TIRA

Schwingtechnik

Vibration Test Systems













Selection Guide 11/2025

TIRA Vibration Test Systems

TIRA Vibration Test Systems – Vibration Testing Equipment

System overview

TIRA GmbH supplies measuring and testing systems for industry and research worldwide. At the Thuringia business location, we develop and manufacture modern plant engineering including application-specific software for testing the properties of materials and recording and eliminating undesirable vibrations.

Our product- and delivery range:

· Electrodynamic vibration test systems, 9N - 300 kN
· Modal systems from 100 N - 15 kN
· Long stroke systems from 4 kN - 15 kN, max. stroke 100 mm
· Calibration shaker systems 100 N - 800 N
· Inertial shaker systems 125 N - 650 N
· Induction ring shaker systems 140 kN
· Elektrodynamic 3D vibration test systems
· Multishaker - Push/Pull- and Push/Push systems
· Slip tables, linear/hydrostatically guided
· Head expanders/special-purpose fixtures
· Analog/digital amplifiers
· Vibration control systems for sine/random/shock/mixed mode
· Servomotor powered vibration test systems

General formula for calculating the force vector of vibration systems:

Force (N) = mass (kg) x acceleration (m/s²)

*Mass = moving element + device under test + fixture,

where applicable: slip table + driver bar + thermobarrier

A variety of applications, all from one source.

The corporate structure of the **TIRA** Group with its product line of vibration testing technology, its own mechanical machining centre and the specialized departments of Material Testing Technology and Balancing Technology opens up the greatest possible flexibility and high manufacturing depth. More than 50 years of tradition, experience and the latest research in our sector form a solid base for first-class technology and reliable performance.

We offer tailor-made and standardized system solutions from one source. We also provide competent support to our customers, from concept and development, via construction, assembly, up to commissioning and support.

TIRA machines have proven themselves worldwide in industry, universities and institutes. Selected sales and service companies in more than 60 countries around the world represent the name and know-how of TIRA GmbH in order to advise and support users and prospective customers all over the world with regard to products.



TIRA booth at the trade show Productronica in Munich

Vibration test systems from 9 N to 400 N

Our products are subject to strict quality control in accordance with the requirements of CE, RoHS and national and international standards. The same care is given to the maintenance and modernisation of our traditional TIRA test and measurement technology, which has been proven over many years. In close cooperation with our customers, we maintain the progress, efficiency and quality of TIRA products and invest in the future of this potential. Our quality management has been certified according to DIN ISO 9001 since 1995 and according to DIN EN ISO 9001:2015 since February 2018.

TIRA permanent-magnet shakers are used as portable and stationary systems for the simulation of environmental influences. Typical applications are **structural analysis** and **testing of smaller assemblies**. The robust construction of the shakers guarantees a long service life. TIRA shakers are characterized by **high lateral stiffness**. TIRA has met the requirements of the industry for **lightweight construction** of the shakers. New rare earth magnets have been added to the usual Alnico magnets. This has resulted in a **reduction in mass** from 36 kg to 12 kg, which guarantees **easy handling** of the shakers especially **in mobile use**. These shakers have proven their worth in applications such as environmental laboratories and universities as well as in industrial production lines for component testing and calibration. These complete system offers allow users to test according to national and international standards such as DIN, ISO, BS, MIL, IEC and ASTM.



Shakers 9 N - 400 N

System	TV 50009	TV 50018	TV 51110
Shaker	**S 50009**	**S 50018**	**S 51110**
Amplifier	**BAA 120**	**BAA 120**	**BAA 120**
Rated peak force $Sine_{pk}$/$Random_{RMS}$	9/- N	18/- N	100/70 N
Frequency range	2 - 20000 Hz	2 - 20000 Hz	2 - 7000 Hz
Max. displacement (pk-pk)	3 mm	5 mm	13 mm
Max. velocity	1.5 m/s	1.5 m/s	1.5 m/s
Max. acceleration Sine/Random	60/- g	65/- g	45/30 g
Suspension stiffness	4 N/mm	4.4 N/mm	8 N/mm
Effective moving mass ±5%	0.015 kg	0.028 kg	0.23 kg
Main resonance frequency	>13000 Hz	>13000 Hz	>6500 Hz
Total shaker mass (without trunnion)	2.2 (1.7) kg	5.0 (3.7) kg	12 kg
Coupling/Armature diameter	M4	M4	60 mm
Max. power consumption at 230 V	50 VA	50 VA	80 VA

System	TV 51120	TV 52110	TV 52120	TV 51140
Shaker	**S 51120**	**S 52110**	**S 52120**	**S 51140**
Amplifier	**BAA 500**	**BAA 120**	**BAA 500**	**BDA 1300**
Blower	**TB 0080**	**–**	**TB 0080**	**TB 0140**
Rated peak force $Sine_{pk}$/$Random_{RMS}$	200/140 N	100/50 N	200/100 N	400/311 N
Frequency range	2 - 7000 Hz	2 - 7000 Hz	2 - 7000 Hz	2 - 6500 Hz
Max. displacement (pk-pk)	13 mm	15 mm	15 mm	20 mm
Max. velocity	1.5 m/s	1.5 m/s	1.5 m/s	1.5 m/s
Max. acceleration Sine/Random	89/62 g	50/25 g	100/50 g	100/50 g
Suspension stiffness	8 N/mm	13.1 N/mm	13.1 N/mm	5 N/mm
Effective moving mass ±5%	0.23 kg	0.25 kg	0.25 kg	0.4 kg
Main resonance frequency	>6500 Hz	>5700 Hz	>5700 Hz	>5500 Hz
Total shaker mass	12 kg	36 kg	36 kg	18 kg
Armature diameter	60 mm	60 mm	60 mm	60 mm
Max. power consumption at 230 V Amplifier/Blower	350/460 VA	80/- VA	350/460 VA	1.22/1.4 kVA

General data - For detailed technical information see product data sheets (Download at https://www.tira-gmbh.de/en/datasheets)

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TIRA Vibration Test Systems

Vibration test systems from 1000 N to 2700 N

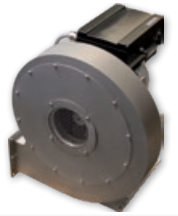
- Automatic centering of the armature
- LS-shakers with up to 45 mm displacement and electronic zero-point regulation with adjustable stiffness
- Optional degauss kit to reduce stray magnetic field
- Multiple safety devices
- Coarse filter unit
- Squeak&Rattle Option (Low noise operation without blower)

TIRA Energy Management System

The TIRA Energy Management System enables for all vibration test systems with a force of 2.7 kN (and higher) two possible energy saving options:

- operation with temperature-controlled cooling unit
- operation with temperature-controlled cooling unit and variable field power (+optional low degaussing kit)

Advantages: Reduction of costs, noise emission and environmental influences



System	TV 5220-120	TV 5220/LS-120	TV 50350-120	TV 50350/LS-120
Shaker	S 5220-120	S 5220/LS-120	S 50350-120	S 50350/LS-120
Amplifier	BDA 1300-E	BDA 1300-ET	Chameleon	Chameleon-T
Blower	TB 0140	TB 0140	TB 0310	TB 0310
Rated peak force $Sine_{pk}/Random_{RMS}/Shock_{pk}$	1000/650/1500 N	1000/650/1500 N	2700/2000/5500 N	2700/2000/5300 N
Frequency range	2 - 6500 Hz	2 - 6500 Hz	2 - 4500 Hz	2 - 4500 Hz
Max. displacement (pk-pk)	25.4 mm	45.0 mm	25.4 mm	45.0 mm
Max. velocity $Sine_{pk}/Random_{RMS}/Shock_{pk}$	1.5/1.5/2.0 m/s	1.5/1.5/2.0 m/s	1.5/1.5/2.5 m/s	1.5/1.5/2.5 m/s
Max. acceleration Sine/Random/Shock	60/35/90 g	60/35/90 g	100/70/180 g	95/73/160 g
Suspension stiffness	22 N/mm	Electr. adjustable	22 N/mm	Electr. adjustable
Effective moving mass ±5%	1.75 kg	1.75 kg	2.7 kg	2.9 kg
Max. payload	20 kg	20 kg	120 kg	25 kg
Main resonance frequency	>4800 Hz	>4600 Hz	>3800 Hz	>3700 Hz
Total shaker mass	122 kg	122 kg	280 kg	280 kg
Stray magnetic field without/with degauss kit	<8.5/<1.5 mT	<8.5/<1 mT	<8.5/<1.4 mT	<8.5/<1.4 mT
Armature diameter	120 mm	120 mm	120 mm	120 mm
Max. power consumption at 230/400 V incl. blower	2.9 kVA	3 kVA	5.7 kVA	5.7 kVA
Interlocks	Temperature, overtravel, airflow, overcurrent, compressed air	Temperature, overtravel, airflow, overcurrent	Temperature, overtravel, airflow, overcurrent, compressed air	Temperature, overtravel, airflow, overcurrent

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Vibration test systems from 4 kN to 8 kN

TIRA EMS

See page 4

- Clamping table ø180 mm with 21 threaded inserts or ø340 mm with 25 threaded inserts
- Long-time operation
- Minimum maintenance effort
- High cross-axial stiffness
- Supported by rugged frame with combined rubber/air isolators
- Automatic centering of the armature
- Fully automatic pneumatic load compensation for heavy test loads
- 50.8 mm (2 inch) displacement
- Standard degauss kit to reduce stray magnetic field
- Optional low degauss kit to reduce stray magnetic field to <0.8 mT
- Multiple safety devices
- Coarse filter unit
- Squeak&Rattle Option (Low noise operation without blower)
- Wheels&Rails Option (Shaker is maneuverable on rails)



Shaker S 55240/LS-340

System	TV 55240/LS-180	TV 55240/LS-340	TV 56280/LS-180	TV 56280/LS-340
Shaker	S 55240/LS-180	S 55240/LS-340	S 56280/LS-180	S 56280/LS-340
Amplifier	Chameleon	Chameleon	Chameleon	Chameleon
Blower	TB 0310	TB 0310	TB 9 FUK	TB 9 FUK
Rated peak force $Sine_{pk}/Random_{RMS}/Shock_{pk}$	4000/3500/12000 N	4000/3600/12000 N	8000/7200/24000 N	8000/7200/24000 N
Frequency range	2 - 3000 Hz	2 - 3000 Hz	2 - 3000 Hz	2 - 3000 Hz
Max. displacement (pk-pk)	50.8 mm	50.8 mm	50.8 mm	50.8 mm
Max. velocity $Sine_{pk}/Random_{RMS}/Shock_{pk}$	2.0/2.0/2.4 m/s	2.0/2.0/2.4 m/s	2.0/2.0/3.5 m/s	2.0/2.0/3.5 m/s
Max. acceleration Sine/Random/Shock	60/50/150 g	50/45/130 g	93/72/186 g	88/65/200 g
Suspension stiffness	50 N/mm	50 N/mm	50 N/mm	50 N/mm
Effective moving mass ±5%	6.8 kg	8.3 kg	8.1 kg	9.6 kg
Max. payload	250 kg	250 kg	250 kg	250 kg
Main resonance frequency	>3000 Hz	>2700 Hz	>2900 Hz	>2500 Hz
Total shaker mass	700 kg	780 kg	765 kg	780 kg
Stray magnetic field Std./Low degaussing	<1.5/<0.8 mT	<1.5/<0.8 mT	<1.5/<0.8 mT	<1.5/<0.8 mT
Armature diameter	180 mm	340 mm	180 mm	340 mm
Max. power consumption at 400 V incl. blower	17 kVA	17 kVA	17 kVA	17 kVA
Interlocks	Temperature, overtravel, airflow, overcurrent, compressed air	Temperature, overtravel, airflow, overcurrent, compressed air	Temperature, overtravel, airflow, overcurrent, compressed air	Temperature, overtravel, airflow, overcurrent, compressed air

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TIRA Vibration Test Systems

Vibration test systems from 11 kN to 15 kN

TIRA EMS

See page 4

- Long-time operation
- Minimum maintenance effort
- High cross-axial stiffness
- Supported by rugged frame with vibration isolators
- Fully automatic pneumatic load compensation for heavy test loads
- Coarse filter unit
- 50.8 mm (2 inch) displacement
- Standard degauss kit to reduce stray magnetic field
- Optional low degauss kit to reduce stray magnetic field to <0.8 mT
- Wheels&Rails Option (Shaker is maneuverable on rails)
- Squeak&Rattle Option (Low noise operation without blower)



Shaker S 58315/LS-340

System	TV 58311/LS-340	TV 58315/LS-340
Shaker	S 58311/LS-340	S 58315/LS-340
Amplifier	Chameleon	A 3 01 11 042
Blower	TB 120 FUK	TB 120 FUK
Rated peak force $Sine_{pk}/Random_{RMS}/Shock_{pk}$	11000/11000/33000 N	15000/13000/45000 N
Frequency range	2 - 3800 (0 dB) - 4500 (-3 dB) Hz	2 - 4000 (0 dB) - 4500 (-3 dB) Hz
Max. displacement (pk-pk)	50.8 mm	50.8 mm
Max. velocity $Sine_{pk}/Random_{RMS}/Shock_{pk}$	2.0/2.0/3.0 m/s	2.0/2.0/3.5 m/s
Max. acceleration Sine/Random/Shock	80/65/200 g	100/80/200 g
Suspension stiffness	75 N/mm	75 N/mm
Effective moving mass ±5%	14 kg	14 kg
Max. payload	250 kg	250 kg
Main resonance frequency	>2650 Hz	>2650 Hz
Total shaker mass	1100 kg	1100 kg
Stray magnetic field Std./Low degaussing	<1.5/<0.8 mT	<1.5/<0.8 mT
Armature diameter	340 mm	340 mm
Max. power consumption at 400 V incl. blower	17 kVA	31 kVA
Interlocks	Temperature, overtravel, airflow, overcurrent, compressed air	Temperature, overtravel, airflow, overcurrent, compressed air

