User's Manual

Incu-Shake series
Shaking Incubator

This Manual applies to:

Modes:

Incu-Shake MINI
Incu-Shake MIDI

Thanks !

Thank you very much for purchasing one of our Incu-Shake incubators specially designed for you-the lab professional. Your choice indicates that you have very high requirements on style and performance of this type of incubators.

SciQuip Incu-Shake incubators have achieved a good reputation and trust among various clients for its advanced temperature controlling technology, sound framework design, excellent molded exterior and outstanding professional workmanship. These products have been exported through most leading companies into European, American and East Asian markets.

SciQuip Incu-Shake incubators have a number of advanced specifications like an intelligent precise control of temperature and shaking speed through the standard control panel and solid operating safety features. This large benchtop model is available all with heavy duty orbital shaking mechanisms that provide smooth start and quiet shaking motion under maximum load with maximum speed.

This equipment is specially designed for the research experiment that involves microbiology, pharmacy and agriculture. It is widely used for cell culturing, hybridization, cell aeration, and solubility studies. Etc.

Since the date of your purchase of this product, after-sale service will always be close to you through your local dealer and/ or the importing company of your region.

Anyhow, no matter what questions you have using our equipment; please do not hesitate to contact us whenever you want.

Reminder

Prior to operation, this manual should be read thoroughly and completely understood-as it might be helpful to master the operation techniques of this unit.

Safety instruction!
Please be sure to follow the instructions, which are really important for your safety.

	**Danger!** **Warnings against injury and damage.**

1. The electrical supply circuit to the incubator must confirm to all national and local electric codes. Check the serial-data plate for voltage, cycle, phase and amperage requirements before you connect the unit.

2. Only use grounded power source (outlet) to avoid an electric shock or fire, and it is recommended that the equipment has an unobstructed access to a dedicated power source.

3. In case of a problem, do not attempt to repair the product yourself. Do not open the power box to avoid electric shocks.

4. Do not pull out the plug when the unit is in use. Never drag on the wire to unplug the unit.

5. This equipment can sustain a maximum of ±10% nominal voltage fluctuation; Otherwise a power stabilizer is needed.

6. A surge protector is recommended to avoid power-related faults.

7. In case of malfunction or burning smell, the unit must be unplugged immediately. Use a circuit breaker to cut off the power supply. Continuance of abnormal state will result in fire caused by overheating.

8. The electric power supply must be cut off in following situations:

8.1.-When opening the door of electrical power box without cutting off power supply might result in electric shock.

8.2.-When replacing the fuse. Replacing the fuse without cutting off the power supply will probably result in electric shock.

8.3.-When a malfunction occurs, mishandling will result in further damage of the equipment or accidental injury to the user(s).

8.4.-If you do not use the unit for a long period of time.

9. Never touch the glass door and/or inner chamber when the incubator is hot.

	Attention! **Instructions for optimal performance**

1. Before starting your equipment, the unit must be placed horizontally on a solid, flat floor, and elevated and leveled with four foot blocks.
2. The incubator needs even heat lost on all surfaces in order to maintain small internal temperature variations. As a result, a minimum of 20 cm must be allowed between the rear and sides of the incubator to any obstructions.
3. Do not locate the unit exposed to direct sunlight or near heating /cooling ducts.
4. The unit must be kept away from electromagnetic interference sources.
5. Flasks placed inside the shaking incubator should be placed to avoid (as much as possible) imbalance on the shaking platform
6. Slam the door(s) will probably leads to damage of the equipment.
7. When in operation (the platform is still moving), do not open the lid (too much or too long) as this might affect the temperature inside.
8. The incubator must be kept away from volatile, flammable, explosive liquids or gases
9. Please keep the chamber clean. Regular cleaning is required.

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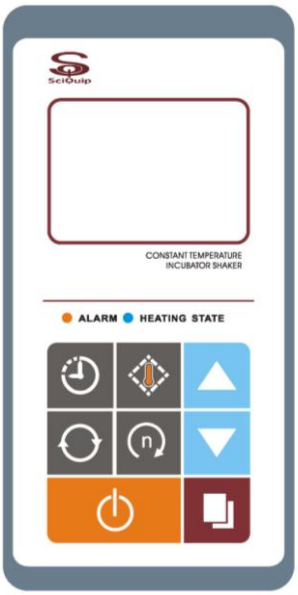
1. Performance Parameters

