I S TECHNOLOGY SOLUTIONS

Pro Shoe™

AUTOMATIC BRAKE FORCE MEASUREMENT SYSTEM
FOR RAIL CARS

FOR TESTING AS REQUIRED BY
THE ASSOCIATION OF AMERICAN RAILROADS

OPERATING MANUAL

VERSION 2016-01

DESIGNED AND PRODUCED BY:

I S TECHNOLOGY SOLUTIONS
5410 W ROOSEVELT RD, STE 209
CHICAGO, IL 60644 USA

(855) 620-5200

WWW.ISTECHNOLOGYSOLUTIONS.COM

INFO@ISTECHNOLOGYSOLUTIONS.COM

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Introduction

The Manual of Standards and Practices of the Association of American Railroads (AAR), Section E, Standard No. S-401, outlines the requirements for measurement of brake shoe force on rail cars, as well as the requirements for calibration of the measurement equipment used for this purpose. This Standard is available from the AAR, and since it is copyrighted and subject to revision without notice, it is not reproduced here. It is available from the AAR.

The PRO SHOE™ was designed to fulfill the AAR requirements and has been approved by the AAR. The PRO SHOE™ provides eight load cells for testing a complete car in one installation and a visual display capable of showing all brake shoe force measurements simultaneously. A four cell model is also available.

OPTIONAL EQUIPMENT: The PRO SHOE™ has been designed to make use of the following optional equipment:

Hand Brake Clevis Pin Load Cell – This load cell, specially created for hand brake force measurement, is a rugged, high-precision device. The Clevis Pin Load Cell does not change the effective length of the chain during testing, so it simulates chain length, lever and bell-crank position as they would be in service.

SETTINGS AND ADJUSTMENTS: All adjustments are internal and inaccessible for field change, protecting the integrity of calibration.

CALIBRATION SERVICE: I S TECHNOLOGY SOLUTIONS provides fast, economical and accurate calibration service. The AAR requires annual calibration. All calibrations are traceable to N.I.S.T. Certificates which can be provided on request.

FEATURES: The PRO SHOE™ includes the following features:

- Option for eight load cells to provide complete car measurement in a single installation
- Capability of viewing all sensor data (brake shoe force for up to eight wheels, hand brake force, and brake cylinder pressure) simultaneously using software provided.
- Sensors that provide built-in reading corrections in the field (eliminating the need for manual corrections)
- Simplified installation and reduced total cable length per car
- Improved electronics to reduce sensor noise and improve accuracy
- Meets all AAR requirements for brake shoe force measurement

Included in the Case (8 Cell Model)

- Custom foam-filled case to protect the Pro Shoe™
- 8 Load cells with mounting brackets
- Spare load cell with mounting bracket (optional)
- 4 Junction Boxes for powering the load cells, labeled A, B, C & D
- 1 Control Box
- Hand Brake Load Clevis Pin (optional)
- Pressure Transducer (optional)
- Brake Cylinder Hose (optional)
- 4 Cat5 cables for connecting the Junction Boxes to the Control Box
- Panasonic ToughPad® tablet for operating the device
- Charger for ToughPad®
- Charger for Pro Shoe™

Information and Safety Warnings

READ THIS MANUAL THROUGH COMPLETELY BEFORE PERFORMING ANY OF THE DESCRIBED PROCEDURES OR USING ANY OF THE EQUIPMENT!

Observe all Safety Regulations of OSHA (in USA), your Employer, and local requirements.

Read and observe all Safety and Cautionary information included in this Manual.

BE absolutely sure it is not possible to change the status of brakes when working around the equipment or under the car.

Avoid placing cables or wires where they may be crushed or damaged, or where you or others might trip over them.

Place components, such as Laptop, Power Supply, Carrying Case, etc. in secure locations where they are not subject to damage or exposure to harmful environmental substances.

Keep the equipment as far away as possible from welding equipment or sources of Electro-Magnetic Radiation during use.

Avoid suddenly applied or released loads. This is especially important with regards to the Clevis Load Pin when using Hand Brakes without a gradual release. A Come-Along must be used to gradually reduce tension with Direct Release Hand Brakes.

Avoid dropping or throwing any part of the equipment.

Do not carry or hold cells by the connecting cables or sensor electronics housing.

WARNING! PLEASE READ AND OBSERVE PRECAUTIONARY NOTICES REGARDING INSTALLATION AND USE OF ALL LOAD CELLS.

Use and Care of Equipment

MAXIMUM LOAD VALUES: The Brake Shoe Load Cells of your System are rated for a nominal maximum value of 15,000 lbs, and they are calibrated to 10,000 lbs. The Clevis Pin Cell is rated at 6,500 lbs and calibrated to 6,500 lbs. Stressing the cells beyond their maximum limits will shorten their life and cause drift of their outputs. Your warranty will be void if you exceed these values.

CAUTION: Load cells may be seriously damaged if subjected to shocks, such as dropping, a brake application that includes a heavy impact of cells to wheels, or any other external shock load. When testing, it is advisable to first make a light brake application and release to observe if there is any “hang-up” of beams that might result in impact under a heavy or emergency application. NEVER release the hand brake rapidly; to do so might introduce shocks that could damage the cells. Load cells are a form of instrumentation, and should be treated accordingly. With proper care you can expect many years of useful and accurate service.

CLEAN UP AND STORAGE: When all force measurements are completed, the equipment should be removed from the car, cleaned, and reinstalled in their respective places in the case. All cables should be cleaned with a damp cloth to remove dirt or soil encountered when coming into contact with the shop floor or earth. Please be careful that no dirt remains on any part when storing. Making this precaution will help to assure long and accurate service life.

MOISTURE PROTECTION: As in all precision electronic equipment, moisture can damage the equipment permanently, or temporarily affect the readings. NEVER use or store the equipment outdoors during precipitation. Avoid allowing any connectors to be exposed to moisture; elevate from the floor if it is wet. If exposure occurs, and operation is affected, remove the equipment to a warm dry area and allow it to remain there until normal operation is observed. Do not attempt to dry the internal parts with cloths or wipers or use chemicals. If in doubt, telephone I S TECHNOLOGY SOLUTIONS for a consultation.

SPARE LOAD CELL (optional): If a ninth load cell is present, it is a spare in case of loss or damage, and it allows you to continue to work normally in such case. If you have equipment , such as certain truck-mounted equipment where shoe forces may frequently exceed 10,000 pounds per shoe, please do not overload the cells. If you are unable to prevent such overloads and wish to proceed, contact us immediately for a double cell carrier and instructions for its use. If you expect this to be a future concern contact us immediately so we will have enough time to provide the carrier for you This may be another opportunity for using the ninth cell.

CAUTION: Do not plug the equipment into 220 V or 240 VAC, as this may permanently damage the equipment, voiding the warranty. Use a 220 to 110 converter if needed.If you have any questions or concerns, do not hesitate to contact us.

Installation and Hook-Up

All parts are packed in a fitted case. When preparing the system for use, remove and install the various components carefully, following this suggested order:

1. Chock the car wheels.
2. Drain all air from car.

SAFETY WARNING – it is extremely hazardous to place the hands or any other part of the body between the brake head and the wheel or between any moving parts of a rail car! Be ABSOLUTELY CERTAIN that it is impossible for the brakes to be applied while the parts are being put into place. Before commencing testing, be sure that all personnel are in the clear and warned to stay clear of all moving parts. Do not attempt to use this equipment with Hanger Style Brake Beams. They are unstable and may rock under force, causing damage to the cells or harm to personnel. Contact us if you need to test such beams. We have an optional carrier for this purpose.

3. Remove all brake shoes from the car.
4. Remove the ToughPad tablet and carefully set it aside.
5. Remove the Control Box and 4 Junction Boxes and set them aside.
6. After assuring that the brakes are released, and cannot be applied, one-by-one, remove the Load Cells from the case and install the Load Cells in the appropriate brake heads. Make sure that the cables are clear of all moving parts so as to avoid being damaged or “pinched” by brake action or pry bars. Note that they should be positioned so that the cables hang straight down. (See Figure 1 for a diagram of Load Cell and Junction Box placement).
7. Connect the load cells to their respective Junction Boxes. (See Figure 1)

    Box A: Load Cells 1 & 2

    Box B: Load Cells 3 & 4

    Box C: Load Cells 5 & 6

    Box D: Load Cells 7 & 8
8. Connect the Junction Boxes to each other and to the Control Box as shown in Figure 1. The Cat5 receptacles on Boxes A & B are interchangeable.
9. Remove the Clevis Pin from the Hand Brake chain and replace with the Clevis Load Cell. Be sure that the flat side of the Clevis load cell is perpendicular to the direction of force. See Figure 2.
10. Connect the Clevis Load Cell Cable to the Control Box.
11. Connect the Pressure Transducer Cable to the Control Box.
12. Connect the Pressure Transducer to the Brake Cylinder Pressure Tap using the Brake Cylinder Hose.
13. Connect the power cable to the Control Box if necessary.
14. Turn the power switch on the Control Box to ON.

