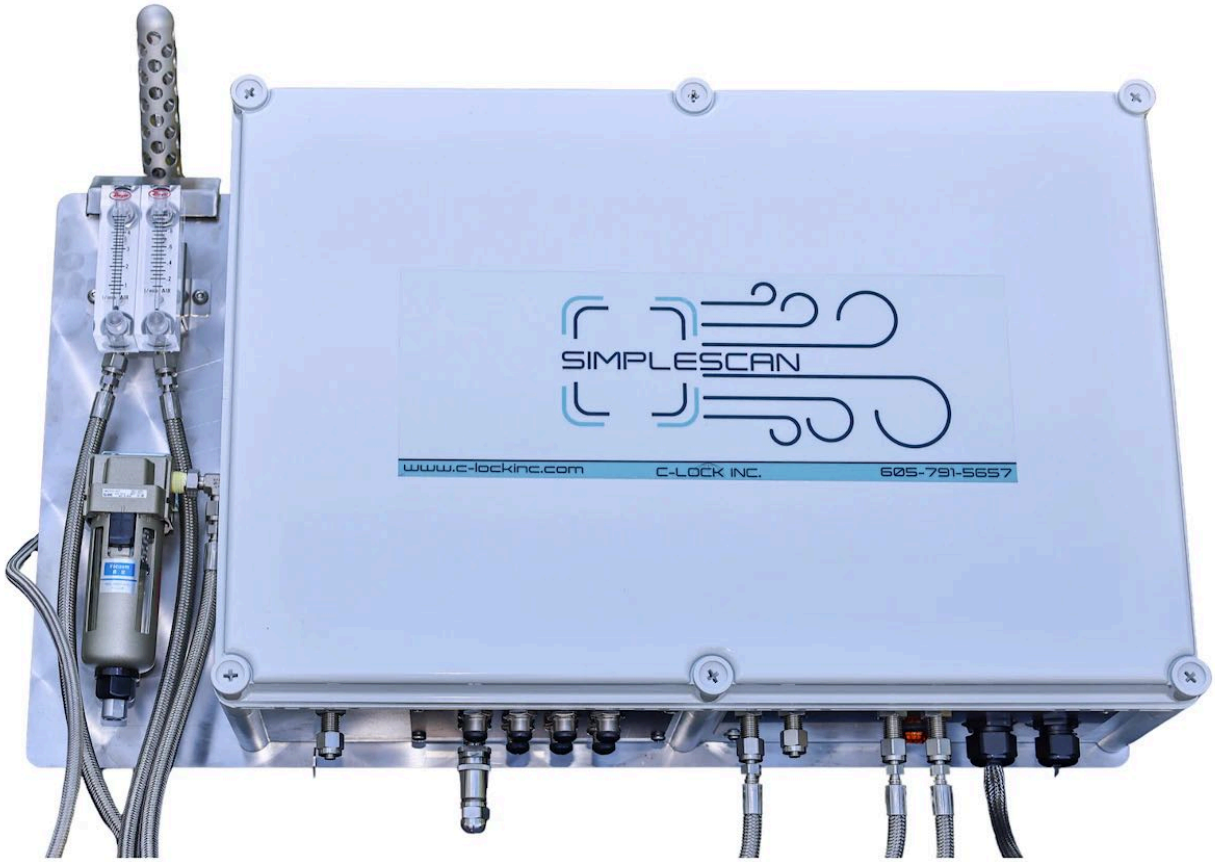
SimpleScan Instruction Manual



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1.1. SimpleScan Component Layout

