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:

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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



Analog Sensor Cable

Figure 2





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.

Main Menu	Statu			
Brake Force Test	Bueto Config	th connecting		
Manual Record Program	Load C	ell B	Load Cell 8	
Calibration	BluetoothServices() - no Bluetooth co	ad Cell 4 and Cell 3		
	Dismiss	XCR	ake Cylinder	
Next				

7. Then tap the Settings box that pops up.

월 <u>1</u> PR <mark>O</mark> Pro Shoe	0 ⊀ ♥# 320
Main Menu	Status
Brake Force Test	Bluetooth <mark>on</mark> Config feb8
 Manual Record Program Configuration 	Load Cell 6 2670 lbs Load Cell 8 2670 lbs Load Cell 5 2670 lbs Load Cell 7 2670 lbs
Calibration	Load Cell 2 2677 lbs Load Cell 4 2670 lbs Load Cell 1 2677 lbs Load Cell 3 2677 lbs
O LAR	Clevis Pin 0 lbs Brake Cylinder 74.8 psig
	Total force 21382 lbs
Next	
main_menu	Pro Shoe 401.01.03 CBR-CAD

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.

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🔅 Bluetooth				I I I I I I I I I I I I I I I I I I I
FZ-828 Not visible t	o other bluetooth devices			
AVAILABLE DEVICES				0
PS1600				
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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.

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🔅 Bluetooth			SEARCH FOR DEVICES	1
FZ-828 Only visible to paired devices. PAIRED DEVICES				
PS1600			4	
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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."

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PRO Pro Shoe					I
Main Menu	5	Status			
Brake Force Test	E	Bluetooth Config	on feb8		
Manual Record Program Configuration	L L	Load Cell 6 Load Cell 5	2670 lbs 2670 lbs	Load Cell 8 Load Cell 7	2670 lbs 2670 lbs
Calibration	1	Load Cell 2 Load Cell 1	2677 lbs	Load Cell 4 Load Cell 3	2670 lbs 2677 lbs
⊖ Exit	(Clevis Pin	0 lbs	Brake Cylinder	74.8 psig
	1	Total force	21382 lbs		
Next					
main, menu	Pro	Shoe 401.01.0	13	CBR-CAD	
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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.

Main Menu	Status	
Brake Force Test	Bluetooth <mark>on</mark> Config feb8	
Manual Record Program Configuration	Load Cell 6 2670 lbs Load Cell 8 Load Cell 5 2670 lbs Load Cell 7	2670 lb 2670 lb
Calibration	Load Cell 2 2677 lbs Load Cell 4 Load Cell 1 2677 lbs Load Cell 3	2670 lb 2677 lb
0.04	Clevis Pin 0 lbs Brake Cylind	ler 74.8 ps
	Total force 21382 lbs	
Next		
main.menu	Pro Shoe 401.01.03 CBR-CAD	

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.

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PRO Pro Shoe		:
Main Menu	Status	
Brake Force Test	Bluetooth on Config feb8	
 Manual Record Program Configuration 	Load Cell 6 2670 lbs Load Cell 8 Load Cell 5 2670 lbs Load Cell 7	2670 lbs 2670 lbs
Calibration	Load Cell 2 2677 lbs Load Cell 4 Load Cell 1 2677 lbs Load Cell 3	2670 lbs 2677 lbs
O EM	Clevis Pin 0 lbs Brake Cylinder	74.8 psig
	Total force 21382 lbs	
Next		
main_menu	Pro Shoe 401.01.03 CBR-CAD	
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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.

			0 🖤 🛙 2:33
PRO Pro Shoe			:
Setup: Starting test on new car. Press Next.	Status		
	Bluetooth <mark>on</mark> Config <mark>feb8</mark>		
	Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
	Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
	Clevis Pin	0 lbs Brake Cylinder	0.0 psig
	Total force	0 lbs	
Next			
bf_oper_id	Pro Shoe 401.01.03	CBR-CAD	
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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.

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PR <mark>O</mark> Pro Sh	ioe															1
Setup: Ent	er the Ca	ar ID						Stat	us							
Car ID: ex: ABC122	14	Not Va	ilid					Bluet	tooth	on feba						
								Load Load	Cell 6	5	0	lbs lbs	Load C	ell 8 ell 7		0 lbs 0 lbs
																Ŷ
Q	w	E	R		т		Y		U		I	7	0		Р	•
А	S	D		F	Ĩ	G		н	T	J		к	T	L		Done
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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.

