

AUTO-CALIBRATION SYSTEM

Automated calibration ensures accurate measurements with minimal manual intervention

Climate Smart
Agriculture Initiative
New Zealand



UCDAVIS
COLLEGE OF AGRICULTURAL
AND ENVIRONMENTAL SCIENCES



SEAMEO
SEARCHA



AUTO-CALIBRATION/RECOVERY SYSTEM



Gas Source

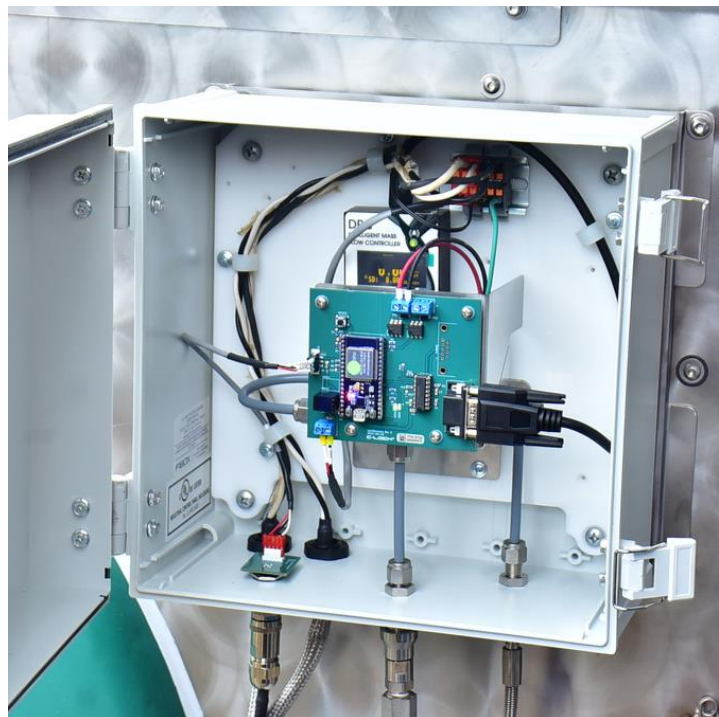
- **Gas Mixture:** The system uses a single high-pressure gas cylinder with the following concentrations:
 - 3.5% CH₄
 - 11.5% CO₂
 - 400 ppm H₂
 - Balance: N₂

Gas Release

- **Flow Rate:** 10L/min for 120 seconds
- **Frequency:** Release occurs every 7 days

Safety Feature

- **Animal Safety:** The gas release is automatically disabled if animals are present in the area



Injection and Measurement

- **Gas Injection:** Gas is injected directly behind the manifold using a gas flow controller
- **Measurement:** The GreenFeed system compares the known gas release rate to its measured mass flux for accuracy

MANUAL CO² RECOVERY TEST

Monthly manual calibration is essential for verifying the accuracy of the auto-calibration system

Climate Smart
Agriculture Initiative
New Zealand



UCDAVIS
COLLEGE OF AGRICULTURAL
AND ENVIRONMENTAL SCIENCES



SEAMEO
SEARCHA



MANUAL CO₂ RECOVERY TEST

Materials Required:

- Recovery gas release mechanism
- Small electronic balance
- 1000g calibration weight
- 90g CO₂ canisters
- Recovery sheet for recording measurements

1 Setup the Balance



- Place the electronic balance on a flat, stable surface
- Use the built-in bubble indicator to ensure the balance is level
- Turn on the balance and set it to measure in grams (g)

MANUAL CO₂ RECOVERY TEST

2 Calibrate the Balance



- Ensure the balance reads zero before use
- Place the 1000g calibration weight on the balance
- Record the weight to the nearest 0.1g on the recovery sheet

3 Weigh the CO₂ Canister



- Attach a new 90g CO₂ canister to the release mechanism
- Weigh the assembly (canister + release mechanism)
- Record the weight as Initial Weight (1) on the recovery sheet

MANUAL CO₂ RECOVERY TEST

⚠ Safety Precautions:

- Ensure all animals are at least 10 meters away from the GreenFeed (GF) unit.
- Avoid inhaling the gas directly from the release
- Keep all onlookers at a safe distance

4 CO₂ Release



Prepare the Release Mechanism

- Locate the marked hole in the airflow manifold (under the feed hood, to the right of the feeder chute)
- Insert the release mechanism into the hole securely



Release the CO₂

- Slowly turn on the valve to begin the gas release
- The GreenFeed unit will detect the release, triggering a chime sound
- As the gas flows, slowly move away from the GF unit

MANUAL CO₂ RECOVERY TEST

⚠ Safety Precautions:

- Ensure all animals are at least 10 meters away from the GreenFeed (GF) unit.
- Avoid inhaling the gas directly from the release
- Keep all onlookers at a safe distance

4 CO₂ Release



Time the Release

- Start timing with a stopwatch as soon as the release begins
- Stop the release after 2.5 minutes
- Turn off the release valve but wait 5 seconds before removing the release mechanism
- Record the release time on the recovery sheet



Post-Release

- Wipe off any condensation on the release mechanism caused by CO₂ flow
- Weigh the release mechanism again and record the final weight (1) on the recovery sheet

CHANGING THE AIR FILTER

Primary filters need regular cleaning (every 4 to 7 days) and should be replaced annually (every 12 months)

Climate Smart
Agriculture Initiative
New Zealand



UCDAVIS
COLLEGE OF AGRICULTURAL
AND ENVIRONMENTAL SCIENCES

GLOBAL
RESEARCH
ALLIANCE
ON AGRICULTURAL
GREENHOUSE GASES



SEAMEO
SEARCHA



CHANGING THE AIR FILTER

1 Preparation



- Using the APP, **put the unit into SLEEP mode** and wait for the fan to stop completely



- **(Optional)** Shut down the unit using the APP and disconnect from the power source

⚠ Safety Precautions:

The fan must not be running when changing primary filters

CHANGING THE AIR FILTER

2 Remove the Old Air Filter



- Unlatch the back top cover of the GreenFeed unit
- Lift the cover until the spring holds it in a raised position



- Unlatch the front cover of the air filter



- Undo the clamp at the top of the filter



- Slide the filter downward to remove it

CHANGING THE AIR FILTER

3 Install the New Air Filter



- Transfer the clamp from the old filter to the new one



- Install the new filter over the pipe, ensuring it is positioned the same as the old filter



- Tighten the clamp to secure the new filter in place



- Close and secure the door to the filter box

CHANGING THE AIR FILTER

4 Reconnect the Unit



- **(Optional)** If unplugged, reconnect to the power source



- **Wake up the GreenFeed** unit using the APP

CLEANING THE AIR FILTER

You can clean the filter several times before replacing it, following these steps:



- **Run hot** (preferably) **water inside the air filter**, allowing it to drain out
- Do **not** use detergent
- Repeat several times to ensure all areas are thoroughly rinsed
- **Dry the filter** completely before reusing it
- Alternatively, you can use **compressed air** (~50psi or 3500 mbar) to clean the filter

⚠ Safety Precautions:

- Always wash **from the inside** of the filter
- Ensure filters are **completely dry** before reinstalling them
- Keep extra filters on hand so that you always have a clean one available for use

