



# Installation Guide CropScan 3300H On Combine Grain Analyser John Deere Combines



## REVISION HISTORY

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# CropScan 3300H On Combine Grain Analyser: Installation Guide

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# CropScan 3300H On Combine Grain Analyser: Installation Guide

## 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 sampled from the clean grain elevator of a combine harvester.

The CropScan 3300H comprises a Sampling Head, a Fibre Optic cable, a NIR Spectrometer and an 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. The transmitted light is collected by a Fibre Optic Cable that connects the Sample Head to the NIR Spectrometer, located inside the cabin of the combine, where it is kept at a stable temperature. The light that passes through the grain is transmitted back through the Fibre Optic Cable 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's 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 scan is collected. The CropScan 3300H scans a sample of grain every 5-8 seconds or 11-17 meters, as the combine travels down the row.



Fig. 1.1 CropScan 3300H On Combine Analyser



Fig. 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. The 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 formats:

- Field Data
- Field Map
- Graph
- Tank Data
- Truck Data
- Field Storage
- Site Storage

The CropScan Display includes a solid state hard drive for storing large amounts of field acquired data. The CropScan Display has an internal SIM Card and Wi-Fi antenna to connect to a supported network or Wi-Fi Hotspot where available in the field. This device allows data to be transmitted to the Cloud and a remote TABLET DISPLAY, Smart Phones or Tablet.

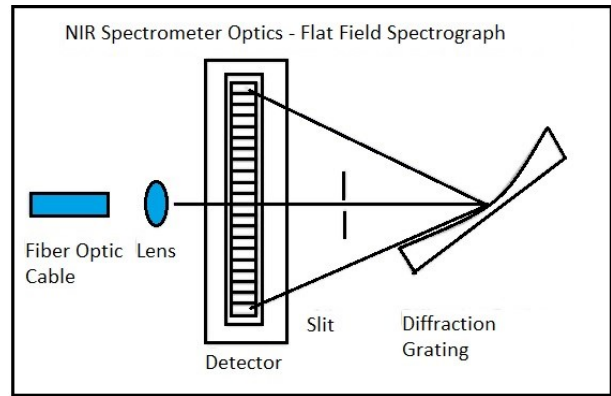


Fig. 1.3 Schematic of the NIR Spectrometer Optics Layout.

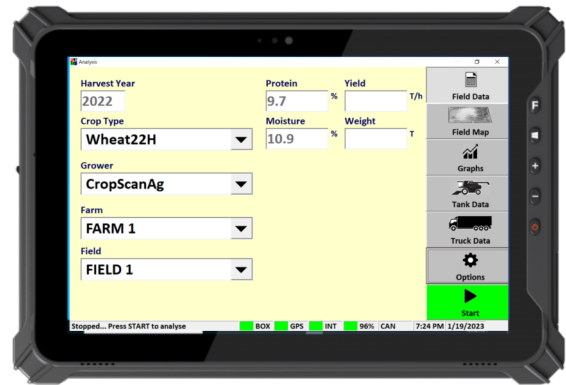


Fig. 1.4 Tablet Display

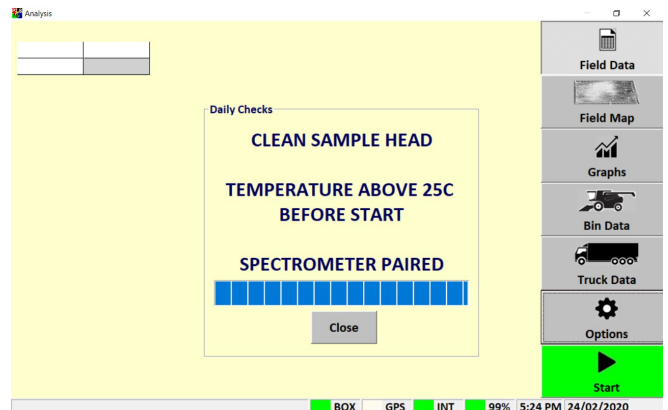


Fig. 1.5 CropScan 3300H Analysis Software

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## 1.5 What to expect from a NIR Analyser

NIR Analysers are becoming more popular as on farm tools to measure the Protein, Moisture and Oil in wheat, barley and canola. So what should you expect from a NIR Analyser?

**Accuracy:** Accuracy is defined as the difference between a reference method and the NIR Analyser . Typically 50 samples of grain are analysed in duplicate by the reference method and then using the NIR Analyser. The Standard Deviation of Differences between the reference method and the NIR Analyser is 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%

This means that for 95 samples out 100, the difference between the reference method and the NIR Analyser will lie between these figures.

**Precision:** Precision is defined as the ability of an Analyser to measure the same sample twice. Typically 10 samples of grain are analysed in duplicate on the NIR Analyser. The Standard Deviation of the 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 data are intended as guides 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 a sample can result in excessive errors.

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## 1.6 Components

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

- NIR Spectrophotometer with an IP66 rated enclosure
- Sample Head
- CropScan display
- 4 inch Ram Arm
- Tablet Bracket and Ball Mount
- Sample Head Outlet Port
- Sample Head Gasket
- Fibre Optic Cable
- Sample Head Cable
- Spectrometer Cable
- Auger Sensor Cable
- Auger Sensor
- Accessories Kit
- Instruction Manual

A packing list is included in the parts kit. Please tick off the items after opening the box. Any shortages should be referred to the CropScan technical support team member via: [support@nextinstruments.net](mailto:support@nextinstruments.net)

	
NIR Spectrometer PN C3H0228	Sample Head, PN C3H219
	
CropScan display PN C3H0289	Fibre Optic Cable PN C3H0370
	
RAM Mount Base PN C3H0274	Outlet Port PN C3H0231
	
4 inch RAM ARM PN C3H0093	Sample Head Gasket PN C3H0190
	
3.0m Spectrometer Cable PN C3H0324 (JD)	Sample Head Cables PN C3H0475 + PN C3H0349
	
6.5 JD GPS Jumper Cable C3H0333	7.0m Auger Sensor Cable C3H0301 & C3H0267
	
Accessories Kit, P/N C3H0602	CaseIH User Manual PN C3H3514

Figure 1.6 CropScan 3300H Parts.

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## 2.0 Installation

Unpack the CropScan 3300H packing box and check off the parts against the supplied packing list.

**Warning:** Turn the combine harvester isolation switch off before attempting installation.

### 2.1 Sample Head Installation

The Sample Head is fitted onto the outboard side of the clean grain elevator. The Sample Head is positioned so that it crosses the up and down side of the elevator. The Sample Head inlet hole is on the left side of the elevator divider and the outlet hole is on the right side of the elevator divider. Check that the Sample Head positioning does not interfere with any doors or latches. To install the Sample Head, follow the instructions below:

- 1) Position and attach the sample head cardboard template so that the bottom horizontal line is 325mm from the bottom clean grain elevator bearing housing. Refer to the dimensions provided in figure 2.1, (see Appendix 5.3 for a full size drawing).
- 2) Mark out and center punch holes 1, 2, 3, and 4.
- 3) Mark out and center punch the 4 inlet and outlet corners.

**Note:** Check hole 1 & 4 for rivet line clearance before drilling.

- 4) Drill holes 1, 2, 3 and 4 using an 8mm drill bit as shown in figure 2.1 and Appendix 5.3. This will give clearance for the square neck of the coach bolt to sit flush against the inside of the clean grain elevator.
- 5) Drill out the four corners of the inlet and outlet cutouts using a 8mm drill.
- 6) Mark out the 4 outer edges of the inlet and outlet holes with a marker pen for cutting guidance.
- 7) Using an angle grinder with a thin cutting blade, cut out the rectangular inlet and outlet cutouts. File the edges so they are flush with the marked lines and deburr all holes and edges.

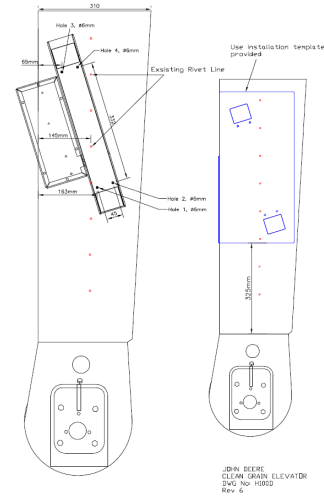


Fig. 2.1. Layout for mounting the Remote Sample Head to the Clean Grain Elevator.

