

UHarvest™ Pro Operation Manual

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SAFETY

NOTICE

Follow the operation and safety instructions included with the implement and/or controller and read this manual carefully before installing or operating this Raven system.

- Follow all safety information presented within this manual. Review implement operation with your local dealer.
- Contact a local Raven dealer for assistance with any portion of the installation, service, or operation of Raven equipment.
- Follow all safety labels affixed to system components. Be sure to keep safety labels in good condition and replace any missing or damaged labels. Contact a local Raven dealer to obtain replacements for safety labels.

Observe the following safety measures when operating the implement after installing this Raven system:

- Do not operate this Raven system or any agricultural equipment while under the influence of alcohol or an illegal substance.
- Be alert and aware of surroundings and remain in the operator's seat at all times when operating this Raven system.
 - Do not operate the implement on any public road with this Raven system enabled.
 - Disable this Raven system before exiting the operator's seat.
 - Determine and remain a safe working distance from obstacles and bystanders. The operator is responsible for disabling the system when a safe working distance has diminished.
 - Disable this Raven system prior to starting any maintenance work on the implement or components of this Raven system.
- Do not attempt to modify or lengthen any of the system control cables. Extension cables are available from a local Raven dealer.

WARNING

HYDRAULIC SAFETY

When installing or servicing a hydraulic system or hydraulic components, be aware that hydraulic fluid may be extremely hot and under high pressure. Caution must be exercised.

- Always wear appropriate personal protective equipment when installing or servicing hydraulic systems.
- Never attempt to open or work on a hydraulic system with the implement running.
- Any work performed on the hydraulic system must be done in accordance with the machine manufacturer's approved maintenance instructions.
- Care should always be taken when servicing or opening a system that has been pressurized.
- The implement or machine must remain stationary and switched off with booms or implement sections unfolded and supported during installation or maintenance.
- Take precautions to prevent foreign material or contaminants from being introduced into the implement's hydraulic system. Contaminants that are able to bypass the hydraulic filtration system will reduce performance and may damage hydraulic components.
- Stand clear of the implement when starting the system for the first time after installing or servicing hydraulic components in case a hose has not been properly connected or tightened.

To avoid tripping and entanglement hazards, route cables and harnesses away from walkways, steps, grab bars, and other areas used by the operator or service personnel when operating or servicing the equipment.

CAUTION

ELECTRICAL SAFETY

- Always verify that power leads are connected to the correct polarity as marked. Reversing the power leads could cause severe damage to the Raven system or other components.
- To prevent personal injury or fire, replace defective or blown fuses with only fuses of the same type and amperage.
- Do not connect the power leads to the battery until all system components are mounted and all electrical connections are completed.
- To avoid tripping and entanglement hazards, route cables and harnesses away from walkways, steps, grab bars, and other areas used by the operator or service personnel when operating or servicing the equipment.

RECOMMENDATIONS AND BEST PRACTICES

HOSE ROUTING

The word “hose” is used to describe any flexible, fluid carrying components. Use the following guidelines and recommendations when connecting and routing hoses while installing or maintaining this Raven system:

- Leave protective caps/covers over hose ends until connecting the end into the hydraulic system to help prevent contaminants from entering the system.
- Follow existing hose runs already routed on the implement as much as possible. Proper hose routing should:
 - Secure hoses and prevent hoses from hanging below the implement.
 - Provide sufficient clearance from moving components and operational zones around shafts; universal joints and suspension components; pulleys, gears, belts, and chains; moving linkages, cylinders, articulation joints, etc.
 - Protect hoses from field debris and surrounding hazards (e.g. tree limbs, fence posts, crop stubble, dirt clumps or rocks that may fall or be thrown by the implement).
 - Protect hoses from sharp bends, twisting, or flexing over short distances and normal implement operation.
 - Ensure sufficient length for free movement of the implement during normal operation and prevent pulling, pinching, catching, or rubbing, especially in articulation and pivot points. Clamp hoses securely to force controlled movement of the hose.
 - Avoid abrasive surfaces and sharp edges such as sheared or flame cut corners, fastener threads or cap screw heads, hose clamp ends, etc.
 - Avoid areas where the operator or service personnel might step or use as a grab bar.
- Do not connect, affix, or allow hoses to come into contact with components with high vibration forces, hot surfaces, or components carrying hot fluids beyond the temperature rating of hose components.
 - Hoses should be protected or shielded if routing requires the hose to be exposed to conditions beyond hose component specifications.
- Avoid routing hoses in areas where damage may occur due to build up of material (e.g. dirt, mud, snow, ice, etc.).

WIRE ROUTING

The word “harness” is used to describe any electrical cables and leads, both bundled and unbundled. Use the following guidelines and recommendations when connecting and routing harnesses while installing or maintaining this Raven system:

- Leave protective caps/covers over harness connectors until needed to avoid dirt and moisture from contaminating electrical circuits.
- Secure the harness to the frame or solid structural members at least every 12 in [30 cm].
- Follow existing harness runs already routed on the implement as much as possible. Proper harness routing should:
 - Secure harnessing and prevent the harness from hanging below the implement.
 - Provide sufficient clearance from moving components and operational zones around shafts; universal joints and suspension components; pulleys, gears, belts, and chains; moving linkages, cylinders, articulation joints, etc.
 - Protect harnessing from field debris and surrounding hazards (e.g. tree limbs, fence posts, crop stubble, dirt clumps or rocks that may fall or be thrown by the implement).

- Protect harnessing from sharp bends, twisting, or flexing over short distances and normal implement operation.
- Connectors and splices should not be located at bending points or in harness sections that move.
- Ensure sufficient length for free movement of the implement during normal operation and prevent pulling, pinching, catching, or rubbing, especially in articulation and pivot points. Clamp harnessing securely to force controlled movement of the harness.
- Avoid abrasive surfaces and sharp edges such as sheared or flame cut corners, fastener threads or cap screw heads, hose clamp ends, etc.
- Do not connect, affix, or allow harnessing to come into contact with components with high vibration forces, hot surfaces, or components carrying hot fluids beyond the temperature rating of harness components.
 - Harnessing should be protected or shielded if routing requires the hose to be exposed to conditions beyond harnessing component specifications.
- Avoid routing harnesses in areas where damage may occur due to build up of material (e.g. dirt, mud, snow, ice, etc.).
- Avoid routing harnesses in areas where the operator or service personnel might step or use as a grab bar.

IMPORTANT: Avoid applying direct spray or pressure washing of electrical components and connections. High pressure streams and sprays can penetrate seals, cause corrosion, or otherwise damage electrical components.
When performing maintenance:

- Inspect electrical components and connectors for corrosion, damaged pins or housings, etc. Repair or replace components or harnessing as necessary.
- Ensure connectors are kept clean and dry. Apply dielectric grease to the sealing surfaces of all connections exposed to moisture, dirt, debris, and other contaminants. Repair or replace harnessing as necessary.
- Clean electrical components with pressurized air, aerosol electrical cleaning agent, or low pressure rinse.
- Remove visible surface water from electrical components and connections using pressurized air or an aerosol cleaning agent. Allow components to dry thoroughly before reconnecting cables.

CHAPTER

INTRODUCTION

2

Thank you for purchasing the Unverferth UHarvest™ Pro grain cart data management system.

The UHarvest Pro system is designed to interface with a grain cart to monitor and record harvest data. The system is capable of tracking grower, farm, and field data in addition to crop variety, truck identification, and destination. UHarvest Pro connects to the existing tractor ISOBUS universal terminal, reducing the need for another display in the cab. Harvest data then can be transferred using a mobile app.

This manual provides information on operating the UHarvest Pro system. For installation of components on the grain cart, refer to the Unverferth website

www.uharvest.net.

PRODUCT REGISTRATION

Register this product at the Unverferth website to receive alerts about software, hardware, and other updates.

www.uharvest.net.

UNIVERSAL TERMINAL OVERVIEW

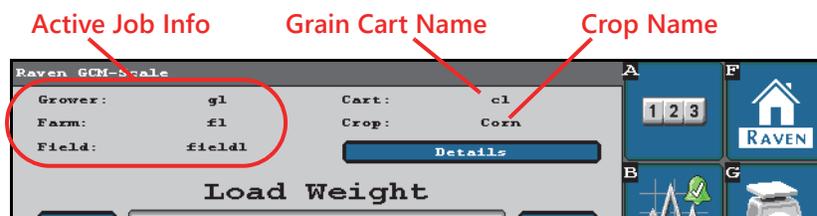
1. Locate the UHarvest Pro working set in the universal terminal menu.

FIGURE 1. UHarvest Pro Working Set Menu



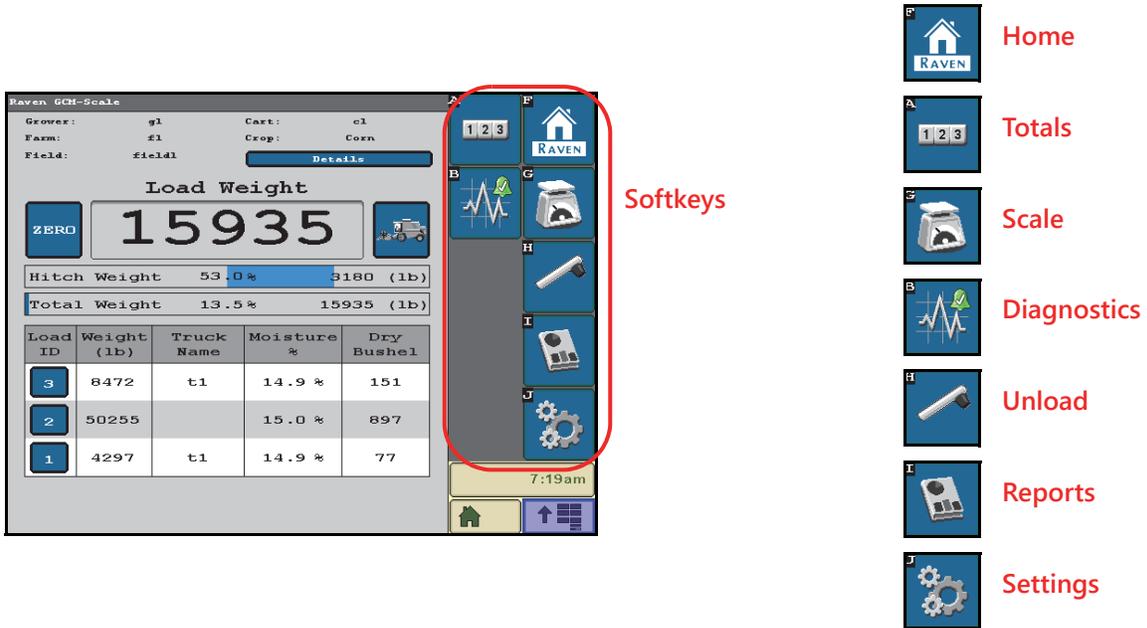
2. The header (shown at the top of the UHarvest Pro Scale, Unload, and Reports pages) provides a summary of the active job.

FIGURE 2. UHarvest Pro Header



3. The softkey buttons along the right side of the display may be used to navigate between various UHarvest Pro pages.

FIGURE 3. UHarvest Pro Softkeys

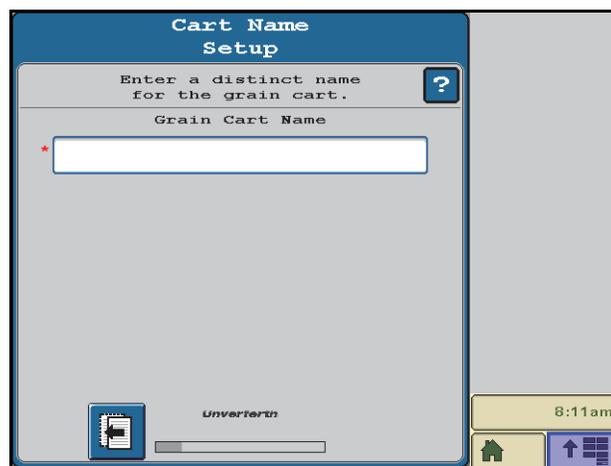


INITIAL CALIBRATION WIZARD

Complete the following steps to complete the initial calibration of the UHarvest Pro system:

1. Enter a name for the grain cart.

FIGURE 1. Enter Cart Name



2. Touch the **Next** button.
3. Enter the grain cart storage capacity in bushels [kilograms].

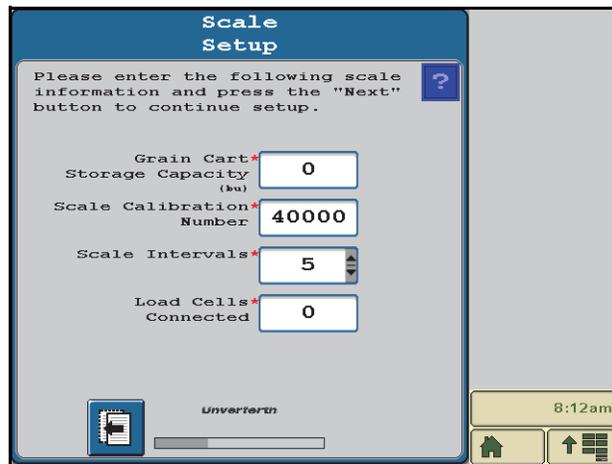
NOTE: UHarvest Pro will use the same units which are configured in the universal terminal. Check the universal terminal settings to apply the desired units to UHarvest Pro.

4. Enter the scale calibration number.

NOTE: The default value of 40,000 is a common calibration number. Refer to Chapter 14, *Calibration Numbers*, for a table of grain cart models and suggested starting calibration values.

5. Select the desired scale weight intervals from the drop down menu.
6. Enter the number of load cells installed on the grain cart.

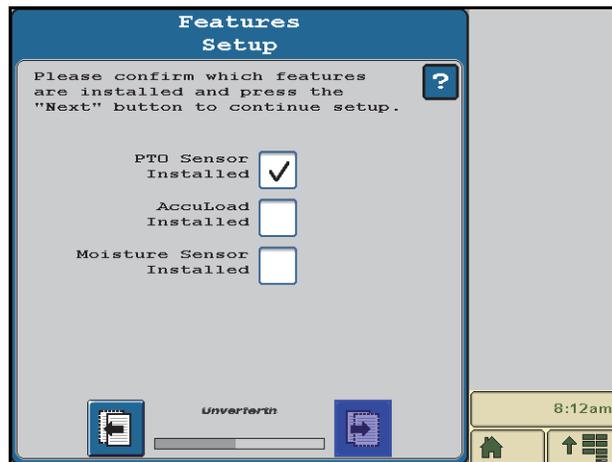
FIGURE 2. Scale Setup Page



7. Touch the **Next** button.
8. Use the check box options to select features which are installed on the grain cart (e.g. PTO Sensor, AccuLoad, and Moisture Sensor).

NOTE: The AccuLoad feature cannot be used unless a PTO sensor is installed.

FIGURE 3. Feature Setup



9. Touch the **Next** button.
10. If the AccuLoad option is enabled, enter the AccuLoad setup information.

NOTE: If AccuLoad is not enabled, skip to step 14.

FIGURE 4. AccuLoad Setup

AccuLoad Setup

Please enter the following AccuLoad information and press the "Next" button to continue setup.

Gate Open Time* (sec)

Gate Close Time* (sec)

Gate Open Percentage* (%)

Minimum PTO Speed* (rpm)

Note: To operate AccuLoad, the system must be placed into Auto mode and the appropriate tractor hydraulic lever should be positioned to open the gate.

Uninvertin

8:48am

AccuLoad Setup

Please enter the following weight deltas and press the "Next" button to continue setup.

	Weight Delta (lb)	Percent Open
Step 1*	<input type="text" value="5000"/>	<input type="text" value="75"/>
Step 2*	<input type="text" value="3000"/>	<input type="text" value="50"/>
Step 3*	<input type="text" value="1500"/>	<input type="text" value="25"/>
Step 4*	<input type="text" value="500"/>	<input type="text" value="0"/>

Note: Weight delta is the difference from the target unload weight to initiate the gate closing sequence.

Uninvertin

8:48am

Gate Open Time. The amount of time it takes to fully open the grain cart flow door using manual hydraulic control from the tractor.

Gate Close Time. The amount of time it takes to fully close the grain cart flow door using manual hydraulic control from the tractor.

Gate Open Percentage. How far AccuLoad should open the gate.

Minimum PTO Speed. AccuLoad will not open the gate until the PTO speed is above this value. If the operational speed dips below this value, AccuLoad will close the gate.

11. Touch the **Next** button.

12. If the AccuLoad option is enabled, enter the weight deltas, or differences.

When AccuLoad is operating, the system will open the gate to the set open position and, as the unload operation continues, the system will close the gate in four steps, based upon the entered weight delta values, as the unloaded weight approaches the target weight.

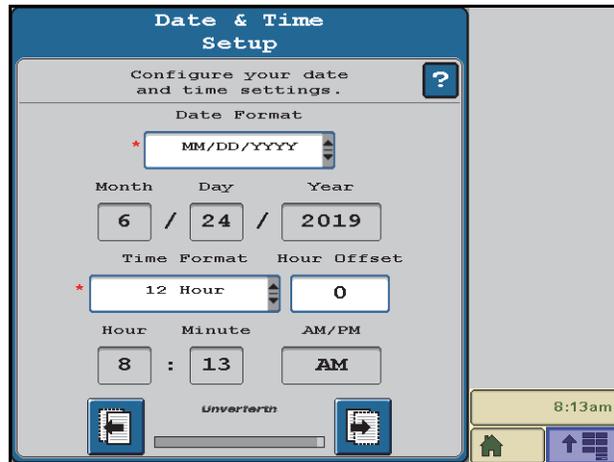
13. Touch the **Next** button.

14. Confirm the date and time detected from the universal terminal.

- If the values are not editable (grayed out), UHarvest Pro has received date and time information from the UT. Edit the format or enter a time zone offset as needed.
- If the date and time values are editable, set the values accordingly.

NOTE: UHarvest Pro does not have a power source to maintain clock settings when the tractor is turned off. The date and time will need to be reset periodically if the UT does not provide that information to the UHarvest Pro system.

FIGURE 5. Date and Time Setup



15. Touch the **Next** button.
16. Review the setup summary screen.

NOTE: Touch the **Back** button to change or edit settings if necessary.

FIGURE 6. Wizard Summary



17. Touch the **Next** button to complete the initial setup and view the UHarvest Pro home page.

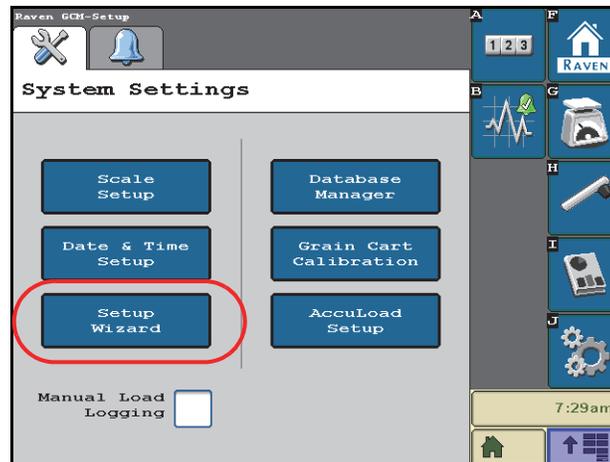
NOTE: The setup wizard may be repeated if the grain cart configuration changes (e.g. adding a moisture sensor for the first time, etc.).

