LoadMan® CARTeL Android Application Reference Guide

For

Fork Based

Weigh-In-Motion

Refuse Trucks

Revision 01.0

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SAFETY WARNING

Using this system while operating a motor vehicle may be distracting, dangerous, or prohibited. The operator remains responsible for safe travel, should obey laws and regulations, and should always exercise good judgment. Failure to pay full attention to the operation of the vehicle may cause an accident resulting in serious consequences.

You assume sole responsibility and risk for using this system.

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INTRODUCTION

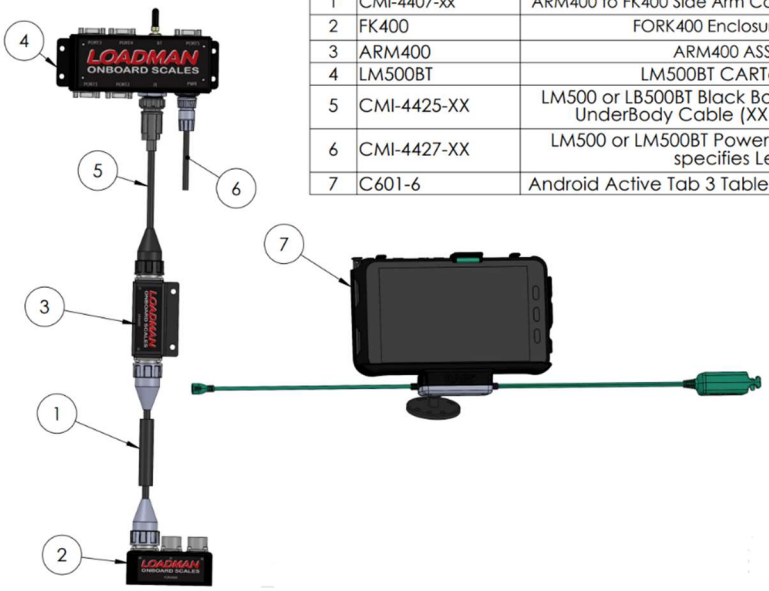
The *LoadMan*® *CARTeL* Android Application (App) is a software program capable of running and controlling many different weigh-in-motion measurement systems. The App documented in this manual is programmed for typical front load, fork-based vehicles that weigh commercial containers in motion – as they are picked up, dumped, and lowered back to the ground. The application documented in this manual is typically used to automatically weigh commercial front load refuse containers and their contents accurately as they are picked up and dumped into the Truck and the empty containers lowered and placed back on the ground. This Software App keeps a running total of the NET contents dumped with each lift and the measured load dumped can then be attributed to a Refuse Customer's Account and stored in the cloud that can be accessed by a typical Web Browser in real time if the Tablet has a cellular service.

The *LoadMan*® system is completely automatic and the driver/operator does not have to press any buttons or take any actions to obtain a weight reading. The Android device display provides all the information needed to understand the status of the weighing system. For example, the App automatically provides the following instruction displays during the weigh-in-motion process as a typical can is picked up and moved up through the weighing window to be weighed, the NET contents of the container dumped into the Truck, then the can lowered back to the ground to complete a typical weighing cycle. The App will give several status displays as a typical weighing cycle is completed and these weighing states will give the operator the following informational displays to help show the operator what the scale is doing during a typical weighing cycle.

READY TO WEIGH	The forks are below the start of the weighing window and ready to weigh.
WEIGHING LOAD	Message while container is lifted through the weighing window.
GROSS WEIGHT	Displays weight of the container and its load.
DUMP LOAD	Weighing is complete and load is ready to dump.
WEIGHING TARE	Measuring the empty container weight while arms are going down.
NET WEIGHT	Displays the computed net weight of the dumped material.
TRUCK	Displays the accumulated load net weight.

INTRODUCTION (cont)

The container load weights are measured and reported to the operator as a net load weight. Also, the dumped load weights are accumulated with the weight of the existing material in the vehicle – providing the driver/operator a running total of the net vehicle weight or the gross vehicle weight. This application not only supports in-motion weighing of the net contents dumped into the truck, but also records the measured load data with optional route, account and GPS data. The *LoadMan*® Fork Based Weigh-In-Motion system consists of the four digital electronic components connected and identified in Figure 1 below;



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CMI-4407-xx	ARM400 to FK400 Side Arm Cable (xx specifies Length)	1
2	FK400	FORK400 Enclosure Assembly	1
3	ARM400	ARM400 ASSEMBLY	1
4	LM500BT	LM500BT CARTel Module	1
5	CMI-4425-XX	LM500 or LB500BT Black Box Module to ARM400 UnderBody Cable (XX specifies Length)	1
6	CMI-4427-XX	LM500 or LM500BT Power Cable with fuse (XX specifies Length)	1
7	C601-6	Android Active Tab 3 Tablet & Ram Mount Cradle	1

Figure 1

- An onboard In-Cab Android device for displaying weight, route and system information and interfacing to the cloud providing system Load Data Collection (LM601-6, Item #7)
- A processing unit usually mounted in the Cab that provides a bluetooth interface between the Android Device and the Onboard Weighing system (LM500BT, Item #4)
- A computer-based Arm Weigh-In-Motion Assembly in a steel protective enclosure mounted one of the lift arms to measure the Arm Angle in real time (ARM400, Item #3)
- A Fork Weigh-In-Motion Assembly mounted in a steel protective enclosure on the fork assembly to measure the fork angle in real time (FK400, Item #2)
- Underbody Cable that connects the LM500BT to the ARM400 module mounted on the Arms of Vehicle (Item #5)
- Side Arm Cable that connects the ARM400 to the FK400 module mounted inside the Fork Loadcell Assembly to measure the Fork Angle and the Fork Loadcells (Item #1)

The fork weigh-in-motion assembly (FK400) converts the sensitive analog data signals from the two fork loadcells to digital, using a precision digital to analog encoder called a CanCoder®. It

INTRODUCTION (cont)

also measures the fork angular position and acceleration, converts the information to digital, and transmits the data to the arm weigh-in-motion assembly (ARM400).

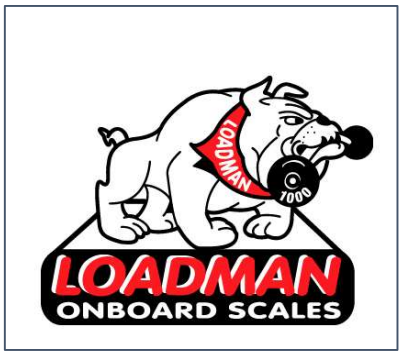
The arm weigh-in-motion assembly (ARM400) also has an angle sensor allowing the weighing system to not only know the angular position/acceleration of the forks, but also the angular position/acceleration of the lift arms in real time. The ARM400 module gathers the weight measurements from the two fork loadcells, the fork angular position/acceleration, and the arm position/acceleration. It then processes this information to measure the weight of the containers plus its contents while going up. Then, in the same manner measures the tare weight of the container going down. The difference between these two weights is the weight of the material dumped into the truck. This information is transmitted to the LM500 black box and then up to the in-cab Android device to be displayed to the driver/operator.

LoadMan®'s Load Management Software (runs from a web browser) manages a cloud database that allows remote tracking of trucks, drivers, customers, routes and products by account or job. Route lists are created with the Load Manager Software and if the Tablet has an internet connection it will automatically synchronize its cloud database data to the *LoadMan*® Android CARTel App. Any recorded load data and/or GPS position data in *LoadMan*®'s data collection memory will be automatically transferred to the Load Management Software - without any prompting or intervention from the driver – whenever an internet connection is established. *LoadMan*®'s Load Management Cloud Software allows several powerful automatic customer identifications using Google Maps and GPS coordinates of load pickups and events as they happen in the field. Other options like RFID container identification are supplied and supported as an option allowing accurate customer/container identification.

Startup

Starting up the CARTel Application

Find the Loadman Icon on the Android Device. Tap on it and the CARTel App will start up. The Icon looks like the image shown below.



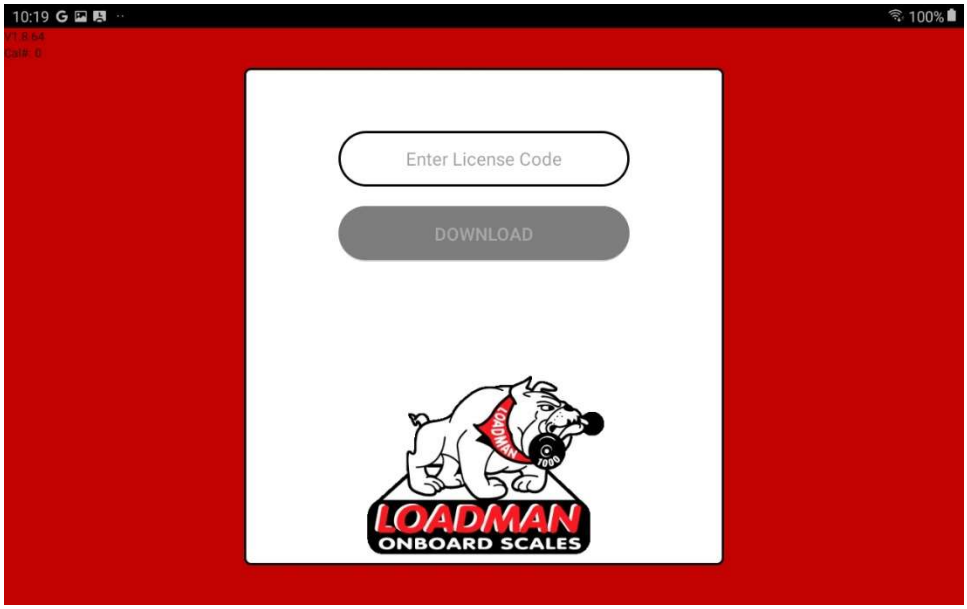
LOADMAN

The Startup Screen pops up on the Screen and shows the Loadman Logo for 1-2 Seconds

STARTUP (cont)

Licensing the CARTel Application

If the CARTel App has never been licensed, then after the start up screen appears an Enter License Screen will appear. Entering a license code provided by *LoadMan*® gives the Tablet instructions on how to properly connect to the correct customer's cloud database that the Tablet is licensed to. If the CARTel App has already been licensed properly, then the screen below is bypassed.



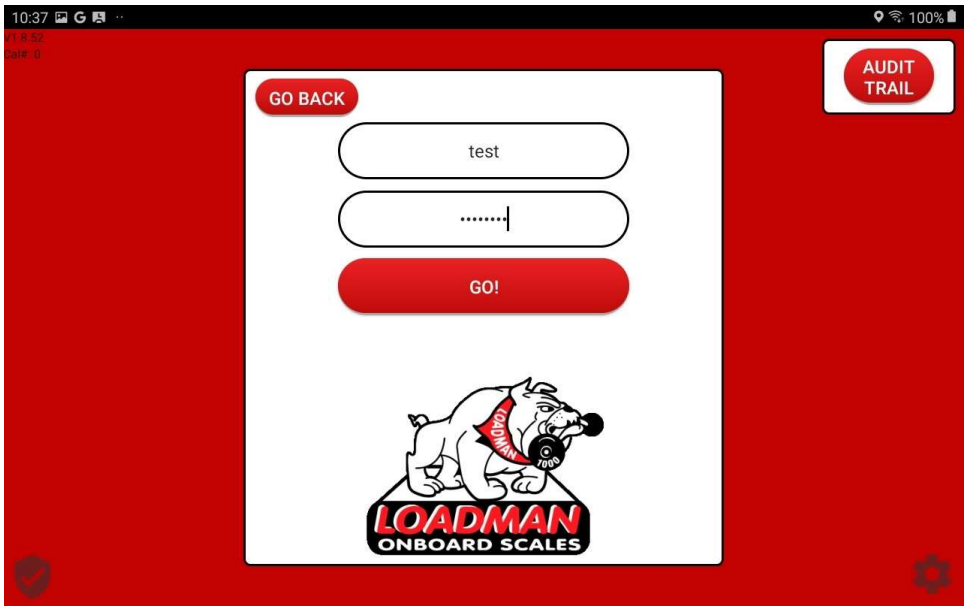
- First, a six-character license code must be obtained from *LoadMan*® On-Board Scales. Enter the code provided in the text box by tapping on "Enter License Code" text and a keypad will appear to enter the six-character code provided. Once entered correctly tap on the "DOWNLOAD" button. If successful, the App will show "Downloading License" then go on to either a driver login page or will display "Scanning for Trucks."
- You can re-license an app by tapping on the small shield with a checkmark on it in the lower bottom corner of the screen when the app is first launched. Once the shield is clicked, a text field to enter a license code will be presented.

STARTUP (cont)

Startup for Online Applications

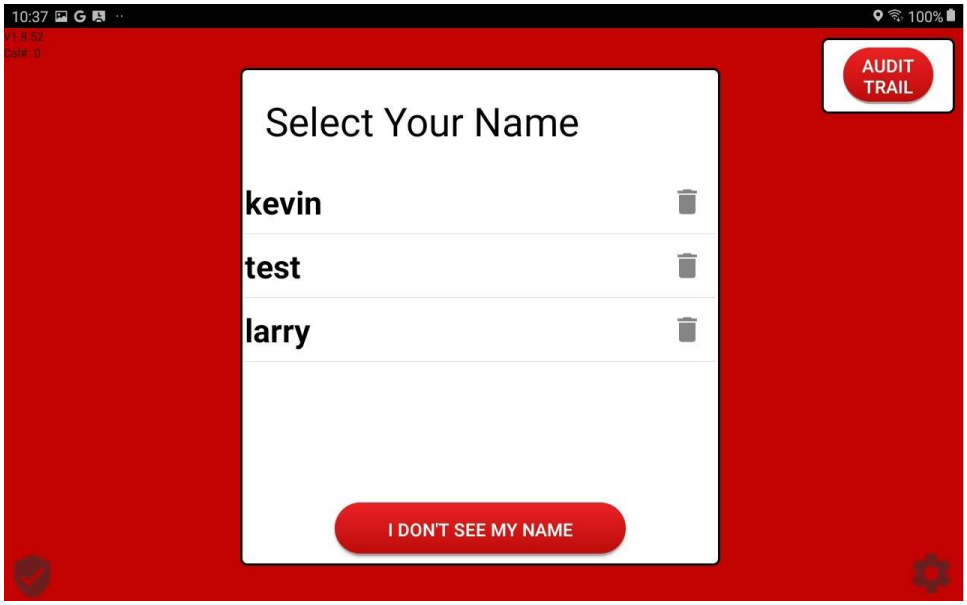
- If an app is to be “online”, meaning it will send load data to the cloud as well as receive data (routes, stops, services etc.) from the cloud, the startup process will involve 3 main steps. Logging in as a driver, connecting to the truck and selecting the route. If the driver login is not desired, then later in the initial setup you can setup the CARTel App to bypass the driver login screen and it will default to the driver that last logged in successfully and skip the driver login screen automatically. If you are using the driver login option, and there is only one driver in the cloud database then you will see the driver and password screen appear shown below. Also, once you log in you can program a setting to forget the password entry altogether. Some users may not want to spend the time needed to enter a password, but others may want to protect who runs the App by using passwords.
- The Program Version of the CARTel App is shown in the upper left corner of the display in small lettering for reference. Also, underneath the Program Version Number is the “Cal #’. If any Setting that affects the Calibration of the Scale is changed, then the Cal # is incremented. Every time a Calibration Setting is changed, it is documented in a Table found in the “Audit Trail” section of the Settings menu.

Logging in as a Driver Screen will look like the screen below



STARTUP (cont)

If there are multiple drivers in the cloud database, then you will see a screen below with all the possible drivers and you must tap on your name to select the correct driver. Once you do that the password screen comes up.



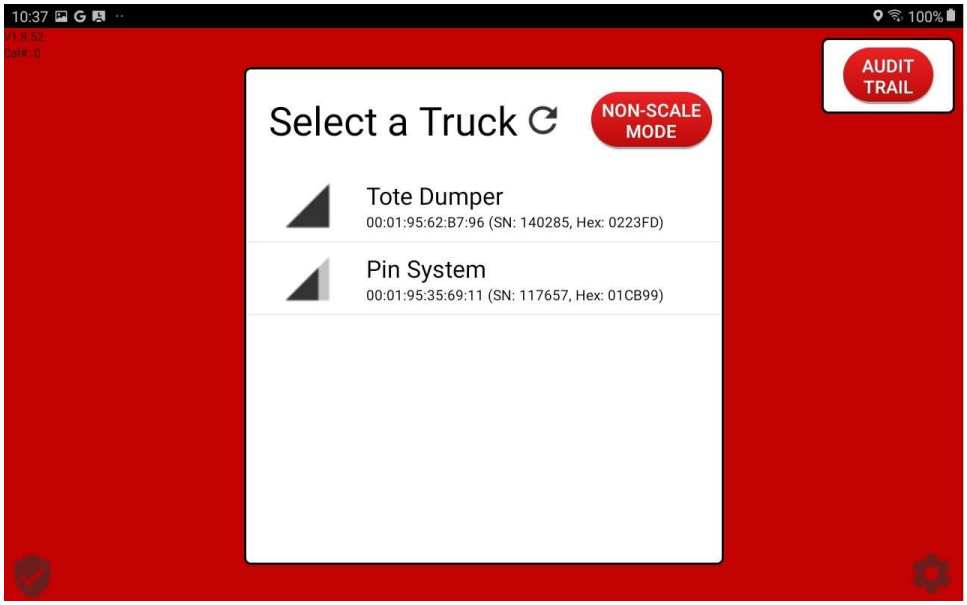
- Beforehand, a driver and password must be set up. This can be done online using Loadman's Driver Portal. Once a driver has been made, simply log in by entering their name and password and tap on "GO"
- An internet connection is needed to log in as a driver who has never logged in before. After a driver has logged in one time, the internet is not needed to log in as that driver.
- Once a driver has logged in at least one time, their name will be displayed on a list right when the app starts. If you want to log in as that driver, simply tap on their name and enter their password.
- If you want to log in as a driver and their name is not on the list, tap on "I don't see my name" at the bottom on the screen, enter the driver's login credentials and tap on "Go". This could happen if the driver has never logged into the CARTel App before.
- To remove a driver in the list, tap on the trash can icon to the right of their name.
- THERE MUST NEVER BE THE SAME DRIVER LOGGED IN TO MORE THAN ONE INSTALLATION RUNNING IN A FLEET. THIS IS NOT ALLOWED.

