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Operations Manual

Digital Drybath

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This manual covers the models shown below

NA Model	EU Model	Voltage	Description
88860021	N/A	100-120V	FS Drybath Stdrd 1 blck 100-120V
88860022	N/A	100-120V	FS Drybath Stdrd 2 blck 100-120V
88860023	N/A	100-120V	FS Drybath Stdrd 4 blck 100-120V
88860024	15387928	200-240V	FS Drybath Stdrd 1 blck 200-240V
88860025	15397928	200-240V	FS Drybath Stdrd 2 blck 200-240V
88860026	15317938	200-240V	FS Drybath Stdrd 4 blck 200-240V

IMPORTANT! Before using this product, read this entire operation manual carefully. Users should follow all of the operational guidelines contained in this manual and take all necessary safety precautions while using this product. Failure to follow these guidelines could result in potentially irreparable bodily harm and/or property damage.

Caution all internal adjustments and maintenance must be performed by qualified service personnel.

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Caution:

Before the initial use of this instrument, please carefully read this manual.

Important Notes

1. General Practice

Caution:
Important information is contained in any item and should be carefully read. Failure to observe the instruction would result in damage or abnormal function of the instrument.

Warning!
The warning message requires extremely careful operation of a certain step. Failure to observe the instruction may result in serious personal injury.

2. Safety

During operation, maintenance and repair of this instrument, the following basic safety notes should be observed. In case of failure to follow these instructions, the warnings or notes indicated herein, the basic protection provided by the instrument, its safety criteria of design and manufacture, and its predicted use range would be impaired. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Caution:
This instrument is for indoor use.

a) The ground connection

To avoid the electric shock, the input power line must be reliably grounded. The instrument is equipped with the three-pin plug that has the third pin (the pin connects the ground), therefore, the plug should be used with the grounded power socket only.This is a kind of safety device. If the plug cannot be plugged into the power socket, please ask the electrician to install a correct power socket, so as to make the grounded plug work for safety.
Thermo Fisher Scientific is not responsible for any injury as a result of the user's failure to observe the following requirements.

b) Servicing and Replacement of Parts

The operator should not take the instrument apart without permission. Only qualified professionals are allowed to replace elements or adjust components inside the instrument. Replacement of components while unit is connected to power and/or turned on is prohibited.

c) Observe voltage/power requirements

Before the instrument is connected to the AC power source, the voltage of the power source should be the same with the required voltage of the instrument (a deviation of ±10% is allowed). The rated load of the power socket should not be lower than the requirements of the instrument.

d) The power cord

The instrument should use the power line cord attached to it. If the power line is destroyed, it must be replaced but not be repaired. The replacement should be carried out with the power line of the same type and same specifications. No items should be put on the power cord when the instrument is in operation.

e) Connecting and disconnecting to/from power source

The user should hold the plug to remove from power source. When connecting the plug, user should make sure it has been fully plugged in; when removing the plug, do not pull the power line forcefully.

f) Placement of the instrument

This instrument should be fixed in a low RH and low dust place away from water source (e.g. sink or water pipeline) and the room should be well ventilated, and free of corrosive gas or interference of strong magnetic field. The instrument should not be placed in wet or location.
The openings on this instrument are for ventilation circulation and in order to avoid over-heat of the instrument body, they should not be blocked or covered. When a single set of instrument is used, the interval

between ventilation opening before and after the instrument and its nearest object should not be less than 25cm. Also, don't use the instrument on loose or soft surface, or the air inlet of its bottom might be blocked. Excessive temperature will impair performance or result in failure of the instrument. This instrument should not be used in locations subjected to direct sun light.
The instrument should be kept away from hot gas, oven and all other heat sources. If the instrument is to be stored for a long time, the power plug should be withdrawn and the instrument covered with soft cloth or plastic film to avoid entrance of dust. The product is powered by connecting the mains plug to a standard socket-outlet. Always place the product in such a way that it is easy for the operator to disconnect the product from the mains supply.

g) Explanation of symbols

Attention, read user manual before use.

