Installation Guide
CropScan 3300H
On Combine Grain Analyser
Agco Ideal Combines

REVISION HISTORY

Initial Prototype	June	2021
Rev II	February	2022
Rev III	July	2022

CropScan 3300H On Combine Grain Analyser: Installation Guide

Table of Contents

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.

Fig. 1.1 CropScan 3300H On Combine Analyser

Fig. 1.2 Remote Sample Head mounted to the Clean Grain Elevator

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 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 internal SIM Card and Wi-Fi antenna to connect to a supported network or Wi-Fi Hotspot where available in the field. This allows data to be transmitted to the CropScanAg Cloud and viewed on any smart device.
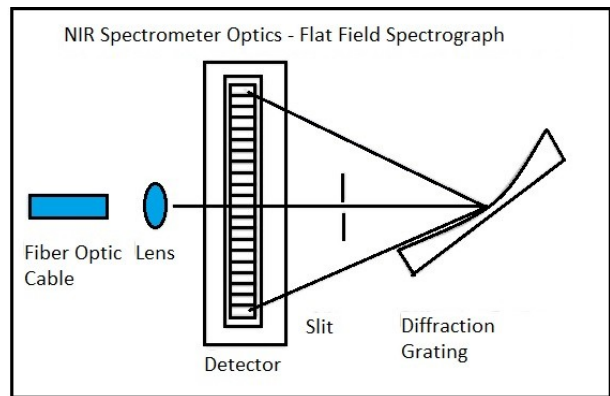

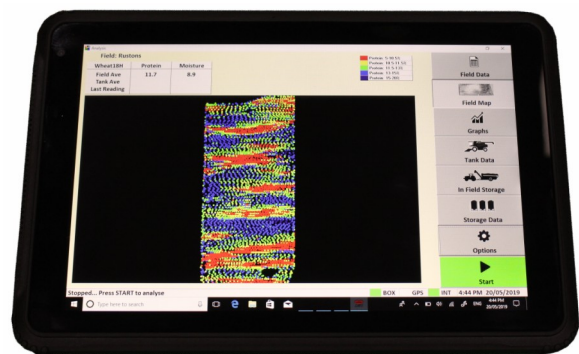Fig. 1.3 Schematic of the NIR Spectrometer Optics Layout.
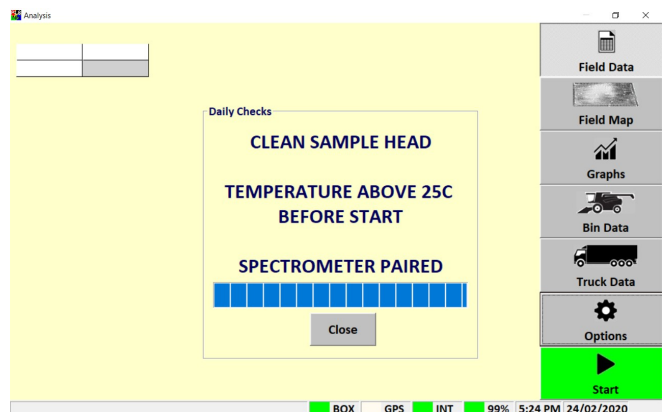

Fig. 1.4 CropScan Display

Fig. 1.5 CropScan 3300H Analysis Software

1.5 Components

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

- NIR Spectrophotometer with an IP66 rated enclosure
- Sample Head
- CropScan display
- 4 inch Ram Arm
- CropScan Bracket and Ball Mount
- Sample Head Outlet Port
- Sample Head Gasket
- Fibre Optic cable
- Sample Head cable
- Spectrometer cable
- Auger Sensor cable
- Auger Sensor and Bracket
- 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**

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NIR Spectrometer PN C3H0228	Sample Head, PN C3H219
CropScan Display PN C3H0227	4 inch RAM ARM PN C3H0093
RAM Mount Base PN C3H0274 Sample	Head Outlet Port PN C3H0231
Sample Head Gasket PN C3H0150	Fibre Optic cable PN C3H0370
Sample Head cable Kit PN C3H0328	Spectrometer cable Kit PN C3H0321
Auger Sensor cable, PN C3H0301	Accessories Box, P/N C3H0603
Auger Sensor & Bracket PN C3H0265	CaseIH User Manual PN C3H0515

Fig. 1.6 CropScan 3300H Parts.

2.0 Installation

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

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

2.1   Remote Sample Head Installation

Note: The Fibre Optic Cable is 5.5m in length, this length will dictate the position of the sample head and Fibre optic cable routing.

The Remote Sample Head is fitted onto the outboard side of the clean grain elevator under the existing moisture meter. 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 Remote Sampling Head, follow the instructions below:

1)   Using the dimensions in Figure 2.1, (see Appendix 5.3 for a full size drawing), mark out the hole 1 and drill a 6mm hole. Use a M6-20 Sample Head Bolt, PN CON0214, to secure the Remote Sample Head to hole 1.

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

2)   With the Sample Head aligned at hole 1 with 1 x M6-20 Sample Head Bolt measure and mark out holes 2, 3 and 4 with a marker pen. Remove the Sample Head and drill 3 x 6mm holes at hole position 2, 3 and 4 as shown in Figure 2.1 and Appendix 5.3.

3)   Re-install the Sample Head using 2 x M6-20 Sample Head bolts and mark out the rectangular cutouts for the inlet and outlet using a marker pen as shown in Figure 2.2.

4)   Remove the Remote Sample Head. Drill out the four corners of the inlet and outlet cutouts as shown in Figure 2.3. 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 debur all holes and edges.
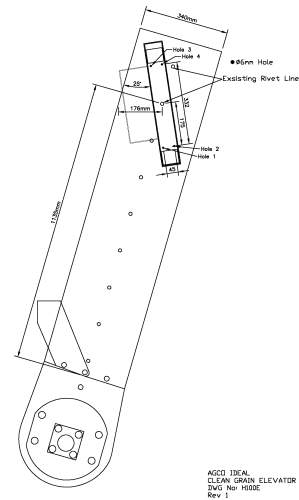

Fig. 2.1. Layout for mounting the Remote Sample Head to the Clean Grain Elevator.

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

Fig. 2.3. Clean Grain elevator cut outs..

5)   Over size the 4 x sample head to clean grain elevator attach holes to 8mm so that the sample head bolt shank will sit flush when the bolt is inserted from the inside of the elevator skin.

6)   Insert the 4 x M6-20 P/N CON0214 bolts from the inside of the elevator so that the threads are stick outwards.

7)   Fit the supplied gasket shown in figure 2.4 P/N C3H0150 onto the 4 x M6-20 bolts. Note gasket orientation to sit the thick edge to the top and thin edge to the bottom.

8)   Install the remote sample head P/N C3H0201 onto the 4 x M6-20 bolts. Install the 4 x M6 P/N CON0215 washers and 4 x M6 P/N CON0216 nuts. Tighten Nuts to secure.