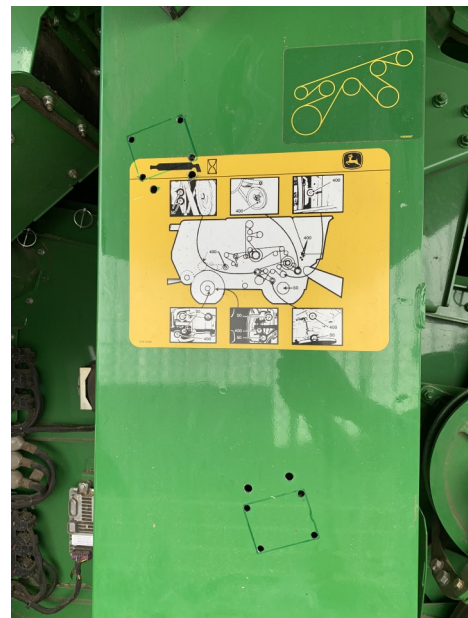


Fig. 2.2. Clean Grain Elevator. Top Inlet Cutout and Holes



Fig. 2.3. Clean Grain elevator cut outs..

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- 8) Insert the 4 x M6-20 bolts from the inside of the elevator so the threads are facing outwards.
- 9) Fit the supplied gasket onto the 4 x M6-20 bolts.

**Note: Gasket orientation. Place thick edge to the top inlet hole and thin edge to the outlet hole as shown in figure 2.4.**

- 10) Install the Sample Head onto the 4 x M6-20 bolts. Install the 4 x M6 washers and 4 x M6 nuts. Tighten nuts to secure the Sample Head to the clean grain elevator.

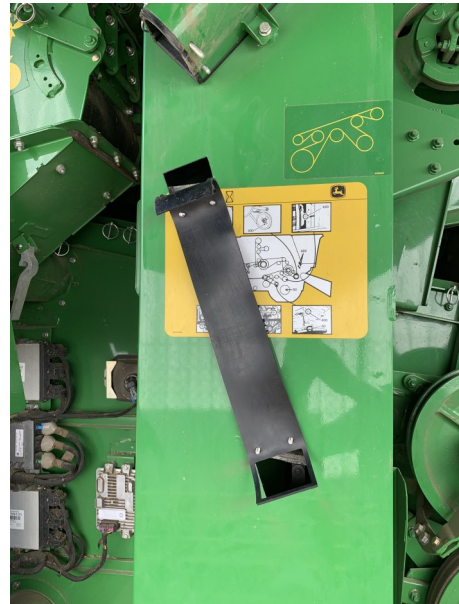


Fig. 2.4. Sample Head Gasket installation.



Fig. 2.5. Sample Head attach bolt.



Fig. 2.6 Remote Sample Head installation .



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## 2.2 NIR Spectrometer Installation

The NIR Spectrometer is to be located inside the cabin to maintain a constant temperature of 35 degrees. The NIR Spectrometer is housed in a black fiber glass enclosure, 300mm x 300mm x 120mm. The box is to be mounted near the left side of the driver's seat.

**Note:** *The spectrometer box can be mounted in different locations across the John Deere range. Option 1 describes mounting the spectrometer to JD9660 Series cabs and earlier. Option 2 describes mounting the spectrometer to JD9770 Series cabs and later.*

- 1) **Option 1:** Mount the NIR Spectrometer box on the right hand side of cabin back wall. Remove the document holder to gain clear access. Manufacture a mounting plate to secure the spectrometer box using the supplied M5 screws. Attach the mounting plate and spectrometer to the cabin back wall.
- 2) **Option 2:** Mount the NIR Spectrometer box behind drivers seat. Sit the Spectrometer so that the cable connections face the right side of the cabin. The Spectrometer will sit firmly in this position and out of the way. **Note that the Fibre Optic Cable can be damaged by the driver seat if not positioned correctly.**



Fig. 2.7. NIR Spectrometer Box fitted to back wall.



Fig. 2.8 NIR Spectrometer Box fitted behind the drivers seat.

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## 2.3 Unloading Auger Sensor Installation

The CropScan Auger Sensor is to be mounted to trigger extension and retraction on the Unloading Auger to signal emptying of the Grain Tank. The positioning of the sensor is critical to trigger the Tank Average reset and API of grain transfers and storage locations data. The installation position across the John Deere models is quite different and will change depending on the model to be installed. Mounting the Auger Sensor under the Auger allows for a greater tolerance of the Unloading Auger to reach its fully closed position.

- 1) Install the Auger Sensor with Mounting bracket to the forward side of the cradle bolts as shown in Figure 2.9. Remove the existing M10 nuts to secure bracket with sensor.

**Note** Allow 10-15mm gap between the Unloading Auger and Sensor.



Fig. 2.9 Auger Sensor mounted under the unloading auger at the cradle.

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## 2.4 CropScan Display Installation

The Tablet Display is to be installed inside the cabin by attaching the supplied Right Angled Bracket to the window support frame threaded lugs. The Tablet is then supported and held and supported by supplied RAM Arm and Brackets.

- 1) Remove the right side cabin pillar to gain access to the existing wiring harness.
- 2) Secure the Right Angled Tablet Bracket and RAM Mount using the 2 x M8 Bolts and Washers to the 2 threaded lugs in the right side pillar. Tighten to secure as shown in figure 2.10.
- 3) Remove a 15mm notch from the u shape trim panel to allow the Tablet power and communication cable to fit around the trim. Re install the trim panel.
- 4) Install the Tablet Display to the RAM Arm and secure to the Tablet Right Angle Bracket and RAM Mount. Tighten the RAM Arm handle to secure the Tablet Display in position as shown in Figure 2.11.



Fig. 2.10. John Deere Cabin Layout



Fig. 2.11. TABLET DISPLAY with power and serial connections.

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## 2.5 Wiring Installation

Appendix 5.2 shows a Block Diagram showing the CropScan 3300H components and the connections between the components.

**Warning: Turn the combine harvester isolation switch off before attempting installing any wiring. Incorrect wiring installation could damage the Spectrometer.**

### NIR Spectrometer to Sample Head

- 1) Connect the Sample Head cable to the sample head connector. Feed and run the sample head cable behind the clean grain elevator and up the forward outboard edge as shown in figure 2.12.
- 2) Install the 3 Way Auger Sensor Cable to the remote Sample Head 3 pin connector and feed the cable behind the clean grain elevator and up the forward outboard edge as shown in figure 2.12.
- 3) Insert the Fibre Optic Cable into the Fibre Optic Probe light guide on the Remote Sample Head. Insert the Fibre Optic Cable ferrule so that the groove aligns to the locking screw and push the Fibre Optic Cable to the end. Tighten the locking screw on the barrel of the Fibre optic probe.

**Note: Place a bead of silicon around the Fibre Optic and the Sample Head to prevent water entering the light guide. Install the end of the Fibre Optic Cable with the serial tag into NIR Spectrometer.**

- 4) Run the Sample Head, Auger and Fibre Optic Cable up the front side of the elevator. Install cable ties every 1-2 ft. Feed the cable up and round the top side of the elevator. Feed the Auger Cable aft to run along the manufactures cable run up to the unloading auger area. Feed the Sample Head and Fibre Optic Cables forward along the main combine wiring harness the cabin right side access panel. Secure with cable ties every 500mm .

**Note: Feed and run the wiring under the forward cross pulley to optimize length and eliminate and rubbing as shown in figure 2.14.**

- 5) Remove the Cabin right hand side access panel to gain access to drill the 38mm bulkhead hole and the 30mm grommet hole.
- 6) Locate and drill 2 x 5mm pilot holes on the access panel for the 30mm grommet hole and the 38mm bulkhead connector hole.
- 7) Over size 1 x pilot hole using a 38mm diameter hole saw for the Sample Head cable bulkhead connector. Deburr the hole.

