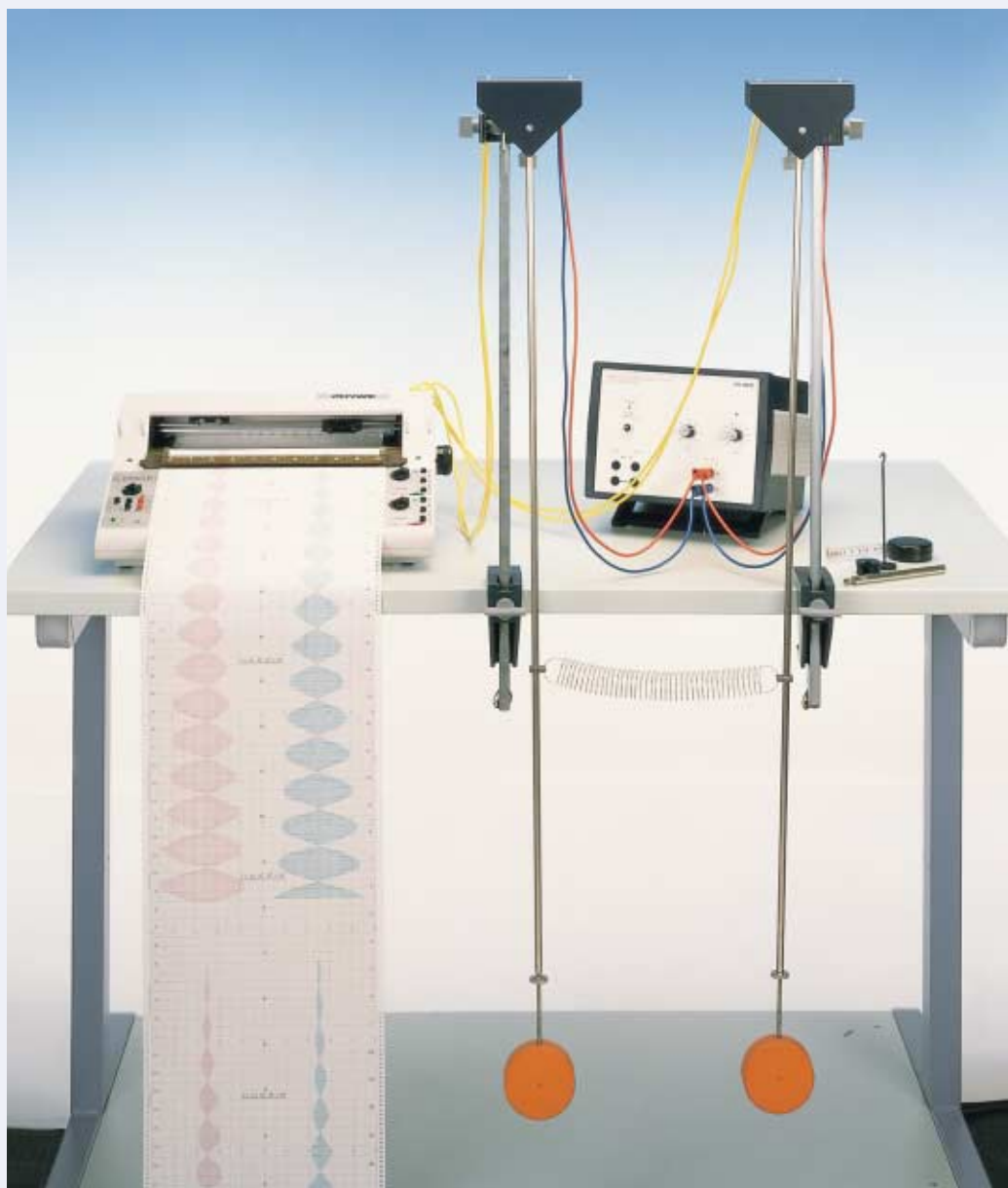


## 1.3.25-01 Coupled Pendula



## What you can learn about ...

- Spiral spring
- Gravity pendulum
- Spring constant
- Torsional vibration
- Torque
- Beat
- Angular velocity
- Angular acceleration
- Characteristic frequency

## Principle:

Two equal gravity pendula with a particular characteristic frequency are coupled by a "soft" spiral spring. The amplitudes of both pendula are recorded as a function of time for various vibrational modes and different coupling factors using a y/t recorder. The coupling factors are determined by different methods.

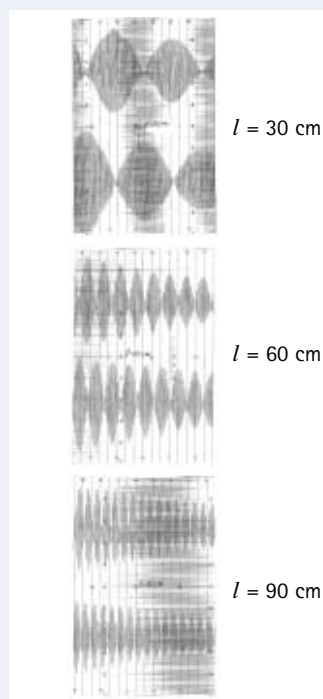
## Tasks:

1. To determine the spring constant of the coupling spring.
2. To determine and to adjust the characteristic frequencies of the uncoupled pendula.
3. To determine the coupling factors for various coupling-lengths using
  - a) the apparatus constants
  - b) the angular frequencies for "inphase" and "in opposite phase" vibration
  - c) the angular frequencies of the beat mode.
4. To check the linear relation between the square of the coupling-lengths and
  - a) the particular frequencies of the beat mode
  - b) the square of the frequency for "in opposite phase" vibration.
5. To determine the pendulum's characteristic frequency from the vibrational modes with coupling and to compare this with the characteristic frequency of the uncoupled pendula.

## What you need:

Pendulum w. recorder connection	02816.00	2
Helical spring, 3 N/m	02220.00	1
Rod with hook	02051.00	1
Weight holder f. slotted weights	02204.00	1
Slotted weight, 10 g, black	02205.01	5
Recorder, Yt, 2 channel	11415.95	1
Power supply 0-12 V DC/6 V, 12 V AC	13505.93	1
Bench clamp -PASS-	02010.00	2
Support rod -PASS-, square, $l = 630$ mm	02027.55	2
Right angle clamp -PASS-	02040.55	2
Measuring tape, $l = 2$ m	09936.00	1
Connecting cord, $l = 1000$ mm, yellow	07363.02	4
Connecting cord, $l = 500$ mm, red	07361.01	2
Connecting cord, $l = 500$ mm, blue	07361.04	2

**Complete Equipment Set, Manual on CD-ROM included**  
**Coupled Pendula P2132501**



Amplitude curves of the vibrations of coupled pendula in the beat case for three different coupling lengths  $l$  as a function of time.  
 Speed of recorder:  $t = 10$  s/Div.