Warning!
There is a sign of "CAUTION: HOT SURFACE! or ATTENTION: SURFACE HOT" on the instrument. The metal part (module) near the sign should not be touched with any part of the body when the Instrument is operating in a high temperature state or just finished operation to avoid burns!

Conductor Terminal

Alternating Current Protective

Caution:
In any of the following cases, immediately cut off the power supply, withdraw the power plug from the power socket and contact the supplier for service:

- Liquid drops into the inside of the instrument.
- The instrument is rained on or water is spilled on it.
- The instrument works abnormally, especially when generating an abnormal sound orodor.
- The instrument is dropped or its casing is damaged.
- The function of instrument obviously changes.

3. Maintenance of the instrument

The holes of the blocks should be regularly cleaned with the damp cloth to ensure the test tube be well contacted with the wall of the holes so as to have good heat conduction. If the surface of the instrument is polluted, it can be cleaned with a slightly damp soft cloth.

Warning!
When cleaning the instrument, the power supply should be shut off and unplugged.The instrument surface should be cleaned with a non corrosive cleaning agent.

4. Declaration of Conformity

We hereby declare under our sole responsibility that this product conforms to the technical requirements of the following standards:

CEEMC:	EN 61326-1
CE Safety:	EN 61010-1 CE
Safety:	EN 61010-2-010
UL:	61010-1/CSAC22.2 NO.61010-1
ROHS2.0:	2011/65/EU

Chapter I Introduction

The product is a dry bath with advanced microcomputer control, which can be widely applied to sample reservation, enzyme reservation and reaction, DNA amplification, electrophoresis degeneration and serum coagulation, etc. The characteristics of the product are as follows:

- The digital display for control of the temperature.
- Heat blocks help avoid possible contamination while containing the sample inside a tube.
- The heat blocks are easy to replace, clean and disinfect and are suitable for various tubes sizes.
- Built-in over-temperature protection device warrants sample and user safety.
- Temperature deviation adjustment.

Chapter II Features

This chapter introduces the usage, transportation, storage conditions of the instrument, as well as its basic parameters, performance and functions.

1. Normal working conditions

Ambienttemperature: 10°C ~ 30°C
Relative humidity: ≤80%
Power supply: 100-120V~ 50/60 Hz or
200-240V~ 50/60 Hz
Operation: Up to 2000m
Pollution degree: 2
Overvoltage category: II Indoor use

Caution:
Before using the instrument, please make sure the working condition meets the above requirements. Especially that the power line is reliably grounded.

2. Transportation and storage conditions

Ambient temperature: -20°C ~ +55°C
Relative humidity: ≤80%

3. Basic parameters

Table 1: 100-120V

NA Catalog Number	88860021	88860022	88860023
Model Name	Digital 1 block 100-120V	Digital 2 block 100-120V	Digital 4 block 100-120V
Temperature Range	Ambient Temperature +5°C ~ 130°C (Ambient Temperature 25°C)		
Temperature Uniformity	≤ ±1.0°C		
Temperature Accuracy	≤ ±0.5°C@37°C		
Temperature Fluctuation	≤ ±0.5°C		
Temperature Rise Time	≤20 min (rise from 30°C to 130°C)		≤25min (rise from 30°C to 130°C)
Size (LxWxH)	288x200x100 mm	318x200x100 mm	450x200x100 mm
	11.3x7.87x3.94 in	12.5x7.87x3.94 in	17.7x7.87x3.94 in
Weight	2.9 kg 6.39 lbs.	3.3 kg 7.28 lbs.	4.7 kg 10.36 lbs.
Fuse Protector (Φ5x20)	F 250V 2.5A	F 250V 5A	F 250V 8A