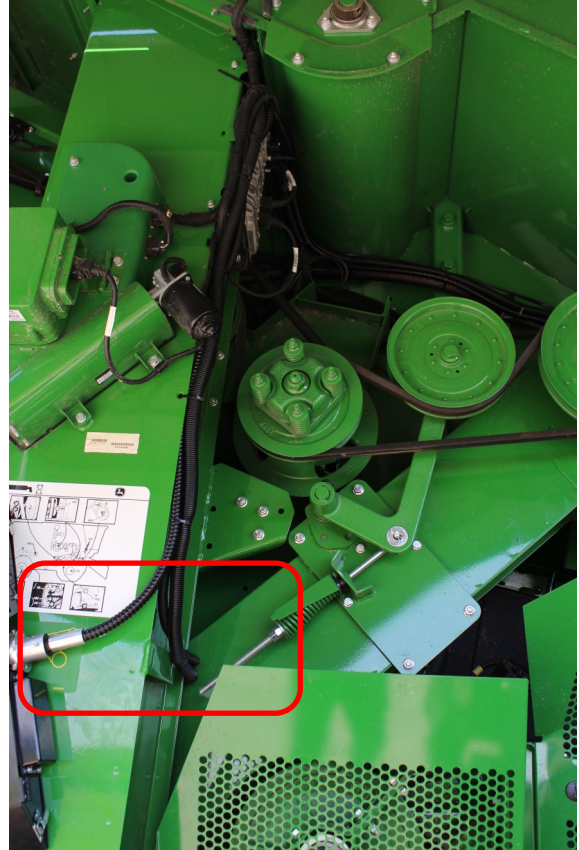


Fig. 2.12. CropScan 3300H Sample Head Wiring.



Fig. 2.13 Sample Head Connectors

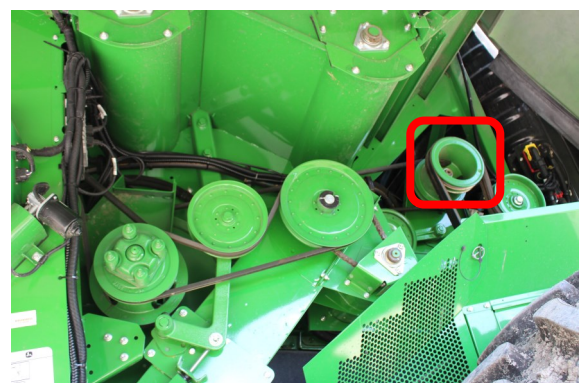


Fig. 2.14 Wiring Routing, forward cross pulley.

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- 8) Over size 1 x pilot hole using a 30mm diameter hole saw for the Fibre Optic Cable grommet. Deburr the hole and remove any metal swarf inside the cabin.
- 9) Insert Sample Head cable bulkhead fitting into 38mm drilled hole and secure cable to cabin using the supplied bulkhead nut.
- 10) Install the 23mm grommet.

**Note: The Fibre Optic, GPS and Battery cables all feed through the 23mm grommet. Feeding the Battery fuse holder through the grommet and then the Fibre Optic cable will enable the cable clearance on installation. The GPS connector needs to be removed to feed the GPS wiring through the grommet last.**

- 11) Insert the Fibre Optic Cable ferrule to the NIR Spectrometer so that the groove aligns to the locking screw. Push the Fibre Optic Cable inwards until the cable ferrule bottoms out and the key way is not seen. Tighten the locking screw as per figure 2.22.

**Note a loose Fibre Optic Cable could cause erratic results.**

- 12) Feed the 1.5m Sample Head cable from inside the cabin to the cabin access panel by feeding the cable through the access hole in the cabin trim. Connect the sample head cable plug to the spectrometer box outer connector. As shown in figure 2.16.
  - 13) Run 12V/GND Battery Cables through the cabin access panel. Remove the fuse and feed the red wire and fuse holder through the 23mm grommet. Run the Battery cable down under the cabin floor along the manufactures cable harness and feed down the right side of the combine to the battery compartment.
  - 14) Connect the 12VDC red wire and fuse to the positive terminal and the ground black wire to the negative terminal of the battery.
- Note: The 3300H requires a constant 12 volts 15 APMS for stability.**
- 15) Return to the cabin and run the Spectrometer cable power and serial communication wiring in behind trim and up to the 3300H Tablet Display. Connect the Tablet power cable and serial cable to the Tablet Display.



Fig. 2.15 NIR Spectrometer Connections

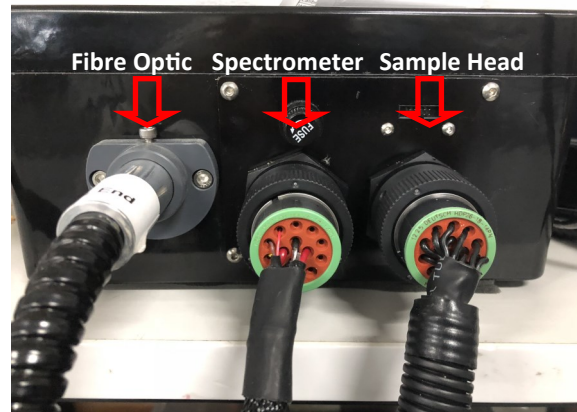


Fig. 2.16 NIR Spectrometer Connections



Fig. 2.17. Power and Serial Connections to Tablet Display.



Fig. 2.18. ON/OFF Switch installation.

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- 13) Install the Spectrometer ON/OFF switch into the right side trim panel as shown in Figure 2.18.
- 14) Connect the Spectrometer 12 Volt Relay input wire to the Combine's 12 Volt accessory power strip to the ignition key power terminal.
- 15) Connect the Spectrometer Cable to the middle connector of the Spectrometer box as shown in figure 2.16.

## 2.6 GPS Interface

The CropScan 3300H GPS positioning requires a serial NMEA message via a connection between the Star Fire Receiver and the 3300H Spectrometer Box.

- 1) Connect the Star Fire Receiver cable as shown in Figure 2.20 and run DB9 connector end to the cabin access panel. Secure the Star Fire Receiver cable to the cabin room with the 5 cable tie adhesives.
- 2) Remove the 12 Pin Duetsch connector from the the end Star Fire Receiver cable. Feed the 3 core wire through the right side cabin access panel grommet and through to the CropScan Spectrometer cable.
- 2) Re install the 12 Pin Deutsch connector the wiring harness. Connect the GPS 12 Pin Duetsch plug to the Spectrometer 12 Pin Connector. Seal up the hole at the Cabin access panel with silicone.
- 4) Configure the John Deere Star Fire Serial Port Baud Rate, Output Rate and NMEA message settings as shown in Figure 2.21

**Baud Rate: 19200**  
**Output Rate: 5 Hz**  
**NMEA Output: GGA**

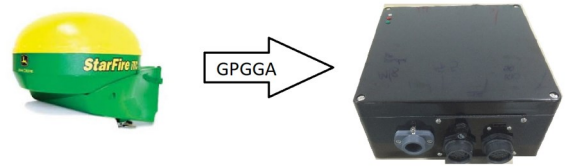


Fig. 2.19 GPS Cable connected to the Star Fire GPS Receiver to Spectrometer Box via P/N C3H0333 Harness.

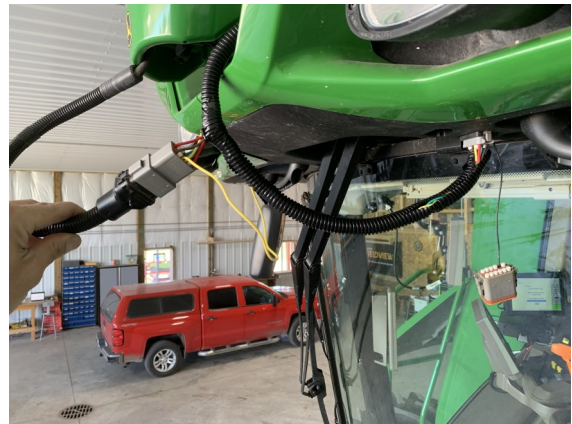


Fig. 2.20 GPS Cable connected to the Green Star GPS Receiver.



Fig. 2.20 John Deere GPS Harness P/N C3H0333 installation.

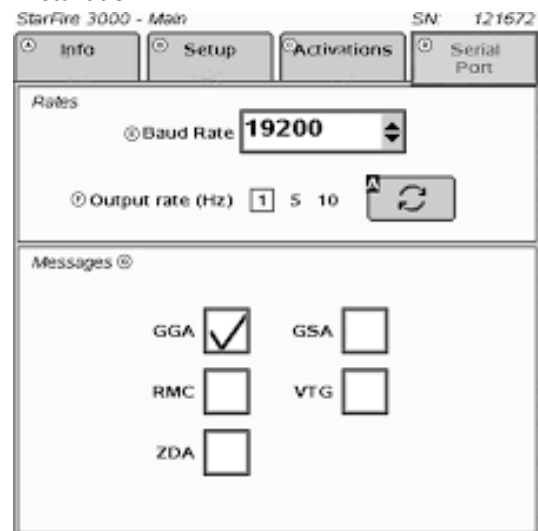


Fig. 2.21 Star Fire Serial Port set up page.