			0 ♥ <u>1</u> 2:36
rio silve			•
Setup: S-401 Section 4.1, Table 4.1: Is the ca	ar Status		
newer than Jan 1, 2004 or rebuilt/converted If rebuilt/converted, is it TOFC/COFC?	? Bluetooth <mark>on</mark> Config feb8		
Rebuilt/Converted (TOFC/COFC)	Load Cell 6 0 lb Load Cell 5 0 lb	is Load Cell 8 is Load Cell 7	0 lbs 0 lbs
 Rebuilt/Converted (All other) Newer than Jan 1, 2004 	built/Converted (TOFC/COFC) Load Cell 6 0 lbs Load Cell 8 Load Cell 5 0 lbs Load Cell 7 built/Converted (All other) Load Cell 2 0 lbs Load Cell 4 wer than Jan 1, 2004 Load Cell 1 0 lbs Load Cell 3 Clevis Pin 0 lbs Brake Cylinder Total force 0 lbs	0 lbs 0 lbs	
	Clevis Pin 0 lb	s Brake Cylinder	0.0 psig
	Total force 0 lb	6	
_			
Next			
car,vebuit IS	Pro Shoe 401.01.03	CBR-CAD	
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7. Enter the car's Light Weight. Hide the keyboard and tap Next to continue.

Setup: Ent	er Car	's Liaht	Weight (LT	WT)	Status			
Weight: Ec: 14000		No	t Valid	1225	Bluetooth on Config feb	8-		
		1			Load Cell 5 Load Cell 5	0 lbs Los 0 lbs Los	ad Cell 8 ad Cell 7	0 lb 0 lb
					Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3		0 lb 0 lb
		+	- 21	111	2	3		
	*	.1		4	5	6	Done	
	()		7	8	9		
				*	0	#		

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

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PRO Pro Shoe							1
Setup: Enter Car	r's Load	Limit (Ld I	.MT)	Status			
Weight: Jec 299000	No	at Valid		Bluetooth on Config feb	8		
	1			Load Cell 5 Load Cell 5	0 lbs Los 0 lbs Los	ad Cell 8 ad Cell 7	0 lbs 0 lbs
				Load Cell 2 Load Cell 1	0 lbs Lor 0 lbs Lor	ad Cell 4 ad Cell 3	0 lbs 0 lbs
	+	20	1	2	3	•	
*	1	1.00	4	5	6	Done	
. C.)		7	8	9		
			*	0	#		
			_	0 8	41.4		

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.

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PR [©] Pro Shoe			:
Setup: This Car's Braking Force will be	Status		
calculated based on its Load Limit (200000 lbs).	Bluetooth <mark>on</mark> Config feb8		
	Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
	Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
	Clevis Pin	0 lbs Brake Cylinder	0.0 psig
	Total force Light % Loaded %	0 lbs 0.0% 0.0%	
Next			
brake_force_comment IS	Pro Shoe 401.01.03	CBR-CAD	

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

PRO Pro Shoe			
Setup: Select Emergency Valve Type	Status		
ABD ABDX-L Other with AAV	Bluetooth <mark>on</mark> Config feb8		
ABDS DB-20 ABDT DB-20L	Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
ABDW DB-60	Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
O HER O DOVE	Clevis Pin	0 lbs Brake Cylinder	0.0 psig
	Total force Light % Loaded %	0 lbs 0.0% 0.0%	
Next			
emer_valve_type IS	Pro Shoe 401.01.03	CBR-CAD	
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12. Select the Service Valve Type and tap Next to continue.

E E É É É PRO Pro Shoe			(I & ♥12238
Setup: Select Servi	ce Valve Type	Status		
ABD ABDX-L	O ther with AAV	Bluetooth <mark>on</mark> Config feb8		
ABDS DB-20 ABDT DB-20L		Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
ABDW DB-60 ABDX DB-60		Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
O HEER O DE UIE		Clevis Pin	0 lbs Brake Cylinder	0.0 psig
		Total force Light % Loaded %	0 lbs 0.0% 0.0%	
Next				
service_valve_type	15	Pro Shoe 401.01.03	CBR-CAD	
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13. Enter the Hand Brake Model. Hide the keyboard and tap Next to continue.

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PR <mark>O</mark> Pro S	hoe										1
Setup: Ha	nd Brak	e Model				Status	s				
Enter Hand	Brake Mo	del Not Va	6đ			Blueto Config	oth on	8			
						Load C Load C	ell 6 ell 5	0 lbs 0 lbs	Load Ce Load Ce	118 117	0 lbs 0 lbs
											Ŷ
q	w	e	r	t	у		u	f	0	р	•
а	s	d	f	9		h	j	k			Done
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7123											٢
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14. Select the Hand Brake Group and tap Next.

