This operations manual is intended for assembly, operating, maintenance, inspection, safety warnings and cleaning procedures.

For technical support please contact us at:
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605-791-5657
For additional information, visit our website: https://www.c-lockinc.com

Table of Contents

1. Getting Started

1.1. Specifications

Operating Voltage:	11 - 15VDC or 120 - 240VAC 50/60Hz (Power supply included)
Operating Temperature:	-20 to 50 ℃ (-4 to 120 ℉)
Power Consumption	~ 10 watts
Dimensions:	Customizable to fit any animal size requirement
Data Communications:	Standard: Wi-Fi (802.11b/n/g) Optional: 4G/LTE Cellular Web-based online interface Data processing: cloud-based server
Sensors:	RFID Tag Reader - (ISO 11784/5 134KHz) Quad Load Cells - Scale weight Load Cell Resolution: 500 gram
Control:	Search "Control Feed" in your App Store

1.2. SmartScale Layout

Figure 1) Shows the Front of the SmartScale

1.3. Installation

Choosing a Location

ⓘ Note: SmartScale is very sensitive to weight fluctuations. To get as accurate of a weight reading as possible, please follow these rules:

1. Choose a location where no grass or plants will grow under the platform
2. Ensure the scale platform is completely suspended only by its load cells.
3. Ensure nothing is leaning against the platform.
4. Check regularly to ensure that debris has not fallen under the scale platform and is piling up.

ⓘ **Caution! SmartScale can tip over if not anchored appropriately. Please use caution when moving or installing the system to prevent injury or damage. ALWAYS ANCHOR SMARTSCALE FIRMLY TO THE GROUND OR SECURE STRUCTURE. C-Lock recommends using ⅝" or ¾" red-head anchors for securing SmartScale to concrete.**
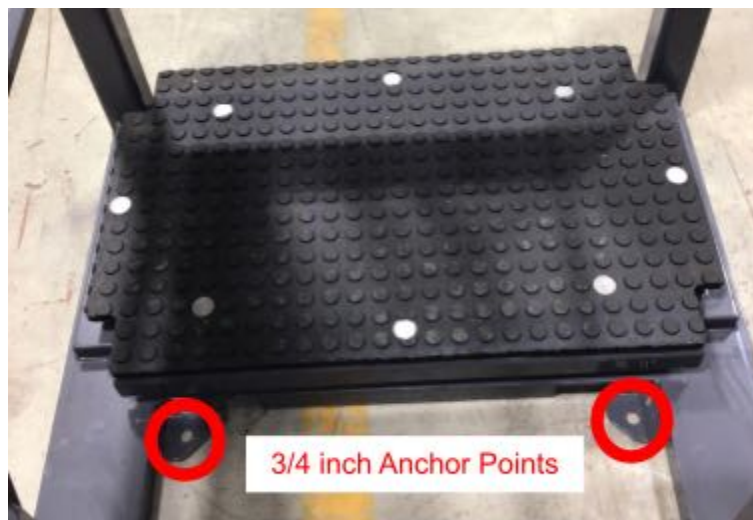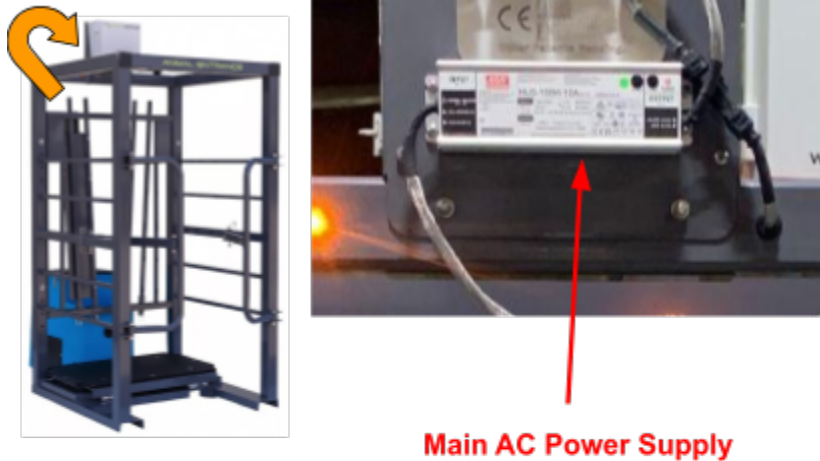

Figure 2) Location of the Anchor Points

Before you set up SmartScale:

- On standard SmartScale systems with an AC power source, the power supply will be found near the electronics box. This means that the power outlet for SmartScale should provide power to the top of the scale.

