WLS555

Installation and Operation Manual

SCI-WLS555 Onboard Weighing System Installation Guide V4.1

Important Safety Information

Precautionary Statements

Warning– Indicates a potentially hazardous situation which, if not avoided, could lead to serious injury or death.

Caution– Indicates a potentially hazardous situation which, if not avoided, could lead to a mild to moderate injury.

Information – Indicates important points that Operators and Installers need to fully understand.

Refer to Documentation – Indicates important points which must be obtained by referring to manufacturers Service, Operation, or Maintenance Manuals.

It is your sole responsibility to install, operate, and maintain the SCI system in a manner that will not cause damage to persons, property, or anything else. Always use safe practices and adhere to any laws that may be in place.

Do not install, operate, or maintain the SCI system unless you are completely competent and understand the system and equipment it is being mounted on.

Read this manual completely prior to use and familiarize yourself with the components and locations.

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1. Introduction

Thank you for purchasing the WLS555 Onboard Weighing System. This product has been designed to be simple to install and operate. The system operates with communication from the processor to a mounted tablet or handheld device. Please ensure you have read and understand the compatibility statements to ensure the best experience. The latest list can be found on our website at https://www.scaleandcontrol.com/support-wls555.html.

1.1. Compatibility Statements

The system uses any WiFi enabled device that has an internet browser. Complete testing has been conducted using Chrome for Windows and Android devices and Safari for Apple products. Other browsers may function with or without limitations.

1.2. Approved Devices

Device Type	Operating System	Browser	Limitations
PC	Windows 7 and up	Chrome	No Known
Tablet – Android	Android 4.4 and up	Chrome	No Known
Phone – Android	Android 4.4 and up	Chrome	No Known
Tablet – iPad	IOS 12	Safari	Can't Download Load or Parameter Logs
Phone – iPhone	IOS 12	Safari	Can't Download Load or Parameter Logs

Phones and other cellular connected devices may require "Mobile Data" to be turned off for full functionality. If you have issues viewing the home page in your browser, turn mobile data off while using the scale. To better serve you in the future, please send an email to support@scaleandcontrol.com with device make, browser used, OS version, and carrier to allow us to make improvements moving forward.

1.3. How the System Works

Weighing - The system uses sensors in the hydraulic circuit to monitor pressure during operation of the loader arm. These pressure readings correspond to the calibration data stored on the module per attachment. The system requires you to make movements past a target area to register the weight of the contents in the bucket. There are two non-contacting switches mounted near the loader arm pivot point. These indicate the relative speed and weigh target area. If the loader arm does not cycle past the target area, the display will not indicate load. If this happens, simply lower the arm and then raise the arm until a load is registered.

Load Data – The system can read weight and record load information. For the system to calculate weight, an attachment needs to be set on the home screen. A load is a series of buckets of various weights, volumes, or pieces accumulated during a load cycle. To complete a load cycle, you must have Customer, Material, and Attachment set on the home screen and a load must be started. Every time a bucket is weighed, it will be recorded as part of a load,

providing you have pressed the START button. This data can be retrieved from the Load Log file for a specific day.

On the Display – When you are looking at the display, to see the load in the bucket, make sure the Customer, Material, and Attachment (NOTE: there must be 1 customer, 1 material, and 1 attachment. You can assign anything, but must have 1 of each) are selected and simply raise the loader arm at a smooth and consistent rate. Once the loader arm passes the second switch, the current bucket total will show in the top section of the display. This allows the operator to get a weight that may not need to be logged / recorded. In addition, with an empty bucket, the operator can make this motion and ZERO / TARE the bucket. This is helpful as material gets stuck in the bucket or can indicate the boom pins are in need of lubrication if the weight deviates from zero.

To record a load and/or see a load accumulate on the display, the operator must first press the START button. By pressing the START button, the system will record every movement of the boom in the up direction as a bucketful being placed into a vehicle / vessel. This will increment the bucket counter in the upper right corner of the display and accumulate bucket loads in the Load Total area (see Fig 16 – Item 5). Additionally, once the START button is pressed, the bottom buttons will change to TIP OFF and FINISH. To end the load, simply press the FINISH button and the load will complete and be logged into memory. If the system has a printer configured, it will also print the load ticket once FINISH is pressed. On SCI supplied Brother printer, pressing the feed button on the printer will reprint the last ticket.

TIP OFF – The TIP OFF function allows the operator to re-weigh the last bucket until they get the desired amount of material. It works by removing the last bucket weight and count from the load. Then the operator can shake off material, lower the arm, and raise the arm to re-weigh the bucketful. This can be repeated as many times as required to get the desired amount. Once the desired amount is weighed, press FINISH TIP OFF to exit the function, then press FINISH to complete the load. The TIP OFF function is to weigh material in the bucket, not the material that was removed.

WIFI Requirements – The control module provides the required WIFI signal for the system (Tablet and Thermal Printer) to function on its own. The system does **not** need access to the INTERNET. To utilize the scale, your device must be connected to the SCI-Scale-XXXXXXXXX network and your device will say Connected, No Internet. Wifi is a radio communication standard and has nothing to do with the world wide web. To utilize the Desktop Printing, your site will require Wifi, in which the control module will connect to it. To utilize Remote Viewer, your site will require Wifi and Internet access (world wide web).

1.4. Components

Standard Components

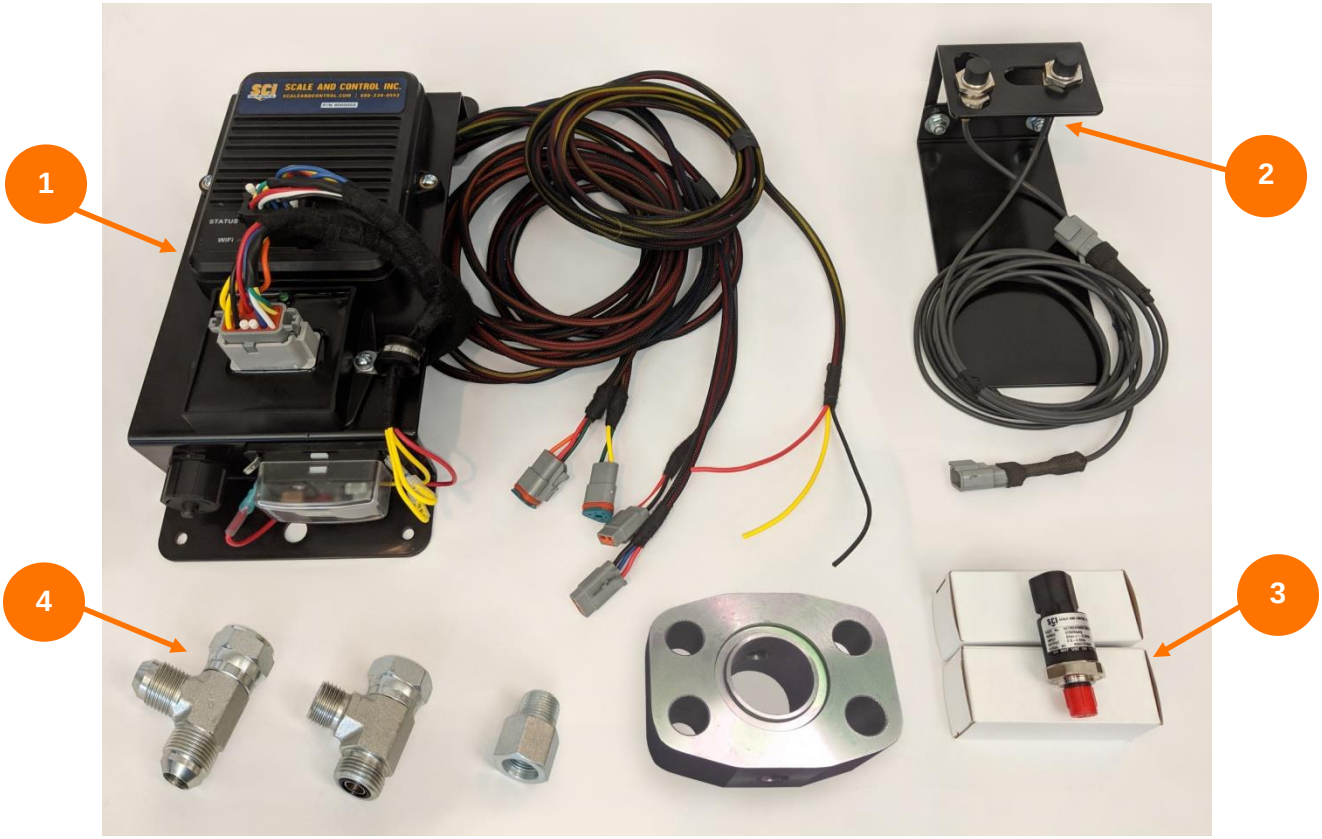


Figure 1

1. **Controller Assembly** – This has the processing module, I/O module, and fuse block. All other wired components get connected to this assembly.
2. **Switch Assembly** – This part gets mounted (welded or bolted) to the frame where the loader arm pivots.
3. **Pressure Transducers** – These parts get mounted between the cylinder and control valve to monitor pressure in the cylinder. Note: These must be mounted between the cylinder and any load holding valves. The mechanical connection is -04 (1/4") O-Ring Boss. If you have questions pertaining adapters or pressure ratings, contact our service department via support@scaleandcontrol.com
4. **Hydraulic Adapters/Flange Fitting** – Adaptors and flanges come in various sizes and styles to accommodate most equipment. (Shown (Left to Right) -06 JIC Run Tee, -06 O-Ring Face Seal Run Tee (ORS), Female -04 O-Ring Boss (ORB) to -04 Male Pipe), flange.

Optional Components

Figure 2

1. **Display** (Optional) – Samsung Tab Active Tablet
2. **Display Mount** (Optional) – This comes in many variations. Consult your order to ensure compatibility with your handheld device.
3. **Printer** (Optional) – This is used to print load tickets on or around the equipment.

1.5. Typical Mounting Locations

Mounting on Wheel Loader
Figure 3

Mounting on Skid Steer
Figure 4

1. **Controller Assembly** – Mounted outside cab away from falling debris
2. **Switch Assembly** – Left hand side at / near loader arm pivot point
3. **Pressure Sensors** – Where hoses attach to cylinders or tubes from main control valve
4. **Display Mount and Printer** – Inside cabin near operator station

2. Installation

2.1. Pre-Installation

- Find, using service manual or pressure gauge, the pressure of the loader arm circuits (up and down motion). Refer to manufacturer's manual for information on how to get the pressures and relieve system pressure.
- Record the pressures

Piston:_____psi

Rod:_____psi

- Compare Pressure Sensors to values to ensure the Pressure Sensor rating meets or exceeds machine values.
- Determine Pressure Sensor mounting locations *(see Figure 5)*. This is generally an adapter between the steel tubes coming from the main control valve to a hose connected to the lifting cylinders.
- Record Adapter size and type

Piston Hose connection size_____

Rod Hose connection size_____

- Compare the adapters in the kit to ensure they are of the same size and type. See Appendix C.

Figure 5

CAT 938K – Near Articulation Point

-16ORS Adapter

2.2. Installation

2.2.1. Hydraulics

A. Lower the boom to ground and engage the float functionality. Turn the equipment off. Follow any instructions for servicing the hydraulic system found in the equipment Operator's or Service Manuals.

B. Locate appropriate locations to install the pressure transducers in both the piston and rod side circuits (when applicable) *(See Figure 5)*. The location should be free of any danger of contacting structure or falling debris. Additional adapters or hoses may be needed to tee the sensors into the circuits. Ideal locations include areas where hoses and tubes join.

C. After ensuring the residual pressure is removed from the circuit and all potential energy is dissipated, break the desired connections and insert the required adapters to "Tee" in the sensors *(See Figure 6)*. Before tightening, ensure to bleed / purge any air in the fittings / circuit. Use proper tightening techniques to ensure hoses and tubes don't have implied torque that will cause connections to loosen. Apply the proper torque to all fittings. Refer to equipment Operator's or Service Manual for tightening specifications.

Figure 6
CAT 938K

2.2.2. Switches

A. With the boom lowered to the ground, start the machine and position the boom at the height you wish to weigh at. Important point to think about when selecting the height is that the movement of the boom will need to be about 5 deg or greater when weighing. If you are loading standard dump trucks or scooping material above grade level, you may want the weighing point to be higher than other applications. If you select a height and do not like the performance, you can move the sensors. However, if the sensors get moved, the system will require recalibration. If your loader is equipped with an automatic stop, the weigh height should be slightly under that height so when the arm stops it does not affect the cylinder pressures.