RESTART THE INITIAL SETUP WIZARD

The Initial Setup Wizard may be used at any time after the initial calibration is complete to change grain cart feature settings (e.g. adding a moisture sensor to an existing UHarvest Pro system) without modifying any database names or job records.

1. Select the Settings softkey.
2. Select Setup Wizard. Review the *Initial Calibration Wizard* section on page 7 for assistance with completing the setup wizard.

FIGURE 7. Setup Wizard in Settings Menu



GROWER, FARM, FIELD NAMES

UHarvest Pro saves grain cart load data in a job file based on a Grower/Farm/Field (GFF) naming structure. Within this structure, Field files are stored within a Farm, and the Farm files are stored within a Grower. Grower/Farm/Field names and assignments can be entered on the Database Manager page. The Database Manager can also be used to enter Truck, Destination, and Variety names as well as to create custom Crop types.

FIGURE 1. Database Manager Page



To create new Grower, Farm, or Field names:

1. Either touch the “Start New Job” button from the Home page or select the Settings softkey icon.
2. Select Database Manager.
3. Touch the Add (plus) button to the right of the Grower Name field to add a new Grower. Enter the grower name and touch the Accept button to save it.

NOTE: Repeat step 3 to add more Grower names as needed. UHarvest Pro supports up to 50 Grower names.

4. To add Farm information to the new Grower, use the drop down menu to select the desired Grower name.
5. Touch the Add button to the right of the Farm Name field to add a new Farm within the selected Grower. Enter the name and touch the Accept button to save it.

NOTE: Repeat step 5 to add more Farm names as needed. UHarvest Pro supports up to 50 Farm names per Grower (maximum of 500 Farms for the system but no more than 50 Farms per Grower).

6. To add Field information to a particular Farm, use the drop down menu to select the desired Grower and Farm names.

7. Touch the Add button to the right of the Field name. Enter the name and press the check mark button to save it. Optionally, a field detail value (Ex. tract ID number) and the field size may be entered.

NOTE: Repeat step 7 to add more Field names as needed. UHarvest Pro supports up to 50 Field names per Farm (maximum of 1000 Fields for the system but no more than 50 Fields per Farm).

To edit Grower, Farm, Field (GFF) information:

1. Use the Database Manager page to select the Grower, Farm, or Field name to be edited.
2. Touch the Edit (pencil) button to the right of the name to be edited.
3. Edit the information and touch the Accept button to save the change.

To delete Grower, Farm, or Field information:

1. Use the Database Manager page to select the Grower, Farm, or Field name to be removed.
2. Touch the Delete (trash can) button.

FIGURE 2. Delete GFF Information



- To delete a single item, press the Accept button in the lower, right corner of the page. Confirm the operation to delete the selected information to proceed.
- To delete all of the items in a family (e.g. all of the Farms within a single Grower), select the check box next to the Delete All option and then press the Accept button. Confirm the operation to delete the selected information to proceed.

NOTE: Deleting a name will also delete any other names belonging to it. For example, deleting the Grower name will also delete all Farms and Fields classified under that particular Grower name.

IMPORTANT: Deleting a name will also delete any jobs that are saved under that name. Make sure data is backed up before deleting names.

TRUCK AND DESTINATION NAMES

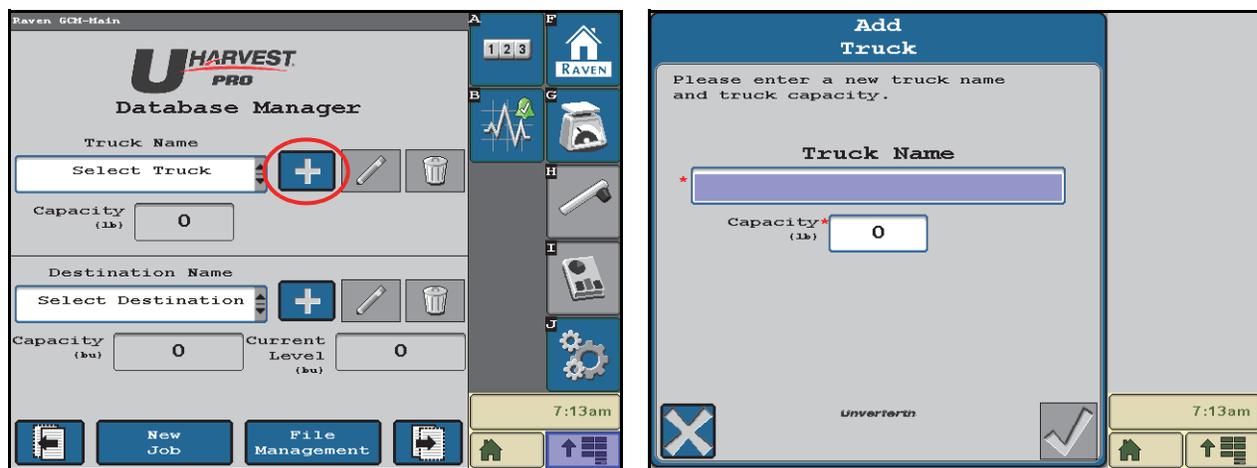
UHarvest Pro may be used to track which trucks were used to haul grain away from the field and which destinations (e.g. bin or elevator) are storing the grain.

To view truck and destination database information:

1. Either touch the "Start New Job" button from the Home page or select the Settings softkey icon.
2. Select Database Manager.
3. In the Database Manager, press the arrow in the lower, right corner of the page to view the Truck Name and Destination Name page.

TRUCK NAMES

FIGURE 3. Add Truck



To add new truck names:

1. Touch the Add (plus) button to add a new name.
2. On the Add Truck page, enter the name and capacity of the truck.

NOTE: If English units are in use, the truck capacity is entered in pounds.

3. Touch the Accept button to save the new truck.

NOTE: Repeat adding Truck names as needed. UHarvest Pro supports up to 50 Truck names.

To edit truck names:

1. Use the Database Manager page to select the truck name to be edited.
2. Touch the Edit (pencil) button to the right of the name to be edited.
3. Edit the information and press the Accept button to save the change.

To delete a truck from the database:

1. Use the Database Manager page to select the truck name to be edited.
2. Touch the Delete (trash can) button.
 - To delete a single item, press the Accept button in the lower, right corner of the page. Confirm the operation to delete the selected information to proceed.
 - To delete all trucks, select the check box next to the Delete All option and then press the Accept button. Confirm the operation to delete the selected information to proceed.

DESTINATION NAMES

FIGURE 4. Add Destination



To add new destination names:

1. Touch the Add (plus) button to add a new name.
2. On the Add Destination page, enter the name of the destination.
3. Optionally, enter the capacity of the Destination. If English units are being used, the Destination capacity is in bushels.
4. After entering the name and capacity, press the check mark button to save the new Destination.
5. Touch the Accept button to save the new destination.

NOTE: Repeat adding destination names as needed. UHarvest Pro supports up to 100 destination names.

To edit a destination:

1. Use the Database Manager page to select the destination name to be edited.
2. Touch the Edit (pencil) button to the right of the name to be edited.
3. Edit the information and press the Accept button to save the change.

To delete a destination from the database:

1. Use the Database Manager page to select the destination to be edited.
2. Touch the Delete (trash can) button.
 - To delete a single item, press the Accept button in the lower, right corner of the page. Confirm the operation to delete the selected information to proceed.
 - To delete all destinations, select the check box next to the Delete All option and then press the Accept button. Confirm the operation to delete the selected information to proceed.

CUSTOM CROP AND VARIETY NAMES

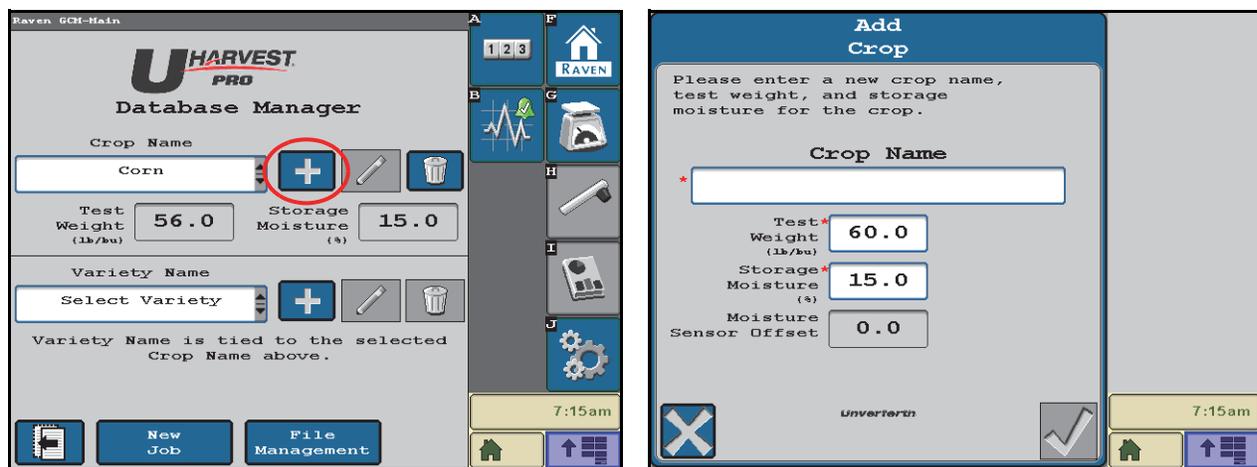
UHarvest Pro provides a database of 17 crop types as well as 3 custom crop types that may be modified by the operator. UHarvest Pro can also track crop varieties harvested.

To view crop type and variety database information:

1. Either touch the "Start New Job" button from the Home page or select the Settings softkey icon.
2. Select Database Manager.
3. In the Database Manager, touch the arrow in the lower, right corner of the page twice to view the Crop and Variety page.

CUSTOM CROP NAMES

FIGURE 5. Add Custom Crop



To add new crop names:

1. Touch the Add (plus) button to add a new name.
2. On the Add Crop page, enter the name of the crop.
3. Enter the test weight for the crop.

NOTE: If English units are being used, this will be in pounds per bushel (lb/bu). This value will be used to convert weight into volume.

4. Enter the storage moisture for the crop. This value will be used to convert wet volume to dry volume.
5. Touch the Accept button to save the new crop information.

To edit custom crop information:

1. Use the Database Manager page to select the custom crop name to be edited.
2. Touch the Edit (pencil) button to the right of the name to be edited.
3. Edit the information and press the Accept button to save the change.

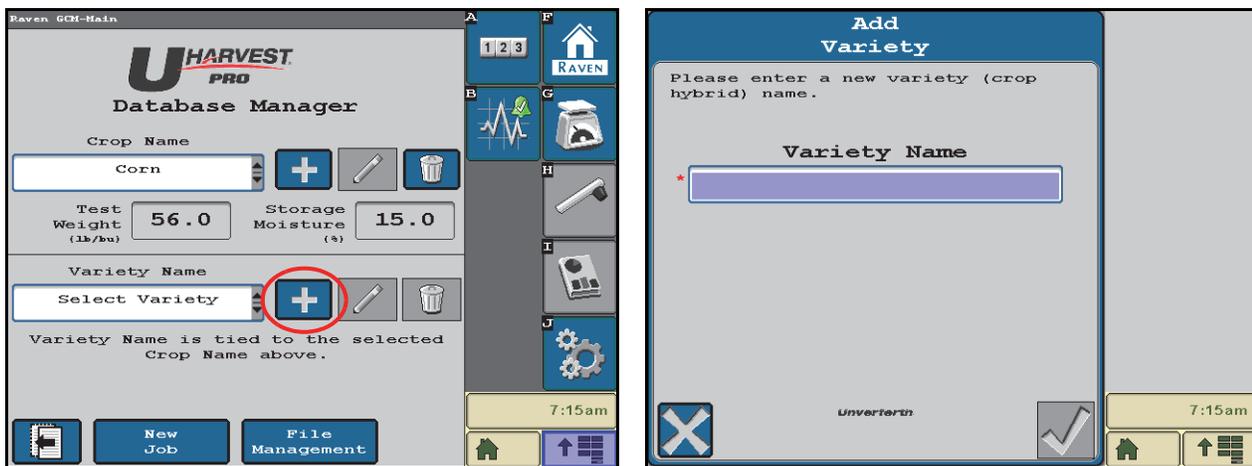
To delete:

1. Use the Database Manager page to select the crop to be edited.
2. Touch the Delete (trash can) button.
 - To delete a single item, press the Accept button in the lower, right corner of the page. Confirm the operation to delete the selected information to proceed.
 - To delete all custom crops, select the check box next to the Delete All option and then press the Accept button. Confirm the operation to delete the selected information to proceed.

NOTE: Only the custom crop names will be deleted. The default crop type names will not be removed.

VARIETY NAMES

FIGURE 6. Add Variety



To add new variety names:

1. Select the crop type for the Variety names that will be entered.

NOTE: The Variety names are linked to the Crop selection. For example, only corn varieties will be shown for a job where corn is selected as the crop type.

2. Touch the Add (plus) button to add a new Variety name.
3. Enter the name of the Variety.
4. Press the check mark button to save the new Variety.
5. Repeat adding Variety names as needed.

NOTE: UHarvest Pro supports up to 100 Variety names.

To edit variety information:

1. Use the Database Manager page to select the variety name to be edited.
2. Touch the Edit (pencil) button to the right of the name to be edited.
3. Edit the information and press the Accept button to save the change.

To delete varieties:

1. Use the Database Manager page to select the variety name to be edited.
2. Touch the Delete (trash can) button.
 - To delete a single item, press the Accept button in the lower, right corner of the page. Confirm the operation to delete the selected information to proceed.
 - To delete all varieties, select the check box next to the Delete All option and then press the Accept button. Confirm the operation to delete the selected information to proceed.

DATABASE TRANSFERS

NOTE: The universal terminal must support the ISO File Server protocol to allow transfer of the UHarvest Pro database.

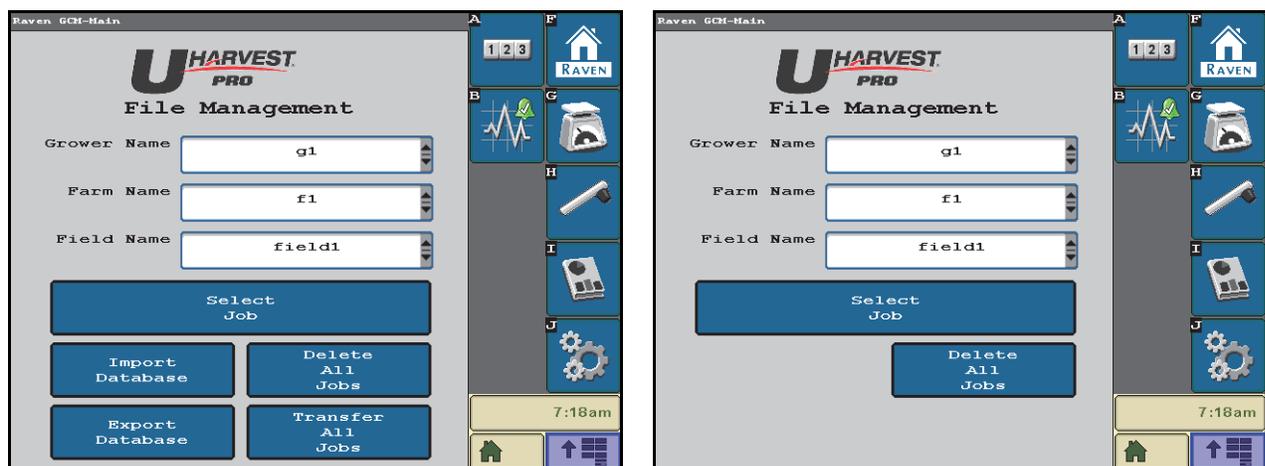
The UHarvest Pro database (i.e. Grower, Farm, Field, Truck, Destination, Crop, and Variety information) may be copied from one UHarvest Pro system to another.

To determine whether the universal terminal supports ISO File Server:

1. Go to the UHarvest Pro home screen and then select File Management.
2. Look for "Import Database", "Export Database", and "Transfer All Jobs" buttons.
 - If the buttons are available, the universal terminal supports ISO File Server.
 - If the buttons are not available, the universal terminal does not support ISO File Server.

NOTE: On newer John Deere displays, the ISO File Server feature has an on/off setting. It may be necessary to turn the ISO File Server feature on.

FIGURE 7. ISO File Server Detection



To copy the database from one UHarvest Pro to another:

1. On the first UHarvest Pro system, the system with the database entries to be copied, insert a USB flash drive into the USB port on the display.

NOTE: Ignore any messages on the universal terminal about importing or exporting with the USB port.

2. Navigate to the UHarvest Pro home page and select the File Management button.
3. Select the Export Database button.

NOTE: On older John Deere displays, the database file is now available on the USB flash drive (or memory card on even older displays). On newer John Deere displays, additional steps are required:

- a. Navigate to the file management screen for the display (not the UHarvest Pro File Maintenance page).
 - b. Use the "Export All" option to copy the display data to the flash drive. This will include the UHarvest Pro database.
4. Once the database has been copied from the first UHarvest Pro system, insert the flash drive into the universal terminal of the second UHarvest Pro system.

NOTE: Again, ignore any messages on the universal terminal about importing or exporting with the USB port.

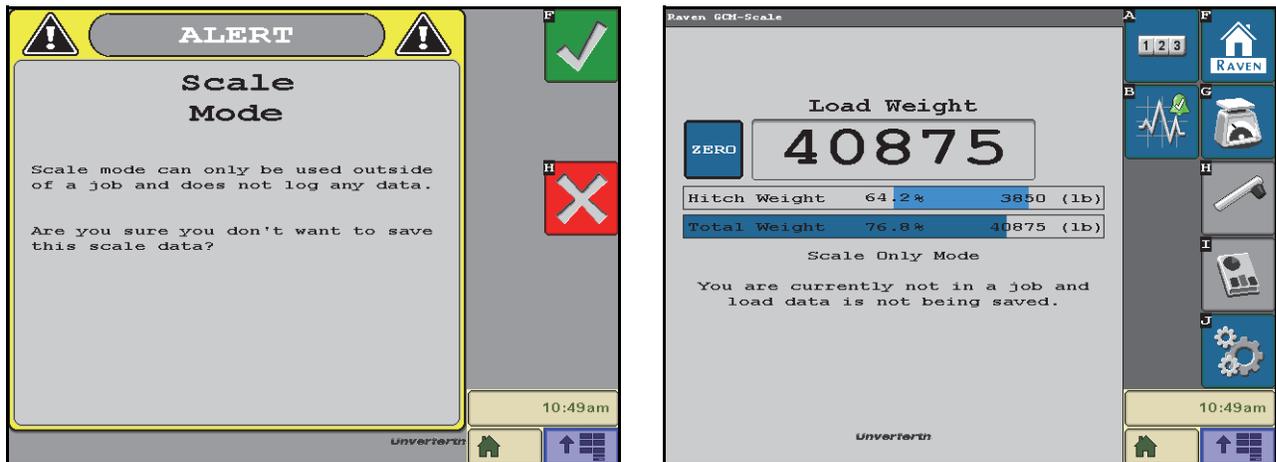
5. Navigate to the UHarvest Pro home screen and select the File Management button.
6. Select the Import Database button.

