



## Dry Block Thermostat BTD

*Operating Manual*



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## 1. About this edition of the Manual

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1.1. The current edition of the operating Manual applies to the following models and versions:

| Model                     | Version      |
|---------------------------|--------------|
| BTD, dry block thermostat | V.3GD, V.3GE |

## 2. Safety precautions

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### Caution!

Make sure you have fully read and understood the present Manual before using the equipment. Please pay special attention to sections marked by this symbol.



### Caution!

Surfaces can become hot during use. Always use thermal protective gloves to install or remove samples when the temperature is set higher than 60°C.

#### 2.1. General safety

- The protection provided can be ineffective if the operation of the appliance does not comply with the manufacturer's requirements.
- The unit should be saved from shocks or falling.
- After transportation or storage keep the unit under room temperature for 2-3 h before connecting to electric circuit.
- Store and transport the unit at ambient temperatures between -20°C and +60°C and maximum relative humidity of 80%.
- Before using any cleaning or decontamination methods except those recommended by the manufacturer, check with the manufacturer that the proposed method will not damage the equipment.
- Do not make modifications to the design of the unit.

#### 2.2. Electrical safety

- Connect only to electric circuit with voltage corresponding to that on the serial number label.
- Do not plug the unit into an ungrounded power socket, and do not use an ungrounded extension lead.
- Ensure that the switch and the plug are easily accessible during use.
- If liquid penetrates into the unit, disconnect it from electric circuit and have it checked by a repair and maintenance technician.
- Disconnect the unit from electric circuit before moving.
- Do not operate the unit in premises where condensation can form. Operating conditions of the unit are defined in the **Specifications** section.

#### 2.3. During operation

- Use only tubes of standard size.
- Do not check the temperature by touch. Use a thermometer.
- Do not operate the unit in environments with aggressive or explosive chemical mixtures. Please contact manufacturer for possibility of unit operation in specific atmosphere.
- Do not operate the unit if it is faulty or has been installed incorrectly.
- Do not use outside laboratory rooms.
- Do not leave the operating unit unattended.

#### 2.4. Biological safety

- It is the user's responsibility to carry out appropriate decontamination if hazardous material is spilt on or penetrates into the equipment.

### 3. General information

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**BTD** is a compact easy-to-use thermostat for microtest tubes. It is specially designed for long incubation at different temperatures.

Universal aluminum block accommodates 3 types of tubes (24 x 2/1.5 ml tubes, 15 x 0.5 ml tube, 10 x 0.2 ml tubes).

The **BTD** device is applicable in:

|                                                 |                                                                                                                                                                                   |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Molecular and gene engineering,<br>cell biology | for PCR analyses, for temperature stabilisation in DNA/RNA<br>restriction and denaturation reaction;                                                                              |
| Biochemistry                                    | for the enzyme processes analyses;                                                                                                                                                |
| Microbiology                                    | for the anaerobic microorganism cultivation,                                                                                                                                      |
| Chemistry                                       | for the preliminary heating of reagents in chromatography<br>(especially when analysing chemical and biological components of fatty acids, which condense in cold microsyringes). |

## 4. Getting started

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- 4.1. **Unpacking.** Remove packing materials carefully and retain them for future shipment or storage of the unit. Examine the unit carefully for any damage incurred during transit. The warranty does not cover in-transit damage. Warranty covers only the units transported in the original package.
- 4.2. **Complete set.** Package contents:
- **BTD**, Dry Block Thermostat with aluminium block ..... 1 pce
  - Power cable ..... 1 pce
  - Spare fuse (inside fuse holder) ..... 1 pce
  - Operating Manual ..... 1 copy
- 4.3. **Setup:**
- Place the unit upon even horizontal non-flammable surface at least 20 cm away from any flammable materials;
  - Remove protective film from the display;
  - Plug the power cable into the socket on the rear side, and position the unit so that there is easy access to the power switch and plug.

