Stackable CO2 Incubator Shaker - 315L
Cat. No. Q5102

User Manual

Welcome

Notice to Purchasers

abm's products are guaranteed to meet required quality control standards at the time of shipment. Notice of problematic products must be made within 10 days of receipt. This product warranty limits **abm**'s liability to the replacement of the product only.

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Overview

Q5102 Stackable CO2 Incubator Shaker - 315L are large-capacity orbital shakers that utilize a five eccentric counter-balanced drive mechanism. They provide horizontal plane rotary motion in a 5 cm (2 in) diameter circular orbit. A Proportional / Integral / derivative (PID) microprocessor controller with instantaneous digital feedback controls the speed over the entire speed range.

Q5102 provides temperature control from 20 °C below ambient (as low as 4 °C) to 60 °C, and the range depend on relative humidity and other ambient factors, as well as the options installed in the unit. Ambient temperature is measured at one meter from the exterior of the unit.

Erlenmeyer flasks (up to 5 liters in size) as well as a wide variety of tubes and plates can be accommodated using the **abm** shaker accessories described in a later section (see Accessories on p. 48). These are easily accessed on slide-out platforms.

Overview

The Q5102 may be operated in the following ways:

- **Continuously:** at a set speed and temperature, until user intervention.
- **In a timed mode:** run at a set speed, time and temperature for a period of up to 999.9 hours, after which the shaker automatically shuts off.
- **In a programmable mode:** run through multiple temperature and speed changes for an extended period of time.
- For more details on these various modes of operation, see Operation on p. 23.

For safe operation, the Q5102 shakers are designed with a safety switch that automatically stops the shaker mechanism when the door is opened.

The Q5102 is equipped with visual and/or audible alarms that alert the user to the following conditions:

- The end of a timed run
- Deviations from speed setpoint
- Deviations from temperature setpoint
- Deviations from CO2 concentration setpoint
- Power failure
- Door open

To accommodate customer needs, a wide variety of platforms can be used with the Q5102:

- Universal platforms are the most flexible, providing hole patterns for flask clamps, test tube racks and other accessories.
- Dedicated platforms are supplied with flask clamps attached; they are designed solely and expressly for this purpose.
- Test tube racks, microplate holders and test tube rack holders are also available (a universal platform is needed for all test tube racks and holders).

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1.0 Operating Instructions

1.1 USING THIS MANUAL

- Carefully read this operating manual before using the device for the first time.
- Also observe the operating manual enclosed with the accessories.
- The operating manual should be considered as part of the product and stored in a location that is easily accessible.
- When passing the device on to third parties, be sure to include this operating manual.
- If this manual is lost, please request another one. The current version can be found on our website **www.abmgood.com.**

1.2 DANGER SYMBOLS AND DANGER LEVELS

1.2.1 HAZARD SYMBOLS

HAZARD POINT 	**BURNS** 
ELECTRIC SHOCK 	**MATERIAL DAMAGE** 
EXPLOSION 	**HEAVY LOADS** 
HEALTH RISK 	

1.2.2 DEGREES OF DANGER

The following degree levels are used in safety messages throughout this manual. Acquaint yourself with each item and the potential risk if you disregard the safety message.

DANGER	Will lead to severe injuries or death.
WARNING	May lead to severe injuries or death.
CAUTION	May lead to light to moderate injuries.
NOTICE	May lead to material damage.

1.3 SYMBOLS USED

EXAMPLE	MEANING
▶	You are requested to perform an action.
1. **2.**	Perform these actions in the sequence described.
•	List.
ⓘ	References useful information.

2.0 Safety

2.1 INTENDED USE

This device is exclusively intended for indoor use and for uniform movement, temperature and CO2 concentration control of biological solutions and cultures in reaction vessels.

2.2 USER PROFILE

The device may only be operated by trained lab personnel who have carefully read this operating manual and are familiar with the device functions.

2.3 APPLICATION LIMITS

	**DANGER! EXPLOSION HAZARD** ▶ Do not operate the device in areas where work is completed with explosive substances. ▶ Do not use this device to process any explosive or highly reactive substances. ▶ Do not use this device to process any substances which could create an explosive atmosphere.

Due to its design and the ambient conditions in its interior, the device is not suitable for use in potentially explosive atmospheres.

The device may only be used in a safe environment, e.g., the open atmosphere of a ventilated lab. The use of substances which may contribute to a potentially explosive atmosphere is not permitted. The final decision on risks associated with the use of such substances lies with the user.

2.4 INFORMARTION ON PRODUCT LIABILITY

In the following cases, the designated protection of the device may be compromised.

The liability for the function of the device passes to the operator if:

- The device is not used in accordance with this operating manual.
- The device is used outside of the range of application described in the succeeding chapters.
- The device is used with accessories or consumables that were not
- approved by **abm**.
- Service or maintenance is completed on the device by people who are not authorized by **abm**.
- The owner has made unauthorized modifications to the device.

2.5 WARNINGS FOR INTENDED USE

Before using the device, read this operating manual and observe the following general safety instructions.

2.5.1 PERSONAL INJURY AND DAMAGE TO DEVICE

WARNING! ELECTRIC SHOCK DUE TO DAMAGE TO THE DEVICE OR POWER CABLE.

- Only switch on the device if the device and power cable are undamaged.
- Only use devices that have been properly installed or repaired.

WARNING! LETHAL VOLTAGES INSIDE OF THE DEVICE

- Ensure that the housing is always closed and undamaged so the user cannot accidentally touch the parts inside.
- Do not remove the housing of the device.

WARNING! DANGER DUE TO INCORRECT POWER SUPPLY

- Only connect the device to voltage sources that meet the requirements on the name plate.
- Only use sockets with a protective earth (PE) conductor and suitable power cable.

WARNING! HEALTH RISK DUE TO CONTACT WITH INFECTIOUS LIQUIDS AND PATHOGENIC BACTERIA

- Observe the national regulations for handling these substances, the biological security level of your laboratory, the material safety data sheets and the manufacturer's application notes.
- Wear personal protective equipment (PPE).
- Follow the instructions regarding hygiene, cleaning and decontamination.
- For complete instructions on the handling of germs or biological material in risk group II or higher, please refer to the “Laboratory Biosafety Manual” (source: World Health Organization).

WARNING! HEALTH RISK DUE TO POISONOUS, RADIOACTIVE OR AGGRESSIVE CHEMICALS

- ▶ Observe the national regulations for handling these substances as well as the material safety data sheets and manufacturer's application notes.
- ▶ Wear personal protective equipment (PPE).

WARNING! BURNS DUE TO HOT METAL ON THE DEVICE AND HOT FLASKS

- ▶ Only touch the device and flasks when wearing protective gloves.

WARNING! RISK OF CRUSHING DUE TO MISSING AUXILIARY AID

- ▶ Lifting and transporting the shaker without suitable technical aids can result in crushing and other injuries.
- ▶ Use a hydraulic lifting platform to install and uninstall the shaker.

CAUTION! RISK TO HEALTH DUE TO LIFTING HEAVY LOADS

- ▶ Only lift the device with another person or using a suitable aid.
- ▶ Make sure to use a transport aid for transportation over long distances.

NOTICE! DAMAGE TO ELECTRONIC COMPONENTS DUE TO CONDENSATION

Condensation can form inside the device after the device has been moved from a cool to a warmer environment.

- ▶ Wait at least three hours before connecting it to the mains/ power supply.

2.5.2 INCORRECT HANDLING OF ACCESSORIES

CAUTION! LACK OF SAFETY DUE TO INCORRECT ACCESSORIES OR SPARE PARTS

Accessories and spare parts that are not recommended by **abm** compromise the safety, function and precision of the device. **abm** cannot be held liable or accept any liability for damage resulting from the use of non-recommended accessories and spare parts.

- ▶ Only use accessories and original spare parts recommended by **abm**.

NOTICE! DANGER DUE TO DAMAGED TUBES

Small scratches and cracks can cause severe damage to the device and accessories. Liquids may escape.

- ▶ Before use, visually check all tubes for any damage.
- ▶ Never use damaged tubes.

