



H-C Mixer

Operating Instructions

Model 270600

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1. Safety

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.



As the unit is producing shaking or rotational movement, be aware of the surface that the unit will be placed upon.



Connect only to a power supply with a voltage corresponding to that on the serial number label.



Ensure that the main switch and isolating device (power supply connector) are easily accessible during use.



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.



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.



Place unit on a solid, level work surface or laboratory bench.

2. General Information

The H-C Mixer is designed for shaking and controlling a set temperature in a range from 18°C below ambient to 99°C in 0.5, 1.5, 2.0 ml micro test tubes and Standard/Deep well micro-titre plates and PCR tubes and plates.

This device can be used in:

- Immuno-chemistry for sample shaking at a constant temperature
- Biochemistry for enzyme analysis
- Other general research laboratory applications

In addition to the controlled temperature mixing function of the H-C Mixer, the unit also has the functionality of a mix-pause function. In this function, the temperature is controlled and the unit can be programmed to mix for an established period of time and then paused for a set period of time. The mix-pause function can be programmed by the end user and cycled for a pre-determined period of time.

The H-C Mixer can also be programmed to control up to two timed set temperature modes while mixing the sample. The temperature, mixing speed and program duration are independently controlled for greater versatility in the laboratory.

3. Getting Started

3.1 Unpacking

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

The Boekel Scientific H-C Mixer includes:

- Thermal-mixer1 piece
- External Power Supply1 piece
- Accessory Block for 20 x 1.5/2.0 microtubes1 piece
- Operating Instructions.....1 copy

