

XES

XES-M50

Operating Instructions

Stereo Power Amplifier

Operating Instructions

Before operating the unit, please read this manual thoroughly and retain it for future reference.

Owner's Record

The model and serial numbers are located on the bottom of the unit.

Record the serial number in the space provided below.

Refer to these numbers whenever you call upon your Sony dealer regarding this product.

Model No. XES-M50 Serial No. _____

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Features

Left and right channel independent monophonic configuration

Two amplifiers are laid out in a single unit and everything is kept separate, even the power supply terminals, so a clear sound quality is realized with almost no interference between signals of the left and right channels.

Equipped with a Non-NFB circuit for clear sound reproduction

Conventional NFB (Negative Feed Back) circuits are effective at reducing the distortion produced by the amplifier but are susceptible to the affects of sound muddiness from the reverse electromotive force produced by the speakers. This system is equipped with a Non-NFB circuit for handling this problem so a clear, unmuddled sound is reproduced.

In addition, output transistor source resistance is removed and the speakers are driven directly. Because there is no source resistance, switching distortion is suppressed and pure transmission is possible.

Pre-Regulated Power Supply with no fluctuations in constant voltage even during large outputs of power and when the engine is running

Once constant voltage has been attained, a Pre-Regulated Power Supply that steps up with a DC/DC converter is employed for the power source of the voltage amplification stage. A choke coil-less method is employed in the

power input of the current amplification stage and the current drive capacity is ensured. As a result of these, a powerful power source is realized that is capable of driving both channels at 200 W each at 1 ohm.

FET Input Circuit

Differential amplifier circuit with positive/negative symmetry due to the use of dual FET. Dual FET with tips of all characteristics contained in one package are used, and allowances have been made for thermal coupling. In addition, using the high input impedance of the FET gates, a DC input circuit is attained that does not use DC coupling capacitors.

High Quality Parts Used

Parts that combine reliability with high sound quality are used in the system including newly developed aluminum power capacitors, power transformers in which allowances have been made for vibration, a planed terminal board, RCA pin jacks, a gold-plated oxygen free copper substrate, and carbon resistant materials, etc.

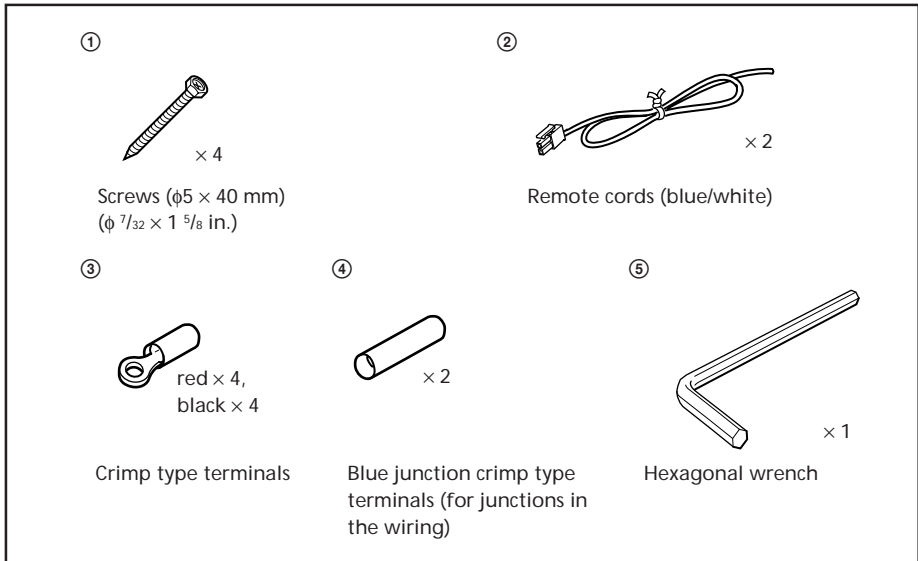
Installation

Before Installation

- Mount the unit either inside the trunk or under a seat.
- To mount the unit you will need a mounting board that is sufficiently thick (at least 15 mm ($19/32$ in.)) and strong.
- When mounting the unit horizontally, mount it on the heat sink surface. Also, avoid installing the unit under the carpet as the heat dissipation will be considerably impaired.
- Because a DC-DC converter is used in this unit, if it is mounted near the radio or antenna, reception of radio and television broadcasts will be hindered. Set the unit up in a place as far away as possible from the radio and antenna.
- Do not install it in a place where it is exposed to high temperatures, such as in direct sunlight, or where it is directly exposed to hot air from the heater.

Parts List

The circled numbers indicate the number of the part to use that is referred to in the explanation of how to install the unit.