Main AC Power Supply

Figure 3) SmartScale AC Power Supply

1. Select a location that will not allow the animals to access the water from behind. Alternatively, place a fence around the SmartScale to prevent access from behind.
2. Make sure the unit is on a level surface by placing it on flat pieces of metal or concrete.
3. Use rebar or ground anchors to secure the frame to the ground, or use clamps or some other coupling technique to attach the scale to a secure structure.

1.4. Powering SmartScale On and Off

SmartScale only requires a 12 volt DC power source to operate. This low voltage is relatively harmless. However, if an external AC to DC power converter is used to power the SmartScale, the AC power going into the converter can be hazardous. Please protect the AC power cord and exercise caution when using AC power.

Before you power on SmartScale:

1. Locate the AC power input. Run an AC power cord to this plug. Ensure the power cord is run above the reach of any animals. See Figure 3 for reference.

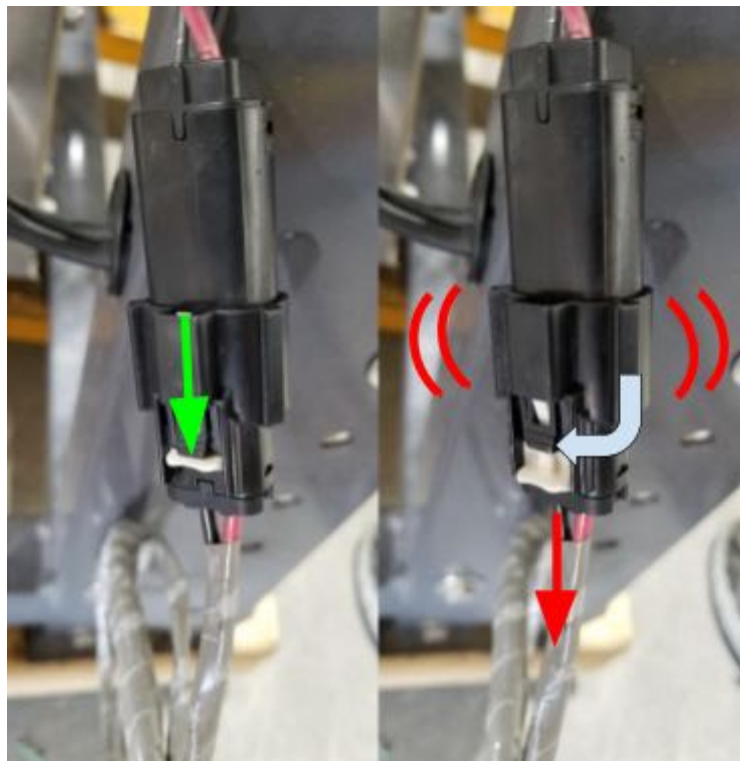**Figure 4) SmartScale AC Power Input**

2. Ensure all power cables are protected from animals and other possible sources of damage, such as vehicle or foot traffic.
3. Ensure the power cord is not a tripping hazard.
4. Contact C-Lock if the power cord is worn or wires are exposed.

To power on SmartScale:

1. Depending on your SmartScale setup, you may have a different method of applying power to the unit, either a power switch or a power connector. Ensure the power source is connected to your SmartScale unit, and if applicable, turn the power switch to ON.
2. The power indicator light on SmartScale will illuminate, to signify that it has power.
3. Once power is applied, please allow ~1 minute for the system to initialize.
4. Use the mobile Control Feed application to scan for your system to ensure it is fully powered on and ready.

