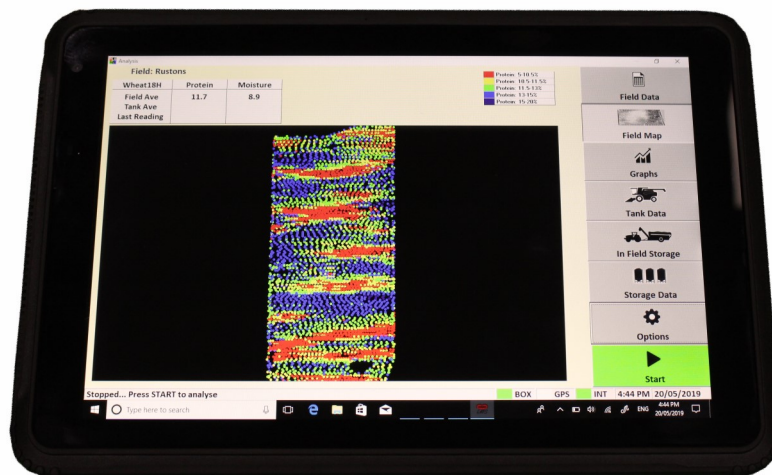


CropScan 3300H On Combine Grain Analyser User Guide



User's Guide CropScan 3300H On Combine Grain Analyser



REVISION HISTORY

Initial Prototype	November	2012
Rev. I	March	2014
Rev. II	August	2015
Rev. III	March	2016
Rev IV	August	2016
Rev V	August	2016
Rev VI	August	2016
Rev VII	May	2017
Rev VIII	May	2018
Rev IX	May	2019
Rev X	May	2020
Rex XI	Feb	2022

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1.0 Product Description

1.1 Overview

This chapter gives you an overview of the CropScan 3300H On Combine Grain Analyser's features and a description of the operation.

1.2 Description

The CropScan 3300H On Combine Grain Analyser has been developed in Australia, for use in measuring Protein, Oil, Moisture, Starch and Fiber in grain as it travels up the clean grain elevator on a combine harvester.

The CropScan 3300H comprises of a Sampling Head, a Fibre Optic cable, a NIR Spectrometer and a in cabin Display. The Sample Head is mounted onto the clean grain elevator. A hole is cut into the up side and the down side of the elevator. As grain travels up the elevator, it falls through the top hole and fills the sample chamber of the Sampling Head. A steel flap and outlet motor controls the flow of the grain in and out of the chamber.

The grain is trapped in the chamber where light passes through the sample of grain and the transmitted light is collected by a Fibre Optic Cable. The Fibre Optic Cable connects the Sample Head to the NIR Spectrometer, located inside the cabin of the combine where it is able to maintained at a stable temperature. The light that passes through the grain is transmitted back to the NIR Spectrometer which separates the light into the NIR spectrum. The CropScan Display applies the calibration models for Protein, Oil and Moisture and displays the data in the CropScan display run screens.

The outlet flap opens and the grain drops out and returns to the down side of the elevator. The chamber refills with grain and the next NIR spectrum is collected every 5-8 seconds.

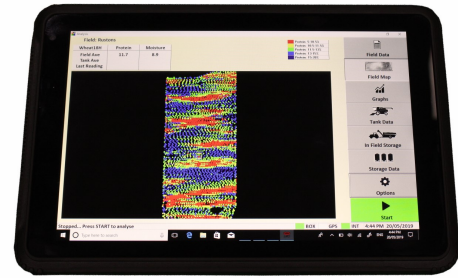


Figure 1-1. CropScan Display.



Figure 1-2. Remote Sample Head mounted to the Clean Grain Elevator

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1.3 Technology

The CropScan 3300H is a full spectrum NIR Spectrophotometer. The CropScan 3300H uses a linear diode array detector and a spectrograph to provide the NIR transmittance spectrum from 720-1100 nm. Within this region of the electromagnetic spectrum, compounds such as Protein (1020nm), Moisture (970nm), Oil, (910nm) sugars (830nm), and other organic compounds absorb infrared energy. By measuring the intensity of the infrared energy that passes through a sample of grain, Protein, Oil and Moisture can be measured.

The NIR Spectrometer is based on a flat field spectrograph and a silicon photodiode array detector as shown in figure 1-3.

The advantage of the diode array Spectrometer lies in that there are no moving parts. The Spectrometer is robust enough to work in the harsh environment of a combine harvester, compact enough to fit inside the cabin of the combine and powerful enough to provide data as good, if not better, than a bench top analyser used in a laboratory. The Fibre Optic Cable allows the NIR spectra to be collected remotely thus removing the Spectrometer from the Sampling Head.

1.4 Analysis Software

The 10.1 inch CropScan display controls the entire system. CropScan 3300H Analysis Software user interface controls the motor flap operation, the lamp, the auger sensor and the sample sensor. The CropScan 3300H Analysis Software computes the Protein, Moisture and Oil data for each sample and the results are presented to the combine operator in a number of run screens.

1.5 Components

The CropScan 3300H On Combine Analyser is provided with the following equipment:

- NIR Spectrophotometer with an IP66 Encloser
- 10.1 inch CropScan Display with Windows 10 OS
- Ram Vesa Mount and Arm
- Remote Sample Head
- Fibre Optic Cable
- Sample Head Cable
- Spectrometer Cable
- Auger Sensor and Cable Assembly
- User Manuals
- USB Memory Device, 8Gbyte
- Spare Lamp and Fuse.
- Cloud Service —CropScanAg Cloud

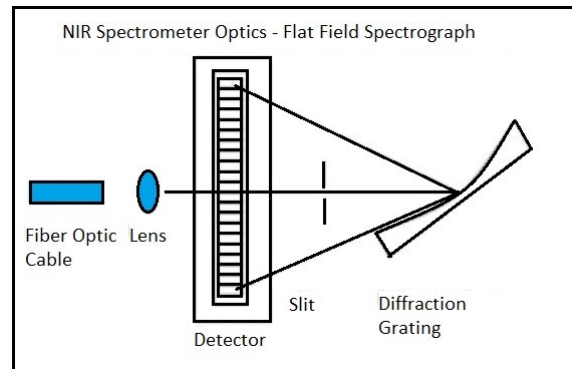


Figure 1-3. Schematic of the NIR Spectrometer Optics

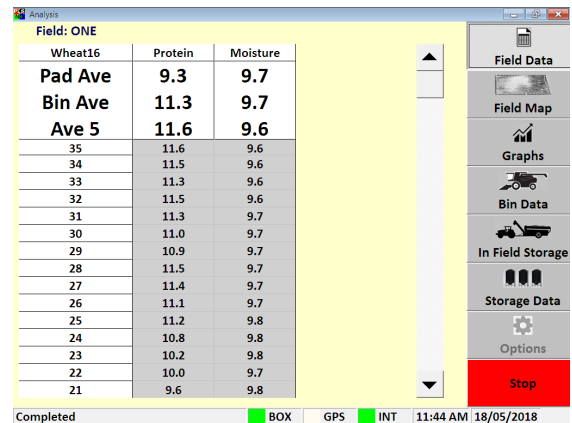


Figure 1-4. CropScan 3300H Analysis Software

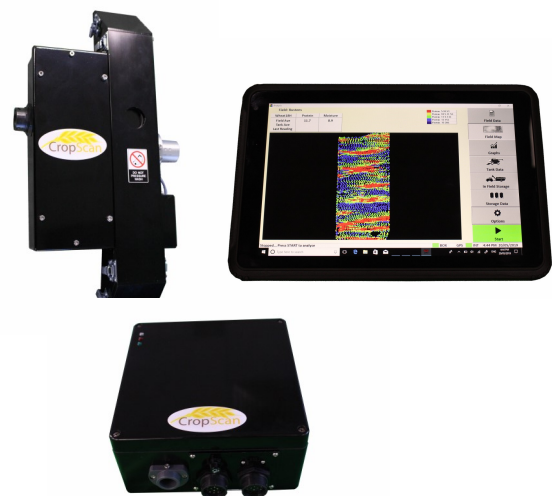


Figure 1-5. CropScan 3300H On Combine Grain Analyser Components.

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2.0 Operation

2.1 Overview

The operation of the CropScan 3300H Grain Analyser has been specifically design for the use by farmers. The easy to use interface allows operators to quickly understand the logic and functions. This operator guide explains in detail each run screen operation and function.

2.2 Daily Checks

Prior to using the CropScan 3300H Grain Analyser the following daily checks are recommended to achieve optimal results.

- Open Sample Head cover door and clean the sample chamber using a brush, rag or air hose.
- Remove any build up of dust and debris.
- Wipe the 2 x lens windows inside the Sample Head with a clean cloth.
- Allow the Spectrometer to warm for 15 minutes or until the Spectrometer reaches a minimum temp of 25 deg C or 77 deg F.

2.3 Power On

The CropScan 3300H On Combine Analyser runs off the combine's 12VDC battery supply. The system will be automatically powered ON when the combine's ignition key is turned to the ON position.

- Turn the CropScan Display ON using the push button on the top right side of the CropScan. When the CropScan Display is turned ON, the Screen will illuminate and boot up into the CropScan 3300H Analysis Software.

The CropScan Display will connect to the NIR Spectrometer as shown in Figure 2-3 boot up screen. The connection status will be displayed by the Start Button turning green and the status Box turning green on the lower status bar. Once the connection is established and the operator has performed the daily checks, close the Daily Checks window and review the diagnostics window which will show all green ticks for the corresponding component operation status. This window provides the operator feedback on the operation of the Motor, Sensors, Lamp, Spectrometer Temperature and Sample Sensor.

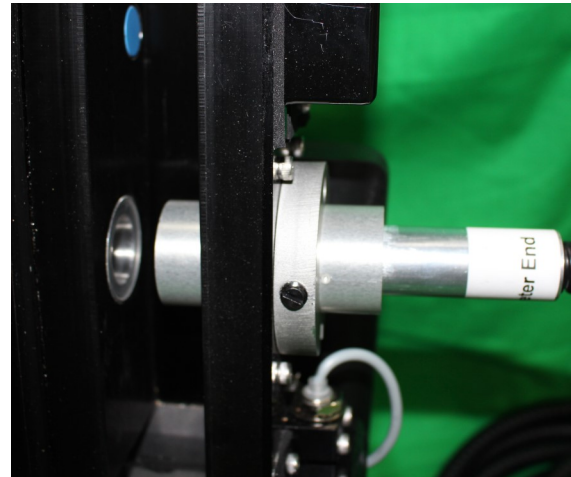


Figure 2-1. Sample Head Lamp and FOP Lens

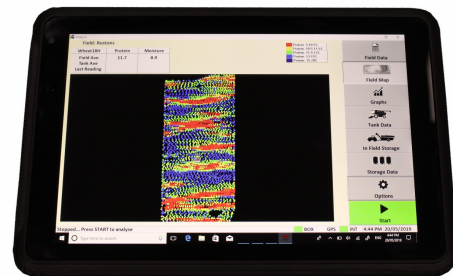


Figure 2-2. Power Switches on the CropScan Display

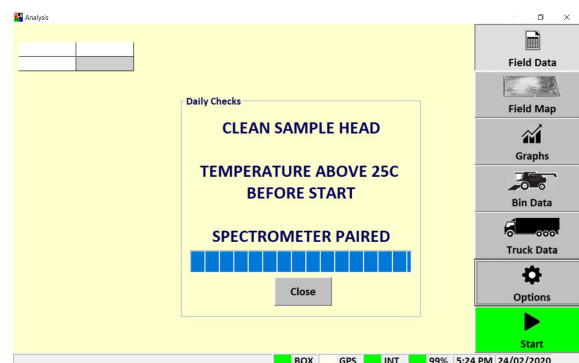


Figure 2-3. CropScan Display boot up screen

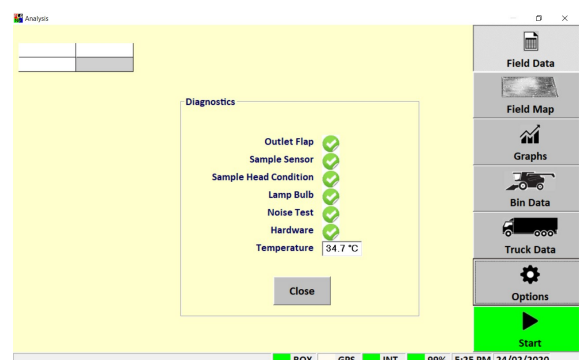


Figure 2-4. CropScan 3300H Analysis Diagnostics Screen

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2.4 Start Analysis

- Press the highlighted green **START** button to begin analysis.
- Select the Crop Type from the list.
- Select Field ID or Client Farm Field ID's using the drop down boxes.
- Press OK to confirm the Crop Type and Field ID.
- Press the Confirm button to agree the FOP probe is in the correct position as shown in Figure 2.7 and 2.8. Adjust the Probe Position if required by loosening the locking screw and moving the Probe in or out to the correct Crop Type position as shown in Figure 2.8. Tighten the locking screw to secure. This warning will come up each time a new calibration has been selected with a different FOP Probe position.

Warning: Incorrect probe portion will cause erratic results. Use the supplied Pathlength Test Block Assembly to check probe gap position.

Sample Head Probe Positions

1. **Canola = 7mm and Motor Sensor Up**
2. **Cereals = 15mm and Motor Sensor Up**
3. **Beans = 23mm and Motor Sensor Down**
4. **Corn = 30mm and Motor Sensor Down**

Once the START button is pressed, the 3300H lamp will turn on and cycle the outlet flap to the closed position. Once the chamber is filled with grain and the Sample Sensor is covered, the transmitted light is collected by the Spectrometer send the scan data with GPS position to the CropScan Display. The calibration models will be applied to the scan data and the results will be displayed on the CropScan Display Run Screens. The system will cycle the outlet flap to the open position and empty the chamber. The outlet flap will cycle to the closed position again to fill the sample chamber so that the next scan can be taken. The cycle time is approximately 5-12 seconds.

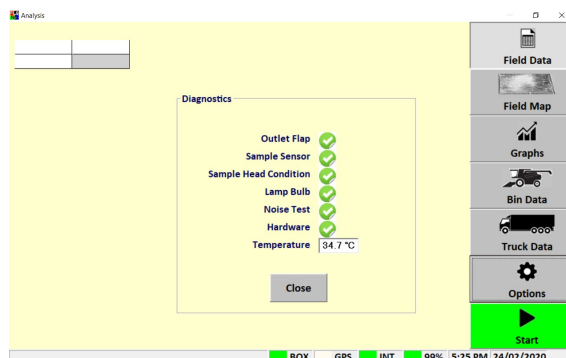


Figure 2-5. CropScan 3300H Diagnostic Checks

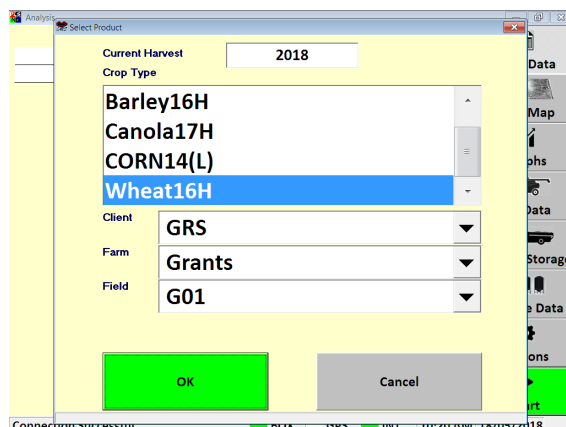


Figure 2-6. Analysis Select Product Window

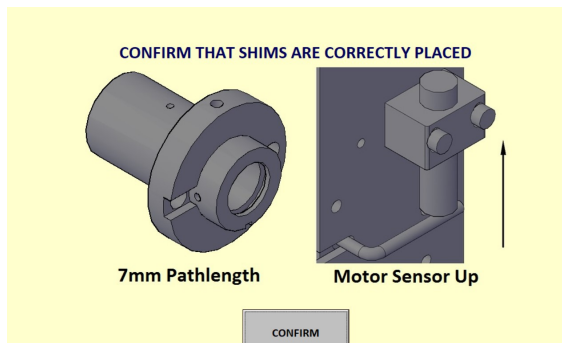


Figure 2-7. Probe and Motor Sensor Position

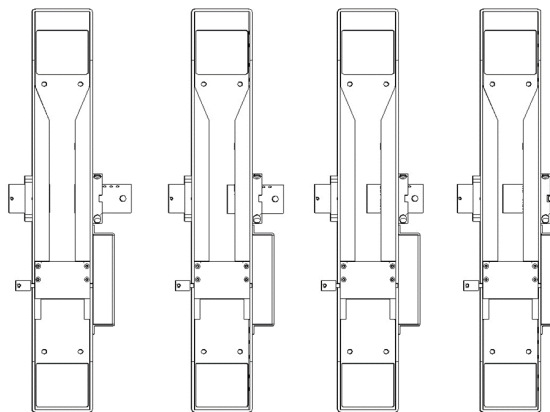


Figure 2-8. Probe positions 30mm, 23mm, 15mm and 7mm

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2.5 Grain Logistics

- When the grain tank is full and the out loading auger extends, a proximity sensor is activated. The Grain Logistics window will appear as shown in Figure 2.9 which allows the operator to select a storage location from a pull down list, enter the volume in tonnes, Kg’s or bushels and the number of Combine’s in use in the field. ie Grain going into a Grain Cart. (This is only activated if the **Storage Data Logistics View** option is ticked in the **Grain Logistics Menu**.)
- The **Cumulative Weight** - The weight is read directly from the Yield Monitor and manually entered in the CropScan 3300H screen. The software calculates the difference from the last cumulative weight and records the difference as the current bin weight.
- The **Tare Weight** tab instructs the software to accept the Bin Weight as the actual weight of the grain in the bin. (Preferred Option)

Transfer Grain

The 3300H is designed to enable operators to transfer grain as it moves from the field other storage locations across the farm or receival elevator.

