

ALPHA 6050 MK2

Vibration Exciter



MB DYNAMICS
Sound & Vibration Testing Technology

Quiet water cooled electrodynamic 6kN shaker with integrated active load support and 50mm stroke

The ALPHA 6050 MK2 is based on our ALPHA 4050 MK2 shaker. An optimized coil design, the significantly improved heat dissipation due to the water-cooled construction and a more powerful amplifier allow higher excitation forces of 6kN sine peak or 3600N RMS. The water-cooled design, in conjunction with the associated recirculating chiller, allows quiet and reliable continuous operation even at high excitation forces. The robust, low-maintenance construction and the low operating noise allow the universal use of the ALPHA 6050 shakers for Squeak & Rattle tests on passenger cars, vans and minibuses and larger vehicle components. The integrated active pneumatic load support for centering the moving element in zero position independent of the applied payload and extensive safety and monitoring functions ensure reliable and safe continuous operation even with higher excitation forces. Naturally, the ALPHA 6050 MK2 meets the strict requirements of GMW 14011, BMW PR311-4 and TPJLR.00.187 as well as other Squeak & Rattle test specifications for the maximum permissible operating noise of the shaker used. The shaker and the associated power amplifier are controlled clearly and conveniently from the central test bench computer via an included control app.



Features & Benefits:

- Compact design, easy integration into a wide range of test benches
- Robust design, low maintenance, reliable and durable
- Very quiet, ideal for Squeak & Rattle testing
- Water cooling enables noiseless cooling even with high excitation forces in continuous operation
- Max. force: 6000N Sine Peak
- Max. displacement: 50mm pk-pk
- Frequency range: DC-1000Hz
- Frictionless guidance of the moving element
- Integrated active load support
- Integrated air spring for generating static preloads
- Integrated overtemperature protection
- Integrated overtravel protection
- Remote control and monitoring via RS-485 network
- Low magnetic stray fields

Typical applications:

- Vibration test systems for excitation in 1 to 6 DOFs
- Squeak & Rattle testing on complete vehicles, vans, minibuses, interior- & exterior components
- Testing of battery modules
- Material- and component testing
- Fatigue test systems
- Static and dynamic tension, compression and bending tests

Options / Accessories:

- Trunnion base for vertical and horizontal alignment
- Mounting tables in various sizes
- Horizontal moving tables
- Multi-axis vibration tables for sequential or simultaneous excitation in 1 to 6 axes
- Climate-option for use within climate chamber in the temperature range from -40°C to +80°C

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Technical specifications:

ALPHA 6050 MK2 vibration exciter	
Maximum dynamic force	
Sine	6000N pk
Random	3200N RMS
Time History	12000N pk, instantaneous peak
Maximum static force	2000N, continuous
Operating noise *	
Noise Rating Curve (NR)	NR18, typical
Sound pressure level **	<28dB(A)
Time Varying Loudness ***	<0,2 Sone
Maximum displacement	50mm pk-pk
Maximum velocity	1,2m/s
Frequency range	DC-1000Hz
Maximum payload vertical	130kg
Maximum payload horizontal	16kg
∅ Mounting table	278mm, other sizes on request
Moving mass including 278mm ∅ mounting table / without mounting table	25,3kg / 22,1kg
Overtravel protection	Yes, integrated laser position sensor, automatic system shutdown in case of inadmissibly high displacements
Overtemperature protection	Yes, integrated temperature sensor, automatic activation of cooling and, if necessary, system shutdown in the event of further inadmissibly high heating
Integrated cooling	Water cooling with associated recirculating chiller
Automatic load support	Yes
Dimensions (∅ * height)	270mm ∅ * 803mm
Weight	92,2kg
Temperature range during operation, standard	+5°C to +40°C
Temperature range during operation, with optional climate package	-40°C to +80°C
Maximum coil current	27A RMS / 95A pk (instantaneous)
Coil resistance	4*10hm

* Measured at 70cm from the shaker when excited with a typical Squeak & Rattle test profile in the frequency range from 5Hz to 100Hz with an averaged acceleration level of 0.3gRMS

** A-weighted Sound Pressure Level, FAST (125ms), 20Hz to 20kHz

*** N10 Percentile Level, loudness according to DIN45631/A1, measured in accordance with GMW14011

Alternative vibration exciters:

Type	Force, Sine / Random	Displacement	Frequency Range
ALPHA 2025 MK2	2000N pk / 1200N RMS	25mm pk-pk	DC-2000Hz
ALPHA 2050 MK2	2000N pk / 1200N RMS	50mm pk-pk	DC-1000Hz
ALPHA 3025 MK2	3000N pk / 1800N RMS	25mm pk-pk	DC-2000Hz
ALPHA 4050 MK2	4000N pk / 2400N RMS	50mm pk-pk	DC-1000Hz

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MB A2500-2 power amplifier

The ALPHA 6050 MK2 shaker is controlled by two MB A2500 power amplifiers. The low background noise and the very low harmonic distortion of these amplifiers enable distortion-free excitation and minimize the operating noise of the ALPHA shakers. The high efficiency of the amplifiers 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 high excitation forces of the ALPHA MK2 shakers in continuous operation. Extensive safety and monitoring functions prevent possible overloads and guarantee reliable and safe operation. The operation, parameterization and monitoring of the shakers and power amplifiers is handled by the associated CU-4 Control Unit via an RS-485 network.