STARTUP (cont)

Skipping the Driver Login:

- Logging in as a driver is needed for the online app to function, as it supplies credentials to use our API. However, if it is not wanted to have drivers be kept track of by having them enter their own password, the driver login can be skipped once a driver has logged in at least one-time. An option to enable “Skip Driver Login” can be found in the “Misc” page of the Settings of the Loadman app. Once enabled, the driver’s name that appears at the top of the driver’s name list will automatically be logged in upon startup.
- Alternatively, if you do want to keep driver tracking, but don’t want to have them bother with passwords, you can enable a setting to skip the password entering screen, but still require someone to tap on a name.
- Finally, a driver’s name and password can be setup in the license for the app, so that from license download, a driver will automatically be logged in.
- If the first thing you see when you start the Loadman app is “Logging in”, driver login skipping has been enabled. If you want to disable this, simply uncheck it in Settings > Misc.

Connecting to a Truck using the Wireless Bluetooth Option



STARTUP (cont)

- The app will display “SCANNING FOR TRUCKS” and it will display all licensed *LoadMan*® devices within Bluetooth range. To connect to a truck, tap on one of these devices.
- If you are stuck on “SCANNING FOR TRUCKS” and nothing is popping up on the screen, there are a few things you can do. First, open the main “Settings” app on the Android device, then go to Connections > Bluetooth and scan for available devices. Make sure nothing is paired to the tablet having “Loadman” in its friendly name. If there are, then unpair it and hit “scan” again. If you now see a “Loadman” device under “Available Devices” then a Loadman device is in communication range. Again, make sure it is under Available Devices and NOT paired devices. Once it shows up, restart the *LoadMan*® app and it should come up properly.
- If still nothing is showing up it may be that there are no *LoadMan*® devices in range to connect to. Contact *LoadMan*® as something could be configured incorrectly with your license.

Connecting to a Truck using the USB wired RS232 Option

- Plug in the USB cable from the scales to the Android devices USB port. Android may ask you to enable serial communication for the connected device. Tap the allow option to enable this. It may also ask if you want to automatically launch the *LoadMan*® app when the USB device is connected. Also allow this and either start the app yourself or let the app start automatically. Once the Loadman app has started, it should automatically connect and begin communicating with the scales.
- If you open the app and see “SCANNING FOR TRUCKS” even though the USB device is connected, unplug, and then plug the USB cable to the device. If that still does not work, restart the android device. If it still does not work, contact Loadman.
- If you see a message pop up that gives a scale system serial number and says, “Scales not Licensed” contact Loadman to fix your license.

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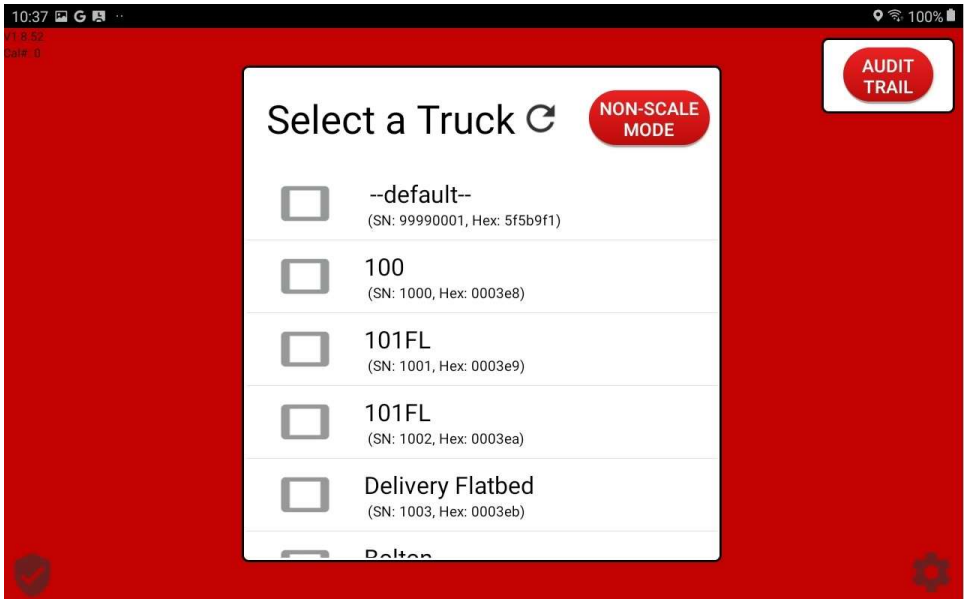
STARTUP (cont)

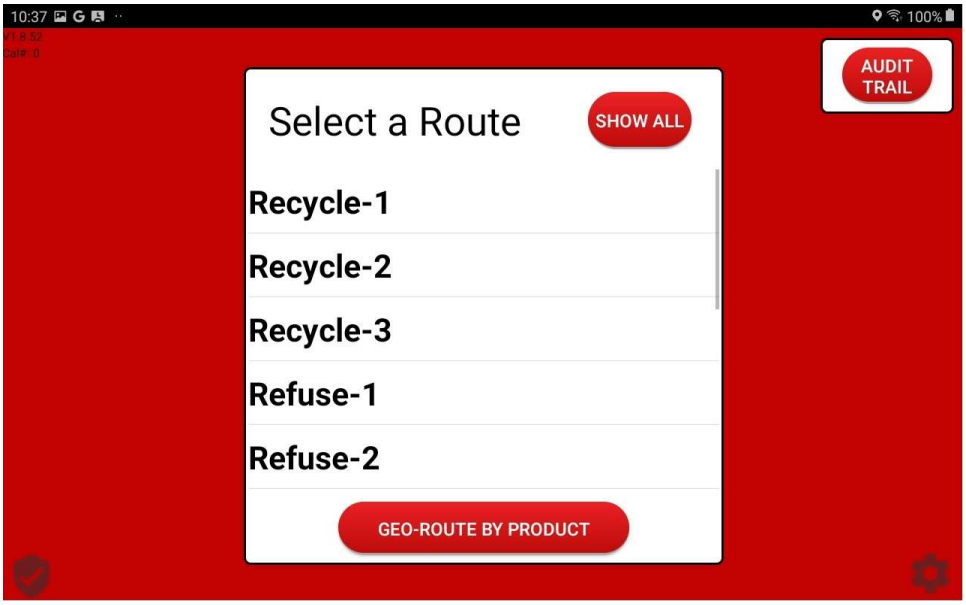
Non-Scale Mode Button Description



- If there is no truck to connect to, the application can still progress to the normal operating mode where the app can run in the “Non-Scale Mode”
- On the screen where you see “Scanning for Trucks”, tap on the button towards the top that says “Non-Scale Mode”
- A scrollable list of all licensed trucks will be presented, tap on the desired truck and all records sent in the normal operating mode will be associated with that truck.
- If it is desired to enter non-scale mode every time the app is launched, an option in Settings > Misc can be enabled to skip the “Scanning for Trucks” message and display the list of licensed trucks every time.

STARTUP (cont)

Downloading Routes:



- A message will display “Downloading Routes” during which time all route data information will be downloaded to the tablet from the licensed database. Depending on the size of the database, this could take a few seconds. An internet is required to download the routes initially. After one download, this step can be skipped if there is no internet connection.
- By default, the app attempts to download routes and it if is unsuccessful, it prompts the user to “retry” or “skip.” Tapping on retry will attempt to download the routes again, tapping on skip goes on to the route selection screen.
- If it is known that at this step, the app will never have an internet connection, the prompt to retry can be skipped. The setting to do this is in Settings > Misc.
- Once the routes are downloaded, a list of routes will be shown to the user. Select one by tapping on it to go on to the main operating screen.
- Routes can be assigned to trucks in the Loadman database. Once a truck has been paired with a route or number of routes, those routes are the only ones that will show up on the route list if that specific truck has been connected to. If no routes belong to a truck, all routes will show up. If a truck has a route or number of routes, but wishes to choose another one, there is a “show all” button to display all routes.
- There is also a button labeled “Geo-Route by Product Type” which can be selected instead of a route. This brings up a list of all product types. Selecting

STARTUP (cont)

one will start the main operating mode and display a geo route of all services of the selected product type. The GPS coordinates are used to automatically identify the customer.

Accessing the Audit Trail:

- Tapping on the "Audit Trail" button in the upper right corner of the screen will allow you to access the audit trail page. Here you can view and export the history of updates to values that affect the calibration of the scales.
- This page can also be accessed in the Settings menu.

Startup for Offline Applications

- Offline applications operate much simpler than online applications. Once an app has been licensed for offline screen, you can simply connect a scale system and go on to the main operating mode. See "Connecting to a Truck" under the "Online Applications" section for more information. This mode allows the scale to be viewed, setup and calibrated but it does not allow customers or commodities to be associated with a Stop Pickup.

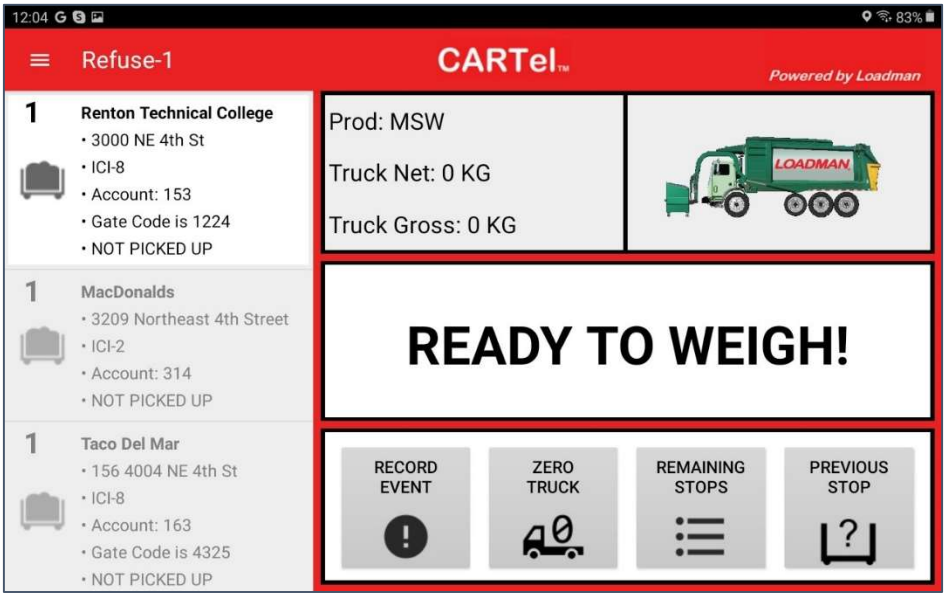
Accessing Settings from the Startup Screen

- Tapping on the gear icon in the bottom right corner of the startup screen will allow you to access the settings for both the scale system and non-scale system.
- The app will first scan for available trucks. If there is a truck in range, you can connect to it here and access the scale's system settings.
- If there is no truck nearby, you can tap on the "non-scale mode" button, select a truck and access the non-scale settings.
- A three-digit security passcode to enter the settings from here is required. The default code is "123" but it can be changed in "Security" in the normal operating mode. See "Security" for more information.

NORMAL OPERATING MODE

Once you get through the startup screens, you will enter the Normal Operating Mode which looks like the screen below. The operation and status of the scale is viewed and controlled through this screen. The on-line Normal Operating Mode is shown below. The main sections of the screen show information relating to;

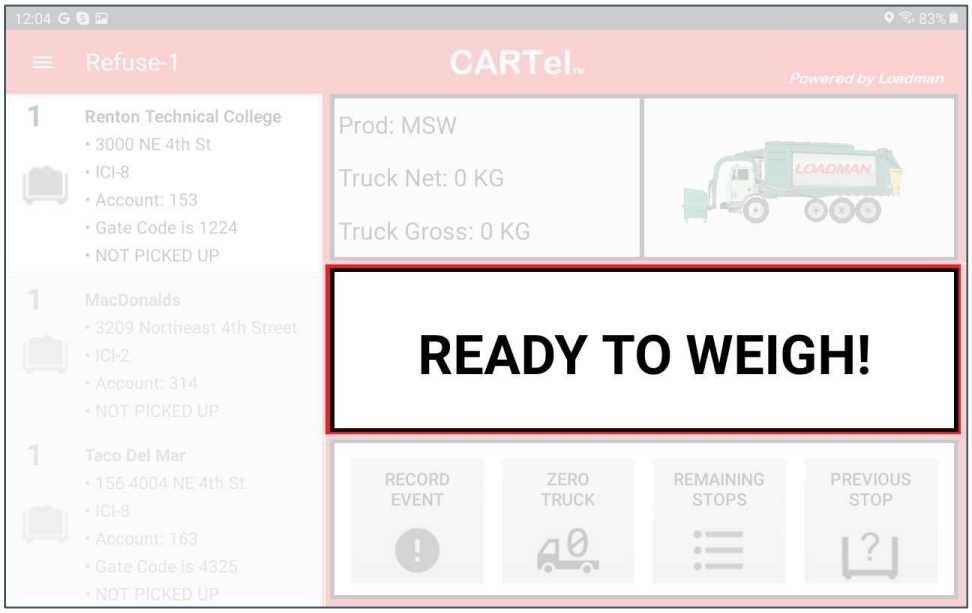
- **LOAD STATE DISPLAYS –** shows information regarding the states the scale goes through to get a Load Reading. The upper right graphic shows the position of the dumpster during the weighing process. The text in the middle right portion of the screen shows text describing each load state.
- **ROUTE LIST** – A scrollable list in the left pane shows the route stops of the route selected during startup.
- **OPERATIONAL CONTROLS –** To perform common scale functions icons in the lower right portion of the screen to activate common scale control functions.
- **INFORMATION AND WEIGHT DISPLAYS –** The upper middle and upper right displays give information pertaining to the Product being picked up and the current NET and GROSS weight of the Truck currently plus a graphic display in the upper right to show the real tim position of the dumpster.
- **SIDE MENU –** Shows less common scale functions and gives access to them.



Normal Operating Mode (cont)

LOAD STATE DISPLAYS

This display is where the weigh-in-motion system normally operates. It has been set up to automatically provide the operator with all the instructions and information needed to run the in-motion weighing system (or alternately the Static-Weigh-Mode discussed in the appendix).



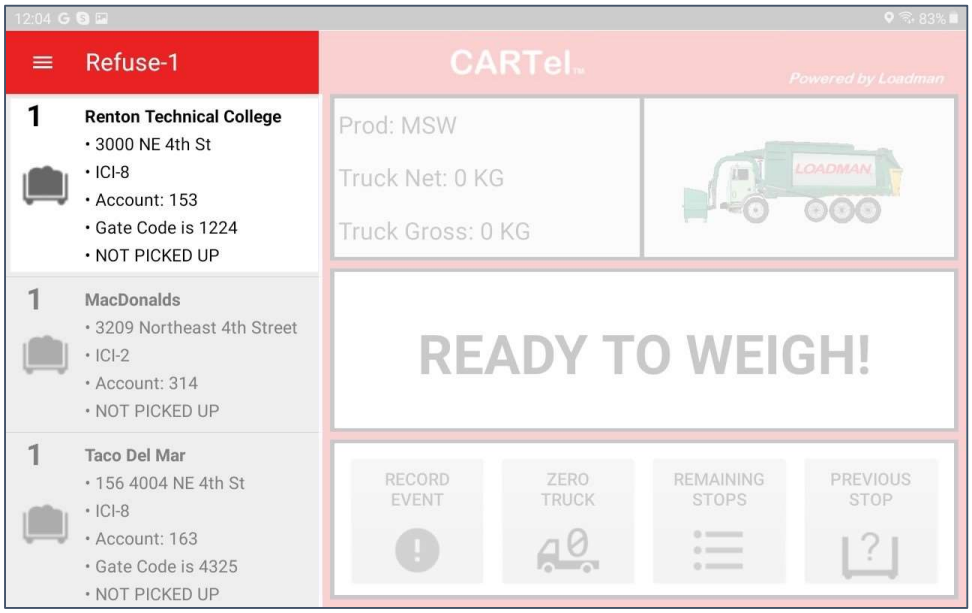
- **READY TO WEIGH**
  Informs the operator that the weigh-in-motion system is ready to weigh.
- **WEIGHING LOAD**
  This message is displayed once the arms have reached the start of the weighing window. There is no need to stop the arms during the weighing sequence as *LoadMan®* computes the weight while the forks and arms are in-motion.
- **GROSS xxxxxx**
  Gross weight of the loaded container – once the arms have been raised above the weighing window. xxxxxx represents the gross weight of the container and its contents.
- **DUMP LOAD**
  This message flashes above the gross weight to inform the operator to complete the lifting process by completely dumping the load.
- **LOWER ARMS**
  LoadMan® displays this message once the load has been dumped and the arms are being lowered.
- **WEIGHING TARE**
  Message displayed as the emptied container is being weighed – while the arms continue to be lowered below the weighing window.

Normal Operating Mode (cont)

- **NET** **xxxxxx**
  Displays the net weight where xxxxxx stands for the weight of the material just dumped into the truck.
- **RECORDING** **LOAD**
  The message indicates that the weigh-in-motion process has successfully completed, and the net weight has been entered into the load record. Additionally, the recorded net weight is added to the accumulated total weight of the TRUCK.
- **CYCLE** **ARMS**
  Infrequently. - This message informs the operator to position the arms below the start of the weighing window (Ready to Weigh State) and forks near zero degrees. This will reset the error and the display will show READY TO WEIGH after this correction is made.