Fig. 2.4. Sample Head Gasket installation.

Fig. 2.5 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 Agco Combine model range.***

1)   **Option 1:** Mount the NIR Spectrometer box in behind the panel of cabin back wall. Remove the panel cover to gain clear access. Manufacture a mounting bracket to secure the spectrometer box to the existing hardware bolts. Attach the mounting plate to the bottom side of the Spectrometer box and secure to the cabin back wall hardware.

2)   **Option 2:** Mount the NIR Spectrometer box on the top side of the console panel at the right side of the drivers seat. Mount the Spectrometer so that the cable connections face aft. Position and mark out the Spectrometer attach holes using the supplied cardboard template, secure the Spectrometer using the supplied 4 X M5 Hex Head screws and washers. ***Note a loose Spectrometer Box cause internal damage to the optic components.***

Fig. 2.6. NIR Spectrometer Box fitted to back wall.

Fig. 2.8 NIR Spectrometer Box can be fitted to the centre consol

2.3 Unloading Auger Sensor Installation

1) Install the Auger Sensor with Mounting bracket P/N C3H0210 to the panel below the Unloading Auger as shown in Figure 2.9. Remove the existing M8 bolt to secure bracket with sensor. *Note Allow 10-15mm gap between the Unloading Auger and Sensor.*

Fig. 2.9 Auger Sensor mounted to the Grain Tank chassis

2.4 CROPSCAN DISPLAY Installation

The CropScan 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

3)   Remove a 15mm notch from the Vertical trim panel to allow the Tablet power and communication cable to fit around the trim. Re install the trim panel.

4)   Install the CropScan Display to the RAM Arm and secure to the Tablet Right Angle Bracket and RAM Mount. Tighten the RAM Arm handle to secure the CropScan Display in position as shown in Figure 2.11.

Fig. 2.10. Agco Ideal Combine Cabin Layout

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

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 Remote Sample Head

1)   Connect the Sample Head cable, P/N C3H0313, to the sample head and run the cable up to the cabin access panel following the manufactures cable run. Use cable ties every 1-2 ft to secure the cable.

2)   Install the 3 Way Auger Sensor Cable, P/N C3H0301, to the Remote Sample Head 3 pin connector.

3)   Run the 3 Way Auger Sensor Cable up to the Outloading Auger following the manufacturer's run. Use cable ties every 1-2 ft.

4)   Connect the Auger Sensor lead plug and connector on the 3 Way Auger Sensor Cable

5)   Insert the Fibre Optic Cable, P/N C3H0302, 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.*

6)   Feed the Fibre Optic Cable up to the cabin access panel. Use cable ties every 1-2 ft to secure the Fibre Optic Cable.

7)   Drill a hole using a 25mm and a 40mm hole saw into the left hand side cabin access panel for the Sample Head Cable bulkhead connector and Fibre Optic Cable to pass through and into the cabin.

Fig. 2.12. CropScan 3300H Sample Head Wiring.

Fig. 2.13 Sample Head Connectors

Fig. 2.14 Wiring Routing

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7) Feed the Fibre Optic cable through hole cut in the cabin access panel and up into the cabin where the spectrometer is mounted. Install the supplied rubber grommet P/N CON0161 to stop chaffing of Fibre Optic Cable on the cabin access panel. *Use Silicon Sealant to seal any spaces or holes.*

8) 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 bulkhead connector. Connect the sample head cable plug to the spectrometer box outer connector.

9) Insert the Fibre Optic Cable so that the groove aligns with the locking screw and push the Fibre Optic Cable to the end. Tighten the locking screw as per Figure 2.16

10) Run 12V/GND Battery Cables through the cabin access panel and to battery compartment of the combine.

11) 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.

12) Return to the cabin and run the Spectrometer cable power and serial communication wiring in behind trim and up to the 3300H CropScan Display. Connect the Tablet power cable and serial cable to the CropScan Display.

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 strip to the keyed power terminal.

15) Connect the Spectrometer Cable to the middle connector of the Spectrometer box as shown in figure 2.16.
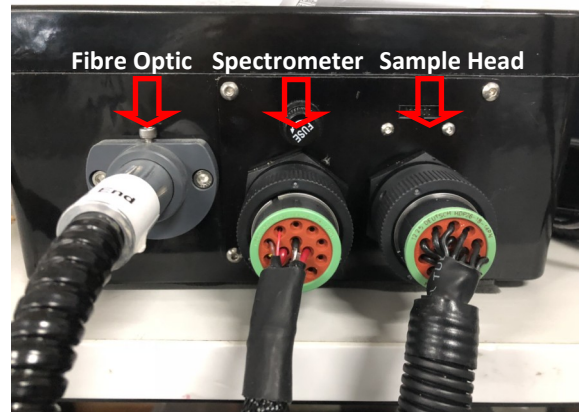

Fig. 2.15 Cabin Fuse access panel

Fig. 2.16 NIR Spectrometer Connections

Fig. 2.17. Power and Serial Connections to CropScan

Fig. 2.18. ON/OFF Switch installation.

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2.6 GPS Wiring Installation

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

1) Connect the Spectrometer Cable 12 Pin Duetsch connector to the Receiver cable. Additional GPS cables or connectors may need to required for install due to model and connector set used.

NMEA Output Settings:
- Press the **Edit NMEA** Output Setup
- Select NMEA Output ON
- Set Baud Rate to 19200 or 38400
- Press OK to confirm new settings

NMEA Message Setup
- Set GGA NMEA Output to 5Hz
- Press OK to confirm new settings

CropScan Display GPS NMEA Rx Setup

To change the GPS RX baud rate of the Spectrometer, use the **Configurations Settings** window (enables the Spectrometer baud rate to be changed) as shown in figure 2.30. *Note the **GPS ON** tick box is required to be ticked to scan GPS messages.*

1) Press **Option/Setup/GPS/Setup** buttons to access the Configuration Settings window.

2) Press **Update GPS Baud Rate** button to view the Configuration Settings window and access the GPS baud rate parameter as shown in figure 2.30.

3) Click on the baud rate white box and enter the new baud rate (19200 or 38400). Press Enter to confirm.

4) Press the **Download** button to save the new baud rate.

5) Press the **Close** button to return to the GPS Test page to test NMEA output message.

