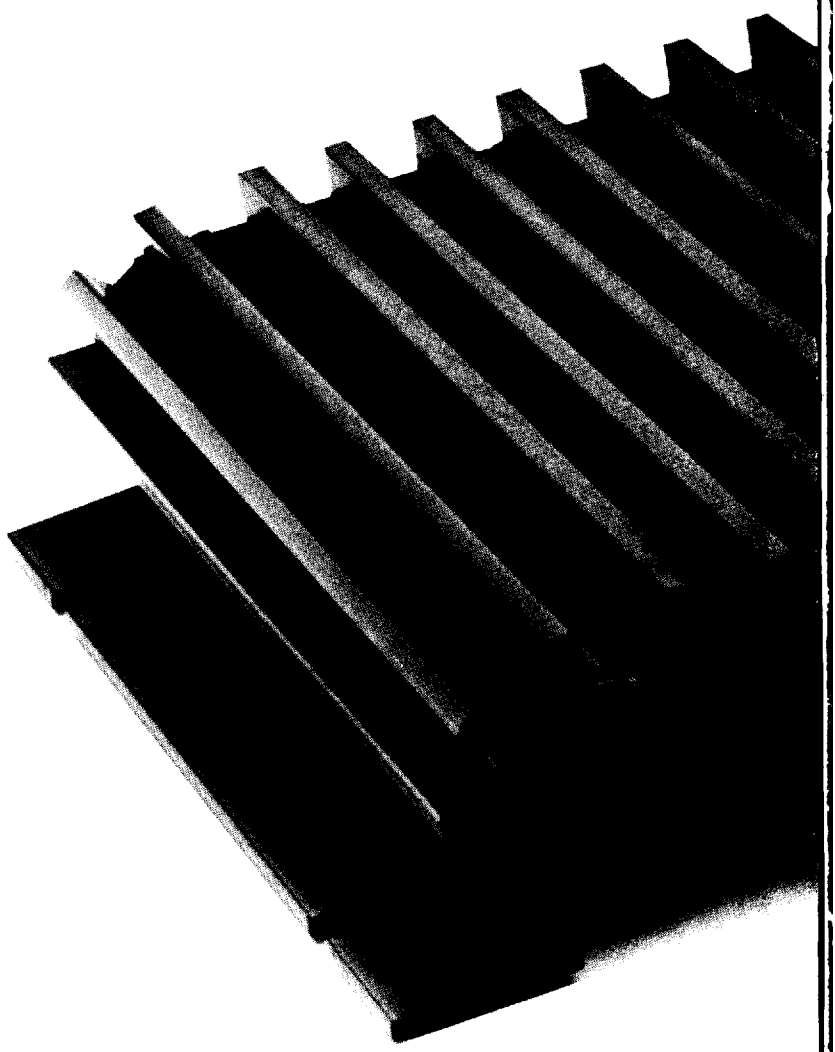
INSTALLATION MANUAL

PUNCH 30
PUNCH 45HD
PUNCH 75HD
PUNCH 150HD



Rockford Fosgate®

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INTRODUCTION

The Rockford Punch 30, Punch 45, Punch 75 and Punch 150 are automotive stereo power amplifiers which will provide state-of-the-art sound in cars, vans, boats, or wherever a 12 volt battery is available.

The Punch adjustable input circuits are designed to match almost any music source, from low preamp levels to speaker levels, with negligible noise. The amplifiers will drive all normal speaker types, impedances, and configurations.

Internal circuitry in the Punch amplifier prevents damage due to speaker terminal shorts. The Punch incorporates internal battery line filtering and extensive noise prevention circuitry.

Due to the technical nature of our products, these installation instructions are enclosed. Damage to speakers or electrical system may result from improper installation, therefore this Punch amplifier should be PROFESSIONALLY INSTALLED. The length and nature of your warranty are dramatically affected if you attempt to install it yourself (see Warranty).