# CropScan 3300H On Combine Grain Analyser: Installation Guide

## 2.7 CropScan 3300H Installation Check List

Item	Description	Carried Out
	<b>Installation</b>	
1	Install Sample Head	
2	Install Spectrometer	
3	Install Tablet Display	
4	Install Auger Sensor	
5	Install 14 Way Distributor Cable	
6	Install Fibre Optic Cable (Tight lock screw)	
7	Install 3 Way Auger Cable	
8	Install 7 Way Spectrometer Cable	
9	Connect Ignition Relay battery terminals	
10	Install John Deere GPS cable	
11	Power Up 3300H	
12	Check Diagnostics Status Box Green	
	<b>Software Setup</b>	
13	Enter User's Client/Farm/Field	
14	Enter User's Storage Location Names and Volumes	
15	Configure NMEA GPS Baud Rate	
16	Enter Grain Tank Default Volumes	
17	Select Truck View or Storage Logistics View	
18	Tether WiFi Hotspot	
	<b>Calibration Verification</b>	
19	Allow 3300H to warm up	
20	Run Auto-Calibration Routine	
21	Adjust Bias if Required	
22	Export Data	

# CropScan 3300H On Combine Grain Analyser: Installation Guide

## 3.0 Display Setup

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.

### 3.1 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 Card is located inside the accessories kit) to your dealer for activation/recharge.

### 3.2 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

### 3.3 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 3.3.

### 3.4 CropScanAg Cloud Sign In

*(NOTE: Sign up at [app.cropscanag.com](http://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 account. Wait for a Authentication Successful notification as shown in figure 3.5.

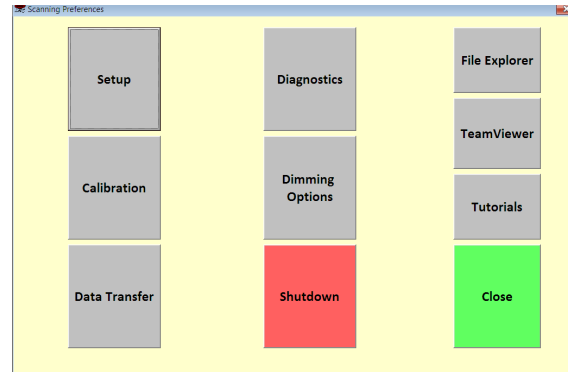


Figure 3-1. Setup - Options Window.



Figure 3-2. Setup—Wifi

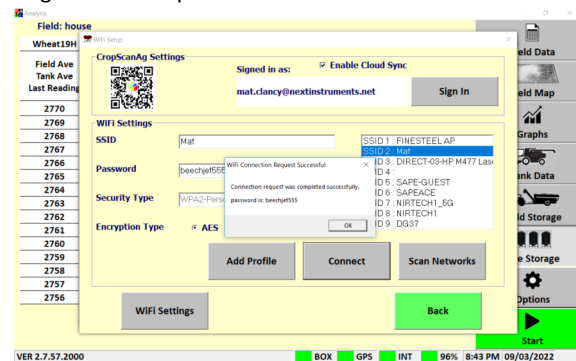


Figure 3-3. Wifi Hotspot Connection

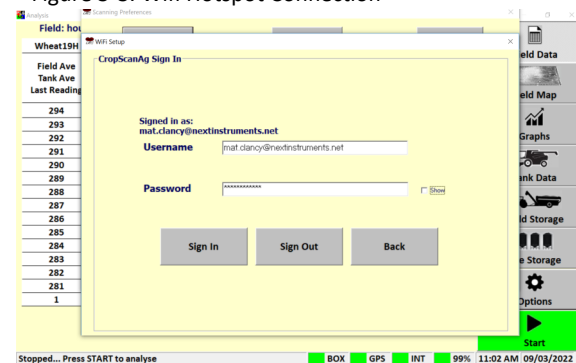


Figure 3-4. CropScanAg Cloud Sign In

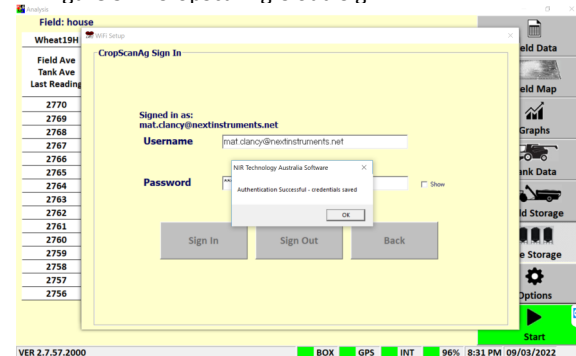


Figure 3-5. CropScanAg Cloud Authentication



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## 3.5 Field ID's

The CropScan Display can import 4 Client Farm Field formats to make setting up the Field ID's easy:

1. CropScanAg Cloud API—Geojson from CNHi and John Deere Portals.
2. CN1 Folder –CNHi Format
3. AgGPS—Trimble Format
4. JD Boundary Shape Files—JD Format

*Note: The API connection is preferred to reduce the duplication of field names and machinery set up data.*

### Client Farm Field Import—API

- Press the **Field ID's** tab to import or edit the Field ID's list.
- Press the **Import GFF Cloud** button to import the sync the Grower Farm and Field ID's from the CropScanAg Cloud.

### 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

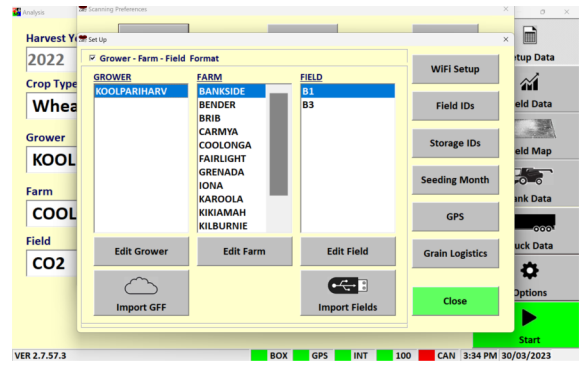


Figure 3.6. Setup - Field IDs in Client-Farm-Field format.

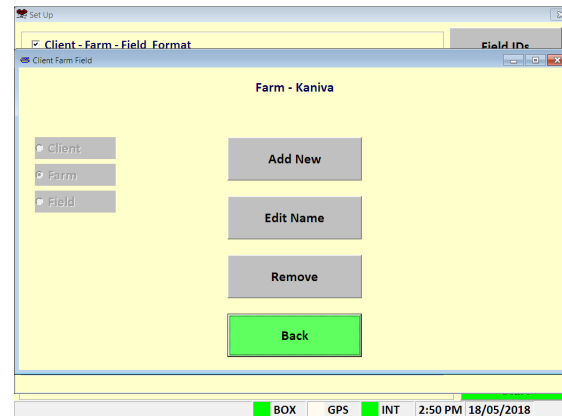


Figure 3.7. Setup - Editing Client-Farm-Field Information.

# CropScan 3300H On Combine Grain Analyser: Installation Guide

## 3.6 Storage ID's

- Press the **Storage ID's** button and setup the names for the different grain storage 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.

## 3.7 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.

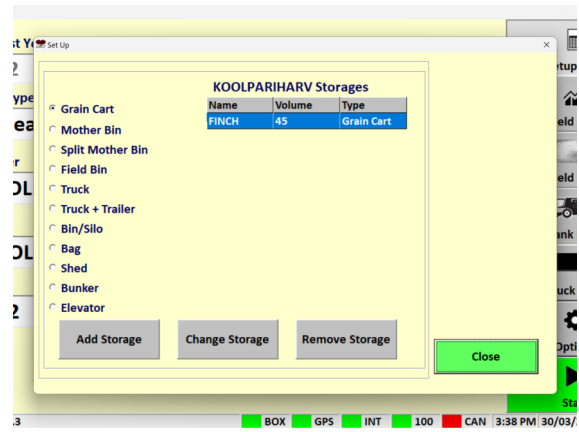


Figure 3.8. Setup—Storage ID's.