6) Press the **Test GPS** button to test the CropScan RX NMEA message condition.
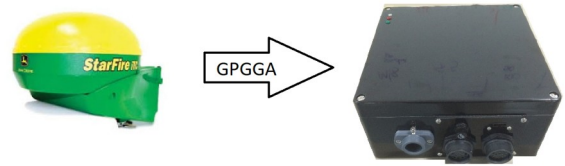
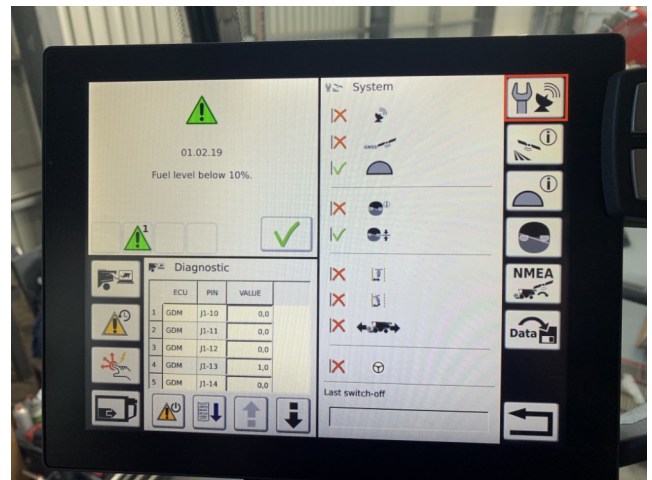Fig. 2.19 Receiver to Spectrometer
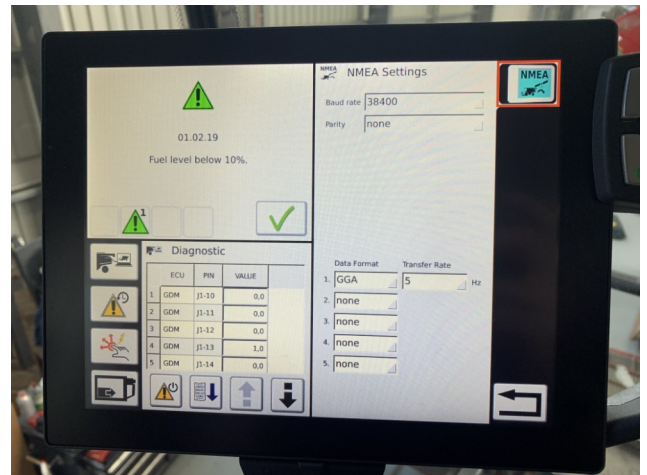
Fig. 2.20 Agco Display

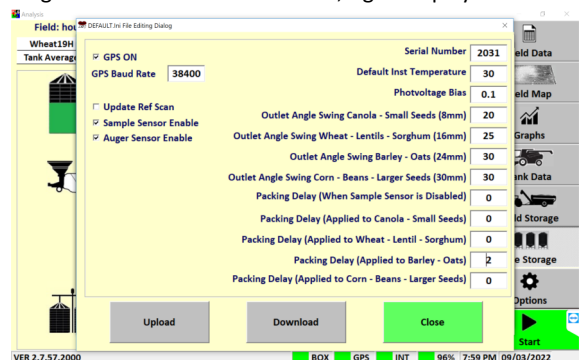Fig. 2.21 GPS Receiver Set menu, Agco Display.

Figure 2.22. Setup - Configuration window.

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CropScan 3300H On Combine Grain Analyser: Installation Guide

2.7 CropScan 3300H Installation Check List

Item	Installation	Carried Out
1	Install Sample Head to Clean Grain Elevator	
2	Install Spectrometer to UCM panel	
3	Install CropScan Display to display rail	
4	Install Auger Sensor Bracket	
5	Install Sample Head Cable	
6	Install Fibre Optic Cable (Tighten lock screw and seal cabin feed	
7	Install 3 Way Auger Cable	
8	Install Spectrometer Cable	
9	Connect GPS connector to NAV Maintenance Plug	
10	Connect Ignition battery relay terminals	
11	Power Up 3300H	
12	Check Diagnostics Status Box is Green	
	Software Setup	
13	Enter User's Client/Farm/Field ID's (CN1, AgGPS or Shape Files)	
14	Enter User's Storage Location Names and Volumes	
15	Configure NMEA GPS Baud Rate	
16	Configure Grain Logistics Window	
17	Tether Wi-Fi Hotspot	
18	Set Up CropScanAg Cloud	
	Calibration Verification	
19	Warm up CropScan 3300H to 30 Degree's	
20	Run 5 Samples in Auto-Calibration Routine	
21	Adjust Crop Type Bias if Required	
22	Export Data	

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 sticker on the back of CropScan Display) 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)

- 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 3.5.
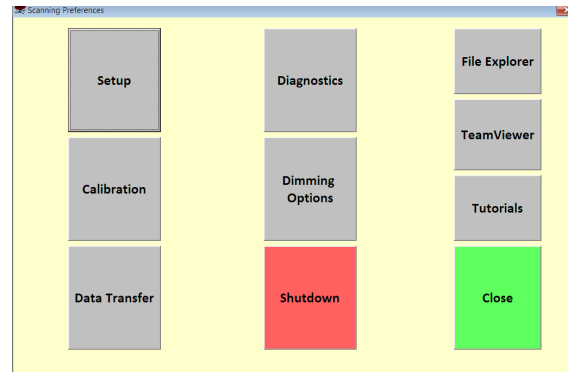
Figure 3-1. Setup - Options Window.
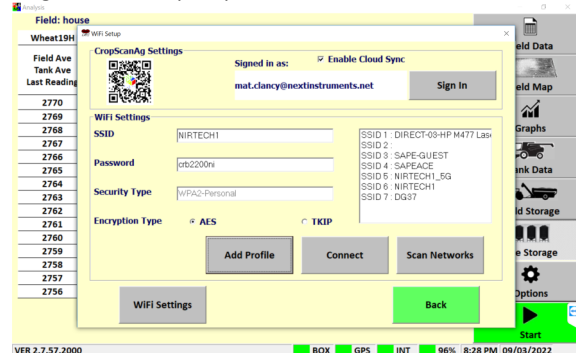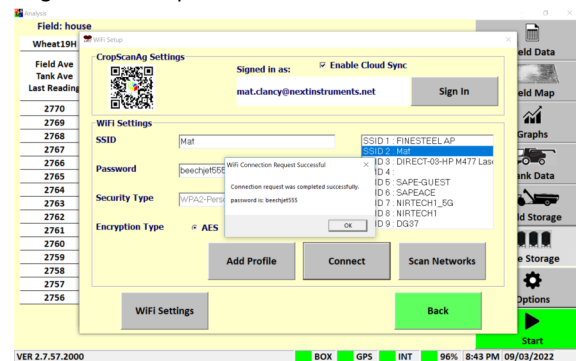