Table 2: 200-2400V

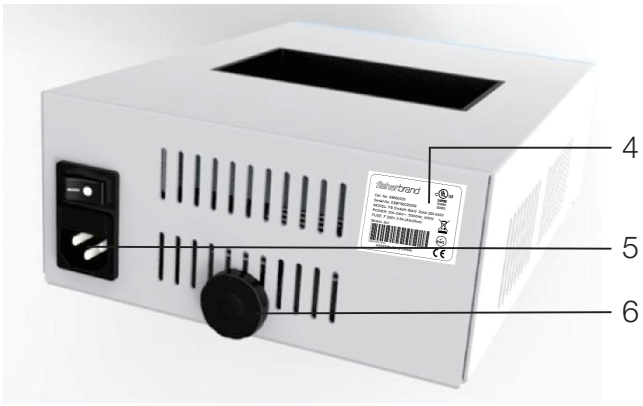
NA Catalog Number	88860024	88860025	88860026
EU Catalog Number	15387928	15397928	15317938
Model Name	Digital 1 block 200-240V	Digital 2 block 200-240V	Digital 4 block 200-240V
Temperature Range	Ambient Temperature +5°C ~ 13°C (Ambient Temperature 25°C)		
Temperature Uniformity	≤ ±1.0°C		
Temperature Accuracy	≤ ±0.5°C@37°C		
Temperature Fluctuation	≤ ±0.5°C		
Temperature Rise Time	≤20 min (rise from 30°C to 130°C)		≤ 25 min (rise from 30°C to 130°C)
Size (LxWxH)	288x200x100 mm	318x200x100 mm	450x200x100 mm
	11.3x7.87x3.94 in	12.5x7.87x3.94 in	17.7x7.87x3.94in
Weight	2.9 kg 6.39 lbs.	3.3 kg 7.28 lbs.	4.7 kg 10.36 lbs.
Fuse Protector (Φ5x20)	F 250V 2.5A	F 250V 2.5A	F 250V 3.15A

Caution: The instrument only use for heating operation: from low temperature to high temperature.

Chapter III Preparation Work

This chapter introduces structure of the instrument, user interface and functions of all buttons and preparation before startup. Read the content in the chapter carefully before using the instrument for the first time.

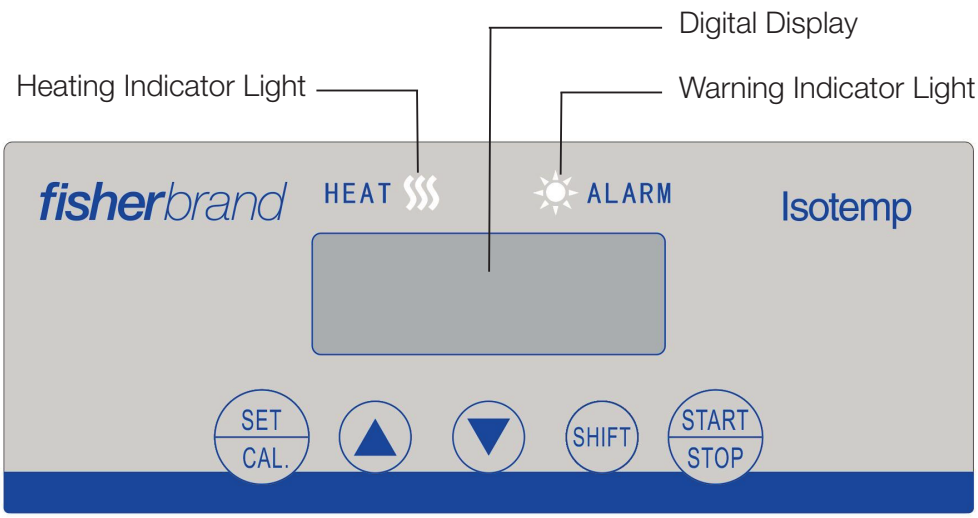
1. Structure diagram



1. Housing 2. Front Cover 3. Display Window 4. Product Label

5.Power Socket, Fuse Housing, Power Switch 6. The Handle, to lift hot blocks

2. Display panel diagram



3. Instructions for buttons

Setting or adjusting button: Press the button to display present setting temperature and press the button again to display present time. After the unit has reached set point and temperature is stable, calibration can be set by pressing the button.

Under the status of setting, press "▲" or "▼" to modify the flashing figure.

The instrument will enter temperature calibration mode if press the two buttons simultaneously under the status of stopping.

When setting or adjusting, pressing the button can move the flashing figure. During the operation, the display can be switched between the temperature and the time.

For starting up or stopping program.