B. The kit comes with a "universal" bracket that can be used in most applications. If needed, you can install the sensors in your own bracket. The bracket can be bolted or

welded to the structure *(See Figure 7)* but needs to have the bottom target not engage until the boom is lifted at some height above ground and the second target needs to be about 5 deg higher than the first in the boom movement *(See Figure 8)*. An example of placement on a skid steer is illustrated in *Figure 9*. These sensors detect any ferrous material and ideally are mounted such that the boom arms are what triggers them. The sensors have a sensing distance of 1/8" – 1/2". **DO NOT DRILL OR WELD ON ROPS / FOPS STRUCTURES.**

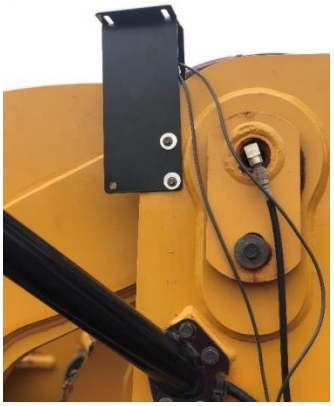


Figure 7

Figure 8
CAT 938K Wheel Loader

Figure 9
Bobcat T650 Skid Steer

2.2.3. Controller

A. The controller and I/O module come installed on a mounting plate. This mounting plate needs to be mounted somewhere on the vehicle in a location it will not come in contact with moving parts or falling debris. This assembly is weather rated and has WiFi communication, thus cannot be installed inside a shielded enclosure. Pick a location and bolt the mounting plate to the equipment. Do not weld the controller plate to the structure, doing so will destroy the electronics and is not covered under warranty.

2.2.4. Electrical

A. There are 5 pigtails coming off of the controller assembly. 2 are for the pressure sensors, 2 are for the switches, and 1 is for connection to the power supply. The power supply harness has 3 wires. Black is to be connected to chassis ground. Red is to be connected to Chassis (Battery) supply. Yellow is to be connected to switched power and will turn the system on. The switch can be ignition or its own dedicated switch to turn the system on and off. The system can operate on any voltage between 9 and 32vdc. The voltage supplied to the red and yellow wires must be the same. The other 4 are labeled and need to be connected with their corresponding sensor / switch.

B. Once connected and all wired up, ensure wiring is tied up away from heat sources and pinch points that could chaff or cut the wires.

2.2.5. *Connecting the Display Device*

A. The system utilizes a customer supplied or optional mobile device, the ruggedized Samsung Galaxy Tablet available for purchase through SCI, as the system display. The requirements of the mobile device are that it has a WiFi connection and a web browser. Tested web browsers include Chrome (all), Firefox, Internet (Android), and Safari (Apple). All are available through the Google Play Store or Apple iTunes for free. If the tablet is purchased through SCI, it will come setup ready for use with the WLS555 system.

B. Once a device is selected, you need to start the scale system up by turning the machine on from section 2.2.4.A. Connect to the WiFi Network ID SCI-Scale XXXXXXXXXXX. The XXXXXXXXXXX represents the serial number of the system. The password for the connection is Weight4It. Once connected, open your browser and search for WLS555.local/ or 192.168.5.1/. This will pull up the login page for the system. **For login info, review the Users section of this manual.** Tip: If using Chrome, you can press the Chrome menu button and then touch on Add to Home Page. This will add an icon and link to the mobile devices home page like an app. Similar can happen on other devices and browsers *(See Figures 10-15)*.

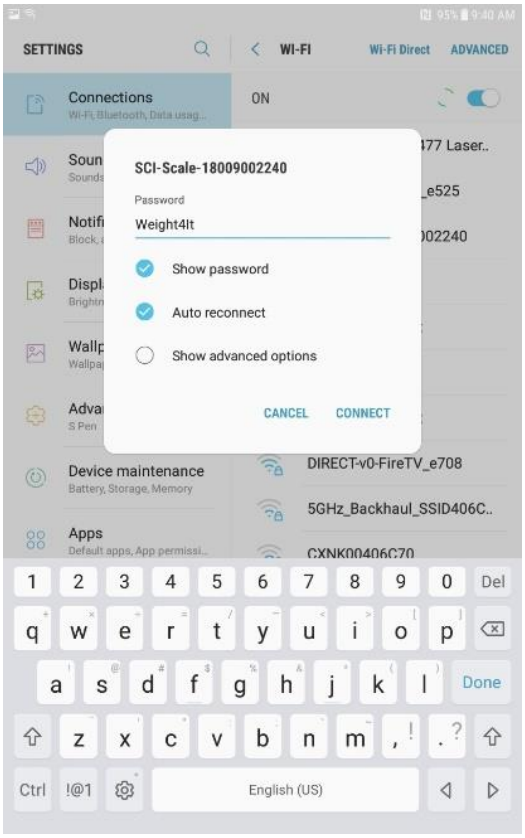


Figure 10

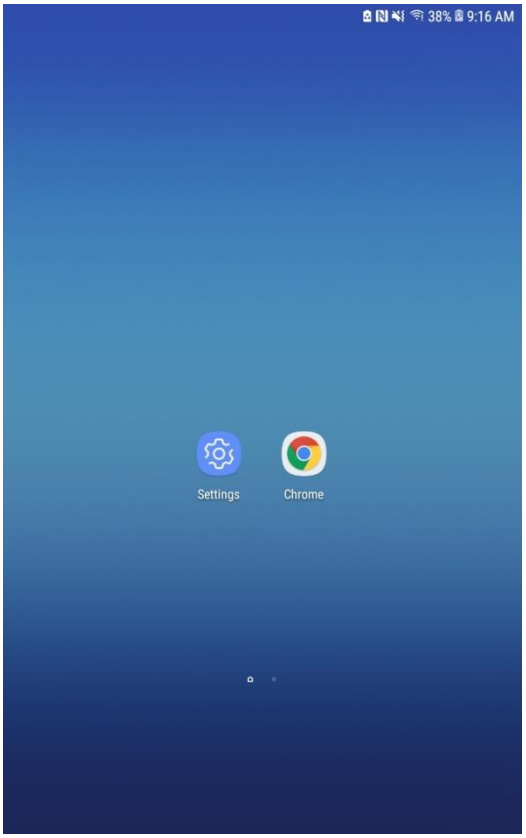


Figure 11

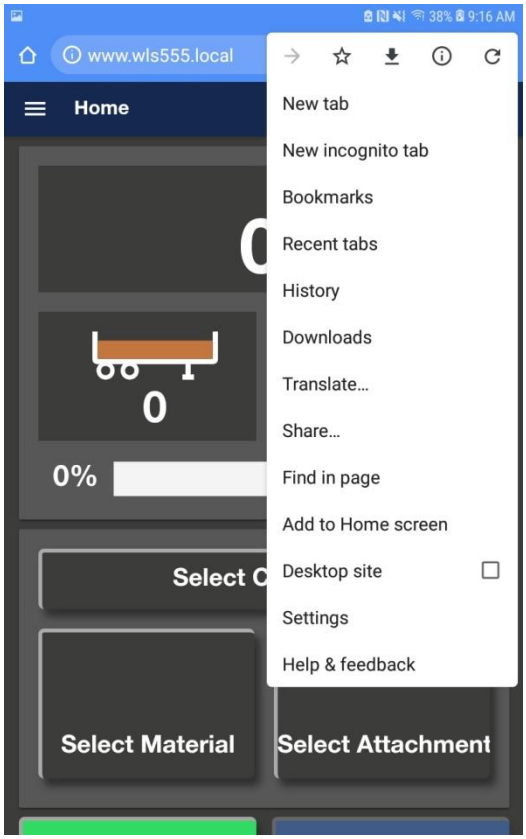


Figure 12

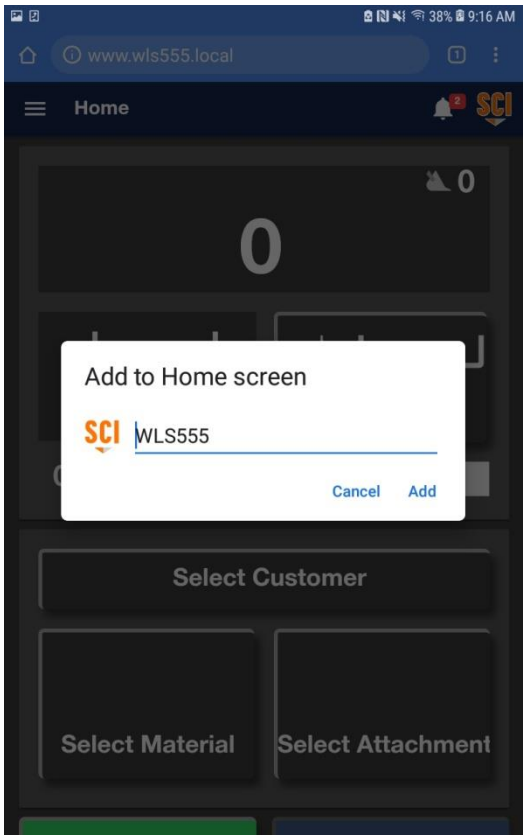


Figure 13

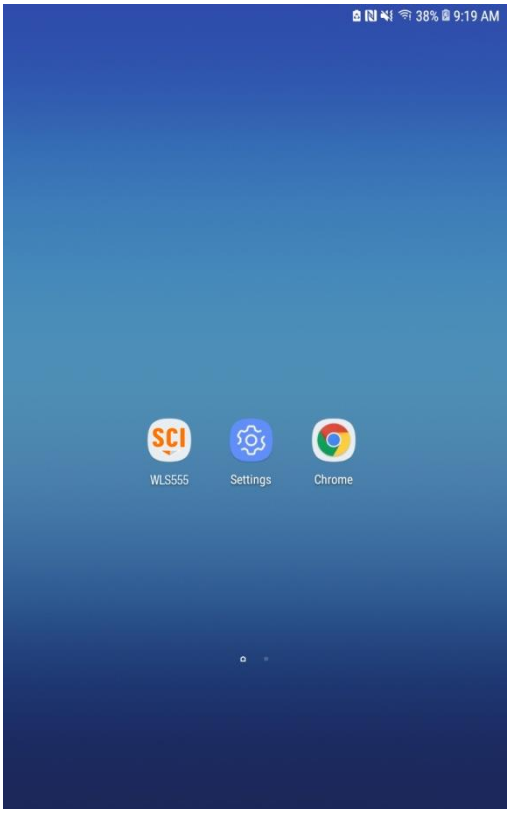


Figure 14

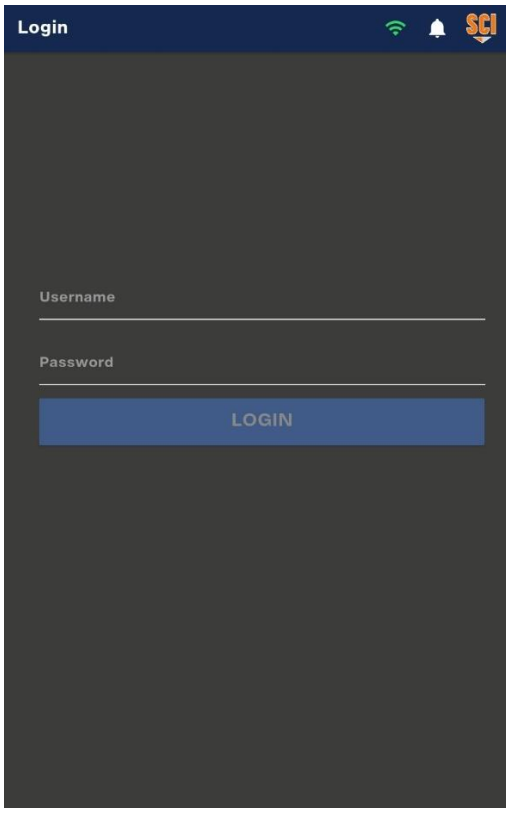


Figure 15

3. Operation

3.1. Display Page Layout

A. The display page consists of several objects that are touch / clickable areas that navigate to other windows or pages. *See Figure 16* and table below for layout and function.