Figure 3-2. Setup—Wifi

Figure 3-3. Wifi Hotspot Connection
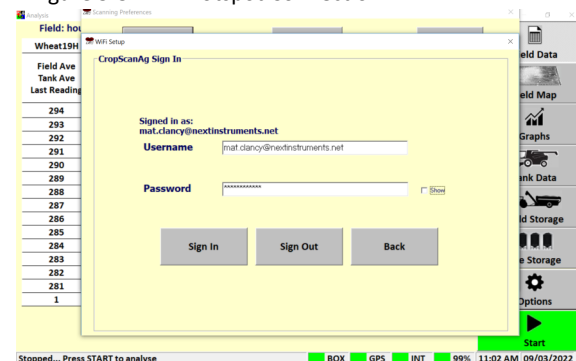
Figure 3-4. CropScanAg Cloud Sign In
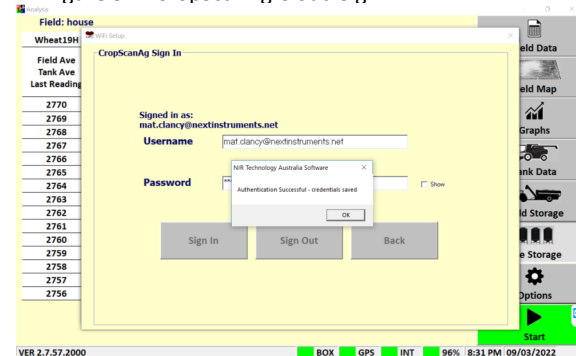
Figure 3-5. CropScanAg Cloud Authentication

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3.5 Field ID's

The CropScan Display can import 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
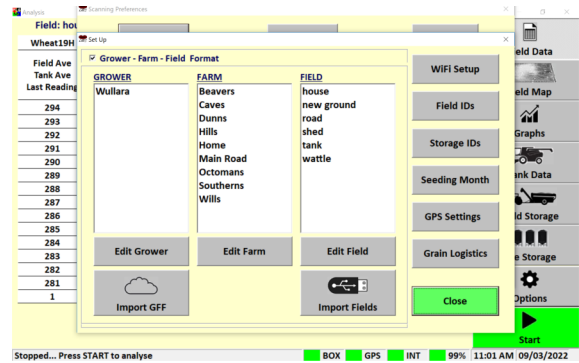
Figure 3.6. Setup - Field IDs in Client-Farm-Field format.
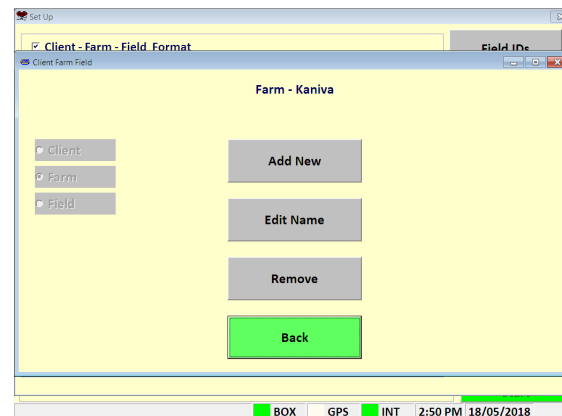
Figure 3.7. Setup - Editing Client-Farm-Field Information.

Figure 3.4. Setup - Field IDs.

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3.6 Storage ID's

- Press the **Storage IDs** 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.

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.
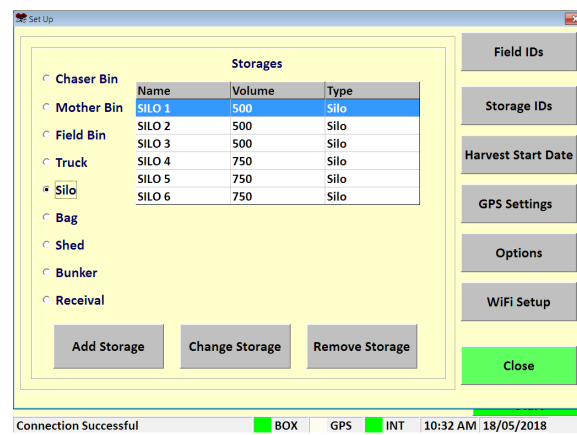
Figure 3.8. Setup—Storage ID's.
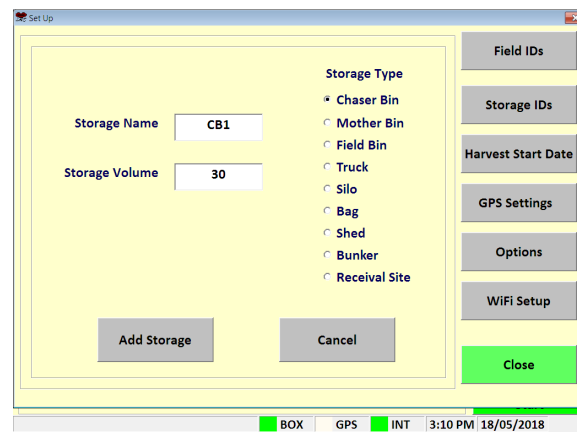
Figure 3.9. Setup - Adding a new storage.
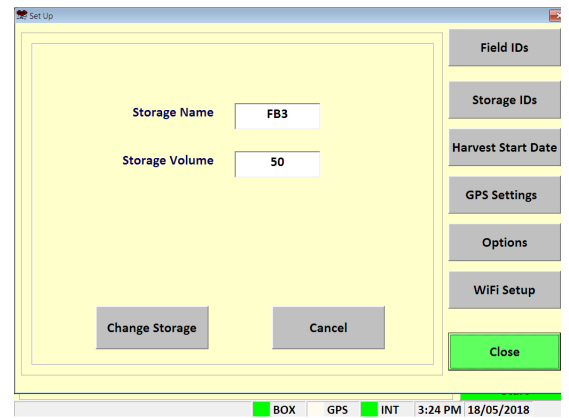
Figure 3.10. Setup - Changing a valid storage.

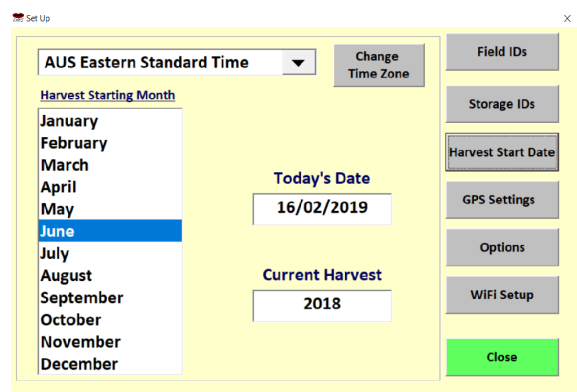Figure 3.11. Setup - Harvest Start Date Screen.

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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.

Figure 3-12. Setup - GPS Settings Screen.

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

Figure 3-13. Setup - GPS Test Window—Pass.

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.

Figure 3-14. Setup - GPS Test Window—Fail.

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.

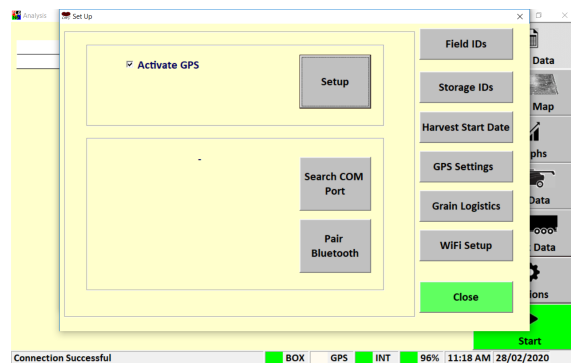- Press the **Download** button to confirm new the settings.