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Vibration test system 22 kN

TIRA EMS

See page 4

- Long-time operation
- Minimum maintenance effort
- High cross-axial stiffness
- Supported by rugged frame with vibration isolators
- Automatic centering of the AIT-System and the armature
- Fully automatic pneumatic load compensation for heavy test loads
- AIT-System fixable to use the full displacement also at low frequencies and heavy loads
- Coarse filter unit
- Available as RIT or AIT trunnion system*
- 76.2 mm (3 inch) displacement (Shock)
- Energy-saving mode (Field power reduction)
- Standard degauss kit to reduce stray magnetic field
- Wheels&Rails Option (Shaker is maneuverable on rails)
- Airglide option (Shaker is maneuverable on air cushions)



Shaker S 59322/AIT-340

System	TV 59322/*-340	TV 59322/*-440
Shaker	S 59322/*-340	S 59322/*-440
Amplifier	Octopus-22	Octopus-22
Blower	TB 7/FUK/11	TB 7/FUK/11
Rated peak force $Sine_{pk}$/$Random_{RMS}$/$Shock_{pk}$	22000/17000/66000 N	22000/17000/66000 N
Frequency range	5 - 3000 Hz	5 - 3000 Hz
Max. displacement (pk- pk) Sine/Random/Shock	63.5/63.5/76.2 mm	63.5/63.5/76.2 mm
Max. velocity $Sine_{pk}$/$Random_{RMS}$/$Shock_{pk}$	2.0/2.0/3.5 m/s	2.0/2.0/3.5 m/s
Max. acceleration Sine/Random/Shock	80/55/200 g	80/55/200 g
Suspension stiffness	150 N/mm	150 N/mm
Effective moving mass	26.0 kg	28.5 kg
Max. payload	300 kg	300 kg
Main resonance frequency	>2250 Hz	>2250 Hz
Total shaker mass *RIT / AIT	1750/2000 kg	1750/2000 kg
Stray magnetic field	<1.5 mT	<1.5 mT
Armature diameter	340 mm	440 mm
Max. power consumption at 400 V Amplifier/Blower	29/17.5 kVA	29/17.5 kVA
Interlocks	Temperature, overtravel, airflow, overcurrent, compressed air	Temperature, overtravel, airflow, overcurrent, compressed air

General data - For detailed technical information see product data sheets
(Download at https://www.tira-gmbh.de/en/datasheets)

The transmission of vibrations to the installation site can be reduced by means of a corresponding trunnion mount ("**RIT**"=**R**igid **I**solated **T**runnion). The frame is equipped with vibration isolators as standard.

The TIRA AIT-System ("**AIT**" =**A**ir **I**solated **T**runnion) is a vibration isolation system integrated in the frame for vertical and horizontal guidance of the shaker. At low frequencies, it ensures optimal vibration isolation and precise guidance of the shaker body in the excitation direction.

Low **B**ase "**LB**" vibration shakers for vertical test operation can be equipped with vibration damping elements or with rail systems for mobility. TIRA shakers, amplifiers and vibration control systems form a complete test system that allows users to verify the quality of their products in accordance with national standards (such as DIN, ISO, BS, MIL, IEC, ASTM).

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TIRA Vibration Test Systems

Vibration test systems from 27 kN to 35 kN

TIRA EMS

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- Energy-saving mode (Field power reduction)
- Optional Dual Bearing-System for enhancement of cross axial stiffness and reduction of wear
- Airglide option (Shaker is maneuverable on air cushions)
- Multiple safety devices
- Clamping table ø340 mm, ø440 mm or ø640 mm
- Long-time operation
- Minimum maintenance effort
- High cross-axial stiffness
- Supported by rugged frame with vibration isolators
- Automatic centering of the AIT-System and the armature
- AIT-System fixable to use the full displacement also at low frequencies and heavy loads
- Fully automatic pneumatic load compensation for heavy test loads
- Air-cooling blower with optional fan speed control
- Available as RIT, AIT or LB trunnion system*
- Displacement of up to 76.2 mm (3 inch) (option for 440 mm CT)
- Standard degauss kit to reduce stray magnetic field
- Optional low degauss kit to reduce stray magnetic field to <0.8 mT



Shaker S 59335/AIT-440

System	TV 59327/*-340	TV 59327/*-440	TV 59327/*-640	TV 59335/*-340	TV 59335/*-440	TV 59335/*-640
Shaker	S 59327/*-340	S 59327/*-440	S 59327/*-640	S 59335/*-340	S 59335/*-440	S 59335/*-640
Amplifier	Octopus-27	Octopus-27	Octopus-27	Octopus-35	Octopus-35	Octopus-35
Blower	TB 7/FUK/11	TB 7/FUK/11	TB 7/FUK/11	TB 7/FUK/11	TB 7/FUK/11	TB 7/FUK/11
Rated peak force $Sine_{pk}/Random_{RMS}/Shock_{pk}$	27000/27000/80000 N	27000/27000/80000 N	27000/27000/80000 N	35000/32000/105000 N	35000/32000/105000 N	35000/32000/105000 N
Frequency range	5 - 3000 Hz	5 - 3000 Hz	5 - 2000 Hz	5 - 3000 Hz	5 - 3000 Hz	5 - 2000 Hz
Max. displacement (pk-pk)	50.8 mm	50.8 mm	50.8 mm	50.8 mm	50.8 mm	50.8 mm
Max. velocity $Sine_{pk}/Random_{RMS}/Shock_{pk}$	2.0/1.8/3.0 m/s	2.0/1.8/3.0 m/s	2.0/1.8/3.0 m/s	2.0/1.8/3.0 m/s	2.0/1.8/3.0 m/s	2.0/1.8/3.0 m/s
Max. acceleration Sine/Random/Shock	84/65/167 g	79/50/158 g	66/50/131 g	100/88/220 g	100/67/207 g	70/63/160 g
Suspension stiffness	150 N/mm	150 N/mm	150 N/mm	150 N/mm	150 N/mm	150 N/mm
Effective moving mass	29.0 kg	36.5 kg	40.5 kg	29.0 kg	36.5 kg	40.5 kg
Max. payload	610 kg	610 kg	610 kg	610 kg	610 kg	610 kg
Main resonance frequency	>2400 Hz	>2400 Hz	>1900 Hz	>2400 Hz	>2400 Hz	2000 Hz
Total shaker mass *RIT/AIT/LB	2350/2700/2250 kg	2350/2700/2250 kg	2350/2700/2250 kg	2350/2700/2250 kg	2350/2700/2250 kg	2350/2700/2250 kg
Stray magnetic field Std./Low degaussing	<1.5/<0.8 mT	<1.5/<0.8 mT	<2/<1 mT	<1.5/<0.8 mT	<1.5/<0.8 mT	<2/<1 mT
Armature diameter	340 mm	440 mm	640 mm	340 mm	440 mm	640 mm
Max. power consumption at 400 V Amplifier/Blower	30/17.5 kVA	30/17.5 kVA	30/17.5 kVA	32/17.5 kVA	32/17.5 kVA	32/17.5 kVA
Interlocks	Temperature, overtravel, airflow, overcurrent, compressed air	Temperature, overtravel, airflow, overcurrent, compressed air	Temperature, overtravel, airflow, overcurrent, compressed air	Temperature, overtravel, airflow, overcurrent, compressed air	Temperature, overtravel, airflow, overcurrent, compressed air	Temperature, overtravel, airflow, overcurrent, compressed air

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Vibration test systems from 49.5 kN to 70 kN

TIRA EMS

See page 4

- Clamping table ø480 mm
- Other clamping table sizes on request
- Long-time operation
- Minimum maintenance effort
- High cross-axial stiffness
- Supported by rugged frame with vibration isolators
- Automatic centering of the AIT-System and the armature
- AIT-System fixable to use the full displacement also at low frequencies and heavy loads
- Fully automatic pneumatic load compensation for heavy test loads
- Air-cooling blower with optional fan speed control
- Up to 76.2 mm (3") displacement
- Degauss kit to reduce stray magnetic field
- Energy-saving mode (Field power reduction)
- Dual Bearing-System for enhancement of cross axial stiffness and reduction of wear
- Airglide option (Shaker is maneuverable on air cushions)
- Multiple safety devices



Shaker S 59370/AIT-480

System	TV 59349/AIT-480	TV 59356/AIT-480	TV 59370/AIT-480
Shaker	S 59349/AIT-480	S 59356/AIT-480	S 59370/AIT-480
Amplifier	A 6 26 11 105	A 6 26 11 126	A 6 26 11 147
Blower	TB 7/FUK/20	TB 7/FUK/20	TB HR160
Rated peak force $Sine_{pk}/Random_{RMS}/Shock_{pk}$	49500/48000/148500 N	56000/56000/160000 N	70000/67000/210000 N
Frequency range	5 - 2500 Hz	5 - 2500 Hz	5 - 2500 Hz
Max. displacement (pk-pk) Sine/Random/Shock	63.5/63.5/76.2 mm	63.5/63.5/76.2 mm	63.5/63.5/76.2 mm
Max. velocity $Sine_{pk}/Random_{RMS}/Shock_{pk}$	2.0/2.0/5.0 m/s	2.0/2.0/5.0 m/s	2.0/2.0/5.0 m/s
Max. acceleration Sine/Random/Shock	91/75/224 g	100/80/350 g	100/80/350 g
Suspension stiffness	250 N/mm	250 N/mm	250 N/mm
Effective moving mass	55.0 kg	55.0 kg	70.0 kg
Max. payload	910 kg	910 kg	910 kg
Main resonance frequency	2000 Hz (±5 %)	2000 Hz (±5 %)	>2100 Hz
Total shaker mass	4800 kg	4800 kg	4800 kg
Stray magnetic field	1.5 mT	1.5 mT	1.5 mT
Armature diameter	480 mm	480 mm	480 mm
Max. power consumption at 400 V Amplifier/Blower	56/27 kVA	66/27 kVA	82/30 kVA
Interlocks	Temperature, overtravel, airflow, overcurrent, compressed air	Temperature, overtravel, airflow, overcurrent, compressed air	Temperature, overtravel, airflow, overcurrent, compressed air

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Water-cooled vibration test systems from 74 kN to 125 kN

TIRA EMS
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Water-cooled **TIRA** shakers are guided hydrostatically and cooled by a closed water circuit. The external cooling unit also supplies the lubricant for the hydrostatic bearings, which enables frictionless positioning of the vibration armature. Water-cooled shakers have the advantage of generating high forces for testing heavy loads with high accelerations. Specimen masses up to 910 kg are possible. A fully automatic pneumatic load compensation system enables the nominal vibration displacement to be reached even at high specimen masses.

- Up to 76.2 mm (3 inch) displacement
- Shaker water circuit with overpressure
- Degauss kit to reduce stray magnetic field
- Dual Bearing-System for enhancement of cross axial stiffness and reduction of wear
- Automatic permanent conductance monitoring of the cooling water
- Automatic centering of the AIT-System and the armature
- AIT-System fixable to use the full displacement also at low frequencies
- Energy saving mode (Field power reduction)



Shaker S 59412/AIT-480

System	TV 59374/AIT-480	TV 59389/AIT-480	TV 59410/AIT-480	TV 59412/AIT-480
Shaker	S 59412/AIT-480	S 59412/AIT-480	S 59412/AIT-480	S 59412/AIT-480
Amplifier	A 6 00 11 210	A 6 00 11 252	A 6 00 11 273	A 6 00 11 315
Cooling Unit	C 59412	C 59412	C 59412	C 59412
Rated peak force Sine$_{pk}$/Random$_{RMS}$/Shock$_{pk}$	74000/74000/222000 N	89000/89000/267000 N	100000/89000/300000 N	125000/110000/375000 N
Frequency range	5 - 2500 Hz	5 - 2500 Hz	5 - 2500 Hz	5 - 2500 Hz
Max. displacement (pk-pk) Sine/Random/Shock	63.5/63.5/76.2 mm	63.5/63.5/76.2 mm	63.5/63.5/76.2 mm	63.5/63.5/76.2 mm
Max. velocity Sine$_{pk}$/Random$_{RMS}$/Shock$_{pk}$	2.0/2.0/4.9 m/s	2.0/2.0/4.9 m/s	2.0/2.0/4.9 m/s	2.0/2.0/4.9 m/s
Max. acceleration Sine/Random/Shock	99/90/300 g	100/90/300 g	100/90/300 g	100/90/300 g
Suspension stiffness	250 N/mm	250 N/mm	250 N/mm	250 N/mm
Effective moving mass	76 kg	76 kg	76 kg	76 kg
Max. payload	910 kg	910 kg	910 kg	910 kg
Main resonance frequency	>2100 Hz	>2100 Hz	>2100 Hz	>2100 Hz
Total shaker mass	5300 kg	5300 kg	5300 kg	5300 kg
Stray magnetic field	<1.5 mT	<1.5 mT	<1.5 mT	<1.5 mT
Armature diameter	480 mm	480 mm	480 mm	480 mm
Max. power consumption at 400 V Amplifier incl. cooling unit / Field power unit	60/40 kVA	70/40 kVA	95/40 kVA	135/40 kVA
Interlocks	Temperature, overtravel, overcurrent, compressed air, water flow rate, conductance	Temperature, overtravel, overcurrent, compressed air, water flow rate, conductance	Temperature, overtravel, overcurrent, compressed air, water flow rate, onductance	Temperature, overtravel, overcurrent, compressed air, water flow rate, conductance

General data - For detailed technical information see product data sheets (Download at https://www.tira-gmbh.de/en/datasheets)

Subject to change without notice. Errors and omissions excepted.