PUNCH EQUALIZER

The Punch equalizer incorporates unique, patented circuitry which is specifically designed to overcome the problems commonly found in mobile speaker installations. Two rotary potentiometers control bass and treble equalization circuits specially designed to compensate for the frequency response errors present in most mobile installations. (Punch equalization is not available on the Punch 30.) Unlike conventional tone controls, the Punch equalization corrects the specific problems of poor low bass response and high frequency rolloff. The result is full-range sound without the unpleasant changes in midrange sound produced by most tone control and equalizer circuits.

INPUT CONNECTIONS (RCA PIN JACKS)

The amplifier's signal input female pin jacks should be connected to the source unit's signal outputs.

If the source unit has "RCA" pin jack outputs, connect the Punch to the source with an "RCA" adapter cable. In some cases, system noise rejection will be improved by using high-quality braided-shield or double-shielded interconnecting cables.

When the source unit does not have pin jack outputs, wire the left signal output to the black center conductor of an adapter cable; the right signal output to the red conductor, and the ground to the shield lines, or use Perfect Interface line output converter #RT-VILOC.

Some higher-powered source units employ "bridged" output circuits ("BTL" outputs). Units with bridged outputs are normally rated at 15 to 25 Watts output by the manufacturer. To connect this type of unit to a Punch amplifier, the speaker positive (+) wires should go to the adapter cable center conductors, but the cable shield ground must be connected to the source chassis, NOT the speaker negative (-) wires.

Be sure to route the Punch signal input cable away from the white power wire and the car's wiring harnesses, to avoid noise coupling.

Pre-assembled interconnector adapters are available from Rockford Corporation's Perfect Interface Division for a wide variety of source units.

NOTE: In most Pioneer pre-amp output units, and some others, the audio shield ground is not at the source chassis common. For these units, connect the shield lines to the audioshield and the chassis common.

INPUT LEVEL CONTROLS

The Punch input level controls are accessible with a jeweler's screwdriver through two holes in the cover. The controls are factory-preset to a level which matches most 500 millivolt to 1 volt rated preamp-output source units.

If you are using the speaker - output leads of the source unit, turn the Punch input controls fully counterclockwise to their minimum gain position.

If the volume control of the source is "touchy" and/or noisy-that is, if just a little volume from the source drives the amplifier into distortion - reduce the Punch input gain controls so that the distortion doesn't start until the source volume is at about 3/4 of its rotation.

If maximum volume from the source won't drive the Punch into distortion, increase the Punch input gain controls until distortion starts at about 3/4 volume.

POWER CONNECTION

The B+ terminal on the Punch must be connected directly to the positive terminal of the battery with the proper size fuse (type 3AG) and wire. (see Table 1). This provides a power source with a low voltage drop and low noise. If the power is connected to any other point (the fuse block, for instance) the amplifier's power output will be reduced and oscillations and noise may distort the sound.

The ground terminal on the Punch must be connected directly to the car chassis with large gauge wire. Ground loops are aggravated by the length of the ground wire or any resistance in the ground path. For this reason we don't recommend extending the ground wire in any installation. The ground point in the car should be a piece of chassis metal that is welded to the main body of the car. Painted surfaces should be scraped or sanded clean before the ground lug is bolted down. (Cover the bare metal area with paint or grease to prevent rust.)

If the power wires must be extended, use only 12-gauge or larger wire and make a good splice.

Avoid running the power wires near the input cabling antenna, power leads, sensitive equipment or harnesses. The power wires carry substantial currents and could induce noise.

TABLE 1

Model	B+ Fuse (Inline with white wire)	B+ Wire Size (White)	GND Wire Size (Black)
Punch 30	7-Amp	14 Gauge	14 Gauge
Punch 45	15-Amp	12 Gauge	12 Gauge
Punch 75	15-Amp	12 Gauge	12 Gauge
Punch 150	25-Amp	12 Gauge	12 Gauge

TURN-ON CONNECTION (RED WIRE FROM 6-PIN CONNECTOR)

The Punch is turned on by applying positive 12 Volts to the red wire. Usually, the red wire is connected to the source unit's "Accessory" or "Auto Antenna" lead, either of which will go positive when the source is turned on. (Note: The Punch 30 is turned on by applying 12 volts to the REM terminal.)