Figure 3-15. Setup - Configuration window.
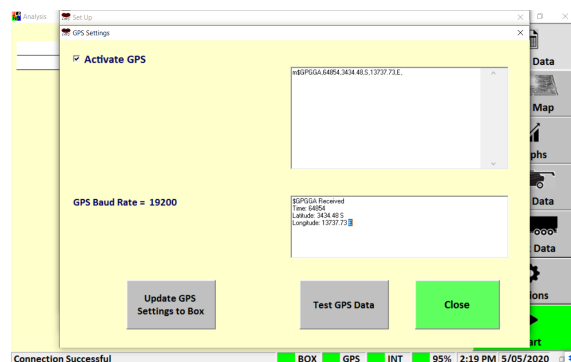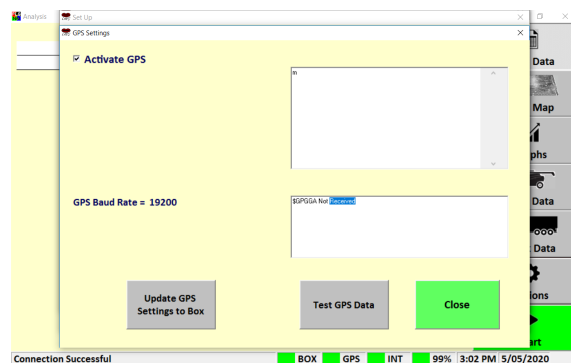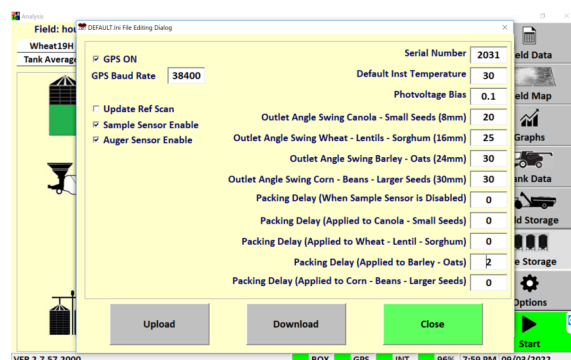
3.9 Grain Logistics

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 3.18.

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:
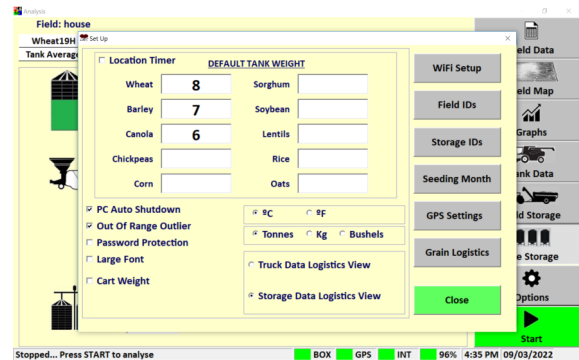
- "Select Truck Data Logistics View"

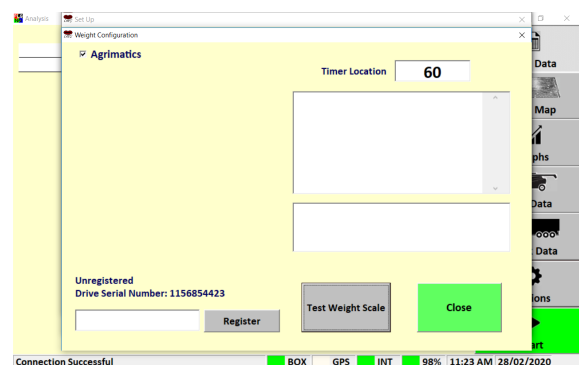
Figure 3-16. Setup - Options Window.
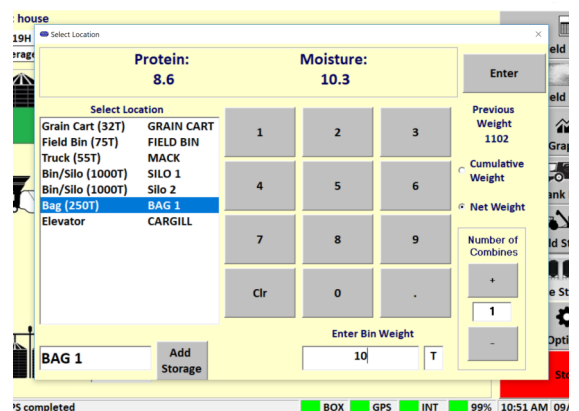

Figure 3-17. Setup - Cart Weight.

Figure 3-18. Grain Logistics Grain Tank Weight Counter.

3.10 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.
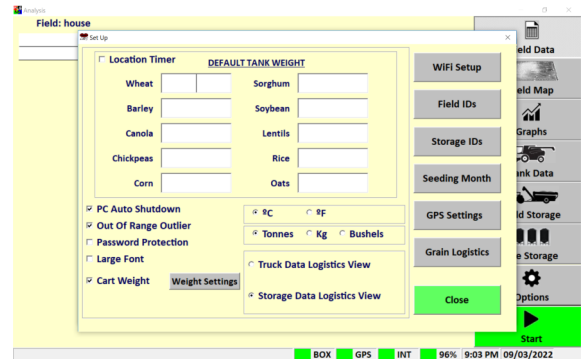

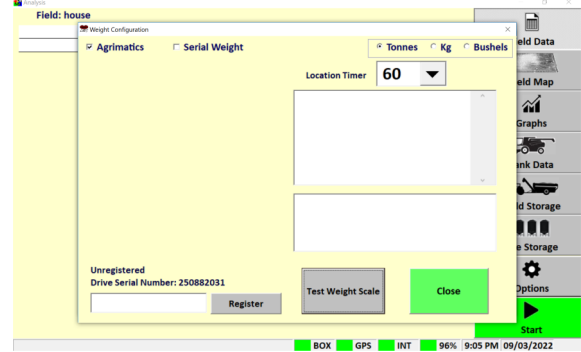Figure 3-19. Setup - Cart Weight Settings

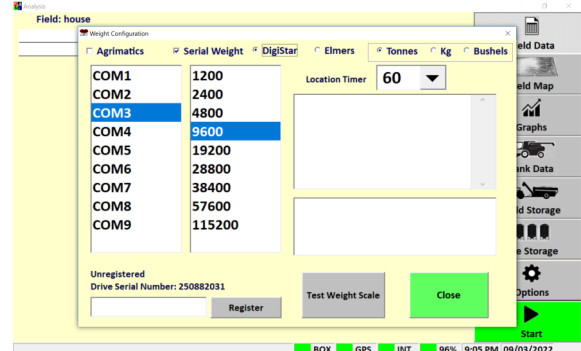Figure 3-20. Setup - Cart Weight—Bluetooth
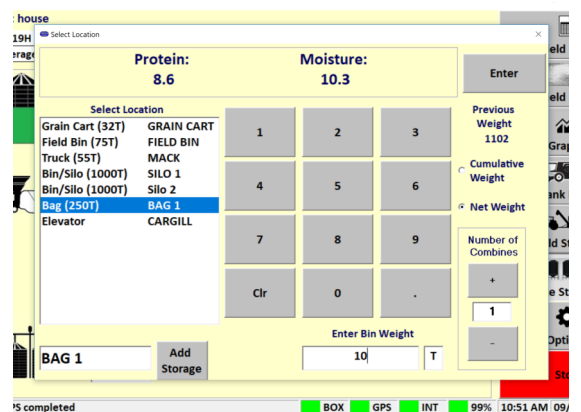

Figure 3-21. Setup - Cart Weight—Lora to Serial.