Water-cooled vibration test systems from 130 kN to 300 kN

TIRA EMS

See page 4

- Up to 76.2 mm (3 inch) displacement
- Shaker water circuit with overpressure
- Degauss kit to reduce stray magnetic field
- Dual Bearing-System for enhancement of cross axial stiffness and reduction of wear
- Payloads of up to 2500 kg
- Automatic permanent conductance monitoring of the cooling water
- Automatic centering of the AIT-System and the armature
- AIT-System fixable to use the full displacement also at low frequencies
- Energy saving mode (Field power reduction)



Shaker S 59420/AIT-590

System	TV 59413/AIT-590	TV 59416/AIT-590	TV 59420/AIT-590	TV 59430/AIT-840
Shaker	S 59420/AIT-590	S 59420/AIT-590	S 59420/AIT-590	S 59430/AIT-840
Amplifier	A 6 00 11 336	A 6 00 11 378	A 6 00 11 462	A 6 00 11 483
Cooling Unit	C 59430	C 59430	C 59430	C 59430
Rated peak force $Sine_{pk}$/$Random_{RMS}$/$Shock_{pk}$	130000/130000/390000 N	168000/168000/504000 N	200000/168000/600000 N	300000/270000/900000 N
Frequency range	5 - 2000 Hz	5 - 2000 Hz	5 - 2000 Hz	5 - 2000 Hz
Max. displacement (pk-pk) Sine/Random/Shock	63.5/63.5/76.2 mm	63.5/63.5/76.2 mm	63.5/63.5/76.2 mm	63.5/63.5/76.2 mm
Max. velocity $Sine_{pk}$/$Random_{RMS}$/$Shock_{pk}$	2.0/2.0/3.5 m/s	2.0/2.0/3.5 m/s	2.0/2.0/3.5 m/s	2.0/2.0/3.5 m/s
Max. acceleration Sine/Random/Shock	100/75/300 g	100/75/300 g	100/75/300 g	70/70/250 g
Suspension stiffness	250 N/mm	250 N/mm	250 N/mm	450 N/mm
Effective moving mass	125 kg	125 kg	125 kg	275 kg
Max. payload	1300 kg	1300 kg	1300 kg	2500 kg
Main resonance frequency	1700 Hz (±5 %)	1700 Hz (±5 %)	1700 Hz (±5 %)	1500 Hz (±5 %)
Total shaker mass	8450 kg	8450 kg	8450 kg	18500 kg
Stray magnetic field	<1.5 mT	<1.5 mT	<1.5 mT	<5 mT
Armature diameter	590 mm	590 mm	590 mm	840 mm
Max. power consumption at 400 V Amplifier incl. cooling unit / Field power unit	220/98 kVA	244/98 kVA	285/98 kVA	370/110 kVA
Interlocks	Temperature, overtravel, overcurrent, compressed air, water flow rate, conductance	Temperature, overtravel, overcurrent, compressed air, water flow rate, conductance	Temperature, overtravel, overcurrent, compressed air, water flow rate, conductance	Temperature, overtravel, overcurrent, compressed air, water flow rate, conductance

General data - For detailed technical information see product data sheets (Download at https://www.tira-gmbh.de/en/datasheets)

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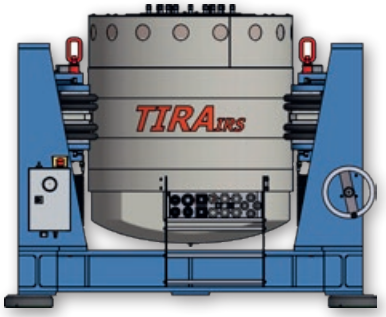
TIRA Vibration Test Systems

Induction ring vibration test systems 140 kN

See page 4

Induction ring shakers operate with an all-metal moving coil with a single winding, in which an alternating voltage is induced by surrounding static coils, thus setting the moving coil in motion. Cooling is provided by a water cooling unit. The external cooling unit also provides the lubricant for the hydrostatic bearings, which enable friction-free mounting of the vibration armature and absorption of high transverse forces.

Advantages of induction ring shakers:
- No power connection to the vibration armature necessary -> Less failure susceptibility
- High mechanical strength of the moving coil -> Greatly reduced maintenance requirements
- High acceleration values
- High resonance frequency of the vibrating armature



Shaker S 69414/AIT-480-IRS

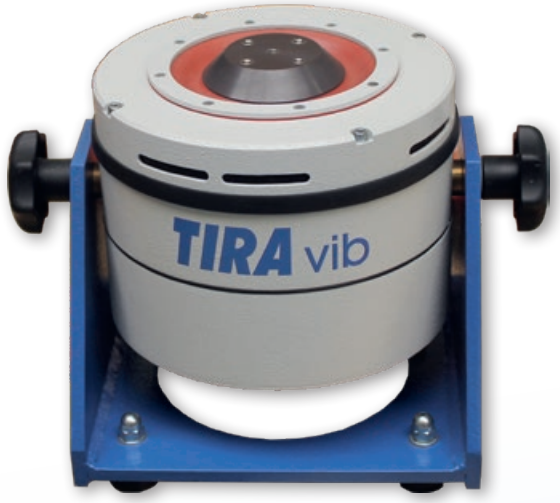
System	TV 69414/AIT-480-IRS-315
Shaker	S 69414/AIT-480-IRS
Amplifier	A 6 00 11 315
Cooling Unit	C 59412
Rated peak force $Sine_{pk}/Random_{RMS}/Shock_{pk}$	140000/130000/420000 N
Frequency range	5 - 3000 Hz
Max. displacement (pk-pk) Sine/Random/Shock	63.5/63.5/76.2 mm
Max. velocity $Sine_{pk}/Random_{RMS}/Shock_{pk}$	2.0/2.0/4.0 m/s
Max. acceleration Sine/Random	200/180 g
Max. acceleration Shock (at payload)	3 ms: 300 g (95 kg) 6 ms: 100 g (240 kg) 11 ms: 100 g (350 kg)
Suspension stiffness	99 N/mm
Effective moving mass	53 kg
Max. payload	610 kg
Main resonance frequency	2400 Hz
Total shaker mass	5300 kg
Stray magnetic field	<1,5 mT
Armature diameter	480 mm
Max. power consumption at 400 V Amplifier incl. cooling unit / Field power unit	135/40 kVA
Interlocks	Temperature, overtravel, overcurrent, compressed air, water flow rate, conductance

General data - For detailed technical information see product data sheets (Download at https://www.tira-gmbh.de/en/datasheets)

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Calibration shakers from 100 N to 800 N

Measurements for determining vibration transmission and vibration analysis are increasingly being carried out in all areas of industry, aviation, the automotive industry and power plants.
In order to be able to carry out such tests, a large number of measuring sensors are necessary. The sensors must be checked and calibrated for accuracy at defined time intervals. Since most transducers have a high measuring range and wide frequency ranges, special shakers are required to calibrate the transducers.
TIRA has taken up this challenge and developed a shaker that meets these requirements. This newly developed shaker consists of a **ceramic vibration system** and a special guide system. This newly developed vibration system is characterized by its very high, usable frequency range up to 25 kHz and is ideally suited for professional calibration with the appropriate measuring equipment. Note: The calibration shakers are not designed for continuous operation at maximum power.
The "AC" calibration shaker additionally has a special air bearing which offers the advantage of friction and wear-free operation and also dampens interference vibrations.



Calibration shaker S 51140-C

System	TV 51110-C	TV 51110-AC	TV 51120-C	TV 51140-C	TV 5220-C
Shaker	S 51110-C	S 51110-AC	S 51120-C	S 51140-C	S 5220-C
Amplifier	BAA 120	BAA 500-T	BAA 500	BDA 1300	BDA 1300-ET
Blower	-	-	TB 0080	TB 0140	TB 0140
Rated peak force $Sine_{pk}$/$Random_{RMS}$	100/50 N	100/50 N	200/100 N	400/200 N	800/400 N
Frequency range	10 - 25000 Hz	1 - 20000 Hz	10 - 25000 Hz	10 - 20000 Hz	1 - 20000 Hz
Max. displacement (pk-pk)	4 mm	25.4 mm	4 mm	4 mm	25,4 mm
Max. velocity	1.2 m/s	1.2 m/s	1.2 m/s	1.2 m/s	1.5 m/s
Max. acceleration Sine/Random	25/12 g	17/8 g	51/25 g	68/34 g	60/30 g
Effective moving mass ±5%	0.40 kg	0.53 kg	0.40 kg	0.50 kg	1.35 kg
Main resonance frequency	>25000 Hz	>19000 Hz	>25000 Hz	>19000 Hz	>13000 Hz
Total shaker mass	33 kg	18 kg	42 kg	21 kg	110 kg
Armature diameter	54 mm	50 mm	54 mm	54 mm	130 mm
Compressed air	-	600 kPa (approx. 2.5 l/min)	-	-	-
Max. power consumption at 230 V Amplifier/Bl.	80/- VA	350/- VA	350/460 VA	1.22/1.4 kVA	3.0/1.4 kVA

General data - For detailed technical information see product data sheets (Download at https://www.tira-gmbh.de/en/datasheets)

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TIRA Vibration Test Systems – Modal systems

Modal systems from 100 N to 2.7 kN

TIRA provides a series of modal exciters from 100 N to 2.7 kN specifically for the requirements of **modal and structural analysis**.

Up to 400 N, the modal exciters are excited by permanent magnets, whereby the exciters, which are manufactured especially with rare-earth magnets, convince by their **lightweight construction** in mobile use. The construction of the modal exciters is characterized by **high lateral stiffness**. Modal exciters from 1000 N upwards provide a vibration displacement of up to 45 mm. This is made possible by a TMC control. The **electronic zero point control TMC** enables an exact coupling of the modal exciter to the test object. The axial stiffness is also electronically adjustable.

All modal exciters are equipped with a trunnion as standard. A variety of coupling options are offered.

The modal exciter systems TV 51120-MNC and TV 51130-MSC are a special development of TIRA to **increase mobility.** The 200 N shaker does not require any additional cooling unit and the 350 N shaker has an integrated air cooling system, which eliminates the need for an additional external cooling unit.



Modal shaker S 51120-M



Modal shaker S 51130-MSC

System	TV 51110-M	TV 51120-M	TV 51120-MNC	TV 51130-MSC
Shaker	S 51110-M	S 51120-M	S 51120-MNC	S 51130-MSC
Amplifier	BAA 120	BAA 500	BAA 500	BAA 500-MSC
Blower	–	TB 0080	–	internal
Rated peak force $Sine_{pk}$/$Random_{RMS}$	100/70 N	200/140 N	200/100 N	350/200 N
Frequency range	DC - 5000 Hz	DC - 5000 Hz	DC - 3000 Hz	DC - 3000 Hz
Max. displacement (pk-pk)	13 mm	13 mm	9 mm	9 mm
Max. velocity	1.5 m/s	1.5 m/s	1.3 m/s	1.3 m/s
Suspension stiffness	8 N/mm	8 N/mm	70 N/mm	70 N/mm
Effective moving mass ±5%	0.23 kg	0.23 kg	0.5 kg	0.5 kg
Main resonance frequency (free-swinging)	>2680 Hz	>2680 Hz	>4000 Hz	>4000 Hz
Total shaker mass	12 kg	12 kg	18 kg	27 kg
Coupling (Thread ø)	M6	M6	M8	M8
Max. power consumption at 230 V Amplifier/Blower	80/- VA	350/460 VA	350/- VA	350/- VA

System	TV 51140-M	TV 5220-M	TV 50350-M
Shaker	S 51140-M	S 5220-M	S 50350-M
Amplifier	BDA 1300	BDA 1300-ET	Chameleon-T
Blower	TB 0140	TB 0140	TB 0310
Rated peak force $Sine_{pk}$/$Random_{RMS}$	400/311 N	1000/650 N	2700/2000 N
Frequency range	DC - 5000 Hz	1 - 5000 Hz	1 - 3000 Hz
Max. displacement (pk-pk)	20 mm	45 mm	45 mm
Max. velocity	1.5 m/s	1.5 m/s	1.5 m/s
Suspension stiffness	5 N/mm	Electr. adjustable	Electr. adjustable
Effective moving mass ±5%	0.4 kg	1.45 kg	2.3 kg
Main resonance frequency (free-swinging)	>2450 Hz	>4000 Hz	>3000 Hz
Total shaker mass	18 kg	122 kg	280 kg
Coupling (Thread ø)	M6	M8	M8
Max. power consumption at 230/400 V Amplifier/Blower (+FPS)	1.22/1.4 kVA	3.0/1.4 kVA	5.7 kVA (total)

General data - For detailed technical information see product data sheets (Download at https://www.tira-gmbh.de/en/datasheets)

Subject to change without notice. Errors and omissions excepted.