## 5. Operation

### 5.1. Recommendations during operation:

- Please check the tubes before using, be sure that they are heat-resistant. Do not heat the tubes over the melting point of the material they are made of.
- Do not fill tubes more than 3-5 mm over the level they are immersed in the heat block slot.

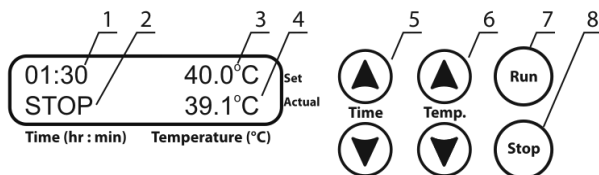


Figure 1. Control panel

- 5.2. Connect the power cable to a grounded power socket and switch ON (position I) the power switch located on the rear panel of the unit.
- 5.3. The unit will turn on and the following readouts will be shown on the display:
- Previously set time (fig. 1/1) and temperature (fig. 1/3) in the upper line (**Set**);
  - Timer indication **STOP** (fig. 1/2) and current temperature (fig. 1/4) in the lower line (**Actual**).
- 5.4. **Temperature setting.** Use the ▼ and ▲ **Temp.** keys (fig. 1/6) to set the required temperature (fig. 1/3). Pressing the key for more than 2 s will increase the increment.
- 5.5. The heat block starts the heating. The actual temperature will be shown in the lower line of the display (fig. 1/4).
- 5.6. After thermal stabilisation of the unit (i.e. after the set and the current temperature become equal) place tubes into the block sockets.
- 5.7. **Time setting.** The unit is equipped with an independent timer for convenient control over the sample incubation time. Use the ▲ and ▼ **Time** keys (fig. 1/5) to set the required sample incubation time in hours and minutes (hr:min). Pressing the key for more than 2 s will increase the increment. The set time value will be shown in the upper line of the display (fig. 1/1).
- 5.8. Press the **Run** key (fig. 1/7) to start the timer. The elapsed time will be indicated in the lower line of the display (fig.1/2). After the set time interval elapses the timer will give a sound signal and a blinking **STOP** indication will be shown on the display. Press the **Stop** key (fig. 1/8) to stop the signal.



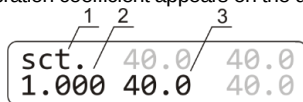
#### Caution!

Stopping the timer does not stop the heating/temperature maintenance process. The heating can be stopped by reducing the temperature below 25°C using the ▼ **Temp** key.

- 5.9. The timer can be stopped before the set time interval elapses if necessary by pressing the **Stop** key. Press the **Run** key to restart the timer with the same time interval.
- 5.10. The set time interval can be changed at any time during the timer operation - just stop the timer and make the changes required.
- 5.11. If the working time is set to 00:00, the unit will operate non-stop.
- 5.12. After finishing the operation, switch OFF (position O) the unit with the power switch, unplug the power cable from electric circuit.

## 6. Calibration

- 6.1. The device is precalibrated at the factory (calibrating coefficient is 1.000) for operation with temperatures measured by a sensor in the heating block.
- 6.2. To change the calibration coefficient, hold the **Stop** key (fig. 1/8) pressed for more than 8 s to activate calibration mode. The calibration coefficient appears on the display (fig. 2/1).



**Figure 2. Display in calibration mode: 1. Calibration mode indicator; 2. Calibration coefficient; 3. Temperature with current coefficient**



**Note.** Values marked in grey on figures 2 and 3 are not used in calibration and are meant for service engineers.

- 6.3. **Restoring factory settings.** Set 1.000 value using the **▲** and **▼ Temp** keys (fig. 1/6) as shown on fig. 2/1 to restore the factory settings. Press the **Run** key (fig. 1/7) once to save the changes and exit the calibration mode.