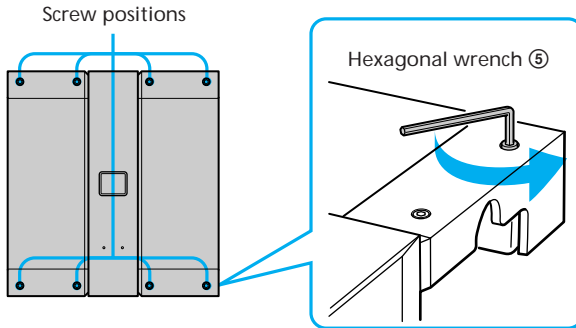


Installation Instructions

Prepare a mounting board that is sufficiently thick (at least 15 mm ($\frac{19}{32}$ in.)) and strong.

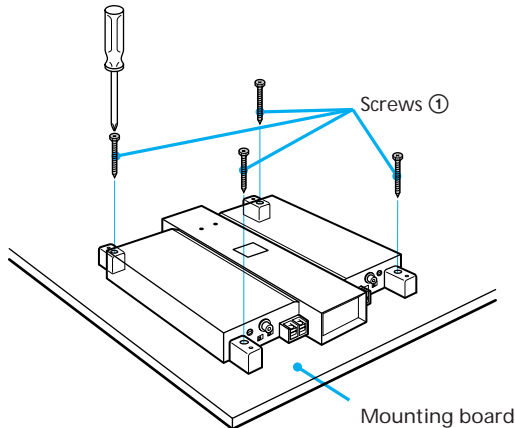
1 Remove the cover.

Loosen and remove the 8 screws using the hexagonal wrench ⑤.



2 Mount the unit on the mounting board.

Place the template (printed on the carton box) on the mounting board, determine where the unit will be mounted and mark the hole positions. Drill holes of at least 3 mm ($\frac{1}{8}$ in.) in diameter at the places you have marked, and using the screws ①, secure the unit on the mounting board.



3 Attach the cover.

Reattach the cover with the hexagonal wrench ⑤ using the screws removed in Step 1.

Before Connecting

- Before making any connections, disconnect from the negative terminal of the car battery to avoid short circuits.
- Always connect the power supply lead last.
- Install the input and output cords away from the power supply lead as running them close together can generate some interference noise.
- This unit is a high powered amplifier. Therefore, it may not perform to its full potential if used with the speaker cords already established in the car.
- Connecting the \ominus terminal of the speaker system to the car chassis or connecting the \ominus terminal of the right speaker with that of the left speaker may result in damage.
- Be sure to use speakers with an adequate power rating. Because this amplifier puts out high power, if you use small capacity speakers, not only will the amplifier not perform at its

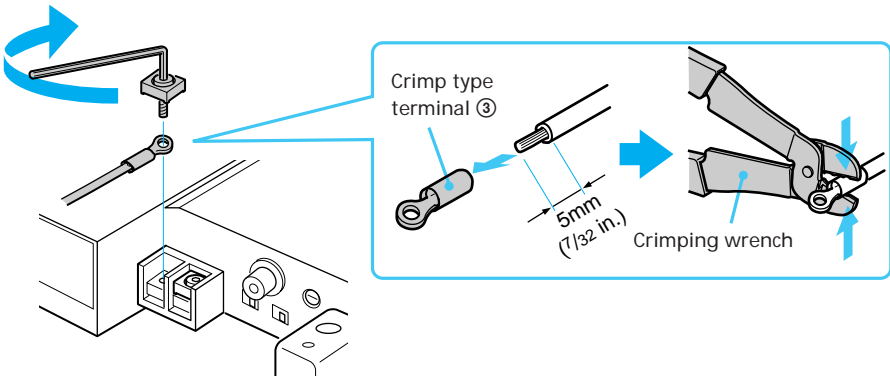
full potential, but the speakers may become damaged as well.

- Use speakers with an impedance of 1-8 ohms. (2-8 ohms with a bridging connection)
- Do not connect the active speaker (speaker built into the amplifier) to a speaker terminal on the amplifier as this may damage the speaker.