Modal systems from 100 N to 15 kN

TIRA offers a new range of special modal exciters for **mobile use**. The MOSP models feature a **large vibration displacement** of up to 25.4 mm. The low mass by using rare-earth magnets, the through hole in the center of the armature for **using piano-wire stingers** besides push/pull stingers and for accomplishing a variable adjustment of the distance to the test structure, are additional features of this series.

TIRA offers a series of modal exciters from 4 kN to 15 kN especially for modal excitation of **large structures** or structures with **high mass**. The construction of these modal exciters is characterized by **high lateral stiffness**. They provide a vibration displacement of up to 100 mm (pk-pk), which is achieved by the use of a TMC control.
The **electronic zero point control TMC** enables an exact coupling of the modal exciter to the test object. The axial stiffness can be easily adjusted.

System	TV 51110-MOSP	TV 51120-MOSP	TV 51140-MOSP
Shaker	S 51110-MOSP	S 51120-MOSP	S 51140-MOSP
Amplifier	BAA 120	BAA 500	BDA 1300
Blower	–	TB 0080	TB 0140
Rated peak force $Sine_{pk}$/$Random_{RMS}$	100/70 N	200/140 N	400/280 N
Frequency range	DC - 5000 Hz	DC - 5000 Hz	DC - 5000 Hz
Max. displacement (pk-pk)	25.4 mm	25.4 mm	25.4 mm
Max. velocity	1.5 m/s	1.5 m/s	1.5 m/s
Suspension stiffness	4 N/mm	4 N/mm	4 N/mm
Effective moving mass ±5%	0.23 kg	0.23 kg	0.4 kg
Main resonance frequency (free-swinging)	>6000 Hz	>6000 Hz	4000 Hz (±5 %)
Total shaker mass	21 kg	21 kg	21 kg
Coupling (Thread ø)	M6	M6	M6
Max. power consumpt. at 230 V Amplifier/Blower	80/- VA	350/460 VA	1.22/1.4 kVA

System	TV 55240-M/LSS	TV 56280-M/LSS	TV 57315-M/LSS
Shaker	S 55240-M/LSS	S 56280-M/LSS	S 57315-M/LSS
Amplifier	Chameleon-T	Chameleon-T	A 3 01 11 063 T
Blower	TB 0310	TB 9 FUK	TB 120 FUK
Rated peak force $Sine_{pk}$/$Random_{RMS}$	4000/3400 N	8000/6000 N	15000/11000 N
Frequency range	1 - 2000 Hz	1 - 2000 Hz	1 - 2000 Hz
Max. displacement (pk-pk)	100 mm	100 mm	100 mm
Max. velocity	2.0 m/s	2.0 m/s	2.0 m/s
Effective moving mass ±5%	11.0 kg	12.0 kg	18.0 kg
Main resonance frequency (free-swinging)	>2500 Hz	>2500 Hz	>2500 Hz
Total shaker mass	800 kg	850 kg	1200 kg
Coupling (Thread ø)	M10	M10	M10
Max. power consumption at 400 V incl. blower	17 kVA	17 kVA	31 kVA



Modal shaker S 51110-MOSP Modal shaker S 55240-M/LSS

General data - For detailed technical information see product data sheets (Download at https://www.tira-gmbh.de/en/datasheets)

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Inertial systems from 125 N to 650 N

TIRA manufactures a range of inertial exciters (IN) from 125 N to 650 N. The inertial exciters (IN) are screwed directly to the structure and can be coupled at any angle to the structure.

These inertial exciters (IN) are characterized by **high lateral stiffness**. The permanent magnet driven inertial exciters are equipped with a special spring system which provides an optimal guidance. This allows the exciter to work on the structure with its full body mass with no problems.

A maintenance-free fan guarantees the cooling of the vibration exciter. The cooling air is suctioned through a coarse filter system. TIRA's inertial exciters (IN) are used in industry, aerospace, civil engineering and the shipbuilding industry, as they are a favourable and effective method for transferring dynamic forces into large structures.



Inertial shaker S 51140-IN

System		TV 51112-IN	TV 51125-IN
Shaker		S 51112-IN	S 51125-IN
Amplifier		BAA 120	BAA 500
Blower		–	TB 0080
Rated peak force	$Sine_{pk}$/$Random_{RMS}$	125/70 N	250/150 N
Frequency range		2 - 2000 Hz	2 - 2000 Hz
Max. displacement (pk-pk)		9 mm	9 mm
Max. velocity		1.5 m/s	1.5 m/s
Max. acceleration	Sine/Random	0.98/0.54 g	2/1.2 g
Suspension stiffness		20 N/mm	20 N/mm
Effective moving mass ±5%		0.35 kg	0.35 kg
Total shaker mass		13 kg	13 kg
Coupling (Thread ø)		M12	M12
Max. power consumption at 230 V Amplifier/Blower		100/- VA	350/460 VA

System		TV 51140-IN	TV 51165-IN
Shaker		S 51140-IN	S 51165-IN
Amplifier		BDA 1300	BDA 1300
Blower		TB 0140	TB 0140
Rated peak force	$Sine_{pk}$/$Random_{RMS}$	400/311 N	650/420 N
Frequency range		2 - 2000 Hz	2 - 2000 Hz
Max. displacement (pk-pk)		9 mm	9 mm
Max. velocity		1.5 m/s	1.5 m/s
Max. acceleration	Sine/Random	2.8/2 g	2.6/1.7 g
Suspension stiffness		56 N/mm	98 N/mm
Effective moving mass ±5%		0.63 kg	0.97 kg
Total shaker mass		16 kg	26 kg
Coupling (Thread ø)		M12	M12
Max. power consumption at 230 V Amplifier/Blower		1.22/1.4 kVA	1.22/1.4 kVA

General data - For detailed technical information see product data sheets (Download at https://www.tira-gmbh.de/en/datasheets)

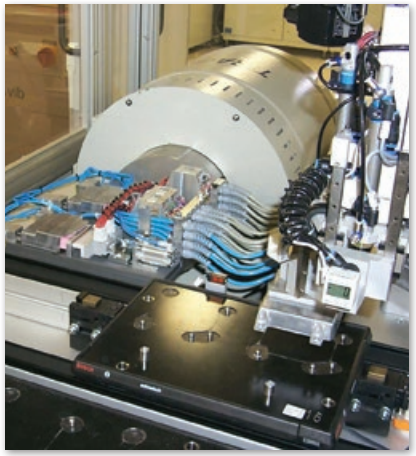
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Long stroke systems with 100 mm displacement (pk-pk)

As a result of growing safety requirements, the industry is increasingly developing sensors and components that have to be tested under extreme stress conditions. The test parameters reach higher and higher accelerations combined with long shock duration - these tests are no longer possible with conventional standard systems with a vibration displacement of 50.8 mm.

TIRA has responded to the requirements of the industry for testing systems that can simulate extreme shocks by developing a series of long stroke exciters with 100 mm vibration displacement (pk-pk). In addition to their use in the laboratory for testing development tasks, these shakers have also proved their worth in the integration into complete production lines.





System	TV 55240/LSS-250	TV 56280/LSS-250	TV 57315/LSS-300
Shaker	S 55240/LSS-250	S 56280/LSS-250	S 57315/LSS-300
Amplifier	Chameleon-T	Chameleon-T	A 3 01 11 063 T
Blower	TB 0310	TB 9 FUK	TB 120 FUK
Rated peak force $Sine_{pk}/Random_{RMS}/Shock_{pk}$	4000/3400/10000 N	8000/6000/20000 N	15000/11000/37500 N
Frequency range	1 - 2000 Hz	1 - 2000 Hz	1 - 2000 Hz
Max. displacement (pk-pk)	100 mm	100 mm	100 mm
Max. velocity $Sine_{pk}/Random_{RMS}/Shock_{pk}$	2.0/2.0/4.5 m/s	2.0/2.0/4.5 m/s	2.0/2.0/4.5 m/s
Max. acceleration Sine/Random/Shock	37/30/74 g	68/48/136 g	60/50/210 g
Max. payload	50 kg	50 kg	80 kg
Effective moving mass ±5%	12.0 kg	13.0 kg	17.0 kg
Main resonance frequency	>2000 Hz	>2000 Hz	>1700 Hz
Total shaker mass	800 kg	850 kg	1200 kg
Stray magnetic field	n/a	n/a	<6 mT
Armature diameter	250 mm	250 mm	300 mm
Max. power consumption at 400 V incl. blower	17 kVA	17 kVA	31 kVA

General data - For detailed technical information see product data sheets (Download at https://www.tira-gmbh.de/en/datasheets)

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TIRA Vibration Test Systems – Slip Tables

TIRA Slip Tables

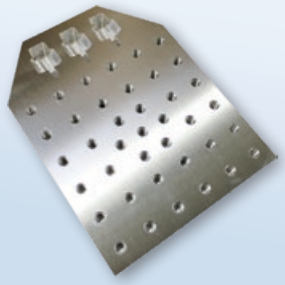
OUR CONCEPT

The clear and functional design of TIRA slip tables enables **user-friendly handling and trouble-free testing.** Swiveling the shaker does not limit the possibility of conventional vibration tests on the vibration armature. Rigid welded structures as a basis increase the reaction mass of our systems. Undesirable vibrations on the surrounding area are damped. Linear guides guarantee the lateral stiffness of the slip plate and minimize lateral vibrations in asymmetrical test arrangements.

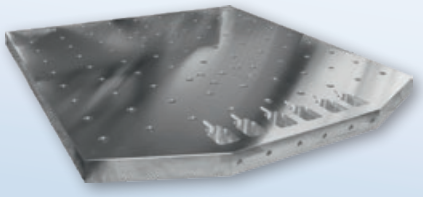
TIRA's Monobase slip tables are available in different versions:

Index XS:	for vibration systems:	TV 5220
Index S:	for vibration systems:	TV 50350
Index SM:	for vibration systems:	TV 55240
Index M:	for vibration systems:	TV 56280
Index L:	for vibration systems:	TV 58311,TV 58315
Index XL:	for vibration systems:	TV 59322,TV 59327,TV 59335
Index XXL:	for vibration systems:	TV 59349 -TV 59412,TV 69414
Index XXXL:	for vibration systems:	TV 59413,TV 59416,TV 59420
Index LX:	for vibration systems:	TV 59430

In vibration technology, testing tasks arise from applications in research, development and quality assurance. As the masses and dimensions of the test specimens increase, the testing tasks can no longer be performed on the armatures of electrodynamic shakers.

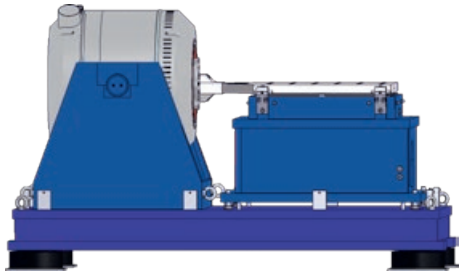


Slip plate 12”



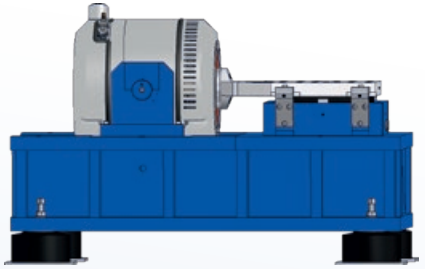
Slip plate 48”

SLIP TABLE MINIBASE



TIRA MINIBASE slip table: shaker in the original frame and slip table module mounted together on a base plate.
Available on request.

SLIP TABLE MONOBASE



TIRA MONOBASE slip table: shaker and slip plate are integrated in a common frame.

Tailor-made manufacturing is our success. We offer customer-specific solutions which can be adapted to all special requirements. TIRA slip tables can be optionally adapted to all existing vibration and climate test systems. By the use of high-quality materials and reliable components, our products ensure long-term use at low operating costs.

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TIRA Slip Tables



TESTING UNDER STRESS

Modern systems and installations have to prove themselves in all areas under their operating conditions such as temperature changes, vibrations and high humidity. From the conceptual design stage to the final inspection of electrical, electronic or mechanical products, **combined vibration-climate testing systems** simulate environmental influences on the test object. Weak points can be detected early and optimized cost-effectively. Expensive downtimes and damage are avoided by the correct design of functionally relevant components. These multi-test systems are important elements of quality assurance in the production process.

DRIVER BARS

TIRA driver bars provide the **link between shaker and slip plate**. They are FEM designed and made of magnesium. Depending on size, they are single pieces or welded together. Their geometric design enables perfect force transmission while minimizing the moving mass. Driver bars are available for vibration generators with different armature diameters from 120 mm to 840 mm.

