

**KEMKRAFT** ENGINEERING, INC.

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INSTRUCTIONAL MANUAL  
INFRARED WIRELESS INCLINOMETER  
MODEL KEI-270

## **\* CALIBRATION PROCEDURE \***

- 1) Charge unit overnight before calibrating.
- 2) Install the mechanical steering wheel fixture onto a calibration stand that can be adjusted for 0 degrees and another known value such as +/-5 or +/-10 degrees. The calibration stand must be located in a position for the transmitter to transmit a signal to the receiver. The receiver XMIT led must be green at all times during calibration indicating a good transmission.
- 3) **RECEIVER CALIBRATION** (*should be performed before calibrating transmitter*)

NOTE: We want to adjust the receiver's meter to a maximum of +/-10.25 degrees. To do this, we need to swivel the S.W.G. back and forth, adjusting the ZERO pot, to make the maximum displayed degree value equal, and then adjust the GAIN pot to display +/-10.25 degrees. This will make all the receivers display the same.

- A) Place the mechanical S.W.G. into the calibration stand.
- B) Notice that when you swivel the SWG greater than a certain point that the numbers, on the digital meter, stop and do not increase even if you keep pivoting the SWG farther.
- C) Swivel the SWG one way until the digital number stops increasing and note that number.
- D) Swivel the SWG, in the opposite direction, until the digital number stops increasing and note that number.
- E) Keep the SWG tilted and adjust the ZERO trimpot, on the front panel of the receiver, until the maximum number, on the display, equals the number when the SWG is tilted maximum in the opposite direction.
- F) Leave the SWG tilted so that the digital number displayed is at maximum and adjust the GAIN trimpot, on the front panel of the receiver, until the digital display reads 10.25 degrees.
- G) Tilt the SWG back the other way until the digital number is at its maximum, in that direction, and ensure that it is also 10.25 degrees.
- F) Repeat steps C thru G until the digital number stops increasing at 10.25 degrees, in both directions, even if you tilt the SWG farther than 10.25 degrees.

## **4) TRANSMITTER CALIBRATION**

NOTE: With the receivers calibrated all the same, the transmitters will now be calibrated all the same, allowing for the interchanging of transmitters, onto different alignment machines, throughout the day. (Do not touch the trimpots on the front of the receivers after they were calibrated in step three.

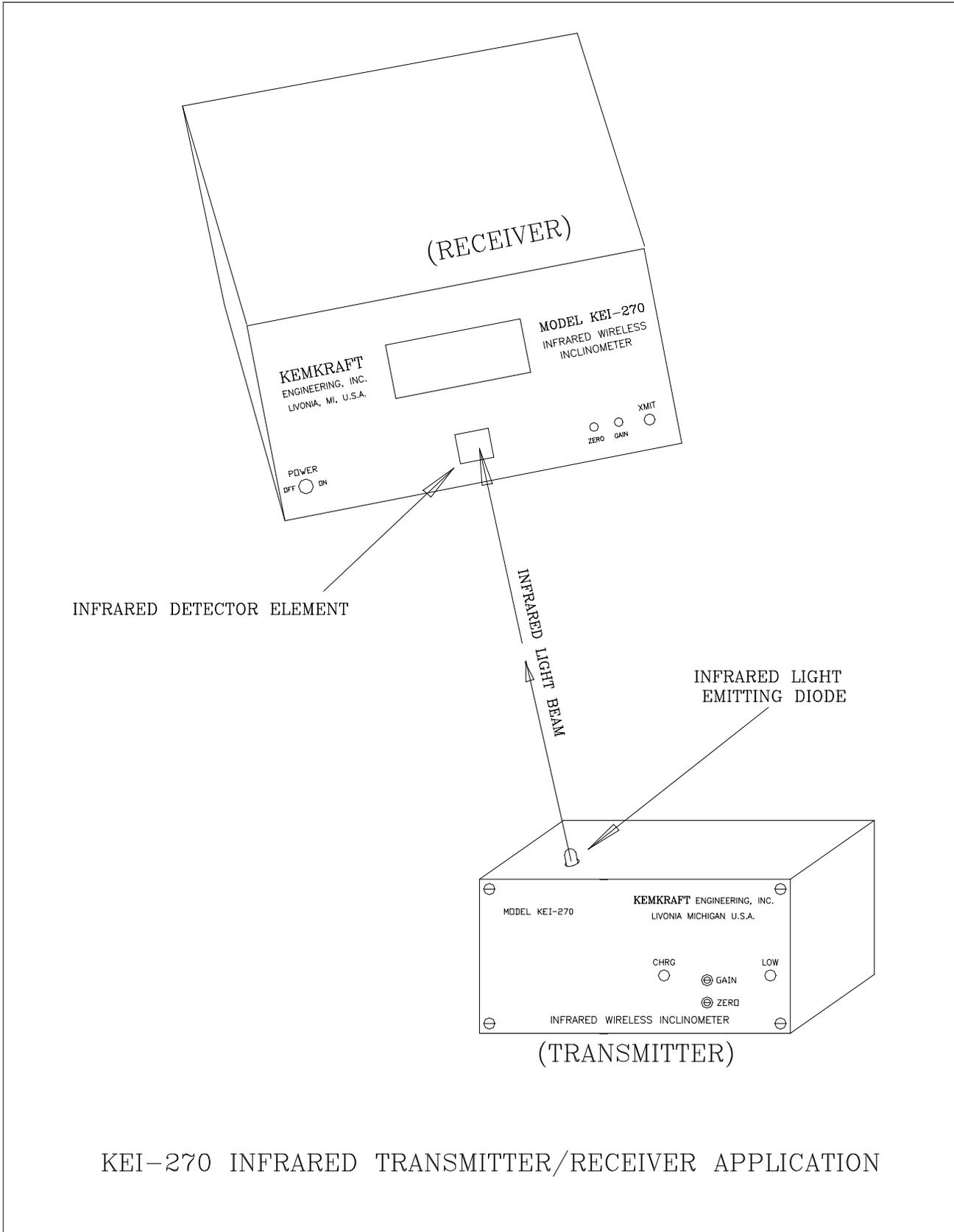
- A) Place the SWG into the calibration stand.
- B) Set the calibration stand to zero degrees. Adjust the ZERO trimpot on the front of the transmitter until the digital meter on the receiver displays 0.00 degrees.
- C) Set the calibration stand to a known angle such as 5 degrees. Adjust the GAIN trimpot on the front of the transmitter until the digital meter on the receiver displays 5.00 degrees.
- D) Repeat steps B, C until values are stable within +/-0.02 degrees.

