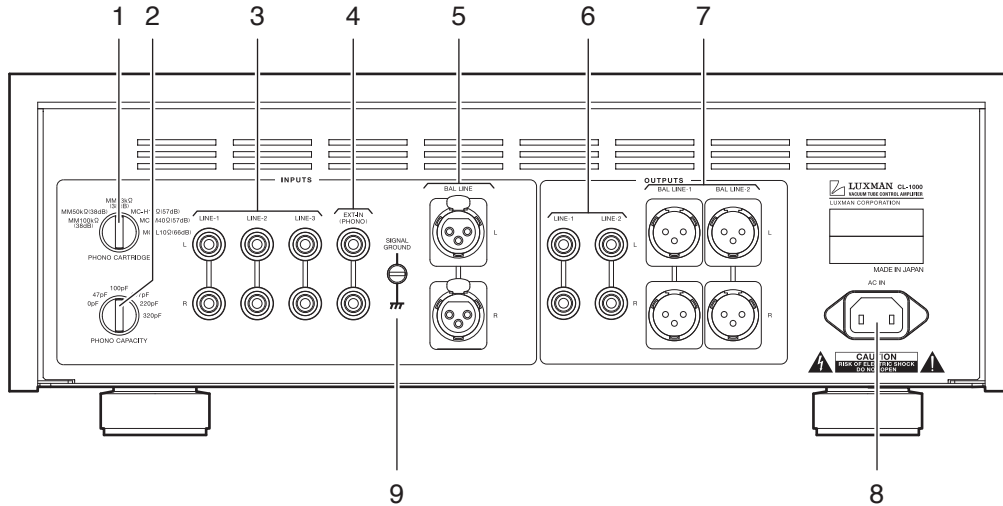
16. Tone control for treble (TREBLE)

Controls the frequency characteristics of the high-frequency range. When this switch is set in the center position, flat frequency characteristics is obtained. Rotating the knob clockwise makes the high frequency range enhanced, and rotating the knob counterclockwise makes the high frequency range attenuated.

17. Tone control for bass (BASS)

Controls the frequency characteristics of the low-frequency range. When this knob is set to the center position, flat frequency characteristic is obtained. Rotating the knob clockwise makes the low frequency range enhanced, and rotating the knob counterclockwise makes the low frequency range attenuated.

Rear panel



1. Cartridge selection switch (PHONO CARTRIDGE)

Selects MM, MC, impedance, or gain in accordance with the cartridge to be used.

Conduct setting in accordance with the specifications of the cartridge or your favorite.

Cartridge selection	MM	MC-H	MC-M	MC-L
Impedance	100 k Ω / 50 k Ω /33 k Ω	1 k Ω	40 Ω	10 Ω
Gain	38 dB	57 dB	57 dB	66 dB

2. Input capacitor selection switch (PHONO CAPACITY)

Selects an input capacitor in accordance with the cartridge to be used.

Conduct setting in accordance with the specifications of the cartridge or your favorite.

Selectable capacitors are the following: 0 pF/47 pF/100 pF/147 pF/220 pF /320 pF

3. Unbalanced input terminals/INPUTS (LINE-1, LINE-2, LINE-3)

Coaxial input terminal to receive unbalanced audio signals of a line level

Connect these terminals to an unbalanced output of an input device such as a CD player with a pin-plug cable. Incoming audio signals are selected with the input selector and delivered.

4. EXT-IN (PHONO) terminal

Is an input terminal to connect an analog record player.

Do not connect a CD player or other devices whose output level is high to this terminal.

Normal playback cannot be achieved due to sound crack.

