

KEMKRAFT ENGINEERING, INC.
MODELS KEI-850 READOUT BOX & KEI-793 STEERING WHEEL GAUGE



INSTRUCTION MANUAL

**CLEAR VISION DUAL INCLINOMETER BOX
MODEL # KEI-850
AND
CLEAR VISION SET TOOL
MODEL # KEI-793/808**

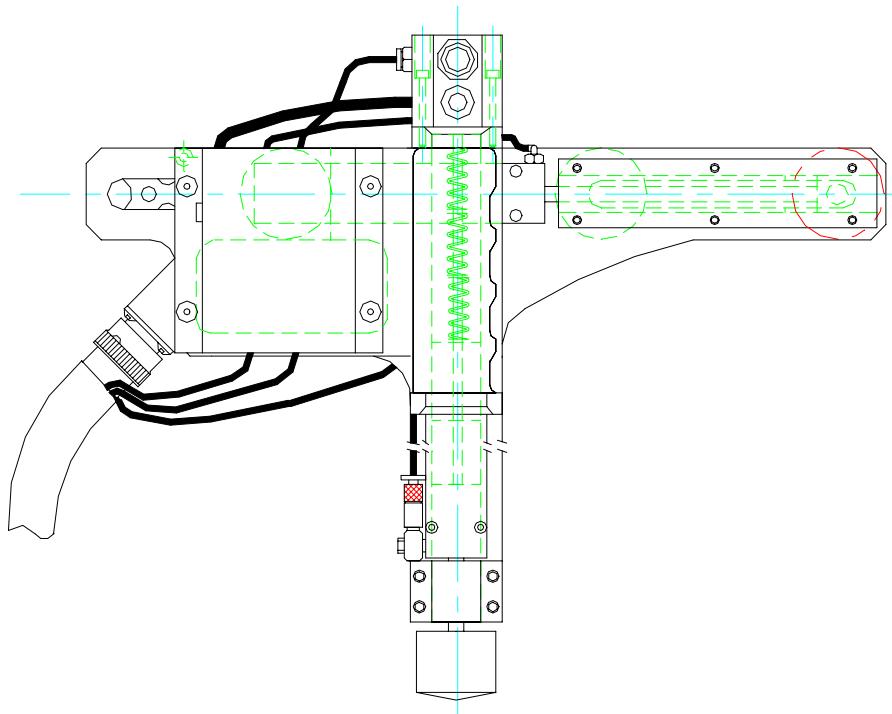
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*** INSTALLATION INSTRUCTIONS ***

1. The KEI-850 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-850 display box can be easily viewed while loading an Unfixtured Clear Vision Tool onto a steering wheel.



KEI-793 PNEUMATIC STEERING WHEEL GAUGE

*** OPERATING INSTRUCTIONS ***

NOTE: As always, these Steering Wheel Gauges are delicate, accurate, gauging tools that need to be treated as such and therefore must be installed in a holder when not in use. If these tools do not have a holder & are thrown down on a table during use, the warranty will be void.

TOOL USE DESCRIPTION:

There are two switches above the handle on the tool. The top switch is a pneumatic switch that when pressed retracts the horizontal air cylinder & when released allows the cylinder to extend. The bottom switch, under computer control, controls the vertical air cylinder.

The horizontal air cylinder, on the tool, is normally in the extend mode to hold the tool either on the steering wheel or in its' resting holder. The only time the cylinder is retracted is when transferring the tool from the steering wheel to its' holder. Hold the top button in while transferring the tool, set the tool into position, on the wheel or holder, then release the bottom

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to allow the tool to hold itself into place.

The vertical air cylinder extends to the vehicles seat to hold the SWG near 0 degrees during the first portion of the alignment cycle. The lower switch, on the tool, controls this function and is under computer control. When the alignment machine is not aligning a vehicle, pressing this button should make the cylinder extend or retract into the position opposite of what it currently is in.

The spring loaded "U" hook, on the back of the tool, holds the tool onto the steering wheel when the vertical cylinder pushes against the seat.

The mechanical fixture (SWG) can be attached to a steering wheel in the following manner:

1. With the vertical cylinder retracted, depress the top switch, on the tool, which retracts the horizontal air cylinder to remove the tool from its' holder.
2. With the horz. air cylinder still retracted, place the "U" hook, located on the back of the tool, onto the very bottom of the steering wheel, push down on the tool so that the rollers can be placed into the opening at the bottom of the wheel.
3. Push the fixed position roller towards the left until it stops against the inside of the cutout.
4. Release the depressed top air switch which will cause the right roller to press, under air pressure, to press against the right inside of the wheel. This will hold the tool onto the steering wheel.
5. Rotate the steering wheel until the green LED, on the tool turns on and press the red push-button. This should extend the vertical air cylinder until it presses against the seat and holds the tool in place. (The LED comes on when the tool is within +/-3 degrees) For better accuracy, the green LED should be on while the air cylinder is pressed to the seat.
6. Under computer control, the alignment machine will retract the vertical air cylinder, allowing the tool to float, during a strategic portion of the alignment process. This allows the hysteresis of the steering system to not be bound up to one side or the other allowing for better clear vision results.
7. To take the tool off of the steering wheel, press the top button, retracting the horiz. air cylinder, tilt the tool forward and out of the steering wheel. With the button still depressed, place the tool back in its' holder.

*** WARRANTY AND SERVICE INSTRUCTIONS ***

Kemkraft Engineering, Inc. warranties this equipment against defects in workmanship and materials for a period of 90 days from date of shipment. 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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*** 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 (eg. Destaco clamps) to reduce the possibility for errors.

- A) Install the desired 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.

- 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-850 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
-60 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 to 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 -60 deg, PRESS SW: means place the cal stand in the -60 degree position and press the CALIBRATE switch when the Hex number has settled out. (It should settle out in a second or two).

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After the switch is pressed, the display will instruct you to place the cal stand to the -45 degree, than to -30 degrees etc. until +60 degrees is completed. When the cal stand is placed in the +60 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.

COMPUTER INTERFACE

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

ANZEN INTERFACE:

The connector is set up for three wire RS-422 interface, ground, +signal, and -signal. When a Clear Vision Tool is used, the limit switch on the tool closes and dumps the angle of the tool out of the serial port in Hexadecimal.

SERIAL PORT PROTOCOL: N, 8, 1, 4800 BAUD

DUMP STRING: (02)(x)(x)(x)(03)(xx) 02 (start of text)
 xx (most significant byte)
 xx (middle " ")
 xx (least " ")
 03 (end of text)
 xx (check sum)

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-850 box) and 2.) dumps the angle (in ASCII) out of the serial port.

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

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

MERRILL INTERFACE:

The connector is set up for three wire RS-232 interface; ground, transmit and receive. 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.)