



## Quick Install Guide M-80 Monitor

This installation manual is a short form guide. It is meant as a reminder of important steps in the M-80 installation process. You should read the **MISSION Model 80 Installation and Users' Guide** before installing an M-80 in-sewer monitor unit for the first time. If you have any questions, please call MISSION'S technical support Help Desk at **877-993-1911** or **678-969-0021**.

### BEFORE YOU START

Ensure you have the tools and parts you'll need for the installation.

| Tools   | Parts   |
|---|---|
| Hammer Drill (Bosch Model SDS Plus – Bulldog 11234VSR) or Equivalent  | M-80 Kit (housing, electronics, radio, battery, fittings, stainless securing cable, latching stainless hook, waterproof wire connections, LEDs) |
| Drill Bit Kit <ul style="list-style-type: none"><li>- 30"L x 3/8"D Masonry Hammer Drill Bit with SDS Connector (Bosch Model S4-HMCT) or Hilty</li><li>- 8"L x 3/4"D Masonry Hammer Drill Bit with SDS Connector (Bosch Model S4-HMCT) or Hilty</li><li>- 6"L x 1/2"D Masonry Hammer Drill Bit with SDS Connector (Bosch Model S4-HMCT) or Hilty</li></ul> | Float (1 or 2), Normally Closed, 125 Degree Tilt to Open, Mercury Switch, 40' Float Cable   |
| Power Rotary Hand Saw (7 1/4")  | Blacktop Elastomeric Driveway Crack and Joint Filler or Quickrete Latex Blacktop Crack Sealer   |
| Masonry Rotary Saw Blade (4" dry / wet diamond blade – premium segmented) or Equivalent   | Waterproof, Marine Grade Shrink Tube for Sealing Float Cable and Antenna Connection   |
| Standard Hand Tools   | Tube of Road Surface Sealant  |
| Plastic or Stainless Cable Ties   | Magnetic Key  |
|   | 1/2" Stainless Masonry Bolt and Nut   |

The M-80 has three (3) operating modes; sleep / ship mode, site test mode and normal operating mode.

**Sleep / Ship Mode** – Sleep / ship mode is used for shipping and storing the M-80.

**Test Mode** – Before installing an M-80 you must test the location to ensure the M-80 will work there. The test mode forces the M-80 to scan the cellular network for the strongest signal and then tests the cellular network to ensure its compatibility with *MISSION*.

**Normal Operating Mode** – Once an M-80 has been tested and installed in a location it must be activated into normal operating mode. Once in normal operating mode the M-80, via the magnetic key, can be put back into sleep / ship mode for removal, storage or re-installation at another location.

### Using the Magnetic Key

Using the magnetic key simply shifts the M-80 from one mode to the next; sleep / ship – test – normal operating – sleep / ship – test – normal operating – sleep / ship, etc.

The magnetic key is held directly above the small key notch that is melted into the surface of the enclosure. This key notch is found on the circular portion of the enclosure just below the seal ring between where the top and bottom



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portion of the enclosure screw together. This notch is no bigger than a match head. *MISSION* places a small piece of yellow tape next to the notch at the factory to more easily identify it in the field, though this piece of tape will probably fall off after months in the sewer. Any strong magnet can be used in place of the circular magnet included with every M-80.

Holding a proper magnet above / over the key notch will initiate a mode switch. This is indicated by the green LED turning on and blinking (except when shifting from test mode to normal operating mode, refer to the Normal Operating Mode section).

### Diagnostic LED's

The M-80 has two (2) diagnostic LED's; one red and the other green. The LED's indicate numerous functions as the M-80 wakes up, tests itself, enters normal operation mode, senses a float trip, sends alarms and, optionally, is put into sleep mode for storage / relocation. Primarily the LED's are used to confirm when the magnetic key has been sensed and that the M-80 is performing a task.

### LED's Alternating Rapidly – Sleep / Ship Mode

When the M-80 is in sleep / ship mode it will not transmit for any reason. The M-80 is put in this mode at the factory for shipping. The M-80 can also be put in this mode if it is being moved from one location to another or is being stored. While in this mode the LEDs may blink in a rapid alternating pattern. This may occur by simply handling the M-80. It simply indicates the M-80 sensed an "interrupt" at the microcontroller. This alternating pattern will go on for approximately five (5) seconds and then stop. The M-80 LEDs will also produce this blinking pattern when it is returning to sleep after awakening for any reason or after it has transmitted a message.

### Green LED on or Blinking

The green LED can turn on steady or blink for a variety of reasons. Primarily it turns on to indicate the M-80 has sensed the magnetic key or to indicate the M-80 is in a countdown or waiting mode. When "keyed" while in sleep / ship mode or in normal operating mode the green LED will begin to blink. This means the key has been detected. Refer to "Testing the M-80 at the Installation Site" and "Relocating / Storing the M-80". If the green LED is continuously blinking the M-80 is waiting to go to normal operating mode after a successful test or is reacting to an input # 2 float alarm trip. Refer to "Putting the M-80 in to Normal Operating Mode" and "Testing – Sending Alarms".

### Testing the M-80 at the Installation Site

Before installing the M-80 you should ensure it would work in the location desired. Because the M-80's antenna is installed in a road surface or in / near a concrete sewer access point there is a reasonable chance you will find locations where the M-80 will not work. The M-80 pre-installation test is designed to determine this prior to installation. The pre-installation test requires a certain signal strength and successful cellular communications to be completed. A successful test must be performed before the M-80 will allow itself to go into normal operating mode and be used for reporting alarms.

