



The Indian River, Sebastian, FL



# PRODUCT BROCHURE 2018

MCMILLER.COM  
+1 772.794.9448 › SALES@MCMILLER.COM

\* Products and specifications subject to change without notice



# SYNCHRONIZABLE CURRENT INTERRUPTER

**NEW!**

## TH100A

### 100 AMP CURRENT INTERRUPTER

The TH100A is a modern current interrupter using the latest technology in current control and digital communication.



You get all the functionality of a 100 Amp interrupter plus the convenience of Bluetooth™ programmability, as well as M. C. Miller's high quality components and manufacturing standards at a price that will make the office budget happy.

#### Capabilities:

- Interrupts 100 Amps at 150 Volts DC
- Cool to the touch - even at full rated current
- Can be synced to Cronos, JR-1 or JR-2 units - works with your existing interrupters
- Can provide immediate or scheduled interruption operations

#### Features:

- Compact, lightweight, sturdy construction
- Bluetooth™ enabled - can be programmed via simple Android™ app
- High accuracy Real Time Clock, on/off cycles from 1 millisecond to 6 months
- Powered by 4 user-replaceable AA batteries



# RECTIFIERS AND DE-COUPPLERS

## **M. C. Miller now manufactures a comprehensive line of Switchmode Rectifiers and Solid State De-couplers**

The Switchmode rectifier is a newer technology known for its quality, efficiency, service life and internal design features.

- High efficiency of up to 95%
- Single phase – lower power consumption
- Lightweight design
- Output DC ripple is less than 200 mV
- Less copper used
- Lower carbon footprint
- Integrated remote monitoring



### Benefits of our Solid State Decouplers

- Higher blocking voltages over older technologies such as polarization cells
- More technically advanced than our competitors
- Can handle large steady state clamping currents for longer periods of time than Metal Oxide Varistor (MOV)
- Lightweight compact designs





# A TRIBUTE TO OUR FOUNDER, THE LATE MELVIN C. MILLER



Melvin C. Miller began his career in 1914, with the Swett Electric Light Company in Medina, New York. In 1921, he joined Northern States Power Company. Six years later he moved to Texas Power and Light Company, where he became chief distribution engineer.

In 1936, he joined the Consulting Engineering Division of Ebasco Services Inc., in New York City, as an electrical engineer. He remained associated with Ebasco for some 25 years both as an employee and later as a consultant while developing his own business.

As an Ebasco engineer, Melvin C. Miller first became interested in the field of cathodic protection while on assignment with a gas distribution company around 1940. At that time, the application of cathodic protection for corrosion control of underground pipelines was in its infancy and Melvin became one of the true pioneers in this field. Based on his early exposure to the new field, he established a corrosion engineering group at Ebasco and was instrumental in the development of corrosion engineering activities in the United States, particularly in the field of cathodic protection.

As a practicing engineer working in the cathodic protection discipline, Melvin C. Miller became aware of an acute need for precision field-use instruments to detect and record the extent of external corrosion on underground pipelines. In the early fifties he began working, in his garage, on the design and construction of instruments that would be practical to take to the field and would yield accurate current and voltage data. It didn't take long for his meters to attract the attention of his colleagues and soon his devices were in high demand. Shortly thereafter, M. C. Miller established his own manufacturing company to satisfy the need for his instruments. The company founded by Melvin C. Miller was also headed up by his grandson, Melvin C. Miller II (Mark Miller), for 23 years until Mark's passing in June, 2009. The legacy established by Melvin and his grandson is continued today by the employees of the M. C. Miller Company and today's generation of the company's meters and related test equipment is in service all around the world.

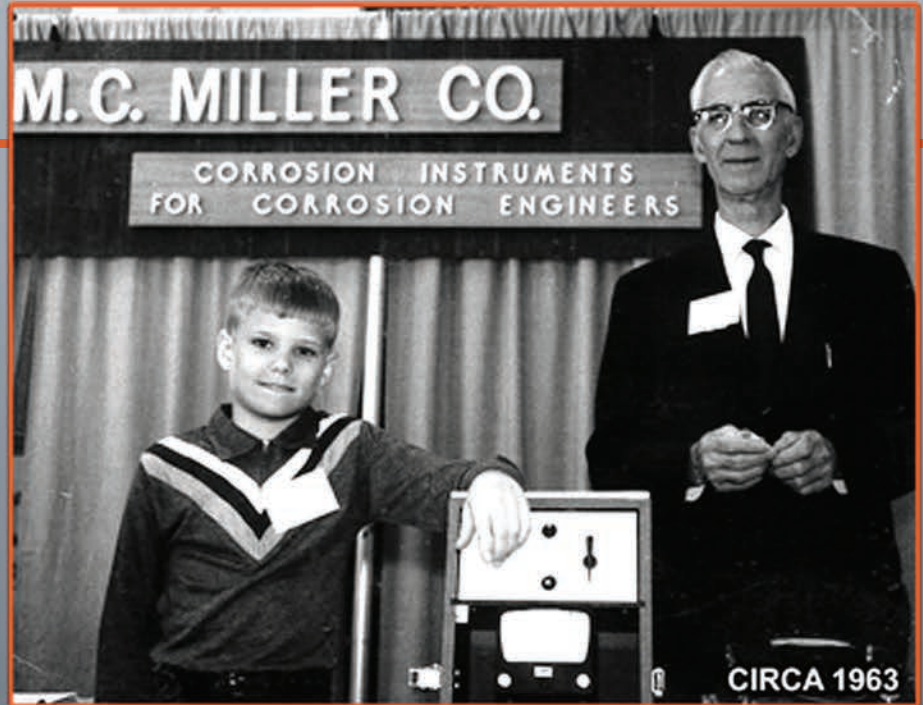
Throughout his career, from the early forties all the way up to his passing in 1979, Melvin C. Miller was an active member of the National Association of Corrosion Engineers and he was highly regarded by the Association for his pioneering contribution to the development of field-use test equipment as well as for his devotion to educating practicing corrosion engineers. In 1978, he was presented by NACE with the prestigious Frank Newman Speller Award for "Outstanding Contributions to Corrosion Engineering".

Additionally, in the education vane, in 1970, M. C. Miller received the Colonel George C. Cox Outstanding Award from the University of West Virginia for his longstanding contributions (going back to its foundations in the mid-fifties) of the Appalachian Underground Corrosion Short Course. As a lecturer for this short course and as a seminar presenter all over both North and South America, he passed on his knowledge and experience to literally thousands of corrosion engineers.





# MARK MILLER'S LEGACY



Melvin C. Miller II, better known to his friends and colleagues in the corrosion industry as, Mark Miller, served the Company as its president from 1986 until his untimely passing in June of 2009.

Mark was the beloved grandson of the late Melvin C. Miller, a pioneer in the corrosion control industry and founder of the M. C. Miller Company.

Mark received a B.S. degree in materials science and engineering from the University of Florida (Gainesville) in 1979, with a specialty in corrosion engineering, and in 1981 earned a master's degree in accounting and business management from the University of South Florida (Tampa).

Mark began his career at the M. C. Miller Company under his grandfather's tutelage as a 15 year old boy doing various jobs, such as sweeping out the machine shop, packing products for shipment and some assembly work. He continued to work at the company during his student days, receiving exposure to all aspects of the business. After completing his formal education, Mark worked full-time at M. C. Miller in the areas of electrical engineering design and business administration. In 1986, Mark succeeded his grandfather as president of the M. C. Miller Company and successfully managed the company until his untimely passing. Mark grew the company through his commitment to in-house research and development. New product development will be his enduring legacy.