Figure 3-22. Grain Logistics Grain Tank Weight Counter.

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 check 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.
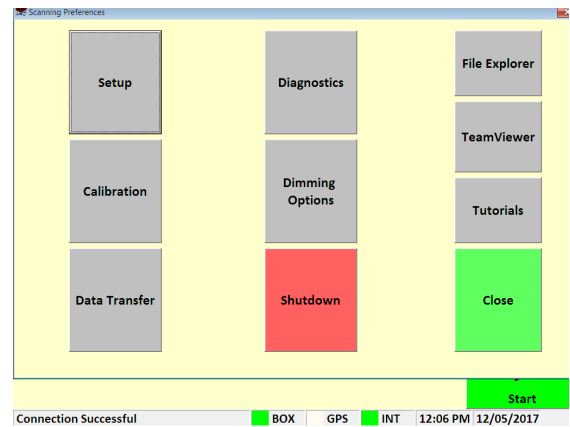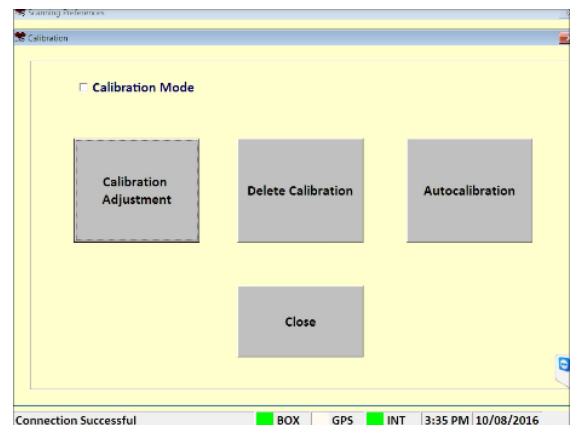

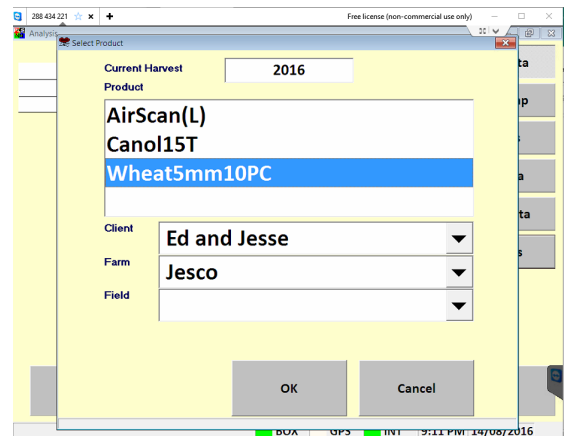Figure 4.1. Options Window.

Figure 4.2. Calibration Menu.

Figure 4.3. Select Product Menu.
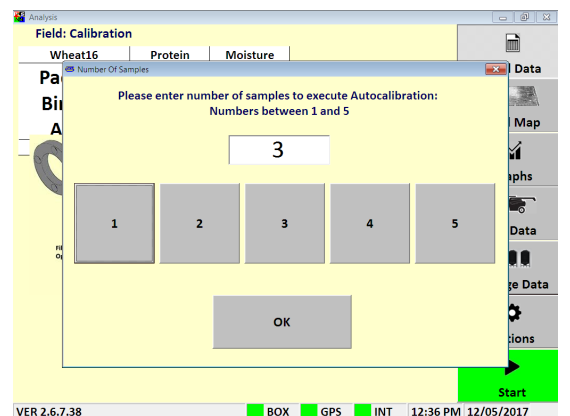
Figure 4.4. Num of samples for Auto-Calibration.

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 Headlamp 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, 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 to the USB stick so the results can be emailed if CropScan technical support if required.

Figure 4.5. Pouring a sample through the CropScan sample head.

Figure 4.6. Auto-Calibration Window.

4.2 Calibration Adjustment

Calibration Adjustments enables operators to increase or decrease Calibration Model's 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 via the Advanced Autocalibration mode. 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:, enter the password ADMIN to make changes.
   Note: Changing the Slope factor can dramatically effect the calibration settings.
   Contact support@nextinstruments.net if a Slope change is required
7) 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.

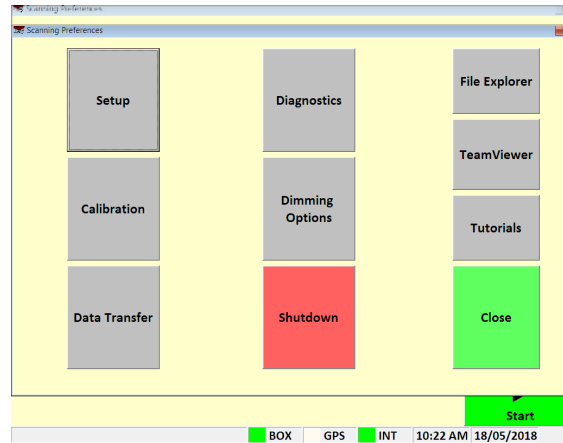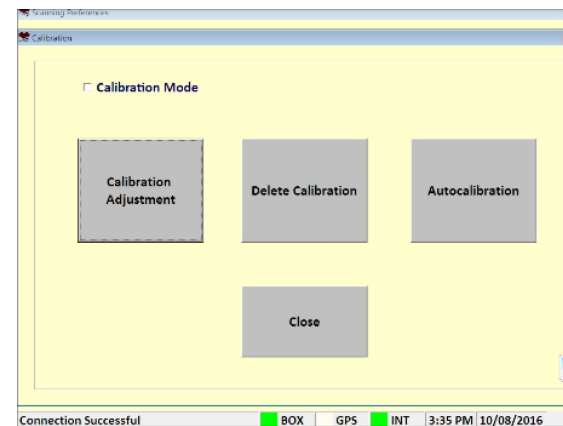4) Press **OK** to confirm.

