



Power Series Amplifiers

P-4020, P-4040 Owner's Manual

GENUINE JBL



Thank you for purchasing your new JBL Power Series™ amplifier. Power Series amplifiers feature the latest advances in discrete-circuit topology, ensuring low distortion and superbly clean and clear sound quality. In addition to RCA-type pre-amp inputs, Power Series amplifiers feature Universal Interface™, designed to facilitate integration with factory-installed audio systems for distortion-free performance that rivals conventional pre-amp connections. Included in the Universal Interface circuit is Common Sense™ turn-on. Common Sense turn-on senses the common-mode voltage present on the speaker outputs of factory and aftermarket radios, turning on the amplifier without a separate remote wire. All Power Series amplifiers feature built-in electronic crossovers and pre-amp outputs for easy system expansion without requiring outboard processors.

Amplifier Features

- 4-, 3- or 2-channel operation (P-4040)
- 2- or 1-channel operation (P-4020)
- Simultaneous stereo and mono operation
- Built-in 12dB/oct electronic crossover
- Balanced differential input
- Pre-amp outputs (filtered on P-4040)
- Oversized Floating Rail Mosfet Power Supply
- Universal Interface
- Common Sense turn-on
- Variable input sensitivity (250mV–4V)
- Fully complementary, direct coupled discrete power amplifier circuitry
- Gold-plated power, input and output connectors
- 2-Ohm stable (stereo)
- JBL badge lights when amp is operating and flashes when protection circuit is activated
- Made in USA

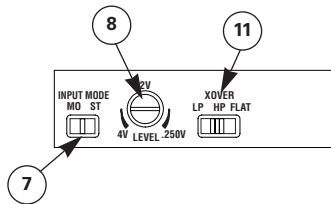
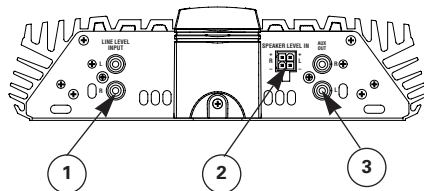
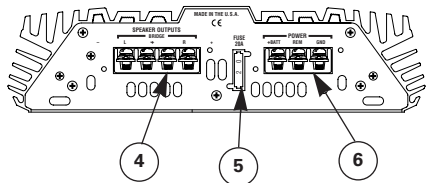
About This Manual

To attain maximum amplifier performance, we encourage you to read the remaining pages before installing and operating your new JBL Power Series amplifier. Especially review the Applications section for ideas on designing and expanding your system. Also, save these instructions for future reference. **Important:** Installation of automotive stereo components can require extensive experience in performing a variety of electrical and mechanical procedures. Although these instructions explain how to install a JBL Power Series amplifier in a general sense, they do not show the exact installation methods for your particular vehicle. If you do not have the experience necessary, do not attempt the installation yourself; instead ask your Authorized JBL Car-Audio Dealer about professional installation options.

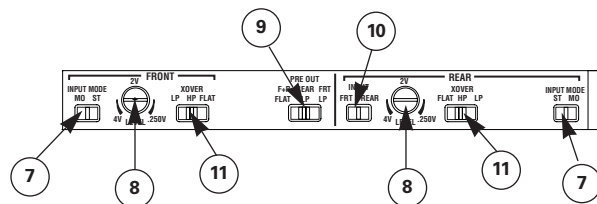
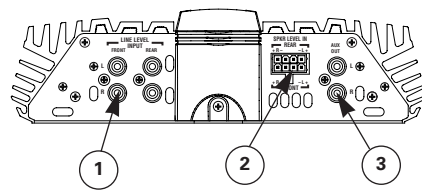
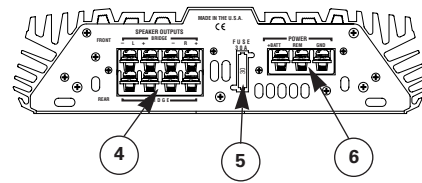
Installation Precautions and Notes

- The JBL P-4020 (or P-4040) has five levels of circuit protection that monitor the amplifier and will shut it down if the electrical system voltage drops below 5Vdc or exceeds 18Vdc, temperatures are above 194° F (90° C), short circuits occur, or current draw exceeds product specifications. For best performance, check the intended mounting site to make sure the operating environment does not create conditions that will trigger the protection circuit.
- Prior to installation, turn off all audio systems and other electrical devices. Also disconnect the (–) negative lead from the vehicle's battery.
- At the installation site, locate and make a note of all fuel lines, hydraulic brake lines and electrical wiring. Use extreme caution when cutting or drilling in and around these areas.
- Check clearances on both sides of a planned mounting surface before drilling any holes or installing any screws. Remember that mounting screws can extend behind the mounting surface.