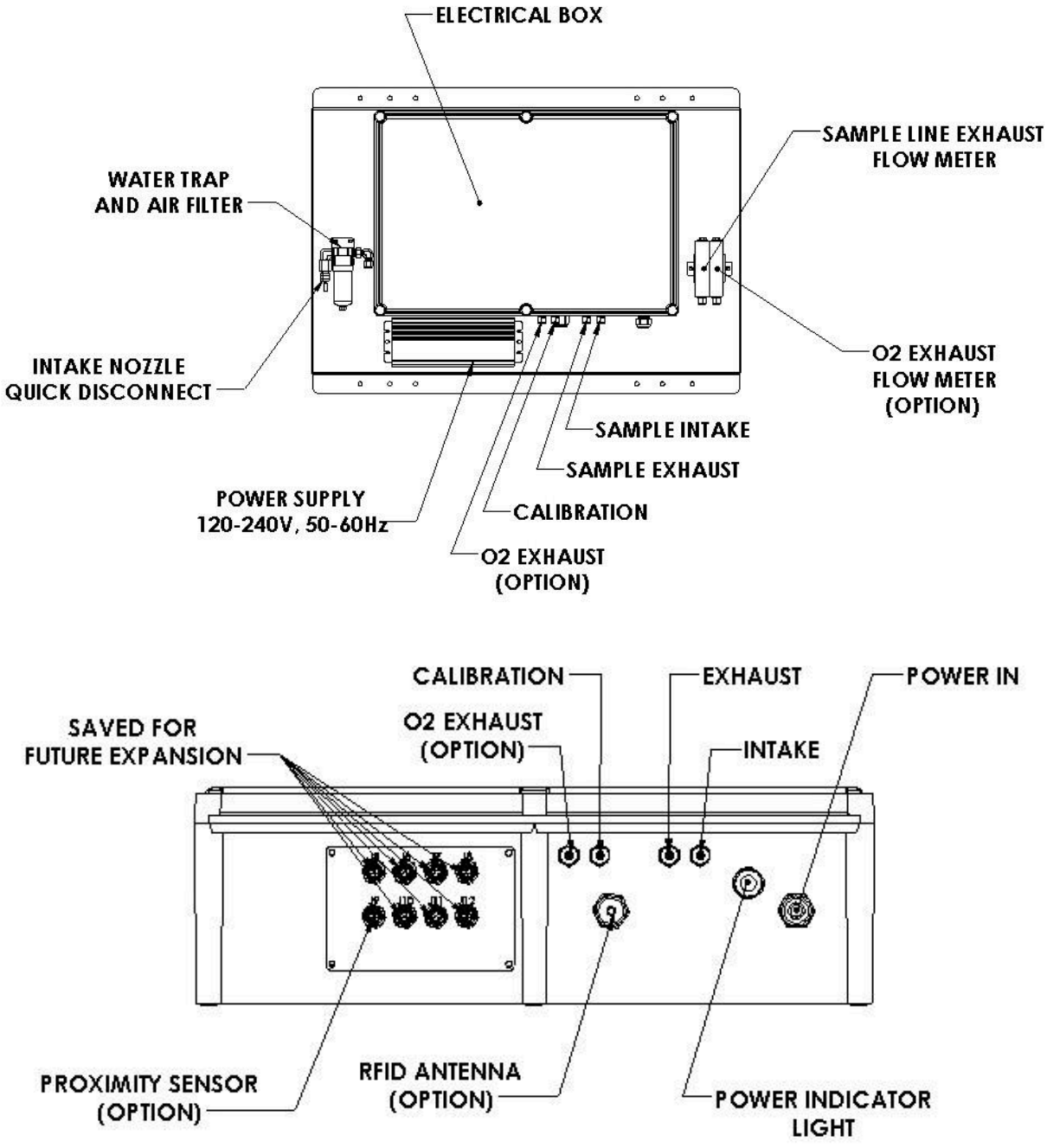


Figure 1 shows the layout of SimpleScan, including the essential components.