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Setup: Select Han	d Brake Group	Status		
		Bluetooth <mark>on</mark> Config feb8		
0 L O N O T 0 I O O O U		Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
OEOPOV		Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
0.04		Clevis Pin	0 lbs Brake Cylinder	0.0 psig
		Total force Light % Loaded %	0 lbs 0.0% 0.0%	
Next				
hand_brake_group	IS	Pro Shoe 401.01.03	CBR-CAD	
	¢			

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

			0	£ ♥ 🛛 2:38
PRO Pro Shoe				:
Setup: Select the me hand brake force.	thod used for measuring	Status Bluetooth <mark>on</mark> Config feb8		
 Sheave â€" Horizont Sheave â€" Vertical 	al	Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
 66 Bell Crank 63 Bell Crank 		Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
55 Bell Crank		Clevis Pin	0 lbs Brake Cylinder	0.0 psig
		Total force Light % Loaded %	0 lbs 0.0% 0.0%	
Next				
hand_brake_method	15	Pro Shoe 401.01.03	CBR-CAD	
	t) () U		

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

- 				€ ♥ 🗋 2:39
PRO Pro Shoe				:
Setup: Does the car ha adjusters?	have automatic slack	Status		
		Bluetooth <mark>on</mark> Config feb8		
Yes		Load Cell 6	0 lbs Load Cell 8	0 lbs
⊖ No		Load Cell 5	0 lbs Load Cell 7	0 lbs
		Load Cell 2	0 lbs Load Cell 4	0 lbs
		Load Cell 1	0 lbs Load Cell 3	0 lbs
		Clevis Pin	0 lbs Brake Cylinder	0.0 psig
		Total force	0 lbs	
		Light %	0.0%	
		Loaded %	0.0%	
Next				
slack_adjust	IS	Pro Shoe 401.01.03	CBR-CAD	
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17. If the car has automatic slack adjusters, select the slack adjuster group. Tap Next to continue.

Saving screenshot				
PRO Pro Shoe				:
Setup: Select Slack A	djuster Group	Status		
<u></u> С Е		Bluetooth <mark>on</mark> Config feb8		
ΟJ		Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
		Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
		Clevis Pin	0 lbs Brake Cylinder	0.0 psig
		Total force Light % Loaded %	0 lbs 0.0% 0.0%	
Next				
slack_adjust_group	IS	Pro Shoe 401.01.03	CBR-CAD	
	↔ d	í ľ		

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

Contraction				U R ¥ E 239
PRO Pro Shoe				1
Setup: Does the car ha valve?	ave a A-1 or similar relay	Status Bluetooth <mark>on</mark> Config feb8		
○ Yes ○ No		Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
		Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
		Clevis Pin	0 lbs Brake Cylinder	0.0 psig
		Total force Light % Loaded %	0 lbs 0.0% 0.0%	
Next	IS	Pro Shoe 401.01.03	CBR-CAD	
	← d			

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

PRO Pro Shoe			:
Setup: Does the car have an Empty/Load	Status		
Valve?	Bluetooth <mark>on</mark> Config <mark>feb8</mark>		
Yes No	Load Cell 6	0 lbs Load Cell 8	0 lbs
0.10	Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
	Clevis Pin	0 lbs Brake Cylinder	0.0 psig
	Total force Light % Loaded %	0 lbs 0.0% 0.0%	
Next			
empty_load IS	Pro Shoe 401.01.03	CBR-CAD	

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

Saving screenshot PRO Pro Shoe						:	
Setup: Select Brake Be	am Type		Status				
0 18			Bluetooth <mark>on</mark> Config feb8				
O 24			Load Cell 6 Load Cell 5	0 lbs 0 lbs	Load Cell 8 Load Cell 7	0 lbs 0 lbs	1
			Load Cell 2 Load Cell 1	0 lbs 0 lbs	Load Cell 4 Load Cell 3	0 lbs 0 lbs	i
			Clevis Pin	0 lbs	Brake Cylinder	0.0 psig	ļ
			Total force Light % Loaded %	0 lbs 0.0% 0.0%			
Next							
brake_beam	IS	Pi	to Shoe 401.01.03		CBR-CAD		
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21. Select the Rigging Type. Tap Next to continue.

					0 8 9 8 2.33
PRO Pro Shoe					:
Setup: Select Rigging determine correct pis Body Mounted 12 in Body Mounted 10 in Body Mounted 8.5 in Body Mounted 7.5 in Elicon-National	Type. (Used t ton travel) Thrall Wabco TMX TTX-Misner Wabcopac II Triax-Davis	Triax II Nycopac Nycopac Nycopac Andreed on Car	Status Bluetooth Config Load Cell 6 Load Cell 5 Load Cell 2 Load Cell 1 Clevis Pin Total force Light % Loaded %	0 lbs Load Cell 8 0 lbs Load Cell 7 0 lbs Load Cell 4 0 lbs Load Cell 3 0 lbs Brake Cylinder 0 lbs 0.0%	0 lbs 0 lbs 0 lbs 0 lbs 0.0 psig
rigging_type	IS		Pro Shoe 401.01.03	CBR-CAD	
	([]		

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.

