OPERATION MANUAL

PREFACE

Welcome to the Operation Manual for LABEC's Chamber(s) Control System. This Manual has been developed to assist with the setup and daily operation of the Chamber(s). The Manual is provided to all clients who have purchased a chamber(s) containing the new control system.

The Manual has been designed to provide detail for majority of chambers configurations. The format is structured to provide step-by-step instructions. The typical installation will find detail including figures, diagrams, and graphics to operate the chamber without issue. However, given that installations are specific to each facility and that facilities may have unique circumstances, additional information or assistance from LABEC may be required. In such cases, contact information is provided as following.

SERVICE AND TECHNICAL SUPPORT

LABEC welcomes the opportunity to provide this assistance and to answer any technical questions related to the start-up, use and general technical support and troubleshooting of the Chamber(s) control system. Before contacting LABEC, please check the following:

• Read this Operation Manual in its entirety for information about the feature(s) with which you are experiencing trouble.

• If you are having a problem using your Chamber(s), paying attention to the relevant section and the pertinent information in this Manual, and use the information to diagnose and correct the problem. If the problem persists and/or you require additional assistance, please collect the following information prior to contacting LABEC:

• The serial number of the chamber which is located on the rating plate on the side of the chamber.

• A description of the problem.

• A description of what you were doing before the problem occurred.

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1.0 INTRODUCTION TO THE JPCS21V1 CONTROL SYSTEM

The first step in becoming familiar with LABEC's new JPCS21V1 Control System is to understand the key components of the system and the general specifications. This section introduces the JPCS21V1 control system and provides an overview of its features and capabilities. Topics covered in this section include:

• An Overview of The JPCS21V1

• General Specifications

1.1 An Overview of The JPCS21V1

Lighting intensity, temperature, and humidity control are three examples of important parameters required in controlled environment systems. Whether the controlled environment is used for plant science research, or research in such other areas as pharmaceutical, nutraceutical, materials testing, or any of the other myriad applications of a LABEC controlled environment system, certain parameters require control and monitoring. For LABEC, this is accomplished with its next-generation JPCS21V1 control system.

The JPCS21V1 is configured for each application from the factory and offers a wide array of set-up, control and alarm features.

The JPCS21V1 control system consists of three primary components:

• **Controller**

• **Display**

• Control system **Software**

1.1.1 The Controller

The **Controller** (Figure 1-1: JPCS21V1 Controller) is mounted inside the chamber's control cabinet and comprises the actual SCM (Single Chip Microcomputer) which developed by LABEC. The controller's job is to monitor the control parameters and adjust the outputs to coincide with the User's programs/schedule. The controller also notifies the User with alarms when parameters, for any number of reasons, wander outside of specified limits.

Figure 1-1: JPCS21V1 Controller

1.1.2 The Display

The **Display** (Figure 1-2: JPCS21V1 Display) provides the interface to the control system by facilitating interaction directly with the controller. To accomplish this, the Display uses LCD (Liquid Crystal Display) touch screen.

The touch-screen Display provides access to the following functions:

- Programming
- Alarm
- Graphing
- Downloading
- Security

Information on the touch screen is easy to read because the screen is backlit. Icons are 'touch-activated' and initiate a controller action when they are 'tapped' (or activated) with fingertip or stylus.

Figure 1-2: JPCS21V1 Display

1.1.3 The Software

The controller **Software** is installed into the controller by LABEC at the time of chamber manufacture and facilitates interaction with, and control of, the chamber. Like other software products, the JPCS21V1 software carries a 'Version' number – this, because LABEC is continuously working to enhance its product capabilities resulting in software version number changes.

1.2 General Specifications

a). The JPCS21V1 control system is a SCM control system designed for a wide range of controlled environment applications.
b). The display uses a 7 to 10 inches touch-screen LCD.
c). Alarm are color-blinking directly on the screen making alarm conditions quick to identify and resolve.
d). Temperature Set-value changes can be set in 'Ramp' mode.
e). A default 'Status Screen' amalgamates set points and actual conditions into single, concise 'dashboard' for easy viewing and improved chamber management.

1.3 Local Control Interface – Programming

a). Touch-screen LCD.
b). Real-time clock programming of control variables.
c). Can store up to 6 'Time-lines' per program (with one-minute resolution) to create a single day, infinite running.

1.4 Data Logging and Management

Log data for the JPCS21V1 can be viewed and managed locally at the control system.

1.4.1 Local Data

a). The data available at the local control interface includes main chamber variables – temperature, humidity, lighting, and CO_2 (if applicable).
b). Parameters are all logged automatically by the controller every 60 seconds.
c). Data can be accessed with up to one (1) day or more time period (installed with Micro SD Card) of history.
d). Trend graphs can be viewed directly on the local control interface for 'actual' values.
e). Pan functions provide additional visualization tools allowing the User to precisely and accurately view and assess the data.

1.4.2 Remote Data (Optional)

a. The data available remotely is more substantial and includes every output parameter being monitored and controlled.

b. Data is logged automatically by the controller 60 seconds regardless of the number of parameters. This provides unprecedented data resolution for the User while it also benefits service personnel.

c. Log data is accessed in several ways:

- A LABEC Memory Module (Optional).
- LABEC's Control Management system (Optional).

1.5 Alarms

a). Audible and color-blinking visual alarms are provided.

b). User-settable absolute alarms for all controlled processes.

1.6 Security

The JPCS21V1 offers two password-protected levels:

- User (Access Level 1).
- Administrator (Access Level 2).
- Factory (Access Level 3).

1.7 Start-Up Delay

At Start-up, JPCS21V1 controllers randomly select delay times is 180 seconds (by default) to reduce start-up loads after a power failure. This delay time can also be programmed by the User - reference Section 5-4: Setting Screen d).

2.0 INITIAL START-UP AND NAVIGATION OVERVIEW

Now that a general overview of the capabilities of the JPCS21V1 Control system have been presented, it's time for the initial set-up. This section provides instructions on start-up procedures and general navigation of the JPCS21V1 control system. Where appropriate, diagrams, actual screen-shots, and step-by-step instructions are provided.

Important: *Do not touch the screen with sharp or pointed objects. Use only fingertip or the stylus provided. Use of any other objects on the display screen may damage the screen and void the warranty.*

2.1 Turning Display On

The JPCS21V1 is shipped from LABEC with latest software installed and with the control system configured for each specific application. Wherever the chamber is turned on, the first screen to be displayed is the Home Screen shown in Figure 2-1: Home Screen

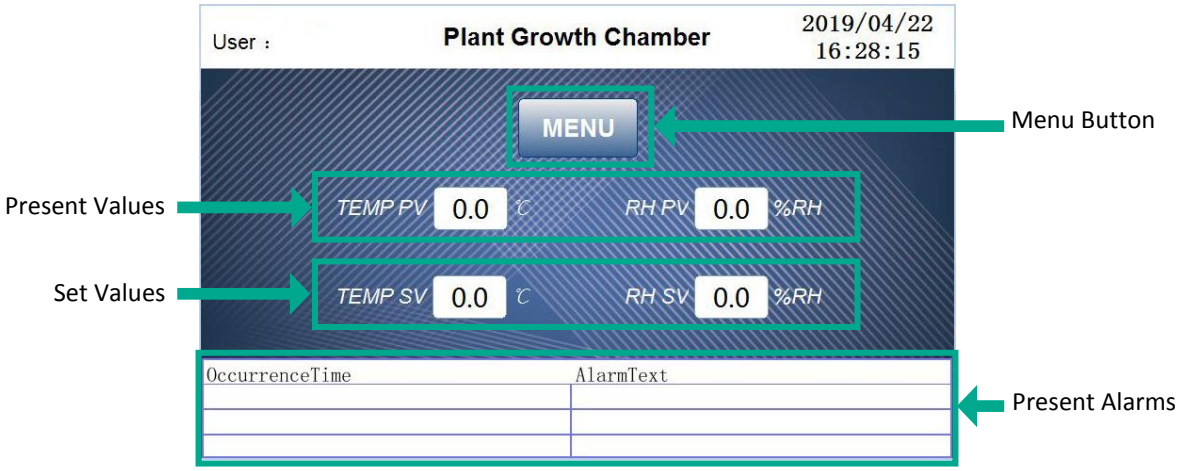


Figure 2-1: Home Screen

Home Screen presents the current status when the chambers running. The main function is displaying present value, set value of parameters and present alarms. Tap the Menu Button on the screen to the Menu Screen showing as Figure 2-2: Menu Screen

