

How to Bias an Amp

Setting idle current so the amp stays alive, musical, and within its tubes' limits.

Bench checklist · Fixed-bias & cathode-bias · Companion to Tube Bias Calculator Pro

Idle (quiescent) current is the quiet argument between headroom and heat. Set it well and the power stage has room to move without collapsing into crossover or cooking the plates. This sheet is a printable bench companion — use it with a real load, proper probes, and professional safety practice.

DANGER — lethal voltages. Live bias work exposes tube pins and circuitry at hundreds of volts DC (often 450–500 V and above). Continue only if you follow professional high-voltage practice. If that is not you, stop and hand the amp to someone who is.

1 · Prerequisites & tools

Bias probes

DiMastro GTA dual-meter probes (or equivalent that let you read plate voltage and current safely).

Insulated ceramic driver

For the bias trim pot; no metal shaft near high voltage.

Two matched multimeters

High VDC range first, then current mode as your probe design requires.

Load

Speaker or dummy load attached before every power-up.

Math

DiMastro GTA Tube Bias Calculator Pro (or equivalent) for dissipation % → mA.

Swapping tube brands or types? Re-bias. A substitution chart and a basic V/I/R power calculator earn their keep on the same bench.

2 · Step-by-step (fixed bias, dual probes)

01 Warm-up

Power up with a proper load. Idle 10–15 minutes until the power tubes are thermally stable, then switch to standby.

02 Install probes

On standby, remove the power tubes, insert the probes into the sockets, and re-seat the tubes into the probe tops.

03 Meters → voltage

Connect both meters. Start on a high VDC range (700 V or 1000 V). Never open the current path by accident on a live B+ node.

04 Read plate voltage

Come out of standby and note V_p . Some probes break pin 3 in VDC mode and can read ~0.3–0.6% high. For plate-to-cathode closer to truth, measure pin 3 to pin 8 without breaking current.

05 Target current

Enter V_p and tube type in Tube Bias Calculator Pro. Choose class and dissipation %. Record the target mA for each tube.

06 Standby → current mode

Return to standby before changing meter function or probe mode. Then measure idle current under the same warm conditions.

07 Adjust

Trim the bias pot in small moves. Watch both sides of a pair. Re-check V_p if it drifts. Match currents to the calculated target.

08 Close the loop

Run dissipation and any screen / total-idle checks. Power down, discharge if needed, remove probes, restore normal seating.

3 · Reading the targets

Class A vs Class AB

Class A keeps the tube conducting for the whole cycle, so idle sits hot — often about **70–90%** of max plate dissipation. Class AB splits the work across a pair; idle can sit cooler — often about **50–70%** — without immediate crossover trouble.

Example. Tube rated 25 W, plate-to-cathode 400 V, target 70% → $I = (25 \times 0.70) \div 400 \approx 43.8 \text{ mA}$.

Fixed bias vs cathode bias

Fixed bias uses a dedicated negative grid supply — it does not self-correct as tubes age. **Cathode bias** builds bias from current through a cathode resistor and largely self-regulates.

4 · Typical idle bands (indicative)

Always defer to the datasheet and the amp's design intent.

Class / style	Typical idle band	Character
Class A (fixed or cathode)	~70–90% of max plate W	Hot idle · full-cycle conduction
Class AB fixed bias	~50–70% of max plate W	Cooler idle · pair shares peaks
Cathode-biased AB / near-A	Often toward higher % of rating	Self-regulating · design-dependent

5 · Measurement methods

Common paths: voltage across a known cathode resistor; OT center-tap / B+ shunt (plates-only vs plate+screen); half-primary shunt; bias-probe adapters; cathode current with an explicit screen split when combined. **Calculator mode must match the measurement** — plate-only and plate+screen are not interchangeable.

6 · Safety & good practice

Load first

No load, no power-up — speaker or dummy load every time.

Standby discipline

Standby before changing meter ranges, probe modes, or tube seating.

Discharge caps

Discharge filter caps with a proper tool before hands go inside.

One-hand rule

One-hand discipline where practical; keep the other out of the current path.

Screen figures

Treat published screen max-dissipation figures as a sanity check, not a precise per-tube guarantee.

Re-check later

Re-check bias after tube swaps and after months of heat cycles.

Companion to the online guide at **dimastro.com**. Does not replace tube datasheets or amplifier service literature. Always verify voltages with a trustworthy meter and follow professional high-voltage practice.

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