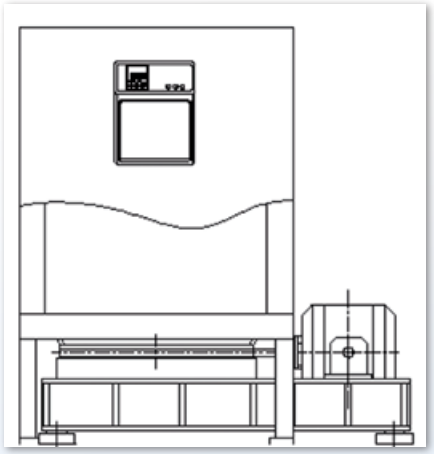
Driver bars		
Slip table version	**Armature diameter**	**~Mass**
XS	120 mm	1.0 kg
S	120 mm	1.5 kg
SM	180 mm	3.0 kg
	340 mm	6.5 kg
M	180 mm	3.0 kg
	340 mm	6.5 kg
L	230 mm	3.5 kg
	340 mm	6.0 kg
XL	340 mm	8.0 kg
	440 mm	9.0 kg
	640 mm	10.0 kg
XXL	340 mm	15.0 kg
	480 mm	16.0 kg
	640 mm	20.0 kg
XXXL	590 mm	49.0 kg
LX	840 mm	96.0 kg

VIBRATION ISOLATION, SAFE INSTALLATION

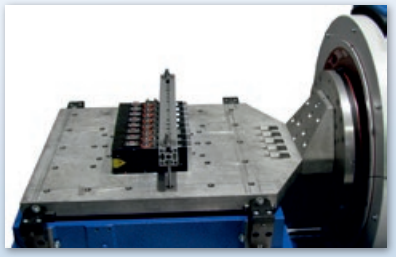
Air spring elements allow the use of the slip tables without expensive foundations. Due to the low natural frequency of the isolators (3 - 5 Hz) a wide test spectrum can be applied.

TEST OBJECT FIXING

Test objects must be excited in their final position for practice-oriented simulation. TIRA supplies individual clamping devices for each application.







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TIRA Vibration Test Systems – Slip Tables

Oil-film slip tables



Shaker S 58311/LS-340
with slip table TGT MO 20 L

Increasing requirements in vibration testing demand additional **slip table systems**, which also allow testing of large and heavy specimens in **horizontal mounting positions**. The **monobase design** ensures fast and precise alignment and coupling of the shaker to the slip table. The slip tables are available as standard with slip table plates up to 2000 mm x 2000 mm. Different and larger tables are manufactured according to customer requirements. The oil film slip tables consist of a precision ground and lapped natural granite base plate on which a magnesium plate slides onto an oil film. **Four linear guides** ensure the lateral guidance of the slip plate and **minimize lateral vibrations**. The possibility of **horizontal and vertical excitation** allows tests in mounting position. Vibration isolators are mounted on the bottom of the frame as a standard feature to prevent vibration effects on the building.

· 100 mm displacement possible
· Integrated oil pan

Designation	Moving plate working area	Slip plate mass (±5%)	Slip plate thickness	Max. specimen mass	Dimensions ~ L*W*H	Max. pitch moment	Max. roll moment	Max. yaw moment
TGT MO 12 XS	305*305 mm	8.5 kg	40 mm	100 kg	950*600*550 mm	550 Nm	550 Nm	250 Nm
TGT MO 12 S					1150*750*750 mm			
TGT MO 12 SM					1500*1050*900 mm			
TGT MO 12 M					1500*1050*900 mm			
TGT MO 18 XS	458*458 mm	18 kg	40 mm	300 kg	1250*650*550 mm	1600 Nm	1600 Nm	250 Nm
TGT MO 18 S					1350*950*750 mm			
TGT MO 18 SM					1600*1050*900 mm			
TGT MO 18 M					1700*1100*900 mm			
TGT MO 18 L					1600*1200*950 mm			
TGT MO 20 XS	508*508 mm	22 kg	40 mm	400 kg	1350*700*550 mm	2400 Nm	2400 Nm	250 Nm
TGT MO 20 S					1350*850*750 mm			
TGT MO 20 SM					1650*1100*900 mm			
TGT MO 20 M					1650*1100*900 mm			
TGT MO 20 L					1700*1200*950 mm			
TGT MO 20 XL					2050*1350*1200 mm			
TGT MO 24 S	610*610 mm	31 kg	40 mm	550 kg	1500*950*750 mm	3880 Nm	3880 Nm	250 Nm
TGT MO 24 SM					1800*1100*900 mm			
TGT MO 24 M					1800*1100*900 mm			
TGT MO 24 L					1800*1250*950 mm			
TGT MO 24 XL					2150*1600*1250 mm			
TGT MO 30 M	762*762 mm	47 kg	40 mm	1000 kg	1950*1100*900 mm	7600 Nm	7600 Nm	250 Nm
TGT MO 30 L					1950*1100*950 mm			
TGT MO 30 XL					2500*1400*1250 mm			
TGT MO 36 L	915*915 mm	80.5 kg	50 mm	1750 kg	2050*1250*1000 mm	12670 Nm	12670 Nm	250 Nm
TGT MO 36 XL					2300*1600*1250 mm			
TGT MO 36 XXL					2700*2000*1600 mm			
TGT MO 39 L	991*991 mm	100 kg	50 mm	2200 kg	2150*1750*1000 mm	16700 Nm	16700 Nm	250 Nm
TGT MO 39 XL					2450*1650*1250 mm			
TGT MO 39 XXL					2800*2000*1600 mm			
TGT MO 48 L	1200*1200 mm	142 kg	50 mm	2400 kg	2200*1800*1000 mm	19500 Nm	19500 Nm	250 Nm
TGT MO 48 XL					2700*1600*1250 mm			
TGT MO 48 XXL					3000*1950*1500 mm			
TGT MO 60 L	1500*1500 mm	243 kg	50 mm	3500 kg	2850*1800*1000 mm	25600 Nm	25600 Nm	250 Nm
TGT MO 60 XL					3050*1800*1200 mm			
TGT MO 60 XXL					3150*1700*1400 mm			
TGT MO 70 L	1800*1800 mm	302 kg	50 mm	4000 kg	3150*2100*1000 mm	30000 Nm	30000 Nm	250 Nm
TGT MO 70 XL					3250*2100*1200 mm			
TGT MO 70 XXL					3450*2000*1400 mm			
TGT MO 78 XL	2000*2000 mm	390 kg	50 mm	4500 kg	3550*2300*1400 mm	34000 Nm	34000 Nm	250 Nm
TGT MO 78 XXL					3650*2300*1400 mm			

Effective frequency range 0 - 2000 Hz / please inquire for larger slip plates/other sizes

Subject to change without notice. Errors and omissions excepted.

Hydrostatically guided slip tables

Oil-film slip tables with **hydrostatic guidance** from TIRA give you a compact system for a variety of vibration tests, including those of **large and heavy specimens which generate high yaw, roll and pitch moments due to their high centers of gravity above the slip plate**.
These tables use **high-pressure bearings** with a separate hydraulic supply unit.

The **monobase design** enables rapid conversion from horizontal to vertical testing and the accurate alignment of vibration generators relative to slip tables. Magnesium slip plates are available in different sizes, up to a working area of max. 2000 x 2000 mm. Other (and larger) sizes can be produced on request.
Oil-film slip tables consist of a precision ground and lapped natural granite block with a magnesium plate sliding on an oil film.

Hydrostatic slide bearings make it possible to restrain the high yaw, roll and pitch moments as they appear with **heavy test items** or very large loads which may have a **high centre of gravity**. Hydrostatically guided slip tables are used to test specimens in a horizontal direction. Vibration isolators are provided on the underside of the frame as a standard feature to prevent vibration transfer to the building.

- Enclosed oil aggregate with return flow pump
- Integrated oil pan
- 100 mm displacement possible



Shaker S 58315/LS-340 with slip table TGT MOH 30 L

Designation	Moving plate working area	Bearings	Slip plate mass (±5%)	Slip plate thickness	Max. specimen mass	Dimensions L*W*H	Max. pitch moment	Max. roll moment	Max. yaw moment
TGT MOH 24 SM	610*610 mm	2	48 kg	50 mm	550 kg	1800*1100*900 mm	26500 Nm	25000 Nm	22300 Nm
TGT MOH 24 M						1800*1100*900 mm			
TGT MOH 24 L						1800*1250*950 mm			
TGT MOH 24 XL						2150*1600*1250 mm			
TGT MOH 30 M	762*762 mm	2	72 kg	50 mm	1000 kg	1950*1100*900 mm	32200 Nm	34000 Nm	24700 Nm
TGT MOH 30 L						1950*1100*950 mm			
TGT MOH 30 XL						2250*1650*1250 mm			
TGT MOH 36 L	915*915 mm	2	96 kg	50 mm	1750 kg	2050*1250*1000 mm	47900 Nm	45700 Nm	34700 Nm
TGT MOH 36 XL						2300*1600*1250 mm			
TGT MOH 36 XXL						2700*2000*1600 mm			
TGT MOH 39 L	991*991 mm	2	105 kg	50 mm	2200 kg	2150*1750*1000 mm	66500 Nm	59800 Nm	44700 Nm
TGT MOH 39 XL						2450*1650*1250 mm			
TGT MOH 39 XXL						2800*2000*1600 mm			
TGT MOH 48 L	1200*1200 mm	2	170 kg	50 mm	6000 kg	2200*1800*1000 mm	91400 Nm	82200 Nm	56000 Nm
TGT MOH 48 XL						2700*1600*1250 mm			
TGT MOH 48 XXL						3000*1700*1500 mm			
TGT MOH 60 L	1500*1500 mm	3	252 kg	50 mm	8000 kg	2850*1800*1000 mm	167000 Nm	143000 Nm	99600 Nm
TGT MOH 60 XL						3050*1800*1200 mm			
TGT MOH 60 XXL						3150*1700*1400 mm			
TGT MOH 70 L	1800*1800 mm	5	330 kg	50 mm	10000 kg	3150*2100*1000 mm	260000 Nm	215000 Nm	125000 Nm
TGT MOH 70 XL						3250*2100*1200 mm			
TGT MOH 70 XXL						3450*2000*1400 mm			
TGT MOH 78 XL	2000*2000 mm	5	465 kg	50 mm	12000 kg	3550*2300*1400 mm	320000 Nm	272000 Nm	182000 Nm
TGT MOH 78 XXL						3650*2300*1400 mm			

Effective frequency range 0 - 2000 Hz / please inquire for larger slip plates/other sizes

Subject to change without notice. Errors and omissions excepted.

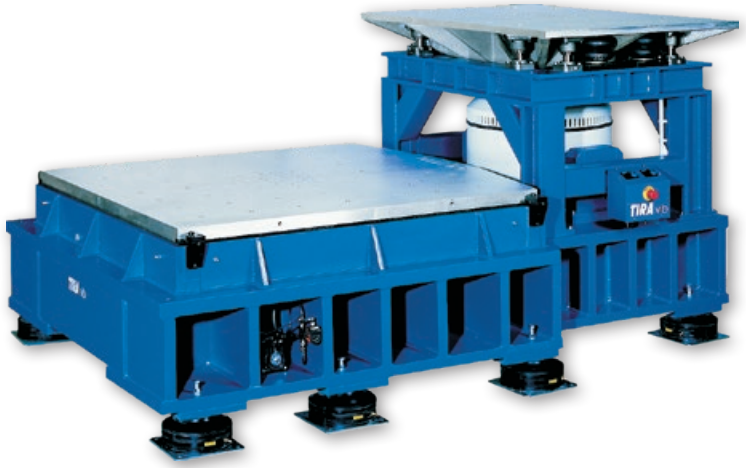
Load-bearing platforms (guided head expanders)

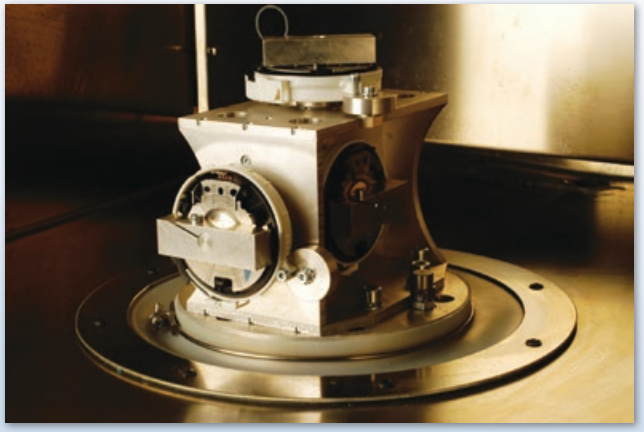
FEM-designed head expanders

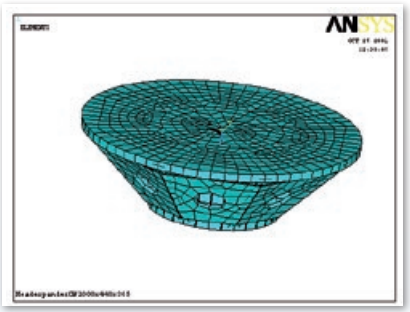
TIRA offers a wide range of head expanders, L and T-type fixtures, cubes and special support systems. The latest software for FEM calculation and analysis is used so that customers get specifically designed fixture assemblies with optimized and predicted dynamic performance to produce the best result.

