

OCTAVE

MRE 220 SE

Owner's Manual

English

INTRODUCTION

Congratulations and thank you for choosing OCTAVE

MRE 220 SE

You are now the owner of one of the world's most innovative and reliable amplifiers. Look after it, and it will provide you many years of listening pleasure.

You often hear people claim that tube amplifier design has not progressed for years. The operating principles of tubes have indeed been documented extensively and are well known to amplifier designers. Of course, the same can be said for transistor amplifiers.

However, advances in both technologies are still possible thanks to the development of innovative and improved components, our greater appreciation of the fundamental principles and, of course, deeper and more advanced insights into the interaction of amplifier and loudspeaker. With tube amplifiers in particular, a general reluctance to depart from the classic circuit designs has not done the technology any favors. Although today's loudspeakers and source equipment provide better performance than ever before, they also present greater demands on amplifiers. Modern sound reproduction equipment delivers a level of performance at a price that simply would not have been possible 20 or even 10 years ago.

These advances have been achieved through the application of the latest technological developments as they become available and affordable. OCTAVE has specialized in tube amplification for the past 30 years, during which time we have developed a number of innovative technologies that have earned us a reputation as one of the leaders in the field.

Here's wishing you many happy hours of musical pleasure!



Andreas Hofmann

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1. DESCRIPTION OF THE MRE 220 SE

The history of the Octave MRE mono power amplifiers goes back to 1994. The first series was called MRE 120. From the beginning, the idea behind this development was to develop tube power amplifiers that would transfer the charm of the tube to a variety of loudspeakers. Therefore, dynamics, pure performance, bandwidth and absolute stability are the prerequisites to achieve this goal. A key feature of this new series of mono power amplifiers was the development of our advanced pentode circuit. This design found its way into all of our top amplifiers, including the Jubilee series.

The MRE 120 received a lot of praise and was replaced in 2004 by the further development MRE 130. 10 years of experience with the 120 made improvements in detail and refinements in the design possible. 9 years later, in 2013, a major overhaul was undertaken. The newly developed KT 120 power tube enabled more power reserves and an even greater bandwidth of the power amplifier. Long listening tests with a newly developed output transformer and power supply led to the MRE 220:

Their special properties are extremely high reliability with the highest tonal finesse. The MRE 220 is the optimal power amplifier for an unusually wide range of combinations. Whether in BI amping with horn systems or solo with a variety of top speakers on the world market: the MRE 220 is rock solid.

Now, again 10 years later - the next step: The MRE 220 becomes the **MRE 220 SE**. Many new loudspeaker concepts with high resolution in the midrange and the triumph of high-resolution digital formats lead to an unprecedented quality of playback. Despite all efforts, developing a power amplifier that harmonizes perfectly with all loudspeakers is - as experience shows - almost impossible. The requirements of the loudspeaker are too different in terms of power delivery, bandwidth and, as can now be seen, also the damping factor (or negative feedback) of the power amplifier.

In listening tests with different loudspeakers, variable negative feedback with an impact on the attenuation factor emerged as an important new tool.

With this absolutely unique adjustment option within the power amplifier, the interaction of the **MRE 220 SE** with speakers can be optimized almost perfectly. The **MRE 220 SE** therefore has a switch with which you can choose between the damping factor low and high (or negative feedback low and high).

This is a completely new approach to the problem of a power amplifier that has to cope as well as possible with all speakers available on the market. However, the result speaks for itself: an incredibly clear, spacious reproduction with a perfectly embedded midrange, free of any impurities and a silky beautiful tonal balance, and this with (almost) all speakers

Short technical explanation:

Damping factor and negative feedback are the subject of controversial discussions. They are usually discussed independently of each other. In fact, these two properties of a power amplifier are dependent on each other. A high damping factor can only be achieved through high negative feedback. Conversely, a low negative feedback inevitably results in a low damping factor. It is often thought that a high damping factor is responsible for controlled bass. However, practice does not confirm this assumption. However, it is largely undisputed that a high level of negative feedback has an influence on the sonic properties of an amplifier. However, the damping factor has a significant influence on the balance of the playback. Due to high fluctuations in the impedance of a loudspeaker, the level at certain frequencies can be excessive if the damping factor is very low. The middle tone, for example, is then reproduced a little too prominently. This puts the supposed advantage of low negative feedback into perspective.

A higher damping factor helps here. But there are also loudspeakers, usually so-called high-efficiency systems with an efficiency of 92dB or more, which, due to their principle, require a low attenuation factor for their top sound.

In the **MRE 220 SE**, the optimal negative feedback was found for both damping factor settings, which eliminates the influence of the higher negative feedback. The switching is so refined that the gain of the power amplifier is almost identical in both positions. This means that there are no volume differences when switching, which is particularly helpful with bi-amping combinations

1. DESCRIPTION OF THE MRE 220 SE

The possibility of setting the damping factor is not the only difference between the MRE220 and the MRE220SE.

New Driver Level

In addition the driver level was new designed and produces an even more beautiful sound

The Octave-specific features that characterize all Octave power amplifiers

BIAS Measurement

The MRE 220 SE is fixed **BIAS**, and utilizes external precision BIAS trim pots and LED confirmation which allows the user to readily monitor the output tubes and simply correct their BIAS individually at the front panel of the unit without the need of a micrometer let alone any special knowledge or tools – just the supplied 3 mm flat-head screwdriver.

Black Box Option

The MRE 220 SE is fitted with a connector for the optional Octave “**Black Box**” capacitance modules – available in normal and “Super” versions. The use of the Black Box or Super Black Box significantly increases power supply capacitance to stabilize current delivery and reduce impedance interaction of the load, thus improving dynamic range, separation, depth, soundstage size and articulation. This enables optimizing the MRE 220 SE in respect to the speaker, which is a tremendous benefit if the speaker is difficult to drive.

Input Section

Unlike other designs, the MRE 220 SE offers single ended RCA and true balanced XLR inputs with a very high common mode rejection ratio that eliminates unwanted hum and high frequency distortion induced in the small signal connection to the preamp.

Power Management

The MRE 220 SE input and output tube heaters as well as its high-voltage rails are logic-controlled to ensure that the conduction of the output tubes as well as the input stage voltages are constantly monitored and controlled by the **Power Management System**, which serves to protect the vital internal parts (tubes, rectifier, electrolytic caps, switches, etc.) against excessive turn-on current. This increases the lifetime of not only the tubes, but all power related components as each derives benefit through this system.

Ecomode

The **Ecomode** serves to reduce heat and unnecessary power consumption when the unit is switched on but not in use. After approximately 8-12 minutes without receiving signal, the MRE 220 SE Ecomode is activated, turning down the power. In this “sleep” mode, the MRE 220 SE draws only 20 W Idle current. Therefore, the unit produces no heat while it remains switched on. When a music signal is once again detected by the MRE 220 SE, the Ecomode circuit will power the unit back on, with a short warm-up/start-up delay (approximately 20 - 30 seconds) before the unit will operate.

The Ecomode also serves to increase the lifetime of the tubes, while providing an added benefit of **increased safety** allowing the MRE 220 SE owner a level of security against any problems when leaving the unit switched on.

2. SAFETY INSTRUCTIONS

2.1. Before you begin

Before using the MRE 220 SE for the first time, remove the grille and install the power tubes! (See Section 3.2 "Removing the grille"). Replace the grille before switching the MRE 220 SE on. Operating the amplifier without its protective grille is dangerous and not recommended.

In case of emergency: unplug the unit from the wall outlet

Never use an amplifier that is damaged or faulty. Make sure that no one can use it until it has been repaired by a qualified service technician. Ensure that there is easy access to the IEC socket and power cord.

Do not open the case

There are dangerously high voltages and hot tubes inside this equipment. To avoid a burn or the risk of electric shock, never allow anyone except qualified personnel to open the case.



Servicing and maintenance

For reasons of safety, please ensure that any servicing, repairs or other modifications to OCTAVE equipment are carried out only by a qualified technician. Always get an engineer to replace blown fuses with ones of the same type and rating. If your amplifier requires servicing, please ship or take your equipment directly to OCTAVE or to one of our authorized service centers.

Modifications to OCTAVE equipment

Use "audio grade" fuses and other power cables at your own risk. The use of such devices will void the warranty. This also applies to the use contact fluids on the tube sockets.

Symbols and terms used in this instructions

	<p>Caution! Text passages marked with this symbol contain important information which must be observed if the amplifier is to operate safely and without problems.</p>
	<p>This information symbol marks text passages which provide supplementary notes and background information; they are intended to help the user understand how to get the best out of the amplifier</p>

Before connecting up

Make sure that the voltage of your amplifier matches your electricity supply voltage.

Grounding

This amplifier is a protection class I device with earth conductor (except 100V versions for Japan). To avoid the risk of electric shock in the event of a fault, the unit must be grounded. To do this, use the power cable supplied with the amplifier.

