Installation Guide
CropScan 3300H
On Combine Analyser
CLAAS Combines

REVISION HISTORY

Initial Prototype	November	2012
Rev. I	March	2014
Rev. II	August	2015
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Rev VI	February	2022

CropScan 3300H On Combine 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 and tested around then world, 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.
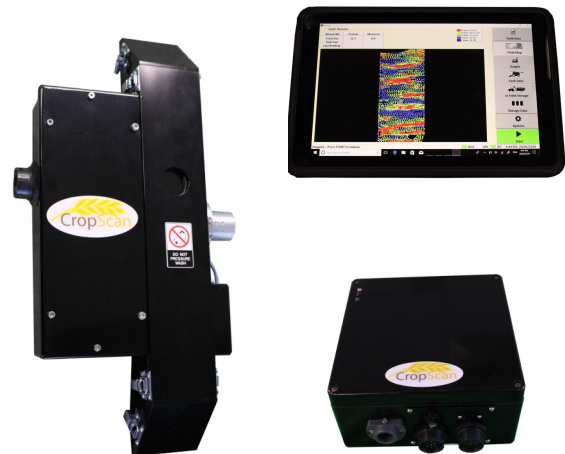

Figure 1.1 CropScan 3300H On Combine Analyser components.

Figure 1.2   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 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 user interface controls the motor flap operation, the lamp, the auger sensor and the sample sensor (chamber full trigger). 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 when the unloading auger is extended and retracted or the STOP button is pressed. The data can be viewed in the N-GAUGE App's on any smart device.
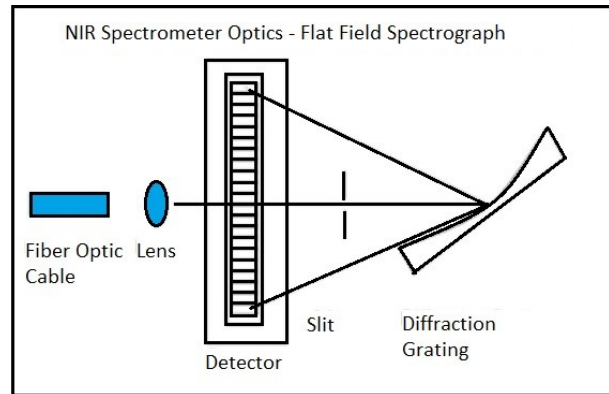

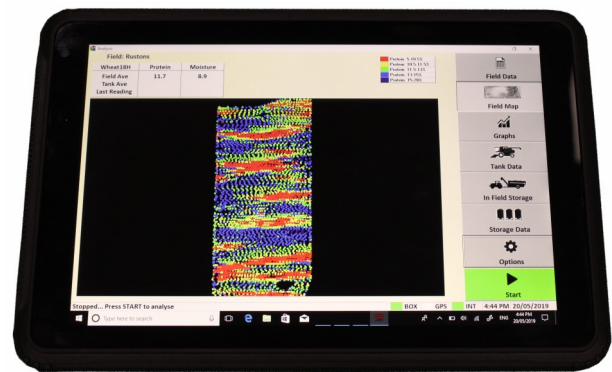Figure 1.3 Schematic of the NIR Spectrometer Optics Layout.
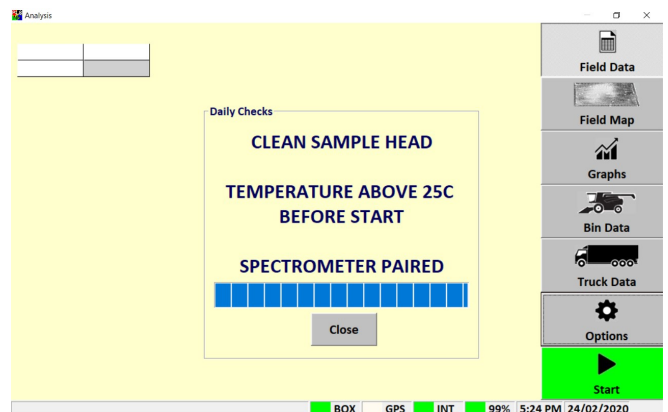

Figure 1.4 CropScan Display.

Figure 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 starting any installation steps.

2.1 Remote Sample Head Installation

Note 1: The Fibre Optic cable is 5m in length, this length will dictate the position of the sample head and Fibre optic cable routing.

Note 2: The sample head should be mounted with a sharp angle crossing the up and down side of the elevator. A lower mounting angle could cause blockages inside the sample head.

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. Using the dimensions and Sample Head as a Template (see chapter 5.5 to 5.7 for a full size photo and drawing), measure and mark out attach holes, 1, 2, 3, 4 and the rectangular inlet and outlet holes with a marker pen or scribe.

Note: Before drilling any holes, check the elevator rivet line does not interfere with any attach holes before drilling into the clean grain elevator.

2. Drill the 4 Sample Head attach holes using an 6mm drill bit as shown in figure 2.1 and chapter 5.4 and 5.5

3. Oversize the 4 Sample Head attach holes using an 8mm to 8.5mm drill bit to allow for the coach bolt head to sit flush inside the clean grain elevator as shown in figure 2.5.

4. Drill out the four corners of the inlet and outlet cutouts using a 6mm drill. 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.
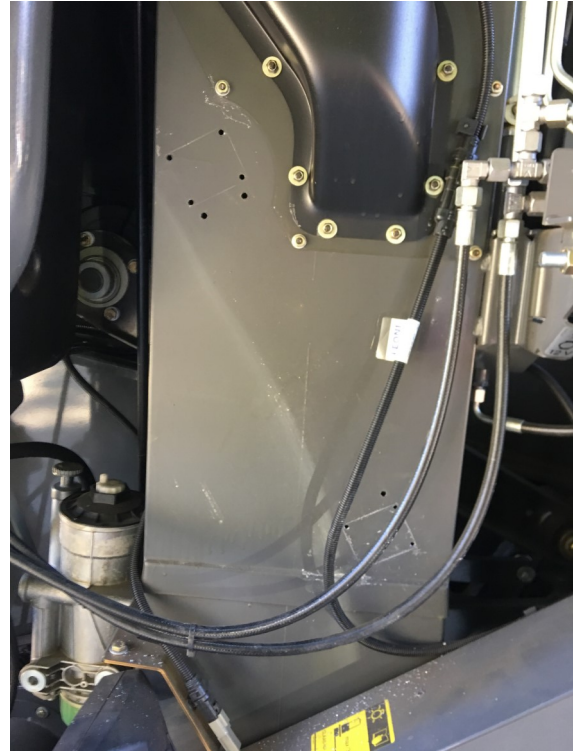

Figure 2.1 Layout for mounting the Remote Sample Head to the Clean Grain Elevator—lower position..

Figure 2.2. Layout for mounting the Remote Sample Head to the Clean Grain Elevator—upper position.

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5. Insert the 4 x M6-20 P/N CON0214 bolts from the inside of the elevator so the threads are face outwards.

6. Fit the supplied gasket P/N C3H0190 onto the 4 x M6-20 bolts. *Note: Gasket orientation. Place the thick edge of the gasket to the top inlet hole and thin edge to the outlet hole as shown in figure 2.4.*

6. Install the Sample Head 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.

Figure 2.4. Sample Head Gasket installation.

Figure 2.5. Sample Head attach bolt.

Figure 2.6 Sample Head installation—lower position.

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2.2 NIR Spectrometer Installation

The NIR Spectrometer is to be located inside the cabin. The NIR Spectrometer is housed in a black 260mm x 250mm x 120mm enclosure. The box is to be mounted behind the driver's seat or on the floor forward of the fuse pane. To install the NIR Spectrometer follow the instructions below:

1. Mount the NIR Spectrometer box behind the drivers seat below the trim panel as shown in figure 2.8. Additional brackets maybe needed to secure the Spectrometer Box if needed.

Figure 2.7. NIR Spectrometer Box

Figure 2.8. NIR Spectrometer Box

2.3 Outloading Auger Sensor Installation

The Auger Sensor is designed to trigger the reset of the Grain Tank average in the CropScan display software. The Tank average for Protein, Moisture and Oil can be displayed in the Tank Data and Grain Logistics run screens.

The Auger Sensor installation position can vary on CLAAS combines due to changes in models.

Position 1: Auger Cradle

Position 2: Grain Tank structure

1. Position 1:
    Install the Auger Sensor with mounting bracket P/N C3H0210 and C3H0079, to the left side cabin back wall. Position and install the sensor to sense the Pivot Mechanism tab. The Auger Sensor is designed to pickup the Auger Pivot tab in the closed position as shown in figure 2.9. Use the 2 x Tek Screws P/N CON0227 to secure the Auger bracket to the cabin wall.