3.0 Product Description

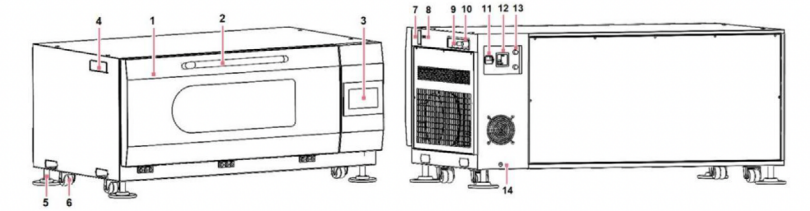


Fig. 3-1: Front and rear view of the Q5102

1 DOOR
With automatic stop function

2 DOOR HANDLE

3 TOUCH SCREEN DISPLAY
Graphical user interface with touch settings, display parameters and parameter values

4 NAME PLATE
Model number, documentation number, serial number and electrical connection data

5 FOOT
Align the device horizontally

6 ROLLER
For moving the device

7 POWER SWITCH
Switches device on or off

8 USB PORT
For data export

9 CO2 INLET ADJUSTMENT KNOB
For regulating the gas inlet rate

10 CO2 INLET
Connects to CO2 gas source

11 POWER CONNECTION
Connect the power cable

12 CIRCUIT BREAKER
Automatic shutdown of current under abnormal circuit conditions (e.g. various short circuit conditions)

13 FUSE
Provides overload protection

14 DRAIN HOSE
Refrigeration unit condensate drain hose

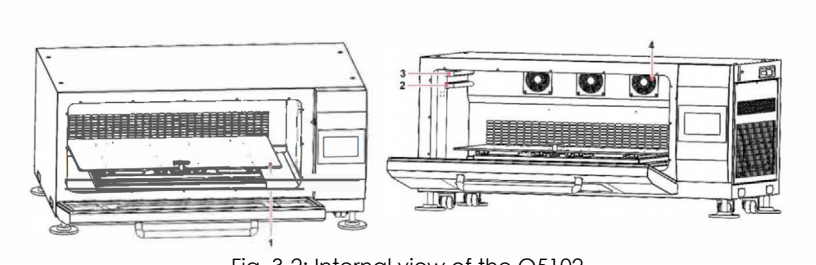


Fig. 3-2: Internal view of the Q5102

1 PLATFORM
For carrying culture containers

2 UV LIGHT
For sterilization

3 ILLUMINATION LIGHT
For lighting

4 FANS
For internal circulation of air

4.0 Inspection and Unpacking of Equipment

4.1 INSPECTION OF BOXES

After you receive your order from **abm**, inspect the boxes carefully for any damage that may have occurred during shipping. Report any damage immediately to the carrier and to your **abm** Customer Service at **order@abmgood.com**.

4.2 UNPACKING OF EQUIPMENT

⚠	**WARNING! RISK OF CRUSHING DUE TO MISSING AUXILIARY AID** ▶ Lifting and transporting the shaker without suitable technical aids can result in crushing and other injuries. ▶ Use a hydraulic lifting platform to install and uninstall the shaker.

To unpack your Q5102, you will need the following tools:

- Claw hammer
- Forklift or other lifting equipment to lift more than 250 kg (570 lb)
- Shears to cut 10 mm (1/2 in) wide strapping
- Tool to remove metal staples

Save all packing materials and this operating manual.

4.3 PACKING LIST VERIFICATION

Verify against your **abm** packing list that you have received all of the correct materials.

If any part of your order was damaged during shipping, is missing pieces, or fails to operate properly, please contact **abm** sales representative.

5.0 Preparing the location

5.1 PHYSICAL LOCATION

It is essential that the instrument be situated in an area where there is sufficient space for the shaker and platform to clear walls and potential obstructions during operation. The surface on which the unit is placed must be smooth, level, and able to support the shaker under full load operating conditions.

	**WARNING! RISK OF CRUSHING DUE TO MISSING AUXILIARY AID** ▶ Lifting and transporting the shaker without suitable technical aids can result in crushing and other injuries. ▶ Use a hydraulic lifting platform to install and uninstall the shaker.

5.2 ENVIRONMENT

The shaker is designed to operate optimally in the following ambient conditions:

- 10 °C to 35 °C
- 20 % to 80 % Relative Humidity (non-condensing)

5.3 ELECTRICAL REQUIREMENTS

The Q5102 can be equipped to run on:

- 115V~230V±10%, 50~60Hz maximum

Check your shaker's Electrical Specification Plate (located on the side of the unit) to be sure the electrical requirements of your unit match the output of your electric supply. If they do not match, contact your **abm** representative.

5.4 GAS SOURCE REQUIREMENTS

Q5102 needs to be equipped to operate under the following conditions:

- CO2 gas source
- CO2 double stage pressure regulator

5.5 SPACE REQUIREMENTS

Allow at least 100 mm (4 in) around the shaker for proper ventilation and for access to Power Switch on the right side. Be sure to keep the power plug and power outlet easily accessible to facilitate unplugging the unit, as needed.

WIDTH	1330 mm (52 in)		
DEPTH	830 mm (32 in)		
HEIGHT	**1 UNIT WITH FEET**	**2 UNITS WITH FEET**	**3 UNITS WITH FEET**
	620 mm (24 in)	1170 mm (46 in)	1120 mm (67 in)

	Be sure to allow at least 100 mm (4 in) around shaker for ventilation, access to power cord (rear panel), and access to power switch (right side).

6.0 Installation

	**WARNING! RISK OF CRUSHING DUE TO MISSING AUXILIARY AID** ▶ Lifting and transporting the shaker without suitable technical aids can result in crushing and other injuries. ▶ Use a hydraulic lifting platform to install and uninstall the shaker.

6.1 TOOLS REQUIRED FOR INSTALLATION

- Phillips head screwdriver
- Blade screwdriver
- Level, >25.4 cm (10 in)
- Two adjustable wrenches
- Forklift or other lifting equipment able to lift more than 250 kg (570 lb)
- Optional: stacking kit(s)

6.2 LEVEL A SINGLE SHAKER

These instructions are for a single shaker without an added base.

Make sure that the shaker is placed on a level surface and that all four feet are solidly on the surface. If the shaker is not level, adjust the feet as needed to achieve leveling:

1. When you adjust the feet, first loosen the lock nut by rotating clockwise, then rotate the adjusting nut clockwise to raise the foot or counterclockwise to lower the foot.

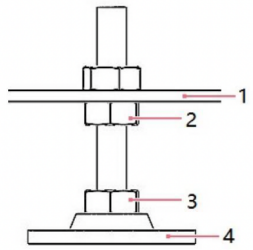


Fig. 6-2: Adjustable Foot

1 BOTTOM OF UNIT

2 LOCKNUT

3 ADJUSTMENT NUT

4 FOOT

2. Place the level on the top of the unit. If necessary, make further adjustments by repeating all steps until the unit is level. Then tighten the locknut by rotating counterclockwise to fix it.

3. After installing a platform (see Getting started on p. 21), fully load the shaker and do a test run at normal speed (see Operation on p. 22). Make additional leveling adjustments if necessary.

	The height of the shaker foot adjustment needs to exceed the height of the roller.

6.3 LEVEL THE OPTIONAL BASE

Place the base on a sturdy (capable of bearing the weight of the combined base shakers and shaker contents), level surface, making sure that all four corners are solidly on the surface. If the base is not level, Please adjust the feet of the stand until it is level.

	**WARNING!** Units cannot be stacked without stacking kit(s).

CAT.NO.	DESCRIPTION
RD-ZJ670M	670 mm base riser, tall
RD-ZJ350M	350 mm base riser, short

6.4 MOUNT Q5102 ON OPTIONAL BASE

1. Using a forklift or lifter, raise the Q5102 so that its back end is tilted toward the rear of the base.

2. With two assistants guiding the shaker from opposite sides, lower the unit onto the base, back end first. Slowly and gently remove the forklift or lifter, lowering the front of the unit onto the base by hand.

3. Using the provided set screws, place on the corresponding holes where the shaker is secured to the base raiser and turn clockwise with a wrench, do not fully tighten the screws yet.

4. Repeat the above steps to complete the screw fixing in 4 holes. Then install the 4 cover plates to enhance the aesthetics. Tighten all screws equally. The shaker mounted on its base will look as shown (see Fig. 6-4 on p. 18):

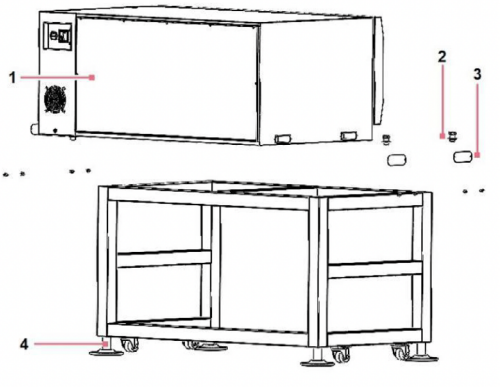


Fig. 6-3: Mount Shaker on Base

1 Q5102

2 INSTALL THE SET SCREWS

3 INSTALL THE COVER PLATES

4 LEVEL FOOT

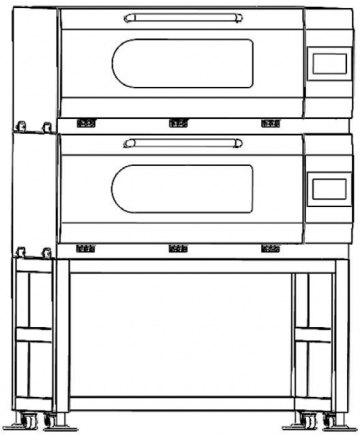


Fig. 6-4: Shaker Installed on Base

5. Make sure the shaker is level; adjust the base feet as needed to level the unit.

6. After fully loading the shaker and do a test run at normal speed. Make additional leveling adjustments if necessary

6.5 INSTALL THE STACKING KIT

To stack two or three Q5102 shakers, (see operation on p. 19).