2. SAFETY INSTRUCTIONS

2.2. Placement

1. Location

OCTAVE equipment is designed strictly for use in a dry domestic environment. Do not use it in the open air or in damp environments!

Never place plants or liquid-filled containers on your OCTAVE equipment. Take care to avoid dropping objects or spilling liquids into the case. Should this happen, remove the mains plug immediately and have your amplifier checked by a qualified service technician.

Condensation may form if the amplifier is taken from a cold environment into a warm one. If you do this, wait until the amplifier has reached room temperature and is dry before switching it on.

Avoid installing the unit close to sources of heat such as radiators or anywhere that may be in direct sunlight.

Do not operate the unit near flammable materials, gases or vapors. Avoid areas where there may be heavy accumulations of dust or where the unit may be subject to mechanical vibration.

Place your OCTAVE amplifier on a stable, level surface.

2. Grille



Never operate the amplifier without the protective grille in place.

3. Ventilation

Make sure that your amplifier has an adequate flow of air around it. If you intend to install your equipment into a cupboard or on a wall shelf unit, ensure that there is at least a ten centimeter (15 cm / 4 inch) gap between the ventilation slots and the walls all around the amplifier. The rear panel of cupboards should have ventilation holes to prevent heat building up. Do not rest the equipment on a soft surface such as carpet or foam sheeting.

2.3. Warranty

OCTAVE can only guarantee the safety, reliability and performance of this unit if modifications and repairs are carried out by specialized personnel and when the amplifier is operated in accordance with the instructions contained in this manual.

3. GETTING STARTED

3.1. Unpack and check the contents of the box.

Scope of delivery

- 2 pc MRE 220 SE
- 2 set power tubes packed separately with tube layout diagram
- Power cord
- 4.0 x 100 flat-bladed screwdriver for adjusting the bias
- Owner's manual with certificate

3.2. Removing the grille



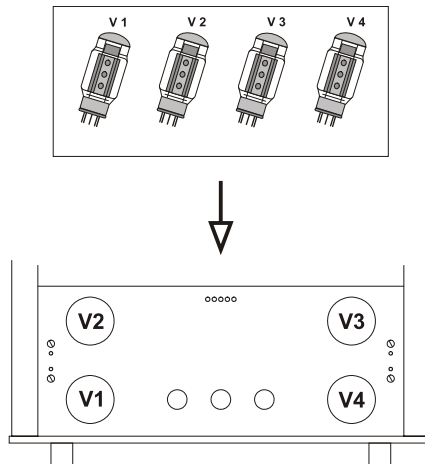
Operating the amplifier without its protective grille is dangerous and not recommended

Procedure

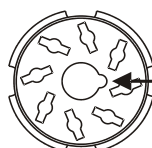
1. For your own safety, switch the amplifier off using the on/off switch
2. Pull the grille upward to remove

3.3. Installing the power tubes

The power tubes are packed in a separate box in the tube compartment



Insert the power tubes into their sockets as shown on the tube layout. Ensure that you correctly locate the anti-rotation lug on each of the tubes.



Anti-rotation recess at the tube socket

Reinstall the cover grille. (reverse order of 3.2.)

3. GETTING STARTED

3.4. Switching on for the first time – the Soft-Start feature

The MRE 220 SE is equipped with a multi-stage Soft-Start-Turn-On safety circuit which extends component as well as tube life considerably by protecting against stress caused by typical high inrush currents during switch on.

Procedure

1. Connect the MRE 220 SE to the mains.
2. Switch on the MRE 220 SE using the amplifier's mains power on/off switch (see chapter 4 front panel ①). The Power-LED ③ will illuminate.
3. Turn the Input Rotary Selector ② to Muting – the Muting LED ④ goes out
4. Turn the Function Rotary Selector ⑤ to Eco off – the Ecomode LED on the top side goes out (see chapter 6.4 Ecomode).
5. After approx. 60 seconds you hear a relay click noise. The soft start phase is finished and the power tubes start to work

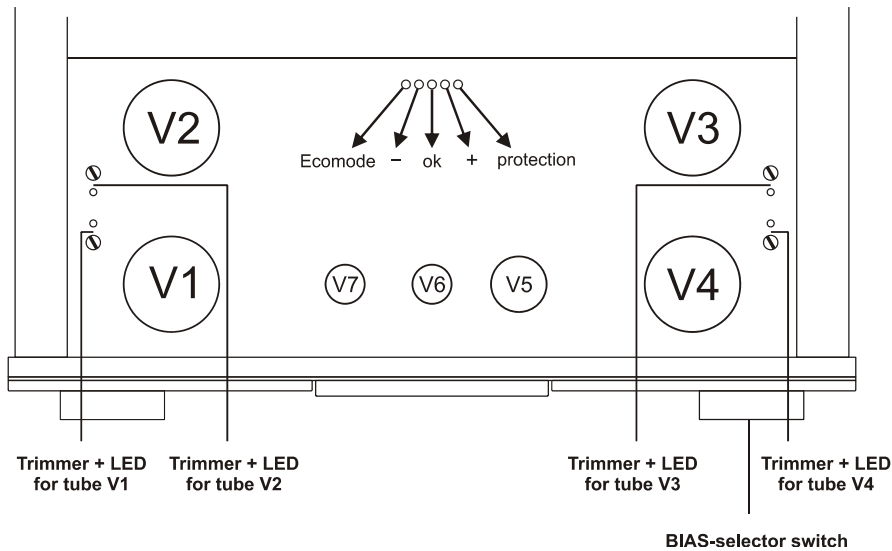
3.5. Checking the power tubes – setting the BIAS

For the first function check you don't have to connect the loudspeakers or the preamp. The trim pots to adjust the BIAS are located next to their respective tubes. Next to each trim pot you will see a pilot lamp, which shows which tubes have been selected with the bias selector switch. A row of LEDs in front of the transformer cover assists you in setting the bias correctly. It shows three conditions: bias too low -, correct ok, and too high +. Additional you find two LED's indicating the status of the ECO Mode Chap 6.5.) and the protection circuit (chap 6.3.).

Before checking the BIAS please wait five to ten minutes. Because the tubes are still cold you would adjust the wrong BIAS.

3. GETTING STARTED

Turn the BIAS-selector switch clockwise to position V1 = BIAS setting for the tube V1. The LED next to the tube will illuminate, and one of the three BIAS LEDs will illuminate, normally first the Minus LED, then the OK-LED.



The LED display:

Ecomode LED	Indicating the status of the Ecomode (see chapter 6.4)
Yellow "-" LED	BIAS setting of the selected output tube is too low
Green "OK" LED	BIAS setting of the selected output tube is correct
Yellow "+" LED	BIAS setting of the selected output tube is too high
Red "off" LED	Indicates that the electronic protection has switched off the amplifier (see chapter 6.2)

After an additional 5 to 10 minutes, respectively the warm up period, the BIAS control LEDs will change from yellow to green in case the BIAS Measurement Electronic is switched to tube 1 for example. This indicates the correct BIAS. Check all four tubes and switch OFF the BIAS electronic during listening. This is the ECO Off position.

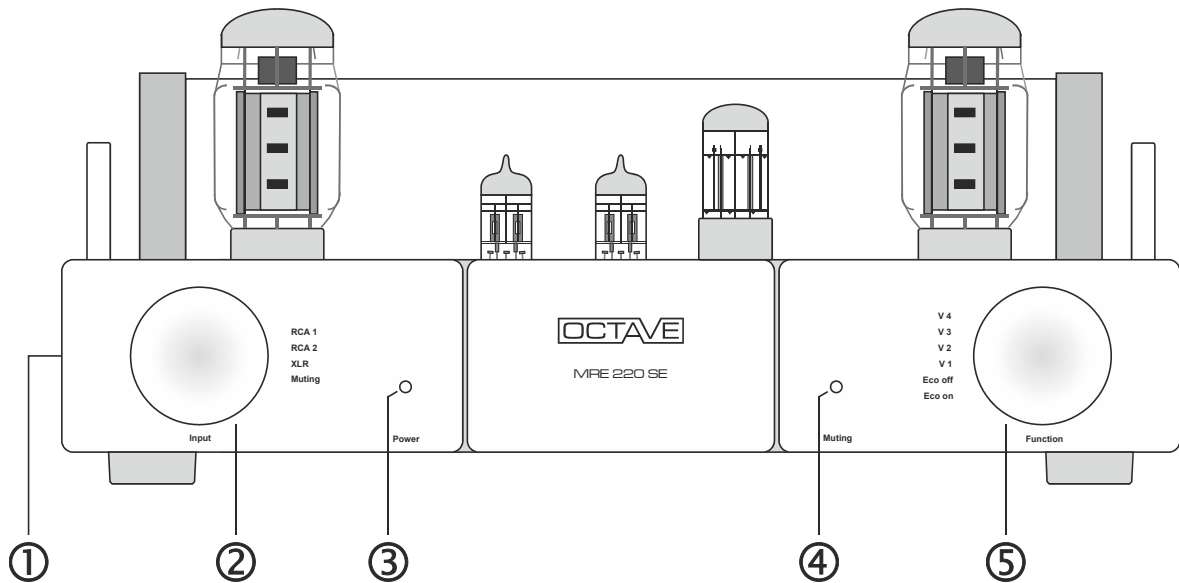
If you notice any irregularity ("+" = High BIAS) in the display please refer to chapter 7.3.

