

## Light barrier 1000563

### Instruction sheet

02/16 Hh



#### 1. Safety instructions

- When using the equipment in conjunction with a laser source, strictly observe the stipulated safety regulations.
- Never look directly into the laser beam.

#### 2. Scope of delivery

- 1 Light barrier
- 1 Stand rod, length: 120 mm
- 1 8-pin mini DIN connection cable, length: 1 m
- 1 Knurled screw M6x15
- 1 Mounting plate for light barrier

#### 3. Description

The light barrier can be used in two operating modes.

1. Internal light barrier mode: light barrier with an infrared light source and an infra-red detector with a very short signal delay for measuring time intervals with moving bodies, e.g. during free

fall, in air track experiments and for pendulum oscillations, as well as for counting pulses.

2. Laser light barrier mode: laser diode detector built in at the side for setting up a wide-range barrier along with a laser pointer, e.g. during sporting events.

The light barrier is equipped with a built-in LED function display: beam broken = 1 (TTL high). When disabled or when the beam is interrupted, the LED function display comes on.

The narrow barrier arm in front of the infra-red source includes a sliding mechanical shutter that is used for disabling internal light-barrier mode and activating laser light -barrier mode.

#### 4. Technical data

Separation of prongs:	82 mm
Rise time:	60 ns
Spatial resolution:	< 1 mm
Time resolution:	10 $\mu$ s

## 5. Operation

- Screw onto the stand rod using the arm attached to the thinner of the two prongs of the barrier and the M6 nut provided for this purpose.
- Insert the mini DIN cable into the mini DIN connector on the broader prong of the barrier and connect it to the 3B NET/og™ interface or to digital counter 1001033 or 1001032.
- Activate internal light barrier mode by opening the mechanical shutter. Subsequently, mount and focus the device for the intended application.
- Activate laser light barrier mode by closing the mechanical shutter and (roughly) focus the laser light source onto the opening at the side of the light barrier. To achieve this, mirrors may be used to deflect the laser beam. Make fine adjustments to the light barrier.

## 6. Applications

Determining the position, velocity and acceleration of moving bodies

Determining the acceleration due to gravity  $g$  in free fall experiments

Measuring periods of oscillating bodies (e.g. using torsion apparatus 1018550 and Kater's reversible pendulum 1018466).



Fig. 1: Light barrier on mounting plate

## 7. Sample experiment

### Determining acceleration due to gravity $g$ using picket fence

Required apparatus:

1 3B NET/og™ @ 230 V	1000540
or	
1 3B NET/og™ @ 115 V	1000539
1 3B NET/lab™	1000544
1 Light barrier	1000563
1 Picket fence	1000564
1 Stand base	1002835
1 Steel rod, length: 750 mm	1002935
1 Universal clamp	1002830
(1 Foam rubber sheet, approx. 20 x 20 cm)	

- Use the stand apparatus to fix the light barrier at a suitable height above ground level or at the edge of a table. If necessary, place a cushioning surface (e.g. foam rubber sheet) along the point of impact.
- Select the digital input of the 3B NET/og™ interface and load the free-fall experiment (template) from the 3B NET/lab™ software. All the necessary settings required for evaluation are provided by this software.
- Conduct the experiment and analyse your results.