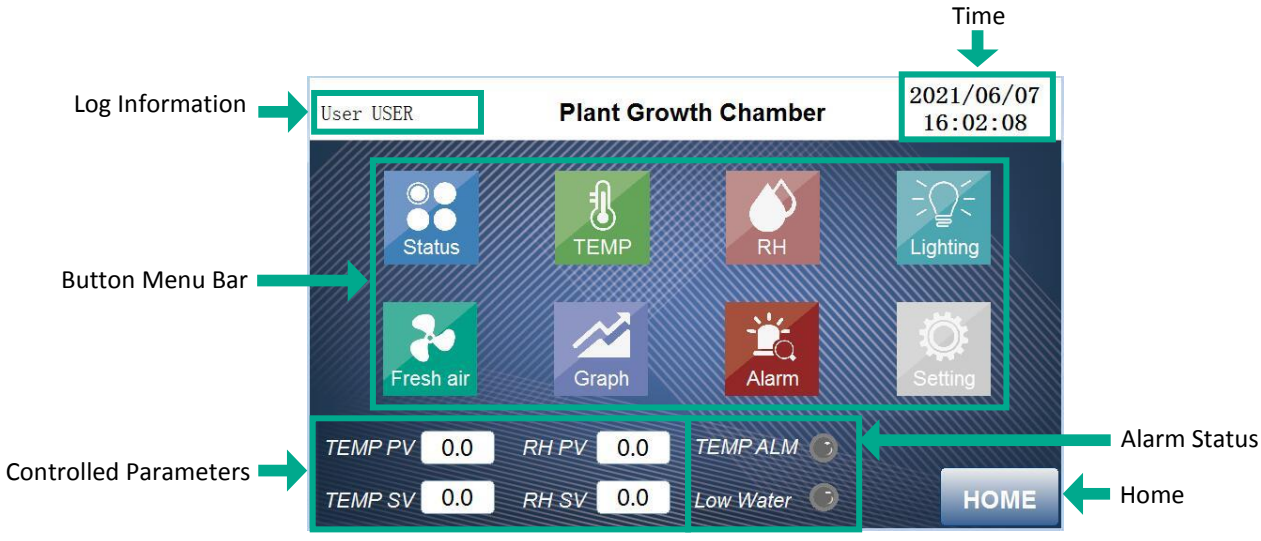


Figure 2-2: Menu Screen

2.2 Set Time and Date

The next step required during the initial start-up is to set the Time and Date. The steps are required the first time the control system is used, and thereafter only if/when these require changing.

Figure 2-2: Menu Screen illustrates the Button Menu Bar located in the middle of the Menu Screen. Although this Button Menu Bar presents eight (8) functional Icons, at this stage of the controller set-up, it is only necessary to set up the proper Time and Date.

Time and Date [Access Level: 1]

Time and Date are essential to the chamber experiment and it is recommended that they be viewed periodically (daily) to prevent experimental error.

The time is displayed in a 24-hour format (00:00:00).
The date is displayed in year-month-day format (yyyy-mm-dd).

Tap the "Setting" Button Icon

to access the following screen (Figure 2-3: Time and Date Set-up).

1. Tap the field box of Time and Date, then a pop-up screen appears (Figure 2-4: Number Keypad) to set time and date.

2. Press the 'Number Keypad Field' keys to enter the year.

3. Press the 'ENTER' key to activate the 'Year' field box.

4. Repeat Steps *two* and *three* for the other field boxes.

5. Press the 'MENU' key after entering every field box of Time and Date, then back to the Menu Screen.

Figure 2-3: Time and Data Set-up

It is essential to follow this process because it locks in the values to be entered into the controller. THIS IS MANDATORY.
All values entered are in real-time. Ensure that the time and date are correct and checked daily to ensure proper experiment processing.

2.3 Other Initial Start-Up Parameters

The Log Information Button and Alarm Status at the Menu Screen also includes six icons – 'ID' Set-Up and 'Security' Alarms. These parameters are not discussed in this section of the Manual because they are more advanced features that are not critical to the initial 'basic' chamber set-up. That is, they are not required in order to for the User to begin using the chamber. The objective for this section is to provide information to allow the Users to get the chamber operating with the bare essential. Note however, that security at this stage is still disabled.

Figure 2-4: Number Keypad

For information related to the advanced features and options, refer to Section 5.0 and Section 8.0 of this Manual.

2.4 Navigation Overview

The JPCS21V1 Display was developed to be intuitive for the Users, while also accounting for a vast array of interactive options and display features. To accomplish this, the Display uses:

• Passive LED Indicator Lights to display various conditions

• An Interactive LCD Touch-Screen

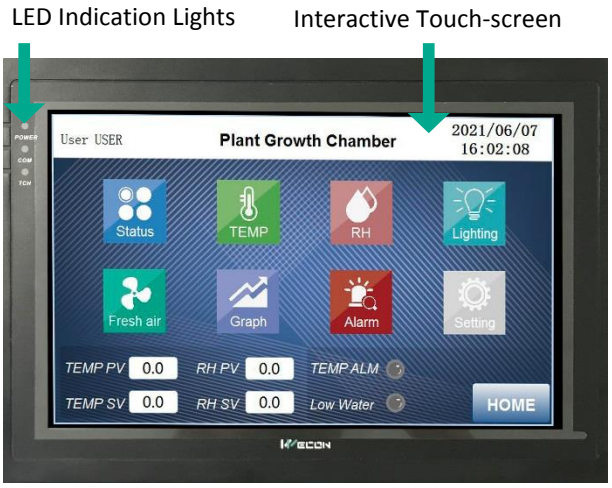


Figure 2-5: JPCS21V1 Display

2.4.1 LED Indicator Lights

There are three LED indicator lights on the Chamber Display. Their functions are as follows:

• Top LED – Power Condition – Power ON
• Centre LED – Communication Active (the light flashes when the chamber connected to the Ethernet or Internet)
• Bottom LED – Touch Condition - (flashes when touch the buttons of the screen)

2.4.2 LCD Touch-Screen

The Touch-Screen has two functions – to display information and to facilitate interaction with the Users. Here, a host of primary and secondary screens are used to provide all the necessary information required to fully interact with the controller. Sections 3 through 8 of this Manual describe each Screen in detail. Note that the main Primary (default) Screen is the Home Screen.

3.0 MENU SCREEN

At this point in the Manual, instructions have not yet been provided to inform the Users how to start an experiment in the chamber. Before that can be done, it is necessary to become familiar with the Menu Screen. This section provides an overview of this important primary screen. Topics covered include:

- Log Information
- Button Menu Bar
- Controlled Parameters
- Alarm Status
- Home

The JPCS21V1 control system uses ten (10) primary screens to interact with the various features of the control system. This Section of the Manual provides an overview of the first of those screens – the Menu Screen. Subsequent sections cover the details of each of the remaining screens.

