thermo scientific

# Thermo Scientific™ IntelliStack™ Incubator Shaker Series

## Instruction Manual

Thermo Scientific™ IntelliStack™ Incubator Shaker Series
Thermo Scientific™ IntelliStack™ CO2 Incubator Shaker Series
50171628 Revision C | 2025-01

Please read this user's manual carefully before using the product

# Contents



The contents of these operating instructions may be changed at any time and without notice. For translations into foreign languages, the English version of these operating instructions is binding.

Keep this instructions close to the device so that safety instructions and important information are always accessible.

If you have any questions that you feel are not covered in sufficient detail in these operating instructions, please contact thermo Scientific for your own safety.

# 1. General Information

## 1. 1. About this Manual

**Please read this user's manual carefully before using the product.**

This manual enables the safe and efficient handling of the device.

All the information and instructions in this operating manual comply with the current standards, legal regulations, the latest technological and scientific developments and the knowledge gained from the manufacturer's many years of experience in this field.

**This operating manual is a component part of the device. It must be kept near to the device and must be accessible to the operators at all times.**

Read this instruction manual prior to installation of equipment. Failure to follow the instructions in this manual can result in damage to the unit, injury to operating personnel, and poor equipment performance that may not be covered by the product warranty.

Material in this manual is for informational purposes only. The contents and the product it describes are subject to change without notice. Thermo Fisher Scientific makes no representations or warranties with respect to this manual. In no event shall Thermo Fisher Scientific be held liable for any damages, direct or incidental, arising from or related to the use of this manual.

This manual contains illustrations to aid general understanding. These may differ from the actual device as supplied.

## 1. 2. Signal Words and Safety Symbols

Observe the information contained in this instruction manual to keep yourself and your environment safe.

**Signal Words - Indicate the degree of hazard**

- **DANGER** - Indicates a hazardous situation that, if not avoided, will lead to death or serious injury.
- **WARNING** - Indicates a hazardous situation that, if not avoided, could result in death or serious injury.
- **CAUTION** - Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.
- **NOTE** - Indicates information considered important, but not hazard-related.

## Signal Symbols

Observe the information contained in this instruction manual to keep yourself and your environment safe.

Refer to instruction manual

**WARNING** - General warning symbol

Disconnect mains plug from electrical outlet

**WARNING** - Hazard caused by crushing of hands

**WARNING** - Hazard caused by optical Radiation

**WARNING** - Hazard caused by electricity

**WARNING** - Hazard caused by flammable material

**WARNING** - Hazard caused by hot surface

# 1. 3. Standards and Guidelines

The device is in compliance with the essential requirements of the following standards:

- IEC 61010-1:2010/AMD1:2016/COR1:2019 with national deviation for Eu, Us and Canada
- IEC 61010-2-010:2019 with national deviation for EU, US and Canada
- IEC 61010-2-011:2019 with national deviation for EU, US and Canada
- IEC 61010-2-051:2018 with national deviation for Eu, US and Canada
- EN IEC 61326: 2021. FCC and ICES

### US (FCC)

**NOTE:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

### Canada (ICES-001)

This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme a la norme NMB-001 du Canada.

### South Korea (ROK) Statement

| 사 용 자 안 내 문 |
| --- |
| 이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서<br>가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다. |

**WEEE Conformity:**

This product is required to comply with European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2012/19/EC. It is marked with the adjacent symbol.

## 1. 4. Maintenance and Field Service

Thermo Fisher Scientific recommends having the shaker and accessories serviced once per year by an authorized service technician. The service technician checks the following:

- Electrical equipment
- Suitability of set-up site
- Safety system
- Used accessories
- Fixation of clamps and platforms and other accessories on the shaker

Before service, shaker and accessories should be thoroughly cleaned and decontaminated to ensure that full and safe inspection can be completed.

Thermo Fisher Scientific offers inspection and service contracts for this work. Any necessary repairs are performed for free during the warranty period and afterwards for a charge. That is only valid if the shaker has been maintained by an authorized Thermo Fisher Scientific customer service technician.

# 2. Safety and Responsibility

This section describes general considerations relating to user safety that must be taken into account when working with the device. In the remaining sections, warning notices are used to highlight particular hazards directly arising from the actions being described in the corresponding section.

**Read this instruction manual prior to installation of equipment.** Failure to follow the instructions in this manual can result in damage to the unit, injury to operating personnel, and poor equipment performance that may not be covered by the product warranty.

This section also refers to areas that are the responsibility of the user due to certain risks arising from particular applications for which the device is used deliberately and with full awareness of the associated risks.

## 2. 1. Intended Use, Safety Notes, and Misuse

The Thermo Scientific™ IntelliStack™ CO2 Incubator Shaker and Thermo Scientific™ IntelliStack™ Incubator Shaker are non-medical device instruments that allow the end user to control the CO2 gas (only for CO2 Incubator Shakers) and humidity levels, shaking speed, time, and temperature inside of the chamber for growth of microorganisms and cells in general laboratory environments.

Depending on its features, the device is designed to be used as an incubation shaker for cultivating microorganisms or cell cultures under the following conditions:

- Cultivation of non-pathogenic microorganisms or cell cultures aligning with a bio safety level 1.
- Cultivation of pathogenic microorganisms or cell cultures aligning with a bio safety level 2.

If shaking any hazardous materials mind the “Laboratory Bio safety Manual” of the World Health Organization (WHO) and any local regulations. When shaking microbiological samples from the Risk Group II, aerosol-tight biological seals have to be used.

The "Laboratory Bio safety Manual” can be found at www.who.int. For materials in a higher risk group, extra safety measures must be taken.

| | |
|---|---|
|  | **WARNING** - The shaker is to be used for its intended use only. Improper use can cause damage, contamination, and injuries with fatal consequences. |

It is the obligation of the operator to make sure that the proper personal protective equipment is used. Intended use also includes following all the instructions in this manual, especially those relating to:

- The installation site
- Use of suitable cultivation vessels
- User qualifications
- Permissible parameter set points
- Correct operation and maintenance

Any failure to observe the requirements specified in this manual shall be deemed incorrect use. This includes use of inappropriate cultivation vessels and/or unsuitable holders at excessive speeds, usage of the device outside of the intended use listed above, and not following the below guidelines:

- The shaker is neither inert nor protected against explosion. Never use the shaker in an explosion-prone environment.
- Do not shake explosives or flammable materials or substances.
- This instrument contains flammable refrigerant, be careful when installing and operating to prevent risks of combustion or explosion.
- The device is not designed to sufficiently protect its users against contamination. Cultivation of pathogenic organisms of risk group III and IV is therefore not permitted.

To use the device for special applications not covered by conventional, intended use, the device must be modified and certified accordingly by the manufacturer.

Any use of the device outside of a biotechnology laboratory, i.e. in any environment in which the conditions required for the safety of users cannot be met or cannot be met to their full extent, shall also be deemed misuse.

**NOTE**: For Laboratory Use. It is the customer's responsibility to ensure that the performance of the product is suitable for customers' specific uses or applications.

## 2. 2. Cultivation Vessels to Be Used

Significant forces are applied to cultivation vessels, in particular in ca vessels and high of speeds. Hence, the cultivation vessels used are particularly significant in relation to user safety.

**WARNING** - Make sure the accessories are installed properly before operating and do not exceed recommended operating speeds..

**Approved cultivation vessels**

The device has been designed for use with the following vessels using the holders designed specifically for them:

- Fernbach flasks up to 3,000 mL made of borosilicate glass or high-grade plastic, such as polycarbonate etc.

- Other vessels with the holders designed for them:
  - Test tubes
  - Centrifuge tubes
  - Microtitre plates
  - Media Bottles
  - Shaker Flasks up to 5L
  - Deep well plates

**Cultivating organisms of risk group II**

When cultivating pathogenic organisms of risk group II, special measures must be taken to eliminate contamination. The user is responsible for this.

When using the device under Bio safety Level 2, stainless steel clamps of the correct size must be used to affix the flasks. Due to limited resistance to disinfectants as well as the risk of unintentional detaching of flasks, adhesive mats are not recommended.

We further recommend using disposable plastic flasks with screw tops and filter membranes. We recommend using sticky tape to secure the lid against loosening unintentionally. Using glass flasks with cotton wool or paper plugs is not sufficiently safe.

**Adhesive Mats**

Adhesive mats are suitable for containers with a wide, flat base, such as Erlenmeyer flasks, Fernbach flasks, media bottles, micro plates, petri dishes, cell culture flasks, volumetric flasks and beakers.

**NOTE** - When using Adhesive mats, follow the manufacturer recommendations for maximum shaking speed since it may be different than using stainless steel clamps.

Generally, all vessels that can stand upright can be used, but as their base area to height ratio decreases, so does the maximum achievable shaking speed. Tall containers with a small base are less suitable.

**NOTE** - Remove Adhesive mats before turning on the UV lamp of the machine

## 2. 3. Qualified Personnel

Due to the complexity of the device and the potential risks arising from its operation, the device may be operated by trained personnel only.

### 2. 3. 1. Provider

The term “provider” applies to all persons who are responsible for purchasing the device and making the necessary infrastructure available. These persons may also be included in the group of people known as “users”, though this is not always the case. Regardless of whether a provider is a member of the company's board of management or a supervisor, they bear a special level of responsibility with regard to the processes and the qualification and safety of the users.

## 2. 3. 2. General User

The term “user” applies to all persons who come into contact with the device in any way and perform work on or with it. This primarily applies to the following activities, which can be performed by the manufacturer's own specialists or a variety of other persons:

- Assembly, installation and commissioning
- Definition and preparation of the process
- Operation
- Troubleshooting and remedying of faults
- Maintenance and cleaning (autoclaving, if necessary)
- Service work and repairs
- Disassembly, disposal and recycling

**Qualified personnel**

On account of their specific education, training, and experience, the qualified personnel required for this work are able to recognize risks and respond accordingly to potential hazards. Examples include:

- Electricians (electrical engineers)
- Decontamination specialists
- Repair specialists
- Specialists in disassembly and (environmentally friendly) disposal Service work and repairs
- Recycling specialists

## 2. 3. 3. Operator

The “operators” are a specific sub-group of users distinguished by the fact that they work with the device. They are the true target audience for this operating manual.

**Qualified technicians**

Only technicians who have been trained for working in a biotechnology laboratory can be considered for the role of operator.

These include:

- Process technicians in the fields of biotechnology and chemistry
- Bio-technologists (bio technicians)
- Chemists with a specialization in biochemistry; chemists in the field of organic chemistry or biochemistry
- Life scientists (biologists) with special education in cytology, bacteriology, molecular biology, genetics, etc.
- Lab assistants (lab technicians) from various fields

In order to be classed as a “sufficiently qualified technician” for the operation of the device, the persons in question must have received thorough training and have read and understood the operating manual.

The "provider" must train the operator on required tasks and inform them of the potential risks of improper conduct.

**Technicians in Training**

Persons in this group who are undergoing training or apprenticeships are only permitted to use the device under supervision and in accordance with the instructions of a trained and qualified technician.

## 2. 4. Unauthorized Persons

The term “unauthorized persons” applies to all persons who can access the work area but are not qualified to use the device in accordance with the aforementioned requirements. Unauthorized persons are not permitted to operate the device or use it in any other way.

## 2. 5. Responsibility of the Provider

The device is used for industrial and scientific purposes. As such, the provider of the device is individually liable with regard to the legal requirements relating to occupational health and safety in a biotechnology laboratory. In particular:

- The provider is responsible for ensuring that the work and environmental regulations applicable in a biotechnology laboratory are observed.
- The provider must ensure that the device remains in safe and proper working condition throughout its entire term of use.
- The provider must ensure that all safety equipment is fully functional and is not disabled.
- The provider must ensure that the device is only worked on by qualified users, and that said users receive sufficient training.
- The provider must ensure that the protective equipment required for working with the device is provided and worn.
- The provider must ensure that this operating manual remains in the immediate vicinity of the device throughout its entire term of use.

## 2. 6. General Hazards

This section covers general hazards and residual risks that are always present when using the device in accordance with normal, intended use. The following notices are general in nature. As such, with a few exceptions they are not repeated in the remaining sections.

### 2. 6. 1. Electrical Current

The device is electrically powered. There is an immediate risk of fatal injury if contact is made with live parts. The following points must be observed in order to avoid the risk of fatal injury:

- In case of damage to insulation, disconnect the device from the mains immediately and arrange for it to be repaired.
- Disconnect the device from the mains before commencing any work on the electrical system.
- Always use qualified electricians for any work on the electrical system.
- Disconnect the device from the mains before beginning any maintenance, cleaning or repair work.
- Do not bypass any fuses or take them out of operation.
- When replacing fuses, ensure they have the correct number of Amperes.
- If the power cable is defective, replace it with a power cable of the same type.
- Keep moisture away from live parts. It may lead to a short circuit.
- Never remove covers from the casing.

### 2. 6. 2. Unauthorized Spare Parts and Accessories

Use of Incorrect or imitated spare parts and accessories as well as spare parts or accessories that have not been authorized by the manufacturer represent a significant safety risk. As such, we recommend procuring all spare parts and accessories or an authorized dealer or directly from the manufacturer.

## 2. 7. Particular Hazards

This section covers particular hazards and residual risks that may arise when using the device for special applications in accordance with normal, intended use.

Since the use of the device for such applications is deliberate, it is the responsibility of the operators and the provider to ensure that all personnel are protected from potential damage to health. The provider is responsible for ensuring that the appropriate protective equipment for such applications is provided, and that the necessary infrastructure is in place.

### 2. 7. 1. Danger due to Hot Surfaces

For applications that are performed with temperatures over 55 °C, there is a danger of burns on hot surfaces in the interior or on the cultivation vessels.

- For applications with temperatures over 55 °C wear heat-resistant protective gloves.

### 2. 7. 2. Dangerous Gases

The use or production of dangerous gases entails a significant health risk, especially in enclosed spaces. To prevent high emissions of dangerous gases, the following measures must be taken:

- When using CO2 control or manufacturing dangerous gases, the device must be set

up in a well-ventilated area.

- The gas connections on the device must be checked before any cultivation processes using dangerous gases are initiated.

### 2. 7. 3. Flammable or Explosive Substances

The use or production of flammable or explosive substances is not covered under “intended use” of the device, as the device is not explosion-proof. If the provider intends to use the device for such purposes, they must check its suitability for the planned application with the responsible local authorities.

### 2. 7. 4. Corrosive or Toxic Substances

The use or production of corrosive or toxic substances entails a significant health risk. As such, special measures must be taken to protect the users for such applications. Since the device is used deliberately for such applications, it is the responsibility of the users to ensure that they have sufficient protection.