Mark joined both NACE and ASTM in 1978 and was extremely active in both organizations through participation on a variety of technical committees. He exhibited at NACE's annual corrosion conference for 31 straight years on behalf of the M. C. Miller Company.





# iBTVM BLUETOOTH VOLTMETER

## iBTVM BLUETOOTH<sup>®</sup> VOLTMETER



- **Android™ compatible Bluetooth® voltmeter with integrated GPS receiver**
- **Wireless communication with tablets & phones**
- **Re-chargeable battery lasts 18 hours with continuous usage**
- **Submeter GPS at no additional cost**
- **Bluetooth® status indicating LED on case exterior**
- **5 pin connector and 2 shrouded banana jacks**
- **iBTVM for Android™ application included**



iBTVM WITH  
TEST SITE SURVEY APP  
Item #12430



iBTVM APP



iBTVM WITH  
PIPELINE SURVEY APP  
Item #12435





# iBTVM BLUETOOTH VOLTMETER

## Voltmeter Characteristics:

- High Voltage Isolation for Operator Safety: Tested to 1 kV steady-state/15 kV transient voltage levels (designed for higher voltage level isolation) – operator isolated from power supply
- Non-Saturating: Voltmeter will not saturate on 5.7 VDC and higher ranges with superimposed AC signals up to 120 VAC (for readings up to approximately 50% of full scale at 60 Hz) and/or inductive spikes up to 2 kV appearing at the input terminals
- Extensive Ranges: Various DC Ranges (40 mV full scale to 570 V full scale) plus 40 V and 400 V AC Ranges. All DC Ranges have <80 ms response times for accurate On/Off pair readings during fast current interruption cycling (for example, 700 ms ON / 300 ms OFF)

## Power Source:

- Lithium-Polymer rechargeable battery
- Interior battery charging port
- Re-chargeable battery lasts 18 hours with continuous usage
- Battery module easily replaced in the field

## Communication with Tablets/Phones via Bluetooth® wireless technology:

- Android compatible
- Bluetooth® status indicating LED on case exterior

## Connectors:

- 5-pin connector for optional push-button data-probe triggering of readings
- Two shrouded banana jacks (one red/one black) – 1,000 V; CAT III (IEC 61010 rating)

## Integrated GPS System:

- Internal GPS antenna

## Environmental:

- IP65 Rated

## Temperature Ranges:

- Operating Range/Battery Charging Range: 32 °F to 104 °F (0 °C to 40 °C)

## Case Dimensions (approximate):

- 5-7/8" long x 3.5" wide x 1.75" high

## Weight

- 0.82 lb



\* Android is a Trademark of Google Inc.



# MILLER Gx DATA-LOGGER

## CP Data Collection made Simple



**TEST SITE  
SURVEYS**



**INTEGRATED  
DIGITAL CAMERA**



**PIPELINE  
SURVEYS**

### FEATURES & BENEFITS

- Specialty voltmeter tailor made for cathodic protection testing
- CIS, DCVG, and Surface Potential Surveys
- Waveprints and Time Chart Recordings
- Test site surveys (rectifiers, test stations, bonds, atmospherics etc.)... integrated with ProActive software for data storage and reporting
- Hi-res camera and WAAS-enabled GPS receiver built-in
- Full-line of survey equipment accessories available
- Comes in weatherproof hard plastic case for the ultimate in protection





# MILLER Gx DATA-LOGGER

## Included Accessories for both Gx Data-loggers



- Hard plastic carry case
- GPS patch antenna
- A/C charger/adaptor
  - Vehicle charger
- USB host cables
  - Serial cable
- 2 Shrouded test leads
  - Excel Survey Download Software



## Key M. C. Miller Voltmeter Characteristics (for test site survey & pipeline survey work)

- **High Voltage Isolation for Operator Safety**  
Tested to 1kV steady-state/15kV transient voltage levels (designed for higher voltage level isolation) – meets the IEC Standard for Category IV environments
- **Analog Pre-Processing & Digital Signal Processing (DSP)**  
Accurate determination of On/Off pair values – voltmeter does not saturate even with superimposed AC signals (up to 120V) and/or inductive spikes (up to 2kV) appearing at the input terminals
- **Fast Response Channels (Ranges) Available**  
80ms response time in combination with high input impedance values (up to 400MΩ) – accurate On/Off pair readings during fast cycle current interruption, even under high source resistance conditions

## General specifications:

- Integrated M. C. Miller voltmeter • Integrated GPS receiver (WAAS-enabled)
  - Built-in 5MP digital camera with auto-focus and illumination
  - Serial port available for an external GPS receiver connection, if required
  - 320x240 pixel (3.5 inch) color LCD touch-screen (indoor/outdoor viewing)
- 55-key alphabetic-order keypad • Windows CE 5.0 operating system • Xscale processor (624MHz) • 256 MB SDRAM
- 2GB SD card (non-volatile memory for survey data storage) • Serial (RS232) & USB outputs • Bluetooth-enabled
  - Re-chargeable 5000mAh Li-Ion battery (40+ hours operation) • IP67 rated (1 meter immersion)
- Satisfies MIL-STD-810F (wind-blown rain) • Meets EN 61000-4-2 standard for electrostatic discharge
- Operating temp range: -4°F to +122 °F (-20°C to +50°C) • Dimensions: 12.5"x5.31"x2.31" • Weight: 2.64 lbs



# Miller Insulation Checker (M.I.C.)

M. C. Miller has created a DIGITAL Above Ground Insulation Checker which is:

- COMPACT- Fits easily in your hand or carried in your back pocket
- SIMPLE TO USE - Employs bright Pass/Fail LEDs for quick readings
- EFFICIENT - 'Push-To-Test' button ensures no power is wasted when the unit is idle, greatly increasing battery life

## FEATURES:

- Uses Radio Frequency technology to distinguish between insulation shorts and shorts associated with interconnected piping
- Checks all types and sizes of insulators - Flanges, dressers, couplings or unions - whether in parallel or series
- Locates shorted bolts - Eliminates costly and unnecessary replacement of good insulators
- Evaluates partially shorted insulators
- Easy to operate - Clear operating procedure reduces training time
- Quick - Fast "touch probe" operation eliminates guesswork and additional wires, coils, etc.

## SPECIFICATIONS:\*

- Enclosure: Heavy duty electronic instrument enclosure - flame retardant ABS plastic.
- Power Source: Two AA size alkaline batteries
- Operating Temperature Range (alkaline battery limited): -4 °F to 131 °F (-20 °C to +55 °C)
- Recommended Storage Temperature Range (alkaline battery limited): -4 °F to 95 °F (-20 °C to +35 °C)
- Max Dimensions: 6.2" L x 3.6" W x 1.5" H (15.8 cm x 9.1 cm x 3.8 cm)

\*Specifications subject to change without notice





# Underground Insulation Checker (Model 702)

Model 702  
Item #461000



## FEATURES:

- Built to provide years of dependable service, this precision instrument is light and compact
- Checks all types and sizes of buried insulators from remote test leads - flanges, dressers, couplings, unions, carrier pipe to casing, whether parallel or in series
- 100% accurate - not effected by pipe to soil potentials or most protection voltages
- Indicates continuity of connection between pipe and test lead
- Simple to operate - simplified operation procedure reduces training time to 10 minutes following step by step instructions
- Cost Effective - saves time compared to present test procedures