5. Balanced input terminals/INPUTS (BAL LINE)

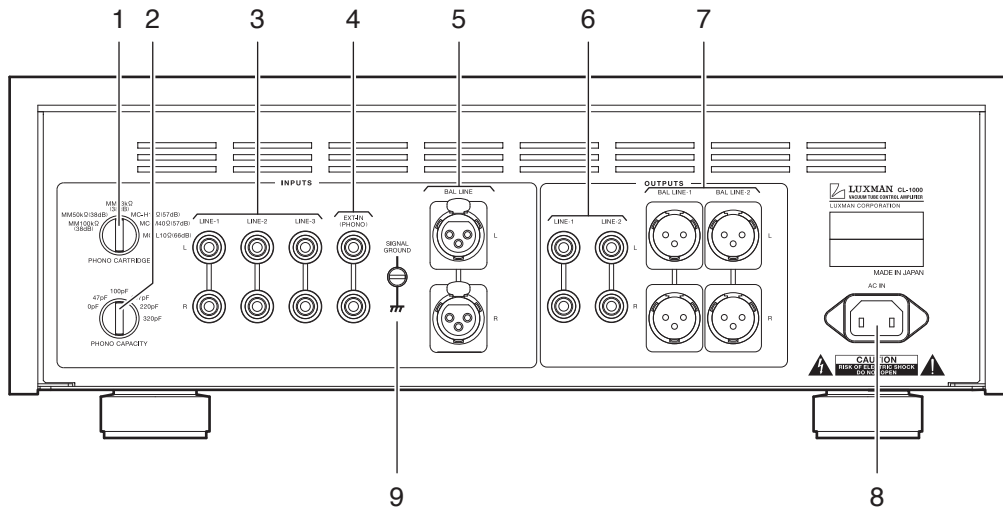
This terminal is an XLR connector input terminal to receive balanced audio signals of the line level.

Connect these terminals to a balanced output of an input device such as a CD player with a balanced cable.

Incoming audio signals are selected with the input selector and delivered.

Names and Functions

Rear panel



6. Unbalanced output terminals/OUTPUTS (LINE-1, LINE-2)

RCA terminals to provide unbalanced audio signals of this unit. Connect these terminals to an unbalanced input of an output device such as a power amplifier with a pin-plug cable. Audio output signals are selected with the output selection switch.

LINE-1, LINE-2 have the same sound quality.

7. Balanced output terminals/OUTPUTS (BAL LINE-1, BAL LINE-2)

XLR output terminals to provide balanced audio signals from this unit.

Connect these terminals to a balanced input of an output device such as a power amplifier with a balanced cable.

Audio output signals are selected with the output selection switch.

BAL LINE-1 and BAL LINE-2 have the same sound quality.

8. AC inlet (AC IN)

Connects the accessory power cable.

The power shall be supplied from a household wall socket.

9. Signal ground terminal (SIGNAL GROUND)

Is a ground terminal for devices to be connected to this unit.

This terminal is used to reduce noise when other devices are connected. This terminal is designed not for safety.

Before connecting

Before connecting other devices, connect the jack side of the accessory power cable to the AC inlet of this unit.

Before connection is made, turn off the main power switch of this unit and the power of all other connected devices to prevent accidents due to noises generated unexpectedly.

How to connect power supply

Use the accessory power cable and insert the AC plug in an outlet on the wall in the room where the unit will be installed.

How to connect an analog record player

1. Mount a cartridge on the tone arm in an appropriate way by referring to the operating instructions of the analog player and cartridge to be used.
2. Insert the pin-plugs of an RCA pin-plug cables from the tone arm with a cartridge mounted into the input terminals of this unit. At this moment, be sure to make a connection without a mistake between the R-channel and L-channel. If the grounding side of the pin-plug cables is inadequately connected, noises including hum may be generated, resulting in an adverse effect on the S/N ratio.
3. Grounding between analog players to be connected and this unit is needed. Be sure to connect the ground wires that come from tone arms in parallel with pin-plug cables to the ground terminals of this unit.
If the ground wires are inadequately connected, noises including hum may be generated, resulting in an adverse effect on the S/N ratio.

Do not connect the output of an analog player with phono equalizer embedded to this unit. Failure to observe this may not only distort the amplifier signals but also cause a malfunction.

Connect the output of an analog player with phono equalizer embedded to the line input of this unit.

How to connect the input terminals to input devices such as a CD player

Connect between the output terminals of an input device such as a CD player and the input terminals of this unit with pin-plug cables or balanced cables.

At this moment, exercise extra care not to conduct wrong connection between the right and left channels. If the right and left channels are connected reversely, the localization of sound images is deteriorated, thus failing in normal stereo playback.

If pin-plug cables are used, inadequate connection of the grounding of the cables may generate noises including hum, resulting in an adverse S/N ratio. Surely insert the connection plug.