ROUTE LIST

Displayed on the left side of the main operating screen is the route list. This is a scrollable list of stops comprising a single route. One route stop at a time can be “selected”. When any load, event or other kind of record is sent by the app, the record will be associated with the selected customer on the route list. Almost everything about the route list can be customized, from the information on the stop to how the stop is chosen.



Normal Operating Mode (cont)

THE ROUTE STOPS

- Each stop in the route is represented by a tile on the route list. Each tile, by default, contains basic information about the stop, this includes things like the name of the stop, product type, account # and service type. All this information can be configured to show different information and in a different order. By default, instructions for the stop will also be displayed if there are any defined.
- The “quantity” of containers at a given stop will be displayed in the top left corner of the route tile. When a load is picked and is determined by the system to be a valid load or an event is recorded, this number will decrease by one.
- When a load is picked up and is determined by the system to be a valid load, the route stop tile will turn green and the load weight will be displayed on the route tile along with the other information. If an event is recorded, the tile will turn red, and the event will be displayed on the route tile.
- When the quantity number hits zero the list will automatically scroll to the next stop. The operator can always tap on any stop to select it again, regardless of how many times that stop has had a load or event recorded at it. Once selected, any load or event will be associated with that stop.

DETECTING A ROUTE STOPS WITH GPS

GEO-ROUTE MODE

- This mode updates the route list to show close-by stops only. Every time the truck comes to a stop, the list will be updated.
- What customers are in the route list is determined by the “geo-route radius”. This is a number, in feet, of how far away the app will detect a stop and display it on the route list. For example, if the geo-route radius is 1000 feet, all stops within 1000 feet of the truck will be displayed on the list.
- All stops within the geo-route radius will be displayed, with the closest stop at the top of the list, followed by any other stops that are within the radius, in order of their proximity to the truck. The top stop will also automatically be selected.
- You can change the size of the geo-route radius in GPS/GEO ROUTE in the settings.
- If no stop is detected, there will always be a stop labeled CUSTOMER UNKOWN that will be associated with any loads recorded.
- If the truck is in an area with many stops close to each other, some action may need to be taken by the driver to select the correct one when picking it up. This can be done by simply tapping on the desired customer on the route list if it is not automatically selected when the truck comes to a stop.

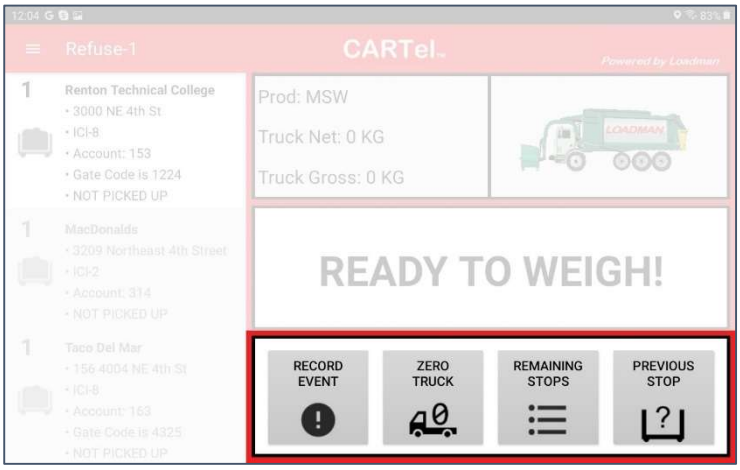
Normal Operating Mode (cont)

GEO-FENCE MODE

- This mode selects and locks onto "CUSTOMER UNKNOWN" on the route list. When this specific stop is selected, the Loadman server will assign any record (load record, event record, etc...) to the best possible match based on the GPS coordinates of that record.
- This is done on the “back-end” of the system. Meaning the Android app will send the record associated with CUSTOMER UNKNOWN and let the cloud software assign the record later.
- The geo-route radius DOES NOT matter for this mode.

You can put the tablet into either or both modes. If both are enabled, CUSTOMER UNKNOWN will still be at the top of the list and most loads will be recorded with it, but the driver will also have a list of near-by stops underneath that they can select if they are picking up a container that is near another one.

OPERATIONAL CONTROLS



Recording an Event:

- An “Event” is any reason a stop cannot be serviced. This could mean anything from a car being parked in front of a container to a gate being locked. To send information about why a stop cannot be serviced, a driver can manually send an “event record”.
- All possible events are pre-determined and set up beforehand in the Loadman database. The list of events are downloaded to the android device just like routes and route stops are
- Tap on the “Record Event” button to be presented with a list of possible events. Tap on one and you’ll be asked if you want to include a picture with the event. If you say yes, you can either take a picture with the android device itself or select

Normal Operating Mode (cont)

from a google photos library. If you don't wish to include a picture, the event will send and be associated with the selected route stop.

Zeroing the Truck:

- Tapping on the "Zero Truck" button will bring you to a screen where you can zero out the accumulated Net weight of the truck.
- You have the option of simply tapping the "Zero Truck" button on this screen, or optionally entering in information gathered from a dump site. Namely the gross weight of the truck upon entering the dump site and the tare weight of the empty truck upon leaving.
- Entering Gross and Tare weight information will cause a "Zero Truck" record to be sent which includes the accumulated Net weight from the Loadman scales prior to zeroing as well as platform scale information measured at the dump site.

Remaining Stops

- Tapping on the "Remaining Stops" button will bring up a list of the stops that have not been serviced yet or still have remaining containers.
- All remaining stops will be displayed in route order in a list. Any event that has been recorded for a stop will also show up on the list to remind the driver why that stop has not yet been serviced
- Tapping on a route stop will cause the route list to scroll to that stop, if it is in the list. This might not do anything if you are running in geo-route or geo-fence mode.

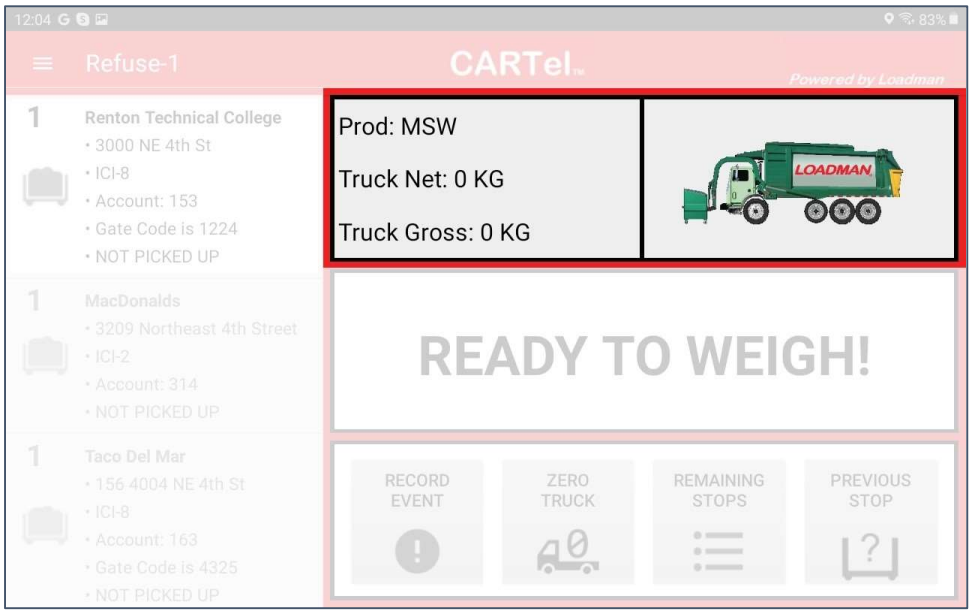
Previous Stop

- Tapping on the "Previous Stop" button will bring up a dialog with information about the last stop that was serviced. This includes information like the load weight, stop name and service type.

INFORMATION AND WEIGHT DISPLAYS

Above the Load state are two boxes, one displaying weight information and another showing a graphic of a front-loading truck as highlighted in the graphic below.

Normal Operating Mode (cont)



Weight and Product Information Display:

- The product type is displayed at the top of this view. The products type is associated with whatever route is selected. The product type can be changed by tapping on the text of the product type. This will bring up a list dialog where you can select another product type.
- The next piece of information displayed is the accumulated Net weight of the truck. This is a summation of all loads since the last time the truck was zeroed.
- The last piece of information displayed is the Gross weight. This is the weight of the empty truck (tare weight) added to the accumulated Net weight. You can set the tare weight of the truck under Settings > Misc.

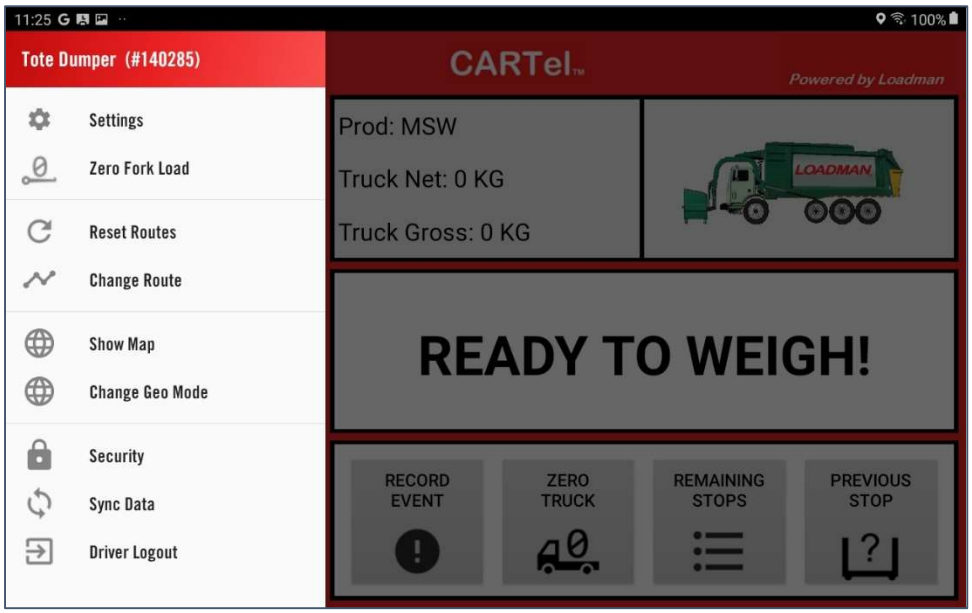
Truck Graphic:

- This displays a graphic of the truck and its arms/forks as it they move through the loading cycle. This should accurately reflect how the truck looks in real time.
- If the scale system you have installed is a “pin system”, then the “frame angle” will also be displayed in this view. The frame angle is the angle of the slope that the truck itself is on.

THE SIDE MENU

By swiping the screen from the left or by tapping on the 3 horizontal lines (hamburger) button in the top left corner of the screen, the sliding side menu will open. Here is an explanation of all menu items.

Normal Operating Mode (cont)



Settings

- Selecting this option will open the settings menu. See more about settings in the Settings section

Zero Fork Load

- Selecting this option will open a screen that will allow you to zero the fork load. Zeroing the fork load is normally done with no load on the forks.
- Zeroing the Fork Load zeroes the scales that measure each individual load pickup.
- Bring the arms and the fork angles between –1 and 1 degree and tap on the “Zero Fork Load Button”.

Reset Routes

- Selecting this option will allow you to reset the information gathered in the routes.
- Whenever a stop is serviced, it will be marked as complete, and the load weight will be associated with that stop. This information will remain with the stop until the routes are reset, even if the app is closed or restarted.
- You can also set a time of day for the routes to reset. This is in Settings > Misc. If the time of day passes and the app is not running or the android device is off, the routes will still be reset.

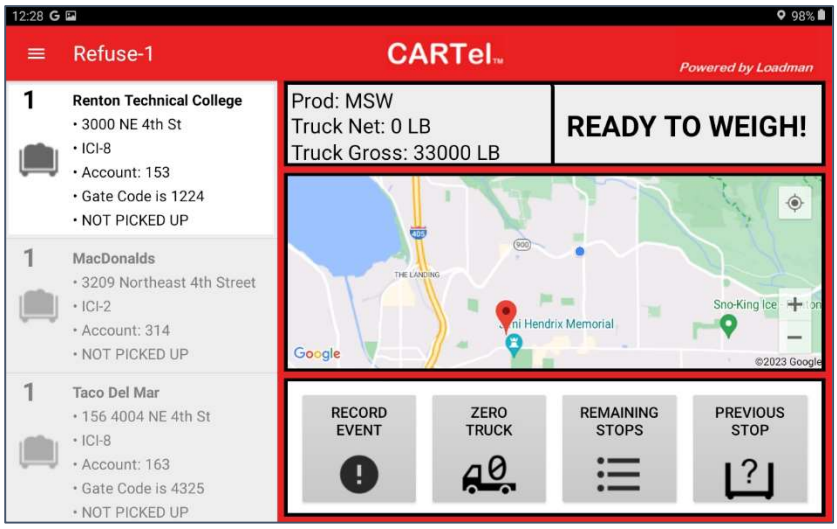
Change Route

- Selecting this option will bring up a dialog with a scrollable list of all routes. Tap on a route to select one.

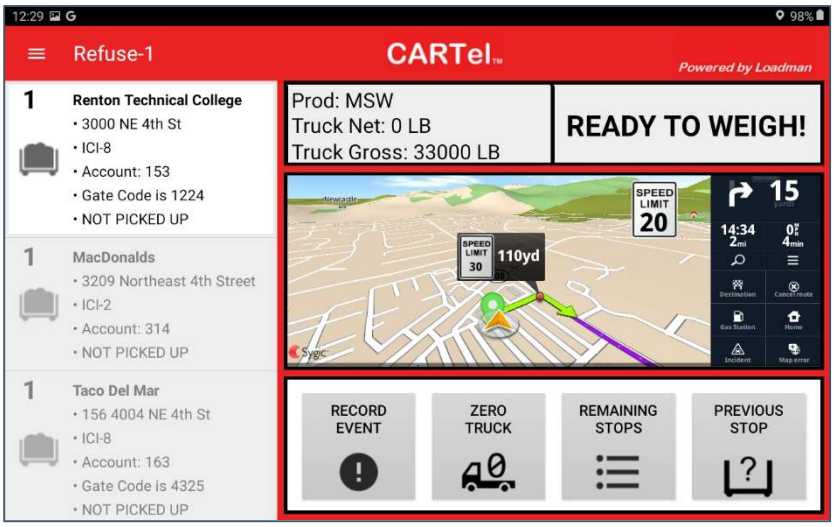
Normal Operating Mode (cont)

- There is also a button at the bottom labeled “Geo Route by Product that will allow you to select a product type to run a geo-route with.

Show/Hide Map



- Selecting this will either hide or show a map in the center of the screen where the load state is. When the map is visible, the load state will move to the upper right.
- By default, the Loadman app will display a map with google map functionality. It will display the truck’s location with a small blue dot, and the location of the selected stop with a red pin. This can function offline but does not offer any routing capabilities by default.
- Optionally, a more robust map can be displayed here powered by Sygic maps. This offers turn by turn navigation to the selected route stop but requires a subscription to use.



Normal Operating Mode (cont)

Change Geo Mode

- This brings up a screen with options to change to geo-route mode or geo-fence mode. Or turn these modes off.
- For more information about these modes, see the route list section.

Security

- Selecting this will launch a screen where you can set the security settings.
- A 3-digit code can be set from this screen and there will be a checkbox to enable security. With security enabled, a user must enter the 3-digit code to enter the settings menu of the Loadman app
- If security is enabled when this option is selected from the side menu, the 3-digit code must be entered to change the security settings.

Sync Data

- This causes a full reset of all data downloaded to the android device. Examples of this data are things like routes, route stops, events and product types. This will delete all data on the tablet currently and re-download everything from the cloud database.

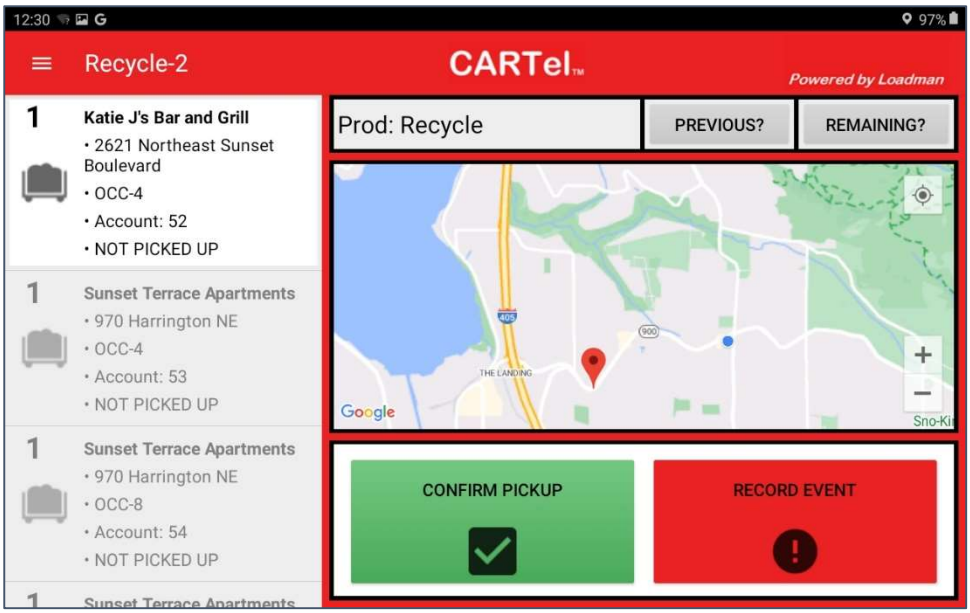
Driver Logout

- This logs the driver out and brings the user back to the initial startup screen.

NON-SCALE MODE

The application can still operate without a connection to any scales. This can be useful if there is no truck available, but you want to view certain settings, send unsent records or verify that the routes have been downloaded correctly.