Note: Allow 10-15mm gap between the Outloading Auger Pivot and Sensor.

2. Position 2:
    Install the CropScan 3300H Auger Sensor P/N C3H0210 with mounting bracket P/N C3H0065 to the grain tank structure above the Outloading Auger. Mark and drill 2 x 8mm holes into the grain tank structure. Secure the Auger sensor and bracket with the supplied 2 X M8 Bolts Washers and Nuts.

Note: Allow 10-15mm gap between the Outloading Auger and Sensor.

3. Make sure all cabling is secure and not loose, the grain tank door actuator or belts could break cables if the wiring is not secured correctly.

Figure. 2.9. Auger Sensor installation CLAAS Combines.

Figure 2.10 Auger Sensor and bracket.

2.4 CropScan Display Screen Installation

The CropScan Display is to be installed inside the cabin. The display is attached to the structural horizontal rail bar as shown in figure 2.12. The CropScan Display is then supported and held by the supplied RAM Arm to the display bracket with ball mount. To install the CropScan Display, follow the instructions below:

1. Position the CropScan display so that the driver vision is not obscured in any way.

2. Fit the supplied RAM Mount Base P/N C3H0092 using the supplied M5 into the horizontal rail bracket.

3. Attach the RAM Arm to RAM mount bracket.

4. Attach the CropScan Display to the RAM Arm and tighten the handle to secure the CropScan on the RAM Mount Base. figure 2.12.
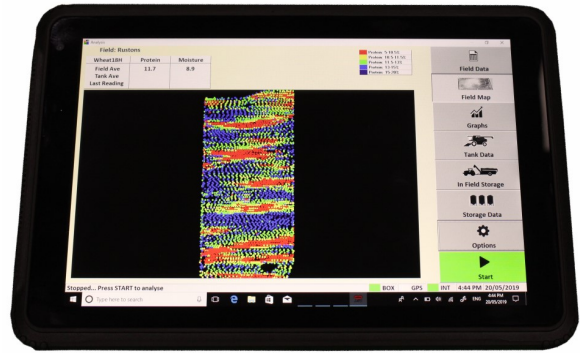

Figure 2.11. CropScan Display with the RAM Mount attached to the back.

Figure 2.12. CropScan Display mounted to Support

2.5 Wiring Installation

Figure 2.13 is a Block Diagram showing the CropScan 3300H components and the connections. A full size drawing is supplied in chapter 5.2.

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

2.6 Sample Head to NIR Spectrometer

1. Disconnect the combine's power at the battery isolation switch.

2. Insert the Fibre Optic cable, P/N C3H0370, into the Fibre Optic light guide on the Sample Head. Insert the Fibre Optic cable ferrule so that the groove aligns to the locking screw. Push the Fibre Optic cable to the end of the probe. Tighten the locking screw on the barrel of the Fibre Optic probe. *Note: Place a ring of silicone 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.*

3. Connect the Sample Head cable plug, P/N C3H0328, to the sample head connector. Run the cable to the cabin access panel. Follow the manufactures cable run along the return elevator. Use cable ties P/N ELC0292 every 500mm to secure the cable.

4. Install the 3 Way Auger Sensor cable, P/N C3H0301 to the Sample Head cable 3 pin connector .

5. Run the Fibre Optic cable up to the cabin access panel. Follow the manufactures cable run. Use cable ties every 500mm to secure the Fibre Optic cable.

6. Remove 3 X 10mm bolts securing the access panel on the right side of the combine to gain access to feed the Sample Head and Fibre cable into the cabin.

7. Remove 2 of black plastic access panel blocks by sliding the block aft. Drill a half hole in the plastic block using a 20mm hole saw for the Sample Head cable to feed into the cabin. Repeat this step in a second plastic block for the Fibre Optic cable to feed into the cabin.

8. Feed the Sample Head and Fibre Optic cables through the access panel into the cabin. Install the 2 X plastic blocks to support and seal the cables.

9. Install the 3 X 10mm bolts to secure the access panel.

10. Apply a bead of Silicon Sealant to the black plastic blocks to seal off any spaces or holes around Sample Head and Fibre Optic cables.
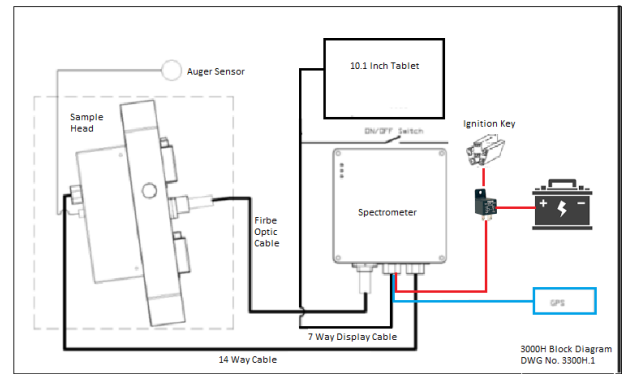

Figure 2.13. CropScan 3300H Block Diagram

Figure 2.14. Sample Head Connectors
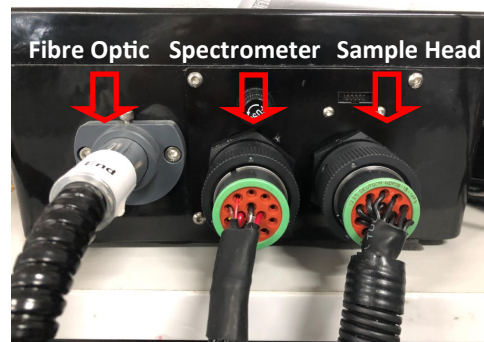

Figure 2.15. Sample Head Connectors

Figure 2.16. NIR Spectrometer Connectors

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11. Run the Sample Head cable and Fibre Optic cable to the Spectrometer box.

12. Connect the Sample Head cable plug to the outer 14 pin connector on the NIR Spectrometer box as shown in figure 2.17.

13. Insert the Fibre Optic cable ferrule 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 2.17.

2.7 Spectrometer to CropScan Display

1. Install and route the Spectrometer cable (battery connections, GPS connector and On/Off switch) behind the cabin trim to the fuse electrical panel.

2. Install the Spectrometer ON/OFF switch in the trim panel next to the ignition key.

3. Connect the 12 pin Deutsch connector into the Trimble or John Deere GPS Harness or connect the supplied 12 pin Deutsch to DB9 jumper cable to the combines GPS interface connector.

4. Connect the Spectrometer cable DB9 serial connector to the right hand side serial port of the CropScan display as shown in figure 2.18.

5. Connect the 2 pin power plug to the CropScan display socket. Insert the display power cable input pin to the bottom right hand side of the display dock. ***Note: The CropScan display power cable input pin is removed for shipping. The CropScan display will shut down automatically if the power input pin on not connected.***

Warning: Incorrect termination of the power and ground wires could damage the Spectrometer. Make sure the Positive Terminal is connected to the Battery + stud and the Ground Terminal is connected to the—stud.

6. Connect the Spectrometer power and ground terminals to the main cabin battery 12VDC power and ground terminals. Tighten to secure terminals. Ref to figure 2.19 and Drawing 5.1 for more detail.

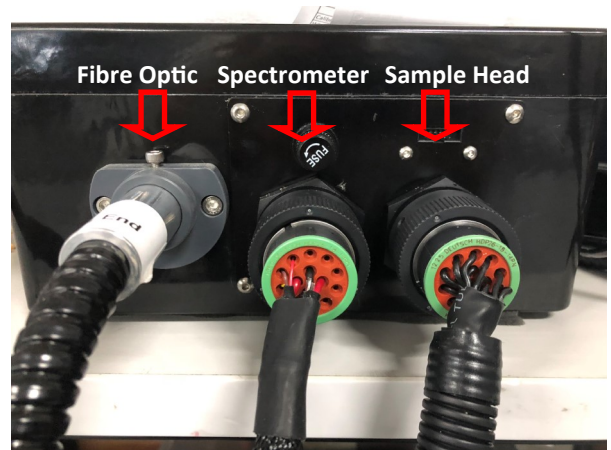7. Connect the red ignition spade terminal to the fuse electrical panel ignition socket.

Figure 2.17. NIR Spectrometer Connections.