1.1. Assembling SimpleScan

- Unpacking
    - SimpleScan will be mounted to a pallet for shipping, remove the system from the pallet and unbox the nozzle and any accessories.
- Sniffer Nozzle Assembly
    - Includes 10’ extension cable
    - Connects to quick disconnect water trap as shown in Figure 1
- Antenna Assembly
    - Includes 10’ extension cable
    - Connects to RFID antenna whip as shown in Figure 1
- Proximity Sensor Assembly
    - Includes 10’ extension cable
    - Connects to terminal J9 as shown in Figure 1

For answers to specific questions, please contact support@c-lockinc.com.

2. Setting Up SimpleScan

2.1. Selecting a Location for SimpleScan

Picking the location and layout for SimpleScan is crucial to collecting valid measurements. Some considerations include:

Electronics Box:

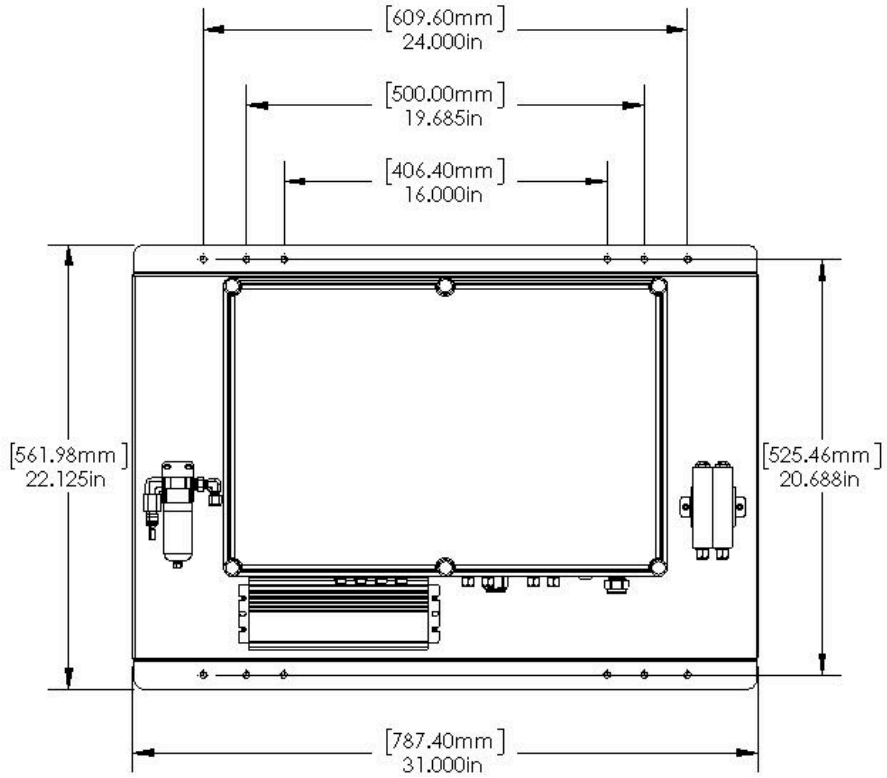
- Select a mounting location within 10’(3m) of the sample collection point.
- Wall or pole should be rated to hold 4 times the system weight of 60lb (240lb or 110kg)
- Mount system at eye level for ease of maintenance.
- Protect the SimpleScan box and cables, as there is important electrical equipment that must *not* be accessible by the animals.

Sample collection:

- Ensuring enough airflow in the environment to prevent background gas concentrations from building up. A closed barn is not an ideal location without ventilation.
- Sample should be collected from near a consistent food source.
- Mount Intake Nozzle directly above the food dish, centered where the animals eat.
- Efforts should be made to limit accessibility to one animal at a time.
    - Allowing only one animal to visit SimpleScan at a time. This requires the use of alleyways to prevent multiple animals from fitting into the feed area at once.
    - Preventing animals from gathering around the system, which will also increase the background concentrations.

- RFID antenna should be placed in an area where it will consistently read animal tags while visiting the system, typically the front or side of the feed dish. The antenna should be no more than 24” (60cm) away from the animal’s tag, and unobstructed.
- Proximity sensor should be placed above the nozzle, the sensor points downward 15 degrees to see in front of the nozzle.