Normal Operating Mode (cont)



Recording Loads

- The application can also still send load records in the form of a “Confirm Pickup Record”, but a manual button press from the driver is needed for this to occur.
- Displayed on the bottom of the screen you will see two buttons, one green button labeled “Confirm Pickup” and one labeled “Record Event”. Tapping on the “Confirm Pickup” button will send a confirm pickup record for the selected customer on the route list
- In sequential mode, confirming a pickup will cause the route list to scroll to the next stop in the list once the quantity of containers (the number in the upper left of the route stop tile) hits zero.

Recording Events

- An event can be recorded by tapping on the red “Record Event” button. This will function identically to tapping the record event button in scale mode. See “Recording an Event” under “Operational Controls” for more information.

Normal Operating Display

- Many aspects of non-scale mode are similar to the scale-mode, with many of the same controls, just in different spots on the screen.
- The route list will be displayed and will function identically to scale mode on the left side of the screen. The only difference being "confirm pickup records” will affect the route list in the way “load records” do for scale mode.
- A large map will comprise most of the right-hand section of the screen. By default, this will be a map powered by google maps that will display a blue dot wherever the android device is and a red pin where the selected customer on the route list is.

Normal Operating Mode (cont)

- At the top of the screen will be controls for the current product, previous stop and remaining stops. See “Operational Controls” for more information.

Settings

- Since no scale system is connected there will be far less options in the Settings menu to choose from. See “Non-Scale System Settings” under “Settings” for more information.

SETTINGS

SCALE SYSTEM SETTINGS

LoadMan®'s Setup & Calibration Mode provides the operator the capability to program advanced functionality, setup and calibrate a truck's configuration, choose optional information displays, enable communications, and troubleshoot issues. Refer to Table 6.

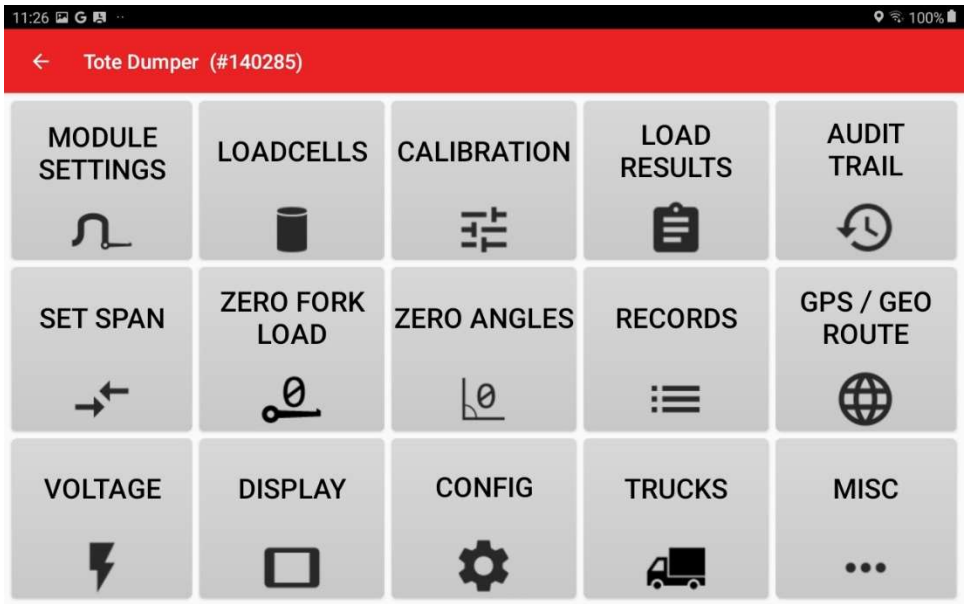
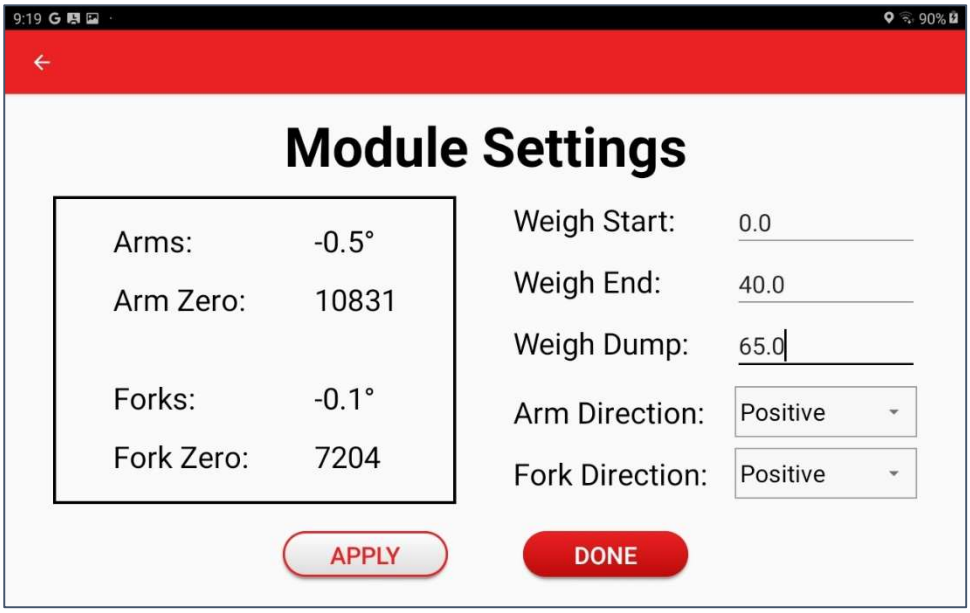


Table 6. Setup & Calibration Commands

MODULE SETTINGS	Used for setup and calibration of the weighing window and the fork/arm angle directions
LOADCELLS	Displays loadcells, their current weight reading and allows for calibration of values that directly affect the load weight sensing.
CALIBRATION	Allows for calibration of the scale system specifically with regards to the system in motion.
LOAD RESULTS	Displays internal scale data from the last weighing cycle
AUDIT TRAIL	Displays a history of the last 1000 changes to calibration values.
SET SPAN	Calibrates *LoadMan* to readings taken from another truck scale
ZERO FORK LOAD	Resets the fork load cells to zero
ZERO ANGLES	Resets the fork and arm angles to zero
VOLTAGE	Displays the voltage readings for the different modules of the scale system
DISPLAY	Allows for the setting of values that affect how the weight is displayed on the screen, but don't change the actual calibration of the scales (units, count by, show neg weight)

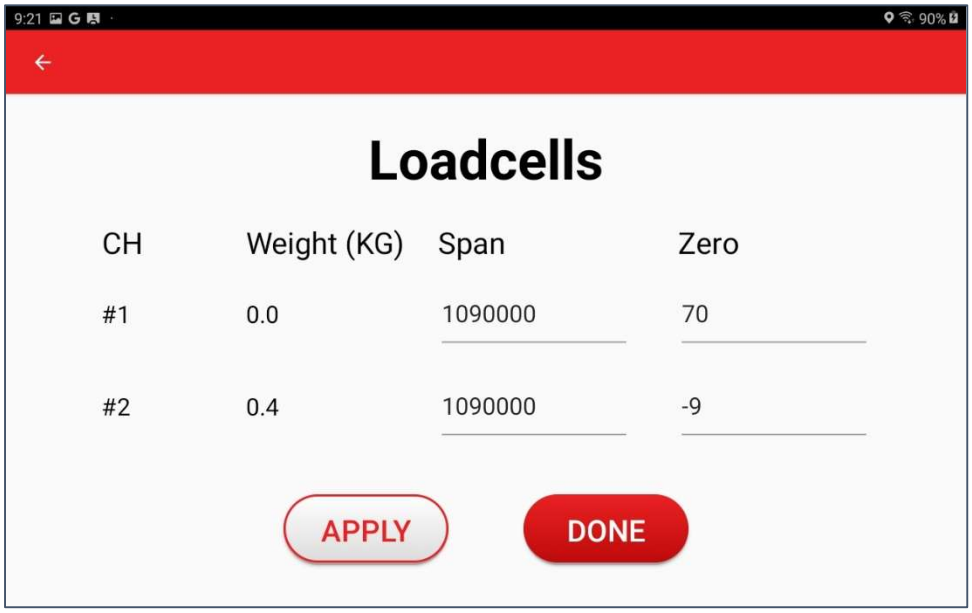
CONFIG	Allows for the changing of many various internal values in the scale system. These affect the output from the system but not the calibration of the scales

Module Settings



- **Weigh Start –** The starting set point angle of the weigh-in-motion window. (Preferred setting is 0.0 degrees.)
- **Weigh End –** The ending set point angle of the weigh-in-motion window. (Preferred setting is 40.0 degrees.)
- **Weigh Dump –** The dump load set point angle of the weigh-in-motion window. (Preferred setting is 65 degrees.)
- **Arm Direction –** A value that determines which direction the arm angle goes when it the arms are raised or lowered. This can be positive or negative.
- **Fork Direction –** A value that determines which direction the fork angle goes when it the forks are raised or lowered. This can be positive or negative.

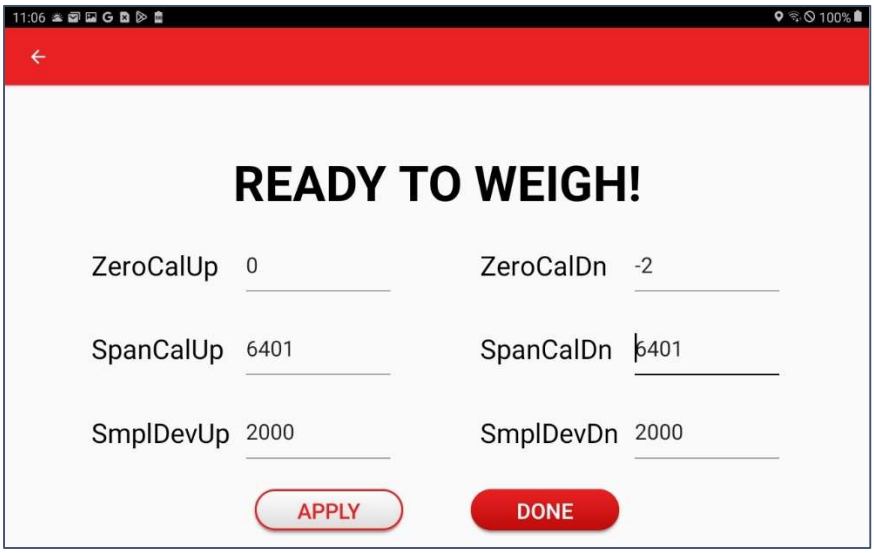
Loadcells



- **CH1 Span –** Sets the gain sensitivity in counts per microvolt for the Channel 1 Loadcell. 1090000 is recommended (See *Note below).
- **CH1 Zero –** Adjustment value to allow the Channel 1 Loadcell to read zero with a dead load.
- **CH2 Span –** Sets the gain sensitivity in counts per microvolt for the Channel 2 Loadcell. 1090000 is recommended (See *Note below).
- **CH2 Zero –** Adjustment value to allow the Channel 2 Loadcell to read zero with a dead load.

***NOTE: If the same weight were to read different on the driver's side of the scale vs the passenger side of the scale, then it is possible to make a manual adjustment to CH1 Span setting and/or CH2 Span setting to make the same weight read the same on either side of the scale. Once this ratio is set it will normally never be changed again. All calibration at this point will be done with the SpanCalUp and the SpanCalDn numbers described in "Calibration" section below.**

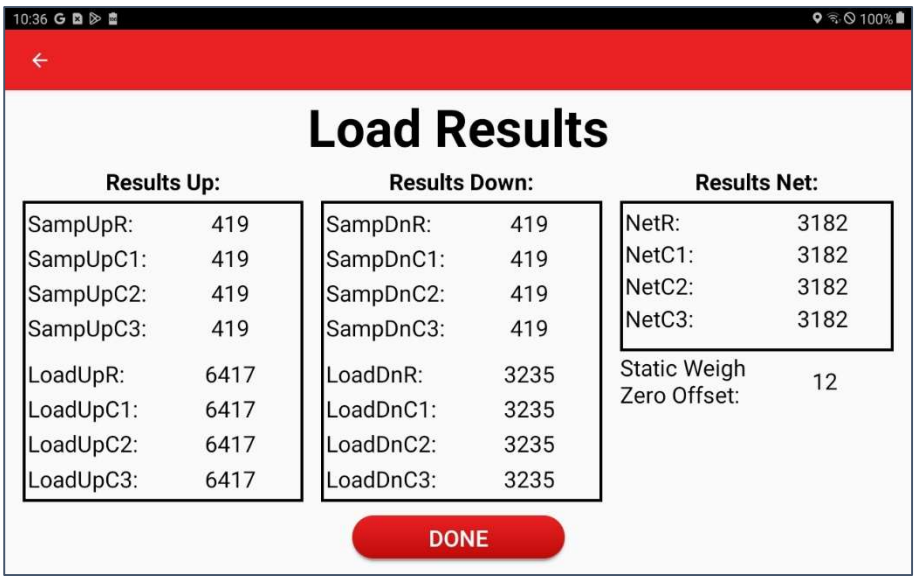
Calibration



- **ZeroCalUp -** A zero calibration adjustment for weights measured as the arms are raised. Used for fine tuning the calibration for measuring the load going up. Usually, this setting is zero. Any non-zero setting is always added to the weights measured going up.
- **ZeroCalDn -** A zero calibration adjustment for weights measured as the arms are lowered. Used for fine tuning the measured weight of the loads coming down. Usually, this setting is zero. The –2 setting above means a constant minus 2 will be added to the measured weight coming down.
- **SpanCalUp -** The span calibration adjustment for weights measured as the arms are raised. Increasing this number by 1% will make the measured weights going up to increase 1%. Normally this setting defaults to 6400.
- **SpanCalDn -** The span calibration adjustment for weights measured as the arms are lowered. Decreasing this number by 1% will cause the measured weights coming down to decrease 1%. Normally this setting defaults to 6400.
- **SmplDevUp –** Sample Deviation Up setting is a filter setting used to filter out any samples that deviate from the average readings through the measurement going up. This setting defaults to 2000.
- **SmplDevDn -** Sample Deviation Down setting is a filter setting used to filter out any samples that deviate from the average readings through the measurement coming down. This setting defaults to 2000.

Load Results

The *Load Results* display supplies a detailed summary of the results of the last Load Cycle done in the normal operating mode. After a lift is completed in the normal operating mode, going into the "Settings" menu and clicking *Load Results* Icon will show the following information concerning the measurement results of the last lift. The information is divided into four Load Results Categories.



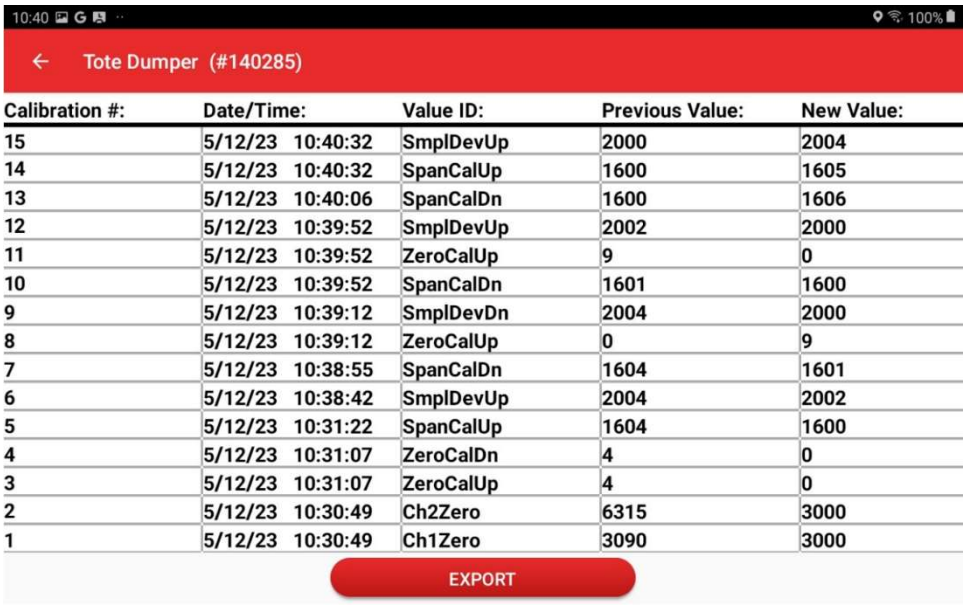
- **Results Up:** This box gives you the results of 4 passes through the raw measurement data going up. The data in this box shows;
    - **SampUpR & LoadUpR**: The total number of samples taken through the weighing window going up is SampUpR and the average of this raw data is LoadUpR.
    - **SampUpC1 & LoadUpC1:** After analyzing the raw samples and throwing away any samples that deviate more than the SampDevUp Setting from LoadUpR average, SampUpC1 is the number of samples left and LoadUpC1 is the average of those samples.
    - **SampUpC2 & LoadUpC2:** After analyzing the SampUpC1 samples and throwing away any samples that deviate more than the SampDevUp/2 Setting from LoadUpC1 average, SampUpC2 is the number of samples left and LoadUpC2 is the average of those samples.
    - **SampUpC3 & LoadUpC3:** After analyzing SampUpC2 samples and throwing away any samples that deviated more than the SampDevUp/4 Setting from LoadUpC2 average, SampUpC3 is the number of samples left and LoadUpC3 is the average of those samples and is the final reading measured going up.
- **Results Down:** This box gives you the results of 4 passes through the raw measurement data coming down.
    - **SampDnR & LoadDnR**: The total number of samples taken through the weighing window going down is SampDnR and the average of this raw data is LoadDnR.

- **SampDnC1 & LoadDnC1:** After analyzing the raw samples and throwing away any samples that deviate more than the SampDevDn Setting from LoadDnR average, SampDnC1 is the number of samples left and LoadDnC1 is the average of those samples.
- **SampDnC2 & LoadDnC2:** After analyzing the SampDnC1 samples and throwing away any samples that deviate more than the SampDevDn/2 Setting from LoadDnC1 average, SampDnC2 is the number of samples left and LoadDnC2 is the average of those samples.
- **SampDnC3 & LoadDnC3:** After analyzing SampDnC2 samples and throwing away any samples that deviate more than the SampDevDn/4 Setting from LoadDnC2 average, SampDnC3 is the number of samples left and LoadDnC3 is the average of those samples and is the final reading measured going down.

