MODAL EXCITATION SYSTEMS

MODAL EXCITATION SYSTEM TYPE 3624

Type 4824	Modal Exciter
Type 2732	Power Amplifier
UA 1598	Three Push/Pull Steel Stingers

MODAL EXCITATION SYSTEM TYPE 3625

Type 4825	Modal Exciter
Type 2720	Power Amplifier
UA 1598	Three Push/Pull Steel Stingers

MODAL EXCITATION SYSTEM TYPE 3626

Type 4826	Modal Exciter
Type 2721	Power Amplifier
UA 1598	Three Push/Pull Steel Stingers

MODAL EXCITATION SYSTEM TYPE 3627

Type 4827	Modal Exciter
Type 2721	Power Amplifier
Type 1056	DC Static Centering Unit
Type 2830	Field Power Supply
UA 1599	Three Push/Pull Steel Stingers

MODAL EXCITATION SYSTEM TYPE 3628

Type 4828	Modal Exciter
Type 2721	Power Amplifier
Type 1056	DC Static Centering Unit
Type 2830	Field Power Supply
UA 1599	Three Push/Pull Steel Stingers

MODAL EXCITERS

MODAL EXCITER TYPE 4824

Includes the following accessories:

AQ 0649	Cable with two 4-pin Neutrik Speakon plugs, length 5 m
KC 1007	Trunnion
UA 1612	Three Adaptors M6 to 10–32 UNF

MODAL EXCITER TYPE 4825

Includes the following accessories:

AQ 0649	Cable with two 4-pin Neutrik Speakon plugs, length 5 m
KC 1007	Trunnion
UH 1035	200 N Blower
AF 1101	Air Hose for UH 1035, 5 m
UA 1612	Three Adaptors M6 to 10–32 UNF

MODAL EXCITER TYPE 4826

Includes the following accessories:

AQ 0659	Cable with two 8-pin Neutrik Speakon plugs, length 5 m
KC 1007	Trunnion
UH 1035	200 N Blower
AF 1101	Air Hose for UH 1035, length 5 m
UA 1612	Three Adaptors M6 to 10–32 UNF

MODAL EXCITER TYPES 4827 and 4828

Both include the following accessories:

KC 1008	Trunnion
UH 1036	1000 N Blower
AF 1103	Air Hose for UH 1036, 5 m
UA 1614	Three Adaptors, M8 to 10–32 UNF
UA 2039	Three M8 to M6 thread inserts

IMPORTANT ASPECTS WHEN CHOOSING MODAL EXCITER SYSTEMS

FORCE RATING DETERMINATION

When choosing a Modal Exciter for the testing of a specific structure, two types of mass definitions come into play: **Static Mass** and **Dynamic Mass**. Here Static Mass is defined as the weight of the structure under test, whereas the Dynamic Mass (sometimes called Apparent Mass) is derived from a mobility measurement. Dynamic Mass is defined as **F**(f) **/ a**(f), where F(f) is force as function of frequency and **a**(f) is acceleration as function of frequency.

Static Mass is related to the rigid body modes of a structure while Dynamic Mass is related to the elastic modes. Therefore, the relationship between recommended force rating and the Static Mass of the structure used in this guide can only be taken as a **rule of thumb**.

The Dynamic Mass and the residual noise in the response channel are generally the determining factors when choosing optimum force rating, but the Dynamic Mass is usually unknown unless a Finite Element model is available!

If the Dynamic Mass is known, the formula **F = m** x **a** can be used to get a better estimation of the force rating needed. **F** is the required force rating, **m** is the Dynamic Mass (at the frequencies of interest) and **a** is the required acceleration level (at the same frequencies of interest). The required acceleration level **a** must be at or above the residual noise in the response measurement chain. However, since damping determines the response amplitude at resonances, the stated formula should be seen only as a tool to help determine the required force rating.

MULTI-SHAKER SETUP

In a multi-shaker MISO (Multiple Input Single Output) or MIMO (Multiple Input Multiple Output) setup, the stated relationship between recommended force rating and Static Mass of the test structure no longer applies as a rule of thumb.

Strong non-linear behaviour of the test object (suggesting distributed low-force inputs), repeated roots and/or a very large test object, normally implies that the number of input locations must be increased to achieve reliable modal parameter extraction. In such applications, several modal shakers with a force rating of only 100, 200 or 400 N are often employed to overcome these problems. Prior knowledge or a "trial-and-error" approach is typically needed to establish the optimum number of modal exciters in such a setup.