Figure 1

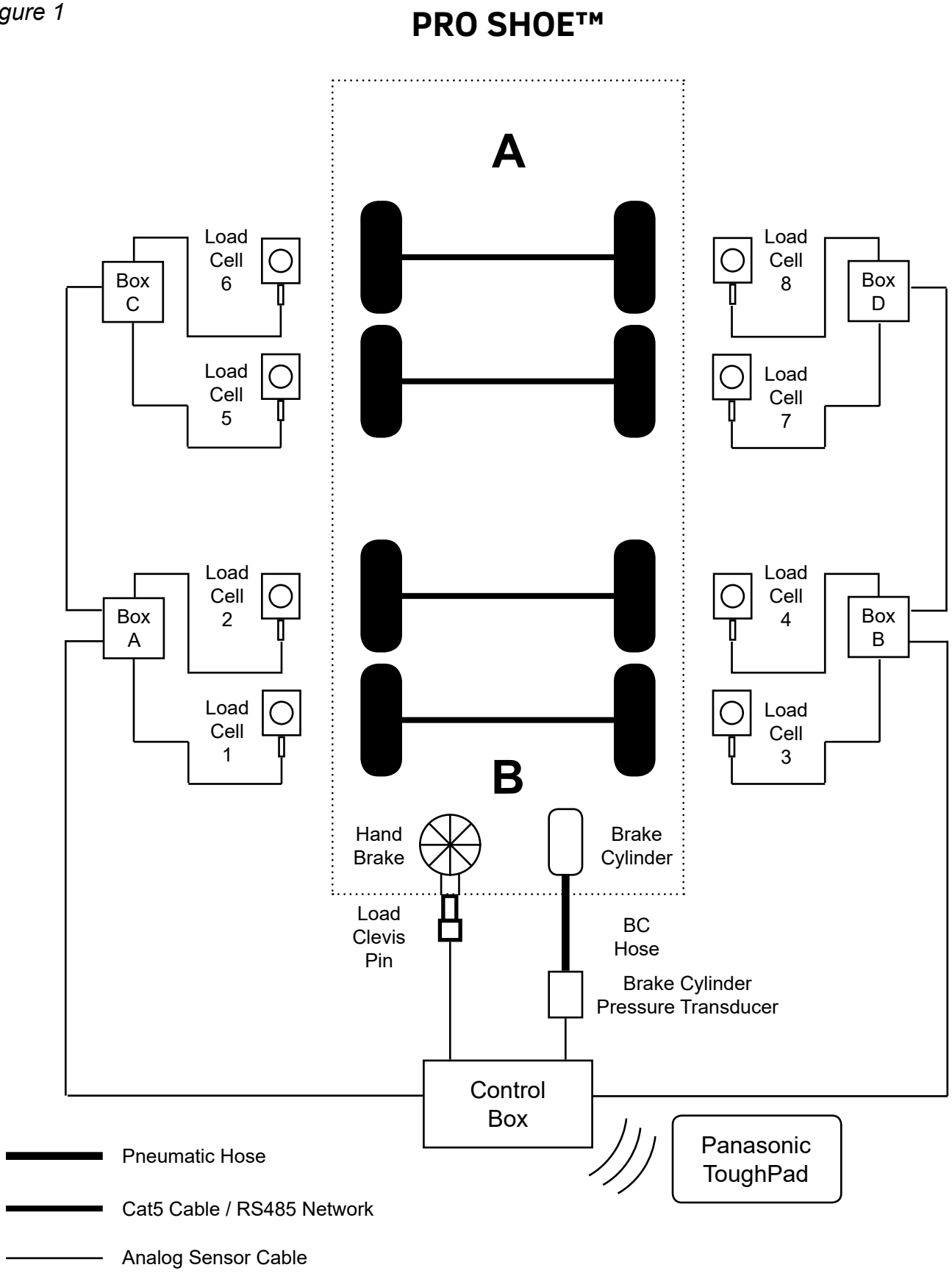
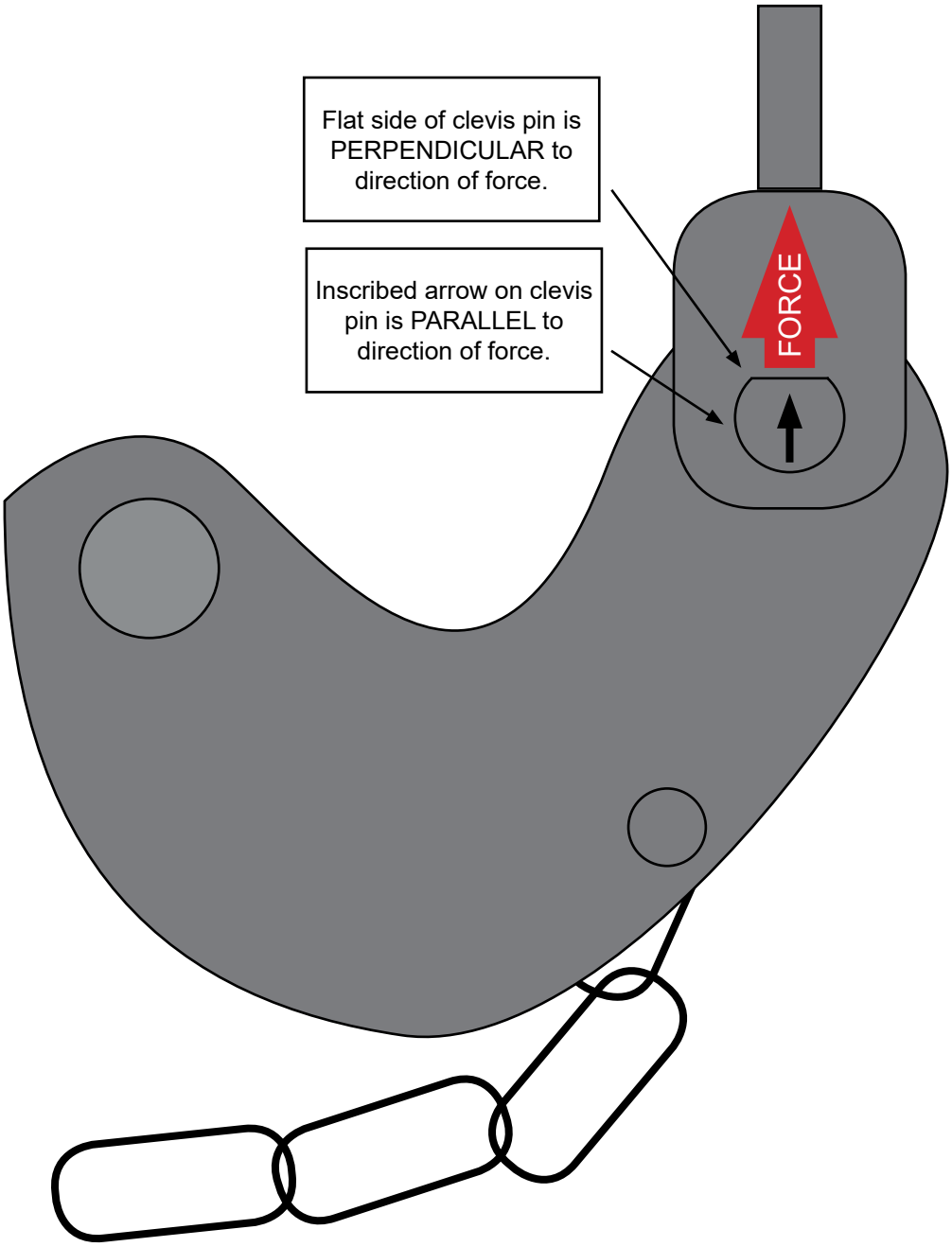
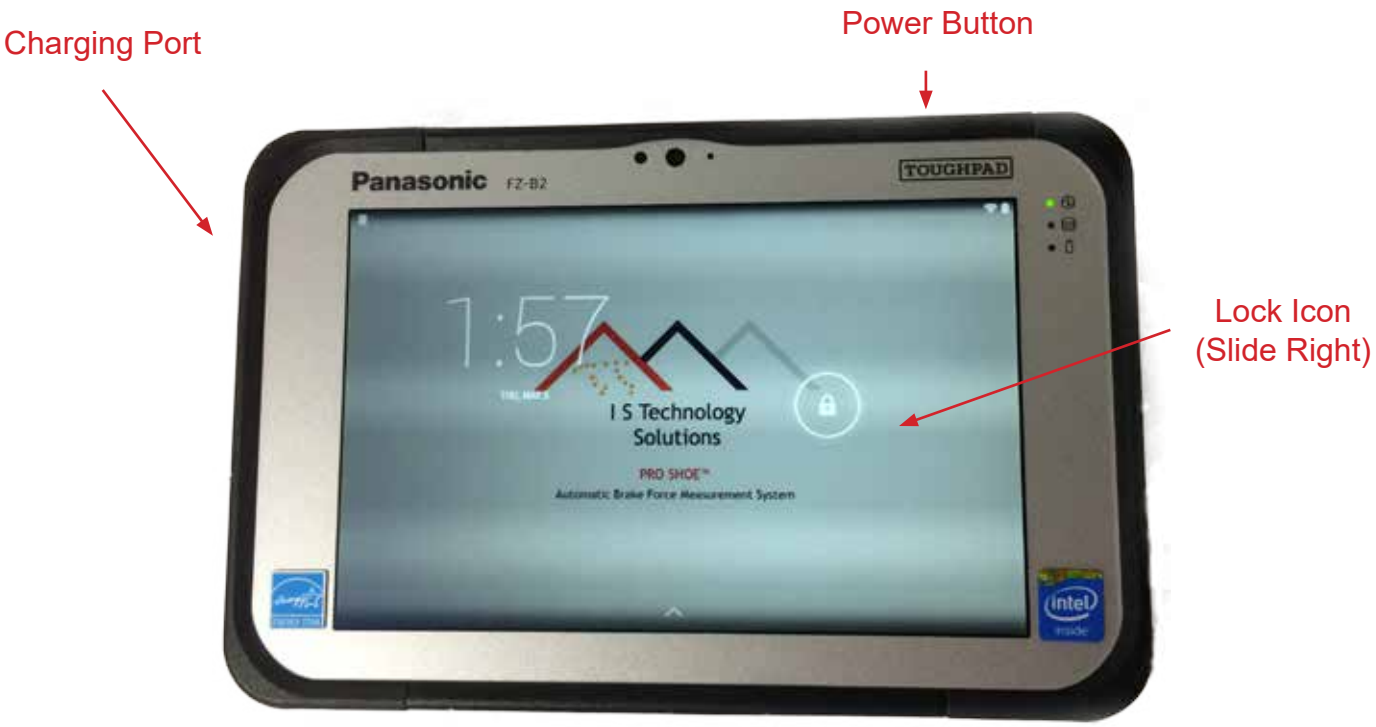

PRO SHOE™
A
B
Box C
Load Cell 6
Load Cell 5
Box D
Load Cell 8
Load Cell 7
Box A
Load Cell 2
Load Cell 1
Box B
Load Cell 4
Load Cell 3
Hand Brake
Brake Cylinder
Load Clevis Pin
BC Hose
Brake Cylinder Pressure Transducer
Control Box
Panasonic ToughPad
Pneumatic Hose
Cat5 Cable / RS485 Network
Analog Sensor Cable

Figure 2


Flat side of clevis pin is PERPENDICULAR to direction of force.
Inscribed arrow on clevis pin is PARALLEL to direction of force.
FORCE

Panasonic ToughPad®



Additional Handheld Tablet Information

Turning Tablet On and Off

To put the tablet into Standby mode, press and quickly release the Power Button once. This will put the tablet into Standby morede, which turns off the screen, but does not shutdown the tablet. This can be used to temporarily preserve battery life.

To completely shutdown the tablet, press and hold the Power Button until prompted to confirm the shutdown of the device. This will completely power down the tablet. Powering down the tablet is recommended when it will not be used for prolonged periods to preserve battery life.

To unlock the tablet and access the applications, slide the Lock icon to the right.

Connecting the Device

1. Power On the ToughPad by pushing the Power Button. If powering on from shutdown, hold power button for 2-3 seconds until tablet vibrates.

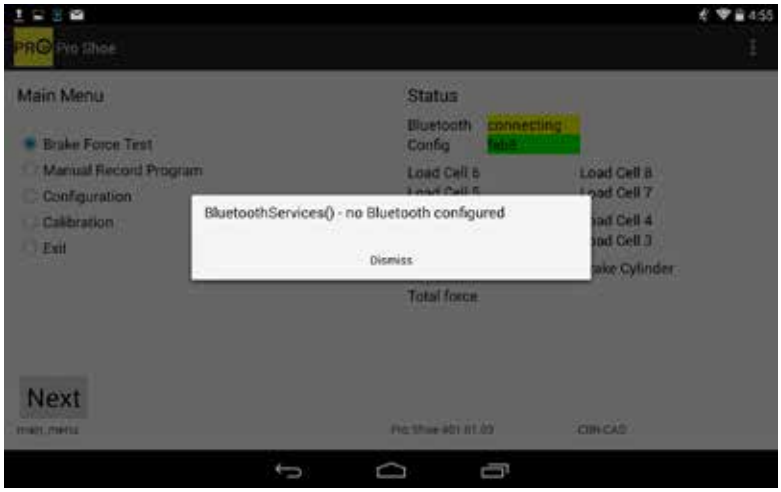
2. Slide the Unlock Button (shown above) to the right to unlock the tablet. This will bring you to the Home Screen.

3. Press the Pro Shoe™ Icon to start the program.

4. Connect the tablet to the Pro Shoe™ device by tapping the Menu button in the upper right corner (3 vertical dots) and then tapping “Restart Bluetooth.”

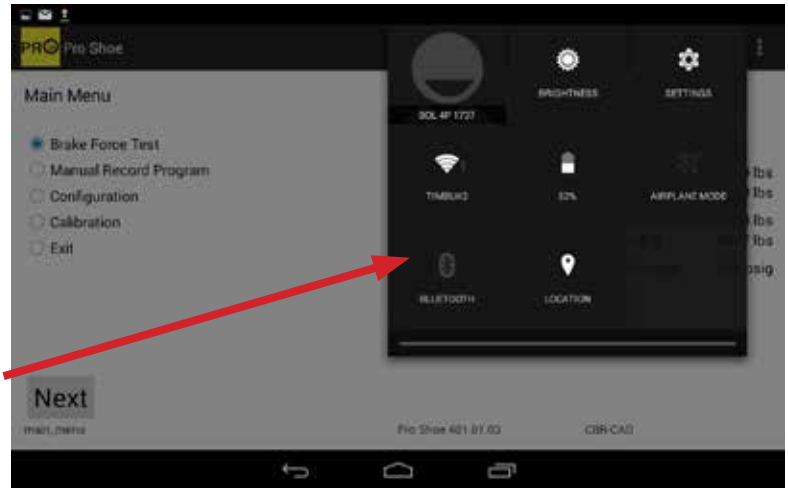
5. If the Bluetooth status continues to read “connecting”, then press the menu button (3 vertical dots) in the upper right hand corner, and select Restart Bluetooth. The device should now connect.

6. If the device now has a Bluetooth Status of “on”, proceed to Application Start Up. If you have the error message “no Bluetooth configured, or if the Bluetooth status remains “connecting or changes to “off”, tap the settings menu in the upper right hand corner.



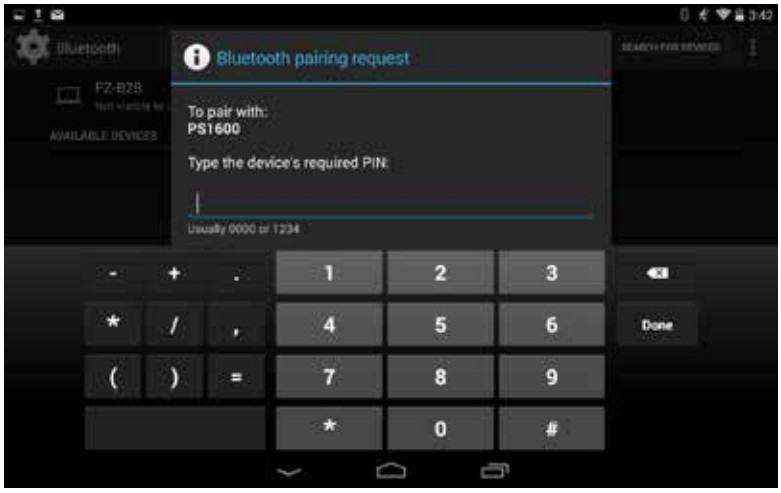
7. Then tap the Settings box that pops up.

