Subject: Motor braking
Posted by Wayne Parham on Sun, 29 Jun 2003 12:06:25 GMT
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You've got the gist of it. Back EMF generated by the speakers will cause current flow through the circuit. Inertia is the energy that drives the voice coil to become a generator. If the amplifier is a good current sink, then it is very nearly a short circuit and it will make the generator do more work because more current will flow. This will slow it more effectively, and that's why it is called damping. I've referred to this as "motor braking" because that's what it is.This is good because it allows more powerful motors and therefore larger loads in the system. Cones can be made more massive and still be well-damped. Motors can be made more powerful. But this requires that the amplifier act as a very good current source and sink, because current is directly proportional to motor strength. That's the down side.So there's the rub. In and of itself, motors that generate a lot of back EMF have strong motor structures and that's a good thing. But if the amplifier isn't a good current source/sink, then the motor isn't strong after all - It's just massive and weak. So if the amp has poor damping ability then a woofer that needs motor braking will perform poorly. Qes will change dramatically and the system won't perform as expected.One other thing - Consider what happens in a circuit containing transformers (or autotransformers) when back EMF is applied. Tube amplifiers are generally less able to deal with speakers that need motor braking, and this is largely because they have output transformers and have relatively high output impedance.There are also speaker designs that use autotransformers in the crossovers, and so it is important to consider this if woofers are installed that generate a lot of back EMF. And also watch out for piezo tweeters, since they are a high impedance capacitive load. I've actually heard a few installations where back EMF from a woofer caused the piezo to chirp, even on amplifiers with exceptional damping ability.