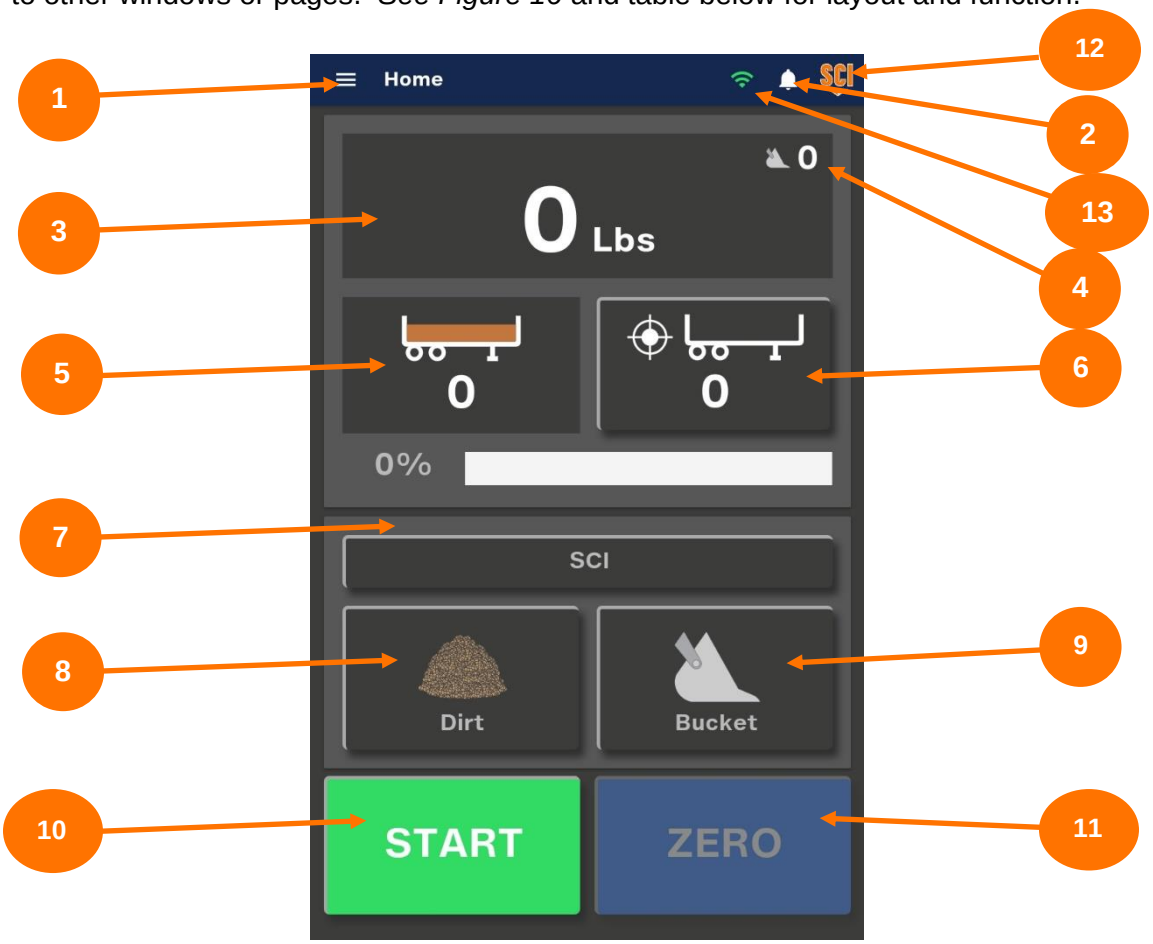


Figure 16

#	Name	Description
1	Menu	Press to open Menu. Can also swipe from left of home screen.
2	Alerts	Press to show active alerts. From popup window, you can download alert log.
3	Load	Shows current Bucket load. Will read when loader arm is lifted through load sensors.
4	Bucket Count	Shows number of all buckets in load.
5	Load Total	Shows accumulated load total of all buckets in load.
6	Target Load	Touch to set desired target load. By setting target load, a status bar (%) will appear below Total and Target Load button showing Total/Target percentage.
7	Customer	Press to select customer from list.
8	Material	Press to select material from list
9	Attachment	Press to select attachment from list
10	Start Load	Start load button. Press to start a load.
11	Zero	Press to Zero Bucket load. This accommodates for stuck material.
12	FULL Screen	Press to toggle between Full screen and window view.
13	Connected/Refresh	Press to refresh page. Green when connected. Red when not connected.

3.2. Menu Layout

The menu layout is as follows:

Menu

- Home – Returns to Home Page
- Attachments – Goes to Attachments Page
- Customers – Goes to Customers Page
- Materials – Goes to Materials Page
- Logging – Goes to Logging Page
- Diagnostics – Goes to Diagnostics Page
- Calibration – Goes to Calibration Page
- Tickets – Goes to Tickets Page
- Users – Goes to Users Page
- WiFi – Goes to WiFi Page

Logout (Exit Door) – Push to logout of the system.

Settings (Gear) – These are the Scale settings. Access by pressing the gear symbol in the menu.

- User – These settings are specific to the user and is stored on the user's device.
    - Units
        - Weight – User selected unit for weight
        - Volume – User selected unit for volume
        - Pressure – User selected unit for pressure
        - Temperature – User selected unit for temperature
    - Language – User selected language
- System – These are settings that store on the scale itself.
    - Scale Settings
        - Machine ID – An identification name for the unit the scale is installed on. Will print on load tickets and transmit to telematics system
        - Calculate Price – Toggle on to have the system calculate price
        - Sales Tax Rate – Enter tax rate for area that will be applied when calculating price.
        - Price Rounding – Used to round the sales unit.
        - Unit Rounding – Used to round the displayed unit.
        - Confirm Stop Load – Turn on to require confirmation when finishing a load
        - Stop Load Comments – Turn on to enable users the ability to enter comments when a load is finished.
        - Single Bucket Limit – 0 is off. Any other number will trigger an alarm when the bucket load exceeds this limit. Used where concerns of machine stability are an issue.
        - Target Exceeded Alarm – Turn on to enable an output for an alarm when Accumulated load exceeds Target setting.

        - Target Exceeded Alarm Duration – The time, in seconds, that an alarm will be triggered when Accumulated load exceeds target. 0 is continuous.
        - Thermal Printer – Toggle on if there is a Brother or Zebra printer installed
        - Desktop Printer – Toggle on to utilize standard network printing devices. This also creates pdf files of load tickets on the system.
        - Invoice Start At – The starting number of the load tickets. If this changes once set initially, it may erase historical data.
    - Company Information
        - Name – Name of the business of the loader (Seller of Material)
        - Address – Address of the business of the loader
        - City – City of the business of the loader
        - State – State of the business of the loader.
        - Zip – Zip of the business of the loader
        - Phone – Phone of the business of the loader
- EEPROM
    - Transducer Number – The number of installed transducers
    - Sample Window Size – The number of pressure readings averaged symmetrically about the weight trigger point. These readings are at 10ms intervals. Used to filter erratic readings.
    - Transducer Piston Volt Min – Minimum voltage reading of piston transducer at atmospheric pressure.
    - Transducer Piston Volt Max – Max voltage of pressure piston transducer (should be 4500 in all cases).
    - Transducer Piston Press Min – Minimum pressure (should be 0 in all cases).
    - Transducer Piston Press Max – Maximum Pressure setting of the piston transducer installed. Should equal pressure rating on transducer.
    - Cylinder Ratio – Area of the rod subtracted from piston area, then divided by the area of the piston on the piston side. Provides a percentage of rod side area for reduction in opposing force on lift cylinder. 1000 = 100%
    - Transducer Rod Volt Min – Minimum voltage reading of rod transducer at atmospheric pressure.
    - Transducer Rod Volt Max – Max voltage of pressure rod transducer (should be 4500 in all cases).
    - Transducer Rod Press Min – Minimum pressure (should be 0 in all cases).
    - Transducer Rod Press Max – Maximum Pressure setting of the rod transducer installed. Should equal pressure rating on transducer.

Info (Circle with i)

- Contact info
- Software info
- Memory Usage

3.3. Attachments Page

Here we maintain the Attachments for the machine. For example, for a given machine you may have a quick attachment system that allows for easy configuration of an Excavation Bucket and Pallet Forks. You will need to enter both attachments into the scale prior to calibrating to indicate load and/or usage. At minimum, 1 attachment needs to be configured. A maximum of 10 attachments can be configured. Attachments have the following fields: Name, Long Name, Serial Number, Scale Enabled toggle, and a selectable Icon. To add an Attachment, go to Menu>Attachment. Press the plus sign in upper right to Add an attachment. Enter the data into the corresponding field and click Submit to save. *See Figures 17 and 18*. Return to Home when done. (* is required)

Fields

- Alias – This is the abbreviated name of the Attachment *
- Long Name – This is the complete name of the Attachment. Keep to 20 Characters or less to ensure the name will fit on the print ticket. *
- Serial Number – This is a field to capture the Attachment serial number. The Load calibration depends greatly on the correct attachment selection to match what is installed.
- Scale Enabled – This needs to be turned on to use the attachment with the scale functionality. If this is turned off, you will not be able to see load or calibrate. *
- Icon – This allows you to select an icon to represent the attachment. You can choose from the following list. Bucket (Standard), Bucket (Alt), Bucket (Snow), Bucket (4-IN-1), Grapple, Forks, Lift, Bale Spear, Rake, Sweeper, Bin, Other. *

Figure 17

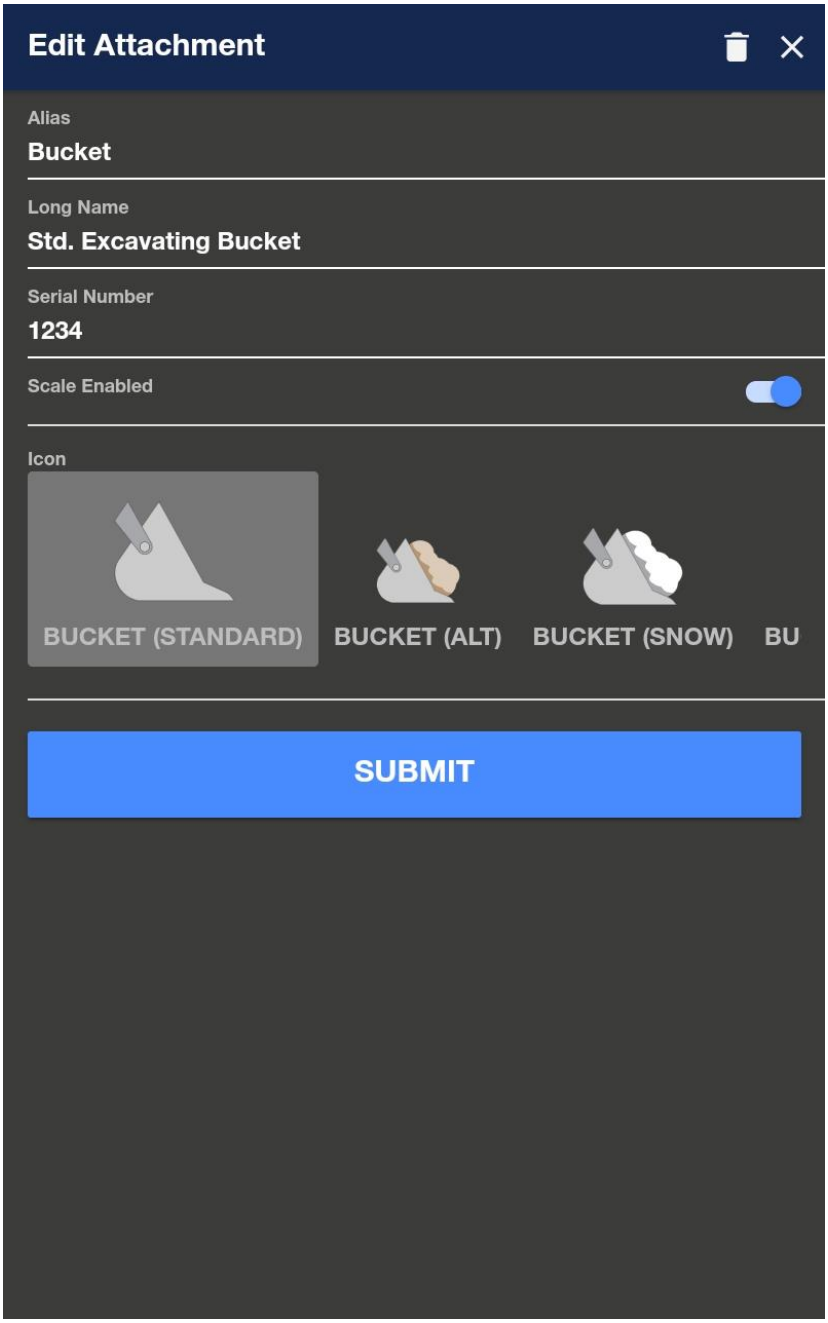

Edit Attachment
Alias
Bucket
Long Name
Std. Excavating Bucket
Serial Number
1234
Scale Enabled
Icon
BUCKET (STANDARD)
BUCKET (ALT)
BUCKET (SNOW)
BU
SUBMIT

Figure 18

3.4. Customers Page

Here we maintain the customers for load operations. For example, for a given business you may have 100 or more customers. In this page you can adjust discount level, taxable, Names, Addresses, etc. At minimum, you must enter 1 customer. This customer can be called anything, but the Name will show up on tickets. A maximum of 200 Customers can be configured. Customers have the following fields: Alias, Long Name, Phone Number, Address, Address 2, City, State, Zip Code, Project Number, Discount, Taxable, Print Address, Require PO, and Require Truck Number. To add a Customer, go to Menu>Customers touch the plus sign in the upper right to add a customer. Fill out the appropriate fields and click Submit to save. *See Figures 19 and 20*. Return to Home when done. (* is required)

Fields

- Alias – Abbreviated Name of Customer *
- Long Name – Full Name of Customer *
- Phone Number – Phone Number of Customer
- Address – Address of Customer
- Address 2 – Second Line for address of Customer
- City – City of Customer
- State – State of Customer
- Zip Code – Zip Code of Customer
- Project Number – Allows for a Specific Customer Project Code.
- Discount – Allows for a discount to be applied to Customer (in % - Price will be 1-Discount%)
- Taxable – Turn on to add tax to customer.
- Require PO – Turn on to open a dialog box where PO number must be entered to start a load.
- Require Truck Number – Turn on to open a dialog box where Truck Number must be entered to start a load.