8. Then tap the Bluetooth box.

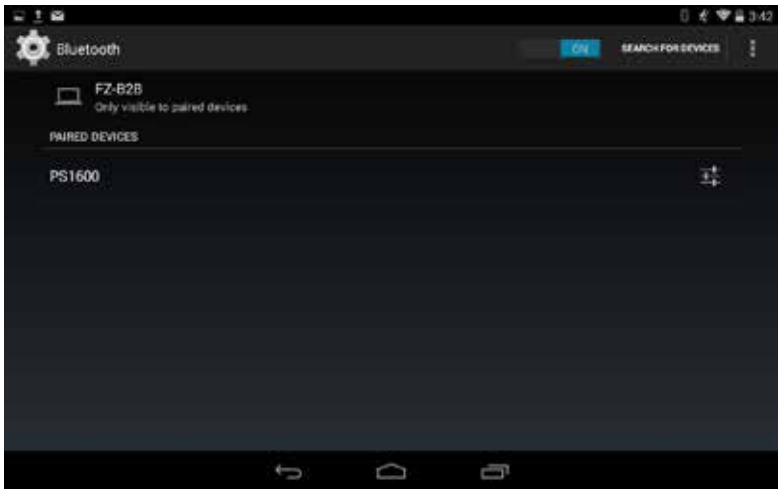


9. Then tap the applicable Pro Shoe™ device in the list. You may need to tap Search for Devices in the upper right corner to find it.

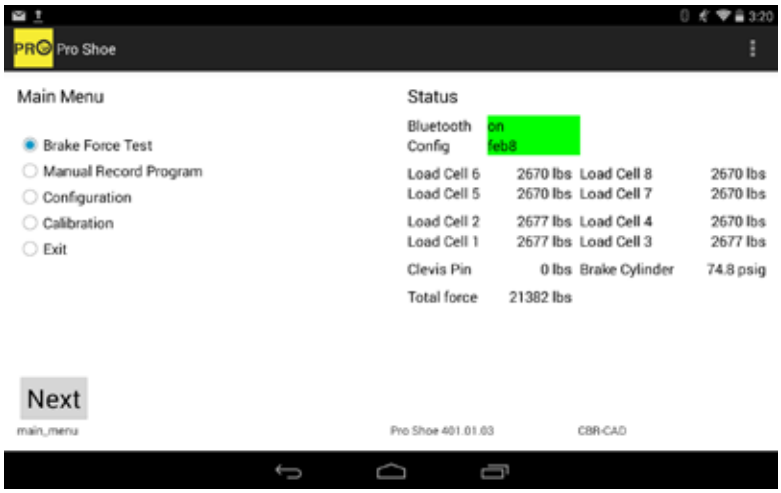
10. If the device has been previously paired, it should connect. If it has not, you may need to enter the passcode. The passcode is the numeric portion of the serial number, in this example 1401. You may need to tap the device name again as shown in the previous screen to connect the devices.



11. Return to the application by tapping the Home button, and then tapping the Pro Shoe™ icon again.



12. Once again tap Restart Bluetooth from the menu in the upper right corner (3 vertical dots). The device should now connect and show a Bluetooth status of “on.”

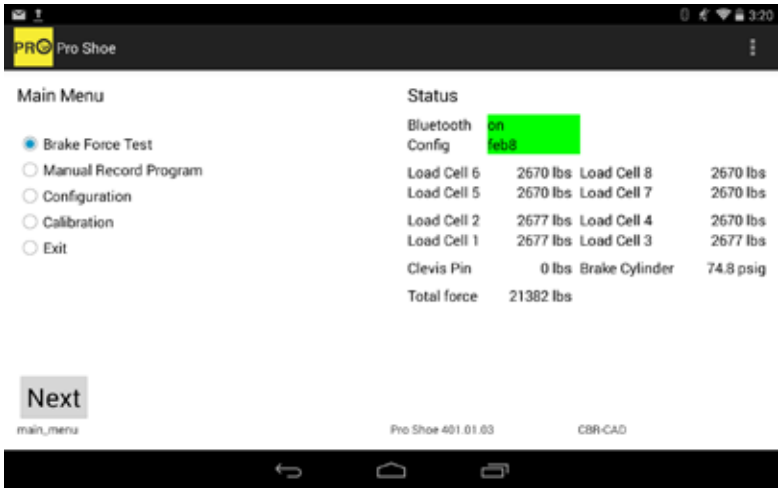


Application Start Up

When starting the application, the Main Menu screen is initially brought up. The options are:

- Brake Force Test
- Manual Record Program
- Configuration
- Calibration
- Exit

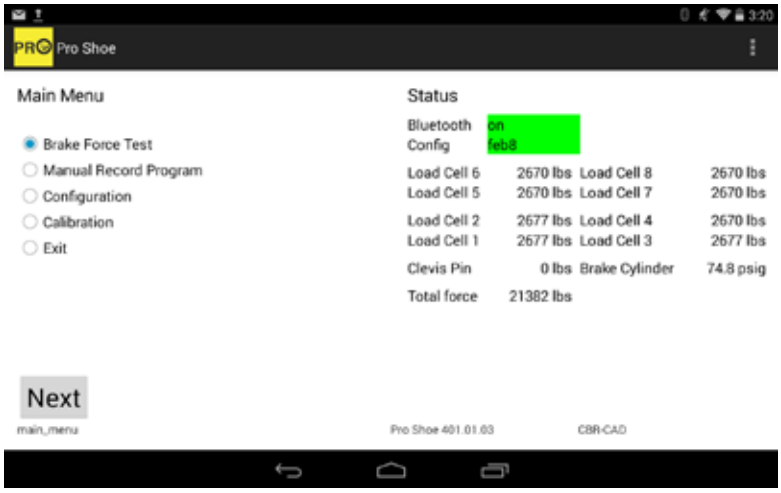
Configuration and Calibration are for use by I S Technology Solutions only, during set up of the device. Exit will quit the application. In the following sections Brake Force Test and Manual Record Program will be explained.



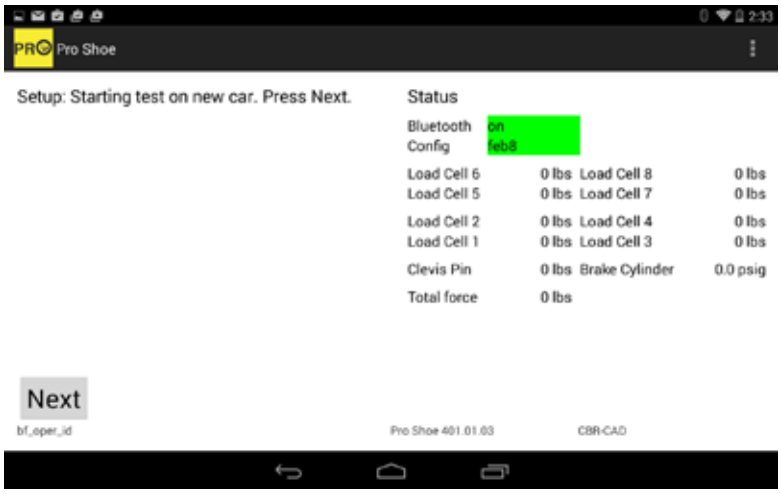
Brake Force Test (8 Cell Configuration)

The Brake Force Test program will walk your through the S-401 Brake Force Test, including the Equalization Test.

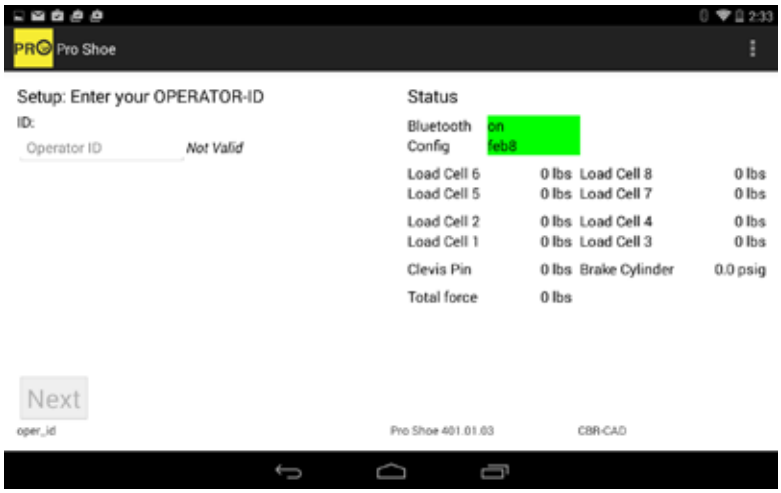
1. Select “Brake Force Test” from the Main Menu and tap Next.



2. If previous car information is present in the memory, you will see a screen with the option to use previous information. If you are retesting a car and the previous information is correct you may select Information Correct, otherwise select Enter new information and tap Next. If no previous car information is present, you will see a screen for starting a test on a new car. Tap Next to continue.

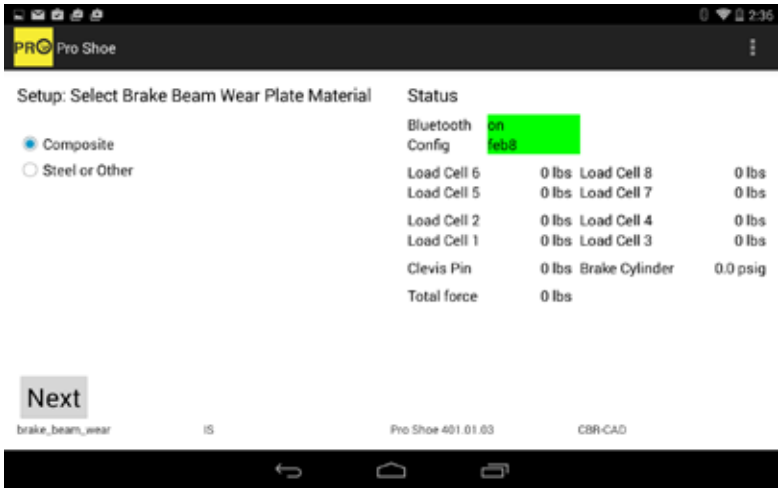


3. Enter your Operator ID. You will need to tap the button in the lower left corner to hide the keyboard, then tap Next to continue.

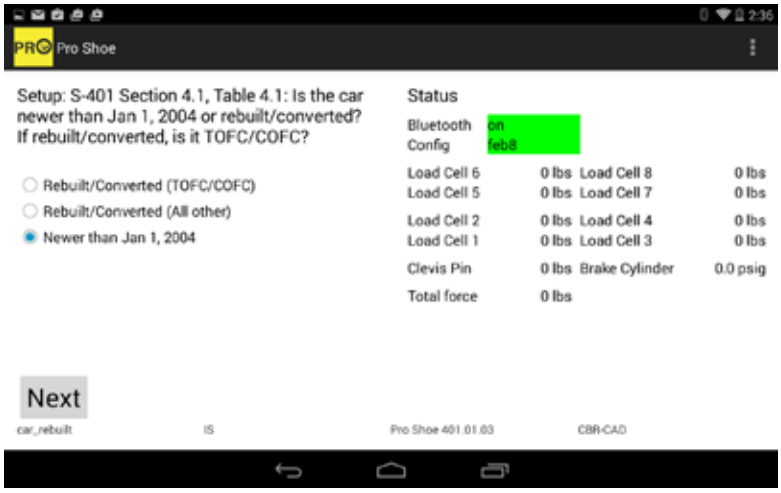


4. Enter the Car ID. Hide the keyboard and tap Next to continue. The program requires a valid car ID to continue.

5. Select the Brake Beam Wear Plate Material and press Next to continue.



6. Select the whether the car is Rebuilt/Converted (TOFC/COFC), Rebuilt/Converted (All Other) or Newer than Jan 1, 2004. Tap Next to continue.



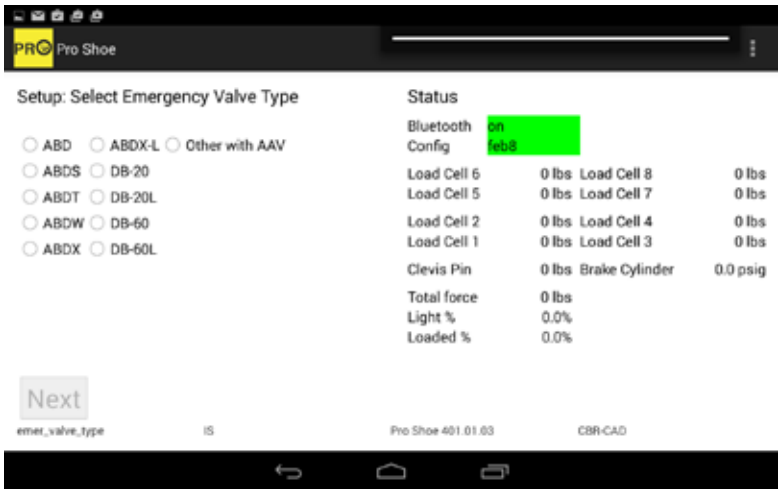
7. Enter the car's Light Weight. Hide the keyboard and tap Next to continue.