- ✶ Both the interior and exterior are made of robust materials for lifetime operations. The inner chamber is made of high quality #304 stainless steel sheets. All exposed edges are de-burred to insure no sharp edges. The exterior is ABS plastic finished with powder coated polyurethane finish, which is resistant to most chemicals and easily cleaned with mild household detergents.
- ✶ The shaking incubator's microprocessor control system uses fast responding PT 100 sensors which commands and executes a special control algorithm that energizes a solid-state switch to supply power to the heaters.
- ✶ The control electronics are protected trough a circuit breaker that may trip at 110% of loading rate, but will trip within 1 second at 150% of load rating.
- ✶ Curved tempered glass window lid provide complete visibility of chamber interior and easy cleaning.
- ✶ Shaking diameter stepless adjustable from 1-50mm
- ✶ LCD display presents all actual and (pre)set parameters.
- ✶ Electronic timer, from 0 – 500 hours, automatic stop, audio/ visual alarm.
- ✶ Password protection against unauthorized change of parameters.
- ✶ Audible and visual alarms for motor temperature and set point deviations
- ✶ Non-volatile memory for set point retention after a power interruption.
- ✶ "Long-Life" brushless AC motor creates a smooth, quiet and uniformed shaking motion
- ✶ Option: unit equipped with RS-485 interface communication can be connected to local network so that remote data logging and control can be achieved via laptop/ PCs.

2. Technical Specifications

Model	INCU-SHAKE MINI	INCU-SHAKE MIDI
Mode	Orbital	
Temperature (°C)	A+5 to 60	
Temper. Accuracy	±0.1˚C	
Temper. Uniformity	⩽±1˚C@37˚C	
Tray (mm)	280*220	340x370
Shakling Diameter (mm)	φ 0-50	
Speed (rpm)	30-600	
Capacity *	***Glass dimensions may reduce max.capacity**	
50ml	9	18
100 ml	9	18
250 ml	5	10
500 ml	-	9
750 ml	-	5
1000 ml	-	4
Tube Rack S/S	-	3
96 Well Plate	4	4
Inner dimensions (mm) (WxDxH)	340*300*175	410*440*295
Exterior dimensions (mm) (WxDxH)	440*410*400	600*580*520
Packing dimensions (mm) (WxDxH)	530*520*560	680*690*700
Net Weight (kg)	43	72
Gross Weight (kg)	54	94
Power (W)	280	550
Electricity	220/240Volt 50/60 Hz	
Approval	CE, ISO	

3. Control Panel



Time button:

Button to display the preset time and the status of the power-off recovery function.

Press again to display the remaining time (if Timer is set).

Press it to stop the acoustic alarm when needed

Power button:

Hold this button for 2 seconds to turn the unit on/off the standby mode

Temperature button:

Press this button to display the actual temperature value and the set temperature in turns

Speed button:

Press this button to display the actual speed value and the set speed in turns

Start/Stop button:

Button to start or stop current operation

Increase button:

Press this button and the parameter will increase by one digit, the parameter will keep increasing while this button is held.

Decrease button:

Press this button and the parameter will decrease by one digit, the parameter will keep decreasing while this button is held .

Set/Confirm button:
Press this button to enter the menu of setting, press it at the end of the setting to save and exit..

- **Temperature alarm indicator:**
  ALARM
  When the temperature inside the chamber is deviated over the preset alarm limit , the indicator flashes and the alarm beeps

- **Heating indicator:**
  HEATING
  When the heater is connected with power supply, this indicator will be light. This indicator will twinkle when the real temperature close to the preset value

- **Refrigeration indicator:**
  COLD
  Lights when the cooling system is switched on to cool down the inner chamber. (Refrigeration models only)

4. Preparation and Start-up

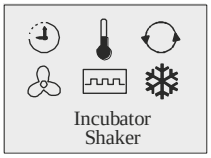
4.1 Before starting your equipment, the unit must be placed horizontally on a solid, flat floor.

Clean the shaking incubator before you put it into use and on a regular base. The interior should be wiped down with an appropriate disinfectant, such as 70 % ISOPROPYL ALCOHOL or equivalent.

DO NOT USE ANY CHLORINATED OR HALOGEN MATERIAL- AS THIS IS HARMFUL TO THE POLISHED STAINLESS STEEL!!!

4.2 Turn the main switch which is located on the right side of the unit, power is applied to the

Unit and the LCD display shows:



-Incubator Shaker

-Pre-set Temperature

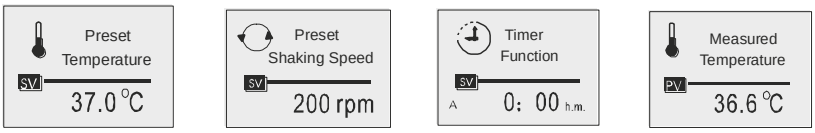
-Pre-set Speed

-Pre-set Time

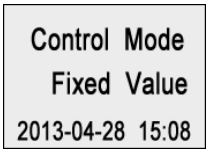
4.3 The screen in turns displays the operating parameter stored in the equipment:

Preset temperature; Preset speed; Preset time; Real temperature.