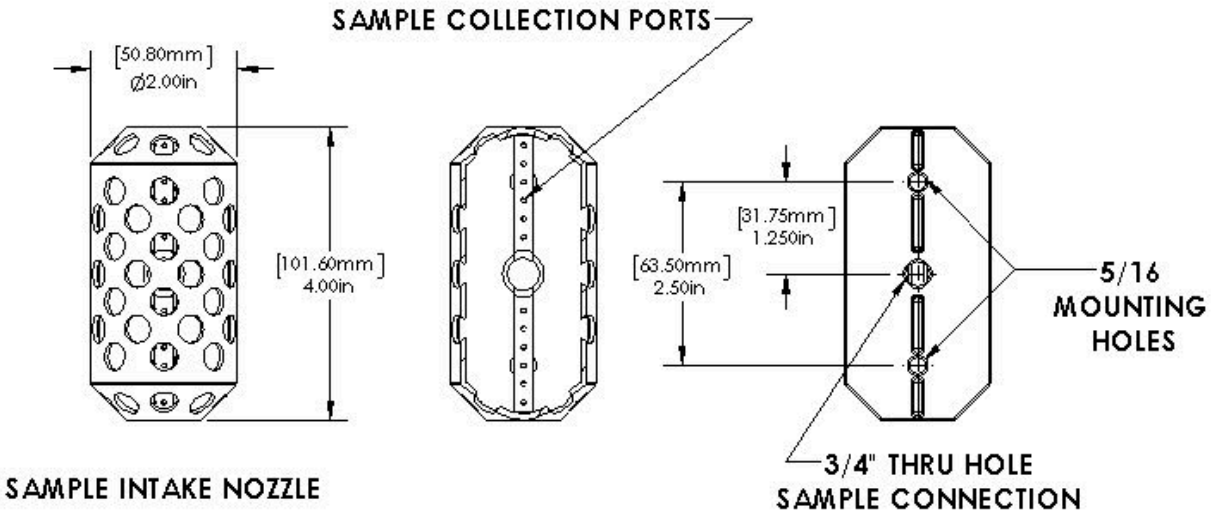
2.2. Anchoring SimpleScan



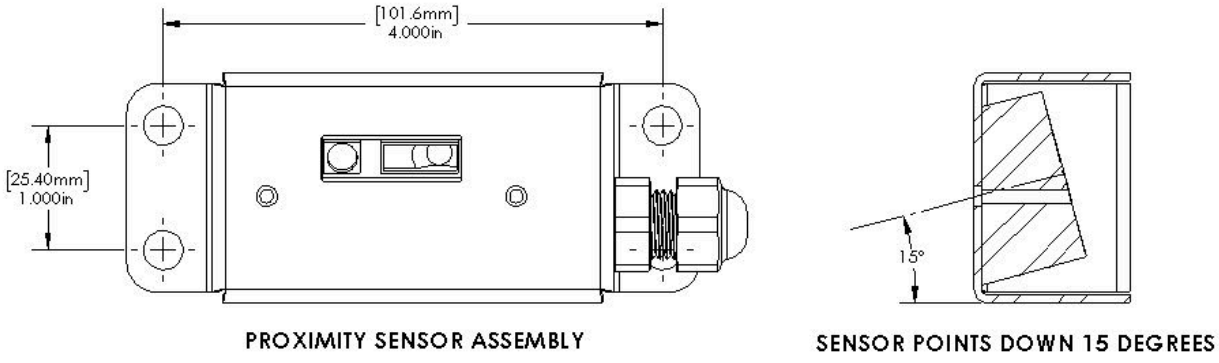
MOUNTING DIMENSIONS

Once a location is selected, SimpleScan must be anchored into place. Some common techniques include:

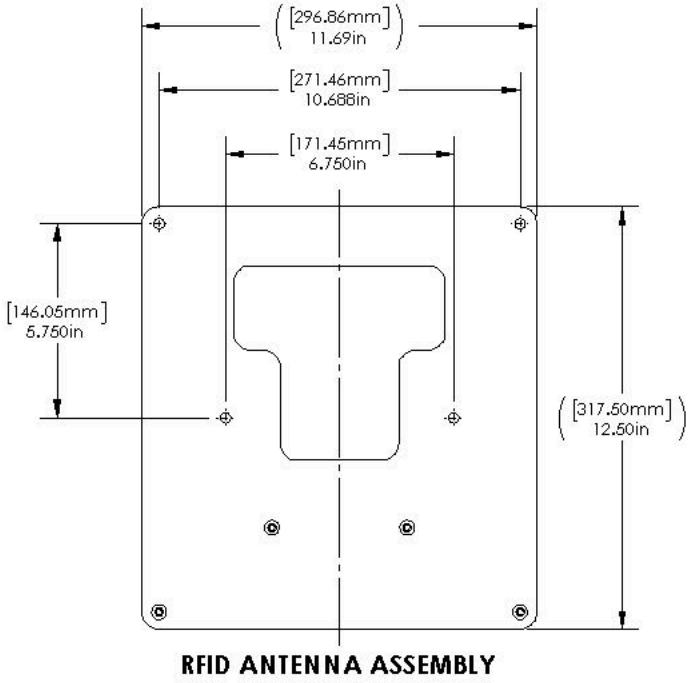
1) Mounting on wall directly to studs.
2) Mount on a panel attached to a post.
3) Mount on an existing piece of equipment.



- Mount Nozzle directly above the food dish. Drill mounting holes as shown above.
- Mounting hardware: ¼”-20
- Mounting hole depth: 0.375”
- Disconnect nozzle at compression fitting for installation



- Proximity sensor should be placed above the nozzle, the sensor points downward 15 degrees to see in front of the nozzle.
- Mounting hardware: ¼”-20



- RFID antenna should be placed in an area where it will consistently read animal tags while visiting the system, typically the front or side of the feed dish. The antenna should be no more than 24" (60cm) away from the animal's tag, and unobstructed.
- Mounting hardware: ¼"-20

2.3. Protecting SimpleScan

Although the SimpleScan sample nozzle is built to withstand animal use, this only applies to the sensors on the system. Animal access to the main box and cables of the system must be prevented. In most free-stall scenarios, this requires a sturdy barrier around the system, preventing the animals from reaching and accessing the equipment (including cables and tubing). When designing the barrier, please remember that a person must access the panel for maintenance and cleaning.

2.4. Powering On SimpleScan

Once the system is in place and secure, powering on the system is simple:

Simply plug in the power cord to a standard grounded AC outlet (110V ~ 220V, 50 ~ 60Hz). Ensure that the outlet as well as any extension cables used are properly grounded, and ensure your power cables are routed in a way that prevents animals from accessing them.

The amber power indicator light will light up once the unit has been connected to power.

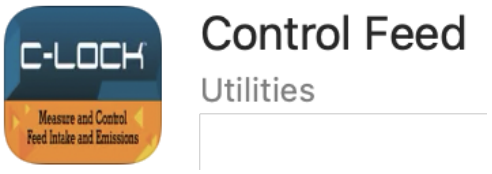
2.5. Powering Off SimpleScan

To power off the system, It is recommended to first put the system into sleep mode. This will allow it to save the logged data, and attempt to upload it. Once in sleep mode, continue turning off the system. To perform these steps, please follow the steps in Section 3.2 - part 6a and 6b ("place system into sleep mode" and "turn the system off"). Once the system is commanded to shut off, please wait 30 seconds before unplugging the power. This will allow enough time for SimpleScan to save its data and full power down.