P-4020



P-4040



- Always wear protective eyewear when using tools.
- When routing cables, keep input signal cables away from power cables and speaker wires.
- When making connections, make sure that each connection is clean, insulated and properly secured. Observe the polarity markings on the rear panel. Refer to the application drawings to set up the amplifier for operation in stereo, bridged-mono, bi-amp or tri-mode configurations.
- If the amplifier's fuse must be replaced, use only the same rating and type as a replacement. Do not substitute another kind.

Controls and Connectors

1. Pre-amp Level Input Connector – Connects to line-level output from the source unit.
2. Universal Interface Speaker-Level Connector – Connects to speaker-level output from the source unit. Provides Common Sense amplifier turn-on when used with factory radios (2-channel on P-4020, 4-channel on P-4040).
3. Pre-amp Level Output Connector – Connects to other amps or processors in the signal chain (flat on P-4020, flat or filtered on P-4040).
4. Speaker-Output Connector – (2-channel on P-4020, 4-channel on P-4040).
5. Fuses – P-4020: 20A ATC type, P-4040: 30A ATC type.
6. Power Connector – Connection for 12V+, Gnd and Rem.
7. Input-Mode Switch – Sums left and right inputs.
8. Input-Sensitivity Control – Adjusts input sensitivity for pre-amp level and speaker-level inputs.
9. Pre-amp Output Selector Switch – Selects input path for pre-amp output. Output can be summed from front and rear inputs with no filter, or filtered by the front or rear crossover.
10. Rear-Channel Input Selector – Selects rear-channel input between front input and rear input.
11. Crossover Selector – Determines whether the crossover is a High-Pass filter (HP), a Low-Pass filter (LP) or unfiltered (Flat).

2. Locate the 3-connection barrier strip labeled +Batt, Rem and Gnd. Connect a black wire (at least 12G) to the Gnd terminal and connect the other end to the nearest bare-metal chassis component. Then, connect a red wire (at least 12G) from the vehicle's +12-volt battery terminal to the +Batt terminal on the barrier strip. Finally, connect a blue wire (16G) to the Rem terminal on the barrier strip and connect the other end to the Rem output of the source unit. (If you are using speaker-level inputs and speaker-level outputs from the source, disregard the previous instruction regarding the Rem terminal.)

Mounting the Amplifier

The JBL P-4020 (or P-4040) can be mounted in virtually any location inside the vehicle. However, make sure to keep the amplifier away from heater vents or ducts.

1. At the chosen site, use the amplifier as a mounting template and mark the locations of the four mounting holes.
2. Drill a small pilot hole at each marked location.
3. Mount the amplifier and securely tighten the mounting screws.

Wiring the Power Connections

Refer to diagrams on page 3 for connector locations.

1. For power, remote and speaker wires, strip 1/4" off one end of each jacket to reveal bare wire for insertion into the barrier strip connectors.

Wiring the Speaker Output Connections

1. Connect the speakers, observing proper polarity, to the speaker output barrier strip on the amplifier using at least 16G high-quality speaker wire. (Note: The total impedance of the speakers connected to the outputs, when the amp is driven in stereo, must be at least 2 ohms.)
2. If you are bridging the amplifier, connect the speaker wires to the terminals marked "bridge," observing proper polarity. (Note: The total impedance of the speaker system to be connected to the amplifier must be at least 4 ohms in bridge mode.)

FREQUENCY Crossover	INDUCTOR GdB/oct. LP (4 ohm)	CAPACITOR GdB/oct. HP (4 ohm)
75Hz	8.0mH	530µF
100Hz	6.4mH	400µF
125Hz	5.0mH	318µF
150Hz	4.2mH	265µF
175Hz	3.6mH	227µF
200Hz	3.2mH	198µF

3. If you are running the amp in tri-mode (stereo and mono simultaneously to one or two pairs of satellite speakers and a subwoofer), refer to the chart above to determine the capacitor and inductor values you'll need to route bass signals to the woofer, and midrange and high frequencies to the satellite speakers. These passive crossover components will also ensure that the impedance of the speaker system doesn't drop below 2 ohms.

Wiring the Input Connections

1. If you are using conventional RCA input connections and a source unit with output voltage less than 4V, simply plug the RCA plugs into the RCA jacks on the amplifier.