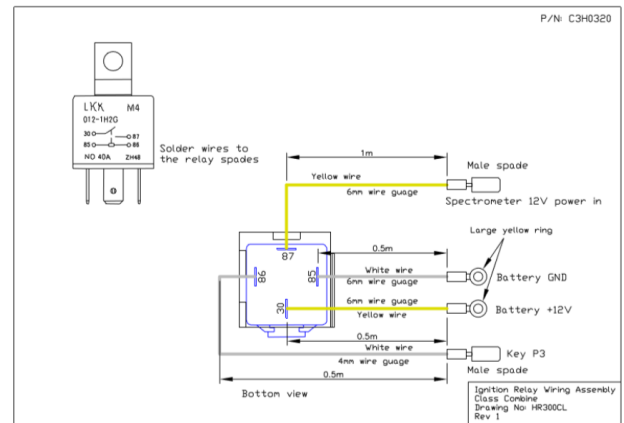Figure 2.18. 12VDC Power Connections to CropScan display.

Figure 2.19. CropScan Battery Relay connections.

2.8 GPS Interface

The CropScan Spectrometer uses a serial communication protocol to receive a Latitude and Longitude position (GPGGA) for each sample cycle. The Spectrometer cable harness comes with a 12 Pin Deutsch connector and an 12 Pin Deutsch to 9 Pin DB9 jumper cable to simply the GPS installation process. ***Note: Please refer to the GPS Guidance System User Manual for NMEA message output settings. Some manufactures do not use standard RS-232 pin out configurations as shown in figure 2.21.*** The below instructions describe steps required to configure a Trimble and John Deere GPS receiver message output.

Trimble FMX

1. On the FMX startup screen, select the Settings icon located on the top right hand corner. Select GPS Receiver from the configuration options.

2. Select the Diagnostics button on the screen to check the incoming GPS signal (long/lat, status, quality, etc.) from the receiver. If working properly, select OK to go back to the configuration screen.

3. Select the Setup button to open the GPS Receiver settings screen (If the FMX display is password protected, you will be prompted to enter the administrative password in order to go to the next screen).

4. On the GPS Receiver Settings screen, select the Settings tab and then the NMEA Output button to open the NMEA Message Output Settings.

5. Select the tab marked Rate. Under this tab, you can select the NMEA message settings such as rate, output port and baud rate for the CropScan Rx.

6. From the dropdown list for these settings, select the following: Message Rate 5 Hz Baud Rate 19200 GGA

7. For the Output Port setting, select B (ext GPS) from the dropdown list to set Port B to output GPS NMEA data.

8. Select the Messages tab under the NMEA Message Output Settings. Make sure the GGA message strings are checked ON. Select OK twice to return to the FMX home screen.

9. RESTART the FMX display by selecting Shutdown and then turning it back ON from the power button manually in order for these new settings to be saved. The Port B on FMX should be activated to output the correct GPS NMEA data now.
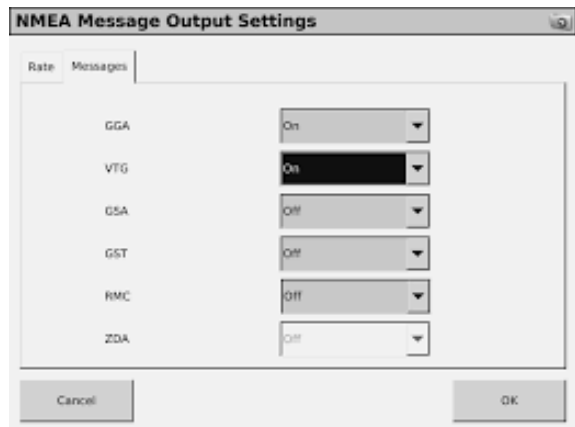

Fig. 2.20 Trimble FMX NMEA Message Settings

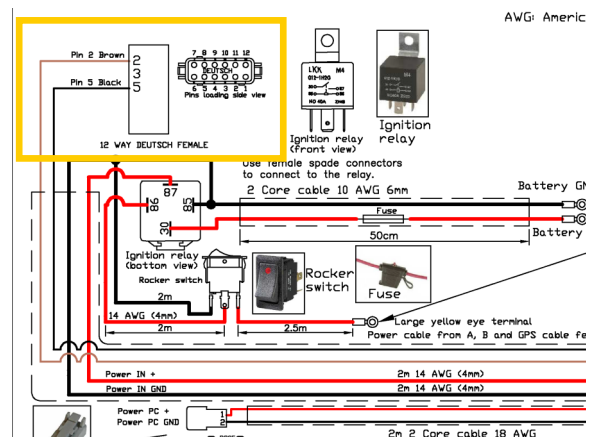| Pin	Port A	Port B
1	CAN Yellow High	CAN Yellow High
2	Sonalert	
3	RS232 RX	RS232 RX
4	RS232 TX	RS232 TX
5	RS232 GND	RS232 GND
6	Video GND	Video GND
7	Video IN	Video IN
8	GND	GND
9	12v DC	12v DC
10	Remote Coverage Switch GND	Ez-Pilot Remote Engage GND
11	Remote Coverage Switch In	Ez-Pilot Remote Engage IN
12	CAN Green Low	CAN Green Low

Figure 2.21 Setup - Configuration window.

Fig. 2.22 CropScan Rx GPS 12 Pin Deutsch Connector

Star Fire

John Deere GPS Cable P/N C3H0333 is designed to connect the Star Fire Receiver to the Spectrometer cable harness via the 12 Pin Deutsch connector. *Note: The John Deere GPS cable is not included in standard CLAAS installation kits. Order P/N C3H0333 separately.*

1. Connect the John Deere GPS Cable P/N C3H0333 to the Star Fire Receiver as shown in Figure 2.24 and run 12 Pin Deutsch connector end to the cabin access panel and feed the into cabin through the access panel blanking plates as described in chapter 2.6.

2. Connect the John Deere Cable P/N C3H0333 to the Spectrometer cable 12 Pin Deutsch connector.

3. Configure the John Deere Star Fire serial port baud rate, Output Rate and NMEA message settings as shown in Figure 2.23.

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

4. Use silicon sealant to fill any up holes/gaps at the Cabin access panel with sealant.

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 2.25. *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.
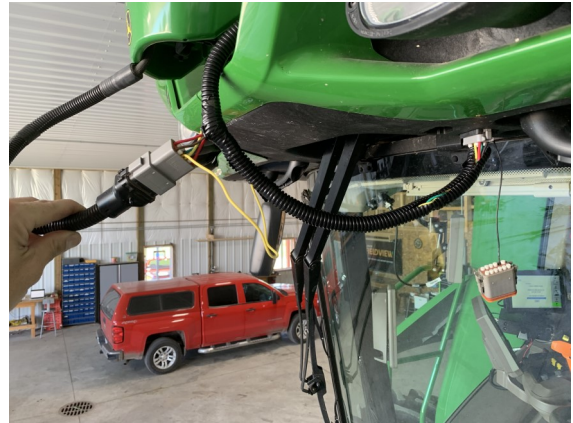

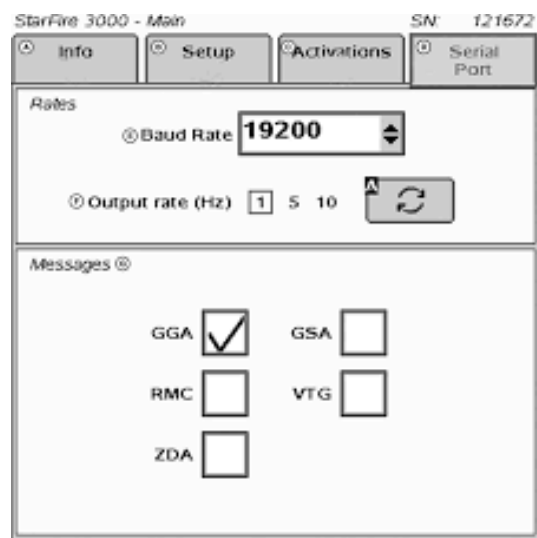Fig. 2.24 GPS Cable connected to the Green Star GPS Receiver.
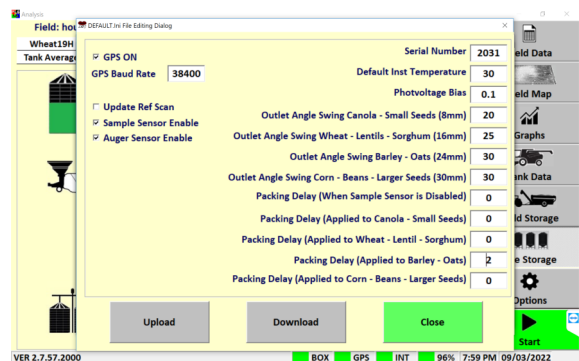

Fig. 2.23 Serial Port configuration window.