도 의 현 후 후 PRO Pro Shoe		0	K ♥112:39
Setup: Information review. Car ID: IS1234 Emergency / Service Valve Type: ABDX-L / ABDX-L Hand Brake Group / Method: N / 66 Bell Crank Slack: E Relay: Yes Empty Load: Yes Brake Beam: 18 Light / Loaded 20000 / 200000 Rigging Type: Body Mounted 8.5 in New / Rebuilt: Newer than Jan 1, 2004 Continue Continue Return to Main Menu	Status Bluetooth Config Load Cell 6 Load Cell 5 Load Cell 2 Load Cell 1 Clevis Pin Total force Light % Loaded %	0 lbs Load Cell 8 0 lbs Load Cell 7 0 lbs Load Cell 4 0 lbs Load Cell 3 0 lbs Brake Cylinder 0 lbs 0.0%	0 lbs 0 lbs 0 lbs 0 lbs 0 lbs
review,data IS	Pre Shor 401.01.03	CBR-CAD	

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.

日日日日日 PRG Pro Shoe			0	€ ♥112:39 [
Setup: The device is c	urrently configured with	Status		
8 load cells. We will te time.	est the entire car at one	Bluetooth <mark>on</mark> Config <mark>feb8</mark>		
		Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
		Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
		Clevis Pin	0 lbs Brake Cylinder	0.0 psig
		Total force Light % Loaded %	0 lbs 0.0% 0.0%	
Next				
num_load_cells_entire	15	Pro Shoe 401.01.03	CBR-CAD	
	←			

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.

국 교 한 순 PRO Pro Shoe		0	£ ♥1 240
Setup: Replace brake shoes with load cells, as shown in the Operating Manual. Press Next when complete.	Status Bluetooth <mark>on</mark> Config feb8		
	Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
	Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
	Clevis Pin	0 lbs Brake Cylinder	0.0 psig
	Total force Light % Loaded %	0 lbs 0.0% 0.0%	
Next			
replace_brake_shoes IS	Pro Shoe 401.01.03	C8R-CAD	

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 PER-PENDICULAR to the direction of force. See FIGURE 2 in INSTALLATION & HOOK UP. Tap Next to continue.

E E E E		0	K ♥ 🗎 2:40
Setup: Replace Clevis Pin in Hand Brake Chain with Load Clevis Pin. Force arrow inscribed on Load Clevis Pin MUST be parallel to direction of force as shown in the Operating Manual. Press Next when complete.	Status Biuetooth on Config reb8 Load Cell 6 Load Cell 2 Load Cell 2 Load Cell 1 Clevis Pin Total force Light % Loaded %	0 lbs Load Cell 8 0 lbs Load Cell 7 0 lbs Load Cell 4 0 lbs Load Cell 3 0 lbs Brake Cylinder 0 lbs 0.0%	0 lbs 0 lbs 0 lbs 0 lbs 0 lbs
Next replace,clevis,pin IS	Pro Shoe 401.01.03	CBR-CAD	

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.

도 걸 <i>걸 겯 흔</i> PRG Pro Shoe		C	∦ ♥≙ 2:40
Setup: Attach brake cylinder pressure transducer to brake cylinder hose. All transducers will be set to Zero. Press h when complete.	Status Bluetooth on feb8 Load Cell 6 Load Cell 5 Load Cell 2 Load Cell 1 Clevis Pin Total force Light % Loaded %	0 lbs Load Cell 8 0 lbs Load Cell 7 0 lbs Load Cell 4 0 lbs Load Cell 3 0 lbs Brake Cylinder 0 lbs 0.0% 0.0%	0 lbs 0 lbs 0 lbs 0 lbs 0.0 psig
Next attach_bc_trans IS	Pro Shoe 401.01.03	CBR-CAD	

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

⊇ Saving screenshot <mark>PRO</mark> Pro Shoe				:
Setup: Attach other end of brak to brake cylinder pressure tap, when complete.	e cylinder hose Press Next	Status Bluetooth <mark>on</mark> Config feb8		
		Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
		Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
		Clevis Pin	0 lbs Brake Cylinder	0.0 psig
		Total force Light % Loaded %	0 lbs 0.0% 0.0%	
Next				
attach_bc_hose IS		Pro Shoe 401.01.03	CBR-CAD	
	¢ d			

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

e e e e e PRO Pro Shoe				0 € ♥12240 I
Setup: Insert block arm to put the car	under Empty/Load Valve in the LOADED position.	Status Bluetooth on Config feb8 Load Cell 6	0 lbs Load Cell 8	0 lbs
		Load Cell 5 Load Cell 2 Load Cell 1	0 lbs Load Cell 7 0 lbs Load Cell 4 0 lbs Load Cell 3 0 lbs Brake Odinder	0 lbs 0 lbs 0 lbs
		Total force Light % Loaded %	0 lbs 0.0% 0.0%	0.0 paig
Next	IS	Pro Shoe 401.01.03	CBR-CAD	
	¢	Ó ľ		

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.

