BRÜEL & KJÆR® Modal and Measurement Exciters

Modal Exciter Type 4824
Modal Excitation System Type 3624

Designed for demanding modal test applications, electrodynamic Modal Exciter Type 4824 provides precise, reliable, stable and long-lasting operation. Highest quality materials, rugged construction and stringent quality control assure a versatile means of modal excitation for any experimental modal test.

Modal Exciter Type 4824 is available as a stand-alone unit – supplied only with the appropriate trunnion and connecting cable – or as a complete system (Type 3624), with matching power amplifier and standard set of stingers and cables.

Optional accessories include traditional push/pull stingers, tension wire stingers, robust lateral modal exciter stands, turnbuckles, cables, chuck nut assemblies and various adaptors.

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Uses and Features

Uses
- Experimental modal analysis using SIMO (single input multiple output) and MIMO (multiple input multiple output) testing techniques
- Normal mode testing (NMT)
- Linearity studies
- Mechanical impedance and mobility measurements
- Advanced structural dynamics investigations
- Test results for finite element model (FEM) correlation and updating
- Structural damage detection

Features
- Force rating:
  - 100 N (22 lbf) sine peak
  - 70 N (15 lbf) random RMS
- 1-inch peak-to-peak displacement for best low-frequency excitation
- Wide operating frequency range: DC – 5000Hz
- Stingers:
  - Through-hole design for easy setup
  - Choice of tension wire or traditional push/pull stingers
  - Tension wire technology minimizes lateral loading and reduces potential rattling (slack) of the structure
- Rugged, industrial design and compact, lightweight construction for easy positioning/orientation relative to the test object
- High force-to-weight ratio due to rare-earth magnet technology
- High-rigidity, low-mass magnesium armature for minimized force drop-off at resonance frequencies
- Low stray magnetic field
- Ideal for any excitation signal (sine, impulse and random)
- Built-in optical sensor for accurate determination of the armature position
- Electronic DC control of tension wire pre-tensioning (optional)
- Robust lateral exciter stands for easy positioning and orientation (optional)
- Included in a complete excitation system: Type 3624

Description

Based on rare-earth neodymium magnet technology, this modal exciter features small physical dimensions relative to the force rating along with low total weight and a low-mass, high-rigidity, spring-suspended armature. The low armature weight helps to ensure high-quality force measurements by minimizing force drop-offs at the test specimen's resonance frequencies. Four upper radial flexures and four lower radial flexures, the latter providing an additional guide for best stabilization, form a strong rectilinear guidance system which keeps the driver coil perfectly centered in the magnetic assembly's air gap. In the transverse directions and in torsion, the flexure system provides very high stiffness to counteract rotational movement of the test specimen. Also, through this configuration, the modal exciter can absorb high lateral forces without damage to the exciter's internal construction.

Cooling

Forced cooling is not required for Type 4824.

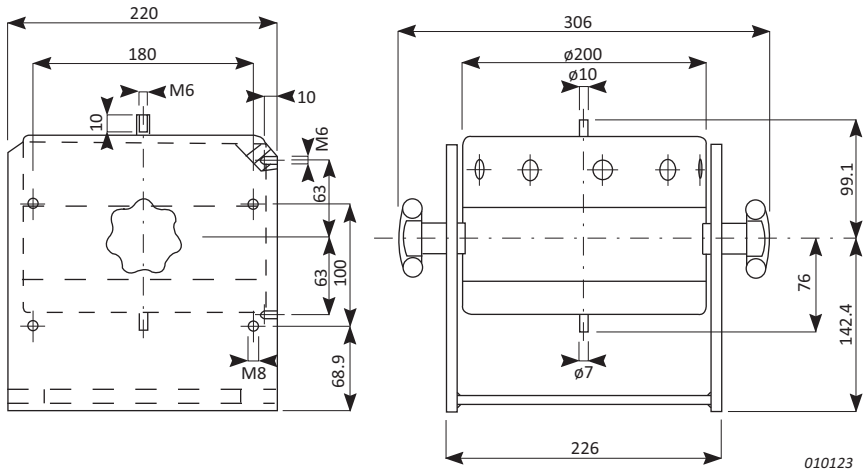
Stingers

The "hole-through" design makes it possible to use tension wire stingers or traditional push/pull stingers with the exciter. Easy and fast attachment of both types of stingers is achieved with the chuck nut assembly (for use with tension wire stingers) or with an M6 to 10 – 32 UNF threaded insert (for use with push/pull stingers).