Figure 2.25 Setup - Configuration window.

2.9 CropScan 3300H Installation Check List

Item	Installation	Carried Out
1	Install Sample Head to Clean Grain Elevator	
2	Install Spectrometer box	
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 through hole)	
7	Install Spectrometer cable	
8	Install 3 Way Auger cable	
9	Connect GPS connector to receiver harness	
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 and 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)(AUS Only)

- 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
- Press Add Profile
- Press OK to confirm Wi-Fi Prolife upload

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.
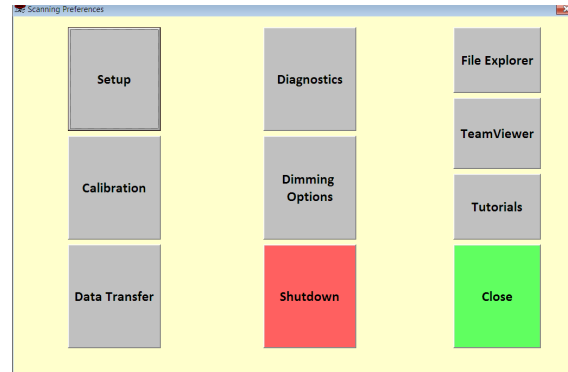
Figure 3-1. Setup - Options Window.

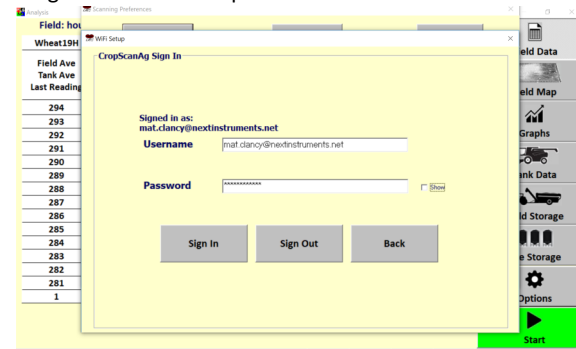Figure 3-2. Setup—Wifi
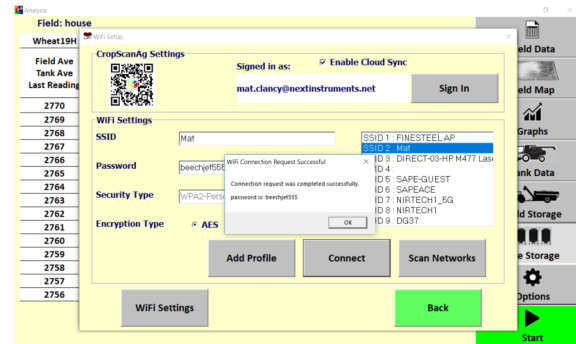
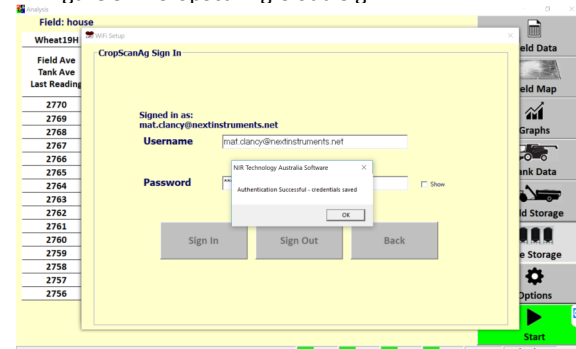Figure 3-3. Wifi Hotspot Connection

Figure 3-4. CropScanAg Cloud Sign In

Figure 3-5. CropScanAg Cloud Authentication

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. AFS/PLM Connect Portal API (Cloud Sync)
  2. CN1 Folder –CNHi Format (USB)
  2. AgGPS—Trimble Format (USB)
  3. JD Boundary Shape Files—JD Format (USB)

Grower Farm Field Import

1. **(Cloud Sync) AFS/PLM Connect Portal**
- Connect your CropScanAg Cloud Web Portal to the AFS/PLM Connect Portal API. Press the API icon at the top right side of the CropScanAg Web Portal to view the API partner list.
- Press the Connect button on the API partner page.
- Enter your AFS/PLM Connect User Name and Password and press SAVE to link the APi connection.
- Once the APi connection is completed the SetUp Data for Field Names and Boundaries will sync to your CropScanAg account and enable the syncing Field ID's down to the CropScan display.
- To sync SetUp Data—Grower Farm Field names press the **(Cloud Icon) Import GFF** button as shown in figure 3.6.
- Wait while the Grower Farm Field names appear in the Grower Farm Field table.

2. **(USB) CN1, AgGPS or John Deere Shp.**
- Save a CN1, AgGPS or Boundaries Folder 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 3.6 to activate Client Farm Field format.
- Press the **(USB Icon) 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.
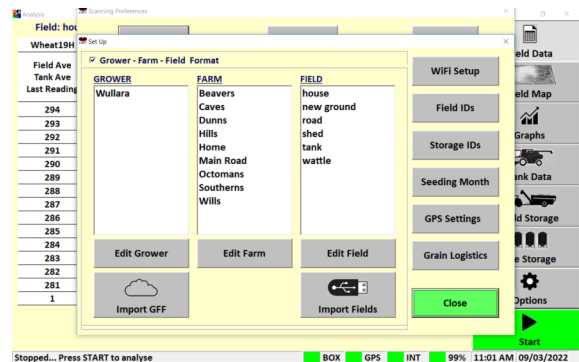
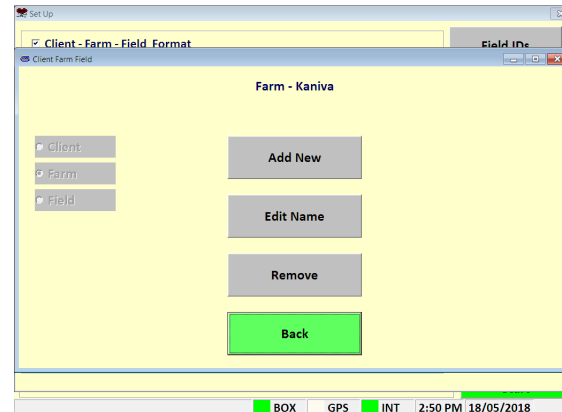Figure 3.6. Setup - Field IDs in Client-Farm-Field format.

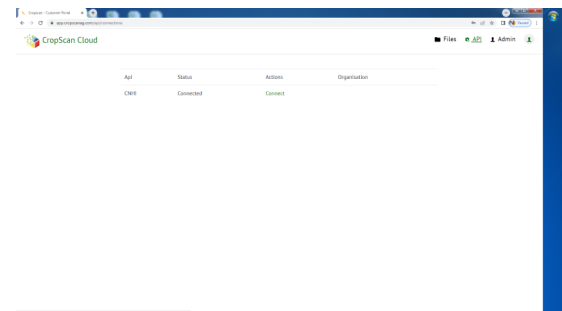Figure 3.7. Setup - Editing Client-Farm-Field Information.

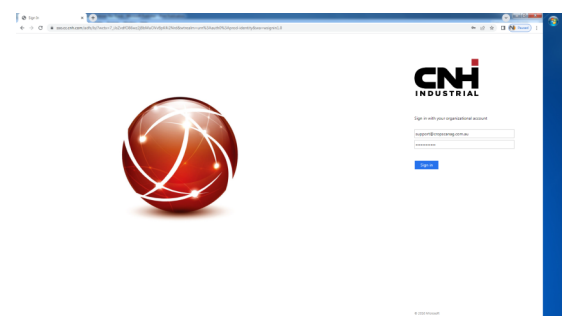Figure 3.8. CropScanAg Cloud Web Portal—API partners.

Figure 3.9. AFS/PLM Connect Web Portal—Sign In.

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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 Seeding Month

- Select the seeding month. 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.