6.5.1 FOR TWO Q5102 SHAKERS

1. If you do not plan to use an optional base, skip to 6.2. If you are using one, level the base (see Level the optional base on p. 17), then mount the bottom unit on the base (see Mount Q5102 on optional base on p. 17). If you are stacking three units, you can only use the feet of the shaker as support.
2. With reference to the figure below (see Fig. 6-5 on p. 19), install the set screws into the top of the bottom unit, on the two side edges, and install the set screws (from the sides of the unit to be stacked) that correspond to the mounting brackets.

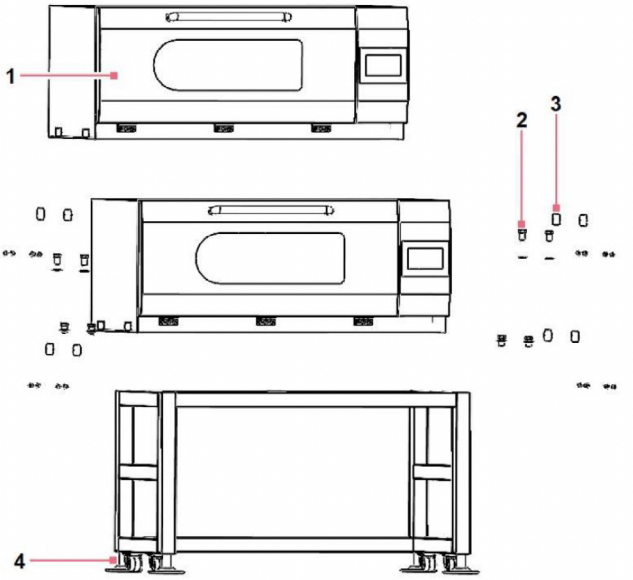


Fig. 6-5: Install Q5102 Stacking Kit

1 Q5102

2 INSTALL THE SET SCREWS

3 INSTALL THE COVER PLATES

4 LEVEL FOOT

	**WARNING!** When operating with the optional base, all feet of the shaker must be removed if the shaker has bottom feet.

6.6 STACK TWO Q5102 SHAKERS

1. Using a forklift or lifter, raise the Q5102 to be stacked so that its back end is tilted toward the rear of the mounting brackets.
2. With two assistants guiding the unit from opposite sides, lower the shaker onto the mounting brackets, back end first. Slowly and gently remove the forklift or lifter, lowering the front of the unit onto the mounting brackets by hand.
3. As shown (see Fig. 6-6 on p. 20), secure the bottom of the upper shaker to the bottom shaker (already fastened to the base) with the screws.

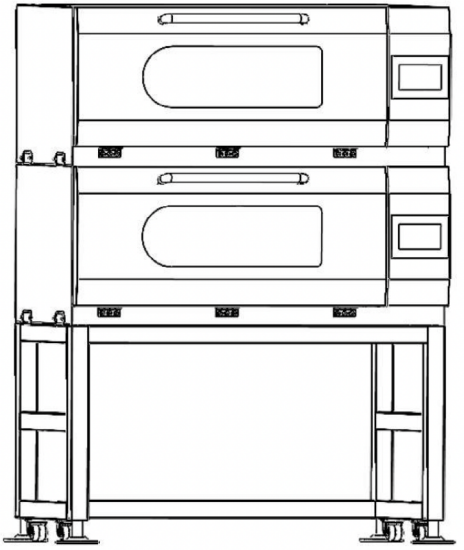


Fig. 6-6: Stacked Shakers

4. Make sure the shaker is level; adjust the base feet as needed to level the unit.

5. After fully loading the shaker and do a test run at normal speed. Make additional leveling adjustments if necessary.

6.7 STACK A THIRD SHAKER

	**WARNING!** When operating with the optional base, all feet of the shaker must be removed if the shaker has bottom feet.

To stack a third shaker, repeat the appropriate procedures provided above to install the stacking kit, to stack the shaker, and to level the entire assembly.

6.8 INSTALLING THE CO2 INLET PIPE

Connect one end of the CO2 inlet pipe to the CO2 inlet (see Figure 3-1, p. 12) and the other end to the CO2 gas source, and adjust the pressure of the supplied CO2 to 0.05~0.1 MPa. Too large or too small pressure value may cause the CO2 concentration value to not be controlled properly.

It is recommended that a single gas source supply one shaker. If a single gas source is needed to supply multiple shakers, a three-way or four-way adapter can be used to divert the gas supply, but it is necessary to ensure that the gas source is sufficient, because the gas consumption of multiple shakers will be accelerated exponentially.

7.0 Features

7.1 CONTROLS

- **Circuit Breaker**: Automatic shutdown of current under abnormal circuit conditions (e.g. various short circuit conditions).
- **Power switch**: Switches device on or off.
- **Touch Screen Display:** Graphical user interface with touch settings, display Parameters and parameter values.

	In addition to the power switch, the power cord is also used to conduct power or to break the power circuit to the shaker. Whenever power to the shaker may be a hazard (during cleaning, maintenance or service work), be sure to disconnect the power cord from the electrical outlet.

7.2 TOUCH SCREEN DISPLAY

When the unit is powered up, using the power switch located on the right side of the machine (see Fig. 3-1 on p. 12), the initial display screen will remain for a short time while the system boots up. Then the main screen appears. For more information on touch screens display, please refer to p. 23.

7.3 MAGNETIC DOOR

The Q5102 is equipped with a magnetic door.

When the door opens, the following will happen:

- Heater turns off
- Shaker stops
- Interior illumination light goes on and, when it is in AUTO mode, will go out after the door is closed

7.4 INTERIOR ILLUMINATION LIGHT

The chamber light will go on when the door is open.

In addition, you can set the chamber light to be continuously ON or OFF by clicking the lighting button on the touch screen.

7.5 UV LIGHT

When the device is stopped, the sterilization button will appear on the touch screen and you can turn the UV sterilization light on or off by clicking the sterilization button.

7.6 SERVICE ACCESSIBILITY

In the unlikely event that your Q5102 needs servicing, all electronic panels, cooling and heating components are on the side and back of the unit and can be easily accessed.

8.0 Operation

8.1 SAFETY PRECAUTIONS

Before operating the shaker, verify that anyone involved with its operation has been instructed in both general safety practices for laboratories and specific safety practices for this apparatus.

- The user is also responsible for following local guidelines for handling hazardous waste and biohazardous materials that may be generated from the use of this equipment.

	**WARNING! PERSONNEL INJURY AND EQUIPMENT DAMAGE!** ▶ This equipment is not explosion-proof and should never be used with flammable

	**CAUTION! EQUIPMENT DAMAGE!** ▶ To prevent damage to the shaker and its contents, never run the shaker without a platform.

8.2 START THE SHAKER

To initially start the shaker, close the door and turn the power switch (located on the righthand side of the control panel) to the ON position. The display will come on. When the shaker begins to operate, the LCD display will track the speed as it accelerates to the last entered setpoint. The shaking action will be started or stopped by clicking the Start/Stop button on the touch screen.

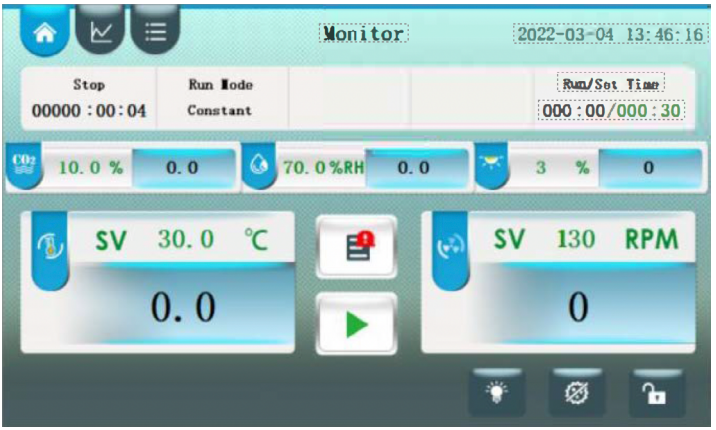
The shaker will not operate if the door is open. This is indicated by the “door open” symbol appearing on the touch screen display.

9.0 Using the touch screen display and platform

When you turn the power on, this is the first screen to appear after the company title screen. The default display parameters are temperature (°C) and shaking speed (RPM).

You can change the displayed parameters.