Transfer Grain Steps:

- Double tap on a specific storage to select it. The information box for that storage will turn blue when it is selected. Double tap again on it to remove the selection
- Press the transfer grain button
- Check the information on the lists “Transfer Grain From” and “Transfer Grain To”. The software will automatically load the selected storages and the maximum weight. If you want to transfer only a portion of the grain, tap on the weight number and enter the correct amount.
- Press the “Split” button if it is a split load and select the second storage location and Press OK.
- If the split option is used, adjust the percentage of weight for each location and press OK
- Confirm the grain transfer. If the system is analyzing a sample, allow until the sample has finished before the graphical interface shows the change.

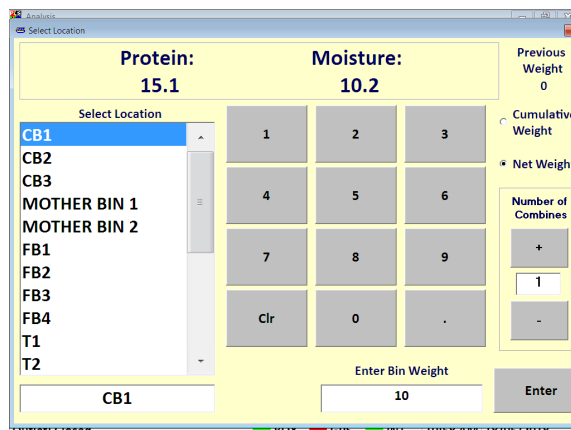


Figure 2.9. Grain Logistics Window

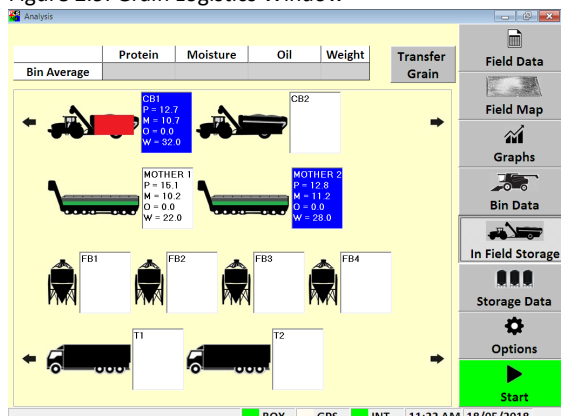


Figure 2.10. Selecting In-field storages

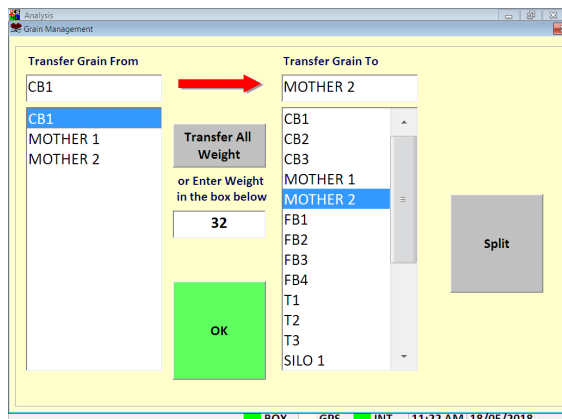


Figure 2.11. Transfer Grain Screen

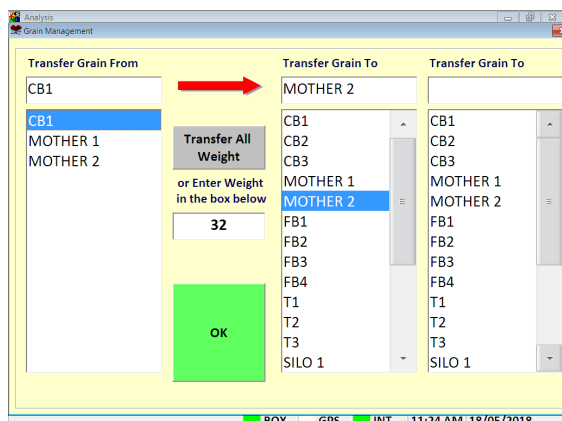


Figure 2.12. Transfer Grain Screen—Split Load

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Blending Estimator

The **Blending Estimator** is available if two or more storage locations have been selected to transfer. By pressing the add weight button for each storage location the transferred grain will simulate and display the blend and transferred volume in the truck location. Once the Storage Location is filled to the desired volume the operator must Press OK to confirm the grain transfer.

2.6 Stop Analysis

- Press the highlighted red **Stop** button to stop the 3300H.
- Once the Stop button has been pressed, the system will finish scanning the sample in the sample chamber and the red Stop button will then change to a green Start button.

2.7 Shut Down

- Press the **Options Menu** button
- Press Close to restart the CropScan App.
- Press the **Shut Down** button to turn the CropScan display off.
- Switch the Ignition Key to the Off position.

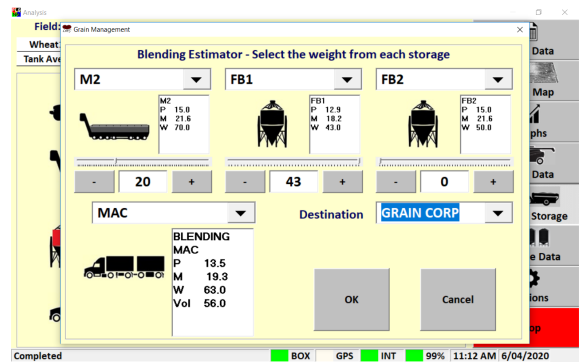


Figure 2.13. Transfer Grain Screen—Split Load

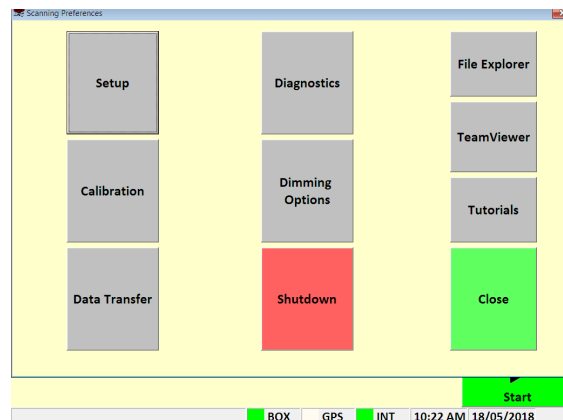


Figure 2-14. Options Window

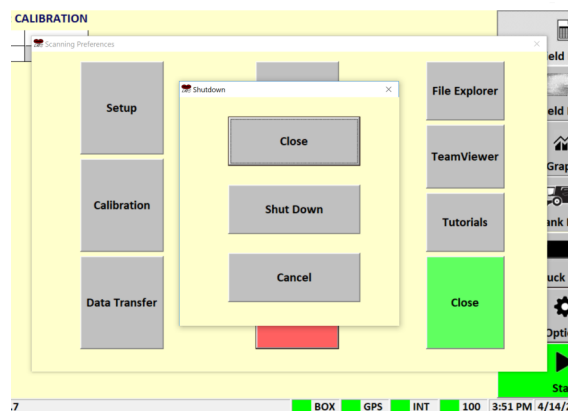


Figure 2-15. Shut Down Window

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3.0 Run Screen's

3.1 Overview

The data can be viewed in five different views. Display Data, Field Map, Graphs, In-field Storage and Storage Data. Click on the Tab to display each display format. The averaged data is formatted consistently across the five views to make data interpretation quick and easy.

3.2 Field Data

The results are displayed in the **Field Data** run screen. The field average, current bin average, average of the last five samples and the last fifteen averaged results are displayed in a table.

3.3 Field Map

The **Field Map** run screen displays the protein, moisture and oil results in a map format across the field. The dots are colour coded according to the customizable legend libraries for each grain type (double click on the legend box to edit legend types). The operator can toggle between maps types (Protein, Moisture and Oil) by touching the map.

3.4 Graphs

Press the **Graphs** run screen displays a histogram of the grain tank loads. This function is used to visually show the protein and moisture variability across the whole field.

3.5 Grain Tank Data

Press the **Bin Data** run screen to display averages for Protein, Moisture and Oil for each bin load. Each time the outloading auger is extended, the auger sensor is triggers the software to record and reset the Grain Tank average and then resets the Bin Average field in the software. This data is stored in a file with the same extension as the Field Name and is identified by the word Bin in the file extension, e.g. Tommy_2014-Bin.csv. This allows operators to segregate bin by bin in the field and save a record of the average Protein, Moisture and Oil in each bin load.

The additional option to select a storage location, tonnage and number of Combine's outloading each time the auger extends can be selected in the **SetUp** menu.

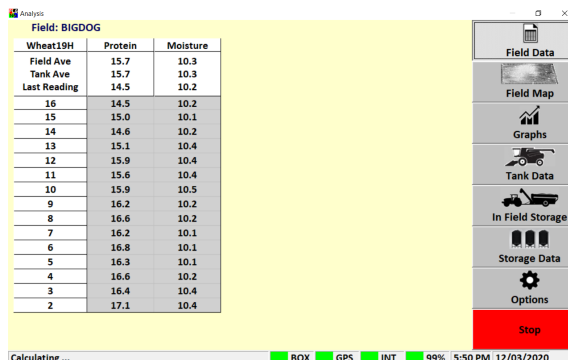


Figure 3-1 Field Data Run Screen

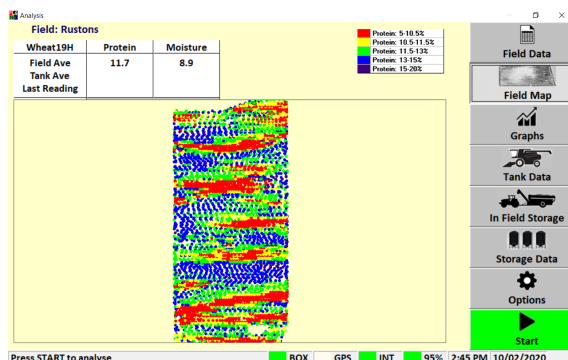


Figure 3-2. Field Map Run Screen

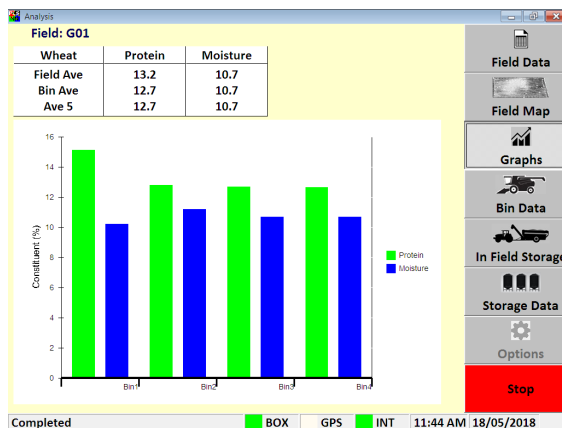


Figure 3-3. Graphs Run Screen

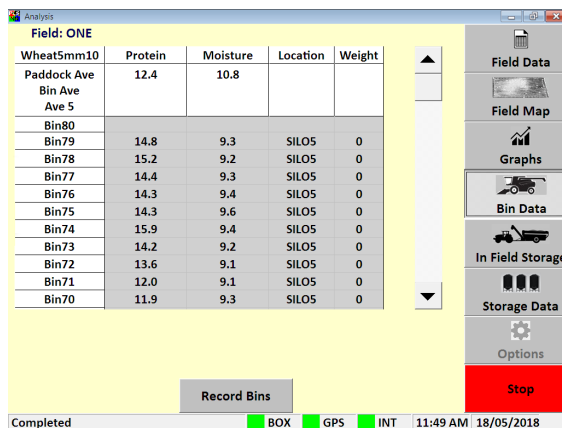


Figure 3-4. Grain Tank Data Run Screen

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3.6 Truck Data

This function can be used by farmers who do not have On Farm Storage and all the Grain from the field are loaded into trucks and delivered to the Elevator. Select the option “Truck Data Logistics View” inside the Setup tab.

When a truck load is full, the operator can group a number of bins from the Bin Data Window by pressing on the cell with column “T” and the desired row. Select all the cells that need to be grouped (they should turn green). Then press the “Record Bins” button to group them. Tap on the Truck Data option to check the average of the grouped bins.

3.7 In-field Storage Data

When the “Storage Data Logistics View” option is activated in the Grain Logistics Menu, the operator will have the ability to allocate grain tank loads to the pre set virtual storage icons for the In Field Storage icons. The icons for grain carts, field bins and trucks show the operator the running stack average in each icon.

Press the **In-field Storage Data** button to graphically show what has been stored in each grain cart, mother bin, field bin and truck.

Press the **Transfer Grain** button when grain is moved from one storage location to another. The In Field Storage run screen will update the stored grain in the display icons each grain transfer.

3.8 Storage Data

When the “Storage Data Logistics View” option is activated in the Grain Logistics Menu, the operator will have the ability to allocate grain tank loads to the pre set virtual storage icons for the Storage Data icons. The icons for silos/bins, grain bags, sheds will display the running stack average in each icon

Grain can also be transferred from the In-field storage locations (temporary location) to the permanent storage locations.

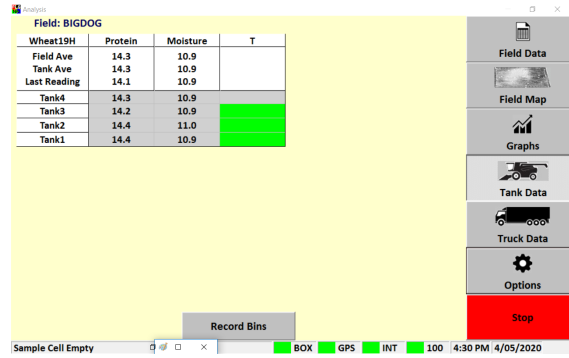


Figure 3.5. Tank Data Run Screen

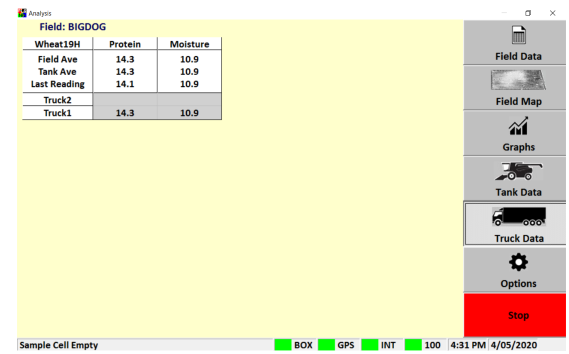


Figure 3.6. Truck Data Run Screen

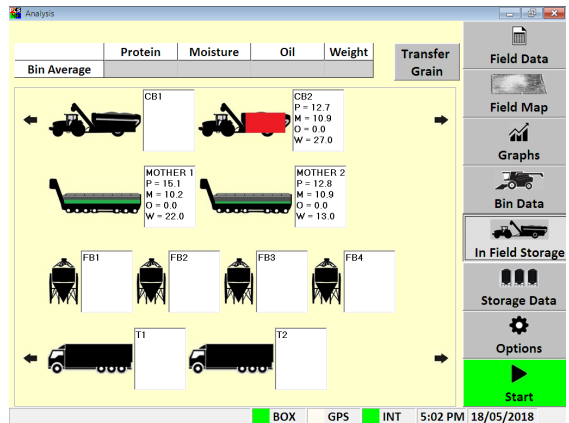


Figure 3-7. In Field Storage Run Screen

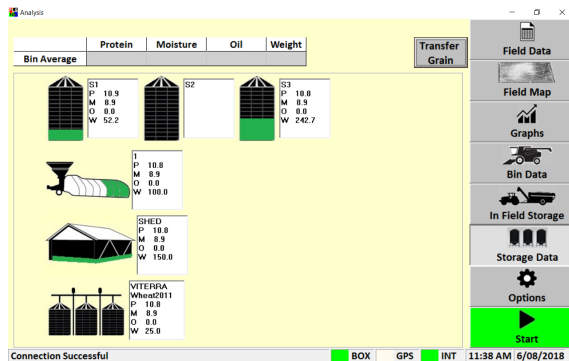


Figure 3.18. Storage Data Run Screen

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4.0 Option Menu's

4.1 Overview

The **Setup Menu** allows operators to setup the CropScan Display to suit the operators farming operation. The operator can import Field ID's, create Storage ID's and storage icons, adjust display time, manage data calendar folders, setup and test GPS messages, add a Wi-Fi Hotspot sign in to the CropScanAg Cloud account.

4.2 SIM Card Activation

(NOTE: SIM Card is pre installed to this display, follow the steps below to extend subscription)

- Contact your local dealer for pricing and subscription terms.
- Supply the SIM Serial Number (SIM sticker on the back of CropScan Display) to your dealer for activation/recharge.

4.3 Wi-Fi and Hotspot Setup

(NOTE: fields are case sensitive. i.e. "iPhone" and the software rejects apostrophe i.e. Tom's iPhone.)

- Press **Scan Network** to search for Wi-Fi Hotspot
- Select the Wi-Fi Hotspot you wish to tether
- Click in the white password box and Enter Hotspot password

4.4 Wi-Fi and Hotspot Connection

(NOTE: A Hotspot Setup is require prior to connection)

- Press **Scan Network** to search for Wi-Fi Hotspot
- Select the Wi-Fi Hotspot name
- Press the **Connect** button and wait for a Wi-Fi Connection Request notification as shown in figure 4.3.

