

ConnectedCrops
User Manual
Model 5

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ConnectedCrops™

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ConnectedCrops™

1: OVERVIEW

1.1 Summary

The ConnectedCrops system is a powerful tool that provides real-time temperature and/or soil moisture data in agricultural fields on a user's mobile phone. This real-time data, in addition to email and text message alerts, allows agricultural professionals to make key decisions for irrigation, frost protection, and spraying without having to be in the field, or even in the country. Users can receive monthly reports to see data changes for a station over the month and can receive historical data to allow comparisons and look for trends from field to field, month to month, or year over year.

This manual describes the procedures for assembling, registering, and preparing the ConnectedCrops Station and Solar Power unit prior to installation, the considerations for choosing an installation site, and the steps to install the station, solar panel, and sensors.

1.2 Package Contents

Station Box – Model 5.0
1 x **ConnectedCrops agriculture station**
1 x **Fuse and Fuse cap** set
1 x SIM card (already installed)

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1 x Antenna
1 x Post Mounting Bracket
2 x M6x16 Hex Head Cap Screws
2 x M6 Course Thread Hex Nuts
2 x 6mm lock washers
1 x QuickStart Guide



Figure 1

Sensors
Depending on what conditions you are monitoring, you should have a combination of up to 4 Temperature Sensors and/or Soil Moisture Sensors



Figure 2

Solar Panel Box – Model 5.0
1 x 5 Watt 6 Volt ETFE Solar Panel
1 x Mounting Bracket
1 x Extension Power Cable
1 x SIM card (already installed)

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Figure 3

Please refer to the specifications section for more details about the components

1.3 How It Works

The ConnectedCrops solution is the integration of four main components:

1. Solar Panel System:
   This Solar Panel System supplies power to charge the Station battery; allowing the Station to function throughout the night and for many days when sunlight is elusive.

2. ConnectedCrops Station:
   The Station is the core of the system: reading the sensors data, making the needed calculations, connecting and sending the data over the cellular network, and adjusting configuration settings you've made through the Mobile Application.

3. Sensors:
   You can select any combination of temperature sensors and soil moisture sensors to meet your specific data needs. The sensors are connected to one of the 4 available sensor ports on the back of the station and configured through the Mobile Application.

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4. ConnectedCrops Mobile Application (CCMobile)
   CCMobile is the ConnectedCrops mobile app that you will download to your Android or iOS smartphone. This application is the interface to your Station allowing you to configure your new Station, check current sensors readings, change sensor thresholds for alerts via email, SMS text message or Phone Calls, view historical sensor data, request historical data be sent to you and configure other aspects of the ConnectedCrops Station.

Each Station collects data from the sensors at a configurable frequency, transmits that data over a cellular network to the ConnectedCrops servers in the Cloud, and then sends that data to the CCMobile App on your phone via your phone's cellular network.



Figure 4

ConnectedCrops was designed and engineered to eliminate many of the challenges with traditional weather stations. For example, each ConnectedCrops Station works independently; you don't have to rely on setting it up and maintaining it or rely on base stations, towers, gateways, etc. And because each Station is solar powered, it will run independently, without the need to worry about connecting a power source or replacing batteries.

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ConnectedCrops™

2: DEPLOYING ConnectedCrops

2.1: Tools You Will Need

To mount the solar panel and the station:

1. 4 screws to mount to a wooden post or strapping, or hose clamps if mounting to a plastic or metal post
2. a wooden, plastic, or metal post
3. drill/impact driver
4. a Philips and flathead screwdriver
5. ladder (if you are mounting the Solar Panel high above the ground)
6. cable ties

To install soil moisture sensor(s) in the ground:

1. auger, post-hole digger, or shovel
2. protective conduit (1″ diameter, between 18 and 30 inches in length). Avoid using metal pipes as it can affect the soil sensor readings.
3. measuring tape
4. electrical tape

To install temperature sensor(s)

Depending on where the temperature sensor(s) will be mounted (air, soil, or water), you may need cable ties, a ladder, or digging tools, similar to what was described above for installing a soil moisture sensor, or whatever you see fit to install it in your planned location. Just make sure you avoid using tools that could harm the sensors or their cables, and plan if you intend on moving the Station and sensors periodically.

To run the ConnectedCrops Mobile Application (CCMobile):

You will need an Android or iPhone smartphone. The minimum requirements are:

- For Android: running 16.0 operating system or higher
- For iPhone: running iOS 15.5 or higher

CC Mobile is designed to be used on smartphones only. Running it on tablets and iPads may affect its behaviour and graphics.

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2.2 Deployment Process



2.2.1 Step 1: Assemble the Station

To start using ConnectedCrops, you need to connect the different parts to the Station as shown in the image below:

1. connect the Antenna to the UFL connector. Make sure the pin on the antenna goes in straight and then screw it clockwise until you feel resistance;
2. the sensors have waterproof universal connectors, so they can be connected to any of the 4 ports. The sensors must be screwed in all the way for the sensors to generate readings and avoid water contamination.

   Be sure to reflect the configuration correctly in the CCMobile App under the "Sensors Setup" while activating your Station, as described in the Sensor Setup section 2.2.5 Step 5: Activate a Station. If you want to change the initial configuration afterward, you can do so from **Sensors Setup** under **Station Configuration**.
3. **DO NOT** connect the fuse at this time. This will be covered in the Sensor Setup section 2.2.5 Step 5: Activate a Station.

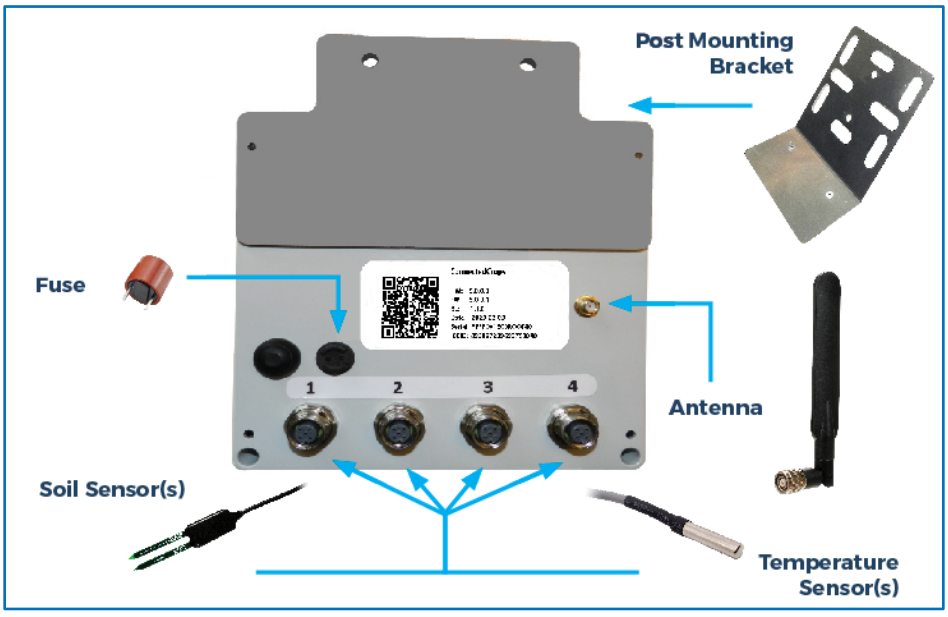


Figure 5

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For all the above connections, please make sure they are tightly sealed or screwed finger-tight to assure proper functioning, keep out moisture, and avoid damage to the component. Do not use tools to tighten as they may damage the parts.

2.2.2 Step 2: Assemble the Solar Panel

To assemble the Solar Panel, connect the Solar Panel Mounting Bracket to the Solar Panel using the 3 screws and nuts provided (as shown in the image below):

1. feed a screw through a corner hole in the top of the solar panel (the red power wire is on the bottom) and through the hole in the mounting bracket (as shown in the image below);
2. make sure the nut is securely fastened to the screw but do not tighten completely;
3. repeat this for the other corner hole and the centre hole;
4. tighten the 3 screw/nut combinations using the Philips and Flathead screwdrivers.

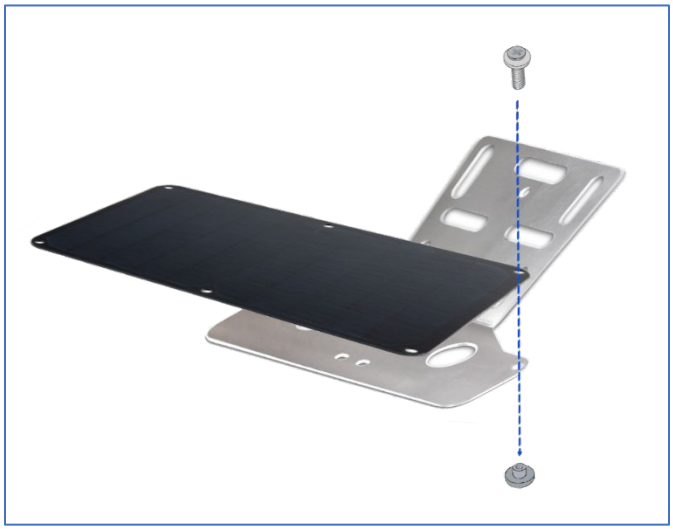
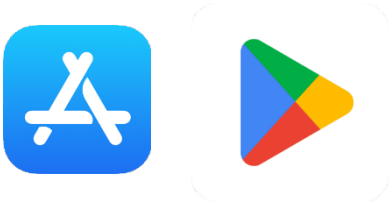


Figure 6

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2.2.3 Step 3: Download and install the ConnectedCrops Mobile App (CCMobile)

On your phone, navigate to the App Store for iPhones OR the Google Play Store for Android phones. Once in the store:



- search for connectedcrops (one word), ccmobile or Esprida
- click on the application icon with the description ConnectedCrops - CCMobile
- click on the Install button
- Once installed, click on the Open button to launch the CCMobile App

2.2.4 Step 4: Sign Up

To activate the Model5 station, you need to set up your account in the CCMobile App. If you've already activated a station previously, or know you already have an account, click the



button and log in with your user credentials.

If you know the email address used for your account but forget your password, click on the Forgot your password? link to trigger a password reset.

For a first-time user, a ConnectedCrops account must be created:

1. launch the CCMobile Application
2. click on Sign Up Now
3. fill in your farm name and the remaining fields. Note: *All fields are mandatory*
4. view the Licence Agreement
5. click on the



button

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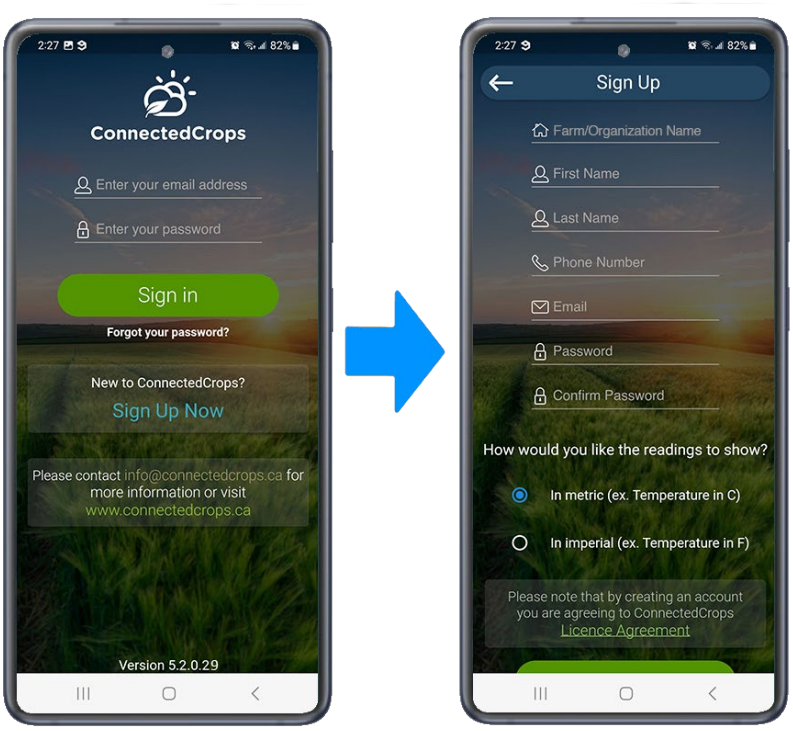


Figure 7

6. Once pressed, you will see an ALERT confirmation message on your screen and an email will be sent to the email address you entered with the confirmation/activation link
7. Click on the OK button in the ALERT screen

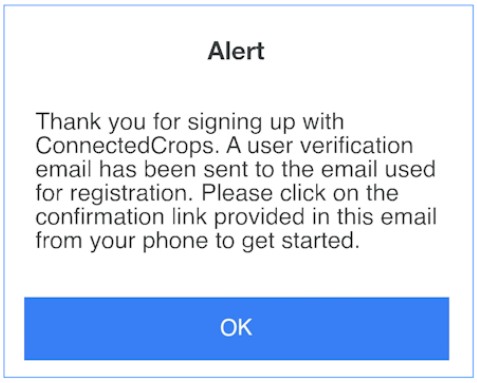


Figure 8

NOTE: CCMobile App passwords must conform to the following specifications:

- a minimum length of 8 characters
- must contain at least one (1) number
- must contain at least one (1) lower case letter
- must contain at least one (1) upper case letter
- must contain at least one (1) special character from the list of
- @, $, !, %, *, ?, and &

8. You will be directed back to the Sign in screen (Figure 7)
9. On the same phone, open the email you received from ConnectedCrops and click on the link to verify your account

NOTE: if you don't see the email, please check your Spam or Junk folder.