Optional Lateral Modal Exciter Stands UA-1607 and UA-1608 can be used with Modal Exciter Type 4824.

In lateral setups of Type 4824, tension wire stingers can easily be mechanically pre-tensioned with the use of Lateral Modal Exciter Stands UA-1607 and UA-1608. For electrical pre-tensioning, especially useful in vertical, skewed excitation setups and for excitation in confined spaces, the optional DC Static Centering Unit Type 1056 can be used. Modal Exciter Type 4824 has a video HR-10 socket that outputs the signal from the built-in optical sensor, providing necessary feedback to the DC Static Centering Unit Type 1056. Traditional push/pull stingers require no pre-tensioning.

Fig. 1 *Dimensions of Type 4824 in its trunnion (in mm)*



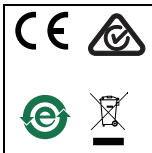
Modal Excitation System Type 3624

Type 3624 is a complete turnkey excitation system comprising Modal Exciter Type 4824 with trunnion, matching Power Amplifier Type 2732, stingers and all necessary cables.

Modal Exciter Configurations

See Modal Exciter Configuration Guide (BG 1483) for an overview of modal excitation systems, exciter stands, stingers, tension wires, and force and impedance transducers.

Compliance with Standards

	The CE marking is the manufacturer's declaration that the product meets the requirements of the applicable EU directives RCM mark indicates compliance with applicable ACMA technical standards – that is, for telecommunications, radio communications, EMC and EME China RoHS mark indicates compliance with administrative measures on the control of pollution caused by electronic information products according to the Ministry of Information Industries of the People's Republic of China WEEE mark indicates compliance with the EU WEEE Directive
Temperature	IEC 60068–2–1 & IEC 60068–2–2: Environmental Testing. Cold and Dry Heat. Operating Temperature: 5 to 40 °C (41 to 104 °F) Storage Temperature: –25 to +70 °C (–13 to +158 °F)
Humidity	IEC 60068–2–78: Damp Heat: 93% RH (non-condensing at 40 °C (104 °F)).

Specifications – Modal Exciter Type 4824

Matching Power Amplifier: Type 2732 (120 VA)
Rated Force (Sine Peak/Random RMS): 100/70 N (22/15 lbf)
Useful Frequency Range: 2 – 5000 Hz
Operating Frequency Range: DC – 5000 Hz
Max. Rated Travel: 25.4 mm (1 in)
Max. Velocity (Sine Peak/Random RMS): 1.5/1.5 m/s (59/59 in/s)
Max. Acceleration (Sine Peak/Random RMS): 432/305 m/s^2 (44/31 *g*)
Rated Current: 5.5 A
Suspension Stiffness: 4 N/mm (23 lbf/in)
Effective Moving Mass: 0.23 kg (8.1 oz)
Main Resonance Frequency: >6000 Hz
Weight of Exciter with Trunnion: 22.8 kg (50.1 lb)
Weight of Trunnion: 7.9 kg (17.4 lb)
Dimensions: See Fig. 1

Modal Exciter

Type 4824 Modal Exciter
Includes the following:
- AQ-0649-D-050: Cable with two 4-pin Neutrik® speakON® connectors, length 5 m (16.4 ft)
- KC-1007: Trunnion
- UA-1612: Three adaptors M6 to 10–32 UNF

Modal Excitation System

Type 3624 Modal Excitation System
Includes the following:
- Type 4824: Modal Exciter
- Type 2732: Power Amplifier (120 VA)
- UA-1598: Three Push/Pull Steel Stingers, including:
  - 3 × fastening screws
  - 3 × adaptors, diameter 2.5 mm to 10–32 UNF
  - 3 × steel rods, length 500 mm, diameter 2.5 mm
  - 1 × 2.5 mm collet chuck (chuck nut with collet insert)

Optional Accessories

POWER AMPLIFIER

Type 2732 Power Amplifier (120 VA)

ELECTRICAL TENSION WIRE PRE-TENSIONING

Type 1056 DC Static Centering Unit (must be calibrated with exciter at HBK)