4.5 CropScanAg Cloud Sign In

(NOTE: Sign up at app.cropscanag.com)

- Press the Sign In button to access the User Credential setup window.
- Enter the Username email address used to create an CropScanAg Cloud account.
- Enter the Password used to create an CropScanAg Cloud account.
- Press the Sign In button to link the CropScan Display to your CropScanAg Cloud server. Wait for a Authentication Successful notification as shown in figure 4.5.

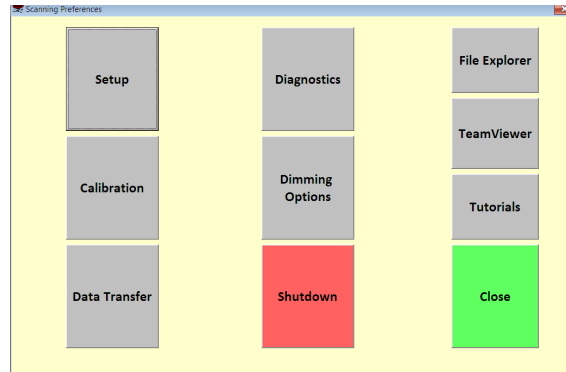


Figure 4-1. Options Window

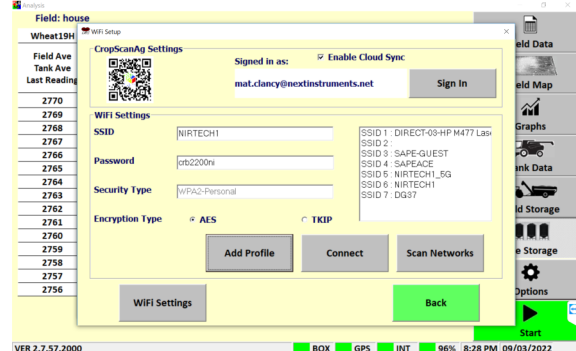


Figure 4.2. Setup—Wifi

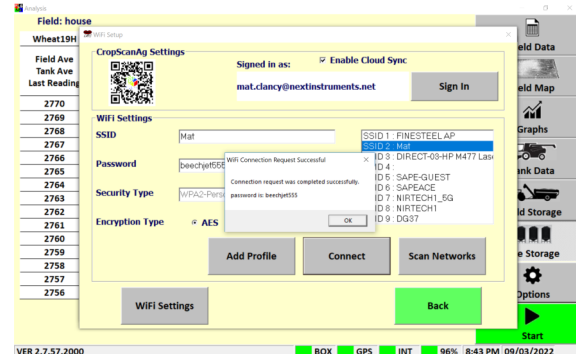


Figure 4.3. Wifi Hotspot Connection

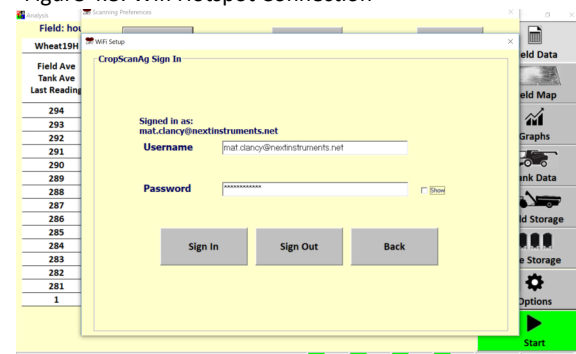


Figure 4-4. CropScanAg Cloud Sign In

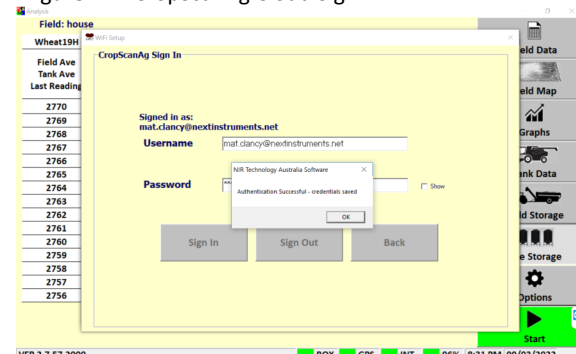


Figure 4-5. CropScanAg Cloud Authentication

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4.6 Field ID's

The CropScan Display can import three Client Farm Field formats to make setting up the Field ID's easy:

1. CN1 Folder –CNHi Format
2. AgGPS—Trimble Format
3. JD Boundary Shape Files—JD Format

Client Farm Field Import

- Save a CN1 Folder, AgGPS or JD Boundary Shape Files to a USB Stick for importing.
- Insert the USB Stick into the CropScan Display USB port located on the left side of the display.
- Press the **Field ID's** tab to import or edit the Field ID's list.
- Press the Client Farm Field tick box as shown in figure 4.2 to activate Client Farm Field format.
- Press the **Import Fields** button to import the CN1 Folder, AgGPS and JD Boundary Shape files from the loaded USB Stick. Wait for the import process to complete.

Edit—Client Farm Field

- To manually add a new client, farm or field, press the Edit button and select the option Add New. To change or remove a client, select it from the list, then press Edit Client and press the appropriate option

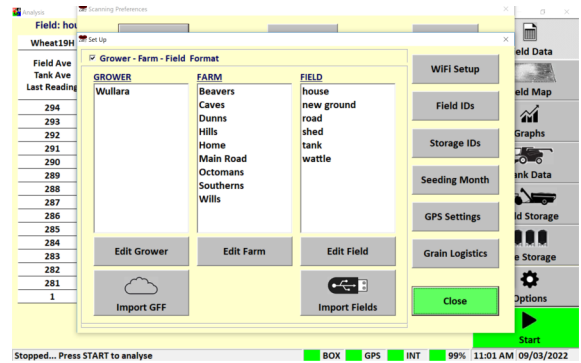


Figure 4-5. Setup - Field IDs in Client-Farm-Field format.

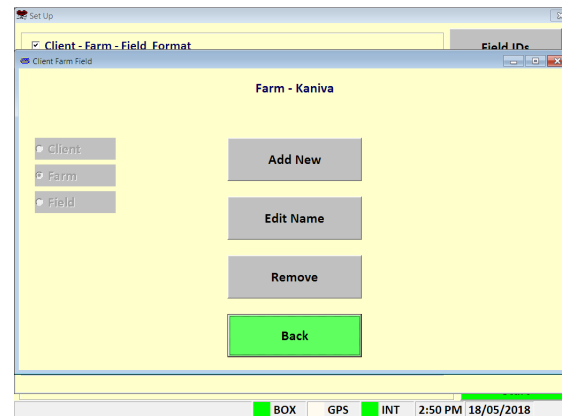


Figure 4-6. Setup - Editing Client-Farm-Field Information.

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4.7 Storage ID's

- Press the **Storage ID's** button and setup the names for the different grain storages locations. This is only needed if the CropScan is used for **In Field Storage** or when outloading grain to a silo/bin.
- To add a new storage, select the desired type and the press **Add Storage**. Tap on the white boxes to enter the name and the volume, check that the storage type is correct and press the **Add Storage** button to confirm.
- To change the storage name or volume, select it from the list and press **Change Storage**.

Note: Changing the storage name will remove the grain associated to that storage. Make sure to change the name when the storage is empty.

- To remove a storage, select it from the list and tap on the **Remove Storage** button.

4.8 Harvest Start Date

- Select the month the harvesting season begins. The CropScan 3300H Analysis Software will manage the harvest data in a 12 month period from this selected month.

Note: Select January for Northern Hemisphere users and June for Southern Hemisphere users.

- Select current time zone from the drop down list and confirm time zone by pressing the **Change Time Zone** button.

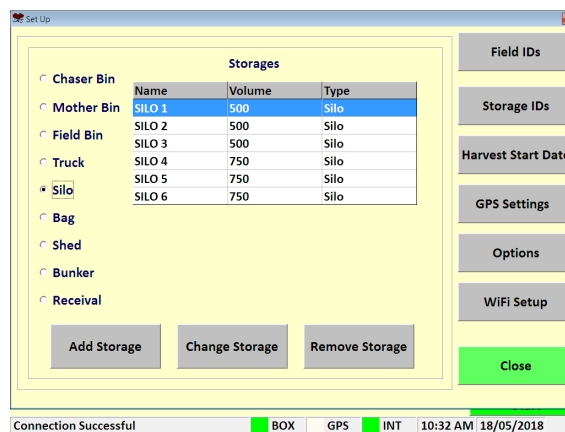


Figure 4-7. Setup—Storage ID's.

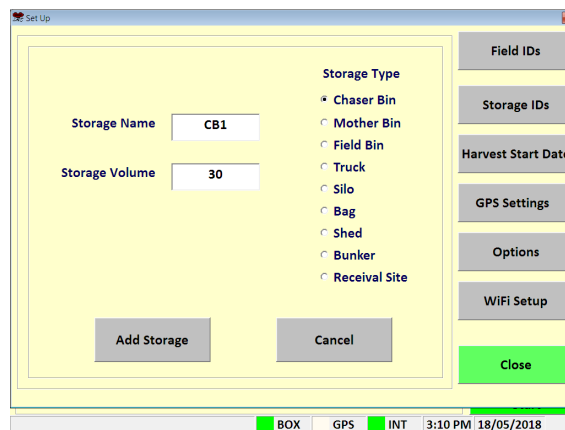


Figure 4-8. Setup - Adding a new storage.

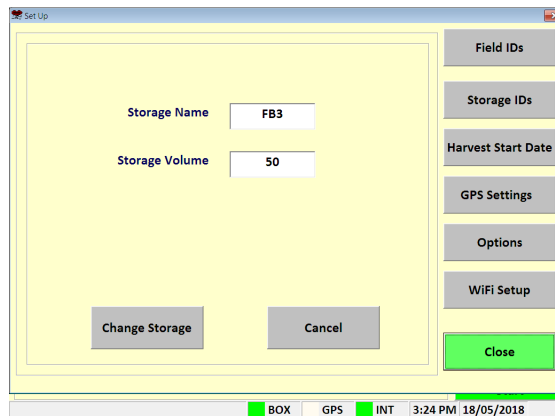


Figure 4-9. Setup - Changing a valid storage.

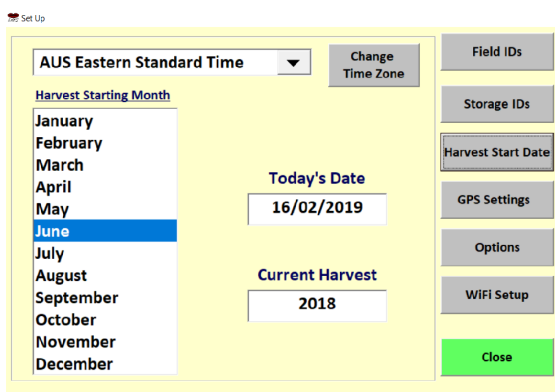


Figure 4-10. Setup - Harvest Start Date Screen.

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4.9 GPS Settings

The CropScan 3300H interfaces to the combine's GPS receiver. The CropScan Spectrometer Cable provides a serial cable connection between the combine's GPS receiver and the CropScan 3300H Spectrometer. The GPS receivers NMEA message and baud rate must be set up to output a message and rate. Please refer to the combine manufacturer's GPS setup instructions for NMEA Message and Baud Rate output setup.

GPS Activation

- Press **Options** Menu button
- Press **Set Up** Menu button
- Press **GPS Settings** button

GPS Configuration Settings

Activate GPS Ticked = GPS ON
Active GPS Un Ticked = GPS OFF

GPS Message Test

- Press the **Setup** button to access the GPS Message test window as shown in figure 3.9 and 3.10.
- Press the **Test GPS Data** button to test NMEA message and baud rate Setting from Combine receiver to CropScan Display.

GPS Received = Pass
GPS Not Received = Fail

If a **GPS Not Received** code is displayed then the NMEA message received was blank or incorrect. A possible cause could be the incorrect baud rate setting.

Baud Rate Configuration

CropScan Baud Rate setting must match the baud rate of the Combine GPS receiver. See the combine harvester manual for GPS receiver baud rate settings and adjustments.

- Press **Update GPS Settings** button as shown in figure 3.9 to open the Configuration window.
- Confirm **GPS On** is ticked
- Set GPS baud rate to match the GPS receiver baud rate. Press in the baud rate white text box and enter to new baud rate and press Enter.
- Press the **Download** button to confirm new the settings.

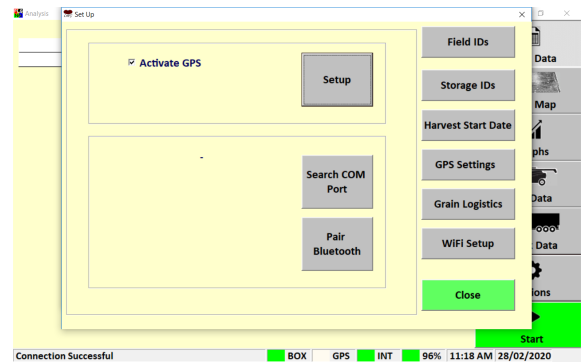


Figure 4-11. Setup - GPS Settings Screen.

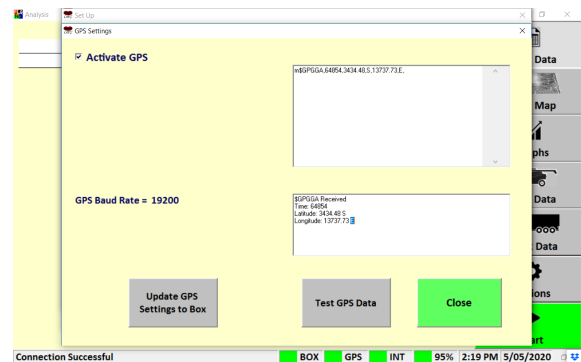


Figure 4-12. Setup - GPS Test Window—Pass.

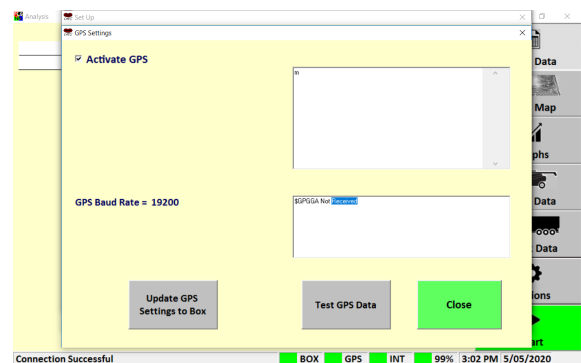


Figure 4-13. Setup - GPS Test Window—Fail.

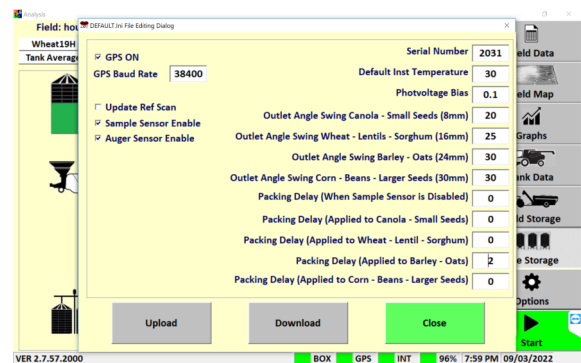


Figure 4-14. Setup - Configuration window.

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4.10 Grain Logistics

Grain Logistics Set Up

Default Tank Weight

- (Optional) Enter the max Tank Weight for each Crop Type. When a Default Tank Weight is entered the Grain Logistics Software will populate the nominated default tank weight into the Tank Weight Counter as shown in figure 3.18.

Location Timer

- When the Location Timer is ticked the Grain Tank Weight Counter will auto close after 60 seconds.

PC Auto Shutdown

- When the PC Auto Shutdown option is selected the CropScan display will shut down automatically after 45 seconds when no power input is sensed at the display.

Out of Range Outlier

- (Recommended) The Out of Range Outlier option applies a filtering method to reject any samples where the result are below or above the Crop Type minimum or maximum range. Wheat (5-20%)

Password Protection

- Tick the "Password Protection" option to lock out non approved operators to the Options Menu.

Large Front

- Tick the "Large Front" option to active a larger font in the Data Views.