How to connect the output terminals to output devices such as a power amplifier

Connect between the input terminals of an output device such as a power amplifier and the output terminals of this unit with pin-plug cables or balanced cables.

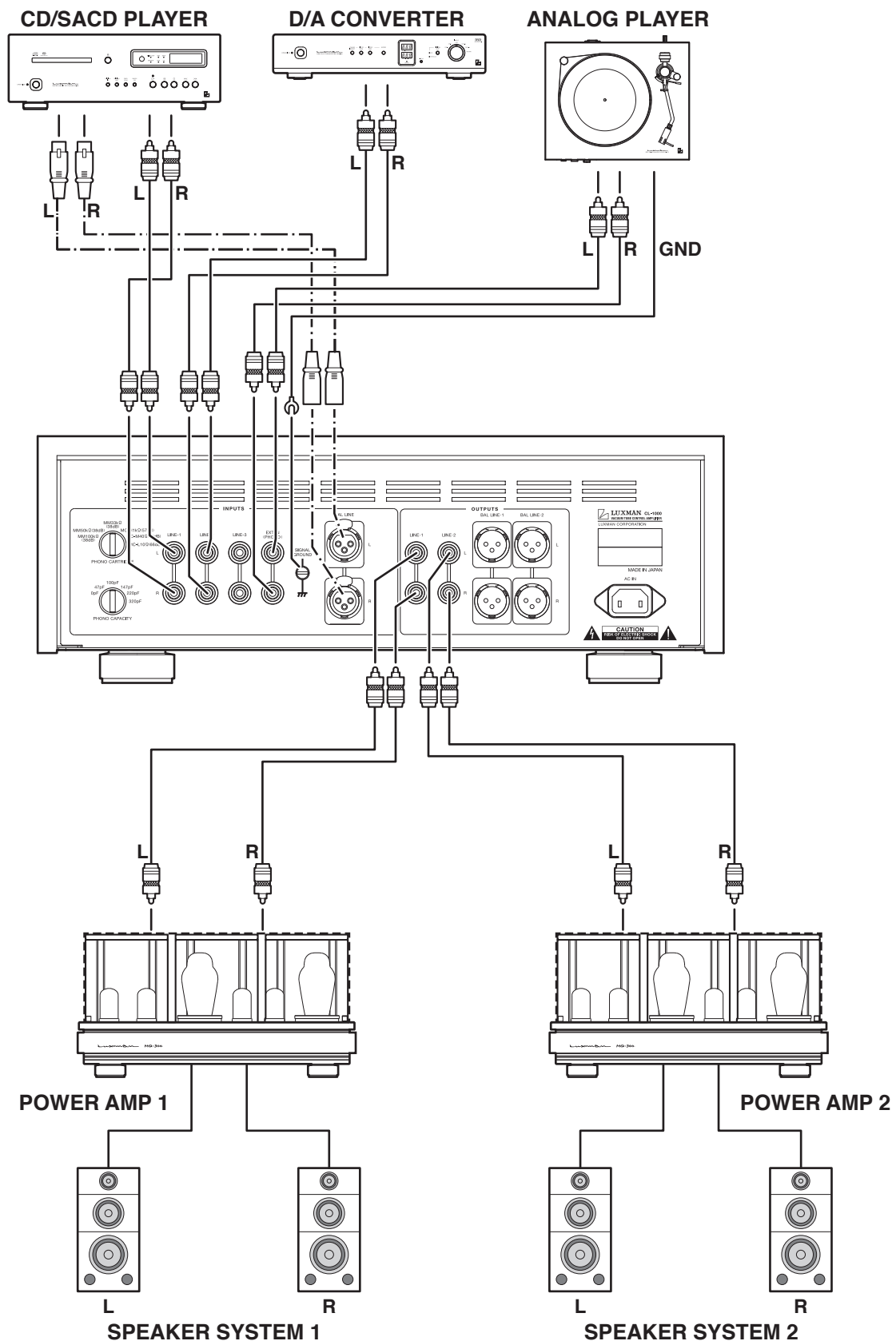
At this moment, exercise extra care not to conduct wrong connection between the right and left channels. If the right and left channels are connected reversely, the localization of sound images is deteriorated, thus failing in normal stereo playback.

