

**TIRA**

*Schwingtechnik*  
Vibration Test Systems



## TIRA Vibration Test Systems

# Modal-Vibration Test Systems from 100 N to 2.7 kN

These exciters are specifically designed for **modal and structure analysis**. Modal shakers up to 400 N are excited by permanent magnets, with **lightweight** rare-earth magnets provided for mobile use. These shakers are characterized by **high cross-axial stiffness**. From 1000 N onwards, modal systems permit a max. displacement of 45 mm due to **TMC control**. TMC is an **electronic armature position control system** for precisely coupling the modal shaker to the specimen. The armature datum adjustment allows the operator to offset the nominal position of the armature in relation to the body. The axial stiffness can also be adjusted electronically.

A standard feature on all modal shakers is a trunnion mount. This allows a great variety of coupling options.

The Modal systems TV 51120-MNC and TV 51130-MSK are a special development of TIRA to increase the mobility. The 200 N shaker does not require an additional cooling unit and the 350 N shaker has an integrated cooling blower.



Modal shaker S 51120-M



Modal shaker S 51130-MSK

System	TV 51110-M	TV 51120-M	TV 51120-MNC	TV 51130-MSK
Shaker	S 51110-M	S 51120-M	S 51120-MNC	S 51130-MSK
Amplifier	BAA 120/DA 200	BAA 500	BAA 500	BAA 500-MSK
Blower	-	TB 0080	-	internal
Rated peak force (N) Sine <sub>pk</sub> / Random <sub>RMS</sub>	100/70	200/140	200/100	350/200
Frequency range (Hz)	DC - 5000	DC - 5000	DC - 3000	DC - 4000
Max. displacement (mm) Pk - Pk	13	13	9	10
Max. velocity (m/s)	1.5	1.5	1.3	1.3
Suspension stiffness (N/mm)	8	8	70	70
Effective moving mass ±5% (kg)	0.23	0.23	0.5	0.55
Main resonance frequency (Hz) (free-swinging)	>2680	>2680	>4000	>2700
Total shaker mass (kg)	12	12	18	27
Coupling (Thread ø)	M6	M6	M8	M8
Max. power consumption at 230V (kVA) Amplifier/Blower	0.08/-	0.35/0.46	0.35/-	0.9 (incl. blower)

System	TV 51140-M	TV 5220-M	TV 50350-M
Shaker	S 51140-M	S 5220-M	S 50350-M
Amplifier	BAA 1000	BAA 1000-ET	A 1 02 11 021 T SV
Blower	TB 0140	TB 0140	TB 0310
Rated peak force (N) Sine <sub>pk</sub> / Random <sub>RMS</sub>	400/311	1000/650	2700/2000
Frequency range (Hz)	DC - 5000	1 - 5000	1 - 3000
Max. displacement (mm) Pk - Pk	20	45	45
Max. velocity (m/s)	1.5	1.5	1.5
Suspension stiffness (N/mm)	5	electr. adjustable	electr. adjustable
Effective moving mass ±5% (kg)	0.4	1.45	2.3
Main resonance frequency (Hz) (free-swinging)	>2450	>4000	>3000
Total shaker mass (kg)	18	122	280
Coupling (Thread ø)	M6	M8	M8
Max. power consumption at 230/400V (kVA) Amplifier/Blower (+FPS)	2.7/1.4	2.7/2.5	17 (complete)

General data - For detailed technical information see product data sheets (Download at <https://www.tira-gmbh.de/en/tira-gmbh/downloads/vibration-test-systems/vibration-test-systems/>)

# Modal-Vibration Test Systems from 4 kN to 15 kN

Especially for modal excitation of big structures or structures with high mass TIRA offers a range of modal systems from 4 kN up to 15 kN.

These shakers are characterized by **high cross axial stiffness** and permit a max. displacement of up to 100 mm (pk-pk) due to **TMC control**.

**TMC is an electronic armature position control system** for precisely coupling the modal shaker to the specimen. The armature datum level adjustment allows the operator to offset the nominal position of the armature in relation to the body. The axial stiffness can also be adjusted electronically.

A standard feature on all modal shakers is a trunnion mount. This allows a great variety of coupling options.



Modal shaker S 55240-M/LSS

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		A 1 02 11 021 T SV	A 1 02 11 021 T SV	A 3 01 11 063 T
Blower		TB 0310	TB 9 FUK	TB 120 FUK
Rated peak force (N)	Sine <sub>pk</sub> / Random <sub>RMS</sub>	4000/3400	8000/6000	15000/11000
Frequency range (Hz)		1 - 2000	1 - 2000	1 - 2000
Max. displacement (mm)	Pk - Pk	100	100	100
Max. velocity (m/s)		2.0	2.0	2.0
Effective moving mass ±5% (kg)		11.0	12.0	18.0
Main resonance frequency (Hz) (free-swinging)		>2500	>2500	>2500
Total shaker mass (kg)		800	850	1200
Coupling (Thread ø)		M10	M10	M10
Max. power consumption at 400V (kVA) incl. blower		17	17	29

General data - For detailed technical information see product data sheets (Download at <https://www.tira-gmbh.de/en/tira-gmbh/downloads/vibration-test-systems/vibration-test-systems/>)



## TIRA Vibration Test Systems

# Special Modal-Vibration Test Systems 100 N to 400 N

TIRA offers a new series of special modal systems for **mobile use**. The MOSP models distinguish themselves by an **extended displacement** of 25.4 mm. The low mass by using rare-earth magnets, the through-hole in the center of the armature for attaching **tension-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.

