

OMEGA 1050

Modal & Inertial Shaker



MB DYNAMICS
Sound & Vibration Testing Technology

Compact, high-performance modal and inertial shaker for the excitation of buildings, bridges and large structures

The OMEGA 1050 modal and inertial shaker is a cutting-edge device that sets new standards in vibration analysis. Its high efficiency allows for the generation of high excitation forces of up to 1000N Sine peak, all while maintaining a lightweight design of only 35kg. This makes it particularly suitable for use in demanding environments where mobility and efficiency are essential. The large displacement of 50mm and the integrated pneumatic load support allow the use of large payloads up to 150kg and the generation of high excitation forces even at very low frequencies. The robust bearing of the shaker element makes the OMEGA 1050 shaker very insensitive to lateral forces and enables the shaker to be operated in vertical and horizontal alignment. Integrated temperature and displacement sensors, along with temperature-controlled fans, ensure the OMEGA 1050 inertial shaker is protected from overheating and overtravel. The shakers are monitored, and the associated power amplifier is controlled clearly and conveniently from the central test bench computer via a control app supplied.



Features & benefits:

- Compact, lightweight and transportable, weight only approx. 35kg
- Robust design, low-maintenance, reliable and durable
- Suitable for mobile outdoor use
- Max. Excitation force: 1000N sine peak
- Max. Vibration displacement: 50mm pk-pk
- Frequency range: DC-500Hz
- Integrated pneumatic load support to support the oscillating weight
- Interchangeable, easy-to-fit oscillating weights
- Integrated temperature monitoring
- Integrated overtravel protection
- Integrated temperature-controlled fan
- Control of up to two OMEGA 1050 shakers with one MB A2500 amplifier
- Remote control and monitoring of the shaker and power amplifier
- Customisable floor or mounting plates for flexible installation or connection to various structures
- Low stray magnetic fields

Typical areas of application:

- Vibration analyses and condition monitoring on buildings, bridges, supporting structures and large machines
- Seismic simulation
- Geological testing
- Structural and modal analyses on huge structures and machines
- Material and component testing

Options / accessories:

- Interchangeable oscillating weights in various sizes
- Interchangeable base plates and mounting adapters for connection to various structures
- Interchangeable handles
- Mounting tables in various sizes
- Trunnion base for vertical and horizontal alignment and operation
- Integrated force sensors
- Stinger in different sizes

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Technical data:

OMEGA 1025 Inertial Shaker	
Maximum dynamic excitation force	
Sine*	1000N pk
Random*	600N RMS
Shock/ Time History*	2000N instantaneous pk
Maximum static force (continuous operation)	1000N
Maximum vibration displacement	50mm pk-pk
Maximum velocity	1.2m/s
Usable frequency range	DC-500Hz
Maximum payload/inertia vertical	150kg
Maximum payload/inertia horizontal	30kg
Mounting table diameter	198mm or 278mm, other sizes on request
Weight of the moving element with 198 mm mounting table / without mounting table	10.5kg / 8.5kg
Position monitoring & overtravel protection	Yes, integrated laser position sensor, automatic switch-off at impermissibly high displacements
Temperature monitoring & overtemp protection	Yes, integrated temperature sensor, automatic activation of cooling and, if necessary, switch-off in the event of further unacceptably high heating
Integrated cooling	Integrated, temperature-controlled fan
Pneumatic load support	Yes, manual (automatic load support available as an option)
Dimensions (diameter * height)	198mm ø * 565mm
Weight	approx. 35kg
Temperature range during operation, standard	-20°C to +40°C
Maximum coil current	25A RMS / 35A pk
Coil resistance	0.80hm

- * Max. excitation force depends on the frequency, the installation and attachment of the shaker to the structure to be excited and the dynamic stiffness of the structure



Figure 1: OMEGA 1050 inertial shaker with mobile amplifier and bracket for suspended connection to bridges or ceilings



Figure 2: OMEGA 1050 inertial shaker with table for additional inertia weights.

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MB A2500 power amplifier

Up to two OMEGA 1050 shakers are controlled by the MB A2500 power amplifier. The high efficiency of this amplifier of up to 85%, the uncompromising selection of components and the solid circuit design of the power electronics according to criteria from the aerospace and automotive industries enable high output currents and excitation forces of the shakers in continuous operation. Comprehensive safety and monitoring functions prevent possible overloads and guarantee reliable and safe operation. The shakers and power amplifiers are operated, parameterised and monitored using the associated CU-4 Control Unit via an RS-485 network.