3.6. Connecting other components to the MRE 220 SE

Procedure

1. Make sure that the MRE 220 SE is switched off!
2. Connect the other components in your system to the appropriate sockets on the rear of the MRE 220 SE. (See chapter 5 "Rear panel connections").
3. Check that the switch positions on the front and rear of the amplifier are in their recommended settings
4. Switch on the MRE 220 SE using the on/off switch ① and wait a few minutes until the unit is powered.
Now you can listen to music

4. FRONT PANEL CONTROLS



Legend

① Mains Power Switch

0 = off; 1 = on. The Power LED ③ illuminates that the unit is ON

② Input Selector

This is used to select the desired input signal.

RCA 1: RCA Input, direct coupled

RCA 2: The same RCA Input, but with different internal connection, see chap. 6.6, 6.7

XLR: Balanced XLR Input, see chapter 6.6, 6.7

Muting: Muting Function of the Input's, see chapter 6.5

③ Power LED

lights up when the Power Switch ① is on 1

④ Muting LED

goes out when the Input Selector Switch ② is in position "Muting"

⑤ Bias Measurement and Ecomode Selector

Eco On: The Ecomode facility is activated, the Ecomode LED lights up in green first and changes to orange if the ECO turns down the unit after 8-10 minutes.

Eco Off: The Ecomode facility is disabled, and simultaneously the BIAS measurement facility is Off.

Position V1 - V4: The BIAS measurement facility is connected to the relevant tubes. To ensure the accuracy of any adjustment, switch On the Muting function

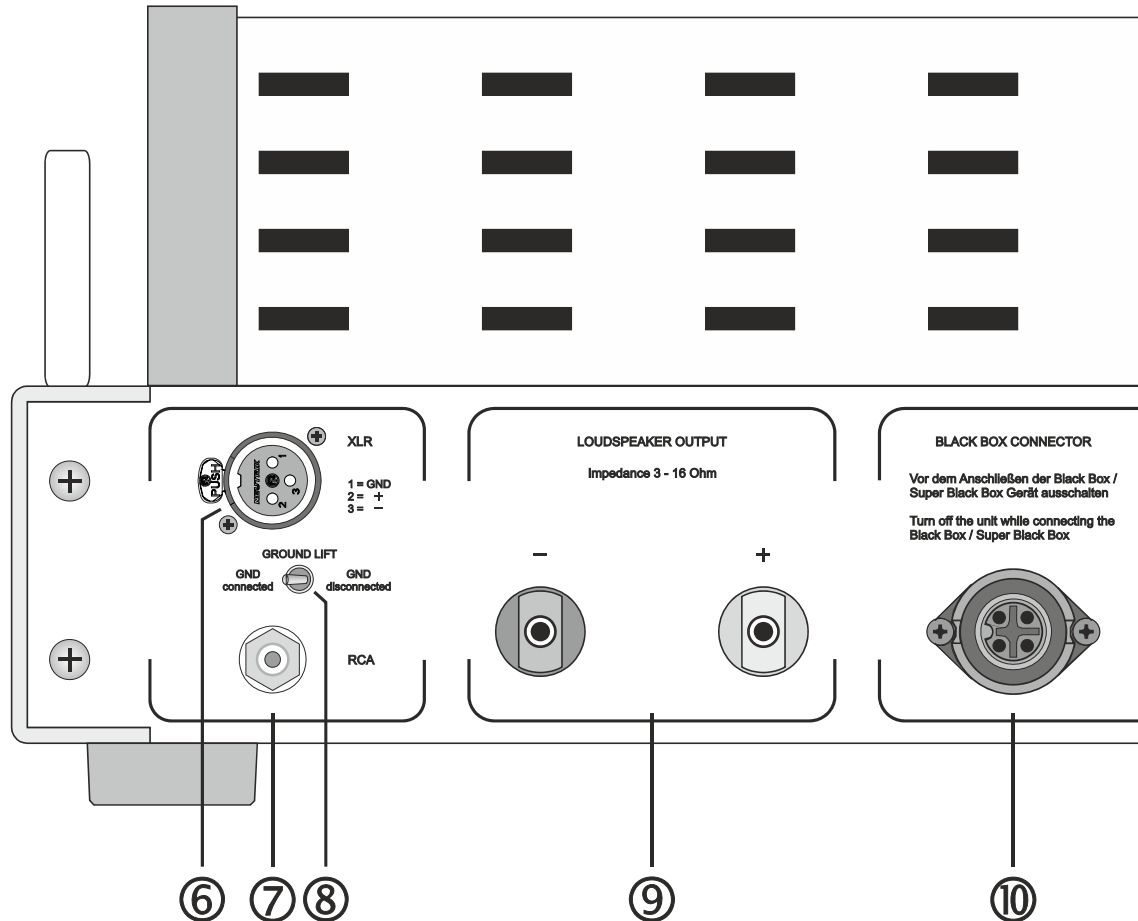
NOTE:

The MRE 220 SE is equipped with a Soft-Start circuit and a Power-Up delay timer.



The amplifier is ready for use after a delay of approximately 45 seconds. Because there are no relays in the signal path, a low-level, slightly distorted signal from your source equipment may be heard through your loudspeakers during warm-up. This circuitry extends tube service life and also protects the power section from voltage spikes and excessive inrush currents.

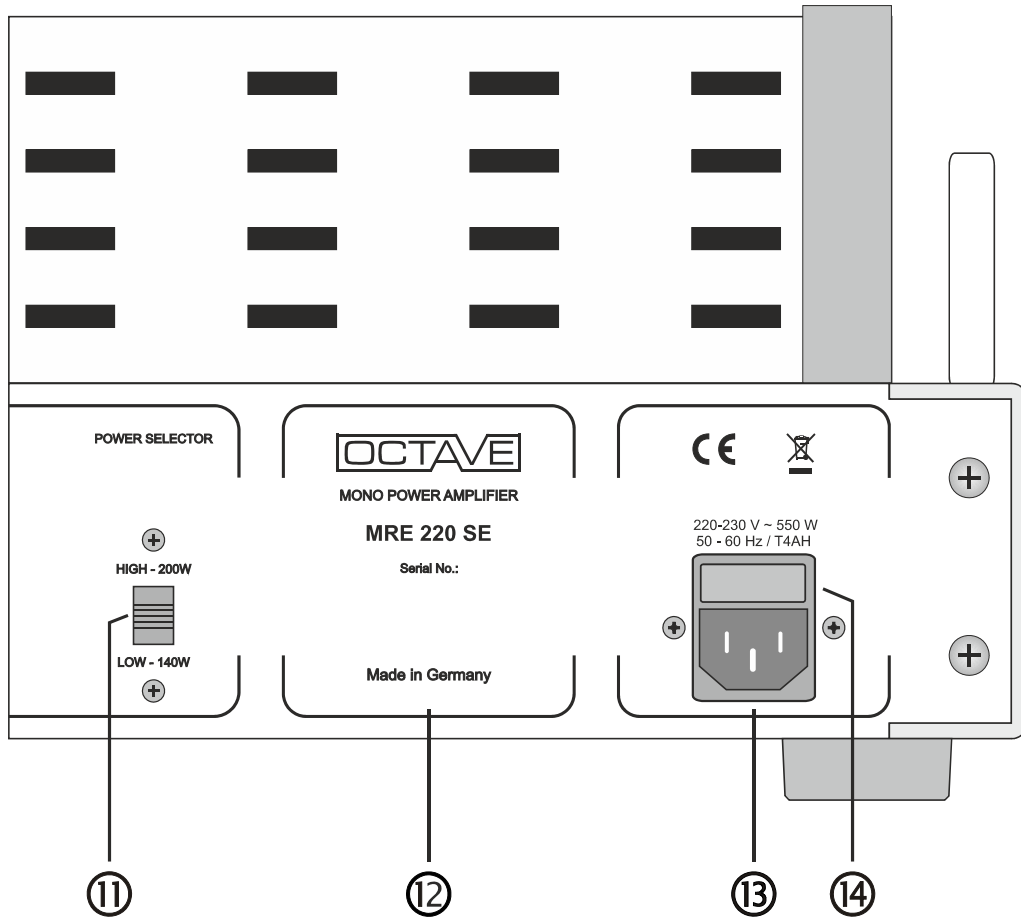
5. REAR PANEL CONNECTIONS



Legend		
⑥	XLR Input	Pin 1: Ground, Pin 2: +, Pin 3 –
⑦	RCA Cinch Input	Input for preamplifier (using RCA Cinch interconnect)
⑧	Ground Lift	Allows connecting or floating the ground connection of the XLR and RCA Input. In the standard configuration (electronic Input) the value for the position “Connected” is 0 ohms and for “Disconnected” is 18 ohms
⑨	Loudspeaker Terminal	Binding posts to connect the speaker cable. Red = positive terminal, Black = negative terminal. You can connect either 4 mm Banana connectors or spades. The negative speaker terminal is connected to ground.
⑩	Black-Box-Connector	The (Super) Black Box is an outboard power supply capacitance upgrade for the power amplifier section (see chapter 8). You must switch off the MRE 220 SE using the power switch before connecting and disconnecting the Black Box!



