

Operations Manual

ORBi-SHAKER™ CO₂
All Environment Shaker

ORBi-SHAKER™ CO₂ XL
All Environment Shaker



Benchmark 

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I. General Information

NOTE : Before operating the Orbi-Shaker CO₂ & XL please take a few minutes to familiarize yourself with the contents of this manual.

Thank you for purchasing the Orbi-Shaker CO₂ & XL.

This operations manual contains instructions for the care of this Instrument. In order to use the instrument properly, please read this manual carefully before operation. Please keep it available for future use.

Prior to the initial operation:

Please check the Instrument and the accessories against the packing list when you first open the shipping carton. If you find there is damage, a discrepancy, or missing items, please contact your supplier immediately.

II-1. Introduction

The Orbi-Shaker CO₂ & XL is designed for use in extreme environments, including CO₂ incubators. The product is ideal for many applications used in general research laboratories, including cell culture, bacteria suspension, etc.

The Microprocessor's constant monitoring system ensures accurate shaking speed. The beltless drive system minimizes noise and vibration while increasing the life span of the unit. Optional accessories are available for compatibility with a wide variety of laboratory vessels, including flasks, tubes, dishes and trays.

II-2. Installation

- Choose a location for the shaking mechanism.
- To assure proper ventilation, allow a minimum of 2 inches (5 Cm) of the clearance between the rear and side of the unit and the adjacent wall.
- Always ensure that the machine is installed on a level surface.
- Once the machine is placed in the desired location, attach the flat cable to the remote controller.
- Place the remote controller in the desired location.
(Ensure that the remote controller is located in a dry area)
- Before plugging the remote controller into the outlet, ensure that the electrical specifications (listed on the serial number label on the rear side of the controller) matches the electrical specifications of your outlet.
- **ALWAYS: Connect the flat cable from the remote controller to the shaking mechanism before connecting the controller to the electrical outlet.**

When installing the instrument inside of an incubator, typically, the flat cable can exit the incubator through a cable port (usually located on the back of the incubator). If your incubator does not include a port, the flat cable is designed so that it can also exit between the front of the door and the chamber without preventing sealing.

II-3. Specification for **BT-4001**

- 1) Dimension (Exterior) : 30 (W) X 34 (D) X 11.8 (H) cm
/ 11.8 (W) x 13.5 (D) x 3.5 (H) in.
(Platform): 30 (W) x 33 (D) cm
/ 12 (W) x 13 (D) in.
- 2) Speed range : 30 - 300 RPM
(No load & on stable surface)
- 3) Shaking Orbit: 19mm (3/4")
- 4) Timer : Digital - 1 min. to 99hr 59min.
(1 min. increments)
Or continuous
- 5) Motor : Brushless DC - Beltless
- 6) Weight: Shaker: 25 lbs / 11.5 kg
Controller: 5 lbs / 2.3 kg
- 7) Electrical: 115V, 60Hz / 25W
230V, 50Hz / 30W
- 8) Fuse: For 115V 125V / 3A
For 230V 250V / 5A
- 9) Operating Environment: 0 to 65°C

II-3. Specification for **BT-4011**

1) Dimension (Exterior) : 43 (W) X 45.75 (D) X 12.7 (H) cm
/ 7 (W) X 18 (D) X 5 (H) in.

(Platform): 40.5 (W) X 42 (D) cm
/ 16 (W) X 16.5 (D) in.

2) Speed range : 30 - 300 RPM
(No load & on stable surface)

3) Shaking Orbit: 19mm (3/4")

4) Timer : Digital - 1 min. to 99hr 59min.
(1 min. increments)
Or continuous

5) Motor : Brushless DC - Beltless

6) Weight: Shaker: 50 lbs / 23 kg
Controller: 5 lbs / 2.3 kg

7) Electrical: 115V, 60Hz / 20W
230V, 50Hz / 30W

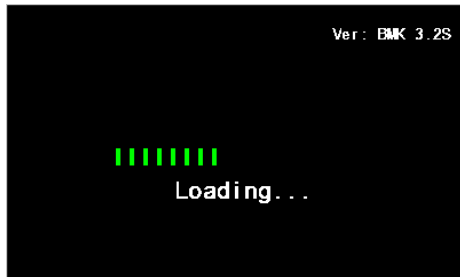
8) Fuse: For 115V 125V / 3A
For 230V 250V / 5A