CLEANING THE FEED DISH AND THE HEAD POSITION SENSOR

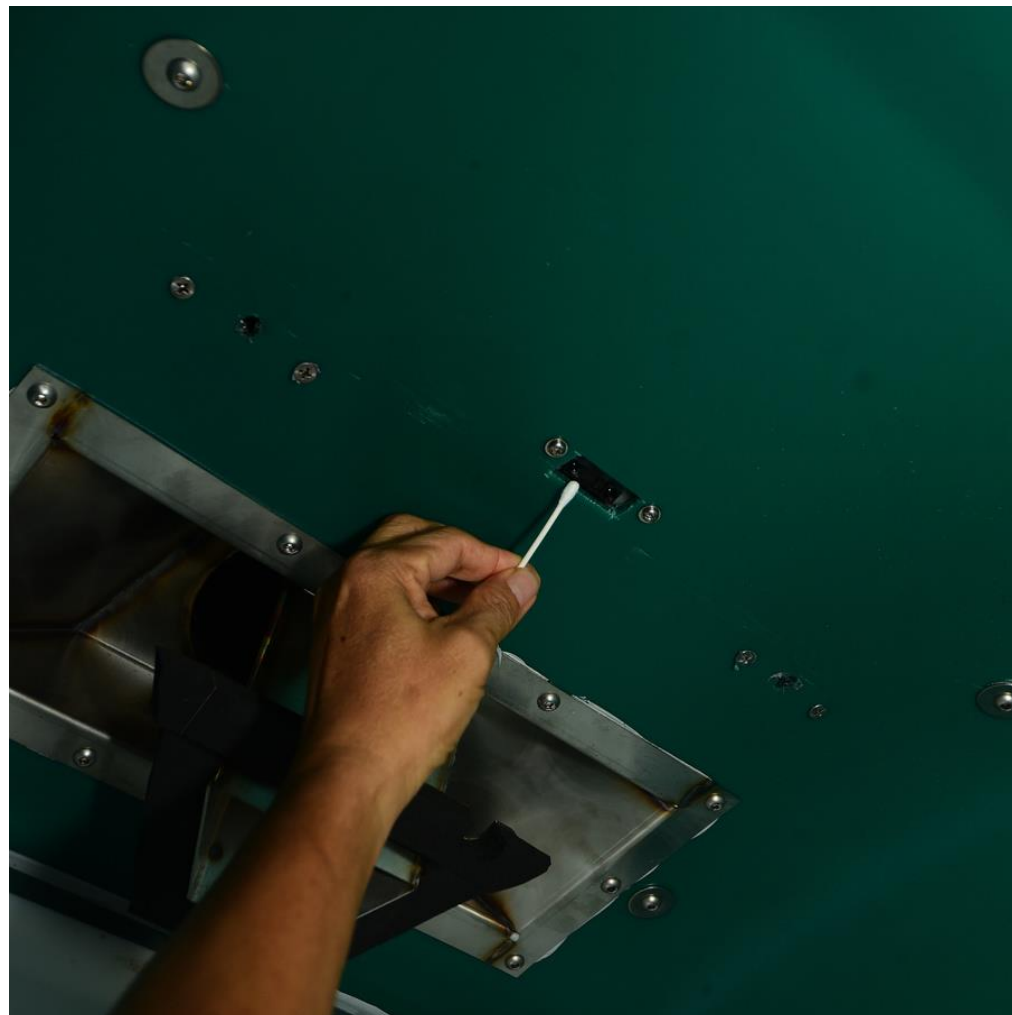
The feed dish and the head position sensor (located above the edge of the feed dish), can accumulate dirt and debris from animals and the environment. Clean them once a week to maintain optimal performance

CLEANING THE FEED DISH



- Unscrew the feed dish from the feed chute and clean it thoroughly
- Dry the feed dish properly before reinstalling

CLEANING THE HEAD POSITION SENSOR



- Gently use a dry cotton swab to remove debris from the two lenses
- If dry swabs do not fully remove the debris, moisten the cotton swab lightly with water and clean the lenses again

ANIMAL ADAPTATION AND TRAINING

Training and adaptation to help animals adjust to the GreenFeed unit can take 7 to 20 days depending on the animal