Technical data:

MB A2500 power amplifier	
Frequency range	DC-20kHz
Number of separate inputs	2
Number of separate outputs	2
Max. Gain factor	32dB, adjustable
Max. Output power @20hm load	>8000W, per channel
Max. short-time output current	120A pk , per channel
Max. short-term output voltage	190V pk, per channel
THD at 1kHz into 4 ohms and -3dB	<0,03%
Latency time (input to output)	0.000ms
Signal limiter	Yes
Monitoring max. output current	Yes, adjustable limit value for max. current
Cooling	3 fans, speed temperature-controlled
AC mains current monitoring	Yes
AC mains input	180VAC to 265VAC, fused with 16A
Inrush current	10A Soft start
Dimensions (width*height*depth)	483mm*88mm*290mm
Weight	10kg (22lbs)



Figure 3: MB A2500 power amplifier can drive & control up to 2 OMEGA 1050 vibration exciters up to full performance

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Excitation force OMEGA 1050 - free-swinging axis

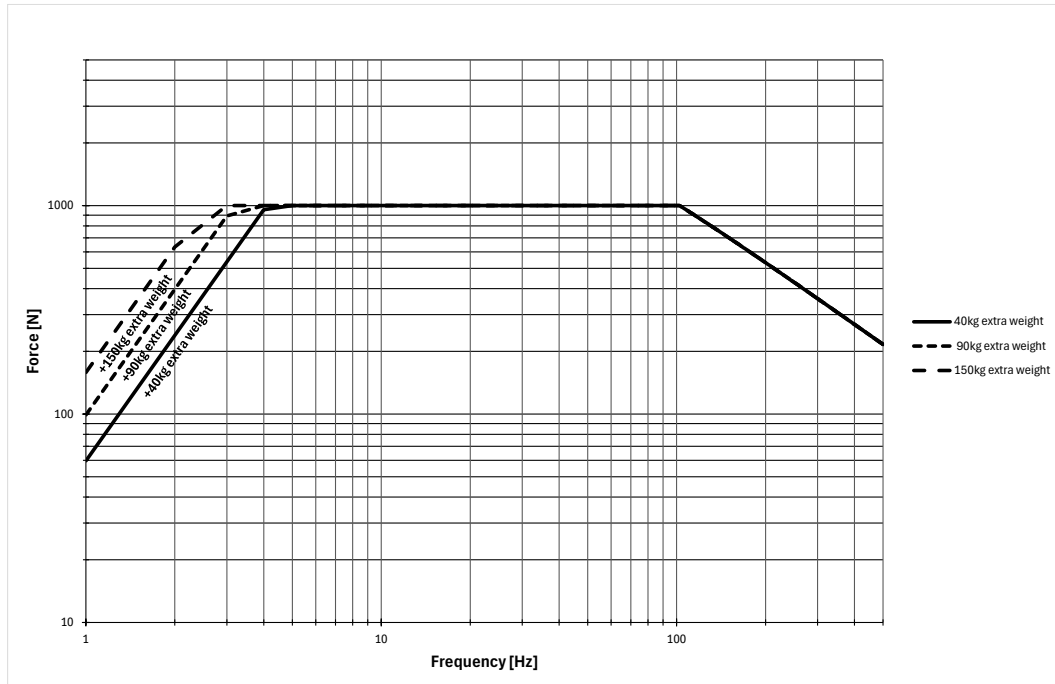


Figure 4: Excitation force OMEGA 1050 inertial shaker with freely oscillating axis or with connection to structures with low stiffness

Excitation force OMEGA 1050 - locked axle

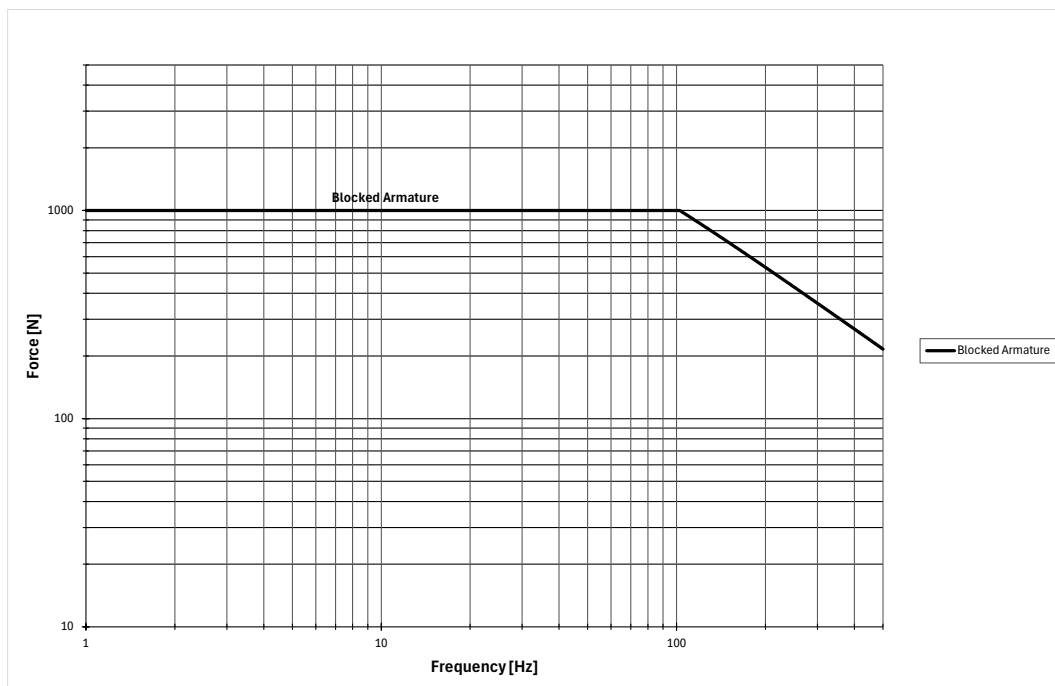


Figure 5: Excitation force OMEGA 1050 inertial shaker with blocked axis or with connection to structures with very high stiffness