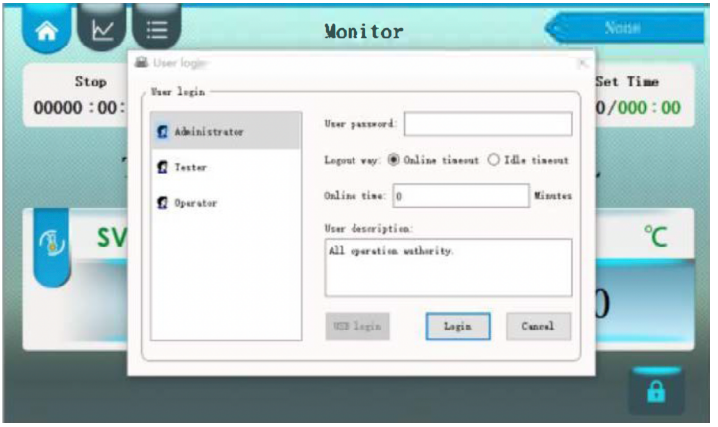
9.1 MENU INTERFACE



Users can select the corresponding function in [System Settings] - [Function Selection] as needed, and the main interface will make the corresponding changes according to the user selection.The selected feature appears in the main interface, and the un-selected feature will not appear.

9.1.1 USERS LOGIN

After the system is started, the above [main interface] will appear. Users who are not logged in need to click the screen to log in, as shown in the figure below:



Administrator: Initial password is "6", with the highest operation permission and all permission except [System Settings];

Tester: no initial password, can set or select basic parameters; fixed value mode or program mode,temperature, speed, humidity, concentration, illumination target value and timing time; only program number, no editing authority in program mode;

Operator: no initial password, only start and stop system;

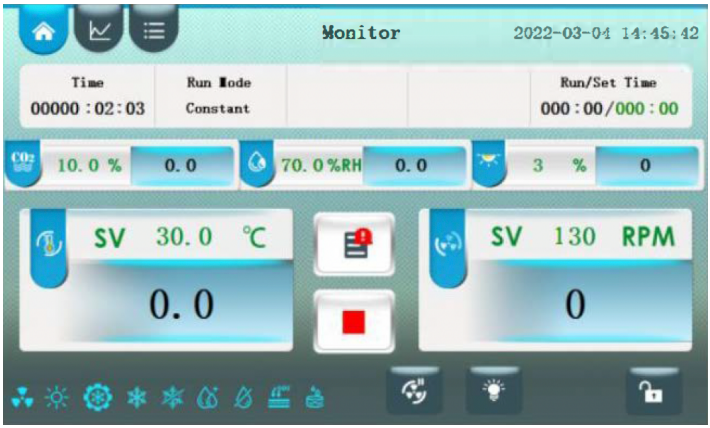
Note: The tester and operator can view real-time curves, work log, historical data & curves, but no operation such as deletion or export.

9.2 CATALOG INTERFACE

After the user completes the login at the login interface, click the label on the top left of the interface to enter the corresponding interface.Users can enter the [User Settings], [Historical Data], [Mode Settings], [System Settings] interface in the directory interface;

9.3 MAIN INTERFACE (DISPLAY)

At the [main interface], the user can view the data to control, operation time schedule, various control output status of the system, control the operation of the system, heating, humidification, inflation, cooling, frost, illumination, speed output state, control state, control the output and shutdown operation of lighting and sterilization, and check the alarm records.



9.3.1 KEY INSTRUCTIONS

ICON	NAME	DESCRIPTION
	[Alarm]	Enter the alarm list interface, you can view the detailed alarm content. Icon in red indicates the current alarm
	[Run/ Stop]	Click the pop-up sub-dialog box to bring the system to operation or stop;
	[Lighting]	Click the light on or off
	[Sterilization]	Click on or off for UV sterilization
	[Lock Screen]	White is unlocked; blue is locked state.
	[Motor Pause]	White is the running state of the motor, and blue is the suspended state of the motor.

9.3.2 ICON DESCRIPTION

NAME	ICON	NAME	ICON	NAME	ICON
Heat		Press Output		Press Delay	
Frost		Humidification		Refrigeration	
Watering		Dehumidification		Open the Door	
Alarm		Aerate			

9.3.3 STATE DESCRIPTION

Display the five operating states of the system in the upper left corner of the [main interface], namely [Stop], [Wait], [Running], [Time], [Auto-tuning];

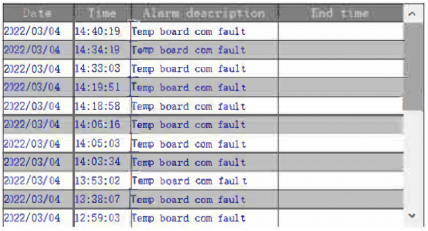
[Stop]: Close the heating, humidification, inflation, compressor and fan output;

[Appointment waiting]: If the reservation time is greater than the current time, the system will enter the reservation state after the operation, and after reaching the reservation time, enter the operation state;

[Running]: Running status, go into various numerical controls;

[Timing]: In the timing, the timing time to, the system automatically enters the stop state;

9.3.4 ALARM RECORD AND OPERATION LOG

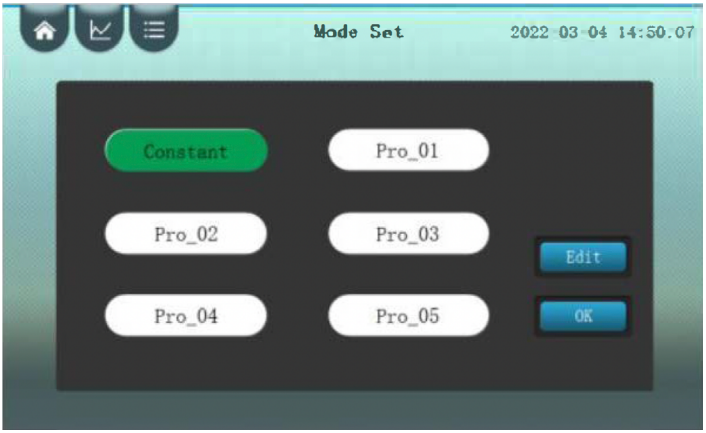


Date	Time	Alarm description	End time
2022/03/04	14:40:19	Temp board com fault	
2022/03/04	14:34:19	Temp board com fault	
2022/03/04	14:33:03	Temp board com fault	
2022/03/04	14:19:51	Temp board com fault	
2022/03/04	14:18:58	Temp board com fault	
2022/03/04	14:06:16	Temp board com fault	
2022/03/04	14:05:03	Temp board com fault	
2022/03/04	14:03:34	Temp board com fault	
2022/03/04	13:53:02	Temp board com fault	
2022/03/04	13:38:07	Temp board com fault	
2022/03/04	12:59:03	Temp board com fault	

When an alarm occurs in the system, the buzzer calls a prompt, and the alarm record in the main interface has a red exclamation point prompt. Click to enter the alarm list interface to view the specific alarm content, and click the right arrow to view the operation log;

TYPE OF ALARM	ALARM INSTRUCTION
Main temperature overflow	The main temperature sensor failed or incorrect wiring
Door temperature overflow	Door temperature sensor has fault or incorrect wiring
Evaporator temperature overflow	The evaporator temperature sensor has faulty or incorrect wiring
Ring temperature overflow	The ambient temperature sensor has failed
Concentration overflow	The concentration sensor may have a fault or incorrect wiring
Main over-temperature	Main temperature > set temperature + temperature deviation
Main under-temperature	Main temperature < set temperature - temperature deviation
Door temperature exceeds	Door temperature < set temperature - main temperature deviation
Super concentration alarm	Concentration > set concentration + concentration deviation
Alarm of concentration	The concentration rose not more than 0.2% for 120 seconds
Ultra humidity alarm	Humidity > Set humidity + humidity deviation
Open the door	During operation, the door opens for a continuous (optional) time
Lack of water, alarm	Water shortage is more than 30 seconds (can be set)
Motor communication failure	No communication exists between the control board and the motor
Motor IPM fault	Power module failure
The motor is blocked and turned fault	The motor is blocked and turned fault
Motor Hall fault	Motor Hall fault
Motor underpressure failure	Bus voltage voltage fault
Overvoltage fault of motor	Bus voltage overvoltage fault

9.4 MODE SETTING



The system has six operation control modes, Pro_01, Pro_02, Pro_03, Pro_04, and Pro_05; users can edit the operation period (0-999), the number of segments (1-30), and time (0-999:59), temperature, speed, humidity, concentration and illumination in each operation mode;

9.4.1 FIXED VALUE MODE

The value setting mode can only set one temperature control point; the following table can be determined according to the timing mode in [user setting] and whether the time setting value is 0:

TIME SET VALUE	TIMING MODE	DESCRIPTION
0	————	Timing time is always 0, and the continuous operation does not stop;
No 0	Running time	Click to run the system to start the timing, the timing time to the set time
	Thermostatic timing	Click the operation system to control the temperature, and start the timing after reaching the constant temperature timing range. Stop the running

