



Instruments and Software for the Corrosion Engineer
11640 US Hwy 1, Sebastian, Florida 32958
Tel: 772-794-9448 ~ Fax: 772-589-9072
sales@mcmiller.com ~ www.mcmiller.com

MAN140

Model IA Potential Meter

Reference Manual Part # 4107





Instruments and Software for the Corrosion Engineer
11640 US Hwy 1, Sebastian, Florida 32958
Tel: 772-794-9448 ~ Fax: 772-589-9072
sales@mcmiller.com ~ www.mcmiller.com

IA Potential Meter

The IA Potential Meter is used primarily for measuring the D. C. Structure-to-Earth potentials of various types of buried or submerged tanks and the structures, such as cable, pipes, tanks, ship hulls, ship ballast tanks, the inside of water tanks, etc. The meter may be used to measure actual potentials on the 0-2 volt scale or as a “go/no-go” indicator using color bands. It may be used with the copper/copper-sulfate reference electrode attached to the base of the meter.

“Go/No-Go” Interpretation:

Since a protection criterion for cathodically-protected structures is a structure-to-soil voltage of 0.85Volts versus a copper/copper sulfate electrode, meter readings larger than 0.85V (green area on the scale) would represent a properly protected structure (a “Go” situation), while meter readings smaller than 0.85V (red area on the scale) would indicate a structure that is not protected to a high enough degree, which would be a “No-Go” situation. It should be noted, however, that the 0.85V criterion refers to the polarized potential, or the “instant-off” potential, rather than the “ON” potential (CP current ON) which would include any IR drop occurring in the soil. Consequently, the CP current should be interrupted for the reading in order to verify that the true polarized potential is above (larger than) 0.85V.

The input resistance of the IA Potential Meter is 10 megohms (10 million ohms). Therefore, all readings taken should be quite accurate except where the reference electrode is in extremely high-resistive soils such as dry sand, gravel or on top of dry paving.

An AC rejection filter is built into the amplifier module to reject power system AC potentials as high as 35 AC volts. Operation may be affected by very high frequency pickup when the meter is used close to radio and television broadcasting stations, walkie-talkies, etc.

Operation

1. Connect the **ORANGE** lead (negative) to the structure.
2. Remove the protective caps from the meter and the electrode.
3. Make contact between the earth and the reference electrode.
4. Depress the **READ** button on the meter’s base.
5. Release the **READ** button after the reading has been taken.

Battery Test

In order to check the voltage of the internal battery, follow these steps:



Instruments and Software for the Corrosion Engineer
11640 US Hwy 1, Sebastian, Florida 32958
Tel: 772-794-9448 ~ Fax: 772-589-9072
sales@mcmiller.com ~ www.mcmiller.com

1. Depress **BOTH** of the push buttons on the meter's base.
(**Note:** *The meter should not be connected to the structure or other source of potential when the internal battery is being tested.*)
2. Replace the internal battery if the pointer stops below the battery arc line on the scale plate.

Current is drawn only while the Push-to-Read button is depressed and the drain is in the order of 0.5 to 0.6 milliamperes. The battery should have an operational life practically as long as its shelf life (normally, one year).

Battery Replacement

To gain access to the internal battery, follow these steps:

1. Remove the three (3) screws located within the rim of the instrument case.
2. Carefully remove (lift out) the complete assembly.

To facilitate battery replacement, the case may be separated from the meter/amplifier/battery assembly by unplugging the connector on the end of the wiring harness. If the potential meter will be used in temperatures down to 32°F or below, use a 9V or equivalent battery. If the meter fails to function properly after replacing the battery, refer to paragraph 7 of the IA Potential Meter Trouble Shooting Suggestions found at the end of this document.

Calibration

M. C. Miller Co., Inc. certifies that this MCM instrument meets or exceeds all published specifications and has been calibrated using standards whose accuracy is traceable to the National Institute of Standards and Technology (NIST) within the limitations of the institute's calibration services, or have been derived from accepted values or natural physical contents, or have been derived by ratio or self calibration techniques.

Under normal use, this MCM instrument should be calibrated annually to insure the accuracy of its readings. Only the qualified technicians at M. C. Miller Co., Inc. should do this annual calibration. Contact MCM for annual calibration service information at: sales@mcmiller.com.