BASIC SCALE MODE

Touch the Scale softkey after startup to access the Basic Scale.

The scale reading is available without starting a job, but UHarvest Pro will not save load records unless a job is active. A warning will be displayed as a reminder that load data will not be saved.

FIGURE 1. Basic Scale Mode

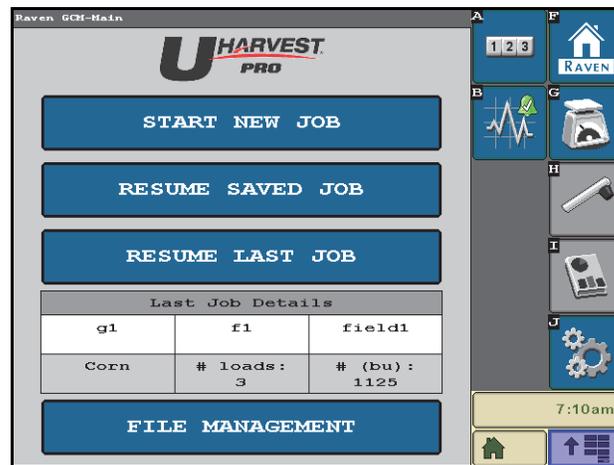


UHARVEST PRO JOBS

UHarvest Pro has three different methods for starting a job:

- *Start a New Job*
- *Resume a Saved Job*
- *Resume the Last Job*

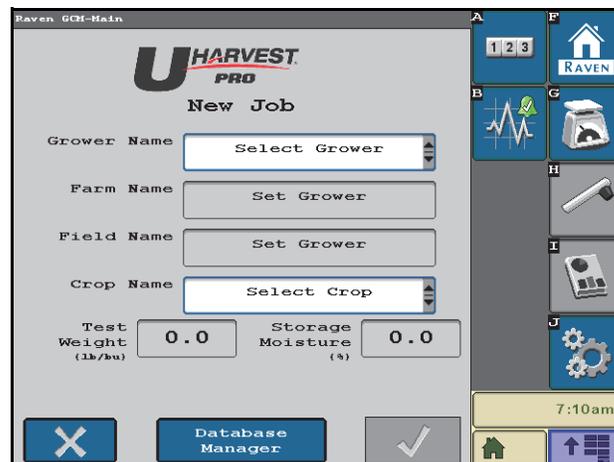
FIGURE 2. UHarvest Pro Home Page



START A NEW JOB

1. From the Home page, touch the Start New Job button.
2. Use the drop down selections to select the Grower/Farm/Field for the job.

FIGURE 3. Start New Job



3. Use the drop down to select the Crop type.
4. Touch the check mark button to begin the job. The Scale page will be displayed.

RESUME A SAVED JOB

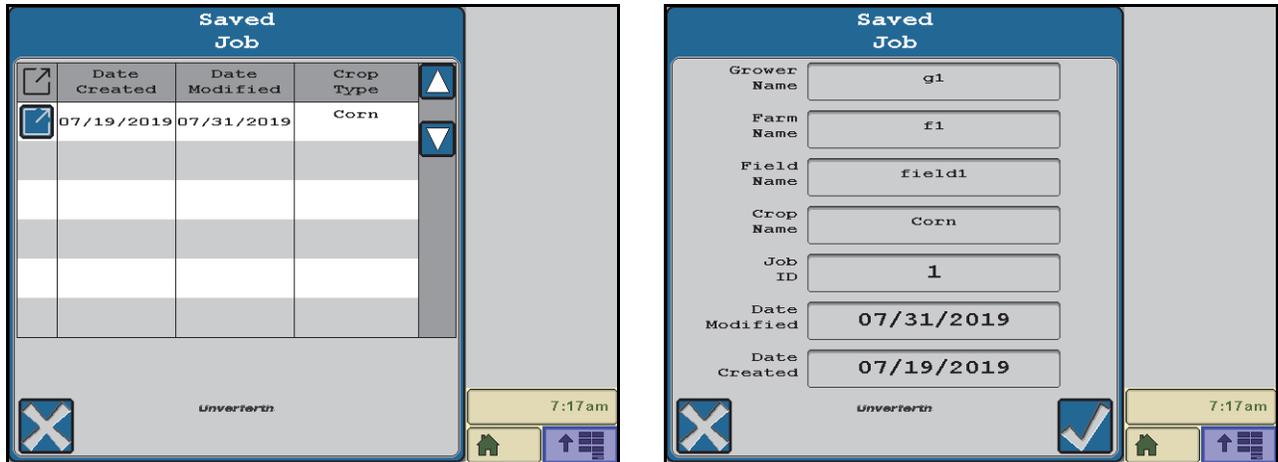
1. From the Home screen, touch the Resume Saved Job button.
2. Use the drop down selections to select the Grower/Farm/Field for the job.

FIGURE 4. Resume Saved Job



3. Touch the Select Job button.
4. Review the saved jobs available for the selected Grower/Farm/Field.

FIGURE 5. Resume Saved Job

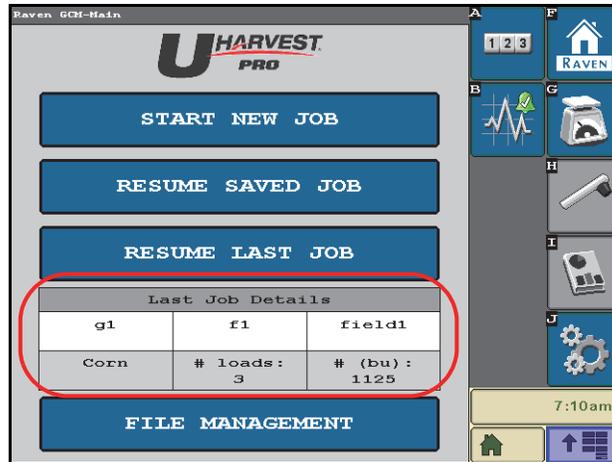


5. Touch the blue button along the left of the display to view more information about the job.
6. Touch the check mark button to resume the selected job. The Scale page will be displayed.

RESUME THE LAST JOB

1. Review the Last Job Details information shown toward the bottom of the page. This shows the Grower, Farm, Field, Crop, total number of loads, and total volume for the most recent UHarvest Pro job.

FIGURE 6. UHarvest Pro Home Page



2. Touch the Resume Last Job button to open the job described in the table.

NOTE: The “Last Job” is the job that was active when power was removed from the UHarvest Pro system. The Resume Last Job button is ideal for quickly resuming the same job if the tractor was shut down while harvesting the field.

FILE MANAGEMENT AND JOB DATA TRANSFER

Completed job and grain cart data may be transferred from the UHarvest Pro system to a home or office PC for further analysis and record keeping. Jobs and data may be transferred via the following methods:

- ISO File Server
- Mobile App

ISO FILE SERVER

If the universal terminal supports the ISO File Server feature, UHarvest Pro jobs can be transferred to a USB flash drive using the universal terminal USB port.

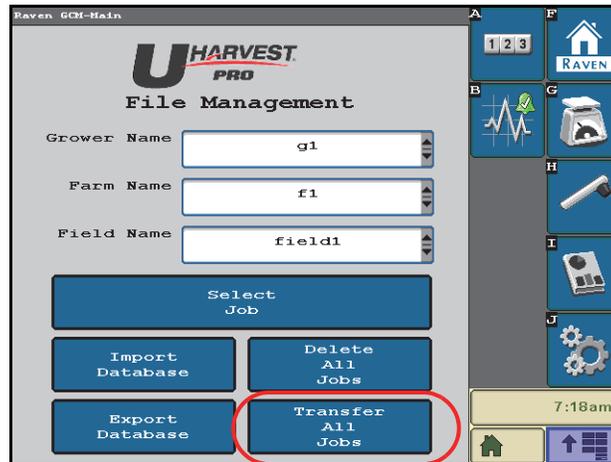
NOTE: On newer John Deere displays, the ISO File Server feature has an on/off setting. It may be necessary to turn the ISO File Server feature on.

TRANSFER ALL JOBS

1. Touch the Home softkey and then select the File Management button.
2. Touch the Transfer All Jobs button.

NOTE: If the Transfer All Jobs button is not available, the UT does not support the ISO File Server feature.

FIGURE 7. Transfer All Jobs



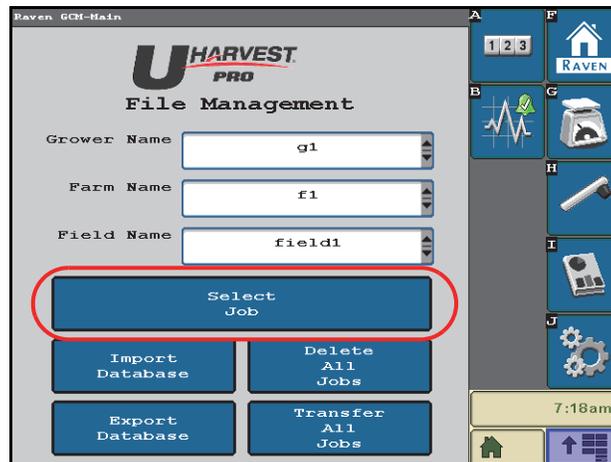
3. UHarvest Pro will begin transferring job data to a connected USB flash drive. Allow the transfer to complete and touch the Accept softkey to resume operation.

NOTE: On newer John Deere displays, it may be necessary to navigate to the universal terminal file management screen after performing the export from the UHarvest Pro. Use the Export All option to copy data, including the UHarvest Pro job files, to a connected USB flash drive.

TRANSFER SPECIFIC JOBS

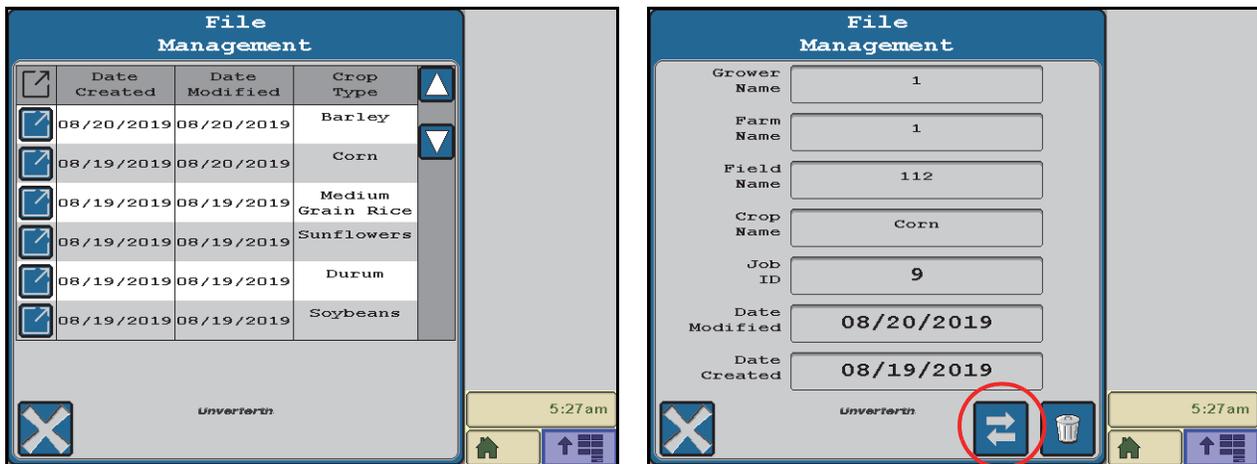
1. Touch the Home softkey and then select the File Management button.
2. Use the drop down selections to select the desired Grower/Farm/Field.
3. Touch the Select Job button.

FIGURE 8. Transfer Jobs



4. Review the saved jobs available for the selected Grower/Farm/Field.
5. Touch the blue button along the left of the display to view more information about the job.
6. Touch the Transfer button at the bottom of the page to transfer the job file.

FIGURE 9. Transfer a Single Job



NOTE: On newer John Deere displays, it may be necessary to navigate to the universal terminal file management screen after performing the export from the UHarvest Pro. Use the Export All option to copy data, including the UHarvest Pro job files, to a connected USB flash drive.

MOBILE APP

The UHarvest Pro mobile app may be used to transfer job data from the ECU to a Raven Slingshot web account. The app is available for both Apple and Android.

FIGURE 10. UHarvest Pro App



CREATE A SLINGSHOT ACCOUNT

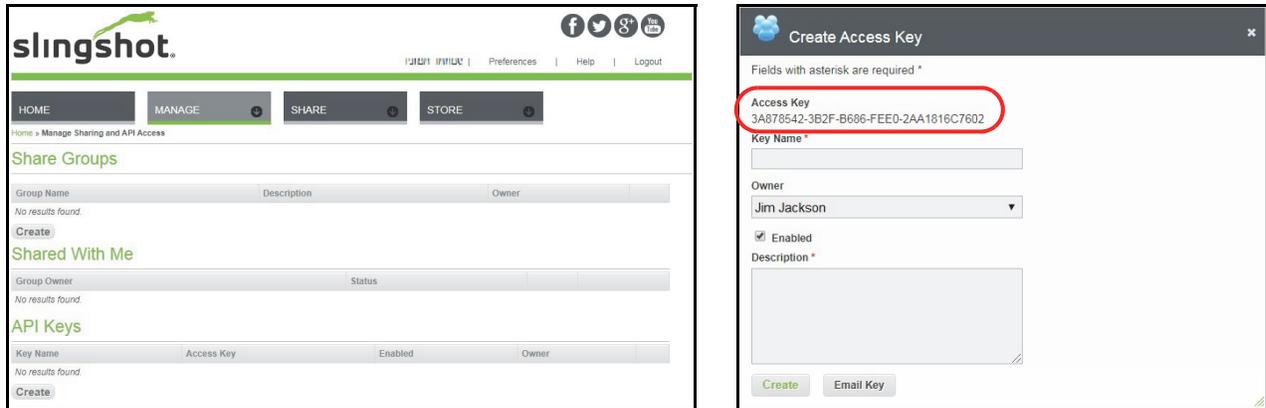
To set up a Slingshot account:

- Using a web browser, open the Slingshot website and select Request Account.
<https://portal.ravenslingshot.com>
- Complete the form and select Submit Request.
- An email will be sent to the address that was submitted with the form. Open the email and follow the link to complete the account registration.
- Create a password and select Submit.

CREATE A SLINGSHOT ACCESS KEY

To create a Slingshot access key:

FIGURE 11. Creating an API Key



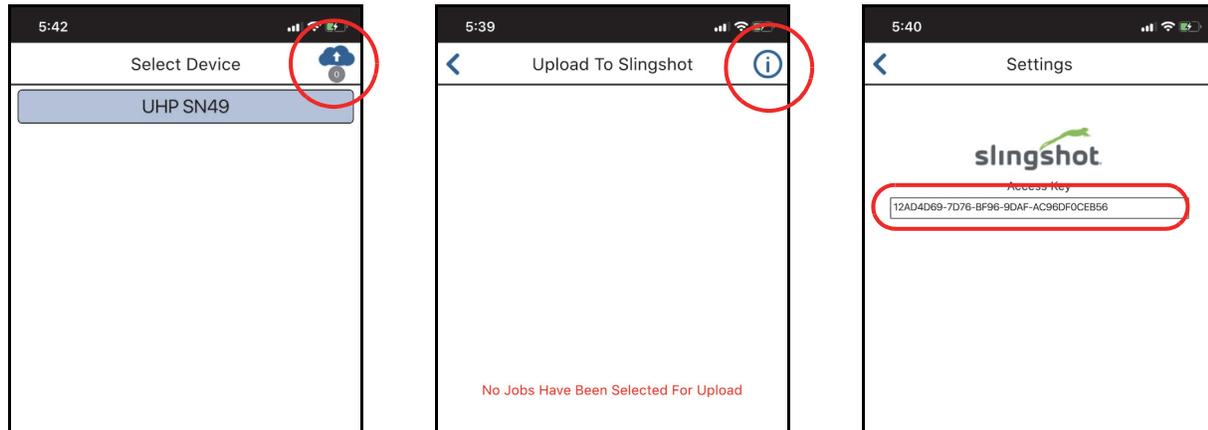
1. Log into the Slingshot account.
2. Select the Share tab along the top of the screen and select API and Data Access Control.
3. In the API Keys section, select Create.
4. Enter a name and description for the key. Ensure to select the Enabled check box for the access key.
5. Select Create to finish the API key.

CONNECT SLINGSHOT WITH THE MOBILE APP

The API key must be entered into the UHarvest Pro mobile app to connect the app with the correct Slingshot account. The API key will be saved in the app and only needs to be entered once.

To connect the Slingshot account with the UHarvest Pro mobile app:

FIGURE 12. Enter the Slingshot Key



1. Launch the UHarvest Pro app on the mobile device.

NOTE: The first time the app is used on the mobile device, the app will request access to the device location services. Select "Always" so the app can continue to transfer data from the ECU even if the mobile device goes to sleep or if another app is used.

2. In the upper, right corner of the screen touch the Cloud icon and then touch the Information icon.
3. Enter the full Slingshot API key exactly as it was shown in the Slingshot account.
4. Touch the back arrow in the upper, left corner of the screen twice to return to the device selection screen.

UPLOAD JOBS

To use the UHarvest Pro app to upload jobs to the Slingshot portal:

1. Launch the UHarvest Pro app.
2. View the list of available devices and select the appropriate UHarvest Pro system to connect to the app.

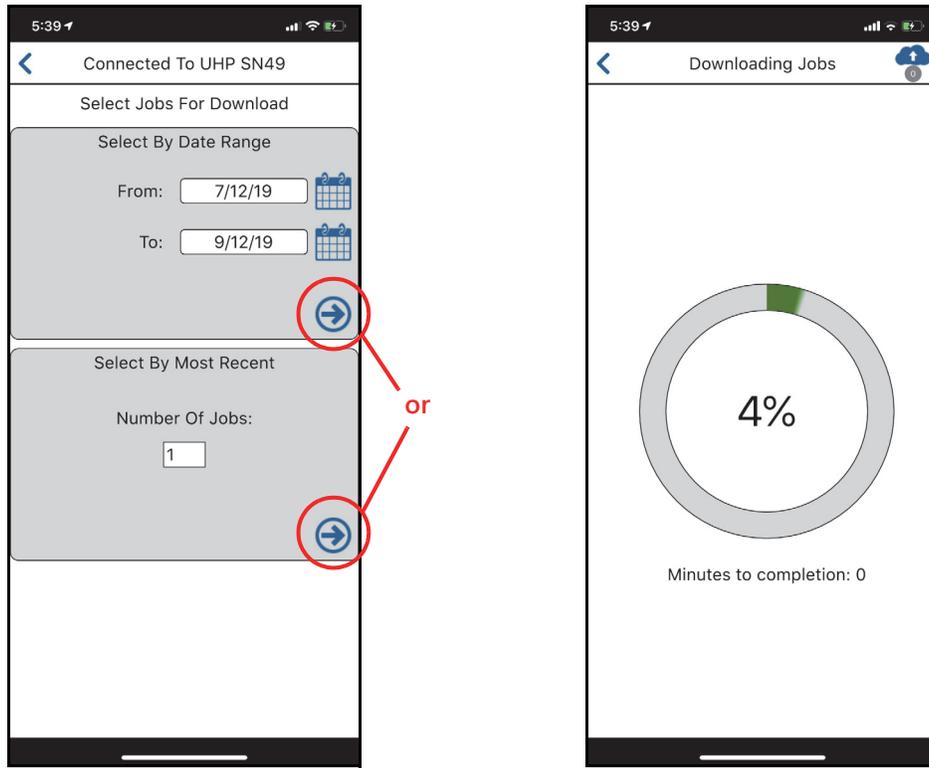
NOTE: The device name shown on the app includes the serial number of the ECU. The serial number can be found on the ECU part number sticker or on the Hardware/Software diagnostics page.

