

***KEMKRAFT* ENGINEERING, INC.**
MODEL KEI-434 STEERING WHEEL TORQUE TESTER



INSTRUCTIONAL MANUAL
STEERING WHEEL TORQUE SYSTEM
MODEL KEI-434

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KEMKRAFT ENGINEERING, INC.

MODEL KEI-434 STEERING WHEEL TORQUE TESTER

GENERAL DESCRIPTION

The KEMKRAFT Model KEI-434 Steering Wheel Torque Data Acquisition System is a precision test instrument which will display and record "Straight ahead steering torque" during vehicle drive testing. The steering wheel force is transmitted to the (receiver) data acquisition system via an RF link. Setup is accomplished in a few minutes with the force transducer and a cigarette lighter plug. Raw data is stored in the Steering Wheel Torque Tester for up to 30 seconds for a single run test or two 30 second runs for a 2 run test. The runs are programmable from 1 to 30 seconds and the sample rate is 10 samples/sec. Torque is determined by inputting the steering wheel radius. Multiple tests can be run and each test is identified with a time/date stamp. After a test is performed, the Mean & Median is displayed on the LCD display. Raw data, Stored into memory, can, at any time, be dumped to a PC for SPC purposes.

INSTALLATION

NOTE: Fully charge the transmitter before use (w/ the power off) over night for 14 hours.

1. Open the KEI-434 Steering Wheel Torque Tester box and remove the force transducer/transmitter and power cable.
2. Review figure 1 below. Clamp the Transmitter onto the steering wheel at 7 o'clock; wrap the wire connected to the force sensor around the wheel to place the Force transducer onto the steering wheel at 1 o'clock. The force sensor and the transmitter should be directly across from each other as to balance the weight on the steering wheel.

