DRY BATH INCUBATOR

(HEATING BLOCKS)

Model: DB-005, DB-006, DB-006E

User's Manual

Operation/Maintenance
And Parts List

Important Information:
This manual contains important operation & safety information.
The user must carefully read & understand the contents of this manual prior to use of this equipment in conformance with your local electrical codes.

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CONTENT

Standard: ISO9001, ISO13485, CE marking, GMP, FDA

Intended use

This Dry Bath Incubator provides a controlled dry heat environment for test tubes containing In Vitro diagnostic specimens or samples for a qualitative or quantitative procedure.
Refer to the clinical Laboratory method specified by the manufacturer of your test reagent Or to methods established by medical technology.

Applications

- Incubating DNA specimens
- Cross-matching and screens in blood banks
- Incubating melted agar
- Enzyme assays
- Digestions
- Residue tests for milk

Specifications

Code	DB-005	DB-006	DB-006E
Overall dimension	205 x 330 x 105mm	305 x 330 x 105 mm	370 X 270 X 140mm
Power Consumption	200W	450W	450W
Module blocks	1	3	3
Uniformity at 37℃	± 0.3℃	± 0.2 – 0.5℃	± 0.2 – 0.5℃
Stability at 37℃	± 0.05℃	± 0.05℃	± 0.05℃
Accuracy	± 0.2℃	± 0.2℃	± 0.1℃
Operating range	Ambient + 5℃ to 110℃	Ambient + 5℃ to 110℃	Ambient + 5℃ to 100℃
Timer	N/A	N/A	Digital, 99 Hr. 59 Min.
Overheating alarm	N/A	N/A	Yes
Temp control	PID	PID	PID
Tem sensor	NTC	NTC	PT-100
Accessory	Mercurial thermometer	Mercurial thermometer	Mercurial thermometer
Net weight	2.5kg	5.6kg	6.5kg (w/3 solid blocks)

NOTE:

- Ambient operation range from 20℃ to 30℃.
- 37ºC is the value to achieve the best temperature stability and uniformity, whereas, with the rising working temperatures, the higher tolerance on stability and uniformity will be seen. This is attributed to the dissipating heat by the open-ended heating blocks.
- NTC: Negative Temperature Coefficient
- Specifications are subject to change without advanced notice.

Classification: This equipment is classified as Class 1 Medical Device.

Standard:

- This equipment complies with EC Electromagnetic Compatibility requirement of EN60601-1-2. EMI filter is designed in conformity with 89/336 EEC-EMC Directive.
- ISO9001, ISO13485, GMP, FDA, CE marking
- The manufacturer also declares the conformity with the actual required safety standards in accordance with LVD 73/23 EEC.

Principles of operation

This equipment is designed to accommodate the heating of thermally conducting Blocks fabricated to confirm to test tubes places in the block contact the walls of the wells to provide constant precise temperatures to the test tubes contents. The output of the heater is Controlled by means of a precision temperature sensor and automatic electronic temperature controller. Selection of variable temperatures throughout the operating range is accomplished by turning a knob to the desired setting.

Heat-up time

DB-005: 10 min to 37℃ , 20 min. to 56℃

DB-006: 6.5 min to 37℃ , 17.5 min to 56℃

DB-006E: 8.0 min to 37℃, 13.5 min to 56℃

BLOCKS AVAILABLE:

Catalog No.	Tube size accepted	No of openings	Opening Diameter
DB-0630	6mm	30	6.5mm
DB-1020	10mm	20	10.5mm
DB-1220	12 or 13mm	20	13.5mm
DB-1612	15 or 16mm	12	16.6mm
DB-1812	18mm	12	18.6mm
DB-2012	20mm	12	20.7mm
DB-2506	25mm	6	25.7mm
DB-15E-20	1.5ml Eppendorf	20	
DB-05E-12	0.5ml Eppendorf	20	
DB-C0M-3 (Combination)	25mm	3	
	12 or 13mm	5	
	6mm	6	
DB-0000	Solid (No holes); use as Hot Plate		

NOTE:

- Other sizes of blocks are available upon request. Please specify your desired size when ordering.
- Solid block (no holes) can be used as HOT PLATE.
- Specifications are subject to change without advanced notice.