3. A job selection screen will be displayed. Two methods are available:

Select by Date Range: Use the calendar pop up to select the beginning and ending dates. The app will transfer only the UHarvest Pro jobs that were created during this time period.

Select by Most Recent Number of Jobs: Enter the number of UHarvest Pro jobs for the app to transfer, starting with the most recent job.

FIGURE 13. Job Selection and Transfer Progress



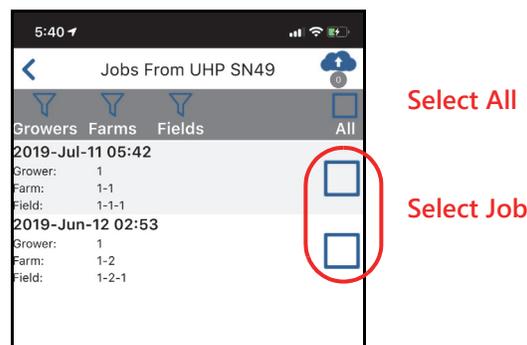
4. After the selection criteria has been entered, touch the arrow corresponding with the desired selection method to download the jobs from the ECU to the mobile app. The app will display a progress indicator while the transfer is in progress.

NOTE: The download duration is directly related to the amount of jobs and loads being transferred. More jobs will take longer to download.

5. Once the download is complete, a list of jobs is displayed. Use the check boxes next to the jobs to select jobs to transfer to Slingshot. To transfer all jobs listed, select the All check box in the upper, right corner.

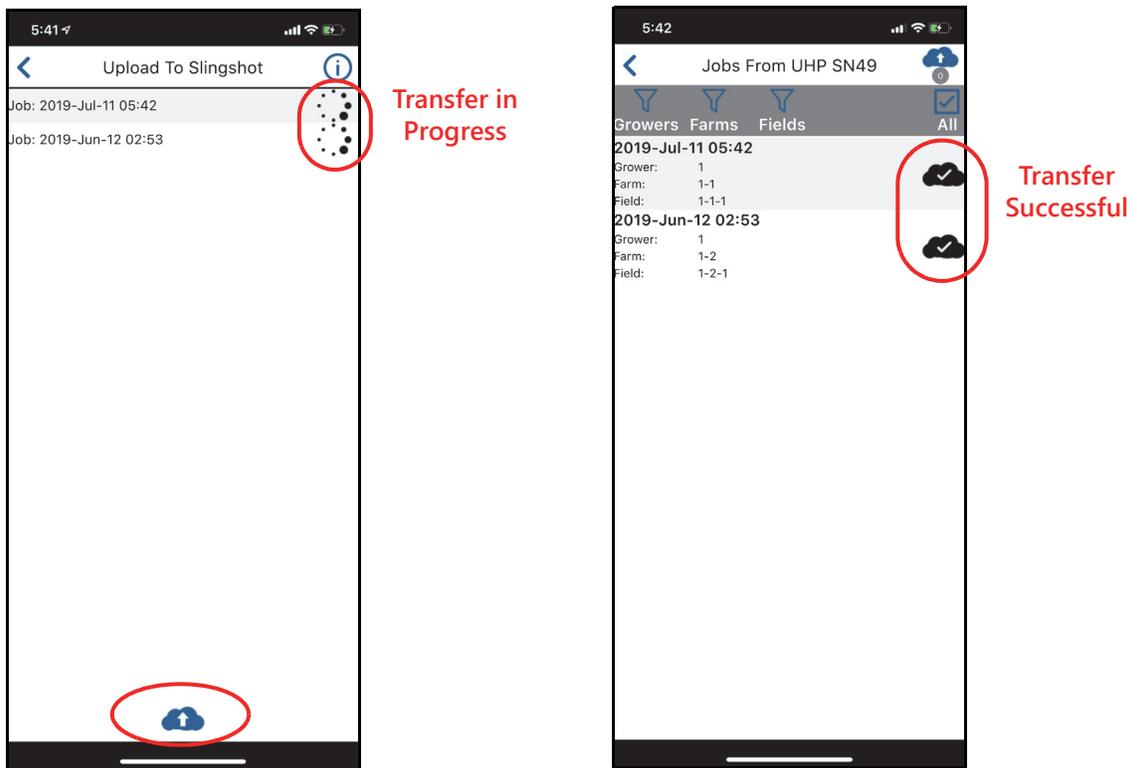
NOTE: Filters are available to narrow the list down to a desired Grower, Farm, and/or Field name.

FIGURE 14. Job List Screen



6. Once the appropriate jobs are selected, touch the cloud icon in the upper, right corner of the screen.
7. The screen will display the list of jobs selected for upload. Touch the cloud icon at the bottom of the screen to send the jobs to Slingshot.

FIGURE 15. Job Transfer and Uploaded



NOTE: As jobs are transferred, the job name will be removed from the list.

8. Touch the back arrow in the upper, left corner of the screen to return to the previous screen. The jobs list will now show a cloud icon next to each job that has been successfully uploaded to Slingshot.

DELETE JOBS

It is necessary to remove jobs from the UHarvest Pro system periodically to make space for new jobs. UHarvest Pro can store a maximum of 1,000 jobs and 10,000 loads.

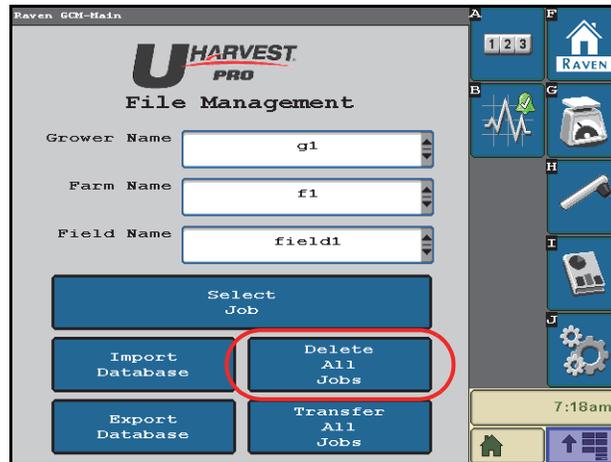
NOTE: Transferring jobs via the ISO File server or the mobile app does not remove jobs and data from the UHarvest Pro ECU.

Individual or multiple jobs can be deleted (e.g. delete last year’s job files prior to harvesting this year’s crop).

DELETE ALL JOBS

1. Touch the Home softkey and then select the File Management button.
2. Touch the Delete All Jobs button.

FIGURE 16. Delete All Jobs

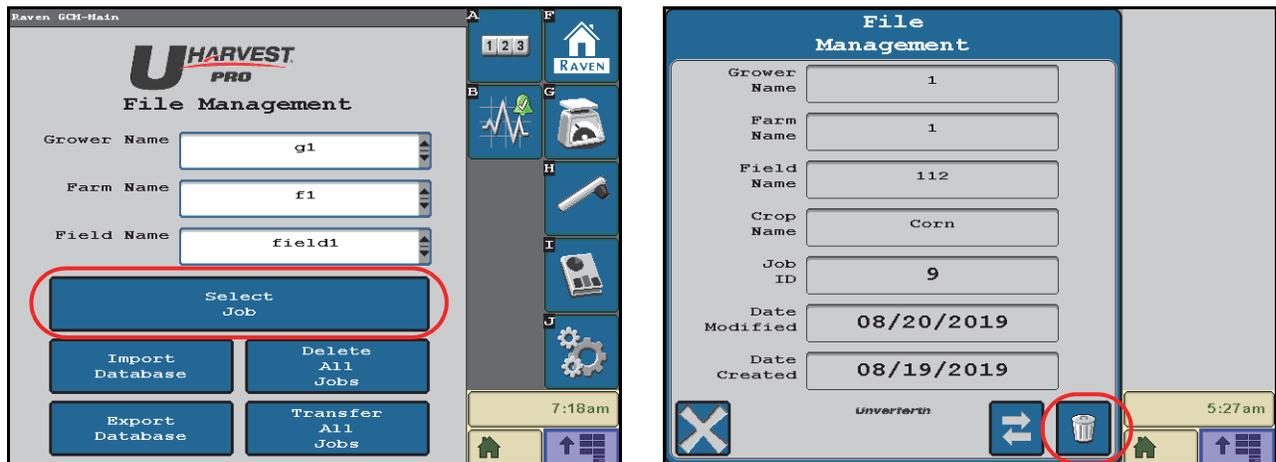


3. When prompted to confirm, touch the Accept key to delete all job information on the UHarvest Pro ECU.

DELETE A SPECIFIC JOB

1. Touch the Home softkey and then select the File Management button.
2. Use the drop down selections to select the Grower/Farm/Field for the job.
3. Press the Select Job button.
4. A list of jobs using that Grower/Farm/Field combination will be displayed. Touch the blue button along the left of the display to view more information about the job.
5. Touch the Delete icon in the lower, right corner of the page to delete the selected job.

FIGURE 17. Delete an Individual Job



ERASE ALL RECORDS

To remove all database names and job records from the UHarvest Pro system without modifying grain cart feature settings such as the scale calibration value (e.g. trading the grain cart and UHarvest Pro):

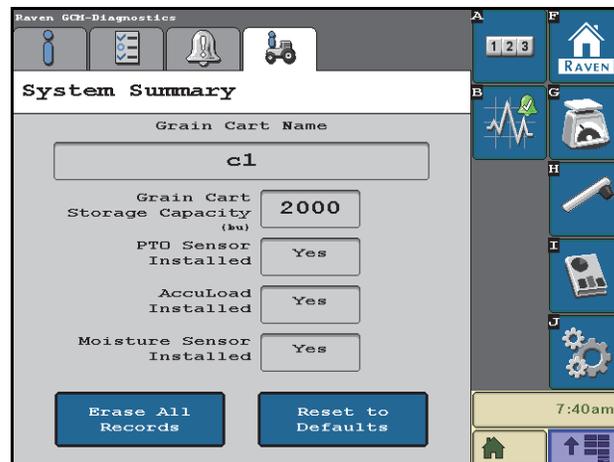
1. Select the Diagnostics softkey.
2. Select the System Summary tab (fourth tab).
3. Touch the Erase All Records button.

RESET TO DEFAULTS

Reset to Defaults may be used to restore the UHarvest Pro ECU to factory settings. This will delete all grain cart settings, all database name entries, and all job records.

1. Select to the Diagnostics softkey.
2. Select the System Summary tab (fourth tab).
3. Touch the Reset to Defaults button.

FIGURE 18. System Summary Tab



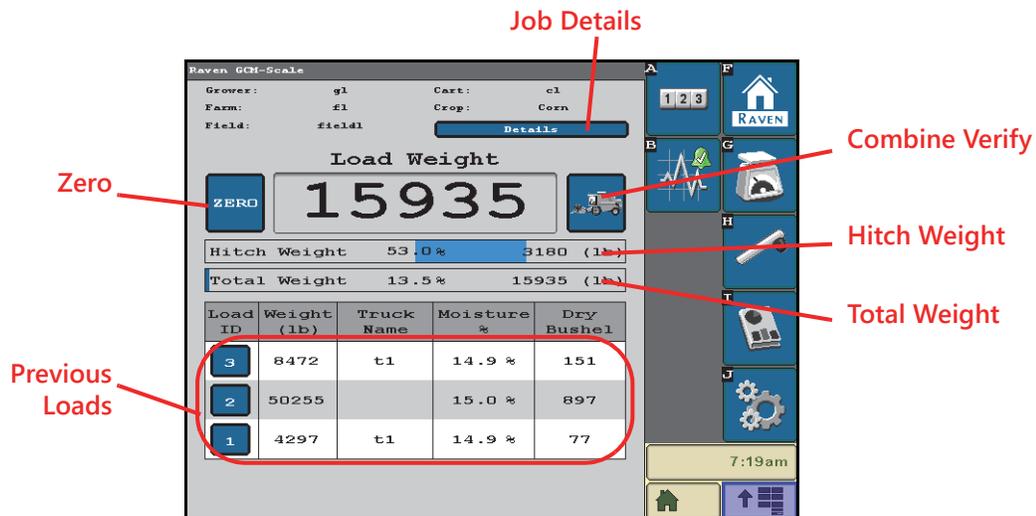
CHAPTER SCALE OPERATION

6

SCALE SCREEN

The scale page is displayed when a job is started or resumed. This page is the primary interface for the cart scale. The scale screen displays total weight, hitch weight, load information, and field totals.

FIGURE 1. Scale Page



Load Weight. The total weight on the grain cart is shown as the Load Weight. It is also shown on the bottom progress bar.

NOTE: 100% on the Total Weight progress bar is equivalent to the grain cart capacity entered in the Setup Wizard, assuming a test weight of 56 lb/bu.

Zero. Touch the Zero button along the left of the display and accept the confirmation prompt to set the Load Weight to zero.

Hitch weight. The weight on the hitch is shown in the top progress bar. 0% will be centered on the progress bar and 6,000 lbs of hitch weight corresponds to 100%.

- Positive hitch weight will display a blue progress bar
- Negative hitch weight will display a red progress bar.

If the hitch is being overloaded in either direction, reposition the cart to more evenly distribute the load.

Previous Load. The three most recent loads are shown at the bottom of the page. Additional loads may be viewed in the Reports screen.

Job Details. Touch the Details button to view more information about the job, including:

- Grower, Farm, and Field names
- Crop name
- Field total weight
- Field total dry volume
- Field average moisture
- Field area
- Yield

NOTE: Yield will not calculate unless the area value was entered when creating the Field name.

FIGURE 2. Job Details Page

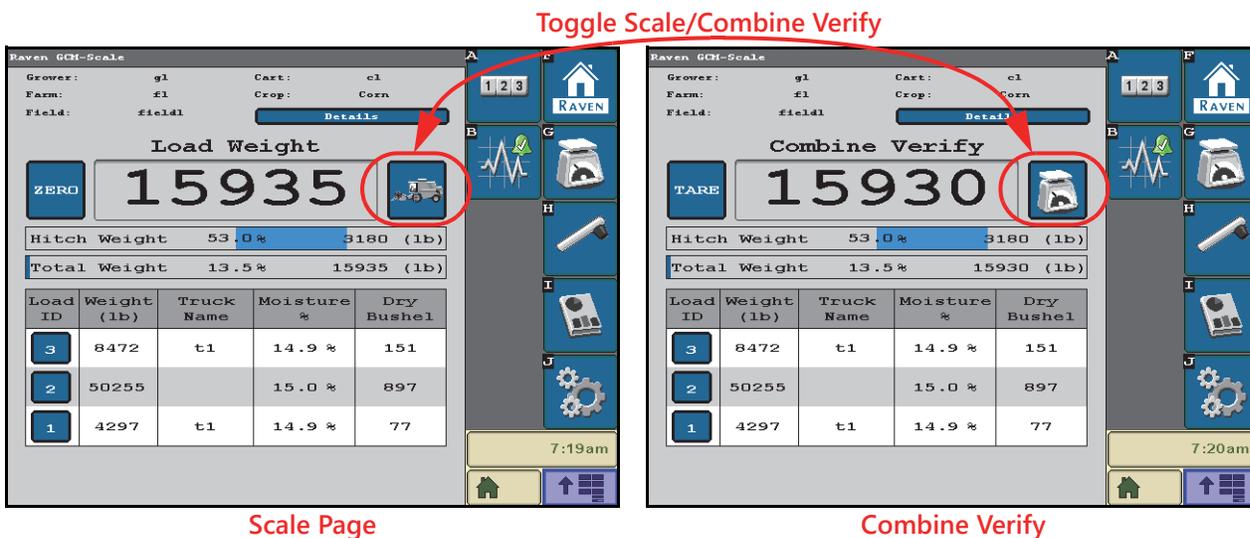
The screenshot displays the 'Grain Cart Summary' page. It features a blue header with the title 'Grain Cart Summary'. Below the header, there are several input fields for job details: Grower Name (g1), Farm Name (f1), Field Name (field1), Cart Name (c1), and Crop Name (Corn). A section for statistics shows Field Totals (lb) as 63023, Field Dry Bu as 1125, Area (ac) as 50, and Yield (bu/ac) as 22.5. The Average Moisture is listed as 14.9. At the bottom left, there is a blue 'X' icon and the text 'unverified'. At the bottom right, there is a yellow bar showing the time '7:20 am' and two icons: a home icon and a menu icon.

Grain Cart Summary			
Grower Name	g1		
Farm Name	f1		
Field Name	field1		
Cart Name	c1		
Crop Name	Corn		
Field Totals (lb)	63023	Field Dry Bu	1125
Area (ac)	50	Yield (bu/ac)	22.5
Average Moisture	14.9		

COMBINE VERIFY

Combine Verify allows for a partial reset of the scale reading without zeroing the total weight (similar to the trip odometer on a car) so that the UHarvest Pro scale may be used to calibrate the combine/harvester yield monitor.

FIGURE 3. Combine Verify Page



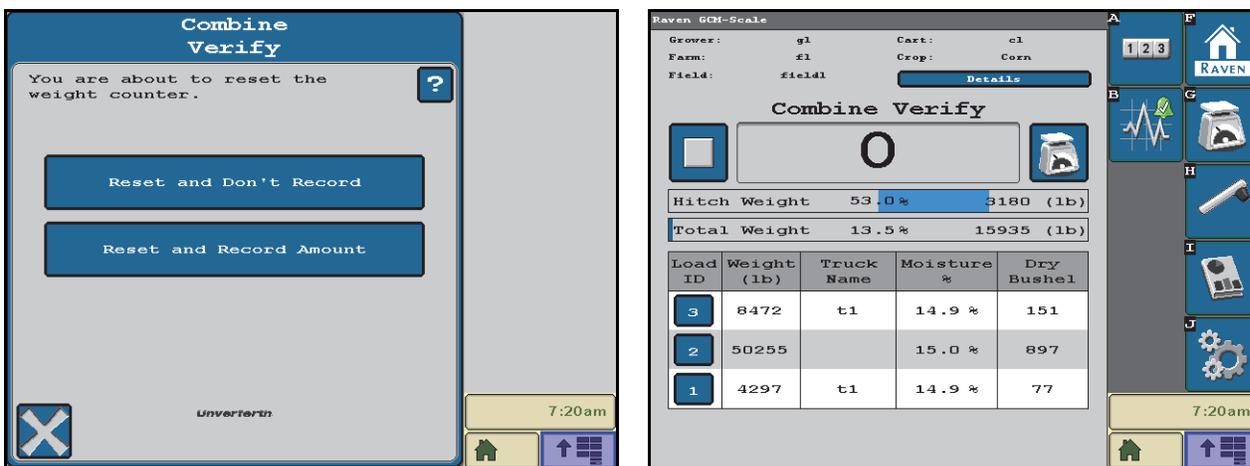
1. On the Scale page, touch the Combine button to toggle to the Combine Verify page.
2. Press the TARE button. The following options will be displayed:

Reset and Don't Record. The partial scale reading will reset to zero but no data will be recorded.

Reset and Record. The partial scale reading will reset to zero and UHarvest Pro will begin logging the weight change.

