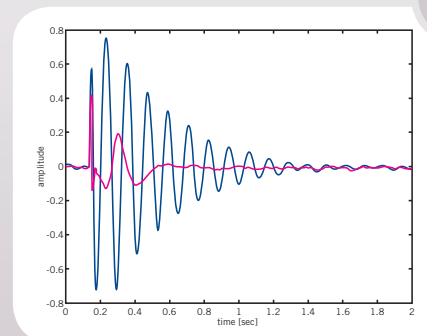


Heavy-Duty Active Vibration Isolation Elements – Duo Series

Modular, multifunctional active vibration isolation elements – Halcyonics heavy-duty isolator series consist of at least two isolation elements; complete control electronics are fully integrated to the elements.



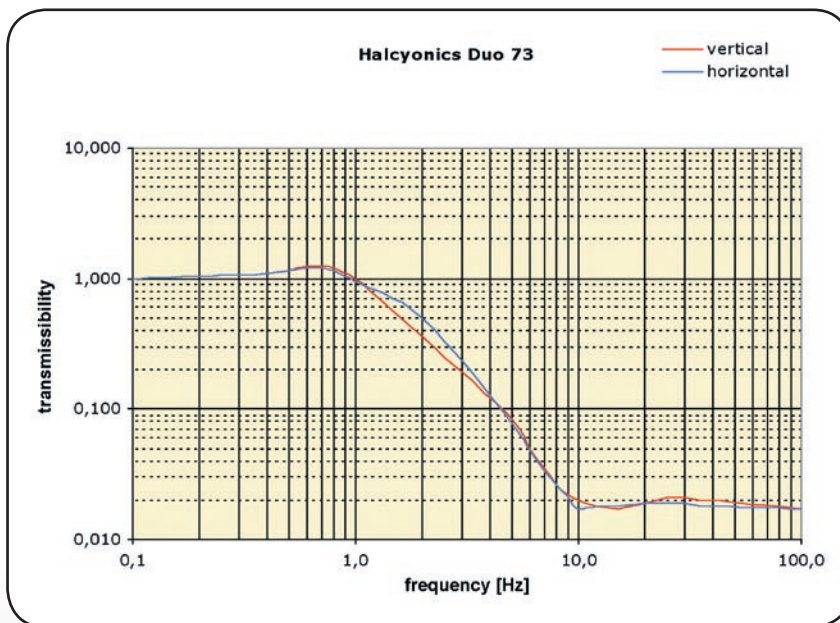
Halcyonics Duo 73 – modular, heavy-duty active vibration isolation system

Duo 73 has been engineered as a modular system to meet the needs of the most diverse applications. Duo 73 systems can be used in conjunction with steel honeycomb-structured platforms, and, using the available adapter plates, can alternatively be installed directly below the frame of many scanning electron

microscopes (e.g., Carl Zeiss Supra). The basic configuration of the Duo 73 consists of two elements; combinations of 3, 4 or more elements can be readily implemented.

A major advantage of the active Duo 73 systems is that they do not generate any natural low-frequency resonance, which is responsible for

problems encountered with passive vibration isolation systems in low-frequency ranges below 5 Hz. The active vibration isolation of Duo 73 starts right at 1 Hz and, above 10 Hz, attains more than 35 dB (98,2 %).



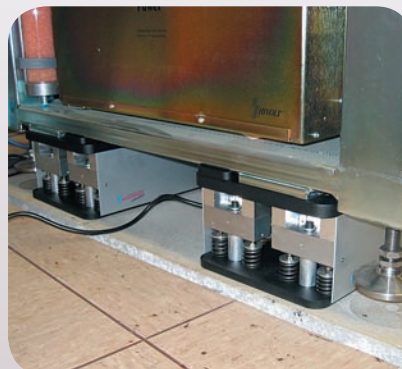
▲ Fig. 1: Transmission Graph of Duo 73 – measured at a velocity of 100 $\mu\text{m/s}$, with a payload of 60 kg (132 lbs)

Features and benefits

- Modular design, combinations of two, three and more units available
- Isolator element contains complete control electronics; only AC power required – no compressed air needed.
- Provides better vibration isolation (> 98,22 % isolation above 10 Hz) than is normally possible with complicated, large pneumatic dampers.
- No natural low-frequency resonance; as a result, excellent vibration characteristics also in frequency ranges below 5 Hz
- Active isolation in all six degrees of freedom

Duo 73 used with scanning electron microscope

Although Duo 73 active vibration isolation elements have been designed as heavy-duty isolators to carry steel honeycomb-structured platforms, the system perfectly fits under the steel frame of Carl Zeiss Gemini SEMs. As shown with these photos, the isolators nearly hide underneath the SEM. Each isolation element already incorporates the complete control electronics – no external controllers or additional cabling required. Halcyonics provides a special set of adapter plates for Carl Zeiss SEMs to ensure quick and effective installation.

