



## THE WHIRLING OF SHAFTS

### HTM67



#### Features

- Table-top experiment on critical rotational speeds on simply loaded and continuous shafts
- Sturdy extruded base frame to ensure the integrity of the results
- Quick release components throughout, samples easily changeable
- Six rotor shaft types made of high-strength steel. Made up of two different lengths in three different diameters
- Steel shafts driven by motor which is electronically speed controlled and its speed digitally displayed
- Transparent polypropylene guard for operator safety

#### Description

The modes of oscillation and resonance of rotors, with continuous mass distribution, can be clearly demonstrated using this bench top unit. The speed control of the motor can be finely adjusted to view a shaft as it reaches and goes through its critical speed modes. A sturdy extruded frame is the base for the driving motor, self-aligning bearings, optional roller bearings (for fixed end condition setups), safety/ guide rings and test shafts. There is a safety micro-switch which ensures that the guard must be down for testing to commence. By using of thin, elastic rotor shafts, made of high-strength steel, the oscillatory phenomena can be easily understood and demonstrated. Some configurations also allow the second mode of whirl to be viewed. A variety of shaft diameters and lengths are provided for testing. The bearing end conditions can be changed, and the safety ring positions moved, to perform a wide variety of experiment configurations. Due to the slotted arrangement of the base extrusion, adjustment of the safety rings and bearing block positions can be easily changed. Samples are made from silver steel and can be easily moved in and out of the test setup where they are fixed in place with specific collets at either end. Because of the nature of the testing, samples can become deformed or bent, which will affect test results. They have therefore been designed to be able to be easily and cheaply removed and replaced.

#### Learning capabilities

- Exploration and investigation of whirling modes as well as industrial and practical solutions for combating the whirling phenomenon
- Speed-dependent experiments on rotation
- Critical speed and positioning of safety rings to reduce risk of damage from whirl in real life applications
- Self-aligning and standard roller bearings provided for free and fixed end condition experimentation
- Modes of oscillation of a continuous rotor shaft for varying bearing spacing
- Modes of oscillation of a continuous rotor shaft for varying shaft diameter

#### Technical Specification

- Encoded electric motor
- Speed control over range 60-5800rpm
- Digital speed indicator
- Drive via elastic (universal) coupling, low friction bearings used throughout
- Silver steel rotor shafts of different lengths and diameters (3, 5 and 6mm)
- Self-aligning bearings on the rotor shaft, for free end conditions
- Roller bearings to be added to change to fixed end condition. Three end condition variations obtainable
- Adjustable safety rings/ support rings for setup, test and safety purposes
- Transparent protective cover for operator safety
- Micro switch power cut-off

#### What's in the Box?

- 1 x HTM67 Base Unit
- Collet set for sample fixing (2 for each size).
- Shaft Set comprising: 5 x 3mm dia 1000mm long, 5 x 3mm dia 750mm long, 2 x 5mm dia 1000mm long, 2 x 5mm dia 750mm long, 2 x 6mm dia 1000mm long, 2 x 6mm dia 750mm long,
- Full instruction manual which comprises operating instructions, experimental set-up, experiment procedure and examples of test results.

#### Weights & Dimensions

- Net Weight approximately 50Kg
- Dimensions 1700mm (L) x 350mm (W) x 350mm (H)

#### Essential Services

- 115V, 60Hz, 1 phase or
- 230V, 50/60Hz, 1 phase

#### Operational Conditions

- Storage temperature: -10°C to +70°C
- Operating temperature range: +10°C to +50°C
- Operating relative humidity range: 0 to 95%, non condensing

#### Ordering information

To order this product, please call PA Hilton quoting the following codes:  
HTM67/115 - Whirling of Shafts  
HTM67/230 - Whirling of Shafts

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