To power off SmartScale:

1. If your system is powered by the AC power supply, simply unplug the AC power cable from the power supply.
2. If your system is powered by a battery or solar setup, either turn the power switch off or unplug the connector from the SmartScale power input.

Figure 5) Steps for Disconnecting the Power Cable

1.5.   Installing the Control Feed Mobile Application

Controlling and monitoring the SmartScale system is made possible using the Control Feed mobile application. To install Control Feed on your mobile device, search for "Control Feed" by C-Lock Inc. in the Google Play Store or Apple App Store, or scan the QR code below.

Control Feed

Utilities

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

For instructions on using Control Feed, see **Section 3**.

2. Setup

2.1. Adjusting the Head Catch Bar Width

Appropriately setting the head-catch width is crucial. It is important to ensure that only one animal is able to stick its head into the feeder at a time. To adjust the head-catch width, perform the following:

1. Remove the pins on both the top and the bottom of the bars. (Top pins are shown in Figure 5.)
2. Space the bars in a V-shape form so that the animal's head will comfortably fit through the head-catch near the top of the bars, and narrowly fit through the bars at the bottom.
3. Once spaced appropriately, use the pins to lock the bars in position.
4. Adjust the additional (outside) bars to space them uniformly.
5. Check as your animals grow to ensure they can still comfortably fit through the head-catch, and their EID is in front of the RFID antenna while they are on the scale.

Figure 6) Head-Catch Adjustment

2.2. Adjusting the SmartScale Alleyway Width

2.2.1 - SmartScale can be adjusted to accommodate a wide range of animal sizes. To adjust the alleyway width follow these steps:

Figure 7) Adjusting the Alleyway Width

1. Remove the bolts and from the locking bars.
2. Turn the alleyways in or out to adjust the width
3. insert the two bolts back in place.
4. Ensure your animals can comfortably fit in the system alleyway.

2.3. Connecting to a Network

SmartScale must have at least one of the following types of connection:

● WiFi - requires configuration when connecting to a new WiFi network.

- Cellular - requires a cellular modem (available at additional cost). A monthly cellular data plan charge may apply, depending on the cellular provider.

2.3.1. WiFi

SmartScale can be configured to connect to any WiFi network. Please see **Section 3** for instruction on using Control Feed to configure SmartScale to use a new WiFi network.

2.3.2. Ethernet

Additional equipment must be installed into SmartScale to allow for an Ethernet connection. To use an ethernet connection, please contact C-Lock.

2.3.3. Cellular

If your SmartScale(s) came with a cellular modem, they will already be configured to connect to the modem. For US customers, the modem will also include a pre-installed SIM card. No additional work is required.

For international customers, an activated SIM card will be required. Please ensure that the SIM card has a data plan allowance of at least 1GB per month of data.

For instructions on installing the SIM card, see Appendix A.

2.4. Calibrating and Checking the Scale

🛈 It is recommended to recalibrate the scale any time the scale platform is removed or the system is moved or repositioned.