### 2. 7. 5. Pathogenic Organisms

The device is not approved for cultivation of pathogenic organisms of risk groups III and IV. In the context of intended use, it is nonetheless possible for pathogenic organisms and viruses to be cultivated.

## 2. 8. Safety Features

The device is equipped with the following safety features:

**Fuses / thermal protection switches**

Two fuses protect the device from impermissible high power input. The fuses are located right next to the mains connection on the left-hand side of the casing.

**Overheating shut-down**

The heating of the device is protected against overheating by a temperature limiter. This triggers as soon as the temperature on the heating element exceeds the maximum allowed value and immediately turns off the heating.

**Door monitoring**

The position of the door is monitored electronically. If the door is opened, the shaker drive is stopped immediately. As soon as the door is fully closed again, the shaker drive restarts automatically.

## 2. 9. Symbols on the Device

The following symbols (stickers) are attached to the device:

Refer to instruction manual

**WARNING** - General warning symbol

Disconnect mains plug from electrical outlet

**WARNING** - Hazard caused by crushing of hands

**WARNING** - Hazard caused by optical Radiation

**WARNING** - Hazard caused by electricity

**WARNING** - Hazard caused by flammable material

**WARNING** - Hazard caused by hot surface

**WARNING** - Protective ground


UL Certified product

CE Certified product

## 2. 10. Declaration of Decontamination

When returning the device for repair, disassembly or disposal, it is required for the safety of all parties involved and because of legal provisions that a lawful declaration of decontamination is present.

The following must be observed if this is the case:

- The device, the component part or accessory must be entirely decontaminated before sending to the manufacturer
- The provider is therefore required to completely and truthfully fill out a declaration of decontamination, and have it signed by the person responsible.
- The declaration of decontamination must be affixed on the outer packaging in which the device is sent back.
- These forms can be obtained from the licensed dealer or the manufacturer.

**Important Note**

If the return shipment is not accompanied by a signed and complete declaration of decontamination or it is not affixed to the outer packaging, the shipment will be returned unopened to the sender at their expense.

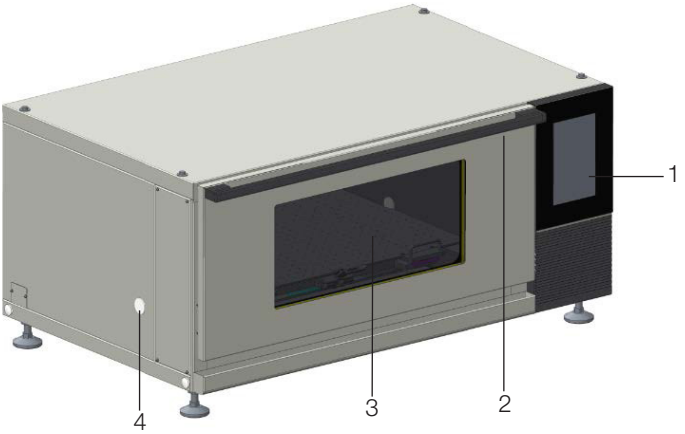
## 2. 11. Safety Technical Specifications

| | |
|---|---|
| Overvoltage Category | II-Connected to Standard Wall Outlet |
| Pollution Degree in Accordance with EN 60664-1.2007 /VDE 0110-1 | 2 |
| Protection Class (IEC 60529, Degrees of Protection Provided) | Ip21 |
| Equipment Mobility | Floor mounted |
| Connection to Mains supply | Detactable cord set |
| Operating Conditions | Continuous |
| Ventilation Spacings | 30 cm away from walls |
| Environmental Rating | II |
| Max Altitude | ≤ 2000m |

# 3. Setup and Function

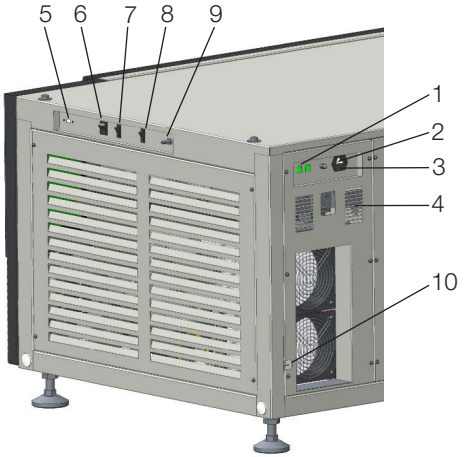
## 3. 1. Setup of the Basic Unit

### Exterior



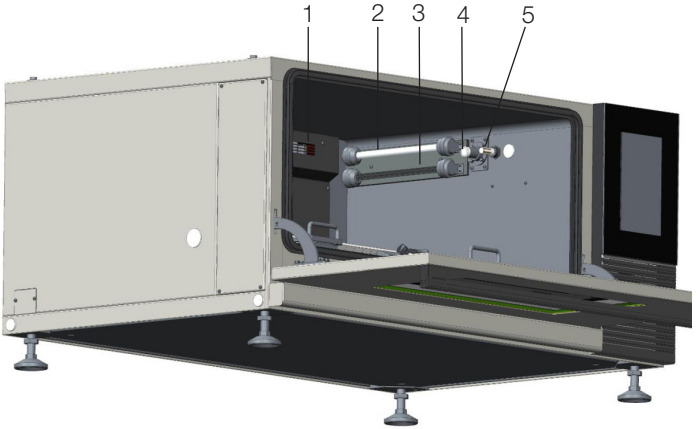

1. User Interface and Display
2. Door handle
3. Door with window (opens downwards)
4. Access port

### Connections



1. RS485 monitor interface
2. Mains connection (MAINS)
3. Slot for fuses
4. Air vents
5. USB
6. Power switch
7. Lamp switch
8. UV lamp switch
9. CO2 connection (CO2 IN, optional)
10. Water inlet for Humidity System

## Interior




1. Finned heating element and axial fans (in back wall, not visible)
2. Lamp
3. UV lamp
4. CO2 sensor (optional)
5. Humidity sensor

### Brief description

The incubator shaker is used to cultivate micro-organisms in a laboratory environment. The basic version of the device is fitted with a shaker drive and a heater. Depending on the version of the device, it will come with either a 25 mm or 50 mm throw.

### Stacking devices

If necessary, up to three units can be stacked to save space. Stacking must be performed by the qualified persons or persons authorized by the manufacturer.

**NOTE**: When the devices are stacked, it is recommended to reduce the maximum rotation speed for the middle unit to 250rpm and 220rpm for the top unit.

**NOTE**: Refer to Appendix A for detailed instructions on stacking.

## Overview of options

To be able to adapt the device to different application situations, the following options are available:

| Thermo Scientific™ IntelliStack™ $CO_2$ Incubator Shaker | | | | |
|---|---|---|---|---|
| SKU | Orbit | Voltage | Door Swing | $CO_2$ Control |
| 8892610D | 25 mm | 120 V, 50/60Hz | Down Swing | Yes |
| 8892620D | 25 mm | 220 V, 50/60 Hz | Down Swing | Yes |
| 8895010D | 50 mm | 120 V, 50/60 Hz | Down Swing | Yes |
| 8895020D | 50 mm | 220 V, 50/60 Hz | Down Swing | Yes |
| 8892610U | 25 mm | 120 V, 50/60 Hz | Up Swing | Yes |
| 8892620U | 25 mm | 220 V, 50/60 Hz | Up Swing | Yes |
| 8895010U | 50 mm | 120 V, 50/60 Hz | Up Swing | Yes |
| 8895020U | 50 mm | 220 V, 50/60 Hz | Up Swing | Yes |

| Thermo Scientific™ IntelliStack™ Incubator Shaker | | | | |
|---|---|---|---|---|
| SKU | Orbit | Voltage | Door Swing | $CO_2$ Control |
| 8882610D | 25 mm | 120 V, 50/60 Hz | Down Swing | No |
| 8882620D | 25 mm | 220 V, 50/60 Hz | Down Swing | No |
| 8885010D | 50 mm | 120 V, 50/60 Hz | Down Swing | No |
| 8885020D | 50 mm | 220 V, 50/60 Hz | Down Swing | No |
| 8882610U | 25 mm | 120 V, 50/60 Hz | Up Swing | No |
| 8882620U | 25 mm | 220 V, 50/60 Hz | Up Swing | No |
| 8885010U | 50 mm | 120 V, 50/60 Hz | Up Swing | No |
| 8885020U | 50 mm | 220 V, 50/60 Hz | Up Swing | No |

| Thermo Scientific™ IntelliStack™ Accessories | |
|---|---|
| SKU | Description |
| 88900000 | Thermo Scientific™ IntelliStack™ Stand for use with Single or Double IntelliStack Shakers, open shelf |
| 88900001 | Thermo Scientific™ IntelliStack™ Carboy Kit |
| 88900002 | Thermo Scientific™ IntelliStack™ window cover for light sensitive applications |
| 88900003 | Thermo Scientific™ IntelliStack™ Stand for use with Single or Double IntelliStack Shakers, closed. |

## 3. 2. Basic Functions

The standard functions of this device include vibration function (parameter RPM), temperature control (parameter Temperature), CO2 concentration control, and humidity control.

### 3. 2. 1. Standard Function Shaking


1. Counterweight 2. Drive hub

The shaking table has a circular motion with a magnetic drive. To prevent injuries and facilitate loading and unloading, the drive is switched off automatically when the door is opened. The counterweight used to balance the mass is fitted under the table. Depending on the design, the deflection of the circular movement is either 25 or 50 mm thrown.

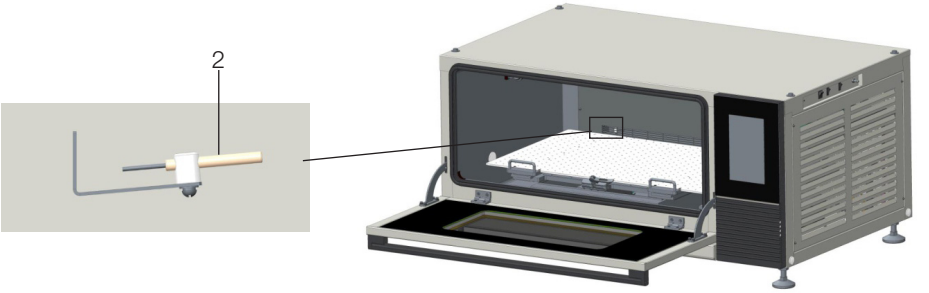
#### Operation

The Rotation speed parameter is operated via the user interface. Beside the actual value, the symbol RPM and the unit min-1 appear on the display. For an exact description of how to set the parameters, see “11. Operational Instruction” on page 54”.

#### Technical data and set points

For a detailed description of the technical data and possible maximum rotation speeds, see Page 31 (Loads and Speed Of the IntelliStack Incubator Shakers)

## 3. 2. 2. Standard Function Temperature Control (Heating)




1. Finned heating element and radial fans (in back wall, not visible)

The temperature in the incubation chamber is regulated using a Pt100 temperature sensor with a PID controller. Two cross flow fans ensure constant air circulation and keep the temperature distribution in the incubation chamber as constant and gradient free as possible. A finned heating element heats the air in the incubation chamber.

**NOTE**: The temperature sensor serves exclusively to measure the temperature of the air in the incubation chamber. The temperature sensor must not be removed from the holder and immersed in the liquid in the cultivation vessel.

2. Pt100 temperature sensor

**Operation**

The Temperature parameter is operated using the user interface. Beside the actual value, the symbol Temp and unit °C appear on the display.


For an exact description of how to set the parameters, see chapter “11. Operational Instruction” on page 54. Technical data and set points

For a detailed description of the technical data and possible maximum or minimum temperatures, see chapter “10. Introduction to Touch Program” on page 42.

## 3. 2. 3. Standard Function CO2 Control

The CO2 control makes it possible to enrich the atmosphere in the incubation chamber by 0 to 20 % CO2. The CO2 control option is particularly suited to cultivation of mammalian cells and algae because the CO2 ensures that the pH value in the culture solution is stable.

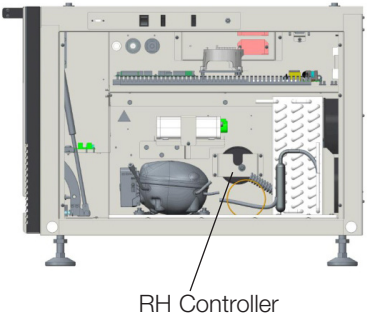
**WARNING** - During normal operation, small amounts of CO2 are constantly dissipated into the environment. Leaking CO2 can lead to discomfort, loss of consciousness or even death by suffocation, especially in small rooms.

- The operator is obliged to install a monitoring system which permanently monitors and analyses the CO2 concentration in the room.
- If you are using the CO2 control, only operate the device in well-ventilated areas.
- Comply with local health and safety regulations and regulations regarding the use of CO2 and its limits.
- Regularly check the gas pipelines for leaks

## 3. 2. 4. Standard Function RH Control

The humidity in the incubation chamber is measured and regulated using a humidity sensor. RH Controller uses deionized water heated at high temperature to form water vapor and ejected into the chamber.

The RH Controller is installed in the electrical box on the right side of the machine.


RH Controller

- The direct steam humidification only works actively in one direction. It only humidifies; it does not dehumidify.
- Long term high humidity operation can cause condensation in the incubation room. It is recommended to regularly dehumidify at high temperatures.
- The Temperature parameter must be activated.
- When the humidity setting is more than 80%, it is easy to produce condensate. It is recommended the humidity should not exceed 80%.

### 3. 2. 4. 1. Connect Water Inlet for Humidity System

The humidity reservoir will require approximately 10 Liters of water on the initial filling. For best operation, sterilized distilled, demineralized or de-ionized water should be used in the humidity reservoir. Water purity should be in the resistance range of 50K to 1MOhm*cm, or a conductivity range of 20.0 to 1.0 µS/cm. Refer to ASTM Standard D5391-93 or D4195-88 for measuring water purity.

Distillation systems, as well as some types of reverse osmosis water purity systems, can

produce water in the quality range specified. Tap water is not recommended as it may contain chlorine, which can deteriorate the stainless steel. Tap water may also have a high mineral content, which would produce a build-up of scale in the reservoir. High purity or ultra pure water is not recommended as it is an extremely aggressive solvent and will deteriorate the stainless steel. High purity water has a resistance of above 1M to 18M Ohm*cm. Even high purity water can contain bacteria and organic contaminants. Water should always be sterilized or treated with a decontaminant, safe for use with stainless steel as well as safe for the product, prior to being introduced into the humidity reservoir.

| | |
|---|---|
|  | **CAUTION** - Distilled or de-ionized water used in humidity reservoir must be within a water quality resistance range of 50K to 1M Ohm*cm to protect and prolong the life of the stainless steel. Use of water outside the specified range will decrease the operating life of the unit and may void warranty. |

| | |
|---|---|
|  | **Warning** - It is normal for condensation to be observed on the door gasket or inside the chamber when the humidity is operated at or above 80%. After each use, we recommend to clean the chamber and door with a dry cloth. |

If condensation continues to accumulate, follow the below steps:

- Verify the horizontal level of the shaker. The feet can be adjusted to ensure that the shaker is level from the front to back of the device. The front can be positioned up to 5mm higher than the back of the unit to assist with condensation flow if needed.
- Verify that the drain is not obstructed.
- After above steps are taken, operate the shaker at 60 C with 0% humidity for at least 12 hours to thoroughly dry the chamber and eliminate any condensation.