5. REAR PANEL CONNECTIONS

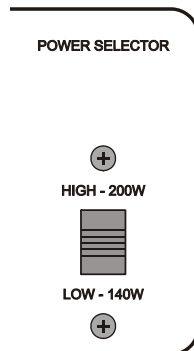


Legend

⑪	Power Selector	Sliding switch to adjust the output power of the MRE 220 SE depending on the Output Tubes. (See chapter 6.1)
⑫	Model identification plate	Model and Serial Number
⑬	Mains supply receptacle	IEC socket with integrated fuse holder. The fuse is located in a pullout compartment above the socket. You can open the fuse compartment after removing the mains plug.
⑭	Fuse holder	Fuse for 230/240V: 4 H slow-blow IEC Type (5 x 20 mm). Fuse for 115/120V: 6.3 H slow-blow IEC Type (5 x 20 mm) Fuse for 100V: 8 H slow-blow IEC Type (5 x 20 mm).

6. ADVANCED FUNCTIONS

6.1. Power Selector, alternative output tubes



Position „HIGH“:
KT 120, KT 150, KT 170

Position „LOW“:
KT88, 6550
(EL34 with Restrictions)

The Power Selector allows adjusting the MRE 220 SE in accordance to the output tubes. Position HIGH is reserved for KT 120 / KT 150 / KT 170 tubes. In the HIGH Position the MRE 220 SE is able to deliver up to 220 W RMS Output Power. The slightly weaker tubes type KT 88 or 6550 can be used in the position LOW. In this position the maximum output power is limited to 140 W to avoid overloading these tubes. The rather rare tubes of type KT 90 and KT 100 can be used also in the LOW position.

The EL 34 can be used in the LOW Position in cases of speakers with an impedance higher than 4 ohms.



Tubes of Type 6L6, KT 66, 5881 are not recommended for the MRE 220 SE
EL 519 and EL 156 are not suitable for the MRE220.

Before switching the Power Selector turn OFF the mains rocker switch.

After switching from power LOW to HIGH and vice versa the BIAS should be corrected in case of using the same output tubes. Normally there is only a slight correction necessary.

When using different tubes the BIAS has to adjust according to chapter 7.3.

6.2. Soft-Start, Inrush current limitation

The MRE 220 SE input and output tube heaters as well as its high-voltage rails are logic controlled to ensure that the conduction of the output tubes as well as input stage voltages are constantly monitored and controlled by the **Power Management system** to protect the vital internal parts (tubes, rectifier, electrolytic caps, switches, etc.) against excessive turn-on current. This increases the lifetime not only of the tubes, but also the caps, while all power related components derive benefit through this system.

The Soft-Start is always activated within the first 20 - 30 seconds after the unit is switched on. During this time you cannot listen.



During the Soft-Start-phase, adjusting the BIAS is not possible.

6. ADVANCED FUNCTIONS

6.3. Electronic Protection System

The MRE 220 SE features a comprehensive electronic monitoring and protection system. This system will automatically switch off the MRE 220 SE in case of a fault occurring in the power section. The protection system has been designed to keep the unit safe from the consequences of overloads of any kind and to protect the output tubes from current surges.

The RED "Protection" LED lights up to indicate that the protection system has tripped.



The amplifier will not play music once the protection system has tripped and you will not be able to check or adjust the BIAS setting.

The BIAS LEDs will show "yellow" for each of the four output tubes.

If a Black Box or a Super Black Box is connected to the MRE 220 SE, the front panel (operate) LED of the Black Box / Super Black Box will go out. If the Super Black Box is connected, tripping the protection system will automatically activate the discharge circuit of the Super Black Box (see chapter 8.2).

The following conditions can cause the protection system to trip:

- Overdriving the MRE 220 SE to excessive levels or with excessive levels of low frequency.
- A speaker cable short circuit while the speakers are being driven at high listening levels.
- A fault in one or more of the output tubes.
- A fault in one of the preamp tubes which overloads the output stage.

The Protection also monitors important functions inside the device. If there are internal errors, the unit is also switched off. The analysis of these errors must be carried out by a specialist.

Once the protection system has cut in, the only way you can turn the MRE 220 SE back on, - is to turn the on/off switch off and then on again. Allow the unit two minutes to cool down before switching it back on. If possible, identify and eliminate the cause of the problem (see chapter 9 "Troubleshooting").

If it is not clear what has caused the protection system to trip, we recommend that you check the BIAS before attempting to use the amplifier again. Tube faults can often result in widely varying BIAS settings. When these settings exceed a particular value they can cause the protection system to trip.

6.4 Muting Function

The Muting Function is switching Off the RCA and the XLR Inputs of the unit. In this way you can connect or change the cables without the need of switching off the unit. You can connect or disconnect the signal or speaker cables in this mode.

6. ADVANCED FUNCTIONS

6.5. Ecomode (power saving mode)

The **Ecomode** serves to reduce heat and unnecessary power consumption when the unit is switched on but not in use. After approximately 8-12 minutes without receiving signal, the MRE 220 SE Ecomode is activated, turning down the power. In this “sleep” mode, the MRE 220 SE draws less than 20 W Idle current. Therefore the running unit produces no heat, because the heater voltage and the high voltage for the power amplifier section are switched off. When the music signal is once again sensed by the MRE 220 SE, the Ecomode circuit will turn the unit back on, with a warm-up/start-up delay of approximately 60 seconds before the unit will operate.

The Ecomode also serves to increase the lifetime of the tubes, while having an added benefit of **improved safety** allowing the MRE 220 SE owner a level of security against any problems when leaving the unit powered on. The Ecomode is a safety and energy-saving feature that automatically switches off the amplifier's tube circuitry during breaks of approximately 8-12 minutes.

Ecomode reduces the overall power consumption of the amplifier to under 20W, compared with 180W in normal operation. When detecting a signal, the MRE 220 SE reactivates automatically and is ready for use again within approximately 60 seconds.

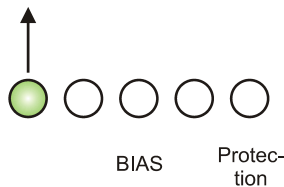
Eco off:

The Ecomode function is off, the Ecomode LED on the top doesn't burn.

Eco on:

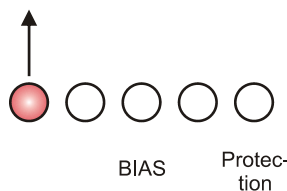
LED display on the top side:

Ecomode on: LED lights **GREEN**



The Ecomode function is activated. The Ecomode LED lights up in GREEN.

Ecomode on: LED lights **RED**



After an approximately 10-minute silence, Ecomode turn the Unit down. The Ecomode LED changes to RED/Orange indicating that the Ecomode circuit is powering down the unit.

Note:

If you switch the MRE 220 SE on with Ecomode active, it will go through the start procedure. If it fails to detect a music signal, it will shut down after approximately 10 minutes. Ecomode is not the same as standby, however, because certain sections of the amplifier remain on.

Important!