## SPECIFICATIONS

- Enclosure: Molded glossy black Phenolic MIL-M-14, CFG. Designed to meet IP54 standard
- Power Source: Two D size alkaline batteries and two AA size batteries
- Operating temperature range (alkaline battery limited): -4 °F to +131 °F (-20 °C to +55 °C)
- Recommended storage temperature range (alkaline battery limited): -4 °F to +95 °F (-20 °C to +35 °C)
- Output voltage: 1.5 VDC
- Dimensions: 7" L x 5.25" W x 4" H (17.8 cm x 13.3 cm x 10.16 cm)
- Weight: 3lbs (1.36 kg)



# MODEL LC-4.5



- DC Volts for IR Drop, Potential & Rectifier readings
- AC Volts for Potential & Rectifier readings
- OHMS for Continuity & Resistance testing
- Selectable Input Resistance
- Display "Freeze" for instant off & Coordinated tests
- Optional plug-in shunt for current readings
- Includes carry case with red and black test leads



Model LC-4.5  
Item #5203





# MODEL LC-4.5

## GENERAL INFORMATION

**MODEL LC-4.5** is the first hand-held digital meter to include a number of special features which facilitate corrosion and cathodic protection testing on underground structures. It is designed for field testing under almost any environmental conditions. Sealed Mil.Spec. switches, sealed windows, a gasketed case and a printed circuit board with baked - on moisture and fungus resistance coating on both sides make this possible.

**LCD DISPLAY:** the large (.5") display characters are easy to read under both high and low lighting conditions and function over a wide temperature range with very little drain on the battery.

**THE LC-4.5** is recommended for potential surveys, side drain measurements, surface potential surveys, IR drop measurements, - checking both the AC and DC circuits of rectifiers, checking for stray or hazardous AC potentials, and checking galvanic anodes. DC current measurements require the use of an optional plug in shunt (0-20 Amp).

**THE SELECTABLE INPUT:** resistance feature permits detection of high resistance in the external circuit and elimination of resulting errors in virtually all cases.

**THE PUSH-TO-HOLD READING:** button freezes the display at any desired time which makes the meter usable in many areas having varying stray currents. It is also useful when conducting instant-off and coordinated tests.

## SPECIFICATIONS

LOGIC:	C-MOS, crystal controlled timing
DISPLAY:	Liquid crystal, 3-1/2 digits, .5" high
DC VOLT RANGE:	0-20 mV (.01 mV resolution)      0-200 mV (.1 mV resolution) 0-2 V (1 mV resolution)      0-200 V (.1 V resolution)
AC VOLT RANGE:	0-600 V (1 V resolution)
RESISTANCE RANGE:	0-200 $\Omega$ (.1 $\Omega$ resolution)
DC CURRENT RANGE:	Using optional .001 $\Omega$ LC Shunt: 0-20 A (.01 A resolution).
ACCURACY:	VDC: 1% of reading $\pm$ 1 digit. VAC: 3% or reading $\pm$ 1 digit. Ohms: 2% of reading $\pm$ 1 digit.
AC REJECTION:	20 mV range: 20 mVAC @ 50/60/400 Hz 200 mV range: 5 VAC @ 50/60/400 Hz 2 V range: 120 VAC @ 50/60/400 Hz 200 V range: 600 VAC @ 50/60/400 Hz 600 VAC range: 600 VDC
DC REJECTION:	600 VAC range: 600 VDC
ZERO:	Automatic
DECIMAL POINT:	Automatic; set by range switch
POLARITY:	Automatic; negative symbol displayed, positive assumed
INPUT RESISTANCE:	20 mV range; 1000 $\Omega$ . All other VDC ranges are switch selectable (10 M $\Omega$ , 25 M $\Omega$ , 50 M $\Omega$ , 100 M $\Omega$ , 200 M $\Omega$ )
OPERATING RANGE:	8 °F to 176 °F (-14 °C to +80 °C)
BATTERY:	(1) 9 V - alkaline recommended
DIMENSIONS:	Weight: 11 oz (.312 Kg); Size 6-1/8" x 3-5/8" x 1-3/4" overall (15cm x 8cm x 4.5cm)
ACCESSORIES:	Includes: carry case, 1 - test lead #16 red, 1 - test lead #16 black



# CONCRETE CORROSION MAPPING



Model CCMS  
Item #15620

## SAMPLE APPLICATIONS

- Bridge Decks
- Highway Slabs
- Parking Garages
- Concrete Piers & Docks
- Substructures
- Pre-cast Structures
- Foundations
- Reinforced Concrete Pipe
- Warehouse Floors
- Tunnels



Case Included

## FEATURES & BENEFITS

- Corrosion Mapping System can be used to satisfy ASTM C-876 standard test method which has been adopted by the Federal Highway Administration
- Corrosion Mapping System contains all the items needed to perform a corrosion survey on virtually every reinforced concrete structure
- Includes our rugged industry proven LC-4.5 digital meter, adapter plate, electrode extensions, portable hand held test wheel (wire included)
- Two portable reference electrodes; sponge bottle reference electrode for testing on slab surfaces and RE-5/U for testing on overhead/vertical surfaces
- Light weight, easy to use designed for field use under nearly any weather
- Large scale digital meter read out at waist height minimizes operator fatigue and errors.
- Packaged with instructions in a durable hard plastic case for ease of storage and transport to survey sites

*NOTE: ASTM Revised standard is C-876-09*



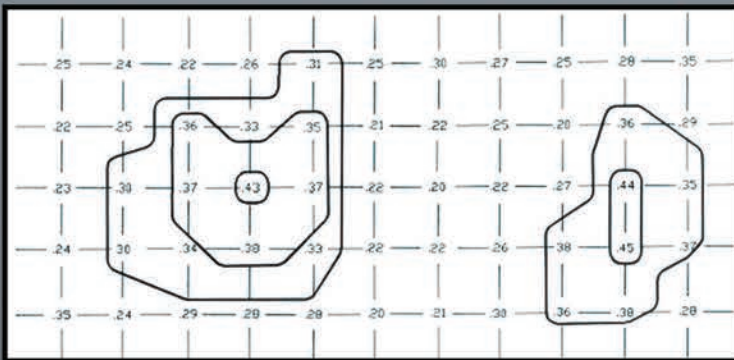


# CONCRETE CORROSION MAPPING

The nature of concrete corrosion is an exchange of energy within different sections of the reinforcing steel. At the anode, corrosion occurs and iron ions are released into the electrolyte. The relative energy levels can be determined in relation to a reference electrode with a stable electrochemical potential. A high impedance voltmeter is connected between the reinforcing steel and a reference electrode placed on the surface of the concrete. The resulting potential reading on the voltmeter is an indication of the energy levels (corrosion activity) of the steel in the vicinity of the reference cell.

Half cell potential measurements serve as an important means of determining the probability of corrosion activity on the structure's reinforcing steel. These measurements, which are related to the electrochemical nature of corrosion, allow an accurate survey to be performed in a short period of time.

Data from these surveys can be plotted to provide an easy to interpret graphic picture of the structure. From this plot, as typically shown below, probable corrosion areas and the total area of the structure subject to corrosion can be determined.



Typical concrete slab section with steel reinforcement (rebars). Potential measurements obtained on 4' centers of 24' x 48' panel.

## Concrete Mapping System Items Included in Kit

Item #	Description
5203	LC-4.5 meter w/carrying case and manual with test leads
5701	Electrode extension meter adapter plate
16200	Intermediate electrode extension (15") - 2 included
15625	Sponge bottle electrode
30500	GEM hand reel (aluminum) with: 30807 No. 16 AWG test lead wire (red wire insulation) 250' included on reel
16906	Copper-sulphate crystals, 12 oz bottle
17105	Electrode anti-freeze solution, 8 oz bottle.
14905	RE-2.5U electrode (overhead testing)
15628	Concentrate, 4 oz surfactant solution
MAN060	C.C.M.S. Reference guide
CAS015	Orange carrying case C.C.M.S.