Climate Smart
Agriculture Initiative
New Zealand



UCDAVIS
COLLEGE OF AGRICULTURAL
AND ENVIRONMENTAL SCIENCES

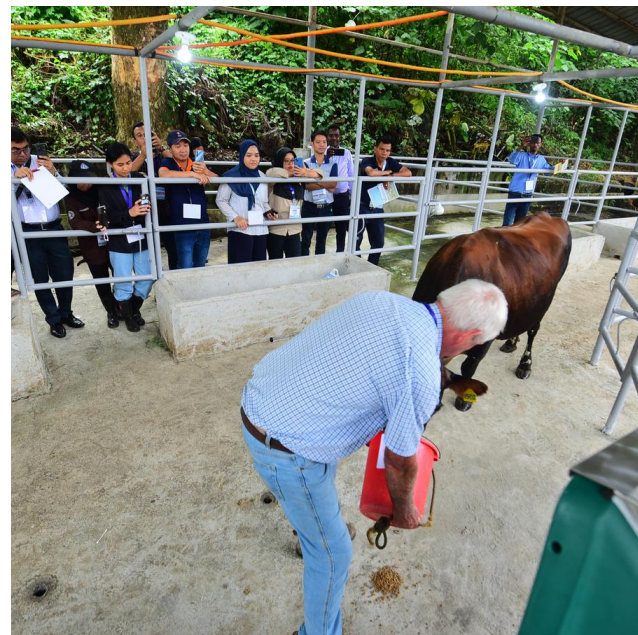


SEAMEO
SEARCHA



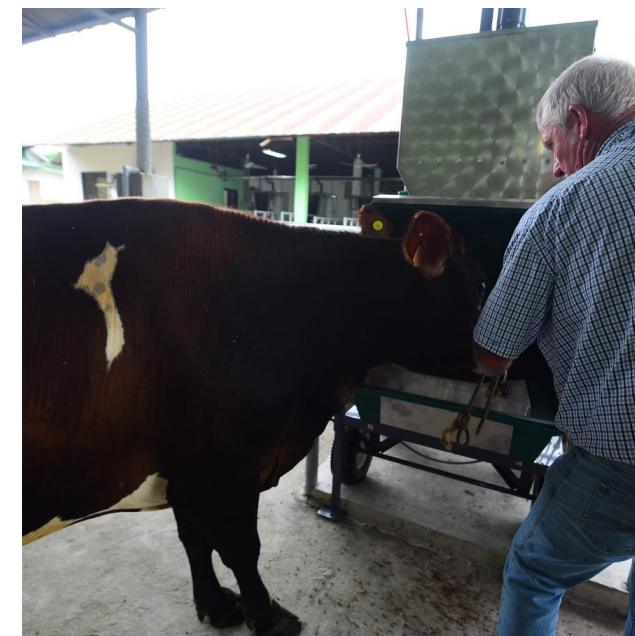
ANIMAL ADAPTATION AND TRAINING

1 Entice the Animal with Food



- Place the unit within the animals' line of sight and gently entice animals with food rewards to approach the unit
- Gradually move the bucket toward the GreenFeed unit
- Lift the bucket to the height of the GreenFeed dish, placing some pellets on the edge of the feed dish

2 Repeat over several days



- Never force the animal
- Continue the process daily until the animals are comfortable with the GreenFeed unit
- Once the animals are comfortable, start manually dropping feed using the Feeder App

RELOCATING AND STORING THE GREENFEED UNIT

To keep the unit working for a long time, ensure safely relocation and storage of the GreenFeed Unit