3. Control Feed Mobile App

Although SimpleScan is an online measurement system, most common tasks can be performed from the feeder itself using the Control Feed mobile app.

Control Feed can be downloaded from the Google Play Store or Apple App Store. To install, search for Control Feed in your respective app store, or scan the QR code below.



Apple App Store

Google Play Store

https://apps.apple.com/us/app/control-feed/id1524038899

https://play.google.com/store/apps/details?id=com.controlfeed

Please note, the Control Feed app will only work within 20 meters of a SimpleScan system. It is not guaranteed that feeders farther than 20 meters will respond correctly.

3.1. Scanning for Systems

1. Begin by pressing “Start Scanning for Systems”.
2. A list of nearby devices will appear on the screen. See **Figure 8**.
3. Press the system you wish to control.
4. A side-box will appear while it attempts to connect to the system.

Figure 8) Scanning and Connecting to a System using Control Feed

3.2. Controlling SimpleScan

Once connected to a SimpleScan system, you will be able to perform the following tasks:

1) View real-time sensor values of the machine
2) Turn on and off the fan and sample pump
3) Dispense feed from the hopper
4) Trigger an auto-calibration
5)
6) Perform other actions such as:
    a) Put the system to sleep/wake it back up
    b) Power off the system
7) Plot real-time sensor values

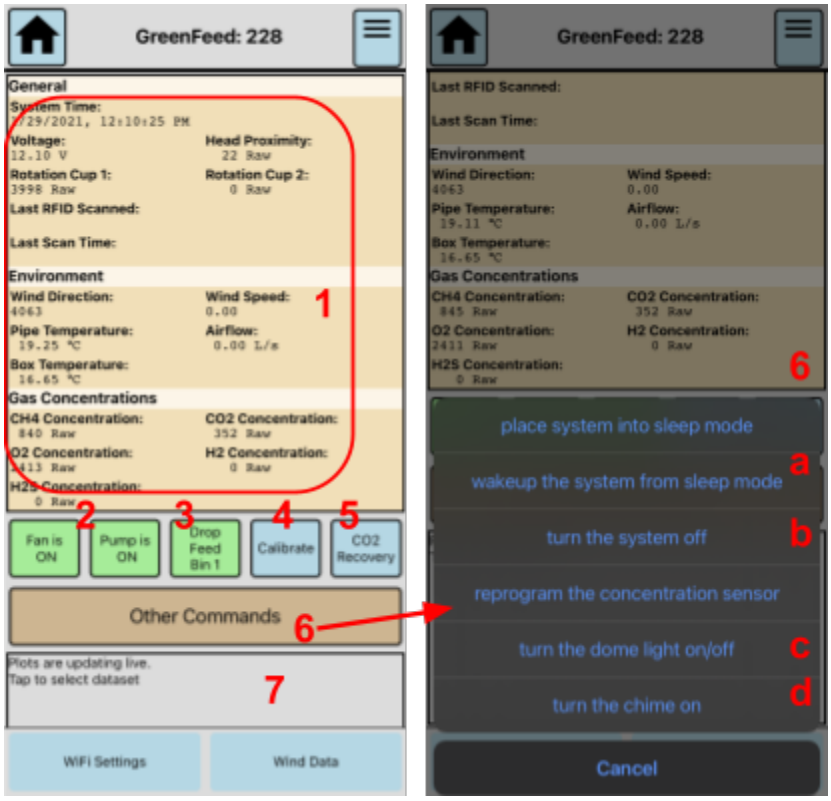


Figure 9) Viewing and Controlling a SimpleScan System from ControlFeed

3.3. Connecting SimpleScan to a Different WiFi Network

To change the WiFi network that SimpleScan connects to:

1. Tap “WiFi Settings”
2. Tap the button with the WiFi network you wish SimpleScan to use
3. In the box that appears, select WPA2
    - If the network is an open network (no password), select None
4. Enter the password for the network under “Password” (if applicable).
5. Tap Add. The system will immediately reboot and connect to the new network.
    - When the reboot occurs, Control Feed may state that it has unexpectedly disconnected. If this happens, wait ~2 minutes and reconnect.