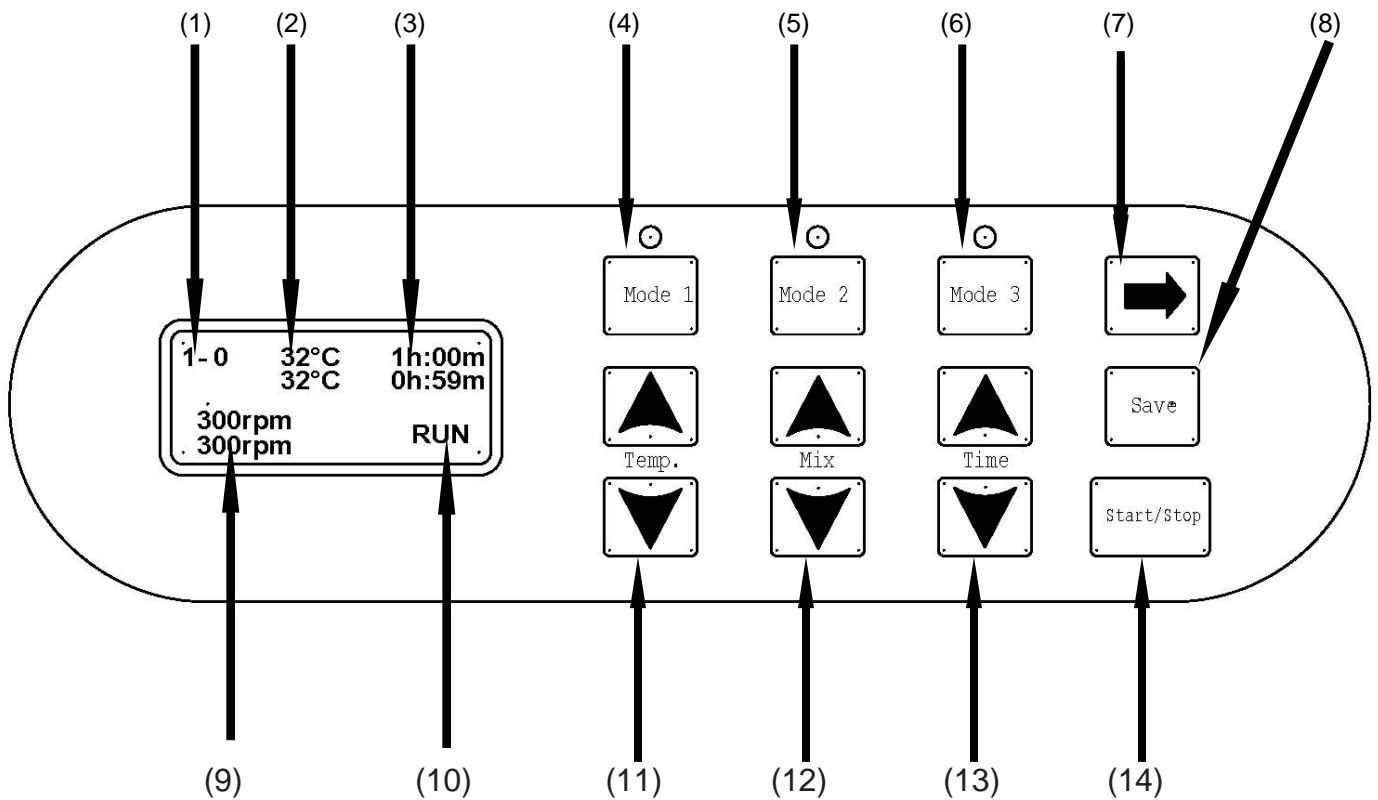
3.2 Instrument Placement

Place the H-C Mixer on a solid level surface so that there is at least 10 cm of clearance from adjacent walls and devices and that the ventilation slots on the side of the unit are free from obstruction.

Connect the H-C Mixer to the AC/DC adapter and the adapter to the main power supply and the power cord to power supply outlet.

Switch the unit to the on position utilizing the power on/off switch located on the rear left side of the instrument.

4. Operation



4.1 Operation Controls (Figure 1)

- (1) Mode Display
- (2) Set Temperature Display (top)/ Actual Temperature Display(bottom)
- (3) Set Time Display (top)/ Actual Time Remaining Display (bottom)
- (4) Mode 1 Program button
- (5) Mode 2 Program button
- (6) Mode 3 Program button
- (7) Function Toggle arrow
- (8) Save program Button
- (9) Set RPM Display (top)/ Actual RPM Display (bottom)
- (10) RUN/PAUSE/STOP/End Function Indicator
- (11) Temperature Adjustment buttons
- (12) RPM Adjustment buttons
- (13) Time Adjustment buttons
- (14) Start/Stop/Reset button

4.2 Mounting exchangeable H-C Mixer Blocks.

The H-C Mixer includes a Thermal block for 20 x 1.5/2.0 ml Tubes. The unit can also be fitted with three additional Thermal Blocks that can accommodate 0.5 ml tubes, 96-well PCR plates and Standard and Deep Well Micro Titre plates. To change and mount the accessory plates, turn the unit off and disconnect it from the power source. Remove the 4 chrome thumb screws and carefully remove the thermal block from the unit. Select the accessory block to be used and align the block on the top of the thermal Mixer Base. The four set-screw holes will align and the block will seat nicely on the top of the unit. Replace the four chrome thumb screws into the accessory block being careful not to over-tighten the screws. Reconnect the power supply and turn the unit on for operation.

The following Accessories are available:

<u>Boekel Catalog #</u>	<u>Description</u>
270690	Thermal Block for 20 x 1.5/2.0 ml tubes (Supplied with unit)
270691	Thermal Block for 20 x 0.5 ml tubes
270692	Thermal Block for 96-well PCR plate
270693	Thermal Block for Standard and deep well Micro Titre Plates

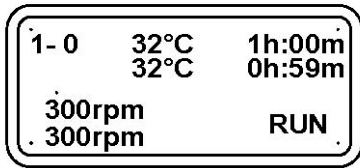
4.3 Mode Selection

There are three programmable modes capable of storing up to ten programmable settings per mode. To select a mode, press the appropriate Mode Button. To select a specific program in a Mode, press the Mode button until the Mode display reads the selected program.