8) Operating Environment: 0 to 65°C

II-4. Features

- 1) Constant Monitoring System (CMS) ensures precise control over speed
- 2) Sealed shaking mechanism for use in extreme environments (humidity up to 100%)
- 3) Controller allows for speed/time adjustment without opening door when it is used in an Incubator or a chamber.
- 4) MAGic Clamp platform available as optional accessory.
- 5) Brushless DC motor and beltless drive system minimizes noise and vibration.
- 6) Digital controller displays speed and time.
- 7) Wide variety of optional accessories available for most common laboratory vessels

III-1. Operation



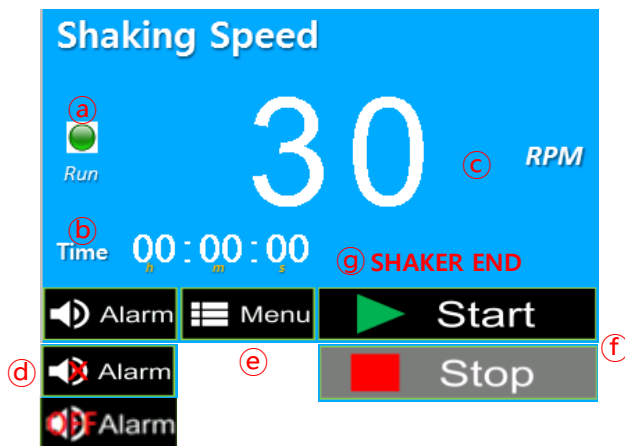
► Booting

Press the power switch into the ON position, the display illuminates and the booting screen is displayed for 2 seconds before showing the "Basic View" screen.

NOTE: If the shaker has been powered off before the completion of a run, the unit will automatically power on to the previous settings.

3.1.1 Basic View Screen

► Basic View Screen



(a) RUN LED: indicates if the shaker is running.

(b) Time setting: Indicates the set or remaining time.
(To adjust, TOUCH the time value)

(c) RPM setting: Displays the set or current RPM
(To set the desired shaking speed, TOUCH the RPM value)

(d) **Alarm Mute** : The audible alarm can temporarily deactivated by TOUCHING the key  when the audible alarm is active (beeping). This silences/mutes the alarm for 10 minutes and the icon is displayed as . Following the 10 minute mute, if alarm event continues, audible alarm is unmuted.

To unmute the alarm, TOUCH the  key to toggle to the unmuted setting, .

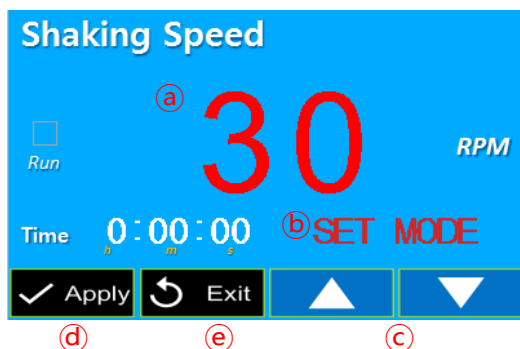
Alarm Disabled : The alarm can be disabled by TOUCHING and holding the  key for 3~5 seconds. To reactivate the alarm setting, TOUCH the  once.

(e) Menu: TOUCH to activate the main menu

(f) Shaker Start/Stop Button

TOUCH to start or to stop the shaker.

(g) Shaker end: Indicates that the setting time has expired and the shaker stops running.