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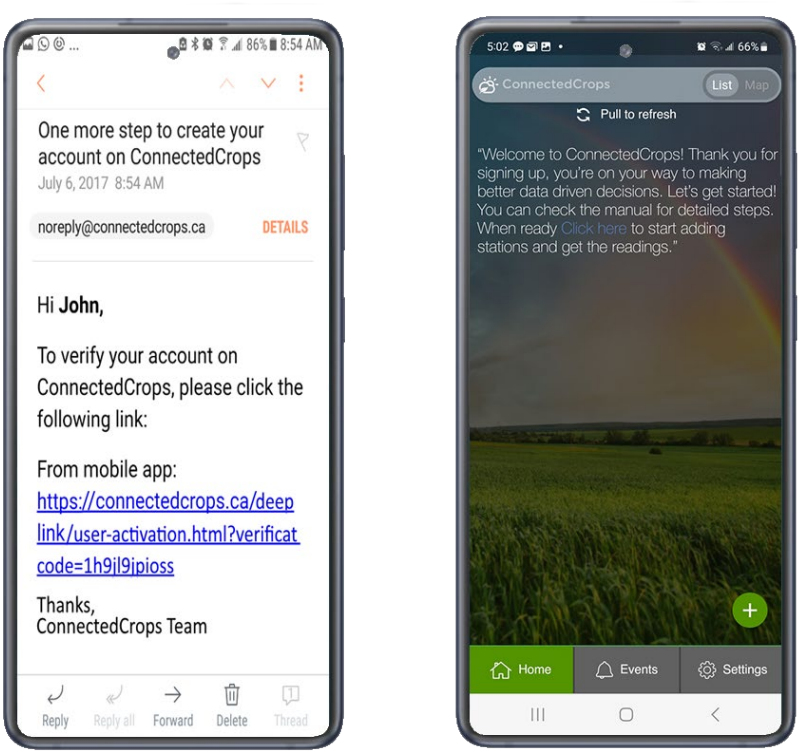
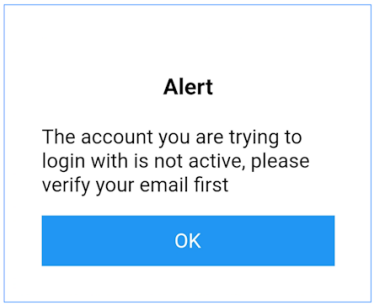


Figure 9

10. Clicking on the link will re-launch the CCMobile application and log you in if you are using the same phone on which you signed up. If not, provide the email address and password credentials you just created and click on the Sign in button
11. The first time you log in, CCMobile will provide some help pages to give you a quick overview of its features. We recommend you read them
12. If you encounter an alert message indicating the account is not active, email support@connnectedcrops.ca and provide the email address you are trying to setup, and our support team will manually activate your account



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2.2.5 Step 5: Activate a Station

In this step, you will be working in the **CCMobile** App and with the ConnectedCrops station. You will be asked to check the label on the back of the Station, connect the fuse to power up the station, and check the lights on the front.

The label at the back of the ConnectedCrops station provides the following information:

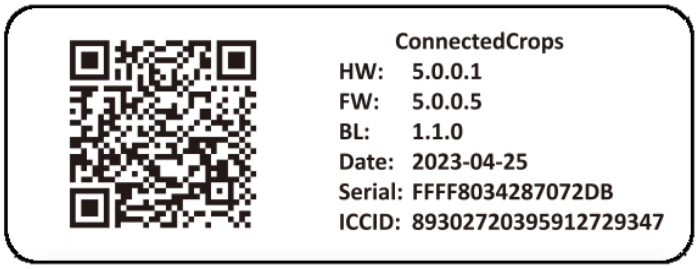


Figure 10

- **HW**: Hardware version
- **FW**: Initial Firmware version
- **BL**: Bootloader version
- **Date**: Manufacturing date
- **Serial**: Serial number
- **ICCID**: SIM Card Identification number with the mobile operator

To activate a Model5 station for the first time, open the **CCMobile App** on your smartphone:

1. click on the Click here link in the message shown on the home screen (as shown in the screenshot in Figure 9), OR
2. click on the ⊕ button in the bottom right corner of the screen, OR
3. click on Settings the button and then select Add New Station

At any time, if you want to add a new station, click ⊕ on the button or click Settings at the bottom of the screen.

A wizard in the CCMobile App will walk you through the four steps for activating a Station:

1. **Registration:** Registering the station to ConnectedCrops Cloud
2. **Sensor Setup**: Setting up the sensors for each station; defining their types, names, and the ports to which they're physically connected on the Station.

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3. **Activation**: Powering up the station, or resetting it, and checking if CCMobile is receiving readings from the stations
4. **Configuration**: Setting up the alerts, station's properties, and operation mode

Registration:

The following steps register the Model5 station to ConnectedCrops Cloud using a station name of your choice and its unique serial number.



Figure 11

Using the QR Code

- in the **Station Name** field, enter a name that reflects the station's location. This will make it easier to manage if you're using multiple stations. (e.g., "East Field")
- press the **Scan QR Code** button to scan the QR code on the back of the station. If presented with a pop-up alert to allow the CCMobile to access your camera app, please select "Allow"
- if allowed, the phone's camera will be launched
- scanning the QR code label will automatically populate all the registration fields
- Click the **Register** button to complete the process

Manual Entry

NOTE: If you DENY access to the camera, you must manually enter the registration information from the QR code label on the side of the station using the phone's onscreen keyboard

1. if you do not use the QR code or have issues with your camera, you may enter the details of the station manually. To do this, click on the down arrow next to **Type in the details manually**
2. this will present the user with two fields: the **Serial number** and the **HW version**. Fill in these two fields using the information on the QR code label
3. the moment the **HW version** field is entered, additional fields for entering the **BL Version**, **FW Version**, **ICCID** and **MFG Date** fields will appear. (Note: all Model5 models have a HW version starting with "5."). Populate these fields using the information on the QR code label

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4. click the Register button at the bottom of the screen
5. if the registration process is successful, the CCMobile App will display the message **Station was registered successfully to the system. Let's get the readings!** Press the OK button and proceed to the next step of the registration process
6. if you receive the message **Station was already registered**, it means the ConnectedCrops Cloud believes this Model5 station is already connected. If this occurs, email support@connnectedcrops.ca with your contact information and the **Model5** serial number and we will assist in identifying the issue

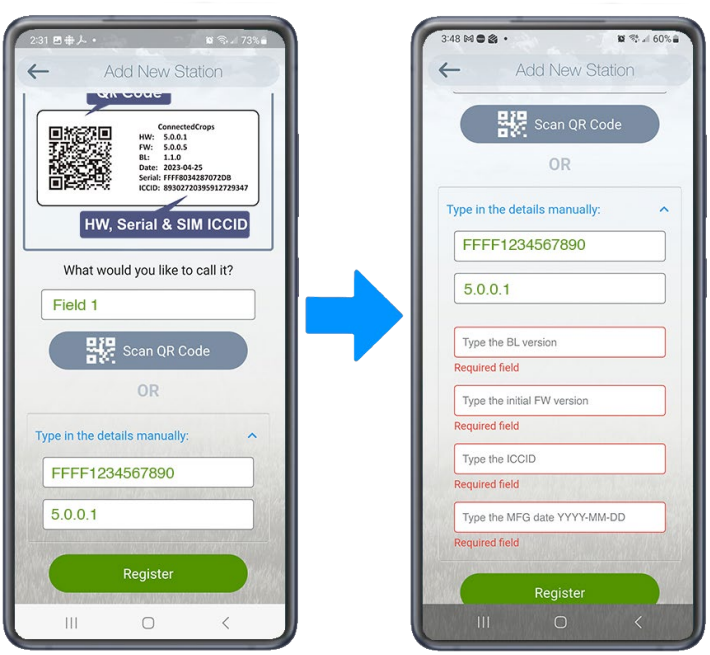


Figure 12

Sensor Setup:

This step of the registration process will define what types of sensors are connected to the station and to which ports.

- select the Port 1 radio button and select the radio button next to the sensor that is connected (or will be) connected to that port
- a default name will be provided for the sensor, but you can provide a sensor name that better reflects the sensor use or location (Ex. Soil Moisture at 8" or Temp at fruiting zone)
- click Save changes to port 1 button to save and move to the next port
- you will receive the popup message **Sensor in Port 1 is configured!** Press the OK button on the popup
- repeat these steps to set up ports 2 – 4. If one or more ports on the station will not have sensors attached to them, leave the radio button for these ports set to None

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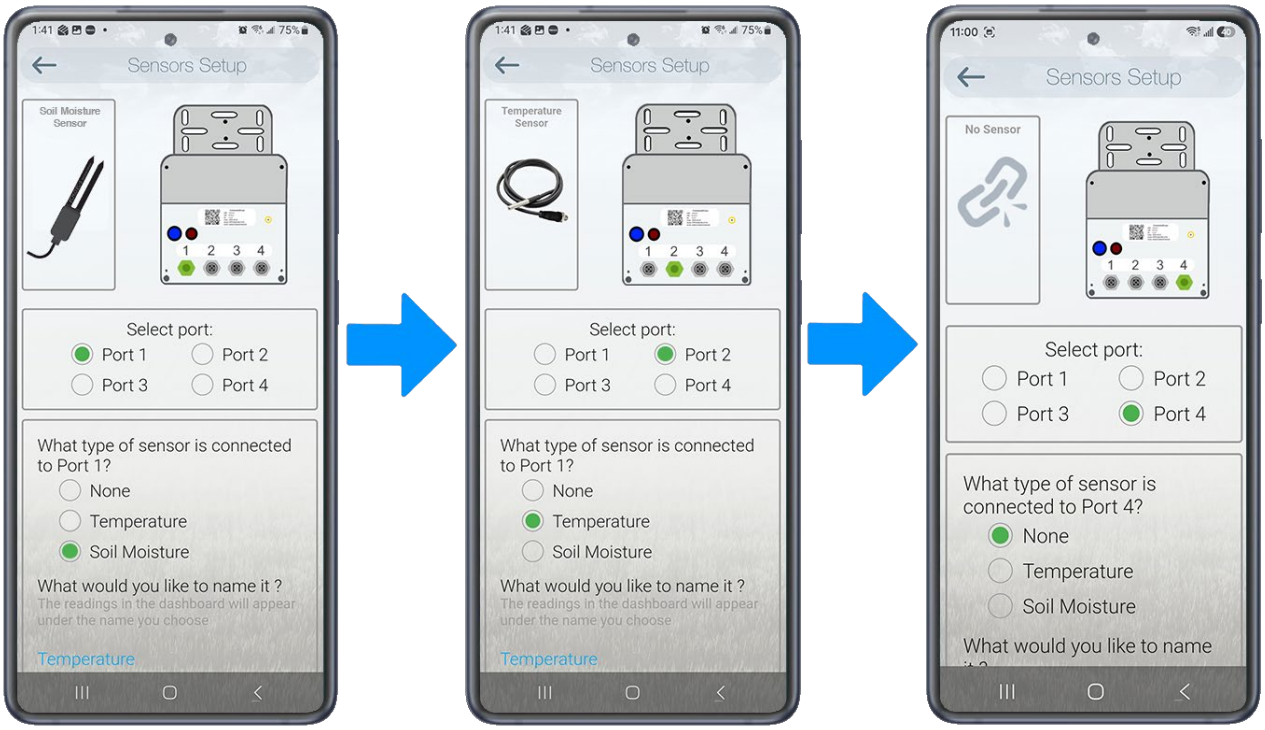


Figure 13

Activation:

The following steps will activate the station to start the data collection process.