The main control screen is the 'Menu Screen' – will back to this screen once touching the 'MENU' button. This is the screen that essentially acts as 'home base' for the Display. The main areas of the Menu Screen are illustrated in the figure below (Figure: 3-1: Menu Screen – Key Area Layout):

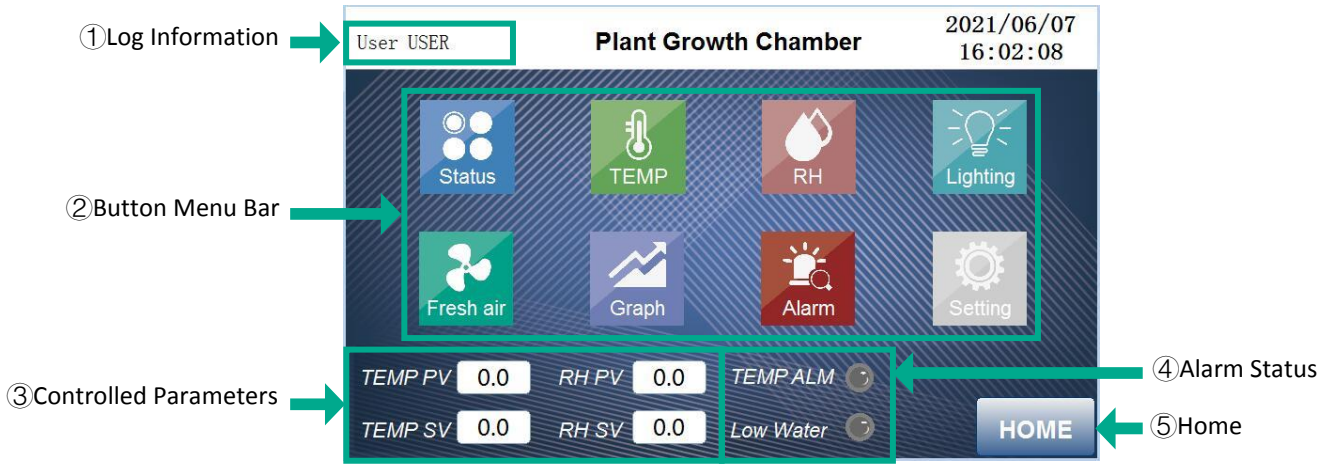


Figure 3-1: Menu Screen – Key Area Layout

① Log Information

User :

This Icon provides the information whether the users have the right to operate the chamber. The Icon displays 'User' represents the users have not logged in the control system yet, users can not set-up or operate the chamber before log in.

User : USER

If you want to set-up or operate the chamber, you need to log in the control system first, the Icon displays 'User: USER' or "User: ADMIN" represents the users have logged in the control system, and the users can program the chamber for further basic setting.

More details about how to log in the control system will be mentioned in **Section 8.0 Security Screen**.

② Button Menu Bar

These Icons provide information related to the chamber's status, programing, alarm, tend and download which includes 'Status', 'TEMP', 'RH', 'Lighting', 'Fresh Air' ('CO_2' if applicable), 'Setting', 'Alarm', 'Graph'

and 'Download'. Tap each of those icons will display status information of the chamber or set up controlled parameters or access other functionalities. Section 4.0 to Section 8.0 will mention details how to reach them.

Status icon - tap this icon to reference the actual status information of the chamber, and the screen displays as Figure 3-2: Actual Status Screen. When press the 'MENU' to back to the Menu Screen.

On the Actual Status Screen, the main function of this screen is to display the actual status which output from the chamber when the chamber running a program during the experiment. Users can easily read them out directly from the screen.

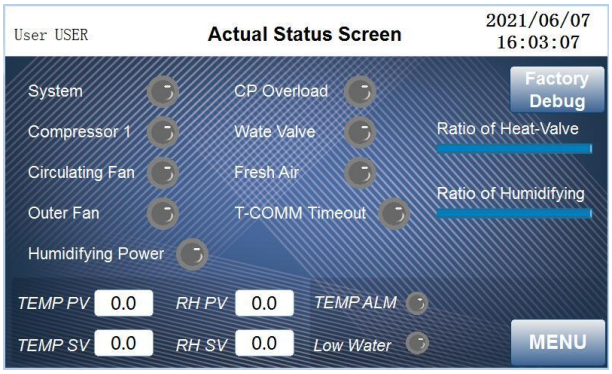


Figure 3-2: Actual Status Screen

TEMP icon - when tap this icon, the screen displays the setting screen for Temperature Parameter. The Temperature parameter set up or display the temperature in Degrees Celsius only.

RH icon - when tap this icon, the screen displays the setting screen for Relative Humidity Parameter (if applicable). It displays the relative humidity in %RH. This parameter is valid only if the chamber is equipped with humidity control.

Lighting icon - when tap this icon, the screen displays the setting screen for Lighting Parameter. The Lighting parameter displays the light intensity in percentage of full power.

Setting icon - tap this icon to set-up Time and Date, Alarm, Alarm Management shown as Figure 3-3: Setting Screen. When press the 'MENU' Icon to back to the Menu Screen.

On the Setting Screen, there are three main functions to set-up for running the chamber safely (Section 5.0 Alarm Screen provides more details for reference):

- Time and Date Setting
- Alarm Setting & Management
- System Run Time Set

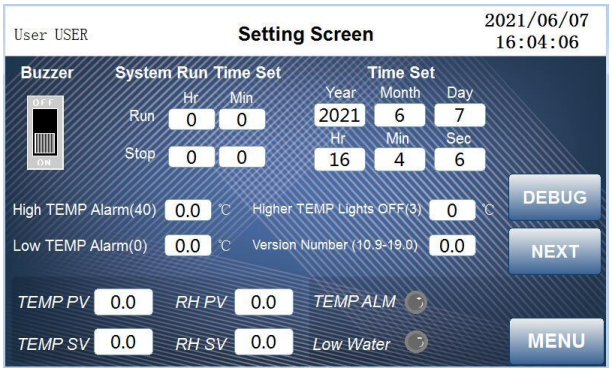


Figure 3-3: Setting Screen

Alarm icon - tap this icon to reference the alarm information, and the screen displays a list of alarms history which describes what the type alarm, time about it triggered and removed during the chamber running an experiment (Figure 3-4: Alarm Information Screen). When tap the 'MENU' Icon to back to the Menu Screen.

On the Alarm Information Screen displays a list of alarms history, it including what type alarms are, when they triggered, when they removed. Users can easily read them out directly form the screen. for more information, Section 5.0 Alarm Screen will provide more details for reference.

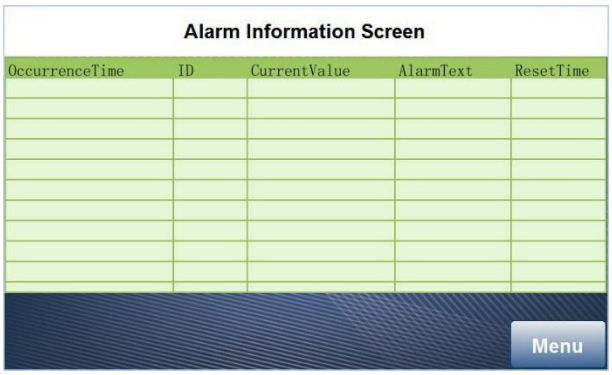


Figure 3-4: Alarm Information Screen

Graph icon - tap this icon to reference the actual and recorded graphs, and the screen displays the actual temperature / humidity parameter of the chamber (Figure 3-5: Graph Screen – T-Graph Screen). When tap the 'MENU' Icon to back to the Menu Screen.

The main function of the Graph Screen is to display and record actual temperature / humidity data about when the chamber running a program during the experiment. Users can easily read them out directly form the screen. Graph Screen displays in the way of graphic chart, for more information, Section 6.0 Graph Screen will provide more details for reference.

Figure 3-5: Graph Screen – TEMP Graph

Download icon - tap this icon to download the controlled parameters which recorded during the experiment or running a program. The chamber recently sport USB flash disk to receive the data from the chamber.

Note: *In order to make sure data download successful, please do not disconnected the dish to the chamber during the process.*

Fresh Air icon - tap this icon to set the chamber with fresh air exchange between the inner chamber and environment. In this way, the chamber can change the air sufficiently, also, it is good for CO_2 regulation. This is a new design for the new edition of the controller.

③ Controlled Parameters

This area of the Menu Screen is reserved for displaying the controlled parameters (Temperature, Humidity, and CO_2). The parameters display depends on several factors including the chamber design and the configuration set-up of the controller. For example, only some chambers come equipped with CO_2 and therefore not all chambers will display CO_2 as a Controlled Parameter.

Figures displayed in the Controlled Parameters area of the screen include the 'Present Value' and the current program 'Set Value' for each parameter. These figures are displayed in two columns – one for the *Present* values and one for the *Set* values.

The Temperature parameter displays the temperature in Degrees Celsius only.

The Relative Humidity parameter displays the relative humidity in %RH.

④ Alarm Status

These Icons provide information related to the chamber actual Alarm Status. Under certain conditions, these Icons will blink red. Each Icon has a defined meaning which graphically represents the status of the chamber and alarm conditions. Refer to Section 5.0 Alarm Screen for more details on alarm functionality.

⑤ Home

Home icon – the screen will back to Home Screen (Figure 2-1) once tap this icon.