► RPM setting change

(a) TOUCH the RPM value, The numbers become red

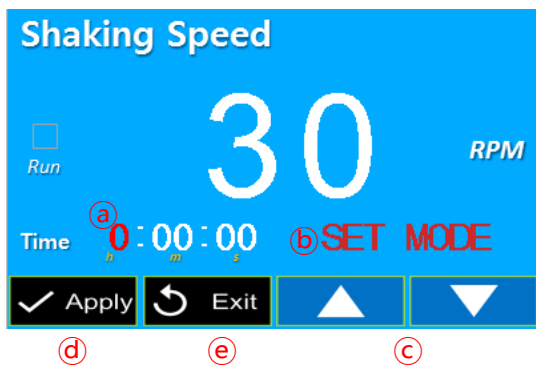
(b) "SET MODE" is displayed (flashes)

(c) Input the desired value by pressing UP(▲)/DOWN(▼) buttons

NOTE: Press and hold the buttons to increase or decrease the value quickly.

(d) Apply: To store the newly set value TOUCH 
(Or wait 5 seconds for the value to store automatically)

(e) Exit: If you press  after changing any values, the values are not saved and the screen returns to the previous screen



▷ Time setting change

① TOUCH the time value, The numbers become red

② "SET MODE" is displayed (flashes)

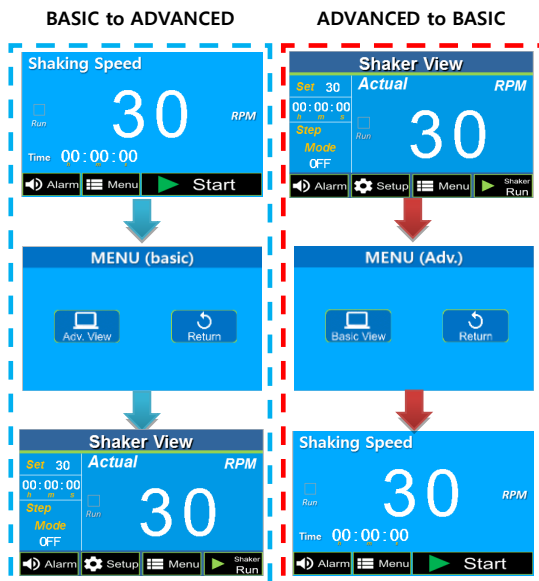
③ Input the desired value by pressing UP(▲)/DOWN(▼) buttons

NOTE: Press and hold the buttons to increase or decrease the value quickly.

④ Apply: To store the newly set value TOUCH (Or wait 5 seconds for the value to store automatically)

⑤ Exit: If you press after changing any values, the values are not saved and the screen returns to the previous screen

NOTE: The time cannot be adjusted during a run. To change the time during a run, you must TOUCH . Change the time value and press and



3.1.2. Advanced View Screen

► Advanced Mode

To switch from the standard BASIC view

To the ADVANCED view,

TOUCH "MENU" and choose ADVANCED View.

NOTE: To return to the BASIC View, TOUCH "MENU" and choose the BASIC View.

The ADVANCED View provides the user with access to the STEP mode for linking consecutive mixing cycles.



► Shaker setting (Advanced)

► RPM setting change

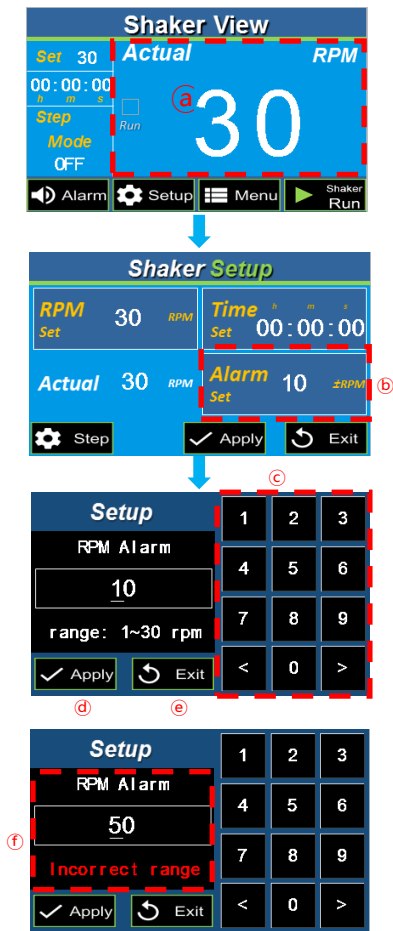
- (a) TOUCH the RPM Shaker value, the screen turns to the Shaker setting screen
- (b) TOUCH the "RPM Set" Value to adjust the set speed.
- (c) Input the desired value by using the key pads in the setup screen
- (d) Apply: When you press **✓ Apply**, the changed setting values are saved and the screen turns to the previous screen
- (e) Exit: If you press **↶ Exit** button, the changed setting values are not saved and the screen turns to the previous screen
- (f) The RPM setting range is 30~300rpm
When entering a value out of this range and pressing **✓ Apply**, the message "Incorrect range" is displayed.