- **Static Weigh Zero Offset -** This reading is displayed only if the scale is in the Static Weigh Operating Mode (the Static Weigh Setting in MISC is enabled). The "Static Weigh Zero Offset" displayed is the reading the scale measured during Step 1 of the Static Weigh Process which is what the scale weighs with no load on the forks. This takes out any long term zero drift of the scale readings automatically by measuring the zero reading before a Static Load Cycle begins. This reading is absent if the Static Weigh Option is disabled.

Audit Trail:

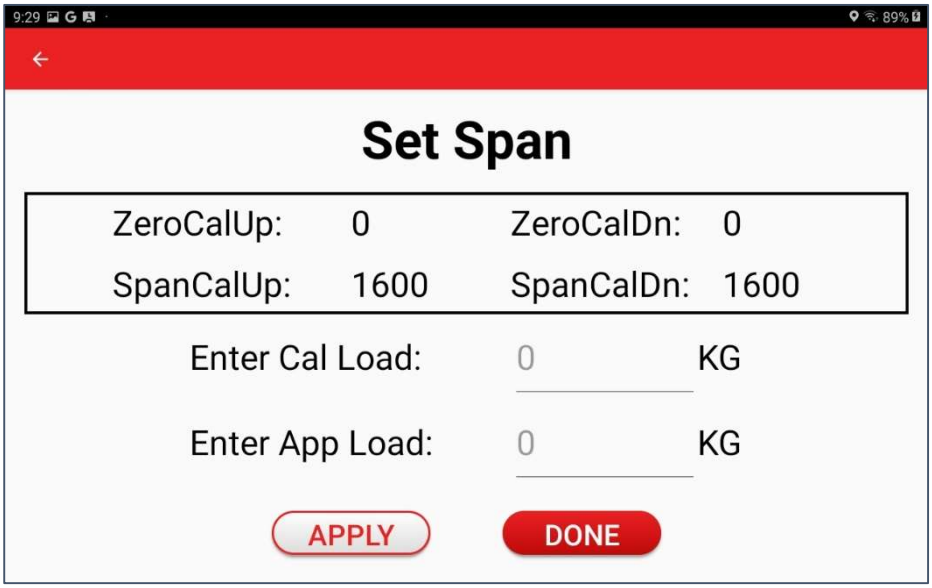
- This page displays a table of the last 1000 (or less) changes to the system's calibration and/or setup values. Each row lists a change to one or more of the variables defined below.
- The information displayed includes the calibration number, date and time the value was changed, the id of the value, the new value and the previous value.
- Changes to values that directly affect the calibrated weight reading will increase the Calibration # in the first column.
- An "Export" button can be found at the bottom of the page. This will export all the data in the table to a CVS file, stored locally on the Android device at "Internal storage/Loadman" If the "Loadman" folder does not exist in internal storage yet, the app will create the folder automatically.



Calibration #: Changing any of the following values in "Settings" will cause the Calibration # to increase.

- **CH1 Span** - Gain sensitivity in counts per microvolt for CH1. Found in LOADCELLS.
- **CH2 Span** - Gain sensitivity in counts per microvolt for CH2. Found in LOADCELLS.
- **CH1 Zero** - The zero offset for the CH1 Loadcell. Found in LOADCELLS.
- **CH2 Zero** – The zero offset for the CH1 Loadcell. Found in LOADCELLS.
- **SpanCalUp -** The span calibration setting for weights measured going up as the arms are raised. Increasing this setting by 1% increases the weight reading going up 1%. Found in CALIBRATION.
- **SpanCanDn -** The span calibration setting for weights measured coming down as the arms are lowered. Increasing this setting 1% increases the weight reading coming down 1%. Found in CALIBRATION.
- **ZeroCalUp** - A zero calibration setting for weights measured as the arms are raised. Increasing the setting by 10 counts causes the weight reading to increase 10 Lbs. Found in CALIBRATION.
- **ZeroCalDn -** A zero calibration adjustment for weights measured as the arms are lowered. Increasing the setting by 10 counts causes the weight reading coming down to increase 10 Lbs. Found in CALIBRATION
- **SmplDevUp -** A filter setting used to filter out any samples that deviate from the average readings through the measurement going up (normally set to 2000).. Found in CALIBRATION.
- **SmplDevDn -** A filter setting used to filter out any samples that deviate from the average readings through the measurement going down (normally set to 2000). Found in CALIBRATION.
- **Count By** – The number value that the weight reading will be rounded to. Found in DISPLAY

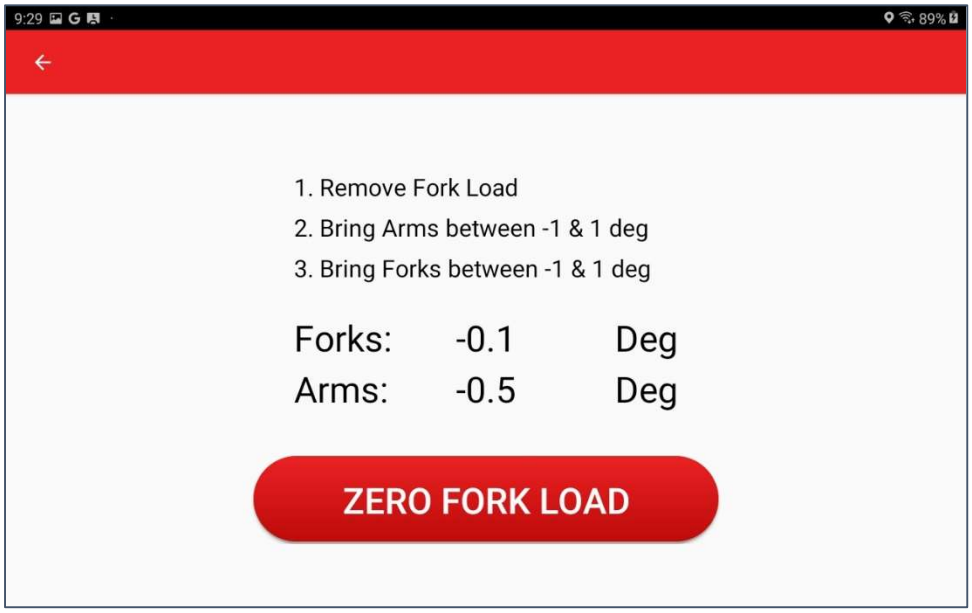
Set Span



This procedure can be done to calibrate the scales for a single load, using a known weight and the weight received from the Loadman Android app.

- 1. Enter the known weight of a container from a calibrated scale into the field labeled “Enter Cal Load”. Tapping the “Enter Cal Load” field will bring up a keyboard to enter the Cal Load.
- 2. Enter the weight the Loadman CARTel app reads the container weight as into the field labeled “Enter App Load”. Use the “GROSS” weight reading from Loadman CARTel App into the “Enter App Load” field. Tapping on its field will bring up a keyboard.
- 3. Tap on the “Apply” button to set the SPAN.
- 4. You will notice that the SpanCalUp, SpanCalDn, ZeroCalUp and ZeroCalDn will be adjusted automatically to calibrate the Loadman CARTel App to the desired Cal Load.

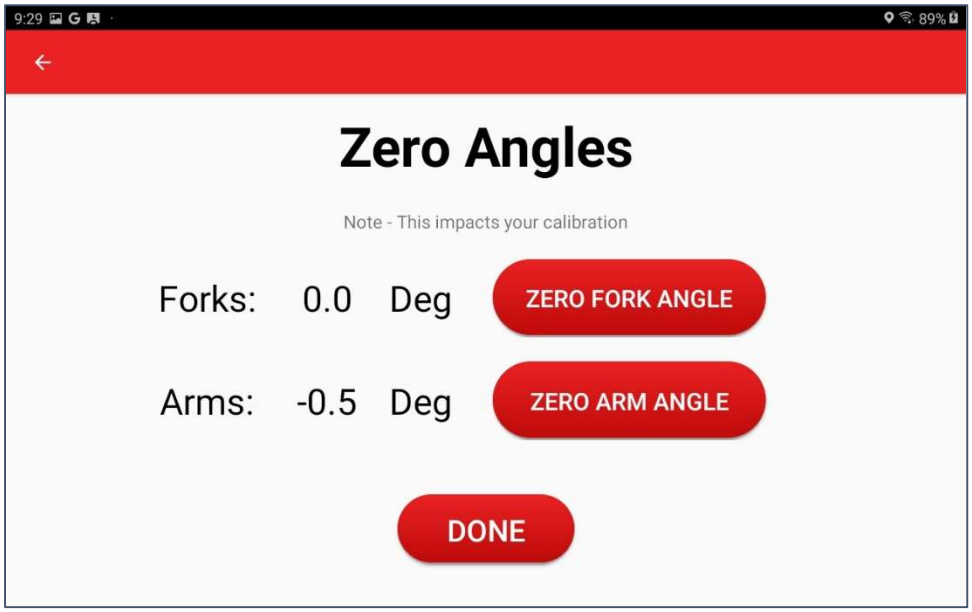
Zero Fork Load:



This procedure can be done to zero the weight on the fork load cells. This same command is available in the Side Menu in the normal operating mode.

- 1. Remove any load from the forks
- 2. Bring the arm angle between –1 and 1 degree.
- 3. Bring the fork angle between –1 and 1 degree.
- 4. Tap on the “Zero Fork Load” button to reset the fork load cells to zero.

Zero Angles:

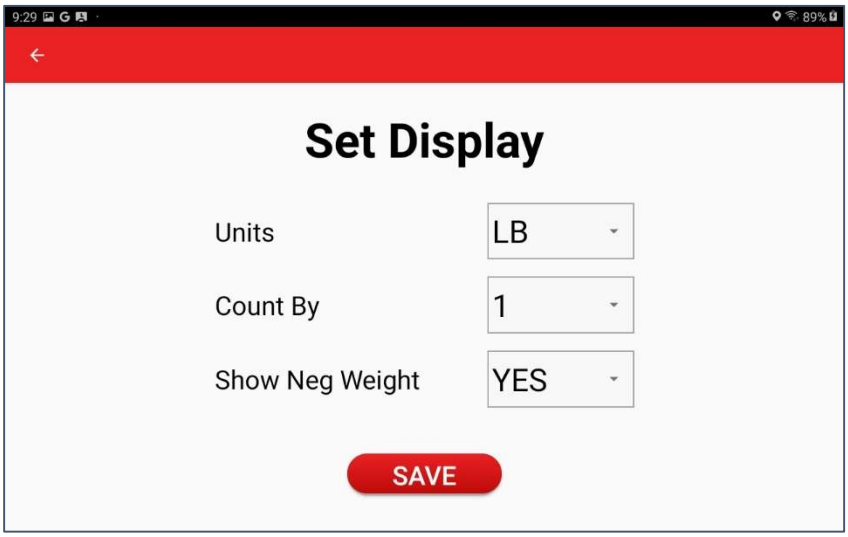


- Position the Forks to exactly level. Use a level sitting on the top of one of the forks to perform this function because the accuracy of the scale is dependent on the accuracy of the measured Fork Angle. When the Forks are in the correct level position, tap on the "Zero Fork Angle" button to cause the angle of the forks to read zero degrees in the position they are currently in.
- Position the Arms to the start of the weighing window. The start of the weighing windows should be the Arm position where the largest container size the truck will be picking up will be 6" to 1Ft off the ground. Tap on the "Zero Arm Angle" button to cause the angle of the arms to read zero degrees in the position they are currently in.

Voltage:

- **Vin LM500 –** The voltage input to the LM500 module
- **Vin Arm –** The voltage being received by the ARM400 module mounted on the Arms
- **Vin Fork -** The voltage being received by the FORK400 module in the Fork Assembly

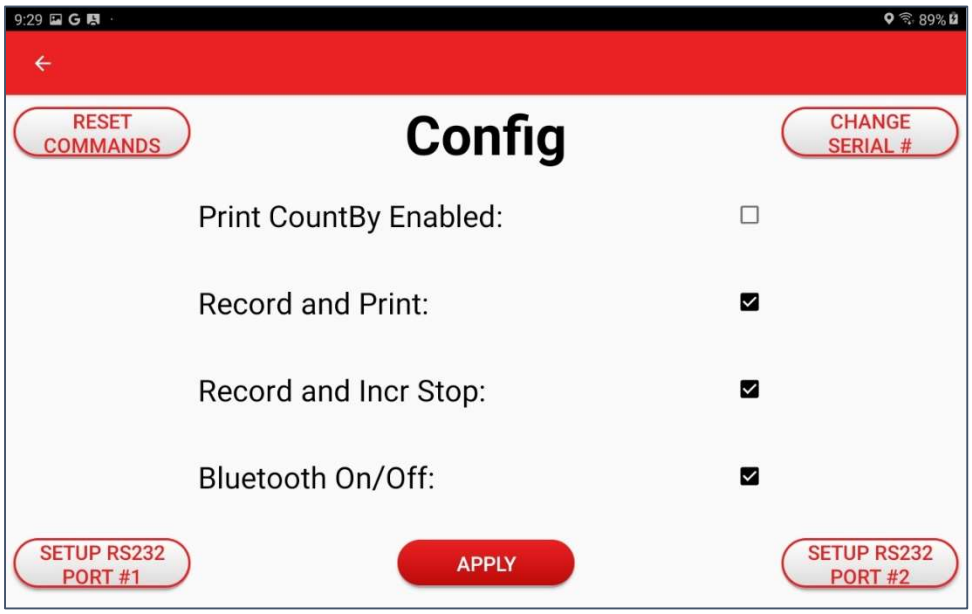
Display:



- **Units –** The weight units to be displayed in the App. Can be LB's or KG's
- **Count By –** How the displayed weight will be rounded by the app in the normal operation mode. The weight will be rounded to the nearest value selected. For example, if the "Count By" is 50 and the raw weight reading is 149, the app will display 150. If the raw weight is 175, the app will display 200.
- **Show Neg Weights –** This decides how the app will display negative weights on the screen.
  - **Yes** – The app will display all negative weights
  - **No** – The app will not display negative weights. Negative weights will de displayed as zero.
  - **< -75** – The app will display negative weights only if the weight is less than negative 75 Lbs. Zero to –75 Lbs will display as 0.

- **< -150** – The app will display negative weights only if the weight is less than negative 150 Lbs. Zero to –150 Lbs will display as 0.
- Tap on the SAVE button to save any changes you make or alternately press the left arrow in the upper left-hand corner of the screen to exit without saving any changes.

Config



Main Page:

- **Print Countby Enabled -** When **ENABLED**, the printed loads will be rounded to the nearest value based on the Count By values defined in DISPLAY. When **DISABLED** the printed loads will be the raw weight values.
- **Record and Print -** When enabled, directs *LoadMan®* to print the recorded load data to an RS232 port on the LM500 Module. Any data that has been configured to record into *LoadMan®'s* data collection memory will be also printed to the RS232 port when the data is recorded in the App. If disabled, the load data will be recorded to *LoadMan®'s* data collection memory but is not printed.
- **Record and Incr Stop -** When enabled, *LoadMan®* automatically increments to the next stop in the Route from the downloaded route list after a load is recorded.
- **Bluetooth On/Off** - Turns on or off the bluetooth port within the loadman scale system

Reset Commands:

- **RESET BLUETOOTH –** This resets the Bluetooth port to factory defaults.

- **SET TO DEFAULTS LB -** Returns all settings to factory default settings for a scale system measuring LB's
- **SET TO DEFAULTS KG -** Returns all settings to factory default settings for a scale system measuring KG's

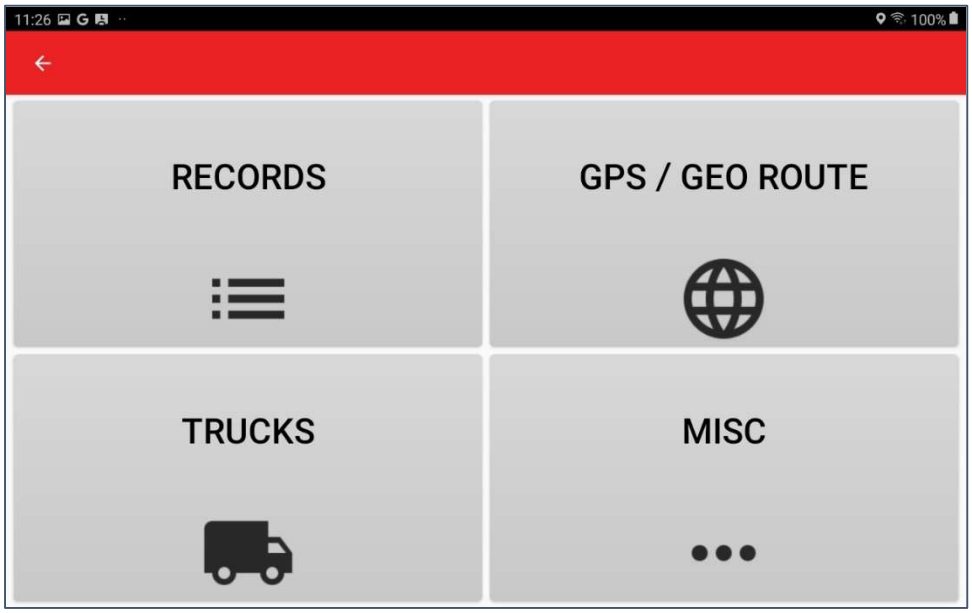
Change Serial Number:

- This allows the user to change the internal serial number of the Loadman scale system. The new serial number is limited to serial numbers that are licensed to the application. If you perform this option, you will be forced to also execute the RESET BLUETOOTH Port to program it for the programmed serial number.
- Select the serial number you want to change the system to from the drop down and tap on the "Apply New Serial Number" button.