Caution

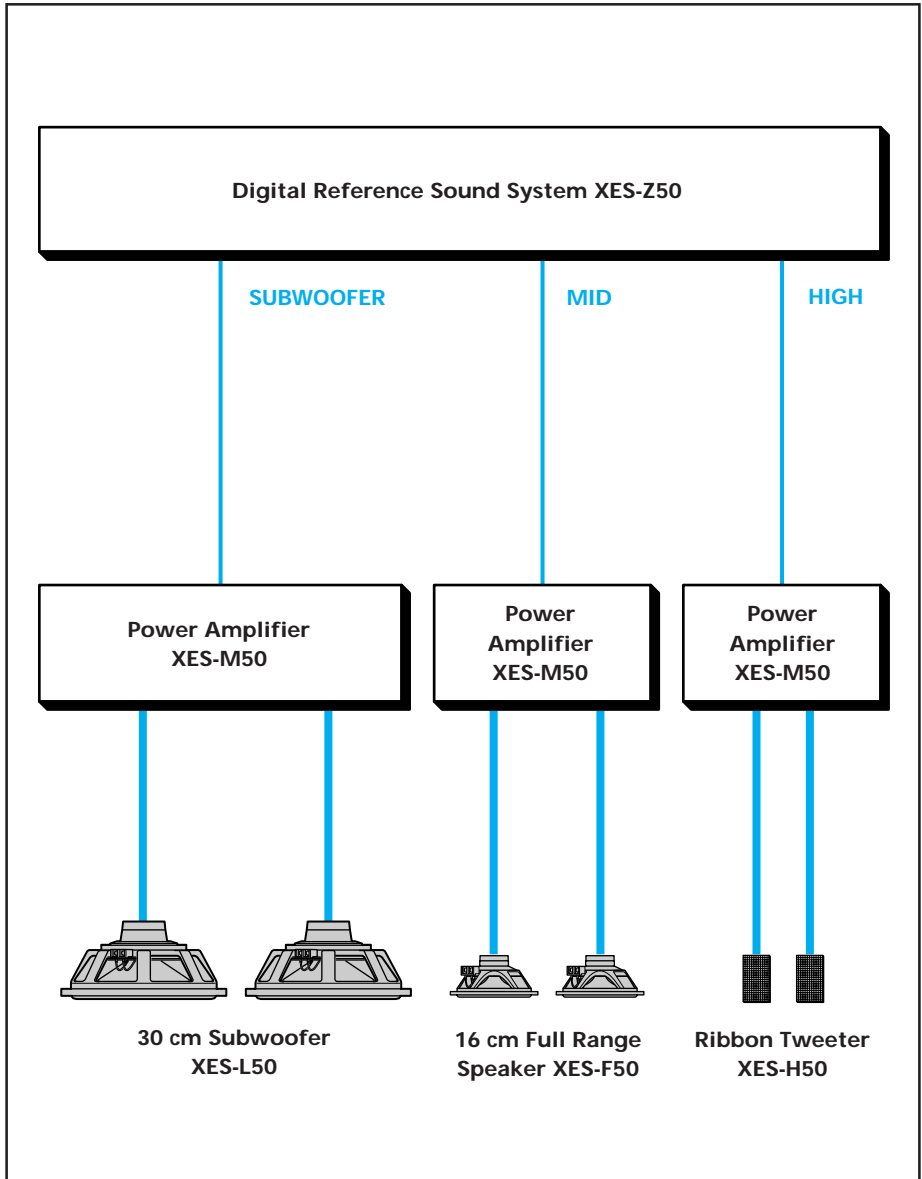
If your car is equipped with a computer for navigation or some other purpose, do not remove the ground wire from the negative terminal of the car battery. If you disconnect the wire, the computer memory will be completely erased. With these types of vehicles, without disconnecting the power supply lead from the negative terminal of the battery, make all the other connections first leaving the connection to the power supply for last.

Make the power supply lead and speaker connection as illustrated below.



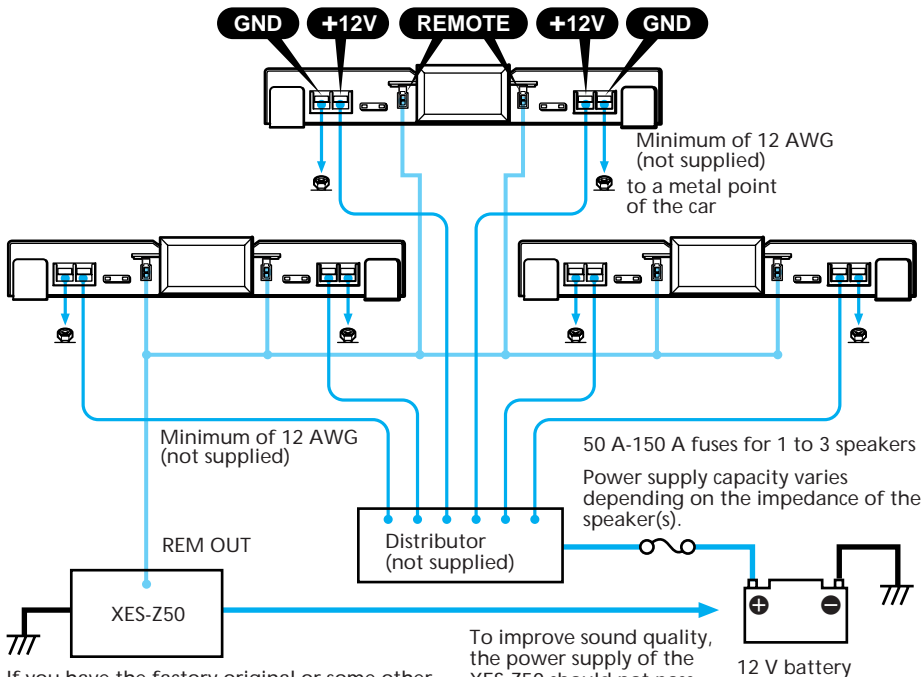
In order not to damage the screws, the tightening torque should be no more than 1 Nm.