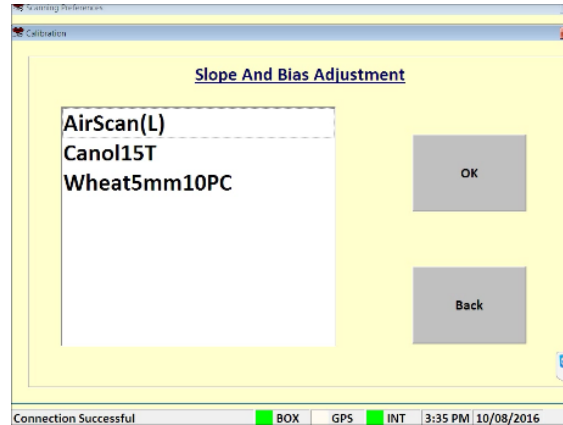Figure 4.5. Options Window

Figure 4.6. Calibration Window

Figure 4.7. Calibration Adjustment Window
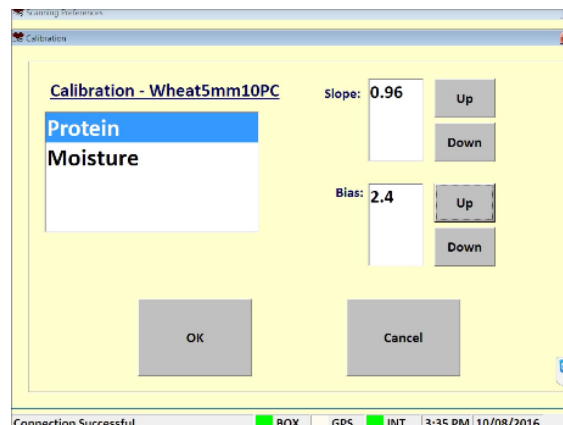
Figure 4.8. Slope and Bias Adjustment Window

5.1 CropScan 3300H Wiring Diagram
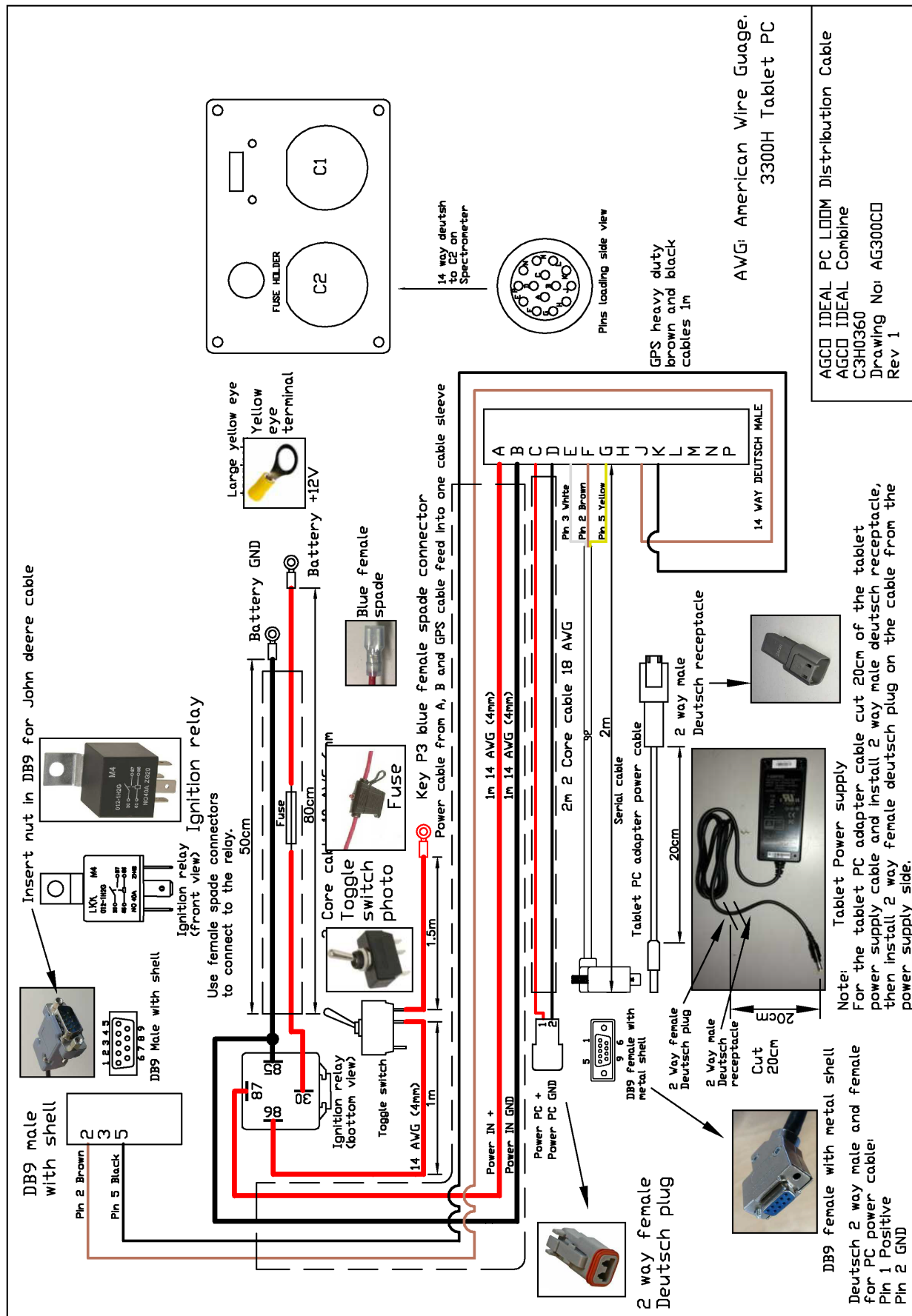
Fig. 5.1. CropScan 3300H Spectrometer Cable Harness Agco Ideal Combines..