Warranty

The IA Potential Meter is guaranteed by M. C. Miller Co., Inc. (MCM) against defects in material and workmanship for one (1) year from the date of purchase. In the event the material fails to work satisfactorily within the warranty period, the meter should be returned to MCM with the attached repair sheet. If inspection by MCM shows no evidence of misuse, MCM will repair or replace the Potential Meter and return it with no charge. If inspection by MCM indicates that the unit was subjected to either electrical or



Instruments and Software for the Corrosion Engineer
11640 US Hwy 1, Sebastian, Florida 32958
Tel: 772-794-9448 ~ Fax: 772-589-9072
sales@mcmiller.com ~ www.mcmiller.com

mechanical overloading or that it received excessively rough handling or other misuse, MCM will repair or replace the Potential Meter in accordance with the MCM repair policy. If only the copper-sulfate reference electrode is found to be defective, return ONLY the electrode to MCM, not the entire meter.

Repair Policy

If this Potential Meter is in need of repair and it is no longer covered by the warranty, it may be returned to MCM for servicing without prior authorization. It should be accompanied by a purchase order authorizing the repair and describing the problem or malfunction and/or the attached repair sheet.

Repair charges will be at the same rate as all other MCM products. An estimate will be submitted prior to repair if repair charges will exceed 50% of replacement cost. In some cases, field servicing is practical. Refer to the Parts List.

Replacement parts, such as the electrode and its components, the carrying case and the spare test lead are available from MCM stock and may be ordered directly.

Replacement Parts List **IA Potential Meter**

MTR007	Instrument, Simpson, 0-2 volt scale.
REP106	Case for instrument, complete with glass and zero adjust, 126-T.
MIS101	PVC cover protecting the instrument glass (specify with or without cut).
SUB020	Amplifier assembly, complete with battery holder.
SUB181	Molded orange case, complete with switches, hardware and wiring harness.
15108	Reference electrode, Model RE-5.
SUB170	Negative test lead, orange, 8' long with banana plug and large test clip.
4115	Carrying case, complete with padding
MAN140	Manual



Instruments and Software for the Corrosion Engineer
11640 US Hwy 1, Sebastian, Florida 32958
Tel: 772-794-9448 ~ Fax: 772-589-9072
sales@mcmiller.com ~ www.mcmiller.com

The above parts and assemblies are covered by the same warranty as the complete IA Electronic Potential Meter. Parts (instrument, amplifier and electrode) returned to MCM during the one (1) year warranty period will be replaced at no charge.

Note: This parts list is applicable only to Potential Meters marked "Model IA."

IA Potential Meter **Trouble Shooting Suggestions**

- Push **BOTH** buttons firmly. The pointer should deflect to the battery test sector or beyond. If the pointer does not deflect at all, check the battery and the battery connector to make sure that the full battery voltage is reaching the points where the battery connector wire is attached to the amplifier circuit board. Replace the battery if the deflection is below the test sector on the scale.
- Push the **READ** push button with nothing connected to the meter. The pointer should remain on zero (0), although it may jump slightly when the button is first depressed. If the pointer drifts appreciably from **ZERO (0)** with no input, the amplifier P.C. board should be replaced.
- Connect a source of known voltage (preferably 2 volts DC) to the IA Potential Meter. The **POSITIVE** input is the brass female insert on the bottom of the meter. The **NEGATIVE** lead is the **BLACK** banana jack. Push the **READ** button. The pointer should show the correct voltage $\pm 2\%$ of full scale. If no reading is obtained, check the electrical continuity of the test leads. Also, check to insure that the nut inside of the orange meter case is tight.
- If the pointer appears to be "frozen" in place or hangs up at some point on the scale, the meter's movement may have to be replaced.
- If the case of the meter's movement is cracked or broken, or if the glass is pushed in or broken, it is often possible to install a new case, provided that the pointer or the meter's suspension is not damaged. The removal of the meter's movement is easily accomplished by removing the screws that secure the meter's movement to the meter's orange case.
- When reassembling, insure that the connector is correctly matched to the pins on the printed circuit board with the **YELLOW** wire next to the **NEGATIVE** terminal.
- All replacement parts and services should be obtained from MCM.