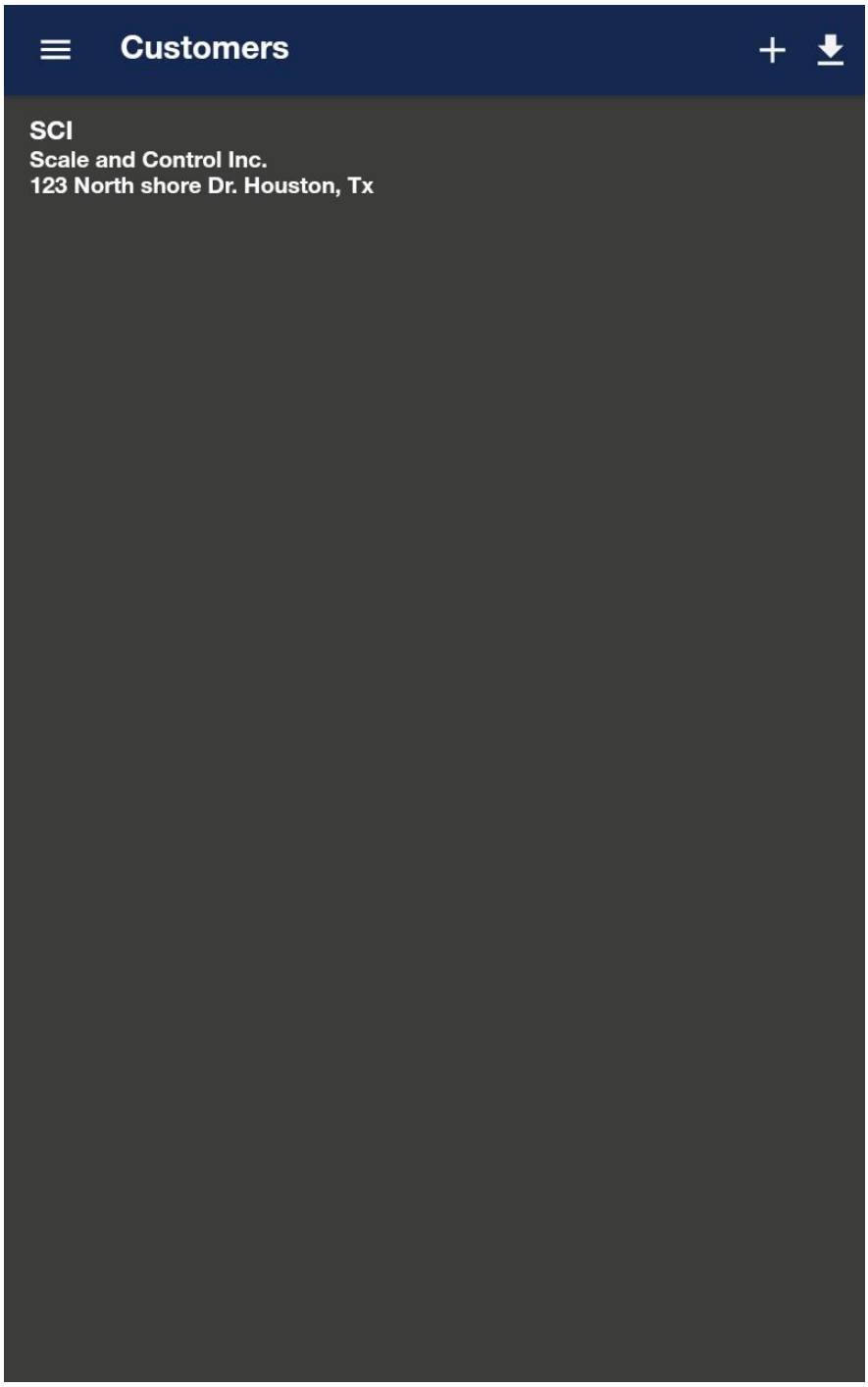

Customers
SCI
Scale and Control Inc.
123 North shore Dr. Houston, Tx

Figure 19

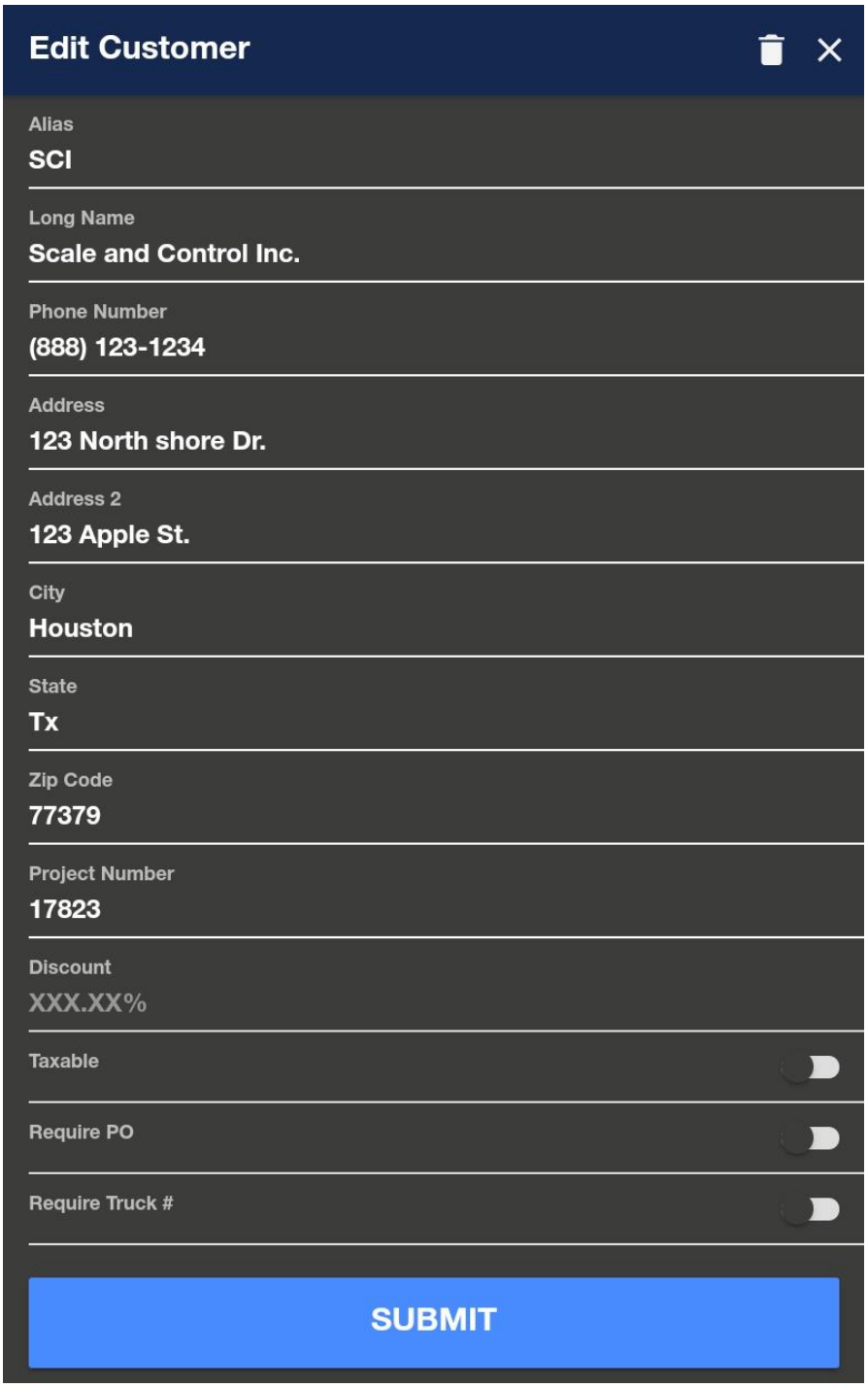

Edit Customer
Alias
SCI
Long Name
Scale and Control Inc.
Phone Number
(888) 123-1234
Address
123 North shore Dr.
Address 2
123 Apple St.
City
Houston
State
Tx
Zip Code
77379
Project Number
17823
Discount
XXX.XX%
Taxable
Require PO
Require Truck #
SUBMIT

Figure 20

3.5. Materials Page

Here we maintain the Material list. Materials are the object the machine will be working with. At minimum 1 material needs to be configured. A maximum of 200 can be configured. Materials have the following fields: Alias, Long Name, Unit Type, Sales Unit, Weight per Sales Unit, Price per Sales Unit, and a selectable icon. You can choose Icons from the following list: Rock, Gravel, Sand, Boulder, Dirt, Bark, Produce, and Other. *See Figures 21 and 22*. Return to Home screen when done. (* is required)

Fields

- Alias – This is the abbreviated name for the material. *
- Long Name – This is the Long Name for the Material. Try to keep to 20 characters or less to ensure the name fits on the ticket. *
- Unit Type – Selectable from Weight, Volume, and Quantity. The default is weight. *
- Sales Unit – Selectable from list of units by Unit Type. Example: Unit Type set to Weight > Sales Units will be Lbs, Tons (Imperial), Tons (Metric), and Kgs. Default is lbs. *
- Price/Sales Unit – This is the selling price per unit. Example: $100 / Ton (Imperial).
- Icon – Select an icon from list to best represent the material. List includes Rock, Gravel, Sand, Boulder, Dirt, Bark, Produce, and Other. *

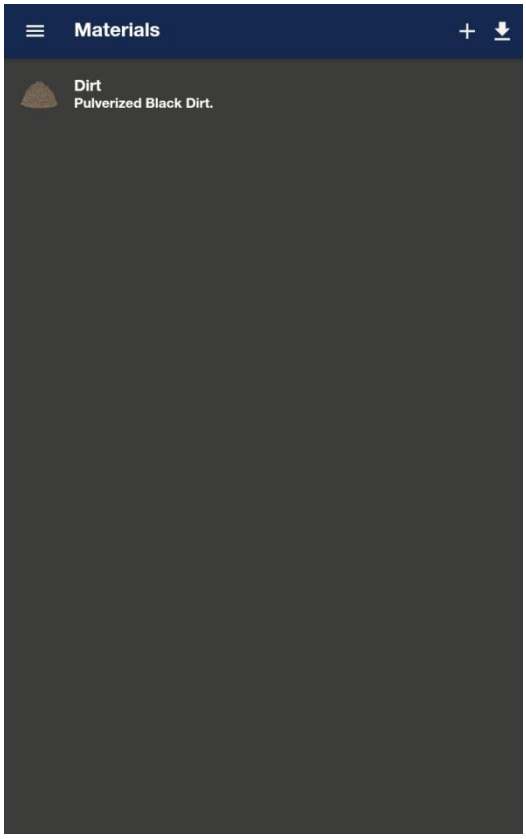


Figure 21

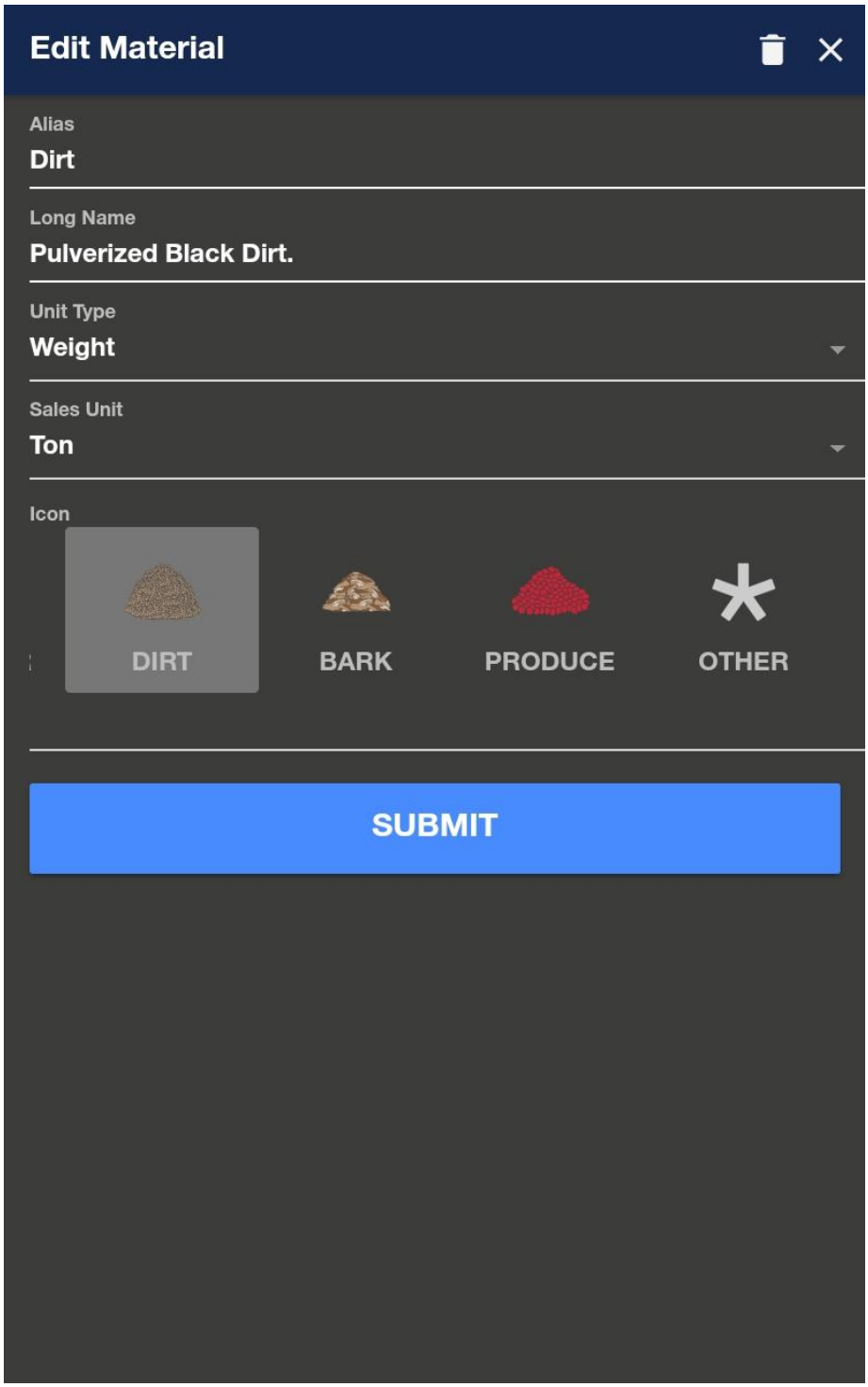

Edit Material
Alias
Dirt
Long Name
Pulverized Black Dirt.
Unit Type
Weight
Sales Unit
Ton
Icon
DIRT
BARK
PRODUCE
OTHER
SUBMIT