If pin-plug cables are used, inadequate connection of the grounding of the cables may generate noises including hum, resulting in an adverse S/N ratio. Surely insert the connection plug.

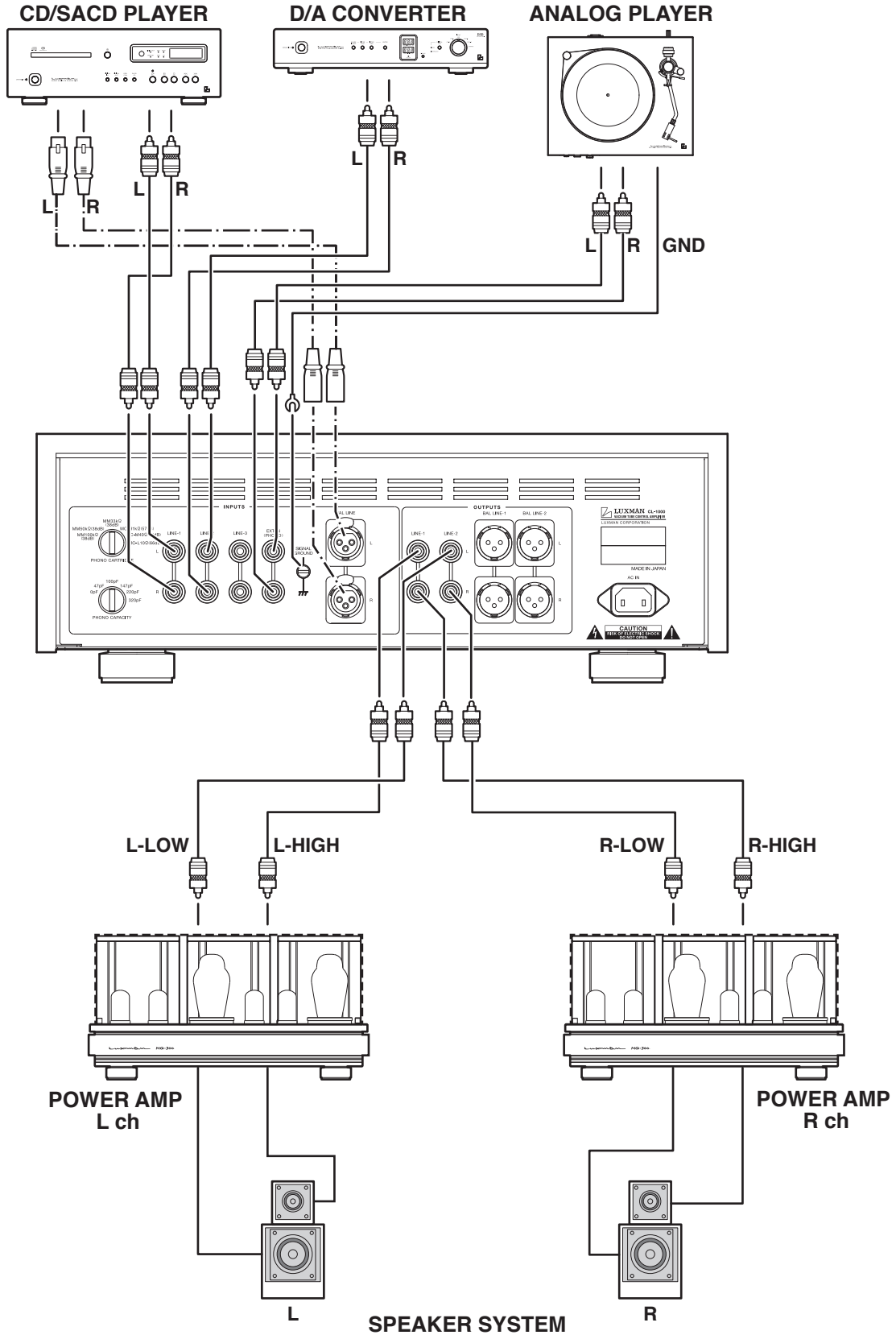
When this unit is connected to an input/output device, turn off the power of this unit to protect the amplifier and speakers from excessive input. Also turn off the power of the input/output devices connected to this unit. After connection, ensure that connections are appropriately performed and turn this unit and the input/output devices to the operating state.