8. Enter the car's Load Limit. Hide the keyboard and tap Next to continue.

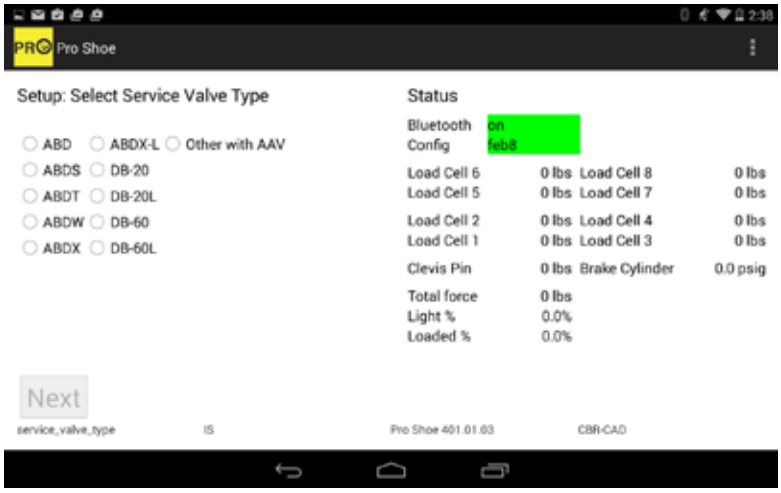
9. Enter the car's Truck Weight Capacity. Hide the keyboard and tap Next to continue.

10. The next screen will display the car's load limit to be used in calculations. Tap Next to continue.

11. Select the Emergency Valve Type and tap Next to continue.

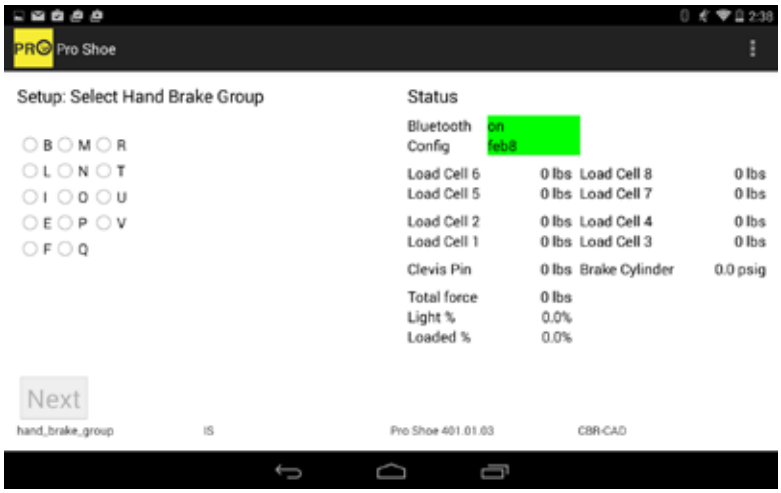


12. Select the Service Valve Type and tap Next to continue.

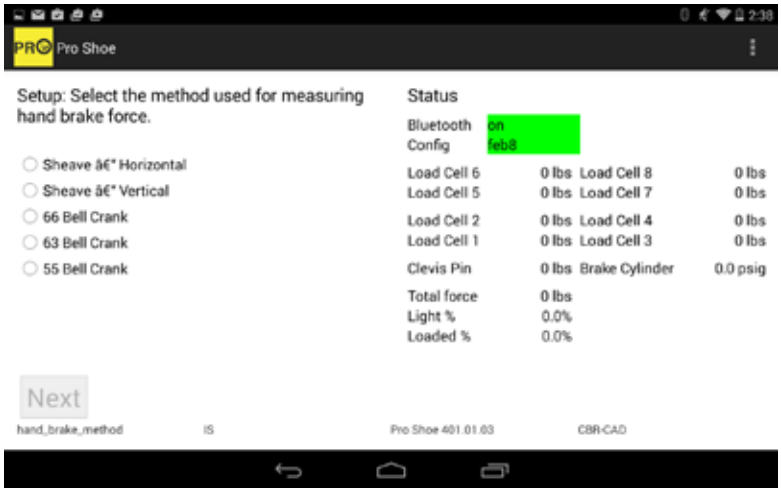


13. Enter the Hand Brake Model. Hide the keyboard and tap Next to continue.

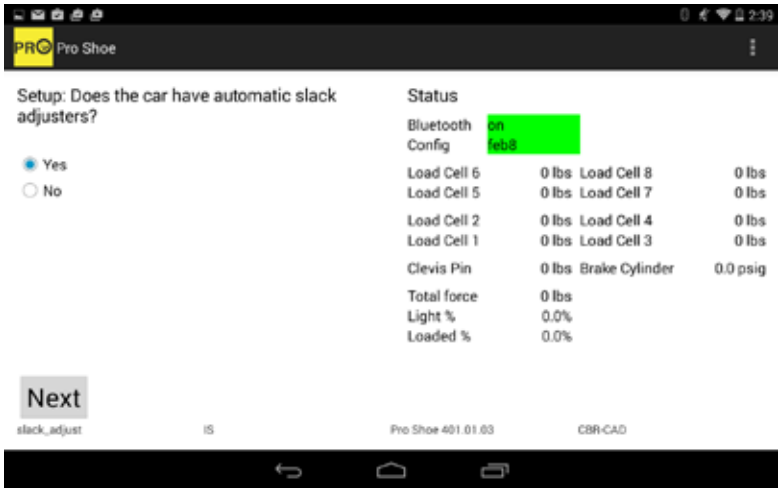
14. Select the Hand Brake Group and tap Next.



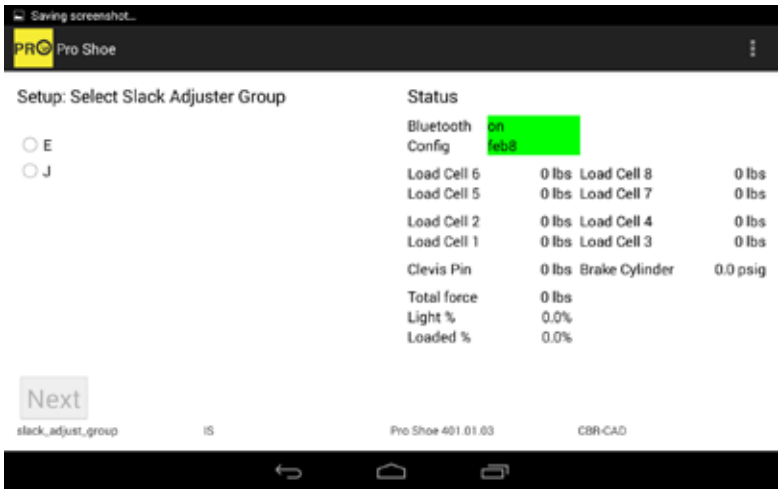
15. Select the method used for measuring hand brake force. Tap Next to continue.



16. Select whether the car has automatic slack adjusters. Tap Next to continue.

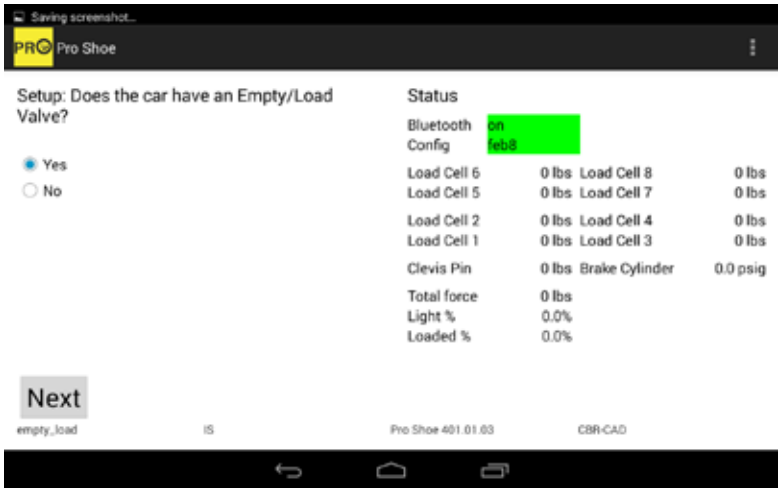


17. If the car has automatic slack adjusters, select the slack adjuster group. Tap Next to continue.

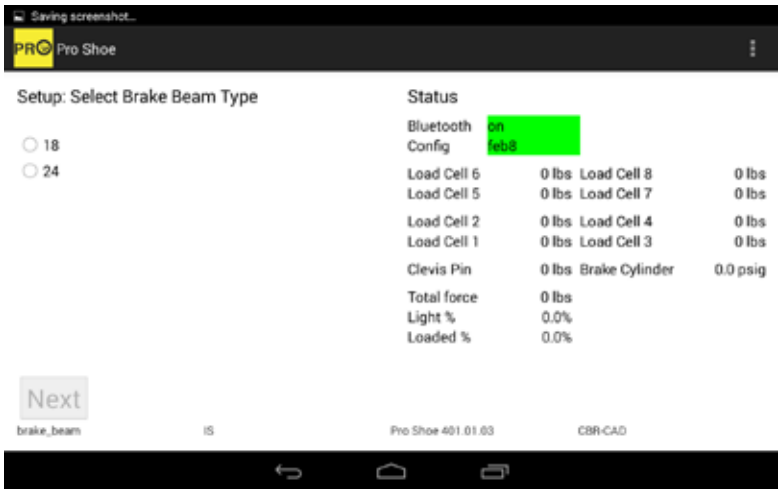


18. Select whether the car has a relay valve. Tap Next to continue.

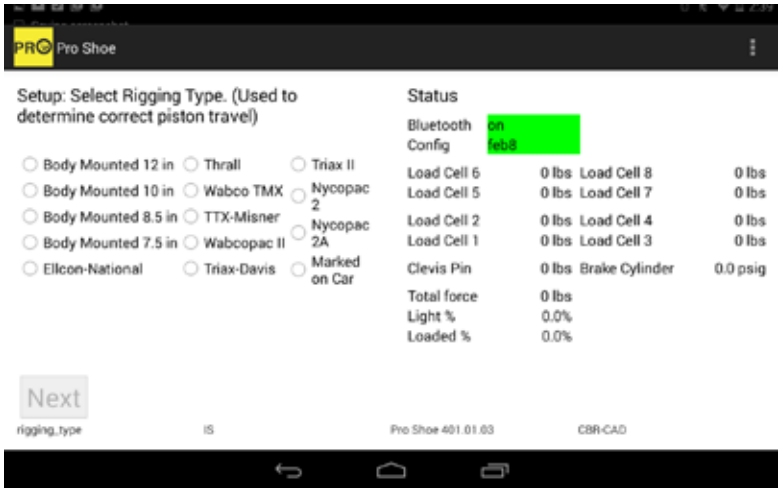
19. Select whether the car has an Empty/Load Valve. Tap Next to continue.



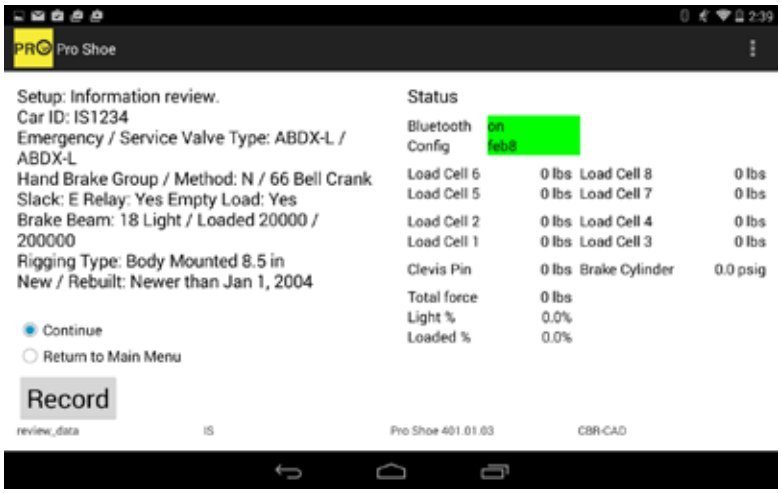
20. Select the Brake Beam Type. Tap Next to continue.



21. Select the Rigging Type. Tap Next to continue.

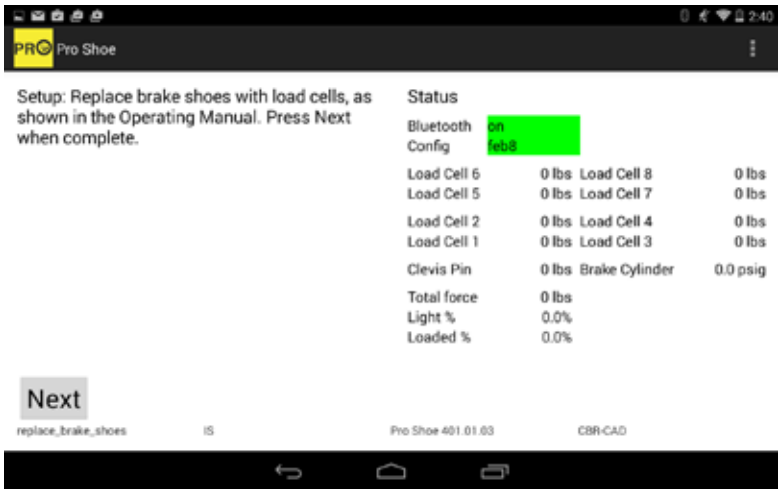


22. Review the setup information. If the information is correct, select Continue and tap Record to continue. If it is incorrect, select Return to Main Menu and tap Record to return to the Main Menu and repeat the setup process.



23. The next screen will confirm the load cell configuration (4 or 8), and advise whether the car will be tested all at once (8 load cells) or one end at a time (4 load cells). Tap Next to continue.