LC-4.5 METER  
ITEM #5203

ADAPTER  
PLATE  
ITEM #5701

INTERMEDIATE  
ELECTRODE  
EXTENSIONS  
(15 INCH)  
ITEM #16200

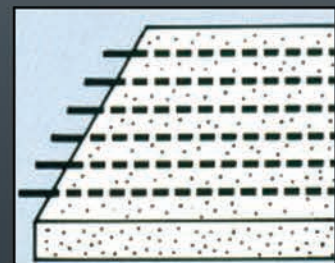
SURFACTANT  
RESERVOIR  
W/ELECTRODE  
ITEM #15625

SURFACTANT BOTTLE  
CAP WITH SPECIAL  
VERSION RE-7 Cu-CuSO<sub>4</sub>  
REFERENCE ELECTRODE

SURFACTANT  
RESERVOIR

INTERFACE  
CONNECTOR

SOLUTION  
DISPENSING  
SPONGE



Concrete slab with steel rods



# DIGITAL POTENTIAL METER

## FEATURES:

- Low Cost
- Rugged
- Easy to use
- Structure to earth potentials
- Ranges:  $\pm 2$  V,  $\pm 20$  V
- Low Battery Display
- Electrode extension optional

**Model DPM**  
Item #4110



### **Model DPM Digital Potential Meter For Electrolysis, Corrosion and Cathodic Protection Testing...**

Designed for use by non-technical personnel, such as crews, service technicians, meter readers, etc., but also suitable for the most experienced engineers and staff.

### **20 Megohms Input Resistance....**

Practically eliminated low potential readings caused by resistance in the external circuit due to contact resistance of the reference electrode. This condition is frequently encountered in city work and in frozen ground.





# DIGITAL POTENTIAL METER

## GENERAL INFORMATION

- Large 1/2" LCD numbers
- Weatherproofed with neoprene gasket
- 20 Megohms input resistance
- Solid state impedance amplifier
- Operates on one 9 V battery
  - Low drain - long shelf life
  - Battery easily replaced and readily available
- Low battery indicator on display
- Push one button to read  $\pm 2$  V; push two buttons to read  $\pm 20$  V while taking a reading
- Digital readout:  $\pm 1.999$  V and  $\pm 19.99$  V
- Molded polycarbonate housing
- Filter eliminates errors caused by AC up to 50 V, 50/60 Hz
- Operating temperature:  $-4^{\circ}\text{F}$  to  $+185^{\circ}\text{F}$
- Plastic carrying case with resilient padding
- Modular construction
- Weight: approximately 3 lbs.
- Size: 2 1/2" deep by 10" long



Item #16203



## KIT INCLUDES

Digital Potential Meter with:

- 1 - (15108) RE-5 Copper Sulfate Electrode
- 1 - (SUB171) Test Lead Positive 8ft Green
- 1 - (SUB173) Test Lead 20ft Red
- 1 - (BAT007) 9v Battery
- 1 - (4115) Carry Case
- 1 - (MIS101) Orange Meter Cover



Potential meter with optional 30" electrode extension



# ANALOG ELECTRONIC POTENTIAL METER

The "Model IA" voltmeter (Analog Potential Meter) is designed for ease of use by meter readers and corrosion technicians alike. The voltmeter comes with an integrated RE-5 reference electrode attached for "metallic structure-to-soil" potential difference readings. The kit also includes a test lead for electrical connection to a metallic structure. The voltmeter offers a 0 - 2 VDC range with a 10 M $\Omega$  input impedance, and the analog display presents a color divided scale for convenient indication as to whether or not a carbon-steel structure is receiving a suitable level of cathodic protection with respect to the accepted 0.85 V (850 mV) threshold value.

## Specifications

- RE-5 reference electrode included
- 8' black test lead with 46-C clip included
- An optionally available electrode extension can be used to eliminate having to bend over to place the reference electrode in contact with soil (Item #16203)
- 2½" taut-band rugged instrument
- Weatherproofed neoprene gasket
- 10 M $\Omega$  input resistance
- Solid-state impedance amplifier
- 9 V transistor battery, low drain - long shelf life, push switch to check battery condition, battery easily replaced and readily available
- Push switch to read potentials, current drain only while taking readings
- Scale marked 0 VDC to 2 VDC, Red to 0.85 VDC, Green to 2 VDC
- Filter eliminates errors caused by AC, Up to 50 V, 50/60 Hz
- Operating temperature: 0 °F to 150 °F
- Molded PVC housing
- Plastic carrying case with resilient padding
- Modular construction
- Weight: about 3 lbs.
- Size: 2 ½" deep x 10" long



Model IA  
Item #4107





# PORTABLE GPS CURRENT INTERRUPTERS

## ...CRONOS SERIES



100 Amp  
External Relay  
Item #12950



100 Amp Relay  
Item #12965



40 Amp  
Internal Relay  
Item #12955

- Rugged design .. highly reliable .. easy to operate .. competitively priced
- Precision clock-timing even with an intermittent view of the GPS satellites
- Runs on replaceable D-Cell batteries .. extremely low power consumption for long battery life
- Easy to program via a PC or can “quick select” via a keypad
- Available in 100 A and 40 A relay models - both relays are rated at 120 V AC/DC
- Solid-state (non-polarity dependent) relay - no orientation or polarity concerns
- Only 11.1 mV dropped per Amp - both small and large currents can be interrupted



# MILLER RESISTANCE METERS

**...Soil Resistivity Testing Made Easy**

**...Your Choice of Analog (Miller 400A) or Digital (Miller 400D) Meter**

Item #44500



Item #44550

## Features:

- Rugged, light-weight, hard plastic case – safe to use on wet ground
- The 400A is weather resistant, even with lid removed
- Convenient case lid removal on both the 400A and 400D
- Resistance measurement range from 0.01  $\Omega$  to 1.1 M $\Omega$  (400A) and 0.01  $\Omega$  to 10 M $\Omega$  (400D)
- Resistance measurements are unaffected by stray interference signals
- Compatible with M.C. Miller's Soil Resistivity Kit (Item #156225)
- Meters run on a set of replaceable batteries (C-Cell for the 400A and D-Cell for the 400D)

## Digital Meter - Additional Features:

- Resistance readings with the push of a button
- Integrates with Bluetooth-enabled PCs and PDAs for wireless data acquisition
- Soil resistivity survey software included free-of-charge





# DUAL REEL WIRING SYSTEM

The Dual Reel Wiring Systems offer maximum pin spacing, with respect to a 4-pin linear array (Wenner methodology). Both reels are positioned at the center of the linear array, as opposed to at one end. Custom lengths available.