Note: Additional time and date settings are available via the windows Control Panel.
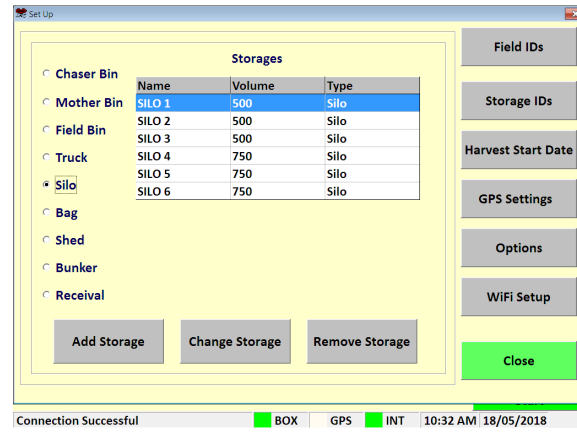
Figure 3.8. Setup—Storage ID's.
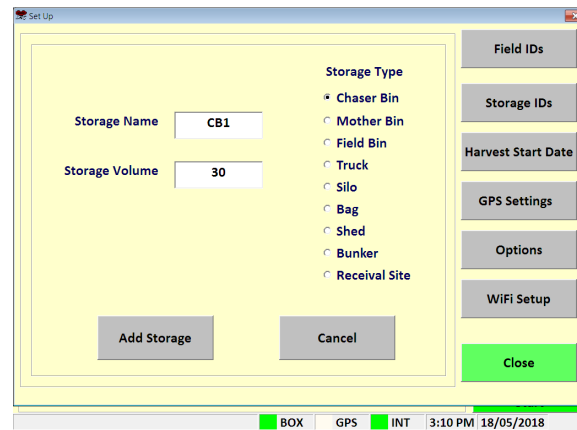
Figure 3.9. Setup - Adding a new storage.
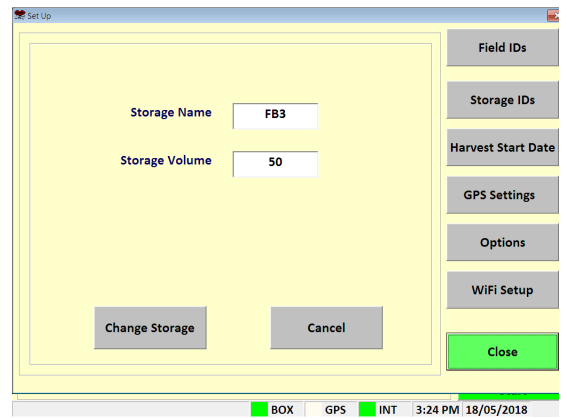
Figure 3.10. Setup - Changing a valid storage.

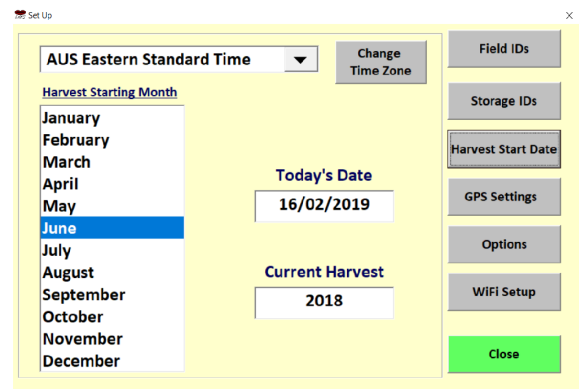Figure 3.11. Setup - Harvest Start Date Screen.

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.

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 3.12 and 3.13.

- Press the **Test GPS Data** button to test NMEA message and baud.

  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 3.14 to open the Configuration window.

- Confirm **GPS On** is ticked

- Set GPS baud rate to match the GPS receiver baud rate. Press in the GPS Baud Rate white text box and enter to new baud rate and press Enter.

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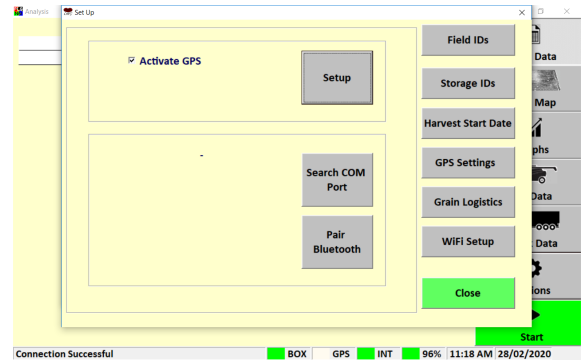

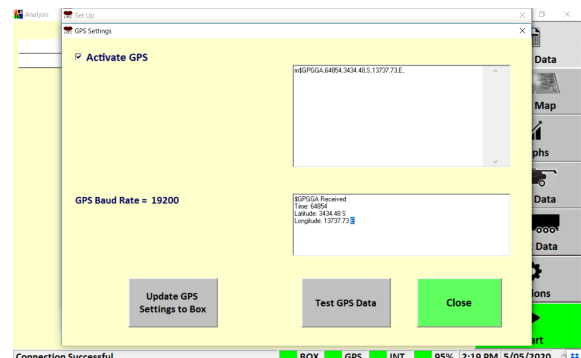Figure 3-12. Setup - GPS Settings Screen.
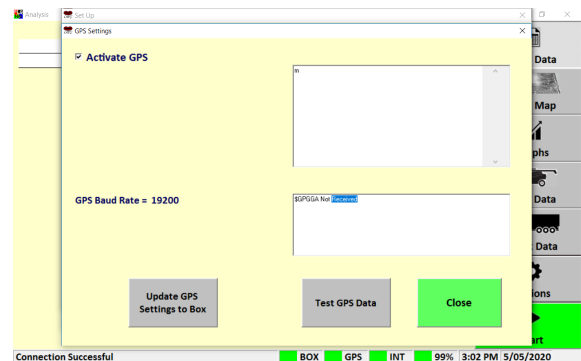

Figure 3-13. Setup - GPS Test Window—Pass.

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

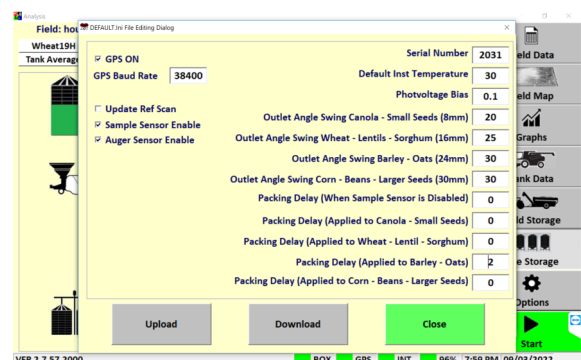Figure 3-15. Setup - Configuration window.

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

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

PC Auto Shutdown

- (Recommended) 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

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

Large Front

- (Optional) 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 quality and quantity 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:
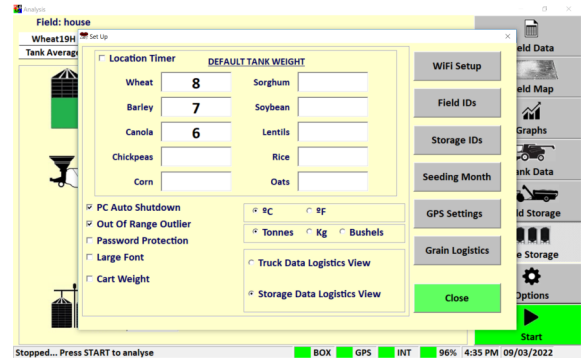
- "Select Truck Data Logistics View"
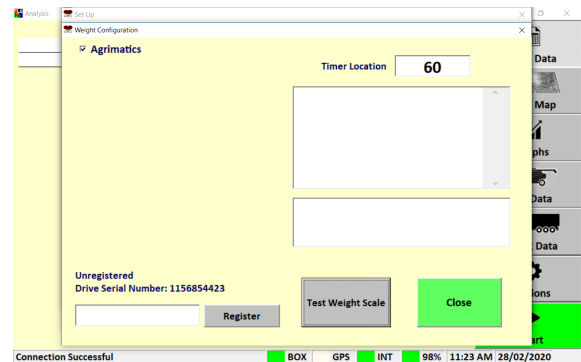

Figure 3-16. Setup - Options Window.

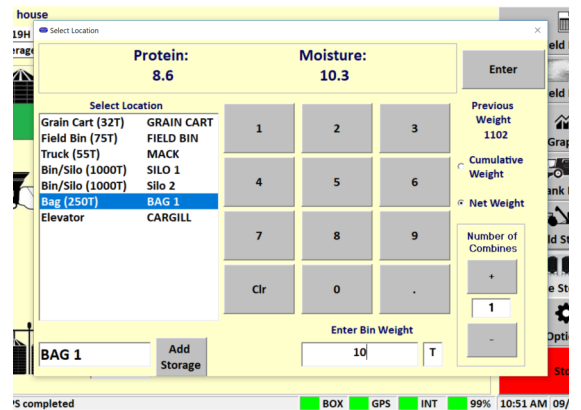Figure 3-17. Setup - Cart Weight.