Temperature Unit

- Select displayed Temperature units (C or F)

Volume Unit

- Select Crop Weight units (Tonnes, Kg's or Bushels)

Grain Logistics Activation

The CropScan 3300H On Combine Analyser has a unique software option called Grain Logistics. As grain is harvested, the Logistics Software provides a means of managing the quantity and quality of grain directly from the combine. To activate the Grain Logistics field Storage and Site Storage run screens the user will need to select:

- "Storage Data Logistics View"

To de-active the Grain Logistics Field Storage and Site Storage run screens the user will need to tick:

- "Select Truck Data Logistics View"
- verify the reading of the Weigh Scales

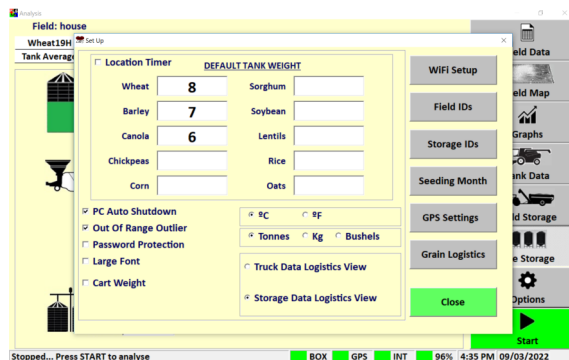


Figure 4-15. Setup - Options Window

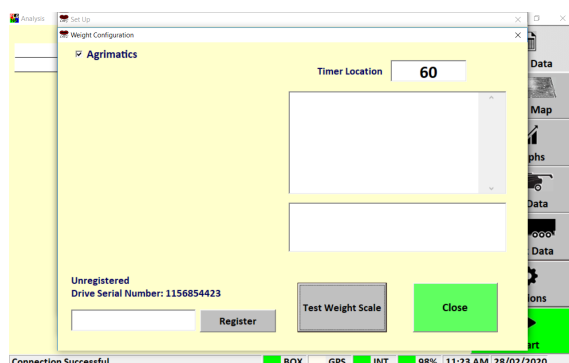


Figure 4-16. Setup - Cart Weight

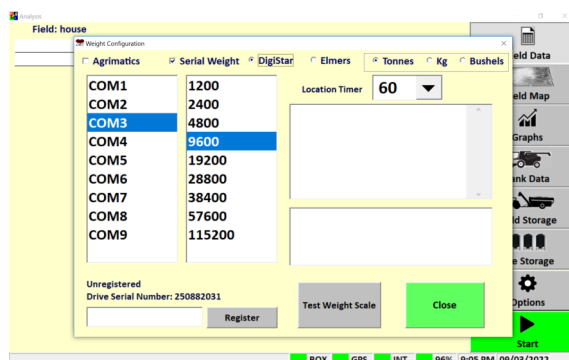


Figure 4-17. Setup - Cart Weight

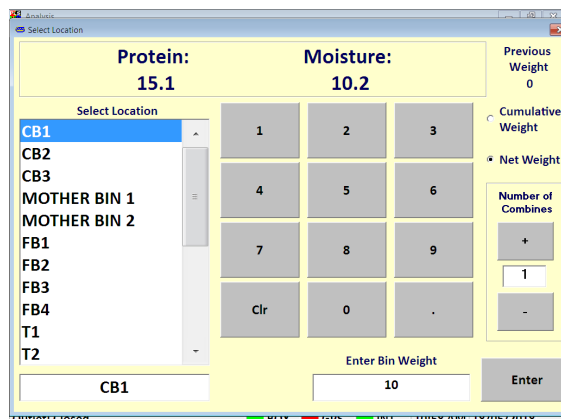


Figure 4-18. Grain Logistics Grain Tank Weight Counter

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4.11 Options—Cart Weight

Note: The Cart Weight feature requires a license key for operation. Contact your local dealer for information and pricing. The Weight Cart Option is design to interface with the Cart's Display weight output via Bluetooth or Serial protocols. Agrimatics, Digi Star and Elmer Cart Scales are approved.

The data from the Cart Weigh Scale is read via Bluetooth or Lora to Serial converter into the CropScan Display when a grain cart pulls alongside the combine. A proximity sensor mounted on the combine's out loading auger triggers the CropScan Logistics Software to automatically read the grain cart weight as the auger is extended. When the auger returns to its cradle, the CropScan Logistics Software automatically reads the grain cart weight again and calculates the difference between the starting weight and finished weight and populates the Grain Tank weight.

Cart Weight Setup

- Press the **Options** Menu button
- Press the **Set Up** Menu button
- Press the **Grain Logistics** button
- To active the CropScan Libra Cart or CropScan Digi Star Weigh Scales Integration license press on the **Cart Weight** tick box to activate
- Click on the **Weight Settings** button to open Weight Configuration Menu
- Enter your License Registration number by pressing into the white box and using the pop up keyboard to enter the registration key, contact your dealer for Registration Key.
- Select the Cart Scale Type from the brand options at the top of the window.
- Select the Cart Scale Weight Unit (Tonnes, Kg's or Bushels)
- Park the Combine with in 20 meters of the Grain Cart. Use the **Test Weight Scales** button to read and verify the reading of the Weigh Scales.

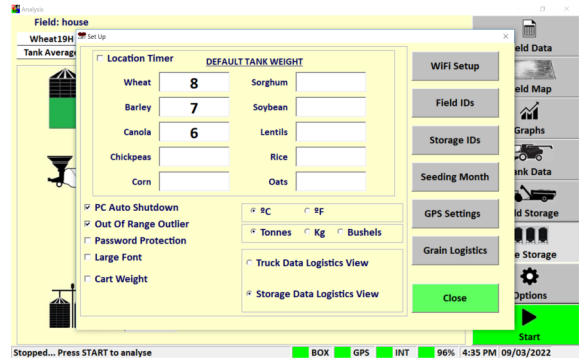


Figure 4-19. Setup - Options Window

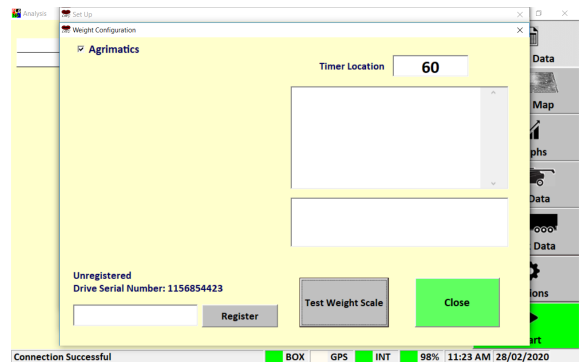


Figure 4-20. Setup - Cart Weight

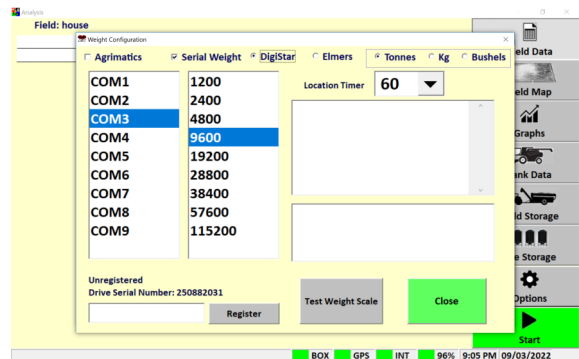


Figure 4-21. Setup - Cart Weight

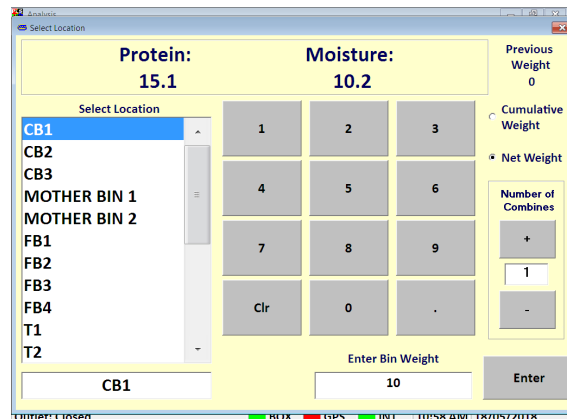


Figure 4-22. Grain Logistics Grain Tank Weight Counter

5.0 Calibration

5.1 Overview

The CropScan 3300H CropScan Display stores the calibration models for each grain type. The models contain one or several components, e.g., protein, moisture and oil. Each of these calibration models have a Bias and Slope adjustment facility. The bias and slope can be adjusted in order to correct the calibration to some traditional reference method of analysis for each component, i.e. Kjeldalh for protein, Oven Drying for moisture and Soxhlet Extraction for oil.

Slope and Bias Description

Slope and Bias adjustment is used when all sample readings lie on a straight line but some samples read high and some read low as compared with the reference readings. The Slope and Bias is calculated by plotting the CropScan readings VS the reference readings in a Slope and Bias Calculator software. The Slope and Bias Calculator will calculate the best line of fit across the sample set, creating an equation = Slope and Bias.

Note: Slope and Bias adjustments require 5 samples with a range from low to high (9% - 15%). Slope and Bias adjustments should only be done by a trained technician.

The Slope and Bias is taken from the X and Y plot equation. Figure 5-5 shows the X Y equation as:

$$\%Protein_{corrected} = Slope \times \%P_{orig} + Bias$$

$$Slope = 1.385$$

$$Bias = -4.6$$

Using this equation the corrected prediction values for Protein % can be calculated. Figure 5.3 shows the new prediction values.

Applying the new Slope and Bias (S & B) we can decrease the standard error of prediction (SEP) or accuracy. The SEP shown in figure 5-4 to figure 5-6 improves protein error from 0.5 to 0.2 by apply the Slope and Bias equation.

The Slope and Bias Adjustment setting for each Crop Type can be accessed through the Calibration Adjustment Tab.

	3300H	Reference	Difference
Sample ID	Protein	Protein	Protein
1	10.5	10	-0.5
2	11.8	11.6	-0.2
3	12.6	12.6	0
4	13.2	14	0.8
5	13.8	14.5	0.7

SEP = Accuracy	0.5
-----------------------	------------

Figure 5-1. 3300H VS Reference Protein Table

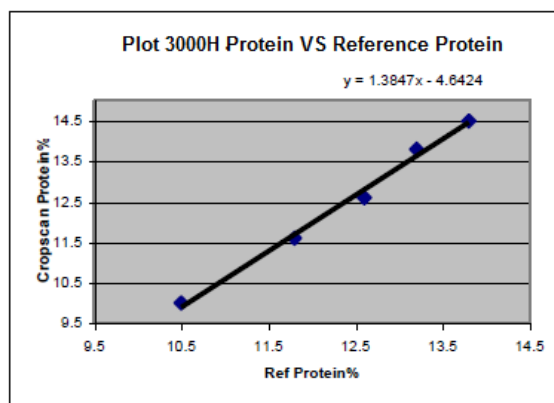


Figure 5-2. CropScan VS Reference X Y Plot

	CropScan	Reference	Difference
Sample ID	Protein	Protein	Protein
1	9.9	10	0.1
2	11.7	11.6	-0.1
3	12.9	12.6	-0.3
4	13.7	14	0.3
5	14.5	14.5	0.0

SEP = Accuracy	0.2
-----------------------	------------

Figure 5-3. New predicted protein vales

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Accuracy

Accuracy is defined as the difference between a reference method and the CropScan. Typically 50 samples of grain are analyzed in duplicate by the reference method and then by the CropScan. The Standard Deviation of Differences between the reference method and the CropScan are referred to as the Standard Error of Prediction (SEP). The following values represent 95% confidence levels or 2 X SEP.

Wheat

Protein +/- 0.5%
Moisture +/- 0.4%

Barley

Protein +/- 0.6%
Moisture +/- 0.5%

Canola

Oil +/- 1.0%
Moisture +/- 0.5%

Precision

Precision is defined as the ability of an analyser to measure the same sample twice. Typically 10 samples of grain are analyzed in duplicate on the CropScan. The Standard Deviation of Differences between the duplicate readings is referred to the Standard Deviation of Differences (SDD). The following values represent 95% confidence levels or 2 X SDD.

Wheat

Protein +/- 0.3%
Moisture +/- 0.2%

Barley

Protein +/- 0.3%
Moisture +/- 0.2%

Canola

Oil +/- 0.5%
Moisture +/- 0.4%

These values are intended as a guide only. Under laboratory conditions, using clean grain samples that are of good quality, then you should be able to achieve similar results. However temperature variations of the sample and the instrument have big effects on SEP and SDD. Weather damaged grain or dirty grain will give rise to larger errors. Poor mixing of sample can result in excessive errors.

	CropScan	Reference	Difference
Sample ID	Protein	Protein	Protein
1	10.5	10	-0.5
2	11.8	11.6	-0.2
3	12.6	12.6	0
4	13.2	14	0.8
5	13.8	14.5	0.7

SEP = Accuracy	0.5
-----------------------	------------

Figure 5-4. CropScan VS Reference Protein Table

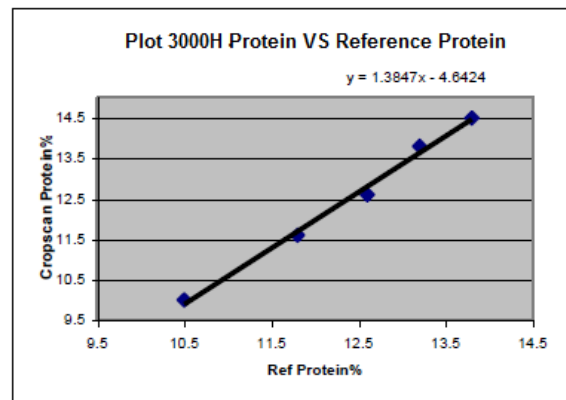


Figure 5-5. CropScan VS Reference X Y Plot

	CropScan	Reference	Difference
Sample ID	Protein	Protein	Protein
1	9.9	10	0.1
2	11.7	11.6	-0.1
3	12.9	12.6	-0.3
4	13.7	14	0.3
5	14.5	14.5	0.0

SDD = Accuracy	0.2
-----------------------	------------

Figure 5-6. CropScan VS Reference X Y Plot

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Note: Only Calibrate the CropScan 3300H using Calibration Mode or Auto-Calibration routines.

5.2 Calibration Mode

Calibration Mode is an advanced function which allows the CropScan to operate like a bench top NIR. The scanned samples allow a sample ID to be entered to the pop up keyboard and results recorded.

Tools Required:

1. 5 x Wheat Samples,
2. 5 x Barley Samples,
3. 5 x Canola Samples,
4. 1 x Funnel, 2 x 1 Litre plus sized containers
5. 1 x Pen, 1 x Validation Sample Sheet

Operation:

- Press the Options Tab
- Press the Calibration button to open the **Calibration** menu
- Press the **Calibration Mode** tick box and enter the **Password = ADMIN (non case sensitive)**
- Press Close to return to the Analysis Screen
- Press START
- Select a Crop Type
- Select the Calibration Field Name or enter a new Field ID = Calibration
- Press OK to confirm Crop Type and Field ID
- Press START to begin analysis
- The operator will now need to go down to the sample head.
- Pour sample 1 into the funnel, catch the scanned grain using the 1 litre container, keep filling the funnel until sample 1 has been scanned 10 times. After the 10th scan the Outlet Flap will open fully and dump the remaining sample into the 1 litre container. Pour sample 1 back into the jar.
- After the samples scans are completed return back to the CropScan Display.
- Enter a unique sample ID using the popup keyboard.
- Repeat sequence for next samples.

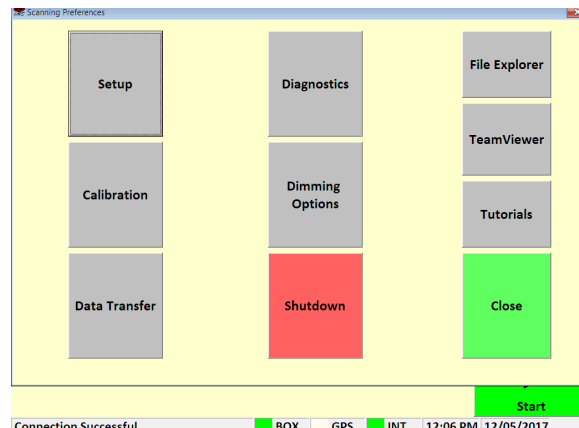


Figure 5-7. Options Window

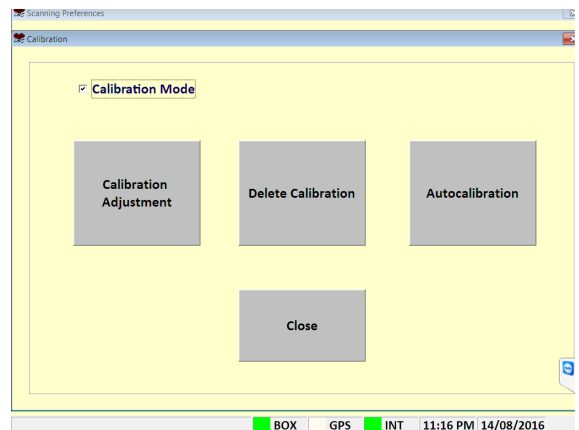


Figure 5-8. Calibration Menu

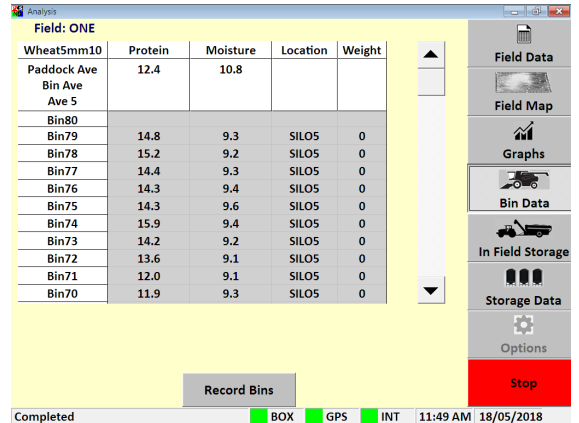


Figure 5-9. Results Screen

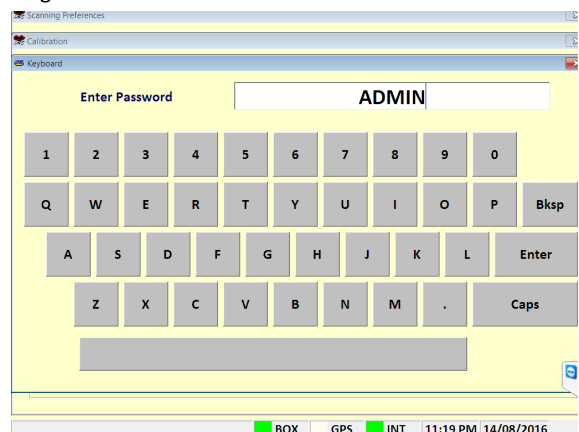


Figure 5-10-. Calibration Password

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5.3 Calibration Adjustment

Calibration Adjustment enables operators to increase or decrease Calibration Models Slope and Bias settings to align with local elevator sites. Operators can toggle the protein bias settings up or down to align or carry out a 5 sample Slope and Bias Adjustment. The follow steps explain how to change the Slope and Bias values in the CropScan Display.