System Connections (XES Series)



Power Supply Lead Connections

For safety reasons it is recommended that you use the crimp type terminals provided for connecting to the power supply lead.



If you have the factory original or some other car audio that does not have a remote output, connect the remote input terminal (REMOTE) of this unit to the accessory power supply.

To improve sound quality, the power supply of the XES-Z50 should not pass through the distributor but should be wired separately.

Caution

- Connect the power supply lead last after all the other connections have been made.
- Be sure to connect the ground lead of the unit securely to a metal point on the car. A loose connection may result in damage.
- Connect the remote output lead of the car audio to the remote input terminal (REMOTE) of this unit. If there is no amplifier remote output in the car audio, connect the remote input terminal to the accessory power supply of the car.

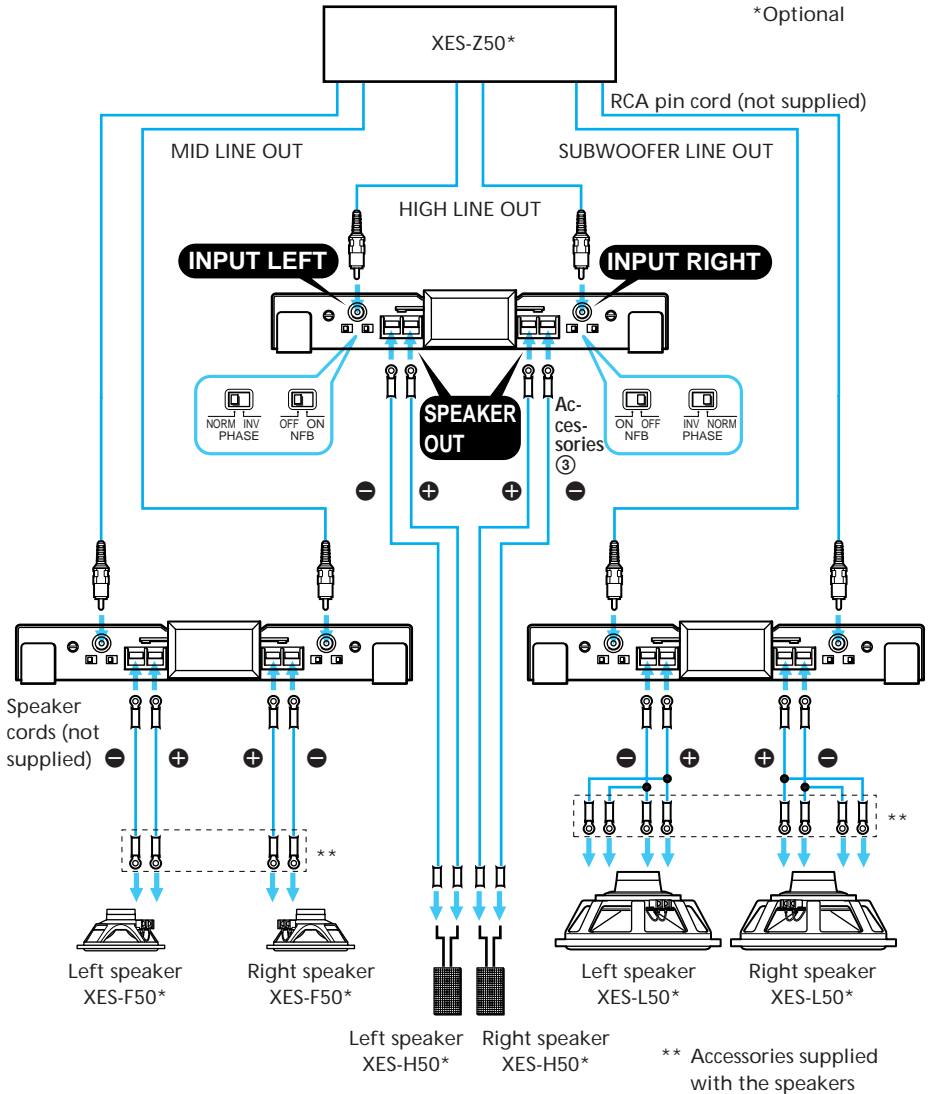
- When using a direct power supply from the car battery, refer to the table on page 21 to select the appropriate cord.

Example: Wiring from the distributor to the battery

$$\begin{aligned}
 &4\text{-ohm speaker} \times 2 \quad (7.5 \text{ A} \times 2) \\
 &+ 1\text{-ohm speaker} \times 2 \quad (26 \text{ A} \times 2) \\
 &+ 1\text{-ohm speaker} \times 2 \quad (26 \text{ A} \times 2) \\
 &= 119 \text{ A}
 \end{aligned}$$

AWG 4 is necessary provided the length is 5 m (16 ft. 5 in.).

