TERRA UNIVERSAL.COM
Critical Environment Solutions

Installation and Operating Guide *Document No. 1788-60*

CleanWatch+® DualZone™

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Safety Notice

A thorough familiarity with all operating guidelines is essential to safe operation of the product. Failure to observe safety precautions could result in poor performance, damage to the system or other property, or serious bodily injury or death.

The following symbols are intended to call your attention to two levels of hazard involved in operation:

The information presented here is subject to change without notice.

CAUTION

Cautions are used when failure to observe instructions could result in significant damage to equipment.

WARNING

Warnings are used when failure to observe instructions or precautions could result in injury or death.

1.0 Introduction

This manual provides information on Terra Universal, Inc.'s CleanWatch+® DualZone™ user configuration (Cat# 6607-14). Keep this document in a safe space for future reference. Please read through this manual in its entirety before operating your Terra Universal CleanWatch+® DualZone™.

2.0 Description

The Terra Universal CleanWatch+® DualZone™ is an environmental monitoring system with integrated sensors for differential particle counts and differential pressure. It is equipped with dual particle count sensors for side-by-side comparison of airborne particles inside and outside the cleanroom. A single differential pressure sensor is provided for cleanroom monitoring. All sensor data is transmitted every 1 minute to ensure responsive environmental control.

The high-resolution particle count sensors track particle sizes individually at 0.3, 0.5, 1, 2.5, 5, and 10 microns. The differential pressure sensor operated at an accuracy of ±0.5 to ±10 (in. H2O). The unit may be powered using 12 VDC (barrel jack or rear terminal) or 5 VDC via USB-C.

The CleanWatch+® DualZone™ provides Modbus and BACnet support for multi-unit daisy-chaining and centralized monitoring. A cloud-based app allows for remote monitoring, data review and export. When paired with Terra PDMs, CleanWatch+® DualZone™ will support automated fan and light control.

The CleanWatch+® DualZone™ supports user-defined alarms. Audible, visual, and dry-contact triggers activate when sensor limits are breached. The unit also integrates advanced sensors to monitor particle counts and differential pressure with user-configurable Min/Max set-points for each parameter.

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3.0 Hardware

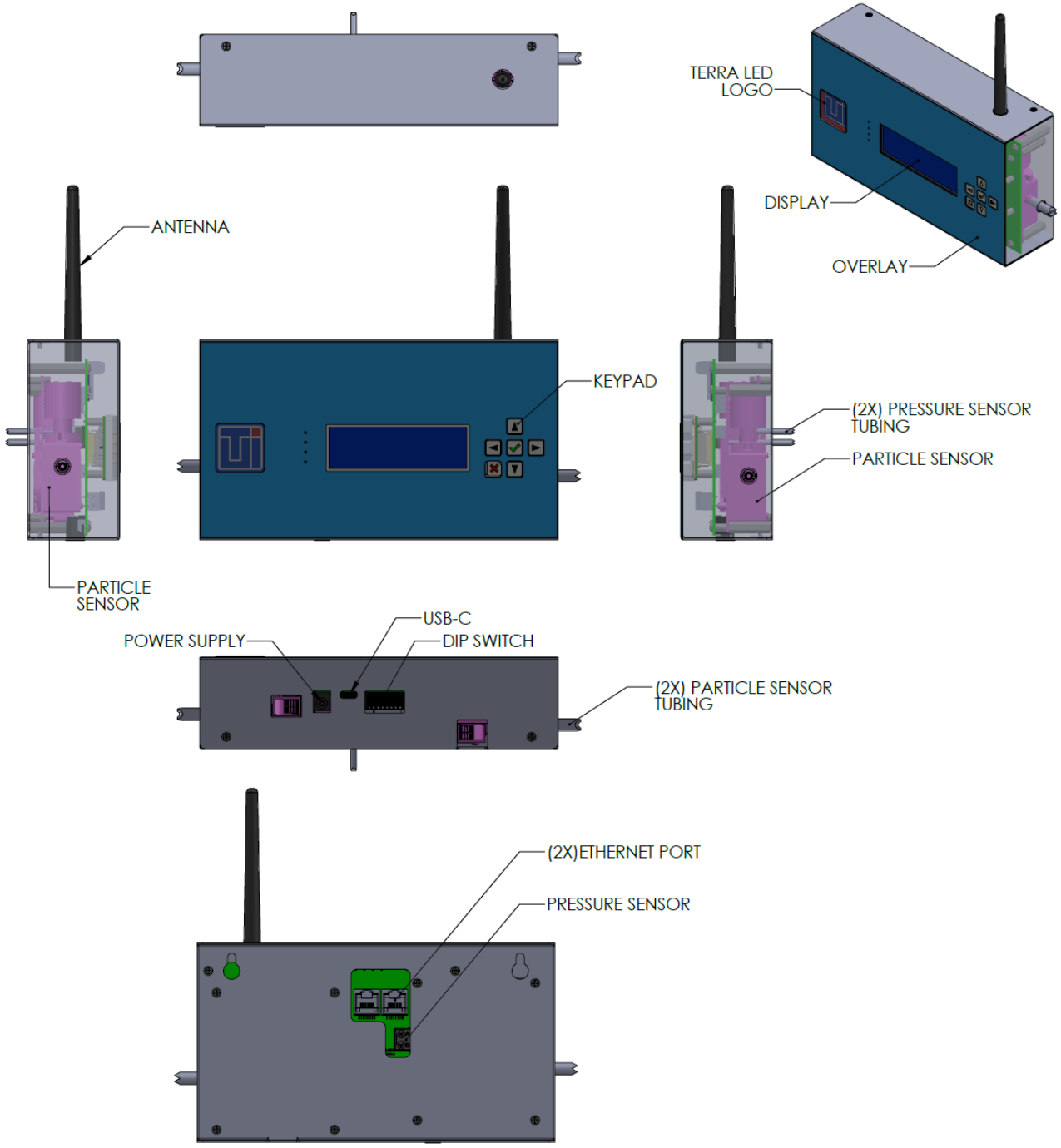

Figure 1: CleanWatch+® DualZone™ layout and hardware

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The CleanWatch+® DualZone™ contains two high-resolution particle count sensors and one differential pressure sensor. Tubing is supplied with the unit to extend the sensor probes.

The high-resolution particle count sensors track particle sizes individually at: 0.3, 0.5, 1, 2.5, 5, and 10 microns. The measurement error of the particle count sensors is +/-30%.

The differential pressure sensor operated at an accuracy of ±0.5 to ±10 (in. H2O).

The particle sensor tubing shall follow the requirements below when installed:
Maximum length: 7.75in
Minimum bend radius: 2.25in

The differential pressure sensor tubing shall follow the requirements below when installed:
Maximum length: 12.00in
Minimum bend radius: 1.00in

The unit may be powered using 12 V DC (barrel jack or rear terminal) or 5 VDC via USB-C.