And now, the microprocessor system has started controlling the temperature according to the preset value.

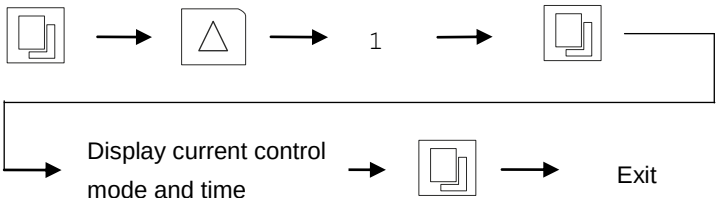


5. Control Mode & Clock Checking

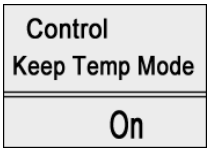


5.1. Press "Set/confirm", press the "Increase" button to "1", then press the "Set/confirm" again. The screen shows the current control mode and current date & time.

5.2. Press "Set/confirm" to exit to the home page

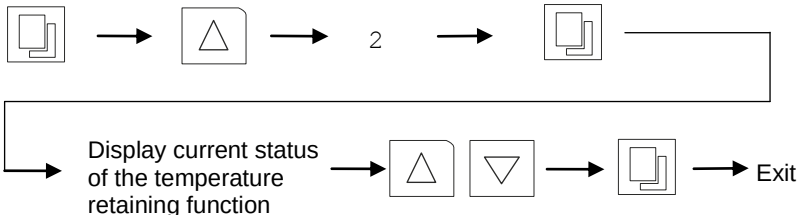


6. Temperature Retaining Switch Setting



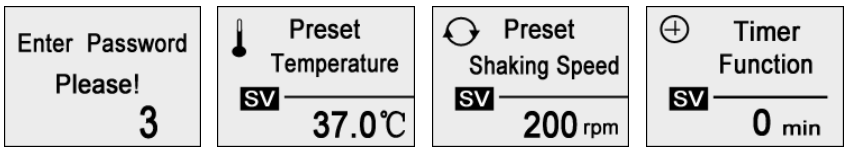
6.1. Press "Set/confirm", press the "Increase" button to "2", then press the "Set/confirm" again. The screen shows the current status of temperature retaining (Keep Temp Mode) function, press "Increase" or "Decrease" to change the setting.

6.2. Press "Set/confirm" to exit to the home page



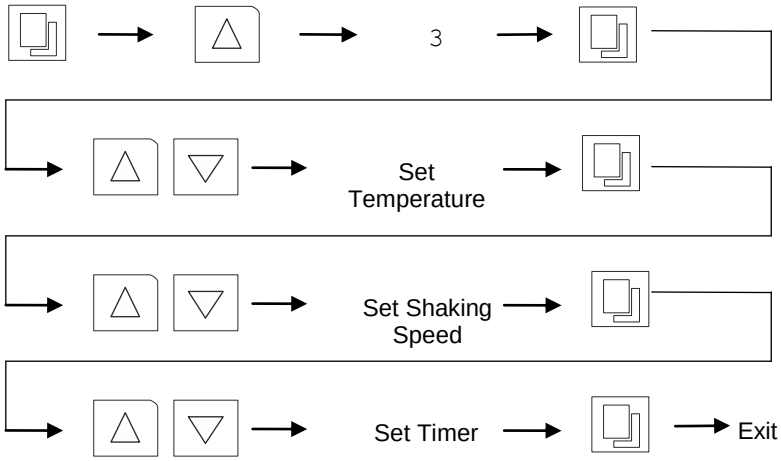
	**Special Attention!** When the status is "on", the temperature will remain under control at its preset value even when shaking operation has been turned off manually or by timer. Otherwise, when the status is "off", the system will stop both shaking motion and temperature control when operation is stopped.