XES Series Speaker Connections



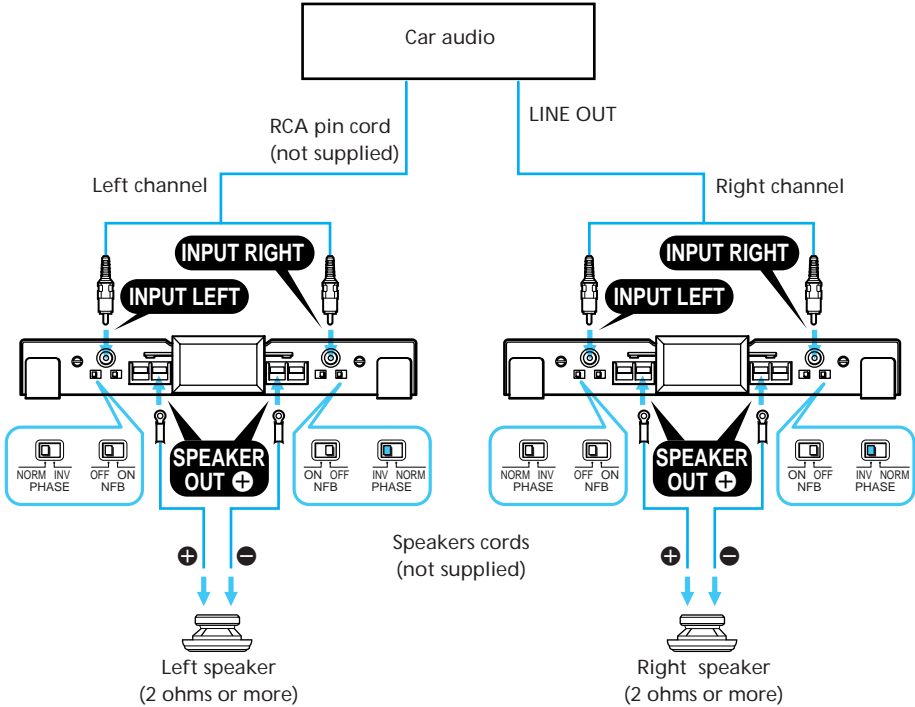
Caution

- The wiring of the cables of the speakers that are used should be kept short because the XES-F50 and XES-L50 speakers of the XES Series are

1 ohm devices. If the cables are too long, the system will not be able to perform at its full potential.

Speaker Connections

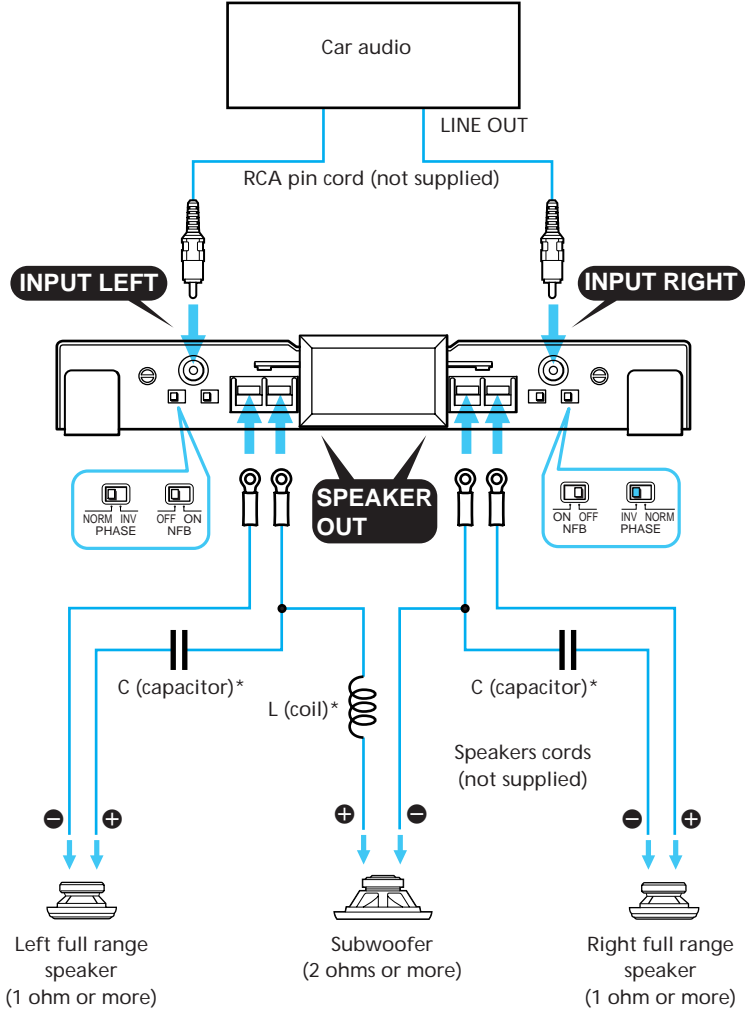
When Used as a Monophonic Amplifier (Bridging Connections)



Note

Make sure that the same signals are input to the INPUT RIGHT/LEFT connectors on the respective amplifier.