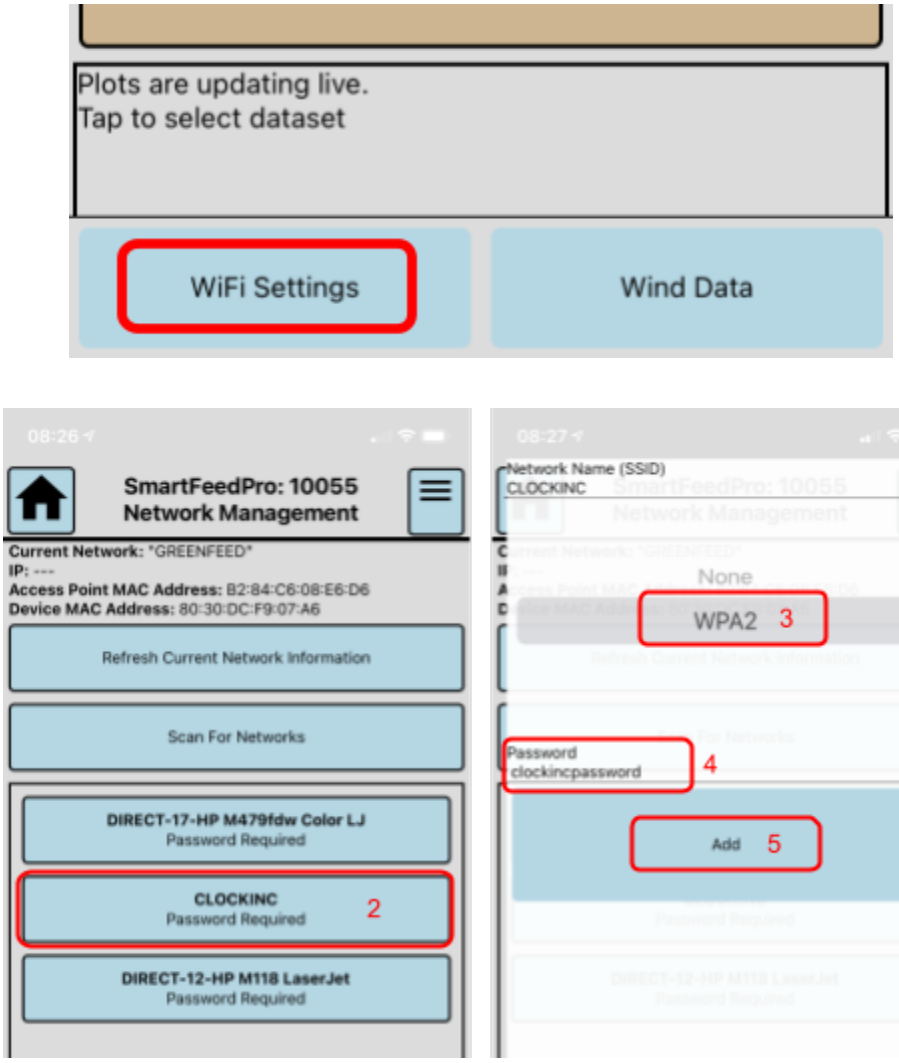


Figure 10) ControlFeed WiFi Configuration

4. Maintenance

4.1. Cleaning the Proximity Sensor

The head position sensor should be located directly above the sample nozzle. From time to time, this sensor will become dirty due to animals and debris. It is important to keep the lenses clean on this sensor. Use a dry cotton swab to remove any debris from the two lenses. If a dry cotton swab cannot remove all the debris, use a lightly wetted cotton swab. It is recommended to clean this sensor once per week.