7. Temperature, Speed, Timer Settings



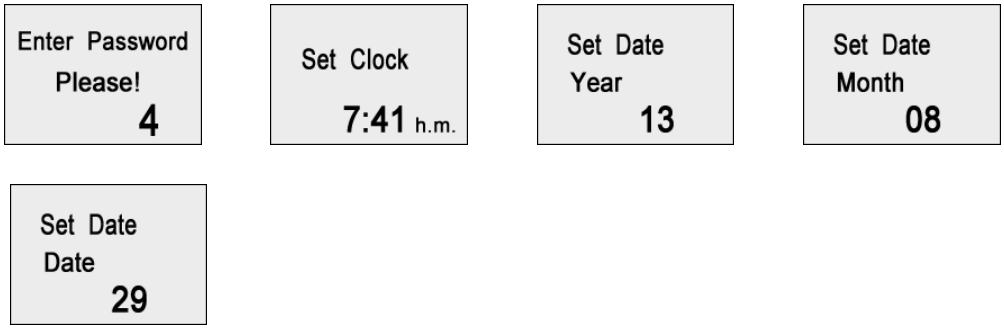
7.1. Press "Set/confirm", press the "Increase" button to "3", then press the "Set/confirm" again. The screen shows the current temperature preset value, press "Increase" or "Decrease" to change the value; press "Set/confirm" to save and switch to speed page, press "Increase" or "Decrease" to change the value, and press "Set/confirm" again to save and switch to the timer page, press "Increase" or "Decrease" to change the value if necessary. **If Timer is set as "0", the unit will keep running continuously.**

7.2. Press "Set/confirm" to exit to the home page



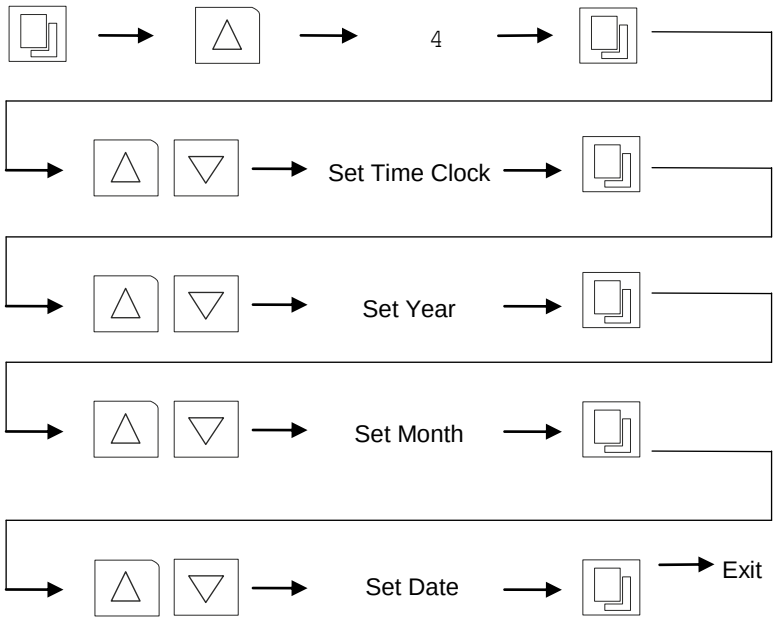
	**Special Attention!** 1. This unit is equipped with "door switch". The temperature control (main heater) will be temporarily disabled when lid is opened. Therefore, always close the lid in time to avoid exceeded heat loss.

8. Date & Time Settings

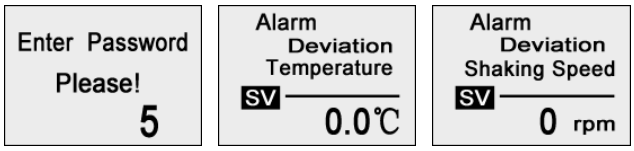


8.1. Press "Set/confirm", press the "Increase" button to "4", then press the "Set/confirm" again. The screen shows the current time clock, press "Increase" or "Decrease" to change the time; press "Set/confirm" to save and switch to "year" setting page, press "Increase" or "Decrease" to set the year, and press "Set/confirm" again to save and switch to the "month" page, repeat the above steps to set "month" and "date".

8.2. Press "Set/confirm" to exit to the home page



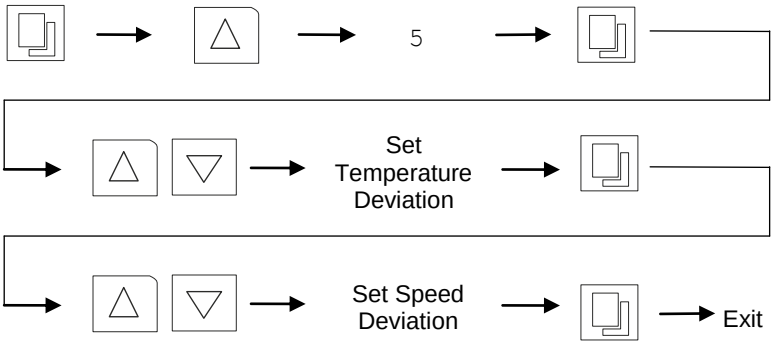
9. Temperature & Speed Alarm Settings



9.1. Temperature and speed alarm is activated when temperature or speed is deviated over limit. The deviation alarm limit can be preset as below,

9.2. Press "Set/confirm", press the "Increase" button to "5", then press the "Set/confirm" again. The screen shows the current "temperature deviation" value, press "Increase" or "Decrease" to change the value; press "Set/confirm" to save and switch to "speed deviation" setting page, press "Increase" or "Decrease" to change the value.