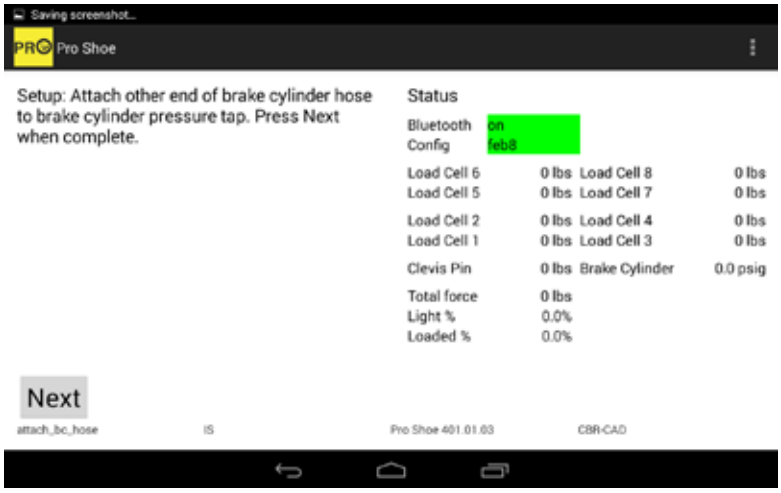
24. You will be instructed to replace the brake shoes with the load cells. Once the load cells are in place, Tap Next to continue.



25. You will be instructed to replace the Clevis Pin with the Load Clevis Pin. It MUST be installed correctly. If your Load Clevis Pin has an arrow inscribed, the arrow must be PARALLEL to the direction of force. If your Load Clevis Pin has a flat sides to the collar, the flat side must be PERPENDICULAR to the direction of force. See FIGURE 2 in INSTALLATION & HOOK UP. Tap Next to continue.

26. You will be instructed to attach the Brake Cylinder Hose to the Pressure Transducer. This step will also zero out the transducer readings. Be sure that there is NO pressure in the Brake Cylinder. If necessary, pull the manual release rod to empty the brake cylinder and release the brakes. Press Next to continue.

27. Now attach the other end of the Brake Cylinder Hose to the Brake Cylinder Pressure Tap. Press Next to continue.



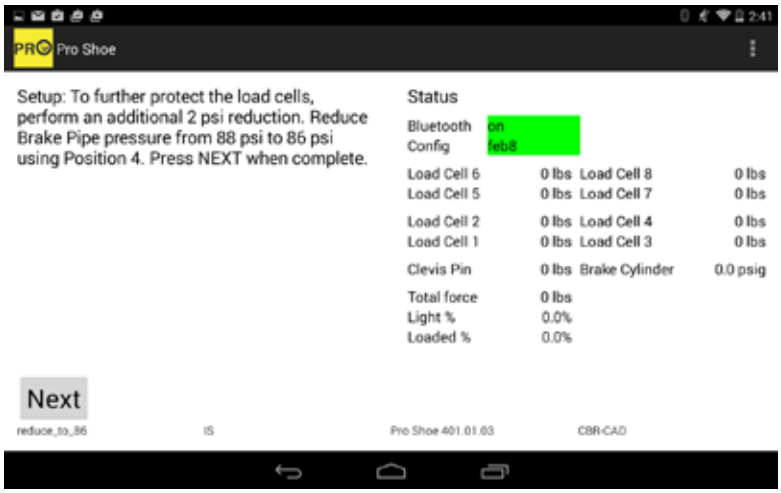
28. If the car has an Empty/Load Valve, insert a block to put the car in the LOADED position. Press Next to continue.

29. You will now be instructed to ensure that the Control valve is Cut In, separate venting devices should be cut in, and the Retaining Valve should be in the Direct Exhaust position. Press Next to continue.

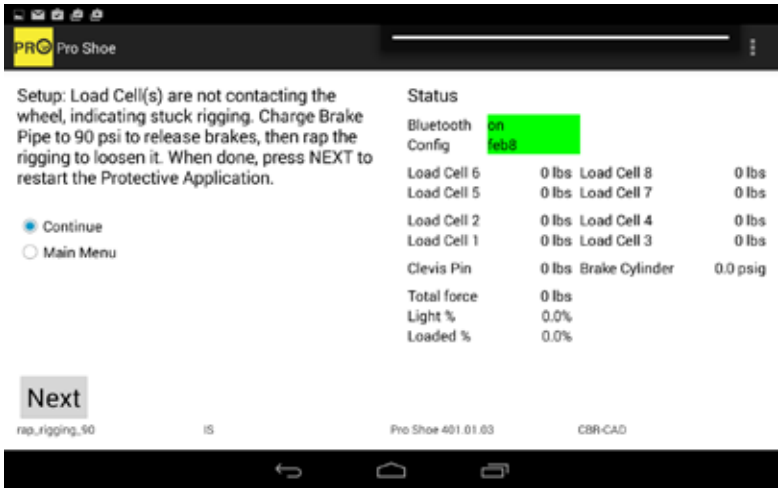
30. You are now ready to begin testing. Charge the system to 90psi. Press Next when the system is fully charged.

31. The next step ensures that the load cells will not be damaged with a sudden impact caused by stuck rigging. You will be instructed to ease the brakes against the wheels with a 2 psi reduction using Rate 4. Make this reduction and press Next when complete.

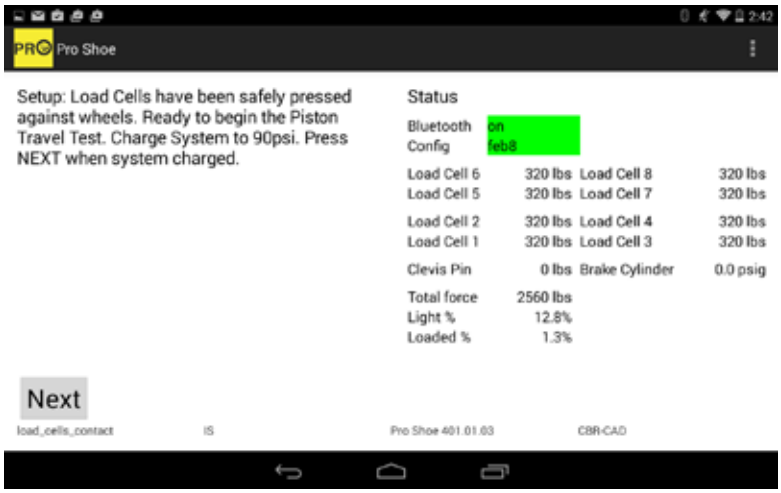
32. The program will check for contact of the load cells with the wheels and instruct you to make another 2 psi reduction using Rate 4. Do this reduction and press Next to continue.



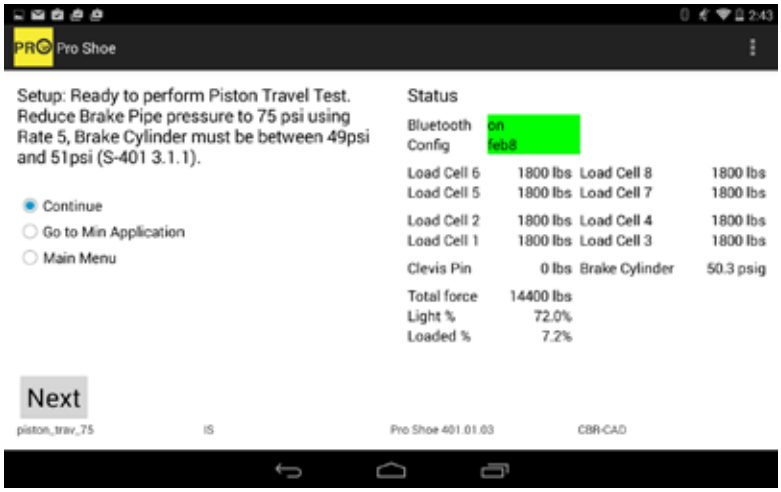
33. If at this point the system does not detect that the load cells are contacting the wheels, you will be instructed to charge the brake pipe to 90psi to release the brakes, and then rap the rigging to loosen it. The program will cycle through the Protective Application until the load cells have been successfully applied to the wheels. You may select Continue to continue the Protective Application, or Return to Main Menu if you need to exit the test.



34. Once the load cells have been safely pressed against the wheels, you will be instructed to charge the system back to 90 psi to begin the Piston Travel Test. Press Next when the system is charged.



35. The Piston Travel test requires that the Brake Cylinder pressure be between 49 psi and 51 psi. Reduce Brake Pipe pressure to 75psi using Rate 5, then slowly reduce pressure from there until Brake Cylinder pressure is 49-51psi. Press Next to continue.

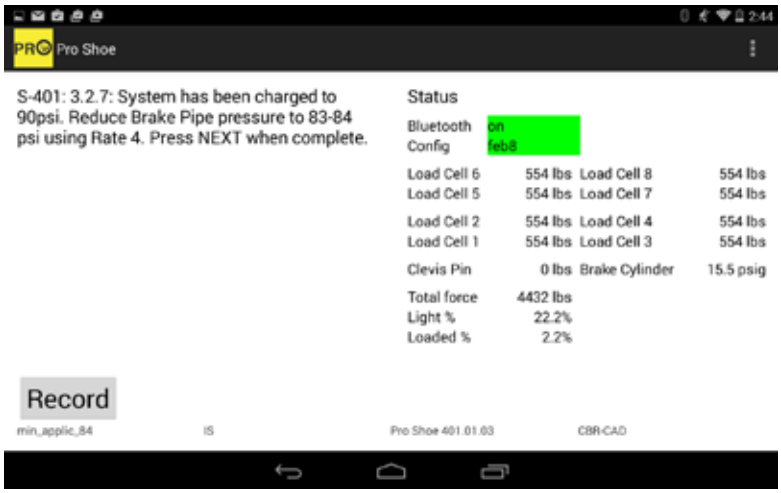


36. Rap the rigging per instructions in AAR S-401, Section 3.2.5. Measure the Piston Travel and enter the number in decimal format (eg. 8.75). Measure is in inches. Hide the keyboard and press Record.

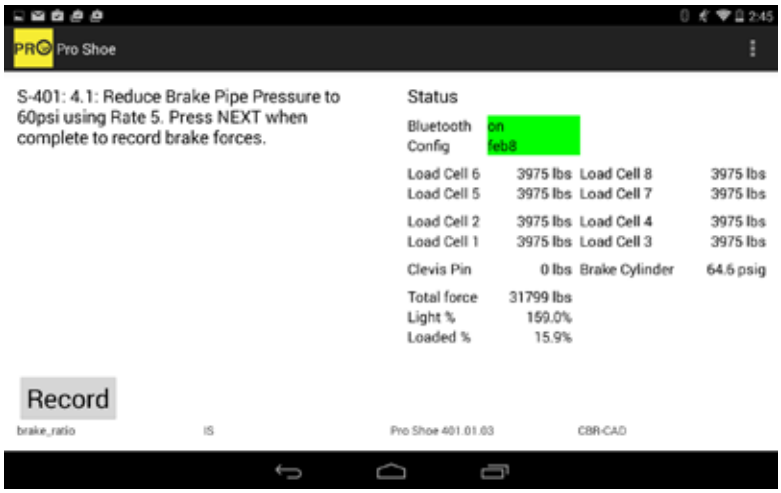
37. Whenever a test fails, you will be given the option to Restart that test section, Skip to the next test, or return to the Main Menu.

38. Charge the system to 90psi to prepare for the Minimum Application Test. Press Next when ready to perform the test.

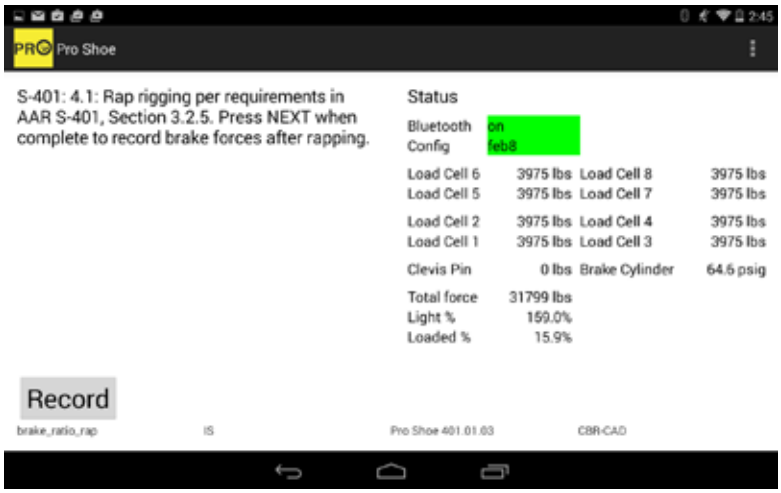
39. Reduce Brake Pipe pressure to 83-85psi using Rate 4. Press Record when ready to record test results.



