



***JITTERBUG-2***

**270400**

***JITTERBUG-4***

**270440**

*Operating Instructions*



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# 1. Safety

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The following symbols mean:-
















Caution: Read these operating instructions fully before use and pay particular attention to sections containing this symbol



Caution: Surfaces can become hot during use.

Always observe the following safety precautions

-  Use only as specified by the operating instructions, or the intrinsic protection may be impaired.
-  After transport or storage in humid conditions, dry out the unit before connecting it to the supply voltage. During drying out the intrinsic protection may be impaired.
-  Connect only to a power supply with a voltage corresponding to that on the serial number label.
-  Ensure that the mains switch and isolating device (power supply connector) are easily accessible during use.
-  Connect only to a power supply which provides a safety earth (ground) terminal.
-  Before moving, disconnect at the power supply socket.
-  If liquid is spilled inside the unit, disconnect it from the power supply and have it checked by a competent person.
-  It is the user's responsibility to carry out appropriate decontamination if hazardous material is spilt on or inside the equipment.
-  The maximum guaranteed number of diagnostic cycles in the shaker mode, which require 15-30 minutes use in one cycle, is 7000-14000 times.
-  Do not use external power supply units other than that recommended by the manufacturer.
-  Before using any cleaning or decontamination method except those recommended by the manufacturer, user should check with the manufacturer that the proposed method will not damage the equipment.
-  Clean the unit only with a damp cloth, do not use chemical cleaning agents.
-  The unit has an air intake for cooling and ventilation. Do not block or impede the ventilation grille.

## 2. General Information

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- 2.1** The **JITTERBUG-2** and **JITTERBUG-4** are designed for shaking a special platform of two standard 96-well immunoplates, and controlling the set temperature in the range of 25°C to 60°C (if the room temperature (RT) is less than 25°C).
- 2.2** The main features of **JITTERBUG-2** and **JITTERBUG-4** are
- A. Additional heating source, in the lid of the device, which allows:
- faster heat-up times
  - increase of temperature range.
- B. Compact size.
- C. Informative liquid crystal display, which allows instant control over both **set** and **current** temperatures of the aluminum block, as well as the shaking intensity and duration.
- 2.3** This unit was designed using the multi-system principle, which allows use as three independent devices:
- A. Incubator - for lasting incubation without shaking of micro quantities (insect, plant cell cultures, etc.) in immunoplates;
- B. Immunoplate Shaker - for operation in the cold room or other conditions, which do not require temperature stabilization;
- C. Heating-Shaking - for immunochemistry and molecular diagnostics, where stringent requirements of reproducibility and precision are necessary.
- 2.4** An external 12V power supply unit is used to power the device. This makes it safe for use in the cold room, where condensation may cause leakage current from the mains. The device can be used in:
- cytochemistry - for in situ reactions.
  - immunochemistry - for immunofermentative reactions.
  - biochemistry - for enzyme and protein analysis.
  - molecular chemistry - for matrix analysis.

## 3. Getting started

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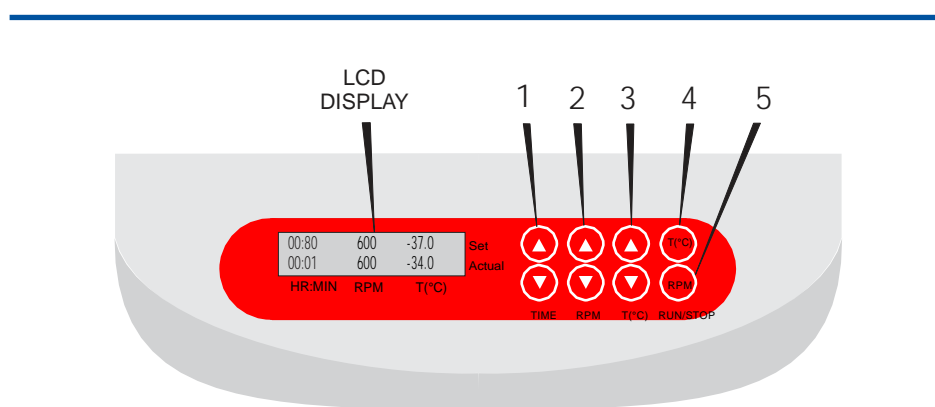
### 3.1 Unpacking

Remove packing materials carefully and retain for future shipment or storage of the unit.

### 3.2 **JITTERBUG-2** and **JITTERBUG-4** includes:

- **JITTERBUG-2** or **JITTERBUG-4** ..... 1 piece
- Spare rubber drive belt ..... 1 piece
- External power supply unit ..... 1 piece
- Operating Instructions ..... 1 copy
- Plug Adapter Kit for UK-Europe-Australia ..... 1 kit

## 4. Operation of **JITTERBUG-2** and **JITTERBUG-4**



- 4.1** Plug the external power supply unit into the 12 V socket at the rear of the unit. Connect power supply unit to the main power. The display will illuminate with the upper line (set point) showing **time**, **RPM** and **temperature** set at the factory (15 min, 1000 RPM, 37.0 °C) and the lower line (actual point) showing current readings of the same parameters (STOP - time, 000 - RPM, thermoblock temperature °C, which automatically starts rising according to the temperature set in the upper line). The total time to achieve temperature stabilization depends on the initial temperature, but does not exceed 5-10 minutes, if the set temperature is 37.0°C.
- 4.2**

**4.3 How to set the necessary parameters.**

Use the readings in the upper line of the display (SET), while setting the necessary parameters.