5.2 CropScan 3300H Block Diagram
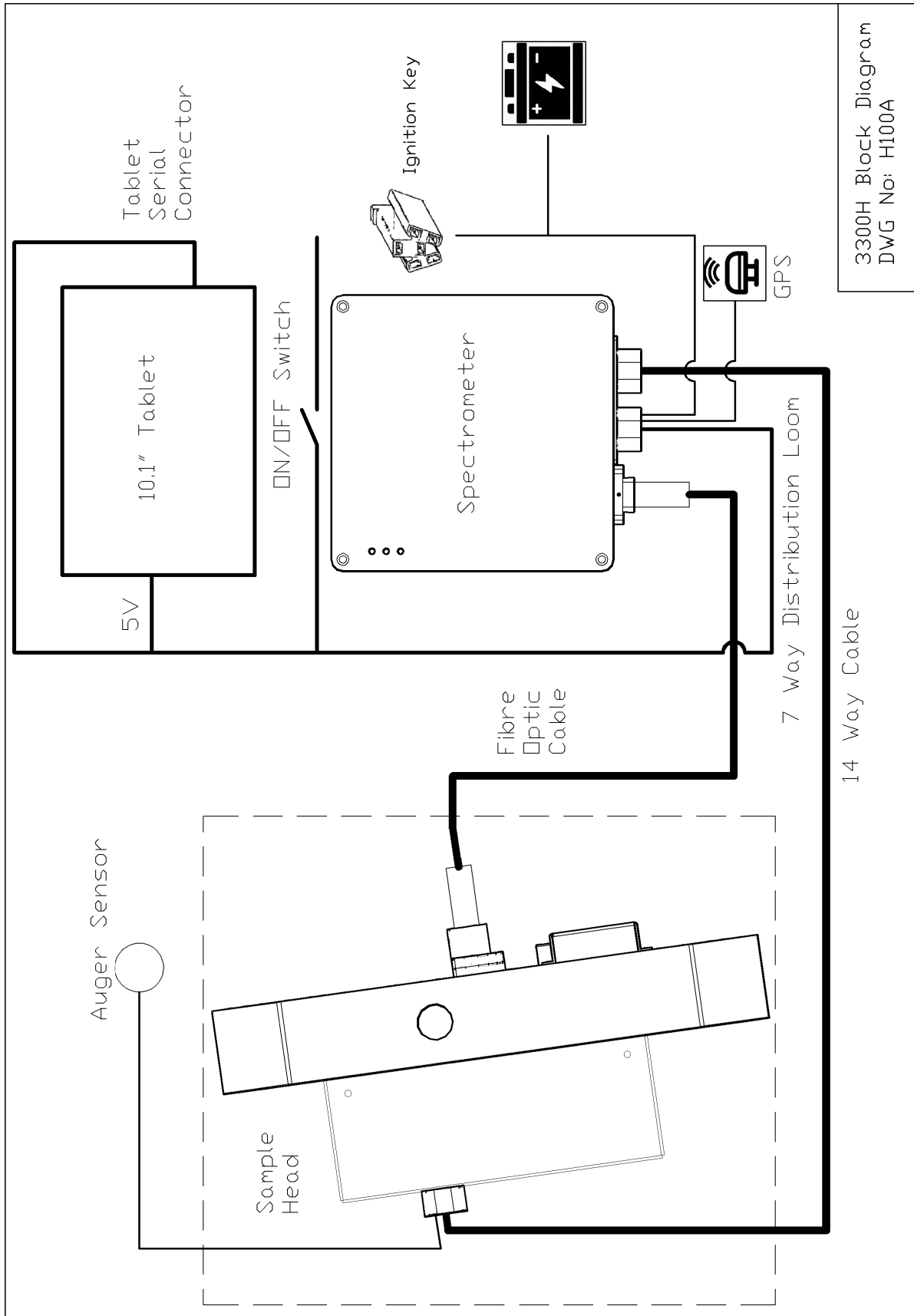
Fig. 5.2. CropScan 3300H Component schematic.

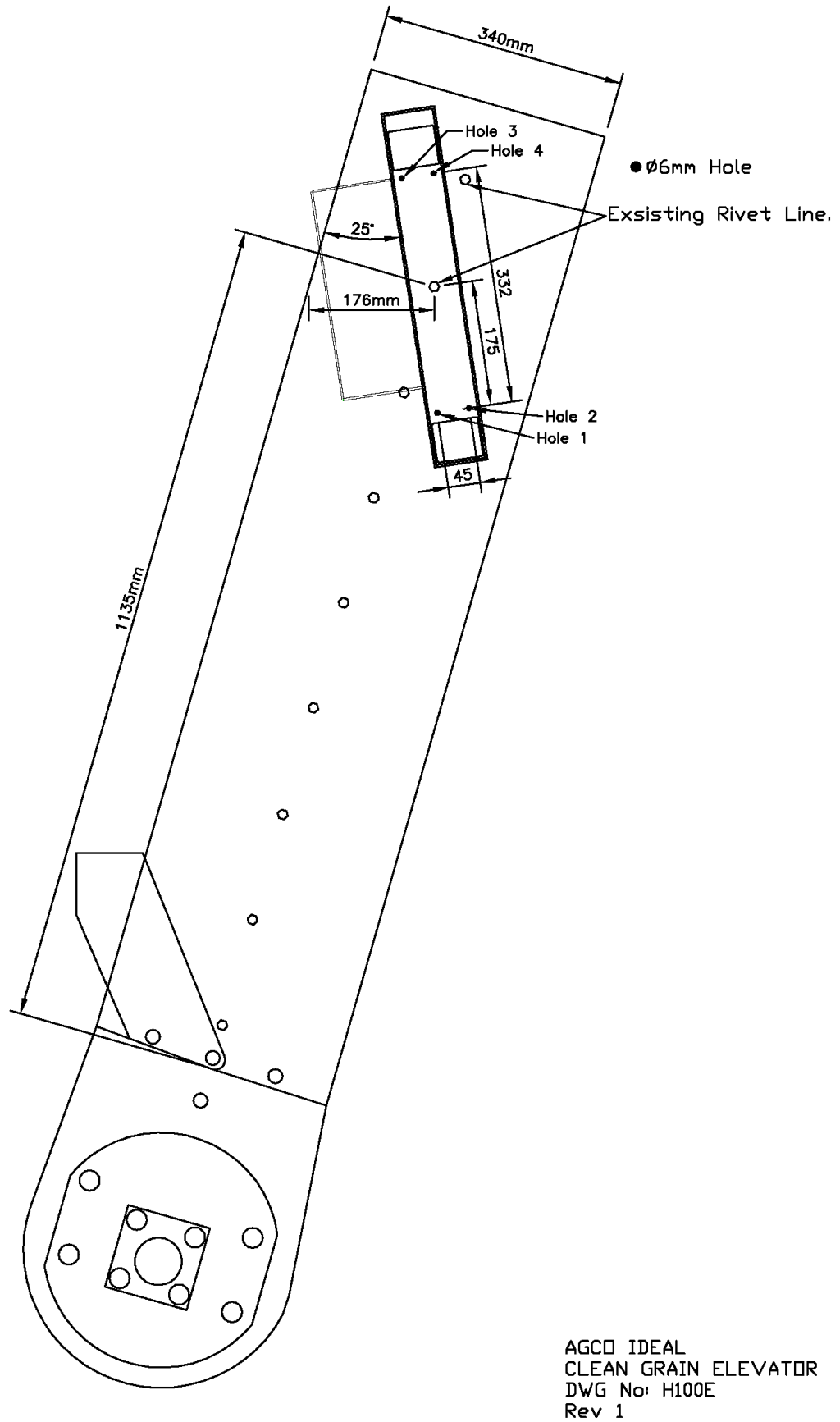**5.3 Remote Sample Head Mounting Diagram for Agco Ideal Combines.**

Fig. 5.3. Agco Clean Grain Elevator Drawing