Although the majority of high-quality automotive source units have an Accessory or Auto Antenna output, there are many which may require different turn-on methods. If the source has no Auto Antenna lead (or if Auto Antenna goes down during tape operation):

a) Find the internal switched power voltage inside the source unit and solder a lead to it. Run the lead out through the back of the unit (being sure to use a grommet for insulation from the case) and connect the Punch red turn-on wire.

b) Or: Install a switch in the car with one terminal connected to +12 Volts and the other to the Punch red lead.

c) Or: Connect the Punch red lead to the accessory point at the car's fuse block. In this case the amplifier will be on whenever the car is on. This method will allow the amplifier to amplify any noise and turn-on and turn-off transients, and may therefore be unsatisfactory.

SPEAKER CONNECTIONS (WIRES FROM 6-PIN CONNECTOR)

ORANGE - LEFT POSITIVE

BLACK - LEFT NEGATIVE

YELLOW - RIGHT POSITIVE

BROWN - RIGHT NEGATIVE

Be certain to observe speaker terminal polarity throughout the system. It is critical for the Punch to use the correct negative leads for the right and left channels, since the right negative lead (brown) is the "hot" lead for the right speaker. DO NOT chassis ground any of the speaker leads. Unstable operation may result. (Note: Punch 30 has 4-pin connector)

SPEAKER WIRE

We recommend that you always use substantial wire for speaker wire harnesses. For short runs, 18-Gauge wire is the smallest we suggest; for runs over 6 feet, 16-Gauge wire should be used. Many users find that sound quality is improved by the use of specially made heavy-duty speaker wire from Perfect Interface. The Punch output harness uses short runs of 16-Gauge wire and should not reduce any benefits gained from using specialized speaker wiring.

SPEAKER IMPEDANCE

The Punch is rated for operation into loads of 2 Ohms or greater in stereo operation.

The primary loads on the amplifier come from directly connected speakers (not isolated by capacitors), and the measured resistance for each side cannot be less than 1.8-Ohms. Single 4-Ohm woofers or parallel 4-Ohm pairs per side will form a high performance system. The maximum direct load per side is a 4-Ohm speaker in parallel with a 4-Ohm speaker.

If the amplifier load drops below 1.5-Ohms, the Punch amplifier will limit output power to a safe level.

The heaviest load on the power amp normally comes from the woofers. In speaker systems where midrange speakers are isolated with crossover capacitors, only the woofer impedance usually needs to be considered.

BRIDGING MODE

The Punch amplifier is capable of driving 4-Ohm or 8-Ohm speakers in a bridged mono configuration to deliver full power into a single speaker. This is done by connecting the orange wire to the speaker's positive terminal and the brown wire to its negative terminal. This capability can be used to run a single woofer in a stereo system, to run two bridged amplifiers as a high power stereo system, to run one amplifier with a bridged mono woofer and another as a high-frequency stereo amp, and many other applications. In any bridged application, DO NOT use speakers with less than 4-Ohms impedance.

SPEAKER FUSING

The Punch amplifiers are supplied with in-line fuses for speaker protection. The Punch amplifiers are fully protected internally against loading problems, and external fuses are not required for amplifier protection. However, speakers are not normally capable of continuous full-power operation and should be fused to prevent damage due to overheating.

Speaker	**Fusing**
Punch-30	3-Ampere
Punch-45	5-Ampere
Punch-75	5-Ampere
Punch-150	6-Ampere

The amplifiers are provided with type AGC (3AG) fuses of the correct value. This fuse value was selected to provide adequate protection for most high-power 4-Ohm speakers. If a light-duty speaker is found to fail frequently, a smaller fuse may be used for better protection. Always use fast-blow type fuses and replace only with recommended fuse.