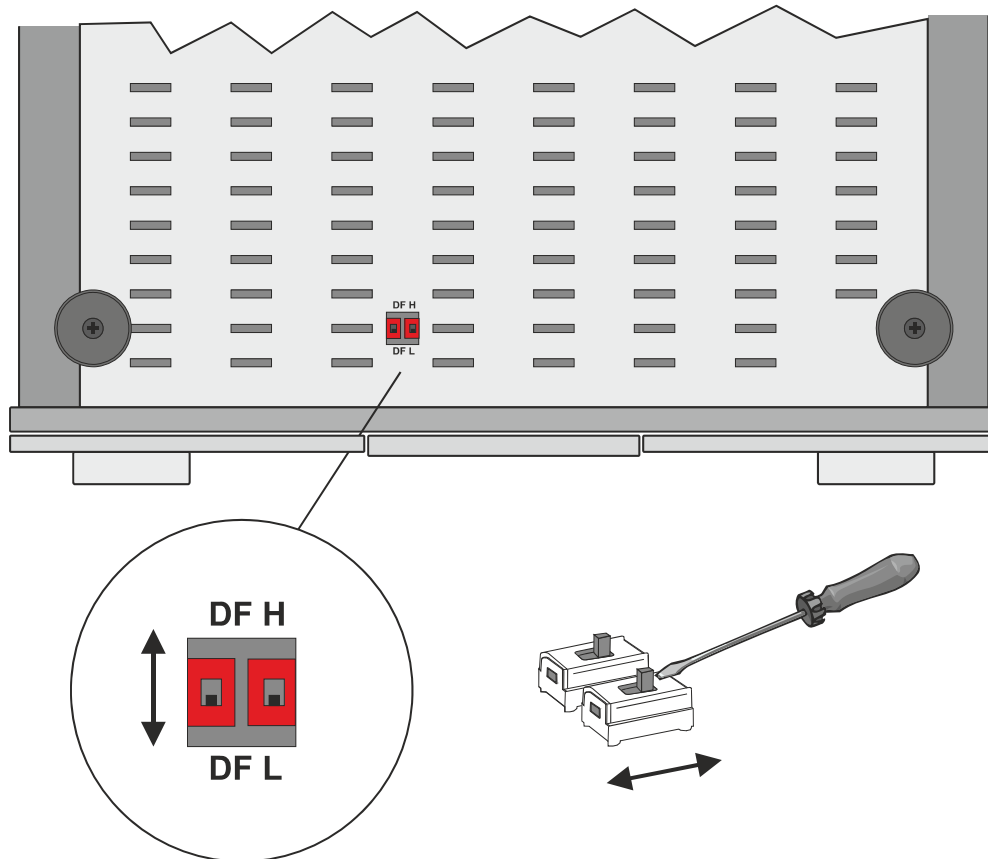
You cannot adjust the BIAS in Ecomode once the amplifier has powered down!

The signal switching level of 0.6 mV results in approx. 40 μW output power of the MRE 220 SE. In case of a speaker with a high efficiency an adjusted listening level can be lower than this value. The Ecomode would drive the unit down. In such cases the Ecomode should be switched off



6. ADVANCED FUNCTIONS

6.6. Setting the damping factor



Attention: before switching the damping factor, please switch off the MRE 220 SE with the power switch

Procedure


1. It is best to do the switchover with two people:
Raise the power amplifier at the front (lift the front by approx. 15 cm) and fix the device in this position

The switching of the damping factor is accessible through the base plate. In the opening you will see two small slide switches. With the included BIAS screwdriver or another suitable tool, you can easily move the switches to the desired position.

2. **Both switches must always be in the same position.**
DF L (damping factor low), or DF H (damping factor high)

Delivery condition is DF L (damping factor LOW)

6. ADVANCED FUNCTIONS

	<p>No high voltages are switched and there are no high voltages near the switches. The switchover is therefore not critical. If a power amplifier is running, while you are switching the damping factor, the amplifier will go into protection mode. You then have to switch off the device to reset the protection electronics.</p>
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When can it make sense to switch from DF L to H and why?

Normal dynamic loudspeakers do not represent a constant load for the power amplifier. The resistance of a loudspeaker usually increases with increasing frequency. This behavior applies to bass, midrange and tweeter speakers. Especially in the midrange, this effect leads to a higher resistance of the speaker in relation to the bass. A power amplifier with a low damping factor will then reproduce this frequency range a little louder. Switching to DF H can help here, as the “volume difference” then becomes smaller and the sound becomes more homogeneous.

The impedance curve of a loudspeaker is rarely published in the technical data; test reports from the relevant press can help here.

Exceptions to which this effect does not apply are magnetostats and electrostatic loudspeakers. Otherwise, in principle all dynamic two-way and multi-way loudspeakers are affected. However, there are manufacturers who have implemented internal measures in their loudspeaker models that largely prevent this increase in impedance. There is then an impedance linearization. In this case the switchover is of minor importance.

6.7 Electronic Balanced Input Circuit XLR

As standard the Balanced Input is equipped with a precision low noise electronic balanced input receiver. The Gain of this converter is 0 dB, which means that in case of the usual +6 dB of the balanced signal of an electronic balanced preamplifier you will have a slightly higher Output level in respect to the RCA connection.

In Position RCA 2 the Balanced Input Converter is switched into the single ended Mode and is connected to the RCA Input. This is helpful in cases you have only a balanced signal connection to the preamp.

Driving the MRE 220 SE via RCA with a preamplifier's Output Impedance of more than 500 ohms the sound of the MRE 220 SE can degrade.

6.8 Ground Lift

The ground lift allows switching the ground connection of the MRE 220 SE to the preamplifier between zero and a higher impedance.

Is the standard input equipped the ground resistance in the position “connected” is 0 ohms and in the position “disconnected” it is 18 ohms.

In most cases you should choose the position “connected”, independent from using XLR or RCA. Only in cases of problematic Ground-Earth situations with a noticeable hum you can use the position “disconnect”.

7. TUBES

7.1. Removing the grille

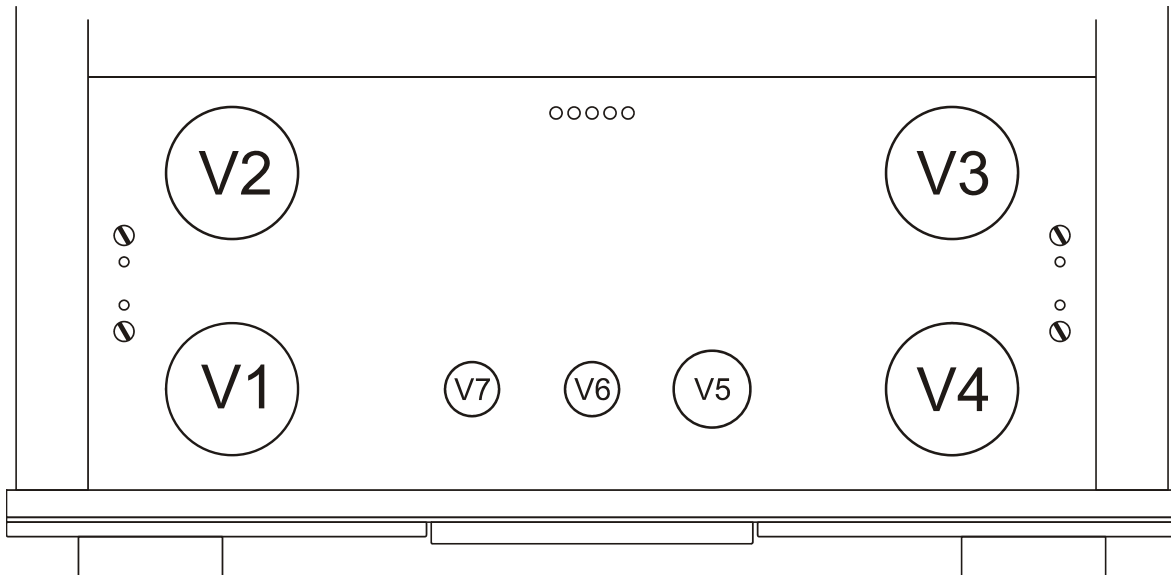
Operating the amplifier without its protective grille is dangerous and not recommended.

Procedure

1. For your own safety, switch the amplifier off using the on/off switch
2. Pull the grille upward to remove

See chapter 3.2.