Figure 22

3.6. Users Page

Here we maintain the User list. The system has a few built-in accounts listed here:

Username	Password	System Settings	EEPROMs	Users	Attachment List	Customer List	Material List	Logs	Tickets	Perform Loads	Re-login Required
Install	SCIinstall	X	X	X	X	X	X	X	X	X	X
Manage	SCImanage	X		X	X	X	X			X	X
PowerUser	WLS555					X	X	X	X	X	
User	user									X	
Observer											

Additional Users can be added. (* is required)

Fields

- Username – This is the Username for the User being added. *
- Password – This is the password for this user. There are no special requirements. Password cannot be changed by user. *
- Login Timeout – This is the duration the user can remain logged into the system. Leaving blank results in a 24hr period. Setting to 0 will allow the user to be logged in indefinitely. *
- Permissions – Select which areas of the program the user should have access to. *

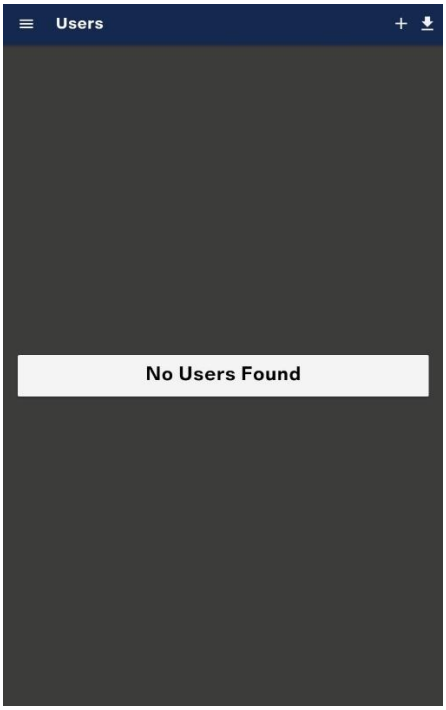


Figure 23

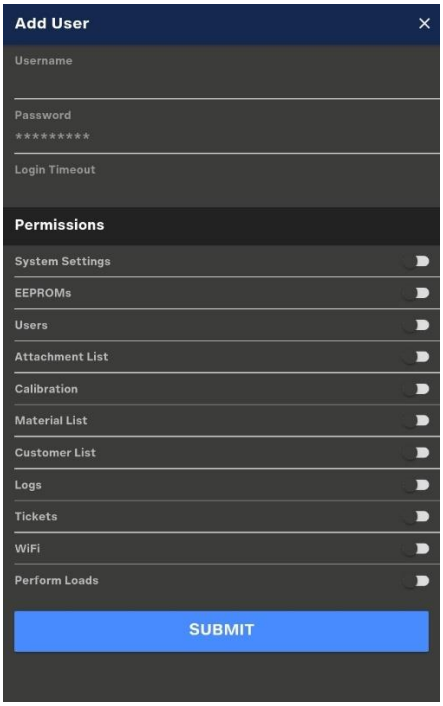


Figure 24

3.7. Logging Page

The system is capable of producing log files. They are saved in non-volatile memory. Load Logs are the daily run totals of loads completed. These are stored by the date *(See Figure 25)*. They are downloadable in .csv format. Go to https://www.scaleandcontrol.com/support-wls555.html to download a sample .csv with load data populated. To download the daily Load Log, go to Menu>Logging and swipe from right to left on the desired date *(See Figure 26)*. Then click the Download button. The file will download to the devices download directory.

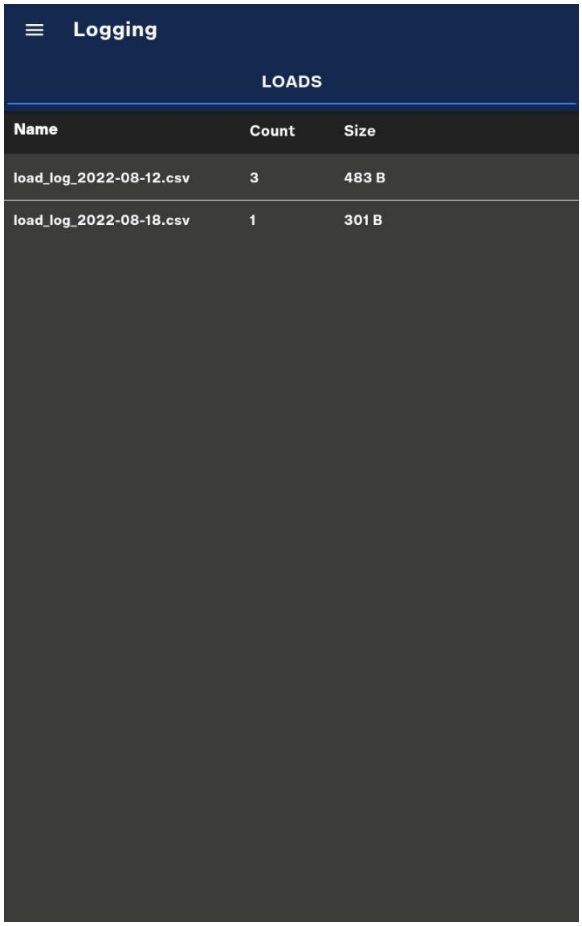


Figure 25

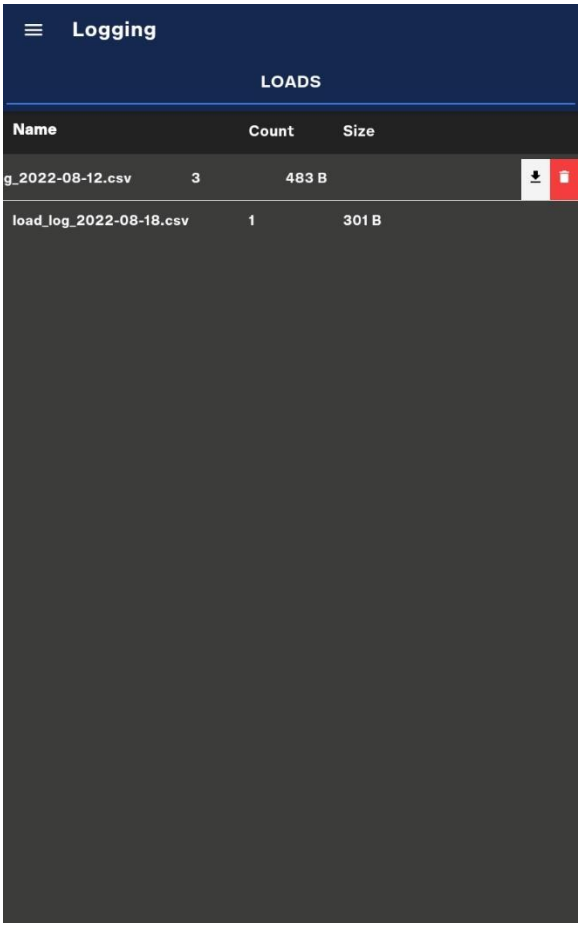


Figure 26 (Slide right to left)

3.8. Diagnostics Page

The Diagnostics page will aid in troubleshooting and installation of the scale. The values displayed on the right side are real time and provide all the information required to diagnose inputs to the system. To get to the Diagnostics page, go to Menu>Diagnostics. *(See Figure 27)*.

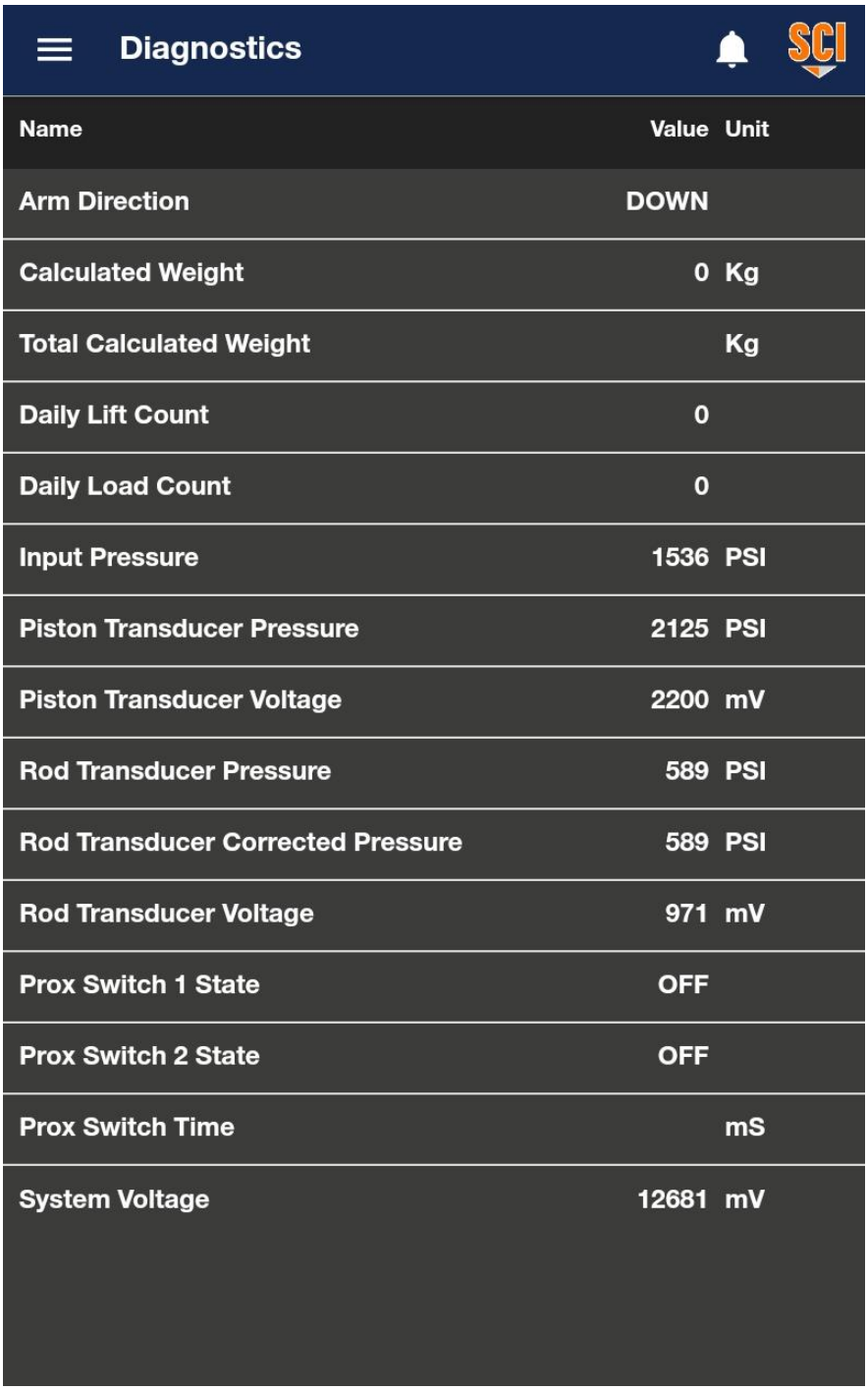


Figure 27

3.9. Calibration Page

The Calibration page allows for Automatic or Manual Calibration of an attachment. Each attachment can have up to 5 calibration points to accommodate nonlinear machines. It is best practice to use automatic calibration for initial calibration and manual mode only for tweaking the calibration points. The Automatic calibration will walk novice installers through the calibration with ease *(See Figures 28 and 29)*. Simply have at least one known weight of 80% or more of the machine's capacity. In most cases, 2-point calibration is sufficient with one point being 0 load and the other being the 80% load. Ideally, the load is actual material and not a concrete block or any device that does not fill the bucket naturally. Bags of concrete mix work if there is no means to determine the weight in the bucket.