4.0 PROGRAM SCREEN

This chapter details the procedures for programming the JPCS21V1 using the Program Screen. Upon completion of this chapter, the Users will be ready to start the chamber and run a program. The settings entered in the Program Screen control the conditions in the chamber.
A Program is defined as User specified experimental set value data that establishes the desired operating conditions of the chamber. Which defines a single 24-hour period and each Program starts at midnight. A time of 00:00 therefore denotes a midnight setting. The total period of a *single* Program is 24 hours.
Furthermore, a program may have one or more timelines which are defined as a User specified sequence and linked together to form such a program. A program can have up to a minimum of 6 Timelines (or more as requested) and the program can be run repeatedly.

4.1 Program Screen Icons and Locations

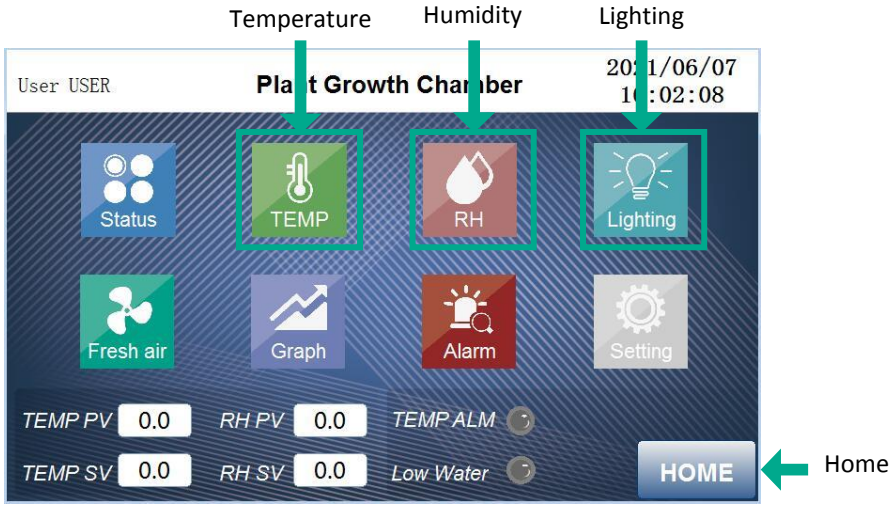


Figure 4-1: Program Scree – Key Area Layout

Every Chamber or Control System produced by LABEC need to set-up a program before running for any of experiments. To complete a program, there are four (4) Parameters at least need to be set-up (Figure 4-1):

- Temperature Parameter
- Humidity Parameter
- Lighting Parameter
- CO_2 Parameter (if applicable)

Tap any of those icons, a sub-menu screen appears to set the specific parameter as requested. The following in this chapter of this manual will describe how to accomplish a program step-by-step.

4.2 Temperature Set-up [Access Level: 1]

Tap the 'TEMP' icon 

to access the temperature programming sub-menu scree.
(Figure 4-2: Temperature Programming Screen)

- By default values, there totally have six (6) timelines available for programming, these timelines represent a 24-hour of the day, ***so the first schedule number must be set 0:0 and last schedule number***

must be set as 23:59. If a schedule number already exists, then the JPCS21V1 will automatically show the next schedule number available. On the right side of each timeline, there is a Set Value of Temperature for setting, the default Set Value of Temperature will show as 0.0.

• To change time, tap the hours and/or minutes field box  for the begin-time and end-time of first timeline (Row).

a). Hours and minutes must be entered separately.
b). Touch the '0:' field for hours.
c). Touch the ':0' field for minutes.
d). A standard pop-up window will appear allowing for numerical data entry. (Figure: 2-3)

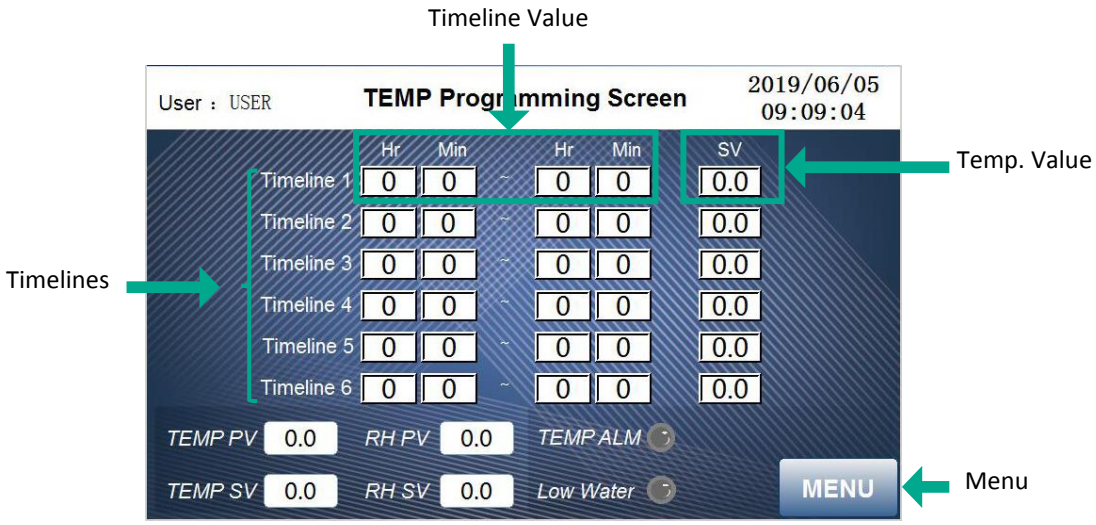


Figure 4-2: Temperature Programming Screen

Note: *When entering the time field, you are NOT entering a time duration in hours and minutes but rather the actual clock-time at which point you would like the chamber to change to the new set-value parameters. This is the reason to set the actual Time and the Date in Section 2.2 was important. Also, remember that the time field format is 24-hour.*

• Tap the set value on the right side of the timeline  to set the desired Temperature.

• Temperature value is the only parameter with a decimal point. Therefore, always enter 3 digits and a '-ve' sign if the chamber is low temp. Note: Set-value parameters have specified ranges. The controller will only allow values to be entered that are within the range.

Note: *Temperature is the only Set-value parameter that is provided on <u>every</u> controller. All other parameters are optional based on the configuration of the chamber.*

• Tap the 'MENU' icon to back to the Menu Screen

4.3 Humidity Set-up. [Access Level: 1]

Tap the 'RH' icon 

to access the humidity programming sub-menu scree.

(Figure 4-3: Humidity Programming Screen)

• By default value, there totally have six (6) timelines available for programming, these timelines represent a 24-hour of the day, ***so the first schedule number must be set 0:0 and last schedule number must be set 23:59.*** If a schedule number already exists, then the JPCS21V1 will automatically show the next schedule number available. On the right side of each timeline, there is a Set-value of Humidity for setting, the default Set-value of Humidity will show as 0.0.

• To change time, tap the hours and/or minutes field box [0 0] for the begin-time and end-time of first timeline (Row).

a). Hours and minutes must be entered separately.
b). Touch the '0:' field for hours.
c). Touch the ':0' field for minutes.
d). A standard pop-up window will appear allowing for numerical data entry. (Figure: 2-3)

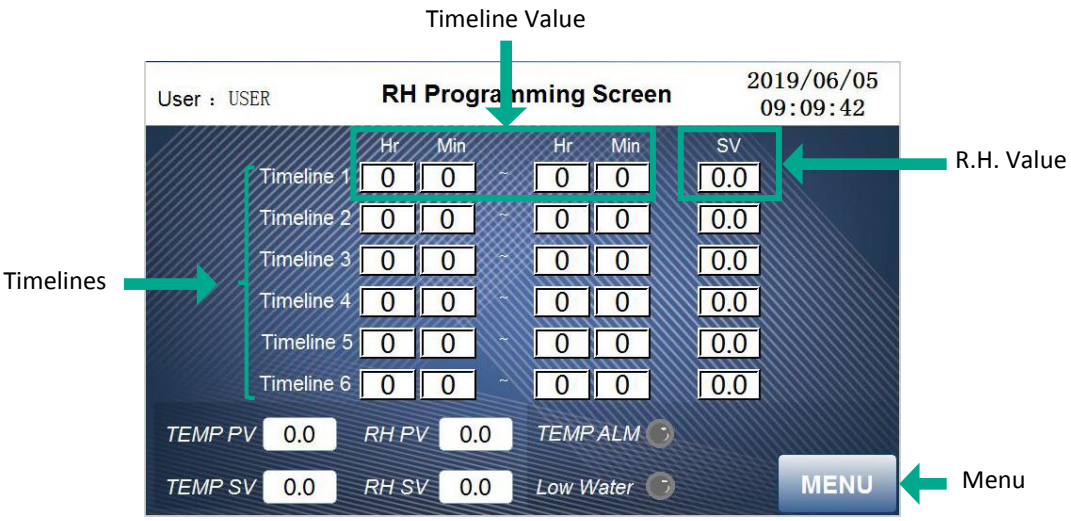


Figure 4-3: Humidity Programming Screen

• Tap the humidity value on the right side of the timeline [0.0] to set the desired Humidity.