3. If the Combine Verify event is being recorded, press the stop button after the combine has finished loading the cart. UHarvest Pro will save a record of this event in a Combine Calibration Report. Refer to Chapter 9, *Totals and Generated Reports*, for additional information.

FIGURE 4. Reset Options and Stop Recording Button

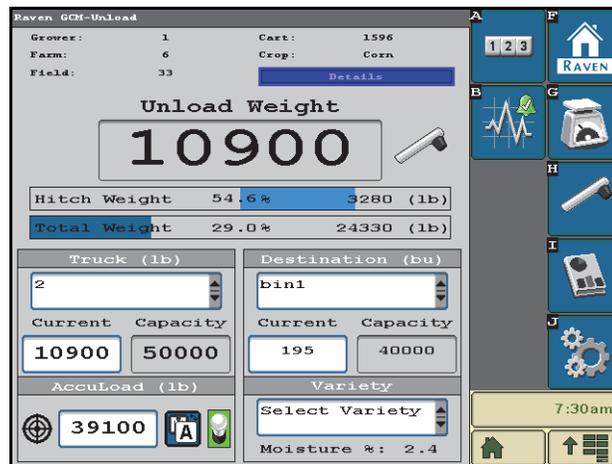


4. Press the scale button to return to the full scale view.

UNLOAD PAGE

The Unload page allows the grain cart operator to monitor how much weight is unloaded from the cart. The operator is also able to set Truck, Destination, and Variety details and operate the optional AccuLoad feature.

FIGURE 1. Unload Page



There are two options for UHarvest Pro load recording:

PTO Sensor. UHarvest Pro will automatically start recording when the measured PTO speed is above 400 RPM. Recording will stop when the PTO speed is below 400 RPM.

Manual Load Logging. A button will be available next to the Unload Weight. The user must use the button to start and stop any load records.

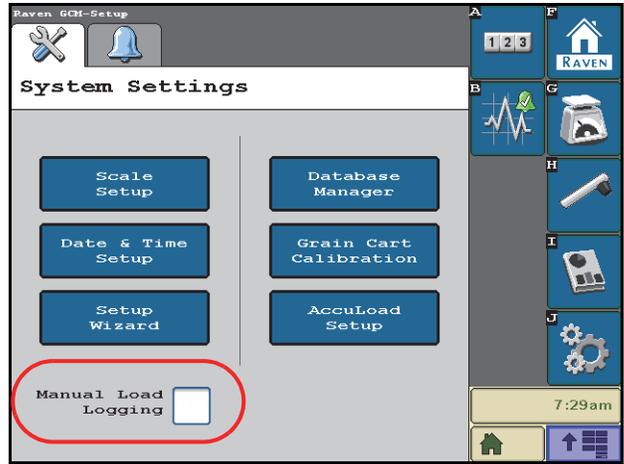
ENABLE MANUAL LOAD LOGGING

NOTE: It is not recommended to enable manual load logging if the PTO sensor is functioning properly. When manual load logging is enabled, the PTO sensor will not be used to automatically record loads.

Manual load logging is enabled by default if a PTO sensor is not enabled during the Setup Wizard.

1. Select the Settings softkey.
2. Enable the Manual Load Logging option.

FIGURE 2. Settings Menu

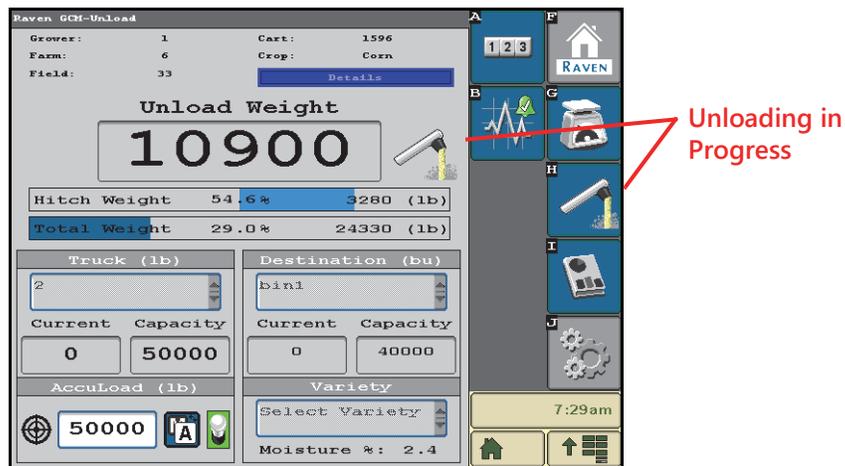


UNLOAD IN PROGRESS

When load recording is in progress, the auger icons on the Unload screen will change to show flowing grain.

NOTE: Several options will be disabled while a load is in progress.

FIGURE 3. Load Recording in Progress



Unload Weight. The Unload Weight is displayed at the top of the page. This value represents the weight that was unloaded from the cart during the unload event. The unload weight is always presented as a positive value.

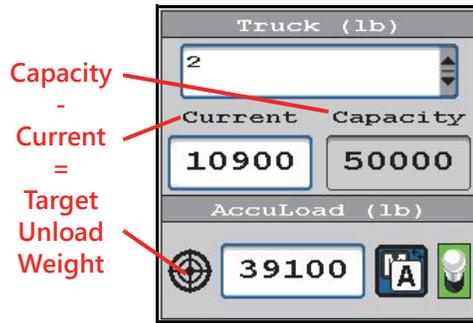
The Unload Weight will continue to display until the next load is started. When the load starts, the Unload Weight will reset to zero and then count upward as weight is unloaded from the cart.

Truck, Destination, and Variety Selection. Use the drop down menus to select the Truck, Destination, and Variety for the upcoming load.

TRUCK

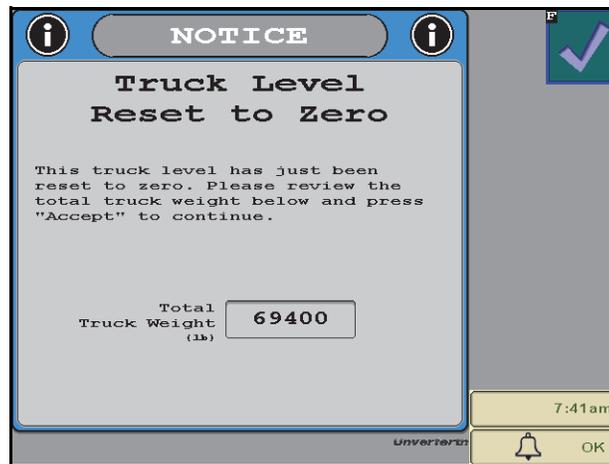
UHarvest Pro will keep track of the weight sent to a truck. This value is subtracted from the truck capacity to determine the target unload weight.

FIGURE 4. Truck Information Area



Once the weight unloaded to the truck (current) reaches a level within 3% of the capacity, UHarvest Pro will automatically reset the truck level to zero. A prompt will display for 5 seconds to display the weight on the truck before the reset. The truck level can be edited if necessary.

FIGURE 5. Truck Reset



DESTINATION

UHarvest Pro will keep track of the weight sent to each selected destination. The current level of the destination may be edited if necessary.

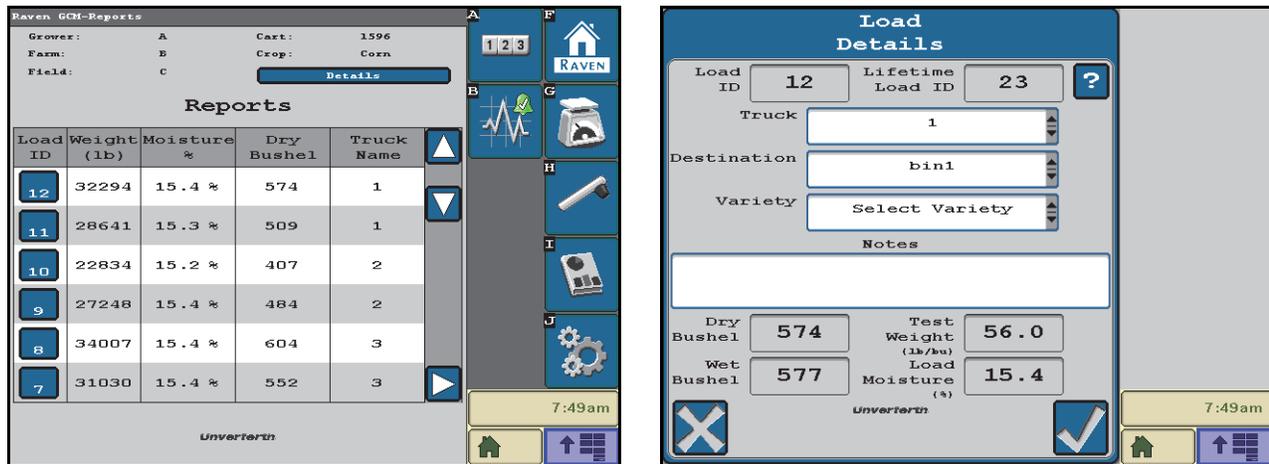
VARIETY

If a moisture sensor is installed, a live readout of the moisture calculation is shown below the Variety drop down menu.

LOAD REPORTS

The Reports page shows a full list of loads in the job. Scroll up and down to view more loads, and scroll left to right to see details about each load.

FIGURE 6. Report Screen and Load Editor Screen



NOTE: The information displayed on the Report page will be different between systems with and without a moisture sensor.

Load ID. The Load ID starts at 1 for each job and will increment upward with each new load. The newest load is shown at the top of the table and the oldest load is at the bottom.

Touch the Load ID number in the left column to display the Load Editor page for the selected load.

Lifetime Load ID. Lifetime Load ID is the load number for the entire history of the UHarvest Pro ECU. Each system will start at 1 and never repeats the Lifetime Load ID, even as more loads are saved.

Truck, Destination, and Variety. The Truck, Destination, and Variety selections may be edited after the load has already been logged.

Notes. The grain cart operator may enter a note to provide more details about the load.

ACCULOAD

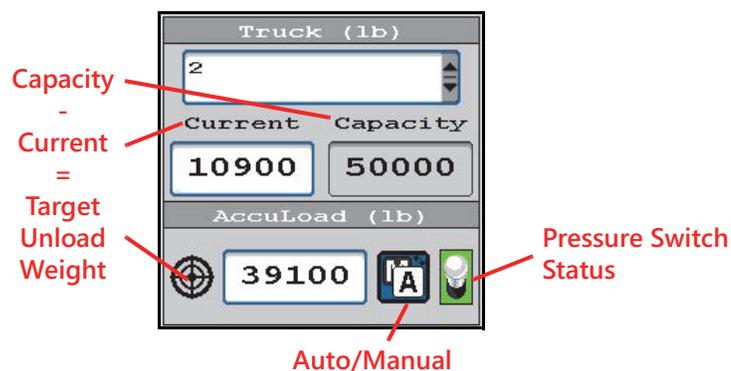
The optional AccuLoad feature may be used to automatically open and close the grain flow gate to achieve the set target unload weight.

NOTE: The AccuLoad feature may require an additional hydraulic valve and harness. Contact a local Unverferth dealer for additional information and assistance.

Before operating with the AccuLoad feature, verify that the AccuLoad feature has been set up. Review the Chapter 3, *Initial Setup*, for more information about the AccuLoad settings.

To operate AccuLoad:

FIGURE 7. AccuLoad Operation



1. Observe the pressure switch indicator displayed on the Unload page. This depicts the position of the override switch installed in the AccuLoad valve.
 - Green (up) indicates that the switch is in the correct position for AccuLoad.
 - Red (down) indicates that the switch is tripped due to the gate being pressurized in the shut direction.

If the switch is tripped, float the hydraulic lever or actuate the lever in the open direction to relieve pressure from the switch.

2. Toggle the Auto/Manual button to Auto ('A' is shown). When AccuLoad is placed into Auto mode with the PTO off, AccuLoad will hold the valve in a neutral position.

NOTE: The button cannot be toggled to Auto if the pressure switch is tripped.

3. Select the desired truck name.
4. Observe the target unload weight.

The target value is automatically calculated by subtracting the current truck level from the capacity. The target weight value can be overridden if necessary.

When it is time to unload grain:

5. Move the tractor hydraulic lever to the gate open position.
6. Verify that the remote timer is set for continuous flow. AccuLoad will hold the valve in the neutral position to prevent gate movement.
7. Engage the tractor PTO and increase the engine speed. Once the PTO speed exceeds the AccuLoad minimum PTO speed setting, AccuLoad will open the grain flow gate.
8. As the unload weight approaches the target weight, AccuLoad will close the gate in four increments as configured by the Weight Delta values entered on the AccuLoad Setup page.

9. After the target weight is reached, disengage the tractor PTO. AccuLoad will hold the gate closed for the Gate Close Time before shifting to neutral.

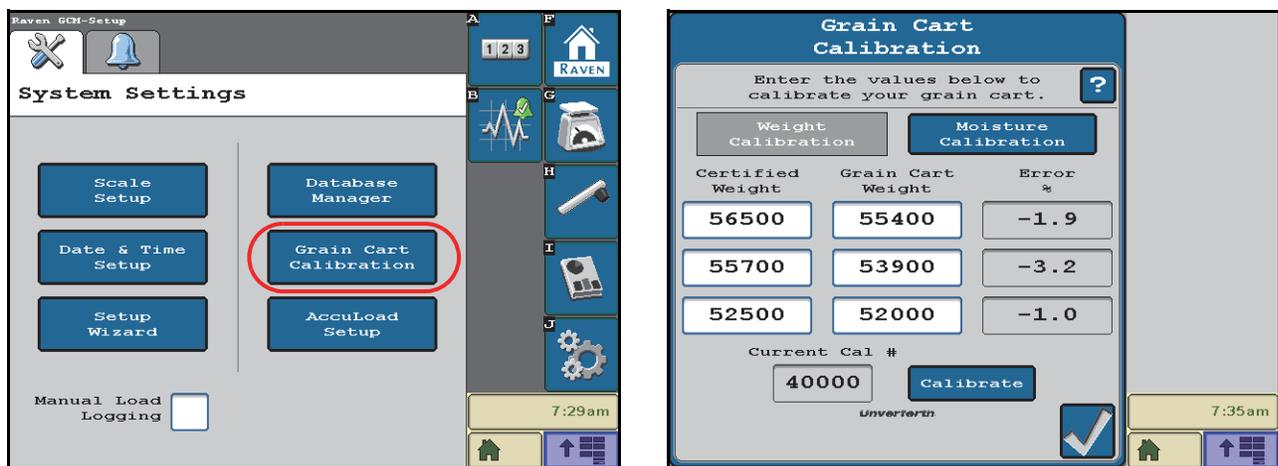
NOTE: The tractor hydraulic lever can either be left in the open position or returned to neutral. AccuLoad will hold the valve in the neutral position until the next load is started.

10. AccuLoad can be overridden at any time by moving the tractor hydraulic lever to the shut position. This will trigger the pressure switch and AccuLoad will automatically toggle to Manual mode.

WEIGHT CALIBRATION

NOTE: It is recommended to perform a weight calibration at least once per harvest season.

FIGURE 1. Weight Calibration



To calibrate the scale measurement:

1. Select the Settings softkey and then select the Grain Cart Calibration button.
2. Select "Weight Calibration" at the top of the screen.
3. Enter the known weight (e.g. an elevator scale ticket) in the Certified Weight column.
4. On the same line, enter the UHarvest Pro measurement in the Grain Cart Weight column. UHarvest Pro will calculate the error percentage.
5. If desired, follow the same procedure to enter calibration data for additional loads. Calibrations can be done using 1, 2, or 3 loads.

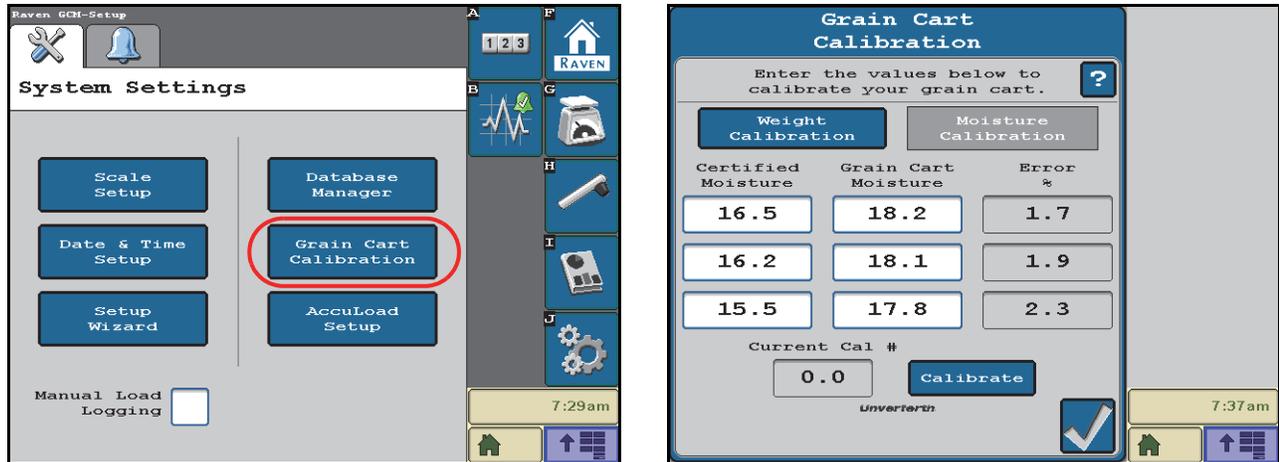
NOTE: For best results, use multiple loads for the calibration. The Calibrate button is disabled if there are any partially completed lines in the calibration table.

6. Touch the Calibrate button. UHarvest Pro will calculate a new recommended calibration value and display the information for the cart operator.
7. Review the pending calibration number change.
8. Touch the Accept (green check mark) button to accept the updated calibration or the Cancel (red X) button to decline.

MOISTURE CALIBRATION

NOTE: It is recommended to perform a moisture calibration at least once per crop type per harvest season.

FIGURE 2. Moisture Calibration



To calibrate the moisture sensor measurement:

1. Start or resume a job for the specific crop that is being measured by the moisture sensor.

NOTE: A unique moisture calibration number will be saved for each crop type. Since UHarvest Pro must know the crop type being used for the calibration, UHarvest Pro does not allow moisture calibration unless a job is active.

2. Select the Settings softkey and then select the Grain Cart Calibration button.
3. Select "Moisture Calibration" at the top of the page.
4. Enter the known moisture (e.g. an elevator scale ticket) in the Certified Moisture column.
5. On the same line, enter the UHarvest Pro measurement in the Grain Cart Moisture column. UHarvest Pro will calculate the error percentage.
6. If desired, follow the same procedure to enter calibration data for additional loads. Calibrations can be done using 1, 2, or 3 loads.

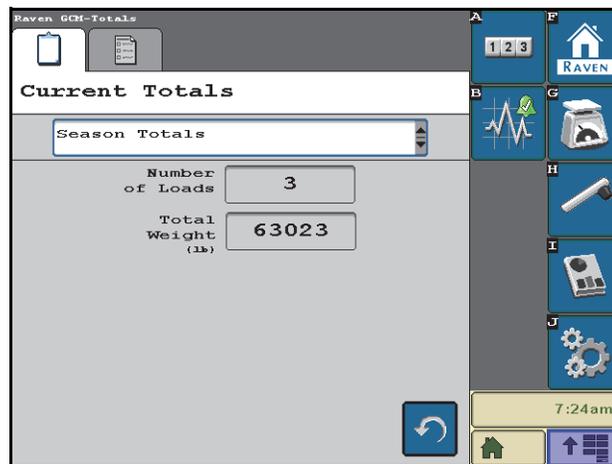
NOTE: For best results, use multiple loads for the calibration. The Calibrate button is disabled if there are any partially completed lines in the calibration table.

