

# PT 500.19

## Electromechanical vibrations kit



### Learning objectives/experiments

- influence of the gap on vibration behaviour
- influence of electromagnetic asymmetry on vibration behaviour
- influence of the load on the level of vibration
- influence of the gap on electromagnetic losses and efficiency
- influence of speed on vibration behaviour
- understanding and interpreting frequency spectra
- use of a computerised vibration analyser
- in conjunction with a current measuring probe
  - ▶ measurement of current consumption per phase

### Description

- **interaction of electromagnetic and mechanical elements of the system**
- **adjustable asymmetric gap between stator and rotor**
- **electromagnetic asymmetry with winding that can be switched off**

Asynchronous motors are in widespread use as drive mechanisms. These motors can generate machine vibrations. If there is an asymmetric gap, the circulating magnetic forces induce rotational and bending vibrations. The same applies to partial failure of the electrical windings. In this case, the asymmetrical magnetic field also induces mechanical vibrations.

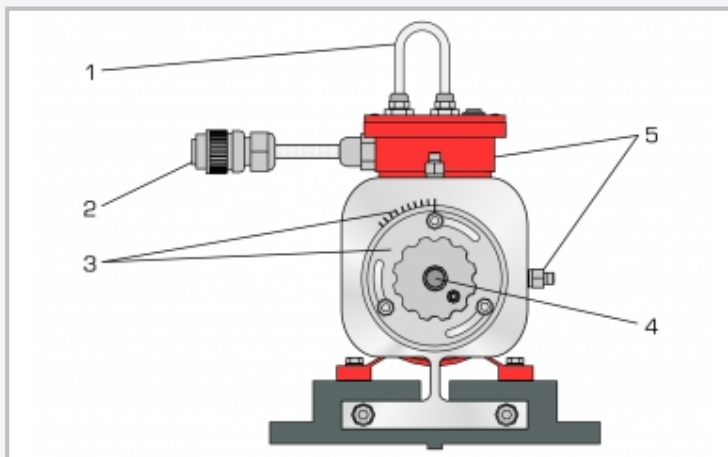
The PT 500.19 accessory set features an adjustable centering device to adjust an asymmetrical gap. A winding that can be switched off generates an electromagnetic asymmetry. The display and control unit of the PT 500 base system powers the asynchronous motor and permits the speed to be adjusted. The motor is subjected to load by the PT 500.05 brake and load unit.

The accessory set is mounted on the base plate of the machinery diagnostic base system PT 500.

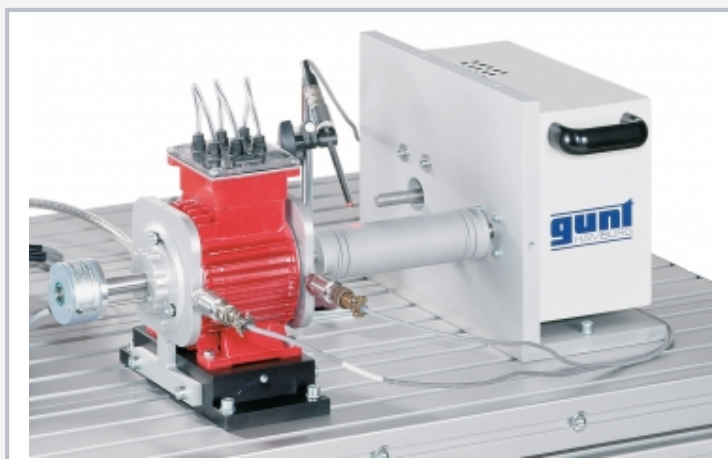
To measure and evaluate the experiment, the computerised vibration analyser PT 500.04 is required. It includes all the necessary sensors, a measuring amplifier and analysis software to record the vibration phenomena.

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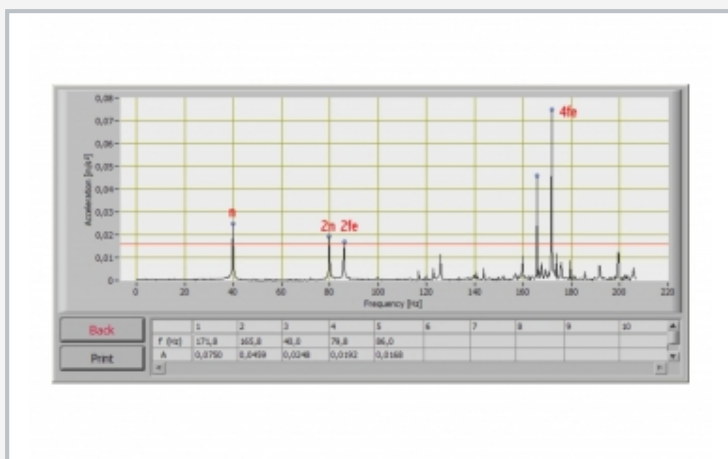
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1 current measuring probe tap for the 3 phases, 2 connection to the display and control unit of PT 500, 3 bearing cover with adjustable centering and scale, to adjust gap, 4 motor shaft, 5 adapter for acceleration sensors



The illustration shows PT 500.19 together with PT 500, PT 500.01 and PT 500.05.



Typical spectrum of an electric motor  
 rotary frequent vibration with  $n$ ,  $2n$  because of balance error  
 power frequent vibration with  $2f_e$ ,  $4f_e$  because of magnetic forces

### Specification

- [1] investigation of vibration behaviour of an electric motor
- [2] asynchronous motor with adjustable gap
- [3] asymmetric magnetic field by winding with shut-off facility
- [4] variable speed via frequency converter of base unit
- [5] speed display on display and control unit of base unit PT 500
- [6] power display on display and control unit of base unit PT 500
- [7] accessory set for PT 500 machinery diagnostic training system
- [8] stackable storage system to house the components

### Technical data

Asynchronous motor with variable speed  
 ■ speed range:  $100 \dots 6000 \text{ min}^{-1}$   
 ■ nominal power output: 370W

Eccentricity of armature:  $0 \dots 0,2 \text{ mm}$

LxWxH: 400x300x320mm (storage system)  
 Weight: approx. 11kg

### Scope of delivery

- 1 electric motor with terminal box
- 1 storage system with foam inlay
- 1 manual

# PT 500.19

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### Required accessories

|           |        |  |
|-----------|--------|--|
| 052.50000 | PT 500 | Machinery diagnostic system, base unit |
|-----------|--------|--|

### Optional accessories

|           |           |                                 |
|-----------|-----------|---------------------------------|
| 052.50004 | PT 500.04 | Computerised vibration analyser |
| 052.50005 | PT 500.05 | Brake & load unit               |