7.2. Tube layout



Output tubes: V1 - V4: basic set: KT88[®]

Driver tubes: V5, 6SN7

V6, V7 ECC802 (= ECC 82,12 AU 7, 5814, 6189)
V 6 should have a system Gain match close to 0.5dB

Compatibility Power Tubes

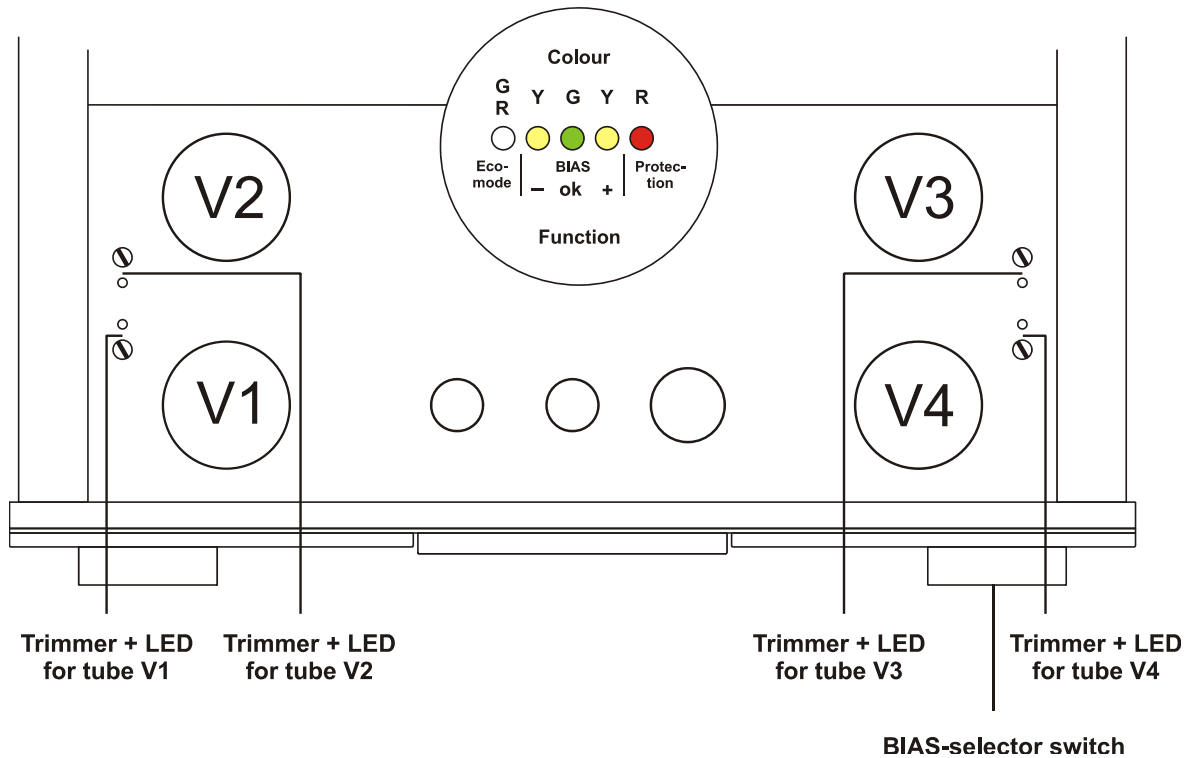
Model	EL34	6550	KT88	KT120	KT150	KT170
MRE 220 SE	+LOW	+LOW	+LOW	+HIGH	+HIGH	+HIGH

⊕ May be used

⊖ May not be used

7. TUBES

7.3. BIAS measurement facility



The BIAS measurement facility makes it easy for you to check and adjust the idle current of the output tubes. Getting the BIAS setting right for all four tubes is critical for both the sound of the power amplifier section and for the service life of the tubes. This feature guarantees consistent sound quality over the entire lifetime of the output tubes.

That is why we have built this BIAS measurement facility into the MRE 220 SE – to allow you, the user, to carry out the adjustment yourself without the need for test equipment. The use of precision op amps makes it possible for you to set the BIAS to accuracy within 0.2%, making it superior to any other method.

Using selected output tubes only makes sense if the idle current is adjusted accurately, as is clearly shown in Fig. 1 Technical Data.



Please turn the trimmers (they look like little screws) carefully and slowly. The bias adjustment should be made only when the tubes are heated. If the tubes are still cold, you will set wrong values.

The LED display:

Ecomode LED	indicates the status of the Ecomode Electronic
Yellow - LED	indicates that the BIAS is Low
Green OK LED	indicates that the BIAS has the correct value
Yellow + LED	indicates that the BIAS is too high
Red OFF LED	indicates that the Protection Electronic has turned off the Power supply of the Tube section

7. TUBES

How to set the BIAS

Make sure that no signal is playing through the amplifier when you are adjusting the BIAS. It is sufficient to turn your preamp volume control to 0, or you switch on the Muting; there is no need to disconnect the speakers.

The tubes should have reached operating temperature. The unit should run at least 15 minutes before you adjust the BIAS. If you notice high BIAS at one or more of the output tubes in cold state you should reduce the BIAS in any case.

Procedure

1. Turn the volume control on your preamplifier to 0
2. Set the bias selector switch to V1. The green LED next to the trim pot for tube V1 will light up to indicate that you have chosen to adjust the bias for tube V1.
The bias setting for this tube is correct when the green OK LED on the display illuminates.
 - If the yellow + LED illuminates, the bias is set too high.
→ Turn the trim pot counter-clockwise until the OK LED illuminates.
3.
 - If the yellow - LED illuminates, the bias is set too low.
→ Turn the trimmer clockwise until the OK LED illuminates.
 Repeat this procedure with the other three tubes.
4. Switch the bias selector back to its "off" position.

If there is no change in the BIAS of a tube while turning the BIAS regulator, the corresponding output tube is faulty.

Note:



It is not possible to adjust the bias if the amplifier's electronic protection has cut in (as indicated by the red "off" LED in the display), or if the Ecomode has powered down the unit. When you activate the measuring facility under these circumstances, the- LEDs will illuminate for all tubes. You must fix the fault or switch off the Ecomode before using the measuring facility. If a defective tube is causing the problem, you should locate and replace it (see Troubleshooting chapter 9).

7. TUBES

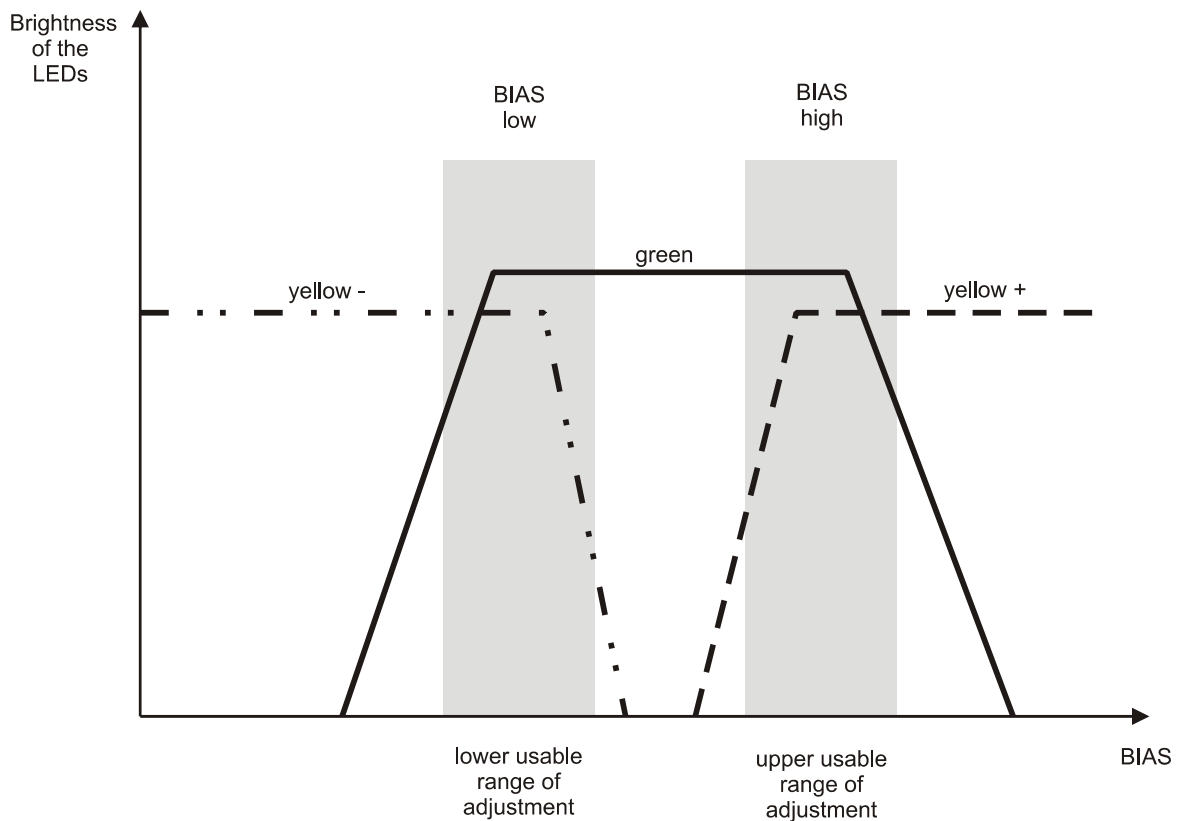
LED graphs, advanced adjustments of the BIAS setting

There is an upper adjustment limit to the "high" BIAS setting, which is indicated by the green and yellow + LEDs lighting up at the same time, and a lower limit to the "low setting, where the yellow - and green LEDs light up. The lower limit should be used with "smaller" output tubes such as the KT 88, 6550, EL 34. The upper value, which provides a higher BIAS current for the output tubes, can be used with the KT 120, KT 150 and KT 170 in both positions of the power selector.

The BIAS LOW setting corresponds to the plate current of 33mA.

The BIAS HIGH setting corresponds to the plate current of 40mA.