7. Touch the calibrate button. UHarvest Pro will calculate a new recommended calibration value and display the information for the cart operator.
8. Review the pending calibration number change.
9. Touch the Accept (green check mark) button to accept the updated calibration or the Cancel (red X) button to decline.

TOTALS SCREEN

Touch the Totals softkey to access the Current Totals and Reports pages. The Current Totals page has several load and weight counters available:

FIGURE 1. Totals Page



Field Totals. Shows the total number of loads and total weight for the active job. This is not resettable.

Season Totals. Shows a resettable load and weight tally. For example, the Season Totals could be reset when switching from wheat harvest to fall harvest.

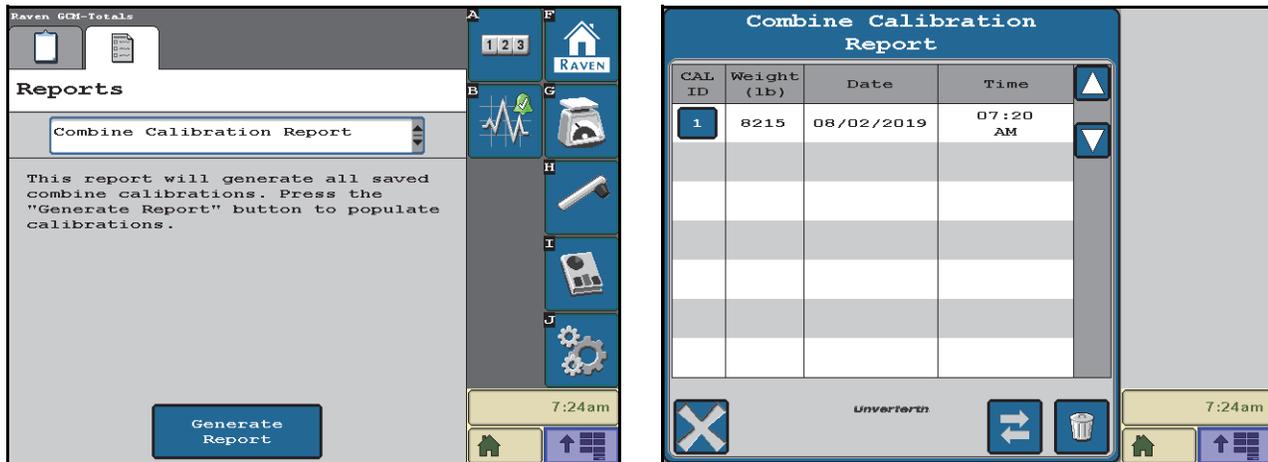
Cart Lifetime. Shows a resettable load and weight tally. For example, the Cart Lifetime could be reset if the UHarvest Pro system is moved to a new grain cart.

ECU Lifetime. Shows the total number of loads and total weight that have been accumulated in the lifetime of the UHarvest Pro controller. This is not resettable.

COMBINE CALIBRATION REPORT

If UHarvest Pro was used to record Combine Verify events, those records are available in the Combine Calibration report.

FIGURE 2. Combine Calibration Report



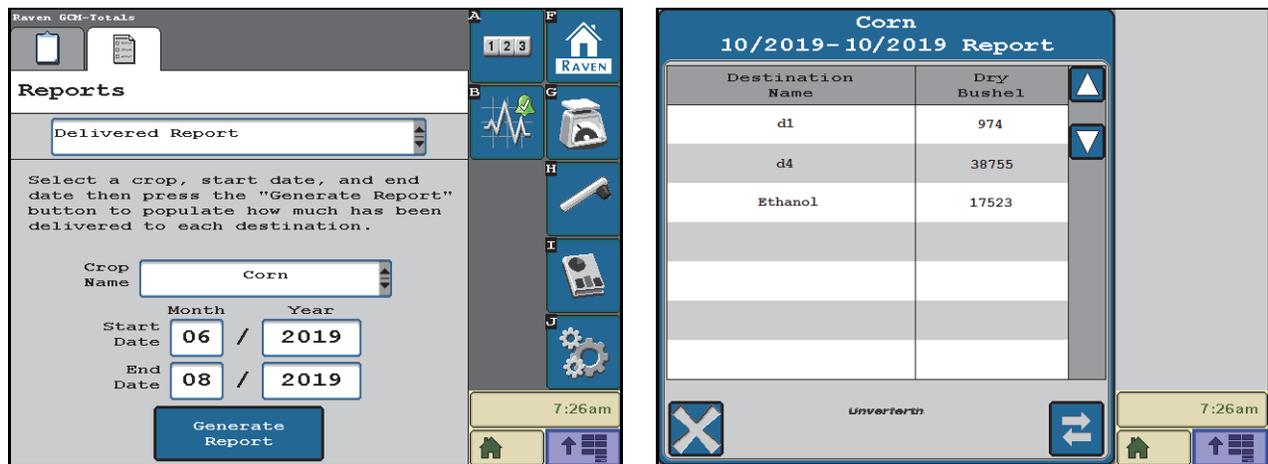
1. Touch the Totals softkey and then select the Reports tab.
2. Select "Combine Calibration Report" from the drop down menu.
3. Select the "Generate Report" button at the bottom of the page. A table of past Combine Verify events will be displayed.
 - Touch the CAL ID button in the left column to view additional information or add a note.
 - Touch the Delete (trash can) button to clear the old records.
 - If the universal terminal supports the ISO File Server feature, touch the Transfer (arrows) button to transfer the Combine Calibration Report to a flash drive connected to the USB port on the display.

- NOTE:** On older John Deere displays, the database file is now available on the USB flash drive (or memory card on even older displays). On newer John Deere displays, additional steps are required:
- a. Navigate to the file management screen for the display (not the UHarvest Pro File Maintenance page).
 - b. Use the "Export All" option to copy the display data to the flash drive. This will include the UHarvest Pro database.

DELIVERED REPORT

The Delivered Report may be helpful to keep track of where harvested crops were sent during a certain period of time. For example, this report can be used to manage monthly corn contracts with an ethanol plant.

FIGURE 3. Delivered Report



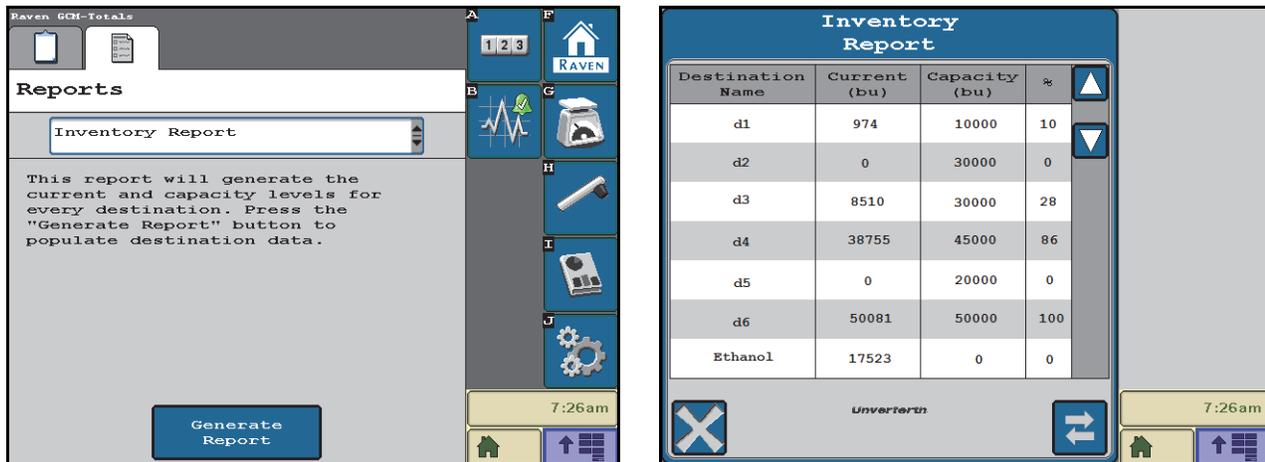
1. Touch the Totals softkey and then select the Reports tab.
 2. Select "Delivered Report" from the drop down menu.
 3. Select the crop type from the list of Crop Names.
 4. Set the date range options.
 5. Select the "Generate Report" button at the bottom of the page. A table of destinations and dry volumes will be displayed for the selected crop and date range.
- If the universal terminal supports the ISO File Server feature, touch the Transfer (arrows) button to transfer the Delivered Report to a flash drive connected to the USB port on the display.

- NOTE:** On older John Deere displays, the database file is now available on the USB flash drive (or memory card on even older displays). On newer John Deere displays, additional steps are required:
- a. Navigate to the file management screen for the display (not the UHarvest Pro File Maintenance page).
 - b. Use the "Export All" option to copy the display data to the flash drive. This will include the UHarvest Pro database.

INVENTORY REPORT

The Inventory Report may be used to quickly observe the fill status of all destinations. This may be useful for managing a bin site.

FIGURE 4. Inventory Report



1. Touch the Totals softkey and then select the Reports tab.
2. Select "Inventory Report" from the drop down menu.
3. Select the "Generate Report" button at the bottom of the page. A table of all destinations will be displayed. It will show the current level, the capacity, and the fill percentage of each configured destination.
4. If the universal terminal supports the ISO File Server feature, touch the Transfer (arrows) button to transfer the Inventory Report to a flash drive connect to the USB port on the display.

- NOTE:** On older John Deere displays, the database file is now available on the USB flash drive (or memory card on even older displays). On newer John Deere displays, additional steps are required:
- a. Navigate to the file management screen for the display (not the UHarvest Pro File Maintenance page).
 - b. Use the "Export All" option to copy the display data to the flash drive. This will include the UHarvest Pro database.

CHAPTER 10

VIEWING DATA ON A COMPUTER

UHarvest Pro harvest and grain cart load data may be viewed in either of the following methods:

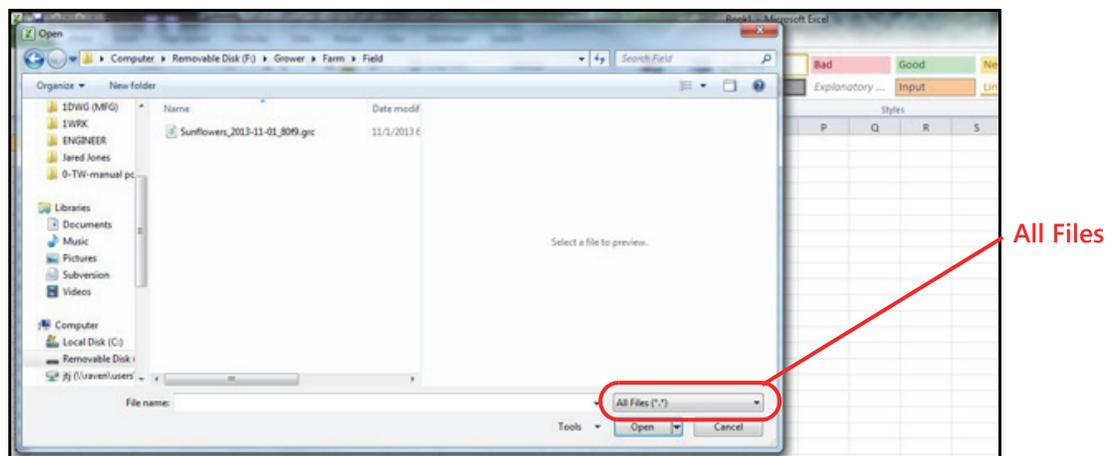
- Microsoft Excel
- Raven Slingshot portal 

VIEWING HARVEST DATA IN EXCEL

NOTE: Review the *File Management and Job Data Transfer* section on page 24 for additional assistance with transferring jobs

1. Open Excel on a home or office computer.
2. Select 'File' and then 'Open'.
3. In the lower, right corner of the popup window, change the setting from "All Excel Files..." to "All Files..."

FIGURE 1. Change File Type

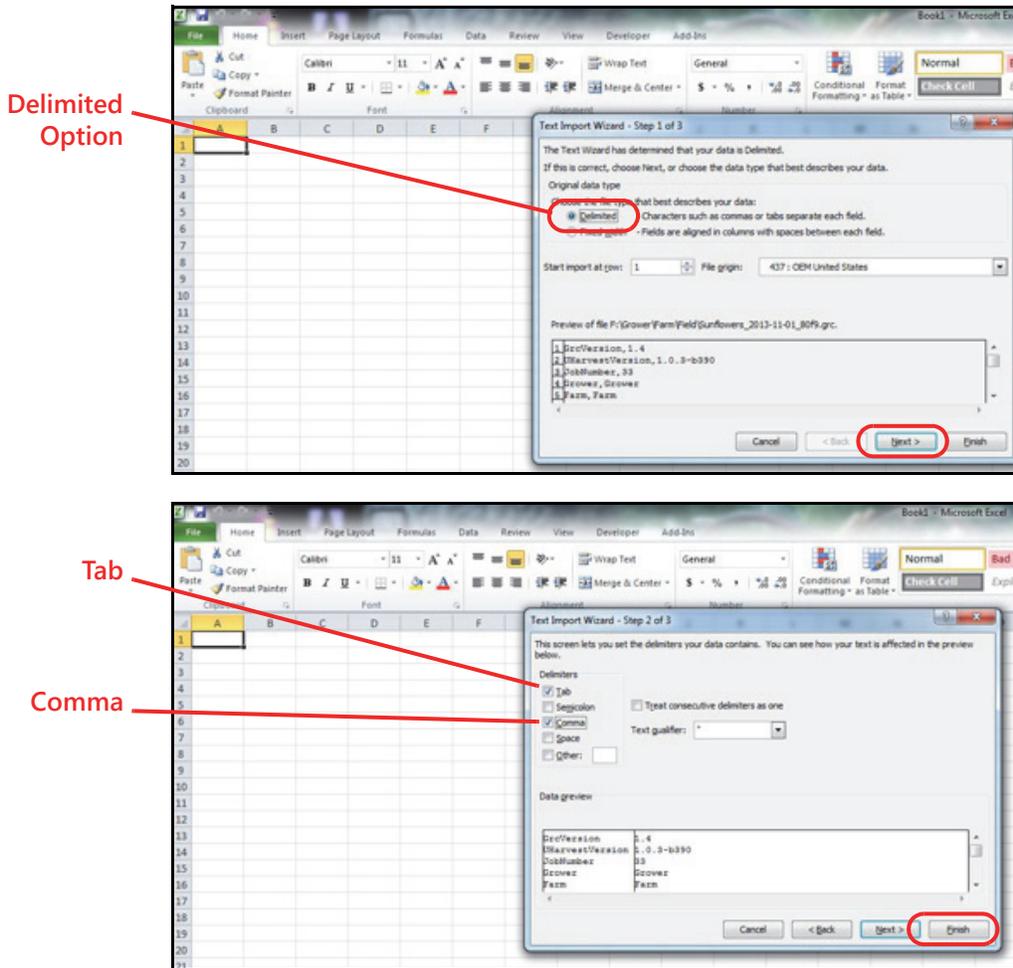


4. Use the File Browser to locate the UHarvest Pro job file.

NOTE: The file path will vary depending upon the universal terminal.

5. Select the job file (.grc).
6. Since the job file is not in Excel format, a configuration wizard will be displayed.
7. On the first page of the wizard, ensure that "Delimited" is selected.
8. Select the Next button.

FIGURE 2. Configuration Wizard



9. On the second page of the wizard, check the Delimiters options for "Tab" and "Comma".
10. Select the Finish button. The job file will open with grain cart data displayed in the Excel spreadsheet.

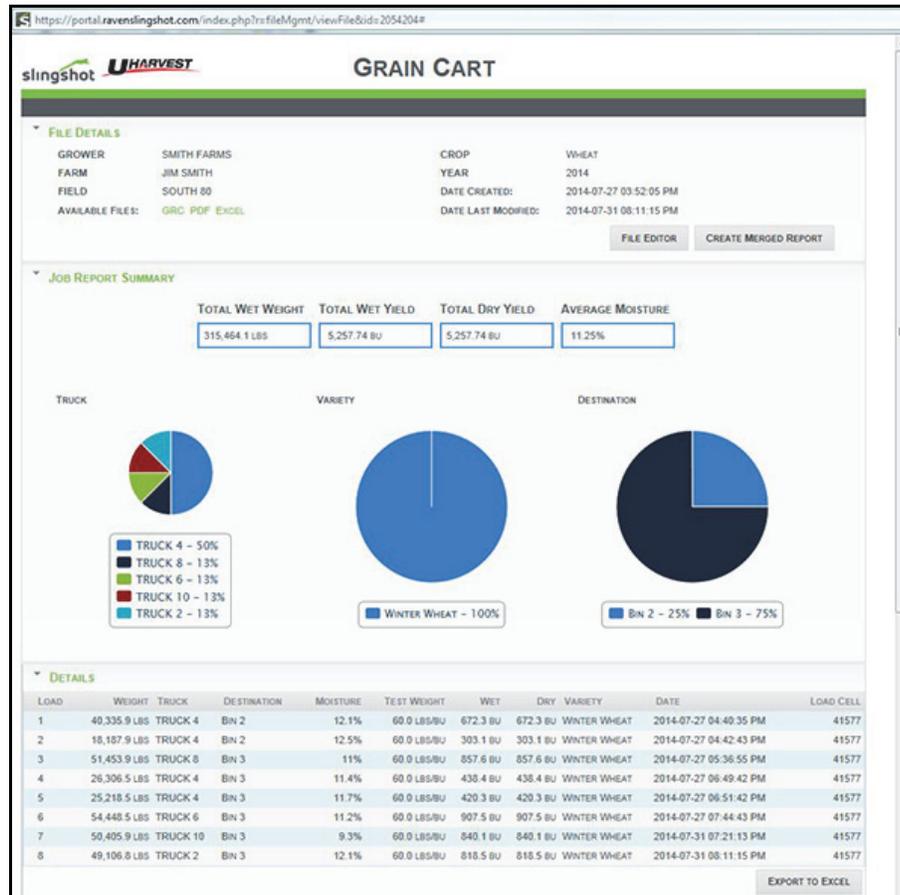
FIGURE 3. Job File in Excel

GrainCartID	Weight	TruckID	Destination	Percent Measured	Percent Moisture	Percent MoistureCorrection	Percent Moisture	TestWeight	Bushels Wet	Bushels Dry	Bushels Variety	UTC Date	UTC Time	Degrees Latitude	Degrees Longitude	LoadCellCal	LocalDate	LocalTime
1	1155.74	undefined	undefined	7.4	0	7.4	30	38.52	38.52	undefined	11/1/2013	17:02:29	43.55092	-96.72513504	252632	11/1/2013	12:02:29	
2	2192.38	Truck 2	Dest 2	7.4	0	7.4	29	75.6	75.6	Var 2	11/1/2013	17:03:05	43.55092	-96.72513504	252632	11/1/2013	12:03:05	
3	3404.87	Truck 3	Dest 3	7.4	0	7.4	30	113.5	113.5	Var 3	11/1/2013	17:03:44	43.55092	-96.72513504	252632	11/1/2013	12:03:44	
4	1236.71	Truck 3	Dest 3	0	0	0	0	41.22	41.22	Var 3	11/1/2013	17:04:14	43.55092	-96.72513504	252632	11/1/2013	12:04:14	
5	2128.17	Truck 3	Dest 3	7.4	0	7.4	30	70.95	70.95	Var 3	11/1/2013	17:04:19	43.55092	-96.72513504	252632	11/1/2013	12:04:19	
6	1345.11	Truck 3	Dest 3	7.4	0	7.4	30	51.5	51.5	Var 3	11/1/2013	17:04:24	43.55092	-96.72513504	252632	11/1/2013	12:04:24	
7	1355.33	Truck 3	Dest 3	7.4	0	7.4	30	45.18	45.18	Var 3	11/1/2013	17:04:28	43.55092	-96.72513504	252632	11/1/2013	12:04:28	
8	2479.67	Truck 3	Dest 1	7.4	0	7.4	30	82.36	82.36	Var 3	11/1/2013	17:04:34	43.55092	-96.72513504	252632	11/1/2013	12:04:34	
9	2052.26	Truck 3	Dest 1	7.4	0	7.4	30	83.88	83.88	Var 3	11/1/2013	17:04:39	43.55092	-96.72513504	252632	11/1/2013	12:04:39	
10	17795.65	Truck 3	Dest 1	7.4	0	7.4	30	592.29	592.29	Var 3	11/1/2013	17:04:47	43.55092	-96.72513504	252632	11/1/2013	12:04:47	
11	8858.8	Truck 3	Dest 1	7.4	0	7.4	30	295.29	295.29	Var 3	11/1/2013	17:04:59	43.55092	-96.72513504	252632	11/1/2013	12:04:59	
12	11422.6	Truck 1	Dest 1	7.4	0	7.4	30	380.75	380.75	Var 3	11/1/2013	17:05:13	43.55092	-96.72513504	252632	11/1/2013	12:05:13	

VIEWING HARVEST DATA IN SLINGSHOT

Raven Slingshot provides online storage and reporting of UHarvest Pro harvest data. Slingshot can be used to create PDF reports, merge data from multiple grain carts and/or fields, and more.

