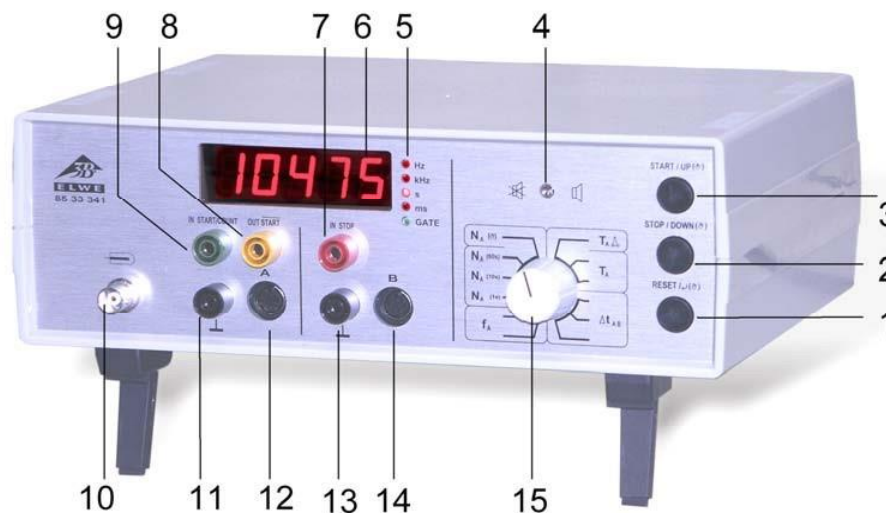


## Electronic counter/timer

1001032 (115 V, 50/60 Hz)  
1001033 (230 V, 50/60 Hz)

### Instruction sheet

09/16 TLE / SP



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|---|---|
| <ul style="list-style-type: none"> <li>1 “Reset / Hand Enter” button</li> <li>2 “Stop / Hand down” button</li> <li>3 “Start / Hand up” button</li> <li>4 Switch for acoustic counter signal</li> <li>5 LED display, operating mode and measuring ranges</li> <li>6 Display</li> <li>7 “In Stop” socket</li> <li>8 “Out Start” socket</li> </ul> | <ul style="list-style-type: none"> <li>9 “In Start / Count” socket</li> <li>10 BNC socket for Geiger-Müller tube</li> <li>11 Earth terminal</li> <li>12 Input A for light barrier</li> <li>13 Earth terminal</li> <li>14 Input B for light barrier</li> <li>15 Selector switch for operating mode and measurement period</li> </ul> |
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### 1. Safety instructions

The counter is intended for operation in dry rooms suitable for the use of electrical equipment.

Safe operation of the equipment is guaranteed, provided it is used correctly. However, there is no guarantee of safety if the equipment is used in an improper or careless manner.

If it is deemed that the equipment can no longer be operated without risk (e.g. visible damage has occurred), the equipment should be

switched off immediately and secured against any inadvertent use.

- The equipment may only be powered using the plug-in power supply provided
- Before setting up or starting any experiments, make sure that there is no damage to the insulation and that no wires are exposed.
- Only trained electricians are permitted to open up the apparatus' housing.

## 2. Description

The electronic counter/timer is able to measure time, frequencies, rates and periods as well as counting events or pulses from a Geiger tube. When counting events, it is possible to set certain fixed periods of time for the count. In addition, an arbitrary time period anywhere between 1 s and 99999 s can be programmed. Counting can be triggered (started or stopped) either by a signal to the input terminals or manually by means of a switch.

## 3. Technical data

Operating voltage:	12 V AC, 300 mA via plug-in power supply
Input (9):	0.5 V ... 15 V AC
Triggering edge	L/H
Input (7):	1 V ... 15 V AC
Triggering edge	L/H
Display:	5-digit LED display
Geiger tube input:	500 V at 300 M $\Omega$
Frequency ranges:	1 ... 100 Hz, 1 ... 100 kHz
Time periods:	1/10/60 s or manual setting 1- 99999 s
Dimensions:	250 x 100 x 160 mm
Weight:	0.9 kg approx.