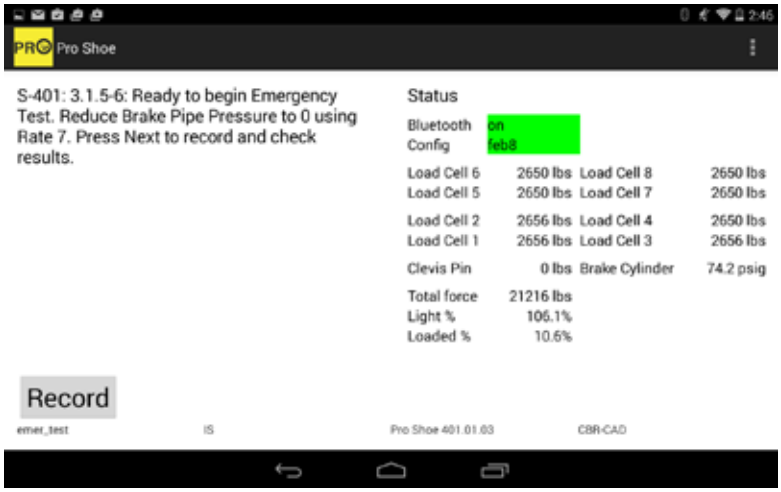
40. Now reduce Brake Pipe pressure to 60psi using Rate 5. Press Record to record the forces used to calculate the Braking Ratio.



41. Rap the rigging per the requirements in AAR S-401, Section 3.2.5. Brake Cylinder pressure must be between 63.5psi and 66.5psi. Adjust if necessary. Press Record to record the rapped brake forces.



42. Ready to perform the Emergency Test. Reduct Brake Pipe pressure to 0 psi using Rate 7. PROTECT YOUR EARS! Press Record to record the results.

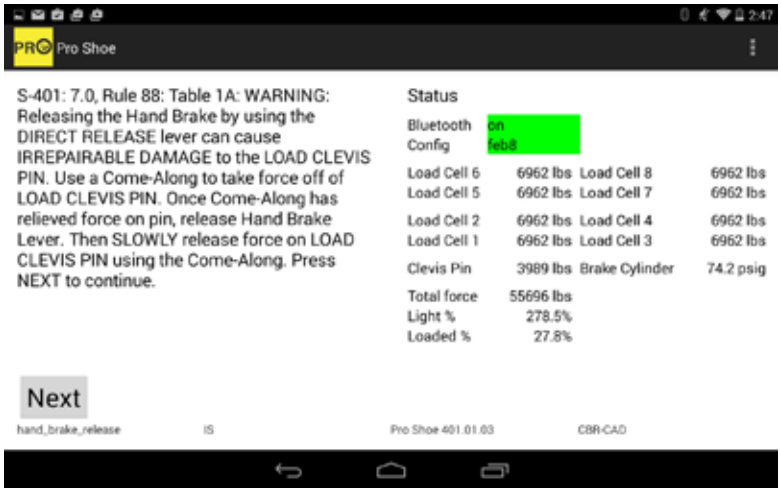


43. Release the brakes to prepare for the Hand Brake test by pulling the manual release rod to drain all air from the car.

44. Ready to perform the Hand Brake test. Ensure that the Load Clevis Pin is correctly installed as shown in Figure 2, Installation & Hook Up. You will be directed to apply the handbrake to the force required per Rule 88, Table 1A based on the setup. Apply the hand brake to the appropriate force and press Next to continue.

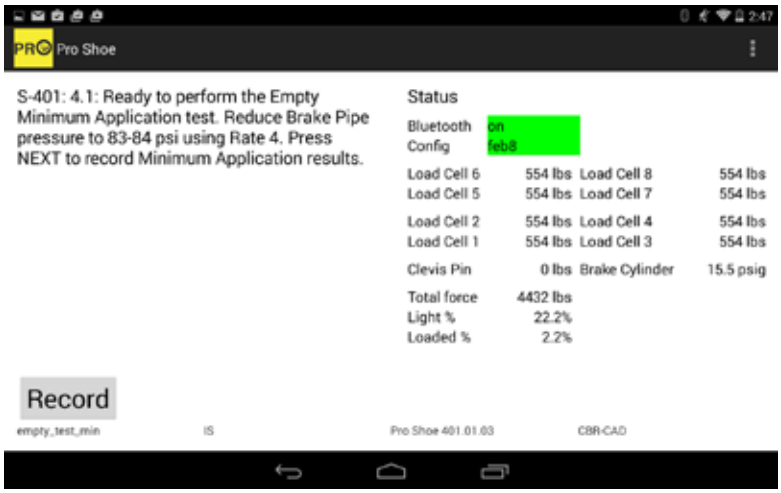
45. At the next screen, tap Record to record the hand brake forces.

46. WARNING: Releasing the Hand Brake using the DIRECT RELEASE lever can cause IRREPARABLE damage to the Load Clevis Pin. Use the gradual release to slowly reduce force. If your hand brake does not have a gradual release, use a Come-Along to slowly take the force off the load clevis pin.



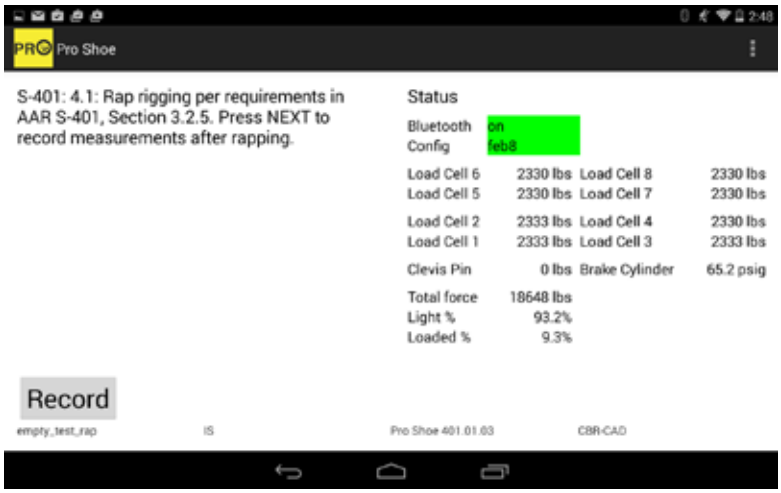
47. To begin testing the car in the Empty position, charge the car back to 90psi. When the brakes have released, return the Empty/Load valve to the Empty position.

48. Perform the Minimum Application Test by reducing the Brake Pipe pressure to 83-84 psi using Rate 4. Press Record when ready to record the results.

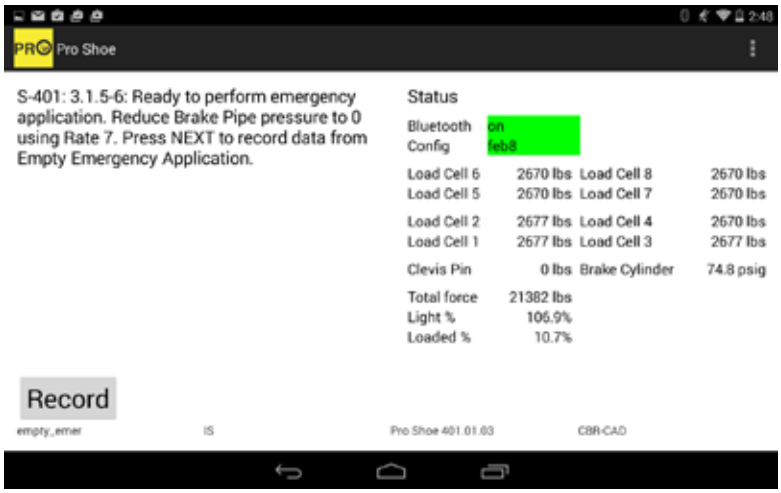


49. Perform the 30psi reduction test by reducing Brake Pipe pressure to 60psi using Rate 5. Press Record when ready to record the results.

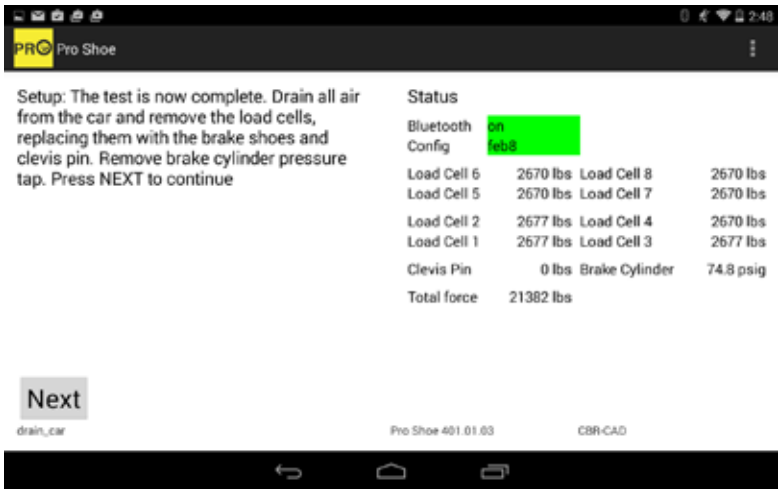
50. Rap the rigging per the requirements in AAR S-401, Section 3.2.5. Press Record when ready to record the results.



51. Perform the Emergency Test by reducing Brake Pipe pressure to 0 psi using Rate 7. PROTECT YOUR EARS! Tap Record to record the results.



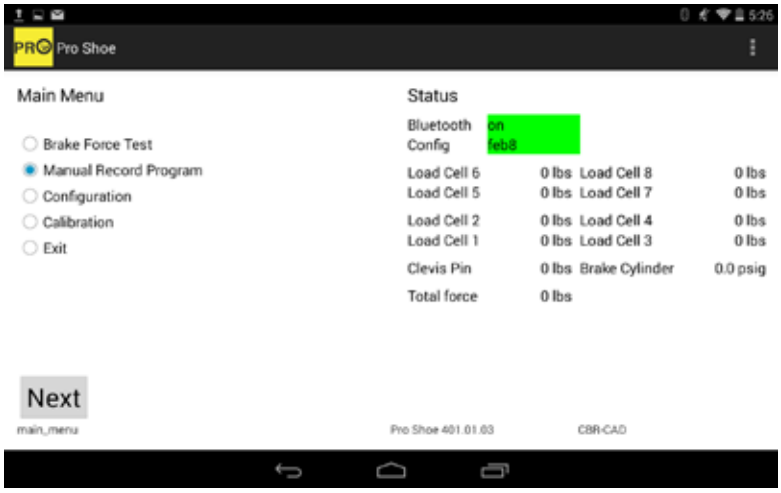
52. The test is complete. Follow the instructions on the screens to drain all air from the car, remove the load cells from the car and replace the brake shoes. You will then return to the Main Menu.



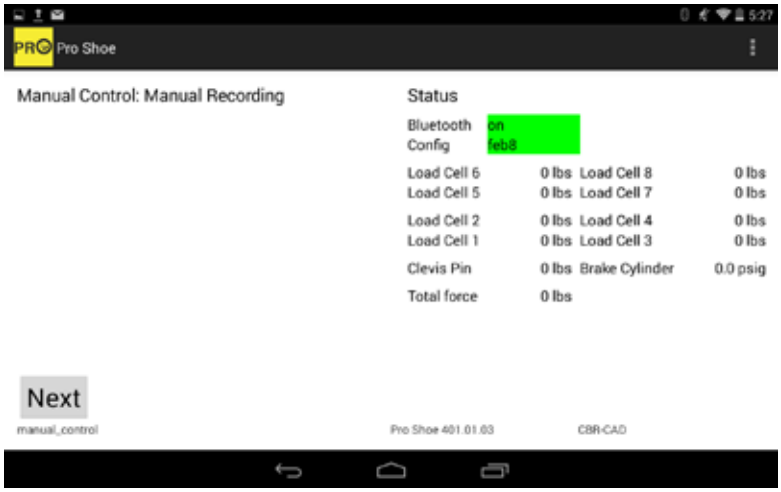
Manual Record Program

Certain users of the device may want to take many different readings, or not use the step-by-step program. The Manual Record Program allows the user to take readings at will.

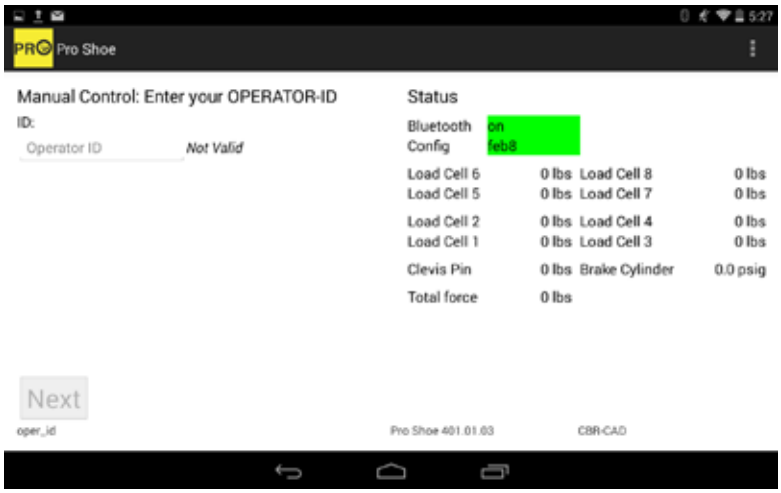
1. Select “Manual Record Program” from the Main Menu. Tap Next to continue.