- Mode 1-** This mode is used for set temperature and mixing control for a set/unlimited period of time.
- Mode 2-** This mode is used for a set temperature control with a mix/pause function that can control the length of time that the samples are mixed and paused for a pre-determined period of time.
- Mode 3-** This mode is used to control a set temperature and mixing speed requirement for a pre-determined period of time then change to a second set temperature and mixing speed requirement for a second pre-determined period of time.

Note: To change between modes during use, the Function Indicator must be in the "STOP" condition. If a program function is in-process, press and hold the "Start/Stop" button until an audible beep is heard and the display reads "STOP".

4.4 Mode 1 Operation



Mode 1 is used for set temperature and mixing control for a set/unlimited period of time and can be programmed for up to 10 programmable user functions.

The mode display will show the Mode and the program setting. For example, the display above shows 1-0 for the mode setting, indicating Mode 1 program 0. For this mode operation, use the Temperature adjustment buttons, RPM adjustment buttons and Time adjustment buttons to set the Temperature, RPM, and Mix Time.

The temperature can be set from 2°C to 99°C or the Temperature control function can be turned off by holding down the Temperature adjustment arrow until the Temperature display reads “off” and audible beep is heard.

Note: During cooling operation, increased fan velocity may be observed.

The timer can also be set to count up by holding down the Time adjustment arrow until the time display reads “off” and audible beep is heard.

To save the set parameters to the Mode, press and hold the Save button until an Audible beep is heard.

Press the Start/Stop button to start the operation. As in the figure above, “RUN” will appear in the function indicator area showing that an operation is in process.

Pressing the Start/Stop button once will “PAUSE” the operation. Pressing the Start/Stop button again will resume the operation. Upon completion of the operation an audible beep will sound and the Function indicator will read “END”.

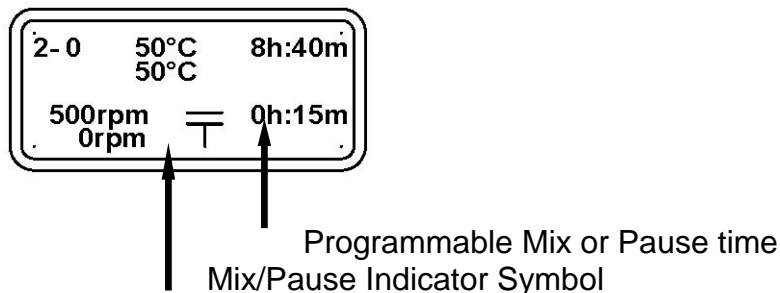
Note: Upon the completion of an operation, the unit will stop mixing. The heat/cool function will continue to operate at the last set temperature.

To reset a program to the starting point or change function parameters during the operation of a program, first pause the cycle by pressing the Start/Stop button. Once paused, the mode cycle will need to be reset by pressing and holding the Start/Stop button for approximately 3 seconds until an audible beep is heard and the function indicator reads “STOP”. At this point you can change function parameters or start a new program cycle.

Following is an example of Mode 1 Program setting to run at 50°C at 400 RPM for 3h:45m:

1. Use Temp arrow buttons to select 50°C.
2. Use Mix arrow buttons to select 400RPM.
3. Use Time arrow buttons to select 3h:45m
4. Depress Save Key if you wish to save the program.
5. Depress the “Start/Stop button to start program.
6. Unit will begin to run. Timer will begin to count down.
7. Upon completion of program the unit will stop and the display will indicate “End”

4.5 Mode 2 Operation



Mode 2 is used for a set temperature control with a mix/pause function that can control the length of time that the samples are mixed and paused for a pre-determined period of time and can be programmed for up to 10 programmable user functions.

The mode display will show the Mode and the program setting. For example, the display above shows 2-0 for the mode setting, indicating Mode 2 program 0. For this mode operation, Use the temperature adjustment buttons, Rpm adjustment buttons and Time adjustment buttons to set the Temperature, RPM, and total program Time.

