



# TINKER & RASOR



CORROSION MITIGATION INSTRUMENTATION  
P. O. BOX 1667 SAN BERNARDINO, CA 92402 TEL: (909) 890-0700 FAX: (909) 890-0736

## PRODUCT INSTRUCTIONS

### MODEL M/1 WET SPONGE HOLIDAY DETECTOR

#### Unpacking Checklist

The Model M/1 Holiday Detector Kit includes the following:

- |   |                                      |
|---|--------------------------------------|
| (1) Model M/1S Unit (085-016)           | (1) Holder, Sponge, Yellow (076-050) |
| (1) Battery, 9v (010-007)               | (1) Knob, Sponge Assembly (094-030)  |
| (1) Cable, Ground, 15' (026-017)        | (1) Sponge Bracket (014-195)         |
| (1) WaterWetter Solution, 4oz (049-013) | (1) Canvas tote bag (028-086)        |
| (1) Wand, 18" (177-071)                 | (1) Instructions                     |
| (1) Sponge, 6" x 3.5" (055-882)         | (1) Warranty/Calibration Document    |



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For updates, please visit our website:

<http://tinker-rasor.com>

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### DESCRIPTION

The Model M/1 Holiday Detector is a highly sensitive device designed to locate holidays (pin holes, voids, etc.) in thin film protective coatings of relatively high electrical resistance when such films are applied to the surface of material of low electrical resistance. In these applications, such as painted metal surfaces, the Model M/1 Holiday Detector will locate these points very accurately with an audible and visual signal. This method of inspection of thin film is a non-destructive test and will not injure the protective coating.

### EQUIPMENT

The Model M/1 Holiday Detector consists of a portable battery powered electronic instrument, a wand handle, sponge assembly (open cell sponge ships compressed, will expand with water), and ground wire. The instrument is housed in a sturdy plastic case with provision for attachment of optional (not included) headphones.

The detector is a "non-destructive wet sponge" type holiday detector. The basic electronic design of the Model M/1 Holiday Detector is that of a very sensitive circuit which is energized by one 9v battery. When current of 500 or 700 (+/- 10%) micro-amperes flows in the circuit, an audible and visual signal is actuated.

The test lead wire used in the ground wire can handle a minimum of 100 milliamps at 100 volts. If replacement or additional wire is needed, make sure it meets these requirements. Up to 100' length of ground wire does not adversely affect the detectors operation, in most cases. If adding additional ground wire, 14 AWG stranded or equivalent is recommended.

The exploring electrode is open-cell sponge material and is conductive when saturated with a wetting solution. The sponge electrode is attached to the non-conductive wand handle by means of the bolt with knob, plastic sponge holder and backing plate.

The wetting solution should consist of potable tap water and a wetting agent. The ratio of one (1) ounce agent to one (1) gallon tap water is recommended. Tinker & Rasor *WATER-WETTER*® is a non-sudsing wetting agent, available in 8 oz. bottles, factory direct or through stocking distributors.

The M/1 is powered by a replaceable 9v battery. The instrument is powered On by sliding the On/Off switch at the top of the case. A Blue LED indicates power.

NOTE: on older M/1 units, a low running tone was used to indicate the instrument was powered On.

The M/1 has belt loops on the back of the instrument so that it can be worn around the waist.

### PRE-ELECTRICAL TEST PROCEDURES

Web: [www.tinker-rasor.com](http://www.tinker-rasor.com)

E-mail: [Info@tinker-rasor.com](mailto:Info@tinker-rasor.com)



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The protective coatings should be dry and free of all contamination prior to electrical holiday testing. Proper curing and drying time of the protective coating must be established prior to conducting electrical holiday testing.

**Note:** Solvents retained in the protective coating film can cause erroneous indications (false holidays) during electrical testing.

The dry film thickness should not exceed 20 mils when electrical holiday testing is done with the low voltage Model M/1 Holiday Detector. Film thickness should be determined with a non-destructive dry film thickness gauge to make sure limits are not exceeded.