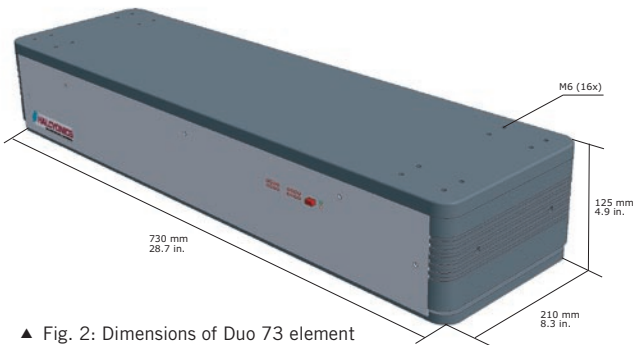


▲ Duo 73 under Carl Zeiss SEM frame during installation



▲ Installation completed, Duo 73 is nearly "invisible" under the SEM

Duo 73 compact element



▲ Fig. 2: Dimensions of Duo 73 element

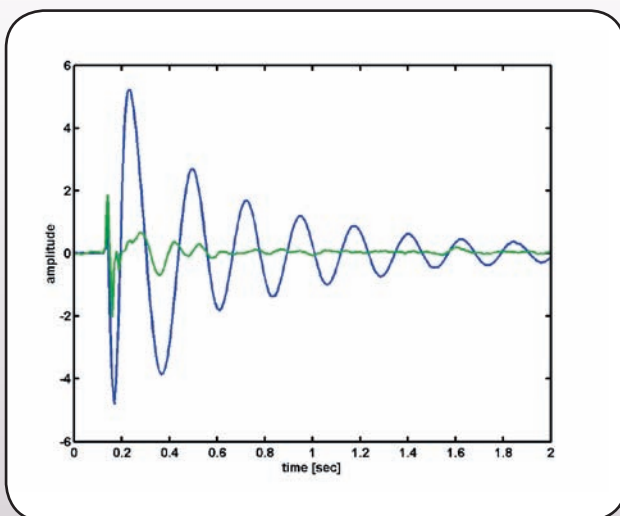
Halcyonics Duo 73 – excellent vibration isolation for heavy-load applications

Installation of a Duo 73 system is exceptionally easy. The isolation elements are attached to the application; they already contain complete control electronics. The latter requires only an AC power output; no compressed air or other media are necessary. Before the Duo 73 is started up, the actual load has to be adjusted. No further adjustments or modifications of the Duo are necessary. After installation the Duo 73 system does not require any further operator

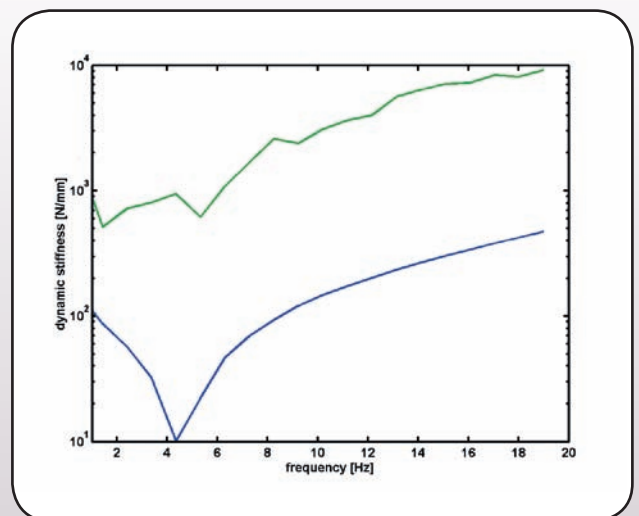
attendance or maintenance and can remain in the continuous operating state indefinitely. The inherent stiffness of Halcyonics systems is typically 20–30 times higher than that of a 1 Hz passive isolator. For this reason, the Halcyonics active isolation technology provides much better position stability than with any other passive system; which is a great advantage at many applications. Thanks to wide range load adjustment, Halcyonics Duo units allow

a load range of 0–400 kg (0–880 lbs) for each element with just one version – this offers good flexibility also for future applications.

To select the required system, the actual weight of the application equipment, load distribution and further parameters are of key importance. Please contact us to give us information about your special application. We will then be happy to advise you on the combination of isolation elements best suited to meet your needs.



▲ Fig. 3: Settling time of a Halcyonics Duo 73 system (green) compared to a conventional air-damped vibration isolation system (blue), made by one of the major manufacturers of optical tables and vibration isolated laboratory desks. Halcyonics active vibration isolation systems provide quick and effective compensation of disturbing vibrations.



▲ Fig. 4: Dynamic isolator stiffness (green) of Halcyonics Duo 73 systems compared to a commercially available passive air-damped isolation system (blue). Due to their higher dynamic stiffness, Halcyonics systems are less sensitive to direct forces that affect the isolated platform. As a result, Halcyonics active vibration isolation systems offer excellent position stability.

Technical Specifications

Available Standard Versions

Duo 73	Minimum configuration, consists of two isolation elements
Duo 73 Add-on	Additional isolation element for combinations of three and more isolators.

Performance Specifications

Isolation technology:	Halcyonics active vibration isolation technology based on piezoelectric type acceleration pickup, fast signal processing and electro-dynamic force transducers.
Force directions:	Active compensation in all six degrees of freedom
Isolation performance:	> 5 Hz = 25 dB (94.4%); > 10 Hz = 35 dB (98.2%)
Active bandwidth:	1.0–200 Hz*
Settling time:	300 ms
Max. correction forces:	Vertical \pm 16 N; horizontal \pm 8 N (for Duo 73–2 isolator configuration)
Load capacity:	0–400 kg (0–880 lbs) per element

Other Specifications

Dimensions:	See figure 2
Weight:	26 kg (57.3 lbs) per isolation element
Maximum compensation level:	350 μ m/s at 9Hz and 300 kg (661 lbs) **
Interface:	BNC analog diagnostic output – 50 Ohms

Environmental and Operational Requirements

Electrical voltage:	100–250 V / 47–63 Hz
Power consumption:	10–max. 50 W per element
Operating temperature:	10–40°C (50–104 F)
Relative humidity:	0–60%
Operating altitude:	< 2500 m (8100 ft)

Certification

Electrical Safety:	CE certificated according to directive 89/336/EC
EMC:	CE certificated according to directive 73/23/EEC

* Floating table top is supported by steel springs; low-pass characteristics of spring-mass combination dominates the dynamic behaviour above 200 Hz.

** The maximum compensation level depends on several conditions, such as payload, frequency, load distribution and height of the payload as well as the distance between the isolation elements. For that reason this value should be considered as an estimation.

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