PASSIVE CROSSOVER IMPEDANCE

When passive crossover components are used in multiple-speaker systems, the crossover system's impedance must be considered along with the speaker's impedance in determining amplifier loading.

For 6dB per Octave systems (where a single capacitor in a series is used for high-pass or single inductor [choke] in series is used for low-pass) the net impedance of the system will be increased and problems are unlikely.

12dB per Octave systems (where both an inductor and a capacitor are used with each speaker) can cause trouble. A 12dB choke capacitor pair forms a series-resonant circuit to ground whose impedance at resonance is determined by the speaker's dynamic independence. For instance, if the speaker is open or disconnected, the crossover input impedance is theoretically ZERO at resonance - a direct short!

Since speaker impedance varies considerably from rated values at various frequencies, it is common to find that "standardized" 12dB per Octave crossovers (which are designed for pure resistor loads) have serious impedance dips near their crossover frequencies, possibly causing overheating and fuse-blowing in the amplifier.

We recommend that you be cautious in using 12dB/Octave crossover systems unless they are specifically designed to have minimual impedance variations for the speakers in use.

SPEAKER POWER RATINGS

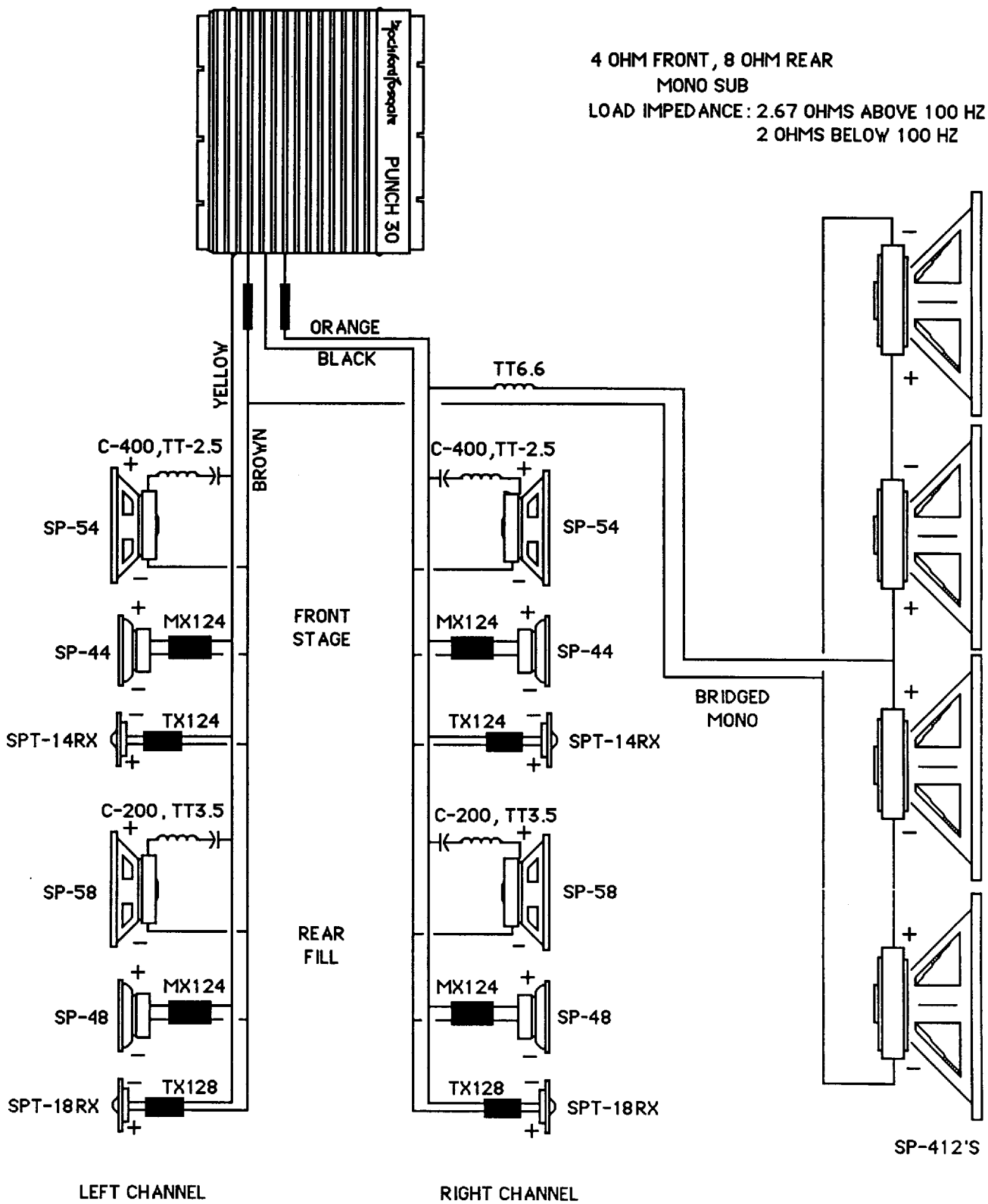
It is common knowledge that more speakers are damaged due to too little power from the amplifier, and sending a distorted "clipped" signal to the speaker. The distortion components of a clipped waveform create a tremendous amount of heat which can, and often does, damage the voice coil. This happens when the user thinks he/she can turn the volume knob up all the way. The amplifier inputs can be adjusted to allow this, and that is highly recommended. Using an oscilloscope, the installer can adjust the gain controls on the amplifier until the signal just clips at maximum volume. Excessive power can also damage speaker voice coils, but most speaker specifications are conservative, and speakers can handle a great amount of power if clipping is avoided.