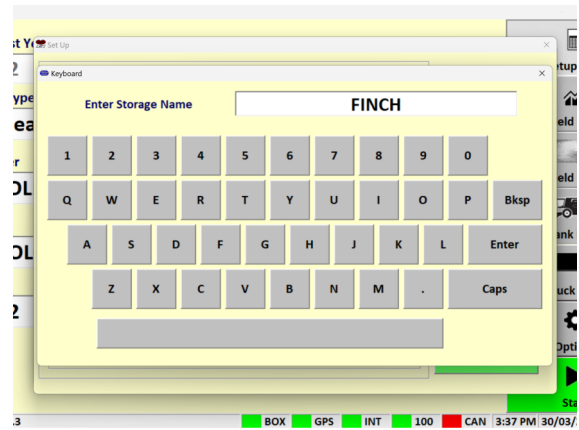


Figure 3.9. Setup - Adding a new storage.

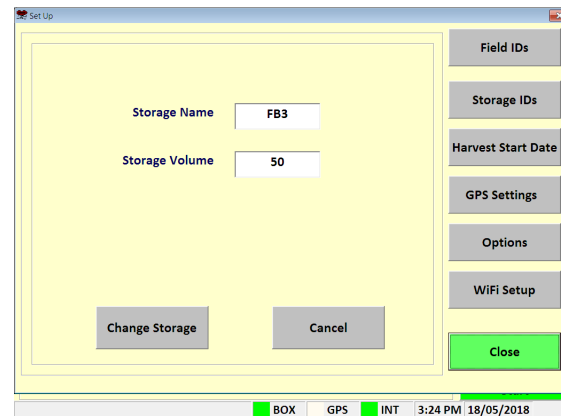


Figure 3.10. Setup - Changing a valid storage.

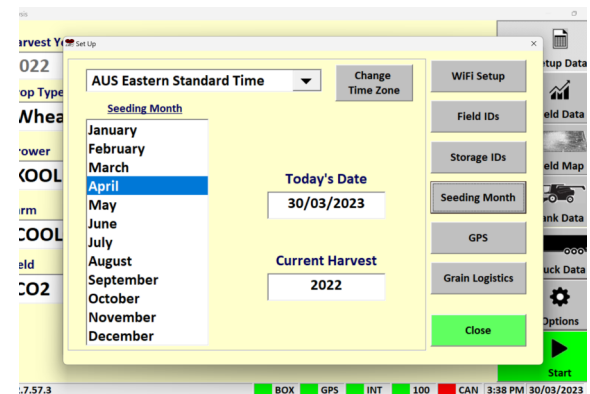


Figure 3.11. Setup - Harvest Start Date Screen.

# CropScan 3300H On Combine Grain Analyser: Installation Guide

## 3.8 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 manufacture's GPS setup instructions for NMEA Message and Baud Rate output setup.

Note: The Tablet has a built in GPS which can be used in replacement of the receivers GPS if an GPS input was not available.

### 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.

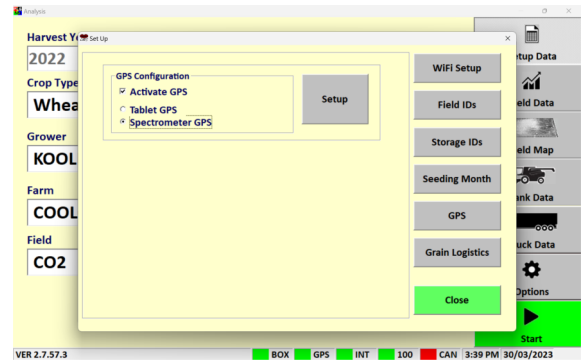


Figure 3-12. Setup - GPS Settings Screen.

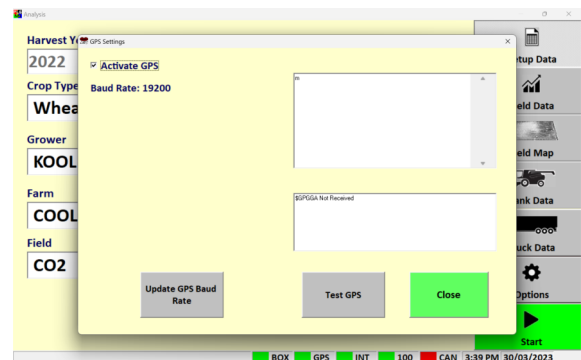


Figure 3-13. Setup - Spectrometer GPS Test Window

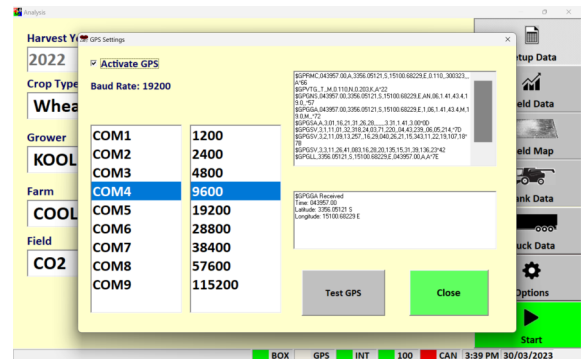


Figure 3-14. Setup - Tablet GPS Test Window

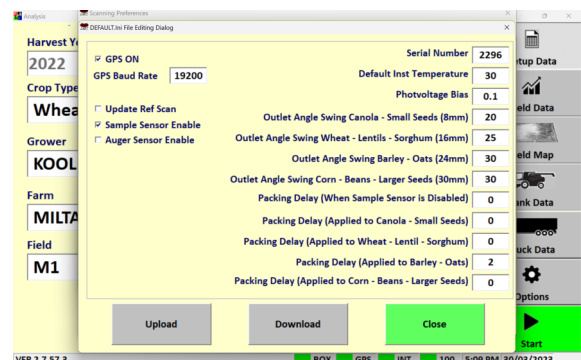


Figure 3-15. Setup - Configuration window.

# CropScan 3300H On Combine Grain Analyser: Installation Guide

## 3.9 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 3.21.

#### 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)

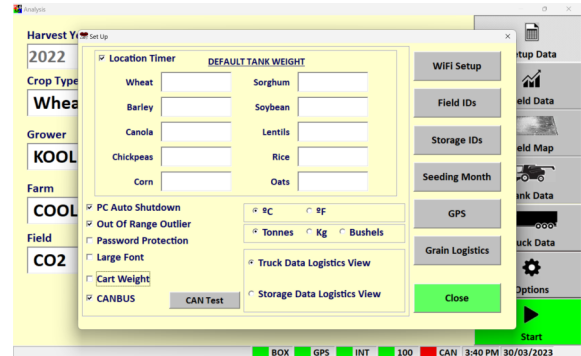


Figure 3-19. Setup - Options Window.

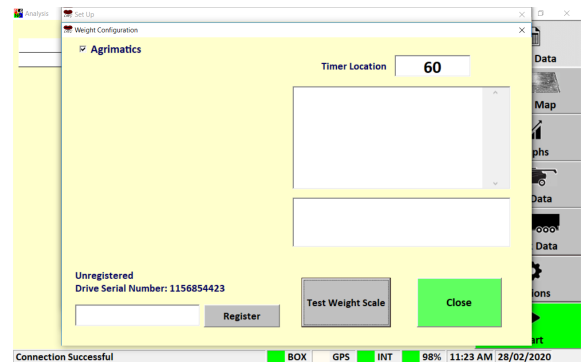


Figure 3-20. Setup - Cart Weight.