Setup RS232:

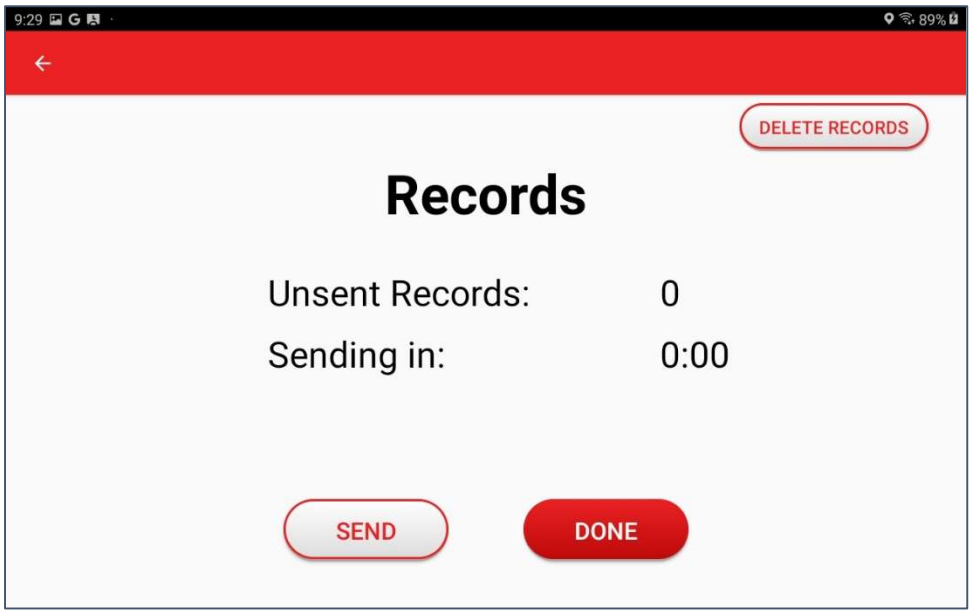
- **Output Mode:**
  - **TICKET PRINT ON** – Programs the RS232 port for printing to a serial printer mounted in the truck cab. Whenever a load is recorded, the scale can be setup to print the recorded load to a Port on the LM500 (Only printouts to Port 2 are allowed since the tablet is connected to Port 1).
  - **SCOREBOARD ON** – When the SCOREBOARD is selected then the total Net Weight of the Truck will be printed once per second.
- **Print Load Name –**Prints the active load account name of the Stop recorded.
- **Print Account –** Prints the active load account number.
- **Print Stop –** Prints the active stop number in the route list.
- **Print Product –** Prints the active product name.
- **Print Event –** Prints the active event condition.
- **Print Truck Gross –** Prints the truck's gross weight. That is, the tare weight plus the accumulated recorded load weights.
- **Print Truck Net–** Prints the truck's net weight. That is, the accumulated recorded load weights.
- **Print Container Gross –** Prints the total gross weight of the container and its load as the arms are raised.
- **Print Container –** Prints the empty container weight (the container tare weight) as the arms are lowered.
- **Print RFID –** Prints the RFID tag read from the loaded container.
- **Print Asset –** Prints the ASSET name,

NON-SCALE SYSTEM SETTINGS:



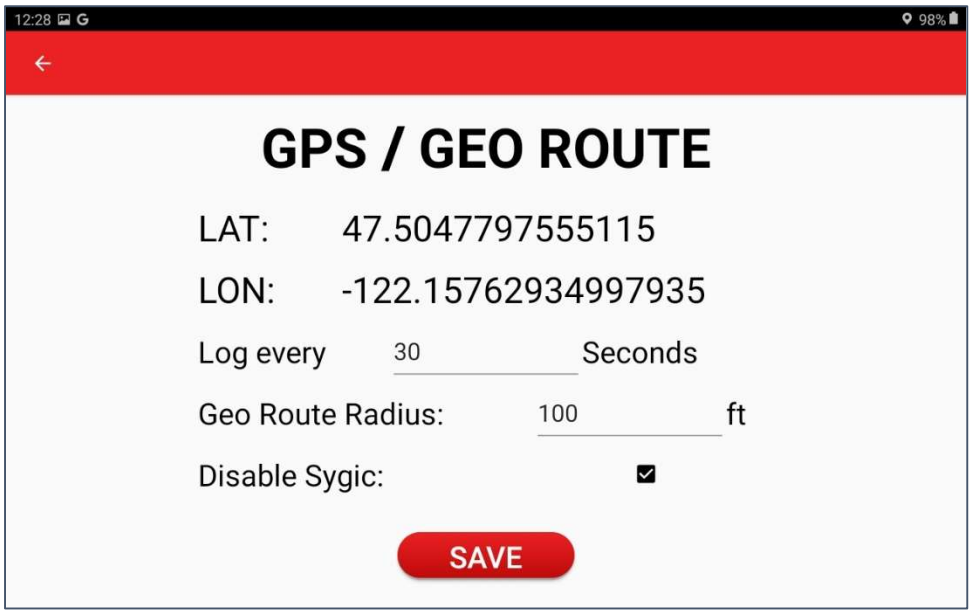
RECORDS	Displays the number of unsent records, if any. And provides a button to manually attempt to send them
GPS/GEO ROUTE	Allows setting of values related to GPS records and the geo-route radius.
TRUCKS	Displays all trucks licensed for the application
MISC	Allows for the configuration of many settings that affect the Android application in many ways, for both an app connected to scales and not connected to scales.

Records:



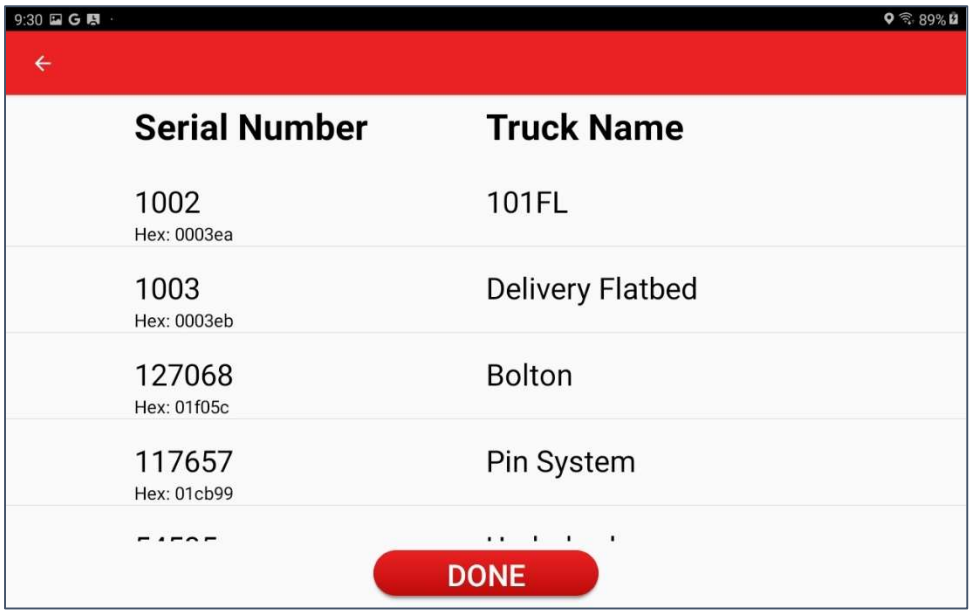
- **Unsent Records** - The number of unsent records on the device. Records that happen when the Android device does not have an internet connection are saved to the local storage of the device and are sent when the device regains internet.
- **Sending In -**There is a one-minute countdown timer that will attempt to send the records automatically. This occurs in the background all the time when the app is running. The records should be sent automatically when an internet connection is made without having to enter this menu normally.
- If desired, the records can be sent manually by tapping on the **"Send"** button. Once they begin to send, the number of unsent records should drop until it hits zero.
- If for whatever reason records exist that cannot be sent to the cloud due to a problem with the data, the **"Delete Records"** button can be pressed to clear out all unsent records.

GPS/GEO ROUTE:



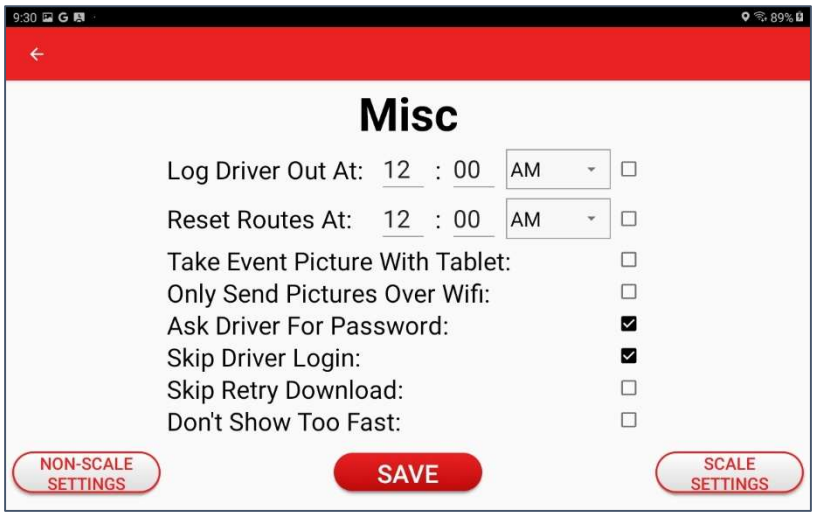
- **LAT –** The current latitude of the Android device
- **LON –** the current longitude of the Android device
- **Log Every** xx **Seconds –** The interval that the application will send a GPS record. A GPS record contains just the GPS coordinates, the time and data and the truck/driver.
- **Geo Route Radius –** This is a number, in feet, of how far away the application will select a route stop to be displayed on the route list when the application is in geo route mode. See Geo Route Mode under Route List for more information.
- **Disable Sygic** – This is only for applications licensed for Sygic turn-by-turn navigation. If desired, Sygic can be disabled, and the map can return to the default view which is powered by google maps.

Trucks:



- Displayed here are all trucks licensed for the application. This page contains a scrollable list of all Serial Numbers, which are the default identifiers for the scale systems, and truck names that have been assigned to the serial numbers. This allows a user to assign a truck a specific name so that it shows up as that name throughout the app, such as the “Scanning for Trucks” page.
- For example, Loadman will assign a scale system a serial number that could be “12345”. If that scale system was installed on “Truck A”, then someone could assign the name “Truck A” to “12345” so that when the app displays the scale system to connect to, it will show “Truck A”, which could be more helpful to the operator.
- If the application is “online”, meaning it is intended to send data to the internet, then the trucks can be assigned names on Loadman’s cloud software platform Load Manager. All android devices licensed for the database will reflect the assigned truck names.
- If the application is “offline”, meaning it will not send data to the cloud, then the truck names can be edited directly on this page by tapping on the “Truck Name”.

Misc



- **Main Page:**
  - **Log Driver Out At -** This will automatically log a driver out at a certain time of day. If the app is running, and the set time comes, the app will return to the startup page. Check the checkbox next to the time to enable this.
  - **Reset Routes At –** This will set a time of day for the routes to be reset. This means all load data that was associated with any route stop will be reset back to the default. They will go back from green to grey and their load will be reset to "NOT PICKED UP". This is true for any event recorded on a route stop too. It is recommended to set this for a time of day when the trucks are not being driven. If the time of day comes and the app is not running, the routes will still be reset upon launching the application. Check the checkbox next to the time to enable this setting.
  - **Take Event Pictures With Tablet –** This enables the application to take a picture with the tablet (or Android device) when an event is recorded. The default is to choose from a google photos library.
  - **Only Send Pictures Over Wi-Fi –** This will prevent the tablet from sending event records with pictures associated with them over a cellular connection. It will only send them over a Wi-Fi connection when this is enabled.
  - **Ask Driver for Password –** If this is enabled, the driver will be forced to enter their password when they log in. If this is disabled, they only need to tap on their name to log in. Is it required that they log in with a name AND password at least once to be able to skip entering their password.
  - **Skip Driver Login –** If this is enabled, the application will take whatever driver appears at the top of the log-in names list and log in with that driver's credentials automatically every time the application is launched. No action from the driver will be necessary for logging in when this is enabled.

- **Skip Retry Download –** This skips the screen asking the driver if they want to retry downloading the routes if the routes could not be successfully downloaded. This is useful in cases where the App will likely never have an internet connection when the driver is starting the App. The routes must have been downloaded at least once successfully in order to skip the "retry" prompt.
- **Don't Show Too Fast –** This is used for Geo Route mode. When the truck is driving too fast, the geo route cannot be updated properly and may show incorrect stops. By default, a message telling the driver the truck is too fast for the geo route to show. If desired, this warning message can be disabled, and any route stops will still appear on the route list, accurate or not.

NON-SCALE SETTINGS:

- **Send Remaining At –** This will send several event records at a certain time of day for the selected route. If the app is running, and some stops of the selected route have not been serviced, event records will be sent for all remaining stops. Set a time and check the checkbox next to the time to enable this.
- **Don't scan for trucks at Login –** This will default to the "non-scale mode" selection for trucks during startup. This is useful if you know the app will never connect to a scale system. The list of all trucks will automatically be brought up when the app normally would show "Scanning for Trucks".
- **Show Arrive Button -** Displays a button on the normal operating screen that will send an "arrive" record to the cloud for the selected route stop.
- **Show Depart Button - Displays** a button on the normal operating screen that will send a "depart" record to the cloud for the selected route stop.
- **Auto Confirm When Detected** – This is for use with Geo Route Mode. When this is enabled, any stop detected by geo route mode will automatically have a confirm pickup record sent for it. The driver will not have to interact with the tablet to send a record confirming they picked up a route stop.
- **Remember Current Truck –** Automatically selects the last truck selected from the startup menu. The same truck will be selected automatically every day.
- **Hide Confirm Pickup Button –** Hides the confirm pickup button on the normal operating screen. By default, only the record event button will be shown. However, if the arrive or depart buttons are enabled, they will be shown too.

Scale Settings:

- **Skip Truck Select If Paired –** If the Android device is paired with a scale system, this will allow the startup screen to skip the "Scanning for Trucks" action and connect automatically with the paired truck.

- **Get Driver Pickup Confirmation –** Asks the driver to confirm the pickup after each valid load pickup.
- **Scout Route Mode –** Replaces all bottom screen buttons in the normal operating mode with one "Learn Location" button. See "Scout Route Mode" for more information.
- **Run in RFID Mode –** Enables the application to connect to and operate with an RFID reader. See RFID Mode for more information.
- **Static Weigh Mode –** Enables the application to run in static weigh mode. See Static Weigh Mode for more information.
- **Overweight Set Pt -** A weight that can be set that the NET payload weight should not exceed. If the NET weight does exceed this setpoint, a warning message will flash in the normal operating mode.
- **RFID Read Duration -** A length of time, in seconds that the RFID reader will search for a tag.
- **Static Weigh Duration –** A length of time for the scale system to take weight measurements in static weigh mode se Static Weigh Mode for more information.
- **Tare Weight -** The weight of the empty truck. This is combined with the NET weight to get the GROSS weight of the truck.
- **Container Set Pt –** The weight that a load pickup must exceed to register as a load pickup. This is to prevent load records from being sent when simply cycling the arms.

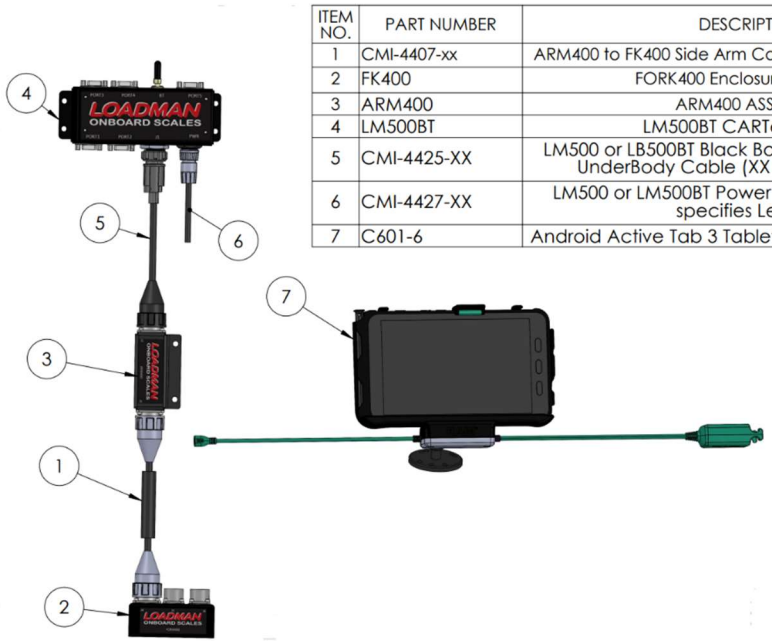
INITIAL STARTUP AND CALIBRATION

The instructions in this section provide a step-by-step process for verifying and calibrating a newly installed *LoadMan*® Fork Based Weigh-In-Motion system. Follow these steps to ensure proper installation and operation.

1. Verify Wiring 2. Power On 3. Verify Angle Sensors 4. Verify Fork Load Cells Respond Correctly 5. Calibrate Arm Angle	6. Calibrate Fork Angle 7. Verify Angle Measurements Respond Correctly 8. Verify Weigh-In-Motion Response 9. Calibrate System for ZERO FORK Load 10. Calibrate System Under Load

1. Verify Wiring

Begin by verifying that the electronics are wired per the wiring diagram shown below.



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CMI-4407-xx	ARM400 to FK400 Side Arm Cable (xx specifies Length)	1
2	FK400	FORK400 Enclosure Assembly	1
3	ARM400	ARM400 ASSEMBLY	1
4	LM500BT	LM500BT CARTel Module	1
5	CMI-4425-XX	LM500 or LB500BT Black Box Module to ARM400 UnderBody Cable (XX specifies Length)	1
6	CMI-4427-XX	LM500 or LM500BT Power Cable with fuse (XX specifies Length)	1
7	C601-6	Android Active Tab 3 Tablet & Ram Mount Cradle	1

- Verify the Android device is charging in its cradle or is connected to a charging USB cable (ref Item 7 above).