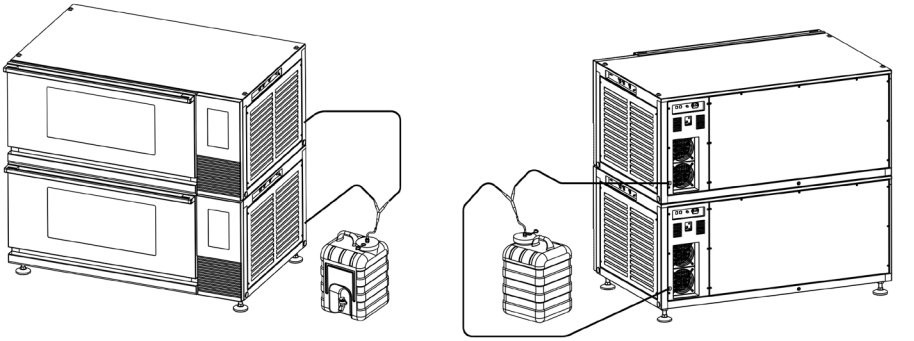
Once the above steps have been taken and the shaker is dry, operation as normal can resume. Contact Thermo Fisher Scientific if the issue persists after following these steps.

#### 3. 2. 4. 1. 1. IntelliStack Incubator Shaker Carboy Kit Installation Guide

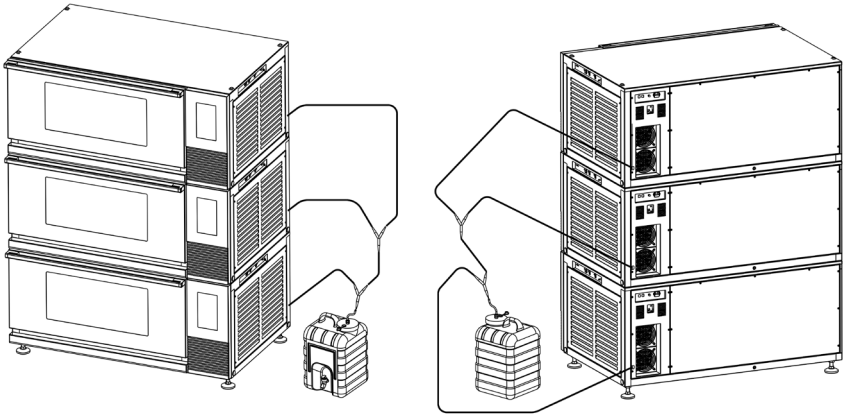
**Parts List:**

1. IntelliStack Carboy Kit (88900001)
2. EVA plastic tubing
3. Plastic connector
   a. Y-Connector for Double Stacked Units
   b. 4-way Connector for Triple Stacked Units
4. Small tubing connector
   a. Use 1 per unit (i.e. 2 for double stack)
5. Adjustable Wrench

**Double Stack Carboy Connection:**



**Triple Stacked Carboy Connection:**



**Carboy Setup Instructions:**

1. Insert the HEPA filter into the larger black port. Tighten the black knob until the HEPA filter is securely attached.

   Attach the included EVA plastic tubing to the metal rod sticking up through the smaller black port. Tighten this knob until it is secure. Connect the thin tubing at the back of the incubator shaker to the small tube connector at the end of the EVA tubing, shown in Figure 1.

   This completes the carboy setup for a single incubator shaker unit.

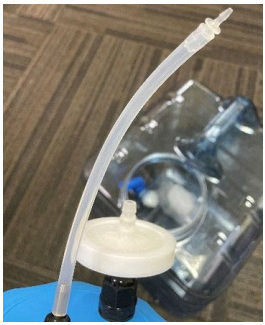


**Figure 1: HEPA filter placement and EVA tube attachment for a single unit setup**

2. When using the water carboy for a double or triple stacked unit, you will need to cut two Or three small pieces off of the EVA tubing, respectively. Attach these pieces to the Y connector (for a double) or 4-way connector (for a triple). (Figure 2)

**Figure 2: EVA tubing connections for a double stack (left) and triple stack (right)**

3. Insert the small double sided tube connectors (Figure 3) into the end of the cut pieces of EVA tubing. The connection for a double stack is shown in Figure 4.

**Figure 3: 2-way tube connectors and Figure 4: Tube connection setup**

4. Connect the thin plastic tubing from the back of each incubator shaker to the smaller end of each 2-way tube connector, shown in Figure 5.

   This completes the setup of the 88900001 IntelliStack Water Carboy. Once it has been filled with water, it is ready for use with your incubator shaker.

**Figure 5: Thin tubing from incubator shaker connected to carboy via 2-way connector**

****Please note that only Lab Grade deionized or distilled water should be used with your Incubator shaker.****

## 3. 3. Connections and Interfaces

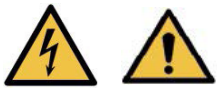
### 3. 3. 1. Mains Connection

The mains connection is located on the back of the unit.

- 220V 50/60Hz
- 120V 50/60Hz

Two fuses (230 V version) or two thermal protection switches (120 V version) immediately adjacent to the power connection protect the device from impermissibly high power input. The country-specific power cable required for connecting the device to the mains is included in the device's scope of delivery. If the power cable is defective, replace it with a power cable of the same type.

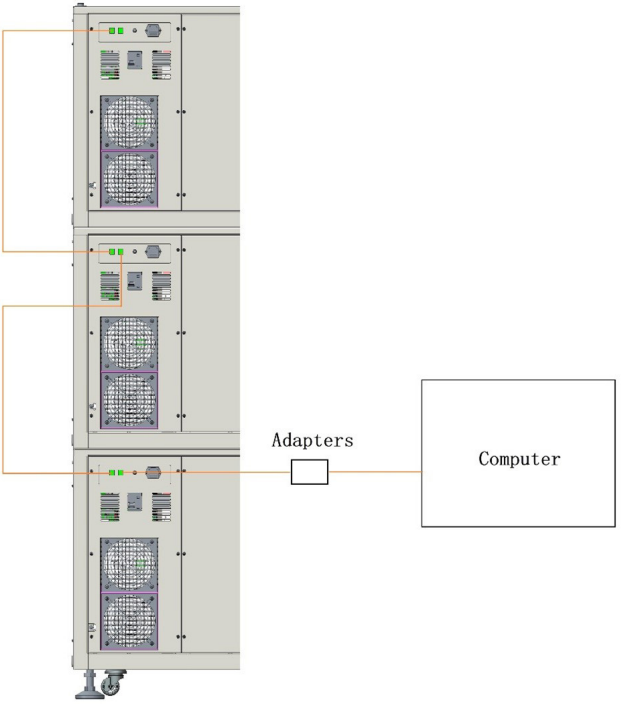
Prior to connecting the device, make sure that the operating voltage of the device match those of the local power supply. The mains connection must be easily accessible at all times so that the device can be disconnected from the power supply quickly in case of an emergency.

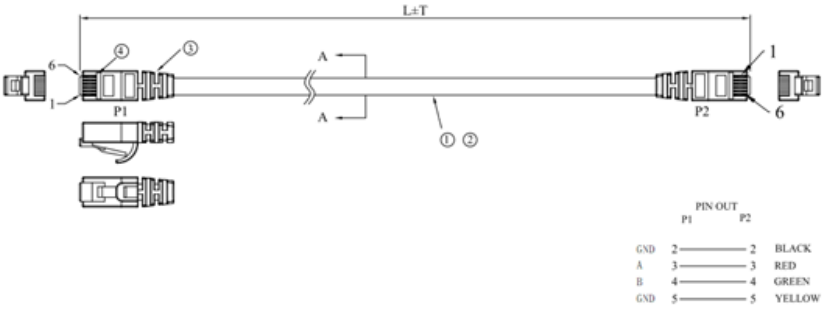
| | |
|---|---|
|  | **WARNING** - Please ensure that the machine is connected to the socket, with a safe grounding protection, otherwise there is a risk of electrical leakage. |

## 3. 3. 2. Connecting to RS 485 Communication Interface

### 3. 3. 2. 1. Hardware connection

Connect each shaker with network cables through RJ11 connector. The wiring diagram is shown as following.



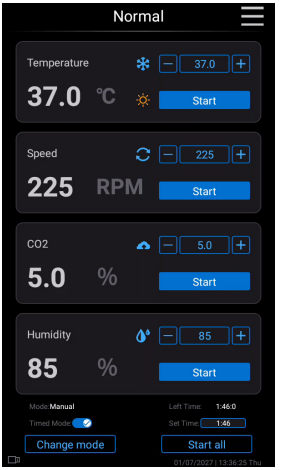
# 3. 4. Operating and Indicating Elements

## 3. 4. 1. Power Switch

The power switch is located on the right side of the device. In addition to normal switching on and off, the power switch also works as an emergency switch.

**NOTE**: In case of an emergency shut down via the power switch, all parameter set points are stored and the device restarts immediately when it is switched on via the power switch.

## 3. 4. 2. Operating Panel




Device functions can be controlled directly via the operating panel on the front of the unit. The operating panel is divided into display and operating sections:

- In the display section on the left side, information on actual values and set-points, runtime of the timer function and fault notifications are displayed, among other things.
- The keys in the operating section on the right side can be used to set the parameters and the timer function and adjust the basic settings of the device.

For detailed information on the display and operating elements see chapter "10. Introduction to Touch Program".

# 4. Unpacking Guide

## 4. 1. Unpacking Procedures

**NOTE:** It is your responsibility to ensure that the shaker is set up properly.

The instrument must be placed on a level surface with caution. The shipping carton should be inspected upon delivery. When received, carefully examine for any shipping damage before unpacking. If damage is discovered, the delivering carrier should specify and sign for the damage on your copy of the delivery receipt.

Unpackage the Instrument carefully making certain that all parts and accessories (Section 4.2) are accounted for before packaging materials are discarded. After unpacking, if damage is found, report it to the carrier and request a damage inspection. If any parts or accessories are missing, contact Thermo Scientific immediately for support.

**WARNING** - Do not transport or move the instrument without helpers.

- Owing to its weight, please use a lift or a forklift or other lifting apparatus to transport or move the instrument.
- Inspect contents upon receipt of the instrument, if the instrument is upside down, contact the manufacturer immediately and notify the carrier.
- Make sure the power is disconnected and the platform is empty when moving the instrument.
- Move instrument individually before stacking them.

**IMPORTANT** – Failure to request an inspection of damage within a few days after receipt of shipment absolves the carrier from any liability for damage. You must call for a damage inspection.

## 4. 2. Packing List

| No. | Name | Unit | Qty | |
|---|---|---|---|---|
| 1 | Incubator Shaker | pcs | 1 | |
| 2 | Power Cord | pcs | 1 for 120V, 3 for 220V | |
| 3 | Filter | pcs | 1 | Included with IntelliStack CO2 Incubator Shaker |
| 4 | PU Pipe (5 m) | pcs | 1 | Included with IntelliStack CO2 Incubator Shaker |
| 5 | Hose clamp | pcs | 4 | Included with IntelliStack CO2 Incubator Shaker |

| No. | Name | Unit | Qty | |
|---|---|---|---|---|
| 6 | Casters | pcs | 4 | |
| 7 | User Manual | pcs | 1 | |
| 8 | T-Connectors Φ14 | pcs | 1 | |
| 9 | Two-way Connectors Φ14 | pcs | 1 | |
| 10 | Plug | pcs | 3 | |
| 11 | Silicone Tube Φ12×2 | m | 1 | |
| 12 | Water pipe | m | 2 | |
| 13 | Fuse | pcs | 2 | |
| 14 | Liquid Collection Tray | pcs | 1 | |
| 15 | Cross Screwdriver 2# | pcs | 1 | |
| 16 | Single open-end Wrench 24 | pcs | 1 | |
| 17 | Wrench S10 | pcs | 1 | |
| 18 | Screw | pcs | 4 | |
| 19 | Plain washer | pcs | 4 | |
| 20 | Spring washer | pcs | 4 | |
| 21 | Ziplock bag | pcs | 1 | |
| 22 | Lifting rods for stacking procedure | pcs | 4 | |
| 23 | Spirit Level | pcs | 1 | |

# 5. Specifications

| | |
|---|---|
| Temp. Range | Room Temp. Minus 18 °C~60°C (Lowest Temp. is 4°C) |
| Temp. Accuracy | 0.1 °C |
| Temp. Uniformity | ±0.3 °C @37 °C |
| Speed Accuracy | 1rpm |
| CO2 Sensor IR | IR |
| CO2 Control Range | 0~20% |
| CO2 Control Accuracy | ±0.2%( @ 5%) |
| CO2 Display Accuracy | 0.1% |
| Recovery Time on Temp. after door closure | ≤6min (@ 37 °C) |
| Recovery Time on CO2 after door closure | ≤6min (@ 5%) |
| Humidity Set Range | Ambient RH +10%~90% |
| Programmability | 1 program, 12 Sections |
| Interior Lighting | Bidirectional UV Lamps and LED lighting |
| UV Lamp | Wave Length 254 nm |
| Door Open Direction | Downward or Upward based on model |
| Display | 10” Color Touch Screen |
| Touch Screen Type | Capacitance Type |
| Display the Date | Yes |
| Data Curve Display | Temp. Curve, Speed Curve, CO2 Curve, RH Curve |
| Max. Capacity | Clamp Capacity: 50ml×134/ 100ml×60/ 150ml×60/ 200ml×60/ 250ml×60/ 500ml×32/ 1000ml×22/ 2000ml×15/ 3000ml×12// 5000ml (Thomson)×6<br>Sticky Mat: 50ml×187/ 100ml×112/ 150ml×104/ 200ml×84/ 250ml×76/ 500ml×40/ 1000ml×28/ 2000ml×15/ 3000ml×13/ 5000ml (Thomson)×8 |
| Max. Load | 20Kg |
| Platform Dimensions | 900×560mm or 35.4" x 22.0" |
| Height of the third platform | 1483mm or 58.4" |
| USB Download Date | Yes |
| Data Store Years | > 912 days |
| Data Store Time | 1 min. |
| Data Store Types | Time, Temp, $CO_2$%, Speed, RH, Machine Status |
| Noise Level | ≤60dB |

| | |
|---|---|
| Water Sparge Resistant | Yes |
| Interface Languages | English, Chinese, French, Italian, German, Spanish, Dutch, Portuguese, Czech, Greek, Hungarian, Lithuanian, Norwegian, Swedish. |
| Auto-run after Power Recovery | Yes |
| Heat Power | ≤850W |
| Cool Power | 70~180W |
| Power Supply | AC120V±10% 50/60Hz for 120V models<br>Or<br>AC220V±10% 50/60Hz for 220V models |
| Power | ≤1000W |
| Net Weight | 310 kg or 683.4 lbs. |
| Internal Dimensions | 1005×690×347mm or 39.6" x 27.2" x 13.7" |
| Outside Dimensions | 1400×886×680mm or 55.1" x 34.9" x 26.8" |

| Model | Orbit Diameter | Power Supply | Speed |
|---|---|---|---|
| 8892610D \| 8892610U (CO2 Incubator Shaker)<br>8882610D \| 8882610U (Non-Gassing Incubator Shaker) | 25 mm | AC120V, 50/60Hz | (0) Stop, 30-350 rpm |
| 8892620D \| 8892620U (CO2 Incubator Shaker)<br>8882620D \| 8882620U (Non-Gassing Incubator Shaker) | 25 mm | AC220V, 50/60Hz | (0) Stop, 30-350 rpm |
| 8895010D \| 8895010U (CO2 Incubator Shaker)<br>8885010D \| 8885010U (Non-Gassing Incubator Shaker) | 50mm | AC120V, 50/60Hz | (0) Stop, 30-300 rpm |
| 8895020D \| 8895020U (CO2 Incubator Shaker)<br>8885020D \| 8885020U (Non-Gassing Incubator Shaker) | 50mm | AC220V, 50/60Hz | (0) Stop, 30-300 rpm |

# 6. Preparation

## 6. 1. Placement Conditions

The instrument must be placed on a firm and level surface. The total weight of the instrument when fully loaded must be taken into consideration. There must be sufficient space left around the instrument. It should be at least 30 cm between the instrument and the wall or any two adjacent instruments.