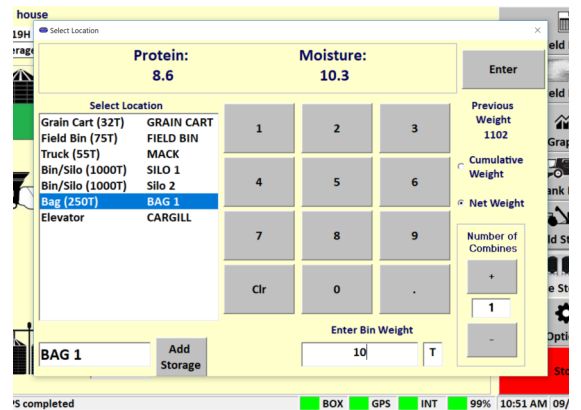


Figure 3-21. Grain Logistics Grain Tank Weight Counter

## 3.10 Grain Logistics—Cart Weight Integration

### 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-activate the Grain Logistics Field Storage and Site Storage run screens the user will need to tick:

- “Select Truck Data Logistics View”

**Note: The Cart Weight feature requires special hardware and setup 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 activate 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 3-22. Setup - Cart Weight Settings

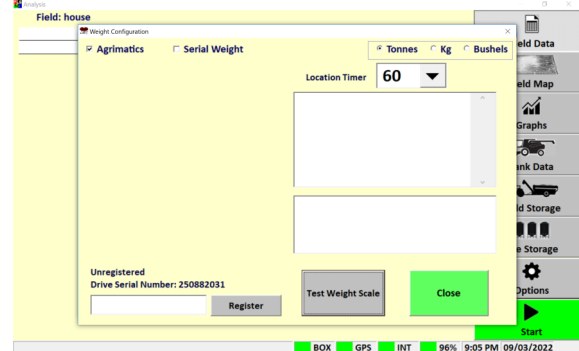


Figure 3-23. Setup - Cart Weight—Bluetooth

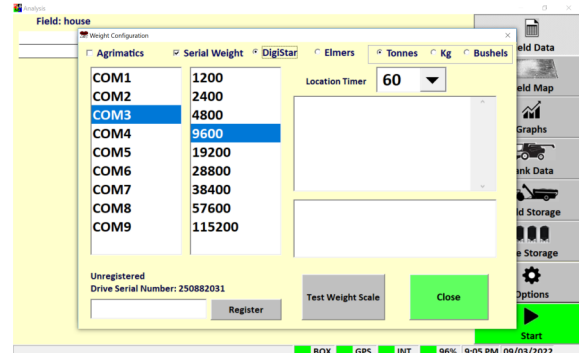


Figure 3-24. Setup - Cart Weight—Lora to Serial.

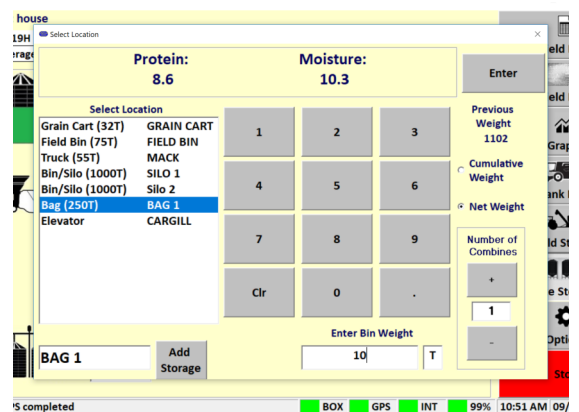


Figure 3-25. Grain Logistics Grain Tank Weight Count

# CropScan 3300H On Combine Grain Analyser: Installation Guide

## 4.0 Calibration

### 4.1 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 checked at installation or annually by a certifier.

The Auto-Calibration routine is suggested to be used as it is a simpler way of analysing 5 samples in a row and entering the samples actual values after all the samples have been analysed. 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 Outlet Port

#### Operation:

**Note: Allow the CropScan to warm up prior to running the Auto Calibration routine.**

- 1) Press the **Options** Menu button.
- 2) Press the **Calibration** Menu button to open the Calibration menu window as shown in figure 4.1.
- 3) Press **Auto-Calibration** button and Select the Crop Type to validate. figure 4.2 and figure 4.3
- 4) Enter the number of samples to check (1-5) figure 4.4
- 5) The Auto-Calibration routine will run the software for the selected number of samples. The operator needs to go down to the Sample Head on the clean grain elevator and pour in the samples.

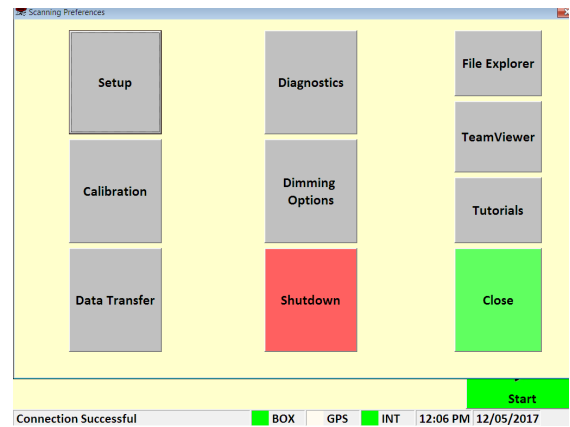


Figure 4.1. Options Window.

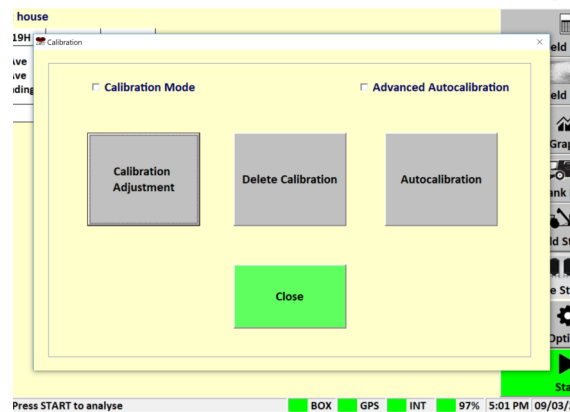


Figure 4.2. Calibration Menu.

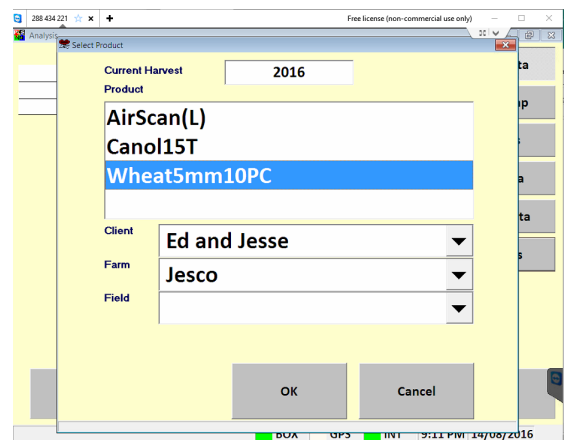


Figure 4.3. Select Product Menu.

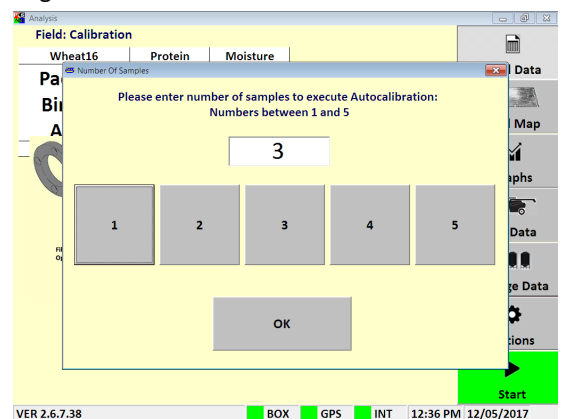


Figure 4.4. Number of samples for Auto-Calibration.

# CropScan 3300H On Combine Grain Analyser: Installation Guide

- 6) Remove Inlet and Outlet cover plates.
- 7) Install Outlet Port on bottom side of sample head.
- 8) Install funnel in the top side of the sample head.
- 9) 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.
- 10) Carry out the above steps for the required number of samples.
- 11) After the last sample has been scanned and pour the sample back into its jar. Return back to the CropScan display to view the results.
- 12) Read the pop up instructions on the CropScan Display and press continue to view the results.
- 13) Press the yellow box to enter corresponding value as shown in Figure 4.6.
- 14) When all the reference values have been entered, the results table will calculate and display the differences for Protein, Oil and Moisture and calculate and report the following:
  - SEP (Standard Error of Prediction)
  - Average Error
  - Old Bias
  - New Bias
- 15) If the SEP box is Green and differences are within 0.3% press the **Close** button and to maintain the original Bias setting.
- 16) If the SEP box is Green and the results are greater than 0.3% press the **Save New Bias** button and this will apply the New Bias setting shown in the New Bias table.
- 17) If the SEP box is Red the CropScan requires a Slope and Bias Adjustment, contact CropScan support for assistance: support@nextinstruments.net.
- 18) Access the **Data Transfer** menu and export the CropScan Data so the results can be emailed if CropScan technical support is required.



