ALPHA 2050 MK2
Vibration Exciter

MB DYNAMICS
Sound & Vibration Testing Technology

Quiet electrodynamic 2kN shaker with 50mm stroke, including active load support and integrated quiet fans

Excitation forces of 2kN Sine Peak or 1200N Random RMS, a maximum displacement of 50mm peak-to-peak, the robust and low-maintenance design and the low operating noise allow the ALPHA 2050 MK2 shakers to be used universally for Squeak & Rattle tests and durability tests on medium and large components. Integrated temperature-controlled quiet fans, 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 2050 MK2 meets the strict requirements of GMW 14011, BMW PR311 and TPJLR.00.187 as well as other Squeak & Rattle test specifications for the maximum permissible operating noise of the shaker used. The high efficiency and the low weight of only 45kg allow the construction of powerful, compact test benches for simultaneous excitation in 1 to 6 axes and the mobile use of ALPHA MK2 shakers for structural and modal analysis. The monitoring of the shakers and the control of the associated MB A2500 power amplifier is done conveniently and easily from the central test bench computer via a supplied control application.

Features & Benefits:

- Lightweight and transportable, weight only approx. 45kg
- Compact design, easy integration into a wide range of test benches
- Robust design, low maintenance, reliable and durable
- Extremely quiet, ideal for Squeak & Rattle
- Max. force: 2000N 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
- Temperature-controlled quiet fans
- Optional water cooling enables noiseless cooling even with high excitation forces in continuous operation
- Low magnetic stray fields
- Remote control and monitoring via RS-485 network

Typical applications:

- Vibration test systems for excitation in 1 to 6 DOFs
- Squeak &Rattle testing on complete vehicles, interior- & exterior components
- Material- and component testing
- Fatigue test systems
- Static and dynamic tension, compression and bending tests
- Structural and modal analyses

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
- Quiet water cooling (retrofittable!)
- Climate-option for use within climate chamber in the temperature range from -40°C to +80°C

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Technical specifications:

***ALPHA* 2050 MK2 vibration exciter**	
Maximum dynamic force	
Sine	2000N pk
Random	1200N RMS
Time History	4000N 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	1,5m/s
Frequency range	DC-1000Hz
Maximum payload vertical	90kg
Maximum payload horizontal	12kg
Ø Mounting table	198mm or 278mm, other sizes on request
Moving mass including 198mm Ø mounting table / without mounting table	10,1kg / 8,3kg
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	3 integrated, temperature-controlled quiet fans
Automatic load support	Yes
Dimensions (Ø * height)	198mm ø * 712mm
Weight	45kg
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	30A RMS / 105A pk
Coil resistance	2*0,8Ohm

* 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* 1525**	1500N pk / 1000N RMS	25mm pk-pk	DC-3000Hz
***ALPHA* 2025**	2000N pk / 1200N RMS	25mm pk-pk	DC-2000Hz
***ALPHA* 4050**	4000N pk / 2400N RMS	25mm pk-pk	DC-1000Hz
***ALPHA* 6050**	6000N pk / 3600N RMS	50mm pk-pk	DC-1000Hz

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MB A2500 power amplifier

The ALPHA 2050 MK2 shaker is controlled by the associated MB A2500 power amplifier. 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 power amplifier	
Frequency range	DC-20kHz
Number of separate inputs	2
Number of separate outputs	2
Maximum Gain factor	32dB, adjustable
Maximum output power @ 2Ohm 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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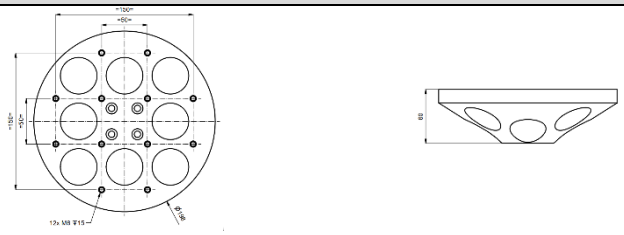
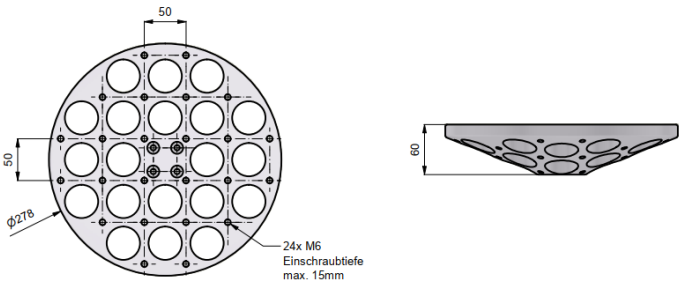
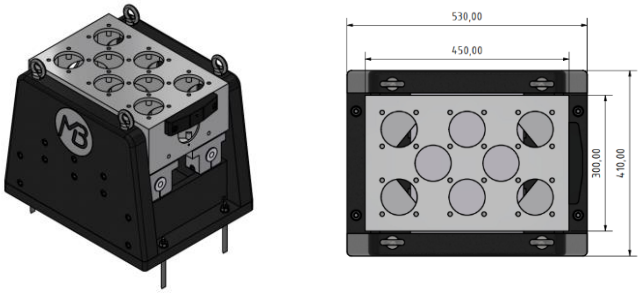
Accessories / Options for ALPHA 2050 MK2 Shaker

Mounting table, 198mm diameter	
Diameter: 198mm M6x1 thread inserts on 50mm*50mm hole grid Weight: 1,8kg	
Mounting table, 278mm diameter	
Diameter: 278mm M6 threaded inserts on 50mm*50mm hole grid Weight: 3,2kg	
Trunnion base	
Allows the shaker to be rotated 90° from vertical to horizontal Dimensions: 600mm*815mm*550mm (W*H*D) Weight: approx. 200kg	
Horizontal vibration table	
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	
Water cooling	
Enables silent cooling of the ALPHA 2050 MK2 shaker even with high excitation forces in continuous operation. Water cooling is a prerequisite for the air-conditioning option. Includes air-cooled recooler with a cooling capacity of approx. 1000Watt as well as 10m supply line and quick couplings.	
Climate option	
Enables the use of the ALPHA 2050 MK2 shaker within a climatic chamber in the temperature range from -40°C to +80°C. Includes thermal insulation of the ALPHA 2050 MK2 shaker and constant temperature control by an external combined heating/cooling unit.	