A 12VDC power supply is supplied with the unit.

A display is located at the center of the unit.

A keypad is used to interact with the main display.

A DIP switch is provided to set the MODBUS address ID to communicate with the Terra Universal Tier System.

Two ethernet ports are provided for MODBUS communication with the Terra Universal Tier System.

A set point terminal block is provided to trigger an alarm on the Terra Universal Tier System ecosystem when the particle sensor and/or differential pressure sensor reach a minimum or maximum user-defined value.

A light and FFU terminal block set is provided to turn on lights and FFUs on the Terra Universal Tier System ecosystem.

An antenna is supplied for Wi-Fi connection.

The Terra LED Logo powers on when the unit is on.

Two key hole cutouts allow the unit to be hung on a wall using standard screws.

CAUTION

Ensure the particle sensor and differential pressure sensor tubing follow the recommended lengths and minimum bend radius.
Ensure the particle sensor and differential pressure sensor tubing are not pinched or blocked during installation.
DO NOT block or obstruct any of the particle sensors exhaust vents.

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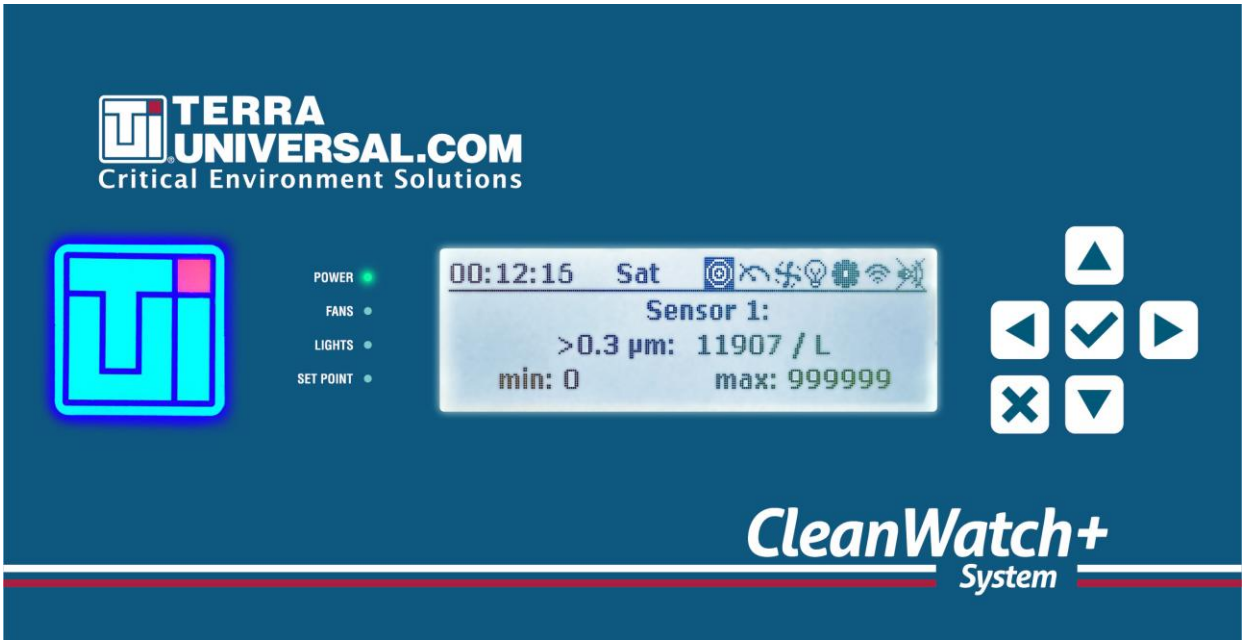
4.0 Controls and Display

4.1 Control Buttons

The main display allows the end user to navigate and set the different features of the CleanWatch+® DualZone™ Environmental Monitoring System using they keypad control.



Up Button

Down Button

Right Button

Left Button

Accept/Enter Button

Cancel/Back Button

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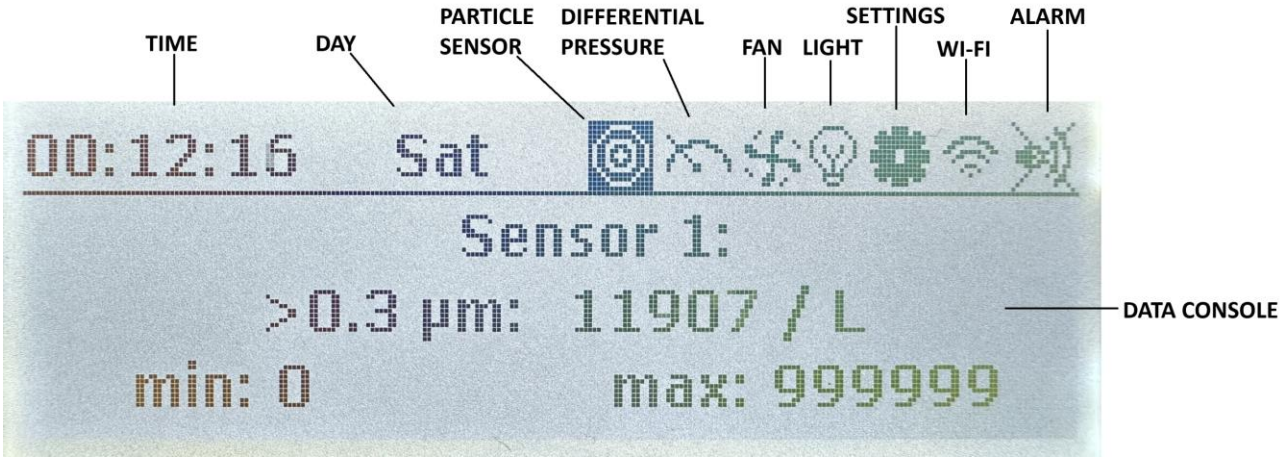
4.2 Indicator Lights

The CleanWatch+® DualZone™ provides indicator lights for the power, fans, lights, and set point to determine whether the peripheral is on or off.

ON – peripheral is active
Off – peripheral is inactive

4.3 Display

The display provides an interface for monitoring multiple variables within the CleanWatch+® DualZone™ environment.



The CleanWatch+® DualZone™ displays the time and date on the top left-hand corner of the screen.

It has two indicators on the right-hand corner of the screen to display if the Wi-Fi and Alarm are on or off.
A cross over the indicator icon indicates the Wi-Fi or Alarm are inactive.

There are five navigation tabs where data is displayed and where variables may be changed. The navigation tabs are:

- Particle Sensor
- Differential Pressure
- Fan
- Lights
- Settings

The Control Buttons are used to navigate through the various tabs.

