



**INSTRUCTIONAL MANUAL**

**BRAKE PEDAL TRAVEL TESTER  
MODEL KEI-095/095A**

# **KEMKRAFT** ENGINEERING, INC.

## MODEL KEI095/095A BRAKE PEDAL TESTER

### GENERAL DESCRIPTION

The KEMKRAFT Model KEI-095 Brake tester is a precision test instrument which will display and record brake pedal travel, brake pedal effort, and car deceleration during vehicle drive testing. Setup is accomplished in a few minutes with three transducers and a cigarette lighter plug. Data is stored in the Brake Tester for approximately 11 minutes of test time at the rate of 10 data readings per second. Multiple tests can be run and each test is identified by its start and stop time/date.

### INSTALLATION

1. Open the KEI-095 Brake tester box and remove the two pedal transducers and power cable.
2. Place the Floor transducer on a stable area of the car with the front line marking facing toward the front of the car. Align the transducer so that the axis of the transducer is exactly parallel to the centerline of the car. See figure 1. Rotate the transducer so that the number faces up.
3. Place the Pedal transducer on the pedal arm. Lock the fixture securely in place. Adjust the multi-axis fixture so that the transducer is level and parallel to the centerline of the car. Rotate the transducers so that the numbers face up, with the wires toward the front of the car.

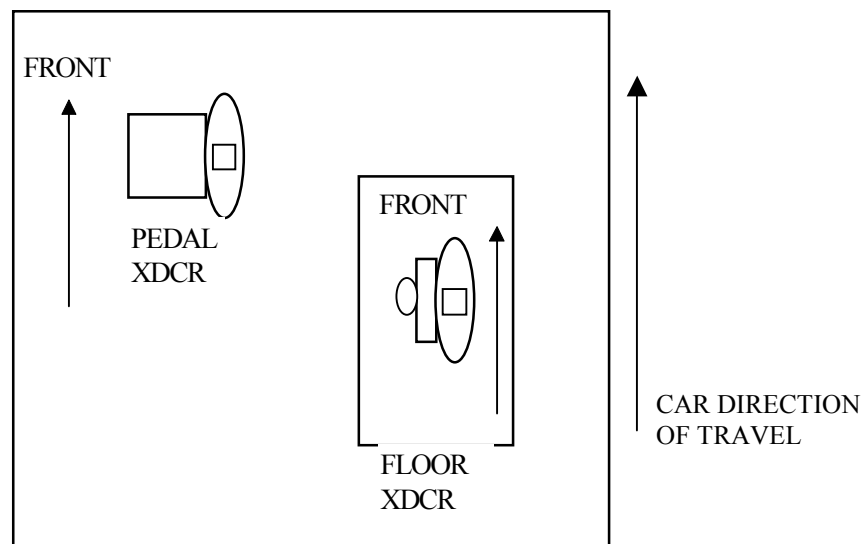


Figure 1

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4. If the Pedal force transducer is used, place it on the brake pedal and secure it firmly in place.
5. Route all transducer cables so that they do not interfere with pedal operation. The cables must have enough slack to move freely without binding.
6. Plug the transducer cables and the power cable into the Brake tester. The brake tester connectors are marked and keyed so no damage can occur from incorrect cable connection.
7. **Start the car** and plug the power cable into the car cigarette lighter.
8. Turn the Brake Tester on. The start-up screen will be displayed. Press any key to enter the first menu.
9. Press the 2 key to enter the system setup menu and press the 2 key again to display the pedal angles. Do not press the 0 key.
10. Adjust the pedal and Floor transducers so that their angles read less than +/- 2 degrees. Adjust the transducer angles by loosening the center thumb screw slightly, adjusting the transducer, and carefully re-tightening the screw.

The installation is now complete. Press the \* key twice to return to the main menu and the tester is ready to be used.

### **OPERATION**

The operation of the KEI-095 Brake Tester is controlled by various menus. Select the required operation from the menu using numbers on the keypad. Any entered data is entered on the keypad. Decimal points are added automatically.

#### **To run a normal test:**

1. Be sure all setup is complete as detailed in the Operation section. Be sure the car is running. Turn on the Brake Tester power switch. Always start and stop the car with Brake Tester power off.
2. Press the 0 key to select START TEST. The Test menu will be displayed. Press the 0 key again to start the test.
3. A menu screen will display which shows the functions of each of the keys during testing. Press any key to start the test.

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Press 0 to ZERO all
Press 1 for DATA Co
Press 3 to Rst Peak
Press * to Abort

4. The test screen will now be displayed.

Pedal	Now	Peak
Travel	0.0	0.0
Force	0.0	0.0
Decel	0.0	0.0

The current data value is displayed under the Now column and the greatest positive or negative peak value is displayed under the Peak column.