9.3. Press "Set/confirm" to exit to the home page



Special Attention!

1. Deviation alarms can only be activated when unit is running, and once actual temperature or speed has reached its preset value and stabilized for a certain period of time.

2. Deviation alarm is activated when the actual parameter value exceeds preset value ± preset deviation alarm value. The "Alarm" indicator is lighted, but can be muted by pressing "Run/Stop" button.

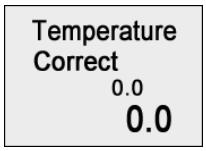
3 Deviation alarm can be automatically deactivated once if the parameter value is back within the deviation tolerance range.

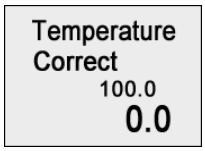
10. Temperature Calibration

Special Attention!

Temperature of each unit has been carefully calibrated in factory before dispatch.

No further calibration is needed. But if it does, do follow the calibration process strictly or consult your supplier, as wrong operation can interfere the temperature accuracy significantly.





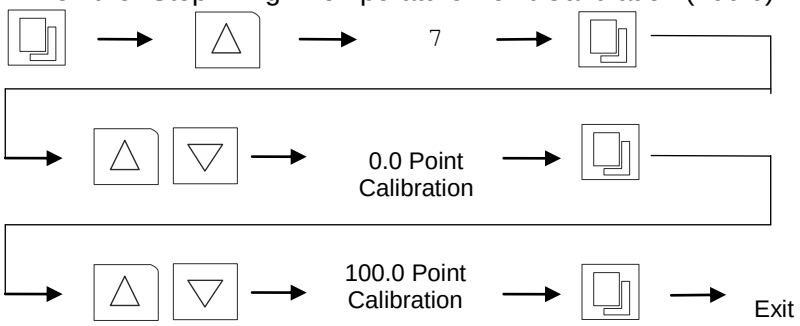
To calibrate the temperature, take a certified calibrated thermometer in a small bottle with glycerin and place that in the geometrical center of the incubator.

10.1 Low Temperature Point Calibration (0.0)

a) Change the set point to lower temperature value, 37°C for ZWY-100B (or 8°C for ZWY-200D,) and let the incubator run for at least 1 hour– until the temperature is constant, and let the temperature inside of the chamber uniform.
b) Read the temperature on the thermometer through the glass lid; calculate the difference with actual displayed temperature. for example, if reading is 35°C, difference would be 35-37= -2°C, while if reading is 38°C, the difference would be 38-37=1°C
c) Press the "Set/Confirm" button and go with the up arrow to code “7”. Press the Set/Confirm again, to enter the Step 1. "Low Temperature Point Correction (0.0)", the display shows the "Temperature Calibration" with "0.0" and the "Current Calibration Value". Use the up and/or down key to make a further adjustment on the current correction value by the temperature difference calculated above, for "-2°C ", decrease by 2, for "1°C ", increase by 1.
d) Keep pressing "Set/Confirm" button, skip the " High Temperature Point Correction (100.0)" setting, save and exit.
e) The displayed temperature should have changed due to the calibration. Waiting for another one hour to let the temperature stabilize again at 37°C, and check the thermometer value again, and calculate the new difference.
f) if necessary, perform the calibration again until the actual display value equals to the calibrated thermometer value. Thus the Step 1. "Low Temperature Point Correction (0.0)" is completed.

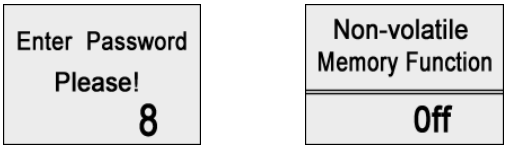
10.2 High Temperature Point Calibration (100.0)

a) If the incubator is to be used for more than one temperature setting, and "High Temperature Point Calibration (100.0)" needs to be performed as well.
b) Change the set point to a higher temperature point as required, for example 60.0°C and let the incubator run for at least 1 hour– until the temperature is constant, and let the temperature inside of the chamber is uniformed
c) Change the enter the code "7" again and press "SET" skip the "0.0", and enter the "100.0" page.
d) Repeat the same procedure, like the "Low Temperature Point Calibration", to correct the high temperature point, until the display value equals to the actual thermometer value. Then the "Step 2 High Temperature Point Calibration (100.0)" is completed.