- make sure that you are in an area that has good mobile coverage
- at this time, ensure that the antenna is connected, and the sensors are connected to their correct ports
- connect the fuse if it wasn't already connected, or press the Reset button on the back of the station if the fuse was already connected
- press the Next button in the CCMobile App
- a countdown timer will be displayed as the station starts up (if the fuse was just inserted), the communication link between your station and the ConnectedCrops Cloud is established, sensor readings from the station are sent to the cloud and the mobile app is able to retrieve this information from the cloud
- if you get an error message, check the listed steps to guide you through solving the issue. Then, using your finger, pull the screen down to refresh and try getting the readings again or you can also press 'Back' and press 'Next' again.

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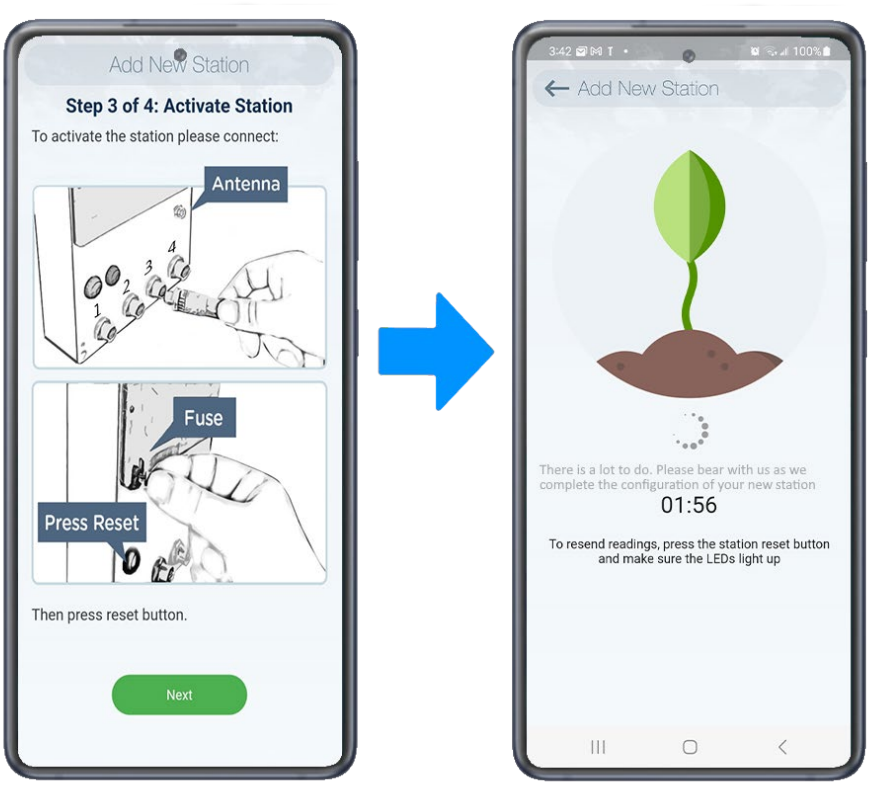


Figure 14

Please check the troubleshooting section if you are facing issues while activating your station

- ConnectedCrops recommends you test the sensors before installing them in their in-field locations. For example, try to dip the temperature/soil moisture sensors in water and check the readings. Soil moisture should be close to 60%, and the temperature will depend on the water being hot or cold
- you can monitor the lights on the Station during the registration process to ensure the Station is working correctly:
    - the battery light should illuminate blue during the registration process indicating there is enough battery charge to transmit the data required for the process
    - the cellular signal light will transition from flashing on /off blue to continuous blue illumination during the registration process
    - the light labeled 2 will illuminate blue during the registration process. If one or more of the sensor ports has been configured to have a sensor connected to it, but the sensor is not connected, this light will illuminate red.

      NOTE: the logic to determine the colour of the LED 2 light is a combined effort between the ConnectedCrops Cloud server and the Station; therefore, it will take

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2 complete communication cycles to for the LED 2 light to correctly determine what colour this LED light should be.

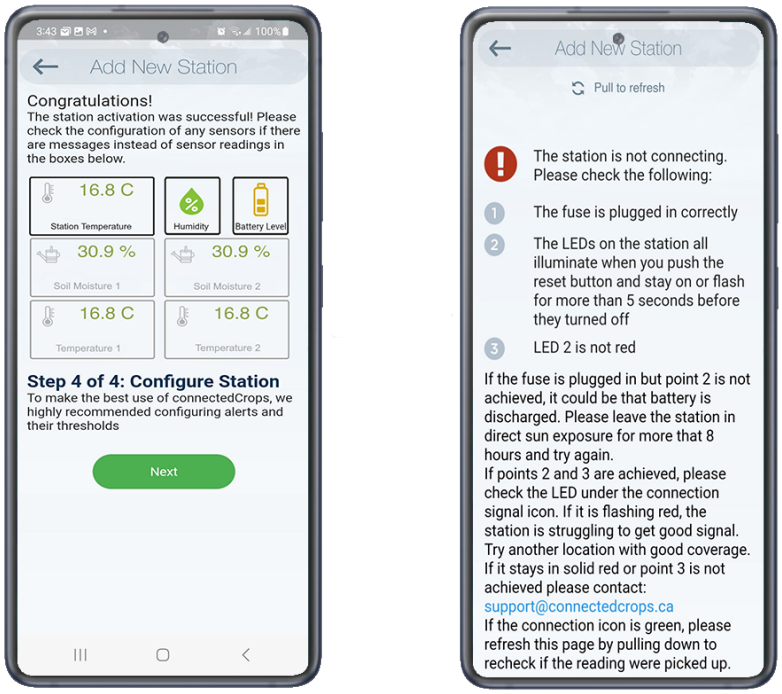


Figure 15

- once you receive the Congratulations screen, your ConnectedCrops Station is now active and correctly communicating sensor data
- press the Next button to proceed to step 4

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Station Configuration:

To take advantage of all that ConnectedCrops platform has to offer, the Model5 should be configured according to your unique needs. The following configuration options are available to customize your ConnectedCrops experience. These steps can be completed immediately after the Model5 has been activated or later using the Settings tab on the CCMobile App menu.

Rename Station

- Pressing on Rename Station will allow a user to change the name of this station. This may not be necessary when setting up the station for the first time, but if the station is moved to a different location later, this may be helpful

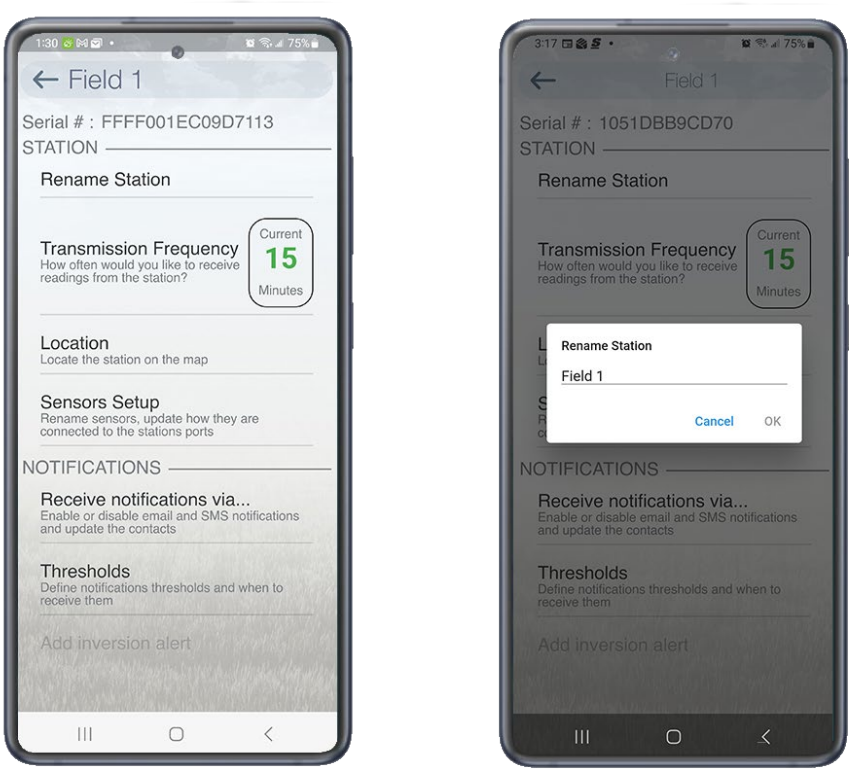


Figure 16

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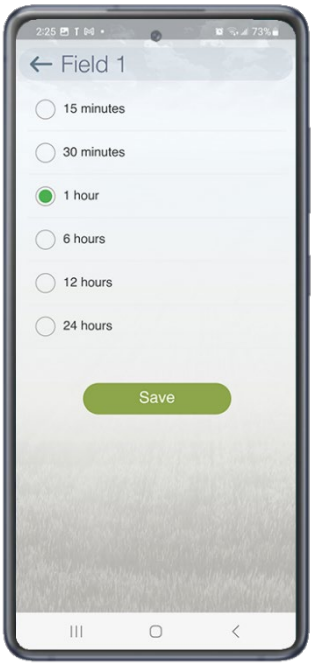


Figure 17

Transmission Frequency

The Model5 has a default transmission frequency that can be adjusted to specific intervals. Click on Transmission Frequency or the current interval number to display the list of frequencies available. Once selected, select the Save button. When the next communication cycle occurs, the new Transmission Frequency will be downloaded and used in all future communication cycles.

The user should consider the following factors when selecting the transmission frequency:

- how quickly the environmental conditions being monitored can change. Temperatures can change quickly while soil conditions change much slower. Adjust the transmission frequency according to the sensors on the station
- when using the Model5 for frost detection, a more frequent temperature update is necessary, however, temperature changes in the summer month are less critical to farm operation decisions, so a less frequent update can be set during the growing season

NOTE: The more frequent the data transmission, the more load on the Model5's battery

Location

- pressing on Location will display a popup requesting to use your phone's GPS location services if this is the first time this feature has been used. Select While using the app when presented with the popup
- pressing on Location after the first use will display the map directly
- when the map is displayed, a pin will be placed at the precise coordinates as detected by your phone. When standing beside your Model5 station in the field where it is installed, this pin will then also represent the location of your Model5 station
- with the pin displaying the location of the station, click on the Save button

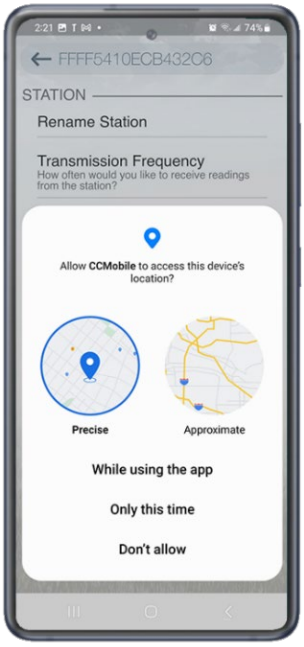


Figure 18

NOTE: This step should be performed while standing beside the station AFTER the station has been installed in the field. You can come back to this Configuration step later.

