

Replacing the 50 μ A Meter Assembly in Portable Instruments

Some of you have been asking about the procedure for replacing the meter movements in portable instruments. Throughout the years, changes in technology have affected even the portable analog meter, with the upshot that what you need to do to replace the meter movement depends upon the vintage of the portable.

In early 1987, new portable instruments (beginning with serial number 46566) were fitted with a 1 mA meter movement instead of the 50 μ A meter movement that had been used. Instruments prior to S/N 46566 can be retrofitted with the new 1mA meter movement, *provided the main circuit board has integrated circuits (ICs).*

The 1mA meter movement retrofit will **not** work in older portables that are **fully-transistorized** (that is, no ICs on the main circuit board). These fully-transistorized instruments have serial numbers less than approximately 9800. In this case, if a replacement is required, it should be done with the 50 μ A meter movement.

NOTE: The 50 μ A meter movement is still available as a replacement part (Part Number 15-8014). This must be specified when ordering a meter replacement.

Instructions for the modifications are described below. They are divided into 2 categories: electronic and mechanical. The serial number of the instrument to be modified will determine the extent of the changes required, as follows:

- Instruments with serial numbers -
 - less than approximately 9800** (fully-transistorized) cannot be modified for the 1mA meter movement.
 - between approximately 9800 and 46566** require both electronic and mechanical changes.
 - between 46566 and 69769** require only the mechanical changes.
 - greater than 69769** normally require no change. See ** in the note for item B1.

Instructions for retrofitting the 1 mA meter movement in instruments that currently have a 50 μ A meter movement (Model 3 used as an example):

A. ELECTRONIC - Resistor Replacement On Main Circuit Board

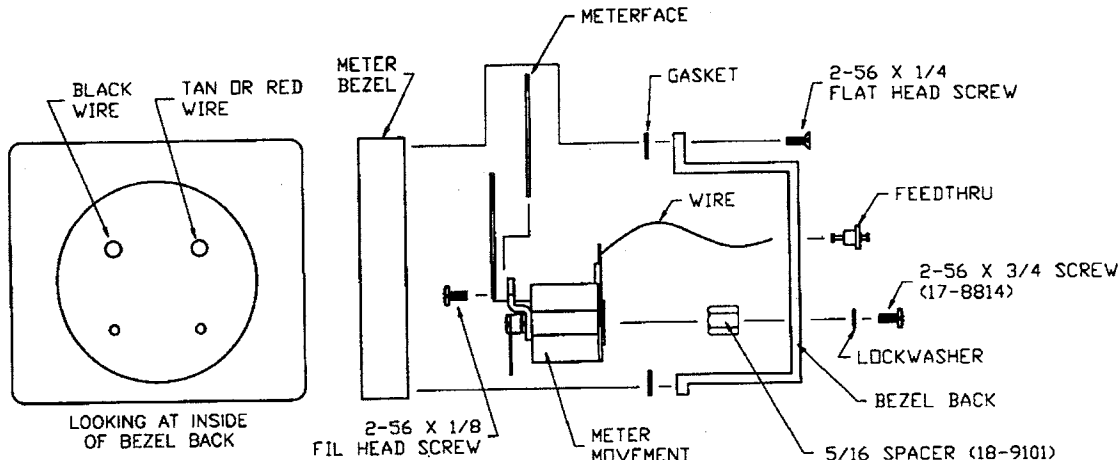
NOTE: Each portable model's main board layout is different, so these instructions will reference the resistors by function and by the Model 3 numbering system, as an example. Please call LMI if you are unsure about your particular model.

1. Replace the 22 K ohm resistor on the output of the voltage follower with a **270 ohm** resistor. In the Model 3, this is component R20.
2. Replace the "select-at-test" (SAT) resistor for the "BAT TEST" function. For the Model 3, this is component R41. The value for this resistor will vary somewhat, in order to make the meter read properly, but it is probably 62 k, as currently installed. Change it to a **2.2 K ohm** value, or something close to this value, as needed.

B. MECHANICAL MODIFICATIONS - Spacers, Screws, Meter Back Post

1. **NOTE: This step only applies to instruments that have serial numbers less than 69769.** After S/N 69769, the castings were changed to standardize the spacer size. ** However, if you find that the zero-adjust spiral roll pin is too short to engage the zero-adjust stem on the movement, a small spacer may be required and a longer screw. (LMI technicians use a 4-40 nut as a spacer.) If you do add a spacer, ensure that the meter needle moves freely and does not rub against the bezel glass.

Refer to the diagram "Assembly Instructions for Meter Assembly 40-1805 (S/N less than 69769)" for screw and spacer sizes and locations. The 40-1805 assembly uses the new movement and fits castings prior to S/N 69769.



