

Microsecond Counter (230 V, 50/60 Hz) 1017333
Microsecond Counter (115 V, 50/60 Hz) 1017334

Instruction manual

01/14 SD/ALF



- 1 4-mm socket "Start"
- 2 4-mm socket "Stop"
- 3 4-mm socket "Ground"
- 4 4-digit display
- 5 Power supply socket

1. Safety instructions

The microsecond counter conforms to safety regulations for electrical measuring, control and laboratory equipment as specified in DIN EN 61010 Part 1. It is to be operated in dry rooms as appropriate for the use of electrical equipment.

Safe operation of this equipment is guaranteed as long as it is used as stipulated. However, there is no guarantee of safety if the equipment is used incorrectly or carelessly.

If there is any suspicion that the equipment can no longer be operated without risk (e.g. if visible damage is detected), the equipment must immediately be withdrawn from use and secured in such a way as to prevent its inadvertent operation.

- Only use the instrument in a dry environment.
- Use only with the supplied plug-in power supply.
- Do not exceed the maximum input voltage of 10 V at the Start and Stop inputs.

2. Description

The microsecond counter is a compact counter for measuring time in microseconds. It is especially well suited for measurements made in conjunction with Kundt's tube and the microphone box.

The counting process is start via the Start input and halted via the Stop input. The count is automatically reset back to zero on each start. Both inputs respond to rising edges and have internal pull-up resistors.

The microsecond counter 1017334 is for operation with a mains voltage of 115 V (±10%), and the unit 1017333 is for operation with a mains voltage of 230 V (±10%).

3. Contents

- 1 Counter
- 1 Plug-in power supply
- 1 Instruction sheet

4. Technical data

Inputs

Connectors:	4-mm safety sockets
Internal resistance	
Start input:	2.4 k Ω
Stop input:	5.6 k Ω
Switching edge for both inputs:	Rising edge
Trigger thresholds	
Start input:	Low 0...0.5 V, High 1...5 V
Stop input:	Low 0...1 V, High 2...5 V

Display:

Display:	4-digit LED display
Measuring range:	1...9999 μ s
Resolution:	1 μ s
Precision:	Quartz precision

General data:

Voltage supply:	Plug-in power supply 12 V AC, 500 mA
Dimensions:	100x75x35 mm ³ approx
Weight:	400 g approx. incl. plug-in power supply

5. Operation

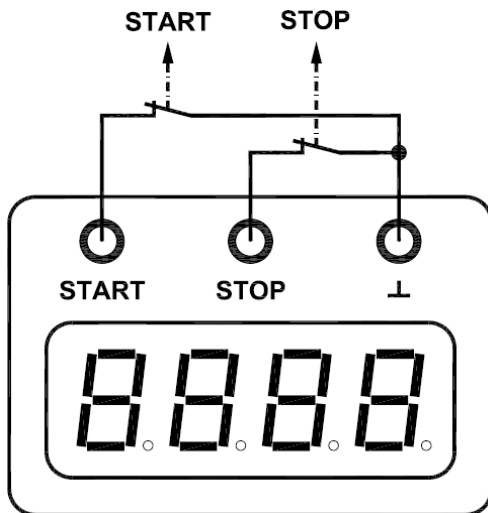


Fig. 1 Schematic circuit diagram of inputs

- Connect the power supply to the microsecond counter.
- Connect both inputs to normally closed switches (see Fig. 1).

Measurement starts when the switch for the Start input opens (disconnecting the input from ground).

Measurement stops when the switch for the Stop input opens.

The display is reset to zero as soon as the Stop and Start inputs are both reconnected to Ground.

6. Example experiment

Determining the speed of sound in Kundt's tube

Additionally required:

1 Microphone box (230 V, 50/60 Hz)	1014520
or	
1 Microphone box (115 V, 50/60 Hz)	1014521
1 Kundt's tube E	1017339
1 Pulse box K	1017341
1 Microphone probe, long	1017342
1 Microphone probe, short	4008308
2 Adapter cable, BNC/4-mm plugs	1002748

- Place the microphone probes in the Kundt's tube and set up the apparatus. (see Fig. 2)
- Connect the long microphone probe to the Channel A input of the microphone box and connect the short one to the input for Channel B.
- Use a BNC/4-mm adapter cable to connect the output of Channel A to the Start input of the microsecond counter (plug red 4-mm plug into green socket, black 4-mm plug into black ground socket).
- Connect the output of Channel B to the Stop input of the microsecond counter (plug red 4-mm plug into red socket, black 4-mm plug into black ground socket from the side).
- Connect the pulse box to the speaker.
- Set both outputs to trigger mode and set the gain for both channels to a medium value.
- Connect the microsecond counter and microphone box to their power supplies and plug them into the mains.
- Trigger a click pulse from the pulse box and read off from the counter the time it takes for the sound to propagate from the long microphone probe to the short one.

Use the distance between the two microphones and the time measured to calculate the speed of sound in the tube at room temperature.

7. Storage, cleaning and disposal

- Keep the equipment in a clean, dry and dust-free place.
- Before cleaning the equipment, disconnect it from its power supply.
- Do not clean the unit with volatile solvents or abrasive cleaners.
- Use a soft, damp cloth to clean it.
- 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. Local regulations for the disposal of electrical equipment will apply.

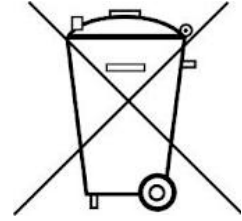


Fig. 2: Experiment set-up with Kundt's tube