- Click the **Calibration** menu to open the calibration options.
- Click on **Calibration Adjustment** menu. Figure 5-15
- Select the Crop Type you wish to adjust and press OK.
- Highlight the value you want to adjust. Figure 5-12
- Press the Bias Up or Down button to increase or decrease the protein, oil or moisture level from Low to High.
- The Slope settings are password protected.
Password = Admin
- Pressing the Up or Down button for the slope setting will change the setting value. (S and B Calculator software and minimum 5 samples with a low to high range are required to correctly change a slope setting). Contact CropScan support if the Slope and Bias is required to be changed—support@nextinstruments.net
- Press OK to save new Calibration Adjustment settings.
- Run 2-3 check sample to confirm adjustment was successful.

5.4 Delete Calibration

Once a new calibration has been Imported to the CropScan Display delete the old calibration model from the Display. Deleting a calibration model will remove the model name from the Select Product menu.

- Click the Calibration Menu.
- Click on Calibration Delete Calibration Figure 5-15
- Select the Crop Type you wish to delete.

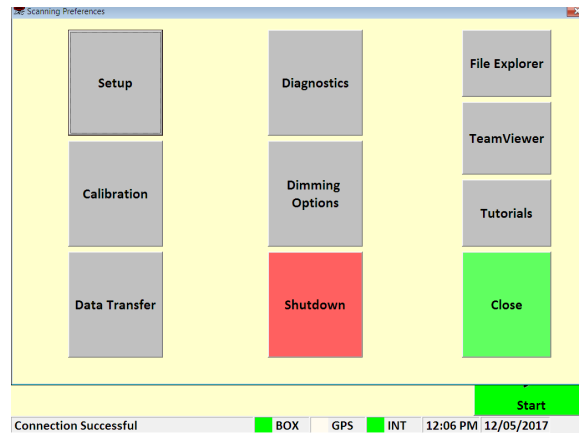


Figure 5-14. Options Window

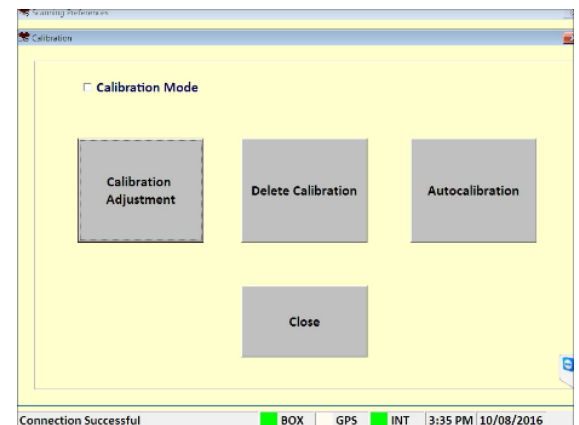


Figure 5-15. Calibration Menu

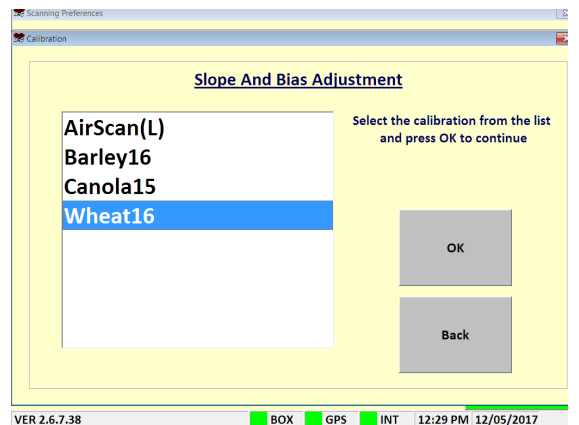


Figure 5-16. Select Calibration Window

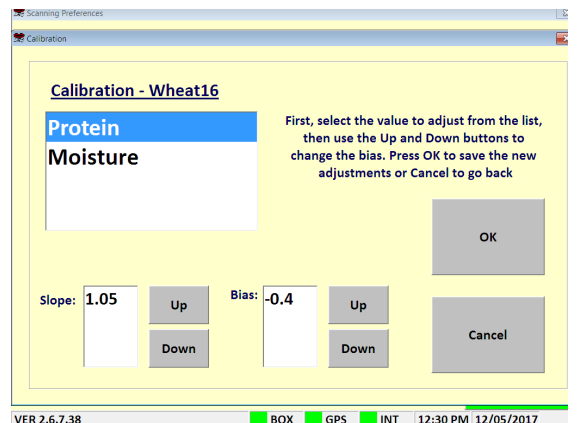


Figure 5-17. Bias Adjustment Window

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5.5 Auto-Calibration

The CropScan 3300H is pre calibrated with 3 Crop Types: Wheat, Barley and Canola. Due to the CropScan requiring installation which involves re-fitting of the Fibre optic cable which is a major optical component a Crop Type validation is required.

A pre-harvest Crop Type validation is suggested to check and fine tune the CropScan 3300H to a set of 5 grain samples, much the same way as any NIR Bench Top Analyser is check at installation or annually.

The Auto-Calibration is suggested to be used as it is a simpler way of analyzing 5 samples in a row and entering the samples actual values after all the samples have been analyzed. The Auto-Calibration routine saves the data so that it can be easily exported after the Auto Calibration routine is completed. The Raw Data results are saved in a file called "Calibration" and stored in the CropScan Display under the C:\WGA\DATA folder directory. The Entered Sample Values for Protein and Moisture are stored in a file called LogDat stored the CropScan Display under the C:\WGA folder directory. These two files can be Exported to a USB when using the Data Transfer function. These two files should be provided to CropScan support for any technical support regarding calibration. support@nextinstruments.net

Tools Required:

1. 5 x Wheat Samples,
2. 5 x Barley Samples,
3. 5 x Canola Samples,
4. 5 x Other Crop Types
5. 1 x Funnel, 2 x 1 Litre plus sized containers
6. 1 x Pen, 1 x Validation Sample Sheet

Operation:

- Press the Options Tab
- Press the **Calibration** menu button to open the Calibration menu. Figure 5-18.
- Press **Auto-Calibration** button and Select the Crop Type to validate. Figure 5-19.
- Enter the number of samples to check (1-5) Figure 5-21
- The Auto-Calibration routine will run the software for the selected number of samples. The operator needed to go down to the Sample Head at the clean grain elevator and pour in the samples.

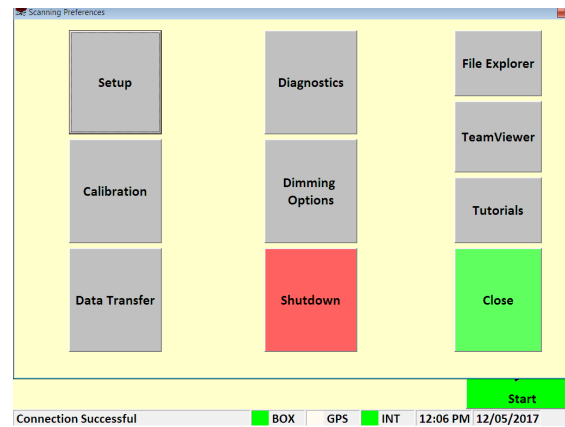


Figure 5-18. Options Window

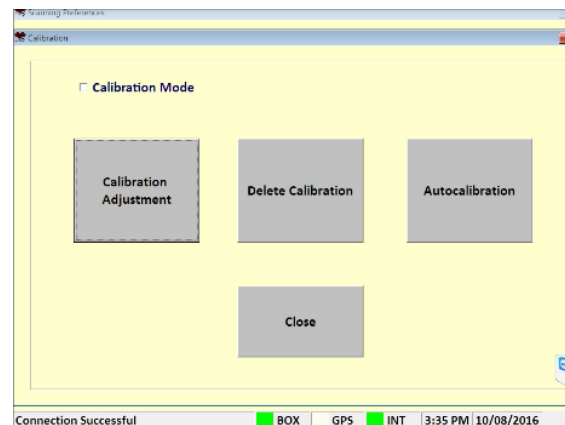


Figure 5-19. Calibration Menu

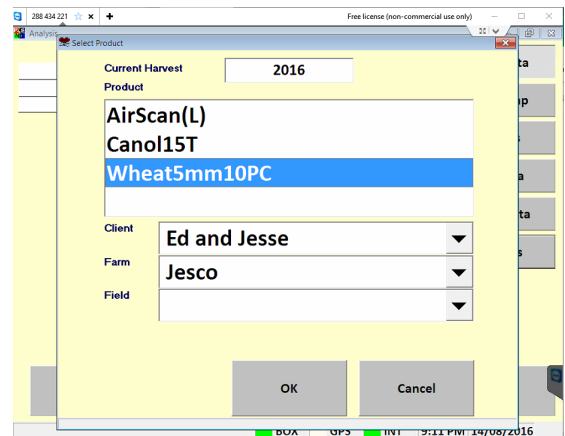


Figure 5-20. Select Product Menu

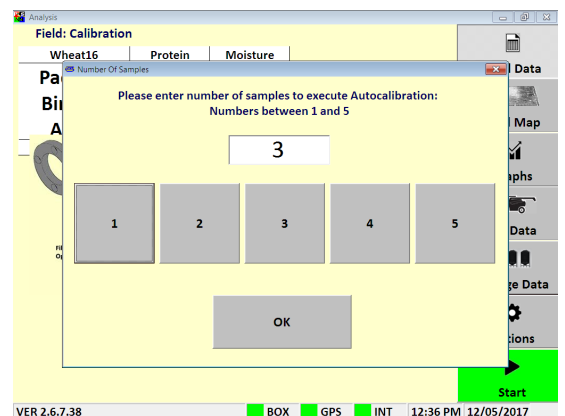


Figure 5-21. Num of samples for Auto-Calibration

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- Remove Inlet and Outlet cover plates.
- Install Outlet Port on bottom side of sample head.
- Install funnel in the top side of the sample head.
- Pour sample 1 into the funnel, catch the scanned grain using the 1 litre container, keep filling the funnel until sample 1 has been scanned 10 times. After the 10th scan the Outlet Flap will open fully and dump the remaining sample into the 1 litre container. Pour sample 1 back into the jar. Note the sample head lamp will flash 4 times to let the operators know to pour in sample 2.
- Carry out the above steps for the required number of samples.
- Record the reference samples values onto the Validation Sample Sheet which can be found in the back of this guide.
- After the last sample has been scanned and put back into its container, return back to the 3300H display.
- Read instructions and press continue.
- Enter the reference values for each sample. Press the green box to enter corresponding value. Figure 5-19.
- When all the reference values have been entered, the results table will calculate and display the differences for Protein, Oil and Moisture then calculate the average error = Bias Adjustment.
- If the SEP box is Green and differences are within 0.3% press Close and to keep the Old Bias setting.
- If the SEP box is Green and the results are greater than 0.3% press SAVE and this will apply the New Bias setting.
- If the SEP box is Red the CropScan requires a Slope and Bias Adjustment, contact CropScan support for assistance. support@nextinstruments.net
- Press Close and access the Data Transfer menu and export the CropScan Data so that the results can be emailed to CropScan support if technical support is needed.



Figure 5-22. Pouring a sample through the CropScan sample head

SampleID	Actual Values			Reference Values			Differences			
	Protein	Moisture	Color	Protein	Moisture	Color	Protein	Moisture	Color	
1	11.4	9.8	60.8	9	10.2		-2.4	0.4	0.0	
2	11.6	9.8	61.1	9.8	10.5		-1.8	0.7	0.0	
3	14.9	10.6	59.6	13	11.0		-1.9	0.4	0.0	
4	14.1	9.6	61	12.2	10.1		-1.9	0.5	0.0	
5	14.2	10.9	61.5	12.8	11.6		-1.4	0.7	0.0	
							SEP	0.36	0.15	0.00
							Average Error	-1.88	0.54	0.00
							Old Bias	0.0	0.0	0.0
							New Bias	-1.9	0.5	0.0

Buttons: Save New Bias, Close, Instructions

Footer: Time Out 15, BOX, GPS, INT, 5:09 PM, 29/10/2019

Figure 5-23. Auto-Calibration Window

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5.6 Slope and Bias Calculator

Overview

The S and B calculator has been designed to simplify the calibration calculation process. The simple to use software quickly plots out CropScan results vs. reference results giving the following statistical information:

- New Slope and Bias values
- Standard Error of Prediction
- Correlation between CropScan and Reference Method

Note: The S & B Calculator software is not part of the CropScan Analysis software—this is a separate download available for dealers.

5.7 Operation

- Open the S and B Calculator Software on a desktop PC or laptop running Windows OS.
- Select a Crop Type by pressing in the white box next to the label “Product”
- Select the Crop Type from the list
- Enter Serial Number by pressing in the white box next to the label “S/N”
- Enter existing Protein Slope and Bias as shown in CropScan Display
- Enter the existing Moisture Slope and Bias as shown in the Display
- Enter CropScan and Reference results into white boxes
- Press Calculate Slope and Bias for Moisture.
- Review Results table as shown in Figure 5-26 and record new Slopes and Bias into Validation Sample Sheet.
- Enter new Slope and Bias into the CropScan Display or each component in the Calibration Adjustment screen.

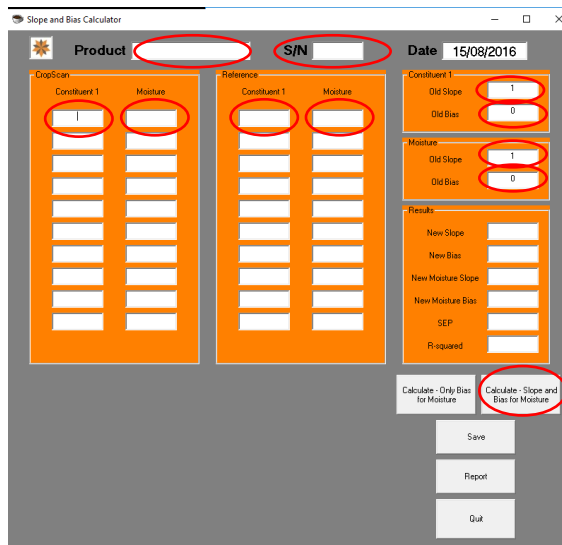


Figure 5-24. Slope and Bias Calculator Software

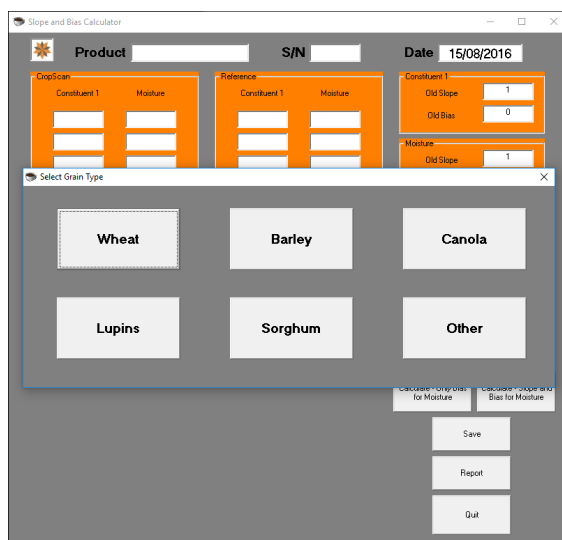


Figure 5-25. Selecting the Crop Type



Figure 5-26. Slope and Bias Calculator results

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5.8 S and B Calculator Reports

The Slope and Bias Calculator has the ability to develop quick reports. Once all the values have been entered into the S and B Calculator, the Reports button can create a customized report, with company logo, address, phone and email details. Once these details have been entered they will remain on the report until changed.

The Report displays:

- New Slope and Bias values
- Standard Error of Prediction
- Correlation between CropScan and Reference Method

To create a S and B report, carry out the following:

- Press the Report button to generate a report for the results displayed in the S and B Calculator.
- To customize the report header, tap on top of the words. The following can be changed:
 - Report Name
 - Company Name
 - Address
 - Email Address
 - Phone Number/Fax Number
 - JPEG Logo in the top left corner
- To print an report, press the print button. A PDF can be created using a PDF writer.
- Press Close to close report.