9.4.2 PROGRAM MODE

In the program mode, a plurality of temperature control steps and the control time of each step may be set, and the operation period of the mode; if the period is set to 0, it means that the reciprocating operation from the first paragraph to the last paragraph does not stop;

TIME SET VALUE	TIMING MODE	DESCRIPTION
0	Running time	If the step time is not scheduled, the system jumps directly to the next set point to continue running. If the last paragraph, jump to the first paragraph, and the last cycle, the operation will stop;
	Thermostatic timing	The step time is not scheduled, and the system controls the temperature. After it reaches the constant temperature timing range, jump to the next set value to continue running. If the last paragraph is done, jump to the first paragraph, and if it is the last cycle, the operation will stop;
No 0	Running time	Click Run, step time to start time, step time reaches the set time, jump to the next set point to continue running, step time to start time again, if the last paragraph, jump to the first paragraph, such as and the last cycle, the operation will stop;
	Thermostatic timing	Click to run, the system control temperature, reach the constant temperature timing range after the step time timing, step time reaches the set time, jump to the next set value to continue to run, temperature still need to reach the constant temperature timing range after the step time to start again, if the last paragraph, jump to the first paragraph, such as the last cycle, run stop;

9.4.3 ACTION INSTANCES

FIXED VALUE MODE

For example, set temperature 30.0˚C, set speed 200RPM, set concentration 10.0%, set humidity 70.0%, stop for 30 minutes, set operation process as follows: then select [value mode] in [mode setting] interface, click edit button, enter [value mode] set edit interface, as shown in the figure above;

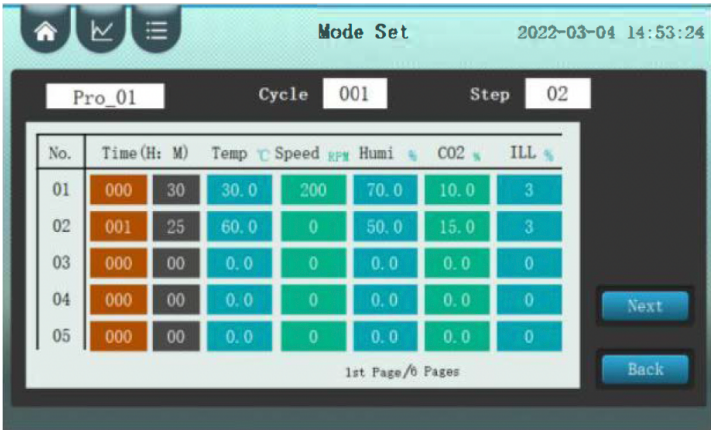
ORDER NUMBER	CONTENT	DESCRIPTION
1	Time Set	Click on the time text box (time: minute) to set it to 0:30
2	Temperature Setting	Click on the temperature text box, set to 30.0˚C
3	Speed Setting	Click on the Speed text box, set to 200
4	Humidity Setting	Click on the humidity text box, set to 70.0
5	Concentration Setting	Click on the Concentration text box, set to 10.0

PROGRAM MODE

For example, set Pro_01, when the temperature rises to 30.0℃ ± 0.5℃ for 30 minutes, speed control 200RPM, humidity control 70.0%, concentration control of 10.0%, rise to 60.0℃ for 1 hour and 25 minutes, speed setting 0RPM, humidity control 50.0%, concentration control 15.0%, cycle is 1, as shown in the following table:

NUMBER OF STEPS	SET TIME	SET TEMPERATURE	SET SPEED	SET HUMIDITY	SET CONCENTRATION
01	0:30 (0 hours and 30 minutes)	30.0℃	200RPM	70.0%	10.0%
02	1:25 (1 hour, 25 minutes)	60.0℃	60.0℃	50.0%	15.0%

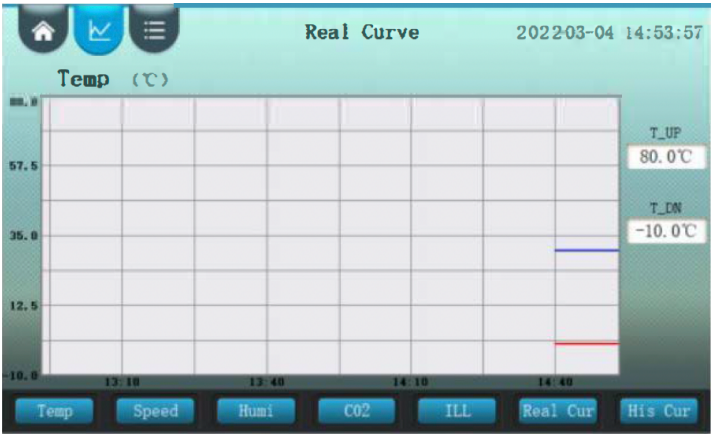
The operation process is as follows: select the [user setting- timing mode]; select Pro_01, click the editing button, and enter the Pro_01 setting editing interface, as shown in the figure



ORDER NUMBER	CONTENT	DESCRIPTION
1	Pro_1	Program name, click to edit
2	Cycle setting	Click on the cycle text box and pop up the number keyboard, set to 1
3	Step setting	Click on the segment number text box, pop up the number keyboard, set to 2
4	Time set	Click the 01 and 02 time text boxes (time: minutes) to set to 30 and 1:25, respectively
5	Temperature setting	Click on the 01 and 02 segment temperature text boxes, respectively, and set to 30.0 and 60.0
6	Speed setting	Click on the 01 and 02 segment speed text boxes, respectively, and set to 200 and 0
7	Humidity setting	Click on the 01 and 02 segment concentration text boxes set to 70.0 and 50.0
8	Concentration setting	Click on the 01 and 02 segment concentration text boxes, set to 10.0 and 15.0, respectively

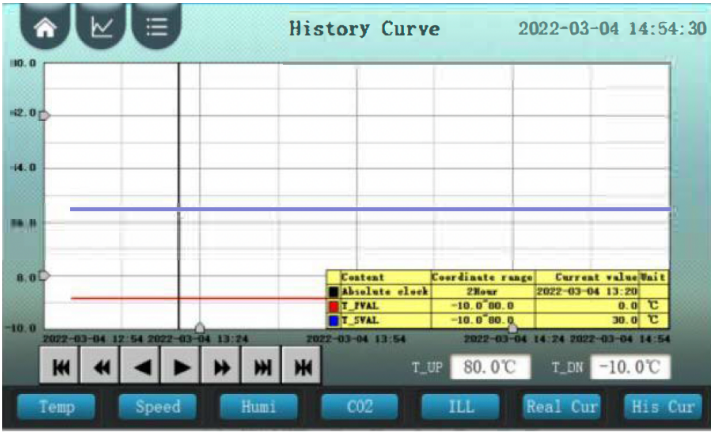
9.5 CURVE INTERFACE

In the real-time curve interface, users can view the temperature, speed, humidity and concentration curve plots in the last 2 hours, where blue is the set value curve and red is the measurement value curve;



9.5.1 HISTORICAL CURVE

In the [historical curve] interface, the user can view the trend of the historical data curve over a period of time. The historical curve corresponds to the data stored by the [historical data]. The upper and lower limits displayed in the historical curve are consistent with the real-time curve setting. The user can also set the time period to query;



9.6 HISTORICAL DATA

9.6.1 INTERFACE DESCRIPTION

Users can enter the [Historical Data] interface and can view the temperature measurement, set point, speed measurement, setting point, humidity measurement, concentration measurement, setting point, illumination measurement, set point, operation and alarm state historical data of the system, and the saving interval can be set;

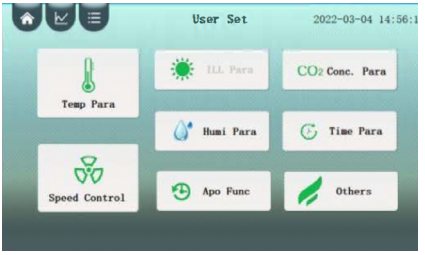
9.6.2 EXPORT DATA

If the user needs to export the historical data with the U disk, confirm that the U disk has been inserted to avoid system error, click [Export] button to confirm the export dialog box, the user should click OK to complete the data export; the exported file is saved in the U disk root directory, the file name" Historical Data + Save time.The pdf ", and the data format is the PDF file;

9.7 USER SETTING

Enter [User Settings], need "Administrator Group" permission, "Tester Group" and "Operator Group" cannot enter;

9.7.1 TEMPERATURE PARAMETER

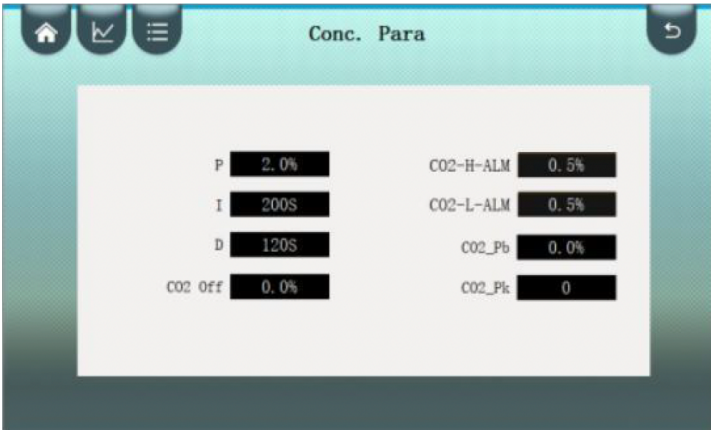


If you need to calibrate the temperature, fill in the temperature compensation value in "Temp. Para." - "T _M_Pb", the compensation value= actual measured temperature value - instrument display value. Other parameters can not be modified without the permission of **abm** after-sales engineers, otherwise it may lead to the abnormal operation of the shaker.