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1. Particle Sensor Tab

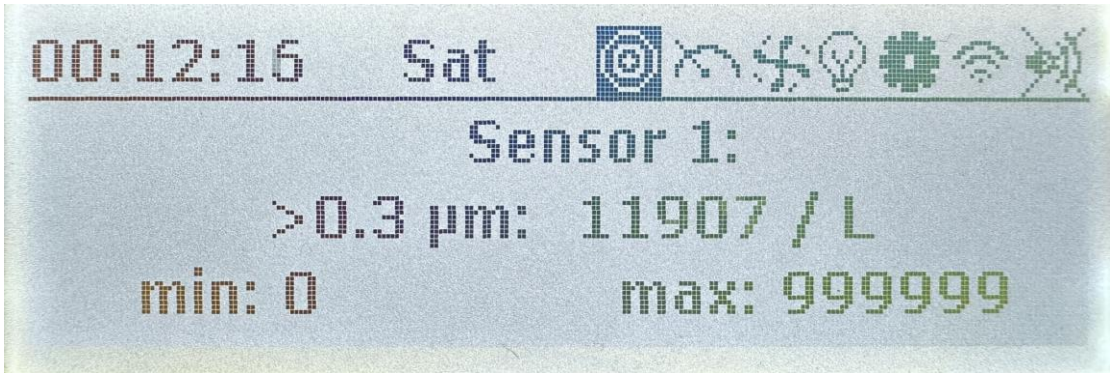
The Particle Sensor tab displays the data collected by the two-high resolution particle count sensors installed on the CleanWatch+® DualZone™.

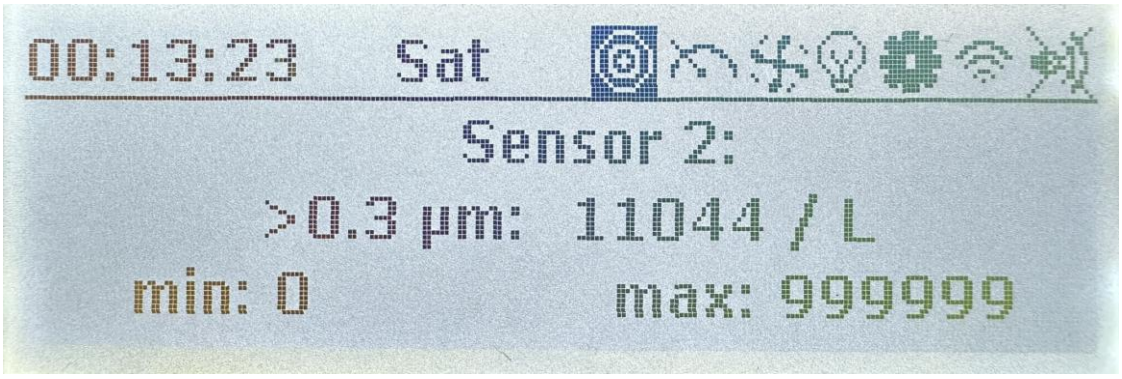
The particle count sensors can track particle sizes individually at 0.3, 0.5, 1, 2.5, 5, and 10 microns. The particle count is displayed as particle count per liter (# particles/L).

The Particle Sensor tab displays:

- Particle sensor (i.e. Sensor 1, Sensor 2)
- Particle count for specific particle size (i.e. >0.3µm: 11907/L)
- Minimum particle count (alarm trigger)
- Maximum particle count (alarm trigger)

The count for each individual particle size may be viewed by pressing the left ◀ or right ▶ control button.
To navigate between particle sensor, use the up ▲ and down ▼ control buttons.





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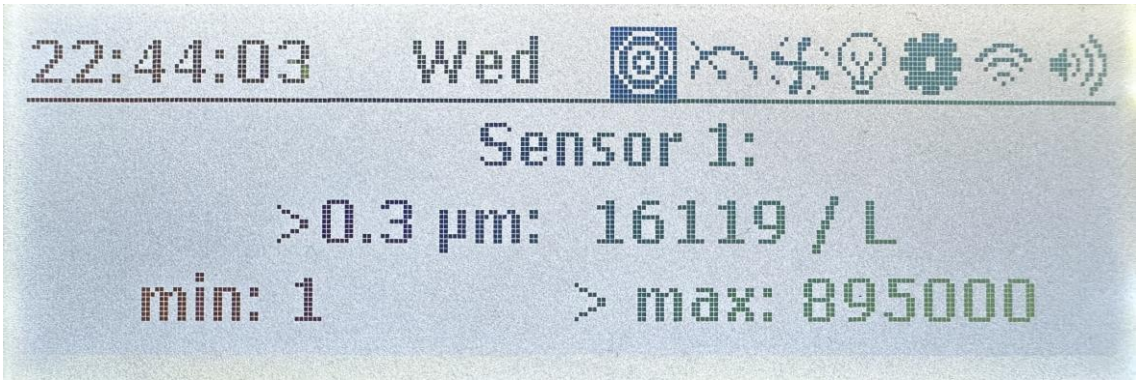
The Particle Sensor tab also displays the minimum and maximum particle count that will trigger the sound alarm. The minimum and maximum particle count alarm triggers may be individually activated or inactivated in the Settings tab.



To change the minimum and maximum particle count alarm trigger value press the accept/enter ✔ control button.

Use the left ◀ or right ▶ control buttons to toggle between the min and max setting.

Use the up ▲ and down ▼ control buttons to change the numerical values for min and max settings one digit at a time. Press and hold the up ▲ and down ▼ control buttons to change the numerical values in 100 increments.

Use the cancel/back ✖ control button to cancel or return to the previous menu setting. Note that pressing the cancel button when modifying the numerical value will reset the value to its default value.

After editing the minimum and maximum particle count alarm trigger, press the accept/enter ✔ control button to save the settings.

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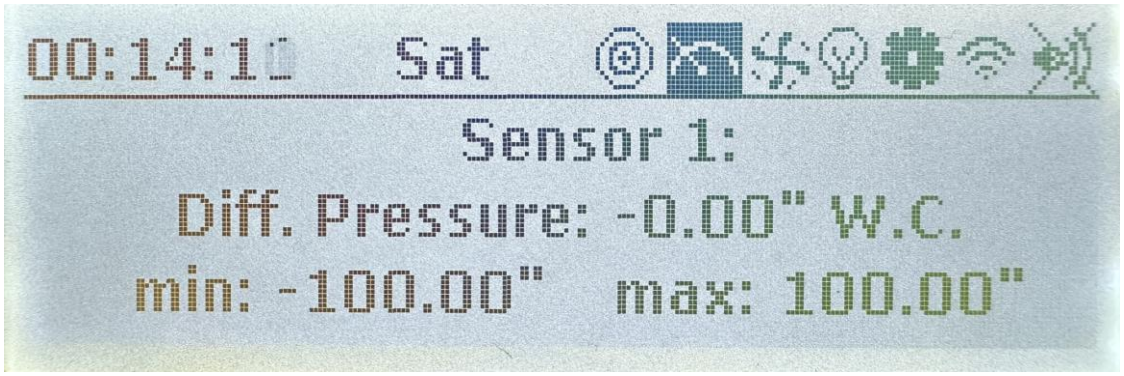
2. Differential Pressure Tab

The Differential Pressure tab displays the data collected by the differential pressure sensor installed on the CleanWatch+® DualZone™.