4.2. Storing SimpleScan

When SimpleScan is to be stored for an extended duration, maintenance operations must be performed to ensure it will be ready for the next use:

1) Disconnect Nozzle from water trap.
2) Clean the Nozzle, removing any debris from the intake manifold holes.

4.3. Sample Filters

There are two filters in the SimpleScan system. The prefilter is attached to the hose end of the quick release. The sample filter is the last point that protects the electronic components from debris and particulate matter. Over time, as the filter is used, there will be a noticeable delay between animals visiting the system, and the gas response from the animals. If the filter goes for too long without being changed, this can damage the system.

Replacing the sample filter every year of full operation is required. To purchase a replacement sample filter, please contact sales@c-lockinc.com.

Note: Using a sample filter that has not been approved by C-Lock Inc., or failure to use a sample filter in SimpleScan will **VOID YOUR WARRANTY.**

5. Controlling SimpleScan

Power Up SimpleScan

Every time the feeder is powered-up from a cold boot, it will require about 30 minutes to warm-up the concentration sensors before they are usable. Because of the required warm-up period, it is recommended that the system is left powered-up or in sleep mode if it will be used on a daily basis. There is no need to power-down the unit on a nightly basis.

"Sleep mode" can be used to allow the user to reduce the power consumption of the feeder if it will not be used for a short period of time (overnight or for a weekend, for example). This mode will allow the user to immediately power-up the system if it will be used in the near future. Once sleep mode is activated, the SimpleScan unit will do the following:

1) Stop collecting data and upload any unsaved data to the central C-Lock server, which may take up to two minutes, depending on connection speed and amount of data to upload

Turn off the sample pump and turn off the RFID reader**Powering Down SimpleScan**

In order to power off the system, SimpleScan must be properly shut down to do this:

1. Put SimpleScan to sleep (See Section 3.2)
2. Once the system is in sleep mode, select "Turn Off The System"
3. Wait 30 seconds, then unplug the power.
4. If SimpleScan is powered by a solar install, turn the power switch to OFF in the main electrical box. If SimpleScan is powered by the provided AC power supply, unplug the power from the AC side of the power supply.

SimpleScan requires a few network connections to ensure the system is able to upload data,, and communicate with the C-Lock server. This requires certain firewall exceptions to be enabled. These exceptions (network "ports") are listed below:

- 22 TCP Outgoing (SSH connection) to greenfeed.c-lockinc.com
- 80 TCP Outgoing (HTTP connection) to greenfeed.c-lockinc.com
- 1883 TCP Outgoing (MQTT connection) to mqtt.c-lockinc.com
- 123 UDP Incoming/Outgoing (NTP connection) with ntp.c-lockinc.com

If you plan to connect SimpleScan to your own WiFi network, please contact your network administrator to ensure these port permissions are set correctly.

6. SimpleScan GUI Control Interface™

The SimpleScan unit is configured through the Internet. To access, view, and configure your SimpleScan unit(s), go to https://greenfeed.c-lockinc.com and log in using your assigned username and password.

By default, your password is "greenfeed". It is very important that you change your password immediately after logging in for the first time.

7. Instrument Specifications

Power Requirements
Power Input: 100 ~ 240VAC / 2.8A 10.5 ~ 15VDC / 10A
Maximum Power Rating: 300 W

Operating Temperature
-20 to 50 ℃ (-4 to 120 ℉)

CO_2 Concentration Measurement
Linearity error: < +/- 1% FS
Accuracy: 0.5% FS
Range: 0-1%
Warm-up Period: 30 minutes

CH_4 Concentration Measurement
Linearity error: < +/- 1% FS
Accuracy: 0.5% FS
Range: 0-1%
Warm-up Period: 5 minutes

RFID (EID) Reader
ISO 11784/5 134KHz

Temperature Measurement
Accuracy: +/- 0.75°C
Range: -30°C to +50°C