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Sensors Setup

The Sensors Setup feature allows a user to modify the sensor connected to a specific port. Specifically, a user can:

- define if a port has a sensor connected to it
- change the name of the sensor in the port

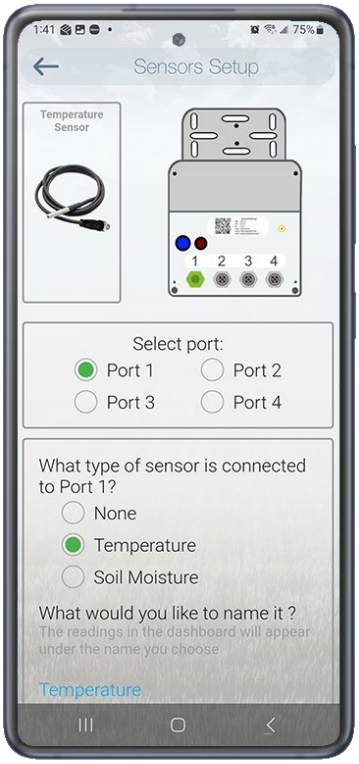


Figure 19

Receive notifications via…

- pressing on Receive notifications via … allows a user to specify how and when to receive sensor alerts and monthly sensor reports
- use the slider to enable **Blackout Periods** during which time users will not receive email, SMS text or phone call alerts (but will continue to receive silent push notifications)
- use the slider to enable Email alerts. The email address used during registration will automatically be prepopulated in the email address field. You can add additional email addresses by clicking on the + Add More button. The email address format is example@email.com. Each field holds one email address only

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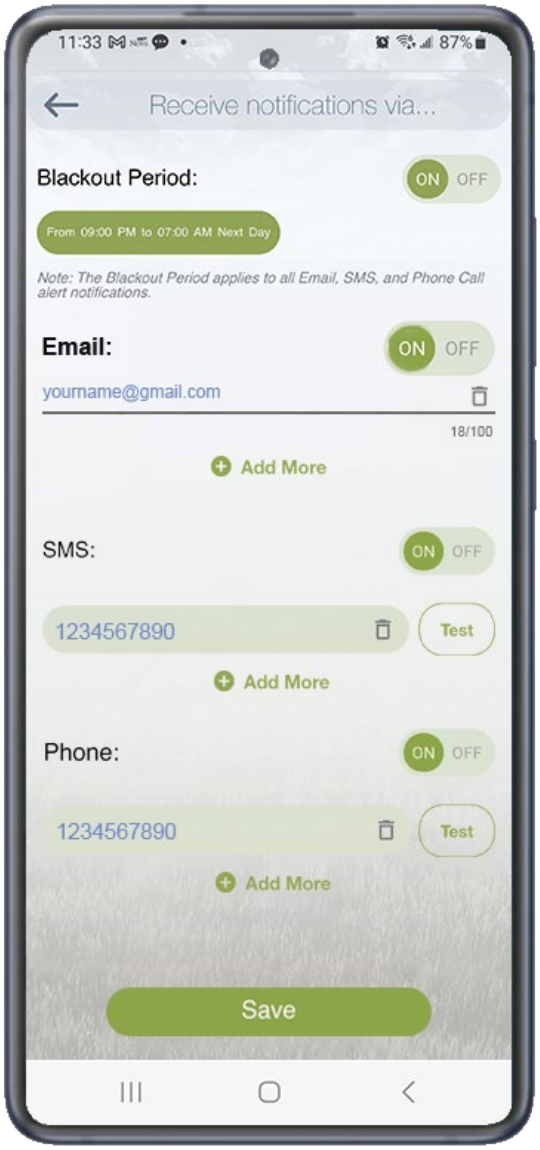


Figure 20

Email Alerts

Moving the **Email:** slider to the ON position (Figure 20) allows a user to enter one or more email addresses where alerts notifications will be sent when a sensor exceeds a defined threshold or when other important station events occur.

- Moving the **Email:** slider to the ON position will display a field to enter an email address
- Enter an email address ensuring the spelling is correct. The email address format is example@email.com. Each field holds one email address only
- You can add additional email addresses by clicking on the + Add More button and remove email addresses by clicking the garbage can button beside the address
- To disable all Email alerts, move the **Email:** slider to the OFF position

SMS Alerts

Moving the **SMS:** (Text Message) slider to the ON position (Figure 20) allows a user to enter one or more phone numbers to which SMS messages will be sent when a sensor exceeds a defined threshold or when other important station events occur.

- Moving the **SMS:** slider to the ON position will display a popup field to enter a phone number (Figure 21)
- Touching in the Enter phone no field will display the on-screen keyboard for entering the phone number
- Enter a mobile phone number in the popup. The phone number format must be all numbers, no spaces or characters, and only a "+" sign is allowed at the beginning. (e.g., +14161234567, 14161234567 or 4161234567). Each field holds one phone number only
- Click the Next button on the popup

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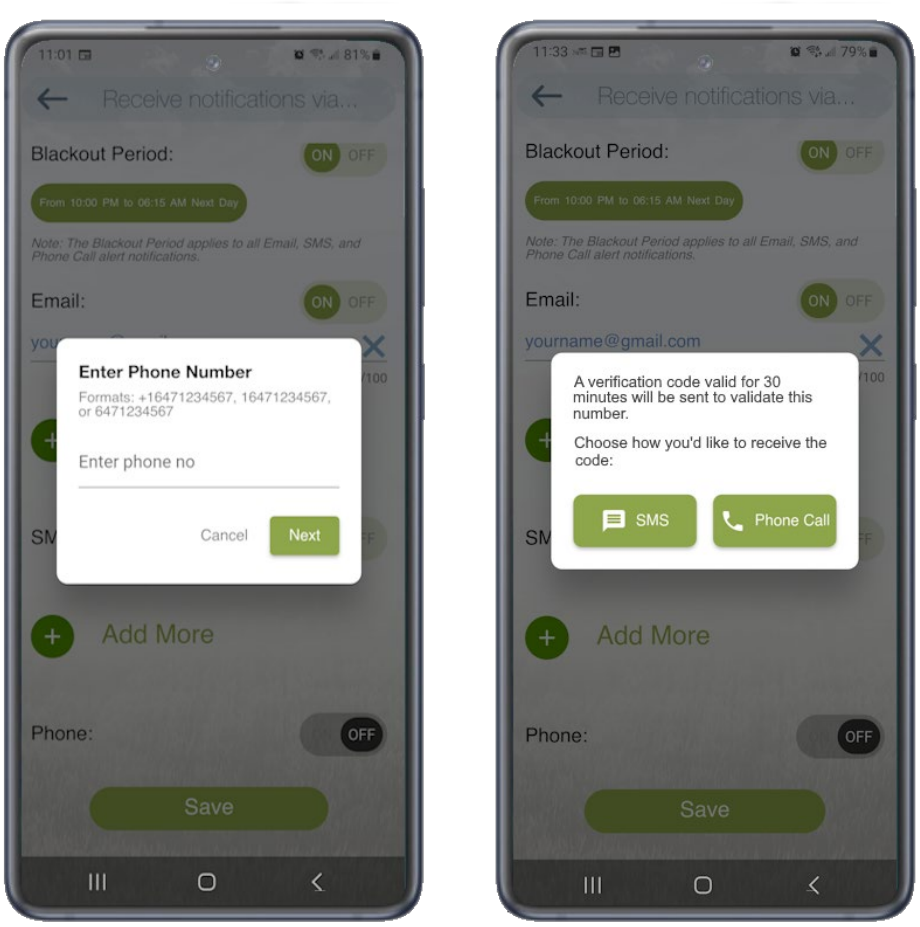


Figure 21

- A popup will be displayed (Figure 21) to validate the phone number being entered. Clicking on the SMS button will send a verification code via SMS to this number. Clicking on the Phone Call button will result in a call to the number with the verification code

> NOTE: If the **Phone call** option is chosen, it may take several seconds after answering the call before the voice message begins and the verification code is provided. Please be patient.

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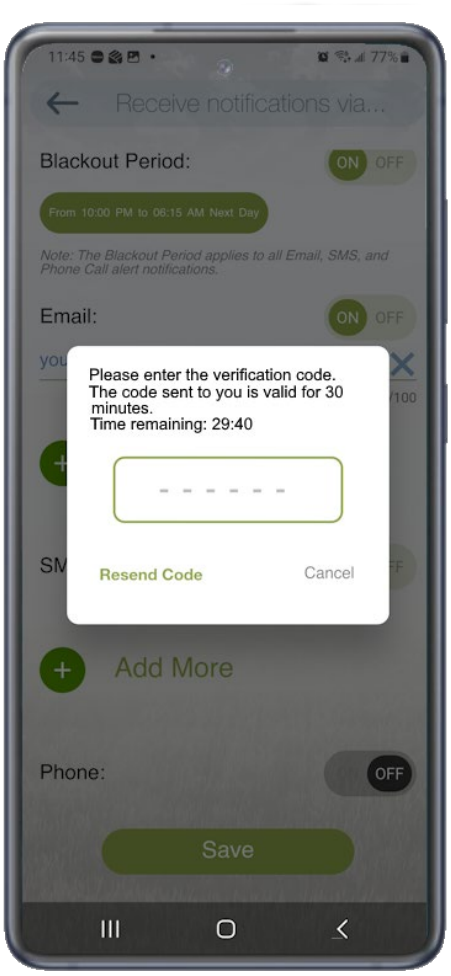


Figure 22

- After clicking on the SMS button or Phone Call button, a new popup will be displayed (Figure 22)
- Touching in the code box field will display the on-screen keyboard for entering the validation code provided. When the 6th digit of the validation code is entered, the screen will automatically return to the **Receive notifications via ...** screen (Figure 20)
- The validation Code is valid for 30 minutes
- Click on the Save button at the bottom of the screen
- You can add additional mobile phone numbers by clicking on the + Add More button
- You can remove a phone number by clicking the Garbage Can (🗑) button beside the number
- You can test that an SMS will be delivered to this phone number by clicking on the Test button beside the number

Phone Call Alerts

Moving the **Phone:** slider to the ON position (Figure 20) allows a user to enter one or more phone numbers to which a Phone call will be placed when a sensor exceeds a defined threshold or when other important station events occur.

- Moving the **Phone:** slider to the ON position will display a popup field to enter a phone number (Figure 21)
- Touching in the Enter phone no field will display the on-screen keyboard for entering the phone number
- Enter a mobile phone number in the popup. The phone number format must be all numbers, no spaces or characters, and only a "+" sign is allowed at the beginning. (e.g., +14161234567, 14161234567 or 4161234567). Each field holds one phone number only
- Click the Next button on the popup

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- A popup will be displayed (Figure 21) to validate the phone number being entered. Clicking on the SMS button will send a verification code via SMS to this number. Clicking on the Phone Call button will result in a call to the number with the verification code
- After clicking on the SMS button or Phone Call button, a new popup will be displayed (Figure 22)
- Touching in the code box field will display the on-screen keyboard for entering the validation code provided. When the 6th digit of the validation code is entered, the screen will automatically return to the Receive notifications via … screen (Figure 20)
- The validation Code is valid for 30 minutes
- Click on the Save button at the bottom of the screen
- You can add additional mobile phone numbers by clicking on the + Add More button
- You can remove a phone number by clicking the Garbage Can ( ) button beside the number
- You can test that an SMS message will be delivered to this phone number by clicking on the Test button beside the number

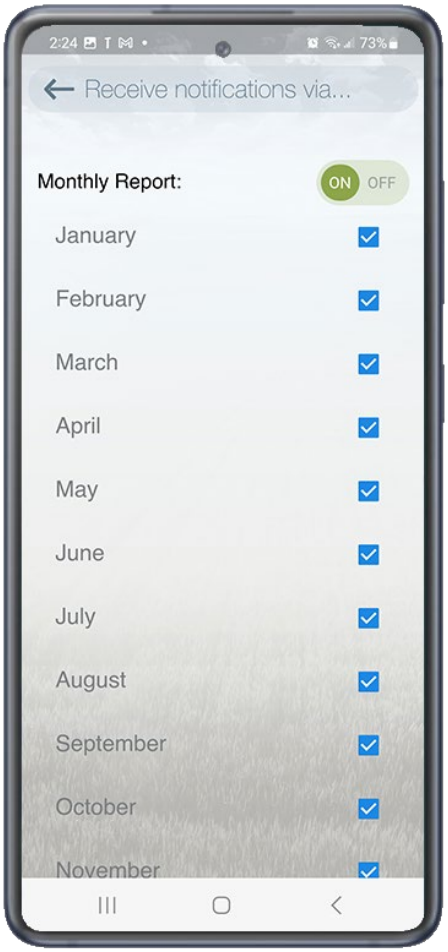


Figure 23

Monthly Reports

On the Receive notifications via… page, a user can also define the months that they would like to receive a monthly sensor report for this station. The monthly report provides a chart showing the sensor readings for the past month in PDF format. It also includes the raw sensor data in Excel® format so users familiar with Excel can perform their own spreadsheet data analysis.