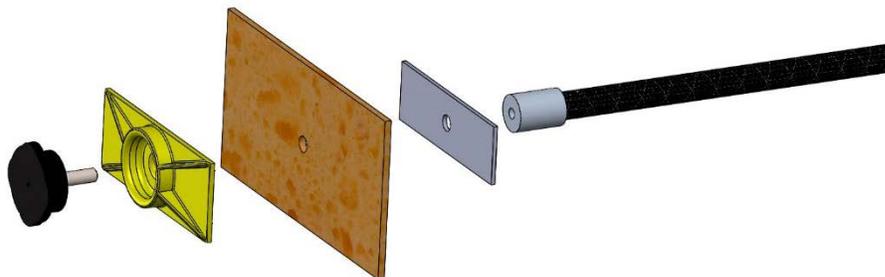
**Special Note:** Ordinary tap water will generally suffice to dampen the sponge electrode, provided the protective coating thickness does not exceed 10 mils. The factory recommended practice is to use a wetting agent at all times, regardless of coating thickness up to 20 mils. The low voltage holiday detector is not recommended for coatings greater than 20 mils of thickness.

Check battery voltage. This can be done by shorting the wet sponge with the bare end of the ground cable of the holiday detector. If a steady, level audible signal is heard, the battery voltage is OK. If the audible signal starts to attenuate while testing, REPLACE battery. Note: A battery output voltage drop of over 10% also indicates weak battery.

### HOLIDAY DETECTOR ASSEMBLY

Assemble the Holiday Detector by first connecting the ground cable to the case. Insert the ground cable banana jack into the 5-way binding post. Connect the Red wand handle cable to the other 5-way binding post.

Attach the sponge bracket (aluminum piece), sponge, sponge holder (plastic piece) and the knob with threaded bolt through all and screw down on the wand end. See Figure 1. Saturate the sponge in a wetting solution.



**Figure 1**

**NOTE ON SPONGE:** The Model M/1 sponge is shipped in a dry and compressed state. The sponge will grow larger and pliable when saturated with water.

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## PRODUCT INSTRUCTIONS

### CHANGING THE BATTERY

The M/1 is powered by a replaceable 9v battery. To access the battery, locate the battery holder on the back of the Red case. See Figure 2. Use a fingernail or small flat head screwdriver to open the battery holder and rotate up away from the case.

Remove the old battery and replace with the new battery. When replacing the battery, observe polarity. See Figure 3. The 9v battery has two terminals side by side. The smaller terminal is the Positive (+) connection, as indicated on the battery (most batteries). The larger terminal on the battery is Negative (-). When connecting the 9v battery to the battery connector, ensure that the terminals are mating with the corresponding connector. If the battery holder does not close easily the battery may be in backwards.



Figure 2



Figure 3

### ELECTRICAL TESTING PROCEDURES

The sponge electrode should contain sufficient amount of wetting solution to assure moisture penetration from the sponge electrode into any defect that may be present in the protective coating. Excess wetting solution should be squeezed out of the sponge electrode.

Attach ground wire directly to the bare structure (substrate) under test. On coated steel structures the ground wire must be directly connected to the bare metal.

On coated concrete structures the ground wire should be connected directly to the reinforcing steel embedded in the concrete. If rebar is not present, a ground connection to the concrete can be made by placing the bare end of the ground wire against the bare concrete surface and anchor it down with a burlap bag filled with damp sand.

The ground wire can be checked quickly for proper connection by contacting the wetted sponge electrode to the bare structure and observing an audible signal, indicating correct electrical continuity of the holiday detector circuit.

The rate of inspection speed of the sponge electrode over the protective coated surface should not exceed sixty (60) linear feet per minute. Using a double stroke of the sponge electrode over each area assures better inspection coverage with less likelihood of any missed areas.

### CALIBRATION

Factory calibration on Model M/1 Holiday Detectors is set at 700 micro-amperes (+/- 10%) of current flow to complete the circuit for the audible signal to indicate a coating holiday on metal substrates. For coatings on concrete substrates, the Model M/1 must be adjusted for current flow of 500 micro-amperes (+/- 10%).

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### ADJUSTMENT OF SIGNAL SYSTEM

Model M/1 Holiday Detector sensitivity may be verified by simply depressing push buttons on the front of the instrument. The instrument is Factory set for use on steel structures.

For use on steel structures, depress **BLACK** button (80K); Detector should signal and **LED** will light if detector is in calibration.