**Note.** Coefficient value changes are recommended after the unit has reached 30°C temperature.

- 6.4. **Calibration procedure.**
- 6.4.1. Install independent sensor (0.5°C accuracy) into microtubes placed into the block sockets.
- 6.4.2. Set the required temperature in operation mode (e.g. 40°C).
- 6.4.3. After the unit reaches the set temperature (when the set and current temperature readings equal) leave the unit for 30 min for thermal stabilization.
- 6.4.4. Let us assume that the readings of independent sensor is 39°C, but the display's actual temperature is 40°C (fig. 1/4). Then it is necessary to add 1°C correction.
- 6.4.5. Hold **Stop** key pressed for more than 8 s to activate calibration mode. The following parameters will be shown on the display (fig. 2).
- 6.4.6. Using the **Temp ▲** and **▼** keys, change the calibration coefficient (fig. 3/1) so that the new temperature value (fig. 3/2) corresponds to the independent sensor temperature. In our example, the calibration coefficient will be 0.974.

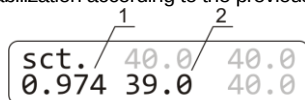


**Note.** Calibration coefficient can be changed in range from 0.936 to 1.063 ( $\pm 0.063$ ), with increment of 0.001. This calibrating coefficient will correct temperature through all the operation range.

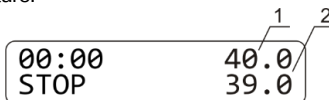


**Note.** Coefficient value changes are recommended after the unit has reached 30°C temperature.

- 6.4.7. After finishing the calibration, press the **Run** key once to save the changes and exit calibration mode.
- 6.5. The display will show calibrated temperature as shown on fig. 4/1 and the unit will continue thermal stabilization according to the previously set temperature.



**Figure 3. Changing the coefficient:**  
1. Calibration coefficient; 2. Temperature with current coefficient



**Figure 4. Display after calibration:**  
1. Set temperature; 2. Current calibrated temperature

## 7. Specifications

The unit is designed for operation in cold rooms, incubators (excluding CO<sub>2</sub> incubators) and laboratory rooms at ambient temperature from +4°C to +40°C in a non-condensing atmosphere and maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C.

Grant is committed to a continuous programme of improvement and reserves the right to alter design and specifications of the equipment without additional notice.

### 7.1. Temperature specifications

|                                      |                              |
|--------------------------------------|------------------------------|
| Setting range .....                  | +25°C to +100°C              |
| Control range .....                  | 5°C above ambient ... +100°C |
| Setting resolution .....             | 0.1°C                        |
| Stability at +37°C .....             | ±0.1°C                       |
| Uniformity at +37°C .....            | ±0.1°C                       |
| Over temperature protection .....    | internal thermal breaker     |
| Temperature calibration option ..... |                              |
| Calibration coefficient range .....  | 0.936 ... 1.063 (± 0.063)    |

### 7.2. General specifications

|                                      |                                                |
|--------------------------------------|------------------------------------------------|
| Digital time setting range .....     | 1 min — 96 hrs or non-stop                     |
| Display .....                        | LCD, 2 x 16 signs                              |
| Block diameter / depth .....         | 130 mm / 45 mm                                 |
| Dimensions (WxDxH) .....             | 210x230x115 mm                                 |
| Working voltage .....                | 120 V~, 50/60 Hz or 230 V~, 50/60 Hz           |
| Consumed power (120 V / 230 V) ..... | 200 W (1.7 A) / 200 W (870 mA)                 |
| Weight, accurate within ±10% .....   | 2.8 kg                                         |
| Block capacity .....                 | 24 x 2/1.5 ml +15 x 0.5 ml + 10 x 0.2 ml tubes |

## 8. Ordering information

### 8.1. Models and versions available:

| Model                        | Block capacity                                                    | Version | Voltage, frequency |
|------------------------------|-------------------------------------------------------------------|---------|--------------------|
| BTD,<br>Dry Block Thermostat | Cylindrical/conical tubes, 10x0.2 ml,<br>15x0.5 ml, 24x1.5/2.0 ml | V.3GD   | 230 V~, 50 Hz      |
|                              |                                                                   | V.3GE   | 120 V~, 60 Hz      |