LED graphs



The crossover setting yellow / green or green / red is an adjustment with a very high precision. Small changes in the brightness of the LEDs are normal due to the long time drift of the tubes or the mains voltage.

7. TUBES

7.4. Replacing the tubes

Changing tubes is only reserved for qualified specialists

- **Driver tubes**
Replacement driver tubes require no adjustment.
- **Output tubes**

Procedure	
1.	Switch off the amplifier and allow it to cool down for 10 minutes. Remove the old tubes and fit the new ones.
2.	Before you switch the amplifier back on, turn all BIAS adjustment screws (see chapter 7) counter clockwise (this greatly reduces the anode current). These screws are ten-turn potentiometers, i.e. it takes ten revolutions to go from the maximum to the minimum setting.
3.	Switch on the amplifier and turn the BIAS selector switch to the BIAS position. Following the Soft-Start phase, the "minus" LED (yellow) will illuminate at every of the four Output tubes. If from this point of time any of the LEDs are green or red, this indicates a faulty tube that must be replaced. After a 10-minute warm-up period, set the BIAS as explained in chapter 7.
3.1.	Original Octave tubes. There is no need to break in original Octave replacement tubes, as they are factory tested and passed a 24-hour endurance test. Allow the tubes 10 minutes to warm up and adjust them to the appropriate setting for the tube type.
3.2.	New, untested output tubes should be allowed a longer warm up period. You should adjust these tubes after about 20 minutes and control the setting in the first days of operation.

7.5. Breaking in

All OCTAVE equipment is subject to a 48-hour performance test at the factory to break in the tubes. The tubes are preselected for use in each particular model.

New tubes can take up to three months to break in and start sounding their best.

Daily use is beneficial in speeding up this process but is not mandatory. Continuous operation does very little to help reduce the running-in time and is therefore ***not*** recommended.

7.6. Tube service life

- Thanks to the protection circuits and soft-start electronics, the output tubes in your amplifier should achieve a service life of up to 3 - 5 years.
- Driver tubes can be used for 10 years or even longer.
- Because tubes have different service lives, you will never have to renew the entire tube complement at the same time. The facility for setting the BIAS for each output tube individually makes it unnecessary to use matched sets of output tubes. You can replace output tubes individually if you wish.
- Some tubes require a long time (up to 300 hours) to achieve their optimum sound quality. Depending on how long the tubes have been stored, it may be necessary to adjust the BIAS several times in the first two to three weeks after installing them.

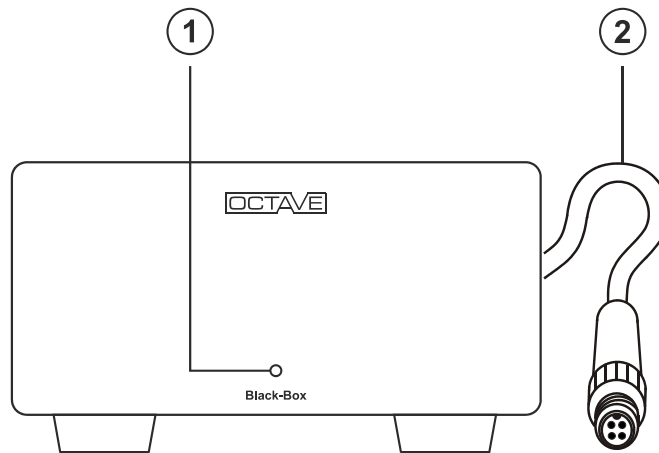
8. OPTION (SUPER) BLACK BOX

Description

With the Black Box technology OCTAVE offers an instrument for optimizing the OCTAVE amplifier in respect to the speaker. This flexibility is a unique feature of the OCTAVE brand.

The dynamic and tonal stability of an amplifier is strongly dependent upon the stability and capacity of the power supply, therefore the Black Box and Super Black Box were developed as external upgrades to the OCTAVE amplifiers' power supply storage capacitors by increasing their capacitance by a factor of 4 (Black Box) or 10 (Super Black Box), respectively. This is a tremendous benefit if the speaker is difficult to drive. Loudspeaker efficiency is made less critical, while the amplifier is enabled to handle speakers with minimum impedances as low as 2 ohms. The power supply capacitance increase realized via use of the Black Box or Super Black Box stabilizes current delivery and reduces the impedance interaction of the load. This improves dynamic range, separation, depth, soundstage size and articulation, rendering the musical reproduction clearer throughout the entire frequency range. The amplifier remains unaffected by mains variations and interferences due to the noise filtering characteristics of the capacitors.

8.1. The Black Box option



Legend

- ① The LED illuminates continuously when the amplifier is on.
The LED goes out when the protection circuitry trips. This is normal, as the protection circuitry cuts the power to the amplifier
- ② High-current plug

8.2. Connecting to the amplifier



- Important! Before connecting the Black Box, switch **off** the unit using **the power switch and wait for 1 minute**.

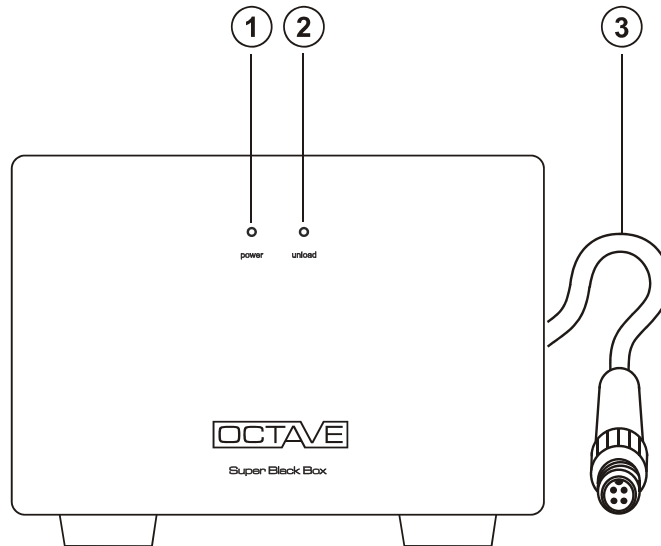
When inserting the connector, guide the anti-rotation lug carefully into the mating recess in the socket.



- When you switch on the amplifier, the LED on the front panel of the Black Box will illuminate.
Note: The LED on the Black Box goes off when the amplifier's electronic protection circuitry is activated or the Ecomode has turned the unit down.
- Should you wish to disconnect the Black Box, switch off the amplifier first and **wait until the LED on the Black Box has gone out**.

8. OPTION (SUPER) BLACK BOX

8.3. Super Black Box option



Legend

- ① **Blue power LED**
The blue "power" LED illuminates when the amplifier is switched on via the amplifier's power on/off switch.
- ② **Yellow unload LED**
The yellow "unload" LED (discharge control circuit) illuminates for approximately two seconds after switch-off, and also when the electronic protection is activated and when the MRE 220 SE is powered down with Ecomode on. The Super Black Box is equipped with a rapid discharge circuit, which discharges the unit's electrolytics. The yellow LED indicates that this procedure is taking place. The discharge circuit also activates if the Super Black Box connecting cable is accidentally removed. This is to prevent the Super Black Box maintaining its charge when it has not been properly disconnected.
- ③ **High-current plug** (Connection see Black Box.)

8.4. Technical Data

Specification Black Box

Weight	3.2 kg
Dimensions	185 x 100 x 310 mm (Width x Height x Depth) with cable clamp and angled cable
Cable length	1 m with connector. Longer lengths are available upon request

Specification Super Black Box

Weight	5.6 kg
Dimensions	200 x 150 x 350 mm (Width x Height x Depth) with cable clamp and angled cable.
Cable length	1 m with connector. Longer lengths are available upon request

9. TROUBLESHOOTING

■ Hum in the speakers

Possible cause: multiple grounds

Hum in an audio system is often caused by several system components having their own separate earth connections to the mains. It is particularly common in systems containing tuners, VCRs or satellite receivers, as these components are connected to an earthed antennas or networks. Because antennas and cables are always grounded, ground loops can form between this connections and other grounded equipment. Other equipment that is normally earthed may include PCs with sound cards, and some CD/DVD players and DACs.

Although the MRE 220 SE is earthed, its signal ground is a "floating" ground, which means that the MRE 220 SE cannot itself create ground loops. Hum can only be caused when it is connected to other items of equipment.

To fix the problem

Before trying to fix the problem, find out which of your system components is responsible for generating the hum.

Procedure:

- check the signal connectors if the ground is properly connected.
- Unplug all source equipment, including any equalizer if used, from the MRE 220 SE, leaving only the loudspeakers connected.
- Reconnect the components back to the MRE 220 SE and the Preamplifier one at a time. As soon as the hum reappears, you have two grounded components connected to the MRE 220 SE via the preamp. Consult a technician if there is a possibility to eliminate this grounding problem.