The power rating for speakers should correspond to the rated output of the amplifiers:

AMPLIFIER	MODE	IMPEDANCE	POWER
Punch 30	Stereo	4-ohm	15 Watts
	Bridged Mono	8-ohm	25 Watts
	Bridged Mono	4-ohm	50 Watts
Punch 45	Stereo	4-ohm	22.5 Watts
	Bridged Mono	8-ohm	45 Watts
	Bridged Mono	4-ohm	70 Watts
Punch 75	Stereo	4-ohm	37.5 Watts
	Bridged Mono	8-ohm	75 Watts
	Bridged Mono	4-ohm	120 Watts
Punch 150	Stereo	4-ohm	75 Watts
	Bridged Mono	8-ohm	150 Watts
	Bridged Mono	4-ohm	180 Watts

At high power levels some woofers, which are rated to handle the power, "pop", "clang", "snap", or otherwise show signs of bottoming. These speakers are designed to use the "air spring" of an enclosed box to prevent bottoming. This applies to almost all woofers originally designed for home or professional use. One solution is to use speakers designed for "infinite baffle" use, which have very stiff suspensions. The best solution is to build enclosures for the woofers.

TYPICAL SPEAKER CONFIGURATIONS



PUNCH 30 MOSFET PROTECTION AND FUSING

The Punch 30 is protected by two 3-Ampere speaker-line fuses and by a 7-Ampere battery fuse. A thermal sensor shuts down the amplifier in case of overheating. Internal circuitry shuts down the amplifier in case of overload.

PUNCH 45 MOSFET PROTECTION AND FUSING

The Punch Amplifier 45 MOSFET is protected by power line fusing, computerized output stage protection circuits, and a thermal sensing circuit will turn off the amplifier for several minutes if the heatsink temperature rises above 90 degrees Celsius (195 degrees Fahrenheit). In addition, in-line 5-Ampere fuses are provided on the output wires for the speaker protection (see SPEAKER FUSING).