The temperature can be set from 2°C to 99°C or the Temperature control function can be turned off by holding down the Temperature adjustment arrow until the Temperature display reads “off” and audible beep is heard.

Note: During cooling operation, increased fan velocity may be observed.

Set the total program time by using the Time adjustment buttons. The total program time is the time that the program will run while cycling between the mix/pause time cycles.

To set the time that the unit will mix, press the function Toggle Arrow once and the mix indicator “ $\overline{\text{T}}$ ” will blink indicating the ability to set the mix time for the function. Set the mix time by using the Time adjustment buttons. Press the Toggle arrow again to toggle to the

pause set time function. The Pause indicator “ \perp ” will blink indicating the ability to set the pause time of the function. Set the pause time by using the time adjustment buttons.

To save the set parameters to the Mode, press and hold the Save button until an Audible beep is heard.

Press the Start/Stop button to start the operation. As in the figure above, “RUN” will appear in the function indicator area showing that an operation is in process.

The mix/pause cycle will continue until the total set time for the complete cycle has elapsed.

Pressing the Start/Stop button once will “PAUSE” the operation. Pressing the Start/Stop button again will resume the operation. Upon completion of the operation an audible beep will sound and the Function indicator will read “END”.

Note: Upon the completion of an operation, the unit will stop mixing. The heat/cool function will continue to operate at the last set temperature.

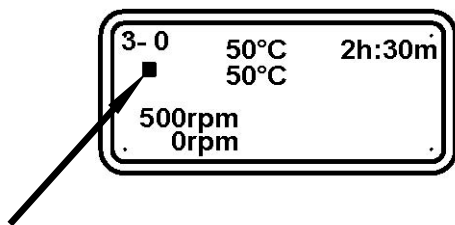
To reset a program to the starting point or change function parameters during the operation of a program, first pause the cycle by pressing the Start/Stop button. Once paused, the mode cycle will need to be reset by pressing and holding the Start/Stop button for approximately 3 seconds until an audible beep is heard and the function indicator reads “STOP”. At this point you can change function parameters or start a new program cycle.

Following is an example of Mode 2 Program setting to run at 60°C at 500 RPM for a total run time of 2h:30m with the unit mixing for 3 minutes and pausing for 1 minute:

1. Use Temp arrow buttons to select 60°C.
2. Use Mix arrow buttons to select 500RPM.
3. Use Time arrow buttons to select 2h:30m.
4. Depress “→” button. “ \perp ” will blink on the display indicating the “cycle run time”. Use Time arrow buttons to select a cycle run time of 0h:03m.
5. Depress “→” button again. “ \perp ” will blink on the display indicating the “cycle pause time”. Use Time arrow buttons to select a cycle pause time of 0h:01m.
6. Depress “→” button to return to the home mode screen.
7. Depress the Save button if you wish to save the program.
8. Depress the “Start/Stop” button to start program.
9. Unit will begin to alternate between running for 3min, and pausing for 1min, this will continue for a total of 2h:30m. During the pause function, the unit will maintain the set temperature while the mixing has paused.
10. Upon completion of program the unit will stop and display will indicate “End”.

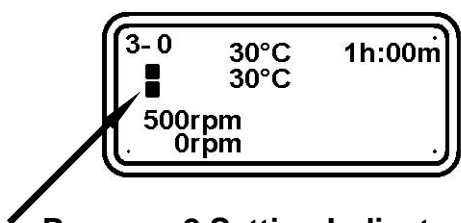
4.6 Mode 3 Operation

Fig. 2



Program 1 Setting indicator

Fig. 3



Program 2 Setting Indicator

Mode 3 is used to control a set temperature and mixing speed requirement for a pre-determined period of time then change to a second set temperature and mixing speed requirement for a second pre-determined period of time and can be programmed for up to 10 programmable user functions.