Figure 4.5. 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

Figure 4.6. Auto-Calibration Window.

# CropScan 3300H On Combine Grain Analyser: Installation Guide

## 4.2 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.

- 1) Press the **Calibration** menu button to open the calibration options.
- 2) Click on **Calibration Adjustment** menu. Figure 4.8
- 3) Select the Crop Type you wish to adjust and press OK.
- 4) Highlight the value to adjust. Figure 4.9
- 5) Press the Bias Up or Down button to increase or decrease the protein, oil or moisture level from Low to High.
- 6) The Slope settings are password protected:  
**Password = Admin**
- 7) 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](mailto:support@nextinstruments.net)
- 8) Press OK to save new Calibration Adjustment settings.
- 9) Run 2-3 check sample to confirm adjustment was successful.

## 4.3 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.

- 1) Click the **Calibration** Menu button.
- 2) Click on **Delete Calibration** Figure 4.8
- 3) Select the **Crop Type** you wish to delete.
- 4) Press **OK** to confirm.

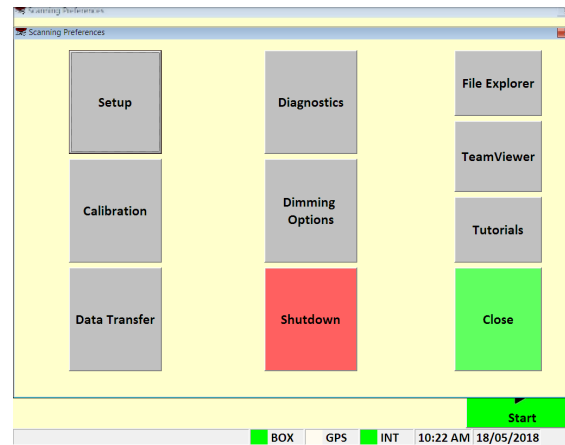


Figure 4.5. Options Window

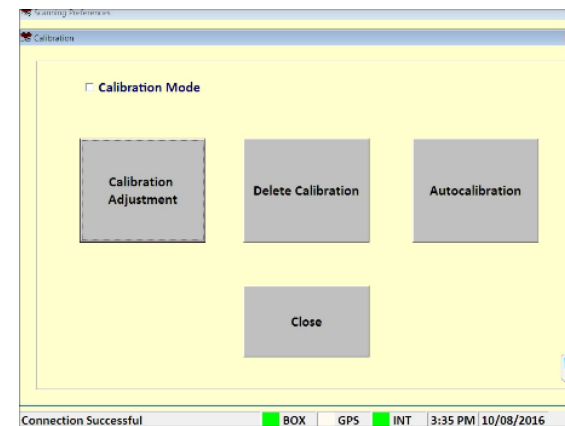


Figure 4.6. Calibration Window

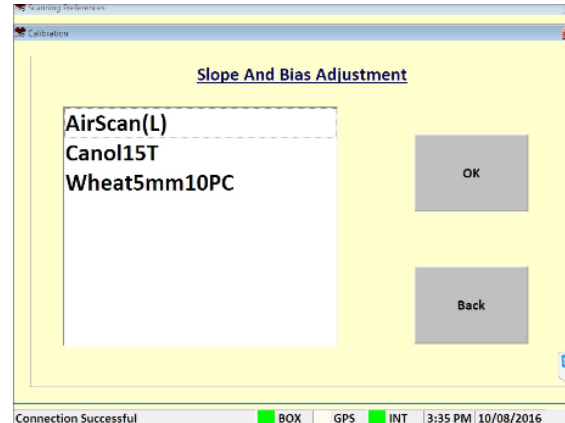


Figure 4.7. Calibration Adjustment Window

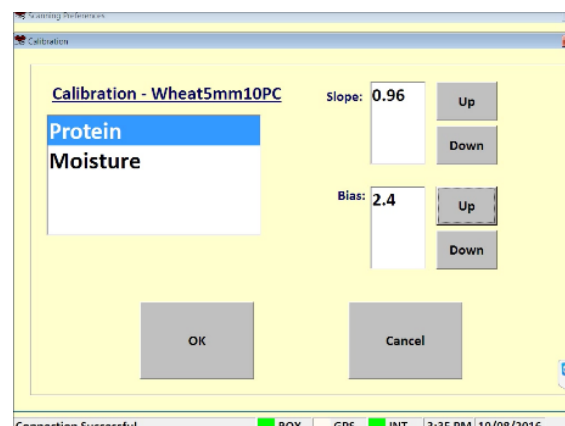
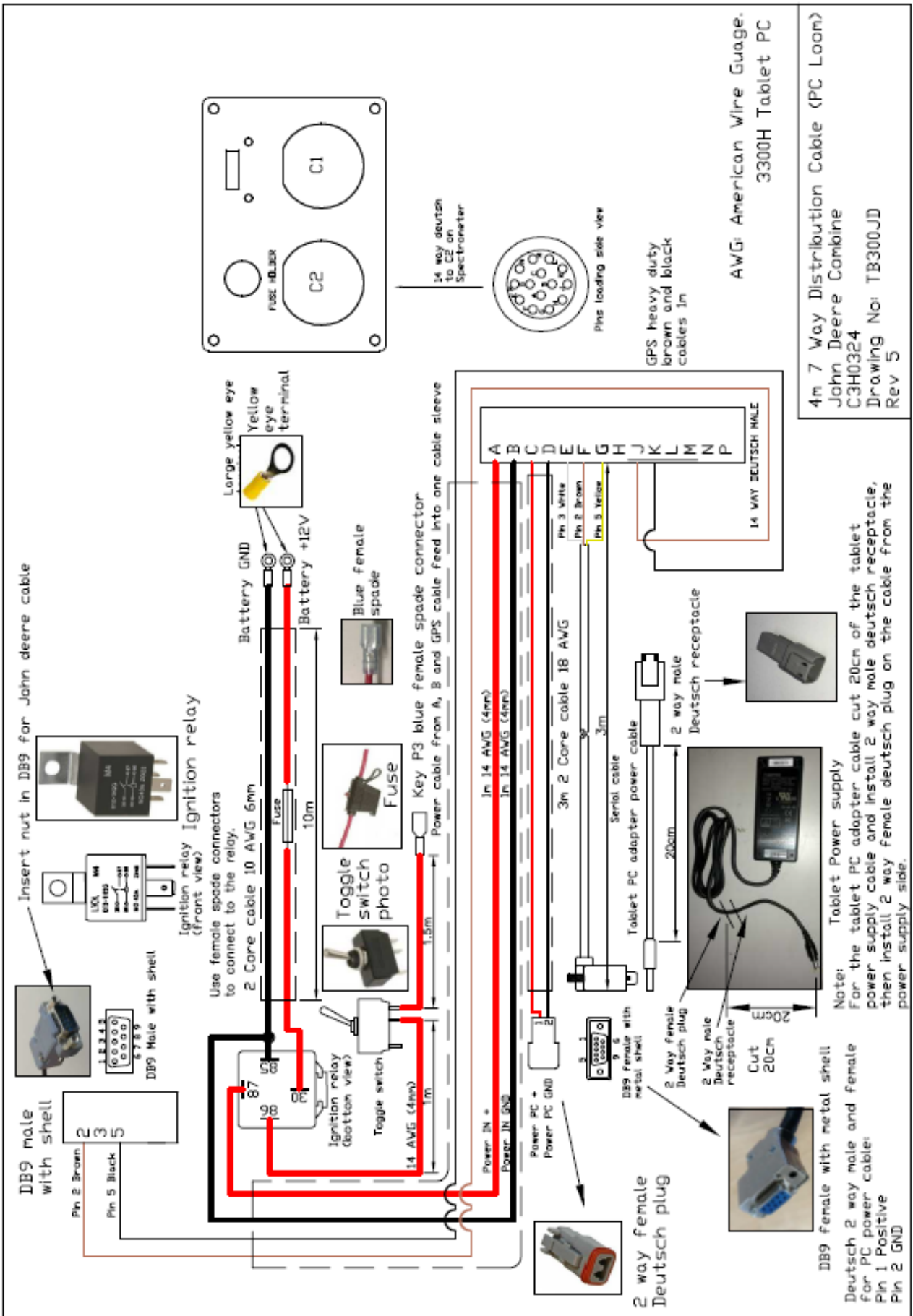