Definition

Uniformity:

The difference in the temperature between any two points in the blocks when Temperature is stable. The two points must be decided at least 1cm away from The walls of chamber upon which the blocks rest. Uniformity can be determined placing The attached mercury thermometer into any two wells of the blocks, so that the temperature difference can be measured.

Accuracy:

The temperature accuracy can be measured by its difference between the dial scale setting and temperature of the contents in test tubes when temperature is stabilized.

Stability:

The temperature stability is determined by the stability of test tubes contents after the temperature has stabilized. It can be determined by placing the attached mercury thermometer into the test tubes.

Installation

- Remove the DRY BATH Incubator from the packing material carefully.
- Thermometer is fragile, handle with care.
- Check the specification label located on back of this equipment. Make sure the power specification must conform to your local electrical code.
- Plug power cord into a properly grounded receptacle. When the power lamp is light up, it indicates the equipment is in normal conditions.
- Turn the controlled knob clockwise to check if the heating lamp is on or not. When the heating lamp is ON indicates the heating element is energized.
- Place enclosed the mercury thermometer into the hole of the block, the PV (practical variable) then can be read out directly. DB-006E features the TEMP and TIME set and display in LED digital.
- Keep the packing material for recycling or for future use.

Temperature Recalibration

The temperature has been initially calibrated in house before shipment, whereas, user is requested to inspect the accuracy whether or not the PV (Block's temperature) is equal to SV exactly when temperature is stabilized. If not, the recalibration is required.

Before making the recalibration, please verify that your thermometer (Mercury or Digital type) reading is within ±0.1ºC of the control knob setting.

Procedure for DB-005 and DB-006:

1) Place three blocks in the chamber of blocks.
2) Fill three test tubes to the proper capacity and insert each test tube in the center of each block.
3) Turn the control switch ON and turn the temperature control knob fully ON
4) Wait until temperature has stabilized, then insert the attached mercury thermometer into one tube to verify that the thermometer reading is within ± 1.0 of your control knob setting.
5) Repeat this process with the other tubes and adjust the control knob slightly right or left If necessary until the mercury level approaches the desire setting:
6) Once you have completed the temperature calibration, you can set your temperature for daily tests directly:
7) Whenever the new thermometer is used, the temperature should be checked prior to each ***in- vitro diagnostic (IVD***) test.

Calibration Procedure for DB-006E

1. Remove the control panel from the right hand carefully. You will find 2 small HOLES marked " 1 and 2 " on it as figure depicted.
2. **HOLE # 1:** Calibrated when the working temperature exceeds 60ºC.
3. **HOLE # 2:** Calibrated when the working temperature lower than 60ºC
4. When the actual temperature (PV) exceeds the digital display on screen, rotate RIGHT the corresponding HOLE to rise the figures of digital display on screen until the two values are matched exactly. ***Vice Verse.***

> **Example:**
> *Thermometer **65℃** (actual temp), Digital display **62℃*** :
> Turn right **HOLE #1** until the digital display rising to 65ºC.

5. Use double-face tape to glue the control panel again.

CAUTION

- **Hot Blocks**. Avoid direct contact during re-calibration. The blocks will become hot and remain hot without visual indication for some time after use. Direct contact may cause body injury.
- Handle with care during the process of recalibration.

Figure

Control Panel

DB-006E

Power ∨ SET TEMP▲▼ ∨ Select ∨ SET TEMP▲▼ ∨ Start

Description

Code	Description
Power	Press keypad to switch on the power
SET TEMP	Press ▲ to rise the desired temperature Press ▼ to decrease the desired temperature
Start	Press keypad to start operation
Heat	To indicate the energizing heater
PV	Practical variables. Actual temperature
SV	Setting variables. It will display in the screen.
Alarm	Function for over-heating alarm and shutout
Select	Select ***Hour*** or ***Min*** for time setting. (Max. 99 hour, 59 minutes)
Set time	Press ▲ to rise time set Press ▼ to decrease the time set.

Note: Timer can start to work only when the set temp is stabilized.