The differential pressure is displayed as inches of water column (" W.C.).

The Differential Pressure tab also displays the minimum and maximum differential pressure readings that will trigger the sound alarm. The minimum and maximum differential pressure alarm triggers may be individually activated or inactivated in the Settings tab.



To change the minimum and maximum differential pressure alarm trigger value press the accept/enter ✔ control button.

Use the left ◀ or right ▶ control buttons to toggle between the min and max setting.

Use the up ▲ and down ▼ control buttons to change the numerical values for the differential pressure setting one digit at a time. Press and hold the up ▲ and down ▼ control buttons to change the numerical value in 100 increments.

Use the cancel/back ✖ control button to cancel or return to the previous menu setting. Note that pressing the cancel button when modifying the numerical value will reset the value to its default value.

After editing the differential pressure alarm trigger, press the accept/enter ✔ control button to save the settings.

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3. Fan Tab – Only applicable when integrated with a Terra Universal Tier System

The Fan tab provides an interface for setting the fan speed and setting a schedule to activate the fans:

- Toggle Fan Speed
- Schedule Fans

To navigate between the two settings, use the up ▲ and down ▼ control buttons.

To change the fan speed, press the accept/enter ✔ control button. Progressively pressing the accept/enter control button shall toggle through the four (4) fan speed settings:

- Off
- Low
- High
- Auto

To enter the Schedule Fans settings, move the cursor to Schedule Fans using the up ▲ and down ▼ control buttons and press the accept/enter ✔ control button.

Each individual day of the week may be selected and programmed for the time range when the fans shall remain active.

To select a day to program, move the cursor to the desired day using the up ▲ and down ▼ control buttons and press the accept/enter ✔ control button.

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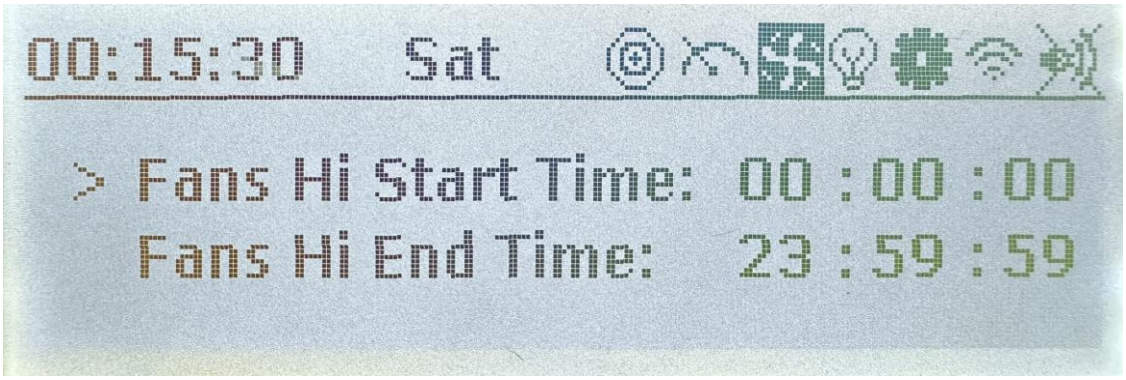
The Schedule Fans setting allows for only two (2) time schedule settings to be programmed per day:

- Fans Hi Start Time (hr:mm:ss)
- Fan Hi End Time (hr:mm:ss)



To select a time to program, move the cursor to the desired time settings using the up ▲ and down ▼ control buttons and press the accept/enter ✔ control button.

To toggle between hour, minutes, and seconds, press the left ◀ or right ▶ control button.

To change the hour, minutes, or seconds digits, press the up ▲ and down ▼ control buttons.

Press the accept/enter ✔ control button to save the scheduled time.

Use the cancel/back ✖ control button to cancel or return to the previous menu setting. Note that pressing the cancel button when modifying the time will reset the value to its default value.

Ensure to select and save the fan schedule on the Schedule Fans menu displayed below.

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4. Lights Tab – Only applicable when integrated with a Terra Universal Tier System

The Lights tab provides an interface for setting the light mode and setting a schedule to activate the lights:

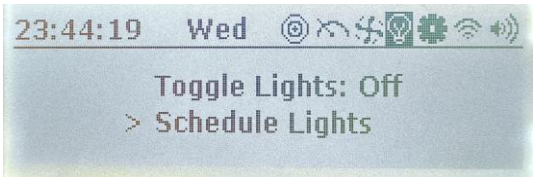
- Toggle Lights
- Schedule Lights

To navigate between the two settings, use the up ▲ and down ▼ control buttons.

To change the light mode, press the accept/enter ✔ control button. Progressively pressing the accept/enter control button shall toggle through the three (3) light modes:

- Off
- On
- Auto

To enter the Schedule Lights settings, move the cursor to Schedule Lights using the up ▲ and down ▼ control buttons and press the accept/enter ✔ control button.



Each individual day of the week may be selected and programmed for the time range when the lights shall remain active.

To select a day to program, move the cursor to the desired day using the up ▲ and down ▼ control buttons and press the accept/enter ✔ control button.

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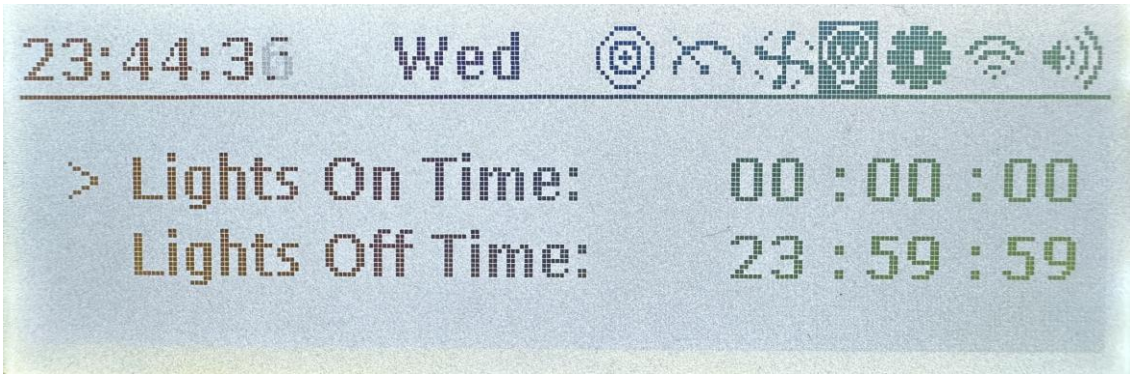
The Schedule Lights setting allows for only two (2) time schedule settings to be programmed per day:

- Lights On Time (hr:mm:ss)
- Lights Off Time (hr:mm:ss)



To select a time to program, move the cursor to the desired time settings using the up ▲ and down ▼ control buttons and press the accept/enter ✔ control button.