**WARNING**

- Pay attention to avoid any risk of body injuries from disassembling, lifting or moving the instrument.
- The CO2 concentration may increase and can be harmful to your healthy if operating the instrument in a small and airtight room.
- Please keep the room ventilated when the CO2 function is on. Additionally, please avoid direct inhalation of the gas when opening the door.
- Keep the vent of the instrument away from heat source or other vents, otherwise the compressor cannot be started or started frequently during refrigeration.
- When the instruments are stacked, make sure the floor loading capacity is at least 1.5 times of the instruments weight. Stack them up against the wall or on the floor with reinforced beam to ensure good loading capacity.

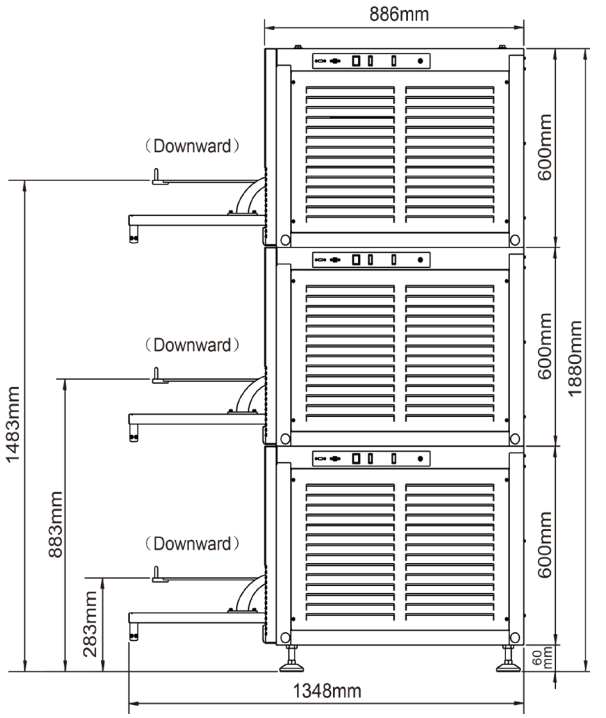
## 6. 2. Operating Conditions

- For indoor use only
- Ambient Temperature: 10-35 °C
- Relative Humidity: 20%-80% RH
- Atmospheric Pressure: 75 kPa-106 kPa
- The fluctuations of power supply voltage is less than 10% of rated voltage

# 6. 3. Space Conditions

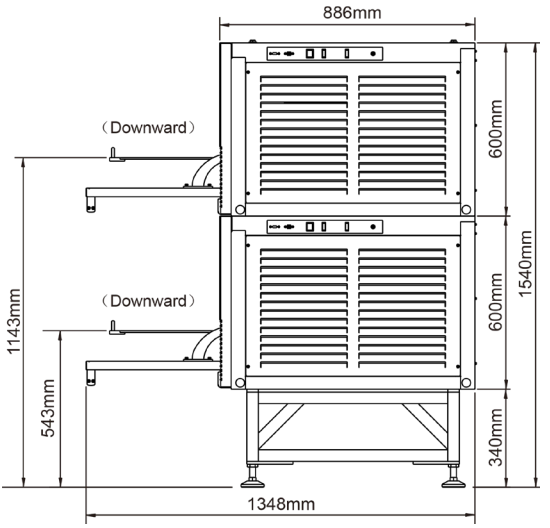
## Configuration Dimensions:

- 3 stacked IntelliStack Shakers



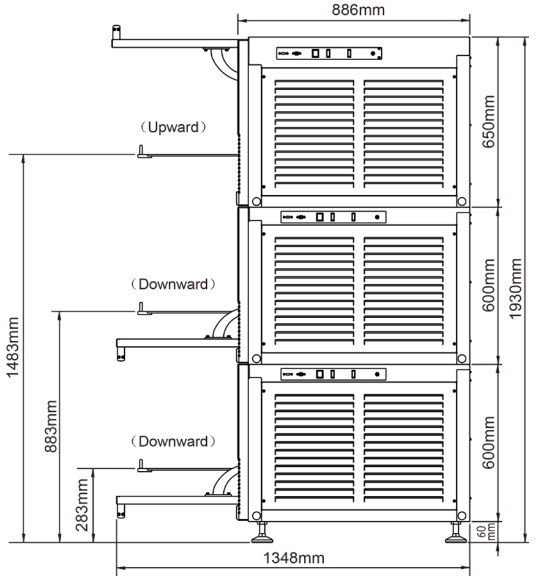
## Configuration Dimensions:

- 2 stacked IntelliStack Shakers with Shaker Stand




## Configuration Dimensions:

- 3 stacked IntelliStack Shakers with up swing top unit



**Shaker Stand (optional)**

Individual units and devices stacked in pairs can be fitted with a 34 cm base. The base has adjustable feet that can be used to level the device.

Shaker Stand with open frame - SKU 88900000

Shaker Stand with closed frame - SKU 88900003

# 7. Safety Instructions

**WARNING** - Please make sure to follow the safety instructions

- Please use a lift or a forklift or other lifting apparatus to raise or move the instrument.
- Make sure the power supply voltage matches the voltage of the instrument before it is connected.
- The instrument must be properly placed.
- Use a dedicated power socket.
- Do not drag the power cord when unplugging.
- Do not use a damaged or non-designated power cord.
- Only qualified personnel are allowed to open the control box.
- Keep the locking latch secured on the platform when the instrument is running.
- Keep the room ventilated.

**Disconnect the power supply in any of the situations below:**

- Moving or transporting the instrument
- Opening the power box
- Changing the fuse
- The malfunctions of instrument
- Equipment out of use for long term

: This instrument contains flammable refrigerant. Be careful when installing and operating, to minimize risk of flame or combustion

: Hot surfaces may be present during operating or maintaining the instrument.

: Risk of hand injuries due to improper operation when opening the door.

## Loads and Speed Of IntelliStack Incubator Shakers:

| Flask Size (ml) | Qty | ≤Capacity (ml) | 25mm Orbit Max. Speed (rpm) | 50mm Orbit Max. Speed (rpm) |
|---|---|---|---|---|
| 5000 (Thomson) | 8 | 1700 | 140 | 130 |
| 3000 | 12 | 1500 | 230 | 220 |
| | | 1000 | 240 | 240 |
| 2000 | 15 | 1400 | 220 | 210 |
| | | 1000 | 230 | 220 |
| | | 500 | 250 | 250 |
| 1000 | 22 | 1000 | 230 | 230 |
| | | 600 | 240 | 240 |
| | | 450 | 280 | 280 |
| 500 | 29 | 400 | 260 | 260 |
| | | 200 | 280 | 280 |

**NOTE**: Please select the speed according to the load condition, in order to achieve the best shaker effect. When the speed is 300rpm-350rpm, it is recommended to use ≤250ml Shake Flask.

**NOTE**: When the devices are stacked, it is recommended to reduce the maximum rotation speed for the middle unit to 250rpm and 220rpm for the top unit.

# 8. Installation

**WARNING** - Lifting the instrument by hand should be prohibited. Please use a lift or a forklift or other lifting apparatus to raise or move the instrument

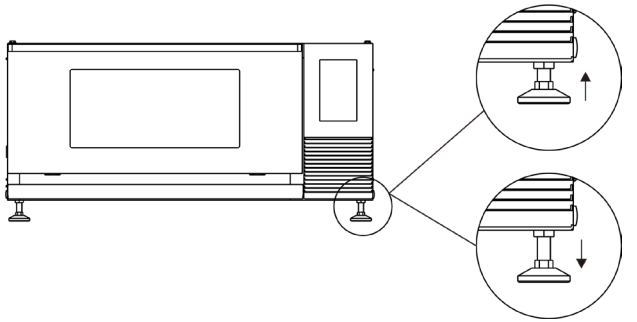
## 8. 1. Tools Requirement

- Hex wrench S10. Cross screwdriver #2. Single open-end wrench 24.
- A lift or forklift or other lifting apparatus with the minimum loading capacity of 350 kg.

## 8. 2. Equipment installation and movement

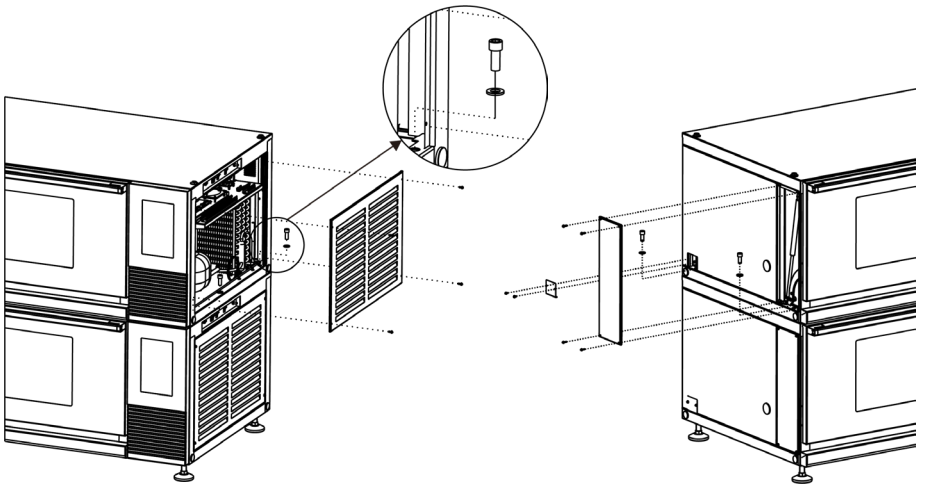
### 8. 2. 1. Installation of equipment

- Ensure the installation site meet the requirement as instructed in manual.
- Use the lifting equipment to lift the machine slowly and then smoothly drag to the designated position.
- Loosen the four adjustable feet with a wrench and adjust all feet upward, with the bottom of the foot approximately 55 mm from the bottom of the machine.
- Use lifting equipment to land the machine smoothly.
- After the machine falls to the ground, adjust the four legs with a wrench to keep the whole machine horizontal and balanced, and then tighten the four adjustable legs with a wrench, and the height of the legs must not exceed 60 mm.
- All legs are adjusted upward so that the bottom of the leg is approximately 55 mm from the bottom of the machine.
- Adjust all the feet downward so that the machine as a whole remains horizontal and balanced, and the height of the feet must not exceed 60 mm.



Adjust all feet up to off the ground, the instrument can move on the wheel.

Adjust the feet down upon the ground, the instrument will be fixed for the short wheel.



| | |
|---|---|
| | **WARNING** - Please make sure each instrument is placed level, stable and still. Do not exceed the maximum load of 20kg and the maximum speed, especially when there are shakers stacked.<br>When the devices are stacked, it is recommended to reduce the maximum rotation speed for the middle unit to 250rpm and 220rpm for the top unit. |

### 8. 2. 2. Move of equipment

- When the machine needs to move a short distance, it can be achieved by installing the four casters in the attachment. After the short distance movement of the machine is completed, the four casters need to be removed.
- Lifts, forklifts or other lifting equipment must be used when the machine needs to be moved over long distances.

## 8. 3. Drain Connection

- When it is stacked up to 3 units, it will need a Two-way Connector and 2 T-connectors.
- When it is stacked up to 2 units, it will need a Two-way Connector and a T-connector.

## 8. 4. Connection of CO2

1. Install a regulator with flow control valve onto the CO2 Cylinder. Please choose a regulator with the primary preset pressure to be 25MPa (250kg/cm2, 3500lb/in2, 250 bar), and secondary preset pressure to be 0.6MPa (2.0kg/cm, 30psiG, 6 bar).
2. Connect the shaker to the regulator of CO2 cylinder with the provided gas tube. The gas

access port is located on the right side of the shaker. (See figure 1)

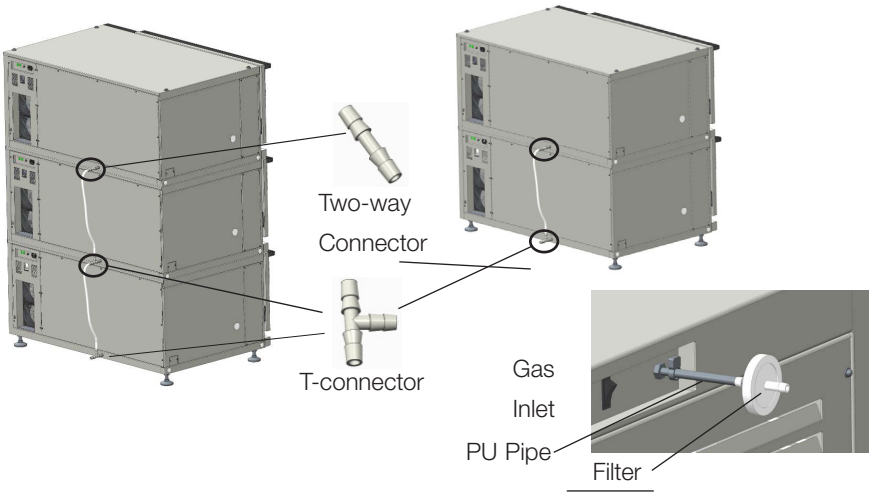



Figure 1

3. Set the secondary flow control valve to 0.08~ 0.1MPa (0.8 - 1 bar) (as shown in figure 2). It may cause the leak of CO2 gas if the pressure is too high. High CO2 concentration will do harm to your health and may cause asphyxia and death. Maintenance is required if the inline tube falls off.
4. Check the tube connections for possible leakage (the connections of tube and regulator, tube and access port and tube and filter).