To enable receiving monthly reports (Figure 23):

- move the **Monthly Report:** slider to the ON position
- select the checkboxes beside the months you would like to receive a report
- Click on the Save button at the bottom of the screen
- To disable a Monthly Reports, move the **Monthly Report:** slider to the OFF position

NOTE: For all changes made on the Receive notifications via… page, ensure you press the Save button at the bottom of the Receive notifications via… page before returning to the previous page.

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NOTE: Monthly Reports will only be sent to email addresses listed under Emails:. If no email addresses have been provided, the Monthly Report will not be sent even if the feature is enabled

Thresholds

Sensor thresholds are target values for an individual sensor that, when reached or exceeded, will trigger an email, SMS text message, and/or Phone Call notification. These alerts will only be sent to the listed email addresses and phone numbers IF they have been enabled in the Receive notifications via … screen.

Pressing on Thresholds takes the user to a screen that identifies all the sensors on the selected Model5 station. From this screen, the user can select the specific sensor on which they wish to define or modify the thresholds.

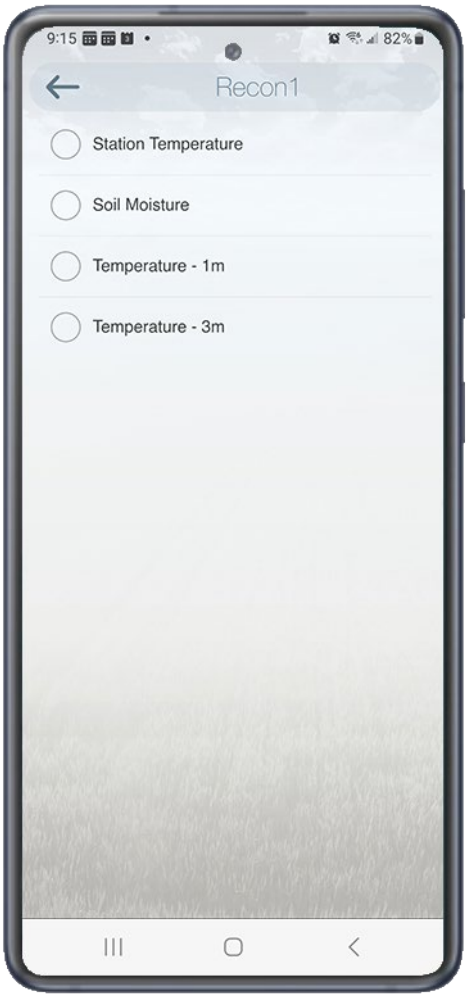


Figure 24

No matter what type of sensors are connected to the Model5 station, the user will always see a Station Temperature sensor. This is a temperature sensor embedded in the Model5 station. Because the Model5 is an ultra-low power system that generates minimal heat, the temperature reading from the built-in Station Temperature sensor will closely match the readings provided by any external temperature sensor connected to the station. This effectively serves as a third sensor, which can be especially useful if the sensors connected to the two external ports do not measure outside air temperature.

Threshold values can be customized for each sensor as follows:

- select the radio button beside the sensor you wish to configure
- To modify a temperature sensor's threshold value:

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- Use the + or – buttons to adjust the **Temperature is above** and **Temperature is below** threshold values
- Email and/or SMS alert notifications will be sent out when the temperature is above the **Temperature is above** value or below the **Temperature is below** value
- click on the **Save** button

- To modify a soil moisture sensor's threshold value:
  - Select soil type from the drop-down list. This will populate default VWC% threshold values for **Wilting point**, **Field capacity**, **VWC% is above** and **VWC% is below**
  - Use the + or – buttons to adjust the four (4) thresholds to the desired values
  - Email and/or SMS alert notifications will be sent out when the VWC% value is:
    - below the **Wilting point** threshold
    - below the **VWC% is below** warning threshold
    - above the **VWC% is above** warning threshold
    - above the **Field capacity** threshold
  - click on the **Save** button

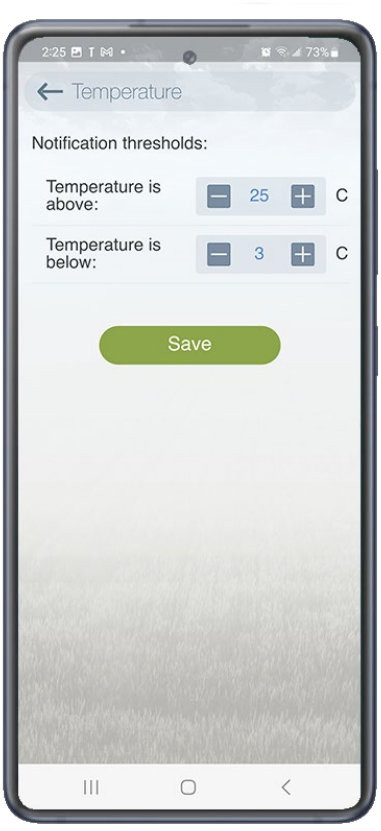


Figure 26

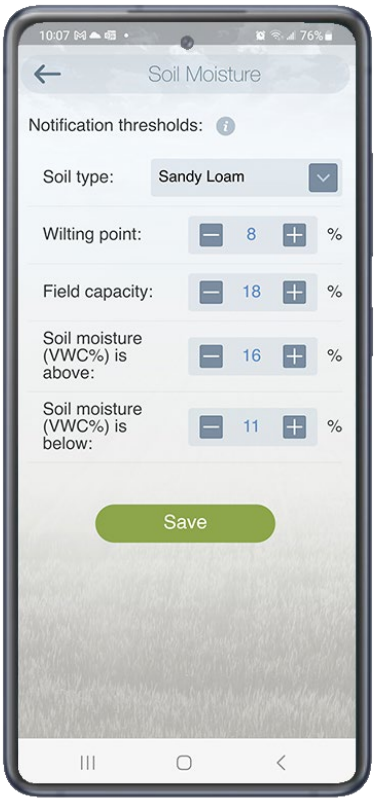


Figure 25

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Add inversion alert

NOTE: This option is only available if the Model5 has been configured with two (2) temperature sensors connected.

Pressing on Add inversion alert will display the page for settings temperature thresholds for sending alert notifications if a temperature inversion is occurring.

To configure the thresholds:

- Click on the **Choose sensor …** field under the heading Sensor at the top and select the name of the sensor that is highest above the ground
- Click on the **Choose sensor …** field under the heading Sensor at the bottom and select the other sensor
- Use the + or – buttons to adjust difference between the two sensor readings which will trigger a temperature inversion alert notification to be sent

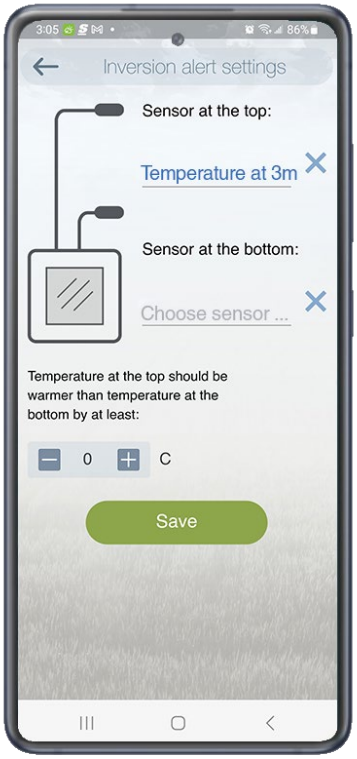


Figure 27

2.2.6 Choosing a location

With the Model5 now activated, it is ready to be installed in the field. Choosing the correct location in a field is critical to getting the most accurate and reliable information for basing your decisions. Consider the following when choosing a location to install the Model5:

For all sensor types

- make sure that the location has a strong **cellular/mobile internet connection**. Use the signal strength bars on your phone to determine if the cellular service is strong enough in the location. Attempt a call to ensure you have a strong, clear signal;
- install the Model5 **away from heavy machinery routes** (e.g., harvesting machines, sprayers, etc.). If the Model5 cannot be moved away from these routes, unmount the Model5 prior to equipment movement to avoid damaging the Model5 and sensor cables;
- make sure to use the **location mapping** feature in the CCMobile App to record the precise installation location. Once the crop is in full foliage or if crop covers are installed, it can be hard to find the Model5;
- **NEVER** leave the Model5 on the ground. While the Model5 enclosure provides strong ingress protection from water, a Model5 lying in water for a prolonged period can result in damage to the internal electronics;
- Make sure the Model5 is sending data from this location, and the data is being transmitted to the CCMobile App before mounting the Model5.

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For all temperature sensor models

- select a spot that is not protected by trees, hedges or buildings. These can skew the temperature readings when winds are coming from specific directions. If possible, the Model5 should be located away from any wind obstructions;
- do not allow the temperature probe end to remain in contact with metal object (like metal poles/stakes). These can result in skewed temperature readings. Use tie wraps or cable ties to keep the probe ends away from these objects.

For all soil sensor models

- Identify the soil type in the field, as soil moisture retention varies significantly depending on it. An incorrect soil type setting can result in inaccurate readings for soil moisture, electrical conductivity (EC), unreliable alerts, and poor irrigation decisions;
- If the field contains a transition between two distinct soil types, consider installing a second station to ensure accurate data collection across both soil conditions;
- Choose a location that accurately represents the majority of the field. Avoid placing the Model5 in the following areas:
  - High spots: soil moisture and EC values may be lower than other parts of the field
  - Low spots: soil moisture and EC readings may be unusually high
  - Sloped areas: runoff can prevent water from soaking into the soil

For the most accurate readings, install the device on flat, level ground.

2.2.7 Step 7: Install the Solar Panel in the field

The following procedures assume that the Solar Panel and the ConnectedCrops Station will be mounted on the same pole. If they will be mounted on different supports, the same installation instructions apply but you must ensure the Solar Panel and the ConnectedCrops Station are close enough to each other so the solar panel extension power cable can reach between the two.

Since the Solar Panel will be mounted higher than the ConnectedCrops Station when mounting both onto a single pole, it is best to mount the Solar Panel first to avoid potentially damaging the station.

Once installed, the solar panel and ConnectedCrops station will look similar to Figure 29.

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Mounting to a Wood Post

If mounting to a wood post, you will need 2 x #10 1¼ (or longer) wood screws and a cordless drill. Attach the Solar Panel Mounting Bracket (with the solar panel already attached) to the wood post by screwing the 2 wood screws through the 2 small holes in the Solar Panel Mounting Bracket and into the wood post. Ensure the solar panel is oriented as best as possible to obtain the most direct sunlight possible.