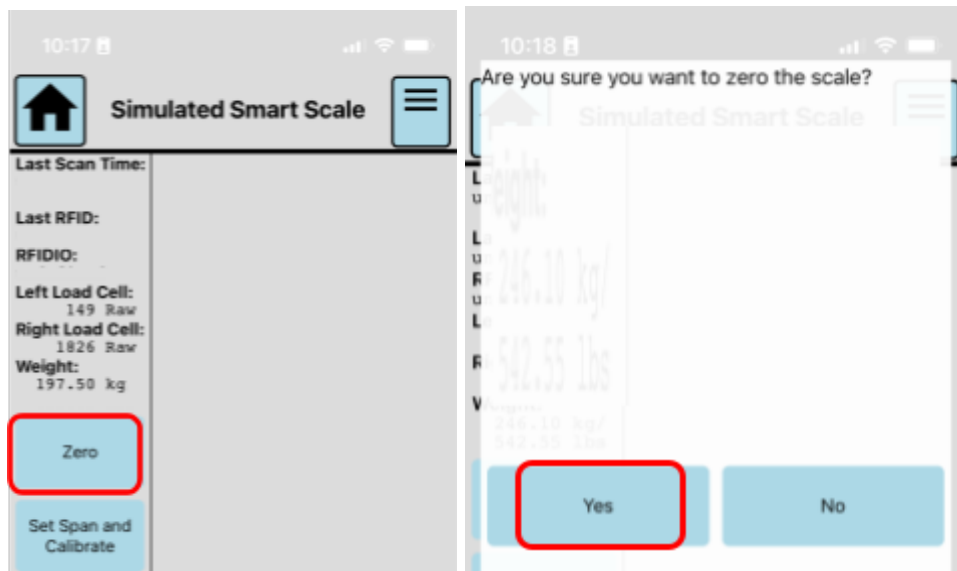🛈 It is recommended to check the scale for accuracy once per week. This will ensure accurate readings.

To check for accurate weight measurement:

1. Make note of the current weight in the feed bin using the Control Feed app.
2. Place the calibration weight on the platform. Every C-Lock provided calibration weight will have the exact weight marked on it.

3. Ensure the SmartScale weight increases by the correct amount.
4. If the weight increase is incorrect - check that the platform is fully suspended only by the load cells. If it is suspended correctly, please calibrate the scale.

To calibrate the scale:

1. Remove all debris from under the scale platform.
2. From the Control Feed app, press Zero
3. When prompted to zero, ensure nothing is touching the bin. Then press Yes.
4. Place your calibration weight in the center of the bunk.
5. Press Set Span and Calibrate
6. Type in the mass of your calibration weight, ensuring to select the appropriate units of weight (lb or kg).
7. Press "Calibrate"
8. The correct weight should now be displayed on Control Feed.
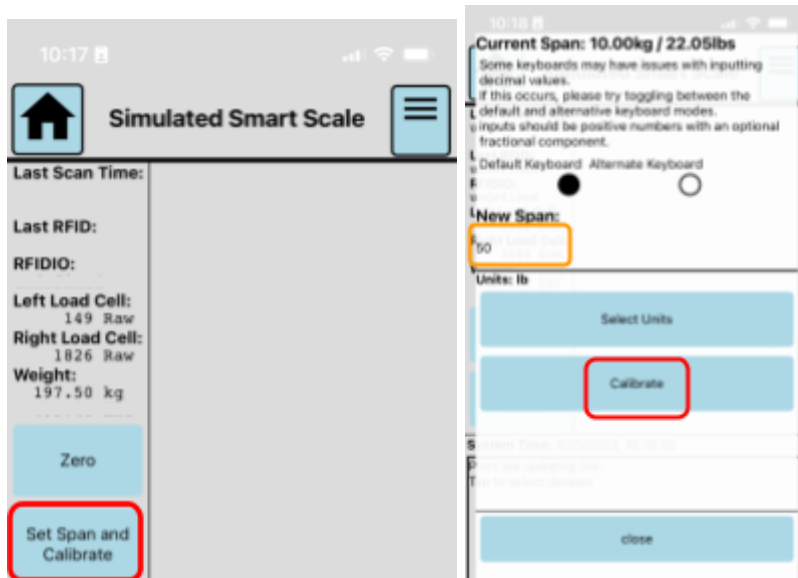