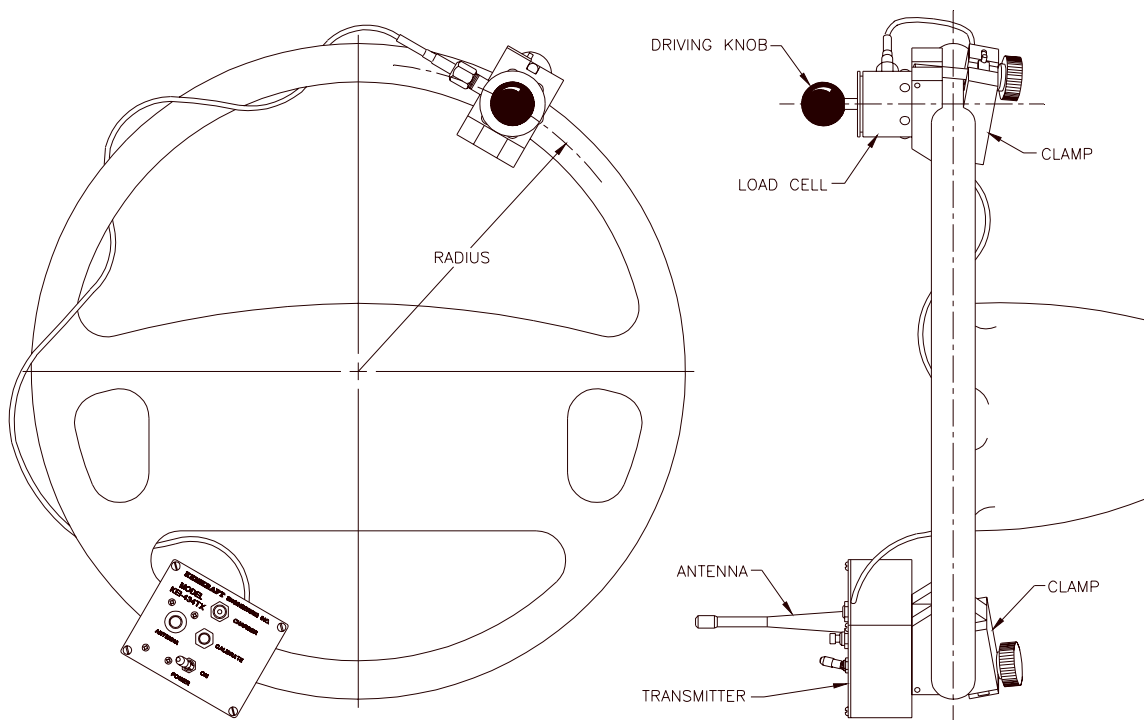


Figure 1

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3. **Start the car** and plug the power cable into the car cigarette lighter.
4. Turn the Steering Wheel Torque Tester on. The start-up screen will be displayed. Press any key to enter the Main menu.

MAIN MENU

0 = Start Test
1 = System Setup
2 = Calibrate
3 = Download

5. Press the 1 key to enter the system setup menu and press the 3 key to display the steering wheel (S.W.) radius. The S. W. radius should be less than 1000.0 mm. Enter a desired radius (in mm) into the keypad or press * to exit.
6. Press the * key and exit to the Main Menu.
7. Turn the Transmitter ON.
8. Press the “0” key to enter into the “Start Test” screen. A high pitched beeper will indicate when there is not a properly transmitted signal. The torque value should be displayed on the LCD screen.

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

SYSTEM SETUP

Certain system parameters must be modified when changing to a new vehicle or adjustment is required. The Steering Wheel radius from center of wheel to the middle of the handgrip must be changed when switching to a new vehicle. (see figure 1)

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

To change or enter setup parameters:

1. Turn on the Steering Wheel Torque Tester. Press any key to display the main menu (to exit the intro message).
2. Press the 1 key to enter the System Setup Menu.

0 = Test timeout
1 = 1,2 Run Test Sel
2 = S.W. Radius
3 = Set Date/Time

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To enter a new Test Timeout:

1. When in the System Setup Menu: press the 1 key to change the Test Timeout.
2. The Test Timeout Menu will be displayed.

Set New Test Timeout
xxSec Currently 10sec
60s MAX = 1 Run Test
30s MAX = 2 Run Test

3. Press the # keys for the timeout required or press * to abort.

To enter a 1 or 2 Run Test:

1. When in the System Setup Menu: press the 2 key to change the 1,2 Run Test Select.
2. The 1,2 Run Test Menu will be displayed.

2 run test currently
1 = ONE run test
2 = TWO run test
Select or ABORT(*)

3. Select the 1 or 2 key for the test required or press * to abort.

To enter a new Steering Wheel Radius:

1. When in the System Setup Menu: press the 3 key to change the Steering Wheel Radius.
2. The Steering Wheel Radius Menu will be displayed.

Current S.W. RADIUS:
1000.0 mm
xxxx.x mm
Enter New RAD or (*)

3. Enter the new S.W. radius or press * to abort.

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To enter a new time and date:

1. When in the System Setup Menu: press the 4 key to change the Date/Time.
2. The display will show the current time and date.
3. Press the 0 key to change the date if required.
4. 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.
5. Press the 1 key to change the time if required.
6. Enter the new time, in 24 hr format (1:00 PM = 13:00:00), on the keypad. Enter a 2 number hours, 2 number minutes, and 2 number seconds. The display will return to display the new time.
7. Press the * key to return to the System Setup and main menus.

OPERATION

The operation of the KEI-434 Steering Wheel Torque Tester is controlled by various menus. Select the required operation from the menu using numbers on the keypad. Decimal points are added automatically.

To run a normal test:

1. Be sure all setup is complete as detailed in the Installation and System Setup sections. Be sure the car is running. Turn on the Steering Wheel Torque Tester power switch. Always start and stop the engine with Steering Wheel Torque Tester power off.
2. Press the 0 key to select START TEST.
3. A Test screen will display Torque data & Test Timeout during testing

??.?? NM TORQUE 0=Zero XDCR Palm SW Starts/Stops Test T.O. 10s, 2 Run Test

4. The current Torque value (NM) is displayed in Newton Meters.
??.?? displayed before NM indicates that the receiver is not receiving the proper RF signal. A high pitched beeper indicates lost transmission.