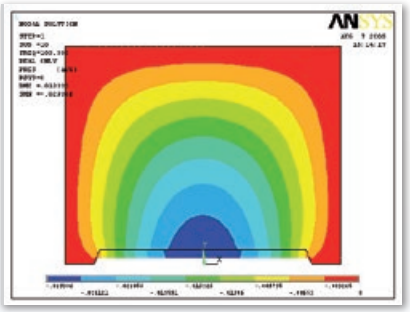
Fixtures are often main items of application conditions in industrial testing where specimens are tested to high standards of precision. This means that the fixture has to be optimized for both the specimen and the test parameters. Many customers, however, can not do these sophisticated calculations to produce a suitable fixture. **TIRA** has met this challenge and will develop, calculate and manufacture any type of special-purpose fixtures for your application, with the emphasis on minimizing its mass and optimize its dynamic performance.

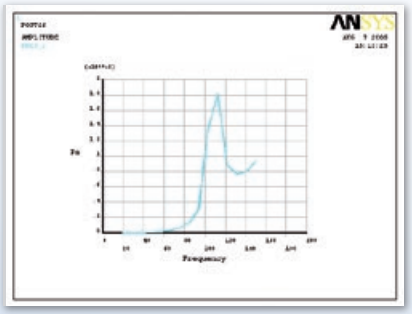
Monobase systems with a horizontal slip table and vertically guided load-bearing platform make it possible to test extremely large and heavy loads in direction of x, y and z axis. Specially-designed slip tables and load-bearing platforms are available with a working area of max. 2000 mm x 2000 mm (78 x 78"). Slip plate and load-bearing platform are accurately aligned in a common base frame. Conversion from horizontal to vertical operation is easy and takes a minimum of time.

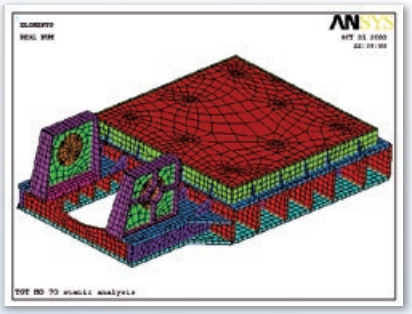






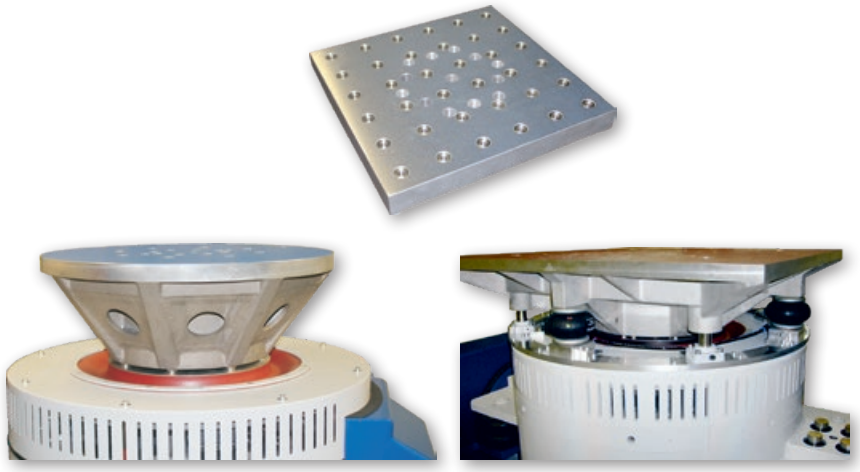






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Head Expanders



TIRA head expanders are manufactured from magnesium and provide an expansion of the armature table. The unique design of the head expanders and 3 channel control strategies allow tests up to a frequency of 2000 Hz (depends on resonance frequency). Head expanders especially provided with 'vibrodamp' can be subjected to test frequencies above 1000 Hz. This damping process reduces amplification of upper frequency resonances.

If a test object needs eccentric clamping or generates high transverse moments, Tira also offers guided head expanders.

Apart from the range of standard head expanders **TIRA** also offers customized fixtures for round, square or rectangular working areas.

CIRCULAR VERSION				
Size (diameter)	**Type**	**Armature diameter**	**Height**	**Mass**
250 mm	THR 25-120	120 mm	80 mm	3.7 kg
	THR 25-180	180 mm	80 mm	4.3 kg
300 mm	THR 30-180	180 mm	80 mm	5.6 kg
	THR 30-230	230 mm	80 mm	6.7 kg
400 mm	THR 40-180	180 mm	120 mm	10.8 kg
	THR 40-230	230 mm	120 mm	12.0 kg
500 mm	THR 50-180	180 mm	150 mm	20.5 kg
	THR 50-230	230 mm	150 mm	22.0 kg
	THR 50-340	340 mm	150 mm	24.4 kg
600 mm	THR 60-180	180 mm	210 mm	29.0 kg
	THR 60-230	230 mm	190 mm	31.0 kg
	THR 60-340	340 mm	181 mm	35.5 kg
800 mm	THR 80-340	340 mm	210 mm	51.0 kg
	THR 80-440	440/480 mm	200 mm	62.0 kg
	THR 80-640	640 mm	130 mm	47.0 kg
1000 mm	THR 100-440	440/480 mm	340 mm	122.0 kg
	THR 100-590	590 mm	305 mm	125.0 kg
	THR 100-640	640 mm	185 mm	91.0 kg
1200 mm	THR 120-440	440/480 mm	335 mm	172.0 kg
	THR 120-590	590 mm	350 mm	184.0 kg
	THR 120-840	840 mm	280 mm	169.0 kg
1500 mm	THR 150-590	590 mm	286 mm	282.0 kg
	THR 150-840	840 mm	275 mm	280.0 kg

Vibrodamp version on request

SQUARE VERSION				
Size	**Type**	**Armature diameter**	**Height**	**Mass**
300 x 300 mm	THS 30-120	120 mm	100 mm	7.3 kg
	THS 30-180	180 mm	105 mm	8.2 kg
400 x 400 mm	THS 40-180	180 mm	100 mm	14.0 kg
	THS 40-230	230 mm	100 mm	14.5 kg
500 x 500 mm	THS 50-180	180 mm	125 mm	22.5 kg
	THS 50-230	230 mm	150 mm	27.5 kg
	THS 50-340	340 mm	180 mm	34.0 kg
600 x 600 mm	THS 60-180	180 mm	180 mm	36.0 kg
	THS 60-230	230 mm	180 mm	39.5 kg
	THS 60-340	340 mm	180 mm	47.5 kg
	THS 60-440	440/480 mm	180 mm	49.0 kg
800 x 800 mm	THS 80-340	340 mm	250 mm	89.0 kg
	THS 80-440	440/480 mm	250 mm	100.0 kg
	THS 80-640	640 mm	120 mm	66.0 kg
1000 x 1000 mm	THS 100-440	440/480 mm	230 mm	129.0 kg
	THS 100-590	590 mm	285 mm	155.0 kg
	THS 100-640	640 mm	175 mm	135.0 kg
1200 x 1200 mm	THS 120-440	440/480 mm	295 mm	195.0 kg
	THS 120-590	590 mm	340 mm	255.0 kg
	THS 120-840	840 mm	345 mm	258.0 kg
1500 x 1500 mm	THS 150-440	440/480 mm	380 mm	286.0 kg
	THS 150-590	590 mm	340 mm	345.0 kg
	THS 150-840	840 mm	380 mm	385.0 kg

Vibrodamp version on request

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TIRA Vibration Test Systems – Temperature/Climatic Test Systems

TIRA Shakers and Vibration Test Chambers

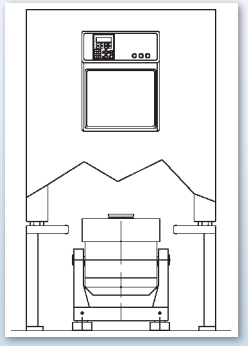
Quality, reliability and safety of products require utmost care from the concept to the end-user. To meet this pretentious requirement, one nowadays investigates the interactions between objects and their direct or indirect environment by means of environmental testing systems. Based upon such experience, products are developed with reference to specific applications as well as high quality and reliability. Utilizing combined temperature and vibration testing techniques our customers can detect material and workmanship defects at an early stage to minimize warranty costs.

In practical use, the products are exposed to various environmental influences at the same time such as e.g. temperature, humidity, vibrations and transport loads.

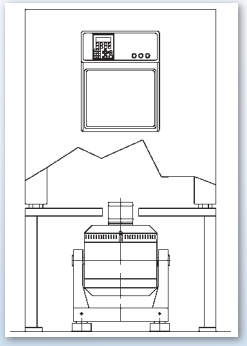
TIRA offers individual fixtures, consisting of steel rings, fitting membranes and clamping ring, for the combination of our vibration exciters with climatic chambers of different manufacturers and allows a smooth process of the testing programs in vertical, horizontal and triaxial direction.

For the operation of our vibration exciters (27 to 70 kN) with low pressure chambers TIRA's product range includes a special low pressure unit with a diameter of 340 mm.

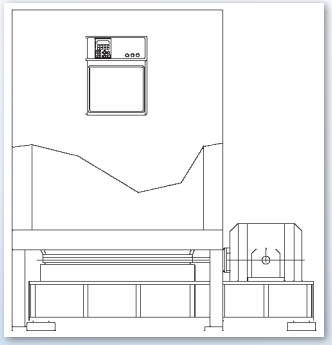




Integration of vibration generator into climatic chamber



Head extender

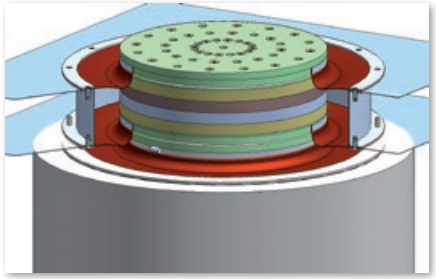


Integration of slip table into climatic chamber

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Chamber leadthroughs

TIRA chamber leadthroughs



TIRA has developed a new leadthrough for the operation of shakers with climatic chambers. This leadthrough allows in comparison to the previous systems with headextender and massive thermobarrier plate a significant better isolation at high temperature differences.
This way an operation of sensitive climate with higher dew points is better possible.

Therefore more constant temperature conditions for the test material are present. The condensation of humidity out of the testing air is reduced considerably. At cooling operation of the chamber the shaker inside is better protected against condensation.
The new model offers in addition to the significantly enhanced isolation attributes also a mass advantage of about 30%.

Thermobarriers (TBR, Circular version)		
Diameter	Height	Mass
60 mm	20 mm	0.1 kg
80 mm	20 mm	0.2 kg
120 mm	20 mm	0.5 kg
180 mm	20 mm	1.0 kg
230 mm	20 mm	1.6 kg
250 mm	20 mm	2.0 kg
300 mm	20 mm	3.0 kg
340 mm	20 mm	3.5 kg
400 mm	20 mm	5.0 kg
440/480 mm	20 mm	5.8 kg
500 mm	20 mm	8.0 kg
590 mm	20 mm	10.5 kg
600 mm	20 mm	11.5 kg
640 mm	20 mm	12.3 kg
840 mm	30 mm	31.5 kg

Other sizes on request

Climatic chamber leadthroughs (THX)			
Armature diameter	Height (Standard)	for chamber floor thickness (Standard)	Mass*
120 mm	100-200 (160) mm	40-140 (100) mm	2.5 kg
180 mm	100-200 (160) mm	40-140 (100) mm	5.6 kg
230 mm	100-200 (160) mm	40-140 (100) mm	7.8 kg
340 mm	100-200 (160) mm	40-140 (100) mm	17.5 kg
440/480 mm	100-200 (160) mm	40-140 (100) mm	25.0 kg
590 mm	100-200 (160) mm	40-140 (100) mm	52.0 kg
640 mm	100-200 (160) mm	40-140 (100) mm	59.0 kg
840 mm	100-200 (160) mm	40-140 (100) mm	107.0 kg

Temperature range -40 °C to 160 °C
* Mass at standard height of 160 mm

Thermobarriers (TBS, Square version)		
Size	Height	Mass
300 x 300 mm	20 mm	3.6 kg
400 x 400 mm	20 mm	6.4 kg
500 x 500 mm	20 mm	10.0 kg
600 x 600 mm	20 mm	14.4 kg
800 x 800 mm	20 mm	25.6 kg
900 x 900 mm	20 mm	32.4 kg
1000 x 1000 mm	20 mm	40.0 kg
1200 x 1200 mm	20 mm	57.6 kg
1500 x 1500 mm	20 mm	90.0 kg
1800 x 1800 mm	20 mm	129.6 kg
2000 x 2000 mm	20 mm	160.0 kg

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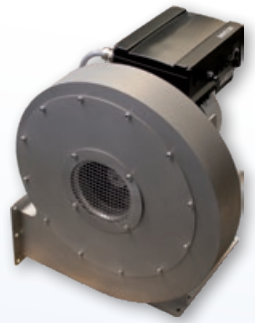
TIRA Vibration Test Systems

Blowers/Noise reduction

Blowers are used for cooling the shakers. TIRA mainly offers side channel blowers that provide an above-average cooling performance in comparison with axial blowers. In addition to this, silencers for damping the blow-off noise are offered.

An aerated sound-absorbing chamber is offered for installing the cooling blower in closed rooms. The low-maintenance blower can also be installed outdoors.

The newly developed Air-Water-Heat exchanger WWT is used for cooling down the exhaust air of the vibration test system to room temperature. This allows the operation inside rooms without problems. The heat exchanger is additionally designed as a noise protection casing and therefore offers highly efficient silencing performance.