Dual Mode Connections



* See the table on the following page for coil and capacitor crossover frequency relationship.

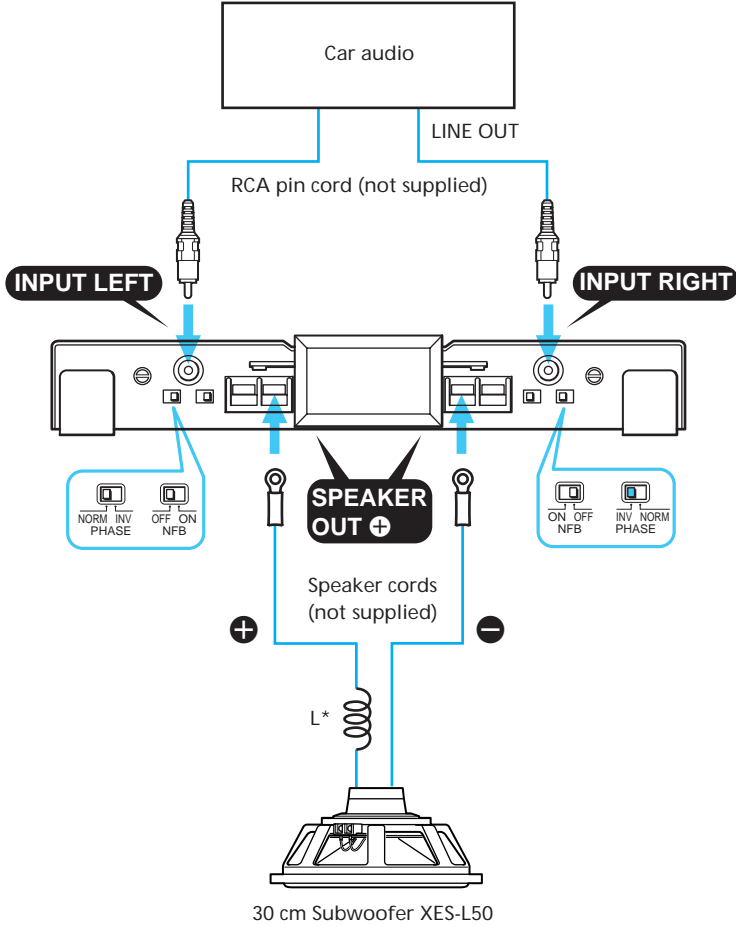
Relationship between crossover frequencies, the inductance of the coil, and the capacitance of the capacitors when a dual connection has been established (6 dB/oct. 4 ohms).

Crossover Frequency (Hz)	L(Coil) (not supplied) (mH)	C1/C2 (Capacitors) (not supplied) (μ F)
50	12.7	800
80	8.2	500
100	6.2	400
130	4.7	300
150	4.2	270
200	3.3	200
260	2.4	150
400	1.6	100
600	1.0	68
800	0.8	50
1000	0.6	39

Caution

- When combined with a multiway loudspeaker system using a passive crossover network, make sure that the impedance of the entire system is at or higher than the matching impedance level.
- When a 12dB/oct passive crossover network is established in which the capacitors and coils are arranged in a series, always connect the speakers. If disconnected from either the \oplus or \ominus terminal of a speaker, the impedance in the vicinity of the resonance frequency decreases and a condition approaching short circuiting occurs. This may result in abnormal amounts of heat being generated or in damage to the system.

Using a Monophonic Amplifier for Subwoofer Use (Bridging Connection)



* See the table in “Dual Mode Connections” (preceding page) for information on crossover frequencies and the inductance of L (a coil which is not supplied). Connections can also be made using a passive low-pass filter (not supplied).

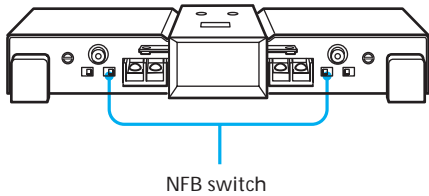
Caution

Connected in this way, the sound of the subwoofer will conform to the signals input to both the left and right terminals.

NFB Switch

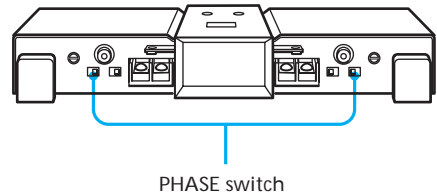
NFB (Negative Feed Back) circuits are effective at reducing the static characteristic distortion produced by the amplifier but are susceptible to the affects of sound muddiness from the reverse electromotive force produced by the speakers.

With a Non-NFB circuit, a clear, unmuddied sound is reproduced.



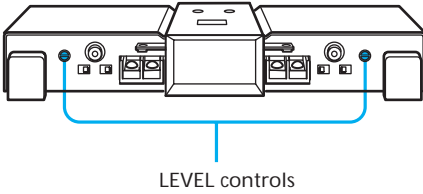
Phase Switch

Used to switch speaker phase. Operates as a positive gain amplifier when set to NORM (normal), and as a negative gain amplifier when set to INV (invert).