► Shaker setting (Advanced)

Adjusting the Shaking Time



- (b) TOUCH the "Time Set" Value to adjust the set shaking time.
- (c) Input the desired value by using the key pads in the setup screen
- (d) Apply: When you press **✓ Apply**, the changed setting values are saved and the screen turns to the previous screen
- (e) Exit: If you press **↶ Exit** button, the changed setting values are not saved and the screen turns to the previous screen.



► Shaker setting (Advanced ONLY)

▷ Alarm setting change

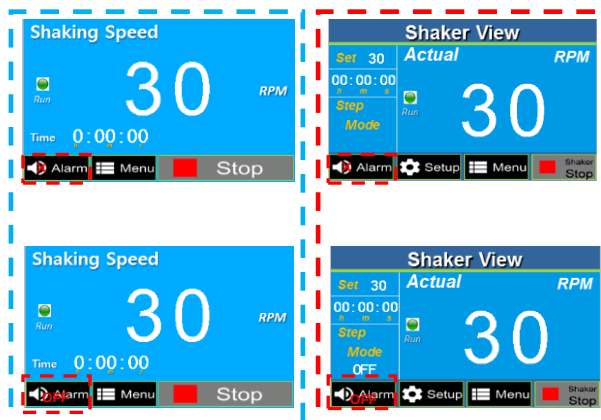
The alarm value is the difference between the set speed and the measured (displayed) speed. If the difference exceeds this value (once the temperature has been reached) the alarm will trigger.

- a TOUCH the RPM Shaker value, the screen turns to the Shaker setting screen
- b TOUCH the "Alarm Set" Value to set the timer
- c Input the desired value by using the key pads in the setup screen
- d Apply: When you press , the changed setting values are saved and the screen turns to the previous screen
- e Exit: If you press , the changed setting values are not saved and the screen turns to the previous screen
- f The RPM setting range is 1~30rpm

When selecting the value out of this range and pressing , the message "Incorrect range" is displayed.

BASIC View

ADVANCED View



▷ Alarm Mute

The audible alarm can temporarily deactivated by TOUCHING the key  when the audible alarm is active (beeping). This silences/mutes the alarm for 10 minutes. and the icon is displayed as . Following the 10 minute mute, if alarm event continues, audible alarm is unmuted.

To unmute the alarm, TOUCH the  key to toggle to the unmuted setting, .

▷ Alarm Disabled

The alarm can be disabled by TOUCHING and holding the  key for 3~5 seconds. To reactivate the alarm setting, TOUCH the  once.



3.1.3. Shaker Step Setting

▷ RPM, time setting

a TOUCH the RPM Shaker value to enter the shaker setup screen.

b Select , the screen moves to the shaker step & setup screen

c You can select/link up to 4 desired shaking speeds.

Choose each of the 4 desired speeds by pressing on the speed value.