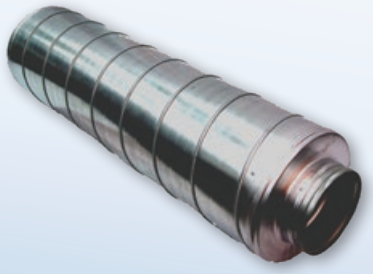
Blower TB 9 FUK



Air-Water-Heat exchanger WWT



Acoustic Enclosure TB 7/FUK-AE



Silencer TB 7/FUK-SI

Blower (free blowing)		Engine				Dimensions	Air hose		Mass	Sound-pressure
Designation	Volume flow	Performance	Phases	Voltage	Frequency	W/H/D	Diameter	Length		
TB 0080	80 m³/h	370 W	1	115/230 V	50/60 Hz	246/247/256 mm	40 mm	3 m	10 kg	53 dB(A)
TB 0140	140 m³/h	1.1 kW	1	115/230 V	50/60 Hz	286/302/292 mm	50 mm	3 m	16 kg	63 dB(A)
TB 0310	315 m³/h	4.0 kW	3	400 V	50/60 Hz	382/384/432 mm	60 mm	5 m	42 kg	69 dB(A)
TB 9 FUK	1080 m³/h	4.0 kW	3	400 V	50/60 Hz	505/598/464 mm	140 mm	5 m	60 kg	99 dB(A)
TB 120 FUK	1500 m³/h	5.5 kW	3	400 V	50/60 Hz	487/637/487 mm	140 mm	5 m	61 kg	102 dB(A)
TB 7/FUK/11	1920 m³/h	11 kW	3	400 V	50/60 Hz	625/775/602 mm	150 mm	5 m	113 kg	102 dB(A)
TB 7/FUK/20	5820 m³/h	20 kW	3	400 V	50/60 Hz	625/773/602 mm	175 mm	5 m	131 kg	105 dB(A)
TB HR160	6600 m³/h	25 kW	3	400 V	50/60 Hz	672/760/730 mm	175 mm	5 m	97.5 kg	105 dB(A)

Blower	Acoustic Enclosure				Silencer			
Designation	Designation	Dimensions (L/W/H)	Mass	Noise Reduction*	Designation	Dimensions(L/D)	Mass	Noise Reduction*
TB 0080	TB 0080-AE	860/650/760 mm	45 kg	15-23 dB(A)	TB 0080-SI	310/65 mm	0.2 kg	5 dB(A)
TB 0140	TB 0140-AE	860/650/760 mm	45 kg	15-23 dB(A)	TB 0140-SI	308/82 mm	0.2 kg	8 dB(A)
TB 0310	TB 0310-AE	860/650/760 mm	55 kg	15-23 dB(A)	TB 0310-SI	308/82 mm	0.58 kg	6 dB(A)
TB 9 FUK	TB 9-AE	1470/1250/1393 mm	103 kg	5-23 dB(A)	TB 9-SI	1012/150 mm	1.2 kg	3-6 dB(A)
TB 120 FUK	TB 120-AE	1470/1250/1393 mm	103 kg	5-23 dB(A)	TB 120-SI	1100/160 mm	1.2 kg	3-6 dB(A)
TB 7/FUK	TB 7/FUK-AE	1470/1250/1393 mm	103 kg	5-23 dB(A)	TB 7/FUK-SI	1120/280 mm	9.2 kg	9-15 dB(A)
variable	WWT	1200/1500/2080 mm	800 kg	30 dB(A)				

*Depending on frequency

Subject to change without notice. Errors and omissions excepted.

Water Cooling Units

The cooling units include the complete primary circuit of shaker cooling system for the TIRA water-cooled shakers and the hydraulics of the shaker's hydrostatic bearings.

The units are designed as compact mobile devices. Primary circuit is based on deionised water. The extraction of the heat is carried out by a customer-provided secondary-process water circuit. Pressure gauges and flow indicators are available at many positions.

The front and side walls are designed with swing doors to ensure a good accessibility to all built-in components. The connections to the shaker are accomplished by hoses with self-sealing couplings that are free from leakage. A TFT touchscreen displays information on conductivity, pressure, flow rates and the temperature curve over time of the sensors installed in the cooling unit and shaker.

Cooling Unit	C 59412	C 59430
Process water:		
Supply temperature	5-15 °C	
Volumeflow at max. supply temperature	10 m³/h	15 m³/h
Supply pressure – static	≤ 800 kPa (8 bar)	
Return - Dynamic differential pressure	≥ 300 kPa (3 bar)	
Dissipated heat flow	110 kW	220 kW
ph-value	7 ±1	
Dirt particle size	< 25 µm	
Water hardness - overall	< 1.4 mmol/l (< 140 ppm)	
Water hardness - carbonate	< 0.9 mmol/l (< 90 ppm)	
Process water connection - Thread	G 1 1/2"	
Total mass	~300 kg	~500 kg
Dimensions (W/H/D)	800/2200/900 mm	800/2200/1100 mm

The water cooling units have the following benefits compared to other known systems:

- The primary circuit is designed as closed system, which guarantees no evaporation loss of the water and no pollution of the circuit.
- The closed system operates at a higher pressure level. This way the usual interferences of the measuring signal by cavitation are eliminated.
- The flow rate of the splitted lines of the primary circuit to moving coil, field coil and short-circuit rings is monitored.
- The primary circuit features besides the conductance monitoring an integrated demineralization cartridge, which keeps the conductance low within the bypass flow for a long operation period.
- The units control the process water flow. This way the water consumption can be reduced at low process water temperatures and during part load operation.

If needed, an additional fine filter unit for heavier polluted process water is optionally available.



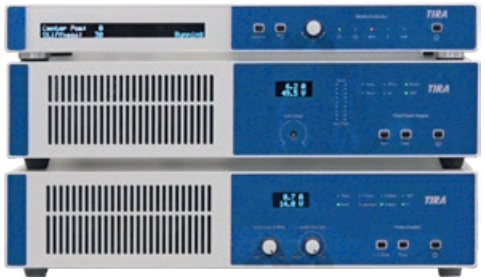
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TIRA Vibration Test Systems

Power Amplifiers up to 1300 VA

TIRA offers a new series of amplifiers with **a rated sinusoidal power** output up to **1300 VA**. The modules control all permanent magnetic shakers as well as shakers in connection with an internal field excitation up to 1000 N.
These amplifiers, equipped with highly-advanced MOSFET transistors, can be run in the **current or the voltage mode**, as desired. The amplifiers are user-friendly because of their backgroundlit multifunctional display.
A safety management system monitors functions such as temperature, overcurrent and overtravel.
Outstanding features include a **high signal-to-noise ratio, low distortion factor** and **monitoring outputs** for voltage and current. **Selectable ranges of operating voltage** and **current range limiting** are preconditions for the fact that **TIRA** amplifiers can be readily adapted to other shakers from other manufacturers.

Optionally, the amplifiers are designed for connecting the electronic zero-adjustment unit "Tira Middle Control" (TMC), which makes even with small longstroke-shakers a load compensation for achieving the nominal displacement possible. As an alternative to the BDA 1300, the analog amplifier BAA 1000 is available with a frequency range up to 50 kHz, distortion factor <0.05%, and signal-to-noise Ratio of >100 dB.



Amplifier BDA 1300-ET

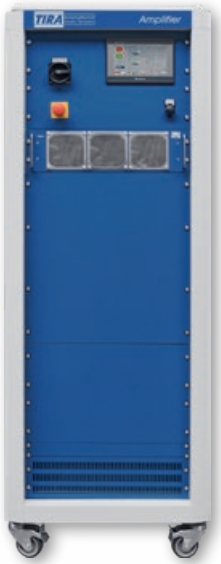
Amplifer	BAA 120	BAA 500	BDA 1300	BDA 1300-E	BDA 1300-ET
Output power $_{RMS}$, max	120 VA	500 VA	1300 VA	1300 VA	1300 VA
Frequency range (small signal/full p.)	DC - 100 kHz / 40 Hz - 25 kHz	DC - 180 kHz / 20 Hz - 25 kHz	DC - 25000 Hz	DC - 25000 Hz	2 - 25000 Hz
Voltage-/Current mode	yes/yes	yes/yes	yes/yes	yes/yes	yes/no
Voltage $_{RMS}$, max.	22 V	45 V	72 V	72 V	72 V
Current $_{RMS}$, max.	5.5 A	11.2 A	18 A	18 A	18 A
Signal input voltage $_{PK}$	3.5 V	3.5 V	3.5 V	3.5 V	3.5 V
Total Harmonic Distortion (THD)	< 0.05 %	< 0.05 %	< 0.1 %	< 0.1 %	< 0.1 %
Signal to noise ratio	> 100 dB	> 110 dB	> 90 dB	> 90 dB	> 90 dB
Field supply	no	no	no	yes (external)	yes (external+TMC)
Field voltage	–	–	–	69 V	69 V
Field current	–	–	–	9 A	9 A
Total mass	9 kg	18 kg	22 kg	39 kg	43 kg
Dimensions (W x H x D)	440 x 90 x 290 mm	440 x 90 x 290 mm	440 x 100 x 500 mm	440 x 200 x 500 mm	440 x 260 x 500 mm
Interlocks	Overload,Temperature, Clipping	Overload,Temperature, Clipping	Overload,Temperature, Clipping	Overload,Temperature, Clipping	Overload,Temperature, Clipping

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Power Amplifiers 15 kVA

The Gradient Amplifier from **TIRA** is a single axis pulse width modulated amplifier. The Amplifier's exceptionally low output noise, extremely high bandwidth and excellent stability make it ideally suited for demanding power amplifier tasks found in laboratory and medical applications. Utilizing advanced hybrid digital and analog control architecture, the **TIRA** Power Amplifiers provide a host of powerful features.

On the **LCD-touch screen display** the module status with current indication and the error diagnostics are shown. A safety monitoring unit protects the amplifier from short circuit and from a possible destruction of the modules.
Error indication and system parameters in plain text increase the availability thanks to a faster diagnostics. The high clock frequency of up to 102 kHz allows test frequencies of up to **4000 Hz** without any decrease in output power. The cascading of the modules allows an **amplifier design up to 240 kVA** RMS output power at low floor space requirements. The output voltage of the modules can be modified so that **TIRA** amplifiers can be adapted to almost all shakers existing on the market.



A 1 02 11 021 SV



A 6 00 11 210

Amplifier	Chameleon	Chameleon-T
Sine output power, max. $_{RMS}$	15 kVA	15 kVA
Frequency range	DC - 5000 Hz	DC - 5000 Hz
Voltage, max. $_{RMS}$	212 V	212 V
Current, max. $_{RMS}$, max.	40-100 A	40-100 A
Signal input voltage $_{PK}$	±10 V	±10 V
Total Harmonic Distortion (THD)	< 0.2 %	< 0.2 %
Signal to noise ratio	> 80 dB	> 80 dB
Field supply	internal	internal
Field voltage*	140-280 V	140-280 V
Field current*	6-8 A	6-8 A
Total mass	330 kg	330 kg
Dimensions (W x H x D)	600 x 1740 x 850 mm	600 x 1740 x 850 mm
Interlocks	Overcurrent, Temperature, Displacement, Cooling air, Compressed air, Phase monitoring	Overcurrent, Temperature, Displacement, Cooling air, Phase monitoring

* variable according to customer specification

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TIRA Vibration Test Systems

Power Amplifiers 22.5 to 150 kVA

Amplifier	Octopus-22	Octopus-35	A 6 26 11 105	A 6 26 11 126	A 6 26 11 147
Sine output power $_{RMS}$	22.5 kVA	37.5 kVA	60 kVA	75 kVA	90 kVA
Frequency range	DC - 5000 Hz	DC - 5000 Hz	DC - 5000 Hz	DC - 5000 Hz	DC - 5000 Hz
Voltage $_{RMS}$, max.	212 V	212 V	212 V	212 V	212 V
Current $_{RMS}$, max.	200 A	300 A	500 A	600 A	700 A
Signal input voltage $_{PK}$	±10 V	±10 V	±10 V	±10 V	±10 V
Total Harmonic Distortion (THD)	< 0.2 %	< 0.2 %	< 0.2 %	< 0.2 %	< 0.2 %
Signal to noise ratio	> 80 dB	> 80 dB	> 80 dB	> 80 dB	> 80 dB
Field supply	internal	internal	internal	internal	internal
Field voltage*	105-140 V	105 V	250 V	250 V	250 V
Field current*	8-75 A	75 A	103 A	103 A	103 A
Total mass	600 kg	620 kg	1050 kg	1100 kg	1150 kg
Dimensions (W x H x D)	1200 x 1800 x 800 mm	1200 x 1800 x 800 mm	1800 x 2200 x 900 mm	1800 x 2200 x 900 mm	1800 x 2200 x 900 mm
Interlocks (extract)	Overcurrent, Temperature, Displacement, Air supply	Overcurrent, Temperature, Displacement, Air supply	Overcurrent, Temperature, Displacement, Air supply	Overcurrent, Temperature, Displacement, Air supply	Overcurrent, Temperature, Displacement, Air supply