22220			C	£°♥∐2:41
PRO Pro Shoe				:
Setup: To perform	m the test, the control valve	Status		
should be cut in, separate venting devices should be cut in, and the Retaining Valve should be in the Direct Exhaust position.	Bluetooth <mark>on</mark> Config feb8			
	Direct Exhaust position.	Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
		Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
		Clevis Pin	0 lbs Brake Cylinder	0.0 psig
		Total force Light % Loaded %	0 lbs 0.0% 0.0%	
Next				
valve_settings	IS	Pro Shoe 401.01.03	CBR-CAD	
	Û			

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

도 또 한 순 순 <mark>PRG</mark> Pro Shoe		0	€ ♥11247 [
S-401: 7.0, Rule 88: Table 1A: In orde testing the car in the empty position, car to 90psi. Press NEXT when car is charged.	er to begin Status charge Bluetooth on s fully Config feb8	B The Lord Cell C	0.hz
-	Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
	Load Cell 1	0 lbs Load Cell 3	0 lbs
	Clevis Pin Total force Light % Loaded %	0 lbs Brake Cylinder 0 lbs 0.0% 0.0%	0.0 psig
Next empty_test IS	Pro Shoe 401.01.03	CBR-CAD	

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.

			0	£°♥∐2341
PRO Pro Shoe				:
Setup: In order	to protect the load cells,	Status		
perform a 2 psi reduction to ensure load o are gently pressed against wheels. Reduc Brake Pipe pressure from 90 psi to 88 psi using Position 4. Press Next when comple	reduction to ensure load cells ed against wheels. Reduce	Bluetooth <mark>on</mark> Config feb8		
	I. Press Next when complete.	Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
		Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
		Clevis Pin	0 lbs Brake Cylinder	0.0 psig
	Total force Light % Loaded %	0 lbs 0.0% 0.0%		
Next				
reduce_to_88	iS	Pro Shoe 401.01.03	C8R-CAD	
	() ()			

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.

			0	£ ♥目241
PRO Pro Shoe				1
Setup: To further p	protect the load cells,	Status		
perform an additional 2 psi reduction. Reduce Brake Pipe pressure from 88 psi to 86 psi using Position 4. Press NEXT when complete.	Bluetooth <mark>on</mark> Config <mark>feb8</mark>			
	Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs	
	Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs	
		Clevis Pin	0 lbs Brake Cylinder	0.0 psig
	Total force Light % Loaded %	0 lbs 0.0% 0.0%		
Next				
reduce_to_86	15	Pro Shoe 401.01.03	C8R-CAD	
	ý ú			

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.

n 🖬 🖄 🚖 🖄			
Setup: Load Cell(s) are not contacting the wheel, indicating stuck rigging. Charge Brake Pipe to 90 psi to release brakes, then rap the rigging to loosen it. When done, press NEXT to restart the Protective Application.	Status Bluetooth Config Load Cell 6 Load Cell 5 Load Cell 2	0 lbs Load Cell 8 0 lbs Load Cell 7 0 lbs Load Cell 4	0 lbs 0 lbs 0 lbs
O Main Menu	Load Cell 1 Clevis Pin Total force Light % Loaded %	0 lbs Load Cell 3 0 lbs Brake Cylinder 0 lbs 0.0% 0.0%	0 lbs 0.0 psig
Next ma,rigging_50 IS	Pro Shoe 401.01.03	CBR-CAD	

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.

		0 🕂 ♥월 2:42
PRO Pro Shoe		
Setup: Load Cells have been safely pressed	Status	
against wheels. Ready to begin the Piston Travel Test. Charge System to 90psi. Press	Bluetooth <mark>on</mark> Config feb8	
NEXT when system charged.	Load Cell 6 320 lbs Load Cell 8 Load Cell 5 320 lbs Load Cell 7	320 lbs 320 lbs
	Load Cell 2 320 lbs Load Cell 4 Load Cell 1 320 lbs Load Cell 3	320 lbs 320 lbs
	Clevis Pin 0 lbs Brake Cylinde	r 0.0 psig
	Total force 2560 lbs Light % 12.8% Loaded % 1.3%	
Next		
load_cells_contact IS	Pro Shoe 401.01.03 CBR-CAD	
¢		

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.

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Setup: Ready to perform Reduce Brake Pipe press Rate 5, Brake Cylinder mi and 51psi (S-401 3.1.1). Continue Go to Min Application Main Menu	Piston Travel Test. ure to 75 psi using ust be between 49psi	Status Bluetooth Config Load Cell 6 Load Cell 5 Load Cell 1 Clevis Pin Total force Light % Loaded %	on (eb8 1800 lbs 1800 lbs 1800 lbs 0 lbs 14400 lbs 72.0% 7.2%	Load Cell 8 Load Cell 7 Load Cell 4 Load Cell 3 Brake Cylinder	1800 lbs 1800 lbs 1800 lbs 1800 lbs 50.3 psig
Next piston_tray_75 to	s	Pro Shoe 401.01.0	13	CBR-CAD	

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.