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

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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 Weight 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.
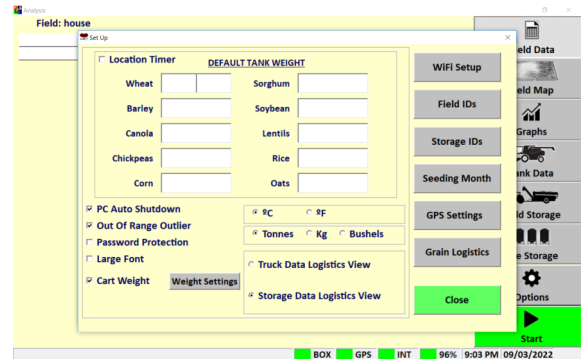

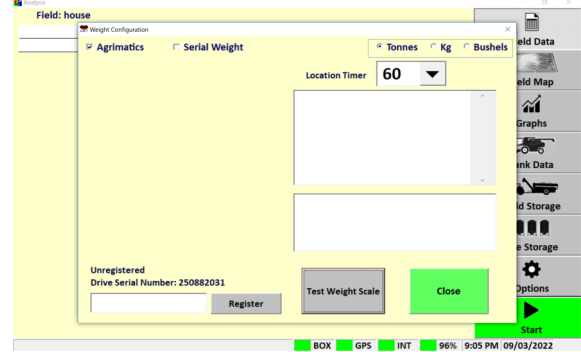Figure 3-19. Setup - Cart Weight Settings

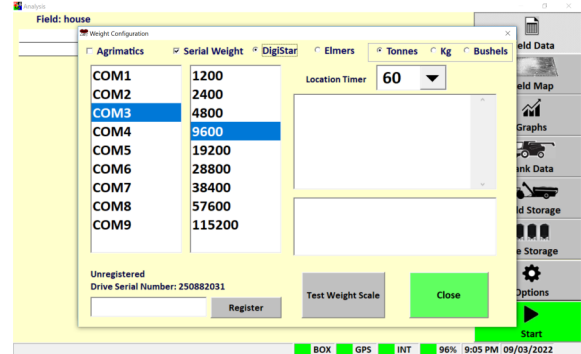Figure 3-20. Setup - Cart Weight—Bluetooth
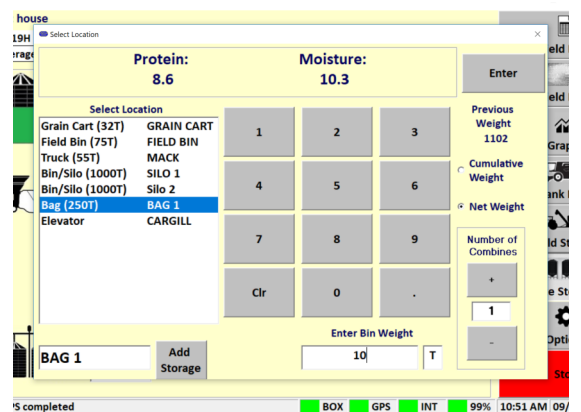

Figure 3-21. Setup - Cart Weight—Lora to Serial.

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:
- 5 x Wheat Samples,
- 5 x Barley Samples,
- 5 x Canola Samples,
- 5 x Other Crop Types
- 1 x Funnel, 2 x 1 Litre plus sized containers
- 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.
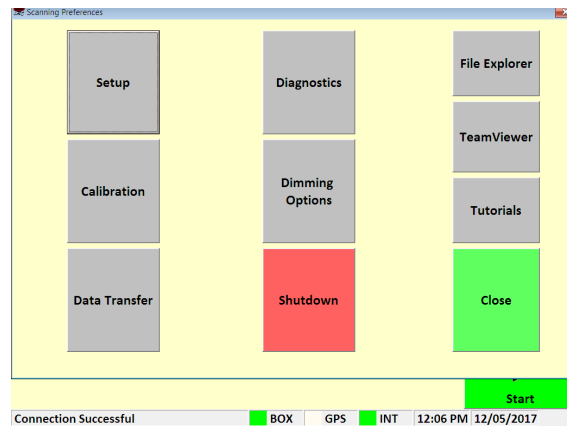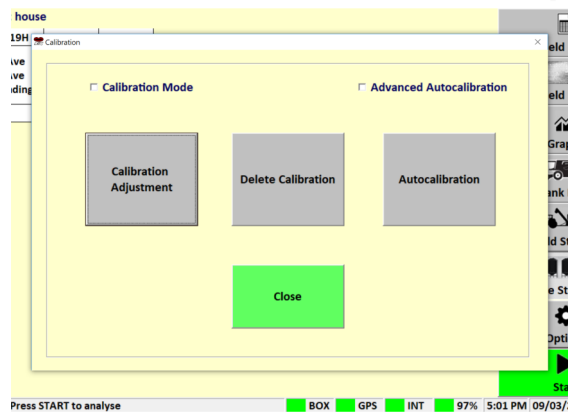

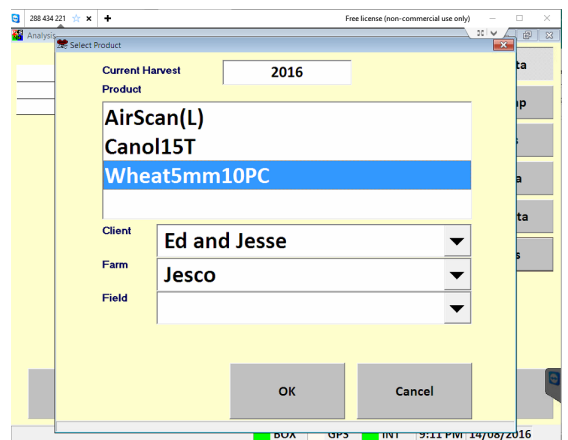Figure 4.1. Options Window.

Figure 4.2. Calibration Menu.

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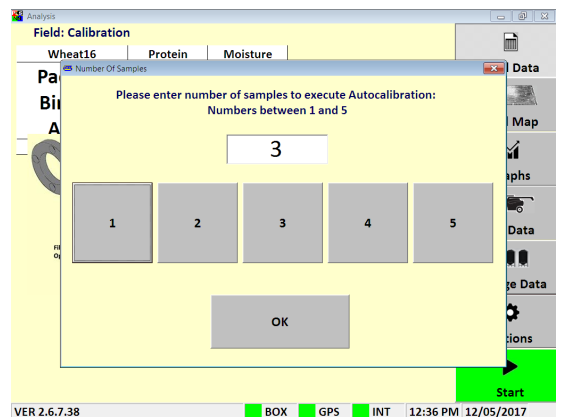
Figure 4.4. Number of samples for Auto-Calibration.

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

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.
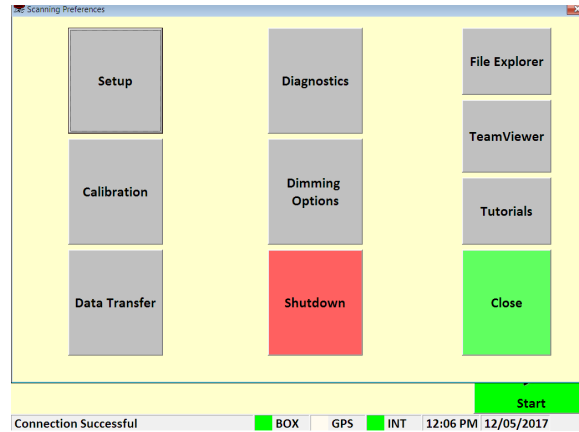
4. Press **OK** to confirm.
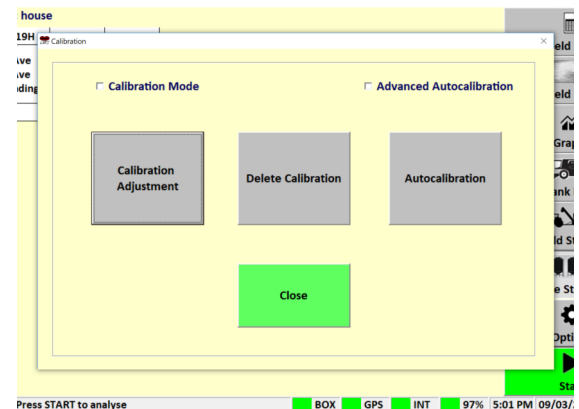

Figure 4.7. Options Window.
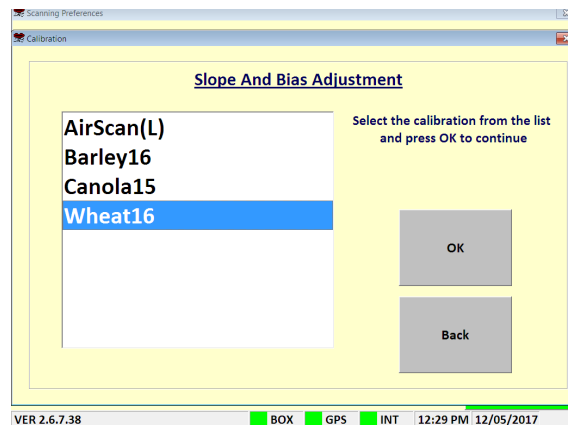

Figure 4.8. Calibration Menu.