Amplifier	A 6 00 11 210	A 6 00 11 252	A 6 00 11 273	A 6 00 11 315
Sine output power $_{RMS}$	120 kVA	135 kVA	150 kVA	150 kVA
Frequency range	DC - 5000 Hz	DC - 5000 Hz	DC - 5000 Hz	DC - 5000 Hz
Voltage $_{RMS}$, max.	212 V	212 V	212 V	212 V
Current $_{RMS}$, max.	1000 A	1200 A	1300 A	1500 A
Signal input voltage $_{PK}$	±10 V	±10 V	±10 V	±10 V
Total Harmonic Distortion (THD)	< 0.2 %	< 0.2 %	< 0.2 %	< 0.2 %
Signal to noise ratio	> 80 dB	> 80 dB	> 80 dB	> 80 dB
Field supply	external	external	external	external
Field voltage*	132 V	132 V	132 V	132 V
Field current*	270 A	270 A	270 A	270 A
Total mass Amplifier/Field power unit	1350/500 kg	1400/500 kg	1800/500 kg	1900/500 kg
Dim. Amplifier/Field unit (W x H x D)	1800x2200x900 / 600x1740x850 mm	1800x2200x900 / 600x1740x850 mm	2400x2200x900 / 600x1740x850 mm	2400x2200x900 / 600x1740x850 mm
Interlocks (extract)	Overcurrent, Temperature, Displacement, Conductance	Overcurrent, Temperature, Displacement, Conductance	Overcurrent, Temperature, Displacement, Conductance	Overcurrent, Temperature, Displacement, Conductance

* variable according to customer specification

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Power Amplifiers 165 to 240 kVA / TIRA Remote Display

Features:
- Flexible by modular design
- Integrated mains switch and line filter
- Multiple switchable field levels (for energy-saving)
- 4 sigma peak current





Amplifier	A 6 00 11 336	A 6 00 11 378	A 6 00 11 462	A 6 00 11 483
Sine output power RMS	165 kVA	195 kVA	225 kVA	240 kVA
Frequency range	DC - 5000 Hz	DC - 5000 Hz	DC - 5000 Hz	DC - 5000 Hz
Voltage RMS, max.	212 V	212 V	212 V	212 V
Current RMS, max.	1600 A	1800 A	2200 A	2300 A
Signal input voltage PK	±10 V	±10 V	±10 V	±10 V
Total Harmonic Distortion (THD)	< 0.2 %	< 0.2 %	< 0.2 %	< 0.2 %
Signal to noise ratio	> 80 dB	> 80 dB	> 80 dB	> 80 dB
Field supply	external	external	external	external
Field voltage*	240 V	240 V	240 V	290 V
Field current*	355 A	355 A	355 A	320 A
Total mass Amp. / Field power unit	2450/1135 kg	2500/1135 kg	2600/1135 kg	2700/1135 kg
Dimensions Amplifier / Field power unit (W x H x D)	2400 x 2200 x 900 / 1200 x 1740 x 850 mm	2400 x 2200 x 900 / 1200 x 1740 x 850 mm	3200 x 2200 x 900 / 1200 x 1740 x 850 mm	3200 x 2200 x 900 / 1200 x 1740 x 850 mm
Interlocks	Overcurrent, Temperature, Displacement, Flow rate, Conductance, Phase monitoring, Compressed air, Emergency power-off switch	Overcurrent, Temperature, Displacement, Flow rate, Conductance, Phase monitoring, Compressed air, Emergency power-off switch	Overcurrent, Temperature, Displacement, Flow rate, Conductance, Phase monitoring, Compressed air, Emergency power-off switch	Overcurrent, Temperature, Displacement, Flow rate, Conductance, Phase monitoring, Compressed air, Emergency power-off switch

* variable according to customer specification

TIRA Remote Display

The TIRA Remote Display consists of a freely placeable housing with 9 inch touch display for remote operation of a vibration test system. All information and operating options of the amplifier display are transmitted.

Features:
- Robust metal housing WxHxD 330x271x207 mm
- up to 100 m cable length
- 9 inch TFT widescreen display with LED backlighting
- shows all information of the system, e.g.: status of components, voltage and current of voice coil and field, time history of all temperatures, actual position of the moving armature and error history
- Emergency stop push-button

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TIRA Vibration Test Systems

Vibration Control Systems and Vibration Accelerometers

Variable control hardware and vibration control software

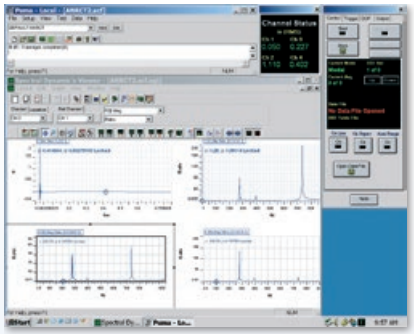
The computer-aided vibration control system meets all requirements for an advanced shaker control. It combines a highly-developed and powerful DSP hardware with a personal computer that is simple to operate. The system covers the entire test range with the modes of operation random, sine, shock and mixed-mode and offers a simple operation with an graphic user environment. Within the control system the PC carries out the test preparation, the indication of the test data and the very flexible report generation.

TIRA offers vibration control systems of various manufacturers with 4 to 32 simultaneous input channels, extensive signal analysing programs incl. Sine-, Transient-, and Modal analysis, acoustic analysis, signal generator. The vibration control systems offer a wide range of options for integration with conditioning cabinets and other test equipment. They allow monitoring and complete control of the test over network and even over internet.

The respective vibration control software finds in the hardware platforms an ideal completion for comprehensive vibration tests. The controller achieves excellent measuring accuracy and an impressive realtime performance by using state of the art technology. The hardware platforms support the extensive functionality of the software, which includes simple sine or random tests over complex tests with random signal excitation, that is overlayed with a multiple sine signal, up to a load simulation in time intervals. Of course all tests are accomplished according to the respective standards ISO, DIN, MIL, ASTM and IEC.









Piezo-electric vibration accelerometers

Part of a complete vibration test system is besides the shaker and control system also a vibration accelerometer. These accelerometers are mostly of piezo-ceramic type. They are used as standard accelerometers for electrodynamic shakers due to their excellent linearity at wide dynamic range and large frequency range. TIRA offers a wide variety for all types of application.







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TIRA Vibration Test Systems in Cooperation with Kokusai

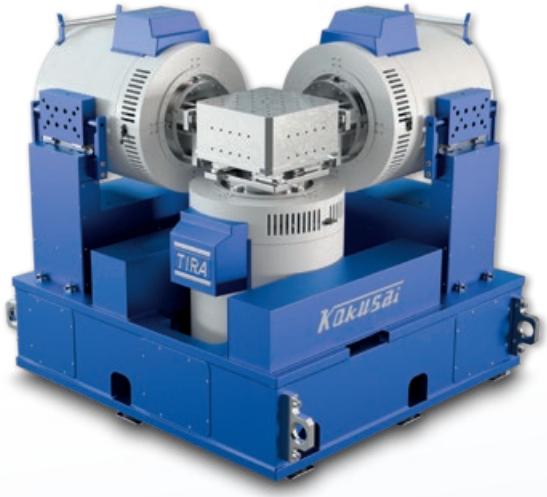
Kokusai / TIRA 3D-Shaker-System

REPRODUCING THE REAL ENVIRONMENT

3DED
TIRA X KOKUSAI

Due to the requirements of the automotive industry for a 3-axis simultaneous testing machine, which can cover a wide frequency range up to 2000 Hz, Kokusai developed a 3-axis testing machine with the aim of meeting the specifications according to MIL standard suitable for the automotive and aviation industries.

As a manufacturer of vibration testing systems, TIRA GmbH produces and supplies the necessary components such as shakers, amplifiers and cooling units in a joint project and also implements the necessary control hardware and software.



Features:

- Energy-saving mode (Field power reduction)
- Multiple safety devices
- Long-time operation
- High cross-axial stiffness
- Air-cooling blower with optional fan speed control

Model		EDS-27M0-3	EDS-35M0-3	EDS-49M0-3	EDS-55M0-3	EDS-70M0-3
Maximum force	Sine	27000 N	35000 N	49500 N	55000 N	70000 N
Frequency range		5 - 2000 Hz	5 - 2000 Hz	5 - 2000 Hz	5 - 2000 Hz	5 - 2000 Hz
Maximum acceleration	Sine	12 g	15 g	21 g	24 g	27 g
Maximum displacement (pk-pk)		50 mm	50 mm	50 mm	50 mm	50 mm
Dimensions of vibration table		500 x 500 mm	500 x 500 mm	500 x 500 mm	500 x 500 mm	500 x 500 mm

A wide range of models and configurations are available, contact us today for your personal quote.
General data - For detailed technical information see product data sheets (Download at https://www.tira-gmbh.de/en/datasheets)

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TIRA Vibration Test Systems in Cooperation with Kokusai

3-Axis/4-poster Automobile Loaded Vibration Tester

Our servomotor-driven vibration testing systems cover a wide range of table sizes and excitation forces. These are extremely versatile and can be adapted to almost any application in the low to medium frequency range up to 500 Hz, depending on size.

Due to the similar frequency range, customers often have to weigh servo motor systems against hydraulic solutions. A direct comparison illustrates many advantages of servo motor technology.

- More precision through position-based control
- Less maintenance
- No idling or warm-up time
- Lower energy consumption
- Clean and silent operation

ELECTRIC SERVO-MOTOR



Technical Data	Values
Maximum frequency	100 Hz (vertical and horizontal)
Maximum acceleration	10 to 25 g
Maximum displacement	±50 mm
Excitation direction	Vertical excitation (Z) Horizontal excitation (X,Y)
Maximum payload	1000 kg (single wheel)
Types of excitation	Sine, Random, Shock, Road simulation
Options	Wheelbase moving device (ST: 1000 mm/Standard) Tread width moving device (ST: 400 mm/Standard)

On customer request:
We offer single/2D/3D-system for 4-poster-applications

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Large Size of 3-Axis Simultaneous Vibration Tester

Our servomotor-driven vibration testing systems cover a wide range of table sizes and excitation forces. These are extremely versatile and can be adapted to almost any application in the low to medium frequency range up to 500 Hz, depending on size.

Due to the similar frequency range, customers often have to weigh servo motor systems against hydraulic solutions. A direct comparison illustrates many advantages of servo motor technology.

- More precision through position-based control
- Less maintenance
- No idling or warm-up time
- Lower energy consumption
- Clean and silent operation

Suitable for testing railway equipment and -parts

ELECTRIC SERVO-MOTOR



Technical Data	Values
Maximum force	90000 N (X/Y-Axis) 120000 N (Z-Axis)
Excitation frequency	200 Hz
Maximum acceleration	1.5 g
Dimensions of vibration table	3000 x 2500 mm (2 units) Total: 6000 x 2500 mm
Maximum payload	4000 kg
Types of excitation	Sine, Random, Earthquake simulation

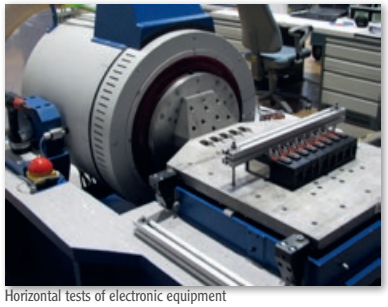
This system is suitable for the railway industry. Versions for the automotive industry are also available on request.

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Customer applications:


Modal examinations


Chassis tests in the automotive industry
First publication in ATZworldwide 1-2013, pp. 18 - 21


Horizontal tests of electronic equipment


Integration in production lines

Additional range of products by TIRA GmbH:

Extract of the production- and delivery program of our other product groups:

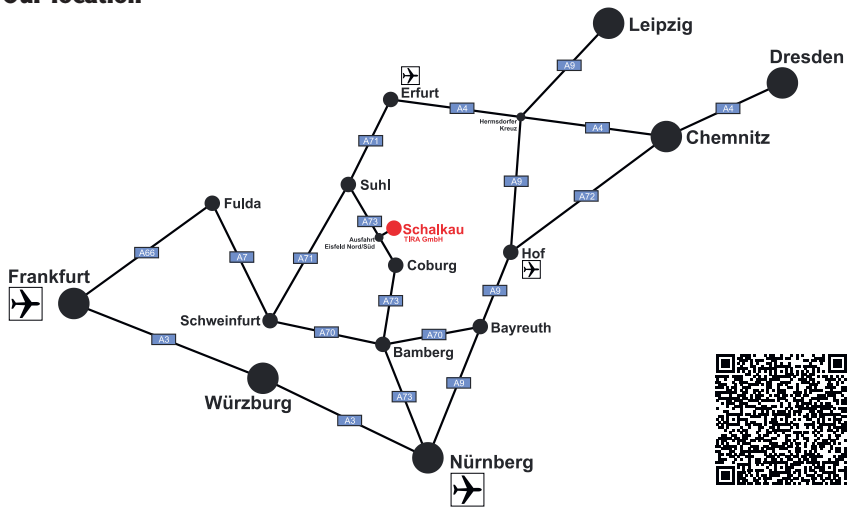
TIRA Balancing Technology
- Hard-bearing and soft-bearing balancing machines
- Machines for small-, medium-, and large-batch production with unbalance compensating units

TIRA Material Testing
- Tensile-/compression-/bending machines with spindle drive
- Universal testing machines

TIRA Mechanical Engineering
- Components and sub-assemblies for plant construction, technology, machine- and machine-tool building, Jig-and-fixture and mold construction
- Welded structures and components for tank construction and machinery



Our location



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version 11/2025