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Subject: more questions! :-)

Posted by [Jerry Parker](#) on Mon, 10 Jun 2002 03:11:56 GMT

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Hey Wayne, Ive got some more questions for you. First of all, what exactly is the difference between linear and progressive spiders? From what I understand, linear spiders have the same restoring force no matter what the excursion, while progressive spiders have more restoring force as the excursion of the driver increases. So basically, a speaker in a ported box would not be a good idea to use with a linear spider, because too much power under the tuning frequency and you would get mechanical damage as a result of the voicecoil smacking the backplate, right? Also, What exactly is the difference between overhung and underhung motor topologies? I know that an overhung design has its voice coil windings longer than the magnetic gap, otherwise they would be 0mm xmax. But how exactly does an underhung design work? From what I heard the magnetic gap is very long and the voice coil windings are shorter than the magnetic gap. What are the advantages and disadvantages to each design? Thanks!

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Subject: Motors

Posted by [Wayne Parham](#) on Mon, 10 Jun 2002 06:01:09 GMT

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Spiders can be made having a constant rate or with variable rate. If the spider flexes easy over part of its travel and then harder as it nears maximum travel then it has a variable rate. As for motor configurations, an overhung voice coil is one where the coil form is longer than the magnet's gap and this ensures that a relatively large number of turns remains within the high energy area of magnetic flux. An underhung voice coil is one where the coil is shorter than the gap and it ensures that the coil is completely surrounded by the magnet and that it cannot be moved to a position where any part of the coil receives less than maximum flux. An overhung coil will always keep a portion of its length within the gap. This ensures that the motor enters displacement compression relatively slowly as the driver nears Xmax. With an underhung coil, the total length of the coil is always within the magnetic gap. This design type is usually associated with high efficiency drivers and motors made this way enjoy increased linearity, reduced distortion and higher efficiency. However, once Xmax is exceeded, the underhung motor becomes rapidly non-linear, as you might well expect. This is rarely an issue though, because the overall motor/diaphragm system is designed so that Xmax is not exceeded until other parameters are nearing critical levels as well. But underhung designs are often more expensive, requiring larger and more powerful magnetic structures.