Choosing Damping Direction

TWO-WAY (damps in compression and extension)

Two way damping is the most effective in reducing oscillation. Two-way damping units will have the same force capabilities as the one-way damping units in each direction.

If the mass must act faster in one direction than in the other, it may be useful to damp in only one direction. Either a push damping or pull damping unit may be selected.

PUSH (damps in compression)
In the Push damping direction an initial rapid movement and compression of air occurs until the dashpot force has risen to equal that of the input force. This is best for controlling motion towards the end of its movement.

PULL (damps in extension)
In the Pull damping direction the dashpot force will rise almost immediately, reaching maximum damping forces with much less shorter movement. This is best for controlling motion through the entire stroke from the very beginning of it.

Force is the primary consideration for dashpot configurations and all applications involving vibration, time delay, and velocity control.

Limits based on damping direction. Force always relates to the net load which is pushing or pulling on the dashpot. Typically, force will dictate the unit's size when the Airpot is used in the dashpot configuration (as opposed to snubber configurations where energy is the primary factor).

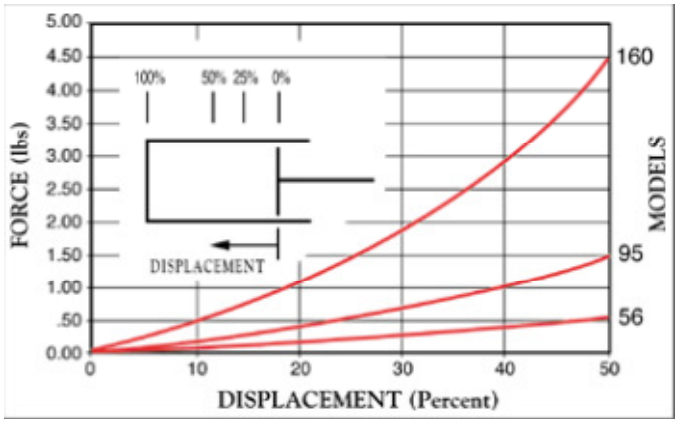
At rest, the dashpot is a passive device and has no force output. In motion, the dashpot offers a resisting force which rises to equal the force of the input load, achieving a zero net force. This results in zero acceleration and constant velocity.
Force limits of Airpot dashpots are determined by the direction of damping and the diameter of the piston.

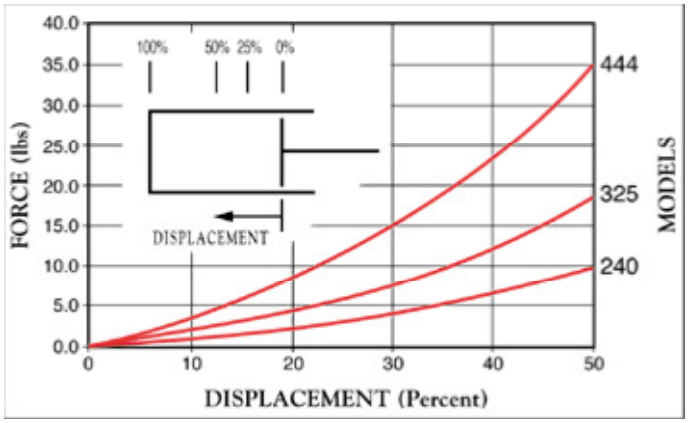
In pull damping units, a vacuum is being created in the dashpot as the piston moves outward. Thus, the maximum resisting force limit of the unit is a direct function of atmospheric pressure and the area of the piston (F=PA).

Assuming an equal ambient pressure, larger diameter units will have force limits higher than smaller diameter units; the limits being directly proportional to their piston areas. (Model force limits are summarized in the specifications section.)

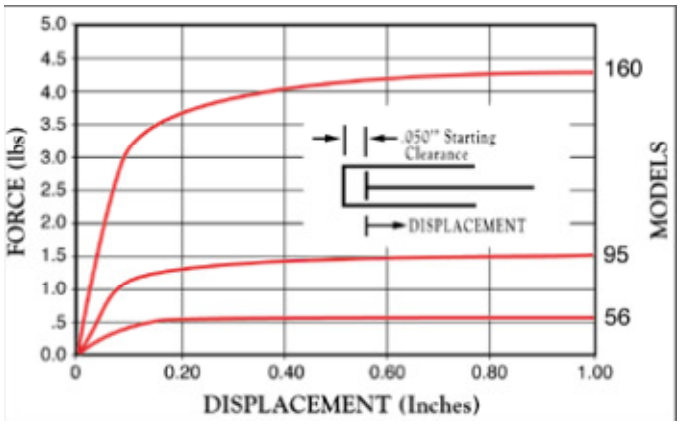
In the push damping (compression) direction, air must be compressed into an ever decreasing space; the force can rise to a level which is higher than is possible in the pull damping direction. Therefore, it is possible for a smaller diameter push damping unit to achieve greater resisting forces than a larger diameter pull damping unit. However, stroke lost to compression should be taken into consideration.

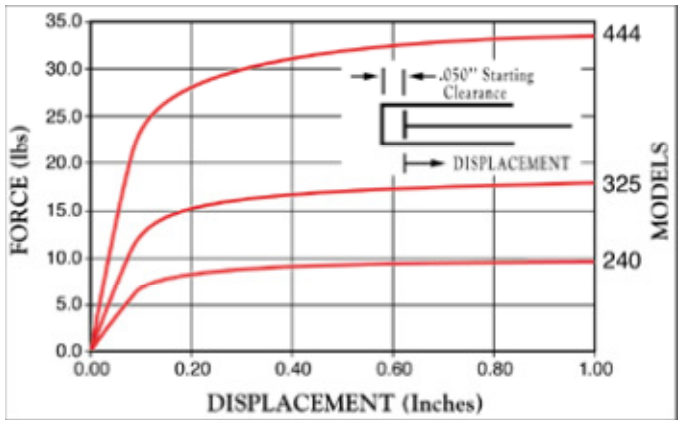
PUSH DAMPING





PULL DAMPING





Air spring distance is least, and force rise is fastest when the piston starts moving from a position as close to the bottom (closed end) of the cylinder as possible, without actually bottoming out, regardless of the direction of damping.