## 4. Operation

### Note:

The counter has no separate on/off switch. Power is turned on simply by plugging in the power supply.

If there is a malfunction, disconnect the equipment from the mains for a few seconds.

### 4.1 Time measurement

The measurement can be triggered by signals applied to terminals 9 and 7 or by pressing a button manually.

- Set selector switch (15) to  $\Delta t_{AB}$  (ms or s).

#### 4.1.1 Manual trigger

- Press the "Start" button (3) and the timer will start counting.
- Press the "Stop" (2) button and the timer will stop counting.
- Press "Reset" (1) to set the timer back to zero.

#### 4.1.2 Via signal (light barrier 1000563)

- Connect one light barrier to socket A (12).
- Connect a second barrier to socket B (14).

When light barrier A triggers, the timing starts. Timing stops upon triggering of barrier B.

#### 4.1.3 Via signal (e.g. free-fall apparatus 1000738)

- Connect the free-fall apparatus via sockets (9), (7) and (11). (Observe colour coding of terminals).


The timer starts counting when the steel ball is released from the free-fall apparatus and stops automatically when the ball strikes the contact plate at the bottom.

#### 4.1.4 Time that a light barrier is obscured

- Connect sockets "Out Start" (8) and "In Stop" (7) together using experiment leads.
- Connect a light barrier to socket A (12).

The period to be measured is the length of time that a moving body takes to move through the light beam. Its entry into the beam obscures the receptor and starts the timer. When the body exits the beam, the receptor detects the light again and the timer is stopped.

## 4.2 Periods of a pendulum

- Set the selector (15) to the symbol  $T_A$  .
- Apply an input signal to terminal (9) or connect a light barrier to socket A (12).
- Press the "Start" button (3).

The time to be measured is the number of milliseconds between successive low-to-high (L/H) edges detected at terminal (9) or three interruptions to the light beam detected at terminal A (12).

## 4.3 Counting periods

### 4.3.1 Fixed periods:

- Set the selector switch (15) to the desired period ( $N_A$  1/10/60 s).
- Apply an input signal to terminal (9) or connect a light barrier to terminal A (12).
- Start counting by pressing the "Start" button (3).

The equipment counts L/H edges at terminal (9), pulses from a Geiger tube connected to terminal (10) or interruptions to a light barrier connected to terminal A (12).

#### 4.3.2 Programmable time periods:

- Set the selector switch (15) to the symbol  $\text{NA t } \frac{1}{f}$ .
- Press the "Start" button (3) to set tens, hundreds, thousands or ten thousands of seconds (incremented by pressing the button).
- The "Stop" (2) has a similar effect but causes the times to be decremented.
- Confirm the period by pressing "Reset" (1). The display will flash briefly then reset to "0".
- Pressing "Start" (3) activates the counter input and the "GATE" LED (5) lights, indicating readiness to count.

#### 4.4 Frequency measurement

- Set the selector (15) to  $f_A$  (Hz or kHz).
- Apply an input signal to terminal (9).
- Start measurement by pressing "Start"(3).
- The "GATE" LED (5) lights, indicating readiness to count.

#### 4.5 Geiger counter

- Connect a Geiger-Müller tube to the BNC socket (10).
- Set the selector switch (15) to the desired measuring period or select  $\text{NA t } \frac{1}{f}$  to set the time manually.
- You can turn the acoustic signal on or off (4).
- Press "Start" (3). The counter now counts all the events occurring within the programmed period.
- After the measurement, either use "Reset" button (1) to set the count back to zero or continue counting from where it left off.

### 5. Care and maintenance

- Disconnect the equipment from the mains before cleaning.
- Use a soft damp cloth to clean the equipment.
- Store the equipment in a dry place with as little dust as possible.
- Do not use cleaning agents with solvents.

### 6. Disposal

- 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.
- Do not dispose of the battery in the regular household garbage. Follow the local regulations (In Germany: BattG; EU: 2006/66/EG).