- Positive 10VDC to 16VDC should connect to the *LoadMan*®500 Black Box (ref Item 6 connecting power to item 4 above)

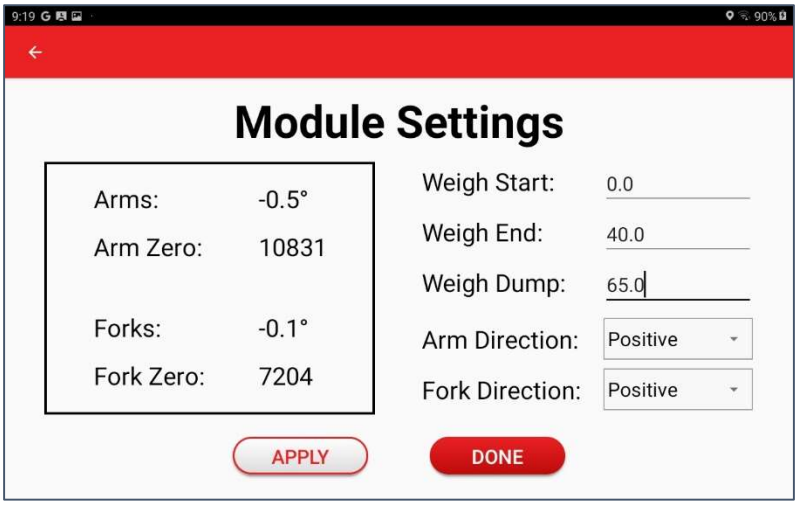
INITIAL STARTUP AND CALIBRATION (cont)

- Verify connection of the cable harness (Item 5) from the *LoadMan*® Black Box (Item 4) to the arm weigh-in-motion assembly (Item 3).
- Then verify the connection of the cable harness (Item 1) from the fork weigh-in-motion assembly (Item 2) to the arm weigh-in-motion assembly (Item 3).
- Finally, verify that the fork loadcells are connected to the fork weigh-in-motion assembly (Item 4).

2. Power On

Tap on the *LoadMan*® Icon on the Android device. Navigate through the startup screen, see startup for more details. Reach the normal operating mode and with the arms and forks lowered the screen should display “READY TO WEIGH!”.

3. Verify Angle Sensors



To verify the angle sensors are responding correctly, first enter the Settings menu as described earlier and locate the MODULE SETTINGS Icon. Tap on MODULE SETTINGS you should see data for the Arm angle, arm zero, fork angle and fork zero. Along with programmable values for the weigh-in-motion window settings and the direction of the arms and forks. If you are using a pin system, you will also see information about the frame angle on this screen.

Weigh-In-Motion Window

- “WEIGH START” should be set to 0.0 degrees. WEIGH START is the programmable angular set point where the weigh-in-motion window starts the weighing of each load.
- If it isn’t programmed to 0.0 tap on the underlined text field to the right of “Weigh Start” and enter it. Hit the “apply” button to save the value

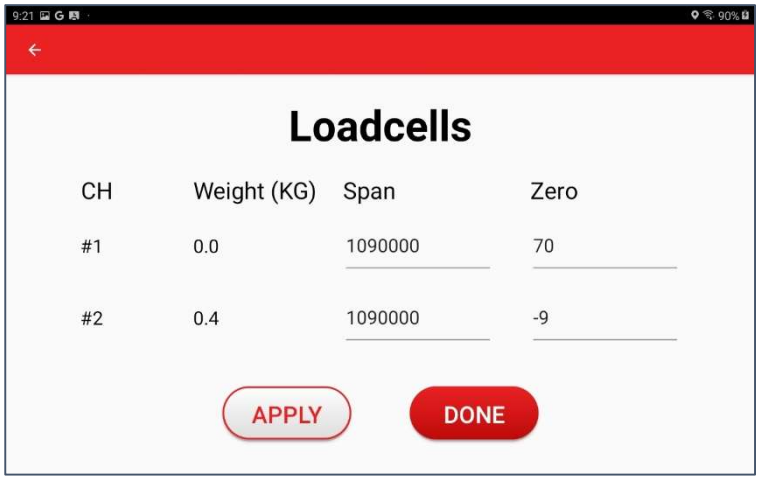
INITIAL STARTUP AND CALIBRATION (cont)

- "WEIGH END" should be programmed to 40.0 degrees. WEIGH END is the programmable angular set point where the weigh-in-motion window ends the weighing of each load. If it isn't programmed to 40.0 tap on the underlined text field to the right of "Weigh End" and enter it. Hit the "apply" button to save the value
- "WEIGH DUMP" should be set to 65.0 degrees. WEIGH DUMP is the programmable angular set point where the Arms are in what is considered the DUMP LOAD Position. If it isn't programmed to 65.0 tap on the underlined text field to the right of "Weigh Dump" and enter it. Hit the "apply" button to save the value.

Angle Directions:

- As you lift the arms or the forks up, the angle in the box on the left next to the corresponding module should go in a positive direction. If it goes in a negative direction, the programmable "Arm Direction" or "Fork Direction" needs to be reversed,
- Tap on the box next to "Arm Direction" or "Fork Direction" to bring up a small drop down where you can select either "Positive" or "Negative". Select the option that causes the angle to go in a positive direction when the module is raised and tap on "Apply" to save the setting.

4. Verify Fork Load Cells Respond Correctly



To verify the loadcells are responding correctly, first enter the Settings menu, locate and tap on the "Loadcells" button.

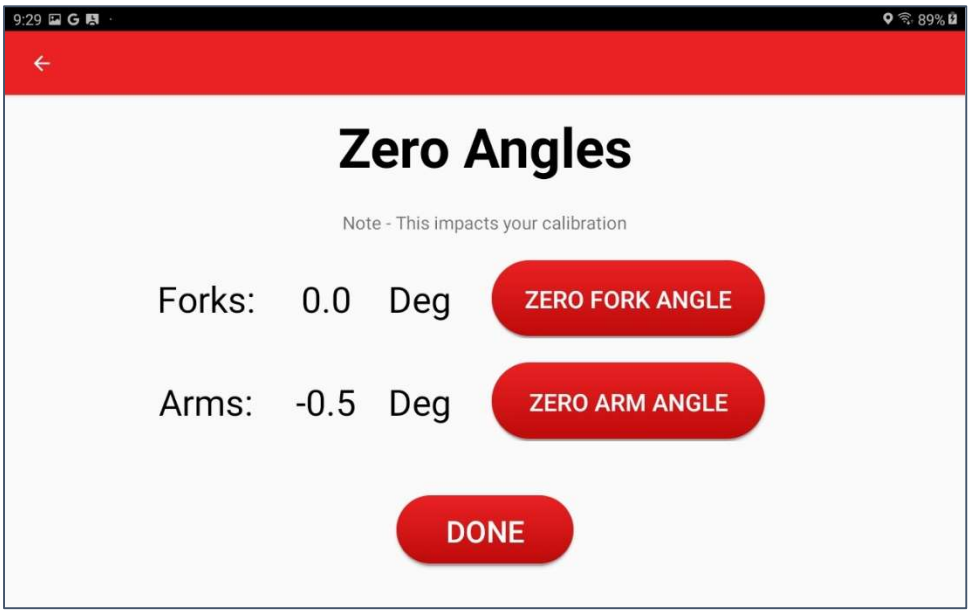
- On the "Loadcells" screen you can program both the "Span" and "Zero" values for both loadcells. Each loadcell is displayed as CH #1 and CH #2.
- The numbers in both "Span" text fields are normally 1090000. Tap on the text field and enter the numbers in. Tap on the "Apply" button to save the settings.

INITIAL STARTUP AND CALIBRATION (cont)

- The numbers under Weight are the current weight reading of the loadcells. They will either be displayed in LB's or KG's depending on your unit setting. The unit will be in parenthesis next to "Weight".
- Move the forks to a horizontal position and make a mental note of the CH1 and CH2 loadcell readings (they will normally bounce around ±1.0 counts).
- Raise the forks to as near vertical as possible. In this position the loadcell reading should decrease 400-2500 LB counts from the horizontal fork reading. If so, then the loadcells are responding correctly. Skip the next step.
- If the reading increases while raising the fork to the vertical position (rather than decreasing as normal) then the loadcell is mounted upside down and should be remounted to correct the problem.

5. Calibrating Arm and Fork Angle Readings

- Enter the Settings Menu.
- Locate and tap on the "ZERO ANGLES" Icon button and you will see the following screen.



- Move the arms to the desired start position of the weigh-in-motion window. Under normal conditions this is the position of the arms when lifting the tallest container that you will be servicing to about 1-2 feet off the ground.
- Once the arms are in position, tap on the "Zero Arm Angle" button.
- The app will ask you to verify that the arms are at the start of the weighing cycle. If they are, tap the "Zero Arm Ang" button.
- A message displaying "Setting Arm Angle to Zero" will display, you should then see the arm angle read 0 degrees.

INITIAL STARTUP AND CALIBRATION (cont)

- A new ARM ZERO value will be modified as required to make the Arm Angle read 0 degrees.
- Verify the "ARMS xxxxx.x DEG" reads zero degrees when the arm is in a position that would lift the tallest container 1-2 feet off the ground.
- Furthermore, the arm angle (ARMS) should become more positive when the arms are raised higher. If not, then the Arm Direction Setting needs to be complemented.
- This next step is critical. The internal calibration assumes that the forks are accurately horizontal when the fork angle displays zero. Any error here will cause an error in the weight measurements.
- This part of the process requires a level. The level should be used on the vertical fork mounting plate – not the forks – as the forks are sometimes tapered.
- Using a level, move the forks until the vertical plate welded to the forks is vertical.
- Once the forks are in position, tap on the "Zero Fork Angle" button.
- The app will ask you to verify that the forks are at a horizontal level. If they are, tap the "Zero Fork Ang" button.
- A message displaying "Setting Fork Angle to Zero" will display, you should then see the fork angle start reading 0 degrees.
- Now verify that the "FORKS xxxxx.x DEG" reads zero degrees when the forks are in the horizontal position (that is, the fork mount plate is vertical).
- Furthermore, the fork angle value (FORKS) should become more positive when the forks are raised higher. If not, then you will be required to change the Fork Direction Setting

6. Verify Angle Measurements Respond Correctly

Verify Arm Angle Response

1. Enter the MODULE SETTING page.
2. Lift the tallest container until the arm angle reads 0.0 degrees. The container should be 1 to 2 feet off the ground at the ARMS 0.0 degrees reading. Also, the arm angle should increase as the arms are raised and decrease as the arms are lowered.
3. If not okay, return to step 5, "**Calibrate Arm and Fork Angle Readings**", and repeat the instructions.

Verify Fork Angle Response

4. Return to the MODULE SETTING page.
5. Position the forks until the fork angle reads 0.0 degrees. At the FORKS 0.0 degrees reading, the forks should be horizontal or more importantly, the fork mounting plate surface should be vertical. Also, the fork angle should increase as the forks are raised and decrease as the forks are lowered.

INITIAL STARTUP AND CALIBRATION (cont)

6. If not okay, return to the step, "**Calibrate Arm and Fork Angle Readings**", and repeat the instructions.

7. Verify Weigh-In-Motion Response

To verify the weigh-in-motion response, first exit Settings:

- The display should now read, "READY TO WEIGH!" when the Arms are in a typical position to pick up a load.
- Raise the arms up through a complete weighing cycle. If everything is working properly the system should respond with the following:
  - WEIGHING LOAD! while the arms are in the weigh-in-motion window.
  - GROSS xxxxx LB as the arms pass the end of the weigh-in-motion window.
  - DUMP xxxxx LB and LOAD xxxxx LB (alternating) when the arms pass up through the dump set point. This message indicates that the Record Load Data and Auto Accumulate functions have been armed.
- Now lower the arms and the display should show:
  - LOWER ARMS! while passing down through the dump set point.
  - WEIGHING TARE! as the arms pass down through the weighing window.
  - NET xxxxx LB after the arms have passed below the start point of the weigh-in-motion window. This is the net payload that was measured and dumped into the vehicle (The difference between the Gross measured going up and the Tare measured coming down).
  - RECORDING LOAD! – indicates that the weighing process is complete, and the load has been recorded (a load will not be recorded if the GROSS measured going up is less than the Container Setpoint Setting).
  - If the application is connected to the internet, the message "Load Record Sent" will flash briefly at the bottom of the screen (If not you will see "Load Record could not be sent" flash on the screen. The load will be saved in the Tablet so it can be automatically sent when the internet connection is made again later).
- Within 1-2 seconds *LoadMan*® should indicate that it is ready for the next load with the message, "READY TO WEIGH!".
- If all of this has worked correctly, proceed to the next step. If not, return to step 6, "Verify **Angle Sensors are Responding Correctly**", and redo the process until all is working correctly.

INITIAL STARTUP AND CALIBRATION (cont)

8. Calibrate System for ZERO FORK Load

- Begin this step by entering the "DISPLAY" section of the settings and program the *LoadMan*® app to "SHOW NEGATIVE WEIGHTS" by tapping on the dropdown and choosing "YES". (After completing this calibration, the app can be reprogrammed to hide negative net weights if desired.)
- Furthermore, to obtain the most accurate calibration results, set the COUNT BY value to one (1).
- Tap SAVE to save the settings in DISPLAY
- Remove any container from the forks.
- locate and enter the ZERO FORK LOAD section of Settings and follow this procedure (Zero Fork Load can also be found in the side menu in the normal operating mode):
    - *LoadMan*® starts this process with the message "1. Remove Fork Load", "2. Bring Arms between –1 &1 deg", and "3. Bring Forks between –1 &1 deg".
    - Position the forks and arms until both are within a degree of zero degrees. *LoadMan*® will provide instant feedback on the current fork and arm angles as you move them.
    - Tap on the ZERO FORK LOAD button. A message displaying "ZEROING FORK LOAD" will show.
    - The fork load should have been successfully calibrated to zero
- Verify that the fork load going up is calibrated to zero. Locate and enter the "Calibration" section in Settings. Begin this process in the READY TO WEIGH state. You should see the load state above the editable text fields.
- With no load on the forks, very slowly raise the arms and forks through the weighing window to verify the GROSS xxxxx LB measurement going up is near zero.
- Perform several slow lifts going up to find an average gross weight. If zero, then skip this next fork calibration step.
- If the average gross weight going up is not zero, the system should be fine-tuned to allow for the variance from zero.
    - Fine tune the ZeroCalUp setting to account for the average gross weight variance. For example, if the average gross weight is -10 LB going up, then increase the ZeroCalUp 10 counts from the current setting. For this example, if the current value for ZeroCalUp is zero (0), then program ZeroCalUp to -10 (negative 10).
    - After programming the adjustment, tap on "Apply" to save the settings.
    - Verify that the GROSS xxxxx LB averages zero (0) over several slow test weights.

INITIAL STARTUP AND CALIBRATION (cont)

Calibrate Forks Going Down

After the load state returns to READY TO WEIGH, verify if the fork load going down is calibrated to zero:

- With no load on the forks, slowly raise, and then slowly lower the arms through the weigh-in-motion window to verify if the NET xxxxx LB measurement going down is zero.
- Do several measurements going down to find an average net weight. If zero, skip this next fork calibration step.
- If the average net weight going down is not zero, the system should be fine-tuned to allow for the variance from zero.
    - Fine tune the ZeroCalDn setting to account for the average net weight variance. For example, if the average net weight measured is 10 LB, then adjust the ZeroCalDn 10 counts from the current setting. For example, if ZeroCalDn is zero (0), then program ZeroCalDn to -10.
    - After programming the adjustment, tap on “Apply” to save the settings.
    - Verify that the NET xxxxx LB averages zero (0) over several slow test weights.

9. Calibrate System Under Load

This step requires an empty container of a known weight, so have an empty container weighed on a known accurate scale.

- When *LoadMan*® is in READY TO WEIGH, pick up the empty container and move through the weigh-in-motion window at a slow smooth speed. Do this several times to obtain the average GROSS xxxxx LB reading going up and note this average gross weight reading.
- Next, perform a span truck calibration process.
    - Locate and enter the “SET SPAN” section found in the Settings menu
    - Two editable text fields will be presented below a section displaying relevant calibration values. They are “Enter Cal Load” and “Enter Meter Load”
    - In the field labeled “Enter Meter Load”, enter the average weight readings that were just obtained from the *LoadMan*® app.
    - In the field labeled “Enter Cal Load”, enter the weight reading obtained from the calibrated scale.
    - Once both weights have been entered, tap on the **Apply** button to save the settings. You should see a brief message labeled “Applying Changes”.
    - The calibration values above the editable text fields should have changed to account for the desired weight reading.
    - EXIT Settings and return to the READY TO WEIGH state.
- At the READY TO WEIGH state, slowly pick up the empty container and move up through the weigh-in-motion window.