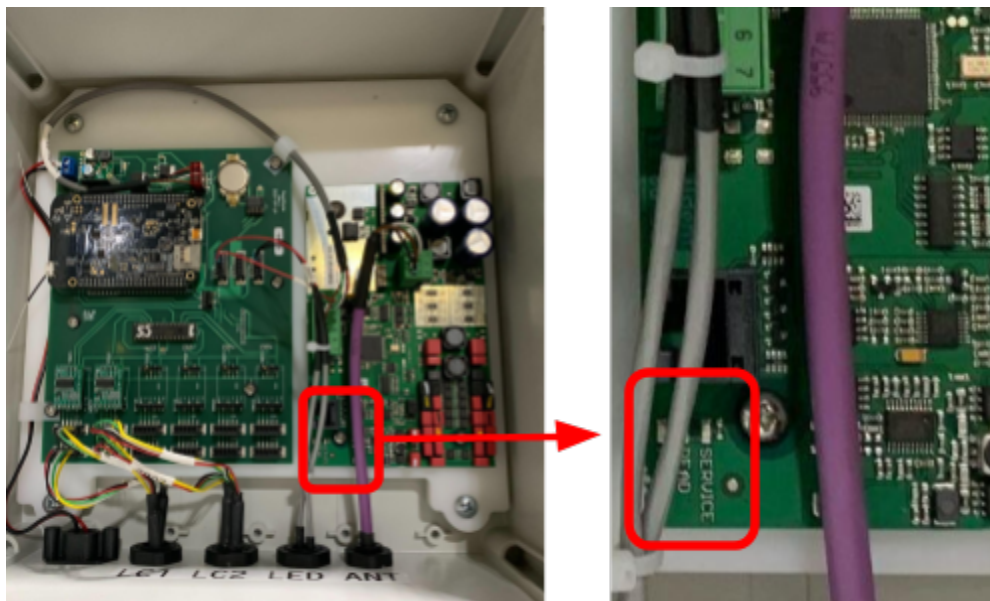**Figure 8) Zeroing (Taring) SmartScale**

Figure 9) Spanning SmartScale

2.5.   Checking your EID (RFID) Tags

To check if the RFID reader is working for your EID tags:

1. You will need a spare ear tag.
2. Open the electronics box by unlatching the 2 fasteners.
3. Stand on the scale platform.
4. Hold the ear tag next to the RFID antenna (Figure 1).
5. Watch for the green "READ" light to blink on the RFID circuit board in the electronics box. When you see the green "READ" light blink, this means it has detected an RFID tag.
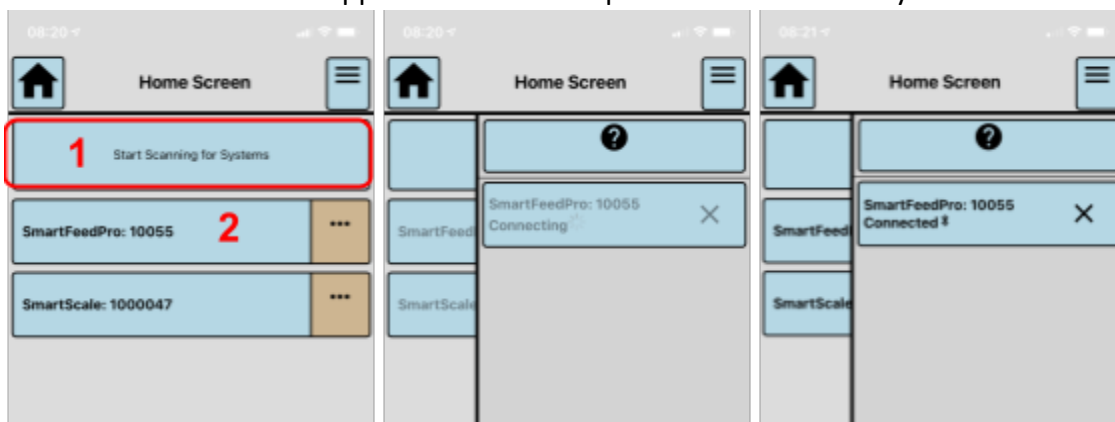

Figure 10) Checking the RFID Reader

3. Control Feed Mobile App

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

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

1. Begin by pressing "Start Scanning for Systems".
2. A list of nearby devices will appear on the screen. See Figure 10.
3. Press the System you wish to control.
4. A side-box will appear while it attempts to connect to the system.