FURTHER INFORMATION

Please notice that this configuration guide should be used in conjunction with Product Data Sheets available on the different products. For additional information please contact your local sales representative or go to www.bksv.com.

BG 1483–11

MODAL EXCITER CONFIGURATION GUIDE

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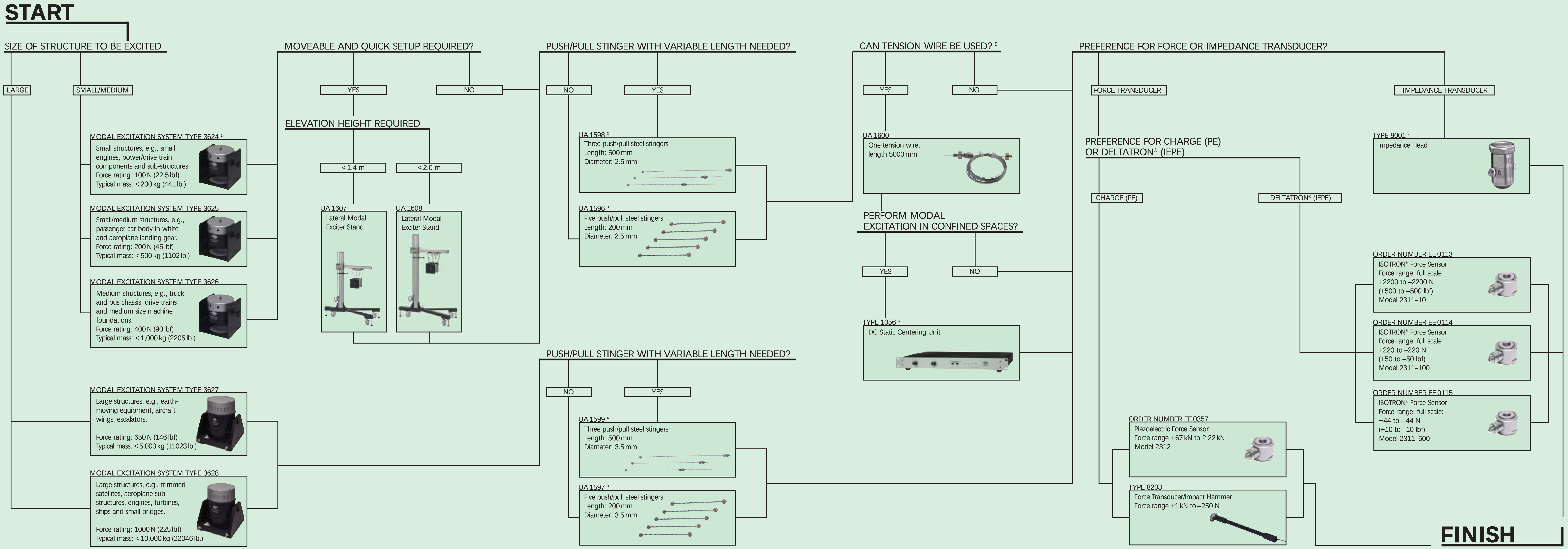
Brüel & Kjær

EXCITATION SYSTEMS AND EXCITER STANDS, STINGERS AND TENSION WIRE INPUT TRANSDUCERS



Footnotes:

1. For even smaller structures, Mini-Shaker Type 4810 is available
2. UA 1598 is included in Modal Excitation Systems Type 3624, 3625 and 3626
3. Only recommended if maximum force rating of chosen modal exciter is used
4. UA 1599 is included in the Modal Excitation System Types 3627 and 3628

5. Excitation via tension wire provides for the highest possible force measurement accuracy but requires that the structure under test can tolerate a constant pull without being displaced towards the modal exciter. It also requires that excitation is applied only at low frequencies (typically < 400 Hz), at low force levels (typically < 200 N) and with the shortest possible length of wire between modal exciter and structure under test
6. Used in conjunction with Types 3624, 3625 and 3626, DC Static Centering Unit Type 1056 provides for electrical pre-tensioning (no need for a pre-tensioning spring), hence making it possible to utilise tension wire stinger UA 1600 in setups that would otherwise only allow for a push/pull stinger

7. An impedance head provides for highest accuracy of the driving point frequency response function measurement as there is a perfect co-linear relationship between force and acceleration measurement. Note that use of the impedance head requires that the dynamic mass of the structure under test must be less than 1.5 kg for force measurement errors less than 10%. Structures with a dynamic weight of more than 1.5 kg should be instrumented with separate force transducers and accelerometers