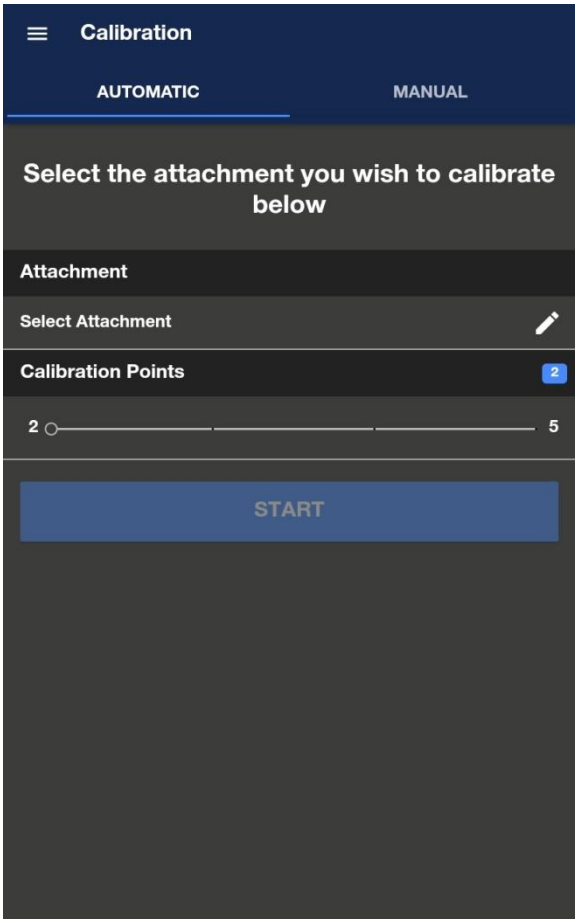


Figure 28

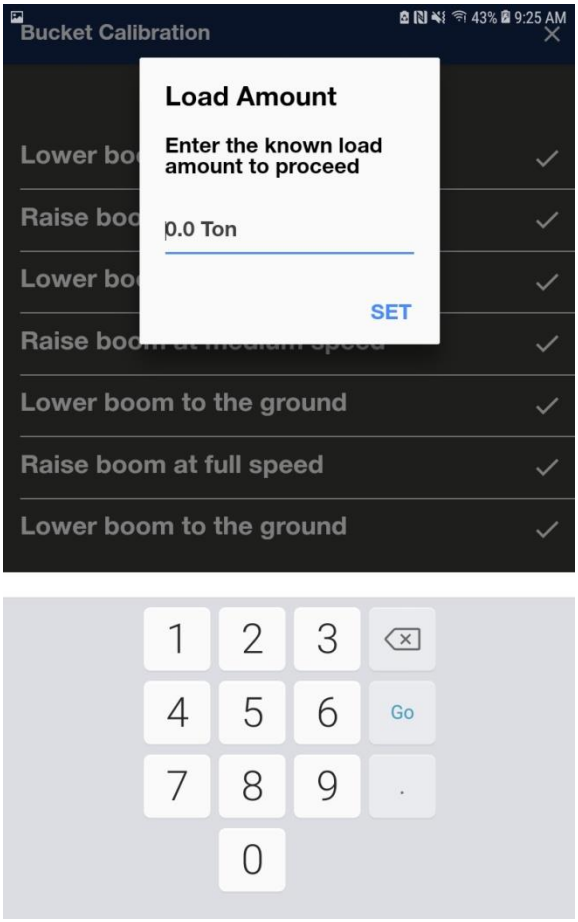
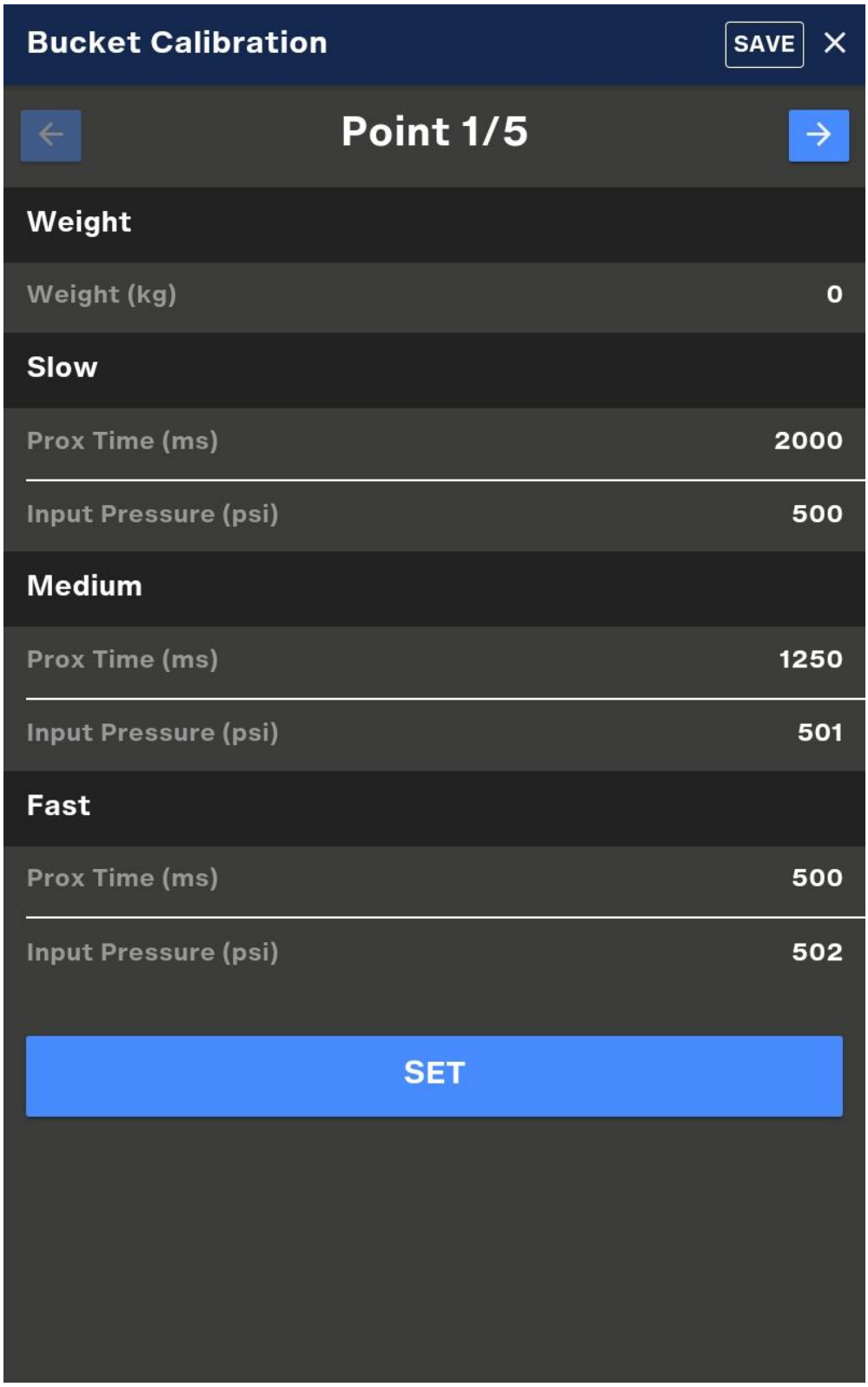


Figure 29

Manual Calibration

Manual Calibration allows the installer to tweak calibration values recorded in the automatic calibration process. It is best to contact SCI Tech Support before modifying any of these values. It is critical that you press set on the points you change prior to saving to ensure the changes are stored. After saving reselect the attachment on the home screen.


Bucket Calibration
SAVE
Point 1/5
Weight
Weight (kg)
0
Slow
Prox Time (ms)
2000
Input Pressure (psi)
500
Medium
Prox Time (ms)
1250
Input Pressure (psi)
501
Fast
Prox Time (ms)
500
Input Pressure (psi)
502
SET

3.10. Sensor Configuration

A. Next, we need to setup the system for the sensors we have. This is completed at the factory for new kits. Press the three horizontal lines in the upper left to access the Menu. Select the gear symbol to the right of Menu *(See Figure 30)*. Touch on EEPROM at the top *(See Figure 31)*. Set Transducer Number to the corresponding number installed in the machine. Set Transducer Piston Press Max to the transducer size installed (3000 or 5000psi). Set Transducer Rod Press Max (if installed) to the transducer size installed (3000 or 5000psi). Press Submit at the bottom. Return to Home by pressing the left arrow.

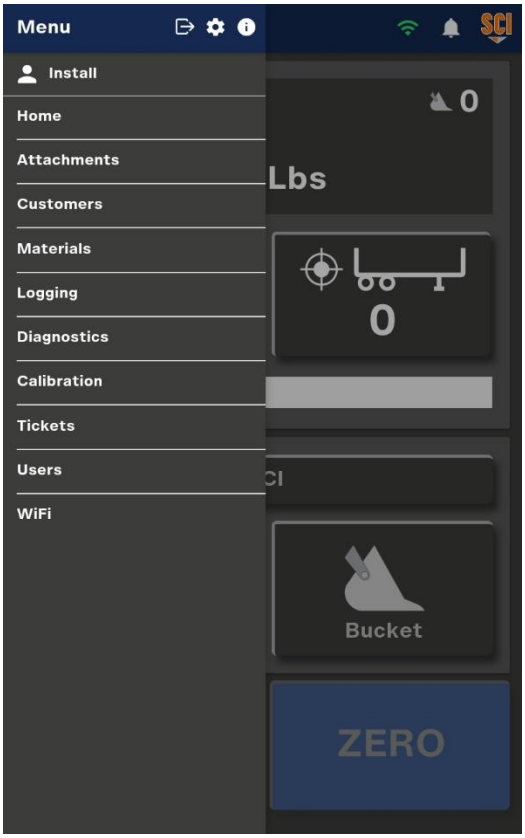


Figure 30

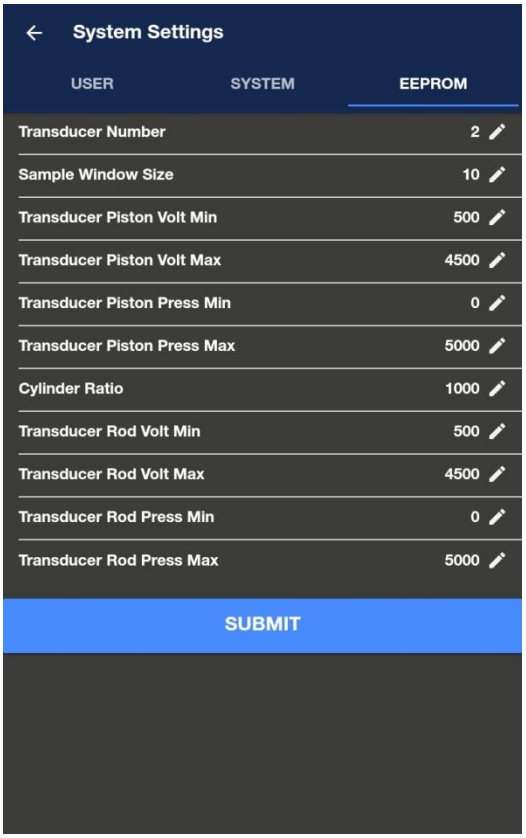


Figure 31

B. Next validate the switches are operating properly. In the Menu, select Diagnostics *(See Figures 30 and 32)*. With the boom on the ground, Prox switch 1 and 2 States should be OFF. With boom going up, switch state 1 should come on first and then switch 2 should come on and register a Prox Switch Time. If switch 2 comes on before 1 then reverse the switch harness connections. If neither comes on, check fuse in controller assembly and lights on the back of the switches. The lights should come on when a ferrous item such as a screwdriver is within ⅜" of the sensing face.

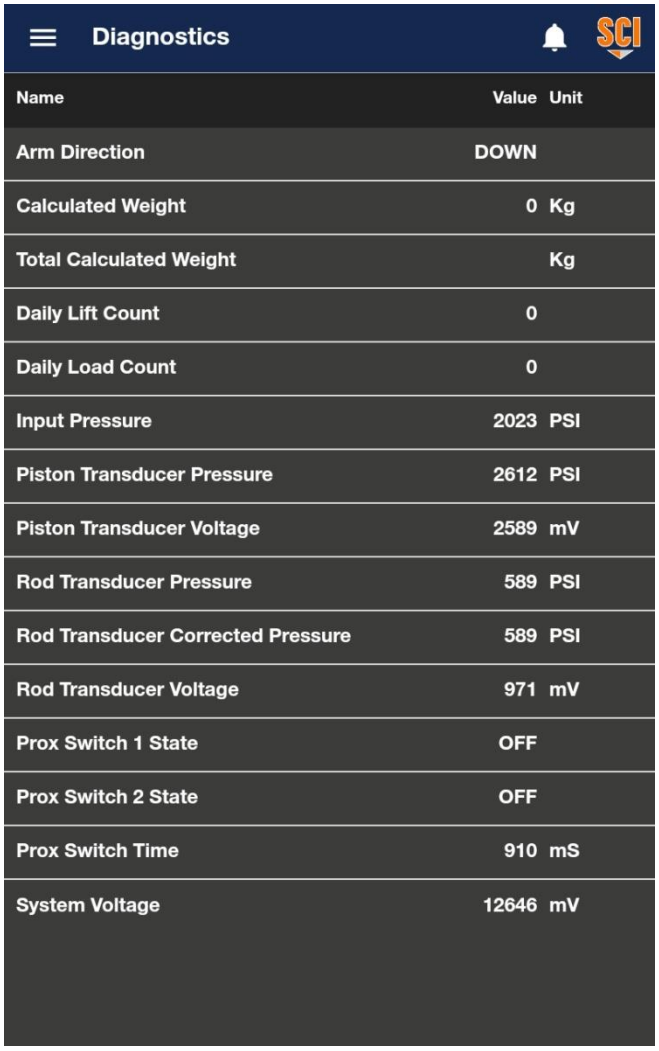


Figure 32

C. Next, we check the pressure sensors. This is completed at the factory for new kits. This info is for service replacements only. With the equipment running and still in the Diagnostics page, run the boom down and continue to hold in the down direction at an idle. You should see the Rod Transducer Pressure go up as the cylinder is bottomed out. The piston pressure should be zero at this point. Reverse direction and confirm Piston Transducer Pressure goes high and Rod is zero. If this logic is backwards, reverse the transducer connections on the harness. Record the mV values on the zero pressure states (bucket on the ground with control in float position or when holding lever in direction against cylinder stops).
    a. Transducer Piston Min Voltage _____mV
    b. Rod Transducer Min Voltage _____mV

D. Return to the Settings EEPROM Page *(See Figure 31)* and enter the Transducer Piston Volt Min to the recorded value. Do the same for the Rod side. Press Submit at the bottom.

