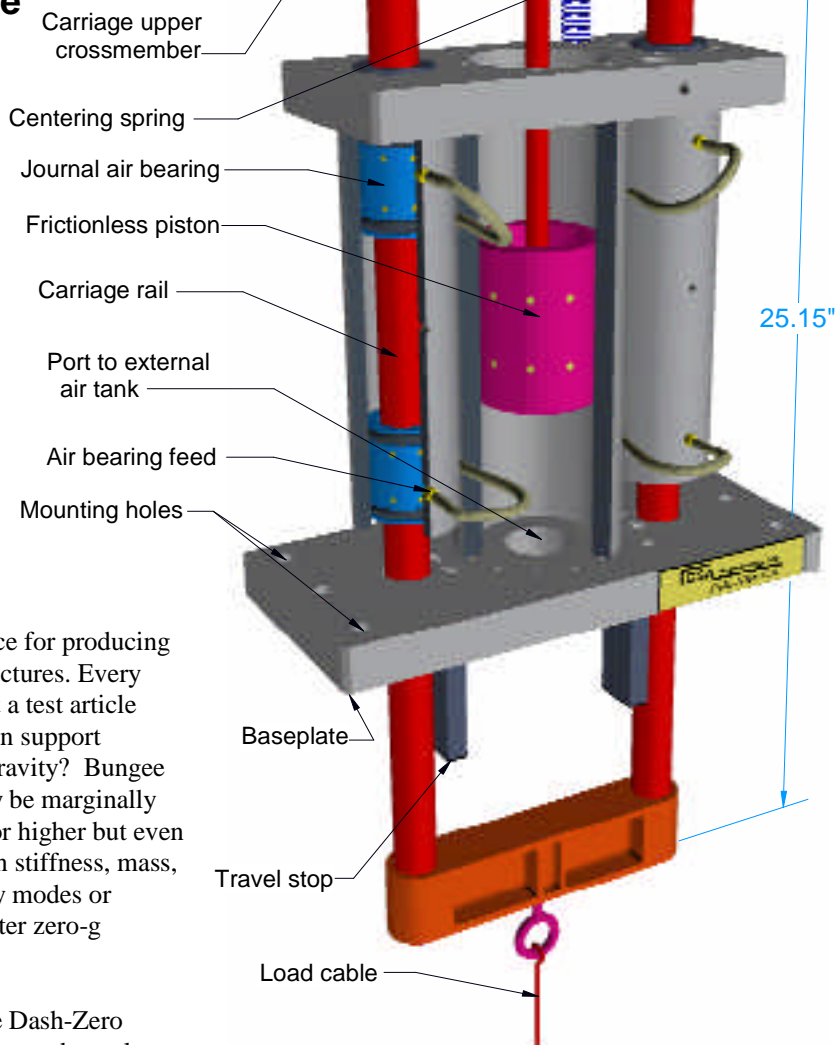
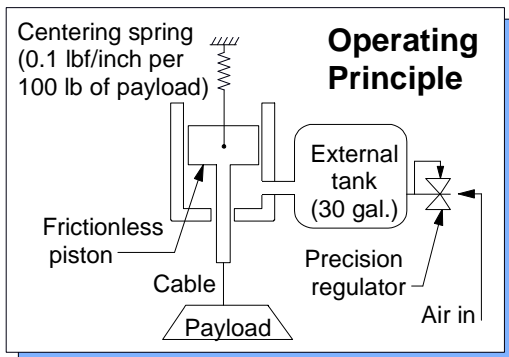