Connections

Normal stereophonic playback



Bi-amplifier/stereophonic playback



Operations

Before operation

1. Ensure that the connections are correctly performed. (Normal playback cannot be achieved with wrong connections of R and L.)
2. When the power is toggled between on and off or the input selector is changed over, set the volume control to the minimum position in advance.

Playback procedure

1. Press the operation switch to turn on the switch after ensuring that the volume control is set to the minimum position.
2. Select a source to be reproduced with the input selector.
3. Adjust the sound level with the volume control.
4. Operate the line straight switch, balance control, tone control, and the like according to the source to be played back.

How to operate line straight switch (LINE STRAIGHT)

The line straight switch is used to play sound with the shortest signaling route for enhancing the purity of the source selected with the input selector. When this switch is set to on, the tone control and balance control are bypassed. When the line straight switch is set to on, the tone control (BASS, TREBLE) and balance control (BALANCE) cannot be adjusted.

How to operate balance control (BALANCE)

The balance control allows users to adjust the balance of sound volume between right and left channels. When the balance adjustment is not required, the balance control is set to the center position.

When the line straight switch (LINE STRAIGHT) is set to on, the right and left sound volumes cannot be changed even if the balance control (BALANCE) is operated.

How to operate tone control (BASS, TREBLE)

This unit has the tone control function for the low-frequency and high frequency ranges.

The low-frequency tone control (BASS) is a function to adjust the tone range lower than the selected one with the selector switch (FREQUENCY/Hz for low-frequency).

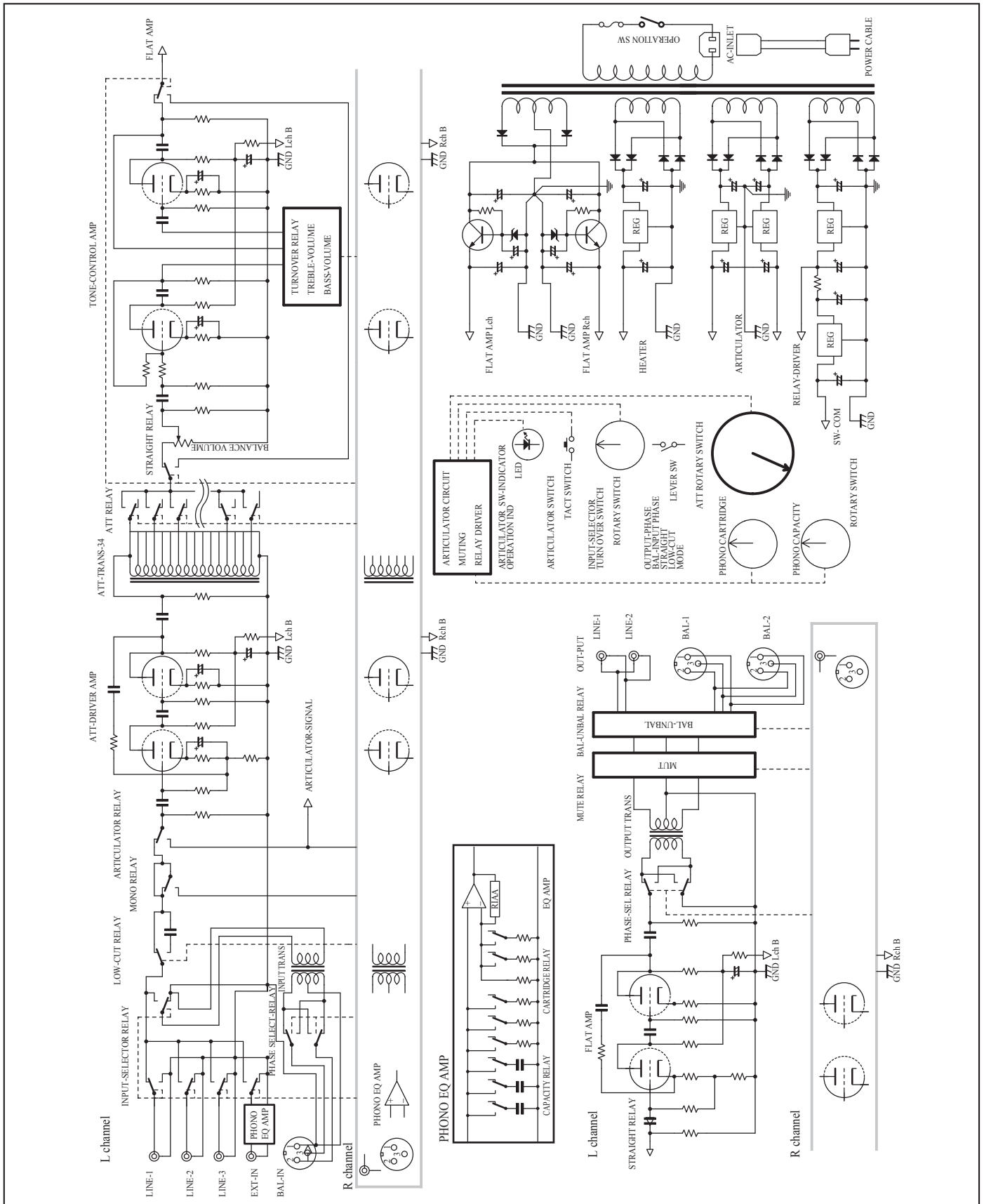
The tone control is set to flat frequency characteristics at the center position. Rotating the control clockwise makes the low-frequency range enhanced, and rotating the control counterclockwise makes the low-frequency range attenuated. The high-frequency tone control (TREBLE) is a function to adjust the tone range higher than the selected one with the selector switch (FREQUENCY/Hz for high-frequency).