Figure 11) Scanning and Connecting to a SmartScale System

5. Once connected, tap the button on the side to launch the control interface.

6. From this interface, you can:
    a. See the current state of each sensor on the system.
    b. Zero/Tare the scale
    c. Recalibrate the scale
    d. View a real-time plot of data
    e. Change WiFi network credentials for the SmartScale
    f. Return to the list of all scanned SmartScale
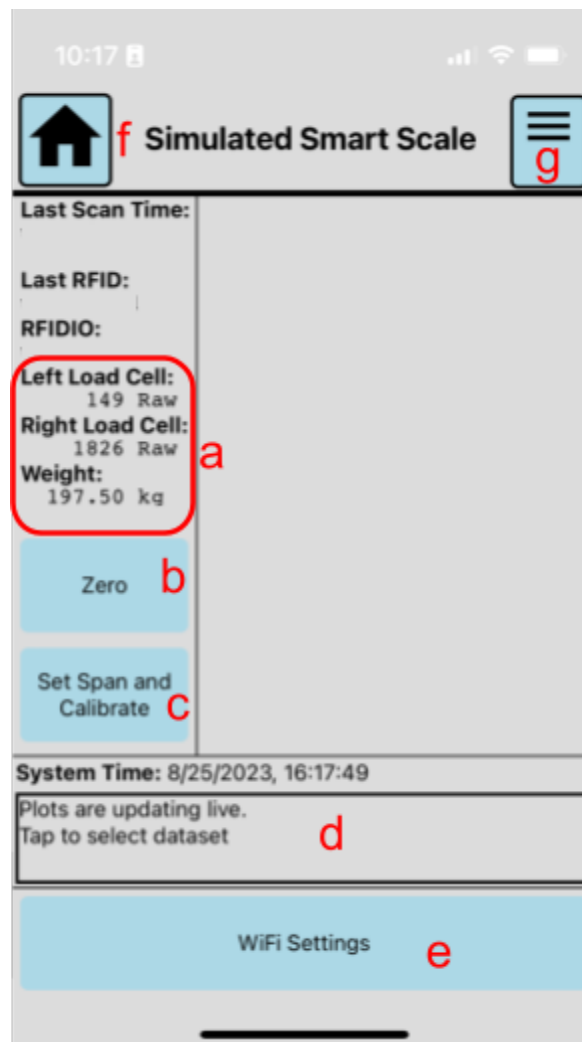   g. See which feeders are currently connected

Figure 12) Control Feed Main Interface Controls

Configuring the WiFi Network Credentials

To change the WiFi network that SmartScale connects to:

1. Tap "WiFi Settings"
2. Tap the button with the WiFi network you wish SmartScale 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).
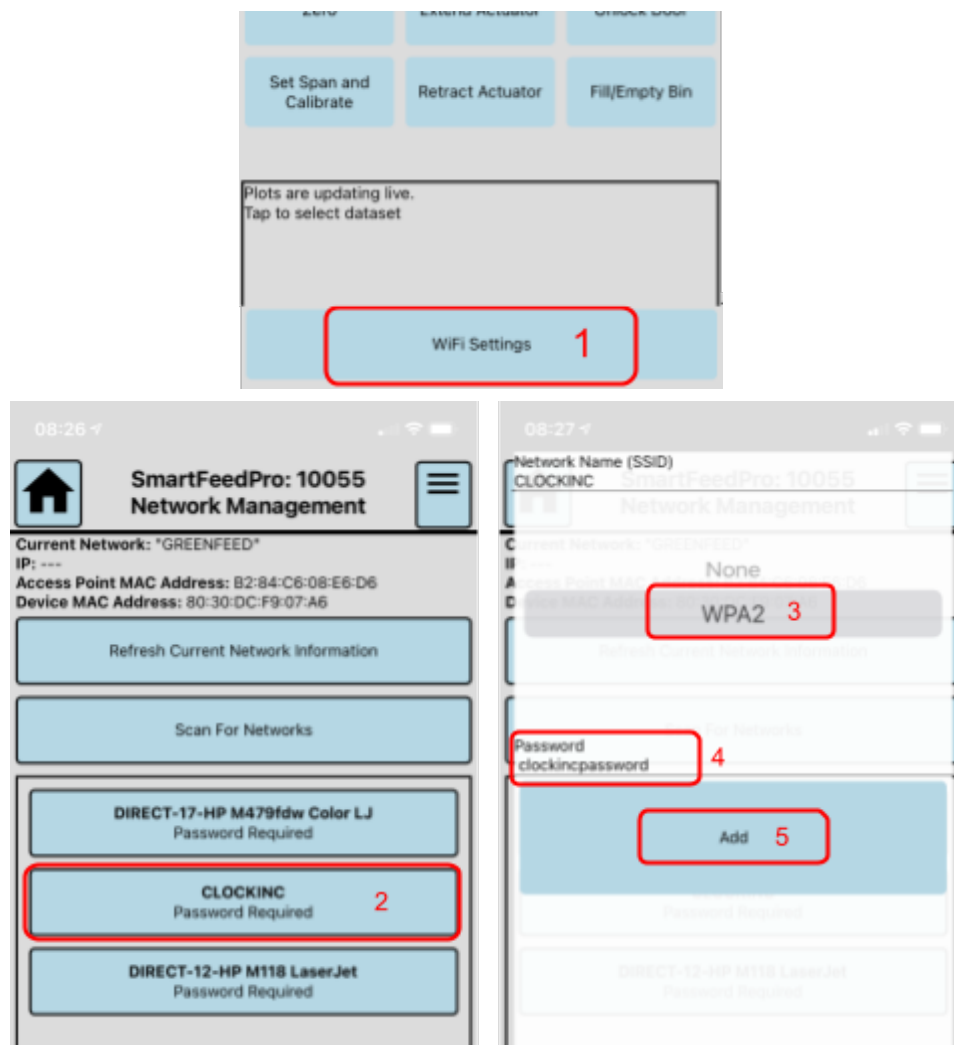5. Tap Add. The system will immediately reboot and connect to the new network.

Figure 13) Control Feed WiFi Configuration

4.   Training Animals

- SmartScale requires all animals to have an RFID tag. SmartScale is compatible with the following RFID standards: ISO 11784 or ISO 11785. To purchase these tags, please contact C-Lock.
- SmartScale has a built-in RFID Reader. This reader will scan the tags automatically.

5.   Online User Interface

By accessing the SmartScale interface, users are allowed to customize notifications, adjust configurations, monitor SmartScale unit(s), and more.

ⓘ Log in to https://ext.c-lockinc.com with your assigned credentials.

6. **Maintenance**

- To clean the inside of the feed bin, unlatch the two cleaning door locks and allow the door to drop. Use a power washer to spray and remove all debris and residue.
- To ensure accurate weight, clean underneath the scale platform. Make sure there is no food or debris touching the bottom of the platform.

- Check the bin calibration (**Section 2.4**) once per week and recalibrate as necessary.

Appendix A - Configuring the Cellular Modem

If your SmartScale system includes a cellular modem, the modem will be pre-configured. The only thing that must be done is inserting an activated SIM card and checking for an Internet connection. To do this, follow these steps:

1) Locate the modem. It will be in the SmartScale battery box, or in a separate box by itself.

2) Disconnect power from the modem to turn it off.
3) Insert the 2FF (or 4FF) SIM card into the slot.

4) Apply power and ensure the modem lights turn on.
5) Wait three minutes.

6) Use a laptop, tablet, or smartphone to check for a WiFi connection. The name of the WiFi network will vary depending on the SmartScale configuration, but the network should start with "SMARTSCALE".
7) Join this network, when prompted for the password, enter: smartscale
8) On the laptop, tablet, or smartphone, go to http://www.c-lockinc.com/ip You should be presented with the following message: **Your IP address is xx.xx.xx.xx**
9) If you see this message, it means your modem is configured and ready.
10) If you do not see this message, please contact C-Lock for assistance.