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5. An actual number must be displayed, in front of the, NM before you can continue. With the engine on, the shifter in park, the steering wheel straight, and nothing pressing on the force sensor, press the 0 key to Zero the Torque value
6. With the palm switch plugged into the RS-232-C interface port, the test can be started/stopped by depressing the palm switch. The start & end of a test is indicated by the low pitched buzzer. The Palm Switch starts a test. The test can either A.) Timeout on its own pre-programmed Timeout Value or, B.) be stopped by depressing the Palm Switch a second time.
7. When the Test is finished, the unit will display the Mean & the Median. These values are not stored in memory and therefore need to be written down if needed for future use. These values can be calculated again later by dumping the raw data to a PC, importing the data into a spreadsheet, and running the proper math formulas.
8. Press the * key to return to the Main menu. If data collection is in progress, when the * key is pressed, the data collection will be lost.

TRANSDUCER CALIBRATION

Periodic re-calibration of the system is necessary & can be performed at the Test site. If at any time during calibration the HI pitched beeper sounds, re-perform calibration.

To calibrate the Force Transducer:

1. Connect the KEI-434 Steering Wheel Torque Tester to a 12 to 15 volt DC, 500 ma power supply
2. Turn on the Steering Wheel Torque Tester & the transmitter. Press any key to display the main menu.
3. Press the 2 key to enter the Calibration mode.
4. The first calibration screen will be displayed:

ZERO FORCE TRANSDUCER
With Gauge Mounted
On Steering Wheel,
Press 0 Key on Receiver

5. With the Steering Wheel straight & nothing touching the force knob, **Press the 0 key** to zero the force transducer.

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6. The second calibration screen will be displayed:

Gauge Calib Constant 123.45 N xxx.xx N Cnstnt on Gage or *

7. The unit will display the current Calibration Constant. The Calibration Constant number is located on a label on the side of the Force Transducer. **Input this Calibration Constant** number into the keypad now if it is different than the value listed on the display. If the numbers are the same, the * key will abort.

8. The third calibration screen will be displayed:

xx.xx Raw Value Hold in CALABRATE Button on xmitter & Press1 key on RECVR
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9. **Hold in the CALABRATE button**, in the center of the transmitter, then **press the 1 key** on the Receiver.
10. The calibration is complete (if the receiver was receiving the proper signal) and the display will go back to the Main.

DOWNLOADING DATA

The KEI-434 Steering Wheel Torque 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-434 Steering Wheel Torque Tester RS-232 port to a PC COM1 port. A standard modem cable is required (male DE-9 to female DE-9). The connections are detailed in the help menu of the KEMLOAD program (press F1 in KEMLOAD). Connect power to & turn on the Steering Wheel Torque Tester.
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.

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3. From the main menu press the 3 key. The Download Data Menu will be displayed.

----- Download ----- 5 = Download Data 9 = Reset Memory * = Abort
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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 Steering Wheel Torque 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-434 Steering Wheel Torque Tester memory and can be download as many times as desired. To clear the memory and reset the pointer to the beginning of memory, select the Download menu and press the 9 key to reset memory. **** NOTE:**** Be sure no important data remains in the Steering Wheel Torque Tester memory before clearing or resetting it as all data is irretrievably lost.
8. Press F10 to exit the KEMLOAD program. Press the Steering Wheel Torque Tester * key to exit the download menu.

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STANDARD EQUIPMENT

1. FORCE TRANSDUCER connected to TRANSMITTER
2. KEI-434TX AC POWER TRANSFORMER (9V DC 200MA)
3. 2 ANTENNAS
4. KEI-434 UNIT W/ LID
5. PALM SWITCH W/ CABLE
6. AC POWER TRANSFORMER (12V DC 500MA)
7. 12 VDC POWER CORD
8. MANUAL - KEI-434 STEERING WHEEL TORQUE SYSTEM
7. SOFTWARE 3 1/2" DISK
 - A. KEMLOAD.EXE
 - B. KEI434.CFG