

***KEMKRAFT*** *ENGINEERING, INC.*  
MODEL KEI-325C DUAL INCLINOMETER READOUT BOX

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**INSTRUCTION MANUAL**

**CLEAR VISION DUAL INCLINOMETER BOX  
MODEL # KEI-325C**

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**\* INSTALLATION INSTRUCTIONS \***

1. The KEI-325C Display box should be permanently installed in a location that is best for the application. It is usually mounted straight out the drivers side window on a pedestal stand.
2. When the box is installed, place a vehicle in the alignment machine and install the mechanical fixture onto the steering wheel. (If help is needed to install the fixture onto the steering wheel, refer to #1 of the operating procedures). Ensure that the KEI-325C display box can be easily viewed while loading an Unfixtured Clear Vision Tool onto a steering wheel.

**WARNING: NEVER ALLOW OPERATORS TO INSTALL STEERING WHEEL GAUGES ONTO STEERING WHEELS WHILE IN VEHICLES. AIRBAGS MAY DEPLOY AND CAUSE INJURY OR DEATH.**

**\* OPERATING INSTRUCTIONS \***

1. The mechanical fixture can be attached to a steering wheel in the following manner:  
  
Place rollers, located on the back of the fixture, into the top spokes of the steering wheel and depress the handle so that the hook on the back of the handle will latch onto the underside of the top of the steering wheel when released. This will allow for the tool to hold itself onto the wheel.
2. The Unfixtured Clear Vision tool ranges from +60 to -60 degrees and therefore, when attached onto a steering wheel, can float during the front wheel alignment process.
3. Go through normal vehicle alignment procedures and when done, remove the steering wheel gauge and place it into its holder.

**\* CALIBRATION PROCEDURE \***

NOTE: Place the cal stand on a surface that is very solid and stable. The angle transducer inside the tool is very sensitive and any movement at all will cause the numbers being displayed to fluctuate. During the calibration procedure the cal stand should not be allowed to tip or move, on the table, because the cal stand might become unlevel and reduce calibration accuracy. It would be advisable to attach the cal stand to the table (e.g. Destaco clamps) to reduce the possibility for errors.

- A) Install the desired Unfixtured Clear Vision steering wheel set tool onto a calibration stand which can be adjusted from +60 degrees to -60 degrees in 15 degree increments. The tool that is placed into the cal stand during the cal mode will be the tool that is calibrated.

**INSURE THAT THE BACK OF THE ROLLERS, ON THE TOOL, ARE PRESSING AGAINST THE CALIBRATION STAND ROLLER SUPPORT AT ALL ANGLES. IF TOOL IS NOT PARALLEL TO THE CALIBRATION STAND AT ALL TIMES, CALIBRATION VALUES WILL NOT BE ACCURATE.**

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B) There are 2 LED's on the front panel, one labeled RUN MODE, and one labeled CAL MODE. The green RUN MODE LED will be lit when the unit is in the standard run mode. When the CALIBRATION push-button switch on the front panel of the KEI-325C Digital Readout box is pressed, the green RUN LED will turn off and the red CAL MODE LED will turn on. The CAL MODE LED will stay lit until you go back to the RUN MODE.

C) Press the CALIBRATION push button switch once and the display will read;

**Press CAL switch  
again to calibrate**

If a calibration procedure is to be performed, press the CAL switch a second time and the program will go into the cal procedure. If the cal procedure is not desired, a countdown timer will countdown for 15 seconds and the program will go back to the RUN MODE. The red LED should turn off and the green LED should turn back on.

D) If calibration is desired, press the CALIBRATION switch again and the display will read;

**xxxx Tx, CAL STND  
-10 deg, PRESS SW**

**xxxx:** is the raw A to D (analog to digital) value displayed in Hexadecimal. It will change as the tool is tilted. (0000 = most negative angle, 8000 ~ zero degrees, FFFF = most positive angle). At -60 degrees, the hex value should be slightly greater than 0000, at 0 degrees near 8000, and at +60 degrees slightly less than FFFF. If at -60 degrees, the hex values is = 0000, or at +60 degrees = FFFF, check the hex value at 0 degrees. First double check that the cal stand is level and set to zero degrees, and that the meter is displaying a value near 8000 hex. If the value is not near 8000 Hex, adjust the transducer, inside the box on the tool, by loosening the 2 mounting screws and tightening it back down so that it reads as near 8000 hex as possible. If the display still reads FFFF at -60 degrees or 0000 at +60 degrees, the amplifier gain is too high and needs reducing. If this is the case, send the unit back to Kemkraft for modification. The Hex value is displayed to observe when the number settles out after the cal stand has been moved to a new position.

**Tx:** means it will display T1 if Tool 1 is in the cal stand or T2 if Tool 2 is in the cal stand.

**CAL STND -10 deg, PRESS SW:** means place the cal stand in the -10 degree position and press the CALIBRATE switch when the Hex number has settled out. (It should settle out in a second or two).

After the switch is pressed, the display will instruct you to place the cal stand to the 0.0 degree, then to +10 degrees. When the cal stand is placed in the +10 degree position and the CALIBRATE switch is pressed, the program will go back to RUN mode and the calibration procedure for that tool is finished. The accuracy of the calibration can be checked in the RUN mode by placing the cal stand into various positions and observing the display values. If only one tool is used, the calibration procedure is finished. If two tools are being used, and the other tool needs calibration, repeat steps A through D for the second tool.

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### **COMPUTER INTERFACE**

The Amphenol Comm. connector on the bottom of the box is the computer interface port.

### **BURKE E. PORTER / FORI INTERFACE:**

The connector is set up for three wire RS-232 interface; ground, transmit and receive. The interface cable plugs into the amphenol connector and on the other end of the cable is a 9 pin "D" connector. The "D" connector plugs into any IBM or compatible computers' serial port. When a Clear Vision Tool is used, the limit switch on the tool closes and 1.) displays the tools' angle (on the KEI-325C box) and 2.) dumps the angle (in ASCII) out of the serial port + CR LF.

SERIAL PORT PROTOCOL: N, 8, 1, 9600 BAUD

DUMP STRING: -xx.xx CR LF    - (+/- sign of the angle)  
                                  x (tens digit)  
                                  x (ones digit)  
                                  . (decimal point)  
                                  x (tenths digit)  
                                  x (hundredths digit)

### **MERRILL INTERFACE:**

Connections, Protocol & Dump String are the same as Burke Porter. The only difference is that the angle is transmitted every time the KEI-850 box receives a "Control E". ("E" is for inquire.)

### **REMOTE COMMUNICATION PORT:**

This Amphenol connector is used for communicating to a KEI-325RD remote display unit or allows two KEI-325C Digital Display units to communicate in a Master/Slave setup.

### **\* WARRANTY AND SERVICE INSTRUCTIONS \***

KEMKRAFT Engineering, Inc. warranties this equipment against defects in workmanship and materials for a period of 1 year from date of receipt. This warranty is covered out of Kemkrafts' Plymouth, MI facility. Said equipment would either need to a.) be sent to Kemkraft for evaluation and/or repair, or b.) if required, Kemkraft would repair the equipment on site if end user pays all travel costs. We will, at our option, repair or replace products which prove defective during the warranty period. No other warranty, expressed or implied, is given. KEI is not liable for consequential damages. Damage caused to the equipment as a result of improper use or abuse, or unauthorized modification of the instrument is not covered under this warranty.

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