The tone control is set to flat frequency characteristics at the center position. Rotating the control clockwise makes the high-frequency range enhanced, and rotating the control counterclockwise makes the high-frequency range attenuated.

For both the low-frequency and high-frequency ranges, the right and left channels interlockingly function.

When the line straight switch (LINE STRAIGHT) is set to on, the bass and treble levels are not changed even if the tone control is operated.

Block Diagram



Specifications

Input sensitivity	LINE	: 180 mV/1 V output, 1 kHz, load 50 k Ω
	BAL LINE	: 180 mV/1 V output, 1 kHz, load 50 k Ω
	EXT-IN (PHONO)	
	MM 100 k Ω (38 dB)	: 2.2 mV/1 V output, 1 kHz, load 50 k Ω
	MM 50 k Ω (38 dB)	: 2.2 mV/1 V output, 1 kHz, load 50 k Ω
	MM 33 k Ω (38 dB)	: 2.2 mV/1 V output, 1 kHz, load 50 k Ω
	MC-H 1 k Ω (57 dB)	: 0.26 mV/1 V output, 1 kHz, load 50 k Ω
	MC-M 40 Ω (57 dB)	: 0.26 mV/1 V output, 1 kHz, load 50 k Ω
MC-L 10 Ω (66 dB)	: 87 μ V/1 V output, 1 kHz, load 50 k Ω	
Input impedance	LINE	: 90 k Ω /1 kHz
	BAL LINE	: 70 k Ω /1 kHz
	EXT-IN(PHONO)	: MM 100 k Ω , 50 k Ω , 33 k Ω MC 1 k Ω , 40 Ω , 10 Ω
Maximum output	LINE	: 18 V/distortion 1 %, 1 kHz, load 50 k Ω
	BAL LINE	: 18 V/distortion 1 %, 1 kHz, load 50 k Ω
Output impedance	LINE/BAL LINE	: 1 k Ω /1 kHz
Total harmonic distortion	LINE/BAL LINE	: 0.016 %/1 V output, 1 kHz, load 50 k Ω
	EXT-IN (PHONO) MM	: 0.3 %/1 V output, 1 kHz, load 50 k Ω
	EXT-IN (PHONO) MC-H.M	: 0.3 %/1 V output, 1 kHz, load 50 k Ω
	EXT-IN (PHONO) MC-L	: 0.5 %/1 V output, 1 kHz, load 50 k Ω
Frequency response	LINE/BAL LINE	: +0.3, -0 dB/1 V output, 20 Hz to 20 kHz, load 50 k Ω
	EXT-IN (PHONO)	: \pm 0.3 dB/1 V output, 20 Hz to 20 kHz, load 50 k Ω
S/N ratio	LINE/BAL LINE	: 120 dB (IHF-A)/distortion 1 %, 1 kHz, load 50 k Ω
	EXT-IN (PHONO) MM	: 108 dB (IHF-A)/distortion 1 %, 1 kHz, load 50 k Ω
	EXT-IN (PHONO) MC-H.M	: 92 dB (IHF-A)/distortion 1 %, 1 kHz, load 50 k Ω
	EXT-IN (PHONO) MC-L	: 83 dB (IHF-A)/distortion 1 %, 1 kHz, load 50 k Ω
Tone control	Max. amount of change	: \pm 8 dB
	Bass turnover frequency	: 150 Hz, 300 Hz, 600 Hz
	Treble turnover frequency	: 1.5 kHz, 3 kHz, 6 kHz
Low cut	30 Hz (-6 dB/oct.)	
Input	Line x 3, phono (EXT-IN) x 1, balanced line x 1	
Output	Line x 2, balanced line x 2	
Supplied functions	[Front panel]	
	<ul style="list-style-type: none"> • Operation switch • Volume control • Articulator switch • Balance control • Input selector • High/low frequency selector switch • Line straight switch • Balanced input phase inversion switch • Tone control • Output selection switch • Low cut switch • Mode switch • Output phase inversion switch 	
	[Rear panel]	
	<ul style="list-style-type: none"> • Input/output terminals • Signal ground terminal • AC inlet • Cartridge selection switch • Input capacitor selection switch 	
Circuiting system	2-step amplification P-K NF type, tone control P-G NF type, phono equalizer amplifier NF type	