FIGURE 4. Slingshot Report



To access an operation guide for Slingshot reporting, click the "Help" button in the upper, right corner of the Slingshot account and then type "UHarvest" into the search bar.

LED DEFINITIONS

FIGURE 1. UHarvest Pro ECU Status LEDs

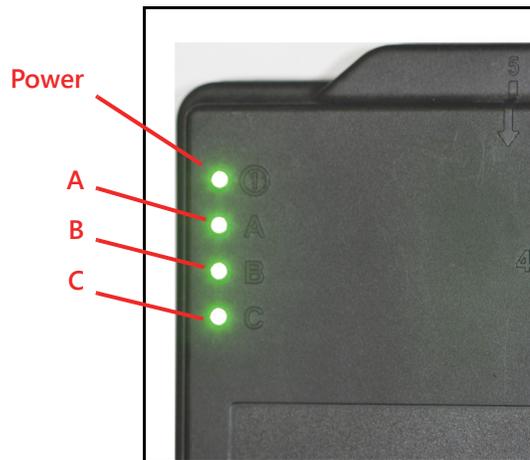


TABLE 1. LED Status Displays

LED	Color	Hz	Status	Description
Power	Green	Solid	ECU Power	ECU has power.
A	Off	-	Microprocessor Off	Microprocessor is not powered.
	Any	Solid	System Fault	Microprocessor is not functional.
	Yellow	1	Boot Hold Mode	Boot loader is in boot hold mode.
	Red	5	Programming Microprocessor	Programming the microprocessor.
	Red	1	ISOBUS Offline	ISOBUS is offline.
	White	1	UT Offline	UT is offline.
	Green	1	Systems Normal	UT connected and system is normal.

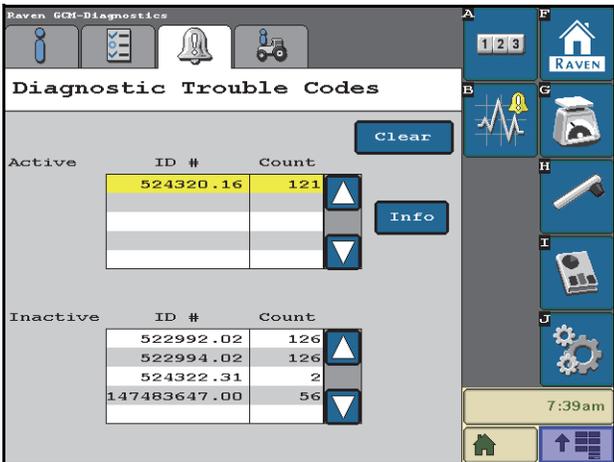
LED	Color	Hz	Status	Description
B	Red	Solid	FPGA Not Running	PCB subsystem not running (FPGA).
	Blue	1	PTO Pulses Present	Detected pulses from PTO sensors detected.
	Yellow	1	DTC Active	One or more diagnostic trouble codes (DTCs) are active.
	White	1	System Under Voltage	System voltage is below 11.5 volts.
	Purple	1	System Over Voltage	System voltage is above 16 volts.
	Green	Solid	LED B Functional - No Error	LED B is functional and there is no other status to report.
C	Red	Solid	FPGA Not Running	PCB subsystem not running (FPGA).
	Blue	1	Bluetooth Transfer In Progress	Bluetooth transfer in progress.
	Green	Solid	LED C Functional - No Error	LED C is functional and there is no other status to report.

DIAGNOSTIC TROUBLE CODES (DTCS)

To access diagnostic trouble codes:

1. Touch the Diagnostics softkey.
2. Select the DTC tab (bell icon).
3. Any trouble codes currently detected by the system are displayed in the Active table.
Use the Up and Down arrows to scroll through the list and select the Info button to view additional information for the selected DTC.
4. Any trouble codes previously detected by the system will be displayed in the Inactive table.
Use the Up and Down arrows to scroll through the list and select the Info button to view additional information for the selected DTC.
5. Touch the Clear button in the upper, right corner of the page to clear the DTC list from the Inactive table.

FIGURE 2. Diagnostic Trouble Codes (DTCs) Page



ALARM SETTINGS

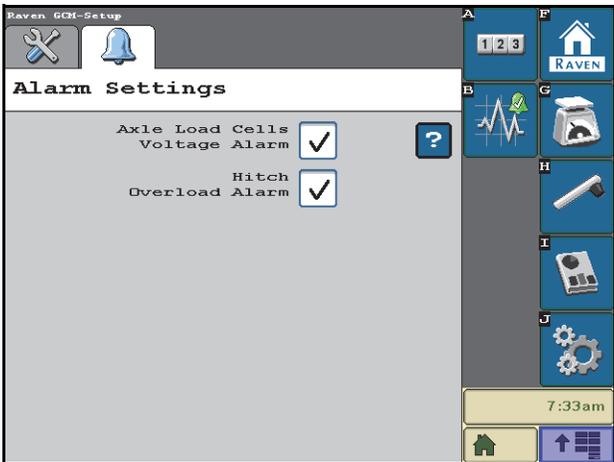
Some UHarvest Pro popup alarms may be enabled or disabled by the machine operator.

1. Touch the Settings softkey.
2. Select the Alarms tab (bell icon).
3. Use the check boxes to enable or disable the following alarms:

Axle Load Cells Voltage Alarm. Activates an alarm if the voltage of the axle load cell channel goes outside of the expected operating range.

Hitch Overload Alarm. Activates an alarm if the hitch exceeds 100% capacity for more than 5 seconds.

FIGURE 3. Alarm Settings Page



SYSTEM INFORMATION

1. Select the Diagnostics softkey.
2. Select Information tab ('i').
3. Use the drop down menu to select the desired information to display:

Sensor Voltages. Displays the measurements from the load cells, moisture sensor, and PTO sensor.

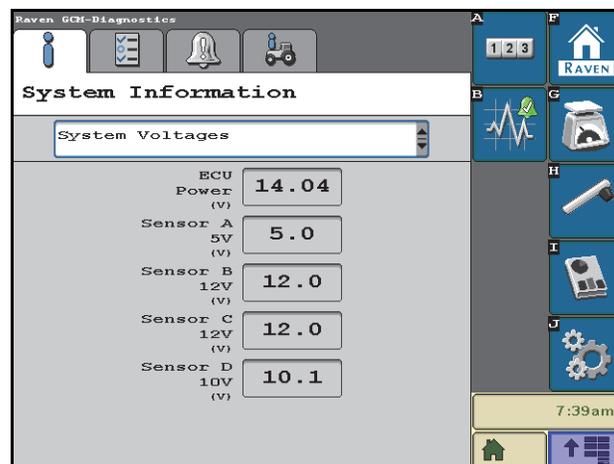
System Voltages. Displays the voltage values supplying the ECU.

Hardware/Software. Displays manufacturing information about the ECU, including the current software version.

AccuLoad Information. Displays the status of the AccuLoad solenoid outputs and the override pressure switch.

Bluetooth Information. Displays information regarding the ECU Bluetooth signal.

FIGURE 4. System Information



UNIVERSAL TERMINAL

The UHarvest Pro pages displayed on the universal terminal are generated by the ECU. If UHarvest Pro is not showing up in the working set menu or on the screen:

- Verify that the ECU has power.
- Check the fuse on the ECU harness.
- Check the ECU harness on the grain cart and verify that a CAN terminator is installed near the ECU.
- Check the tractor fuse panel for any blown power fuses.

SCALE

FIGURE 1. Load Cell Junction Box

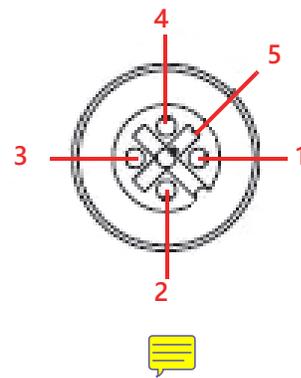


TABLE 1. Load Cell Connector Pinout

Pin	Function
1	5V Power
2	Signal (-)
3	Signal (+)
4	Ground
5	Shield

TABLE 2. Scale Troubleshooting

Issue	Action
<p>Scale is unresponsive to weight changes on the grain cart.</p>	<ul style="list-style-type: none"> • In the Scale Setup screen, verify that a load cell calibration number has been entered. • In the Scale Setup screen, verify that a non-zero number has been entered for the quantity of load cells. • Observe the axle and hitch load cell voltages in the Diagnostics screen. <ul style="list-style-type: none"> • A voltage of ± 19 mV indicates an open circuit, which could be a faulty load cell, a damaged cable, or a loose connection. • Verify that the hitch channel is being powered. <ul style="list-style-type: none"> • Check for 5 V across pins 1 and 4 of the HITCH port of the junction box. • Check for 5 V across pins 1 and 12 of the green "JUNCTION BOX" connector on the ECU cable. • Verify that the axle channel is being powered. <ul style="list-style-type: none"> • Check for 5 V across pins 1 and 4 of any of the AXLE ports on the junction box. • Check for 5 V across pins 1 and 12 of the green "JUNCTION BOX" connector on the ECU cable.

Issue	Action
Scale is inaccurate or unstable	<ul style="list-style-type: none"> • Recalibrate the scale system, preferably using multiple loads' worth of values. • Beginning and ending weights for each load are taken when the PTO crosses 400 RPM. If the PTO coasts to a stop instead of stopping abruptly, take care to avoid excessive tractor movement that may cause a spike in the scale weight while the PTO is still winding down. • Check for loose load cell connections. • Check for load cell cable damage. • Disconnect all but one load cell from the junction box and connect it to one of the axle ports. Stand or hang weight above that load cell and observe the axle load cell diagnostic voltage. <ul style="list-style-type: none"> • The voltage should increase and stabilize. • If the voltage decreases when weight is added, the load cell is likely installed upside down. • If the load cell response seems to be OK, repeat the process with a different load cell. • If no faulty load cells are detected, repeat the above procedure by connecting one load cell at a time to the hitch port of the junction box. This will help determine if the problem lies with the junction box and/or ECU cabling. • If a faulty load cell is detected, connect that load cell to the other load cell channel (hitch or axle). <ul style="list-style-type: none"> • If the problem persists, the load cell is likely the source of the error. • If the problem goes away, the previous junction box port may be the source of the error.
Bushel measurements seem inaccurate	<ul style="list-style-type: none"> • UHarvest Pro uses the same units that the universal terminal is using. If the UT is using imperial units, UHarvest Pro will use imperial bushels for the crop test weight rather than US bushels. Imperial bushels and US bushels are not equal (1 imperial bu = 1.032 US bu, or a 3.2% difference), so the UHarvest Pro wet and dry bushel calculations may not match expectations. <ul style="list-style-type: none"> • Check the UT settings and change to the desired units.

LOAD RECORDING

FIGURE 2. PTO Sensor and Target



TABLE 3. Load Recording Troubleshooting

Issue	Action
UHarvest Pro does not record loads.	<ul style="list-style-type: none"> • In the Diagnostics screen, watch the PTO speed measurement. 400 RPM is required to trigger recording. <ul style="list-style-type: none"> • The speed should be 0 RPM when the PTO is off. • The speed should increase when the PTO is engaged. • The speed should increase or decrease accordingly when the PTO speed changes. • If PTO speed is detected, check if UHarvest Pro is in manual load logging mode. In manual load logging mode, the Start/Stop button is the sole recording mechanism and the PTO sensor is ignored. • If PTO speed is not detected in the Diagnostics screen, check the LED on the PTO sensor. The light should turn on when the metal target is detected and turn off when the target is not detected. • Check the clearance between the PTO sensor and the target. The clearance should be 1/16" to 1/4". • Verify that the PTO sensor is powered. There should be 12V across pins B and C of the PTO sensor connector. • Check the PTO sensor cable for loose or broken wires.
UHarvest Pro records multiple small loads instead of one large load.	<ul style="list-style-type: none"> • Check the clearance between the PTO sensor and the target. The sensor may be at the edge of its functional detection range. The clearance should be 1/16" to 1/4".

ACCULOAD

FIGURE 3. AccuLoad Hydraulic Schematic

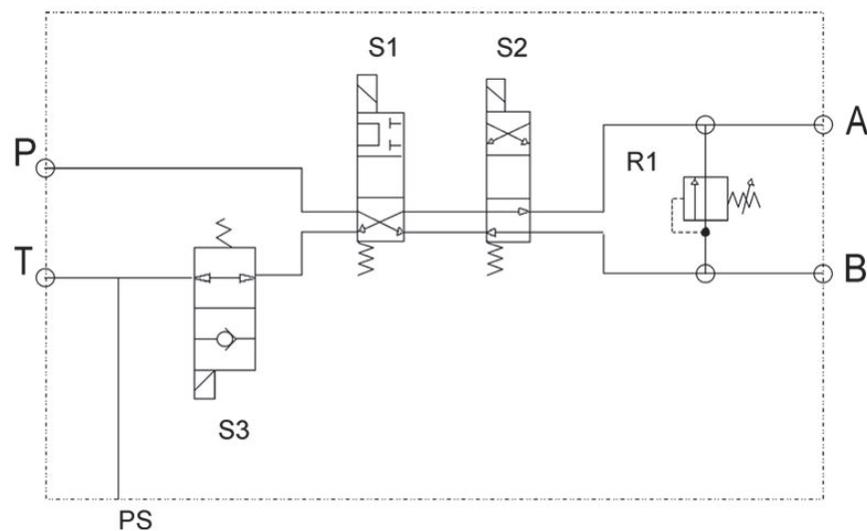


TABLE 4. AccuLoad Troubleshooting

Issue	Action
AccuLoad is stuck in Manual mode and cannot be set to Auto mode.	<ul style="list-style-type: none"> Verify that the T port of the AccuLoad valve is not pressurized (hydraulic lever positioned to shut the gate). <ul style="list-style-type: none"> If the T port is pressurized, the pressure switch (in port PS) will be triggered and AccuLoad will not engage. Detent the tractor's hydraulic lever in the opposite direction or float the circuit to relieve pressure. Verify that the PSI connector of the AccuLoad cable is connected to the pressure switch on the AccuLoad valve. Verify that the pressure switch is set at 2200 PSI. If the pressure switch is set lower than the hydraulic circuit's standby pressure, AccuLoad will not engage. Adjust the pressure switch setting if necessary. Check the AccuLoad cable for loose or broken wires.
The load gate closes too soon before reaching the target weight.	<ul style="list-style-type: none"> Adjust the AccuLoad delta thresholds so AccuLoad keeps the gate open longer. Begin by decreasing the weight delta for the 0% step and possibly for the 25% step. Verify that the gate open and close times have been entered correctly.
The door closes too late and overshoots the target weight.	<ul style="list-style-type: none"> Adjust the AccuLoad delta thresholds so AccuLoad shuts the gate sooner. Begin by increasing the weight delta for the 0% step and possibly for the 25% step. Verify that the gate open and close times have been entered correctly.



Loosen set screw on adjusting sleeve, rotate CW to increase pressure, CCW to decrease.

Issue	Action
AccuLoad does not open the door during a load.	<ul style="list-style-type: none"> • Make sure AccuLoad is in Auto mode. • Verify that the hydraulic lever is set in the same direction that is used to open the door in Manual mode. • Make sure the actual PTO operating speed reaches the minimum AccuLoad RPM setting. • Set the tractor hydraulic lever so it provides continuous flow instead of timing out. • Make sure S1, S2, and S3 connectors are attached to the correct cartridges in the AccuLoad valve. • Verify operation of the door in Manual mode. • Check hose coupler connections. • Verify that the PTO sensor is functioning properly. <ul style="list-style-type: none"> • Watch the RPM value in the Diagnostics screen. • Check the LED on the PTO sensor. It should turn on when the target is detected. • Make sure the target is within 1/16" and 1/4" of the sensor. • Verify that the sensor is powered. There should be 12V across pins B and C of the PTO sensor connector. • Check the sensor cable for loose or broken wires.
Load gate does not open all the way.	<ul style="list-style-type: none"> • Increase the AccuLoad open percentage. • Confirm the accuracy of the AccuLoad Open Time that it takes to open the door. Adjust if necessary. • Set the tractor hydraulic lever so it provides continuous flow instead of timing out. • Compare the target weight to the AccuLoad delta thresholds. If the target weight is less than any of those thresholds, AccuLoad will not open fully.
Load gate opens immediately after engaging the hydraulic lever, but before the PTO is turning at the minimum speed for AccuLoad.	<ul style="list-style-type: none"> • Verify that the S1 connector is connected to the S1 cartridge. • Verify that the S1 cartridge is powered. • Verify that AccuLoad has not returned to Manual mode. Adjust the pressure switch if necessary.
Load gate does not close at any time during a load.	<ul style="list-style-type: none"> • Set the tractor hydraulic lever so it provides continuous flow instead of timing out. • Confirm the accuracy of the AccuLoad Close Time that it takes to close the door. Adjust if necessary. • Verify that the S1 and S2 connectors are connected to the correct AccuLoad cartridges. • Check the AccuLoad cable for loose or broken wires. • Check the AccuLoad relief valve setting. The relief setting should be 2200 PSI. <ul style="list-style-type: none"> • Verify that the tractor's relief setting is higher than 2200 PSI. • Flush the S1 and S2 cartridges to remove contaminants.