5. With the engine on, the shift level in park, and your foot off the brake pedal, press the **0 key to Zero** all values. The Brake tester will store the zero values until the unit is switched off.
6. While testing, the **Peak** value can be reset by pressing the **3 key** at any time. **This has no effect on data storage or any other reading, it resets the displayed peak only.**
7. To begin **data storage** at any time press the **1 key**. The first line of the test screen will change to DATA-000, indicating that the brake tester is now collecting data. The number will begin counting upward to indicate how much memory has been used. The memory is full when the display reaches DATA-460.  
To stop data collection at any time, press the 1 key again.  
The start and stop time of each test (press of the 1 key) is recorded and stored in memory to distinguish tests.
8. Press the \* key at any time to abort the test and return to the test menu. If data collection is in progress, when the \* key is pressed, the data collection will be stopped and the data end time stamped with the current time.

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### **SYSTEM SETUP**

Certain system parameters must be modified when changing to a new vehicle or adjustment is required. The pedal length from pivot point to the middle of the brake pedal must be changed when switching to a new vehicle.

The clock should be checked for accuracy and reset for daylight savings time.

#### **To enter a new pedal angle:**

1. Turn on the brake tester. Press any key to display the main menu.
2. Press the 0 key to enter the Start Test menu.
3. Press the 1 key to change the pedal length.
4. The display will show the current pedal length. Enter the Four numbers of the new pedal length on the keyboard. Be sure to enter any leading zeros and the hundreds place decimal point will be entered automatically.
5. When the forth number is entered, the display will go back to the Start Test Menu. The new pedal length is stored in memory and will remain until it is changed again.

#### **To enter a new time and date:**

1. Turn on the brake tester. Press any key to display the main menu.
2. Press the 2 key to enter the System Setup menu. Press the 1 key to set the time and date.
3. The display will show the current time and date.
4. Press the 1 key to change the time if required.
5. Enter the new time, in 24 hr format (1:00 pm = 13), on the keypad. Enter a 2 number hours, 2 number minutes, and 2 number seconds. The display will return to display the new time.
6. Press the 0 key to change the date if required.
7. Enter the new date on the keypad. Enter a 2 number months, 2 number days, and the last 2 digits of the year. The display will return to display the new date.
8. Press the \* key to return to the System Setup and main menus.

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### **TRANSDUCER CALIBRATION**

The KEI-095 brake tester works by comparing the angle on the brake pedal level transducer to the angle of the floor transducer. The angles must be the same from each transducer. Because the pedal travel and deceleration values are derived from these angles, the angles must be accurate for the system to be accurate. Periodic re-calibration of the system is necessary.

Calibration requires +/- four precision known angles, and zero, to set the pedal and floor transducers to, and a precision known weight for the force transducer.

#### **To calibrate the Angle Transducers:**

1. Connect the KEI-095 brake tester to a 12.6 to 15 volt, 500 ma power supply. Connect all transducers to their brake tester ports.
2. Turn on the brake tester. Press any key to display the main menu.
3. Press the 0 key to enter the Start Test Menu.
4. Press the 1 key to set the pedal length to **07.00"**. This is required to calibrate the transducers using Cal Stand KE095CS. Press \* key to return to the main menu.
5. Press the 1 key to enter the Calibration mode.
6. To prevent unwanted access to the calibration modes a numeric code must be entered. Enter "1", "2", "3", "4" on the keypad. The calibration menu will be displayed.
7. Press the 1 key to calibrate the both transducers at the same time. This is the generally recommended transducer calibration mode. Press the 2 key to calibrate each transducer individually, Press the 3 key to calibrate the pedal force transducer.
8. The display will show the current raw transducer output. For the angle transducers, place the calibration stand on a level surface and adjust the transducer so that the reading is as close to zero as possible. Press the 1 key when close to 0.00 degrees.
9. The display will instruct the operator to set the angle transducers to a known negative angle. The recommended first angle is -60 degrees, however any angle 0 to -99.999 degrees can be used. Set the transducers to the angle and enter the 5 digits of the angle (60.000) on the keyboard.