OPERATION:

DB-005, DB-006:

- Check the electrical specifications located on back of the unit. Make sure it must conform to your local electrical code. Plug cord into a properly grounded outlet.
- Choice of your three desired heating blocks and place in the chamber of blocks.
- Turn switch to ON position, preset your desired testing temperature by turning the control knob.
- Insert test tubes in the wells of blocks to start operating this incubator.

DB-006E

- Press the button of **POWER** to switch the power on. The corresponding lamp of power will be illuminated at the same time.
- Present your desired temperature by pressing button▲ or ▼ to rise or lower temp set.
- Preset your desired time by pressing button of **SELECT**∨ to set your time for hour and minute, then adjust up ▲ and down ▼to rise or lower the time set.
- Press button **START** to energize the heating element, while the corresponding lamp will emit at the same time.
- Timer will start to work when the set temperature has been stabilized.
- The alarm will function and shut off power when the over-heating temperature is 2ºC above the set point.
- When the set time has elapsed, the alarm will sound and the words ***"END***" will be displayed on the screen.
- The solid block # DB-000 without holes can be used as Hot Plate.
- Features:
    - **Temperature control**: PID, microprocessor
    - **Sensor:** PT-100
    - **Built-in shutoff temp**: 37ºC
    - **Temperature Accuracy**: ±0.2ºC
    - **Over-heating alarm**: 5ºC to the set point

CAUTION:

- Solution should not exceed the block level.
- Hot Surface. Avoid direct contact. The blocks will become hot and remain hot without visual indication for some time after use.
- Always use the supplied handle to remove hot blocks to avoid injuring your hands.
- In the event solution is accidentally spilled into the bath, disconnect from power supply and turn incubator upside down to avoid solution contacting the internal components.
- Select proper test tubes to match the holes of the blocks as close diameter as possible, which can ensure an accurate lab result.

Maintenance & Servicing

1) Always disconnect from power prior to maintenance & Servicing
2) Refer servicing to qualified personnel or licensed engineers. GEMMY will not assure any responsibility on persons who violate the concerned regulations established I the manual.
3) To avoid electrical shock, this equipment must always use a properly grounded electrical receptacle of correct voltage and current handling.
4) This equipment and linkage assemble does not need lubrication.
5) Disassembly of this equipment is strictly limited to the qualified personnel and licensed engineers.
6) This equipment contains glass fiber that can produce respirable fibers and dust when handled. Always use mask and goggles when handling the glass fiber.
7) In the event that fluid is accidentally spilled into the bath, disconnect grounded plug and turn equipment upside down to avoid fluid contacting the internal components.
8) Always clean the blocks and its holes after use. Any scales or dust on the blocks will influence the temperature accuracy.
9) The blocks have been anodized.
10) Check and see if the temperature needs to be recalibrated monthly.

CAUTION:

This equipment contains ceramic fiber which can produce respirable fiber and dust when handled. These fibers or dusts can cause irritation and can aggravate pre-existing respiratory disease. Tests performed by the manufacturer indicate that there is no significant risk of exposure to dust or respirable fibers resulting from operation of this equipment under normal conditions. However, there may be a risk of exposure to respirable dusts or fibers when repairing or maintaining the insulating materials. Through the use of proper handling procedures you can work safely with these insulating materials and minimize any exposure.

Use mask and goggles when handling the glass fiber is recommended.

Disassembly:

WARNING:

For safety purpose, the disassembly to this equipment is strictly limited to the qualified personnel or license engineers only. Disconnect from power supply when disassembling. ***MRC*** will not assure any responsibility on personal injury or equipment quality if user violate the regulation.

1. Remove the screws from sides of case to release the upper/lower case.
2. The rocket switch should be compressed on the sides for removal.
3. The front control panel is held in position by drive rivets, tap the drive rivets tip gently and remove it. While the control panel of DB-006E is glued by double-face tape, remove it carefully.
4. Unscrew the control knob for removal
5. Disconnect wires from assembly and remove the linkage.
6. Loosen screws form bottom to remove the spacers and the related heater, bracket and chamber.
7. This equipment contains the insulating material of fiberglass. Wear mask and goggles to remove it.