## A. Schematic diagram

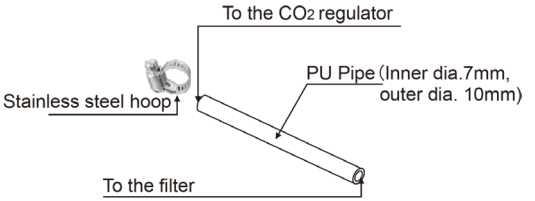
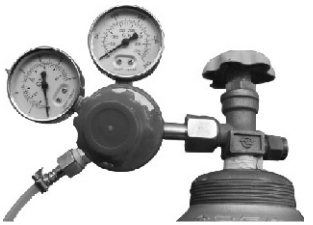




Figure 2

## B. Actual picture

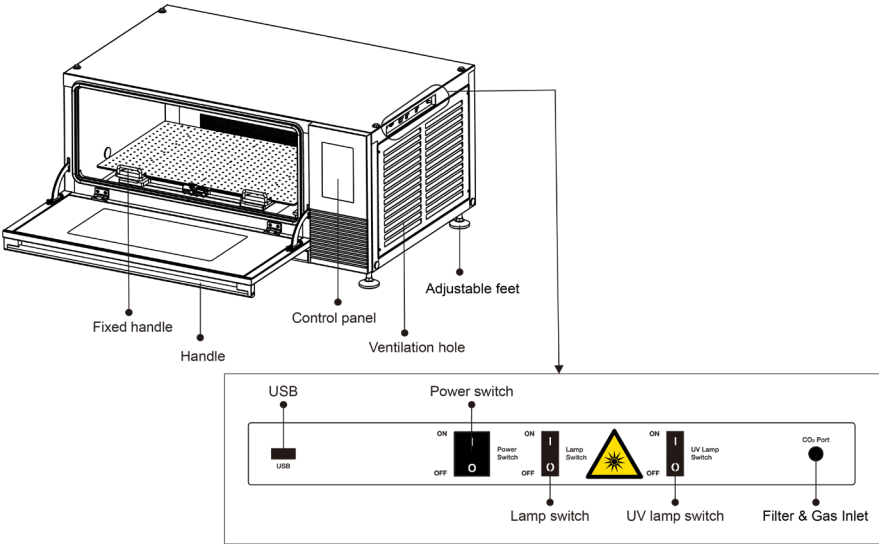


**NOTICE**:

- Do not move the pressure adjustment rod on the regulator when changing the Co2 cylinder. It will affect the secondary pressure and will need to reset the valve. The inline tube might fall off if the pressure is too high and maintenance is required.
- Check tube regularly to ensure it is safely connected. Change the tube if it is damaged or aged.
- Use the stainless steel hoop to tighten the connection point of the PU tube and the filter to prevent the pipe from falling off and leakage of gas.
- Use more than 99.99% pure CO2. Low purity may cause blocking of the filter or damage of the electromagnetic valve.

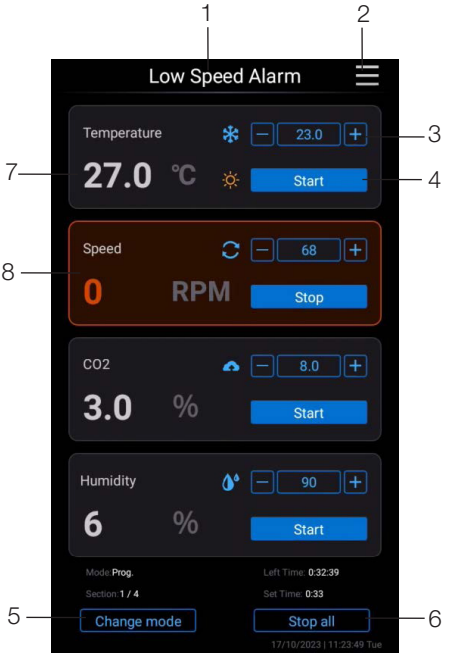
| | |
|---|---|
|  | **WARNING** - Confirm the gas supply meets the specified requirements, all the pipes are properly connected, and the gas pressure settings are correct. Incorrect pipe connection or pressure settings may cause CO2 leakage. High CO2 concentration will do harm to your health and may cause suffocation or death.<br>Alternative methods should be taken if there is no sufficient ventilation in the room to guarantee safety. These methods include gas monitoring and alarming system. Maintain correct gas pressure can prevent gas leakage. |

# 9. Structure


Fixed handle
Handle
Control panel
Ventilation hole
Adjustable feet
USB
Power switch
ON
OFF
Power Switch
Lamp Switch
UV Lamp Switch
CO₂ Port
Lamp switch
UV lamp switch
Filter & Gas Inlet

# 10. Introduction to Touch Program

## 10. 1. Main interface




1. Displays the current status of the machine.
2. Click to expand the drawer, as shown in the figure 3.
3. Set value display, which can be manually entered byadding or subtracting buttons.
4. By clicking this button, the corresponding function can be individually controlled to run/stop, which can be used in conjunction with 6.
5. Manual and Program mode switching.
6. Control the operation of the entire machine's functions, and click to “run” or ”stop” all functions.
7. Click on the temperature indicator to view the real-time temperature curve.
8. Alarm box, click on the background area to display detailed alarm information as shown in the figure 4.

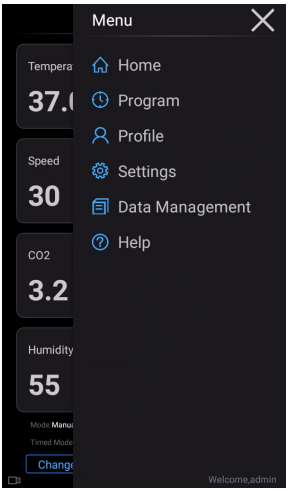



Figure 3

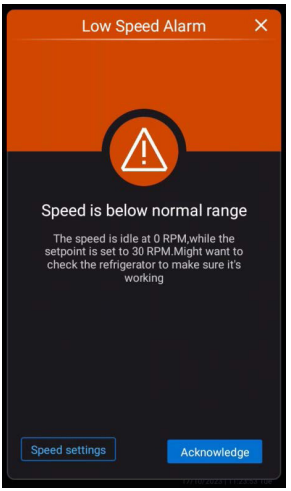



Figure 4

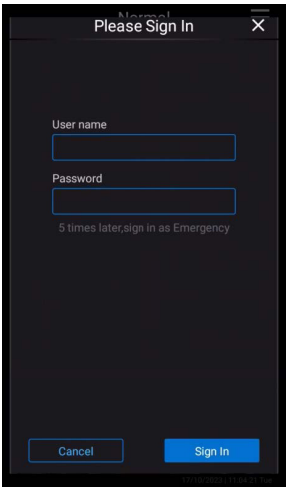
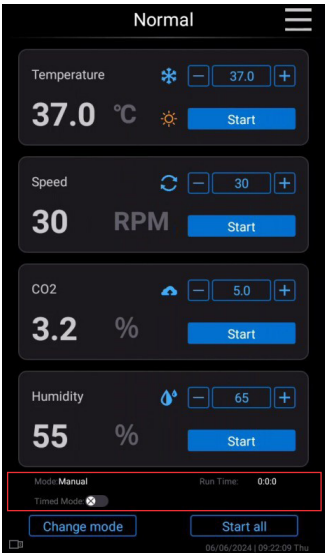



Figure 5

**NOTE**: During the operation of the instrument, you need to log in. The initial account is “admin” and the password is “123456”. The login interface is as shown in the figure 5. If you are not logged in, click anywhere on the interface to pop up the login interface.

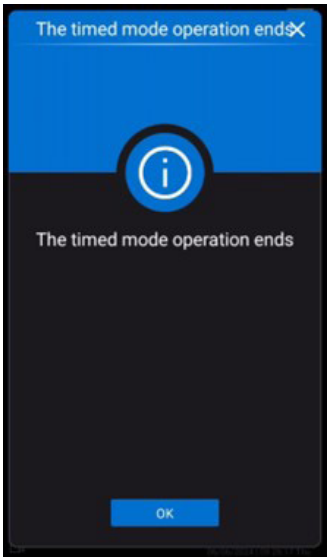
## 10. 2. Manual Mode



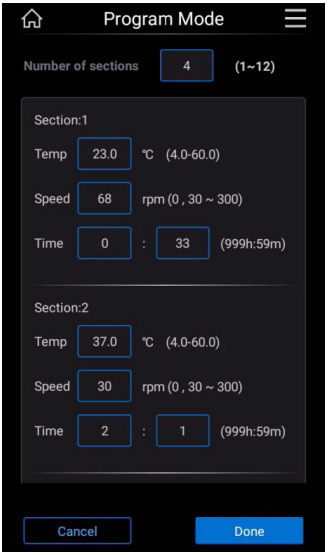

a. Timed Mode Off


b. Timed Mode On

1. Timed mode off: Only record the running time of the instrument
2. Timed mode on: Control the running time of the instrument. Click the “Set Time” window to enter a fixed time, the maximum time is 9999:59, the input time must be in accordance with the format of XXXX : XX input. There is a pop-up window and visual alarm when the time runs out.



## 10. 3. Program Mode




This interface allows for program control mode parameter settings. Set the number of segments at the top of the interface, slide settings in the middle of the interface, and cancel and save operations at the bottom of the interface.

## 10. 4. Profile

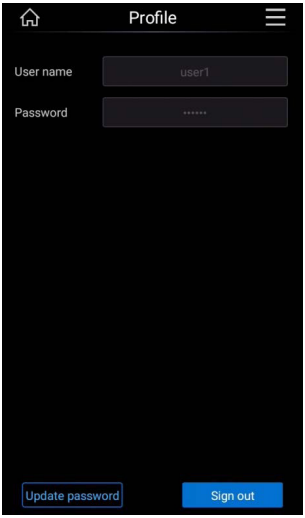



Figure 6

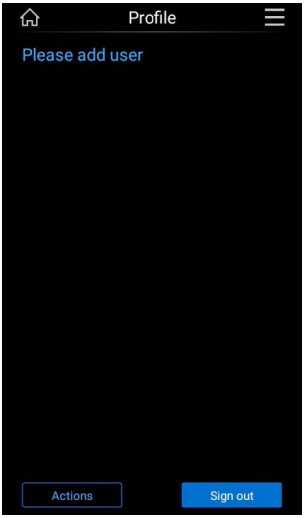



Figure 7

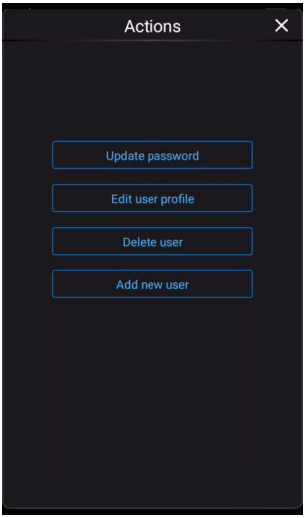



Figure 8

When the login account does not have "Auth Manage" option, it will be displayed as figure 6, and only password modification and login operations can be performed. When the login account has "Auth Manage" option, it is displayed as figure 7.

When logging in to an account with "Auth Manage" option, you can perform the operations shown in the figure 8, including update password, edit user profile, delete user, and add new user.

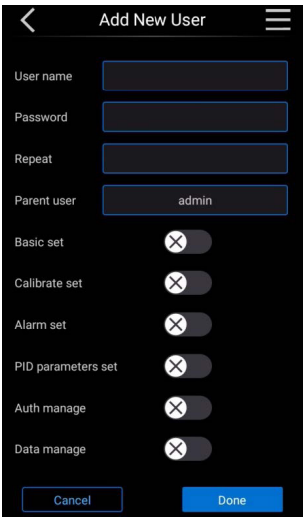



Figure 9

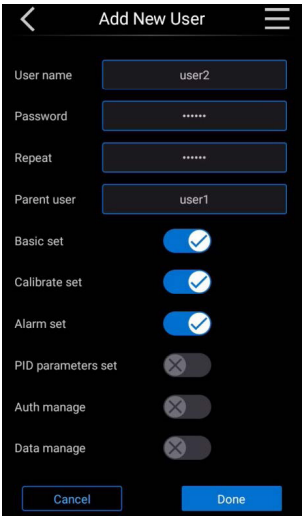



Figure 10


Figure 11

Add New User interface as shown in the figure 9, You need to enter a username and password, select Parent user, and assign permissions. Permissions can be assigned only to the parent user. For example, in figure 10, the parent user is user1 and three permissions are grayed out and unavailable. After the information is set, click the Done button to complete the addition of personnel. A maximum of three levels can be added to add a user, as shown in figure 11. Level 3 users, such as user3, user7, user8, and user9, cannot be selected as Parent user for user addition.

Edit User interface as shown in the figure 12, In this interface, you can modify the user's username, password, and permission assignment. The permission assignment rules are the same as those for adding users, and only parent users can be assigned permissions.