STINGERS, TENSION WIRES AND ACCESSORIES

UA-1596 Five 2.5 mm Push/Pull Steel Stingers, including:
- 10 × adaptors, diameter 2.5 mm to 10–32 UNF
- 5 × steel rods, length 200 mm, diameter 2.5 mm
- 10 × fastening screws

UA-1597 Five 3.0 mm Push/Pull Steel Stingers, including:
- 10 × adaptors, diameter 3.0 mm to 10–32 UNF
- 5 × steel rods, length 200 mm, diameter 3.0 mm
- 10 × fastening screws

UA-1598 Three 2.5 mm Push/Pull Steel Stingers, including:
- 3 × fastening screws
- 3 × adaptors, diameter 2.5 mm to 10–32 UNF
- 3 × steel rods, length 500 mm, diameter 2.5 mm
- 1 × 2.5 mm collet chuck (chuck nut with collet insert)

UA-1599 Three 3.0 mm Push/Pull Steel Stingers, including:
- 3 × fastening screws
- 3 × adaptors, diameter 3.0 mm to 10–32 UNF
- 3 × steel rods, length 500 mm, diameter 3.0 mm
- 1 × 3.0 mm collet chuck (chuck nut with collet insert)

UA-1600 One 0.75 mm Tension Wire, length 5000 mm, including:
- 1 × fastening screw
- 1 × adaptor, diameter 0.75 mm to 10–32 UNF
- 1 × 0.75 mm collet chuck (chuck nut with collet insert)

UA-1601 Three 1.5 mm Tension Wires, length 500 mm, including:
- 3 × fastening screws
- 3 × adaptors, diameter 1.5 mm to 10–32 UNF
- 3 × 1.5 mm collet chuck (chuck nut with collet insert)

UA-1602 Three 0.75 mm Collet Chucks and Adaptors, for tension wires, including:
- 3 × chuck nuts
- 3 × collet inserts, diameter 0.75 mm
- 3 × fastening screws
- 3 × adaptors, diameter 0.75 mm to 10–32 UNF

UA-1603 Three 1.5 mm Collet Chucks and Adaptors, for tension wires, including:
- 3 × chuck nuts
- 3 × collet inserts, diameter 1.5 mm
- 3 × fastening screws
- 3 × adaptors, diameter 1.5 mm to 10–32 UNF

UA-1604 Three 2.5 mm Collet Chucks and Adaptors, for push/pull rods, including:
- 3 × chuck nuts
- 3 × collet inserts, diameter 2.5 mm
- 3 × fastening screws
- 3 × adaptors, diameter 2.5 mm to 10–32 UNF

UA-1606 Five 3.5 mm Nylon Stingers, including:
- 5 × nylon rods, length 200 mm, diameter 3.5 mm
- 10 × fastening screws
- 10 × adaptors, diameter 3.5 mm to 10–32 UNF

FORCE TRANSDUCERS AND IMPEDANCE HEADS

Type 8230 CCLD Force Transducer (+44/–44 N range)
Type 8230-001 CCLD Force Transducer (+220/–220 N range)
Type 8230-002 CCLD Force Transducer (+2200/–2200 N range)
Type 8230-003 CCLD Force Transducer (+22000/–2200 N range)
Type 8230-C-003 Charge Force Transducer (+22200/–2200 N range)
Type 8231-C Charge Force Transducer (+110000/–2200 N range)
Type 8001 Impedance Head

THREAD AND BUSHING ADAPTORS

UA-2052 Set of 10 Stud Adaptors, 10–32 UNF to ¼²–28 UNF
UA-2054 Set of 20 Bushing Adaptors, 10–32 UNF to ¼²–28 UNF

CABLES

AQ-0648 Cable with two 4-pin Neutrik speakON connectors, length 10 m (32.8 ft), for connection to Type 2732
AQ-0658 Cable with 9-pin D-sub connector to video HR-10 connector, length 10 m (32.8 ft), for connection to Type 1056

LATERAL MODAL EXCITER STANDS

UA-1607 Modal Exciter Stand, max. exciter elevation: 1.24 m (4.1 ft), mechanical pre-tensioning of tension wire is possible via an adjustable spring
UA-1608 Modal Exciter Stand, max. exciter elevation: 1.64 m (5.4 ft), mechanical pre-tensioning of tension wire is possible via an adjustable spring

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