Figure 4.9. Select Calibration Window .
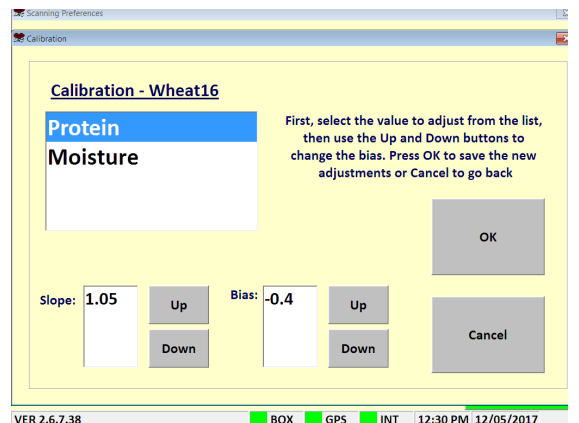
Figure 4.10. Bias Adjustment Window.
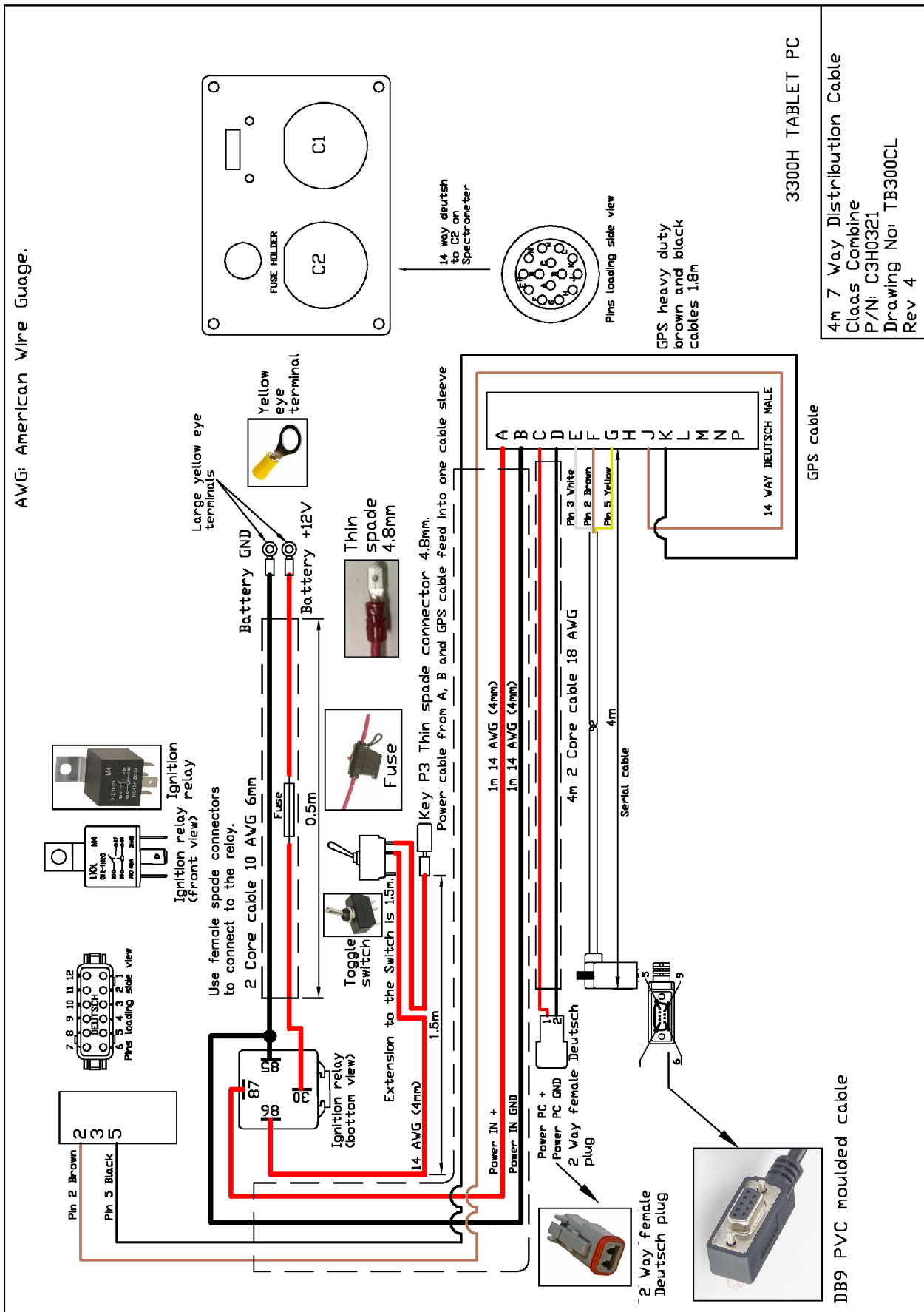
5.1 CropScan 3300H Spectrometer Wiring Diagram

Fig. 5.1.   3300H Spectrometer Wiring Diagram.
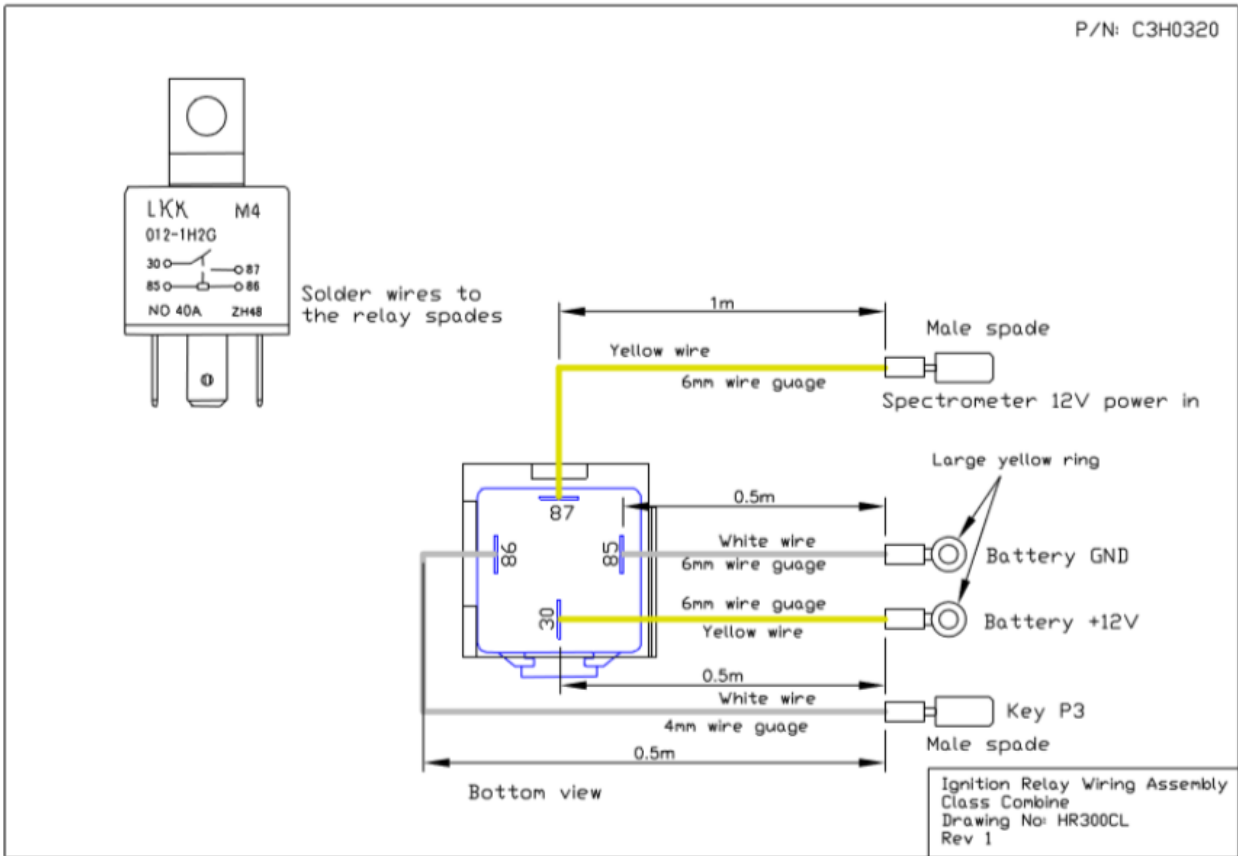
5.2 CropScan 3300H 12 Volt Input Wiring Installation