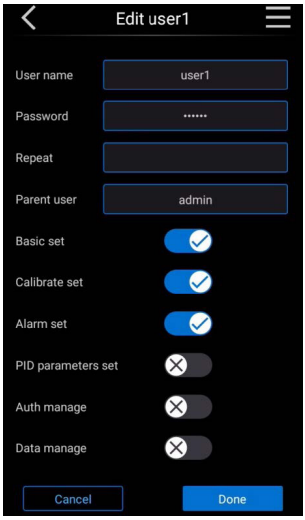



Figure 12

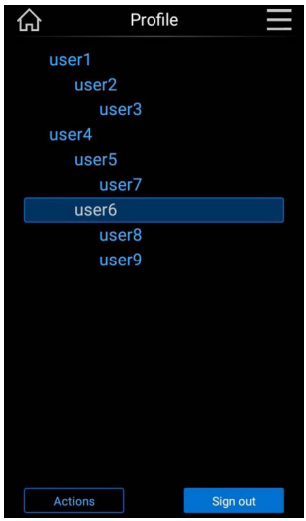
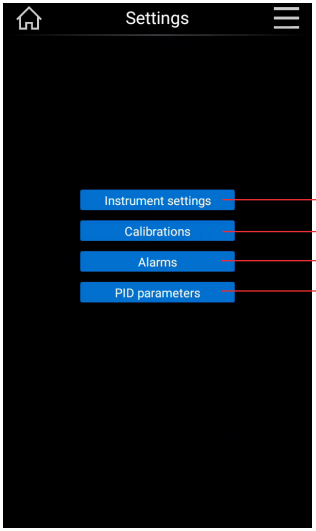



Figure 13


Figure 14

User deletion deletes the user and their sub-users. For example, if you select user6 in Figure 13 to delete it, the deletion result is Figure 14. user6, user8, and user9 are deleted

## 10. 5. Settings



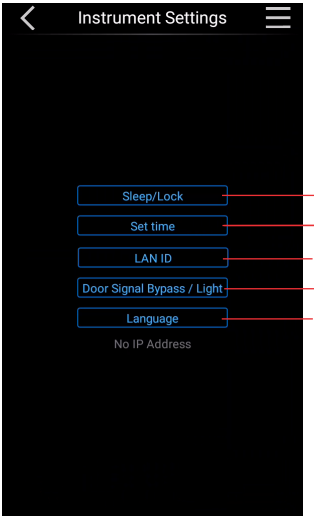

Click the first button 1 to enter the Instrument settings interface, as detailed in 10.5.1

Click the second button 2 to enter the Calibrations interface, as detailed in 10.5.2

Click the third button 3 to enter the Alarms interface, as detailed in 10.5.3

Click the fourth button 4 to enter the PID parameters interface, as detailed in 10.5.4

## 10. 5. 1. Instrument Settings



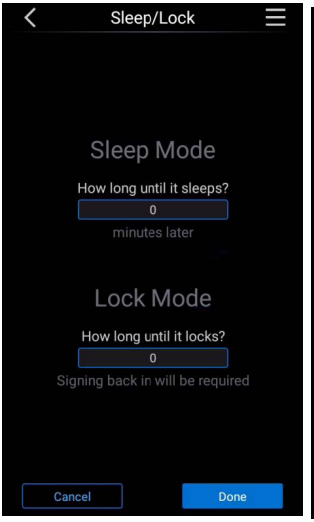

Click the first button 1 to enter the Sleep/Lock interface, as detailed in a.

Click the second button 2 to enter the Set time interface, as detailed in b.

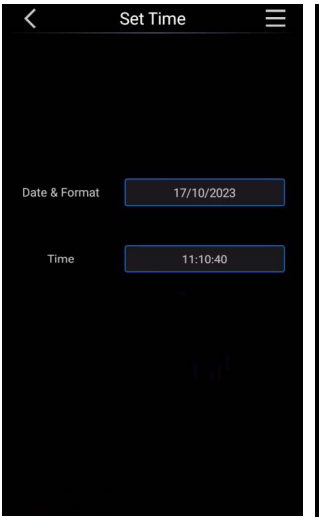
Click the third button 3 to enter the LAN ID interface, Refer section "10. 5. 1. 1. Set of RS 485 Communication on User Interface".

Click the fourth button 4 to enter the Door Signal Bypass/Light interface, as detailed in d.

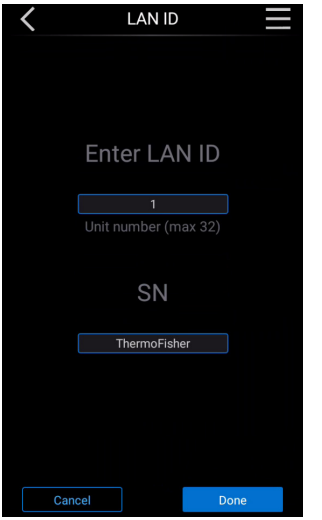
Click the fifth button 5 to enter the Language interface, as detailed in e.



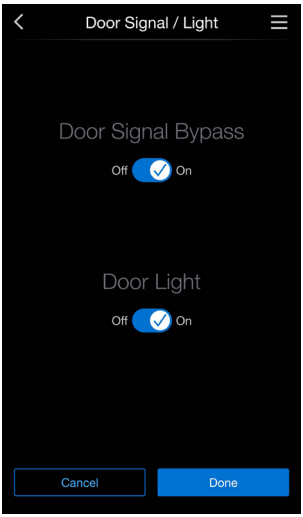

a. Sleep/Lock



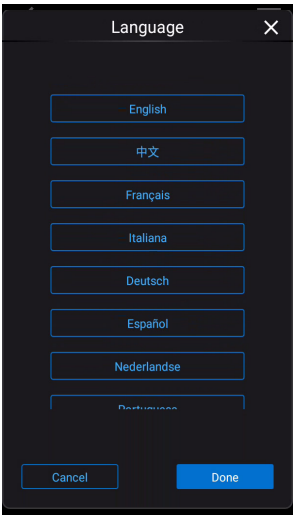

b. Set Time

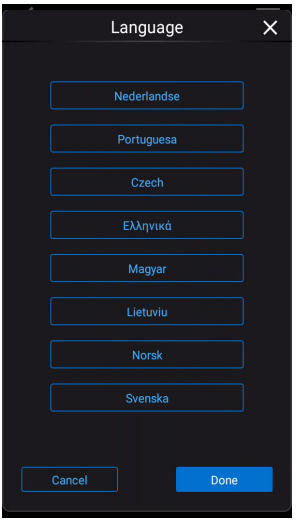



c. LAN ID




d. Door Signal/Light

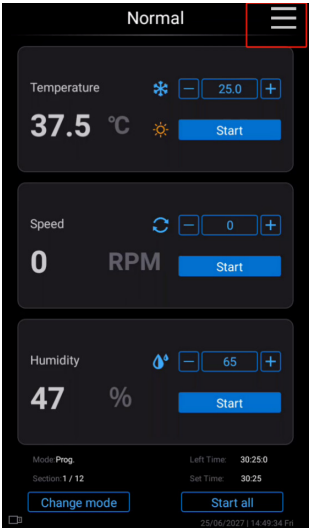


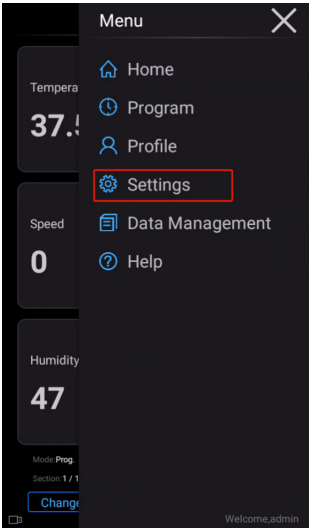




e. Language

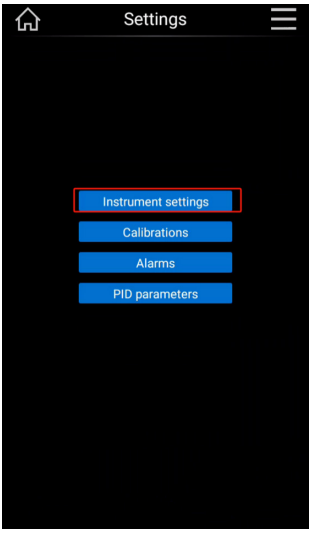
### 10. 5. 1. 1. Set of RS 485 Communication on User Interface

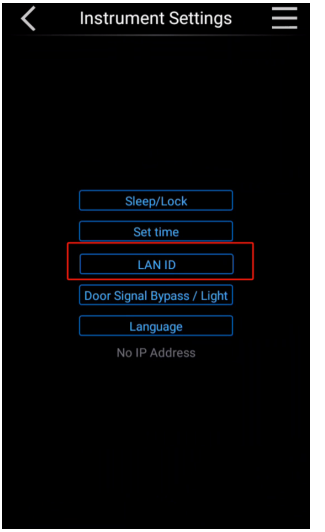
1. Press Menu icon to enter into setting interface.
2. Click on the Settings button.



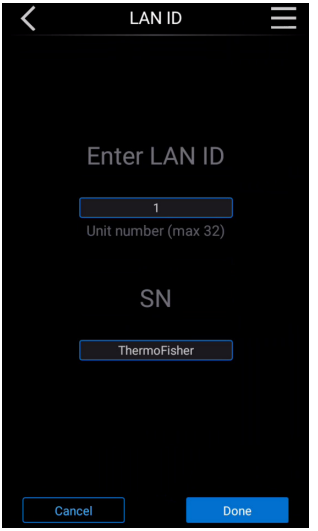
3. Click on the Instrument Settings
4. Click on the LAN ID




LAN ID and SN code can be set on the interface. LAN ID should be unique for each device, with a maximum of 32 devices can be connected and added here. No restriction for SN code.

**NOTE**: The LAN ID is the slave address used by Modbus RTU. SN code is the identification code for the shaker which can be defined by the user. It can be alphabets, digits or a combination, up to 12 strings.

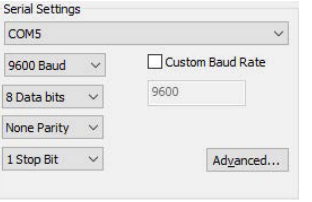


**Communication Testing**

When connecting the Modbus to the user's software, some basic parameters need to be set:

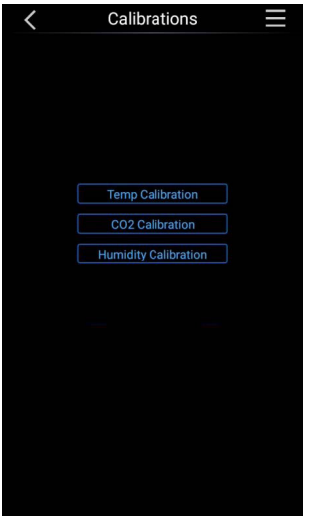
Serial basic settings

1. 9600 Baud
2. 8 Data bits
3. None Parity
4. 1 Stop Bit

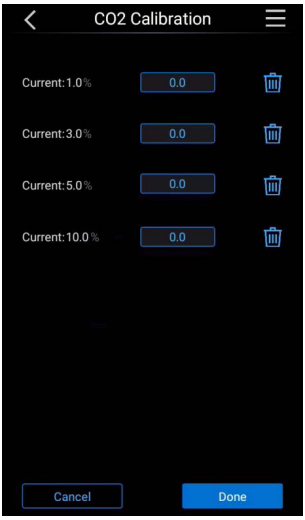



After completing the basic parameter settings, remote monitoring of the device can be completed by combining the Modbus protocol requirements with the provided Modbus address table.

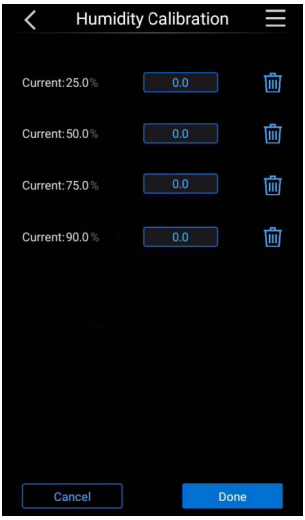
## 10. 5. 2. Calibrations




a. Temp Calibration

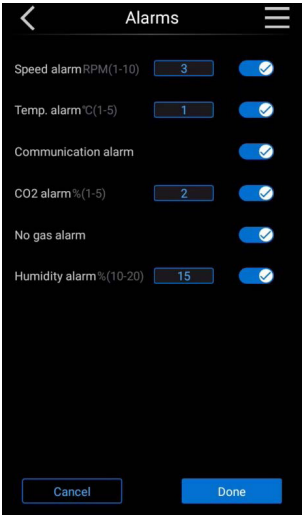



b. CO2 Calibration



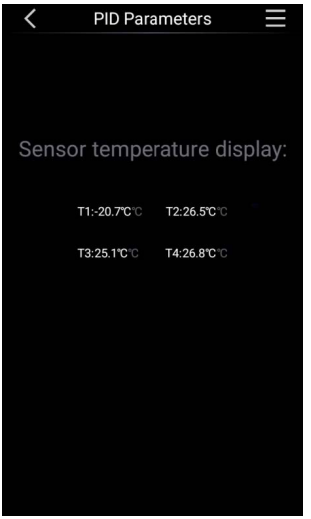

c. Humidity Calibration

## 10. 5. 3. Alarms



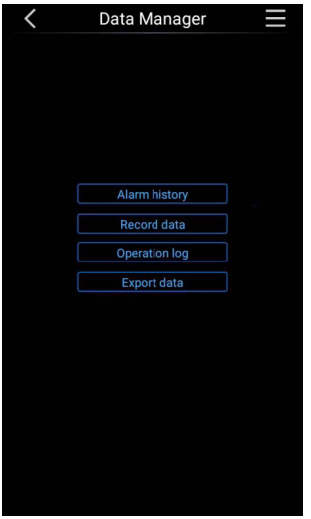

Set speed alarm, temperature alarm, communication alarm, CO2 alarm, no gas alarm and humidity alarm.

## 10. 5. 4. PID Parameters




This interface can display temperature control parameters and display the temperatures of various sensors in the equipment.

## 10. 5. 5. Data Manager



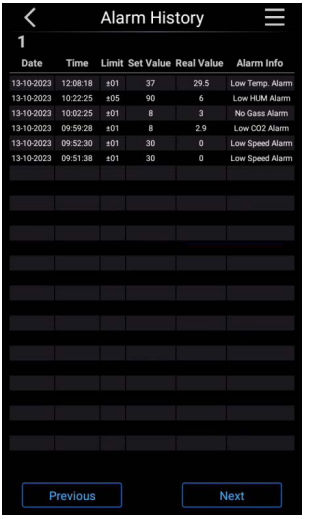

**NOTE**: Click on Data Management button in Main Menu interface, as shown in figure 3.

Within the Data Manager product screen:

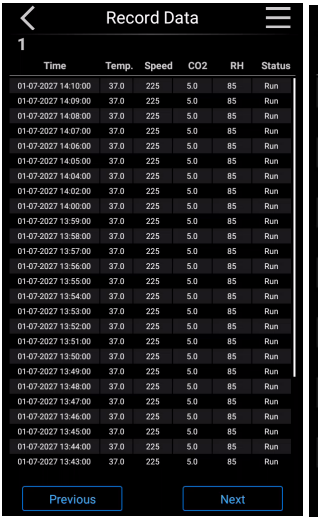
- Alarm History screen will show data displayed on image a below, including Alarm information, event date/time, and set/actual data.
- Record Data screen will show data displayed on image b below, including performance parameters, collected every minute of operation.
- Operation Log screen will show data displayed on image c below, including user and operator activities on the IntelliStack Shakers
- Export Data screen is displayed on image d below. Be sure to enter the desired start and stop dates for the records to be exported. Select the items to download by checking the box in front of the appropriate record.
- Data can be downloaded in Adobe PDF or CSV formats.
  Note: Only upto 1 month Data export at a time can be done using PDF format.

