Frequency Hopping
Spread Spectrum Transmitter

Certification Test Report

FCC ID: R7XTPM2

ACS Report Number: 04-0189-15C

Manufacturer: Test Point Tech, LLC
Equipment Type: Transceiver
Model: TPM2

Manual

Test Point Tech - Test Point Monitor 2 - Installation Instructions

Product description: Self contained, battery powered, Wireless Remote Reading Voltmeter, environmentally sealed, with three external DC voltage measurement input terminals, to measure the pipe to soil Cathodic Protection Voltage on buried carbon steel structures using a Permanent Reference Electrode. Additionally the unit has an internal Programmable Latching Relay connected between terminals V1 and V2 to allow it to make current and instant off voltage measurements when located at the sacrificial anode test point or it can make instant off IR-Free readings and 100 mV shift measurements when using a carbon steel test coupon.

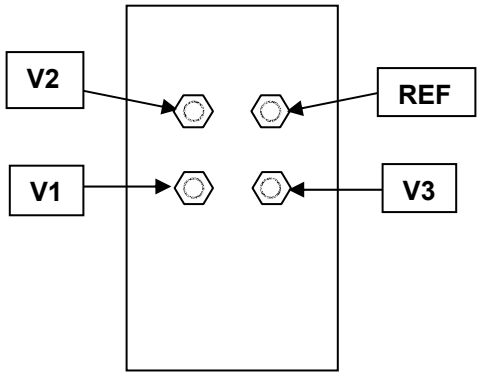
FCC Notice: This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions (1) This device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation. **FCC ID: R7XTPMII**

Warning: This equipment is approved for mobile and portable applications. When using this device a minimum separation distance of 8 inches (20 centimeters) or more should be maintained. To ensure compliance, operation at distances closer than this is not recommended.

Warning: Changes or modifications to this device not expressly approved by Test Point Tech could void the user's authority to operate the equipment.

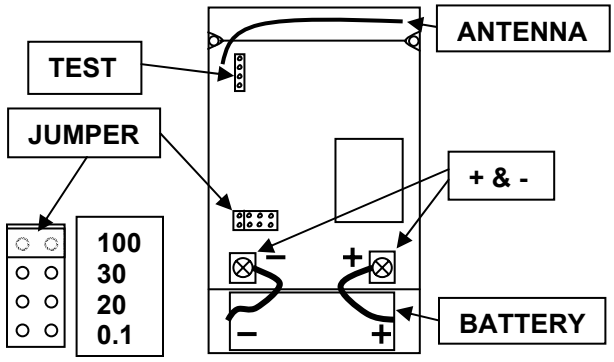
Test Wire Terminals: The four voltage measuring terminals on the back of the unit are as shown.

- **V1** is the Structure Test Wire Connection with a programmable contact closure to connection to V2.
- **V2** is for the Test Coupon or Sacrificial Anode with a contact closure connection to V1 to measure Coupon instant off voltage or Anode current.
- **V3** is a third isolated input to measure Structure or Test Coupon IR free voltage.
- **REF** is connected to a buried Permanent Reference Electrode.



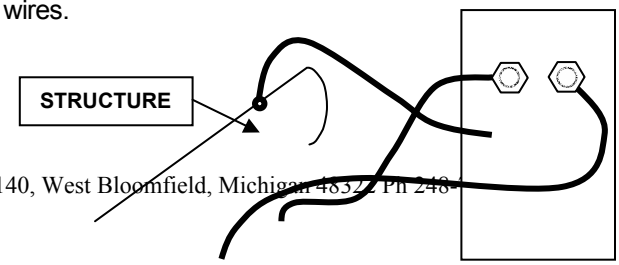
Internal Jumpers and Battery: Remove the front cover panel to access the internal jumpers by removing the two #1 Phillips head screws and pulling the cover out from the top end and lifting up from the bottom catch.

- **100** Jumper is placed here for 1 sq. cm coupon.
- **30** Jumper is placed here for 10 sq. cm coupon.
- **10** Jumper is placed here for 100 sq. cm coupon.
- **0.1** Jumper is placed here for sacrificial anode.
- **+ & -** Battery connection terminals #2 Phillips head.
- **Test** Used for system test and programming.



Typical Installation Wiring: Showing a single Buried Steel Pipe with bonded test wire, a Permanent Reference Electrode and a Steel Test Coupon with two bonded test wires.

- **V1 Structure** test wire connected to Structure.



Cautions for Installation:

- Insure that unit is installed with the Antenna end facing up and the Battery end down. It may be necessary to drill two or more new ¼ inch holes in the Test Station terminal board to allow the Test Point Monitor to fit inside the Test Station cover.

- The four ¼-20 stainless steel hex nuts can be removed and used to mount the Test Point Monitor to the Test Station terminal board to give better cover clearance.

- Insure that when using existing Test Stations the terminal board is toughly cleaned on both sides of all contaminates before mounting the Test Point Monitor. Contaminates along with moisture will cause the Test Point Monitor to give incorrect readings because of high impedances and false current paths.

- When installed in a below grade Road Box the unit must be protected from direct contact with corrosive water by being mounted in a Test Station and for optimum RF performance use a plastic pipe section long enough to locate the top of the Test Station enclosure within 4 inches of the Cast Iron Cover.

- When installed in vaults or Valve Boxes with large covers the unit must be installed with the top of the Test Station within 4 inches of the Cast Iron Cover for optimum RF performance. Use a flange adaptor and suitable clamps or fasteners to hold the Test Point Monitor and Test Station in this position.

General Specifications:

- Three Analog Voltage Monitoring Inputs capable of negative 0-2.5 volts DC +- 0.005 accuracy with 20 Meg Ohm input impedance, 60 HZ AC rejection of 90db and transient voltage protection of 10,000 volts. Higher voltages can be measured using suitable external voltage divider resistors.

- Sacrificial Anode to Structure Current as well as Instant Off IR Free Test Coupon measurements are possible using a programmable 1 amp dual contact zero power latching relay with internal jumper selectable series resistors of 0.1,10,30 and 100 Ohms.

- Using state of the art ultra low power Microprocessor and RF Transceiver technology with Flash memory, 12 bit AD converter, and a internal time of day clock having a 2-second per month accuracy.

- Measure and store twelve voltage readings from three test wire terminals at a field programmable interval of from ½ Hr to 30 days. Other options are factory programmable to customer specifications.

- When interrogated by the wireless RF link with its unit serial number the TPM will send back all of the stored voltage readings and the current internal Lithium battery voltage.

- The wireless RF link uses the North American unlicensed 902-928 MHz ISM band Frequency Hopping Spread Spectrum communications, with a maximum power output of 0.25 watts.

- Wireless communications range in a below grade road box, valve box or regulator vault is 30 - 300 feet depending on conditions while the range in above ground Test Stations is greater than 1,000 feet.

- Powered by a Field Replaceable long life A-size lithium–thionyl chloride cell with an expected life in excess of ten years when programmed for a scheduled interrogation of once a year.

- Designed to fit within a standard plastic 3 inch pipe Cathodic Protection Test Station with Four ¼-20 mounting studs to mount on terminal board in place of the terminal bolts. Dimensions are 4.2" x 2.5" x 0.9" with four 1" long ¼-20 terminals on back side in a 1" center to center square arrangement.

- Epoxy encapsulated electronics will operate in –40 to +85 degrees Centigrade temperatures at 99% humidity. Direct emersion of TPM in water during operation is not allowed under any circumstances due contaminates in the water and high input impedance of the inputs improper operation will result.