Figure 29

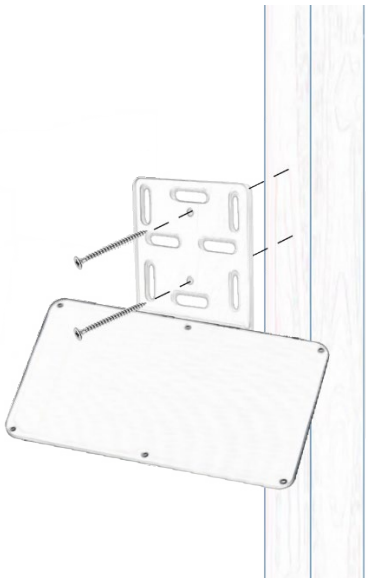


Figure 28

Mounting to a Plastic Pole

If mounting to a plastic pole, the 2 simplest options available are Hose Clamps and U-Clamps.

These clamps can use the vertical or horizontal slots in the mounting bracket to attach the Solar Panel Mounting bracket to the pole. The size of clamp you will need will depend on the diameter of the pipe it is being attached to.

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Figure 30

You can use either 1 or 2 clamps to affix the mounting plate to the pole.

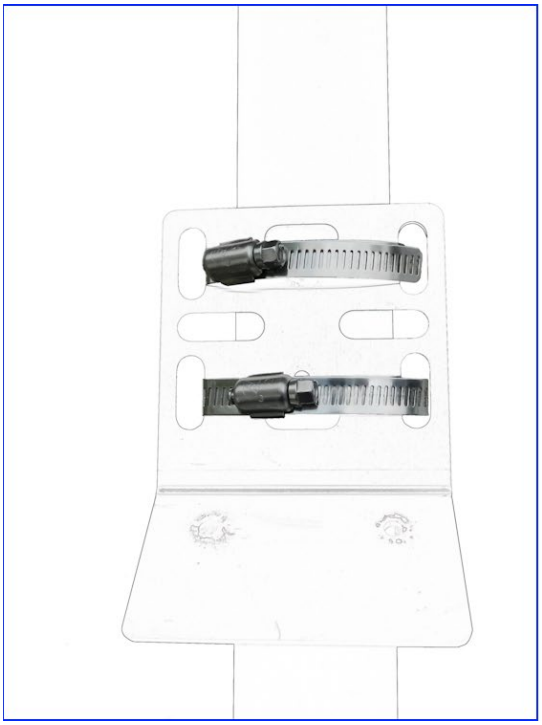


Figure 31

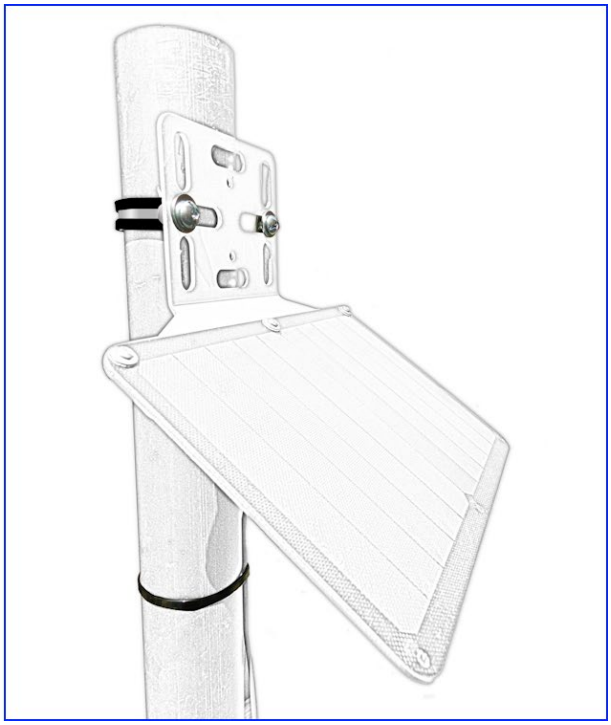


Figure 32

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2.2.8 Step 8: Install the Model5 in the field

Mounting the ConnectedCrops Station to a post can be performed with the same method used to mount the Solar Panel.

TIP: When mounting the ConnectedCrops Station to the post, it is easiest to install the ConnectedCrops Mounting Bracket WITHOUT the station attached to it.

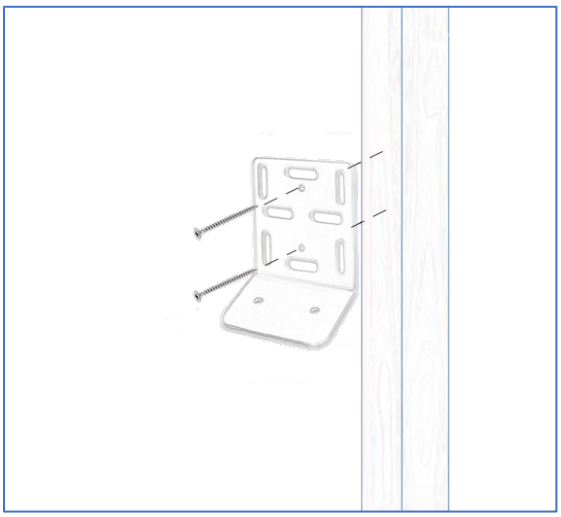


Figure 33

Mounting to a Wood Post

If mounting to a wood post, you will need 2 x #10 1¼ (or longer) wood screws and a cordless drill. Attach the ConnectedCrops Mounting Bracket (without the Station attached to it) to the wood post by screwing the 2 wood screws through the 2 small holes in the Mounting Bracket and into the wood post.

Make sure the ConnectedCrops Station is close enough to the Solar Panel so that the extension power cable from the Solar panel assembly can reach the station.

Mounting to a Plastic Pole

If mounting to a plastic pole, the same type of clamps used to mount the solar panel assembly can be used to affix the ConnectedCrops Mounting Bracket to the pole.

For ease of installation of the sensors, disconnect the sensors from the Stations. Remember which port each of the sensors was connected to simplify the reinstallation of the sensors later.

Attach the ConnectedCrops Station to the ConnectedCrops Mounting Bracket using the two ⅝ hex bolts, lock washers, and nuts. Use a 10 mm ratchet, adjustable wrenches or pliers to tighten the bolts.

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2.2.9 Step 9: Install the sensors

The sensor installation instructions differ according to what you're measuring, the type of the sensor, and where you are installing them.

Temperature Sensors:



Figure 34

Temperature sensors can be installed in air, water, or soil as follows:

To measure **air** temperature:

- choose where to install the high-accuracy temperature sensor(s) based on the conditions you want to measure. For example, Grape growers may want to place temperature sensors at the top of the canopy and at the fruiting zone to understand what temperature the grapes are experiencing, accounting for shade and wind effects. They could also mount one high on the wind machine and another in the fruiting zone to monitor for temperature inversion. Berry growers may want to mount temperature sensors inside and outside of the protective cover so they can understand the efficiency of the protective cover and its effect on the yield. In cold climates, root vegetable growers have placed temperature sensors in the ground to see when the ground gets too cold in an effort to investigate what they can do to extend their growing cycle.
- make sure it's not close to any metal and take notice if the location is in shade or direct sunlight which can impact the temperature reading. Also, avoid installing the sensors and the station on the route of heavy machinery, like harvesting machines, as it may damage the sensor cables.
- use cable ties or electric tape or similar products to fasten the sensor probe in the location of your choice. You can gently wrap the probe around the wire or the post to which you're mounting. If you're planning to move the station, make sure the fasteners can be removed without damaging the sensors.

To measure **water** temperature:

- the temperature sensor is a probe with a metal tip. Dip the metal tip in the water making sure the Station stays dry and away from the water. The Station is designed to be weatherproof but not for working while submerged.
- fasten the probe gently using cable ties or electric tape making sure it is not pulled too hard from the station which may harm the cable or the connector, which may prevent the Station from getting readings.

To measure **soil** temperature:

- follow the installation steps for installing the soil moisture sensor.

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Soil Moisture Sensors:

The soil moisture sensors are pre-calibrated for mineral soil and will work in most growing conditions, even extremely cold weather. In extremely cold weather, it is expected the reading will show dry if the moisture in the soil is frozen.

These sensors need a different kind of calibration for soils with high organic content or potting soil (e.g., with compost). Using them as is in such soils will not provide accurate readings. For measuring soil moisture in these conditions, contact support@connectedcrops.ca.



Figure 35

To help protect these sensors from damage from farm machinery, the soil moisture sensor should be enclosed in ABS piping that is partially buried in the ground and extends at least 18 inches (45 cm) above the ground surface. The ABS piping should have a minimum of 1" inside diameter but can be larger if desired. If you are installing 2 or more soil moisture sensors, they can all be enclosed in the same ABS pipe.

To determine the length of pipe you need, the following formula can be used:

TIP: Minimum length of ABS Pipe required = (Depth of shallowest soil moisture sensor) + 16 Inches

When installing the soil moisture sensor, it is important to maximize contact between the sensor and the soil. If the soil moisture sensor is placed in very loosely compacted soil, it will not return an accurate reading of the Volumetric Water Content percentage (VWC%).

To install a sensor:

1. dig a hole to the desired depth using an auger, shovel or post hole digger
2. label the top of the sensors near the connectors so you easily identify each sensor;
3. feed one end of the sensor cable down through the ABS pipe until the sensor cable protrudes through both ends of the pipe;
4. push the prongs on the sensor into undisturbed soil in the sidewall of the hole. Make sure that the prongs and black over-molding of the sensor prongs are buried completely. The sensor may be difficult to insert into extremely compact or dry soil. If you have difficulty inserting the sensor, try wetting the soil. NEVER pound the sensor into the soil;

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5. the sensor must be oriented vertically in the soil as shown in the diagrams. Orienting the flat side perpendicular to the surface of the soil will minimize effects on downward water movement and water pooling on the sensor prongs;
6. if possible, develop a pattern of orienting the direction of the prongs so that if you needed to dig up the sensor in the future, you can take it out safely and easily (e.g., always orienting the prongs directly away from the post or always orienting the prongs facing North);
7. while holding the ABS pipe so that it is just above the shallowest soil moisture sensor, carefully begin to back fill the hole with soil;
8. carefully pack down the soil as you backfill the hole to match the bulk density of the surround, leaving enough length of the conduit above the ground (around 18 inches or 45 cm);
9. fill the ABS pipe with soil too to prevent it from accumulating water or filling with other debris, or cover the ABS pipe top with electrical tape;
10. gather any loose length of exposed cable from the sensor and, using cable ties or rope, secure it to the post;
11. inspect any exposed cable from the sensor(s) to ensure they are not in danger of being damaged by equipment or will not be tripped over by workers. Provide additional cable security as needed; and
12. connect the sensor to the station if it was disconnected for installation.

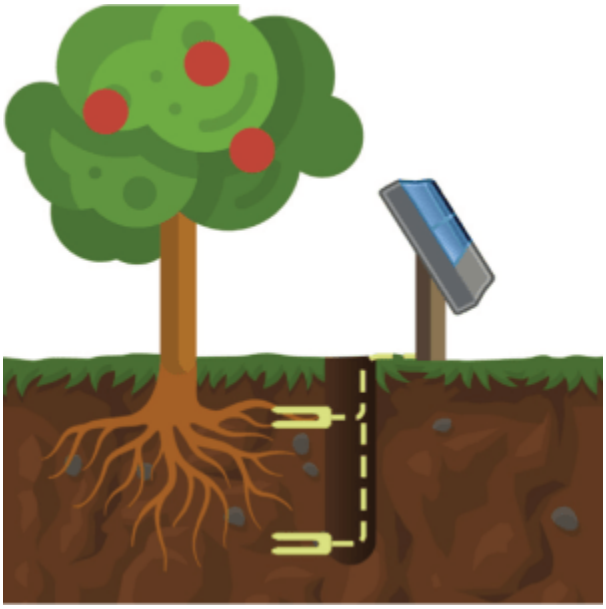


Figure 36



Figure 37

To Remove a soil moisture sensor

Dig carefully around the sensor to make sure you don't break it. If you followed step 5 of the sensor installation steps, you should know the orientation of the prongs. When removing the sensor from the soil, do not pull it out of the soil by the cable! Doing so may break internal connections and make the sensor unusable.