**NOTE**: Over 2 years of data is retained in the IntelliStack internal memory, however it is recommended to download data frequently.

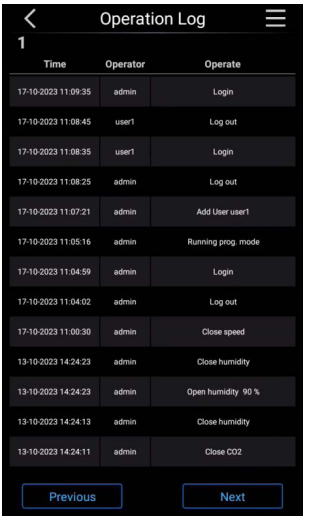
When downloading data, use a 8 GB or smaller USB Flash Drive that has FAT32 formatting.



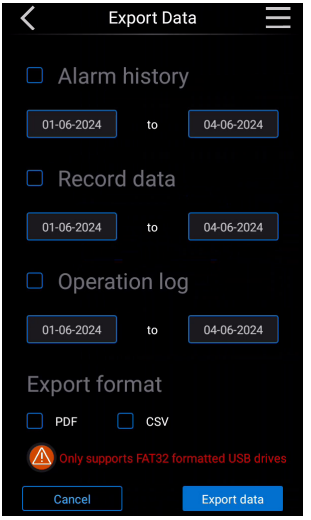

a. Alarm History




b. Record Data




c. Operation Log




d. Export Data

# 11. Operational Instruction

## 11. 1. Temperature Control

### 11. 1. 1. Temperature Setting

In the temperature setting box of the main interface, the actual temperature value is displayed on the left, and the set temperature can be adjusted on the right. You can modify the setting value by clicking the number in the setting box to pop up the keyboard, or click the "+" and "-" sign to modify the setting value.


### 11. 1. 2. Temperature Calibration

Click on the right menu bar, pop up the menu, select the Settings option, and enter the interface. Click on the calibration interface to enter the temperature calibration. The calibrated temperature points are 5°C, 16°C, 28°C, 37°C, 50°C, 60°C.

Taking the calibration of 37°C as an example, if the measured internal temperature value is 36.5°C, we will input (actual value) 36.5°C - (setting value) 37°C = -0.5°C, -0.5°C into the calibration box of 37°C (Note: -9°C to 9°C can be entered in the calibration box).


### 11. 1. 3. Temperature Alarm

Click on the right menu bar, pop up the menu, select the machine setting option, and enter the interface. Click Alarm Settings to enter the interface. We can modify the temperature alarm threshold

(**NOTE**: The threshold can be set in the range: 1°C-5°C).

For example, if the temperature alarm threshold is set to "3°C", after the temperature is stable and stable 37°C, if the actual temperature is lower than 37°C-(threshold) 3°C=34°C or if the actual temperature is higher than 37°C+(threshold) 3°C=40°C, it will trigger the alarm.


(**NOTE**: The alarm switch must be on to receive the alarm information, and the off state is none.)

* Low Temperature alarm trigger time is around 15 mins when measured at 37C 70%RH 5% direct inject CO2 open door.

* High Temperature alarm trigger time is around 15 mins when measured at 10C 35%RH 5% direct inject CO2 open door.

## 11. 2. Speed Control

### 11. 2. 1. Speed Setting

In the speed setting box of the main interface, the actual value is displayed on the left, and the setting speed can be adjusted on the right. You can modify the setting value by clicking the number in the setting box to pop up the keyboard, or click the "+" and "-" sign to modify the setting value.


### 11. 2. 2. Speed Alarm

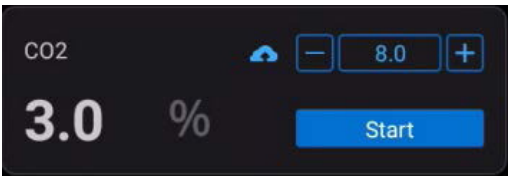
Click on the right menu bar, pop up the menu, select the machine setting option, and enter the interface. Click Alarm Settings to enter the interface. We can modify the speed alarm threshold. (**NOTE**: The threshold can be set in the range: 1rpm-10rpm).


For example, if the alarm threshold is set to "rpm", after the speed is stable and stable 150rpm, if the actual speed is lower than 150rpm-(threshold) 5rpm=145rpm or if the actual speed is higher than 150rpm+(threshold)5rpm=155rpm, it will trigger the alarm. (**NOTE**: The alarm switch must be on to receive the alarm information, and the off state is none.)

## 11. 3. CO2 Control

### 11. 3. 1. CO2 Setting

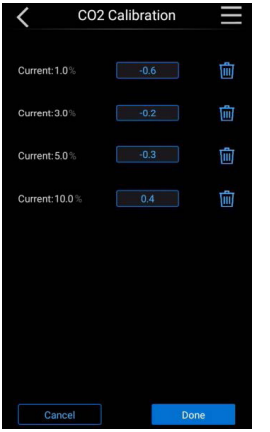
In the CO2 concentration setting box on the main interface, the actual value is displayed on the left, and the setting concentration can be adjusted on the right. You can modify the setting value by clicking the number in the setting box to pop up the keyboard, or click the "+" and "-" sign to modify the setting value.



## 11. 3. 2. CO2 Calibration

Click on the right menu bar, pop up the menu, select the machine setting option, and enter the interface. Click on the calibration interface to enter the concentration calibration. The calibrated concentration points are 1%, 3%, 5%, and 10%.

Taking the calibration of 5% as an example, if the measured concentration value in vivo is 4.4%, we will input (actual value) 4.4% - (set value) 5% = -0.6%, -0.6% into the calibration box of 5% (note: -9% to 9% can be entered in the calibration box).




## 11. 3. 3. CO2 Alarm

### 11. 3. 3. 1. No gas alarm

Click on the right menu bar, pop up the menu, select the machine setting option, and enter the interface. Click Alarm Settings to enter the interface. Turn on the no air intake alarm switch, the machine detects that no CO2 gas enters the box within a certain period of time, and the machine prompts no air intake alarm.


Gas Empty Alarm trigger time is around 30 mins when measured at 10C 35%RH.

### 11. 3. 3. 2. CO2 alarm

Click on the right menu bar, pop up the menu, select the machine setting option, and enter the interface. Click Alarm Settings to enter the interface. We can modify the alarm threshold of $CO_2$ concentration.


(**NOTE**: the threshold can be set in the range: 1%-5%).

For example, if the $CO_2$ alarm threshold is set to "3%", after the $CO_2$ is stable and stable 5%, if the actual $CO_2$ is lower than 5%-(threshold) 3%=2% or if the actual $CO_2$ is higher than 5%+(threshold)3%=8%, it will trigger the alarm.

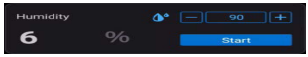
**(NOTE**: The alarm switch must be on to receive the alarm information, and the off state is none.)
* CO2 Low alarm trigger time is around 10 mins when measured at 37C 70%RH 5% direct inject CO2.

* CO2 High alarm trigger time is around 10 mins when measured at 10C 35%RH 5% direct inject CO2.

# 11. 4. Humidity Control

## 11. 4. 1. Humidity Setting

In the humidity setting box of the main interface, the actual humidity value is displayed on the left, and the humidity can be adjusted on the right. You can modify the setting value by clicking the number in the setting box to pop up the keyboard, or click the "+" and "-" sign to modify the setting value.

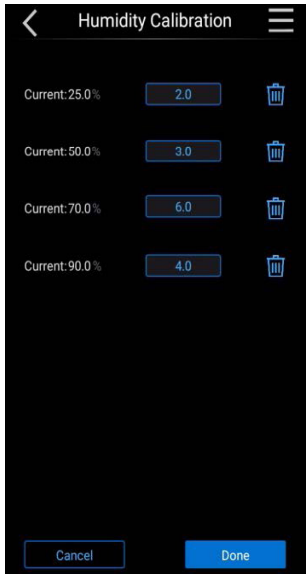



## 11. 4. 2. Humidity Calibration

Click on the right menu bar, pop up the menu, select the machine setting option, and enter the interface. Click on the calibration interface to enter the humidity calibration. The humidity points are 25%, 50%, 70%, and 90%.

Taking the calibration of 70% as an example, if the measured internal humidity value is 76%, we will (actual value) 76%-(set value) 70%=6%, and 6% will be entered into the 70% calibration box.

(**NOTE**: -9% to 9% can be entered in the calibration box).




## 11. 4. 3. Humidity alarm

Click on the right menu bar, pop up the menu, select the machine setting option, and enter the interface. Click Alarm Settings to enter the interface. We can modify the humidity alarm threshold.

(**NOTE**: the threshold can be set in the range: 10%-20%).

For example, if the humidity alarm threshold is set to "10%", after the humidity is stable and 80%, if the actual humidity is lower than 80%-(threshold)10%=70% or if the actual humidity is higher than 80%+(threshold)10%=90%, it will trigger the alarm.


(**NOTE**: The alarm switch must be on to receive the alarm information, and the off state is none.)

* RH Low alarm trigger time is around 30 mins when measured at 37C 70%RH 5% direct inject CO2 open door.

* RH High alarm trigger time is around 30 mins when measured at 10C 35%RH 5% direct inject CO2 open door.

# 12. Maintenance

For the sake of personal, environmental, and material protection, you must inspect, clean and if necessary disinfect the shaker and its accessories on a regular basis.

- Periodically remove back side plate to clean out dust on the condenser and fan to ensure proper operation.
- Only use refrigerant that is consistent with the nameplate of the instrument and do not overfill.
- The power supply must be unplugged when maintenance is being performed.
- When replacing fuses, use the specified fuse and ensure the power supply is unplugged before beginning maintenance.
- Inspect the fastening screws on clamps regularly to avoid operational error.
- Regularly check the screws on rotating parts, connections, CO2 Gas Inlets and Instrument lights for proper operation.
- It is not allowed to use gasoline, banana oil, and any other volatile chemicals to contact with the outside coating of the instrument.

Thermo Fisher Scientific recommends cleaning and manually disinfecting your laboratory shaker at least once each month. Normal indoor air contains thousands of circulating microorganisms which can take up residence in your shaker, putting your cultures at risk.

- Unplug the power supply and remove all installed accessories before cleaning, disinfecting, or decontaminating.
- Do not clean the instrument with corrosive or flammable liquid and make sure this type of liquid is kept away from the instrument.
- Use warm water with a mild detergent with a soft cloth to clean the materials. If in doubt contact Thermo Fisher Scientific.
- Rinse off with clean water and dry thoroughly.
- Never use caustic cleaning agents such as phosphoric acid, bleaching solutions or scrubbing powder.
- Use only disinfectants with a pH of 6–8.
- Clean up any spills immediately using a lint-free cloth dampened with a noncorrosive cleaner as instructed by the manufacturer of the cleaning agent.
- You are responsible that the level of disinfection and decontamination is achieved according to your requirements.

## WARNING

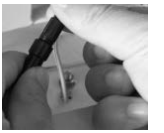
- The refrigerant used in the instrument is flammable.
- Ensure proper ventilation of the room.
- Do not use any mechanical means or other ways to accelerate the defrosting process.
- Do not use electrical appliances in the instrument except products specifically recommend by Thermo Fisher scientific.
- It is forbidden to smoke around the instrument, use open flame or use electrical appliances that directly generate electrical sparks.

## CAUTION

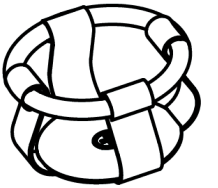
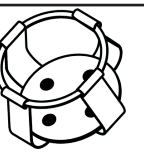
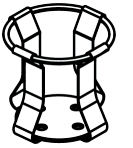
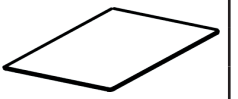
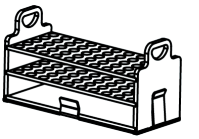
- Incompatible Cleaning Agents - some device components are made of plastic, which may be damaged by solvents, strong acids, and bases. For cleaning of plastic components and surfaces, do not use hydrocarbon containing solvents, detergents with >10% alcohol, or strong acids and bases.
- Disinfectants that contain chlorine may corrode stainless steel. Only use disinfectants that do not damage stainless steel.
- Disinfectants that contain >10% alcohol may produce gas that is combustible and explosive. When using such disinfectants, avoid open flames or exposure to excessive heat during the disinfection process.
- Use of such disinfectants should be done in a space with proper ventilation.
- After disinfectant has been used, wipe all surfaces and components to ensure they are thoroughly dried.
- Observe all safety regulations to avoid fire and/or explosion hazards caused by alcohol containing disinfectants.
- When operating the UV lamp feature, it is recommended to not exceed 2 hours.