*To Set the Time (TIME)*

With the help of the up and down arrow keys (1) set the required working time interval.

*To Set the Shaking Intensity (RPM)*

With the help of the up and down arrow keys (2) set the required shaking intensity in revolutions per minute.

*To Set the Temperature (T,C)*

With the help of the up and down arrow keys (3) set the necessary temperature, for example 35 °C.

*Attention: It is possible to turn off heating of the thermoblock only by setting the required temperature below 25 °C (the display will show OFF - T,C - actual temperature). In this mode the **Jitterbug-2** and **Jitterbug-4** can be used in the cold rooms as a mixing device without thermoregulation.*

**4.4 Program execution**

After the thermal stabilization of the shaker (when the set and current temperature readings become the same):

- 4.4.1 Place microtiter plates on the platform and fix in position with clamp. Tighten down the thumb screw against the plate to secure.
- 4.4.2 Press the **RPM-RUN/STOP** key (4). The platform will start to rotate and the timer indicator will start counting down the time interval (in 1 minute steps). If the **RPM-RUN/STOP** key is pressed again the program is halted and the platform movement stops. Press the **RPM-RUN/STOP** again to resume the program.
- 4.4.3 At the end of the program the platform rotation stops and the timer shows **STOP** which will flash, this will be accompanied by a repetitive beeping sound signal until the **RPM-RUN/STOP** key is pressed.
- 4.4.4 The platform movement can be stopped at any time by pressing the **RPM-RUN/STOP** button (4).

**4.5 Repeating the program**

If required, it is possible to repeat the process by pressing the **TIME** key (5).

## 5. Specifications

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### 5.1 The *Jitterbug-2* and *Jitterbug-4* provide:

- Gentle or vigorous rotational shaking of the samples;
- Regulation, stabilization and indication of rotation speed;
- Even shaking amplitude throughout the platform;
- Setting and indication of the required working time;
- Automatic stop of the rotation after the set time expiration,
- Indication of the current working time,
- Setting and indication of the required temperature on the platform.

•Temperature regulation range .....	ambient +5°C to 60 °C
•Stability .....	0.1°C
•Temperature uniformity over the platform .....	±0.2°C
•Orbit .....	2 mm
•Speed variation .....	250-1200RPM
•Independent timer with sound signal .....	0 to 96 hrs 59 min
•Time setting unit .....	1 minute
•Rotation speed setting interval .....	10 rpm
•Time of thermoblock heating from “RT” to 37°C .....	15-20 min
•Display .....	16x2, LCD
•Platform loading capacity ( <i>Jitterbug-2</i> ).....	2 x 96 well immunoplates
•Platform loading capacity ( <i>Jitterbug-4</i> ).....	4 x 96 well immunoplates
•Platform dimensions ( <i>Jitterbug-2</i> ).....	9.8 in. x 5.9 in.
•Platform dimensions ( <i>Jitterbug-4</i> ).....	8.3 in. x 11.4 in.
•External power supply;	
input .....	AC 115 V, 1.5 A, 50-60 Hz
output .....	DC 12 V, 5.0 A
•Dimensions ( <i>Jitterbug-2</i> ).....	10.6 in. x 10.2 in. x 4.9 in.
•Dimensions ( <i>Jitterbug-4</i> ).....	14.9 in. x 15.4 in. x 5.5 in.
•Weight, including power supply ( <i>Jitterbug-2</i> ).....	13.2 lb
•Weight, including power supply ( <i>Jitterbug-4</i> ).....	19.8 lb



## 6. Warranty – Service – Maintenance

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### 6.1 Warranty

When used in laboratory conditions and according to these operating instructions Boekel warrants this product to be free of defective material and workmanship for a period of two years from the date of shipment. The liability of Boekel for any defective equipment during the warranty period shall be limited to the repair of such equipment or replacement thereof without charge for parts or labor.

### 6.2 Service

A Returned Material Authorization (RMA) number provided by Boekel Scientific is required prior to any product return. Contact Boekel Customer Service at 1-800-336-6929 Extension 5. A Decontamination Certificate must be completed, signed by the user, and returned to Boekel Scientific prior to receiving the RMA number. Please be sure to mark the outside of the returned goods package with this RMA number to ensure prompt handling.

### 6.3 Maintenance

#### 6.3.1 Replacing Drive belt (Boekel part number 902-0231)

1. Remove the fixing screws on the bottom of the shaker.
2. Remove the bottom plate.
3. Replace the rubber drive belt and reassemble the unit.

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