Input Level Adjustments

When connecting a car audio system of another manufacturer the input level must be adjusted with the LEVEL controls. Turn it to MAX when the input level seems low and to MIN when the input level seems high.

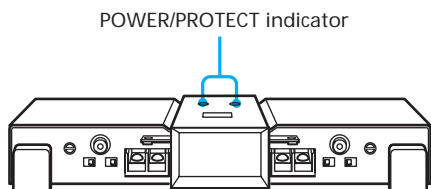


Precautions

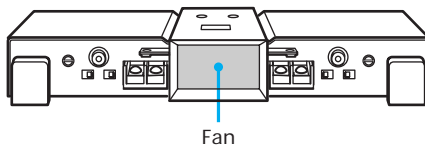
Precautions on Use

- If your car is parked in direct sunlight with the windows closed the temperature inside it rises considerably. At such times, allow the humidity level inside the car to drop before using the system.
- The protection circuit inside the amplifier will operate under the following circumstances in order to protect the output transistor and the speakers:
 - when the level of temperature inside the amplifier has become excessive
 - when an abnormality has occurred and a DC voltage has been generated
 - when an output terminal has been short circuited

At this time the color of the POWER/PROTECT indicator will change from green to red and sound will no longer be audible from the speakers. If this happens, turn off the connected equipment immediately and investigate the cause of the malfunction. When you think that overheating is the cause, wait until the unit cools down before using.

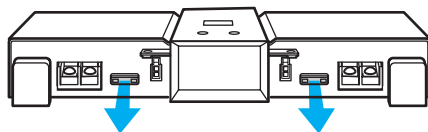


- Do not use the unit on a weak battery as it depends on the condition of the battery for optimal performance.
- For safety reasons, keep the volume at a level that allows you to hear sounds outside the vehicle when driving.
- Do not obstruct the ventilation holes provided for the fan.



Fuse Replacement

When a short circuit occurs or the unit is damaged, a fuse blows preventing excessive current from flowing into the unit. If a fuse blows, check the power source and ground lead connections and replace the fuse. If a fuse blows again soon after it has been replaced, consult your nearest Sony dealer.



Caution

- Never use a fuse with an amperage other than what is specified, as this could result in damage to the unit.

Troubleshooting Guide

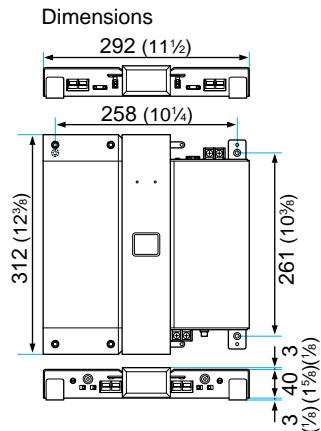
Problem	Cause/Solution
The POWER/PROTECT indicator does not light.	The fuse is blown. → Replace the fuse.
	The ground lead is not sufficiently secured. → Fasten the ground lead securely to a metal point of the car.
	The voltage going into the remote terminal of the unit is too low. <ul style="list-style-type: none">• The power of the car audio is not on. → Turn on the power.• The system employs too many amplifiers. → Use a relay.
	Check the battery voltage (10.5-16 V)
The POWER/PROTECT indicator flashes.	Use speakers with compatible impedance. <ul style="list-style-type: none">• During stereo operation: 1-8 ohms• During bridging operation: 2-8 ohms
	The unit heats up abnormally during use.
	Speaker output is short-circuited. → Remove the cause of the short-circuit.
	The power source lead is too close to an RCA pin lead. → Keep the lead away from the RCA pin leads.
	RCA pin leads are too close to a wiring harness of the vehicle. → Keep the leads away from the wiring harness.
	The ground lead is not securely connected. → Fasten the ground lead securely to a metal point of the car.
	A negative terminal of a speaker is contacting the car chassis. → Keep it away from the car chassis.

If the countermeasures described above appear to have no effect or the problem continues, something is probably damaged. Consult the store where you purchased the system or the nearest Sony dealer.