9.7.2 SPEED CONTROL

NAME	FUNCTION	INITIAL VALUE (SET RANGE)
Motor steering	Positive turn only: the motor remains in a constant positive turn state Reverse only: the motor keeps in constant reversal Positive and reverse alternation: single machine	Just turn (Forward turning only, reverse only, positive and reverse alternating)
Alternate Time	Positive turn time: the duration of the positive turn Reverse time: Reverse duration Stop time: Stop time	1 Points (0~9999m) 1 Points (0~9999m) 1 Points (0~9999m)

9.7.3 CONCENTRATION PARAMETER



If you need to calibrate the CO2 concentration, fill in the concentration compensation value in "Cone.Para." - "CO2_Pk", the compensation value = 1000 x (measured concentration value - instrument display value)/instrument display value. Other parameters cannot be modified without the permission of **abm** after-sales engineers, otherwise it may lead to the unnormal operation of the shaker.

9.7.4 TIME PARAMETER

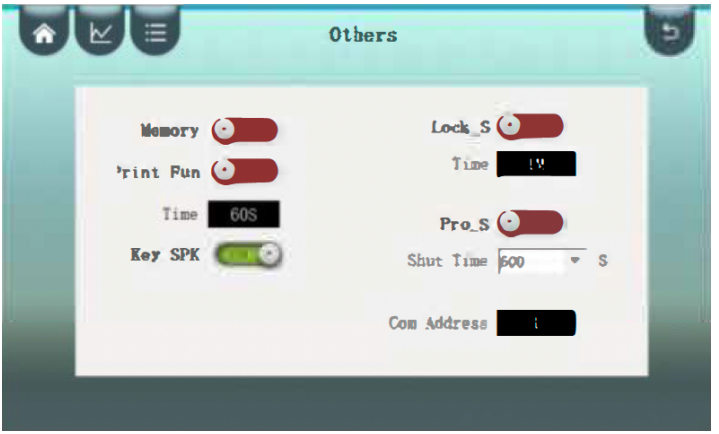
NAME	FUNCTION	INITIAL VALUE (SET RANGE)
Timed way	Run timing: Runtime starts timing Thermostatic Timing: Timing starts after the temperature reaches the timing deviation	Running time
Thermostatic timing deviation	During constant temperature timing, the temperature measurement enters the setting value positive	0.5 (0 ~ 5°C)
Constant wet timing deviation	The humidity measurement value enters the set value of positive and negative within this parameter range	3.0 (0 ~ 5% RH)
End of the buzzer prompt	Turn off the buzzer at the end of the operation, calling at this time	60 (0 ~ 9999S)
Open the door to alarm delay	Keep to open the door at this time and report the door opening alarm	120 (0 ~ 999s)
Lighting hours	Turn on the lighting at this time	120 (0 ~ 9999s)

9.7.5 APPOINTMENT FUNCTION

NAME	FUNCTION	INITIAL VALUE (SET RANGE)
Appointment	Make an appointment function switch	OFF(ON~OFF)
Appointment	When real time arrives the appointment time starts	/

Note: When the appointment time exceeds the real time, your shaker incubator will enter the appointment waiting state. When you set the temperature, speed and other parameters and find that the equipment does not start running, please check your appointment time and real time, just set the real time over the appointment time and the equipment will start running.

9.7.6 OTHER SETTING



NAME	FUNCTION	INITIAL VALUE (SET RANGE)
Erection	Do you need to return to the operation state before	OFF(ON~OFF)
Automatic	Lock screen function on continue “lock screen time”	OFF(ON~OFF)
Print function	Print information once after the print interval	OFF(ON~OFF)
Screen Protection	Screensaver turns on and continue “off backlight time” to turning off the screen backlight	OFF(ON~OFF)

Button buzzer	Click the touch screen when opening	ON(ON~OFF)
Mailing	Communication address between screens	1(1~32)

Warning: User adjustment of parameters not introduced in this manual is prohibited, if you encounter problem please contact **abm** after-sales engineers; if you modify the parameters without permission, your shaker incubator may not operate normally.

9.8 POWER INTERRUPTION

In the event of a power failure, the Q5102 Shakers are equipped with an automatic restart function. The shaker's non-volatile memory retains all stored information.

If the shaker was in operation prior to the power interruption, the shaker will begin to operate at its last entered setpoints.

9.9 SLIDE-OUT PLATFORM

The Q5102 is equipped with a slide out platform mechanism as a standard feature. This allows you to easily slide the platform out of the shaker for easy access to the platform without the need for tools.

TO OPERATE THE PLATFORM SLIDE-OUT MECHANISM:

1. Make sure the platform has stopped moving.
2. Turn the fixed screw knob located at the front of the platform counterclockwise until it comes off.
3. Hold the handle on the front of the platform and pull it toward you. This will move the platform to an easily accessible position.
4. To re-insert the platform, reverse this process. Make sure the two slots in the back of the platform are inserted under blocks of subplatform in the back.

	Make sure that you have rotated the front fixing screw knob clockwise to lock the platform in position.

10.0 Troubleshooting

PROBLEM	CAUSE	SOLUTION
Shaker does not run	• No power • Display is not on • Device is not connected to mains/ power supply and/or mains/power switch is switched off	1. Connect the device to mains/power supply 2. Press the mains/ power switch 3. Touch the screen to wake up the screen
	• Door is open. Look for icon on display	▶ Close door firmly
	• Mains/power switch is not working. • Door is closed but Door open icon is on display • Door magnet is not adjusted correctly • Defective main board • Defective display controller board • Jammed shaking mechanism • Defective motor • Drive belt out of alignment or worn	▶ Contact your **abm** customer service
	• Fuse(s) burned out	▶ Contact your **abm** customer service
	• Shaking speed has been set to zero • Run out of set time • In the appointment waiting state	1. Check program. 2. Reset speed and time. 3. Modify appointment wait time
Shaker runs slowly and/ or no speed indication	• Fuse(s) burned out	▶ Contact your **abm** customer service
	• Incorrect speed calibration	▶ Recalibrate speed
	• Defective main board • Defective motor • Drive belt out of alignment or worn	▶ Contact your **abm** customer service
Shaker does not run at set speed	• Shaker is overloaded	1. Remove some contents 2. Balance load
	• Defective motor • Drive belt out of alignment or worn	▶ Contact your **abm** customer service

PROBLEM	CAUSE	SOLUTION
Operating noise	• Load is out of balance	1. Unload all contents 2. Reload platform and balance load
	• Slide-out platform fixing screw knob is loose	▶ Tighten the fixing screw knob of slide-out platform
	• Loose component(s) in slide-out platform, sub-platform, and/or drive assembly	▶ Contact your **abm** customer service
Device does not reach set temperature	• Shaker running in Program mode	1. Check program parameters 2. Reset temperature, if necessary
	• Compressor over-pressure switch activated • Chamber fans not working • Door is not completely closed (even though Open Door icon may not be on display) • Sealing between the service drawer and the chamber is damaged • Defective heater • Defective refrigeration system	▶ Contact your **abm** customer service
	• Ambient temperature is too high or too low	▶ Cool or heat the room. See ambient conditions in chapter Preparing the location (see p. 14)
Incorrect temperature indication	• Temperature offset has been programmed	1. Check offset value 2. Reset offset value
	• Defective temperature probe or broken contact • Defective PCB mainboard	▶ Contact your **abm** customer service
Incorrect CO2 concentration display	• No CO2 gas source connected • CO2 gas source is out of gas • CO2 gas supply pressure is too high or too low • Leakage of CO2 gas supply line • CO2 calibration is required	1. Connect the CO2 gas source correctly and the pipeline has no air leakage 2. Ensure adequate supply of CO2 gas source 3. CO2 supply pressure is controlled at 0.05~0.1 MPa 4. Refer to Section 9.7.3

PROBLEM	CAUSE	SOLUTION
Incorrect CO2 concentration display	• CO2 detector failure • PCB motherboard failure • Solenoid valve failure	▶ Contact your **abm** customer service
Incorrect relative humidity indication	• Defective humidity probe or broken contact • Defective PCB mainboard	▶ Contact your **abm** customer service
Illumination light/UV light does not work	• The program turns off the light	1. Check program 2. Turn on light, if necessary
	• The device is in "start" mode	▶ The UV sterilization button will appear on the screen only when you click "Stop".
	• Bulb is burned out • Fuse is burned out	▶ Contact your **abm** customer service
	• Ballast voltage is wrong • Incorrect cable connections	▶ Contact your **abm** customer service
Door does not stay in the fully open position	• Door tension is too low	▶ Contact your **abm** customer service
The shaker has obvious abnormal shaking	• Feet are not leveled	▶ Level the four feet

11.0 Maintenance

11.1 BIOHAZARD DECONTAMINATION

It is the responsibility of the user to carry out appropriate decontamination procedures if hazardous material is spilled on or inside the equipment. Before using any cleaning or decontamination method other than those suggested by the manufacturer, users should check with **abm** that the proposed method would not damage the equipment.