**DUAL REEL WIRING SYSTEM (120) V2**  
Item #44820



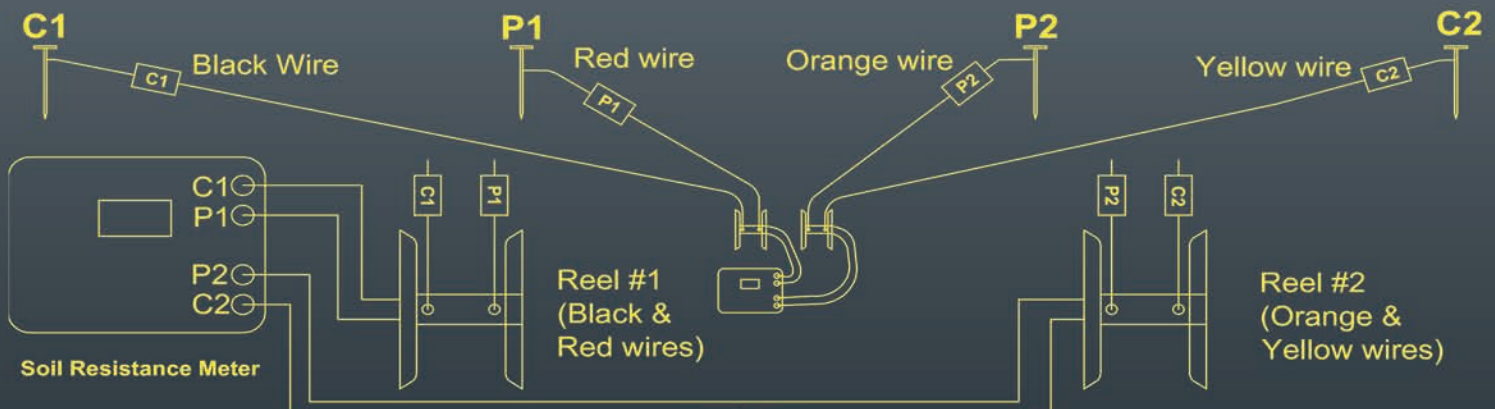
**DUAL REEL WIRING SYSTEM (240) V2**  
Item #44852

Each reel has the following features:

- 9" Diameter
- One 180 ft long wire and one 60 ft long wire
- Two color coded banana jack terminals (for banana plug cable connection to a 4-terminal resistance meter)
- A set of four (4 ft long) color coded banana plug leads used to connect the two wires on each reel to a 4-terminal resistance meter
- Weight - 4.7 lbs.

Each reel has the following features:

- 18 Gauge Steel Construction
- Balanced Carrying Handle
- Adjustable Brake
- Simple Clamp-on Connectors
- Totally Enclosed Collector
- One 360 ft long wire, one 120 ft long wire and an 8.5 ft long integrated cable for resistance meter connection (with 2 banana plug terminals)
- Weight - 15 lbs.



# SOIL RESISTIVITY TEST KIT



**Soil Resistivity Test Kit**  
Item #156226

- ➔ Kit equipment can be used to satisfy both the 4-Electrode ASTM (G57-06) and the 2-Electrode AASHTO (T-288) soil resistivity testing methodologies (the two interior pins are removed from the soil box in the case of the AASHTO methodology with an appropriate adjustment to the multiplication factor)
- ➔ Kit items are supplied in a hard plastic carrying case that can also conveniently accommodate a 4-terminal resistance meter, such as the Miller 400A, Miller 400D or Nilsson 400 Resistance Meters. **(Resistance Meters are sold separately.)**

## **Test Kit Includes**

- 4-Pin Test Reel (with color-coded wires), including “reel-to-meter” test leads (also color-coded)(*maximum pin spacing is 20 feet*)
- Set of four stainless steel soil pins for use with the 4-Pin Test Reel
- Large Soil Box - 270 ml volume (4-terminal)
- Soil Box Test Leads (each lead has a banana plug on one end (for connection to a resistance meter) and a pointed plug on the other end (for connection to the soil box))





# SOIL RESISTIVITY TEST KIT

## TEST KIT ITEMS



Set of four 3/8" dia. x 18" long  
Stainless Steel Soil Pins  
Item #44720 (Single pin)



Soil Container Test Leads(4 FT)  
Item #37010



Large Soil Box (270 ml)  
Item #37008



4-Pin Test Reel  
Item #44900



4-Pin Test Reel Lead Set (4FT)  
Item #44698



# MILLER SOIL BOXES



**Large Soil Box**  
Item #37008  
1.5"W, 8.75"L, 1.25"D



**Small Soil Box**  
Item #37006  
1.2"W, 4.4"L, 1"D

## ACCESSORIES

**Test Leads for Miller Soil Boxes**  
Item #37010

Set of 4 Leads (2 Red / 2 Black)  
w/banana plugs on one end and  
pointed plugs on the other end.



## FEATURES AND BENEFITS

- Plexiglass body with rounded corners for easy cleaning
- Stainless steel current distribution plates and removable brass pins can be used with any 4-Terminal Resistance Meter, including Miller 400A, Miller 400D and Nilsson 400
- Can also be used with any M.C. Miller multimeter (or separate volts and amps meters) together with an external battery
- Can be used to satisfy the ASTM (G57 and G187) standards as well as the AASHTO (T-288) Standard





# MILLER IR-FREE COUPONS

**CONVENIENTLY MEASURE LOCAL POLARIZED POTENTIALS WITHOUT THE NEED TO INTERRUPT ALL CURRENT SOURCES**



## FEATURES & BENEFITS

- Wide range of standard “low-carbon steel” coupons available, including 10 sq cm and 1 sq cm exposed surface area coupons having both flat disc and cylindrical shaped designs
- Custom coupons manufactured to customers’ specifications, including choice of metal type (including ductile iron and aluminum), coupon shape and cable requirements (including wire gauge, insulation type, color and number of wires)
- IR-drop-free polarized potential readings possible in association with coupon current interruption
- Coupons integrate with pre-existing test stations
- Coupon holder available allowing integration of coupons with customer-supplied 2” diameter PVC tubes



# ACCUREF 20

## Silver / Silver Chloride Permanent Reference Electrode

### FEATURES & BENEFITS:

- Electrodes are buried directly with native soil backfill – no need for composite backfills
- Electrodes can be used in chloride ion containing soils, due to the use of a saturated chloride filling solution (please see the Specifications section for details)
- Depressed electrolyte (filling solution) freezing temperature of -20 °C allows electrodes to experience a deep frost without freezing or cracking
- Design life of 20 years (please see “Important Notes” below)
- Large electrical contact area (electrically active surface area) having hygroscopic characteristics promotes good electrode-to-soil electrical contact. (Note: Soil moisture content is a requirement for a buried metallic structure potential reading versus any permanently installed reference electrode, which means that readings in ultra-dry soil are not possible)



### SPECIFICATIONS:

- Sealed cable type/length (standard): 25 feet of #12 AWG wire coated with XLP (USE-2/RHH/RHW-2) insulation; 600 V rating, 90 °C max. temp. in wet & dry environments
- Active electrical contact surface area: approx. 16.4 inches<sup>2</sup>
- Half-cell materials: 99.99% Ag, 99.99% AgCl and proprietary filling solution
- Please see the “Important Notes” section below) Metallic structure-to-soil potentials versus these electrodes can be adjusted to the Copper/Copper Sulfate potential, if necessary, as indicated in “A Guide to Understanding Reference Electrode Readings”, Materials Performance, Sept. 2009 issue
- Max. diameter: 2.77 inches,  
Overall length (not including sealed cable): 11 inches  
Weight (including sealed cable): 1.9 lbs

#### Important Notes:

- These products must be installed according to the installation instructions provided
- These products are not guaranteed to maintain their calibration in all soil environments and it is incumbent on the customer to test their soil for the presence of any potential chemical contaminants prior to installation of these products. The M. C. Miller Company has not tested these products with regard to the effects of specific (potential) chemical contaminants on their calibration.
- These products are not designed for submersion applications.