Specifications

Circuit system	PDD-SEPP (Pure Direct Drive – Single Ended Push Pull) circuit	output) 1 A × 2 (when signal absent)
Input connectors	RCA pin jacks	5 mA (remote current consumption)
Output connectors	Speaker terminals (12 mm (1/2 in.) width) 50 watts per channel (20 Hz-20 kHz, 0.03% THD, 4 ohms, NFB ON) (20 Hz-20 kHz, 0.5% THD, 4 ohms, NFB OFF) 100 watts per channel (20 Hz-20 kHz, 0.03% THD, 2 ohms, NFB ON) (20 Hz-20 kHz, 0.5% THD, 2 ohms, NFB OFF) 200 watts per channel (20 Hz-20 kHz, 0.05% THD, 1 ohm, NFB ON) (20 Hz-20 kHz, 0.5% THD, 1 ohm, NFB OFF)	Mass 4.0 kg (8 lb. 13 oz) Supplied accessories Mounting hardware (one set) Optional equipment XES-Z50 Digital Reference Sound System XES-L50 30 cm (12 in.) Subwoofer XES-F50 16 cm (6 3/8 in.) Full Range Speaker XES-H50 Ribbon Tweeter
Total harmonic distortion	0.003% (NFB ON)	
Frequency response	5 Hz-100 kHz (+0, -3 dB)	
Input impedance	50 kilohms	
Input level adjustment range	1-8 V	
Damping factor	300 (NFB on at 4 ohms)	
Compatible impedance	1-8 ohms (bridging connection: 2-8 ohms)	
Power supply	12 V DC car battery (negative ground)	
Power supply voltage	10.6-16 V	
Current drain	7.5 A × 2 (4 ohms rated output) 14 A × 2 (2 ohms rated output) 26 A × 2 (1 ohm rated	

Design and specifications are subject to change without notice.



Units: mm (inch)

Power Supply Wire

(For a voltage drop of 0.5 V)

For safety reasons, use the crimp type of terminals supplied to connect to the power supply lead.

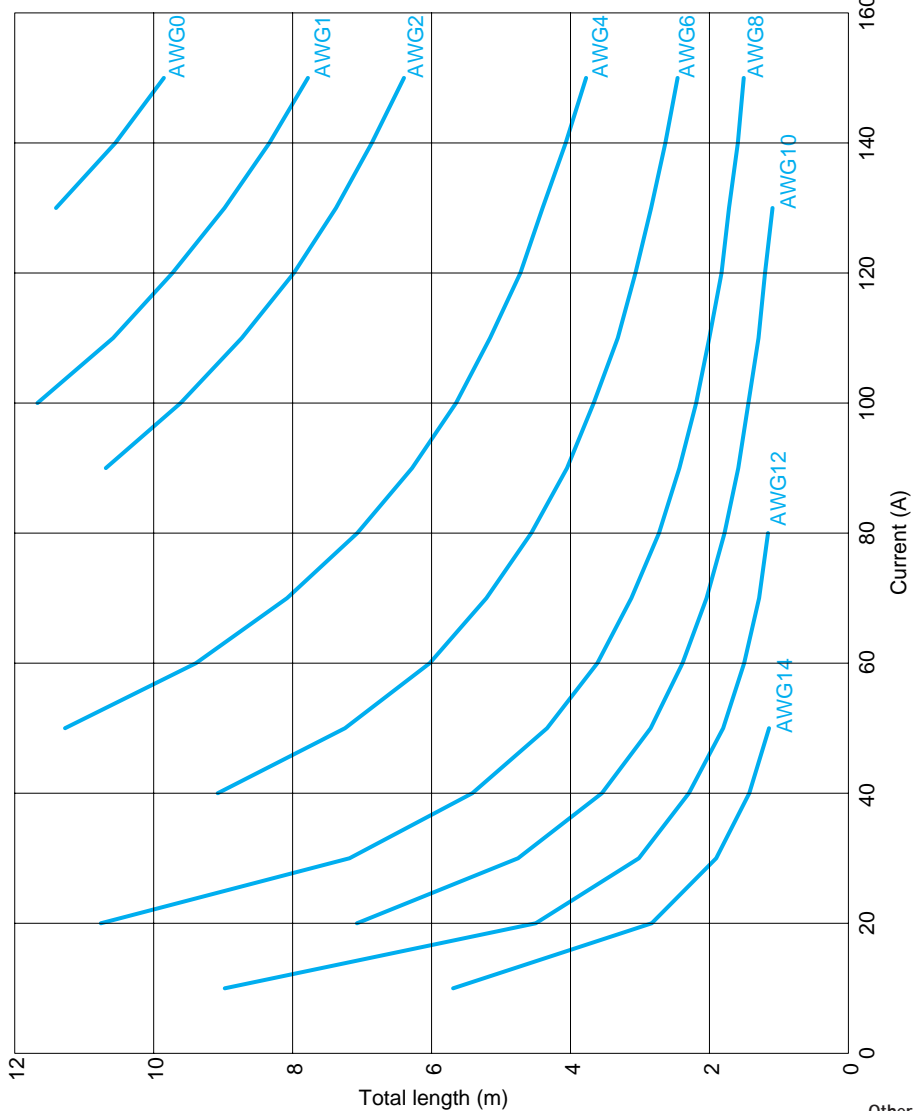
Standards for power supply leads vary depending on the length of the lead and the impedance of the speakers used.

Please see the graph below. Current consumption of the XES-M50 is as shown below.

7.5 A × 2 (4 ohms rated output)

14 A × 2 (2 ohms rated output)

26 A × 2 (1 ohm rated output)



XES