Zero-Gravity Suspension, Model 60350-0

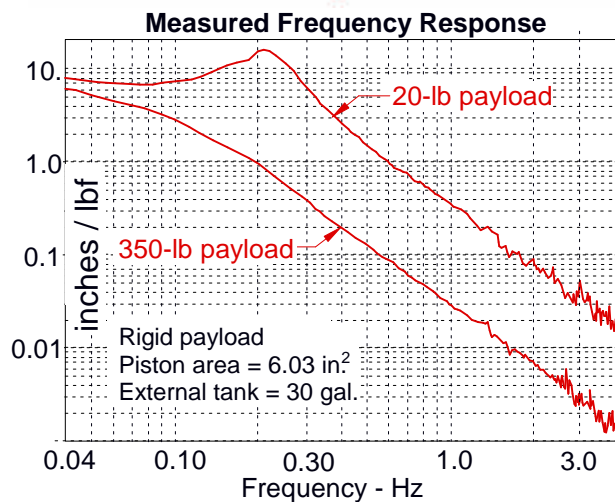
- Simulates free-free boundaries in dynamic testing
- Vertical suspension frequency < 0.2 Hz
- Supports up to 350 lb per device
- Virtually frictionless
- Available from stock

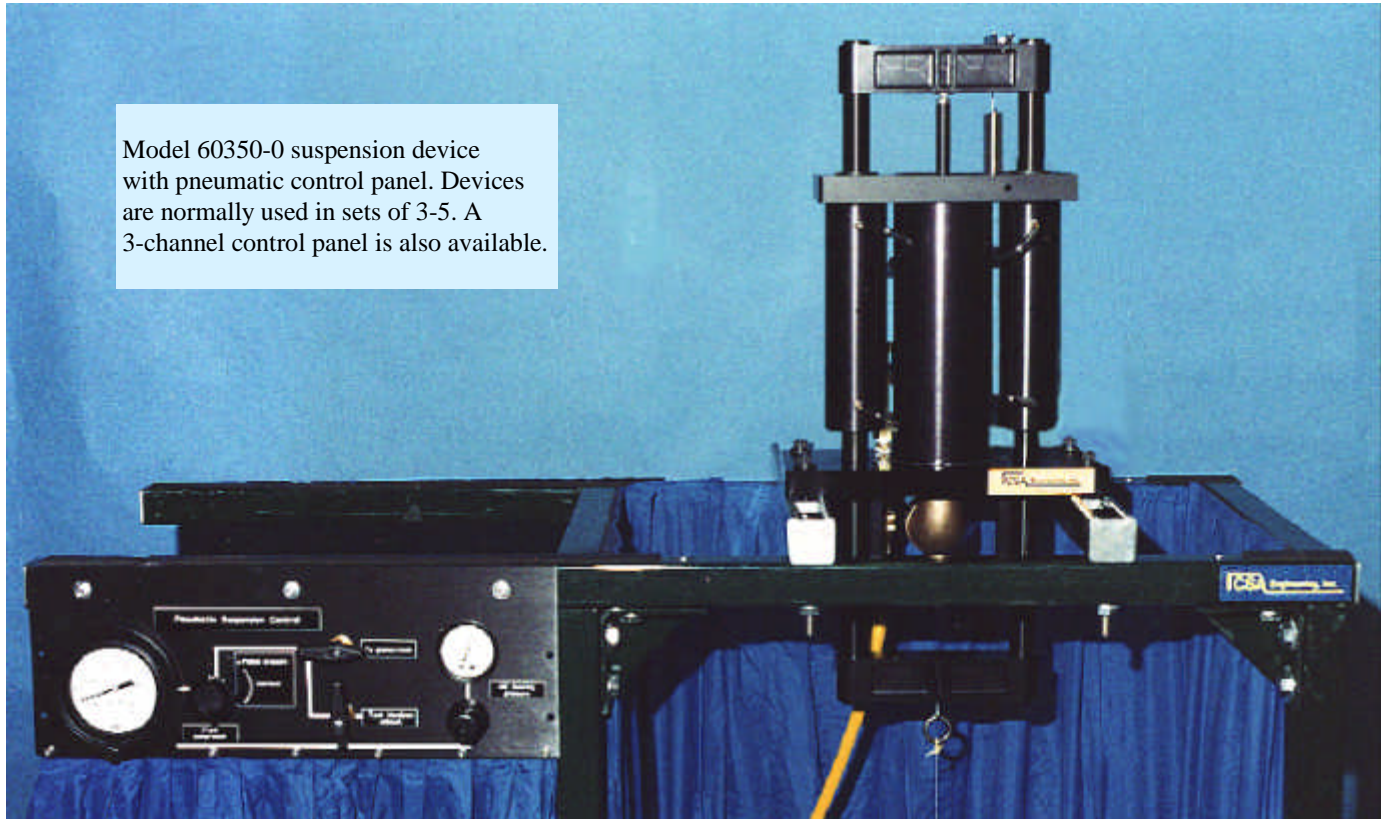


Finally. A simple, reliable, affordable, easy-to-use device for producing free-free boundary conditions in dynamic testing of structures. Every modal test engineer knows the problem: how to support a test article such that test results are not corrupted by uncertainties in support conditions. How to make it "float" as if there were no gravity? Bungee cords, coil springs, or other home-grown solutions may be marginally adequate for structures with first frequencies of 30 Hz or higher but even then, expensive test data can be corrupted by suspension stiffness, mass, modes, and worst of all, friction. Tests of low frequency modes or rigid-body (zero frequency) modes demand a much better zero-g simulation.

Derived from research for NASA and the Air Force, the Dash-Zero suspension device uses a unique frictionless air spring to produce plunge frequencies below 0.2 Hz for payloads from less than 50 lb to 350 lb per device. Its simple construction and light weight make it easy to install, operate, and maintain. Best of all, its cost is much less than the 60350-DA active-passive device from which it is derived.

The Dash-Zero suspension device produces for most applications the same high-fidelity simulation of zero-gravity as does the Model 60350-DA. The plot at right shows a typical measured frequency response between vertical force and displacement for a rigid payload. Vertical suspension frequency is very low, on the order of 0.1-0.2 Hz, even for payloads well below the capacity of the device. For payloads which operate the device at a piston pressure of several atmospheres, the suspension resonance all but disappears and the payload acts virtually as if it were floating freely in space. Modal properties closely approximate those for true free-floating boundary conditions.