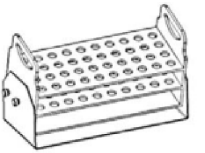
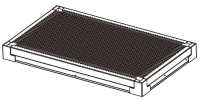
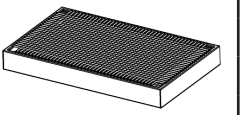
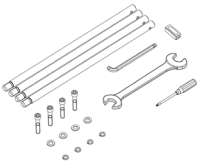
# 13. Troubleshooting

| Troubleshooting | | | |
|---|---|---|---|
| Error | | Cause | Solution |
| LCD Display | LCD | | |
| Over speed alarm | Display “alarm” | Speed difference more than 5 rpm | Contact local sales/service |
| | | Electrical malfunction | Contact local sales/service |
| | | Electric motor failure | Contact local sales/service |
| Over temperature alarm | Display “alarm” | Temperature difference more than 3 degrees | Contact local sales/service |
| | | Temperature sensor damaged | Change sensor |
| | | Cooling system failure | Contact local sales/service |
| | | Heating system malfunction | Contact local sales/service |
| Communication failure | | Communication cable not connected | Connect communication cable |
| | | Communication cable interrupted | Restart instrument |
| | Display "Open door Pause" | Door open | Close incubator door |
| | | Sensor damaged | Change sensor |
| No gas intake | Display “No Gas In” | Empty CO2 gas tank | Change CO2 gas tank |

| Instructions | | |
|---|---|---|
| Display window off Platform not shaking | No power | Plug not connected |
| | | Power outlet out of power |
| | | Power switch off |
| | Burned fuse | Change to a new fuse with the same specification  Position: at the power outlet  Position: inside the electrical cabinet |
| Platform shaking but the display window malfunctioning | High frequency interference source exists in the same ower line | Press the confirm button to recover display |
| | | Remove interference source of the same power line or use a dedicated power line |
| Display window on but platform not shaking | Poor contact of door switch | Contact local sales/service |
| High temperature Fluctuation | Frequent door opening | Reduce times of door opening and decrease the time consumed when opening the door |
| Loud noise | Unleveled instrument | Adjust footings to level the instrument |
| | Loose platform | Fasten the fixing screws of the platform |
| | Loose flask clamp | Fasten the fixing screws of the flask clamp |

# 14. Optional Accessories

| Part No. | Type | Size | Max Qty | Figure |
|---|---|---|---|---|
| 88881135 | Flask Clamp | 25ml | 134 |  |
| 88881105 | | 50ml | 134 | |
| 88881106 | | 100ml | 60 | |
| 88881107 | | 150ml | 60 | |
| 88881108 | | 200ml | 60 | |
| 88881109 | | 250ml | 60 | |
| 88881110 | | 500ml | 32 | |
| 88881111 | | 1000ml | 22 |  |
| 88881112 | | 2000ml | 15 | |
| 88881113 | | 3000ml | 12 | |
| 88881114 | | 5000ml | 6 | |
| 88881115 | Infusion Media Bottle Clamp | 500ml | 40 |  |
| 88881116 | | 1000ml | 28 | |
| 88881126 | Adhesive Mat | 140×140mm | 24 |  |
| 75004126 | High Adhesion Sticky Mat | 200×200mm | 15 | |
| 75004127 | | 280×170mm | 10 | |
| 75004111 | Low Adhesion Sticky Mat | 200×200mm | 15 | |
| 75004117 | | 280×170mm | 10 | |
| 88881117 | Sep Funnel Clamp | - | 4 |  |
| 88881118 | Fixed Test Tube Rack | 40 x14mm | 9 |  |
| 88881119 | | 40 x16mm | 9 | |
| 88882118 | | 40 x18mm | 9 | |
| 88881136 | | 27 x22mm | 9 | |
| 88882119 | | 21 x30mm | 9 | |

| Part No. | Type | Size | Max Qty | Figure |
|---|---|---|---|---|
| 88881120 | Adjustable Test Tube Rack | 40 x14mm | 9 |  |
| 88881137 | | 40 x16mm | 9 | |
| 88881138 | | 40 x18mm | 9 | |
| 88881139 | | 27 x22mm | 9 | |
| 88881140 | | 21 x30mm | 9 | |
| 88881141 | | 24 x30mm | 6 | |
| 88881124 | Micro plate holder | 96 well | 30 |  |
| 88881142 | Spring Platform | 900×540×80mm | 1 |  |
| 88881143 | | 720×440×80mm | 1 |  |
| 88881144 | | 350×240×80mm | 4 | |
| 88881145 | | 450×400×80mm | 1 | |
| 88881146 | | 428×295×80mm | 2 | |
| 88STACKIT | Stacking Kit | 560x120x100mm | - |  |

# 15. Warranty

## THERMO FISHER SCIENTIFIC STANDARD PRODUCT WARRANTY

The Warranty Period starts two weeks from the date your equipment is shipped from our facility. This allows for shipping time so the warranty will go into effect at approximately the same time your equipment is delivered. The warranty protection extends to any subsequent owner during the first year warranty period.

During the first two (2) years, component parts proven to be non-conforming in materials or workmanship will be repaired or replaced at Thermo's expense, labor included. Installation and calibration are not covered by this warranty agreement. The Technical Services Department must be contacted for warranty determination and direction prior to performance of any repairs. Expendable items, glass, filters and gaskets are excluded from this warranty.

Replacement or repair of components parts or equipment under this warranty shall not extend the warranty to either the equipment or to the component part beyond the original warranty period. The Technical Services Department must give prior approval for return of any components or equipment. At Thermo's option, all non-conforming parts must be returned to Thermo Fisher Scientific postage paid and replacement parts are shipped FOB destination.

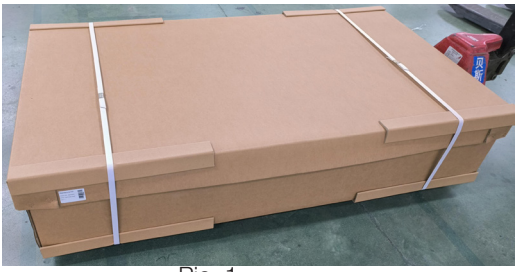
THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER WRITTEN, ORAL OR IMPLIED. NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE SHALL APPLY. Thermo shall not be liable for any indirect or consequential damages including, without limitation, damages relating to lost profits or loss of products.

Your local Thermo Sales Office is ready to help with comprehensive site preparation information before your equipment arrives. Printed instruction manuals carefully detail equipment installation, operation and preventive maintenance.

If equipment service is required, please call your Technical Services Department at 1-866 984-3766, option number 2. We're ready to answer your questions on equipment warranty, operation, maintenance, service and special application. Outside the USA, please contact local Thermo Technical Services Department or local distributor for warranty information.

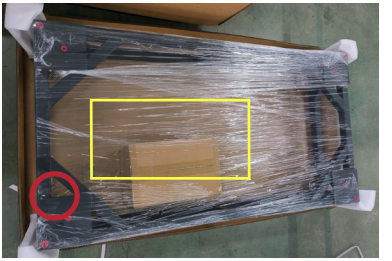
# Appendix A - Stacking Procedure for Shaker and Stand

1. Check the package for the base stand. See pic. 1



Pic. 1

2. Turn the packaging upside down, so that the top cover of the packaging is facing downwards. Remove the stretch film and the package cover, and make the bottom of stand upwards. See Pic. 2



Pic. 2

3. Remove the 8 x red plastic plugs(marked in red) at the bottom of the stand. Find the cardboard box ((marked in red,see Pic. 2) and take out 4 x metal feet and 4 x black casters inside. See Pic 3.

Pic. 3

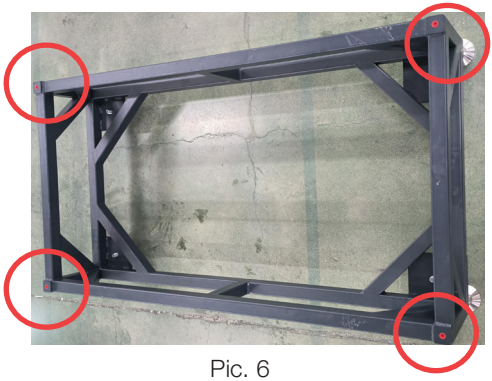
4. Fix the metal feet and casters on the stand. See pic 4.
5. Fine tune the height of the metal feet, about 9cm, slightly higher than casters. See Pic 5.

Pic. 5

Pic. 4

6. If need to move the shaker, the height of the metal foot should be slightly lower than that of the casters to move on the ground. However, when the shaker is used, the metal foot must land at a height higher than that of the casters.

7. Flip the stand again, with the metal foot facing downwards, move it to the designated position and remove the 4x red plastic plugs. See pic 6



Pic. 6

**8** By rotating and fine-tuning the height of the metal feet,confirm that the stand remains stable and the four metal feet are completely sitting on and attaching to the ground. Then adjust the nuts above the metal feet to the highest position and lock the min place. See pic 7.

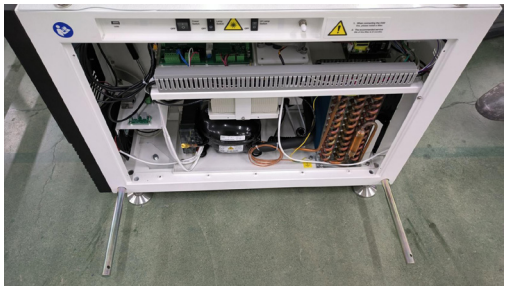
Pic. 7

9.Remove the package of the shaker which needs to be stacked on the base stand and place it on a pallet or flat ground. Remove the side panels on left. Take out the silicone plugs, install with the 2 lifting rods in the same position and make sure they are fully screwed in. See pic 8 and 9; Remove the right side panel and the white silicone plugs, install the 2 lifting rods in the same Position, and make sure they are fully screwed in. Figures 10 and 11.

Pic. 8

Pic.9

Pic. 10



Pic.11

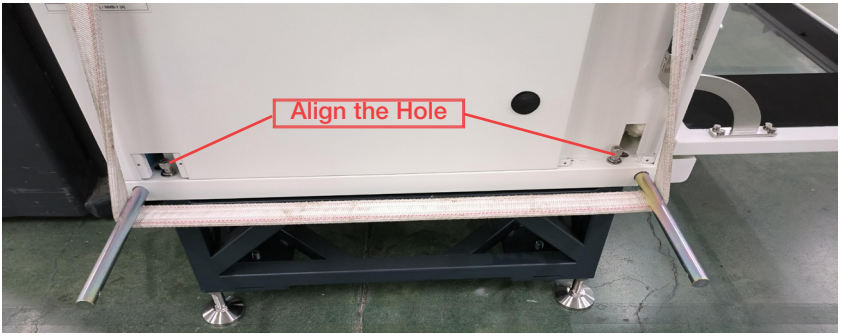
10.Use heavy-duty lifting straps (at least 1T), attach them to the lifting rod,and then use a forklift to lift the machine off the ground. See pic. 12

Pic.12

11. Rotate the four bottom feet of the machine counterclockwise to remove them. See pic 13

Pic.13

**12.** Move the shaker on top of the stand, adjust the position, lower the shaker so that the bottom of the shaker falls on the stand. Make sure the threaded hole at the original red plastic plug position (Figure 6) of the stand is completely aligned with the shaker holes on both sides. See pic 14

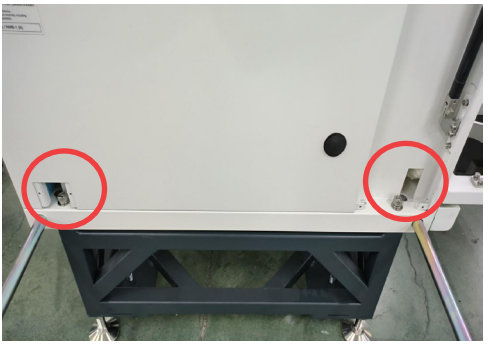



Pic.14

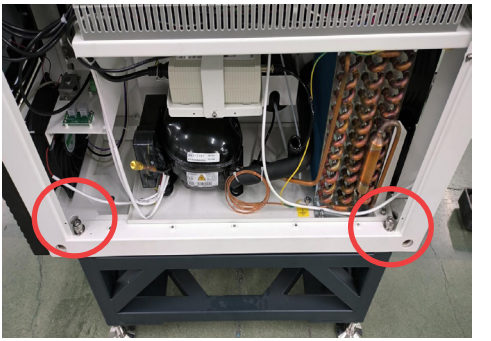
13. Use the hex wrench and internal hex bolt fasteners provided in the tooling kit to fully tighten and securely connect the shaker and the stand. See pic 15.

Pic.15

14. Check and verify all the 4 positions are fully screwed. See Pic 16 and 17



Pic.16

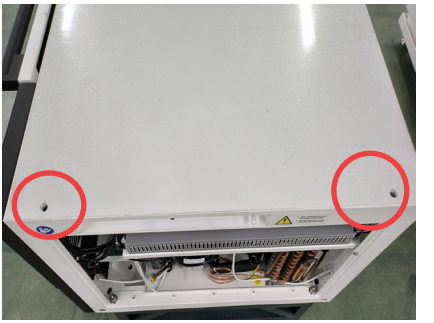


pic.17

15. If need to stack another shaker, Remove the 4 screws and the pads and confirm that the internal threads are intact. See pic 18 and 19

**Note**: Ensure to remove the plastic sheet from top of the shaker, when shakers are stacked.

Pic.18



pic.19

16. Refer to the above stacking procedures and stack another unit.

Pic.20

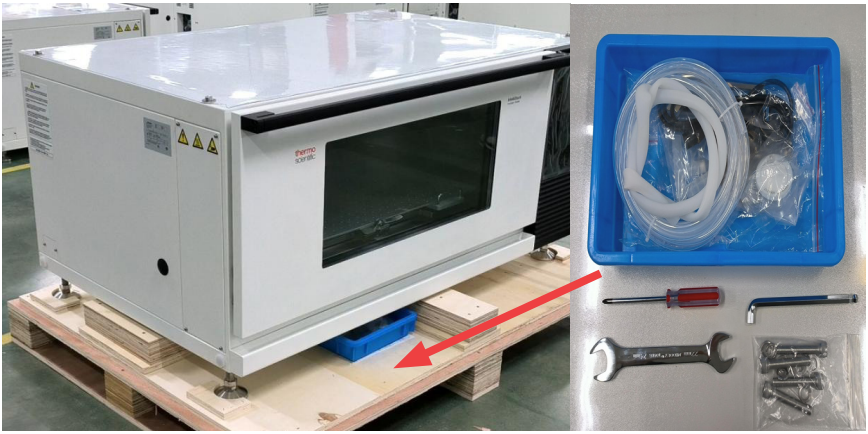
pic.21

17. Re-install all panels and silicone rod caps, see pic 20 and 21.

**Note**: The casters are intended for use during positioning of the product and should only be used for moving short distances. Once the unit is installed in its final location, the casters must be removed.

The metal feet should be adjusted to the lowest height to enhance the stability.

Tools needed for installation:



1.The accessories and tools are packed in a blue box, which is usually placed in the gap between the shaker and pallet.

2. Stacking procedure will require a cross screwdriver for disassembling and assembling the side panel; Internal hexagonal wrench and internal hexagonal bolts are used for stacking ; Open wrench, used to fine tune the height of metal feet.

**Country of Origin: China**



Thermo Electron LED GmbH
Robert-Bosch Strasse1
D-63505 Langenselbold
Germany

Thermo Electron LED GmbH is a subsidiary of:
Thermo Fisher Scientific Inc.
168 3rd Avenue Waltham, MA 02451
USA

**UK Importer**
Life Technologies,
3 Fountain Drive Inchinnan Business Park PA4 9RF
Scotland

**Australia**
+61 39757 4300

**Austria**
+43 1 801 40 0

**Belgium**
+32 53 73 42 41

**China**
+800 810 5118 or
+400 650 5118

**France**
+33 2 2803 2180

**Germany national toll free**
0800 1 536 376

**Germany international**
+49 6184 90 6000

**India**
+91 22 6716 2200

**Italy**
+39 02 95059 552

**Netherlands**
+31 76 579 55 55

**New Zealand**
+64 9 980 6700

**Other Asian Countries**
+852 2885 4613

**Spain/Portugal**
+34 93 223 09 18

**Switzerland**
+41 44 454 12 12

**UK/Ireland**
+44 870 609 9203

**USA/Canada**
+1 866 984 3766

**Countries not listed**
+49 6184 90 6000

ThermoFisher SCIENTIFIC

**Find out more at thermofisher.com/IntelliStack**