Issue	Action
Load gate chatters when opening or closing:	<ul style="list-style-type: none"> • Reduce the tractor hydraulic flow until the chatter is removed. <ul style="list-style-type: none"> • If the flow rate is adjusted, the AccuLoad open and close times should also be adjusted in the AccuLoad settings. • Flush the hydraulic lines to eliminate contaminants that may cause the AccuLoad cartridges to stick. • Check the AccuLoad connectors and cables for intermittent power supply.
Load gate does not close when operator panic mode is engaged by moving the tractor hydraulic lever in the gate shut direction.	<ul style="list-style-type: none"> • Verify that the S3 connector is connected to the S3 cartridge. • Verify that S3 is powered when in Auto mode. • Verify that the pressure switch is powered. • Check the pressure switch setting. The switch should be set at 2200 PSI. • Verify that the tractor relief setting is above 2200 PSI. • Check the AccuLoad cable for loose or broken wires. • Move the hydraulic lever to the AccuLoad position and enter Auto mode. Do not engage the PTO. <ul style="list-style-type: none"> • If both hoses to P and T have flow but are not highly pressurized, the hoses are correct. • If only the T hose is pressurized, the flow direction is reversed. Move the hydraulic lever the opposite direction.

MOISTURE SENSOR

FIGURE 4. Moisture Sensor on Cleanout Door



TABLE 5. Moisture Troubleshooting

Issue	Action
<p>Measured moisture does not change at all for different loads.</p>	<ul style="list-style-type: none"> • In the Diagnostics screen, check the Moisture Voltage and Temperature Voltage. <ul style="list-style-type: none"> • The Temperature should have a stable, non-zero voltage. • The Moisture Voltage should respond instantaneously to a moisture change. Placing a hand over the sensing element should result in a voltage spike. • Verify that the moisture sensor is getting powered. There should be 12 V across pins 1 and 2. • Verify that the sensing surface is free from buildup of old grain. • Check for loose or broken wires on the moisture sensor.
<p>Measured moisture seems erratic or inaccurate.</p>	<ul style="list-style-type: none"> • Verify that the correct crop was chosen for the job. The output of the moisture sensor is crop dependent. • Recalibrate the moisture sensor offset, preferably using values from multiple loads. • Verify that the sensing surface is free from buildup of old grain. • Check for loose or broken wires on the moisture sensor.

MOBILE APP

FIGURE 5. File Transfer Error

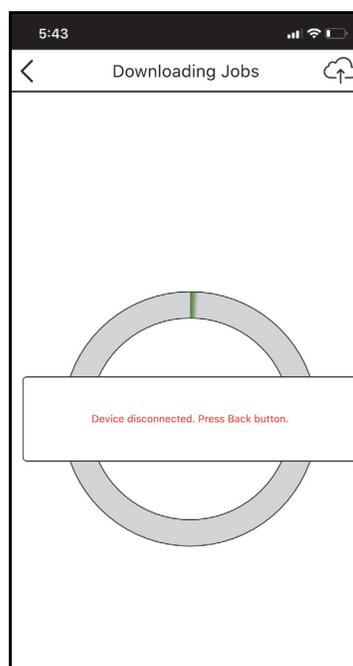
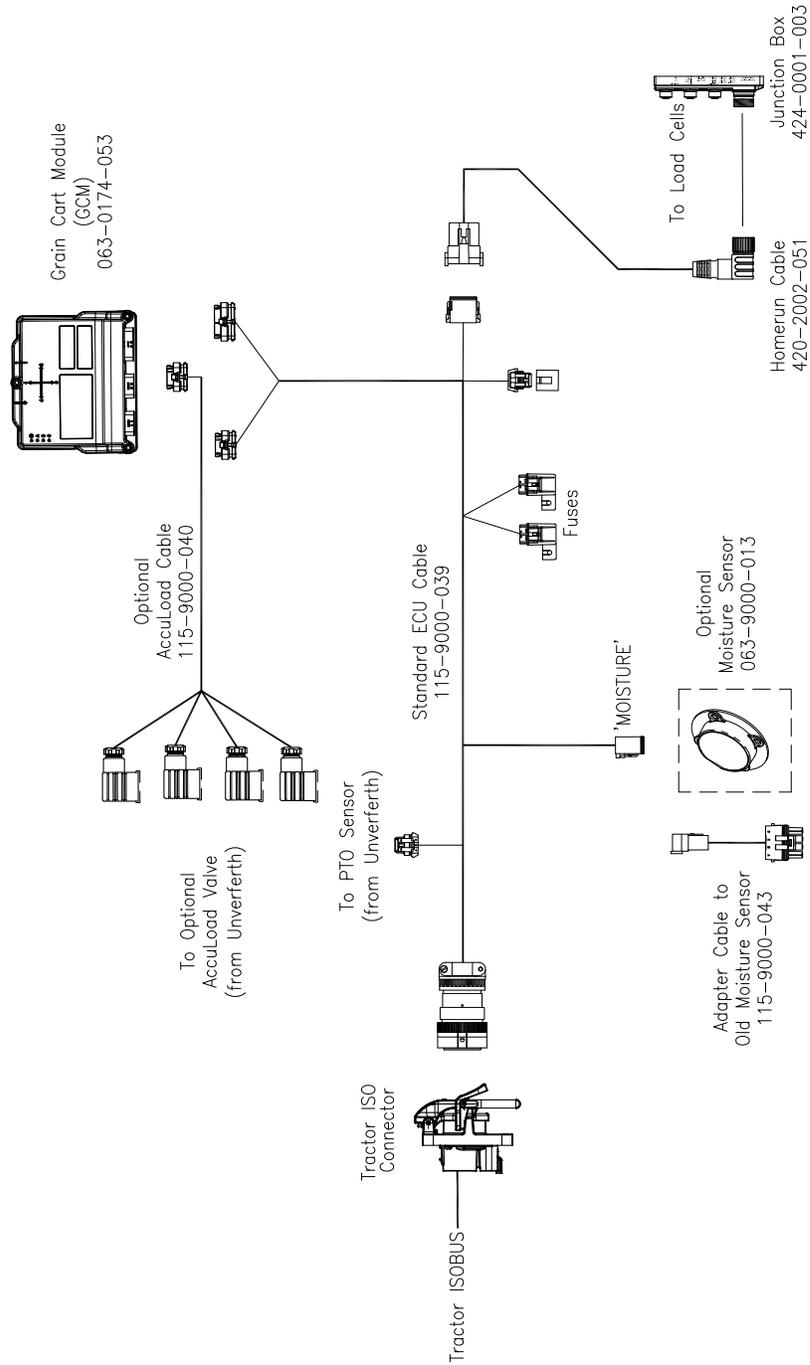


TABLE 6. Mobile App Troubleshooting

Issue	Action
App will not connect to the UHarvest Pro ECU.	<ul style="list-style-type: none"> • Some devices with weaker Bluetooth chips may need multiple attempts to connect. Attempt 4-5 times before moving to other troubleshooting methods. • Completely close out the app, cycle power on the ECU, and launch the app again. • Move closer to the ECU and try to connect. If the connection is successful, it may be necessary to relocate the ECU to provide a better signal in the tractor cab.
Error occurs during the transfer:	<ul style="list-style-type: none"> • Completely close out the app, cycle power on the ECU, and launch the app again.
Error occurs during upload to Slingshot.	<ul style="list-style-type: none"> • Verify that the mobile device has an internet connection (cellular or WiFi). • Verify that the Slingshot access key has been properly entered into the UHarvest Pro app.
App does not show any available UHarvest Pro devices.	<ul style="list-style-type: none"> • Verify that the mobile device Bluetooth is enabled. • Verify that the ECU is powered. • Navigate to the Bluetooth information menu in the Diagnostics screen on the UT. Verify that the Bluetooth status says "Advertising" and that the box is checked for "Enable Wireless." • Toggle the "Enable Wireless" check box off and on again. • Completely close out the app, cycle power on the ECU, and launch the app again.

FIGURE 1. UHarvest Pro System Diagram



CHAPTER

CALIBRATION NUMBERS

14



FIGURE 1. Common Scale Calibration Values (Page 1)

Brand	Model	Capacity	Steerable Tandem	Tracks	Walking Tandem	Single Tires (5pt)	Single Tires (3pt)	Straddle Duals
Gain/Cal Number/#Load Cells								
Brent	2096	112000	1.288/78000/5	1.1/40000/5	-	-	-	-
	1596	84000	1.5/40000/5	1.1/40000/5	-	-	-	-
	1396	72800	-	.75/40000/5	1.5/40000/5	.75/40000/5	-	-
	1196	61600	-	.75/40000/5	1.5/40000/5	.75/40000/5	-	-
	1386	74480	-	.75/40000/5	-	.75/40000/5	-	-
	1186	63000	-	.75/40000/5	-	.75/40000/5	-	-
	1282	67200	-	.75/40000/5	1.5/40000/5	.75/40000/5	-	-
	1182	61600	-	.75/40000/5	-	.75/40000/5	-	-
	1082	56000	-	.75/40000/5	-	-	1.75/24000/3	1.75/24000/3
	882	47040	-	-	-	-	1.75/24000/3	1.75/24000/3
	782	42000	-	-	-	-	1.75/24000/3	1.75/24000/3
	V1500	84000	-	1.1/40000/5	-	-	-	-
	V1300	72800	-	.75/40000/5	-	.75/40000/5	-	-
	V1100	61600	-	.75/40000/5	-	.75/40000/5	1.288/46500/3	-
	V1000	56000	-	.75/40000/5	-	.75/40000/5	1.288/46500/3	.75/40000/3
V800	44800	-	.75/40000/5	-	-	1.288/46500/3	1.288/46500/3	
V700	39200	-	-	-	-	1.288/46500/3	1.288/46500/3	
Unverferth	2020	11200	1.1/40000/5	1.1/40000/5	-	-	-	-
	1610	89600	-	1.1/40000/5	-	-	-	-
	1310	72800	-	.75/40000/5	1.5/40000/5	.75/40000/5	-	-
	1110	61600	-	.75/40000/5	1.5/40000/5	.75/40000/5	-	-
	1319	72800	-	.75/40000/5	-	.75/40000/5	-	-
	1119	61600	-	.75/40000/5	-	.75/40000/5	1.288/46500/3	-
	1019	56000	-	.75/40000/5	-	.75/40000/5	1.288/46500/3	.75/40000/5
	1317	72800	-	.75/40000/5	1.5/40000/5	.75/40000/5	-	-
	1117	61600	-	.75/40000/5	1.5/40000/5	.75/40000/5	-	-
	1017	56000	-	.75/40000/5	-	.75/40000/5	1.288/46500/3	-
	1315	72800	-	.75/40000/5	1.5/40000/5	.75/40000/5	-	-
	1115	61600	-	.75/40000/5	1.5/40000/5	.75/40000/5	-	-
	1015	56000	-	.75/40000/5	-	.75/40000/5	1.288/46500/3	-
	1160	61600	-	.75/40000/5	-	.75/40000/5	1.288/46500/3	-
	1060	56000	-	.75/40000/5	-	.75/40000/5	1.288/46500/3	.75/40000/5
	860	44800	-	.75/40000/5	-	-	1.288/46500/3	1.288/46500/3
	760	39200	-	-	-	-	1.288/46500/3	1.288/46500/3
	1050	58800	-	.75/40000/5	-	.75/40000/5	-	-
	9250	56000	-	-	-	-	(900) 1.5/24000/3	-
		56000	-	-	-	-	(1050) 1.288/46500/3	-
8250	44800	-	-	-	-	1.5/24000/3	1.288/46500/3	
7250	39200	-	-	-	-	1.5/24000/3	1.288/46500/3	

For all other brand grain carts use the following formula
 Cal Number = Axle Weigh Bar Capacity/(5 x mV Output) x # load cells x 2

FIGURE 2. Common Scale Calibration Values (Page 2)

Brand	Model	Capacity	Steerable Tandem	Tracks	Walking Tandem	Single Tires (5pt)	Single Tires (3pt)	Straddle Duals
-	-	-	Gain/Cal Number/#Load Cells					
Parker	1648	89600	-	1/46000/5	-	-	-	-
	1352	72800	-	.75/40000/5	1.5/40000/5	.75/40000/5	-	-
	1152	61600	-	.75/40000/5	1.5/40000/5	.75/40000/5	-	-
	1348	72800	-	1/46000/5	1/46000/5	1/46000/5	-	-
	1048	56000	-	1/46000/5	-	-	1/27500/3	-
	1142	61600	-	.75/40000/5	-	.75/40000/5	1.288/46500/3	-
	1042	56000	-	.75/40000/5	-	.75/40000/5	1.288/46500/3	-
	842	44800	-	.75/40000/5	-	-	1.288/46500/3	1.288/46500/3
	742	39200	-	-	-	-	1.288/46500/3	1.288/46500/3
	1139	61600	-	1/46000/5	-	1/46000/5	1.0/27500/3	-
	1039	56000	-	-	-	-	(900) 1.0/27500/3	-
		56000	-	-	-	-	(1050) 1.74/27500/3	
	839	44800	-	-	-	-	1.0/27500/3	1.74/27500/3
739	39200	-	-	-	-	1.0/27500/3	1.74/27500/3	
Killbros	1611	89600	-	1/46000/5	-	-	-	-
	1311	72800	-	1/46000/5	1/46000/5	1/46000/5	-	-
	1111	61600	-	1.0/46000/5	1.0/46000/5	1.0/46000/5	-	-
	1950	56000	-	1.0/46000/5	-	-	1.0/27500/3	-
	1135	61600	-	.75/40000/5	-	.75/40000/5	1.288/46500/3	-
	1035	56000	-	.75/40000/5	-	.75/40000/5	1.288/46500/3	-
	835	44800	-	.75/40000/5	-	-	1.288/46500/3	1.288/46500/3
	735	39200	-	-	-	-	1.288/46500/3	1.288/46500/3
	1135	61600	-	1/46000/5	-	1/46000/5	1.0/27500/3	-
	1195	56000	-	-	-	-	(900) 1.0/27500/3	-
		56000	-	-	-	-	(1050) 1.74/27500/3	
	1185	44800	-	-	-	-	1.0/27500/3	1.74/27500/3
	1175	39200	-	-	-	-	1.0/27500/3	1.74/27500/3

Brand	Model	Steerable Tandem	Tracks	Walking Tandem	Single Tires (5pt)	Single Tires (3pt)	Straddle Duals
Parker w/ Weightronix Load Cells	1648	-	40000	-	-	-	-
	1348	-	40000	40000	40000	-	-
	1048	-	40000	-	-	24000	-
	1139	-	40000	-	40000	24000	-
	1039	-	-	-	-	24000	-
	839	-	-	-	-	24000	24000
	739	-	-	-	-	24000	24000
Killbros w/ Weightronix Load Cells	1611	-	40000	-	-	-	-
	1311	-	40000	40000	40000	-	-
	1111	-	40000	40000	40000	-	-
	1950	-	40000	-	-	24000	-
	1135	-	40000	-	40000	24000	-
	1195	-	-	-	-	24000	-
	1185	-	-	-	-	24000	24000
1175	-	-	-	-	24000	24000	

For all other brand grain carts use the following formula
 Cal Number = Axle Weigh Bar Capacity/(5 x mV Output) x # load cells x 2

LIMITED WARRANTY

WHAT DOES THIS WARRANTY COVER?

This warranty covers all defects in workmanship or materials in your Raven Applied Technology Division product under normal use, maintenance, and service when used for intended purpose.

HOW LONG IS THE COVERAGE PERIOD?

Raven Applied Technology products are covered by this warranty for 12 months from the date of retail sale. In no case will the Limited Warranty period exceed 24 months from the date the product was issued by Raven Industries Applied Technology Division. This warranty coverage applies only to the original owner and is non-transferable.

HOW CAN I GET SERVICE?

Bring the defective part and proof of purchase to your Raven dealer. If the dealer approves the warranty claim, the dealer will process the claim and send it to Raven Industries for final approval. The freight cost to Raven Industries will be the customer's responsibility. The Return Materials Authorization (RMA) number must appear on the box and all documentation (including proof of purchase) must be included inside the box to be sent to Raven Industries.

WHAT WILL RAVEN INDUSTRIES DO?

Upon confirmation of the warranty claim, Raven Industries will (at our discretion) repair or replace the defective product and pay for the standard return freight, regardless of the inbound shipping method. Expedited freight is available at the customer's expense.

WHAT IS NOT COVERED BY THIS WARRANTY?

Raven Industries will not assume any expense or liability for repairs made outside our facilities without written consent. Raven Industries is not responsible for damage to any associated equipment or products and will not be liable for loss of profit, labor, or other damages. The obligation of this warranty is in lieu of all other warranties, expressed or implied, and no person or organization is authorized to assume any liability for Raven Industries.

Damages caused by normal wear and tear, misuse, abuse, neglect, accident, or improper installation and maintenance are not covered by this warranty.

EXTENDED WARRANTY

WHAT DOES THIS WARRANTY COVER?

This warranty covers all defects in workmanship or materials in your Raven Applied Technology Division product under normal use, maintenance, and service when used for intended purpose.

DO I NEED TO REGISTER MY PRODUCT TO QUALIFY FOR THE EXTENDED WARRANTY?

Yes. Products/systems must be registered within 30 days of retail sale to receive coverage under the Extended Warranty. If the component does not have a serial tag, the kit it came in must be registered instead.

WHERE CAN I REGISTER MY PRODUCT FOR THE EXTENDED WARRANTY?

To register, go online to www.ravenhelp.com and select Product Registration.

HOW LONG IS THE EXTENDED WARRANTY COVERAGE PERIOD?

Raven Applied Technology products that have been registered online are covered for an additional 12 months beyond the Limited Warranty for a total coverage period of 24 months from the date of retail sale. In no case will the Extended Warranty period exceed 36 months from the date the product was issued by Raven Industries Applied Technology division. This Extended Warranty coverage applies only to the original owner and is non-transferable.

HOW CAN I GET SERVICE?

Bring the defective part and proof of purchase to your Raven dealer. If the dealer approves the warranty claim, the dealer will process the claim and send it to Raven Industries for final approval. The freight cost to Raven Industries will be the customer's responsibility. The Return Materials Authorization (RMA) number must appear on the box and all documentation (including proof of purchase) must be included inside the box to be sent to Raven Industries. In addition, the words "Extended Warranty" must appear on the box and all documentation if the failure is between 12 and 24 months from the retail sale.

WHAT WILL RAVEN INDUSTRIES DO?

Upon confirmation of the product's registration for the Extended Warranty and the claim itself, Raven Industries will (at our discretion) repair or replace the defective product and pay for the standard return freight, regardless of the inbound shipping method. Expedited freight is available at the customer's expense.

WHAT IS NOT COVERED BY THE EXTENDED WARRANTY?

Raven Industries will not assume any expense or liability for repairs made outside our facilities without written consent. Raven Industries is not responsible for damage to any associated equipment or products and will not be liable for loss of profit, labor, or other damages. Cables, hoses, software enhancements, and remanufactured items are not covered by this Extended Warranty. The obligation of this warranty is in lieu of all other warranties, expressed or implied, and no person or organization is authorized to assume any liability for Raven Industries.

Damages caused by normal wear and tear, misuse, abuse, neglect, accident, or improper installation and maintenance are not covered by this warranty.