2. **All Model 19s:** The post on the back of the new meter movement must be bent 90 degrees toward the meter face to clear the middle "feedthru."

NOTE:

- Part Number for **1 mA meter kit (includes bezel with glass)**
- Part Number for **1 mA meter assembly:**
- Part Number for **1 mA meter movement:**
- Part Number for **50 μ A meter assembly:**
- Part Number for **50 μ A meter assembly:**
- Part Number for **50 μ A meter movement:**

- P/N 4363-572 (for S/N > 69769)
- P/N 40-1805 (for S/N < 69769)
- P/N 15-8030
- P/N 40-1802 (for S/N < 9800)
- P/N 40-1801 (for S/N 9800 - 46566)
- P/N 15-8014

If you need more information or have questions, please call.

Introducing

We would like to introduce to you one of our salesmen, Robert Ludlum. Robert joined the LMI Sales Department in November 1993. His duties include phone sales, customer service, and marketing. Robert plays a key role in the production of items such as: product catalog, catalog on disk, web page, and "new" product literature.

A graduate of Sweetwater High School in 1984, he attended Texas Tech University in Lubbock, Texas.

Robert and his wife Pam have two children, Jeff age 9 and Kevin age 4. Hobbies include card games, swimming, and watching movies. He also plays the trumpet in the Sweetwater Municipal Band.

Robert is also involved in the community, where he is an active member of the Rotary Club and serves on the local boards of the United Way and the American Heart Association.



Robert Ludlum

CE Marking Appears on Ludlum Products

As of November 1997, a number of new instruments and detectors from Ludlum Measurements have a slightly different look - a "CE" appears on the battery door of many portables and on the front panel of other instruments. Not surprisingly, this is referred to as CE Marking and is a result of the requirement to comply with the Electromagnetic Compatibility Directive (EMC Regulations) for marketing products in the European Community. Although this marking is not required in all countries, including the United States, any instrument or detector which carries a Declaration of Conformity to the EMC Directive will be marked with the "CE" symbol, regardless of its destination.

December 1997

Model 500-Series Pulse Generators

The repair and calibration of nuclear radiation detection instruments sometimes require the use of a pulse generator. The Model 500-Series pulsers provide an easy means of reading the survey meter or scaler instruments' high voltage (HV), pulse frequency, and input sensitivity.

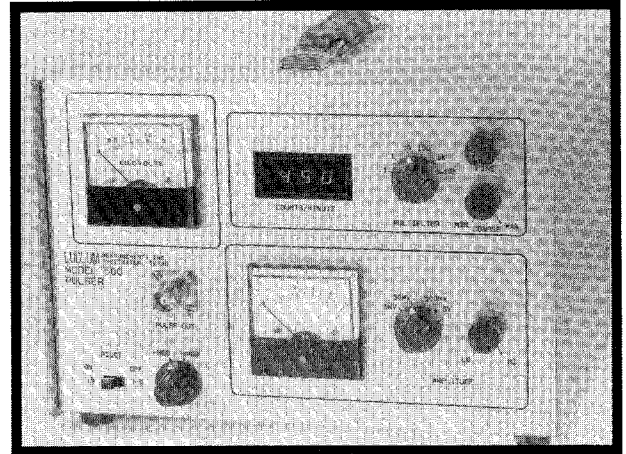
The HV, frequency and pulse amplitude provide the necessary information for determining accurate instrument response and performance specifications for the instruments. The pulsers produce either a positive or negative pulse with a 0.5 microsecond lead, a 1.5 microsecond width and a 5 microsecond tail, which is similar to a radiation pulse.

The high voltage readout is 0 - 2500 volts on pulsers with an analog readout and 0 - 1999 volts on digital readout versions. High voltage is measured by a high impedance voltmeter (2.5 x 2500 megohms ± 2%) on the pulse-out connector.

Pulse rate is displayed on a 3-digit LED readout and is determined by the position of the multiplier switch. Coarse and fine adjustments control easy selection of the desired frequency. Dividing the M500 cpm setting by 60 will provide calibration of an instrument whose scale is in counts per second (cps). The pulse rate range is 10 cpm to 9, 900,000 cpm ± 2 % of reading.

The pulse amplitude readout can be either digital or analog, depending on the Model 500-Series pulser. The total range is 0 mV - 5 V (positive or negative polarity available).