• Tap the 'MENU' icon to back to the Menu Screen

4.4 Lighting Set-up. [Access Level: 1]

Tap the 'Lighting' icon 

to access the lighting programming sub-menu scree.

(Figure 4-4: Lighting Programming Screen)

• By default value, there totally have six (6) timelines available for programming, these timelines represent a 24-hour of the day, ***so the first schedule number must be set 0:0 and last schedule number must be set 23:59.*** If a schedule number already exists, then the JPCS21V1 will automatically show the next schedule number available. On the right side of each timeline, there is a Set-value of Humidity for setting, the default Set-value of Humidity will show as 0.0.

• To change time, tap the hours and/or minutes field box [0 0] for the begin-time and end-time of the timeline.

a). Hours and minutes must be entered separately.

b). Touch the '0:' field for hours.
c). Touch the ':0' field for minutes.
d). A standard pop-up window will appear allowing for numerical data entry. (Figure: 2-3)

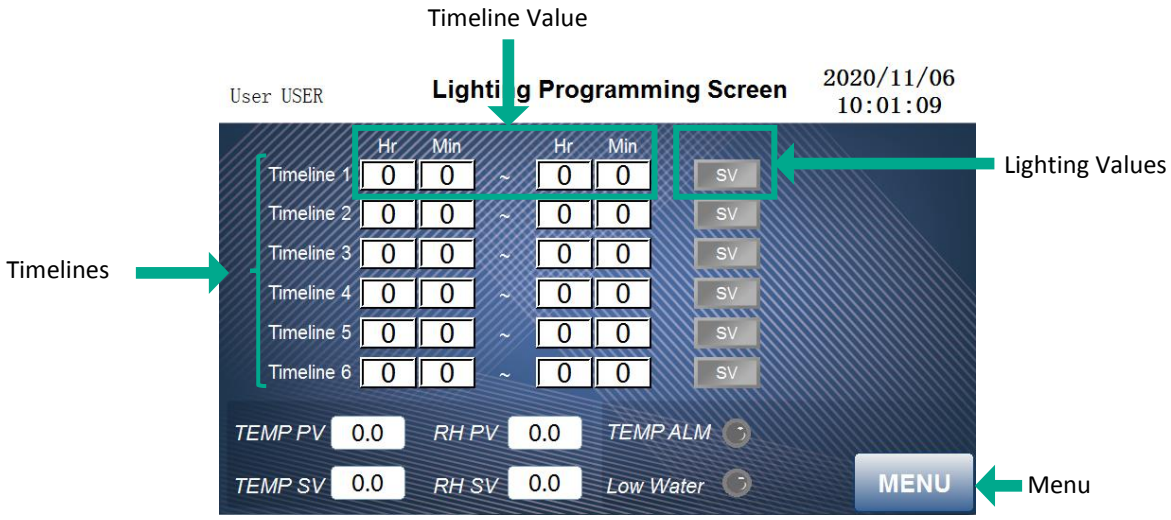


Figure 4-4: Lighting Programming Screen

• Tap the 'Lighting' icon SV to access the lighting values sub-menu scree.
(Figure 4-5: Lighting Values Screen)

• Tap the Lighting value 0 of any value of the chamber to set the desired Lighting value.

• Tap the 'Menu' icon to back to the Menu Screen

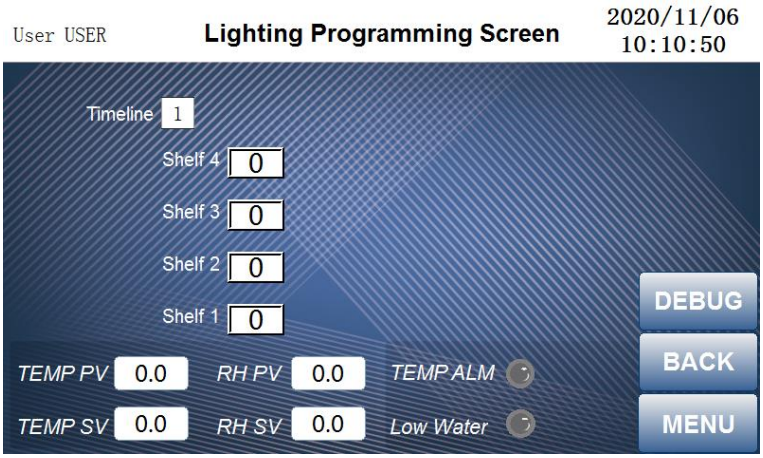


Figure 4-4: Lighting Programming Screen

4.5 CO_2 Set-up. (If available) [Access Level: 1]
There are many different configurations for the JPCS21V1 and it is beyond the scope of this Manual to define each one. Normally, every controller is configured by LABEC for each application. When creating a Program, and provide that CO_2 is an available controlled parameter with your chamber configuration, the CO_2 Set-value is accomplished in the same manner as other Set-values. Tap the CO_2 field and use the keypad screen to select the desired Set-value.

Important: *Once all the Parameters have been entered into the program, the chamber will run as the parameters set-up infinitely. But the chamber will not run experiment right now. In this chapter by now, all programmable parameters have been set up completely. There have Security conditions need*

to be set up before the chamber working for an experiment. ***Section 5.0 Alarm Screen*** *will show more details for reference.*

5.0 ALARM SCREEN

The alarm screen allows the Users to set-up and manage alarm conditions for each chamber. Alarms are used to notify the User when *Actual* controller parameters move outside of the *Set-value* conditions and their respective limits. With the ability to program alarms, receive error messages and manage reporting, experimental research specimens can be effectively protected. This section of the Manual provides information on setting-up and managing alarms effectively. Topics covered include.

- Alarm Setting
- Alarm Status
- Alarm Management
- Alarm History

5.1 Alarm Icons

From the Menu Screen, there are three areas relate to alarm functionality. Alarm Stetting, Alarm Status and Alarm History (Figure: 5-1: Alarm Icons). Tap either 'Setting' Icon or 'Alarm' Icon to access a sub-menu screen for setting alarms or reviewing alarm history. 'Alarm Status', as well as called *Actual Alarm* reminder, in this area include some indication light icons that any which of them turning red once the defined alarm triggered.

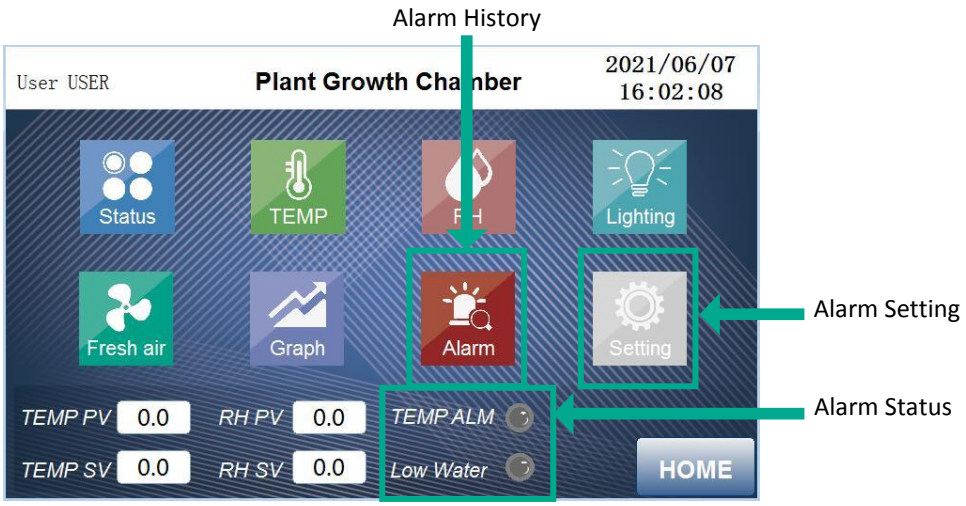


Figure 5-1: Alarm Icons

5.2 Alarm Overview

The JPCS21V1 contains a total of 15 alarm types. Based on the configuration of the unit, these alarms will be either enabled or disabled by LABEC at the time of manufacture.
Each of the 6 alarms in the JPCS21V1 are classified with two (2) main alarm classifications.