■ Tube faults caused by output tubes

There are 3 different symptoms indicating a faulty output tube:

1. Broken heater filament: the tube stops glowing.
2. Defective cathode layer: the tube glows, but no current can flow. You can confirm this fault using the bias display LEDs - no amount of adjustment will be able to extinguish the minus LED.
3. Internal short circuit: Normally, the electronic protection cuts in and the red "off" LED illuminates, or the tube will not respond to BIAS adjustment (the display keeps jumping from plus to minus or vice versa).

With faults 1 and 2, the amplifier will still operate, although the channel containing the faulty tube will be quieter than normal. At low listening levels, the fault may not be obvious, but distortion will become evident at higher listening levels.

If fault 3 occurs, the protection circuits will normally switch off the amplifier. You may also hear loud background noises just before it switches off, although these will not harm the amplifier.

You can find the faulty tube by removing one tube at a time. Operating the power amplifier with just a single output tube is allowed for test purposes and will not damage the power amplifier.

Only a qualified technician must carry out this test.

■ Tube faults caused by driver tubes

Increased noise in one channel.

Normally the noise level of a driver tube is stable during its lifetime. Depending on the production and type of tube, the noise can noticeably increase over some time. The most sensitive tube in the MRE 220 SE in this regard is the input tube V5 and in rare cases V6.

10. SPECIFICATIONS AND DIMENSIONS

Power Amplifier MRE 220 SE

Configuration: push pull pentode circuit, class A/B; negative grid voltage adjustable separate for each power tube through ten turn precision regulators. Special wideband output transformer using high efficient PMZ core.

Output power into 4 ohms	Power Selector High: 200 W RMS Power Selector Low: 140 W RMS
Peak Power into 4 ohms:	Power Selector High: 220 W Peak Power Selector Low: 150 W Peak The Output Power specs are measured with the Super Black Box Into 8-ohms Load the Output Power is reduced by 20 %
Damping Factor	selectable, DF Low = 4, DF High = 8, (8 Ohm Load) Delivery state: DF Low
Power Bandwidth:	20 Hz – 70 KHz / - 3 dB at Full Power 5 Hz – 80 KHz / -3dB at 5 W
Noise:	< 100 µV 150 Hz – 15 KHz, > -116 dB
Input Sensitivity	1.5 V RCA, XLR
Input Resistance	50 kΩ RCA; 25 kΩ XLR
CMRR of the XLR-Input	> 85 dB / 1 kHz
Minimal Load Impedance	3 Ω
Gain DF Low and High	+26 dB - RCA
Eco Mode Trigger Level	0.6 mV input Level

In- and Outputs:

Inputs:	1 x RCA, 1 x XLR
Outputs	1 x speaker terminal suitable for 4 mm Banana connectors and spades

General Data

Power consumption	< 20 W in Ecomode, 180 W idle, 550 W at full power
Weight	29.80 kg
Mains:	100 V / 115-120 V / 220-230 V / 240 V available
Dimensions:	488 x 229 x 412 mm (W x H x D)

Fuses

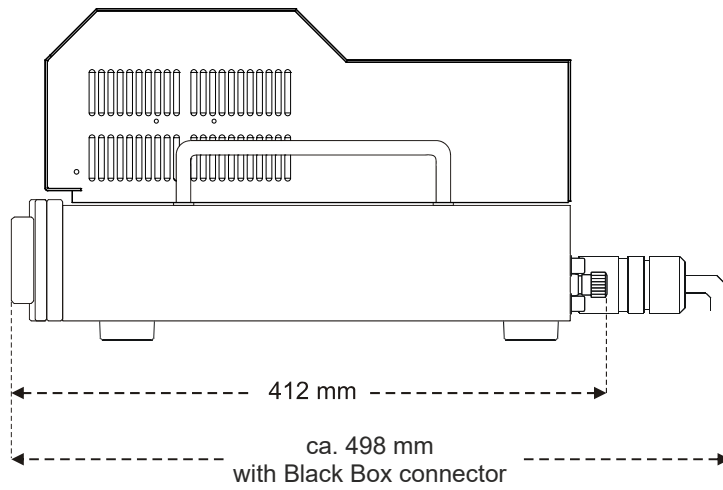
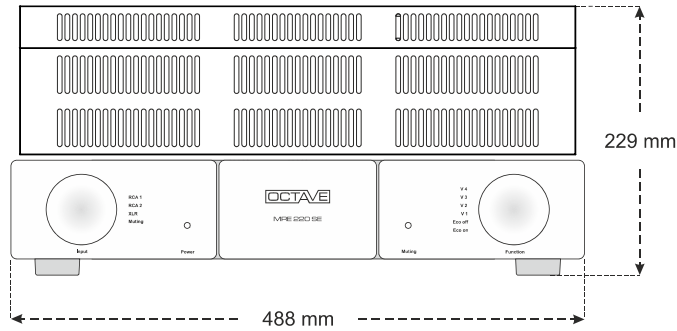
Fuse for 230/240V	4 A Type H slow blow / IEC Type (5 x 20 mm)
Fuse for 115/120V	6.3 A Type H slow blow / IEC Type (5 x 20 mm)
Fuse for 100V:	8 A Type H slow blow / IEC Type (5 x 20 mm)

Construction

- double sided PCBs using 70µ copper
- ceramic tube bases with silver contacts
- specially selected and burned-in long-life tubes
- professional, low inductance electrolytic capacitors, LH grade 105° C

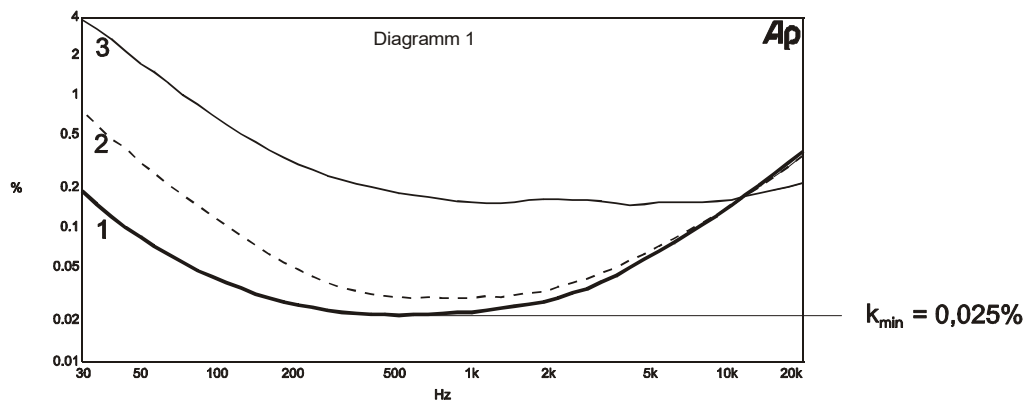
10. SPECIFICATIONS AND DIMENSIONS

Dimensions:



Diagram

THD at 4 V into 4 ohms from 30 Hz to 20 kHz at a variety of BIAS settings



- Curve 1: BIAS adjusted correctly
- Curve 2: BIAS 10 % out
- Curve 3: BIAS 30 % out

11. FAQ

1. Can you operate the MRE 220 SE when no loudspeakers are connected?

Yes. The MRE 220 SE, like all OCTAVE amplifiers, is fully protected against open circuit operation, i.e. the amplifier will come to no harm if it is operated without loudspeakers connected and the input level is in the magnitude of normal listening levels.

2. How do you recognize a faulty tube?

See troubleshooting chap 9

3. Is there a loss of sound quality as tubes age?

No. Tubes normally sound the same throughout their service life. Our soft-start technology contributes greatly to extending the service life of tubes. You can tell when an output tube has reached the end of its useful life: it becomes impossible to adjust it correctly. Driver tubes cannot be checked, but these will generally last for well over 10 years.

4. What is the significance of loudspeaker impedance and efficiency?

The impedance and efficiency of modern loudspeakers is not an issue for OCTAVE amplifiers. The often-quoted damping factor is not normally a guarantee that an amplifier will exert tight control over the loudspeakers. In practice, speakers of 85 dB efficiency and above are suitable for use with tube amplifiers. The high stability of the OCTAVE power amplifier technology even allows the use of speakers whose impedance dips as low as 2 ohms (except for EL34 with 4 ohms).

5. What cables are suitable for tube power amplifiers?

The cable manufacturers are now offering cables that have supposedly been designed specifically for tube amplifiers. Although such cables may be of good quality, there is no need to use special cables with tube amplifiers. Speaker cable can exhibit high values of capacitance and inductance, and tube power amplifiers deal with such loads better than transistor power amplifiers. The only exception would be if you needed to use a tube pre-to-power amp interconnect cable longer than 5 meters. In that case, a low capacitance cable would be advisable.



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