3.11. Calibration

A. Once the Attachments are set up, you can calibrate. To calibrate you must have at least one known load available. Bags of sand or some other validated load can be used. The load must be at least 80%-100% of capacity or highest load the user will be picking.

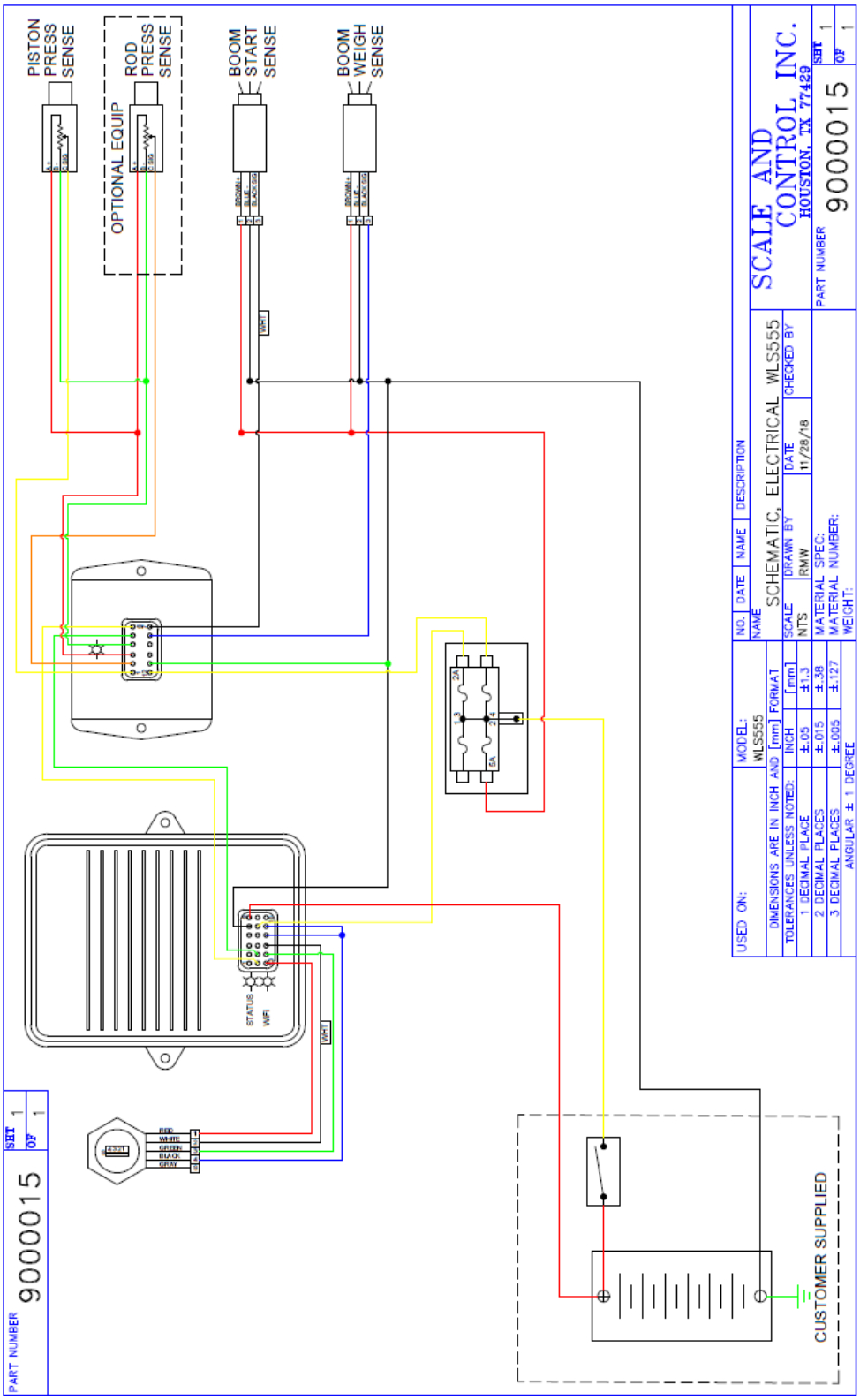
B. Enter the menu and select Calibration. This will bring up the Calibration page. Select the attachment to be calibrated. Select the number of calibration points (2 to 5). The default is 2 points and that should be used for most installations. Additional calibration points should only be used in machines that end up in non-linear weight results. In the case of two load points, the two points will be 0 lbs. load and the larger load (80 – 100% of rated capacity) as mentioned earlier. For additional points, try to evenly distribute over the load range. Click Start. There will be a pop-up window that appears. Enter 0 lbs. as a value and press Set. The screen will highlight a series of instructions and will move along as the steps are completed. For the 0 load, you will be asked to raise the boom 3 times starting with slow speed, then medium speed, and fast speed. It is important to highlight that smooth operation of the hydraulics is key to accuracy and bouncing loads will not result in a good calibration. When calibrating, slow is at idle and just enough control movement to move the boom in an upward direction. Medium is considered the sweet spot for weighing and is generally 1/3 throttle and 1/3 control lever movement. Full speed is full throttle and control lever movement. Once the steps are complete for light load, it will start the series for the next calibration point. There will be a pop-up window that appears. Enter the heavier load value and press Set. Again, you will raise and lower the boom at slow speed, medium speed, and fast speed. Once all calibration points are complete, the system will pop up a box indicating calibration is successful and return to the home screen.

3.12 Advanced Configuration

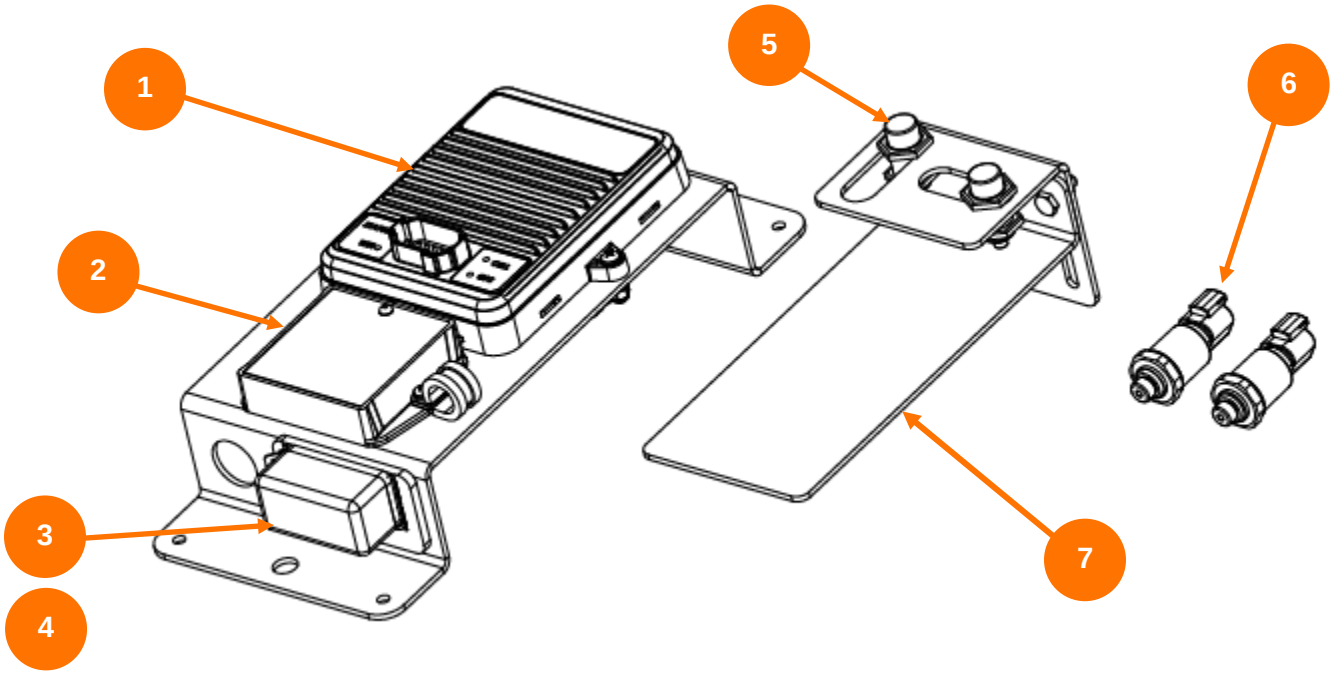
A. Printer Setup
   a. Thermal Printer
      i. If your system was purchased with a Brother or Zebra Printer or other printer you purchased after the fact, you must enable it in the system menu.
         1. Printer IP set to Static at 192.168.5.110
         2. Gateway is 192.168.5.1
         3. Must be connected to Wifi SSID SCI-Scale-XXXXXXXXXXXX
         4. To get printer reprint last ticket, printer must be purchased through SCI.
      ii. Go to Menu>Settings>System and toggle Thermal Printer to “ON”
      iii. Set beginning “Ticket Number” this can be any numeric value greater than 0.
      iv. If desired, set the alpha characters as well. There can be up to three letters.
      v. Set Company Information. This info will print on the top of the ticket as the “Sold By” info.
      vi. Press the Submit button to save the settings.
      vii. Turn on Thermal printer. Make sure once started that there is paper loaded and the Wifi icon is on.
      viii. Start a load, pick some weight, finish a load and validate the ticket printed and info at the top is correct.
   b. Desktop Printer
      i. If you desire to use a desktop printer, be aware that the system uses WiFi and must be in range of the site’s network.
      ii. Open Menu>WiFi. Select the site’s SSID and enter the corresponding password. Set priority to 1 unless there are multiple SSIDs you will be connecting to on the site. If so, set the priority to best suite your need.
      iii. Once set, the module will try to connect to the network. Upon successful connection, the WiFi light on the module will turn green indicating the module is connected to the site network
      iv. Return to the Menu and go to Menu>Settings>System and toggle Desktop Printer to ON.
      v. Next you will need to open a web page to 192.168.5.1:631. Add a network discovered printer in the CUPS interface. If you have any questions on the printer name, please consult your IT professional.
      vi. The printers that are compatible can be seen on our support website at https://www.scaleandcontrol.com/support-wls555.html

This completes the installation, setup and configuration of the WLS555 Onboard Weighing System. For Operation questions and guidance, please visit our Support page @ https://www.scaleandcontrol.com/support-wls555.html

Appendix A – Wiring Diagram



Appendix B – Parts Diagram



Item	Part Number	Description	Qty
1	9000003	Module, Base Control	1
2	9000004	Module, I/O	1
3	1000024	Fuse, 2 Amp Mini	2
4	1000025	Fuse, 5 Amp Mini	1
5	9000013	Assembly, Prox Switch	2
6	9000000 / 9000001	Transducer 5000psi / 3000psi	A/R
7	9000012	Assembly, Switch Mount	1
Not Shown	9000014	Harness, Scale Main	1

Appendix C – Hydraulics

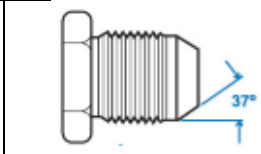
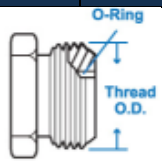
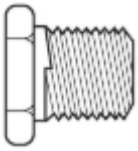
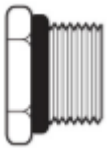
Key points for working on hydraulic systems

1. Do not use Teflon Tape on hydraulic systems. The tape can break free and move through the system and get caught in valve spools and pumps causing damage.
2. Use two wrenches when tightening adapters and hoses. One wrench holds the hose or adapter and the other tightens the nut.
3. LOTO – Lock Out Tag Out. Hydraulic systems are dangerous to work on and proper training should be obtained before maintaining or modifying any connections. Preventing someone from operating while working on the system is imperative.
4. Hydraulic fluid under pressure can kill. Know what you are doing and read the manufacturer's manuals completely.

