# 3B SCIENTIFIC® PHYSICS

...going one step further

## 5g Accelerometer U11363

### Instruction sheet

07/07 Hh


### 1. Safety instructions

- Never exceed the maximum acceleration of 1500 times gravitational acceleration in any direction, to avoid permanent damage to the semiconductor built into the small black box!
- The maximum height from which the sensor can survive dropping onto a hard surface is 1.2 m.
- Only use the accelerometer 5-g for educational purposes!

The 5g accelerometer is not suitable for safety-related applications.

### 2. Description

Sensor box with permanently connected semiconductor acceleration sensor, Z-axis sensitive, for the measurement of gravity and the general acceleration of masses up to ±5 x g.

The effective axis (Z-axis) is marked with an arrow and the label “Earth’s Gravity Field” on the acceleration sensor.

“Capacitive" method of measurement (g-cell) with built-in signal linearisation, low-pass filtering, temperature compensation and automatic self-test.

The sensor box is automatically detected by the 3B NET*lab*™ interface.

### 3. Scope of delivery

1 Sensor box with permanently connected acceleration sensor, cable length 2 m.

1 Velcro strip, 500 mm long, 20 mm wide, self-adhesive

1 8-pin miniDIN connecting lead, 60 cm length

1 Instruction sheet for U11363

## 4. Technical data

| | |
|---|---|
| Measurement range: | 0 to ±50 m/s² |
| Sensor type: | Capacitive semiconductor sensor |
| Sensitivity: | Typically 400mV/g |
| Non-linearity: | No more than ±1% of the full measurement range. |
| Resolution: | 0.03 m/s² |
| Band width: | typically 50 Hz |
| Drill hole for sensor attachment: | 3 mm diam. max. |

## 5. Operation

- Place the sensor box alongside the experiment and attach the acceleration sensor (small black box) to the mass to be investigated (target). Use the supplied Velcro strip or a clamp for this purpose.
- Read the value of the acceleration from the display on the 3B NET*log*™ unit.

## 6. Applications

Demonstration track and air track experiments:

Downward acceleration

Elastic and non-elastic impact

Oscillating spring-mass system

High-resolution measurement of objects' inclination

Pendulum oscillations

Jumping experiments; "bungee jumping"

## 7. Sample experiment

**Acceleration measurement in a damped oscillating spring-mass system**

Required equipment:

| | | |
|---|---|---|
| 1 3B NET*log*™ | interface | U11300 |
| 1 3B NET*lab*™ | software program | U11310 |
| 1 5-g accelerometer | | U11363 |
| 1 Stand base | | U13270 |
| 1 Stand rod, 750 mm length | | U15003 |
| 1 Stand rod, 250 mm length | | U15001 |
| 2 Universal clamps | | U13255 |
| 1 Coil spring 3 N/m | | U15027 |
| 1 Weight 100 g, from | | U30016 |

- Set up the equipment for the experiment as in Fig. 1.
- Run the 3B NET*lab*™ software with the appropriate template for the experiment using the 5g accelerometer.
- Attach the acceleration sensor to the weight with a piece of Velcro.
- Suspend the weight and acceleration sensor from the eye at the bottom of the coil spring and be careful not to hinder the oscillating motion.
- Drape the connecting lead for the acceleration sensor over the universal clamp, as shown in Fig. 1. This adds further to the damping.
- Pull down the weight by hand to the level of the stand base and release it.
- Start recording the measurement data in 3B NET*lab*™ (Fig. 2).
- Analyse the recorded chart.

Fig. 1 Acceleration measurement for a damped oscillation of a mass on a spring

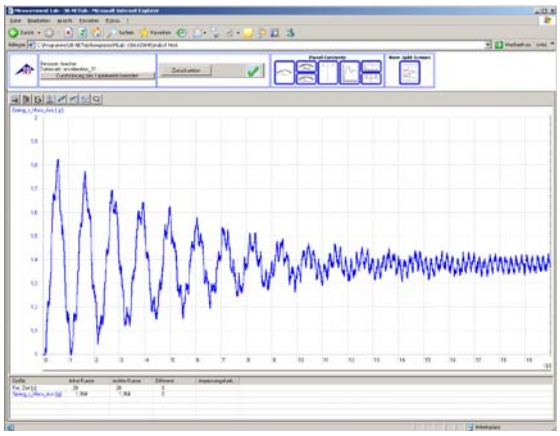

Fig. 2 Monitor display of the damped oscillation of a mass on a spring in 3B NET*lab*TM (U11310)