Fig. 5.2.   3300H Battery Relay Wiring Diagram.
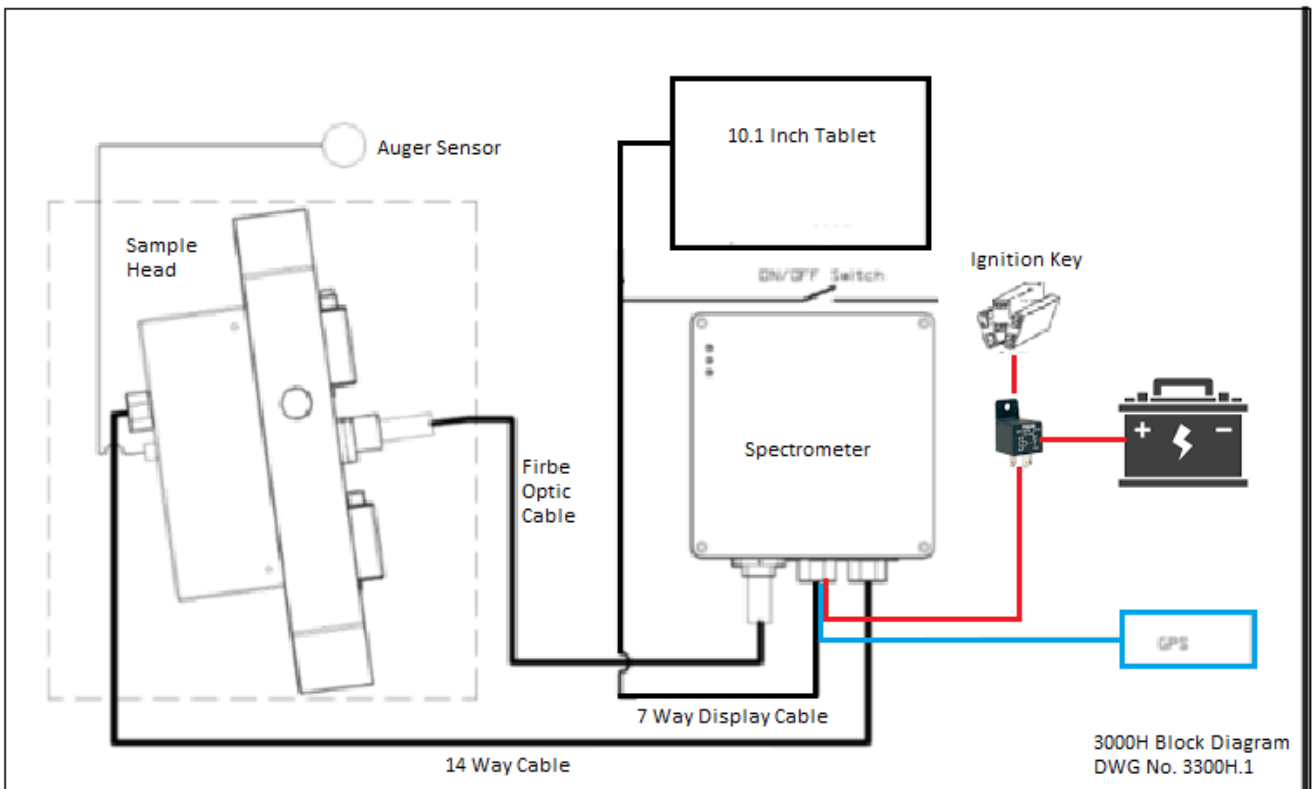
5.3 CropScan 3300H Block Diagram

Fig. 5.3.   3300H Block Diagram.

5.4 Remote Sample Head—Upper Mounting location for CLAAS Combines.

Fig. 5.4.   3300H Remote Sample Head Installation lower elevator position.

5.4 Remote Sample Head—Upper Mounting location for CLAAS Combines.

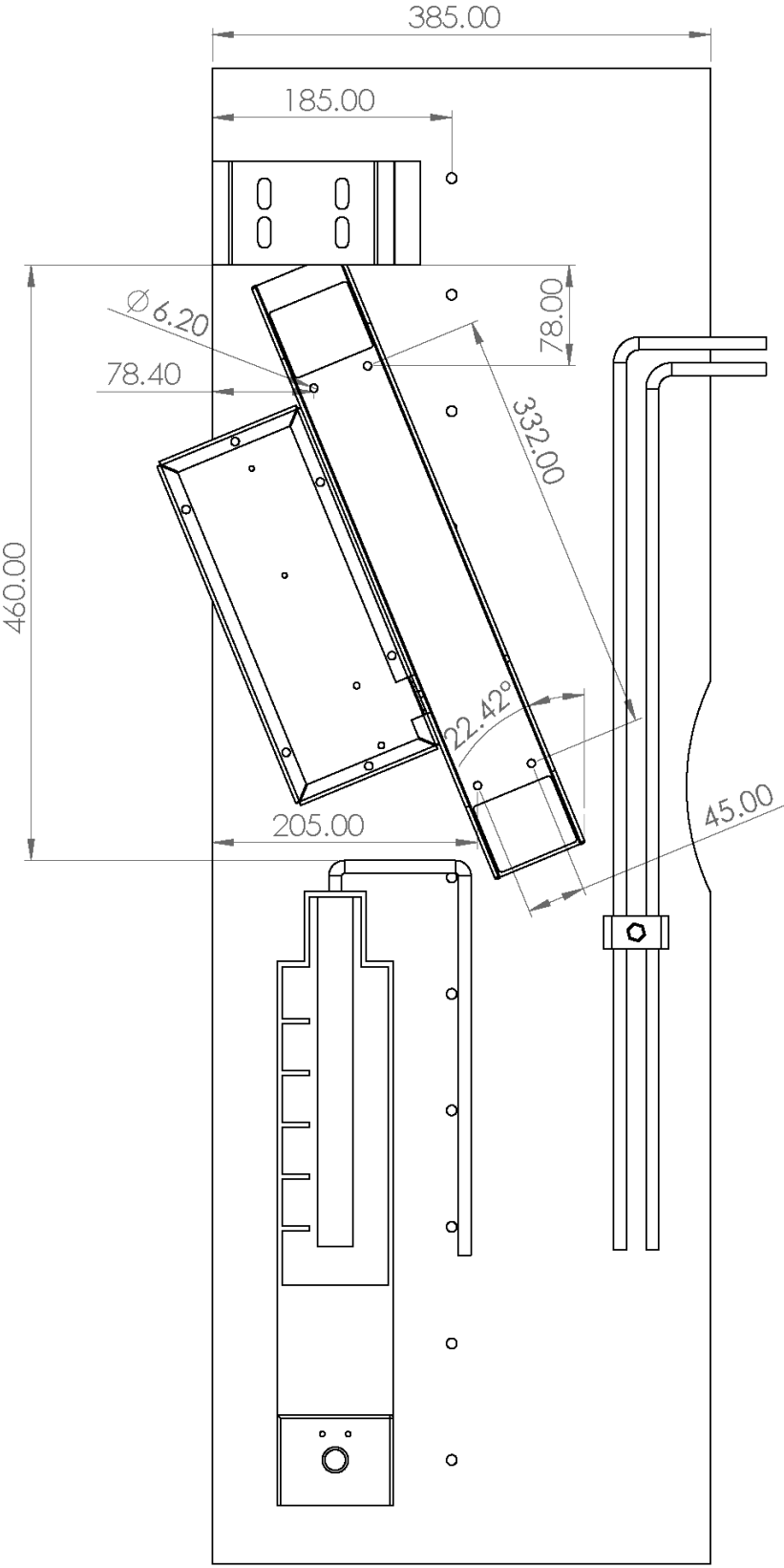Fig. 5.6.   3300H Remote Sample Head Installation upper elevator position.

Fig. 5.7.   3300H Remote Sample Head Installation drawing upper elevator position.