# ACCUREF 60

## Silver / Silver Chloride Permanent Reference Electrode

### FEATURES & BENEFITS

- Electrodes are buried directly with native soil backfill – no need for composite backfills
- Electrodes can be used in chloride ion containing soils, due to the use of a saturated chloride filling solution (please see the Specifications section for details)
- Depressed electrolyte (filling solution) freezing temperature of  $-4^{\circ}\text{F}$  ( $-20^{\circ}\text{C}$ ) allows electrodes to experience a deep frost without freezing or cracking
- Design life of 60 years (please see “Important Notes” below)
- Large electrical contact area (electrically active surface area) having hygroscopic characteristics promotes good electrode-to-soil electrical contact. [Note: Soil moisture content is a requirement for a buried metallic structure potential reading versus any permanently installed reference electrode, which means that readings in ultra-dry soil are not possible]



### SPECIFICATIONS

- Sealed cable type/length (standard): 25 feet of #12 AWG wire coated with XLP (USE-2/RHH/RHW-2) insulation; 600V rating,  $90^{\circ}\text{C}$  max. temp. in wet & dry environments
- Active electrical contact surface area: approx.  $16.4\text{ in}^2$
- Half-cell materials: 99.99% Ag, 99.99% AgCl and proprietary filling solution
- [Please see the “Important Notes” tsection below]. Metallic structure-to-soil potentials versus these electrodes can beadjusted to the Copper/Copper Sulfate potential, if necessary, as indicated in “A Guide to Understanding Reference Electrode Readings”, Materials Performance, September 2009 issue
- Max. diameter: 2.77 in, Overall length (not including sealed cable): 15 in; Weight (including sealed cable): 3.9 lbs

#### Important Notes:

- 1) These products must be installed according to the installation instructions provided
- 2) These products are not guaranteed to maintain their calibration in all soil environments and it is incumbent on the customer to test their soil for the presence of any potential chemical contaminants prior to installation of these products. The M. C. Miller Company has not tested these products with regard to the effects of specific (potential) chemical contaminants on their calibration.
- 3) These products are not designed for submersion applications.



# ACCUREF 30 SPLICE-ABLE ELECTRODE



Item #14628



## FEATURES & BENEFITS

- All hardware components included for onsite cable splicing (silicone sealant & PVC cement to be supplied by customer)
- Any customer-supplied cable can be used having a maximum outside diameter of 0.4 inch (10 mm) and a maximum wire size of #8 AWG (10 mm<sup>2</sup>)
- Copper / copper sulfate electrode has a design lifetime of 30 years (AccuRef 30) and a -20 °C freezing temperature
- Moisture absorbent ceramic tip has a large electrical contact area of approximately 16.4 sq. inches (approx. 100 cm<sup>2</sup>)
- Electrode contains 80 grams of high purity copper and 500 ml of saturated copper sulfate gel
- Electrode has a 2.77" diameter (6.9 cm) at its maximum, is 15" long (37 cm) and weighs 3.9 lbs (1.77 kg)





# ACCUREF 30

## Copper / Copper Sulfate Permanent Reference Electrode

### FEATURES & BENEFITS

- Electrodes are buried directly with native soil backfill – no need for composite backfills. Note: These products are suitable for use in neutral soil having a chloride ion content <500 ppm. (AccuRef Silver/Silver Chloride electrodes are recommended for use in higher chloride ion content soils)
- Depressed electrolyte freezing temperature of -20 °C allows electrodes to experience a deep frost without freezing and cracking
- Design life of 30 years (please see “Important Notes” below)
- Large electrical contact area (electrically active surface area) having hygroscopic characteristics promotes good electrode-to-soil electrical contact. (Note: Soil moisture content is a requirement for a buried metallic structure potential reading versus any permanently installed reference electrode, which means that readings in ultra-dry soil are not possible)



### SPECIFICATIONS

- Sealed cable type/length (standard): 25 feet of #12 AWG stranded copper wire coated with XLP (USE-2/RHH/RHW-2) insulation; 600 V rating, 90 °C max. temp. in wet & dry environments
- Active electrical contact surface area: approx. 16.4 in<sup>2</sup>
- Half-cell materials: 80 grams of 99.99% copper and 500ml of saturated copper sulfate gel electrolyte
- Max. diameter: 2.77 in, Overall length (not including sealed cable): 15 in  
Weight (including sealed cable): 3.9 lbs

### Important Notes:

- 1) These products must be installed according to the installation instructions provided
- 2) These products are not guaranteed to maintain their calibration in all soil environments and it is incumbent on the customer to test their soil for chloride ion content and for the presence of any other potential chemical contaminants prior to installation of these products. The M. C. Miller Company has not tested these products with regard to the effects of specific (potential) chemical contaminants on their calibration.
- 3) These products are not designed for submersion applications.



# PERMANENT REFERENCE ELECTRODE

**with Integrated Coupon  
...single hole burial**



Item #146305

## REFERENCE ELECTRODE FEATURES

- Applications: Direct burial in soil, assuming low (<500 ppm) levels of chloride ion contamination. AccuRef Silver/Silver Chloride electrodes are recommended for use in chloride ion contaminated soil
- Low Freezing Point:  $-20^{\circ}\text{C}$
- Design Life: 30 years (AccuRef 30)
- High Purity Materials: Copper rod and copper sulfate crystals
- Cost: Less expensive than most copper sulfate permanent electrodes
- Tip: Moisture absorbent ceramic tip
- Evaporation: Will not dry out at low humidity and/or high heat
- Wire: 25 feet of #12 AWG XLPE RHW-2 lead wire; cross-linked Polyethylene jacket, direct burial, low leakage, 600 V,  $90^{\circ}\text{C}$  Rating. Longer lengths of wire are available
- Electrical Contact Surface Area: Approximately  $16.4\text{ in}^2$  (a cylindrical surface, 1.5 in diameter and 3.5 in length)

## COUPON FEATURES

- Integrated coupon/holder assembly
- Integrated PVC pipe adapter for optional PVC pipe connection (nominal 3 in (7.6 mm) diameter pipe)
- Carbon Steel coupon (AISI 1018, ASTM A108, AMS5069) with  $10\text{ cm}^2$  surface area
- #12 AWG ( $4\text{ mm}^2$ ) standard copper wire, green colored THHN insulation, single wire, 25 ft long for coupon connection. Longer lengths of wire are available

Dimensions:

Width: 4.0 Inch maximum outside diameter

Length: 20.75 Inch long (with pipe adapter attached)

Weight: 5.25 Pounds





# RE-SERIES REFERENCE ELECTRODES

## MODEL RE-5:

Flat surface ceramic plug for general use on soil surfaces. Approx. overall size 1 3/8" dia. X 6" long. Dry weight: 4 oz.



Item #15108

## COPPER/COPPER SULFATE ELECTRODES

### MODEL RE-5C:

Ceramic plug has conical shape designed for use in soft soil conditions. Approx. overall size 1 3/8" dia. X 6 3/4" long. Dry weight: 5 oz.



Item #15210

### MODEL RE-7:

Ceramic plug has a flat surface with beveled edge for general purpose use on soil surfaces. Fits through 1 inch diameter holes in pavement & asphalt, for example. Approx. overall size: 1" dia. X 8 1/2" long. Dry weight: 5 oz.



Item #15301

### MODEL RE-375:

Small diameter electrode (non-extendable) designed for readings taken through small holes or cracks. Comes in de-ionized water (DW) and antifreeze (AF) versions. Length: 6 1/2" Diameter: 3/8 inch



RE-375 (DW): Item #15102  
RE-375 (AF): Item #15104

### MODEL RE-2.5U:

Highly durable, large area ceramic plug (2.25" diameter). Electrode can be used in any orientation, including upside down configuration. Ideal for concrete corrosion potential mapping (bridge decks, parking garages, etc.) - stands upright by itself. Electrode supplied with highly absorbent sponge cap for enhanced electrical contact to concrete surfaces.