Accessories included with the pulser are a 39" cable, "C" to BNC or "C" to MHV adapter, 8-ft power cord, and a voltage current convertor (a shielded 10k resistor with connectors).



| | MODEL 500 | MODEL 500-1 | MODEL 500-2 | MODEL 500-3 | MODEL 500-5 |
|-------------------------|------------|-------------|-------------|--------------------------------------|-------------|
| HV READOUT | Analog | Digital | | | Analog |
| AMPLITUDE READOUT | Analog | | Digital | | |
| PULSE FREQUENCY READOUT | Digital | | | | |
| PULSE WIDTH ADJUSTMENT | N/A | | | 1 - 10 μs via a 1 turn potentiometer | N/A |
| PRICE | \$ 1295.00 | \$ 1650.00 | \$ 1595.00 | \$ 2150.00 | \$ 1650.00 |

Press Release: Model 2350 Software

The Perspective Software Company announces the release of the RadSurvey Tools Package, An intuitive Windows interface designed for use with the Model 2350.

The package comprises two programs: the Comm2350, which interacts with the Model 2350, and the Survey Report Generator, for data management and report generation.

In the Comm2350 program, a button click downloads the Model 2350 data, which may include extended location codes, along with detector and user information. Another button saves it to a database. This application includes forms to read and set detector parameters, recycle parameters, and command scripting for repetitive tasks. It also features a terminal interface to communicate directly with the Model 2350 using keypad commands.

The survey report generator can be used to preview and print survey data, instrument inventory and technician information. Reports can be customized with a company logo, header and footer lines, alert levels and report formula. Additionally, this program provides forms which make it easy to view and modify data. It also features database utilities to export data and create new databases.

We think you will find that the RadSurvey Tools Package, which is compatible with both the Model 2350 and 2350-1 data logger, can increase the efficiency and accuracy of radiological data collection and reporting. A free demo is available. Contact the Perspective Company by phone (505) 672-1527, by email (perspective@compuserve.com) or through their web page (<http://ourworld.com/homepages/perspective>).

Model 2360 Alpha Beta Data Logger

The Ludlum Model 2360 Scaler / Ratemeter Data Logger is an easy-to-use survey instrument incorporating an analog meter with a digital scaler display. Able to measure both alpha and beta radiation simultaneously, the Model 2360 will also provide ratemeter or scaler counts, or both simultaneously. Up to 550 data points can be logged in non-volatile memory with the following data identifiers:

| Sample Number | Sample Measurement (both alpha and beta) | Date / Time stamp |
|------------------------------------|--|-------------------|
| Count time (for scaler count only) | Location code (10 alphanumeric characters) | |

Data logging is achieved by a pushbutton in the handle. An internal selection allows for logging of scaler count, ratemeter count, both readings, or NO LOGGING. An identification code can be entered by barcode, ASCII terminal, or computer. Other features include information headers on logged data for user name, survey name, instrument serial numbers, etc., and a calibration due date parameter that will automatically deactivate the instrument after the calibration has expired. Each M2360 is supplied with software to download and communicate with an IBM - compatible PC.

PC SOFTWARE

The Model 2360 Data Logger communicates through a RS-232 port located on the instrument can. Each instrument is supplied with communication software that runs on any IBM-compatible PC and includes the following functions:

- ASCII-formatted logged data download (*includes headers*)
- Allows for setting and/or reading of header information
- Sets and clears the Calibration Due Date
- Sets the user-definable scaler count time (activated by the PC position on the front panel)
- Sets the real time clock/calendar
- Clears the logged data memory

Data Output Example

```
JOHN DOE<CR><LF>
SER# 123456<CR><LF>
PR123455 M43-68<CR><LF>
SURVEY #123A<CR><LF>
BLDG 13<CR><LF>
RM 123<CR><LF>
0001 06/01/96 08:30:00 000020 000450 R 00060 CHKSOURCE<CR><LF>
0002 06/01/96 08:30:30 000015 000390 R 00060 TABLE0001<CR><LF>
0003 06/01/96 08:32:00 000040 001400 S 00060 TABLE0002<CR><LF>
0550 06/05/96 14:25:00 004400 240500 R 00060 HOTSPOT<CR><LF>
$<CR><LF> (END OF TRANSMISSION)
```

INDICATED USE: Alpha-beta discrimination and data logging.

COMPATIBLE DETECTORS: Proportional and dual phosphor scintillation detectors.

DATA LOGGER: Capable of storing up to 550 individual data points with identifiers for each point: (*All data is stored in non-volatile memory, allowing batteries to be removed without loss of data.*)

LOGGING PUSHBUTTON: Located in handle; used to activate scaler and/or log a count.

LOGGING FUNCTION CONTROL: Internal selection that enables the pushbutton to log the ratemeter reading, initiate a scaler count and log the resulting reading, log both the scaler and ratemeter reading, or disable the logging function.