1. Warning
   Notification of a non-critical alarm condition. The chamber will continue to operate under the alarm condition(s). Examples of this type of alarm include humidity, light etc.
2. Shutdowns
   Notification of a critical alarm condition. The chamber will deactivate to prevent damage to the chamber and/or experiment. Examples of this type of alarm include temperature, refrigeration system malfunction, circulating fan malfunction, etc. Shutdown alarms are further classified by Latching and Non-Latching.

a) Latching

The chamber does not recover and user intervention is required. This alarm will stop the program and force the user to manually re-start the chamber.

b) Non-latching

The chamber automatically recovers without human intervention when the alarm conditions are corrected and/or no longer active.

Example: Temperature limits.

5.3 RAMP Mode and STEP Mode

For the Temperature Set-value parameter, the User has the option of selecting temperature Set-value transitions to either RAMP Mode or STEP Mode. RAMP mode provides a user-defined gradual ramp for temperature transitions, while STEP mode provides an instantaneous Set-value 'step' for temperature transitions. Obviously, the chamber cannot produce an instantaneous (step) change in the temperature. As such, in STEP mode, the chamber will transition from the last Set-value to the new Set-value as fast as the refrigeration system and the chamber conditions will allow. (In STEP mode, the tracking alarm feature is disabled.) The controller software then works to 'soften' the temperature transition to prevent 'overshoot'.

Note: *The Temperature Mode is a global setting which means the controller runs in either RAMP or STEP Mode. So, any of programs run either in RAMP or STEP Mode.*

Note: *The default configuration from LABEC places the Chamber Temperature transition to RAMP Mode. To change the Temperature transition mode, please contact us for customization service.*

5.4 Alarm Setting Screen

1. Tap the 'Setting' icon

to access Setting Screen (Figure 5-2).

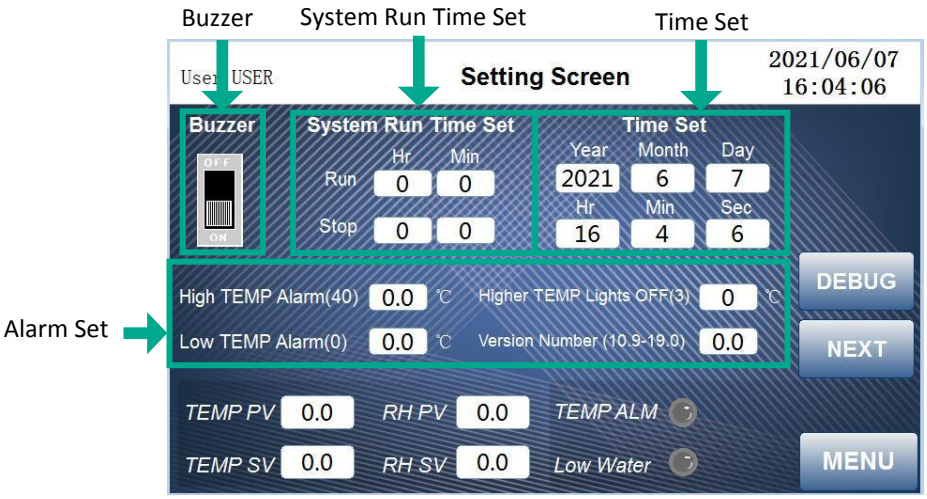


Figure 5-2: Setting Screen

• Alarm Set Area – There are 6 parameters to set up. The values shown in the bracket are default values. The default values may different because there are many different configurations for a same control system.

• System Run Time Set – The default value is 00:00 to 23:59, it means the system is running automatically for the cycle of days and nights, if the users want the system run a specific time period, it can be also be

set this specific time period (e.g. 08.00 to 18.00).

• Alarm Management area – There is a Switch Icons, **Section 5.6 Alarm Management** for more details about these Icons.

• Time Set area – For this part, please refer to **Section 2.2 Setting the Time and Date** for more details.

5.5 Setting Alarms

To accomplish Alarms Setting for the chamber before running it, there are four (4) steps to set-up. (Figure 5-3: Alarms Set Area)

a). Set the high and low temperature limit alarms.

• Tap the high temperature field box to display a keypad and enter the high temperature limit alarm. The value entered cannot be higher than the factory set maximum of +5.0°C.

Figure 5-3: Alarms Setting Area

• Tap the low temperature field box to display a keypad and enter the low temperature limit alarm. The value entered cannot be lower than the factory set minimum of -5.0°C.

b). Set lights-shut-off limit when higher outside of the high temperature limit.

• Tap the Higher TEMP for Lights OFF field box to display a keypad and enter the temperature limit.

c). Version Number.

• Number in the field box displaying the current software version.

5.6 Alarms Management

There are three switch icons shown as Figure 5-4: Alarm Management Switches for alarm management when alarm condition triggered. Turn OFF/ON any of those switches will stop alarm condition temporarily or permanently:

Figure 5-4: Alarms Management Switches

Buzzer Switch – The default value is ON. The buzzer ringing when any alarm conditions triggered. Turn OFF this switch, the buzzer stop ringing but the alarm condition is still exist.

Important: *Please reset (turn ON) the Buzzer Switch when the alarm condition is eliminated, or the chamber will not ringing when any alarm conditions is triggered.*

5.7 Alarm Corrective Action

For any of the above alarm conditions, there are three (3) ways to correct the alarms.

1. Adjust the alarm settings if necessary.
2. Repair the fault where necessary.
3. Shut down and restart the chamber.

5.8 Alarm Types

Following is a list of the 15 alarm types along with a description of each.

Warnings:

High Humidity Warning Alarm	Chamber power shuts off while a program is running as a result of the main contactor open.
Low Humidity Warning Alarm	A warning message that the humidity has drifted below the low alarm.
High CO_2 Warning Alarm	The amount of CO_2 in the chamber is above the alarm.
Low CO_2 Warning Alarm	The amount of CO_2 in the chamber is blew the alarm.
High Light Warning Alarm	The µMOL or lighting level is above the alarm.
Low Light Warning Alarm	The µMOL or lighting level is below the alarm.
High Pressure Warning Alarm	A warning message that the condensing pressure has reached the high-pressure limit value.
Low Pressure Warning Alarm	A warning that the suction pressure has reached the low-pressure limit value.
Loft Temperature Warning Alarm	A warning message that the lamp loft temperature has exceeded the Set-value.
Plenum Temperature Warning Alarm	A warning message that the plenum temperature is above or below the Set-value.

Shutdown Latching:

High Pressure Count Alarm	A warning message that the high-pressure switch has been tripped off 3 times within the last 30 minutes.
Low Pressure Count Alarm	A warning message that the low-pressure switch has been tripped off 3 times within the last 30 minutes.
High Pressure Time Alarm	A warning message that the high-pressure switch has been tripped off more than 30 seconds.
Low Pressure Time Alarm	A warning message that the low-pressure switch has been tripped off more than 30 seconds.

Shutdown Non-Latching:

Temperature Tracking Shutdown Alarm	Chamber shut off down as a result of the temperature exceeding the user tracking limit.

5.9 Alarm History [Access Level: 1]

The Alarm History provides alarm information stored in the Chamber for Users reviewing. The information provides records of any alarms that the chamber encountered.