Item #14905

### FREE-STANDING RE-5C ELECTRODE:

Allows readings to be taken without the technician having to hold onto a reference electrode. Includes a RE-5C electrode (Item #15210). Highly durable plastic stake with stainless steel clip. Length: 15" Width: 1 3/4" Depth: 3 1/2"



Item #15310



# ACCESSORIES

## SUBMERSIBLE ADAPTERS:

Coverts any MCM electrode for use underwater, includes your choice of a lead length (8', 25', 50', 100', 150' or 200') with banana plug. Water-tight connection.



Item #16305  
(8 foot model shown)

## EXTENSIONS:

Intermediate electrode extension: 30" long. One or more can be used with MCM model IA and LC series meters or between the electrode and the standard electrode extension, so that the electrode can be easily placed at the desired location inside manholes, water tanks, etc. Will fit through 1" diameter augered hole.



Item #16203

## ELECTRODE EXTENSIONS:

Electrode extensions 30" long. Side terminal connection allows use of the electrode without bending over or stooping. Extensions also available in 15" lengths.



Item #16101

## ANTI-FREEZE SOLUTION:

For use with any MCM electrode. Permits potential measurements with temperature as low as -10°F (-23°C) without danger of cracking electrode tube. Available in 8 oz. and 32 oz. (fl.) containers. Can be used year around.



Item #17207



Item #17105

## COPPER SULPHATE:

Finely divided high-purity crystals. Available in ¾ lb and 2 ½ lbs containers. Under normal conditions a ¾ lb container will be sufficient to maintain an electrode for a year.



Item #17003



Item #16906

## LEAK STOP GEL:

New, improved Leak Stop Gel for use with any MCM electrode. Stops the leaking of CuSO<sub>4</sub> electrodes, has no expiration date

Item #18020

Item #18010





# COLLAPSIBLE DATA-PROBES

*...the performance of our regular data-probes with the convenience of collapsibility*



Collapsible Data-probe Completely Assembled



Data-probe  
disassembled  
for transportation



Push-button, green-handled probe  
Item #SIN159



Push-button, red-handled probe  
Item #SIN158



Continuous read probe  
Item #TRI0151



Push-button, red handled, 3 pin probe  
Item #TRI0145

## FEATURES & BENEFITS

- Simple assembly & disassembly
- Convenient for travel - collapsed probes (x2) integrate with our pipeline survey equipment carrying case (Item #11231)
- Detachable reference electrode design - integrates with any electrode with a 1/4 x 20 threaded fitting, including RE-5, RE-5C, RE-7 and sponge bottle electrodes (sold separately)
- 6" long middle section (compared to 12" standard section) is available to make the assembled probes shorter (or longer), if required (sold separately) (Item #SUB9771)



# CUSTOM LENGTH WIRE

Wire can be purchased by the foot, by the spool, or mounted on a reel.

#16 - Item #30807  
#18 - Item #31210

#16 - Item #31505  
#18 - Item #31410



#16 - Item #31108  
#18 - Item #31352

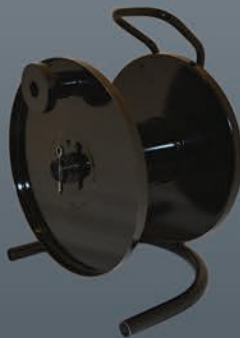


#16 - Item #30909  
#18 - Item #31301

#16 - Item #31006  
#18 - Item #31403



Available Reels:



Hykon JL-9



GEM Reel



Hykon JL-15

Reel Capacity (non-spliced) *		
Reel	Wire Gauge	Max Qty (Feet)
GEM Reel	16	250
	18	1000
Hykon JL-9	16	500
	18	1500
Hykon JL-15	16	500
	18	3000

\* Non-spliced lengths limited to 500 FT for #16 and 3000 FT for #18

Items shown are not to scale





# ACCESSORIES

## HANDHELD PUSH BUTTON DATA PROBE

Item #12425



### REQUIRES:

Item #12428 BLACK BAND (NEGATIVE) CABLE  
OR  
Item #12429 RED BAND (POSITIVE) CABLE

Canes and adapter  
platforms for LC-4.5, Gx  
and iBTVM meters

Item	Item #
Ball Handle Can	16281
Cane Handle Can	16282
LC 4.5 Adapter	16285
Gx Adapter	16288
iBTVM/Tablet Adapter	11850



## TEST LEAD FIELD KIT



Item #36100

## RE-5 FIELD KIT



Item. #15150

## RE-5C FIELD KIT



Item #15150

## SELECTABLE IMPEDANCE AMPLIFIER



Item #5615

## HALF-CELL SOLUTION TEMPERATURE MONITOR



Item #15215

## WIRE MEASURER CONTINUITY TESTER



Item #HIP048



# IONX PORTABLES



## Package Contents:

- IonX Portable Electrode (either RE-5 or RE-5C style)
- Electrode calibration certificate
- “Derivation of Electrode Potential Value” document
- Instructions & Maintenance sheet
- 2 oz. squeeze bottle of Electrode Solution for “top-ups”





# IONX PORTABLES

## FEATURES & BENEFITS:

- No copper sulfate solution leakage (“Green” Electrodes)
- Half-cell cannot be contaminated
- No need to handle, store or dispose of hazardous copper sulfate crystals or copper sulfate anti-freeze solutions
- Electrodes arrive “ready-to-use” – no need to prepare chemicals, etc. in the field
- All IonX Portable Electrodes are calibrated at the factory and are shipped with a certificate of calibration.
- Electrode potentials are in the range  $316\text{mV} \pm 10\text{mV}$  at  $25^{\circ}\text{C}$  versus Standard Hydrogen Electrode (SHE)
- Electrodes can be stored at temperatures down to  $-20^{\circ}\text{C}$
- Electrodes have the same fittings as conventional M. C. Miller portable electrodes (for connection to standard canes and electrode extensions). The robust ceramic plugs are customized for IonX electrodes

## CERTIFICATION

IonX Portable Electrodes are in a “ready-to-use” state upon completion of the manufacturing process and their electrode potentials are measured at the factory, prior to shipping. A certificate of calibration is issued for each electrode which, in addition to indicating the electrode potential as measured at the factory, presents the certification date and the expiration date, which is 12 months beyond the date of certification. IonX Portable Electrodes can be returned annually to the factory for recalibration.