### To Perform the Test

- Remove the M-80 from its shipping box,
- Uncoil the antenna cable,
- Attach / connect the antenna cable to the antenna connector found at the bottom of the M-80 (next to the stainless latching hook), carefully screw it on tight,



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- Lay the red coated antenna on the street about eight (8) inches from the lip of the manhole cover or in the case of a field access manhole, lay the antenna on the ground next to the field manhole, do not place the antenna on the manhole cover or any other metal,
- Obtain the magnetic key and locate the key notch on the M-80 (next to yellow tape / small indent on the circular portion of the enclosure just below the top / bottom seal),
- Hold the M-80 so that the LEDs are on the bottom,
- Position the magnetic key on / over the key notch – *Watch for the green LED to start blinking.* When it does count three (3) blinks and remove the magnetic key. The test has now begun.

The test can take up to ten (10) minutes. During the test you will see the green and red LEDs blink occasionally.

**Successful Test** – The green LED will blink every two (2) seconds. Look closely as it may be hard to see the LED in the sunlight!

**Failed Test** – There will be no LED activity. The M-80 will return to the sleep / ship mode and await another test attempt in another location.

Upon a successful test completion, and with the LED blinking every two (2) seconds, proceed with installation. The M-80 will stay in this “post test, awaiting normal mode” state for two (2) hours. The 2-hour period is the anticipated time for installation. Trip inputs will be ignored. After installation you should “key” the M-80 again to activate it into normal operating mode. Do not “key” the M-80 until all connections are made.

### Mounting the M-80 in the Sewer

The M-80 is intended to hang from under the iron manhole casting via its foot long stainless steel top cable. The M-80 comes with a ½” x 2” long stainless steel masonry bolt. Hang the M-80 from this bolt, secured by the nut. The masonry bolt inserts into a ½” hole drilled into the leveling bricks found below the manhole casting.

First drill a 2” deep masonry bolt hole in the concrete/brick area just below the iron manhole casting using a hammer drill with ½” bit. Insert the masonry bolt. Tap the bolt into the hole with a hammer. Tighten clockwise the nut onto the bolt. This will expand the masonry bolt to secure it in the hole. Next, loosen the nut and remove the nut and washer from the bolt.

Slip the loop end of the M-80 top cable over the mounting bolt. Place the washer and nut on the bolt and securely tighten.

### Hanging the Floats

**NEVER** allow the floats to hang directly from the M-80 without using the latching support hook. The float wire “pigtail” that exits from the bottom of the M-80 *IS NOT* designed to support the weight of the hanging floats and doing so will eventually destroy the float wire seal and allow water into the M-80. ***Additionally, the Installer should not place the level sensing floats at such a height so as the M-80 will send alarms during normal sewer flow.***

The M-80 has two float inputs. The red and black wires are for digital input 1 (typically the low float and called “high level”), and the green and white wires are for digital input 2 (typically the higher float and called “emergency high level”).



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### Installing the Antenna

From the edge of the in-road manhole cover measure outward 8 – 10 inches from the edge. Using the  $\frac{3}{4}$ " drill bit, drill a hole 1  $\frac{1}{2}$ " vertically down in the road. Switch to the 27" X  $\frac{3}{8}$ " drill bit. Place the 27" bit in the starter hole and tilt the bit at a 30 to 45 degree angle towards the underground sewer vault. In this manner you can drill through the roadbed and into the sewer vault.

With a  $\frac{3}{8}$ " hole from the road surface into the sewer vault a cut must be made in the road for the antenna elements (the top of the "T" portion of the dipole antenna). Using a power rotary handsaw with a masonry blade set to 1" depth, cut a 12" long slit across the top of the  $\frac{3}{4}$ " starter hole. Make several parallel cuts to accommodate the antenna elements width.

Feed the connector end of the antenna cable into the hole and through to the sewer vault. Pull the cable though so as the red antenna elements sit down in the 12" slit in the road.

Once the antenna sits correctly in the road slit apply the road tar sealant (included) on top of the antenna and slit.

### Waterproof Connections

#### ***USE CAUTION WITH THE HEAT GUN OR OPEN FLAME IN THE HAZARDOUS GAS ENVIRONMENT OF THE SEWER!***

Connect the first float to the red / black wire pair. Use a crimping tool and make secure. Using a heat gun, shrink the ends of the butt connects. Do this to the second float if used. If not used simply leave the connectors empty and proceed with heat shrinking the entire connector assembly. Once the float connection(s) are made and heat shrink sealed, slide the larger 6" heat shrink tube down over the butt connector(s). Heat shrink seal the butt connectors.

With the antenna installed and its cable feeding into the sewer vault, blow the cable connector clean, slide the  $\frac{3}{8}$ " by 4" heat shrink tubing over the antenna cable. Using loops of about 6" bundle the excess antenna cable and avoid sharp bends in the cable, since that will damage it. Secure the cable with plastic ties and screwed into the antenna connector on the M-80. Using a heat gun, shrink the heat shrink tubing to seal the connection.

Once the float connection(s) are made and heat shrink sealed, slide the larger 6" heat shrink tube down over the butt connector(s). Heat shrink seal the butt connectors. This seal is primarily to protect the inner connectors.

### Putting the M-80 into Normal Operating Mode

Once the installation is complete the unit must be shifted from test / installation mode into normal operating mode. ***DON'T FORGET TO DO THIS OR THE M-80 WILL NOT WORK!***

Key the unit again and put it into normal operating mode. The slow flashing green LED will go out and both LEDs will begin to blink; then blink red for about 90 seconds while the startup messages are sent and the lights will then go off. The unit is now in normal operating mode, however, the unit is asleep. To test an alarm, change the state of one of the floats for 90 seconds and the unit will send alarms.

***Call MISSION to confirm receipt of the signals. 877-993-1911***