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Protecting sensor cables – Buried cable indicators

Do not install a soil sensor directly at the base of the pole or post the Model5 is mounted to. The presence of the pole or post so close to the sensor can impact the water flow and lead to inaccurate soil moisture and soil EC readings. The soil sensor should be installed at least 1 metre (3 ft) from any post or pole that could affect the water flow.

It is NOT recommended leaving the 1 metre length of cable from the sensor to the Model5 station lying exposed on the ground. It should be buried in a trench to protect it from passing farm equipment.

This buried cable is still prone to damage by shovels from farm workers who may be unaware of the cable's existence. It is recommended placing markers along the path where the cable is buried. Coloured flag markers can be purchased online and provide a simple indicator to workers to be careful while digging in this area.

Removing soil sensors

Dig carefully around the sensor(s) to make sure you don't break it. If Step 7 of the sensor installation process was followed correctly, the orientation of the prongs should already be known, making it easier to determine the appropriate location for digging. When removing the sensor from the soil, do not pull it out by the cable! Doing so may break internal connections and make the sensor unusable.

Confirming the Installation

With the deployment process completed, field conditions can be monitored through the CCMobile App. To check this:

- Open the CCMobile App on your phone
- Press and hold the **Reset** button on the side of the Model5
- Wait for approximately 3 minutes for the Model5 station to collect the sensor data and transmit it to the ConnectedCrops server
- Place your finger on Pull to refresh at the top of the screen and pull your finger down the screen to force the CCMobile App to download the latest data from the ConnectedCrops server

Once the screen has refreshed:

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- The Last Communication value should indicate 0 minutes ago
- Some of the sensors may have been updated with different values



Figure 38

Congratulations

You've successfully registered and deployed the Model5 station

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3: Power and Recharging

3.1 Model 5 Transmission Frequency

On the Model 5 station, the largest factors affecting power consumption are:

- The sensor(s): the time and energy required to power up the sensor, request and receive data, and power off the sensor
- The modem: transmission of the data to the ConnectedCrops server

The power used by the modem is directly related to how often the data is transmitted (the Transmission Frequency).

On the Model 5, the transmission frequency can be set by the user through the CCMobile App. The more frequent the Model 5 communicates data, the more battery power is used. On sunny, summer days, the recharging capabilities of the solar panel will be more than adequate to keep the battery fully charged However, in early spring and late fall, when days are shorter, or on prolonged periods of overcast days, the solar panel may not be able to keep up with the needs of the station. Consider setting the transmission frequency to the longest period needed to reduce the possibility of the battery decreasing below the minimum threshold for communication.

To determine the transmission frequency for your Model 5 model:

- click on the Settings button on the bottom menu
- select Configure Station
- select your station from the list of your available stations

The transmission frequency will be displayed on this screen.

3.2 Data transmission and Battery Level

How the Model 5 functions depends on what the current battery level is:

- If the battery level is above 20%, the Model 5 will operate normally and transmit data at its defined transmission frequency
- if the battery falls below 15% of full charge:
    - the Battery LED light will be solid Red during the data transmission cycle

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    - the Model 5 will only send the most recent sensor readings. If some older data has been placed in the queue, this data will not be sent to preserve the battery. The queued data will be sent when the battery level returns above 15%
- if the battery falls to between 3% and 7% of full charge:
    - the Battery LED light will flash Red during the data transmission cycle
    - the Model 5 will not transmit any data to the ConnectedCrops Cloud but will continue to gather data from the sensor(s) and hold the data in the queue
    - on the CCMobile App, the user will see that the Last Communication Time value will be a date in the past
- if the battery falls below 3%:
    - the Model 5 will go into a deep sleep mode. The Model 5 will show no activity if the Reset button is pressed and no data will be gathered from the sensor(s)

3.3 Battery Recharging



Figure 39

Included with your Model 5 is a battery charger. Depending on the charger supplied, it may may included a number of adapters of different sizes. The Model 5 charging port requires a 3.5*1.35mm plug. If the plug on the charger supplied does not fit into the Model 5 charging port, find and attach the 3.5*1.35mm adapter (red tip) supplied with the charger and connect it onto the end of the base connector.

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4: Troubleshooting

Depending on what you are trying to do, there are several ways to troubleshoot a Station. In all cases, check the status indicators on the Station. ConnectedCrops Stations are provided with 4 bi-colour LED lights on the front cover for status indication and troubleshooting. They will be either red, blue, or not illuminated.

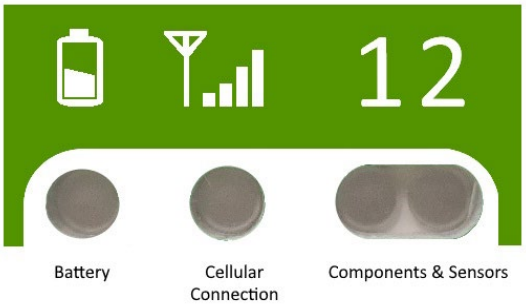


Figure 40

4.1 LED Lights Guide

While the Station is in its 'Wake' state, the lights illuminate and flash to indicate the status of their respective features. While the Station is in its 'Sleep' state the lights are not illuminated to conserve battery power.

Each light indicates the status of a specific feature of the Station: Battery, Cellular connection/communication, Board Components, and Sensors. The Station has 2 states:

- Wake: when the Station is communicating sensor data, and
- Sleep: when the station is performing no activities and operating with the lowest battery consumption possible.

On station initialization (e.g., when the fuse is inserted or after the *Reset* button is pressed), the Station will do a test to validate all components. The LEDs will then flash on and off 5 times to represent the success or failure of the initialization process. If all flashes illuminate blue, the initialization was successful. If all flashes illuminate red the initialization process has failed. The results of the validation test are shown right before the unit sleeps, and this takes anywhere from 30 seconds to 3 ½ minutes to appear.

The following illustrations show the meaning of solid or flashing light sequences for each LED during the 'Wake' phase of the Station.

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4.1.1 Battery LED

Battery fully charged	Solid Blue
Charging (good power to charge)	Blue, Off, Blue, Off, Blue, Off
3 days with no solar input	Solid Red
Low battery – less than 20% charge (flashing red)	Red, Off, Red, Off, Red, Off

4.1.2 Connection LED

Modem Not found	Solid Red
Weak signal / Struggling to connect/ errors from Server/ SIM Card related issues / Errors on Modem	Red, Off, Red, Off, Red, Off
Connecting	Blue, Off, Blue, Off, Blue, Off
Sending / Transmitting	Solid Blue

4.1.3 LED 1: Internal Hardware

All internal components are connected and working well	LED1
It turns off after emitting a blue light	Off
One or more components are not connected	LED1

4.1.4 LED 2: Sensors

All sensors are connected	LED2
One or more configured sensors are not connected	LED2
It turns off after emitting a blue light	Off

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4.2 Troubleshooting Scenarios

4.2.1: Model5 registration issues

(1) Signed up but never got a confirmation email

If you are signing up in the CCMobile App for the first time and you did not receive a confirmation email:

- check your email spam folder
- it is possible you mistyped your email address when registering the first time. Try going through the Sign Up process again

If you still don't receive a confirmation email or you get an error message on CCMobile App indicating that the email address used during your subsequent attempt to signup is already used, please contact support@connectedcrops.ca and supply the email addressed used to register for the ConnectedCrops account.

(2) Station registration error: Station already exists

If you receive a message during the registration process that the Model5 is already registered, perform the following steps to see if you can identify this Model5 station. In the CCMobile App:

- open the CCMobile App on your phone
- click on the Settings button on the bottom menu
- select Configure Station
    - select the first ConnectedCrops station from the list of stations registered to your farm operation
    - look at the Serial # listed at the top of the screen
    - compare this to serial number indicated on the QR Code on the back of the Model5
    - repeat these steps for each ConnectedCrops station registered to your farm operation

If any of your stations has a matching serial number, the Model5 is already registered and cannot be registered again.

If you can't identify the station, please contact support@connectedcrops.ca and supply the Serial Number that is printed on the QR Code on the back of the Model5.

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4.2.2: Model5 communication issues

The Model5 uses a cellular modem to connect to the cellular network available in your area. It will communicate to the Rogers or Bell cellular network depending on the type of SIM card in the station and our conversations with you about the best cellular network in your area.

(1) Station lights are not illuminating during startup

- is the fuse in good shape? If it's broken, the station will not receive power and you will need a replacement, contact support
- was the fuse's cap well sealed, or could it have let moisture in? If moisture got in, it might have caused damage to the station, please contact support
- is the fuse connected properly? There isn't a specific direction for it, just make sure it's pushed in until you feel resistance
- what does the battery % value on CCMobile App interface show for this station. If the battery level goes below 8%, the station's battery may be too low. Leave it in the sun for 3-8 hours (or more if cloudy) and check again.

(2) Model5 has not communicated according to its schedule

The Model5 station lights are illuminating, and the station appears to be functioning, but you don't see any updated data in the CCMobile App:

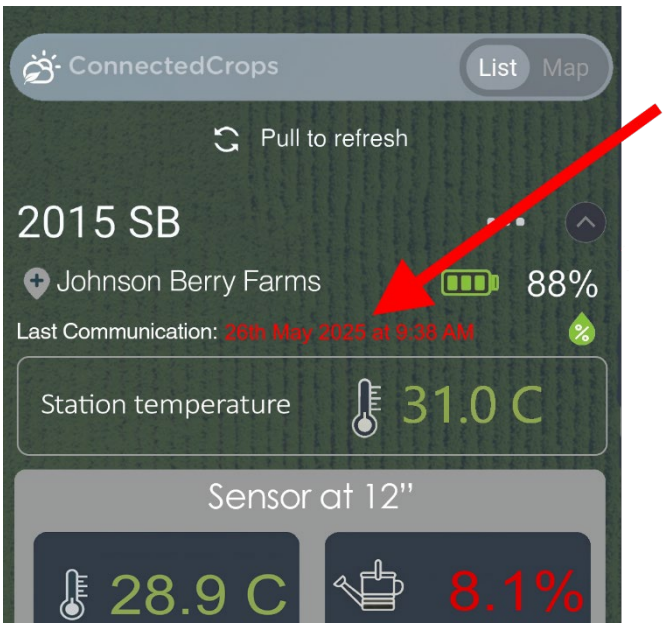


Figure 41

- try to reset the station by pushing the reset button. This will restart the station and attempt to send new sensor readings
- if lights are illuminating on startup, check the state and colour of the battery LED. If it is flashing red it means the battery is too low. To conserve battery power, the station will not attempt to send data to the ConnectedCrops Cloud server if the battery is below 8%. The data is collected as scheduled but stored on the station until the battery has charged sufficiently to send the data. Leave the station in the sun for 4-6 hours and check if the readings have arrived

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- if the battery LED is blue, check the Cellular Connection LED. If it's flashing red, the station is struggling to connect to the cellular network. Confirm, using your mobile phone, if you have a strong cellular signal. If you can a mobile call while standing beside the station, the cellular signal should be strong enough for ConnectedCrops. If it used to work in that location but is struggling now, it could be a temporary issue with the network. Wait for a short period of time and check again;
- if the Connection LED is solid red, it means there is an internal issue with the connection or the SIM card, please contact support
- if none of these solutions corrects your problem, please contact support

4.2.3: Sensor issues

(1) Sensors are connected but show "Sensor not connected"

In the CCMobile App, you may encounter the message "Please connect the sensor" for one (or more) of your sensors. This error is shown if the ConnectedCrops station is not receiving data from a sensor port on the back of the station (Ports 1 - 4) that is configured to have a sensor connected to it. If you think you should not be getting this error, please check the following:

- is the port configured for a sensor (e.g., temperature or soil moisture sensor) and is the sensor connected to that port? If so, is the connector screwed all the way in? Disconnect and re-connect the sensor, making sure you align the pins correctly, and then turn the metal ring around the connector clockwise until you face resistance. Please do not use tools to tighten the connector. The connector can be tightened with your fingers alone. If you feel it offers too much resistance:
    - remove the connector and make sure the pins are straight
    - make sure the Key guide on the sensor connector (male) is properly aligned with the key slot on the station connector (female) when inserting the connector. It helps to rotate the sensor connector around with a light amount of force applied until you feel the slot and key align and the sensor connector inserts up to the threads
    - make sure the threads are properly aligned before connecting the sensor fully. Never apply excessive torque when connecting the sensors as this could mean the threads are not aligned. It helps to rotate the sensor connector counter-clockwise initially until you feel the threads align
- make sure that the sensor itself doesn't have any physical damage or breaks that might affect the signal

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- when you reset the station, are you getting a red light on LED #2? If yes, there could be an issue with an internal part of the connector, please contact support

(2) Soil Sensor "Please install sensor in soil" reading

If you are seeing the message "Please install sensor in soil" for a soil moisture sensor in the CCMobile App, it means the readings received from the soil moisture sensor are consistent with the sensor not being in soil.