The mode display will show the Mode and the program setting. For example, the display above shows 3-0 for the mode setting, indicating Mode 3 program 0. For this mode operation, Use the temperature adjustment buttons, Rpm adjustment buttons and Time adjustment buttons to set the Temperature, RPM, and initial timed temperature cycle. The Setting indicator will show one solid block indicating that you are programming the first timed setting of the program. See Fig. 2.

To set the second program setting of the cycle, press the Toggle Arrow once until two Solid blocks appear, see Fig. 3. For the second program function, set the temperature, RPM, and time for the second program setting. Press and hold the Save button until an audible beep is heard to save the program.

Note: During cooling operation, increased fan velocity may be observed.

Press the Start/Stop button to start the operation, "RUN" will appear in the function indicator area showing that an operation is in process. A single solid block in the Program Setting indicator shows that the program is in the first phase of the program. Two solid blocks in the Program Setting indicator shows that the program is in the final phase of the program. Pressing the Start/Stop button once will "PAUSE" the operation. Pressing the Start/Stop

button again will resume the operation. Upon completion of the operation an audible beep will sound and the Function indicator will read "END".

Note: Upon the completion of an operation, the unit will stop mixing. The heat/cool function will continue to operate at the last set temperature.

To reset a program to the starting point or change function parameters during the operation of a program, first pause the cycle by pressing the Start/Stop button. Once paused, the mode cycle will need to be reset by pressing and holding the Start/Stop button for approximately 3 seconds until an audible beep is heard and the function indicator reads "STOP". At this point you can change function parameters or start a new program cycle.

Following is an example of a Mode 3 Program. The 1st program step will heat at 90°C at 1200 RPM for a run time of 1h:30m, and a 2nd program step will cool at 25°C at 250 RPM for a run time of 4h:00m:

1. When you enter Mode 3 a solid block indicating the 1st program step, will be displayed in the upper left corner of the display as indicated in Fig. 2.
2. Use Temp arrow buttons to select 90°C.
3. Use Mix arrow buttons to select 1200RPM.
4. Use Time arrow buttons to select 1h:30m.
5. Depress the "→" button; a 2nd solid block indicating the 2nd program step will appear on the display as indicated in Fig. 3.
6. Use Temp arrow buttons to select 25°C.
7. Use Mix arrow buttons to select 250RPM.
8. Use Time arrows to select 4h:00m.
9. Depress the "Save" button if you wish to save the program.
10. Depress "Start/Stop" button to start the cycle.
11. Unit will now run for 1h:30m at 90°C and 1200RPM, at the conclusion of 1h:30m the unit will then run for 4h:00m at 25°C and 250RPM.
12. The unit will stop and display "end" at the conclusion of both steps.

5. Specifications

The Boekel Scientific H-C Mixer provides:

- Adjustable speed offers gentle or vigorous mixing action
- Precision temperature control from 18 °C below ambient to 99 °C
- Multiple Thermal block configurations for 0.5, 1.5/2.0 MCT, PCR plats and Standard/Deep well Micro Titre Plates
- Programmable control for standard operation, Mix/Pause function and heat/cool programmable Mode with up to 10 programmable settings per mode.

- Temperature control range.....18 °C below ambient to 99 °C
- Orbit2 mm
- Independent timer with sound signal1m – 99h:59m
- Speed range250 - 1400 RPM
- Rotational speed setting10 rpm
- Heat-up Time.....5 °C per Minute
- Cool-down Time2-3 °C between 99 °C and Ambient, 0.5-1 °C between ambient and 2 °C
- Display16x4, LCD
- Block loading capacity20 x 1.5/2.0 ml tubes
- Nominal voltage19V, 6.32 A via 100/240 AC adapter
- Dimensions175 mm x 185 mm x 90 mm
- Weight with power supply7.25 kg

6. Warranty and Service

6.1 Warranty

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

6.2 Service

A Boekel Scientific Returned Material Authorization (RMA) number provided by Boekel Scientific is required before any Boekel products are returned for any reason. 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.

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