Fig. 2: Measuring free fall

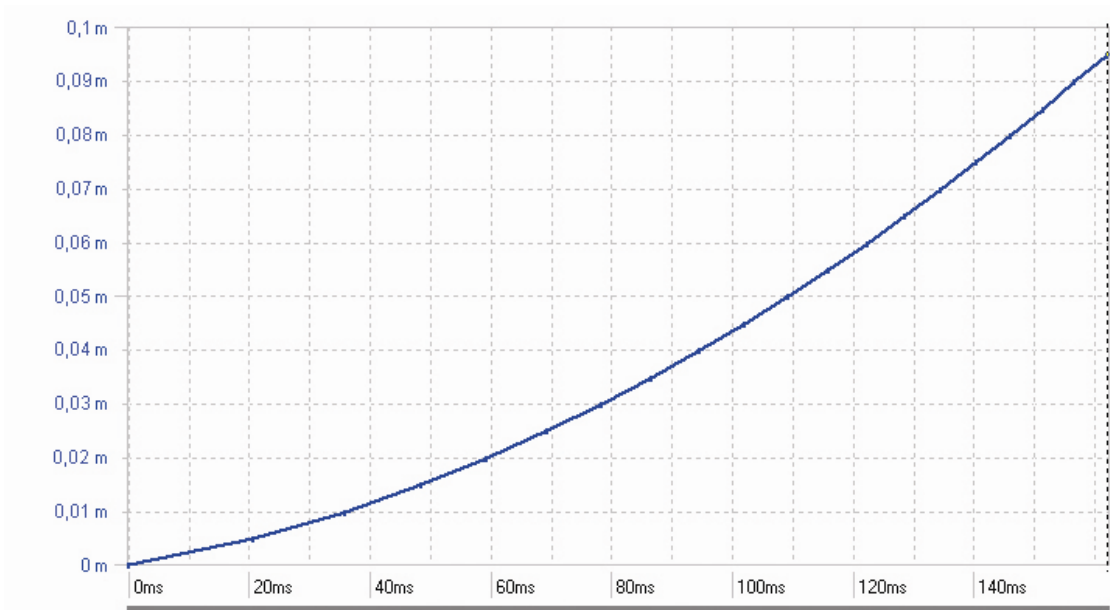


Fig. 3: Distance against time

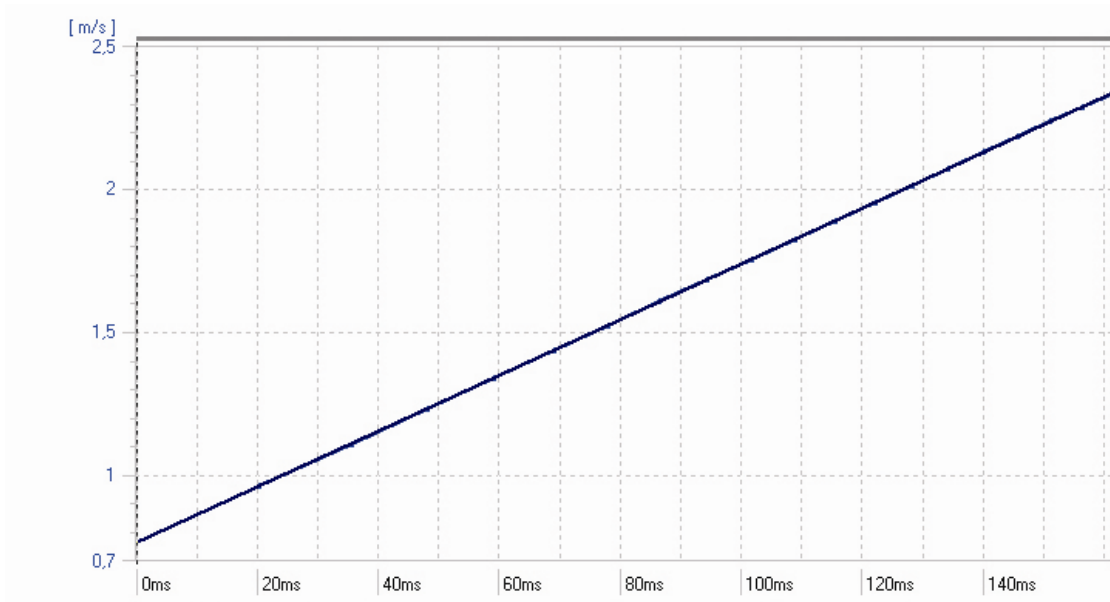
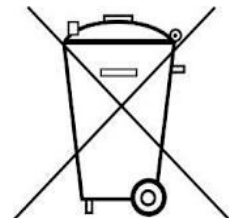


Fig. 4: Fall velocity against time

### 8. Storage, cleaning and disposal

- Keep the equipment in a clean, dry and dust-free place.
- Do not use any aggressive cleaning agents or solvents to clean the equipment.
- Use a soft, damp cloth for cleaning.
- The packaging should be disposed of at local recycling points.

Should you need to dispose of the equipment itself, never throw it away in normal domestic waste. If being used in private households it can be disposed of at the local public waste disposal authority.



- Comply with the applicable regulations for the disposal of electrical equipment.