의 열 <i>한 은 은</i> PRG Pro Shoe			C	€♥1244 I
Setup: Ready to begin I Test. Charge system to when ready to perform	Minimum Application 90psi. Press NEXT test.	Status Bluetooth <mark>on</mark> Config feb8		
		Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
		Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
		Clevis Pin	0 lbs Brake Cylinder	0.0 psig
		Total force Light % Loaded %	0 lbs 0.0% 0.0%	
Next				
min_appric		Prio Shor 401.01.03	Can CAD	

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.

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PRO Pro Shoe					1
S-401: 4.1: Reduce Bra	ake Pipe Pressure to	Status			
60psi using Rate 5. Pr complete to record bra	ess NEXT when ake forces.	Bluetooth or Config fe	n 68		
		Load Cell 6 Load Cell 5	3975 lbs 3975 lbs	Load Cell 8 Load Cell 7	3975 lbs 3975 lbs
		Load Cell 2 Load Cell 1	3975 lbs 3975 lbs	Load Cell 4 Load Cell 3	3975 lbs 3975 lbs
		Clevis Pin	0 lbs	Brake Cylinder	64.6 psig
		Total force Light % Loaded %	31799 lbs 159.0% 15.9%		
Record					
brake_ratio	iS	Pro Shoe 401.01.03		CBR-CAD	
	¢		71		

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. PRO-TECT YOUR EARS! Press Record to record the results.

					0≮*♥≙246
S-401: 3.1.5-6: Ready to Test. Reduce Brake Pipe Rate 7. Press Next to re- results.	begin Emergency Pressure to 0 using cord and check	Status Bluetooth on Config fel	b8		
		Load Cell 5 Load Cell 2	2650 lbs 2656 lbs	Load Cell 8 Load Cell 7 Load Cell 4	2650 lbs 2650 lbs
		Load Cell 1 Clevis Pin	2656 lbs 0 lbs	Load Cell 3 Brake Cylinder	2656 lbs 74.2 psig
		Light % Loaded %	106.1% 10.6%		
Record	15	Pro Shoe 401 01 03		CRB.CAD	
	÷ t	<u> </u>	ji -		

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.

도 의 <i>한 후 후</i> PR <mark>O</mark> Pro Shoe		:
S-401: 7.0, Rule 88: Table 1A: Ready to begin Hand Brake test. Make sure that Clevis Load Pin has been inserted into chain, with the arrow parallel to the direction of force. Tighten Hand Brake to just under 4000 pounds of force as specified in table for Group N and Sheave 66 Bell Crank. Press NEXT to continue.	Status Bluetooth on tebs Config tebs Load Cell 6 6962 lbs Load Cell 8 Load Cell 5 6962 lbs Load Cell 7 Load Cell 2 6962 lbs Load Cell 4 Load Cell 1 6962 lbs Load Cell 3 Clevis Pin 3989 lbs Brake Cylinder Total force 55696 lbs Light % 278.5%	6962 lbs 6962 lbs 6962 lbs 6962 lbs 6962 lbs 74.2 psig
Next hand,brake IS	Pro Shoe 401.01.03 CBR-CAD	

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

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S-401: 7.0, Rule 8	88: Table 1A: Measuring Hand	Status			
Brake force. Press Next	is Next to record.	Bluetooth or Config fe	n ib8		
		Load Cell 6 Load Cell 5	6962 lbs 6962 lbs	Load Cell 8 Load Cell 7	6962 lbs 6962 lbs
		Load Cell 2 Load Cell 1	6962 lbs 6962 lbs	Load Cell 4 Load Cell 3	6962 lbs 6962 lbs
		Clevis Pin	3989 lbs	Brake Cylinder	74.2 psig
		Total force Light % Loaded %	55696 lbs 278.5% 27.8%		
Record					
hand_brake_meas	15	Pro Shoe 401.01.03		CBR-CAD	
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46. WARNING: Releasing the Hand Brake using the DIRECT RELEASE lever can cause IRREPARA-BLE 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.