Figure 5-27. R Squared value highlighted

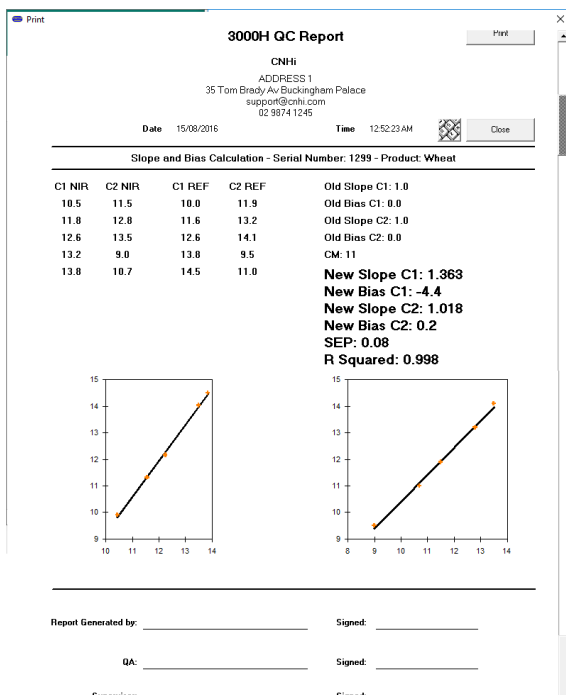


Figure 5-28. Slope and Bias Calculator Report

CropScan 3300H On Combine Grain Analyser User Guide

5.9 Validation Sample Sheet

Wheat	3000H	3000H	Reference	Reference	Difference	Difference
ID	Protein	Moisture	Protein	Moisture	Protein	Moisture
1						
2						
3						
4						
5						
			New Slope =			
			New Bias =			

Barley	3000H	3000H	3000H	Reference	Reference	Reference	Difference	Difference	Difference
ID	Protein	Moisture	Colour	Protein	Moisture	Colour	Protein	Moisture	Colour
1									
2									
3									
4									
5									
					New Slope =				
					New Bias =				

Canola	3000H	3000H	3000H	Reference	Reference	Reference	Difference	Difference	Difference
ID	Oil	Moisture	Protein	Oil	Moisture	Protein	Oil	Moisture	Protein
1									
2									
3									
4									
5									
					New Slope =				
					New Bias =				

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6.0 Data Transfer

The data is stored to the CropScan display's internal hard drive. The data of files can be exported to a USB or to the CropScanAg cloud via the Data Transfer menu. If a CropScanAg Cloud account is setup and signed in the CropScan

The **Data Transfer** menu is designed to allow operators to Export and Import data or files to the CropScan Display or CropScanAg Cloud.

The following data can be imported to the display:

- Import Calibrations from a USB
- Import Calibration from the CropScanAg Cloud
- Import Software from a USB
- Import Software from, the CropScanAg Cloud

The following data can be exported from the display:

- Export Storage Locations to the N-GAUGE App
- Export Data to a USB
- Export Data to the CropScanAg Cloud
- Export Grower Farm Fields to the CropScanAg Cloud
- Export Yield Data to the CropScanAg Cloud
- Export Grain Logistic Data to the N-GAUGE App
- Field Data Files

6.1 Import Calibration

(Note: Create a Folder named CalFiles on the root drive of the USB)

- Copy Calibration Bin File onto USB Stick. The calibration must be stored inside a folder called CalFiles. If it does not exist, create a folder called CalFiles inside the root directory of the USB stick and then copy the calibration file.
- Insert USB Stick into CropScan Display USB port
- Press the Options Menu
- Press the Data Transfer button
- Press Import Calibration button
- Click on the Calibration you wish to import from the USB
- Press OK and wait for the Import to be completed

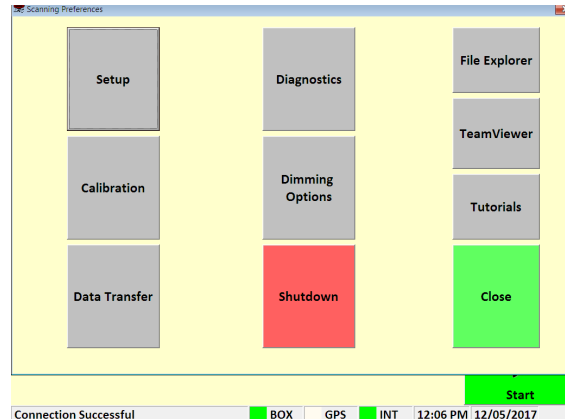


Figure 6-1. Options Window.

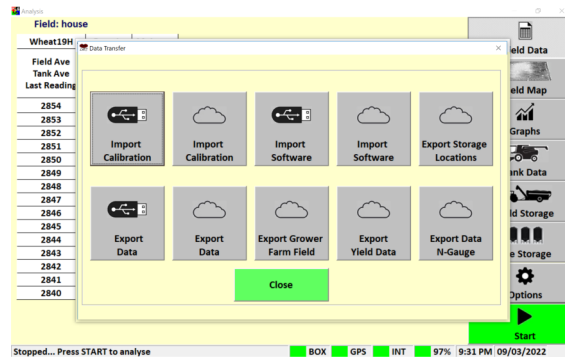


Figure 6-2. Data Transfer Menu

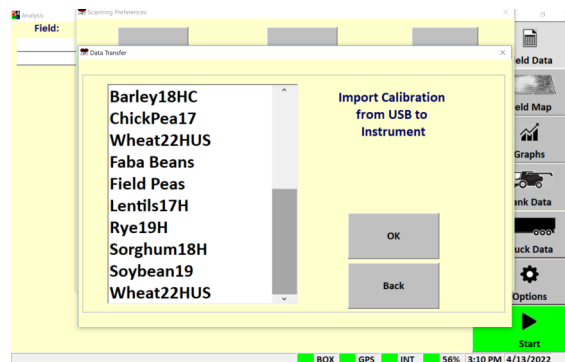


Figure 6-3. Import Calibration

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6.4 Export Data

(Note: Create a Folder named Data on the root drive of the USB)

- Insert USB Stick into CropScan Display USB port
- Press the Options Menu
- Press the Data Transfer button
- Select Calendar Year Export
- Press Export Data button
- Press OK and wait for data transfer to be completed.

6.5 Import Yield Data

- Copy the Yield Data in the root directory of the USB
- Insert USB Stick into CropScan Display USB port
- Press the Options Menu
- Press the Data Transfer button
- Press Export Data button
- Select the File you want to Import
- Press OK and wait for Import to be completed and synced to the CropScan Cloud.

6.6 Downloading Software

(Copy & Paste Software Files to root drive of the USB)

- Insert USB Stick into CropScan Display USB port
- Press the Options Menu
- Press the Data Transfer button
- Press Install New Software button
- Click on the Software version you wish to install.
- Press OK to run Software Installer
- Accept and follow installer prompts.
- Re Boot CropScan Display

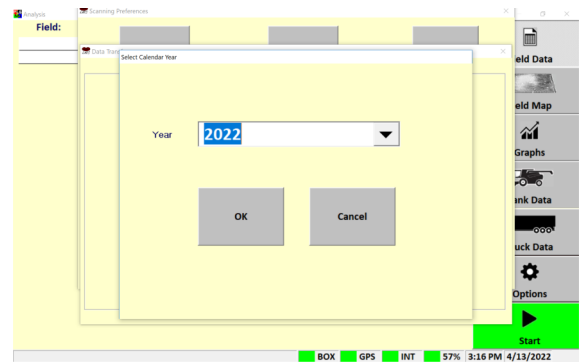


Figure 6-3. Data Transfer—Export Data—

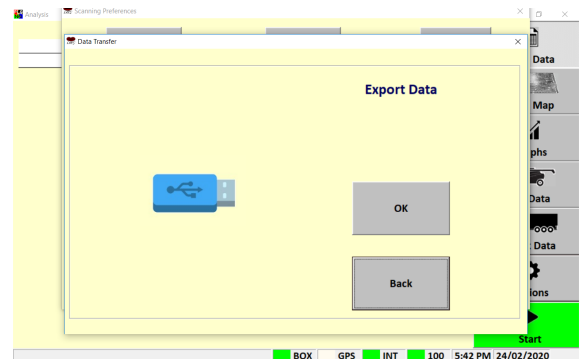


Figure 6-4. Data Transfer—Export Data

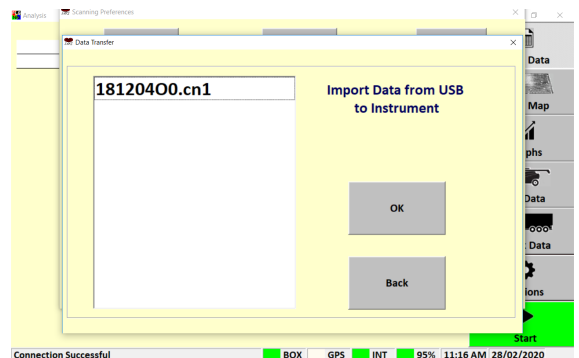


Figure 6-5. Yield Data Import

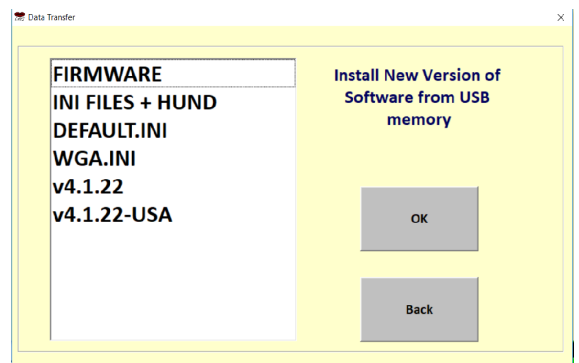


Figure 6-6. Display Software Download

CropScan 3300H On Combine Grain Analyser User Guide

7.0 Diagnostics

7.1 Overview

Diagnostics is a troubleshooting tool used to test the operation of the CropScan 3300H sensors and motors. These tools provide a service person with a means of diagnosing problems with in the system. Unless instructed by your Technical Support agent, these tools should not be used by the operator.

7.2 100% Lamp Signal Test

Press the Lamp On button on to turn the lamp on. The lamp Status Box turns Green when 12VDC is applied to the lamp. Click on the Lamp Off to turn the lamp off and Status Box turns White. Check that the Lamp at the Remote Sampling Head turns on and it is stable (**No lamp flickering**).

7.3 Noise Hardware Test

See Chapter 12.8 for Noise Hardware Test

7.4 Temperature Test

Press the Temperature button to read the internal temperature of the spectrometer. Allow the spectrometer box to heat up to 35 degrees.

7.5 Sample Sensor

Press the PT Level button to test the Phototransistor Level. The value displayed should be > 50 units.

7.6 Outlet Motor Test

Press the Outlet Open button to open the outlet flap, press Outlet Close button to close the outlet flap. Cycle this 2-3 times to test operation.

7.7 Auger Sensor Test

Press the Test Auger Sensor button to check the Auger Sensor is operating and sensor gap is set up correctly. A 10mm gap is suggested between the yellow sensor and the Unloading Auger.

With the Outloading Auger retracted, the Test Auger Sensor status box should turn **GREEN** when the Test Auger button is pressed.

With the Outloading Auger extended away from the yellow sensor, the Test Auger Sensor status box should turn **RED** when the Test Auger Button is pressed.

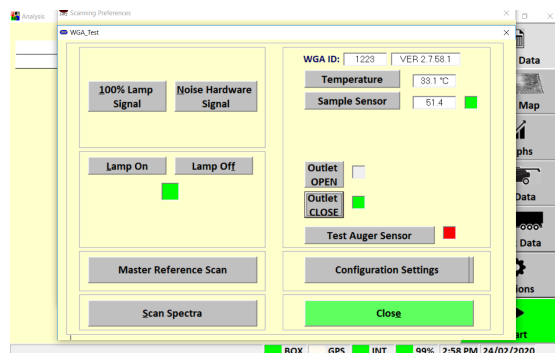


Figure 7-1. Diagnostics Window

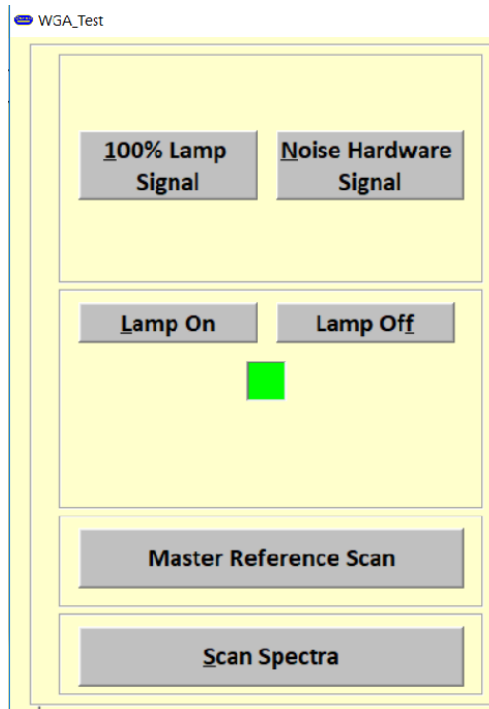


Figure 7-2 - Left side of WGA Test screen

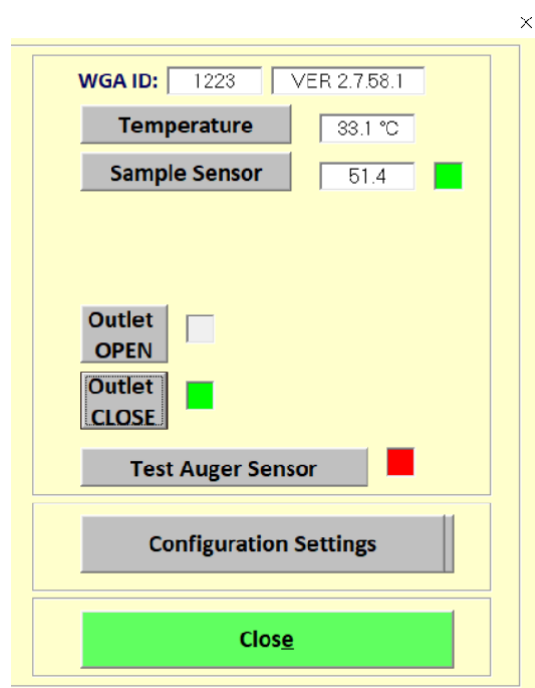


Figure 7-3 - Right side of WGA Test screen

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8.0 Screen Dimming Options

8.1 Overview

The Screen Dimming Options is design to allow operators to set when the CropScan Display will reduce the brightness level of the CropScan Display. The CropScan display will automatically Dim the screen at the time programmed into the Diming Options window.

8.2 Screen Dimming

Dimming refers to the brightness of the screen. Click the Dimming Options Tab to set up the CropScan Display Screen Dimming Times. Factory default is 6:00am for Sunrise and 8:00pm for Sunset.

Enter the time to activate the screen dimming by setting Night Starts time. Increase or decrease the time to suit local conditions.

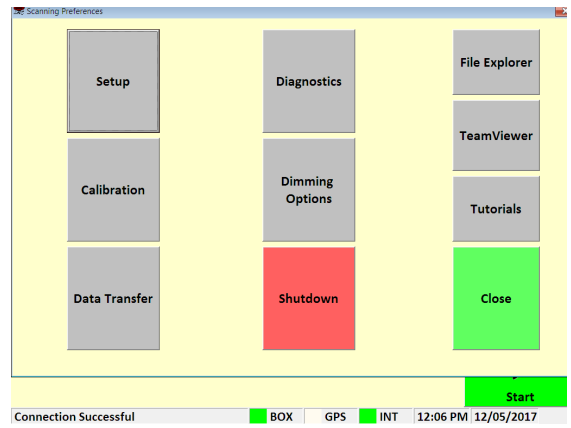


Figure 8-1. Options Window

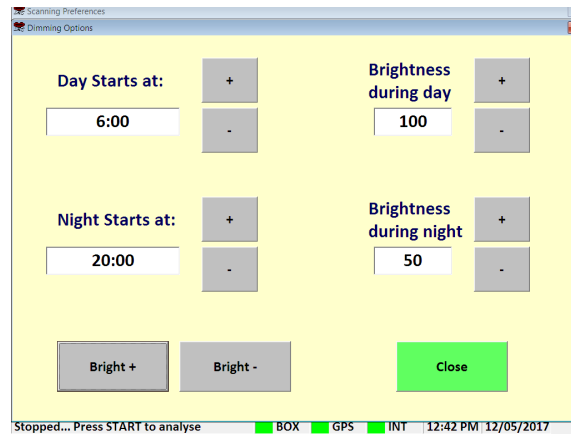


Figure 8-2. Dimming Options Window

CropScan 3300H On Combine Grain Analyser User Guide

9.0 File Explorer Menu

9.1 Overview

The File Explorer is design to allow operators in the Window's part of the CropScan Display.

9.2 Opening File Explorer Window

The File Explorer button will navigate to the Windows File Explorer. This is used to access the Windows 10 functions of the CropScan Display.

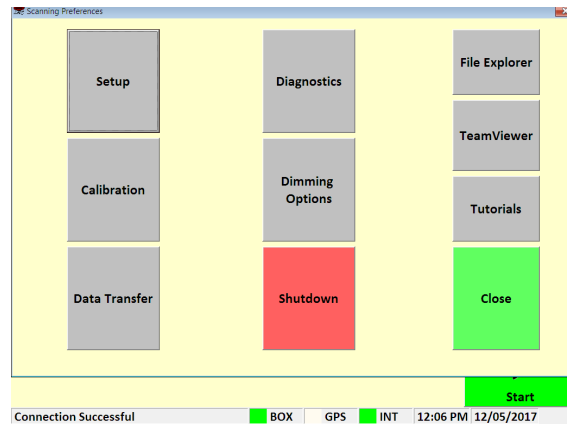


Figure 9-1. Options Window

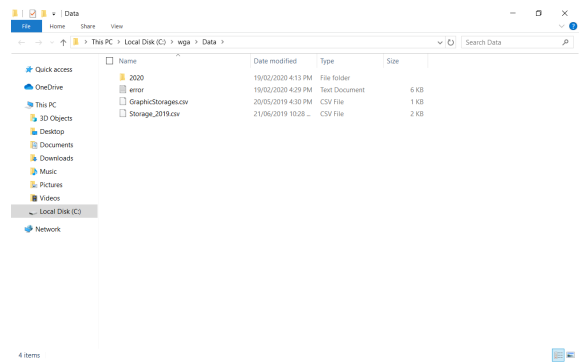


Figure 9-2. File Explorer Window

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10.0 TeamViewer

10.1 Overview

A copy of TeamViewer is installed on the CropScan Display. This software allows the Technical Support agent to connect to the CropScan Display through the internet and to be able to assist in setup and problem solving.