The power line fuse supplied with the Punch 45 MOSFET is a 15-Ampere Type AGC (3AG) fast-blow fuse. This fuse should supply enough current for normal load and music conditions. For extreme load conditions, fuses up to 20-Ampere fast blow types may be substituted.

PUNCH 75 MOSFET PROTECTION AND FUSING

The Punch Amplifier 75 MOSFET is protected by power line fusing, computerized output stage protection circuits, and a thermal sensing circuit will turn off the amplifier for several minutes if the heatsink temperature rises above 90 degrees Celsius (195 degrees Fahrenheit). In addition, in-line 5-Ampere fuses are provided on the output wires for the speaker protection (see SPEAKER FUSING).
The power line fuse supplied with the Punch 75 MOSFET is a 15-Ampere Type AGC (3AG) fast-blow fuse. This fuse should supply enough current for normal load and music conditions. For extreme load conditions, fuses up to 20-Ampere fast blow types may be substituted.

PUNCH 150 MOSFET PROTECTION AND FUSING

The Punch Amplifier 150 MOSFET is protected by power line fusing, computerized output stage protection circuits, and thermal sensing circuit will turn off the amplifier for several minutes if the heatsink temperature rises above 90 degrees Celsius (195 degrees Fahrenheit). In addition, in-line 6-Ampere fuses are provided on the power wires for the speaker protection (see SPEAKER FUSING).

The power line fuse supplied with the Punch 150 MOSFET is a 25-Ampere Type AGC (3AG) fast-blow fuse. This fuse should supply enough current for normal load and music conditions. For extreme load conditions, fuses up to 35-Ampere fast blow types may be substituted.

MOUNTING THE PUNCH

The mounting location and position of the Punch will have a large effect on its ability to dissipate the heat generated in normal operation. The Punch has a normal heat sink for its heat dissipation, and internal overheating shutoff circuitry, so it is reasonably tolerant of mounting variations. However, care should be taken to be sure of adequate ventilation.

TRUNK MOUNTING

We have measured trunk temperatures as high as 175 degrees Fahrenheit in the summertime. Since the thermal shutoff point for the Punch is 195 degrees F, it is easy to see that the amp must be mounted for maximum cooling capability. Mounting the amp on the floor or roof of the trunk will not allow convection air flow. Mounting the unit vertically on a surface is usually required for adequate convection cooling. This position allows air flow through the fins.

PASSENGER COMPARTMENT MOUNTING

When the amp is mounted in the passenger compartment, mounting requirements are considerably relaxed, since the driver will not often allow temperatures to stay anywhere near 175 degrees F. Floor mounting is usually satisfactory in the cab, and under the seat will work as long as there is at least 1 inch above the amplifier fins for air movement. Vertical mounting (for instance, the back of pick up cabs) is still the best. Under dash mounting is satisfactory as well.

Any situation which allows moving air to be directed over the cooling fins will improve cooling dramatically. A simple fan blowing on the amplifier will improve cooling by a factor of 3. In any case it is critical that the amp not be enclosed in a small box or cover so that the air can't flow around the fins. Fan shrouds are available through **Perfect Interface**, a division of Rockford Corporation.

BATTERY CHARGING SYSTEM

High power amplifiers will naturally put an extra load on the battery and charging system. A Punch 30 MOSFET may draw up to 3-5 Amperes average current when playing very loudly; a Punch 45 MOSFET may draw up to 5-9 Amperes average current when playing very loudly; a Punch 75 may draw up to 8-12 Amperes average current when playing very loudly, and a Punch 150 up to 10-20 Amperes.

Stock electrical systems in good condition will typically handle the extra load of any Punch without problems, although battery and alternator life may be slightly reduced.

Some special situations will require greater attention to the electrical system:

1. If the sound system will be used often when the car is not running, the battery will obviously be discharged - perhaps enough to prevent starting. The discharge-recharge cycle will reduce battery life and alternator life will be shorter because of the high-current recharge requirements.