380 <i>00</i>				0 £ ♥Ⅱ 2:47
PRO Pro Shoe				1
S-401: 7.0, Rule 88: Table 1A: WARNING:	Status			
Releasing the Hand Brake by using the DIRECT RELEASE lever can cause IRREPAIRABLE DAMAGE to the LOAD OF EVIS	Bluetooth or Config fe	n 68		
PIN. Use a Come-Along to take force off of LOAD CLEVIS PIN. Once Come-Along has	Load Cell 6 Load Cell 5	6962 lbs 6962 lbs	Load Cell 8 Load Cell 7	6962 lbs 6962 lbs
relieved force on pin, release Hand Brake Lever. Then SLOWLY release force on LOAD	Load Cell 2 Load Cell 1	6962 lbs 6962 lbs	Load Cell 4 Load Cell 3	6962 lbs 6962 lbs
CLEVIS PIN using the Come-Along. Press	Clevis Pin	3989 lbs	Brake Cylinder	74.2 psig
NEXT to continue.	Total force Light % Loaded %	55696 lbs 278.5% 27.8%		
Next				
hand,brake,release IS	Pro Shoe 401.01.03		CBR-CAD	
¢		<u>r</u>		

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.

			0 £ ♥0 2:47
PRO Pro Shoe			1
S-401: 4.1: Return Empty/Load valve to Empty	Status		
position (remove block). Press NEXT to continue.	Bluetooth <mark>on</mark> Config feb8		
	Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
	Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
	Clevis Pin	0 lbs Brake Cylinder	0.0 psig
	Total force Light % Loaded %	0 lbs 0.0% 0.0%	
Next			
empty_test_block IS	Pro Shoe 401.01.03	CBR-CAD	
c) c)	à G		

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.

					0 £ ♥월 2:48
PRO Pro Shoe					:
S-401: 4.1: Ready to p	perform the 30 psi test.	Status			
Continue reducing Br 60psi using Rate 5. P	ake Pipe pressure to ress NEXT to record 30	Bluetooth or Config fe	n 68		
psi Application results.		Load Cell 6 Load Cell 5	2330 lbs 2330 lbs	Load Cell 8 Load Cell 7	2330 lbs 2330 lbs
		Load Cell 2 Load Cell 1	2333 lbs 2333 lbs	Load Cell 4 Load Cell 3	2330 lbs 2333 lbs
		Clevis Pin	0 lbs	Brake Cylinder	65.2 psig
		Total force Light % Loaded %	18648 lbs 93.2% 9.3%		
Record					
empty_test_30	iS	Pro Shoe 401.01.03		CBR-CAD	
	¢ ú		ī,		

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.

					0 £*♥≙2:48
PRO Pro Shoe					1
S-401: 3.1.5-6: Ready 1	to perform emergency	Status			
application. Reduce Brake Pipe pressure to 0 using Rate 7. Press NEXT to record data from Empty Emergency Application.		Bluetooth or Config fe	n 68		
		Load Cell 6 Load Cell 5	2670 lbs 2670 lbs	Load Cell 8 Load Cell 7	2670 lbs 2670 lbs
		Load Cell 2 Load Cell 1	2677 lbs 2677 lbs	Load Cell 4 Load Cell 3	2670 lbs 2677 lbs
		Clevis Pin	0 lbs	Brake Cylinder	74.8 psig
		Total force Light % Loaded %	21382 lbs 106.9% 10.7%		
Record					
empty_emer	15	Pro Shoe 401.01.03		CBR-CAD	
	t) c)		<u>r</u>		

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.

R B C Pro Shoe		0 € ♥≙248
Setup: The test is now complete. Drain all air from the car and remove the load cells, replacing them with the brake shoes and clevis pin. Remove brake cylinder pressure tap. Press NEXT to continue	Status Bluetooth on Config feb8 Load Cell 6 2670 lbs Load Cell 8 Load Cell 5 2670 lbs Load Cell 7 Load Cell 2 2677 lbs Load Cell 4 Load Cell 1 2677 lbs Load Cell 3 Clevis Pin 0 lbs Brake Cylind Total force 21382 lbs	2670 lbs 2670 lbs 2670 lbs 2677 lbs der 74.8 psig
Next drain_car	Pro Shoe 401.01.03 CBR-CAD	

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.

1 2 8		0	€ ♥≣ 5:26
PRO Pro Shoe			:
Main Menu	Status		
O Brake Force Test	Bluetooth <mark>on</mark> Config feb8		
Manual Record Program Configuration	Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
Calibration	Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
	Clevis Pin	0 lbs Brake Cylinder	0.0 psig
	Total force	0 lbs	
Next			
main_menu	Pro Shoe 401.01.03	CBR-CAD	
¢	0 Ū		

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

⊇ ± ≅ <mark>PR©</mark> Pro Shoe		0	⊀ ♥11527
Manual Control: Manual Recording	Status		
	Bluetooth <mark>on</mark> Config feb8		
	Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
	Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
	Clevis Pin	0 lbs Brake Cylinder	0.0 psig
	Total force	0 lbs	
Next			
manual_control	Pro Shoe 401.01.03	CBR-CAD	

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.

				0 ⊀ ♥≟ 5:27
PRO Pro Shoe				:
Manual Control: Zeroin	g out load cells	Status		
		Bluetooth <mark>on</mark> Config <mark>feb8</mark>		
		Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
		Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
		Clevis Pin	0 lbs Brake Cylinder	0.0 psig
		Total force	0 lbs	
Next				
mc_zero	IS	Pro Shoe 401.01.03	CBR-CAD	
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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.