Model 60350-0 suspension device with pneumatic control panel. Devices are normally used in sets of 3-5. A 3-channel control panel is also available.

The Dash-Zero device uses a special frictionless air piston and air-bearing carriage (see cutaway figure). By porting the cylinder volume to an external tank, AC stiffness of the air spring is reduced to a very small value while retaining high payload capacity. Like any regulated air spring, static deflection is easily reduced to zero by adjusting air pressure. Used with a precision regulator, the air spring has virtually no DC stiffness. A very light mechanical spring is used to hold the payload's mean position near the center of the vertical stroke of the device. The spring is easily changed to suit the payload or removed entirely if external control of payload vertical position is available.

The special piston and air bearings eliminate friction completely, even when supporting a load of 350 lb. The load can be moved vertically by the lightest finger pressure, as if by an astronaut in space. Devices are usually used in sets of 3-5 with each supporting one hard point of the payload to obtain full, 6-degree-of-freedom simulation of zero gravity.

Dash-Zero devices are furnished complete with external air tanks, pneumatic control panel, and all distribution hoses. The user mounts them to suitable supports above the payload, connects the load cables and air lines, and is ready to "float" the payload for testing. Installation assistance is available. Custom requests are welcome.

Specifications: 60350-0

Payload @ 58 psig:	350 lb
Vertical suspension frequency:	0.1-0.2 Hz (varies with payload and centering spring)
Horizontal suspension frequency:	0.20 Hz (20-ft load cable, lower for longer cable)
Friction:	< 0.005% of payload
Vertical stroke:	6.0 in
Moving carriage mass:	6.0 lb (excluding load cable)
Weight	suspension device: 26 lb external air tank (30 gal.): 88 lb

Other models available with capacities of 600, 1200, 2700, and 5500 lbs/device.

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