Depress **RED** button (90K): Detector should **NOT** signal and **LED** will **NOT** light if detector is in calibration.

If the detector signals when both the **BLACK** button (80K) and the **RED** button (90K) is depressed, the unit is set for concrete structures. The adjustment is a small jumper setting on the main circuit board. This jumper is accessible by removing the Red case. See Figure 4. Care must be used when separating the Red and Black halves of the case, as the Battery holder is mounted in the Red case and wired to the main board mounted in the Black case.

If the **BLACK** button (80K) fails to signal, the instrument is not in calibration and should be sent for Factory calibration.

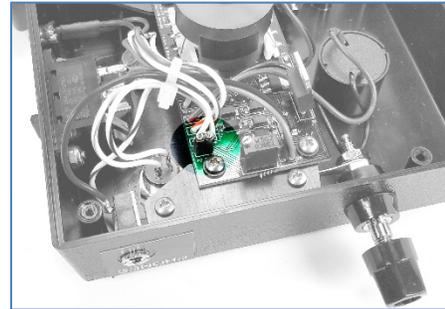


Figure 4

### ACCESSORIES

All accessories included with the instrument (page 1 list) are available for purchase, including additional sponges. Sponge electrodes are available in standard size, as included with new instruments, or as custom size widths, or as disks for internal pipeline coatings. Contact T&R for details.

The M/1 can use optional headphones for loud/noisy environments. Headphones are available for purchase from Tinker & Rasor or many standard headphones with 3.5mm jack will work with the M/1. Older versions of the M/1 accepted a 1/4" stereo jack headphone.

### FACTORY REPAIRS

Holiday Detectors returned to the factory for repairs should be sent TRANSPORTATION PREPAID. In most cases the detector can be repaired and returned the same day it is received at the factory.

**WHEN ORDERING PARTS FOR YOUR DETECTOR OR REQUESTING FURTHER INFORMATION ALWAYS GIVE THE DETECTOR'S SERIAL NUMBER.**

Visit [www.tinker-rasor.com/repair](http://www.tinker-rasor.com/repair) for shipping information and the Repair Form

103-278

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### MODEL M/1S INFORMATION BULLETIN

The electrical holiday detector commonly used for inspection for brushed, sprayed or dip-applied protective coatings is considered a non-destructive device with a source of less than 75 volts applied to the coatings using an electrode consisting of a cellulose sponge dampened with an electrically conductive liquid such as tap water. The electrode pushes a film of liquid over the surface and when a holiday is encountered, current will flow through the liquid to the metal. An audible indicator is used to signal coating defects.

Recommended points to be included in a specification for the electrical inspection of thin film coating with the so-called "non-destructive" type holiday detector, Tinker & Rasor Model M/1 are:

1. The voltage between the electrode (sponge) and the metal surface upon which the coatings lies should not exceed 75 volts measured between the electrode sponge and the coated metal when the detector is in its normal operating position.
2. An electrical connection must be made from the detector to some bare spot on the metal structure to be coated.
3. The holiday detector should be equipped with an audible signal which is responsive to high current flows between electrode and the metal surface.
4. The coated surface should be dry prior to making the inspection and if the surface is in an environment where electrolytes might form on the surface such as salt spray, the coated surface should be washed with fresh water and allowed to dry.

The consensus of the industry is that ordinary tap water will suffice to wet the sponge electrode when this type of electrical holiday inspection is conducted on protective coatings up to 10 mils in thickness. On film thickness between 10 and 20 mils a non-sudsing type wetting agent added to the water is recommended. This allows for faster penetration of the liquid into pinhole defects. A wetting agent such as **TINKER & RASOR'S "WATER-WETTER"** is an excellent product for this purpose. Available in 8 ounce size bottle.

It is further agreed that this type holiday detector is not satisfactory for inspection of protective coatings over 20 mils in thickness and completely ineffective on prefabricated coatings such as PVC, etc.

An electrical holiday detector should be used at the time the coating is applied. The holiday detector should never be used to evaluate the quality or usefulness of a coating and should be used only as an aid in the application of the coating. When the detector is used at the time of application, holidays can be readily located and repaired. The detector not only locates holidays, but it enables the applicator to develop techniques of better application.

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