10.2 Activating Team Viewer

Press the TeamViewer button in the Options Menu to open the application. The TeamViewer application will open on the screen.

This software should be used while in phone contact with Technical Support.

Provide the ID and Password to a Technical Support team member over the phone and they will be able to log on to the CropScan Display to help.

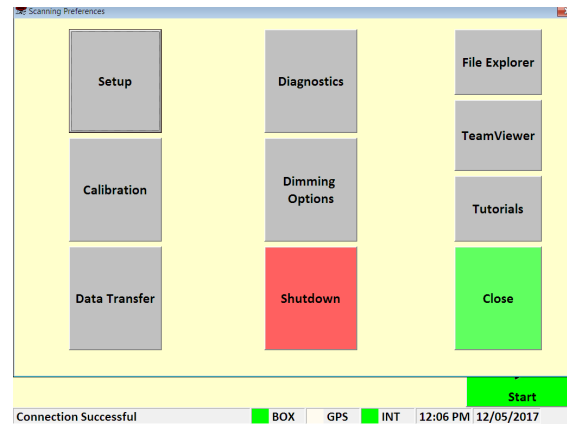


Figure 10-1. Options Window

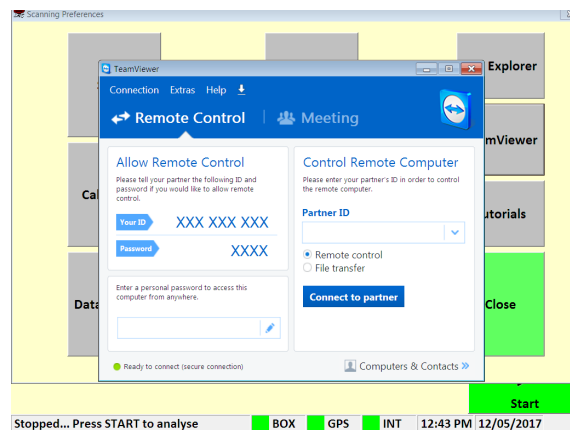


Figure 10.-2. TeamViewer screen

CropScan 3300H On Combine Grain Analyser User Guide

11.0 Tutorials

11.1 Overview

The tutorials tab allows operators to view the electronic version of the User Guide and view the loaded tutorial videos.

11.2 Viewing the CropScan User Guide

Click on the Open Manual button to view the CropScan 3300H On Combine Grain Analyser's User Guide.

11.3 Viewing the CropScan Tutorials

Several video tutorials are loaded into the CropScan Display. Select the topic that you wish to view and wait for the video player to load and play the tutorial.

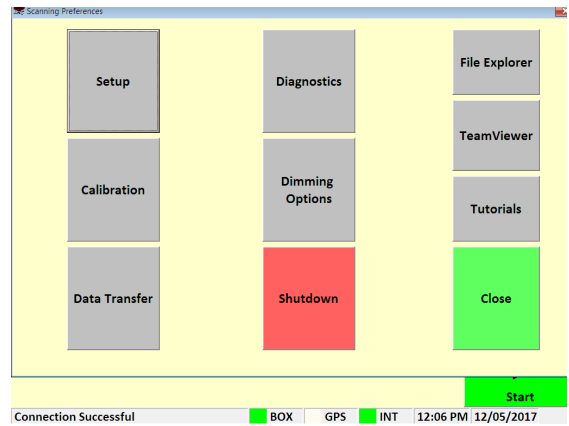


Figure 11-1. Options Window

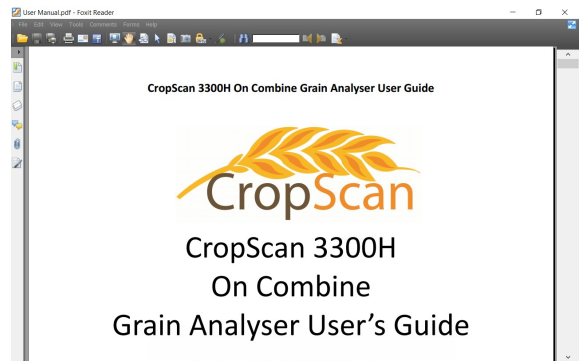


Figure 11-2. User Guide

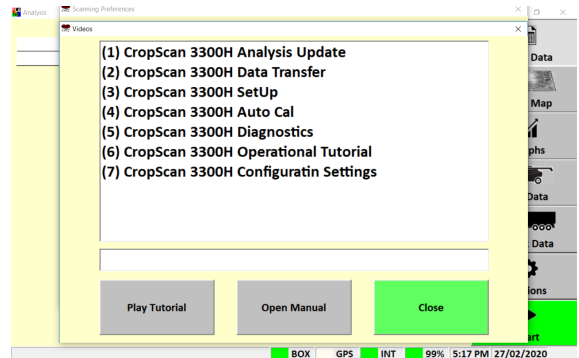


Figure 11-2. Tutorial

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12.0 Maintenance

The CropScan 3300H On Combine Analyser has been designed to make maintenance as easy as possible. Before attempting any maintenance, disconnect any external power supplies and ensure the instrument is turned OFF. Refer to the Service Manual for parts replacement and software downloading and updates.

12.1 Sample Head Cleaning

The CropScan 3300H Sample requires a daily inspection and general cleaning. The main area to focus is at the Lamp and Fibre Optic Probe. Using a clean rag wipe the lens of the Lamp Probe and Fibre Optic Probe lens each day. Remove dust and dirt build up daily to reduce dirt build up. **Note Do Not Pressure Wash Sample Head.**

12.2 Lamp Replacement

- Remove the sampling head front cover by releasing the 2 x latches and opening the Sample Head door.
- Remove the left side Electrical Cover by removing the 6 x M5 Hex Head screws. Remove Electrical Cover and set aside.
- Loosen the Locking Grub Screw on the Lamp Probe.
- Remove the Lamp Guide Assembly out of the Lamp Probe.
- Remove the Lamp Bulb from the receptacle using a clean cloth or tissue.
- Install the Lamp Bulb using a clean cloth or tissue by inserting the lamp 2 pins into the Lamp Cable receptacle.
- Re Install the Lamp Guide into the Lamp Probe Assembly. Tight the Locking Grub Screw to secure.
- Check and Test the Lamp Energy in the Diagnostics Test Page as shown in Figure 10.6 to be within 2000 to 3500 units. **Note: Make sure the sampling head is clean**



Figure 12-1. Remote Sample Head

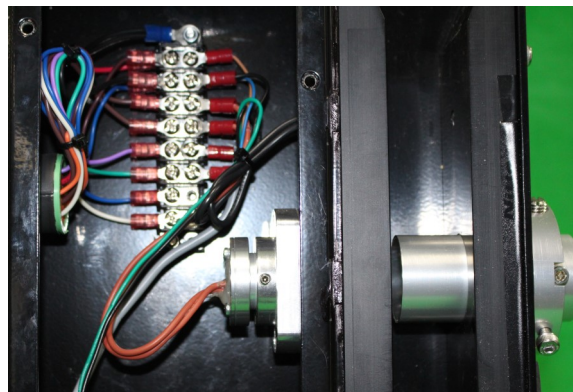


Figure 12-2. Lamp Probe Installed

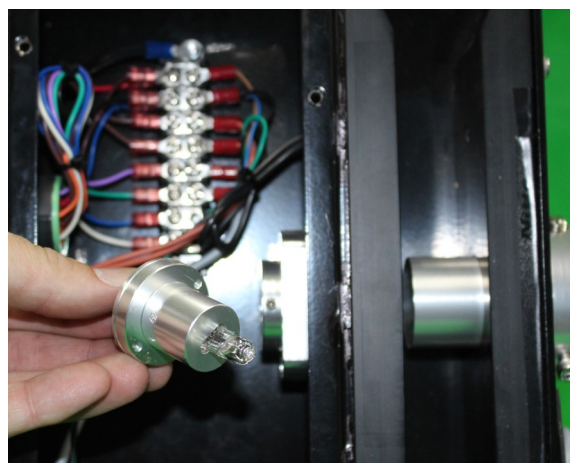


Figure 12-3. Lamp Bulb Replacement

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- Press the Options Tab
 - Press the Diagnostics Button
 - Press the 100% Button and check that the lamp is turned ON
 - Press the Scan Spectra Button
 - Press the Sequential Button
 - Check that the spectra is clean and the maximum value is between 2000 and 3500 units as shown in Figure 10.6.
- If the lamp intensity needs adjustment, loosen Grub screw and Pull Lamp Probe aft to increase energy level.
 - Tighten Lamp Probe grub screw once energy level is achieved.
 - Apply 5cm of electrical tape around the gap between the Lamp Guide and Lamp Probe to seal from any dust.
 - Conduct a Master Reference Scan Routine as per Chapter 12.12

12.3 Spectrometer LID

- Unscrew the 4 Phillips Head screws on the top lid of the Spectrometer.
- Disconnect the 6 Pin LED flat connector and place the Spectrometer LID in secure position.
- Reconnect the 6 Pin LED Flat Connector.
- Place the Spectrometer Lid on top of the box and secure the 4 Philips Head screws.

12.4 Fuse Replacement

- Unscrew the Spectrometer Fuse Holder.
- Remove and discard the Old Fuse
- Replace the Fuse with a new 12VDC 10 AMP Fuse
- Tighten the Fuse and Fuse Holder to the Spectrometer box.

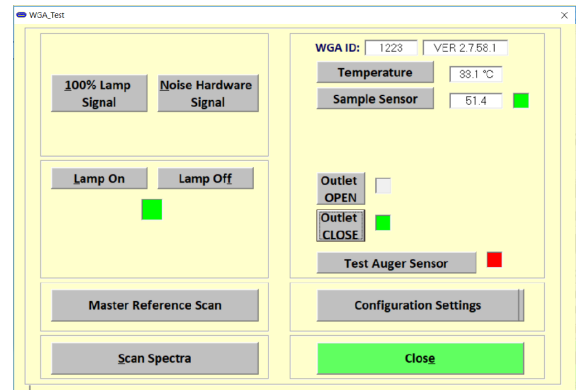


Figure 12-4. Diagnostic Test Page

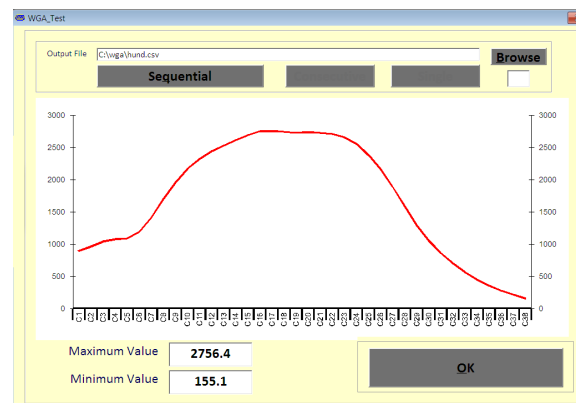


Figure 12-5. Lamp Energy Level Graph



Figure 12-6. Spectrometer Lid Removed



Figure 12-7. Fuse Replacement

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12.5 Motor Replacement

- Remove the Sample Head front cover by releasing the 2 x latches and unscrewing the 4 x M4 Countersunk hex hinge screws and remove the Sample Head Cover.
- Remove the right side Bar Cover panel by unscrewing the 4 x M5 Hex Head screws.
- Remove the left side Electrical Cover by removing the 6 x M5 Hex Head screws. Remove Electrical Cover.
- Disconnect the Blue and White Motor wires.
- Remove the 2 x M5 Nuts and Washers that hold the Motor Bracket to the Sample Head.
- Remove the Flow Through Cell Plate 4 x M3 Hex Head Screws. Remove Flow Through Cell Plate.
- Remove the Motor Flap Assembly.
- Remove the Flap coupler attach screw.
- Remove failed Motor from bracket and install new motor.
- Re install the Flap coupler to the new motor and tighten the attached screw.
- Re install the Motor Flap assembly to the Sample Head and tighten the 2x M5 Motor Bracket.
- Re install the Flow Through Cell Plate and secure with the 4 x M3 hex head screws.
- Connect the Blue and White Motor wires to the terminal block.
- Re install the left side Electrical Cover by screwing the 6 x M5 Hex Head screws.
- Re install the right side Bar Cover panel by screwing the 4 x M5 Hex Head screws.
- Re install the Sample Head front cover by releasing the 2 x latches and unscrewing the 4 x M4 Countersunk hex hinge screws and remove the Sample Head Cover.
- Test new motor using the Open and Close Outlet operation in the Diagnostics Test Page,

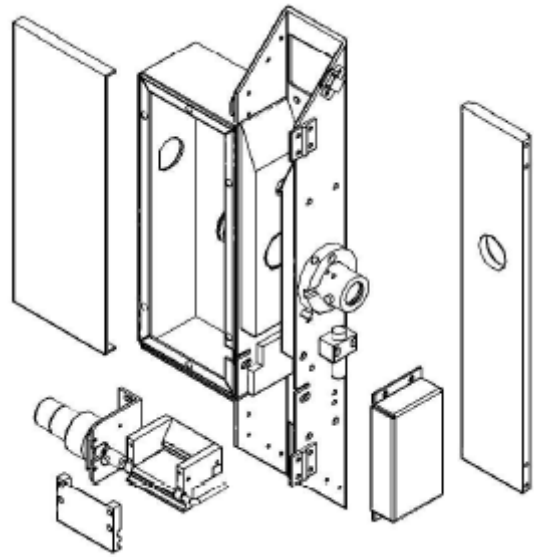


Figure 12-8. Sample Head exploded view

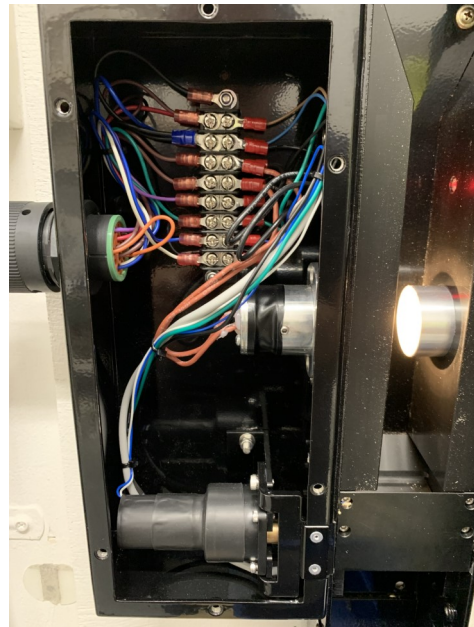


Figure 12-9. Outlet Motor

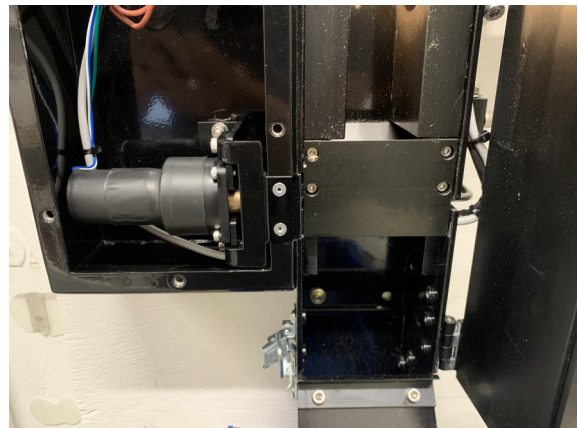


Figure 12-10. Motor covers and brackets

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12.6 Motor Sensor

- Remove the Sample Head front cover by releasing the 2 x latches and unscrewing the 4 x M4 Countersunk hex hinge screws and remove the Sample Head Cover.
- Remove the right side Bar Cover panel by unscrewing the 4 x M5 Hex Head screws.
- Remove the left side Electrical Cover by removing the 6 x M5 Hex Head screws. Remove Electrical Cover.
- Disconnect the Brown, Blue and Black Motor Sensor wires.
- Remove the 2 x M5 hex head screws that hold the Motor Sensor to the Sample Head.
- Remove the Flow Through Cell Plate 4 x M3 Hex Head Screws. Remove Flow Through Cell Plate.
- Remove the cable ties to separate the Motor Sensor Wires.
- Remove the failed Motor Sensor and Wires from the Sample Head.
- Remove failed Motor from sensor block.
- Install the new Motor Sensor to the sensor block.
- Feed the Motor Sensor wires along the Flow Through Cell wire cavity and up to the terminal block. Attach the red ring terminals to the brown, blue and black wires.
- Attach the brown, blue and black wires to the terminal block as shown in Figure 9.9.
- Attach the 2 x M5 hex head screws that hold the Motor Sensor to the Sample Head.
- Install the Flow Through Cell Plate and 4 x M3 Hex Head Screws.
- Install the right side Bar Cover panel with the 4 x M5 Hex Head screws.
- Install the left side Electrical Cover by installing and tightening the 6 x M5 Hex Head screws.
- Install the Sample Head front cover plate by screwing the 4 x M4 Countersunk hex hinge screws.