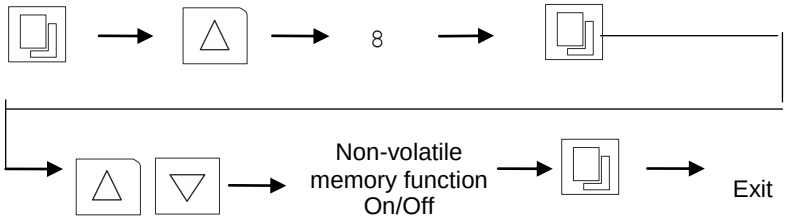
11. Non-Volatile Memory Setting

If the non-volatile memory function is active (ON), the unit will run to the originally temperature, speed and time program when the external power is recovered after a power failure.



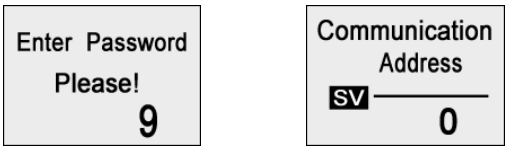
11.1 To set the non-volatile memory function, first press the, then press the Increase button to “8”, next press the "Set/Confirm" button and the screen will display the character ON or OFF. Press the "Increase" or "Decrease" button to change the parameter and press the "Set/Confirm" button to save the change and exit.

11.2 Press the Timer button, if the symbol “A” is displayed on the lower left corner of the screen, it means the non-volatile memory function has been active.



12. Setting of communication address for RS485 connection (Opt)

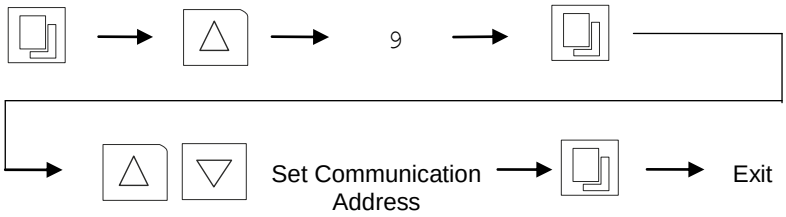
If the RS-485 communication kit is equipped on this product, please follow the instructions below for address setting.



12.1 Press the Change/Confirm button, then press the Increase button to "9", press he Change/Confirm button again to enter the "communication" address setting page.

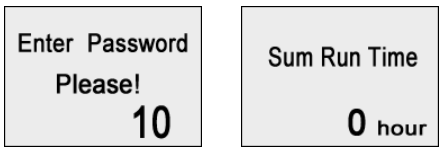
12.2 The screen displays the current communication address, and use Increase or Decrease button to change the address, within the range of 0 to 63

12.3 Press the Change/Confirm button to save and exit



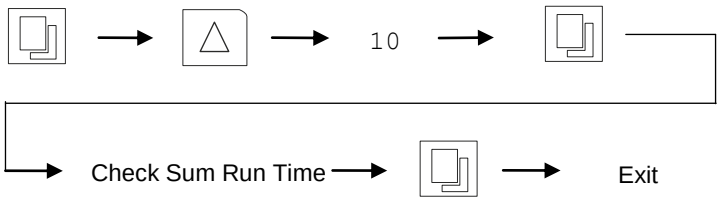
13. Sum Run Time Checking

The total run time of current operation can be checked via following steps. Run time starts counting once "Start/Stop" button is pressed, and stops when pressed again.



13.1 Press "Set/Confirm" button and press the "Increase" button to "10", then press "Set/Confirm" button again to see "Sum Run Time".

13.2 This is the accumulated time of current operation, which cannot be changed.



Special Attention!

The communication address is used as an identifying code for each unit to pair with the software of the PC terminal. Each communication code must be connected to only one unit. Different communication addresses must be used if multiple units are to be connected to the same PC terminal.

14. Operation and Switch off

14.1 When all the above settings are done, press the Start/Stop button and the equipment will run according to the stored settings.

14.2 When during operation, the Start/Stop button is pressed, the platform stops from haking temporarily. The operation time remains on hold.

14.3 Press the Start/Hold button again to resume operation, the pre-set time starts to count down from the remaining time when the operation was stopped.

14.4 When during operation, if the Start/Stop button is held on, within 3 seconds the remaining operating time will be cleared to zero. Press the Start/Stop button once more, and the unit starts again to count down from the preset operation time.

14.5 While the unit is in use, the current remaining operating time cannot be changed. f however changed at this time, it is invalid with the current operation. Only when the current operation has passed or stopped according to the above method, only if the instrument is re- started the new changed value will be effective.

14.6 The equipment can be turned off by holding on the Power button on the control panel for 2 seconds. At this time, the control board is still connected to the power supply, so the main switch on the right side of the equipment must be shut off to end operation completely.