9 <u>1</u> 6				0 € ♥≣ 5:28
PRO Pro Shoe				:
Manual Control: Continue	with Manual	Status		
Recording Program?		Bluetooth <mark>on</mark> Config feb8		
Save another Manual Record	bro	Load Cell 6	0 lbs Load Cell 8	0 lbs
O Return to Main Menu		Load Cell 5	0 lbs Load Cell 7	0 lbs
		Load Cell 2	0 lbs Load Cell 4	0 lbs
		Load Cell 1	0 lbs Load Cell 3	0 lbs
		Clevis Pin	0 lbs Brake Cylinder	0.0 psig
		Total force	0 lbs	
Next				
mc_continue IS		Pro Shoe 401.01.03	CBR-CAD	
	¢	Ó ľ		

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.

100			0	£ ♥ 🗎 5:40
PR© Pro Shoe				
Main Menu		Status		
O Brake Force Test		Bluetooth <mark>on</mark> Config feb8		
 Manual Record Program Configuration 		Load Cell 6 0 lbs Load Cell 5 0 lbs	Load Cell 8 Load Cell 7	0 lbs 0 lbs
Calibration		Load Cell 2 0 lbs Load Cell 1 0 lbs	Load Cell 4 Load Cell 3	0 lbs 0 lbs
		Clevis Pin 0 lbs	Brake Cylinder	0.0 psig
		Total force 0 lbs		
Next				
main,menu IS	Pr	to Shoe 401.01.03	CBR-CAD	
	ý á			

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

PRG Pro Shoe				() ≮ ♥≞ 5:40 E
Configuration: Co	nfiguration		Status		
Configure Spare	Cell		Bluetooth <mark>on</mark> Config <mark>feb8</mark>		
 Import Configura Return to Main M 	ition Menu		Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
			Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
			Clevis Pin	0 lbs Brake Cylinder	0.0 psig
			Total force	0 lbs	
Next					
configuration	IS		Pro Shoe 401.01.03	CBR-CAD	
		Ĵ	Ū Ū		

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

<u></u>		0	£ ♥11547
PRO Pro Shoe			
Configuration: Spare Cell Configuration.	Status		
Choose which load cell position should use the spare load cell.	Bluetooth <mark>on</mark> Config <mark>feb8</mark>		
O Position 1 O Position 6	Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
Position 2 Position 7 Position 3 Position 8	Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
 Position 4 Onone Position 5 	Clevis Pin Total force	0 lbs Brake Cylinder 0 lbs	0.0 psig
Next			
config_spare_cell IS	Pro Shoe 401.01.03	C8R-CAD	

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.

로 <u>1</u> 점 PRO Pro Shoe				0 K ♥± 547 E
Configuration: Spare	Cell configuration: Spare	Status		
configured at load cel	Il position 8	Bluetooth <mark>on</mark> Config feb8		
		Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
		Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
		Clevis Pin	0 lbs Brake Cylinder	0.0 psig
		Total force	0 lbs	
Next				
config_spare_announce	IS	Pro Shoe 401.01.03	CBR-CAD	
	← C			

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).

120				0 1	€ ♥ 🗎 5:53
PRO Pro Shoe					
Main Menu			Status	Restart Bluetooth	
Brake Force Te	est		Bluetooth <mark>on</mark> Config <mark>feb8</mark>	Begin Continuous Record	(60 min)
 Manual Recon Configuration 	d Program		Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
Calibration Exit			Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
			Clevis Pin	0 lbs Brake Cylinder	0.0 psig
			Total force	0 lbs	
Next					
main_menu	IS		Pro Shoe 401.01.03	CBR-CAD	
		t) C	'n		

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

100		0	€ ♥ 🗎 5:55
PRO Pro Shoe			1
Main Menu	Status		
Brake Force Test	Bluetooth <mark>on</mark> Config <mark>feb8</mark>		
 Manual Record Program Configuration 	Load Cell 6 Load Cell 5	0 lbs Load Cell 8 0 lbs Load Cell 7	0 lbs 0 lbs
Calibration	Load Cell 2 Load Cell 1	0 lbs Load Cell 4 0 lbs Load Cell 3	0 lbs 0 lbs
	Clevis Pin	0 lbs Brake Cylinder	0.0 psig
	Total force	0 lbs	
Next	Continues capture tunning.		
main, menu IS	Pro Shoe 401.01.03	CBR-CAD	

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.

4 1 1 1 1 1 1			0 **
Compose			(e) > 1
	From istechsoles@gmail.com		
	To info@istechnologysolutions.com		÷
	Pro Shoe Reports		
	Compose email		
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	ProShoe-RR9876-report.cov	0	

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.