Technical specifications:

MB A2500-2 power amplifier	
Frequency range	DC-20kHz
Number of separate inputs	4
Number of separate outputs	4
Maximum Gain factor	32dB, adjustable
Maximum output power @ 20Ohm load	> 8000W, per channel
Maximum instantaneous output current	125A pk, per channel
Maximum instantaneous output voltage	190V pk, per channel
THD, 1kHz at 4 Ohm 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 temperature-controlled fans
AC-mains monitoring	Yes
AC-mains input	180VAC to 265VAC, protected by 16A fuse
Inrush current	10A soft start
Dimensions (w*h*d)	483mm*88mm*290mm
Weight	10kg (22lbs)



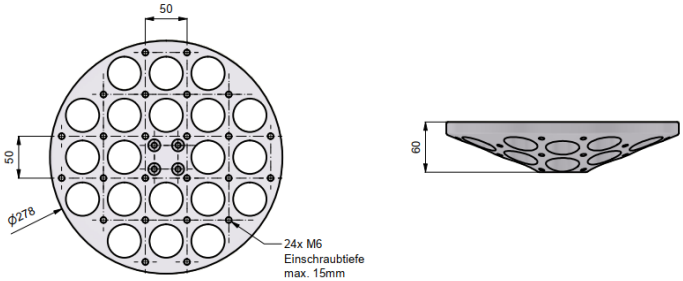
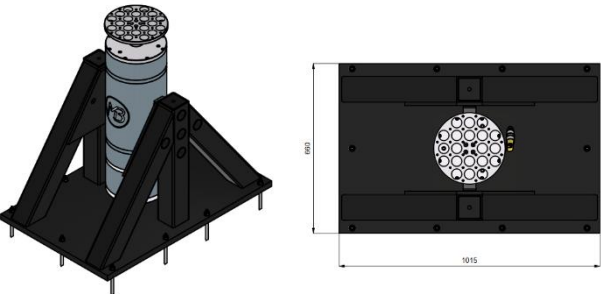
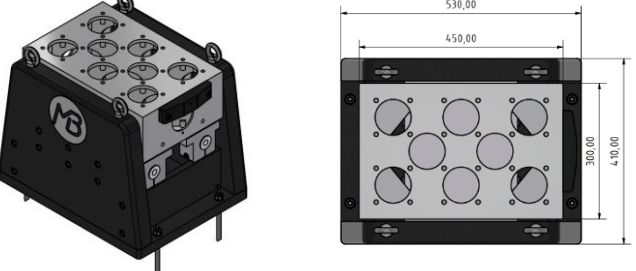
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Accessories / Options for ALPHA 6050 MK2 vibration exciters

<p>Mounting table, 278mm diameter</p> <p>Diameter: 278mm M6 threaded inserts on 50mm*50mm hole grid Weight: 3,2kg</p>	 <p>Technical drawing showing a circular mounting table with a 50mm grid and 24 M6 threaded inserts. The diameter is labeled as $\Phi 278$. A note indicates: "24x M6 Einschraubtiefe max. 15mm". A side view shows a thickness of 60mm.</p>
<p>Trunnion base</p> <p>Allows the shaker to be rotated 90° from vertical to horizontal Dimensions: 1015mm*660mm*960mm (W*H*D) Weight: approx. 240kg</p>	 <p>Technical drawing showing a trunnion base. A 3D view shows the base supporting a shaker. A 2D top view shows dimensions of 1015mm width and 660mm height.</p>
<p>Horizontal vibration table</p> <p>Magnesium mounting table, air-bearings Mounting surface of 300mm*450mm M6 thread inserts on 75mm*75mm grid Moving mass of the table: approx. 9kg Maximum payload: 50kg Dimensions: 410mm*415mm*530mm (W*H*D) Weight: approx. 236kg</p>	 <p>Technical drawing showing a horizontal vibration table. A 3D view shows the table with a shaker. A 2D top view shows dimensions: 530.00mm width, 450.00mm mounting surface width, 410.00mm height, and 300.00mm mounting surface depth.</p>
<p>Climate option</p> <p>Enables the use of the ALPHA 6050 MK2 shaker within a climatic chamber in the temperature range from -40°C to +80°C. Includes thermal insulation of the ALPHA 6050 MK2 shaker and constant temperature control through an external combined heating/cooling unit.</p>	