Commercially available household bleach solutions, when diluted at a 1:10 ratio, are effective in routine decontamination of the instrument. The method for decontaminating a spill depends upon the nature of the spill.

Spills involving fresh cultures or samples known to have low concentrations of biomass should be flooded with decontamination solution and soaked for 5 minutes before cleanup. Spills involving samples with high concentrations of biomass, or involving organic matter, or occurring in areas warmer than room ambient temperature, should be exposed to decontamination solution for at least one hour before cleanup.

	**WARNING! PERSONNEL INJURY!** Personnel involved in the cleanup of any spill should wear gloves, safety glasses, and a laboratory coat or gown during the cleanup process. Respiratory protection should be considered for spills where aerosolization is suspected.

11.2 ROUTINE MAINTENANCE

No routine maintenance schedule is required for the Q1502.

	**WARNING! PERSONNEL INJURY AND EQUIPMENT DAMAGE!** When cleaning the unit, always turn off the shaker and disconnect the power cord from the power supply.

To ensure that your shaker retains its attractive appearance, an occasional cleaning, using a cloth with conventional household (non-abrasive) cleaner is recommended (see Cleaning external and internal surfaces on p. 45).

We recommend you occasionally wipe down the shaker with a non-abrasive household cleaner. We also suggest that the area around the shaker be vacuumed or swept to remove dust and other debris, ensuring proper air flow in and around the shaker.

11.3 CLEANING EXTERNAL AND INTERNAL SURFACES

	**WARNING! PERSONNEL INJURY AND EQUIPMENT DAMAGE!** When cleaning the unit, always turn off the shaker and disconnect the power cord from the power supply.

The unit may be cleaned using a damp cloth or any standard household or laboratory cleaner to wipe down its outer surfaces. Do not use abrasive or corrosive compounds to clean this instrument, as they may damage the unit.

12.0 Technical data

12.1 SPECIFICATIONS

These specifications assume a maximum load of 15 kg (34 lb), including platform, clamps, glassware and contents.

Alarms	• Visible and audible warning indication when the shaker runs abnormally. Audible alarm can be muted		
LCD display	• 7-inch		
Automatic restart	• Automatic restart after power is restored • Restart indicated by flashing display		
Stacking	• Up to 3 units may be stacked • Second and third units require stacking kit(s)		
Drive	• Five-eccentric counterbalanced drive		
Drive motor	• Servo Motor		
Safety	• Drive interrupt shuts off power to shaker when door opens • Acceleration/deceleration circuit prevents sudden starts and stops, minimizing both splashing and mechanical damage		
Electrical requirements	115V-230V±10%,50~60Hz	1200 VA per shaker	
Chamber dimensions	**Width**	**Depth**	**Height**
	1070 mm (42 in)	730 mm (28 in)	340 mm (13 in) from top of platform
Chamber door	• The doors of the first and second shakers open downward, and the third opens upward		
Platform	• Aluminum • 520 x 880 mm (20 x 34 in) • Select universal or dedicated styles		
Altitude Limit	• 2000 meters		

12.1.1 SHAKING

Speed	• 30 - 350 rpm with 26 mm (1 in) orbit • 30 - 300 rpm with 50 mm (2 in) orbit or with 2 units stacked • 30 - 250 rpm for 3 units stacked
Control accuracy	• ±1 rpm
Indication	• Displayed in 1 rpm increments
Stroke/orbit	• 50 mm (2 in)

12.1.2 TEMPERATURE

Range	• 20 °C below ambient temperature (minimum 4 °C) to 60 °C
Control accuracy	• ±0.1 °C at 37 °C
Indication	• Displayed in 0.1 °C increments
Heater	• Long-life • High temperature thermostat

1 Depending on ambient factors, such as relative humidity, and options installed

12.1.3 GAS CONCENTRATION

CO2 control range	• 0 - 20 %
CO2 display resolution	• 0.10 %
Principal of CO2 sensor	• Infrared (IR)
CO2 supply	• 0.05~0.1 MPa is recommended

12.1.4 UNIT DIMENSIONS

	Width	**Depth**	**Height**
Single unit	1330 mm (52 in)	820 mm (32 in)	620 mm (24 in)
2 units	1330 mm (52 in)	820 mm (32 in)	1170 mm (46 in)
3 units	1330 mm (52 in)	820 mm (32 in)	1720 mm (67 in)

12.1.5 GROSS WEIGHT

Q5102	220 kg (484 lb)
Short base	25 kg (55 lb)
Tall base	30 kg (66 lb)

13 Ordering information

13.1 REPLACEMENT PARTS

ORDER NO.	DESCRIPTION
RL010	Chamber light bulb
RU010	UV light bulb
RF3101	Peacock blue crystal sticky pad

13.2 ACCESSORIES

When ordering accessories, you may be asked to provide the model number and serial number of your shaker. This information is on the electrical specification plate, located on the side panel of the unit.

13.2.1 REPLACEMENT CLAMP HARDWARE KITS

abm flask clamps come complete with mounting screws. Additional screws are available separately in packs of 25 (Part number RFS025).

13.2.2 FLASK CLAMPS, TEST TUBE RACKS AND OTHER ACCESSORIES

Accessory Description		Part Number	Platform Capacity
Peacock blue crystal sticky pad	140 x 140 mm	RF3101	18
Fixed flask clamps	125 ml	RF125	90
	250 ml	RF250	60
	500ml	RF500	40
	1000 ml	RF1000	24
	2000 ml	RF2000	15

Adjustable angle Test Tube Rack for tubes	24 x 15 ml tube and 18 x 50 ml tube capacity	RF23W	4
	52 x 15 ml tube capacity	RF24W	4
	30 x 50 ml tube capacity	RF25W	4
Copper CO2 double stage pressure regulator	G5/8	RD006CO2	/
	G3/4	RD006CO2-RU	/

14.0 Transport, storage and disposal

14.1 TRANSPORT AND STORAGE

When transporting or storing the device, always use the original packaging material.

14.2 DISPOSAL

In case the product is to be disposed of, the relevant legal regulations are to be observed.

Please refer to the requirements of local regulations for information on disposal of electrical and electronic equipment

Within the European Community, the disposal of electrical devices is regulated by national regulations based on EU Directive 2002/96/EC pertaining to waste electrical and electronic equipment (WEEE).

According to these regulations, any devices supplied after August 13, 2005, in the business-to-business sphere, to which this product is assigned, may no longer be disposed of in municipal or domestic waste. To document this, they have been marked with the following identification:

Because disposal regulations may differ from one country to another , please contact your local regulatory body if necessary.

EQUIPMENT TERMS AND CONDITIONS

These terms and conditions apply to Equipment purchased from Applied Biological Materials Inc. ("we" "us" or "our").
If you have any questions about our quotation, our ordering process, or what terms and conditions apply to your order, please call Customer Services at 1-604-247-2416.

1. Contract Terms.
1.1 General Terms. These are the contract terms and conditions under which we sell, and/or provide, our Equipment to you ("Service Terms"). By ordering or requesting Equipment from us, you agree to accept and be bound by these Service Terms. This Agreement is the complete and exclusive contract between us with respect to your purchase of Equipment.
1.2 When Agreement takes Effect. The Agreement between us is created when you send us your Equipment order and we provide you with an order confirmation.

2. Price.
2.1 Determining Price. For the Equipment you purchase, the price is shown in our quotation to you. If we do not provide you with a quotation, the price will be the list price that applies to your country on the date we receive your order.
2.2 Taxes and Fees. Our prices do not include any taxes (including VAT), duties, levies or other government fees that may apply to your order. If they apply, it will be your responsibility to pay them. If we pay them, we will add them to your invoice.