Proper tightening techniques

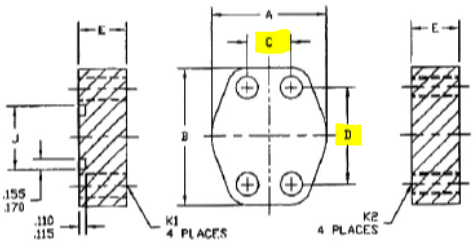
Using proper tightening techniques is important to keep the environment clean and prevent costly repairs and maintenance on hydraulic equipment. Here, http://blog.parker.com/turn-vs-torque-how-making-the-right-choice-keeps-your-hydraulic-fitting-connections-leak-free, you will find valuable information on proper installation and tightening of adapters. Here, http://blog.parker.com/10-things-not-to-do-when-your-hydraulic-fitting-leaks, is additional information on how to prevent leaks.

Adapter Size Identification Chart

Size	JIC Thread	JIC Wrench	ORS Thread	ORS Wrench	Pipe Thread	Pipe Wrench	ORB Thread	ORB Wrench
								
-04	7/16-20	9/16	9/16-18	11/16	1/4-18	11/16	7/16-20	9/16
-06	9/16-18	11/16	11/16-16	13/16	3/8-18	7/8	9/16-18	11/16
-08	3/4-16	7/8	13/16-16	15/16	1/2-14	1	3/4-16	7/8
-10	7/8-14	1	1-14	1 1/4			7/8-14	1
-12	1 1/16-12	1 1/4	1 3/16-12	1 3/8	3/4-14	1 1/4	1 1/16-12	1 1/4
-16	1 5/16-12	1 1/2	1 7/16-12	1 5/8	1-11 1/2	1 1/2	1 5/16-12	1 1/2
-20	1 5/8-12	2	1 11/16-12	1 7/8	1 1/4-11 1/2	1 7/8	1 5/8-12	2

Code 61 Flange Dimensions

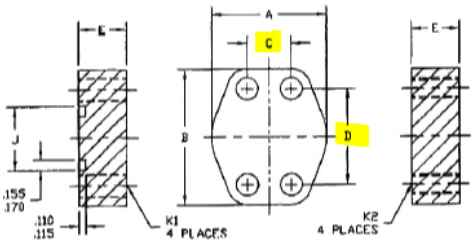
PLUG BLOCK - CODE 61 (O-RING FACE)



PART NO.	Flange Size	A	B	C	D	E	J Min	J Max	K1 Drill	K2 Thread
1942-61-08	1/2	1.813	2.125	0.688	1.500	0.750	1.000	1.005	0.344	5/16-18
1942-61-12	3/4	2.063	2.563	0.875	1.875	0.750	1.250	1.255	0.406	3/8-16
1942-61-16	1	2.313	2.750	1.031	2.063	0.880	1.560	1.565	0.406	3/8-16
1942-61-20	1-1/4	2.875	3.125	1.188	2.313	0.940	1.750	1.755	0.469	7/16-14
1942-61-24	1-1/2	3.250	3.688	1.406	2.750	1.190	2.115	2.125	0.531	1/2-13
1942-61-32	2	3.813	4.000	1.688	3.063	1.440	2.490	2.500	0.531	1/2-13
1942-61-40	2-1/2	4.281	4.500	2.000	3.500	1.820	2.995	3.005	0.531	1/2-13
1942-61-48	3	5.156	5.313	2.438	4.188	2.190	3.615	3.625	0.656	5/8-11

Code 62 Flange Dimensions

PLUG BLOCK - CODE 62 (O-RING FACE)



PART NO.	Flange Size	A	B	C	D	E	J Min	J Max	K1 Drill	K2 Thread
1942-62-12	3/4	2.500	2.950	0.937	2.000	1.250	1.245	1.255	0.406	3/8-16
1942-62-16	1	2.750	3.190	1.093	2.250	1.500	1.560	1.565	0.469	7/16-14
1942-62-20	1-1/4	3.060	3.750	1.250	2.625	1.500	1.750	1.755	0.531	1/2-13
1942-62-24	1-1/2	3.750	4.440	1.437	3.125	1.820	2.115	2.125	0.656	5/8-11
1942-62-32	2	4.500	5.250	1.750	3.812	1.750	2.490	2.500	0.781	3/4-10

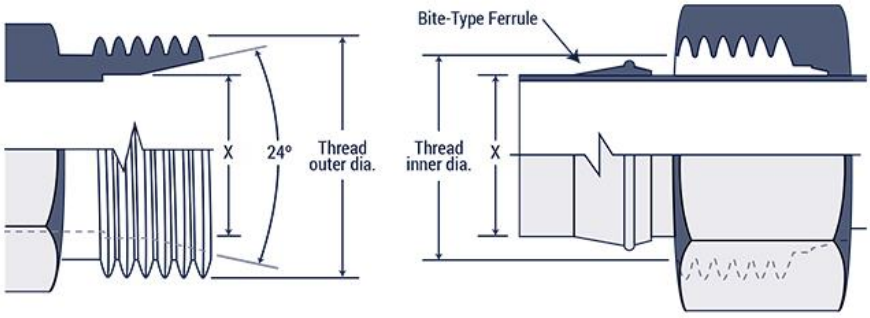
Flange, JIC, flat face O-ring

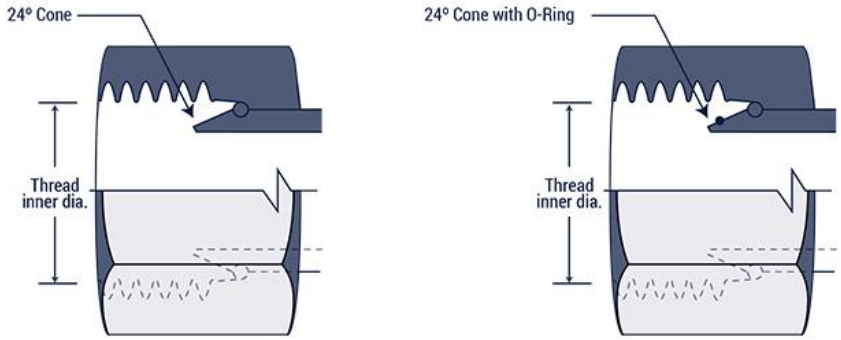
DIN FITTINGS

Metric Tube Compression (DIN 2353 24° Cone)

The male connector has a 240 Cone with a straight thread, while the three female connectors have straight threads with a sealing surface. The seal forms between the cone on the male and the sealing areas on the females.

Fittings are available in two categories: DIN 2353 L (light) and DIN 2353 S (heavy) classes. Each has its own tube sizes and thread dimensions as shown in the following table:

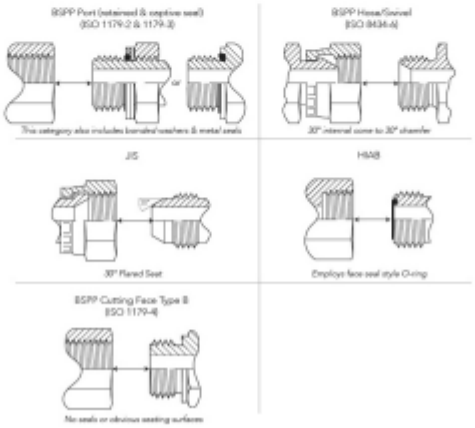




DIN 2353 L Tube O.D.(mm)	DIN 2353 S Tube O.D. (mm)	Metric Thread Size	Male Thread O.D. (mm)	Female Thread I.D (mm)
6		M12 x 1.5	12	10.5
8	6	M14 x 1.5	14	12.5
10	8	M16 x 1.5	16	14.5
12	10	M18 x 1.5	18	16.5
	12	M20 x 1.5	20	18.5
15	14	M22 x 1.5	22	20.5
	16	M24 x 1.5	24	22.5
18		M26 x 1.5	26	24.5
22	20	M30 x 2.0	30	28
28	25	M36 x 2.0	36	34
	30	M42 x 2.0	42	40
35		M45 x 2.0	45	43
42	38	M52 x 2.0	52	50

BSPP FITTINGS

Dash Size (Nominal Size)	Thread Pitch	Male Thread O.D. mm	Male Thread O.D. inches	Female Thread I.D. mm	Female Thread I.D. inches
-02 (1/8)	28	9.7	0.38	8.9	0.35
-04 (1/4)	19	13.2	0.52	11.9	0.47
-06 (3/8)	19	16.5	0.65	15.2	0.60
-08 (1/2)	14	20.8	0.82	19.1	0.75
-10 (5/8)	14	22.4	0.88	20.3	0.80
-12 (3/4)	14	26.4	1.04	24.6	0.97
-16 (1)	11	33.0	1.30	31.0	1.22
-20 (1 ¼)	11	41.9	1.65	39.6	1.56
-24 (1 ½)	11	47.8	1.88	45.5	1.79
-32 (2)	11	59.7	2.35	57.4	2.26



Appendix D – Electronics

All multi pin connectors used in the scale are Deutsch DT and DTM type and use size 16 or 20 pins. For proper insertion, removal, and crimping, please see here https://laddinc.com/resources/how-to-instructions/dt-family/, and https://laddinc.com/resources/how-to-instructions/deutsch-contact-crimping/.

All wiring is designed for normal use in and around construction equipment. If wire needs to be replaced or extended, please use industry standard practices to ensure water and corrosion cannot take place. All wire is 16-gauge SAE J1128-GPT and has excellent resistance to oil and flame with an operating temp of -40 – 185degF.

Key Points for working on electrical systems

1. LOTO – Lock Out Tag Out. Electrical systems are dangerous to work on and proper training should be obtained before maintaining or modifying any connections. Preventing someone from operating while working on the system is imperative.
2. Use proper tools. You will not get a proper crimp on a size 20 contact using needle nose pliers. Poor crimps can lead to extensive troubleshooting and costly repairs.
3. Do not use dielectric grease as a sealant. If dielectric grease is to be used, only a small amount needs to be applied to aid in connection. Excessive amounts can collect dirt and debris which can lead to poor connections and wear.

Tools required to maintain the system

1. Digital Multimeter
2. Wire Strippers

Appendix E – Troubleshooting and Mobile Printers

Additional troubleshooting information can be accessed at
https://www.scaleandcontrol.com/support-wls555.html

Brother Printer

Verify printer is working before you connect the Brother RuggedJet 3050Ai printer to your computer.

Brother Printer LED Descriptions

■ = Indicator is lit
-■- = Indicator is blinking
▮□ = Indicator blinks 1 or 2 times in each color, then turns off
□ = Indicator is lit or blinking in any color or pattern
(off) = Indicator is off

G = Green
O = Orange
R = Red
B = Blue

Example: G-■- = Indicator is blinking in green

POWER	STATUS	(Wi-Fi)	(Bluetooth)	Description
G■	□	□	□	Power on
□	O■	□	□	Roll cover open
G-■-	□	□	□	Receiving data Transferring data
G■	R-■-	□	□	Error Print error Feed error Cover open error Communication error Image processing error Database search error No template error Access point search error Access point connection error Security error
R-■-	R-■-	(off)	(off)	Error Battery error Mass storage error
R-■-	R-■-	B-■-	B-■-	System error
□	□	B-■- (Once every 3 seconds)	□	Wireless on, not connected
□	□	B■	□	Wireless on, connected
□	□	B-■- (Once every second)	□	Now setting WPS

POWER	STATUS	(Wi-Fi)	(Bluetooth)	Description
□	□	□	B■	Bluetooth on
□	□	□	B-■- (Once every second)	Pairing with Bluetooth
□	□	□	B-■- (Once every 2 seconds)	Connecting to an Apple device (iPad, iPhone, or iPod touch)
O■	(off)	B■	B■	Now resetting
O▮	(off)	B▮	B▮	Formatting complete (When [Print Data after being Printed] is set to [Erase])
O-■-	□	□	□	Now cooling
G■	G■	(off)	(off)	In mass storage mode
G■	G■	(off)	B■	Processing file in mass storage mode
G■	R■	(off)	(off)	Initializing

(Battery)	Description
O-■- (Once every second)	Battery needs recharging
O-■- (Twice every 4 seconds)	Rechargeable battery power: low
O-■- (Once every 4 seconds)	Rechargeable battery power: half
O■	Charging
(off)	Rechargeable battery power: full Charging complete

Zebra Printer

Verify printer is working before you connect the Zebra ZQ500 Series printer to your computer, make sure that the printer is in proper working order. You can do this by printing a configuration label using the “two key” method. If you cannot get this label to print, refer to the “Troubleshooting” section of this manual. Printing a Configuration Label: 1. Turn the printer off. Load the media compartment with journal media (media with no black bars printed on the back). 2. Press and hold the Feed Button. 3. Press and release the Power button and keep the Feed button pressed. When printing starts, release the Feed button. The unit will print a line of interlocking “x” characters to ensure all elements of the print head are working, print out the version of software loaded in the printer, and then print the report. The report indicates model, serial number, baud rate, and more detailed information on the printer’s configuration and parameter settings. (Refer to the Troubleshooting section for sample printouts and a further explanation on how to use the configuration label as a diagnostic tool.)

Zebra Printer Icons

	Bluetooth		Media
	WiFi Connection		Cover Open
	WiFi Signal Strength		Battery
	Error	DC	Battery Eliminator
	Data		Power Save Mode
	Draft Mode		

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