These shakers are characterized by a **high cross axial stiffness**.

A standard feature on all modal shakers is a trunnion mount. This allows a great variety of coupling options.

System	TV 51110-MOSP	TV 51120-MOSP	TV 51140-MOSP
Shaker	S 51110-MOSP	S 51120-MOSP	S 51140-MOSP
Amplifier	BAA 120/DA 200	BAA 500	BAA 1000
Blower	–	TB 0080	TB 0140
Rated peak force (N) Sine <sub>pk</sub> /Random <sub>RMS</sub>	100/70	200/140	400/280
Frequency range (Hz)	DC - 5000	DC - 5000	DC - 5000
Max. displacement (mm) Pk - Pk	25.4	25.4	25.4
Max. velocity (m/s)	1.5	1.5	1.5
Suspension stiffness (N/mm)	4	4	4
Effective moving mass ±5% (kg)	0.23	0.23	0.4
Main resonance frequency (Hz) (free-swinging)	>6000	>6000	4000
Total shaker mass (kg)	21	21	21
Coupling (Thread ø)	M6	M6	M6
Max. power consumpt. at 230V (kVA) Amplifier/Blower	0.08/-	0.35/0.46	2.7/1.4

General data - For detailed technical information see product data sheets (Download at <https://www.tira-gmbh.de/en/tira-gmbh/downloads/vibration-test-systems/vibration-test-systems/>)



Modal shakers S 51110-MOSP, S 51120-MOSP, S 51140-MOSP

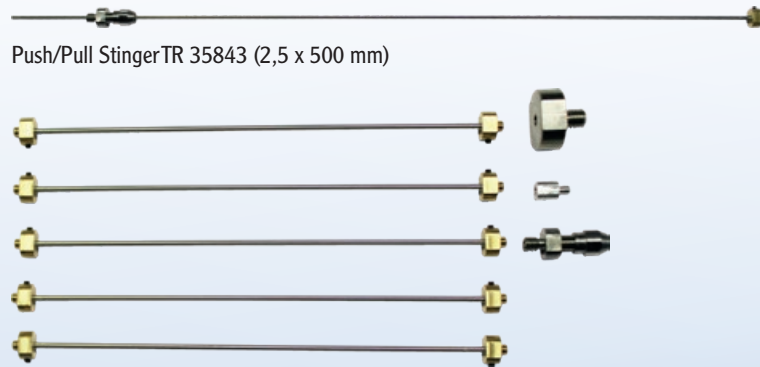
# Stinger - Push/Pull

A stinger consists of a thin and flexible steel rod with fixation device on each end. The stinger transfers forces in axial direction and is flexible in lateral direction to minimize lateral forces to the structure. Lateral forces are not measured by uni-axial force pickups and add unwanted random signals to the measuring process, therefore the reduction of these forces is important. Avoiding these lateral forces increases the accuracy of measurement.

The stinger is also useful for isolating the moving armature from the test structure, reducing unwanted shock forces. Additionally it helps to avoid damages to the armature and the structure by unwanted excitations.

TIRA offers a variety of stinger models, collet chucks and adapter for different types of application.

Modal adapters enable the utilisation of normal vibration exciters for modal applications.



Push/Pull Stinger TR 36154 (3,0 x 200 mm),  
Adapter TR 36235 (10-32 UNF - M8), Adapter TR 36237 (10-32 UNF - M4),  
Collet chuck TR 36232

Push/Pull Stinger	
Designation	Description
TR 35833	Push/Pull Stinger 2,5 x 200 mm (Adapter thread 10-32 UNF)
TR 36154	Push/Pull Stinger 3,0 x 200 mm (Adapter thread 10-32 UNF)
TR 36156	Push/Pull Stinger 2,0 x 500 mm with collet chuck M6 (Adapter thread 10-32 UNF)
TR 35843	Push/Pull Stinger 2,5 x 500 mm with collet chuck M6 (Adapter thread 10-32 UNF)
TR 36155	Push/Pull Stinger 3,0 x 500 mm with collet chuck M6 (Adapter thread 10-32 UNF)

Collet chucks (separate)	
Designation	Description
TR 36231	Collet chuck M6 for TR 36156 2,0 mm (Adapter thread 10-32 UNF)
TR 36232	Collet chuck M6 for TR 35843 2,5 mm (Adapter thread 10-32 UNF)
TR 36233	Collet chuck M6 for TR 36155 3,0 mm (Adapter thread 10-32 UNF)

Adapter	
Designation	Description
TR 36235	Adapter 10-32 UNF - M8
TR 36234	Adapter 10-32 UNF - M6
TR 36237	Adapter 10-32 UNF - M4
TR 36238	Adapter M5 - M4
TR 36239	Adapter M6 - M4
Modal adapter 60-M6	Modal adapter - Internal thread M6 for mounting on armature ø60 mm
Modal adapter 80-M8	Modal adapter - Internal thread M8 for mounting on armature ø80 mm
Modal adapter 120-M8	Modal adapter - Internal thread M8 for mounting on armature ø120 mm

# TIRA company view and location