To toggle between hour, minutes, and seconds, press the left ◀ or right ▶ control button.

To change the hour, minutes, or seconds digits, press the up ▲ and down ▼ control buttons.

Press the accept/enter ✔ control button to save the scheduled time.

Use the cancel/back ✖ control button to cancel or return to the previous menu setting. Note that pressing the cancel button when modifying the time will reset the value to its default value.

Ensure to select and save the lights schedule on the Schedule Lights menu displayed below.

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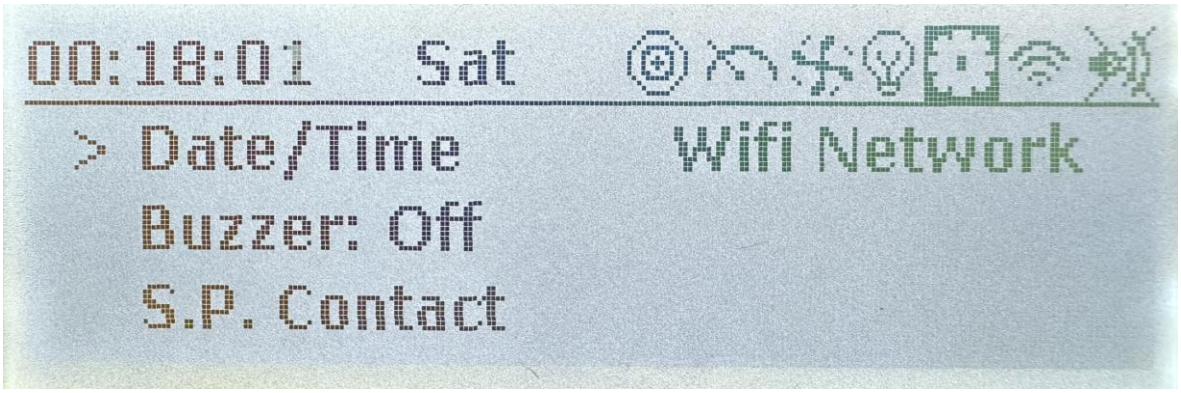
5. Settings Tab

The Settings tab provides an interface for setting and/or viewing the following:

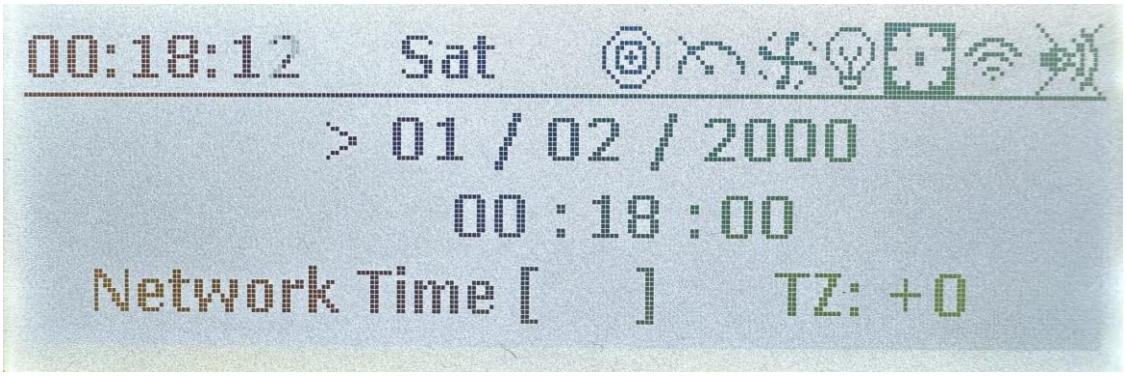
- Date/Time
- Buzzer
- S.P. Contact
- Wifi Network

Use the up ▲ and down ▼ control buttons to place the cursor on the desired setting to view and/or modify.

Press the accept/enter ✔ control button to enter the desired setting.



a. Date/Time



To select a setting to modify, move the cursor to the desired settings using the up ▲ and down ▼ control buttons and press the accept/enter ✔ control button.

To toggle between digits, press the left ◀ or right ▶ control button.

To change the numerical digits, press the up ▲ and down ▼ control buttons.

Press the accept/enter ✔ control button to save the date/time.

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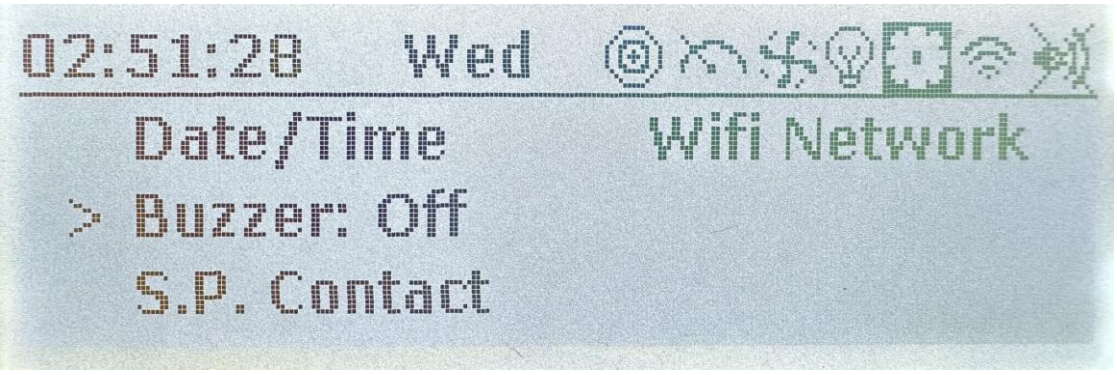
Use the cancel/back ✖ control button to cancel or return to the previous menu setting. Note that pressing the cancel button when modifying the time will reset the value to its default value.

The Network Time may be activated to set the date and time to match the network. To change its state, press the accept/enter ✔ control button. An asterisk [*] indicates the mode is active. Note that when the Network Time is activated, the time and date may not be modified. Only the time zone TZ may be modified.

b. Buzzer



The CleanWatch+® DualZone™ has an internal buzzer that will activate whenever the minimum or maximum alarm triggers for the particle sensor or differential pressure sensor are reached.

To change the buzzer mode, press the accept/enter ✔ control button. Progressively pressing the accept/enter control button shall toggle through the two (2) buzzer modes:

- On
- Off

The buzzer indicator icon shall change accordingly on the screen.

