CALIBRATING LMI MICRO R/HR METERS Sept 1988

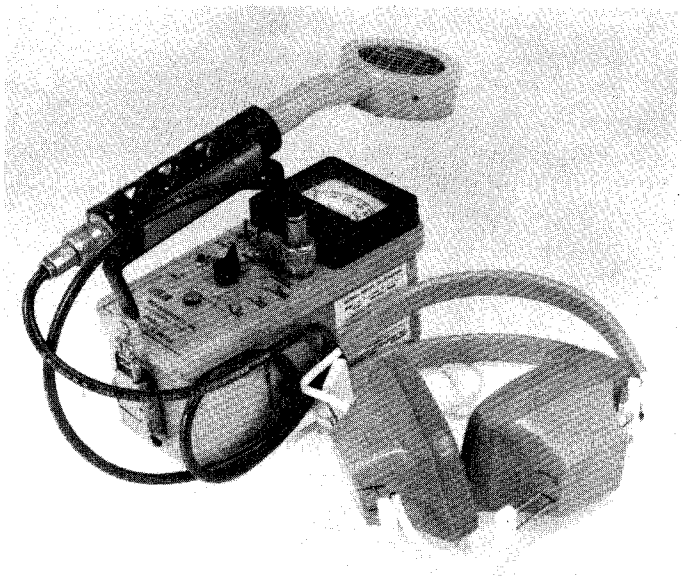
LMI instruments with micro Roentgens per hour (μR/hr) meter faces are typically calibrated with a Cs-137 source and a pulse generator (pulser). The pulser should possess the capability of producing a negative pulse with a 0.5 microsecond lead, a 1.5 microsecond width and a 5 microsecond tail. Our LMI Model 500 supplies the correct pulse size and also has a High Voltage (HV) read-out which will be necessary for complete calibration.

To begin calibration, adjust the HV to determine the operating voltage. This may be accomplished by turning the HV pot clockwise to increase the count readout until the count rate readout is at a constant rate. If the count readout abruptly goes off the scale, turn the HV pot counter clockwise and start this step over. Then place detector in a milli Roentgen per hour level.(There are a few different micro R/hr. meter faces available.) To determine the correct level, calculate the location of the meter needle at 3/4 of full scale. For example, the LMI Model 12S comes standard with a 0 - 3 micro R/hr. face. Thus, when the instrument is set on the X1000 range, 3/4 scale calculates to the 2000 micro R/hr. meter face point. This reading is equivalent to 2 milli R/hr. One milli Roentgen per hour equals one thousand micro Roentgen per hour. (1 mR/hr. = 1000 μR/hr.)

For instruments using 1" X 1" NaI (Tl) crystals, place the detector facing the source beam half the distance of the crystal size. Calibrate the meter scale and then check your calibration at the 1/4 scale. The reading should be within ± 10 per cent. Our LMI Calibration Department is limited to 1 milli R/hr or 1000 micro R, thus a pulser is mandatory to calibrate lower scales. Once higher scale is calibrated, connect the instrument to the pulser. Next, increase the counts per minute to equal 3/4 scale on the range calibrated. Then, decrease the counts to equal 1/4 of the meter face scale. For example, 2 milli R/hr. (2000 micro R/hr.) = 475,000 cpm. 1 milli R/hr. (1000 micro R/hr.) = 200,000 cpm. Next, decade down both the pulser and the instrument by a factor of 10. Using the same pulser count rate but, by a factor lower, calibrate the next range. Repeat this procedure for all the lower ranges.

Sept. 1988

Due to the noise of our survey work environment, RAE employees installed 1/4 inch headphone jacks in their survey instruments to replace the normal speaker output when the headphones were plugged in. One day one of the employees claimed he could hear a faint radio broadcast in his headset along with the normal "chirping" of the meter. Nobody thought much of it at the time, but it set the stage for a well planned joke. We decided to let our project manager, David Bernhardt (who had heard the radio reception story) really hear the music first hand.



So then I called Ludlum Measurements about a meter case, which you supplied. Dennis Owen then rigged the empty case with an AM/FM tuner and the appropriate switches and controls. The big switch came on day when Dave was at lunch; our special meter was switched for his real one.

Upon returning to work, Dave first propelled himself up into a tall ceiling area with his roto-zoom (a sort of small cherry-picker). He then put on his headphones and was then very confused by the rock and roll music he heard. After about thirty seconds of fiddling with the meter he began to look around while we tried not to look at him. Finally, his roto-zoom descended and he began to walk toward us at which time we told him the whole story; he thought was pretty funny. So now Dave has a souvenir of an especially long and involved Rogers and Associates project.

METER INFORMATION Sept 1988

In November of 1986, LMI began offering an improved meter movement in our portable survey instruments. This new type movement was changed in order to reduce the possibility of a meter needle becoming "sticky" in some situations. The current meter movements are 1 milli amp movements (starting with LMI serial number 46566 and all numbers greater than) compared to the 50 micro amp variety (s/n 1 through 46565) which were used previously.

When a replacement meter movement is essential, it is important to determine which movement might best fulfill your needs. For example, if your instrument was manufactured prior to the use of the integrated circuits (IC's), the 50 micro amp movement must be used. Conversely, if your instrument does incorporate IC's, the 1 milli amp movement is recommended; however, a simple modification might possibly be required. Listed below are some tips to determine if the modification is required:

1. With the instrument in the OFF position or battery removed, detach the positive lead (white wire). Then measure the impedance with an ohm meter by placing the positive (+) lead of the ohm meter on the terminal where the white wire was connected and the negative (-) ohm meter lead to where the instruments black wire is connected. The 50 micro amp movement should read approximately 2,000 ohms. The 1 milli amp movement should read approximately 1,000 ohms. In case your readings are not within these recommended and you would like some assistance, please give the LMI Repair Dept. a call at (915)235-5494.
2. The other alternative is to inspect the circuit board of your instrument and check the resistor values. For example, the battery SAT resistor for the 50 micro amp should have 62 K ohms while the 1 milli amp instrument should have 2.2 K.

LUDLUM MEASUREMENTS, INC.
501 OAK STREET
P.O. BOX 810
SWEETWATER, TX 79556

PLEASE FORWARD
ADDRESS CORRECTION REQUESTED