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
Erratic temperature	Defective circuit board	Replace new one.
Can not heat	- Defective circuit board - Burnout heater - Defective triac	- Replace new one - Replace new one - Replace triac
Can not switch ON	- Disconnected linkage - Burnout heater - Burnout power switch	- Connect linkage & assembly - Replace heater - Replace switch
Blocks temperature varies	Failure transfer heat block to block	Clean block & chamber
Temp keeps rising and can not stabilize DB-006E	Malfunction of circuit board	Replace new one with additional Relay .

Direction to Clean

- Disconnect from power supply prior to cleaning.
- Use a moist cleaning cloth to clean the exterior case and interior chamber.
- Dry the equipment thoroughly
- Do not immerse the equipment in water
- Wear gloves when clean the equipment
- Never use benzine or paint thinner for cleaning.

Transportation

- This equipment is FRAGILE, always handle with care
- Use no hook
- Do not drop the equipment
- Do not place the equipment upside down
- Do not vibrate and bump equipment during transportation.

Storage

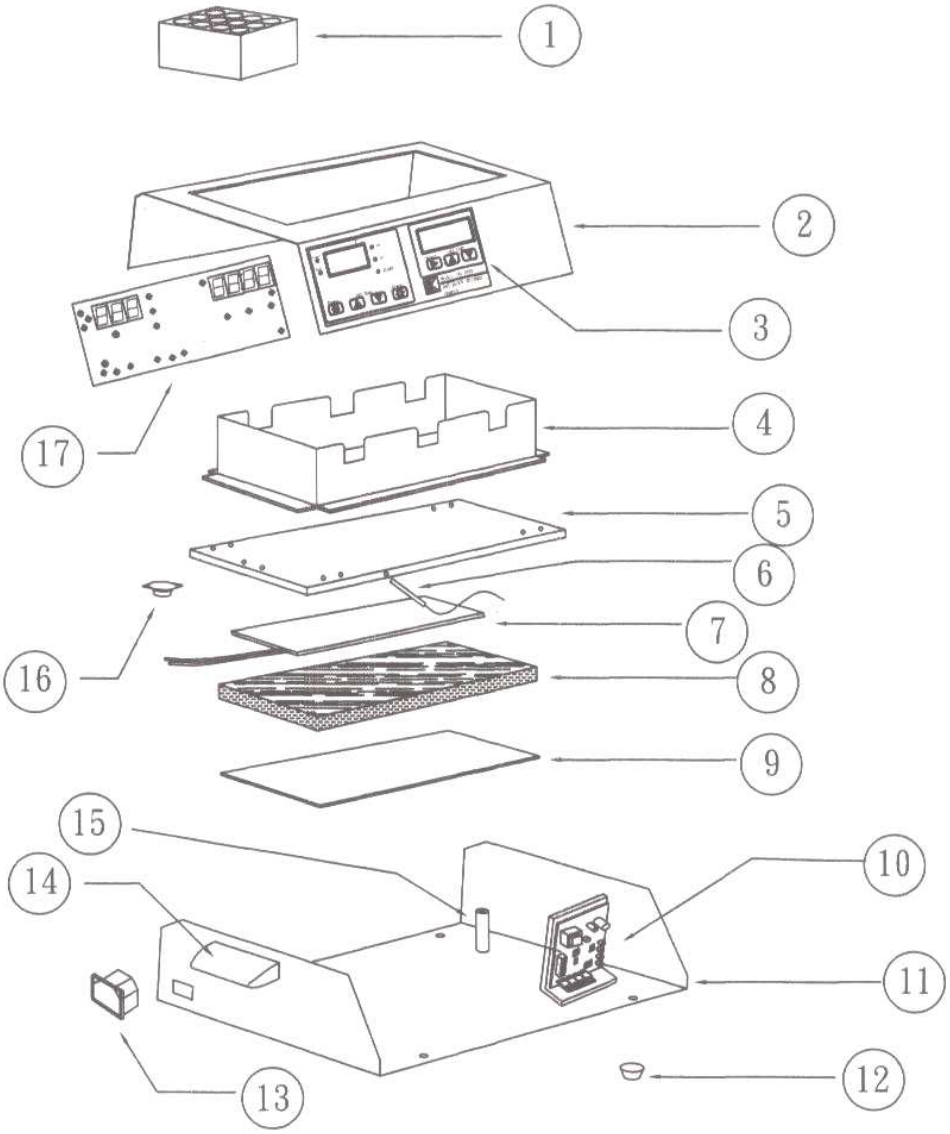
- Do not place equipment in a draft, sunlight or near a place of equipment, which emits heat as well as electromagnetic conduction emission.
- Switch power off after use of this equipment.
- Do not place or store equipment where it can fall easily.
- This equipment shall be stored under the condition of room temperature and humidity.