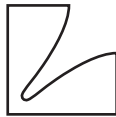
Vacuum tube used	E88CC (manufactured by JJ Electronic/reliable tube) x 6	
Accessories	<ul style="list-style-type: none">• Power cable• Terminal protection cap	<ul style="list-style-type: none">• Owner's Manual (This document)• Safety cautions
Power supply	230 V ~ (50 Hz)	
Power consumption	52 W	
Max. external dimensions	460 (W) x 166 (H) x 454 (D) mm (including 13.5 mm front knob and 14.5 mm rear terminals)	
Weight	24.4 kg (main unit)	

* Specifications and appearance are subject to change without notice.

Before Asking for Repair Service

While in use, this unit may display phenomena which may be confused as malfunctions. Before contacting your country's official LUXMAN distributor for repair services, please read the operating instructions and operating instructions for any connected input and through output devices and check the troubleshooting table below. If the cause of the malfunction cannot be identified, please contact your dealer. After LUXMAN's representatives have accepted your request for repair services, inspection fees and transportation expenses may be claimed, even though the unit may be found to be operating normally.

Problem	Cause	Solution
No power is supplied even though the operation switch is pressed. The pilot light does not turn on.	• The power plug is disconnected from the wall outlet, or it is not completely inserted.	• Insert the power plug in the wall outlet completely.
	• The power plug is disconnected from the AC inlet, or it is not inserted completely.	• Securely insert the power plug in the AC inlet completely.
No sound is generated.	• The volume control or attenuator of the power amplifier is set to the minimum level.	• Rotate the volume control or attenuator of the power amplifier to adjust the sound volume.
	• The input selector is not set to the source to be reproduced.	• Set the input selector to the source to be reproduced.
	• The connected output terminal does not match the selected output mode setting.	• Adjust the output mode of the connected output terminal according to the selected output mode.
	• Cable connections are incomplete.	• Make cable connections securely.
Sound is generated but the sound volume is low. The sound volume is low only at one side channel.	• The balance control is rotated in a one-sided manner.	• The balance control shall be set to the center position under normal conditions.
	• The attenuator of the power amplifier is set to on.	• Set the attenuator to off.
Humming sound (boon or zzz noise) is generated.	• The grounding side of the connection cable has no contact with the terminal.	• Make cable connections securely.
	• Induction noise is picked up from the power transformer of another device.	• Install it distant from other devices. Use a wall socket of a different line.
	• The input/output cables and speaker cables are too close to the power cable.	• Keep the input/output cables and speaker cables away from the power cable.
There is no effect of tone control.	• The line straight switch is set to ON.	• Set the line straight switch to OFF.



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