3. Payment Terms.
3.1 Late Payment. If you are late in making payment, without affecting our other rights, we may suspend the warranty support, cancel your contract, reject your future orders, and charge you a late-payment charge, from the due date until paid, at the rate of 1% per month (12% per year) or, if less, the maximum amount allowed by law. You agree to pay this late charge upon request.
3.2 Collection Costs. If we appoint a collection agency or an attorney to recover any unpaid amounts, you must pay all reasonable costs of collection, including all associated reasonable attorneys' fees.

4. Warranty.
4.1 Limited Warranty. We warrant that the Equipment we provide to you will be in accordance with the generally accepted standards. You must make any claim for this warranty prior to any unauthorized repair, change, or modification has been made to any part of the Equipment. If the serial number of the product is altered, removed, or defaced as to be illegible, the warranty shall be null and void in its entirety.
We hereby undertake to repair, replace or refund at our option, or to arrange repair or replacement by our representative, on the Equipment if a defect in materials or workmanship arises under conditions of normal and proper use and maintenance provided that:

a) The Equipment was purchased and used for a purpose for which it was suitable, was operated and maintained in accordance with the operating instructions, and was not used in a way which was unsuitable or not in accordance to the operating manual's procedures;
b) The claim is first notified promptly to us in writing;
c) The defect occurs within twelve months from the date of delivery of the Equipment;
d) The Equipment has not been repaired or modified by anyone other than us or our authorized representative;
e) You have paid the invoice for the Equipment in full.

4.2 Remedies. During the applicable warranty period only, we agree, at our option to: (i) repair the defective Equipment, (ii) replace the defective Equipment with the same model or equal value, or (iii) refund to you the fee you paid to us for the defective Equipment, if applicable. This section states our entirely liability for a valid warranty claim under this Agreement.
4.3 Obligations of the Original Purchaser. The original dated purchase receipt must be retained as proof of purchase and submitted upon request by us for replacement or repair processing. For the repair option, transportation to and from us is the responsibility of the purchaser.
4.4 Exclusions. Our warranties do not apply to (i) normal wear and tear; (ii) damages by fire, flood, and/or acts of God; (iii) your neglect, carelessness, or unsuitable or improper use, such as but not limited to, connecting the Equipment to electrical services or other utilities not in accordance with the installation requirements for the Equipment, using incompatible solvents or samples with the Equipment, operating the Equipment not in conformance with our instructions or specifications, or your improper or inadequate maintenance of the Equipment; (iv) defective installation, bad civil works, or start up by you or third parties; (v) modification, repair, service transfer to another location of the Equipment that you or your employees, agents or an unauthorized contractor made; (vi) ignorance of relevant user manuals; or (vi) any defects or damage that we did not cause. ADDITIONALLY, ANY INSTALLATION, MAINTENANCE, REPAIR, SERVICE, RELOCATION OR ALTERATION TO OR OF, OR OTHER TAMPERING WITH, THE EQUIPMENT PERFORMED BY ANY PERSON OR ENTITY OTHER THAN US WITHOUT OUR PRIOR WRITTEN APPROVAL, OR ANY USE OF REPLACEMENT PARTS WE HAVE NOT SUPPLIED, WILL IMMEDIATELY VOID AND CANCEL ALL WARRANTIES WITH RESPECT TO THESE EQUIPMENT AND THE AFFECTED PRODUCTS.
4.5 Limitations. OUR WARRANTIES EXTEND ONLY TO YOU, THE ORIGINAL PURCHASER, AND YOU CANNOT TRANSFER THEM. WITH RESPECT TO EQUIPMENT, EXCEPT AS EXPRESSLY STATED, WE DISCLAIM ALL OTHER WARRANTIES OF ANY KIND, WHETHER OR EXPRESS OR IMPLIED, ORAL OR WRITEN, INCLUDING BUT NOT LIMITED TO WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY.
4.6 Except as expressly warranted above, equipment is provided without other representations, warranties or conditions of any kind, including implied representations, warranties and conditions of merchantability, fitness for a particular purpose, title or non-infringement of third party rights. Except for the limited remedies provided above, you assume the entire risk as to the results and performance of Equipment. Nothing stated in these terms will imply that the operation of any Equipment will be uninterrupted or error free or that errors will be corrected. Other written or oral statements by us, our representatives, or others do not constitute warranties of Applied Biological Materials Inc.

5. Compliance with Law.
We make no representation that the Equipment we provide to you will meet or satisfy standards of any governmental body, including the U.S. Food and Drug Administration. You agree that it is your responsibility to ensure that such Equipment are adequate to meet your regulation or certification requirements and that all requirements of any governmental body or other organization, including, but not limited to, any requirement of the U.S. Food and Drug Administration are your responsibility.

6. Limitation of Liability.
TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, WE WILL NOT BE LIABLE UNDER ANY LEGAL THEORY (INCLUDING BUT NOT LIMITED TO CONTRACT, NEGLIGENCE, STRICT LIABILITY IN TORT OR WARRANTY OF ANY KIND) FOR ANY INDIRECT, SPECIAL, INCIDENTAL, PUNITIVE, MULTIPLE, EXEMPLARY OR CONSEQUENTIAL DAMAGES (INCLUDING BUT NOT LIMITED TO COSTS OF COVER, LOST PROFITS, LOST DATA, LOSS OF BUSINESS, LOSS OF GOODWILL OR LOSS OF REVENUE) THAT YOU MIGHT INCUR UNDER THE AGREEMENT, OR THAT MAY ARISE FROM OR IN CONNECTION WITH OUR EQUIPMENT OR SERVICES, EVEN IF WE HAD NOTICE OF THE POSSIBILITY OF SUCH DAMAGES. WE WILL NOT BE LIABLE FOR ANY LOSS OR INJURY THAT IS THE RESULT OF INSTRUMENT, EQUIPMENT, OR PRODUCT ERROR OR THE FAILURE OF AN INSTRUMENT, EQUIPMENT, OR OTHER PRODUCT TO PERFORM IN ACCORDANCE WITH ITS SPECIFICATIONS. OUR TOTAL CUMULATIVE LIABILITY IN CONNECTION, INCLUDING WITHOUT LIMITATION ANY SERVICES RENDERED THEREUNDER, OR BREACH THEREOF OR FAILURE TO PERFORM IN CONTRACT, TORT, WARRANTY, OR OTHERWISE, WILL NOT EXCEED THE AMOUNT OF FEES YOU PAID US FOR THE EQUIPMENT THAT GIVE RISE TO YOUR CLAIM.

7. INDEMNIFICATION.
You shall indemnify, hold harmless, and if so requested by Applied Biological Materials Inc., defend Applied Biological Materials Inc. against all claims (Claims) directly or indirectly arising out of or in connection with the Equipment, its use or this Agreement. Claims refer to all losses, liabilities, damages, penalties, expenses (including legal fees and costs), claims, actions, and suits, whether in contract or in tort, whether caused by Applied Biological Materials Inc.' negligence or otherwise, and whether based on a theory of strict liability of Applied Biological Materials Inc. or otherwise, and includes, but is not limited to, matters regarding:

a) The selection, manufacture, purchase, acceptance, rejection, ownership, delivery, lease, possession, maintenance, use, condition, return or operation of the Equipment;
b) All latent defects or other defects in any Equipment or software, whether or not discoverable by Applied Biological Materials Inc. or by you;
c) Any patent, trademark or copyright infringement; and
d) The condition of any Equipment arising or existing during your use.

8. Miscellaneous.
8.1 Assignment. You may not transfer or assign your warranty or any contract with us on the Equipment. Any attempted transfer or assignment will be void.
8.2 Governing Law. The Agreement and performance under it will be governed by the laws of the British Columbia, Canada, without regard to provision on the conflict of laws. The United Nations Convention on Contracts for the International Sale of Goods shall not apply to the Agreement.
8.2 Uncontrollable Circumstances. We will not be responsible or liable for failing to perform our obligations under the Agreement to the extent caused by circumstances beyond our reasonable control.
8.3 No Waiver; Invalidity. Our failure to exercise any rights under the Agreement is not a waiver of our rights to damages for your breach of contract and is not a waiver of any subsequent breach. If any provision or part of the Agreement is found by any court of competent jurisdiction to be invalid or unenforceable, such invalidity or unenforceability will not affect the other provisions of the Agreement. No person other than you or us will have any rights under the Agreement. Headings are for convenience only and shall not be used in the interpretation of these Terms.
8.4 Confidentiality. You agree to keep confidential any non-public technical information, commercial information (including prices, without limitation), manuals or instructions received from us as a result of discussions, negotiations and other communications between us in relation to our products or services.
8.5 Notices. Any notice or communication required or permitted under these Terms must be in writing and will be deemed received when personally delivered, or 3 business days after being sent by certified mail, postage prepaid, to a party's specified address.
8.6 Commercial Purposes: You represent and warrant that Equipment is being purchased hereunder, as applicable, for business or commercial purposes and not for personal, family or household purposes.
8.5 You acknowledge that you have read and understand the terms and provisions of these Sale Conditions and have had an opportunity to have the same reviewed by an attorney of choice.