Chapter IV Operation Guidance

This chapter introduces the displaying window and the operation of buttons of the dry bath with constant temperature.

Notes:
The illumination pattern of the 'Heat Light' indicates the Operation status.

- Heat Light OFF (Unit Stopped) = “Set/Cal” button used for Setpoint adjustment.
- Heat Light blinks/flashes as Block is heating or cooling toward setpoint.
- Heat Light ON (Unit Started and stable at setpoint) = “Set/Cal” used for Calibration.

1. Examination before startup

Please confirm the following content before plugging the plug into the power socket.

1. The power source is in accordance with the voltage requirement of the instrument (please refer to the chapter II for the requirement of the voltage);
2. Make sure the plug has been fully plugged into the power socket;
3. The power line is reliably grounded.

Caution:
If the display of the instrument is abnormal after startup, please turn off the power source immediately and contact with the supplier.

2. Startup

Press the power switch and the instrument will power on. All indicator lights and display serial ports will be turned on. About 3 ~ 5 seconds later, temperature display window will show the real-time temperature. All indicator lights will be turned off.

3. Setting temperature and heating time

Set Temperature and Hold-Time Setpoint:

1. Connect power cord to appropriate electrical supply.
2. Make Power switch, located near power cord on rear, to the ‘on’ position.
3. Confirm the Heat-indicator is ‘off’. If 'on' or 'blinking’, press "Stop".
4. Set-up Temperature:
   A. Press the "SET/CAL" button.The instrument is in the Temperature Setpoint mode with the display window showing the previous temperature set value, and the left digit flashing.
   B. Press "▲" to increase or "▼" to decrease the flashing digit of the Setpoint.
   C. Press "SHIFT" to move the flashing right, to the next digit.
   D. Repeat Steps 4B and 4C to complete Temperature setpoint selection.
5. Setting Hold-Time Setpoint:
   A. After the temperature is selected, press "SET/CAL" button.The instrument is in the Hold-time Setpoint mode with the display window showing the previous Hold-time set value, and the left digit flashing.
   B. Press "▲" to increase or "▼" to decrease the flashing digit of the Hold-Time. Choose a time from 00:01 to 99:59, hours and minutes.
   C. Press "SHIFT" to move the flashing right, to the next digit.
   D. Repeat Steps 5B and 5C to complete Hold-Time setpoint selection. For Continuous operation, Choose 99:59 then increase to display "- -:- -".
   E. After the Time setting is complete, Wait for 5 seconds and the instrument will automatically exit the Setpoint mode. The display will now show the current measured temperature.

6. Press "Start" button to begin heating the Block. The green "Heat Light" will blink as Block is heating toward set point.
7. Allow 30-minutes for temperature to stabilize. The heat indicator stops blinking and remains constantly ON to indicate the temperature is stable, and instrument is ready to use.

Instruction:
There is limitation for temperature and time setting. The setting temperature range is: 15 ~ 135°C; the time range is : 0~99h59min and continuous mode "- -:- -".

4. Start and stop instrument

START: Press "START/STOP" to start operation, the indicator light "HEAT" will be flashing. When the instrument achieves the setting temperature, the "HEAT" light will stop flashing. This indicates that the unit will enter hold temperature status. The digital display window will display the real-time temperature and the timing function by pressing "SHIFT" button. When the holding time equals to the setting time, the instrument will alarm 5 beeps.

STOP: Under the working status, press "START/STOP" to stop working. At that time, corresponding working indicator light "HEAT" will be turned off. The digital display window displays the real-time temperature.