- if the sensor is in the air (i.e., not installed in the ground) this is expected. Installing the sensor in the ground will rectify the situation
- if the sensor is buried in the ground, there could be an air gap around the sensor. This could occur if:
  - the sensor was initially installed in loosely packed soil and the air between the prongs is preventing an electrical conductivity reading from occurring
  - the sensor has been installed for a while but environmental conditions, water pockets, or machinery operating close by have resulted in an air packet forming around the sensor prongs

    In either case, dig around the sensor carefully and re-install it into the sidewall of tightly packed soil properly.
- it could also be that the soil type is not supported by the sensor's calibration if it was newly installed. In this case, please contact support

(3) Sensor "Error" reading

If you are seeing the message "Error" for a sensor in the CCMobile App (in place of an expected reading), it means the value being returned by the sensor is outside of its normal operating range. It could mean the sensor is damaged. To verify:

- check the sensor and its cable for physical damage or cuts
- if possible, move the sensor to another location to see if the readings appear in the CCMobile App
- disconnect and reconnect the connector to the station
- press the Reset button on the back of the station

If the readings don't change, please contact support

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(4) "Sensor setup mismatch" reading

If you are seeing the message "Sensor setup mismatch" for a sensor in the CCMobile App (in place of an expected reading), it means the sensor is misallocated on the app under Sensors Setup (e.g., a temperature sensor is plugged into a port configured for a soil moisture sensor). To verify this:

- open the CCMobile App on your phone
- go to Settings> Configure Stations> screen
- choose the station > Sensors Setup radio button
- ensure the port is configured for the sensor connected to that port
- save the configuration when leaving the screen
- press the Reset button on the back of the station

If the readings don't change, please contact support

4.2.4: Power issues

(1) Model5 station doesn't seem to be charging

If a ConnectedCrops station battery is not charging properly, there are a few indicators you will receive in advance to warn you of the situation:

- if the battery level is between 20% and 40% and the Transmission Frequency is more frequent than 60 minutes:
    - the user will receive an email suggesting that they change the transmission frequency to less often to reduce the battery consumption
- if the battery falls below 20% of full charge and the Transmission Frequency is more frequent than 60 minutes:
    - the Transmission Frequency will automatically be changed to every 60 minutes
    - the Battery LED light will flash Red while the station is booting up or performing a scheduled communication
    - the user will receive an email or text message alert indicating the battery level is below 20%
- if the battery falls below 15% of full charge:
    - the Battery LED light will flash red
    - the Connection LED will flash Blue or be solid Blue while the modem is communicating

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    - the station will only send the most recent sensor readings. If some older data has been placed in the queue, this data will not be sent. This is done to preserve the battery by limiting how long the modem is powered. This queued data will be sent when the battery level returns above 15%
- if the battery falls to between 3% and 7% of full charge:
    - the Battery LED light will flash Red or be solid Red while the station is booting up or performing a scheduled communication
    - the station will not power up the modem, and no data will be sent to the ConnectedCrops Cloud or the CCMobile App. The station will continue to gather data and place it in the queue to be sent at a later time
- if the battery falls below 3%:
    - the station will go into a deep sleep mode. The station will show no activity if the Reset button is pressed and no data will be gathered.
    - the user-defined Transmission Frequency will automatically be changed to every 60 minutes. The user will not be able to change this transmission frequency through the CCMobile App until the battery level has reached 8%

To ensure the battery can be properly charged:

- make sure the solar panel is facing south, exposed directly to the sun, not in the shade or under foliage, and the surface of the station is clean (i.e., not covered with dirt)
- decrease the transmission frequency to every **6 hours** using CCMobile App to allow the battery to charge faster before returning the frequency to its original setting. If you tried all of the above and it still doesn't seem to be charging, please contact support.

4.2.5: Notification issues

(1) Not Receiving email, SMS text message or Phone Calls when sensor thresholds are exceeded

If you completed all the steps during the deployment process, you should be receiving notifications (email, SMS text messages, and/or SMS Phone Calls) if any of your sensor values exceed their defined thresholds. If you're not receiving any notifications, or you want to adjust the thresholds, the following steps can be performed.

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Confirm Alerts are configured

- Navigate to Settings > Configure Station
- select the station from the list
- Select Receive notifications via…

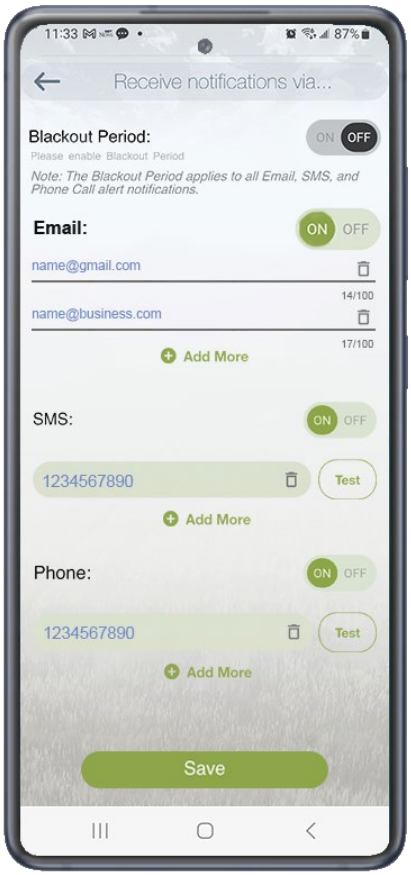


Figure 42

On this page:

- confirm the slider for **Email**, **SMS** and/or **Phone** alerts is enabled
- ensure the email addresses, SMS numbers or phone call numbers are correct
- use the Add More button to add missing emails addresses or phone numbers
- use the garbage can icon to removed unwanted email addresses, SMS numbers or phone call numbers

Remember: Email addresses, SMS numbers and Phone Call numbers are configured for an individual Model5 station. If you have multiple Model5 stations, you need to add these addresses and phone numbers to each individual station.

Check the status of the Blackout Period

A daily **Blackout Period** can be defined for a Model5 station during which emails, SMS messages and Phone Calls will not be sent. A Blackout period can be created if, for example, you do not want to be disturbed at night by your phone's sounds as these alerts are received.

If you think you are not receiving all emails, SMS messages, or Phone Calls:

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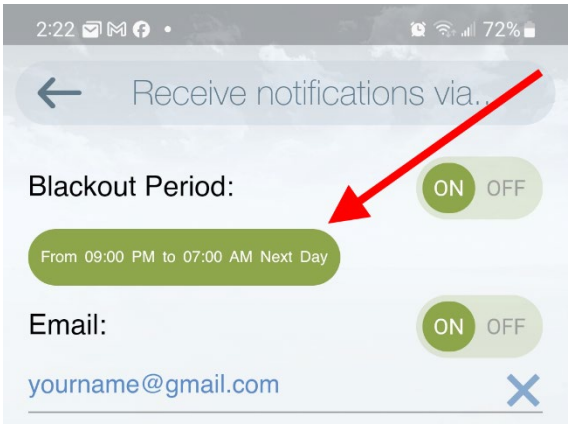


Figure 43

- Navigate to Settings > Configure Station
- Select the station from the list
- Select Receive notifications via...

If a Blackout Period has been defined, this page will display the hours of the blackout period.

- ➢ The Blackout Period can be enabled or disabled using the use the slider
- ➢ The Blackout Period can be edited by clicking on the current Blackout Period hours
- ➢ Only one blackout period can be defined per Model5 station

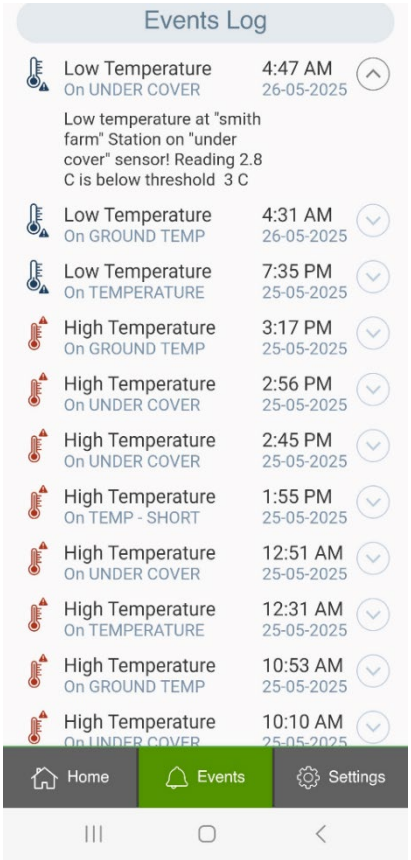


Figure 44

To see messages not sent because of the blackout period, check the message history on the Events page:

- click on the back arrow in the upper left corner of the CCMobile App page until the main dashboard page is displayed
- select **Events** on the menu at the bottom of the dashboard page
- on the **Events Log** page, look for events that occurred during the Blackout Period. Since the **Events Log** page displays events for all your ConnectedCrops stations, you may need to click on the down arrow beside an event to see which station and which sensor generated the event.

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4.2.6 CCMobile App issues

(1) Can't log in to the CCMobile App

If you experience trouble logging into the CCMobile App:

- check that you have a strong cellular or Wi-Fi signal and can connect to the internet. If your signal is weak, try moving to an area with better coverage or switch between Wi-Fi and cellular and try to login again
- if you've forgotten your password, please click on the Forgot your password? link on the Sign In page in CCMobile App
- if you can't remember your username, please contact support@connectedcrops.ca and supply your name and the name of your farm operation. The ConnectedCrops support team will use the mobile phone number we have associated to your account to validate your identity and help reestablish your credentials.

5: Specifications

5.1 Sensors Specifications

Temperature Sensor:

- Cable Length: 1m (3.3') or 3m (9.9')
- Temperature Range: -55°C to +125°C (-67°F to +257°F)
- Temperature Accuracy: ±0.5°C Accuracy

⚠ **NOTE**: Please note that the CCMobile App provides readings between -55°C and 70°C only and considers values out of this range as "Error" values.

Soil moisture sensor:

- Length: 5m/ 16.4'

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- Soil Moisture Range 0-60% based on the calibration for mineral soil
- Accuracy: ±3% VWC, most mineral soils
- Operation Temperature: -40°C to +50°C (-40°F to 122°F)

5.2 Station Specifications

The Temperature range the station is expected to operate under is: -20°C to 50°C / -4°F to 122°F

Enclosure:

- Type 4X Polycarbonate & General-Purpose ABS Enclosure
- Designed to meet IP 66 & NEMA 4, 4X, 12 & 13 ratings.
- UV stabilized for outdoor use
- Weatherproof
- Dimensions: 160mm x 160mm x 62mm (6.2” x 6.3” x 2.4”)

Battery:

- Rechargeable Lithium-Ion battery with protective circuit
- Voltage: 3.7V
- Capacity: 8000 mAh

Modem:

- Type: Cellular. Operates using LTE Cat M1
- Frequency: 850 MHz to 1.9 GHz
- Certifications:
    - FCC (US), ISED (Canada), PTCRB
    - Carrier: Rogers, Telus, AT&T, Sprint, and Verizon

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6: Contact Us

At any time, feel free to contact us at info@connectedcrops.ca or for support, please email us at support@connectedcrops.ca

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