Tap the 'Alarm' icon 

to access the following screen. (Figure 5-5)

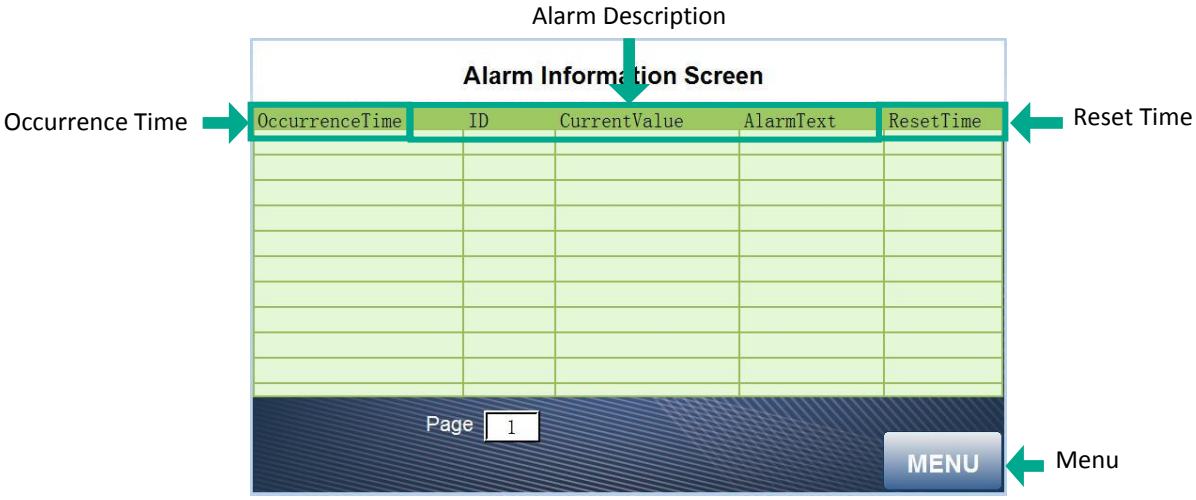


Figure 5-5: Alarm History Screen

Time	Indicates the time of the alarm was triggered and reset.
Description	Indicates the alarm cause or malfunction. • Scroll down the button on the side of the screen for more alarm history.

Tap the 'MENU' icon to back to Menu Screen.

6.0 GRAPH SCREEN

Data management is an important aspect of controlled environment systems. LABEC is the need for researchers to be able to view and assess their log data. In some cases, this is acritical requirement. This section of the Manual is about Data Management. Key topic is covered on-screen graph data reviewing.

The JPCS21V1 employs a data logging feature that is viewable locally directly on the Display. The local data, viewable on the Display, is automatically logged every 60 seconds and includes Temperature, Humidity and CO_2 (where applicable). The data is viewed in the form of Trend Graphs (a charted history) on the Display (Figure: 6-1: Graph Screen-TEMP Graph). A Micro SD card is needed to assisting store plenty experimental data. The default memory capacity is to store one-day data which it over-writes the oldest data.

Figure 6-1: Graph Screen-TEMP Graph

To access the Graph Screen for any of the three (3) Keys parameters (Temperature, %RH, CO_2 - if applicable) tap the 'Graph' Icon 

on the Menu Screen. The example below (Figure 6-2) shows the Trend Screen for Temperature.

6.1 Graph Screen – Key Area Layout

Important: *When the controller memory has reached full capacity, by default, it will overwrite the oldest data stored present in the memory, without issuing a warning to the User.*

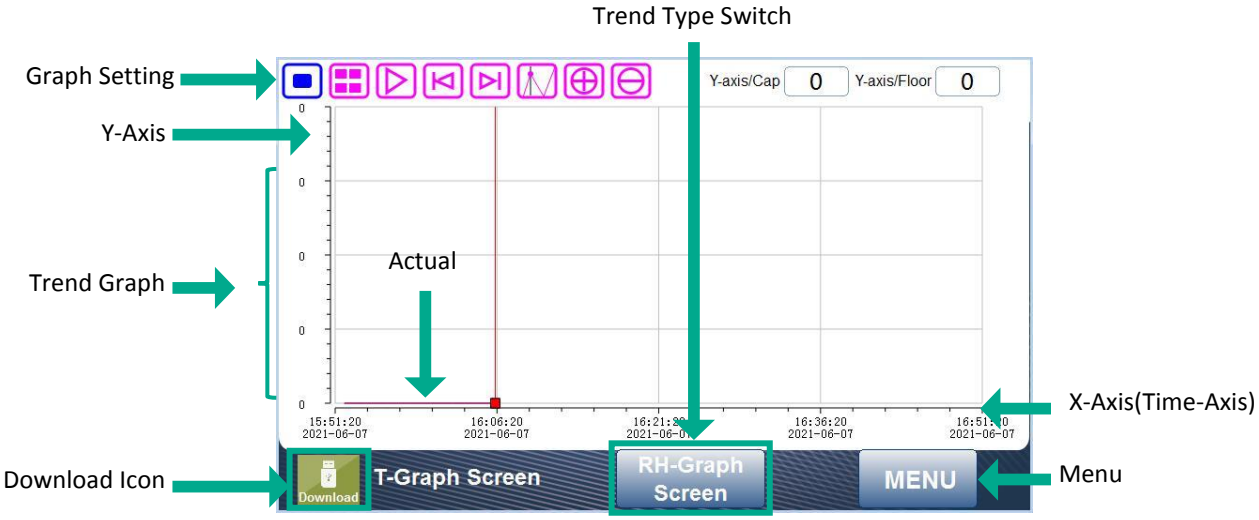


Figure 6-2: Graph Screen – Key Area Layout

6.1.1 Graph Screen Illustration

Graph Setting Icon	Tap the Trend Setting Icon to set the Trend Graph (include Y-Axis, X-Axis, Pan Time-Axis etc.) displays on screen.
X-axis (Time-axis)	Set horizontally to the beginning or end of the experimental data. Enter a time period to view the trend graph horizontally at specific intervals.
Y-axis	Pan the trend graph vertically.
Actual	Actual trend line that the Chamber is showing.
Axis	Depending on the trend graph, these values will change. For example, temperature will indicate units in degrees Celsius while relative humidity will indicate units measured as a %.
Span Time-axis	The Time Axis shows integers in units of time, and these units change as you Pan. To know what units the Time Axis is displaying ensure you are viewing the Trend Screen in Pan Mode (Figure 6-2) and then compare the Time Period display.
Trend Type Switch	Tap this icon to switch the trend graph type the screen displaying, it depends on the trend graph, these values will change.

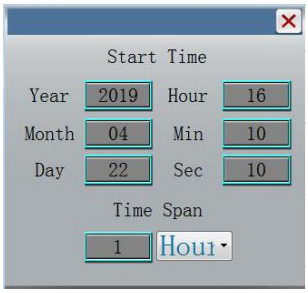
6.2 How to Pan on The Graph Screen

The Trend graph display can be panned. Tap 'Graph Setting' Icon  to access a pop-up screen Figure 6-3: Graph Setting Icons.

Figure 6-3: Graph Setting Icons

To set the begin-time of the X-Axis and Time Span of the trend graph display, tap the year, month, day, hour, minute, second and Time Span for changing.

a). Year, month, day, hour, minute and second must be entered separately.
b). Touch the 'Year' field for year.
c). Touch the 'Month' field for month.
b). Touch the 'Day' field for day.
d). Touch the 'Hour' field for hour.
e). Touch the 'Minute' field for minute.
f). Touch the 'Time Span' field for X-Axis.



Tap this icon to renew the trend graph display.

Tap this icon to "back moving" or "forward moving" the trend graph display.

Tap this icon to back to the "Actual Time Line" of the trend graph.

Tap this icon to “enlarge” or “shrink” the trend graph display.

Important: *Depending on the trend graph, the Y-Axis values will change. For example, temperature will indicate units in Degree Celsius while relative humidity will indicate units measured as a %.*

Tap ‘RH Graph’ Icon 

to review the RH trend graph.

6.3 DOWNLOAD SCREEN

Data download is also important for users to use LABEC’s control system and chamber. The chamber recently support USB flash disk to download the experimental data. This section is about Data Download.

To download the data recorded, there are two steps to accomplish:

- USB flash disk connect to the chamber
- Data download

6.3.1 USB Flash Disk Connection

Each chamber produced by LABEC is equipped with USB port on the right side of the chamber for experimental data downloading. Users can use USB flash disk connect to the chamber and receive the experimental data which recorded in the chamber (or SD card in the chamber). Before data download, users must make sure the USB flash disk well connected to the chamber.

6.3.2 Data Download

Tap the ‘Download’ Icon 

on the Graph Screen, a pop-up warning window appears (Figure 6-4) to download data. When the data download successfully, this window will disappear automatically.