15. Shaking Diameter Adjustment

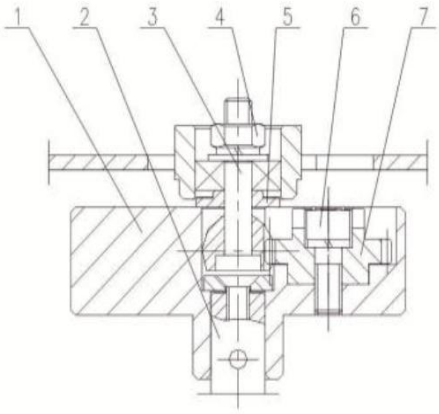
15.1 Instruction of stepless adjustment (INCU-SHAKE MINI):

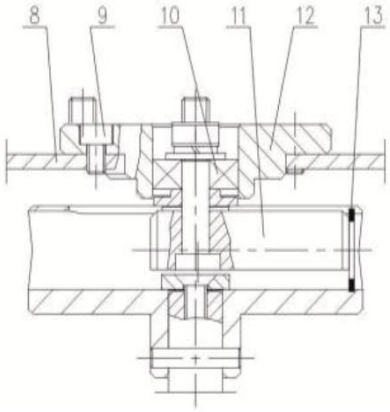
⚠	**Attention:** Power supply must be disconnected before performing the following operations!

These models have an adjustable shaking diameter of Ø0-50mm. To adjust it, please follow the instructions below,

15.1.1 Tools needed: M6 Allen key, M6 Socket Spanner, Gear spanner (Included in accessory pack)

Structure illustrations





1. eccentric
2. main axis
3. pinch bolt
4. hexagon nut
5. pad
6. inner hexagon nut
7. gear
8 main shaking board
9. inner hexagon bolt
10. bearing
11. gear back
12. connecting block of main shaking board
13. hole retaining ring

15.1.2 Turn off the unit, unplug the power code, open the glass door, hold platform tray from the bottom firmly and pull the whole shaking tray assembly out. (you do need some strength)

15.1.3 Turn the shaking base with four rubber sockets until seeing the center of the shaking mechanism

15.1.4 Use the M6 Allen key to loosen the inner hexagon bolt (6) on the adjusting kit.

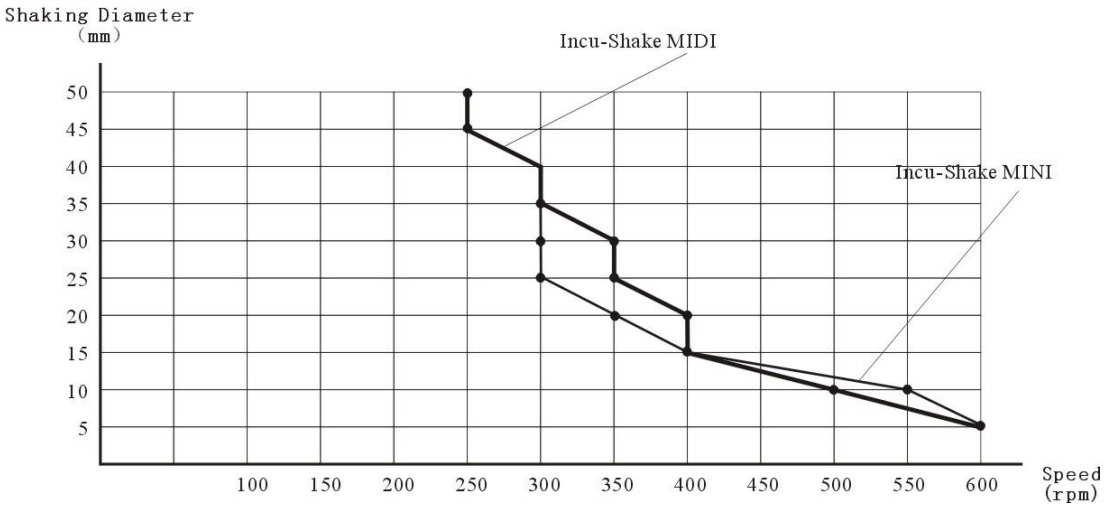
15.1.5 Keep M6 Allen key on the hex bolt to hold the shaking base as stationary, in the meantime, loosen the M6 hexagon nut (4) with turning anti-clockwise with the socket spanner

15.1.6 Now the shaking base is free to move along in the slot of the shaking mechanism. Move the shaking base to adjust the shaking diameter. The closer to the central, the smaller the shaking diameter, while the further away from the central, the larger the shaking diameter. Alternatively, rotate the gear (7) with the gear spanner clockwise to enlarge the shaking diameter and anticlockwise to reduce it. Use left side of the chamber as reference, measure the distance that the pinch bolt moves as the shaking diameter. Keep adjusting until the ideal shaking diameter is reached.