2. If you are connecting the amplifier to a factory-installed source unit, or to a source unit that only has speaker-level outputs, connect the speaker outputs of the source to the speaker inputs on the amp, observing the following color codes:

Front Left+: White

Front Left-: White with black stripe

Front Right+: Gray

Front Right-: Gray with black stripe

Rear Left+: Green

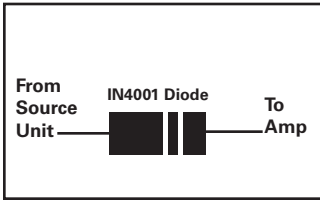
Rear Left-: Green with black stripe

Rear Right+: Purple

Rear Right-: Purple with black stripe

(Note: When using the Universal Interface speaker-level inputs and line-level outputs, the Rem terminal on the amplifier may be used as a remote output connection, and will provide power to turn on other amplifiers and processors in the system.)

3. If you are connecting your Power Series amplifier to a source unit with output voltage higher than 4V, connect the output-signal wires of the source unit to the Universal Interface speaker inputs. Because the inputs have an impedance of 10K ohms, this connection will provide the best noise-free performance possible.



4. In some systems it may be desirable to have two sources play simultaneously through the audio system. For instance, if you have a factory-installed radio in your car and you want to add an aftermarket CD player, you may connect the CD player to the RCA inputs of the amp and the factory radio to the Universal Interface speaker inputs. (Note: Front and rear channels of the CD and radio must be driven into the front and rear inputs of the amplifier. Use Y adapters if necessary.) The Universal Interface circuitry will isolate the two signals from each other while allowing them to drive the amp simultaneously. Therefore, switching from one source to the other is as simple as turning the unused source off, and the other on. (Note: you must connect the remote turn-on wire from the CD player to the Rem terminal on the amp. Install a diode in the remote line from the CD player as shown in the diagram above.)

System Setup and Adjustment

Electronic Crossover

The electronic crossover in the P-4020 and P-4040 should be used to route the appropriate signal to speakers intended to play only bass, or only midrange and treble frequencies. The crossover slope is 12dB/oct and the frequency is fixed at 80Hz.

Pre-amp Outputs

Connect these to the input connectors of other amplifiers or processors in your system. Refer to the “Applications” section for system expansion possibilities.

Setting Input Sensitivity

Proper input-sensitivity control settings on Power Series amplifiers are critical to ensure optimum performance, low noise levels and maximum system reliability. As a general rule, controls at the front end of a system (source, equalizers and other processors) should be set as high as possible with the amplifier input sensitivity set as low as possible while still providing adequate volume levels. Using a high signal level and a low-sensitivity setting will help keep background noise in the system to a minimum.

Initially, turn the input sensitivity GAIN control to its minimum (counterclockwise) position.

1. Reconnect the (–) negative lead to your vehicle’s battery. Apply power to the audio system and play a favorite music track from CD or tape. (Note: After the source unit is on, the JBL badge (on the top panel) will illuminate, indicating the amplifier is on. If not, check the wiring, especially the remote connection from the source unit. Also refer to “Troubleshooting” on page 7.)
2. On the source unit, increase the volume control until it is approximately 3/4 of its maximum output level. Slowly increase the Input Sensitivity control (clockwise) toward three o’clock and, at the same time, listen to the quality of the reproduced sound. At some point, you’ll hear distortion on the music peaks. Stop the adjustment and turn it back slightly. This is the maximum undistorted output level of your system, and it should not be exceeded during use.

3. After adjusting the level of the main speakers in your system, you should adjust the remaining channels (if you are using a P-4040 or a multi-amp system) for the desired system balance. You’ll find this easiest to do by adjusting the channels in the following order: 1) front speakers, 2) rear speakers, 3) subwoofer. Elaborate, multi-channel systems may be complex to adjust. Your local JBL installation specialist is the best person to help with such an adjustment.

Applications

For your convenience, we’ve included several application diagrams to help you plan your own system installation. Figures 1 through 3 show how to configure the JBL P-4020 or P-4040 for stereo, bridged-mono and tri-mode operation. For system expansion ideas, see Figures 4 and 5 on the next page. (Note: For simplicity, Figures 1 through 5 do not show power, remote and input connections.)

Many different system configurations are possible using the crossovers and pre-amp outputs featured in Power Series amplifiers. If you are considering expanding your system beyond what is shown here, please consult your local JBL installation specialist, who is experienced in designing complex mobile-audio systems.

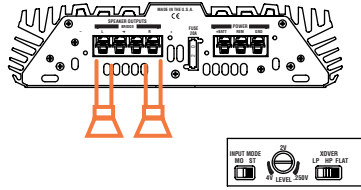


Figure 1. This wiring diagram shows a JBL P-4020 amplifier set to stereo mode to drive a pair of full-range speakers.