5. Temperature measurement and calibration

1. The instrument has been operational for minimum of 30-minutes at desired setpoint.
2. An independent temperature measurement device is in the designed 5mm hole in Block, along with paraffin oil, or similar heat-transfer oil.
3. Confirm the Heat-indicator is ‘ON’ steady, not ‘blinking’.
4. Compare the Display and independent measurements. And check if the temperature gap is >0.2°C or not.
5. If less than 0.2°C, no calibration should be made.
6. If more than 0.2°C, calibrate the Temperature by these steps:
   A. Press and hold the "SET/CAL" button. The instrument is in the Temperature Calibration mode with the display window showing the measured temperature value, and the left digit flashing.
   B. Press "▲" to increase, or "▼" to decrease, the flashing digit to match the same digit of the independent measurement.
   C. Press "SHIFT" to move the flashing right, to the next digit.
   D. Repeat Steps B and C to complete Temperature caibration.
   E. After the temperature calibration is completed, press "SET/CAL" button to exit the calibration mode and continue the Start mode.
7. The Heat-indicator may start 'blinking' as the temperature is stabilized to the calibrated temperature.
8. When the Heat-indicator is 'ON' steady, the temperature is stable.
9. After the instrument stable operated for additional 10 minutes, compare the display temperature and measurement again.
   If the temperature gap is >0.2°C, repeat all steps of 6.

Caution:
1. To ensure the accuracy of temperature, the instrument shall be calibrated after temperature stabilizes for 30 minutes.
2. Calibrate the instrument with qualified Grade II standard filled thermometer.
3. Calibration point: The middle hole of the heat block. Fill with paraffin oil and soak the thermometer bulb.

Chapter V Failure Analysis and Troubleshooting

This chaper introduces possible failures of this instrument, explanation and troubleshooting.

Caution:
The user is not allowed to open the housing of the instrument for inspection during the warranty period. If any failures that require opening the housing for inspection occur, the supplier or manufacturer should be contacted timely.

Failure Analysis and Troubleshooting

NO.	Error	Cause	Soultion
1	Display window is not turned on after switching on power supply	Power supply fails to be connected	Check power supply and connect it
		Fuse burned out	Replace fuse
		Damage of the switch	Replace the switch
		Others	Contact Thermo Fisher Scientific
2	Temperature display window shows "001" and the buzzer alarm in a di...di...sound	Short circuit of sensor	Check if the connecting line of sensor is damaged, and replace it
3	Temperature display window shows "002" and the buzzer alarm in a di...di...sound	Open circuit of sensor	Check if the connecting line of sensor is damaged, and replace it
4	Temperature display does not conform to actual temperature	Sensor is damaged or in poor contact	Contact Thermo Fisher Scientific

Chapter VI Accessories

Accessories

NA Cat. No.	EU Cat. No.	Heating Blocks	No. of Holes
88860101	15327938	For 6mm test tubes	46
88860102	15337938	For 10mm test tubes	28
88860103	15347938	For 1.5ml test tubes	28
88860104	15357938	For 2.0ml test tubes	28
88860105	15367938	For 12mm & 13mm test tubes	24
88860106	15377938	For 15mm & 16mm test tubes	15
88860107	15387938	For 17mm & 18mm test tubes	12
88860108	15397938	For 20mm test tubes	8
88860109	15307948	For 25mm test tubes	6
88860110	15317948	For 0.5ml test tubes	40
88860111	15327948	For 96 well Elisa plate	1
88860112	15337948	For mixed size test tubes 32 holes for 6mm test tubes 21 holes for 10mm test tubes	32+21
88860113	15347948	For mixed size test tubes 18 holes for 1.5ml test tubes 10 holes for 2.0ml test tubes	18+10
88860114	15357948	For mixed size test tubes 3 holes for 25mm test tubes 12 holes for 13mm test tubes 6 holes for 6mm test tubes	3+12+6
88860115	15377948	For mixed size test tubes 30 holes for 0.5ml test tubes 20 holes for 0.2ml test tubes	30+20
88860116	15387948	For 15 ml flat bottom test tubes	15
88860117	15397948	For 50 ml flat bottom test tubes	4
88860118	15307958	For 15ml conical bottom test tubes	15
88860119	15317958	For 50ml conical bottom test tubes	4
88860120	15337958	For 96 well none skirted PCR plate	1
88860121	15347958	For 96 well half/full skirted PCR plate	1

* Dry bath blocks can be autoclaved.

Warranty

When used in laboratory conditions and according to these operation instructions and maintenance, this product is warranted for 24 months against defective materials or workmanship. The 24 month warranty period begins from the delivery date of this product.

For product quality or performance issues, contact Fisher Scientific Customer Service.

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