If problems arise:

a) Use a premium battery or deep-cycle marine battery.

b) Use a heavy duty alternator.

c) Use a trickle-charge or battery charger.

d) Install a second battery with a switching system for recharge (paralleling batteries is not recommended).

2. If multiple amplifiers are installed, average currents may be high enough to overload the standard alternator and reduce alternator and battery life. In this case it is a good idea to use a heavy-duty alternator and a high-quality battery.

SPECIFICATIONS: PUNCH 30 MOSFET

POWER RATINGS:

4-Ohms: 15 Watts per channel continuous power, both channels driven into 4 Ohms from 20 to 20,000 Hertz, with less than 0.05% THD+N.
(Total Harmonic Distortion plus Noise).

4-Ohms: 30 Watts per channel continuous power, both channels driven into 4 Ohms at 1000 Hertz, with less than 10% THD+N.

2-Ohms: 25 Watts per channel continuous power, bothchannels driven into 2 Ohms from 20 to 20,000 Hertz, with less than 0.10% THD+N.

Frequency response: 20 to 20,000 Hertz ± 1.0 dB

Bandwidth: 15 to 100,000 Hertz ± 3 dB

Damping Factor:
At circuit board: Over 200 (referred to 4 Ohms).
At speaker lead: Over 50 (referred to 4 Ohms).

Signal to noise ratio: Over 80 dB, unweighted.

Slew factor: over 5

IM Distortion (IHF): Less than 0.05%

Input Gain: Variable from 40 dBV to 14 dBV. Factory pre-set at 26 dBV (correct for most 500 millivolt-rated source units).

PROTECTION:

The Punch 30 MOSFET is protected by two 3-Ampere speaker-line fuses and by a 7-Ampere battery fuse. A thermal switch shuts down the amplifier in case of overheating. Internal circuitry limits power in case of overload.

DIMENSIONS:

6.1" long by 7.1" wide by 1.6" high, exclusive of knobs.
(155mm long by 180mm wide by 40.6mm high)

NOTE: Specifications subject to change without notice.

SPECIFICATIONS: PUNCH 45 MOSFET

POWER RATINGS:

4-Ohms: 22.5 Watts per channel continuous power, both channels driven into 4 Ohms from 20 to 20,000 Hertz, with less than 0.05% THD+N.
(Total Harmonic Distortion plus Noise).

4-Ohms: 40 Watts per channel continuous power, both channels driven into 4 Ohms at 1000 Hertz, with less than 10% THD+N.

2-Ohms: 35 Watts per channel continuous power, both channels driven into 2 Ohms from 20 to 20,000 Hertz with less than 0.10% THD+N.

Frequency response: 20 to 20,000 Hertz ± 1.0 dB

Bandwidth: 15 to 100,000 Hertz ± 3 dB

Damping Factor:
At circuit board: Over 200 (referred to 4 Ohms).
At speaker lead: Over 50 (referred to 4 Ohms).

Signal to noise ratio: Over 80 dB, unweighted.

Slew factor: over 5

IM Distortion (IHF): Less than 0.05%

Input Gain: Variable from 40 dBV to 14 dBV. Factory pre-set at 26 dBV (correct for most 500 millivolt-rated source units).

EQUALIZATION:

Bass Boost: 0 to +18 dB Maximum at 45 Hertz.
Treble Boost: 0 to +12 dB Maximum at 20,000 Hertz.

PROTECTION:

The Punch 45 MOSFET is protected by two 3-Ampere speaker-line fuses and by a 15 Ampere battery fuse. A thermal switch shuts down the amplifier in case of overheating. Internal circuitry limits power in case of overload.

DIMENSIONS:

6.6" long by 8.6" wide by 2.2" high.
(168mm long by 218mm wide by 56mm high.)

NOTE: Specifications subject to change without notice.