Figure 4.8. Slope and Bias Adjustment Window



CropScan 3300H On Combine Grain Analyser: Installation Guide

5.1 CropScan 3300H Wiring Diagram



# CropScan 3300H On Combine Grain Analyser: Installation Guide

## 5.2 CropScan 3300H Block Diagram

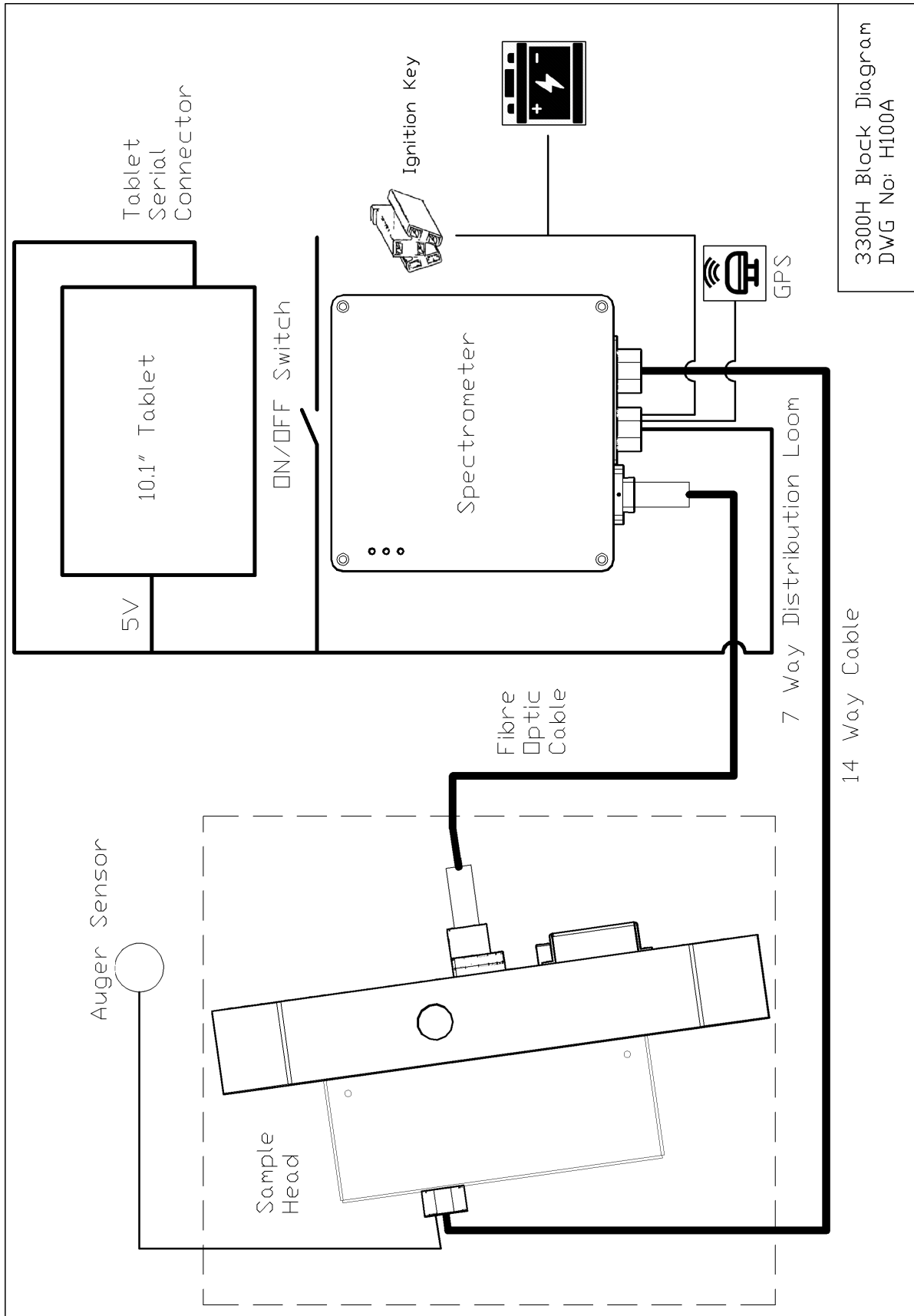


Fig. 5.2. CropScan 3300H Component schematic.

# CropScan 3300H On Combine Grain Analyser: Installation Guide

## 5.3 Remote Sample Head Mounting Diagram for John Deere Combines.

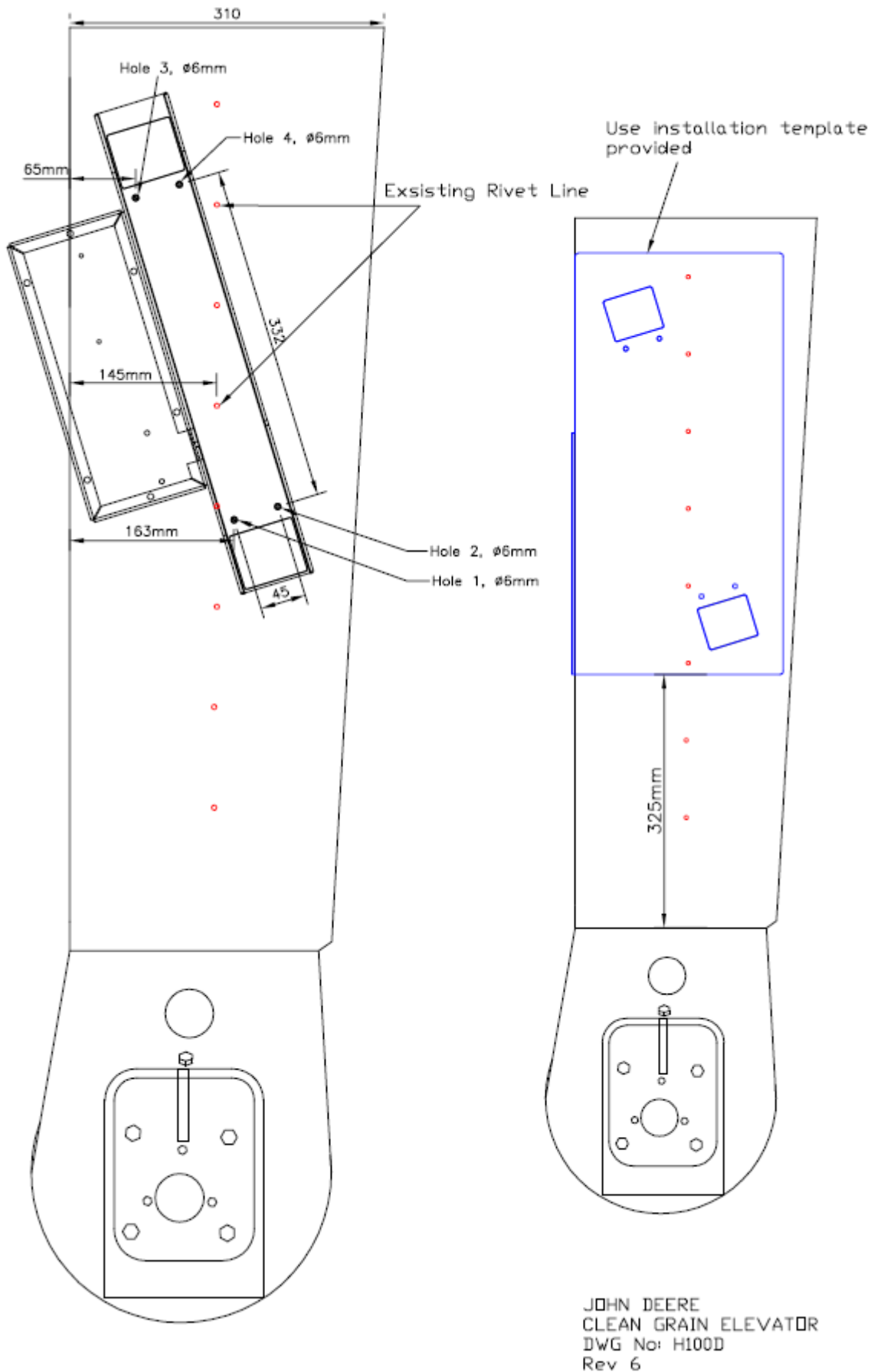


Fig. 5.3. John Deere Clean Grain Elevator Drawing