15.1.7 One adjustment is finished, tighten the M6 hex bolt and M6 nut, and locate the shaking tray assembly back to its original position.

⚠	**Special Attention:** The below chart indicates the highest speed ranges of three models with certain shaking diameter settings. The top speed indicated in the chart shall never be exceeded.

Chart of ratio between speed and shaking diameter.



16.2.1. Turn off the unit, unplug the power code, open the glass door, hold platform tray from the bottom firmly and pull the whole tray kit out. (you do need some strength)

16.2.2. Loosen and remove the 4 M5 inner hexagon bolts (4) on the shaking board, use a spanner to loose and remove the M6 bolt (3) in the center to disassemble the main shaking board (1). The 4 M6 screw holes (5) in a row can be seen in the middle of the core plate once the main shaking board is removed.

16.2.3. Use the M6 bolt (2) to tighten the connection to the desired screw hole (5) for different shaking diameters. The further away from the centre, the larger shaking diameter.

16.2.4. When adjustment is finished, reverse the above steps, assemble the main shaking board, locate the shaking tray assembly back to its original position.

16. Trouble Shootings

Error Indicator	Possible cause	Corrections
Power on , No display	Power supply is not connected	Check the power supply system to see if there is voltage on the line
	Plug has no access to socket	Plug in firmly
	The power switch has not been turned on.	Turn on the power switch on the right side of the unit
	The fuse is broken	Replace fuse with new one of same specification
	Circuit occurs mall function of power box	Notify distributor for repair service
Actual temperature is higher than the set point, high temperature alarm is activated	Unit has not yet reached the required (constant) temperature.	Wait a moment and observe
	Temperature setting is at the blind area of temperature control	Open the ventilation hole
	Improper setting of refrigeration parameter	Set the refrigeration parameter to be “0.5”and close the ventilation opening.
	The ventilation fan is broken	Notify the distributor to replace the fan
	Malfunction occurs with refrigeration system	Notify the distributor to repair the refrigeration system
Actual temperature is lower than the set point. low temperature alarm is activated	Unit has not yet reached the required (constant) temperature	Wait a moment and observe
	The circulation of cold air is excessive	Close(a part of) the ventilation opening
	The ventilation fan is broken	Notify the distributor to replace the fan
	The heater does not work	Notify the distributor to repair the heater
Actual temperature is fluctuating and will not be stable	Improper setting of refrigeration parameter	Refer to Users Guide and reset the refrigeration parameter
	The door (lid) is not closed firmly	Close the door (lid) firmly
	Malfunction occurs with the control circuit	Notify distributor for repair service
Temperature is constant out of control	Malfunction occurs with the control circuit	Notify distributor for repair service
The oscillation of platform is unstable	The platform is in imbalance due to a spoiled object	Remove the object , clear and clean the chamber
	The equipment is not placed horizontally	Adjust the left-back foot leveler install the equipment in a proper way.
	Malfunction occurs with control circuit	Notify distributor for repair /service

The shaking platform does not work	The door switch has not yet made contact	Check the door to see if it is closed firmly
	The platform is blocked with an object at the bottom	Remove the platform and clear the object and clean the inside
	The belt is broken	Notify the distributor to replace the belt
	Malfunction occurs with control circuit	Notify distributor for repair service
The oscillation of platform is out of control	Malfunction occurs with control circuit	Notify distributor for repair service
The platform keeps shaking after the door is opened	The door switch has short circuit ,could be caused by humidity	Use a blower drier to dry the chamber Press the Start/Stop button before opening the door
As the door is closed ,the platform starts shaking but the speed runs high suddenly	Improper operating method	Refer to Users Guide and press the Start/Stop button to operate again
Screen has no response when button on the control keyboard is pressed	Equipment is disturbed by high frequency.	Press the Change/Control button and try other operation mode.
		Restart the equipment-if it does not work:
		Notify the distributor.
The equipment causes a strange loud noise	The equipment is not placed horizontally	Adjust the left back foot to make the equipment stable
	The fixed screw of clamp is loose	Remove the platform and tighten the screw
	The platform is loose	Remove the platform an tighten the screws on the four corners
	There is strange object, like a piece of a bottle, under the platform	Remove the platform ,clear the object and clean the inside
	Mechanical malfunction occurs	Notify the distributor for repair service
The accumulation of frost is fast after refrigeration is started, resulting in the rise of temperature	The refrigerating time is too long and the evaporating chamber is too humid	Refer to Users Guide and conduct a drying maintenance on the evaporation chamber

17. Electronic Control System