SPECIFICATIONS: PUNCH 75 MOSFET

POWER RATINGS:

4-Ohms: 37.5 Watts per channel continuous power, both channels driven into 4 Ohms from 20 to 20,000 Hertz, with less than 0.05% THD+N (Total Harmonic Distortion plus Noise).

4-Ohms: 60 Watts per channel continuous power, both channels driven into 4 Ohms at 1000 Hertz, with less than 10% THD+N.

2-Ohms: 60 Watts per channel continuous power, both channels driven into 2 Ohms from 20 to 20,000 Hertz with less than 0.10% THD+N.

Frequency response: 20 to 20,000 Hertz ± 1.0 dB

Bandwidth: 15 to 100,000 Hertz ± 3 dB

Damping Factor:
At circuit board: Over 200 (referred to 4 Ohms).
At speaker lead: Over 50 (referred to 4 Ohms).

Signal to noise ratio: Over 80 dB, unweighted.

Slew factor: over 5

IM Distortion (IHF): Less than 0.05%

Input Gain: Variable from 40 dBV to 14 dBV. Factory pre-set at 28 dBV (correct for most 500 millivolt-rated source units).

EQUALIZATION:

Bass Boost: 0 to +18 dB Maximum at 45 Hertz.
Treble Boost: 0 to +12 dB Maximum at 20,000 Hertz.

PROTECTION:

The Punch 75 MOSFET is protected by two 5-Ampere speaker-line fuses and by a 15 Ampere battery fuse. A thermal switch shuts down the amplifier in case of overheating. Internal circuitry limits power in case of overload.

DIMENSIONS:

7.6" long by 8.6" wide by 2.2" high, exclusive of knobs and wiring.
(193mm long by 218mm wide by 56mm high)

NOTE: Specifications subject to change without notice.

SPECIFICATIONS: PUNCH 150 MOSFET

POWER RATINGS:

4-Ohms: 75 Watts per channel continuous power, both channels driven into 4 Ohms from 20 to 20,000 Hertz, with less than 0.05% THD+N.
(Total Harmonic Distortion plus Noise).

4-Ohms: 120 Watts per channel continuous power, both channels driven into 4 Ohms at 1000 Hertz, with less than 10% THD+N.

2-Ohms: 90 Watts per channel continuous power, both channels driven into 2 Ohms from 20 to 20,000 Hertz with less than 0.10% THD+N.

Frequency response: 20 to 20,000 Hertz ± 1.0 dB

Bandwidth: 15 to 100,000 Hertz ± 3 dB

Damping Factor:
At circuit board: Over 200 (referred to 4 Ohms).
At speaker lead: Over 50 (referred to 4 Ohms).

Signal to noise ratio: Over 80 dB, unweighted.

Slew factor: over 5

IM Distortion (IHF): Less than 0.05%

Input Gain: Variable from 40 dBV to 14 dBV. Factory pre-set at 32 dBV
(correct for most 500 millivolt-rated source units).

EQUALIZATION:

Bass Boost: 0 to +18 dB Maximum at 45 Hertz.
Treble Boost: 0 to +12 dB Maximum at 20,000 Hertz.

PROTECTION:

The Punch 150 MOSFET is protected by two 6-Ampere speaker-line fuses and by a 25 Ampere battery fuse. A thermal switch shuts down the amplifier in case of overheating. Internal circuitry limits power in case of overload.

DIMENSIONS:

9.6" long by 8.6" wide by 2.2" high minimum mounting dimensions.
(244mm long by 218mm wide by 56mm high)

NOTE: Specifications subject to change without notice.

Rockford Fosgate

P45/75/150HD

Looking into the Amp

#1 **OPEN**	#2 **YELLOW** Right Positive	#3 **ORANGE** Left Positive
#4 **RED** Remote Lead	#5 **BROWN** Right Negative	#6 **BLACK** Left Negative

catch prong

* Numbers 1-6 are numbered on PC Board