2. The next screen will confirm the Manual Recording mode. Tap Next to continue.

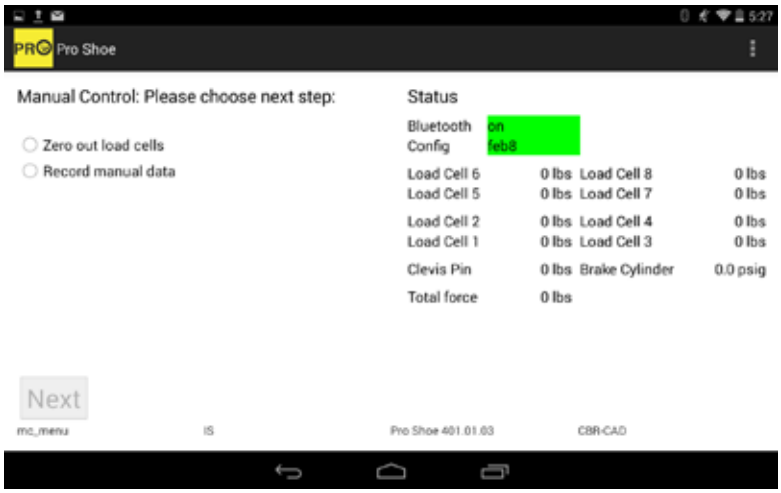


3. Enter your Operator ID. Hide the keypad by pressing the down arrow in the lower left hand corner. Tap Next to continue.

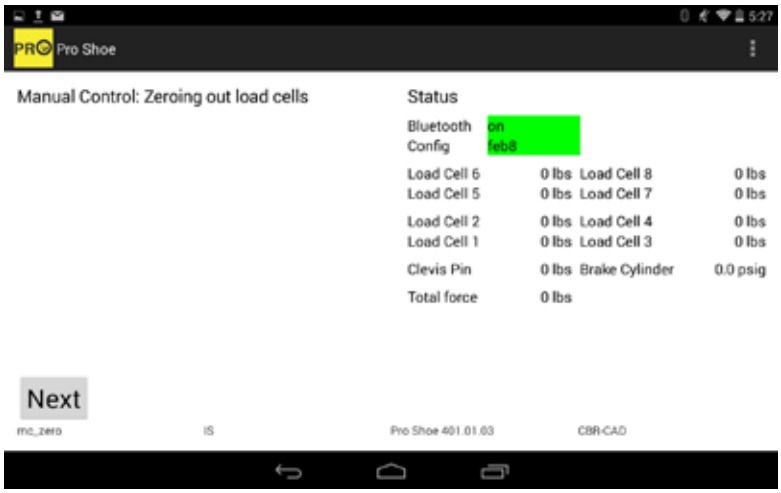


4. Enter the Car ID. Hide the keypad and tap Next to continue.

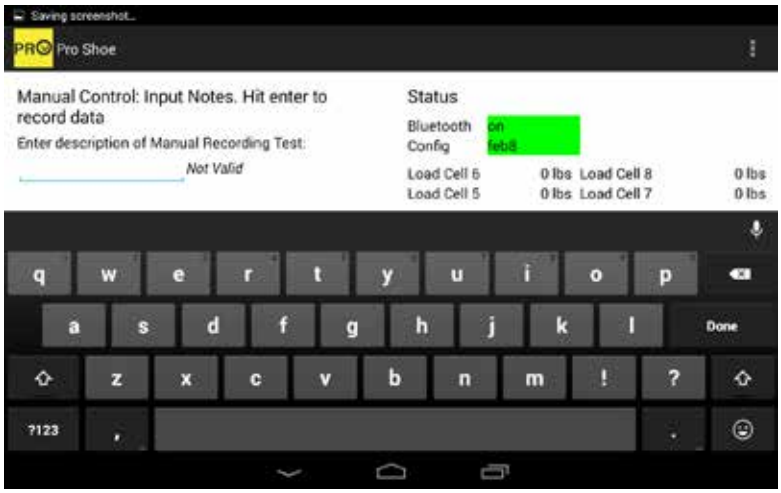
5. The next step allows you to “Zero Out” the load cells. If you choose to do this you need to release the brakes so that NO FORCE is on the load cells.



6. By choosing Zero out load cells and pressing Next, you will come to the screen where the load cells are zeroed out.



7. The program allows you to type in a description of every recording, to differentiate the readings in the test report. Type in a description and then hide the keyboard. Tap Record to record all readings.

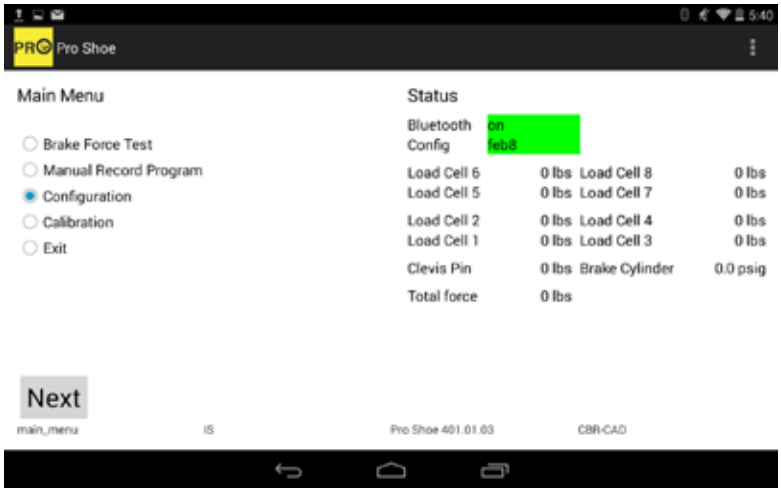


8. The next screen gives you the option to save another Manual Record or Return to Main Menu. Choose your selection and tap Next to continue. By returning to the Main Menu, you are closing that test report.

Using the Spare Load Cell

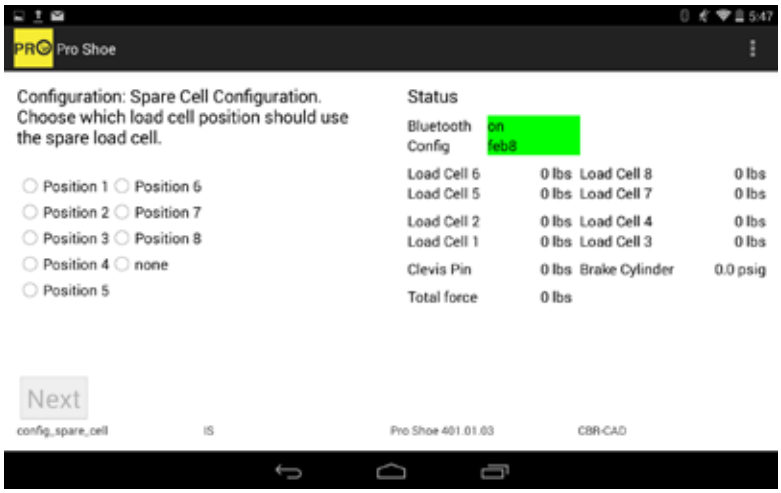
If your device has a spare load cell, you may configure it in place of another load cell if necessary.

1. From the Main Menu, select Configuration and tap Next to continue.

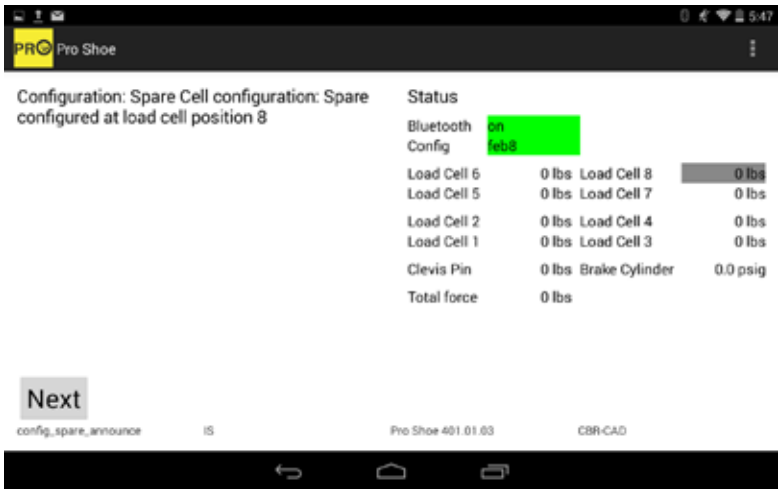


2. On the next screen select Configure Spare Cell, and tap Next to continue.

3. Select which load cell position it will replace and tap Next to continue.



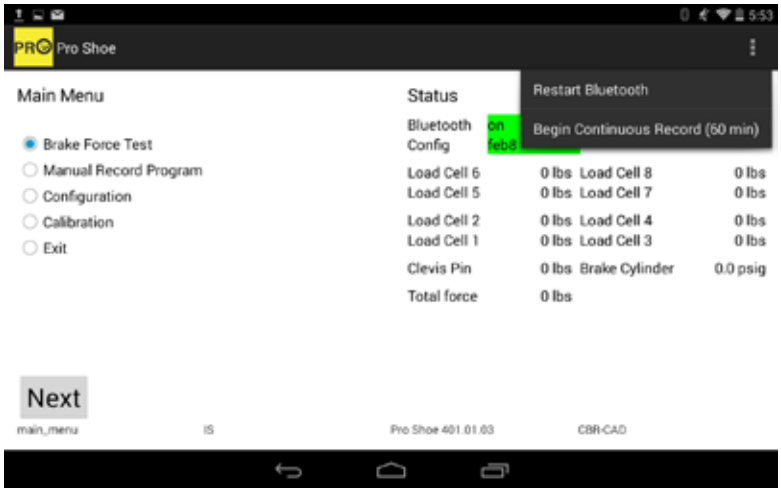
4. The next screen will confirm the position of the spare load cell. The load cell position will now have a gray background to indicate it is the spare cell. Tap Next to return to the Configuration Menu.



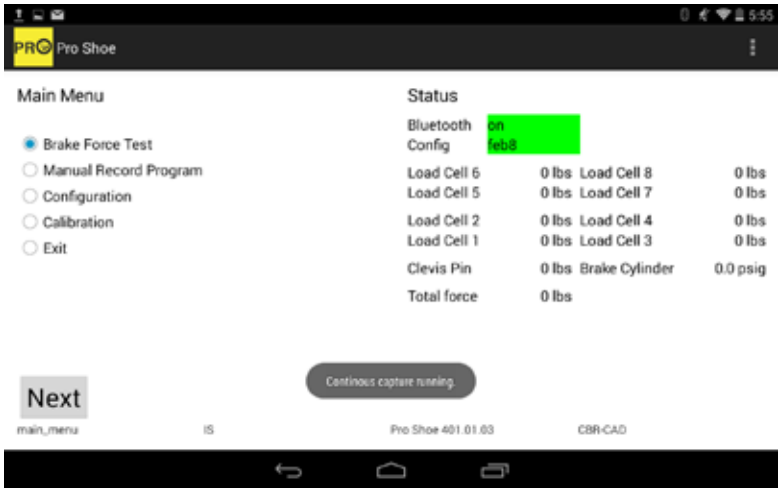
Continuous Recoding

The Continuous Recording feature can be used to take an automatic recording every second for up to 60 minutes.

1. From the Main Menu, tap the menu button (3 vertical dots) in the upper right corner and select Begin Continuous Record (60min).



2. You will see the Continuous capture running message at the bottom of the screen.'



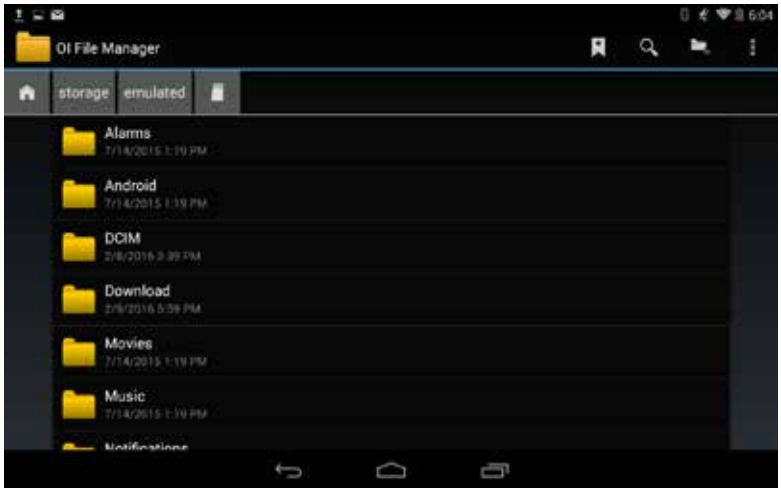
Test Reports

Test reports are stored in the ISTechSol folder on the device. Test reports can be transferred in several ways from the Android device to a computer, but the way we recommend is email. If you are interested in transferring via USB cable, Dropbox, and automated script, or any other way, contact I S Technology Solutions.