## **TRANSDUCER CENTERING** (*should be performed ONLY if the ZERO pot on the Transmitter does not go to zero.*)

Remove the front panel of the Transmitter and place the tool in the calibration stand so that the receiver will receive the proper signal indicated by the green XMIT LED being on. Loosen the 2) 6-32 screws holding the transducer in place. One of the mounting holes of the transducer is a slot so that it can be pivoted slightly to adjust for true zero degrees. If the Receiver is properly calibrated: rotate transducer (slightly) and tighten down mounting screws so that when the ZERO pot is adjusted, on the front panel of the transmitter, it is symmetrical about zero. Replace cover.

## **\* INSTALLATION INSTRUCTIONS \***

1. The Inclinometer should be fully charged before use and can operate for up to 24 hours on a fully charged battery. For optimum performance, the inclinometer should be placed in the charging stand daily when not in use and through the night to insure a fully charged battery for the next day.
2. *REFER TO THE DIAGRAM ON THE NEXT PAGE.*  
The infrared light emitting diode located on the top of the transmitter emits an invisible infrared light beam for the receiver to detect. This light beam projects, as indicated on the diagram, directly out of the center of the LED in a straight beam. Since the beam is a light beam, detection must be line of sight. The beam can travel through a windshield but cannot be obstructed by anything solid. With the mechanical fixturing installed onto the vehicle steering wheel, the transmitter will transmit the beam, through the windshield, to the receivers' infrared detector element. The receiver should be permanently mounted outside of the vehicle with the detector element facing directly towards the infrared LED. When the receiver detects a proper uninterrupted signal, the red XMIT LED on the front of the receiver will turn to green.
3. The receiver box should be permanently installed in a location that is best for the application. Some of the options are 1.) straight out the drivers side window on a pedestal stand. (this method can cause problems if an operator blocks the infrared beam, at any time, during alignment procedures.) 2.) hanging in the air, higher than the vehicle, straight out in front of the driver where he can see the display while sitting in the drivers seat. 3.) if a rolling master is used and #2 mounting suggestion will not work, some plants still project the infrared beam through the windshield, mounting the box off to the side, on an angle, near the front fender at approx. the height of the top of the vehicle.
4. 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 #2 of the operating procedures.
5. The infrared LED must be pointed directly at the infrared detector on the front of the receiver box. The infrared emitter LED can be aimed directly towards the receiver by moving it in its ball & socket. To do this, loosen the 4 screws holding the socket tight, point the LED directly at the silver infrared detector and retighten the screws.
6. The holder/charger stand should be mounted near the vehicle, directly outside of the drivers window where he could reach the tool from inside the vehicle.
7. If the remote pit meter is used, mount the meter on the wall of the pit where the operator can see it during alignment procedures. For wiring instructions refer to the diagram on the page directly after the calibration procedures page.



KEI-270 INFRARED TRANSMITTER/RECEIVER APPLICATION

**\* OPERATING INSTRUCTIONS \***

1. The Inclinometer should be fully charged before use and can operate for up to 24 hours on a fully charged battery. For optimum performance, the inclinometer should be placed in the charging stand daily when not in use and through the night to insure a fully charged battery for the next day.
2. Remove the steering wheel gauge from its holder/charger stand and place it onto the steering wheel. The mechanical fixture can be attached to a steering wheel in the following manner.
  - A. Place the rollers, located on the back of the fixture, into the spokes of the steering wheel.
  - B. In one motion, press down on the fixture (which will seat the rollers into the corners of the spokes) while pressing up on the handle, located in the center of the ratchet shaft. You must press hard enough, on the handle, to obtain enough spring pressure between the steering wheel and the windshield for the tool to hold itself in place.
3. While placing the fixture onto the steering wheel, note the receivers display reading and turn the wheel until the display indicates as near zero as possible while locking the wheel into place with the pogo stick. Or after the pogo is placed on the steering wheel, and locked to the windshield, nudge the rubber bumper over until the display on the receiver is as close to zero as possible.
4. Go through normal vehicle alignment procedures and when done, remove the steering wheel gauge and place it in its holder/charging stand.