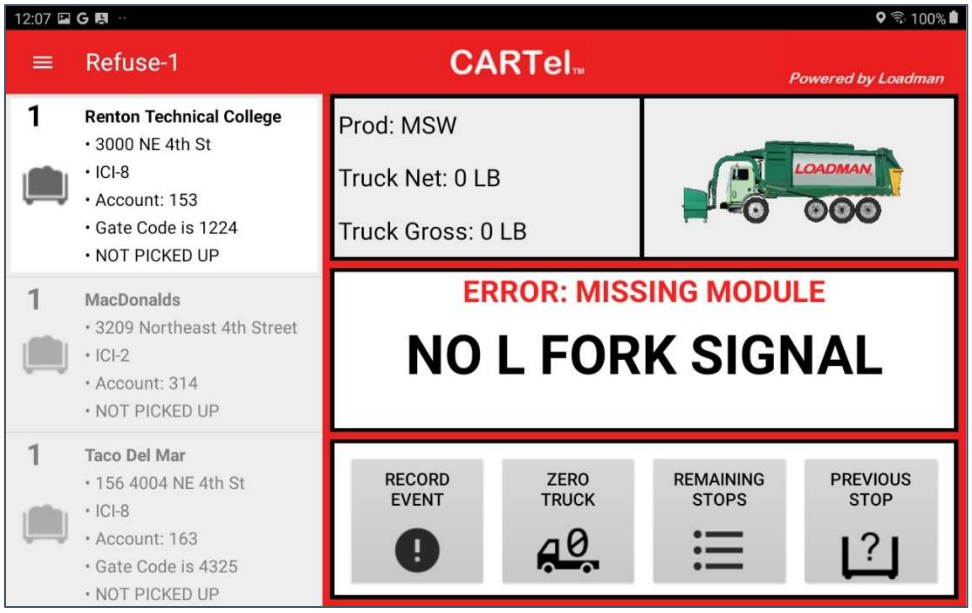
INITIAL STARTUP AND CALIBRATION (cont)

- Lower the empty container down through the weigh-in-motion window at a slow smooth speed possible. Do this several times to obtain an average NET xxxxx LB reading going down.
- If the NET reading is not zero (0) then enter the "CALIBRATION" section of Settings to either increase or decrease the SpanCalDn value to correct the error using the ratio calculation: **Ratio =** Gross Weight Going Up ÷ (Gross Weight Up – Net Weight Down)
- For example, if the average NET weight reading is +20 LB and the average GROSS reading was 720 LB, then the system going down is measuring only 720-20 = 700 LB. So, the SpanCalDn value needs to be adjusted by the ratio: 720÷700 = 1.02857
- Reprogram SpanCalDn by multiplying the current value times the weight ratio calculated in the previous step, tap on Apply then EXIT Settings.
- Continue this calibration process until the weights going up and going down are equal, and the NET xxxxx LB reading is zero (0).
- Once this calibration procedure is completed, the SpanCalup and the SpanCalDn values may not be equal, but they should not be different by more than 200 counts for a system that is operating properly.

Reminder – During these calibration procedures, COUNT BY was programmed to 1 and SHOW NEGATIVE WTS was set to YES. Reprogram these values if desired for the normal operating of the weighing system. They can be found in the DISPLAY section.

TROUBLESHOOTING GUIDE

This section of the manual provides a guide to troubleshooting common issues with the *LoadMan*® Fork Based Weigh-In-Motion System. It is assumed that the reader has already become familiar with using the application and understands how to access Settings functions that are all detailed in the chapter titled ***Setup & Calibration***.



LoadMan® must receive all sensor signals to display the valid weighing display message "READY TO WEIGH". The four sensor signals are:

- Left Fork Loadcell Signal
- Right Fork Loadcell Signal
- Fork Angle Sensor Signal
- Arm Angle Sensor Signal

If any of these signals are not detected, *LoadMan*® suspends all weighing functions and enters a Troubleshooting Diagnostic Mode. When *LoadMan*® enters this mode, one to three diagnostic messages will be displayed:

- NO ARM SENSOR! or ARM SENSOR OK!
- NO RGHTFORK SIG! or RGHTFORK SIG OK!
- NO LEFTFORK SIG! or LEFTFORK SIG OK!

Troubleshooting (cont)

1. NO ARM SENSOR!

This message is displayed when there is no communication to the Arm Weigh-In-Motion sensor. The arm weigh-in-motion assembly has a microcomputer and arm angle sensor. The microcomputer gathers all four sensor signals (arm and fork) and communicates their measurements to the *LoadMan*®500 Black Box for processing and then to the Android device for display. If *LoadMan*® cannot detect the arm assembly microcomputer, then neither will the angle sensors be detected. If this is the case, then the other two diagnostic messages, "NO RGHT FORK SIG!" and "NO LEFTFORK SIG!" will also be displayed. The right and left fork signals might be fine at this point, but of course will not detected if the arm assembly microcomputer is not communicating. There are three sources to the problem:

a. The cable connection from the LM500 *LoadMan*® black box to the arm weigh-in-motion assembly box has failed. Make certain that the 7-pin male connector is firmly plugged into the arm assembly box mounted on the arm of the vehicle. Also, make sure that the connector at the other end of this cable is firmly plugged into *LoadMan*® black box RS232 port#2.
b. The arm weigh-in-motion assembly has failed. This unit is a potted assembly to survive harsh outdoor environments. The unit is not field-repairable and must be replaced or rebuilt.
c. The *LoadMan*® black box has failed. The black box is not a field-repairable for this type of communication failure. It must be replaced with a new or rebuilt unit.

2. NO LEFTFORK SIG! and/or NO RGHTFORK SIG!

If either of these two messages are displayed, first make certain that the message ARM SENSOR OK! is also displayed. If not ("NO ARM SENSOR!" is displayed) then go back to the earlier troubleshooting section. The microcomputer inside the arm weigh-in-motion assembly reports whether it is receiving the fork loadcell signals. The fork weigh-in-motion assembly has digital to analog converters for the right and left fork loadcells and the fork angle (which is independent of the arm angle sensor).

a. *LoadMan*® must receive both loadcell signals. Check the cable that connects the arm weigh-in-motion assembly to the fork weigh-in-motion assembly and verify that they are plugged tightly into each module.
b. If the cables are connected securely, then check the cable harness for damage and perform a continuity check. This cable harness has a 7-pin connector on each end, and all connections go pin-to-pin (i.e., pin-A to pin-A, pin-B to pin-B etc.).
c. If the cable is OK but the messages NO LEFTFORK SIG! and NO RGHTFORK SIG! still display:
    - Attempt to disconnect both loadcell cables that plug into the fork weigh-in-motion box to eliminate a fault in one or both loadcells.

- If after unplugging both loadcells the messages NO LEFTFORK SIG! and NO RGHTFORK SIG! still display, then the fork weigh-in-motion box has most likely failed.
- The fork weigh-in-motion module is a potted assembly to survive harsh outdoor environments. The unit is not field-repairable and must be replaced or rebuilt.

3. NO LEFTFORK SIG! but RGHTFORK SIG OK!

LEFTFORK SIG OK! but NO RGHTFORK SIG

If one of the loadcell signals is present but the other is not, then it is most likely that one of the loadcells has failed. Swap the two loadcells on the fork weigh-in-motion assembly and see if the error message moves to the other loadcell channel. If it does, then one of the loadcells has failed. Swap the loadcells again to make certain which loadcell has failed. When isolated, replace the failed loadcell. If the error is still on the same channel after swapping the connectors, then the Fork Weigh-in-Motion Module has failed.

4. Load Measurements Inaccurate

Load measurements that are not repeatable or are inaccurate can be traced to one of the following:

- One or both loadcells have failed.
- The fork digital to analog converter has failed.
- Fork angle measurements are faulty.
- Arm angle measurements are faulty.

Checking Loadcell Response and Fork Module

- Locate and enter the LOADCELLS section of the Settings.
- Move the forks to a horizontal position. The CH1 and CH2 fork loads should read near 0 counts. If not, perform the Zero Fork Load command and try again.
- Raise the forks to as near vertical as possible. When raising the forks near vertical, the load on the forks comes off the loadcells and the reading should decrease 400-1000 counts (depending on the weight of the forks).
- Pick up an empty container and verify that the loadcell responds in a positive direction.
  - If the loadcell responds in a negative direction under load, then the loadcell is mounted upside down and must be removed and rotated 180°.
  - If the loadcell reading is bouncing 100s of counts, drifting, or will not repeat to the same reading under a given container load, then one or more of the following could be the problem:
    - The loadcell has failed.

- The fork weigh-in-motion analog to digital converter has failed.
- else a loadcell cable has been damaged.
- or the connector is loose and has moisture/dirt in the contacts.

- Check for damaged loadcell cables or dirty contacts. If the contacts are dirty, then the pins should be cleaned with isopropyl alcohol and a Q-tip. The signals on these pins are on the order of less than one millionth of a volt so any film residue or moisture on the contacts can cause the loadcell's signals to drift wildly.
- If the problem persists after cleaning the contacts, then the fork weigh-in-motion box should be replaced. If replacing the fork weigh-in-motion box does not fix the problem, then the loadcell should be replaced.

Checking Fork and Arm Angle Measurements

LoadMan® relies heavily on the accuracy of the fork and arm angles to measure accurate weight measurement results. The loadcell weight measurement response is a direct function of the fork angle. Any error in the fork angle will have a major effect on the overall accuracy of the weighing system.

Furthermore, the arm angle informs *LoadMan*® when to look at the fork loadcell signals. Any error in the arm angle can cause *LoadMan*® to look at the loadcell weight measurement response in the wrong part of the weighing cycle.

To check on the fork angle calibration:

- Go into the MODULE SETTINGS section of Settings to view the current fork angle, "FORKS xxxx.x DEG".
- Place a level on the fork mounting plate and move the forks until the fork mounting plate is perfectly vertical (this makes certain that the forks are perfectly horizontal).
- When the fork mounting plate is vertical the "FORKS xxxx.x DEG" display should measure 0.0 degrees. If not, go to step 6 of the ***Initial Startup and Calibration Procedure*** and follow the directions for calibrating the fork angle.

To check on the arm angle calibration:

- While still in the MODULE SETTINGS, view the current arm angle, "ARMS xxxx.x DEG".
- The arm angle should read zero degrees when a typical container is lifted 1 to 2 feet off the ground.
- If not, then go to step 5 of the ***Initial Startup and Calibration Procedure*** and follow the directions for calibrating the arm angle.

COLLECTING LOAD DATA

When a load is recorded, load data is sent via the internet to the *LoadMan*® servers. There, the data is stored in the database that the *LoadMan*® Android app is licensed for. If there is no internet connection to the Android device, the load data will be stored in the local storage of the Android device until an internet connection is reestablished. The following data is sent in a standard load record:

Table 12. Recorded Load Data

LOAD DATA
Date & Time
Account Number
Route Id
Load Weight (Dumped Load)
Container Net Weight (Empty)
Net Truck Weight (Payload Weight)
Product
GPS Coordinates

After each recording of a load, *LoadMan*® sequences (when auto sequence enabled) to the next Stop Number and its corresponding Load Name and Account Number and is therefore automatically setup for the next collection. If a geo-mode is active, the next stop will be assigned automatically, see "Detecting a Stop with GPS" under the Route List section of this manual for more information.

Out-of-Sequence or Unplanned Collections:

It sometimes is necessary to collect a load out-of-sequence or to record a load that was unplanned during a collection route. There are several options available through the front panel PROGRAM buttons for these and similar situations.

- If the application is in a geo detection mode, the app should automatically detect any customer, even when they are out of sequence.
- If the application is in geo route mode, and the customer is part of the selected route, it should appear on screen and be automatically selected. If it is not part of the route, it is recommended that CUSTOMER UNKNOWN be selected, which is always at the bottom of the route list.
- If the application is running in geo fence mode, CUSTOMER UNKNOWN will always be selected and thus, no action is needed.

Collecting Data (cont)

- If the application is running in sequence mode (aka non-geo detection mode) AND the stop is in the current route, then the driver will need to scroll to and select the current customer if it is out of sequence. If the stop is in a different route, the route will need to be changed by opening the side menu and selecting “Change Route”. Alternatively, you could scroll to the bottom of the route list and select CUSTOMER UNKNOWN, which will always be there.

Recording Unexpected Problems:

Sometimes a problem will occur in picking up or delivering a load and it is valuable to record that problem for a particular route stop (e.g., no container, road blocked, gate locked, etc.). For more information on recording these problems or “events”, see “Recording an Event” under the “Operational Controls” section of “The Normal Operating Mode”.

Sending Unsent Data

If the *LoadMan*® application tried to send records of any kind to the cloud, but was unsuccessful due to no internet connection, the data will be stored locally in the Android device and will be sent when an internet connection is reestablished.

- To send any unsent data, navigate to the “RECORDS” page of Settings. There will be a countdown timer that will try to send records every minute. A button labeled “SEND” can be pressed to try to send the unsent records. The number of unsent records should start decreasing and eventually will hit zero, in which case all unsent records have been successfully sent.
- If the android device has an internet connection but still cannot send the records, contact *LoadMan*® technical support.
- Rarely, a record will have an issue that cannot be resolved and sent to the *LoadMan*® database, in which case the “DELETE RECORDS” button will have to be pressed. This will delete and remove all unsent records in the Tablets memory.

DOWNLOADING THE APPLICATION

- To download the *LoadMan*® Android Application, first open a web browser on your Android device. This can be a program like Chrome or the Samsung “Internet” app.
- Navigate to www.loadmansoftware.com with the web browser.
- Tap on the button that starts with “Loadman CARTeL”, this will download a file with the extension .apk to the android device.
- You will see a small pop-up at the bottom of the screen that says “open file” click on this when you see it
- If the pop-up goes away, exit the web browser and find an app on the device called “My Files”
- Locate the downloads folder in the “my files” app. You should see the .apk file.
- Tap on the .apk file to install the application.
- Android may ask you to enable installing applications from unknown sources for the app you are using (internet browser or my files). Follow the instructions and enable installing applications.
- If you had to enable installing application from unknown sources, return to “my files” and install the application by tapping on it.
- Once installed, open the application. Allow all permissions the app asks you for.
- If all displayed is a box labeled “Enter License Code”, enter your 6-character license code or contact *LoadMan*® for a license.

APPENDIX

RFID MODE

The *LoadMan*® Android app can be connected to an RFID reader and receive RFID tag information when picking up a load. This allows for the most accurate form of route stop identification that Loadman offers. RFID tags will need to be associated with route stops in *LoadMan*® 's cloud data management software. The setup of the RFID reader type can be selected in the MISC setup category. The RFID reader type options are;

- **Ethernet -** In this mode, the android device will have to be connected via ethernet to the RFID reader. A small RFID icon will display in the top right corner of the normal operating mode if the connection is successful. If not, a circle with a line through it will display instead. Once connected, tags will be read during the weighing cycle. The RFID reader starts when the weighing system starts a new weighing cycle indicated by the READY TO WEIGH load state changing to the WEIGHING LOAD load state. The duration of the RFID tag read can be set in MISC under Scale Settings > More Settings
- **Scales –** In this mode, the Loadman scale system will be connected to the RFID reader instead of to the Tablet, and tag data will come to the Android device from the *LoadMan*® LM500 black box. No ethernet connection is needed for this mode.

SCOUT ROUTE MODE

- In this mode, all buttons on the bottom of the screen in the normal operating mode will be replaced with a large "Learn Location" button. Tapping on it will send a "learn location record" to the cloud which tells the cloud-based backend software the GPS coordinates are of a selected stop or service on a route.
- A learn location record will have the selected route stop on the route list, along with the current GPS coordinates of the Android device.
- When the *LoadMan*® servers receive the learn location record, the GPS coordinates of the record will be assigned to the selected route stop. So, from then on, unless changed manually or with another learn location record, that stop will function with geo-route mode and geo-fence mode using the GPS coordinates learned for the selected stop or service.

STATIC WEIGH MODE:

In this mode, the *LoadMan*® scale system will take very accurate weight measurements, but require a specific procedure, involving stopping at certain moments in the weighing cycle. Here is an overview of the procedure:

APPENDIX (cont)

There is a window that the Arm and Forks must be in for the weight to be measured accurately. The arms must be lifted to between +2 and +6 degrees and the forks must be lifted between –2 and +2 degrees. This procedure will refer to that window.

1. Lift the arms and forks into the window with no load to measure the zero of the scale. This removes any long term zero of scale and automatically learns the zero load of the scale before a weighing cycle can begin.

Once the Arms and Forks are in the correct weighing position the display will inform the operator to Stop Moving the Arms and Forks. The Arms and Forks must remain in the correct weighing position continually for about 4 seconds before Step 1 is completed.

2. After step 1 has been completed, a timer displays on the screen.

Once the timer goes to zero, the display will show “ZERO COMPLETE! LOWER ARMS!” This indicates that the Zero of the scale has been measured and the weighing system is ready to weigh the load.

APPENDIX (cont)

3. Lower the Arms to Pick up the container desired to weigh and bring the load back into the weighing position by moving the Ams and Fork position as directed below.

4. Raise the arms and forks back into the weighing window to begin weighing the Gross weight. Once in the correct weighing position the display informs the operator to "STOP MOVING ARMS AND FORKS" as shown below.

Once the weighing system is in the correct weighing position continually for about 4 seconds you will see a WEIGHING GROSS timer appear on the display as shown below.

5. Once the timer reaches zero, the display shows the "GROSS xxxxx LB" reading as shown below;

APPENDIX (cont)

6. Raise the Arms up and eventually you will see “DUMP LOAD” flashing on the display. Continue to dump the load in the container.

Once done dumping the container contents, lower the arms and the display will eventually show the message “PUT THE CONTAINER ON GROUND”. This message will remain on the screen until the empty container is resting on the ground and the load is off the loadcells.

7. Raise the empty container into the weighing window again to get the Tare weight measurement.

8. Raise the empty container is back into the weighing position you will see the following display

APPENDIX (cont)

Once the weighing system is in the correct weighing position continually for about 4 seconds you will see a WEIGHING GROSS timer appear on the display as shown below.

9. When it reaches zero the screen reads “Tare Weight xxxxx LB”. Lower arms for Net Weight”, lower the arms to the ground again to view the Net weight.

10. After the NET weight is displayed, and if the GROSS measured weight was larger than the Container Weight Setpoint setting, RECORDING LOAD on the screen will flash and then back to the very beginning of another weighing cycle with the screen shown below. The RECORDING LOAD means the load record was saved and sent up to the cloud if an internet connection is present. If the GROSS weight measured is less than the Container Weight Setpoint setting, the display goes to the screen below without the RECORDING LOAD Display and the load record is ignored, since no container was picked up. The process then repeats again from step 1 with the following display.

APPENDIX (cont)

1. Bring Arms between +2 & +6 degrees: Arms: -3.6°

STEP 1: LIFT WITH NO LOAD TO ZERO

2. Bring Forks between -2 & +2 degrees: Forks: 0.9°