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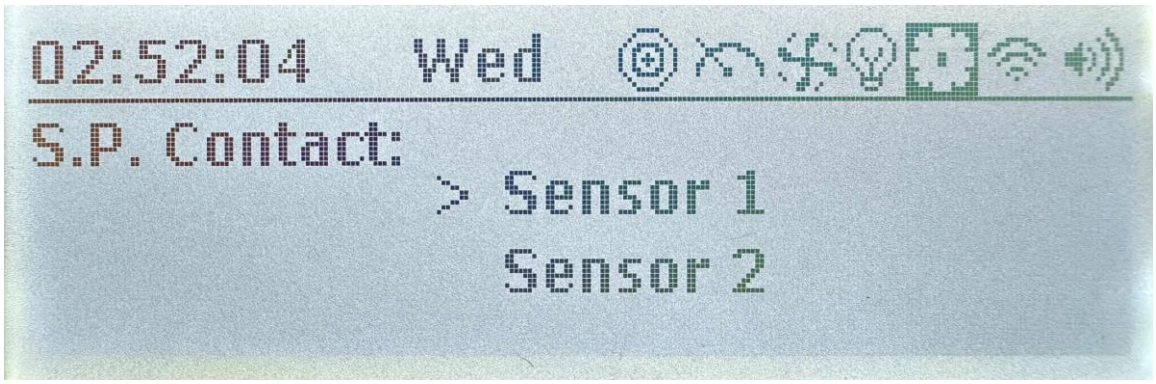
c. S.P. Contact

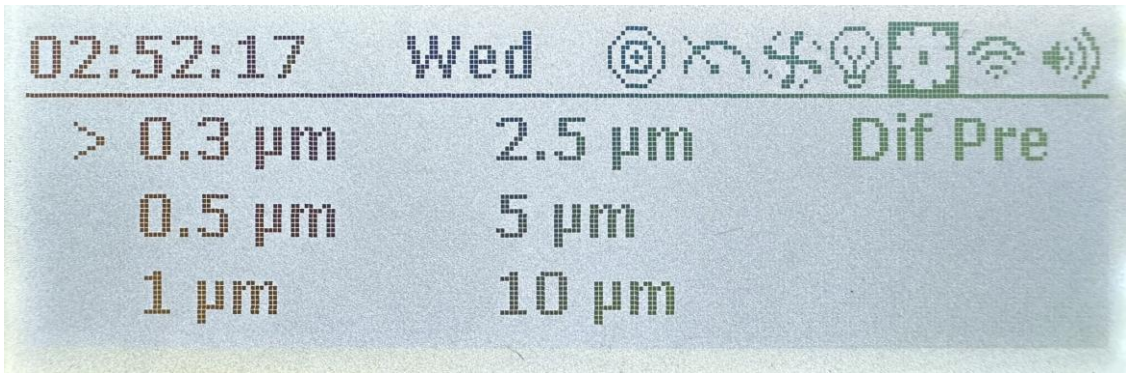


The CleanWatch+® DualZone™ has a low voltage contact that can be activated when a particle sensor or differential pressure sensor hits one of its min or max set points.

Sensor 1 modifies the set point contact setting for first particle sensor and the differential pressure sensor.

Sensor 2 modifies the set point contact setting for the second particle sensor.

To select a setting to modify, move the cursor to the desired settings using the up ▲ and down ▼ control buttons and press the accept/enter ✔ control button.



The particle sensor triggers may be modified for: **0.3 µm, 0.5 µm, 1 µm, 2.5 µm, 5 µm, 10 µm**

Use the up ▲ and down ▼ control buttons to place the cursor on the desired setting to view and/or modify.

Press the accept/enter ✔ control button to enter the desired setting.

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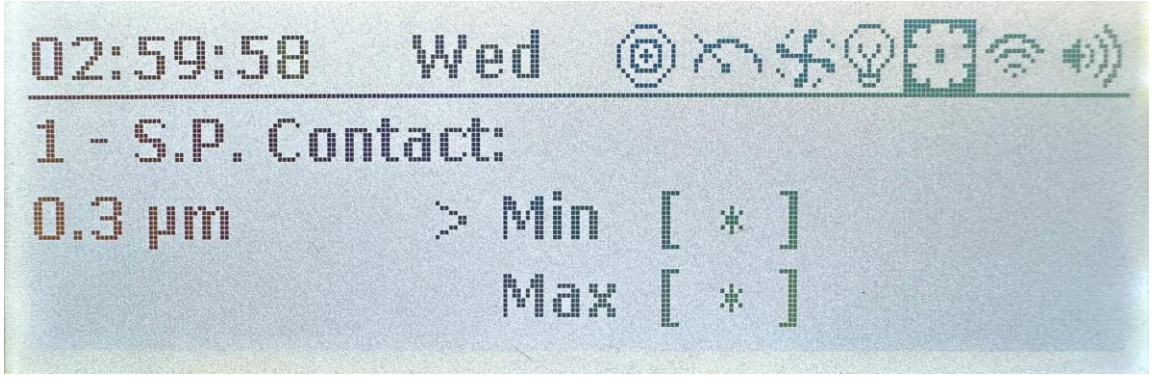
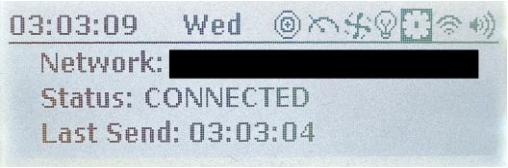
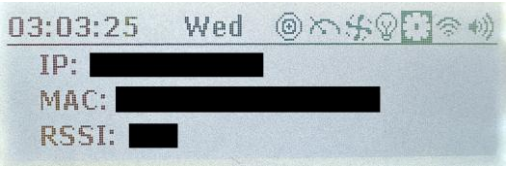


To activate or inactivate a min or max alarm trigger, move the cursor to the desired settings using the up ▲ and down ▼ control buttons and press the accept/enter ✔ control button. An active alarm trigger is designated with an asterisk [*].

Use the cancel/back ✖ control button to cancel or return to the previous menu setting. Note that pressing the cancel button when modifying the value will reset the value to its default value.

d. Wifi Network





The Wifi Network provides two windows for general information about the network, status, and device.

To navigate between the two windows, press the left ◀ or right ▶ control buttons.
The following information is displayed:

- Network: Wi-Fi network the device is connected to
- Status: Wi-Fi connection status (connected, disconnected)
- Last Send: Last recorded time device sent message (hh:mm:ss)
- IP: Device IP address
- MAC: Device MAC address
- RSSI: Received Signal Strength Indicator value (dBm)

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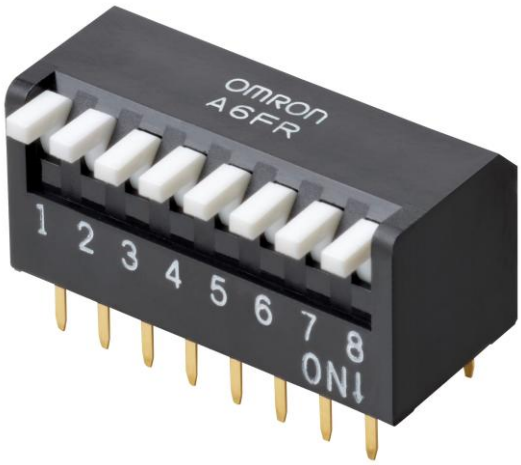
4.4 DIP Switch



A DIP switch is provided to set the MODBUS address ID to communicate with the Terra Universal's Tier System.