Climate Smart
Agriculture Initiative
New Zealand



UCDAVIS
COLLEGE OF AGRICULTURAL
AND ENVIRONMENTAL SCIENCES



SEAMEO
SEARCHA



UNIT RELOCATION AND STORAGE



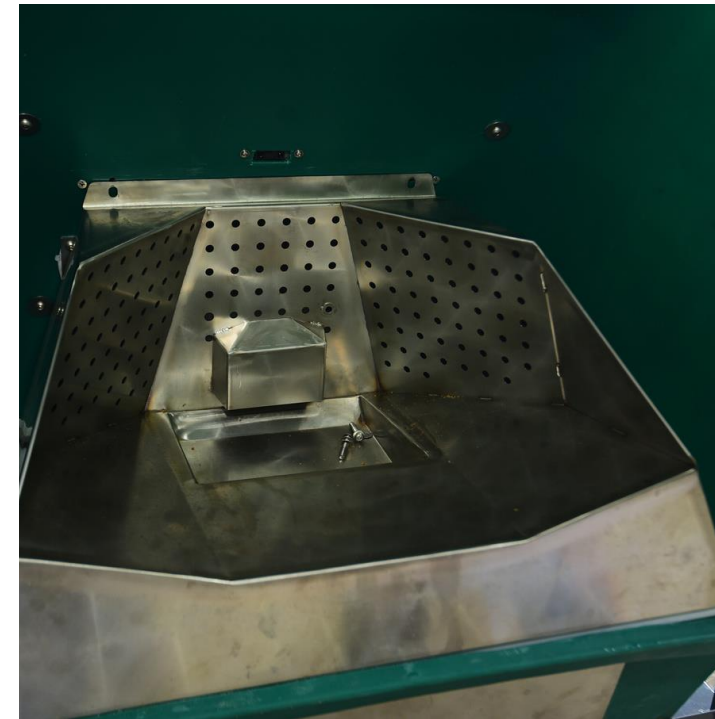
Prepare the Unit

- Put the unit into SLEEP mode using the APP
- Shut down the unit and wait for 30 seconds
- Disconnect from the power source



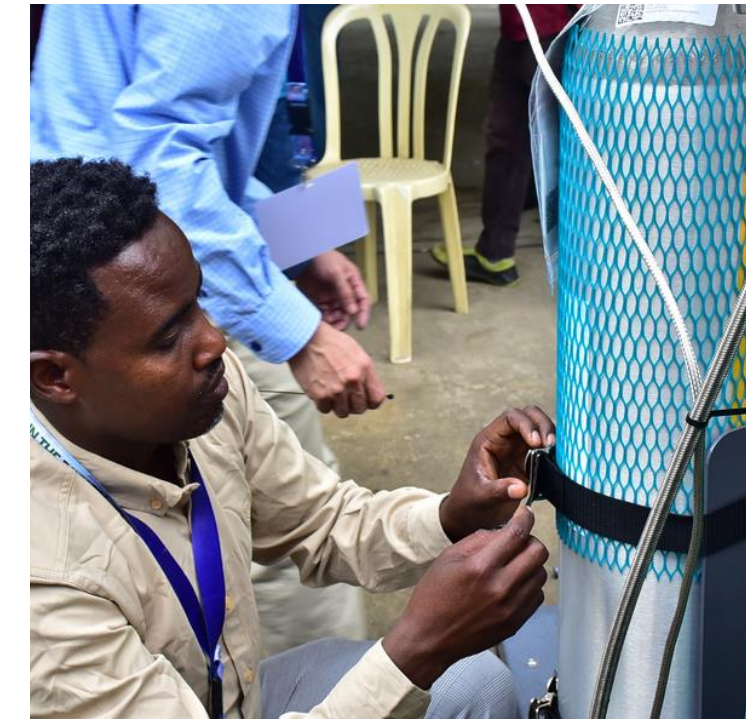
Empty the Feed Hopper

- Empty the feed hopper completely



Clean the Unit

- Remove the feed dish and clean behind, on top, and along the sides of the electronic box



Remove the Auto-Calibration System

- Close the gas tank and disconnect the calibration gas lines from the regulators
- Remove the gas tanks from the trailer

UNIT RELOCATION AND STORAGE



Disconnect the Weather Station

- Disconnect the weather station
- Store the weather station with foam padding for protection



Remove the Air Velocity Transmitter

- Disconnect wiring from the transmitter
- Remove the air velocity transmitter



Remove the Fan

- Disconnect the fan power and remove the fan



Disconnect and Remove the Conduit Pipe

- Disconnect the conduit pipe connections
- Remove the conduit pipe

UNIT RELOCATION AND STORAGE



Remove the Chimney Pipes

- Remove both the upper and lower chimney pipes



Install Covers

- Install chimney and conduit covers to protect exposed components during relocation/storage