Figure 12-11. Motor Sensor

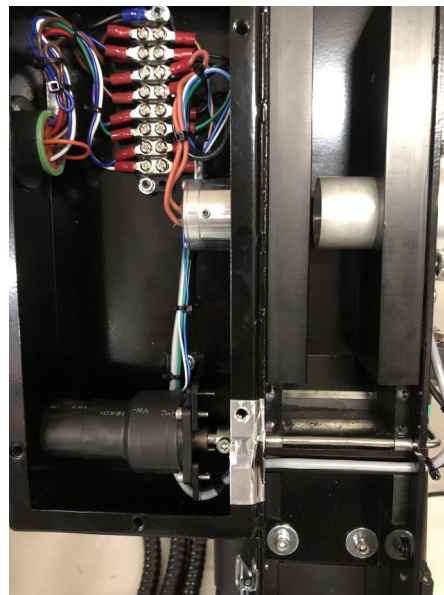


Figure 12-12. Motor Sensor wiring

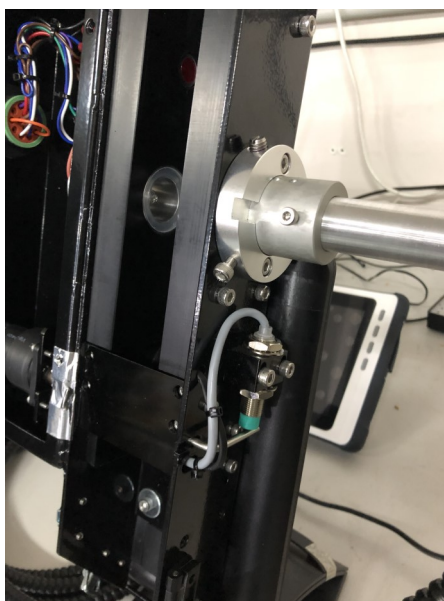


Figure 12-13. Motor Sensor

12.7 Sample Sensor

- Remove the Sample Head front cover by releasing the 2 x latches and unscrewing the 4 x M4 Countersunk hex hinge screws and remove the Sample Head Cover.
- Remove the right side Bar Cover panel by unscrewing the 4 x M5 Hex Head screws.
- Remove the left side Electrical Cover by removing the 6 x M5 Hex Head screws. Remove Electrical Cover.
- Disconnect the Green and Black Sample Sensor wires at the terminal strip.
- Remove the Flow Through Cell Front Plate 4 x M3 Hex Head Screws. Remove Flow Through Cell Front Plate to again access to the Sample Sensor wiring.
- Remove the cable ties to separate the Sample Sensor and Motor Sensor Wires.
- Loosen the M5 Fibre Optic Probe assembly locking screw and position the Probe assembly to the Corn (32mm) position. Note: when the Probe assembly is removed from the sample head the internal key way could fall out if not locked into the 32mm Corn position.
- Remove the 2 x M5 Fibre Optic Probe assembly screws and remove the Probe from the Sample Head.
- Remove the 4 x M5 Fibre Optic Probe Black Sample Head Guide Block and remove the Guide Block assembly from the Sample Head.
- Remove and replace the Sample Sensor from the Guide Block.
- Reinstall the Guide Block to the Sample Head and feed the Sample Sensor wires as per removal and feed along the Flow Through Cell wire cavity and up to the terminal block. Attach the red ring terminals to the green and black wires and secure to the terminal block to the opposing wire colour. Refer wiring diagram figure 6.1.5.
- Secure the Guide Block with the 4 x M5 screws.
- Install the Flow Through Cell Plate and 4 x M3 Hex Head Screws.
- Test the Sample Sensor operation in the Diagnostics terminal in the Analysis Software.

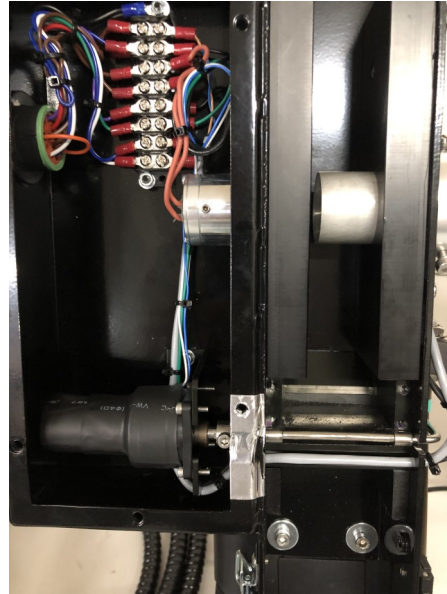


Figure 12-14. Sample Head



Figure 12-15. Sample Sensor receiver

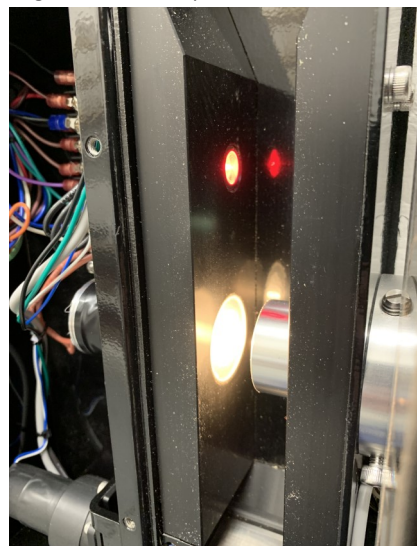


Figure 12-16. Sample Sensor LED.

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12.8 Configuration Settings

The Configuration Setting Menu contains the follow:

1. Outlet Flap Angle Swing—Small Seeds = 20
2. Outlet Flap Angle Swing—Wheat = 25
3. Outlet Flap Angle Swing—Barley = 30
4. Outlet Flap Angle Swing—Large Seeds = 30
5. Sample Packing Delays—Barley = 2
6. Update Reference Scan = Unticked
7. Sample Sensor Enable = Ticked
8. Auger Sensor Enable = Ticked
9. Adaptive Scan Time = Unticked
10. GPS Activation = Ticked
11. GPS Baud Rate = 38400 or 19200

These settings should be only changed when instructed by Next Instruments or a trained dealer.

- Press the Options Menu
- Press the Diagnostics button
- Press the Configuration Settings button
- ONLY IF the table is empty, press the Upload Button
- Select the parameter you want to change and use the popup keyboard to adjust setting, then press ENTER to confirm
- Repeat the previous step to adjust all the needed parameters
- Press the Download button to update the parameters. NOTE: the Spectrograph takes around 45-60 seconds to reboot, let it run until the progress bar is completed
- Press Close to go back to the Main Run Screens.

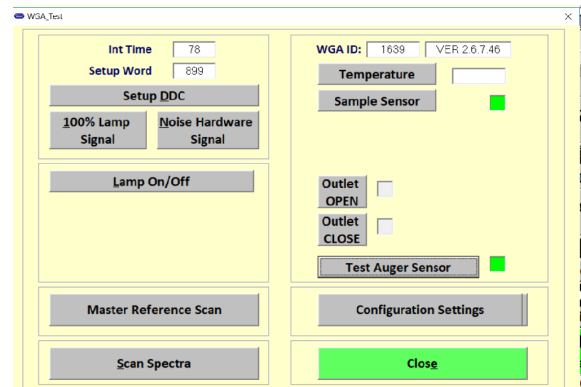


Figure 12-17. Diagnostics Window

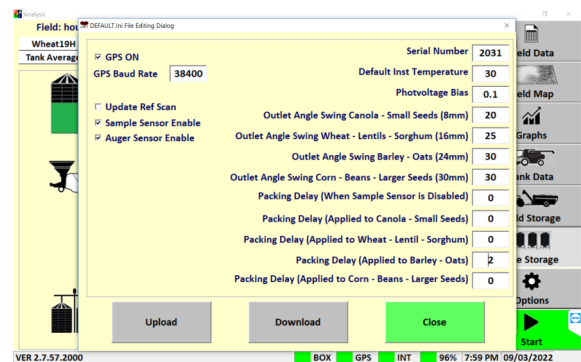


Figure 12-18. Configuration Settings Window

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12.9 100% Lamp Signal

- Make sure the sampling head is clean
- Press the Options Menu
- Press the Diagnostics button
- Press the 100% Lamp Signal button and check that the lamp is turned ON
- Press the Scan Spectra button
- Press the Sequential button
- Check that the spectra is clean and the maximum value is between 1500 and 3000 units

12.10 Noise Hardware Signal

- Make sure the Sampling Head is clean
- Press the Options tab
- Press the Diagnostics button
- Press the Noise Hardware Signal button and check that the lamp is turned OFF
- Press the Scan Spectra Button
- Press the Sequential Button
- Check that the spectra is between ± 0.01 units

12.11 Spectrometer Temperature

- Make sure the sampling head is clean
- Press the Options Menu
- Press the Diagnostics button
- Press the Temperature button, the temp should be 35C at operating temperature (after 15 Minutes)

12.12 Sample Sensor Signal

- Press Lamp ON
- Press the Sample Sensor button, the indicator box should be Green
- Press Lamp OFF
- Press the Sample Sensor Button, the indicator box should be Red

12.13 Motor Sensor Operation

- Press the Options Menu
- Press the Diagnostics button
- Press the Outlet Open to test the flap operation
- Visually check the Flap position opened when the Outlet Close button was pressed.
- Press the Outlet Close to test the flap operation
- Visually check the Flap position Closed when the Outlet Close button was pressed.

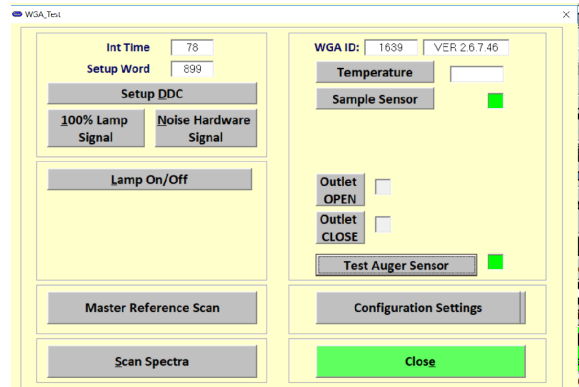


Figure 12-19. Diagnostics Window.

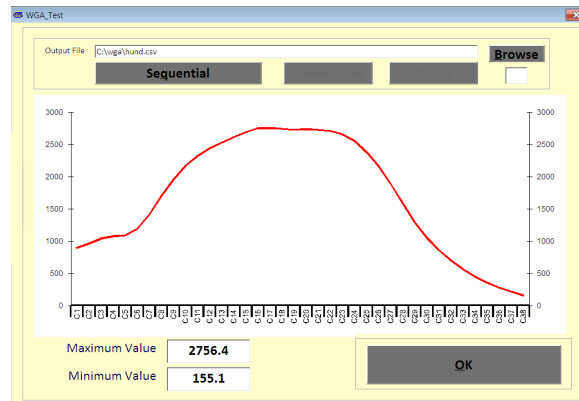


Figure 12-20. WGA Test Sequential Scan Window showing the 100% Energy Curve.

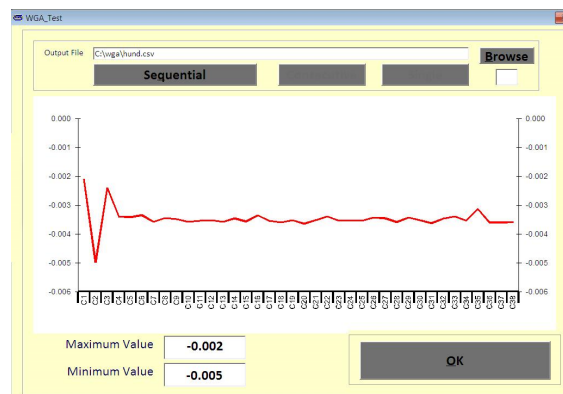


Figure 12-21. WGA Test Sequential Scan Window showing the Noise Energy Curve

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12.14 Master Reference Scan

After installation, run the master reference scan routine to calibrate the lamp from cold to hot as the spectrometer box heats up. Ideally the system is calibrated plus or minus 10 degrees of the set operating temperature of the spectrometry box. Note the spectrometer box can be set at any temperature above ambient. Normally it is 35 degrees but if the combine is operating in a cooler climate the spectrometer box can be set heat to 25 degrees Celsius.

(Note: **The 35 Degree Reference Scan must be collected**).

Start this operation with the CropScan at cold temperatures so the system can gather different reference scans while it is warming up to 40 degrees. This process could take up to 45 minutes

Press the Options Menu to open the options menu.

Press the Diagnostics tab

Press Master Reference Scan button

The Master Reference Scan test page will open displaying the current Master Reference Scan loaded at the factory.

Press New Reference Scan to load a new Reference Scan onto the test page.

The Maximum Value box will display the peak value and this should be from 1500 to 3000 units. If the maximum value is below 1500, clean out chamber again, make sure lenses are clean, ensure Fibre Optic cable is pushed all the way in. Repeat new reference scan process.

If the value is with in the 1500 to 3000 range press the Continuous Reference Scan button and allow the system to collect all the scans at different temperatures until it reaches 40 degrees.

The stop button will pause the operation and will download the collected data back to the system. Allow about a minute for this process to finish.

Press Close to return to the Diagnostics Screen

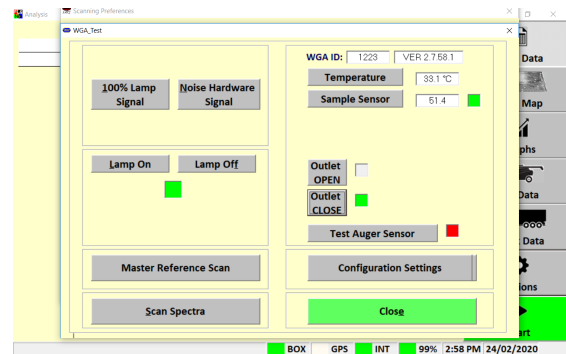


Figure 12-22. Diagnostics Window

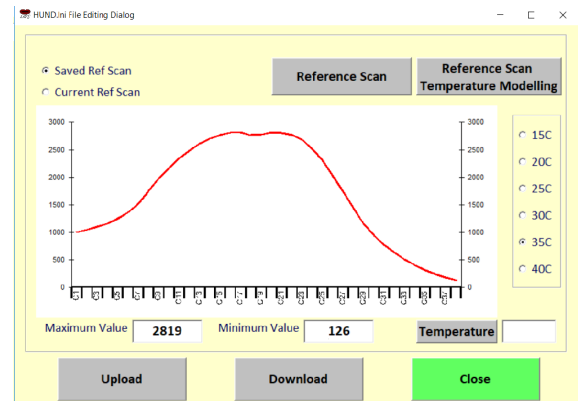


Figure 12-23. Master Reference Scan button

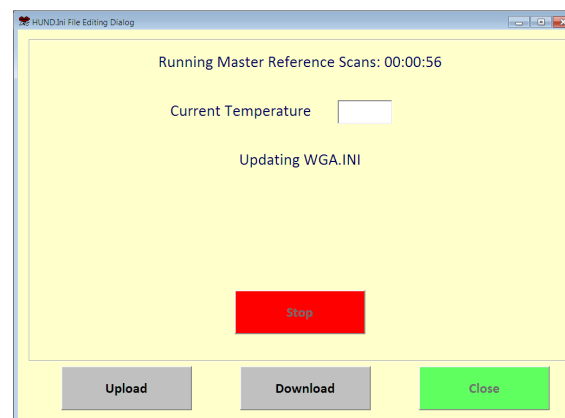


Figure 12-24. Master Reference Scan Window

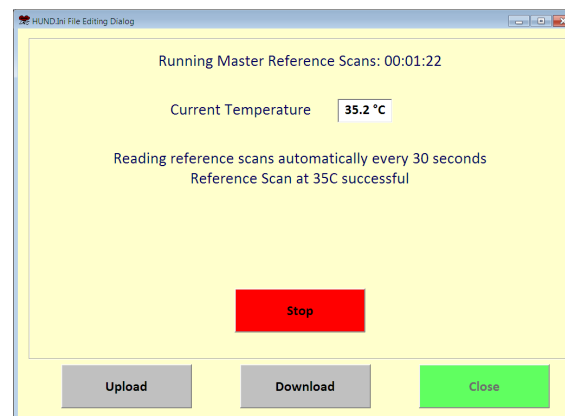


Figure 12-25. Master Reference Scan Window

12.15 Foreign Matter

Foreign matter, such as chaff, dirt and straw, will affect the results. If the thrashed grain flowing through the Remote Sample Head contains excessive Foreign Matter then adjust the settings for the harvester to reduce the trash.

12.16 Temperature Dependence

Both sample and instrument temperature are important factors to making accurate measurement of chemical components. Sample temperature should be between 10-45C, however the most accurate measurements will be made between 25 and 35C. The calibrations should be developed using samples at 10 and 45C as well as 28C, in order to train the instrument to recognize samples with high or low temperatures. Instrument temperature is included in the calibration process, however the instrument response is corrected for temperatures between 10 and 45C. It is recommended that the NIR Spectrometer be turned on 10-20 minutes prior to starting to strip grain. The systems internal heating system will control the system between 32 and 36 degrees. The system temperature is constantly monitored throughout the day and recorded in the hund.csv file each half hour.

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13.0 Warranty

The CropScan 3300H On Combine Analyser is warranted for 12 months. The warranty includes all parts and labour for the repair of any component that has failed within the recommended operating conditions. If there is damage to the instrument due to inappropriate handling, then the warranty will be voided.

14.0 Disclaimer

The CropScan 3300H On Combine Analyser is designed to function as a Near Infrared Spectrophotometer. The instrument measure the amount of light absorbed by the sample and the computer applies a calibration model for a specific product and thereby calculates the constituent values. Calibrations supplied with the instrument are not guaranteed to perform to any standard or specification. Owners are responsible for evaluating the calibrations used within the instrument. Owners are responsible for interpreting and using the information provided by these instruments at their discretion. The manufacturer takes no responsibility for any damages or costs incurred by the user based on the information provided by the instrument.