The MODBUS address ID is set using binary number.

The ON position is indicated in the DIP switch.

Convert the MODBUS address ID to binary and set the DIP switch toggle pins to the corresponding binary number.

The eight digit in the DIP switch corresponds to the first digit in the MODBUS address ID.

The ON position represents 1 and the OFF position represents 0.

CAUTION

DIP switch setting is not required for stand-alone CleanWatch+® DualZone™ operation.
DIP switch setting is ONLY required for integration with Terra Universal's Tier System.

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5.0 Renesas WiFiProvisioning App Installation

Renesas WiFiProvisioning app from Renesas Electronics is a mobile application that works with devices which support the Renesas Wi-Fi provisioning functionality. It shall be used to connect the CleanWatch+® DualZone™ to the network Wi-Fi.

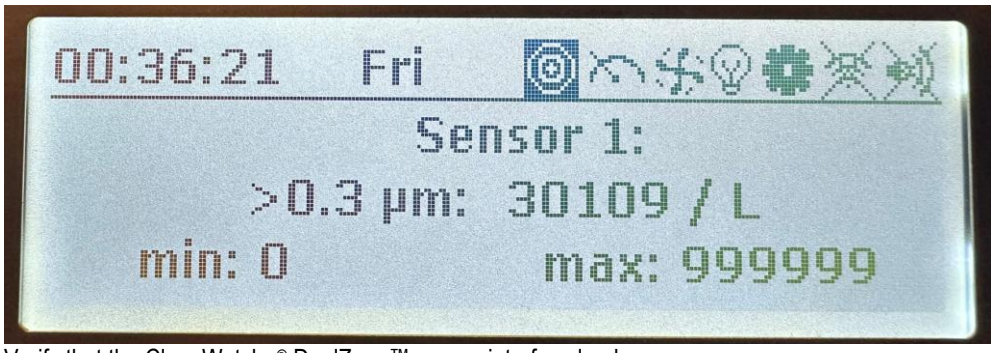
1. Search for the Renesas WiFiProvisioning app in the Google Pay Store or Apple App Store.
2. Install the app into the mobile device.
3. Open the app to verify installation was successful.

6.0 Wi-Fi Network Connection

This process shall connect the CleanWatch+® DualZone™ to the network Wi-Fi.

1. Connect the power source to the CleanWatch+® DualZone™.

2. Allow the CleanWatch+® DualZone™ to boot up.



3. Verify that the CleanWatch+® DualZone™ screen interface loads up.

4. Verify the Wi-Fi is not connected.

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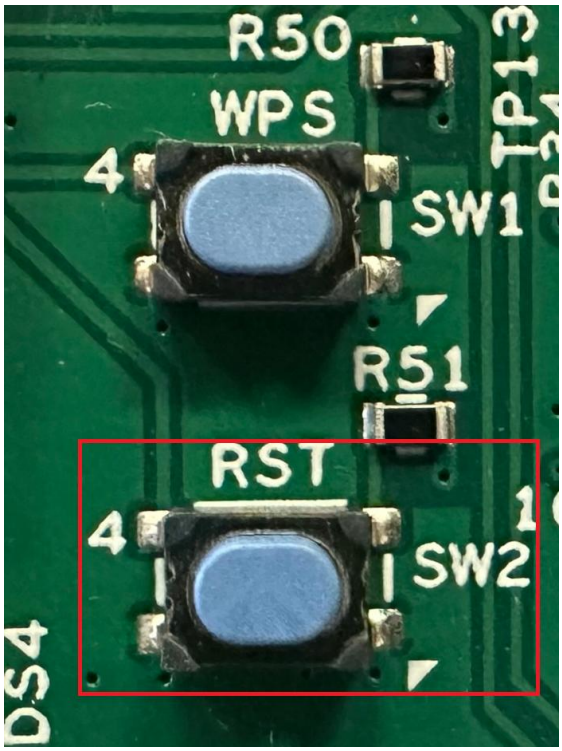
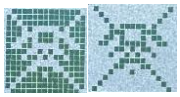


5. On the CleanWatch+® DualZone™, click and hold the SW2 button for a minimum of 5 seconds to place the unit in SOFT-AP mode.



6. The Wi-Fi signal will flash on and off on the Display when it is ready to connect to the network Wi-Fi.

7. Open the Renesas WiFiProvisioning app using a mobile device.

8. Select “Start provisioning over Wi-Fi.”

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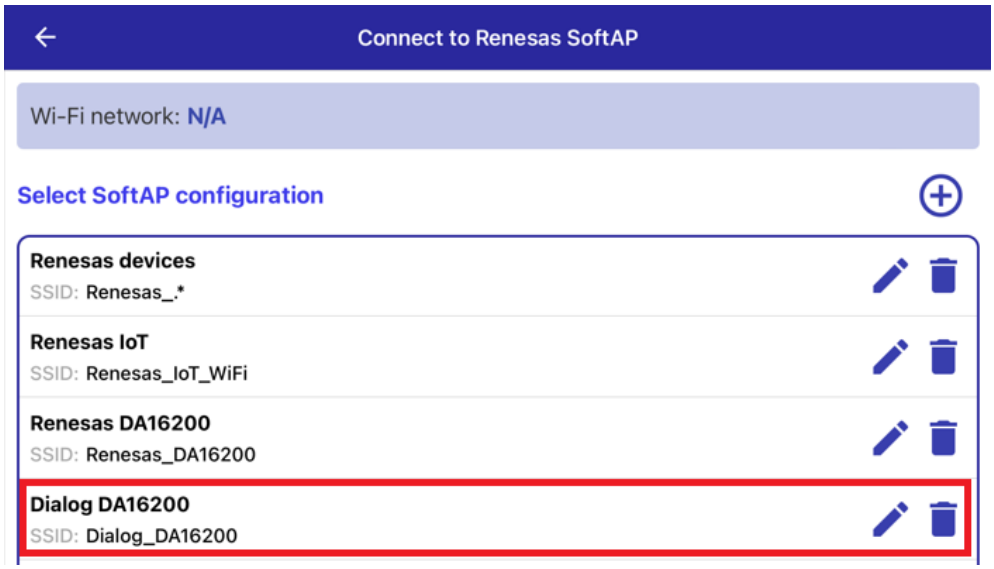
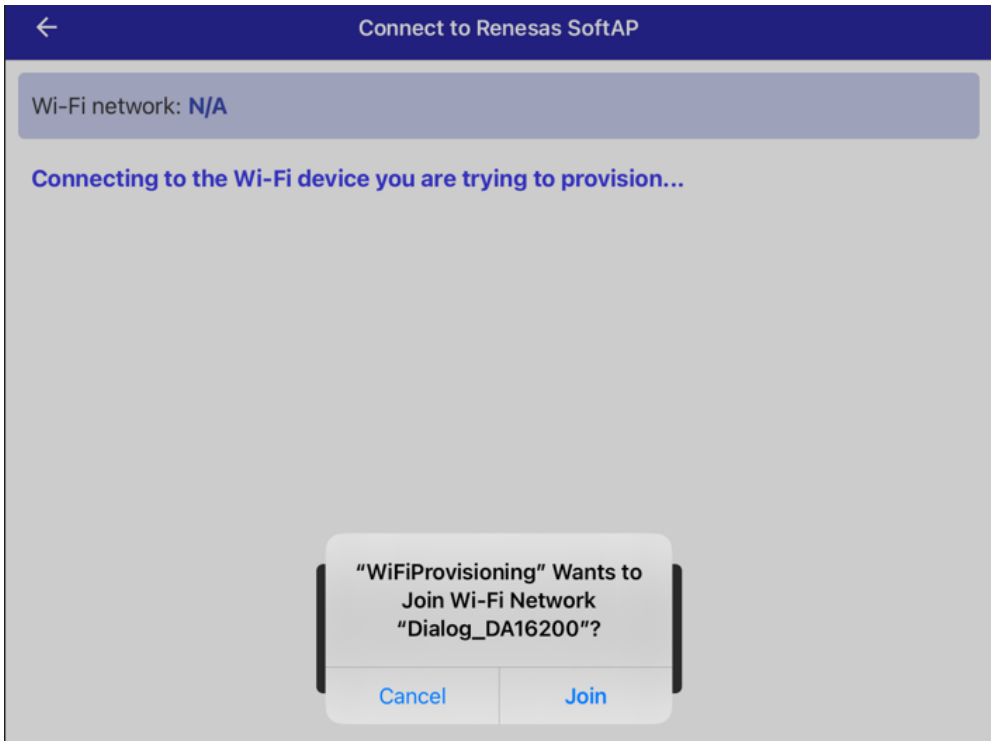