(If less than 4 linked speeds are desired,

leave the time and speed values as "0" to skip.)

d Once a RPM step is selected, use the keypad in the setup screen to select the desired RPM value

e Apply: When you press , the changed setting values are saved

and the screen turns to the previous screen

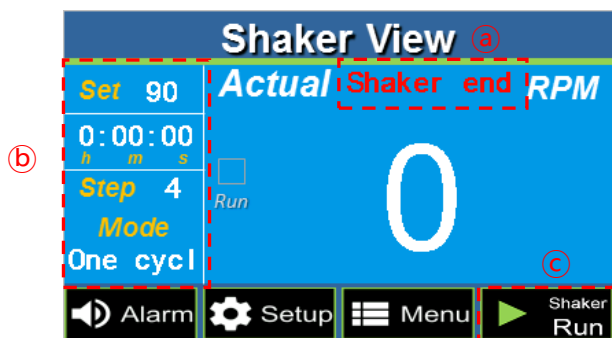
f Exit: If you press , the changed setting values are not saved

and the screen turns to the previous screen

g Once the desired RPM speeds have been chosen, adjust the time values by following the same steps.

h There are 3 modes available for Step Operation :
"One cycle", "Repeat Cycle", "Step off"

NOTE: Repeat cycle will result in continue repeating of all programmed steps until the stop button is pressed.

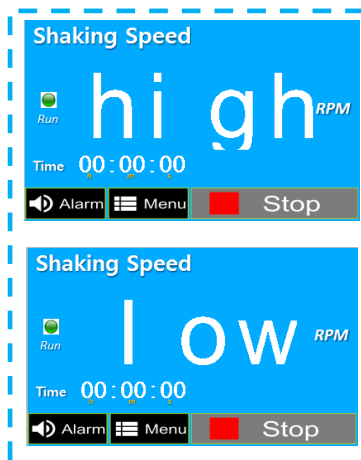


► Step Cycle Ending Screen

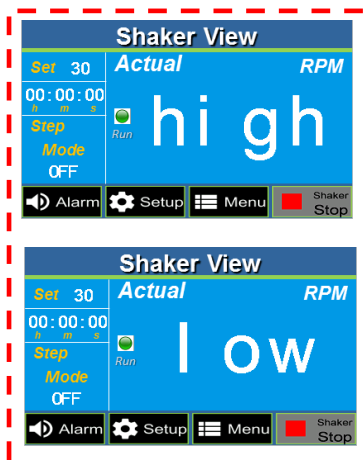
- a When the time for each step has expired, the "Shaker End" message is displayed
- b "Set" displays the setting value of 1st step
(Default value is displayed when Step Off)
Time is displayed as 0
- c  is displayed as the instrument can be restarted at any time.

3.1.4. Warning Messages

BASIC View



ADVANCED View



▷ Shaker Alarm

The message "low" or "high" is displayed on the display when the measured value is deviating from the set value.

The message is only displayed when the difference exceeds the user programed value for the alarm

NOTE: The message is cleared when the equipment maintains the values for 1 minute following the activation of the alarm.

III-2. Platform Installation

The Orbi-Shaker CO₂ includes a flat non-slip platform for low speed operation with many common vessels, including trays and dishes. For installation of the optional MAGic Clamp platform, please follow the instructions below:

- 1.) Unscrew the four metal thumb screws from the corners of the internal platform and remove the green rubber mat.
- 2.) Unscrew the four center screws (using a Phillips screw driver).
- 3.) Remove the included platform and apply the MAGic Clamp platform.
- 4.) Screw in the four screws that were previously removed from the included platform.

When installing the microplate platform (H1000-P-MP) or universal spring platform (H1000-P-SP), please follow the simple instructions below:

- 1.) Unscrew the four metal thumb screws from the corners of the included platform.
- 2.) Apply the desired platform lining up the four corner holes and screw in the 4 thumb screws.

III-3. Maintenance

The platform of the Orbi-Shaker CO₂ & XL should be cleaned regularly with a soft cloth dampened with water or alcohol. (Always ensure that the machine has been powered down prior to cleaning.)

In the event of a spillage: Power down the unit, remove the platform and dry the internal chamber with a soft cloth. DO NOT attempt to operate the unit until the spillage had been properly dried.

IV-1. Service and Contact

Service on the Orbi-Shaker CO₂ & XL should only be performed by qualified service personnel. To request service or technical support, please contact Benchmark Scientific or your local Benchmark Scientific representative.



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