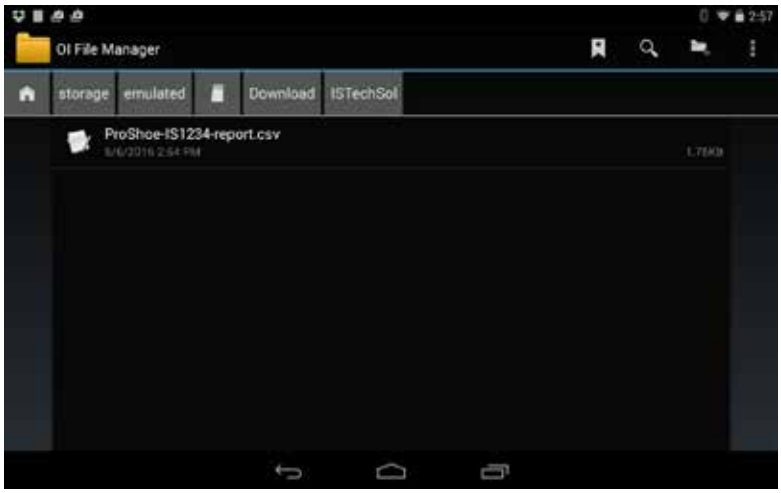
Accessing the ISTechSol folder:

1. From the Home Screen (or Applications) open OI File Manager. The OI File Manager icon is an orange folder.

2. The application will typically open to the SD Card folder. From there select Download and then ISTechSol.



3. Files can be sorted by Name or Last Modified. To change this setting, click the menu icon (3 vertical dots) in the upper right hand corner and then select Settings.

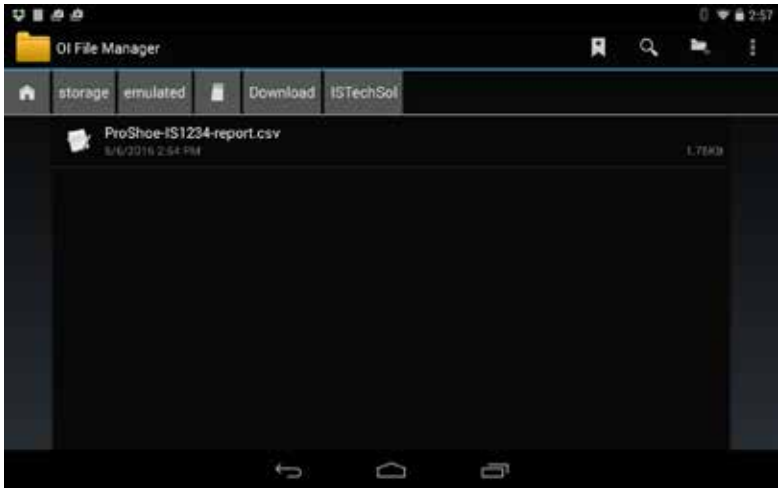


4. Set the Sort by settings as desired. Tap the back button in the lower left corner to return to the file listing. The files will be sorted as desired.

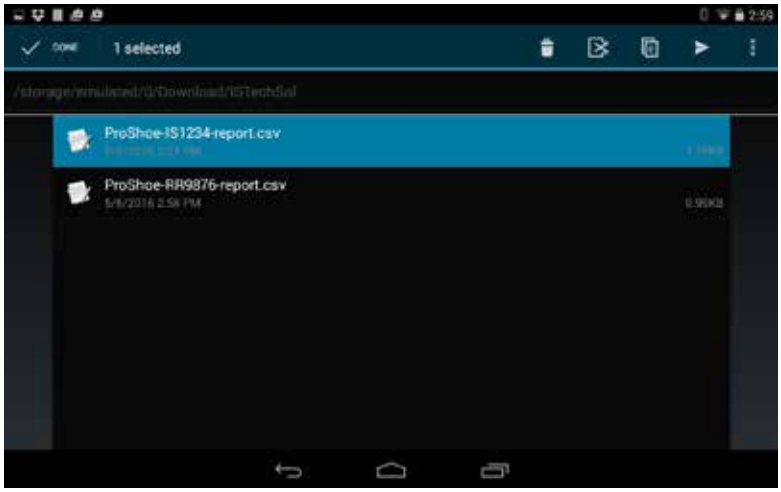
Emailing Reports

I S Technology Solutions sends out Android devices with a Gmail account loaded that corresponds to the serial number of the device. Ask I S Technology Solutions if you need this account information, but it should be set up. The tablet must have a WiFi connection to send email.

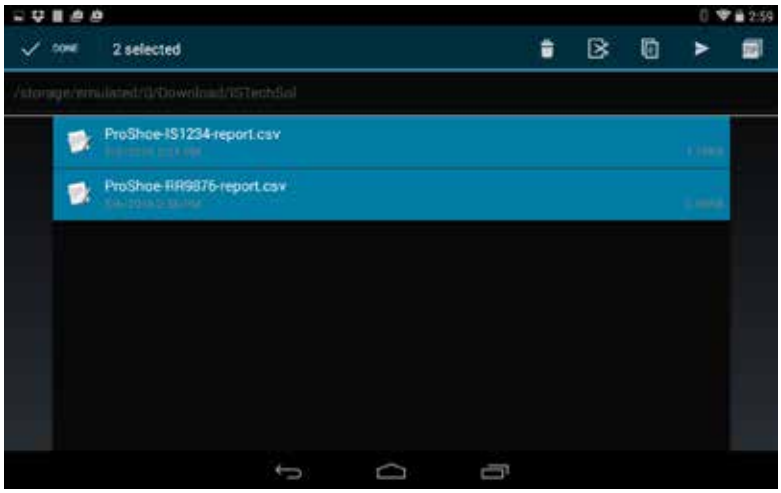
1. Open the OI File Manager application and navigate to the ISTechSol folder as described in the previous section.



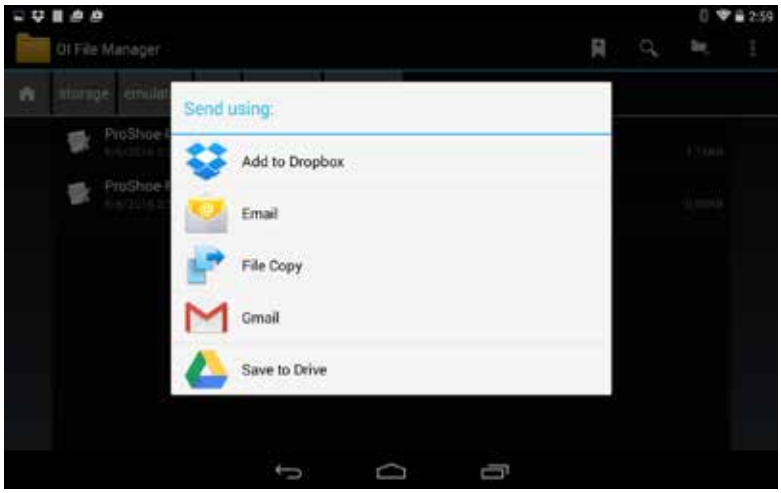
2. Press the name of one of the files you would like to attach to the email and hold down. The screen will change showing how many files have been selected.



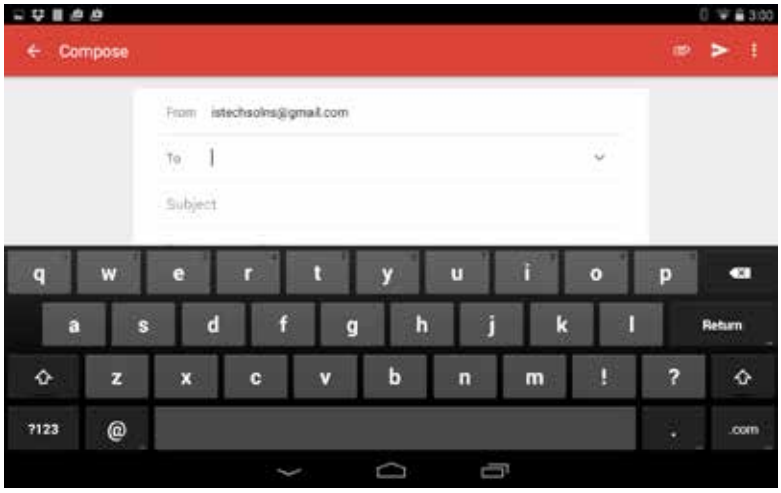
3. If you would like to attach more than one report file, tap all of the files you would like to include. Once you are ready to send, tap the Send icon in the upper right corner. The Send icon looks like a paper airplane pointing to the right.



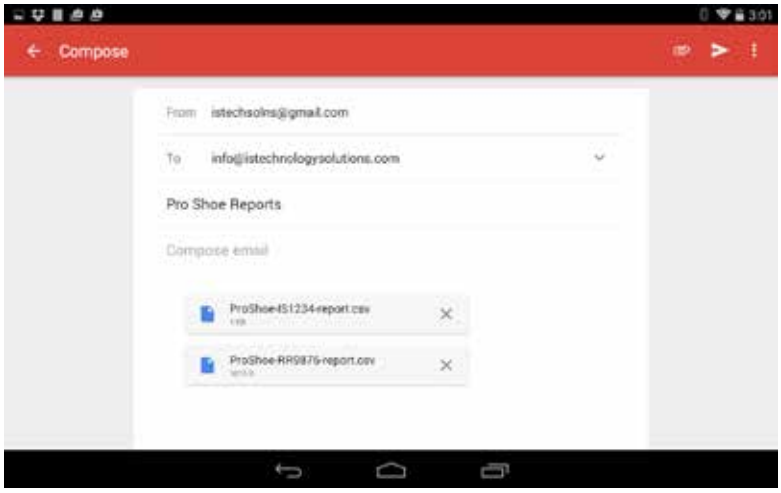
4. Select Gmail on the popup menu.



5. The Gmail application will start and open a new email. Type the email address where the reports will be sent. It is a good idea to add a Subject line to get around SPAM filters.



6. Hide the keyboard review the files you want to send. When ready, tap the word SEND in the upper right corner. Your email will be sent, if the tablet has a wireless connection.



Viewing Reports

Pro Shoe reports are .csv (comma separated values) files that can easily be viewed in a spreadsheet program such as MS Excel. Each car tested will have a separate report file. If multiple tests are conducted on the same car, all data is appended to the file until the file is deleted from the Android tablet.

When viewing the file, there are 3 types of lines:

1. Information line - contains, in order from left to right:

    - Time stamp
    - Configuration/Calibration used
    - Date of configuration/calibration
    - Time stamp of configuration
    - Empty/Load Valve Present label
    - Empty/Load Valve value
    - Hand Brake Group label
    - Hand Brake Group value
    - Emergency Valve Type label
    - Emergency Valve Type value
    - Car ID label
    - Car ID value
    - Operator ID label
    - Operator ID value
    - Relay Valve Present label
    - Relay Valve Present value
    - Service Valve Type label
    - Service Valve Type value
    - Load Weight label
    - Load Weight value
    - Brake Beam Type label
    - Brake Beam Type value
    - Rigging Type label
    - Rigging Type value
    - Slack Adjuster Group label
    - Slack Adjuster Group value
    - Hand Brake Model label
    - Hand Brake Model value
    - Light Weight label
    - Light Weight value
    - Car Build Classification Date label
    - Car Build Classification Date value
    - Hand Brake Method label
    - Hand Brake Method value
    - Truck Capacity label
    - Truck Capacity value

2. Brake Test Program readings line:

    - Time Stamp
    - Car ID
    - Operator ID
    - Test Section
    - Load Cell 1 Reading
    - Load Cell 2 Reading
    - Load Cell 3 Reading
    - Load Cell 4 Reading
    - Load Cell 5 Reading
    - Load Cell 6 Reading
    - Load Cell 7 Reading
    - Load Cell 8 Reading
    - Hand Brake Reading
    - Pressure Transducer Reading

3. Manual Record Program readings line:

    - Time Stamp
    - Car ID
    - Operator ID
    - ManualText
    - Empty Column
    - Description of Reading (typed in by operator)
    - Load Cell 1 Reading
    - Load Cell 2 Reading
    - Load Cell 3 Reading
    - Load Cell 4 Reading
    - Load Cell 5 Reading
    - Load Cell 6 Reading
    - Load Cell 7 Reading
    - Load Cell 8 Reading
    - Hand Brake Reading
    - Pressure Transducer Reading

Warranty

We offer to repair or replace, at our option, non-abused material found to be defective in material or workmanship for 90 days from date of shipment, f.o.b. our works, Chicago, Illinois. Returns must be accompanied by our written authorization. Upon inspection, if we find that any electronic components, other than stressed measurement components, are out of adjustment, we will restore adjustment for up to one year from date of shipment. Parts that are subject to stress loads, such as transducers, are excluded from this offer unless defects as described above exist.

Liability

The foregoing is the full extent of our liability. Neither we, nor the manufacturers of goods that we ship, shall be liable for any injury, loss or damage, direct or consequential, arising out the use or inability to use these products or services. Before using, user shall determine the suitability of the product for its intended use, and user assumes all risk and liability in connection therewith. The foregoing may not be amended or altered, except explicitly in writing by an authorized officer or seller. All instructions for safety and procedure in using this product are the responsibility of the user.