9. Select "Dialog DA16200."



10. Select "Join."

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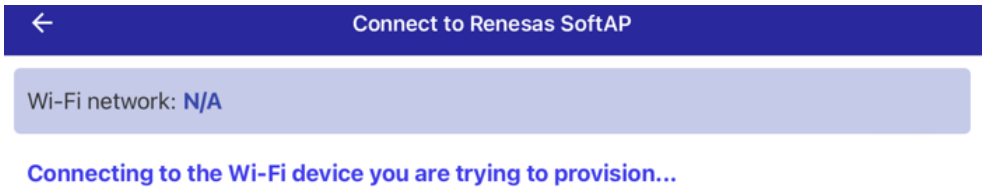
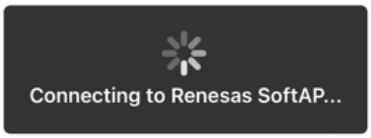
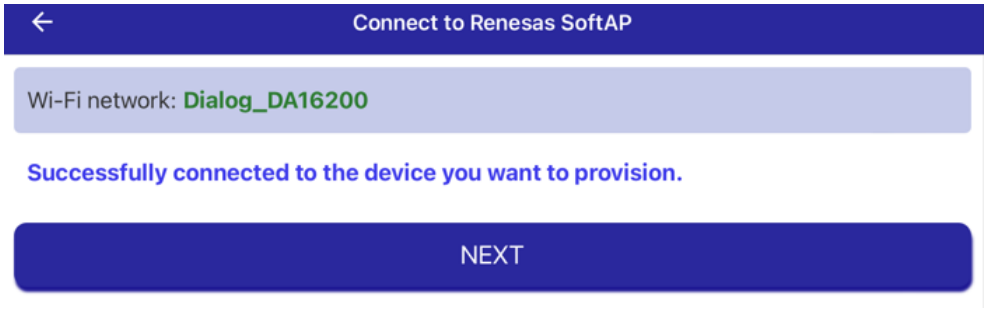




11. Wait for Renesas SoftAP to connect.



12. Click Next.

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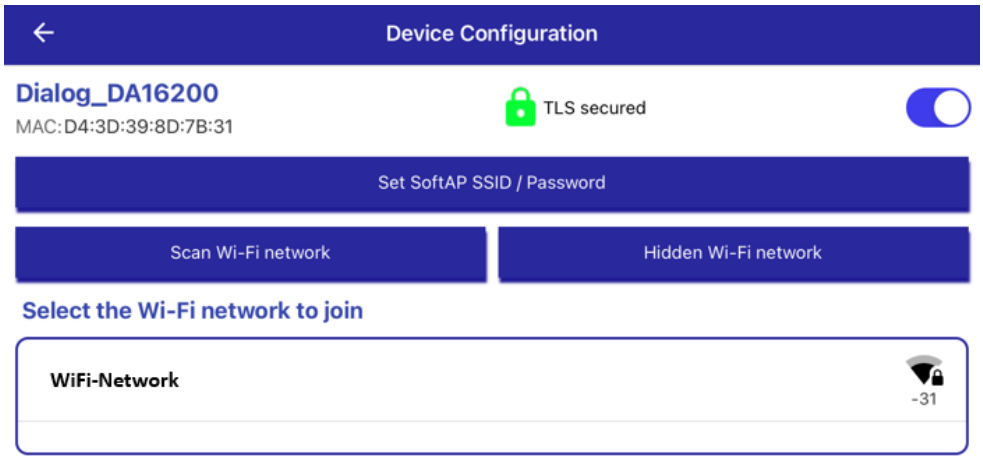
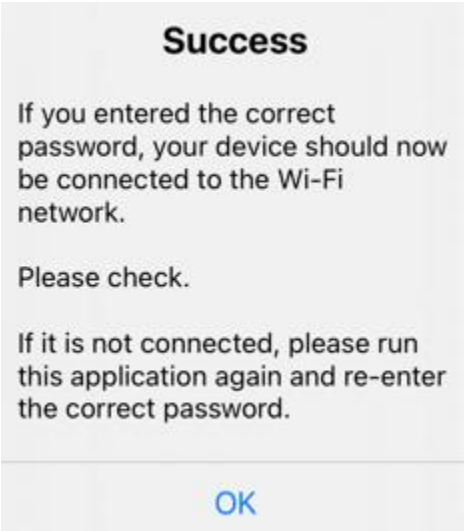


13. Click "Scan Wi-Fi network" and select the Wi-Fi to join and enter the network password.



14. Click OK.

15. The Wi-Fi icon will display the connected status on the CleanWatch+® DualZone™ display.

16. Disconnect the power source from the CleanWatch+® DualZone™ to power off.

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7.0 Warranty

Thank you for ordering from Terra Universal!