Conditions for Transportation & Storage

- Temperature 10ºC – 40ºC
- Humidity 40% – 90%

Diagram of Components

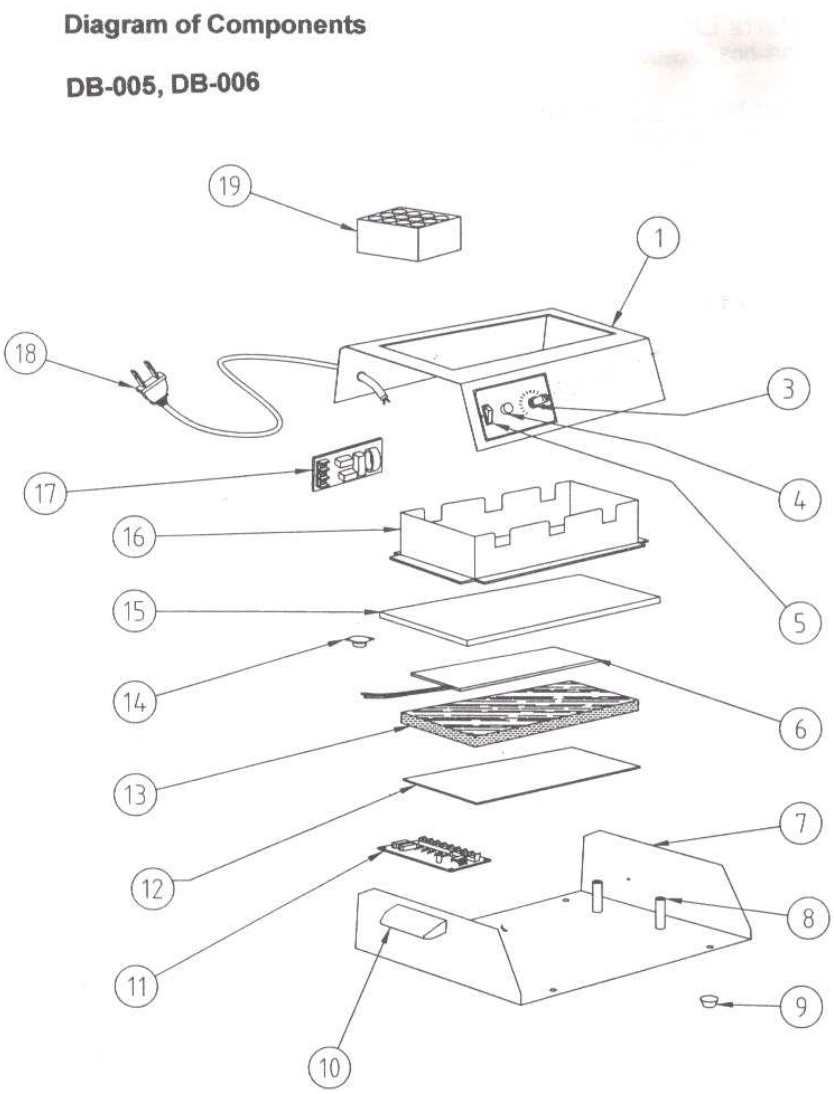
DB-006E



Parts List

Codes	Description	Codes	Description
1	Aluminum Blocks	10	Circuit board
2	Upper case	11	Lower case
3	Control panel	12	Rubber feet
4	Chamber	13	Outlet for power source
5	Heat emitting plate	14	Handles
6	Sensor	15	Aluminum spacers
7	Heating element	16	Temperature switch
8	Insulator, fiber glass	17	LED digital display screen
9	Plate attached to insulator		