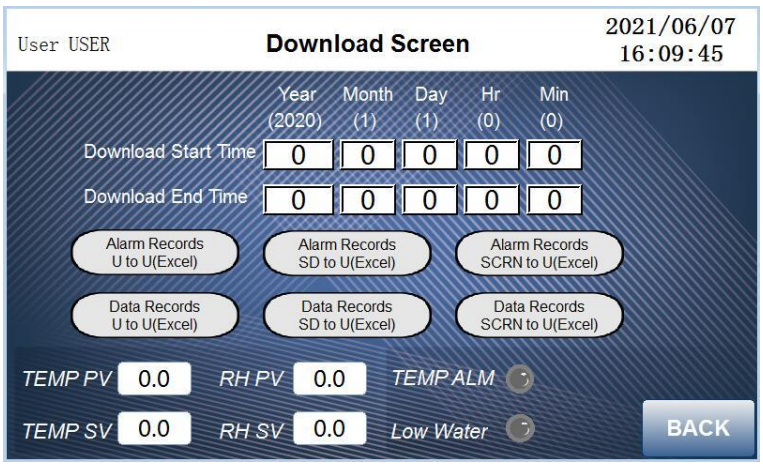


Figure 6-4: Download Screen

Important: *Data download takes a few seconds to a few minutes depends on how big the data downloading is, please make sure the USB flash disk well connected to the chamber during this process.*

7.0 FRESH AIR SCREEN

Fresh air exchange is also important for users to use LABEC's new control system of JPCS21V1. Our new designed chamber equipped with fresh air feature, which accomplish the chamber exchange the fresh air between the inner chamber and environment. In this way, the chamber can change the air sufficiently. Also, it is good for CO_2 regulation.

7.1 Fresh Air Set-up. [Access Level: 1]

Tap the 'Fresh Air' icon 

to access the fresh air Setting scree.

(Figure 7-1: Fresh Air Setting Screen)

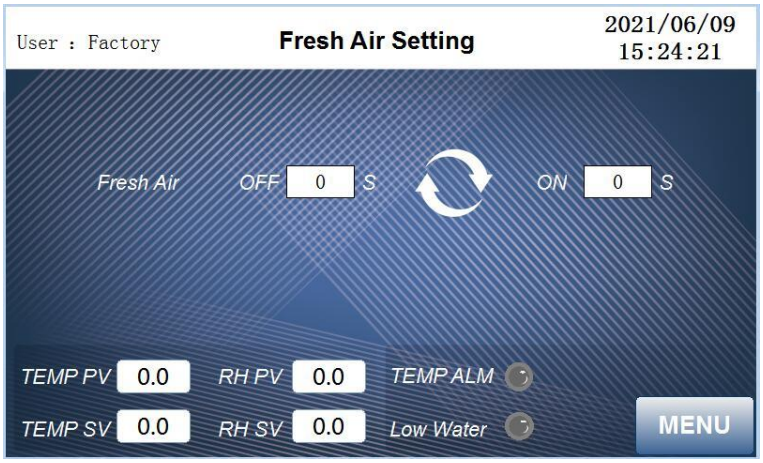


Figure 7-1: Fresh Air Setting Screen

• There totally have two configurations to be set, the duration time for OFF, and the duration time for ON. The default values are those, OFF for 5 seconds, ON for 5 seconds, the user can set these two values according to their using conditions.
• To turn OFF this feature, OFF for any values and ON for 0 second.

8.0 SECURITY SCREEN [Access Level: 1]

The JPCS21V1 has a security feature to manage Users by managing their level of access. The feature requires Users to be set-up (a maximum of 2 User ID passwords can be assigned). Once this is, Users are required to login – this is to ensure that Program modifications are made by authorized personnel only. The Administrator can override all Users and can access all programming functionalities.

The JPCS21V1 is shipped with security features turned Off. This enables any Users to start the chamber and become familiar with the chamber controls without having to enter a password.

> ***Important:*** *It is recommended that a security Users be assigned to login authority and that security features be added as soon as possible.*

8.1 Security Overview

With security enabled, there are two 'type' of Users in the JPCS21V1 including:

- User (Access Level 1)
- Administrator (Access Level 2)
- Factory (Access Level 3)

Users have Level 1 access which means they have access to the basic features such as Programming, Alarms, Trend Graphs, Downloading. **Administrators** has Level 2 access which includes Level 1 access plus other Services and configuration features. **Factory** has Level 3 access which includes Level 1 and Level 2 access plus other Services and configuration features.

> ***Note:*** *when Security is turned OFF, anyone can access the Level 1 features. For this reason, it is recommended to setup the User login authorities as soon as possible.*

8.2 Chamber Level Access

The following table provides JPCS21V1 access levels available to the User, Administrator. Access level is password enabled. In this Manual, access level codes are presented at the beginning of every chapter to inform the user of specific access required.

Menu	Sub-Menu	Access Level
Status Options	Time & Date	1
	Startup Delay	1
	Startup	1
Security	Login	1
	Logout	1
	Change Password	1
Service	LABEC Access	2
	System	2
	User Reset	2
	PID Setting	2
	O/P Runtimes	2
Alarm	Setting	1
	Manage	1
	History	1
Trend Graph	N/A	1
Program	Schedule	1
	Edit	1

Legend
1 = User access
2 = Administrator access

Note: *Administrator login is only available to LABEC personnel.*

8.3 Login Security System [Access Level: 1]

User login is required once users want to do something to the chamber and touch any icons on Menu Screen, a Login Screen (Figure 8-1) appears. This is the screen used to login User, Administrator and Factory with passwords.

The first step to setting up the Security feature is to setup the User. The JPCS21V1 comes from the factory with a default User password has already set up. The default password of the user's is **2017**. Using this as current password, assign the User and the password can be changed. This is accomplished as follows:

- Tap the 'User' field box, select User to enter the control system.
- Tap the 'Password' field box, inset the default password **(2017)** for login.
- Tap the 'Enter' to login the control system.

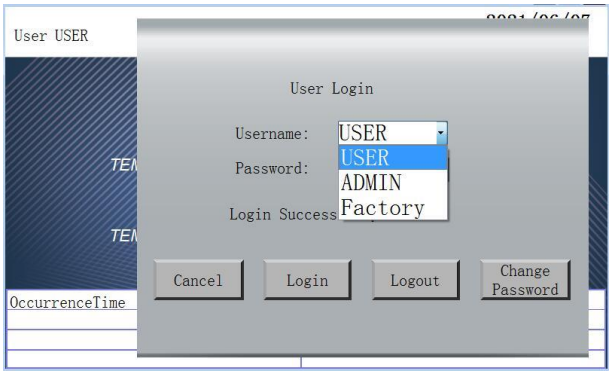


Figure 8-1: Login Screen

8.4 Logout Security Screen [Access Level: 1]

Touch the icon User : USER on the top the screen to access the logout screen.

Touch the 'Logout' key to logout of the control system.
After logout, by default, it will return to the Home Screen.

- After sixty (60) minutes of inactivity, the Chamber will automatically Logout all Users.
- A pop-up window will appear and inform the User to Log in again.
- Follow the same procedure in Section 8.3: Login Security System.

GLOSSARY

Button	An active spot on the screen that performs an action when touched.
Chamber	A entire unit is called the chamber. Parts of the chamber include the control screen, the electrical panel, the refrigeration system and the plant growth area.
Controller	The device that sets and records the conditions in the plant growth are according to a user created program. The JPCS21V1 is the most recent controller model.
SCM	Single Chip Microcomputer, one of control and monitoring systems which was developed by LABEC.
Data storage	An optional Micro SD card may also be used to store data information.
Field box	A specified area on the screen where data is displayed and/or is entered.
Icon	A graphical symbol.
Plant growth area	The environmentally controlled section of the chamber interior.
Program	One or more timelines that create conditions in the growth area during a 24-hour period. The timelines to enter to the Program Table indicate program conditions to the controller.
Program table	The series of columns and rows use for entering program timelines on the Program screen.
Ramp mode	When conditions change gradually and steadily between timelines.
Step mode	When conditions change dramatically between timelines. The Chamber works in step mode.
Time line	Any single row in the program table that contains a setting or setting that define conditions in the plant growth area. For example, temperature and relative humidity.
Schedule	One or more timelines make up a schedule.