## 9. Guarantee and service

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- 9.1. **Guarantee.** When used in laboratory conditions and according to this operating Manual, this product is guaranteed for TWO YEARS against faulty materials or workmanship.
- 9.2. **Service & Maintenance.** There are no user-serviceable parts inside the unit. For all maintenance and repairs (except as defined below) return to our service department in the UK or in other countries, our distributor.
- 9.3. **Cleaning & Disinfection.**
- 9.3.1. **Cleaning the outside parts.** Use mild soap and water with a soft cloth or sponge for cleaning the exterior. Rinse remaining washing solution with distilled water. Wipe dry the excess water with clean, soft cloth or sponge. This maintenance operation is performed by the user.
- 9.3.2. **Disinfecting the exterior plastic parts.** Use 75% ethanol or DNA/RNA removing solution (e.g., PDS-250). After disinfecting it is necessary to wipe the surfaces dry. This maintenance operation is performed by the user.
- 9.3.3. **Autoclave.** The unit and its components are not autoclavable.
- 9.4. **Fuse replacement.** Disconnect from electric circuit. Remove the power plug from the rear of the unit. Pull out the fuse holder by applying leverage in recess (fig. 5/A). Remove the fuse from the holder. Check and replace with the correct fuse if necessary, M 2 A for 230 V or M 3.15 A for 120 V (type **M** – time lag: **Medium**).

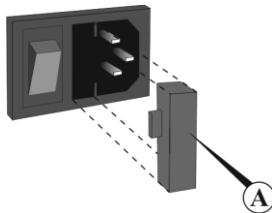


Figure 5. Fuse replacement

## 10. Compliance

### EU Declaration of Conformity

All the products covered by this Manual comply with the requirements of the EU harmonised legislation verified using the following standards

|                                                                                   |                                                |
|-----------------------------------------------------------------------------------|------------------------------------------------|
| Low Voltage Directive (2014/35/EC) for Electrical safety.                         | LVS EN 61010 Part 1<br>LVS EN 61010 Part 2-010 |
| EMC directive (2014/30/EC) for Electromagnetic compatibility                      | LVS EN 61326-1                                 |
| RoHS Directive (Directive 2011/65/EC including 2015/863) for Hazardous substances | LVS EN 50581                                   |

### UK Declaration of Conformity

All the products covered by this Manual comply with the requirements of UK statutory requirements verified using the following standards.

|                                                                                                          |                                              |
|----------------------------------------------------------------------------------------------------------|----------------------------------------------|
| Electrical Equipment (Safety) Regulations 2016                                                           | BS EN 61010 Part 1<br>BS EN 61010 Part 2-010 |
| Electromagnetic Compatibility Regulations 2016                                                           | BS EN 61326-1                                |
| The Restriction of the Use of Certain Substances in Electrical and Electronic equipment Regulations 2012 | BS EN 50581                                  |

### Waste Electrical and Electronic Equipment (WEEE)



All the products covered by this Manual are marked with the crossed-out wheelie bin symbol indicating they must not be disposed of with unsorted waste. Safe recycling of WEEE helps conserve natural resources and protect human health.

Grant Instruments complies fully with the UK Waste Electrical & Electronic Equipment (WEEE) regulations 2013. We are a member of the B2B compliance scheme (Scheme Approval Number WEE/MP3338PT/SCH), which handle our WEEE obligations on our behalf. Grant Instruments have been issued with a unique registration number by the Environmental Agency, this reference number is WEE/GA0048TZ.

For information regarding WEEE collections in the UK please contact our B2B Compliance Scheme directly on 01691 676 124 or [www.b2bcompliance.org.uk](http://www.b2bcompliance.org.uk)

In the EU, Grant Instruments complies with WEEE Directive 2012/19/EU.

Contact your local equipment supplier for WEEE collections.

### REACH Regulations

This product does not contain any Substances of Very High Concern (SVHCs) at greater than 0.1% that have to be identified in accordance with Regulation (EC) No 1907/2006 and therefore does not have an entry in the SCIP database.

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