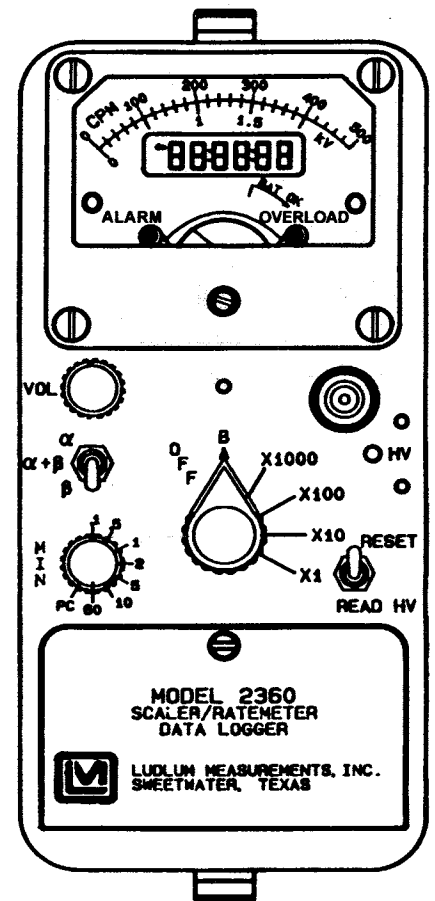
LOCATION CODE: A 10 character alphanumeric identifier.

(*Can be set by barcode reader, ASCII terminal, or PC.*)

CALIBRATION DUE DATE: An internal date that disables the instrument if the required calibration interval has been exceeded.

HEADER INFORMATION: Six lines of user-defined memory at the beginning of the stack for storing user name, survey name, serial numbers, etc. (*information is dumped with logged data.*)

RS-232 PORT: Located on the can, this allows the instrument to be connected to a PC for dumping of data and setup of parameters.



December 1994

-Continued-

AUDIO: Built in unimorph speaker with volume control (*greater than 60 dB at 2 feet, full volume*) Can-mounted headphone jack.
AUDIO DIVIDE: Internal selector for beta audio, divide-by of 1, 10, or 100 click-per-event audio. Also can activate beta audio subtract.

METER: 2.5"(6.4cm) arc, 1 mA analog type.

SCALER: 6-digit LCD display with 0.25"(0.64cm) digits, overflow arrow, colons to indicate when a count is in process.

RESET/READ HV: A two position momentary action switch to allow for the meter to be reset or a reading of the HV setting.

HIGH VOLTAGE ADJUST: Accessible from front of instrument (*protective cover provided.*)

OVERLOAD: Senses detector saturation. Indicated by red lamp on meter and meter deflecting to full scale (*adjustable depending on detector selected.*)

BATTERY LIFE: Greater than 150 hours with 2 ea. D-cell alkaline batteries (*battery condition can be checked on meter.*)

CONSTRUCTION: Cast and drawn aluminum with beige polyurethane enamel paint.

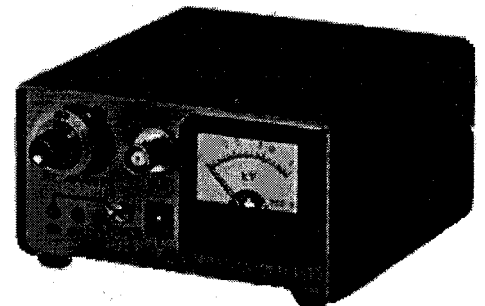
SIZE: 6.5"(16.5cm)H X 3.5"(8.9cm)W X 8.5"(21.6cm)L.

WEIGHT: 3.5 lbs(1.6kg), including batteries.

Price: \$ 1095.00 ea.

Model 416-3 High Voltage Bias Supply

The Ludlum Model 416-3 is intended for use as a scintillation detector bias supply. An economical solution for providing the HV power supply to a detector when using a MCA card or anytime an independent power supply is needed. It can support dynode string resistances of 4 megohms or greater. The unit may also be used to bias solid state and G-M type detectors. The maximum output is 1500 volts.



A power switch allows convenient High Voltage On/Off control. A ten-turn precision potentiometer with a dial indicator allows for repeatable settings.

The unit requires an MHV type cable and must have some type of signal splitter in order to connect to a detector having a single HV/signal connector.

SPECIFICATIONS

Output Voltage: 25 to 1500 Vdc for scintillation detectors filtered with 0.0047 μ F to ground.

Output Power: 300 mW (0.3 mA @ 1000 V)

Output Connector: MHV type, others available.

Input Power Consumption: quiescent power: less than 450 mW. Total power: 1.1 W @ 1000 V into 3.6 Megohm load. Input voltage from 6 - 20 Vdc. Wall transformer is supplied with unit.

Readout: 0 to 1.5kVdc Analog Meter.

Miscellaneous Features include: Gross Overload Indicator, Power ON LED Indicator, On/Off Power Switch.

Size: 4.4" W x 5.5" D x 2.6" H.

Price: \$ 399.00 ea.

Ludlum Measurements, Inc.



Serving the Nuclear Industry

Since 1962