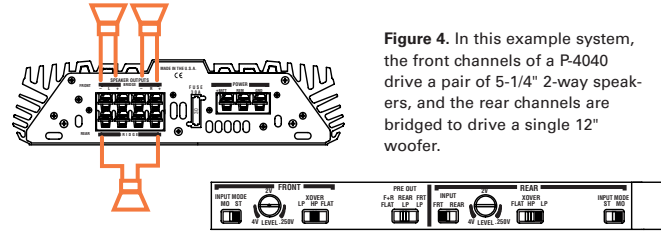


Figure 4. In this example system, the front channels of a P-4040 drive a pair of 5-1/4" 2-way speakers, and the rear channels are bridged to drive a single 12" woofer.

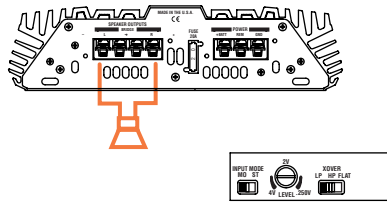


Figure 2. This wiring diagram shows a JBL P-4020 amplifier set to bridge mode (mono) to drive a single subwoofer.

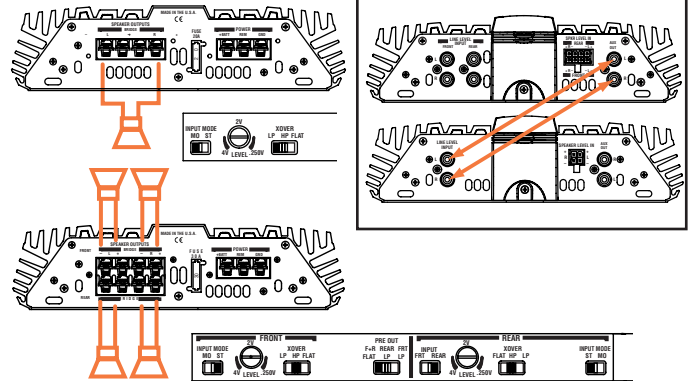


Figure 3. This wiring diagram shows a JBL P-4020 amplifier set for tri-mode operation. For a desired crossover frequency, use the chart on page 4 to select an inductor for the subwoofer, and corresponding capacitors for left and right speakers.

Figure 5. In this expanded system, a JBL P-4040 drives two pairs of 6-1/2" 2-way speakers. The JBL P-4040's pre-amp outputs feed a JBL P-4020 to drive a single 12" subwoofer in bridge mode.

Troubleshooting

Use the following guide to identify symptoms and solve problems. Make sure the vehicle's electrical system is working properly and power is reaching the JBL P-4020 (or P-4040).

Symptom	Likely Cause	Solution
No audio	Low/no remote on voltage Speakers are not connected or are blown	Check connections; turn-test turn-on voltage Check wiring; use VOM/DVM to measure speaker-coil resistance
Distorted audio	Input sensitivity is not set properly	See Setting Input Sensitivity on page 5
Audio lacks "punch"	Speakers are wired with wrong polarity	Check polarity of connections; refer to Applications
Audio cycles off and on; amber protection LED (JBL badge on top panel) is flashing	A protection circuit is turning the amplifier off and on	Verify the following: off electrical system is between 5 ~ 18Vdc; temperature is not over 194°F (90°C); there are no short circuits; speaker loads are not less than 2 ohms (4 ohms in mono)
Audio cycles off and on; amber protection LED (on top panel) is flashing	GAIN is set too high	Set Input Sensitivity correctly (see page 5)
Fuse blows	Incorrect wiring or short circuit	Check connections; refer to Applications

Declaration of Conformity



We, JBL Europe A/S
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declare in own responsibility, that the products described in this owner's manual are in compliance with technical standards:

EN 55013/A12/8.1994
EN 55020/12.1994

Steen Michaelsen
JBL Europe A/S
Birkerød, DENMARK, 3/98

Specifications

P-4020, P-4040

Specifications	JBL P-4020	JBL P-4040
Power Output, 4 ohms:	2 x 40 watts	4 x 40 watts
Power Output, 2 ohms:	2 x 50 watts	4 x 50 watts
Power Output, Bridged 4 ohms:	100 watts	100 watts x 2
Frequency Response:	20Hz ~ 20kHz +0dB, -1dB	20Hz ~ 20kHz +0dB, -1dB
Input Sensitivity:	250mV ~ 4V	250mV ~ 4V
THD + Noise (4 ohms):	0.05 %	0.05 %
Signal-to-Noise:	>100dB	>100dB
Maximum Current Draw:	18A	40A
Dimensions (W x H x L):	7-5/8" x 2-1/4" x 8-3/4" 194 x 58 x 223mm	13-5/8" x 2-1/4" x 8-3/4" 347 x 58 x 223mm



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