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10. When the fifth number is entered, the display will show the next recommended angle to be entered.
11. The display will instruct the operator to set the angle transducers to the next negative angle. The recommended angle is -45 degrees, however any angle from 0 to the previous angle can be used. Set the transducers to the angle and enter the 5 digits of the angle (45.000) on the keyboard.
12. When the fifth number is entered, the display will go show the next recommended angle to be entered.
13. The display will instruct the operator to set the angle transducers to the next negative angle. The next recommended angle is -30 degrees, however any angle from 0 to the previous angle can be used. Set the transducers to the angle and enter the 5 digits of the angle (30.000) on the keyboard.
14. The display will instruct the operator to set the angle transducers to the next negative angle. The next recommended angle is -15 degrees, however any angle from 0 to the previous angle can be used. Set the transducers to the angle and enter the 5 digits of the angle (15.000) on the keyboard.
15. The display will instruct the operator to set the angle transducers to the zero angle. The recommended angle is 0 degrees, however any angle from the previous angle to the next angle can be used. Set the transducers to the zero angle and enter the 5 digits of the angle (00.000) on the keyboard.
16. The display will instruct the operator to set the angle transducers to the first positive angle. The recommended angle is 15 degrees, however any angle from 0 to 99.999 can be used. Set the transducers to the angle and enter the 5 digits of the angle (15.000) on the keyboard.
17. The display will instruct the operator to set the angle transducers to the next positive angle. The recommended angle is 30 degrees, however any angle greater than the previous angle can be used. Set the transducers to the angle and enter the 5 digits of the angle (30.000) on the keyboard.
18. The display will instruct the operator to set the angle transducers to the next positive angle. The recommended angle is 45 degrees, however any angle greater than the previous angle can be used. Set the transducers to the angle and enter the 5 digits of the angle (45.000) on the keyboard.
19. The display will instruct the operator to set the angle transducers to the last positive angle. The recommended angle is 60 degrees, however any angle greater than the previous angle can be used. Set the transducers to the angle and enter the 5 digits of the angle (60.000) on the keyboard.

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20. When the last angle is entered, the display will read "Calibration Complete".

Calibrate all transducers and check the angle values using the System Setup menu XDCR Angles display.

### **To calibrate the Pedal Force Transducer:**

1. Connect the KEI-095 brake tester to a 12.6 to 15 volt, 500 ma power supply. Connect all transducers to their brake tester ports.
2. Turn on the brake tester. Press any key to display the main menu.
3. Press the 1 key to enter the Calibration mode.
4. To prevent unwanted access to the calibration modes a numeric code must be entered. Enter "1", "2", "3", "4" on the keypad. The calibration menu will be displayed.
5. Press the 3 key to calibrate the pedal force transducer.
6. The display will show the current raw transducer output. For the pedal force transducer, just place on a level surface. Press the 1 key.
7. Place a known weight from 05.00 to 99.00 lbs on the transducer and enter the four numbers of the weight on the keypad. Be sure to enter any leading zeros and the decimal point will be entered automatically.
8. When the fourth number is entered, the calibration is complete. Press the \* key to exit the calibration mode.

### **DOWNLOADING DATA**

The KEI-095 Brake Tester can store data for download to a computer and further analysis. The Kemload program and the Download menu are used for this purpose. After downloading the data, the memory can be reset using the same menu.

### **To download data:**

1. Connect the KEI-095 Brake Tester RS-232 port to the computer COM1 port. The connections are detailed in the help menu of the KEMLOAD program (press F1 in KEMLOAD). Turn on the Brake tester.



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### CABLE CONNECTIONS ARE:

KEI-095 RS-232 (9 Pin) D-Type	COMPUTER COM1 (9 Pin) D-Type
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Pin 2 (RxD)	Pin 2 (TxD)
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Pin 3 (TxD)	Pin 3 (RxD)
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Pin 5 (GND)	Pin 5 (GND)
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2. From the KEMLOAD directory, type KEMLOAD <CR> on the computer to start the Kemload program. Press F4 to change the data file name if desired.
3. From the main menu press the 0 key. The Start Test menu will be displayed. Press the 2 key to enter the Download Menu.
4. Press the 5 key to begin the data download. If the Download Error message is displayed, check the cable and be sure the last line of the Kemload Computer screen reads "Waiting to receive data".
5. The data will display on the computer screen as it is being received by the computer. When the download is complete, both the computer and Brake tester will indicate this.
6. The KEMLOAD program allows the data to be edited before being saved. Press F3 to edit the file. If the data is to be saved on disk, press the F2 key to save. Data is not permanently stored on disk until F2 is pressed.
7. The data remains in the KEI-095 Brake tester memory and can be download as many times as desired. To clear the memory and reset the pointer to DATA-000, select the Download menu and press the 9 key to reset memory. There is also a clear memory command in the System Setup menu. **NOTE: Be sure no important data remains in the Brake tester memory before clearing or resetting it as all data is irretrievably lost.**
8. Press F10 to exit the KEMLOAD program. Press the Brake tester \* key to exit the download menu.