Diagram of Components
DB-005, DB-006

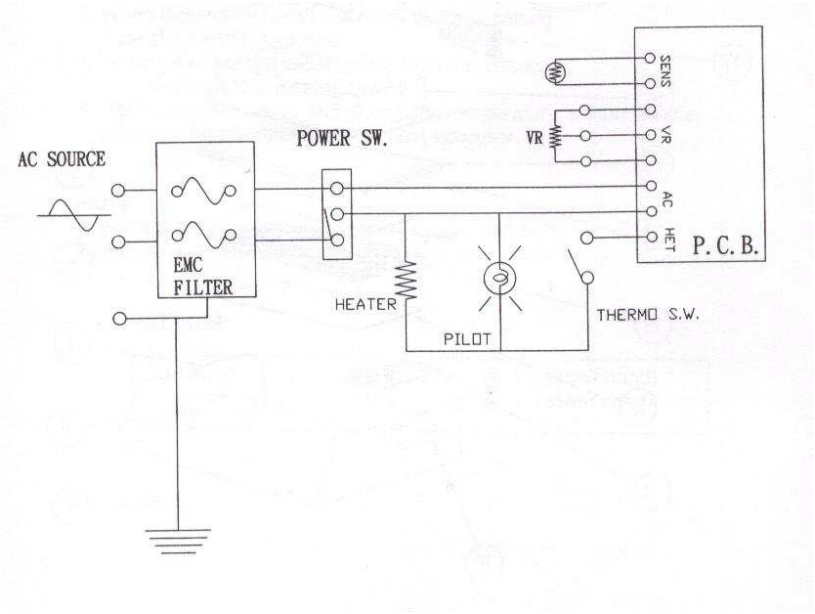


Parts list

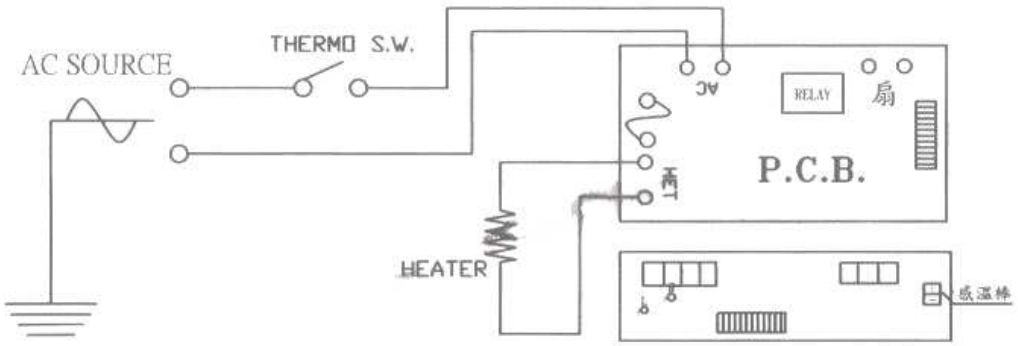
Code	Description	Code	Description
1	Upper case	11	Circuit board
3	Control knob, temperature	12	Plate attached to insulator
4	Pilot lamp	13	Insulator, fiber glass
5	Rocket switch, power	14	Temperature switch
6	Heating element	15	Heat emitting plate
7	Lower case	16	Chamber
8	Aluminum spacers	17	EMI filter
9	Rubber feet, 4 required	18	Power cord
10	Handles	19	Blocks

Wiring diagram

DB-005, DB-006



DB-006E



ONE YEAR LIMITED WARRANTY

Your ***MRC*** product is guaranteed be to free from defects in materials and workmanship for one (1) year under normal use from the date of purchase.

This ***WARRANTY*** does not apply to any product damaged by accident, misuse, abuse, improper line voltage, drop, fire, flood or if the product was altered or repaired by anyone other than the qualified service personnel.

The liability of Gemmy Industrial Corp. is limited to repair or replacement and under no circumstances shall MRC be liable for any collateral consequential damages or losses. This guarantee specifically excludes the expendables and consumables.

All warranty claims must be directed to the distributors or agents authorized by MRC Industrial Corp. responsible for the sale of this equipment. The users are responsible for shipping expenses.

User Name : _____

Address : _____

_____

Fax No. : _____

User's complaint:

Date of Purchase: _____

Product Model : _____

Serial No. : _____

Distributor : _____