# MILLER TEST REELS

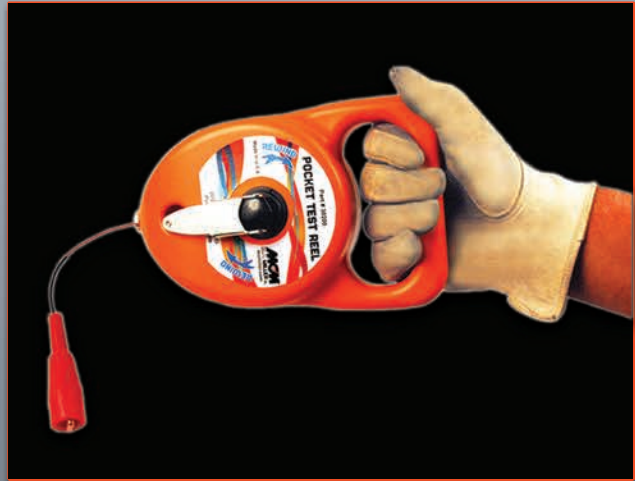
**ONE GREAT DESIGN...TWO GREAT OPTIONS**



## **MAGNUM TEST REEL**

### **PVC-INSULATED WIRE OPTIONS:**

**200ft of #18 AWG Wire** (Item #30218)  
**100ft of #16 AWG Wire** (Item #30215)



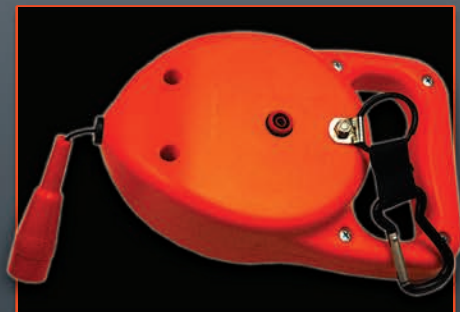
## **POCKET TEST REEL**

### **PVC-INSULATED WIRE OPTIONS:**

**75ft of #18 AWG Wire** (Item #30190)

## **FEATURES & BENEFITS:**

- One-piece steel crank for long life
- "Glovable" grip for cold weather
- Ergonomic design to reduce wrist strain
- Integrated safety banana jack for test lead connection
- 40 Amp copper C-Clip with insulated boot included
- Corrosion-proof body
- Belt clip attached (Pocket Reel)
- Optional Submersible Adapter (replaces C-Clip) - available with the #16 AWG wire option (priced separately)



**POCKET REEL W/ BELT CLIP,  
SAFETY BANANA JACK ALSO SHOWN**





# PROACTIVE SOFTWARE

*Pipeline Integrity for the  
Life  
of Your System*



## ProActive®

### Pipeline Integrity System

**ProActive®**

Pipeline Threat Management

#### Corrosion and Mechanical Damage Prevention Data:

- External Corrosion (Cathodic Protection)
- Internal Corrosion
- Atmospheric (Exposed Pipe)
- Depth-Of-Cover

#### Anomaly Detection & Repair Data:

- ILI (Smart Pig) Surveys
- DCVG Surveys
- Surface Potential Surveys
- Anomaly Direct Inspections

**ProActive®**

Pipeline Integrity System

#### Pipeline Structural Integrity Data Management

- APDM, ISAT & PODS Integration
- Data-Loggers & Mobile Device Support
- Graphical Reports & Asset Mapping
- Customizable Risk Assessment Model
- Remote Monitoring Support



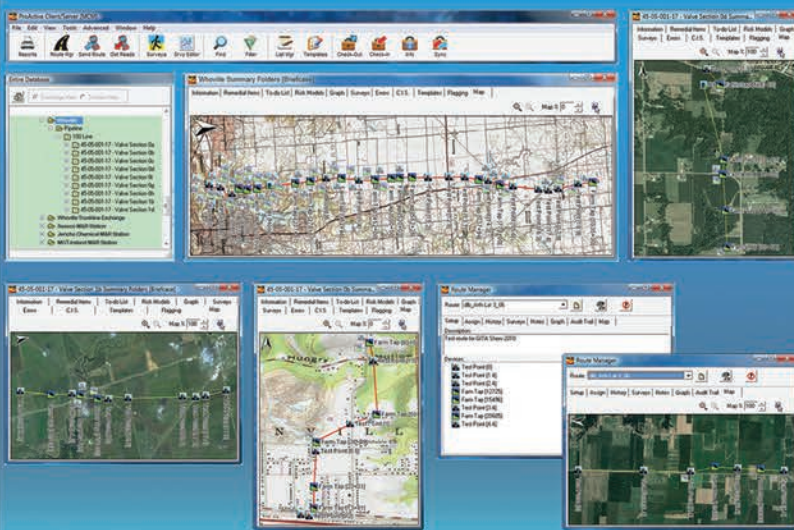


# PROACTIVE SOFTWARE

## ProActive®

Pipeline Asset Mapping

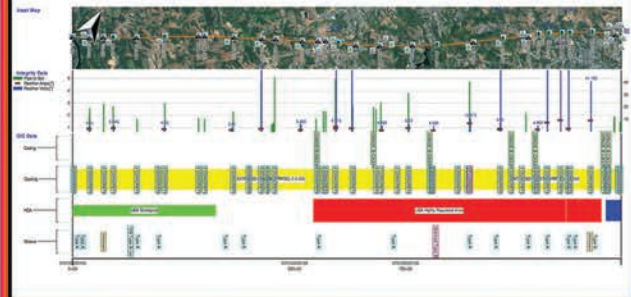
### Integrated Web Service Imagery



## ProActive®

GIS Database Integration

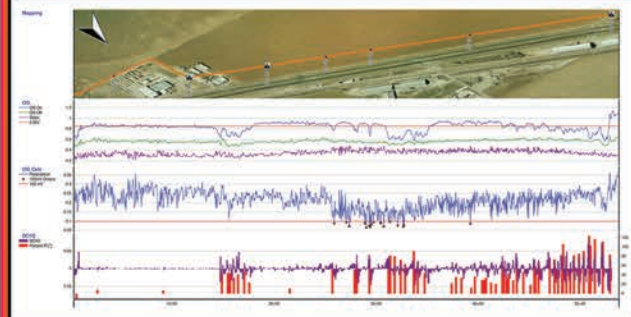
### Pipeline Structural Integrity data support inside GIS Databases



## ProActive®

Graphical Pipeline Reports

### ECDA Graphical Reports



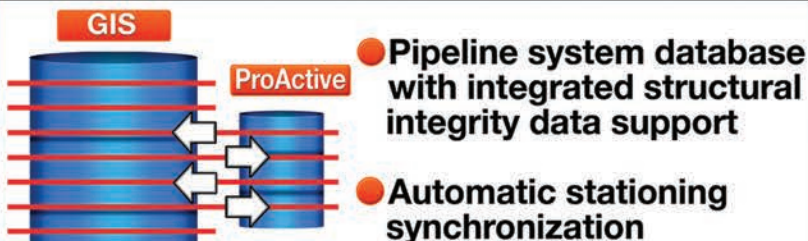
## ProActive®

GIS Database Integration

### Pipeline Structural Integrity data support inside GIS Databases

• APDM • ISAT • PODS

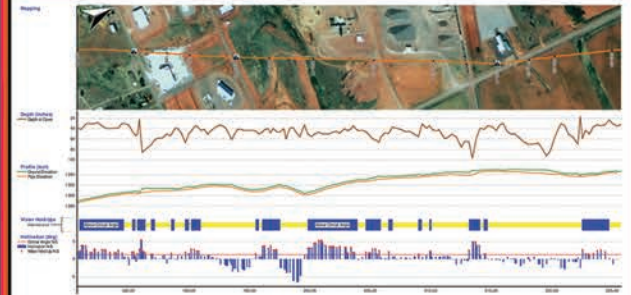
### Pipeline GIS/ProActive Integration:



## ProActive®

Graphical Pipeline Reports

### ICDA Graphical Reports





# NOTES

---



# NOTES

---





# THE M. C. MILLER FAMILY

---



# FREE TRAINING

M. C. Miller is now offering **FREE** in-house **ProActive** and **Gx/iBTVM** training multiple times a year. This training is for any new ProActive and supported ProActive customers. Classes will be limited to 12-16 participants per session.

The list of scheduled dates for these classes and the registration forms are now available on our website ([www.mcmiller.com](http://www.mcmiller.com)). So, visit our website and sign up to come to sunny Sebastian, Florida for this **FREE** training session. The \$800.00 per day training cost will be waived and you will only be responsible for your travel and expenses to attend. All sessions will be 3 days.



+1 772.794.9448 • [SALES@MCMILLER.COM](mailto:SALES@MCMILLER.COM) • [WWW.MCMILLER.COM](http://WWW.MCMILLER.COM)