

Leak-Guardian®

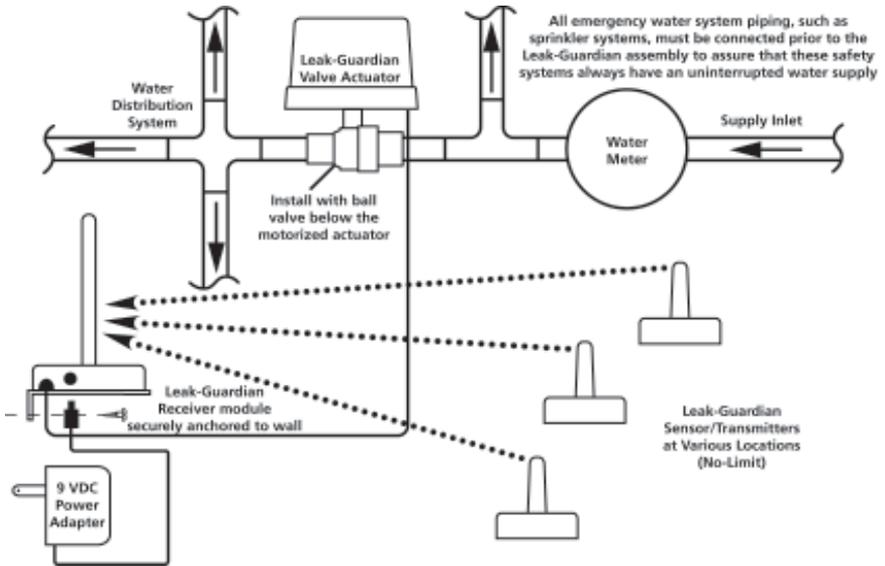
RADIO CONTROLLED LEAK DETECTION/
AUTOMATIC WATER SHUT OFF SYSTEM



2500 SYSTEM GUIDE



The Leak-Guardian® System



Receiver



Actuator



Sensor/Transmitter

1. **The Leak-Guardian System is activated upon sensing any leak where a Leak-Guardian Sensor/Transmitter is located.**
2. **Water coming from the main water supply will be cut-off.**
3. **Residual water may flow down from pipes in the water distribution system.**

Leak-Guardian® Installation

The Leak-Guardian System installation is a simple procedure. Unlike other systems that offer leak protection on a point-by-point basis, where a shut off device must be placed at each potential leak site, the patented Leak-Guardian requires only ONE plumbing connection.

The Leak-Guardian Actuator allows full flow of water in 3/4 or 1 inch water piping systems, when the valve is in the open state. In the OFF state, it completely shuts off the water line to the pipeline downstream from the Leak-Guardian Actuator.

The Leak-Guardian Systems requires these five installation steps:

1. Start by turning off the main shutoff valve for the water system you will be installing the Leak-Guardian into.
2. Install the motorized water cutoff ball valve assembly (The Actuator) onto the water supply line *after* the water meter and *after* fire suppression sprinkler line. (See figure on opposite page). Make sure that the plastic cover is oriented above the ball valve and motor assembly.
3. Attach the Leak-Guardian Receiver to the wall within 8 feet of the ball valve.
4. Remove cover from the Leak-Guardian Receiver, connect the 9-volt battery, replace Receiver cover, and plug the 9-volt AC power supply into the receiver power connector (J2).
5. Remove cover from the Sensor/Transmitter. Pull the insulator shim from the battery holder (see figure 3).

Once the installation has been accomplished, the system is ready to protect your building. Place the Leak-Guardian Sensor/Transmitter at locations where there might be any possible flooding events: Water Heaters, Boilers, Washing machines, Dishwashers, Ice makers, Com-modes, or any other devices that use water from your water system and needs to be protected with the Leak-Guardian System.

IMPORTANT: There is no limit to the number of Sensor/Transmitters that may be placed in a single application.

Test your Leak-Guardian system on a regular basis (see text for test procedures)

The Leak-Guardian Valve Actuator

Size: 3.4" x 4.3" x 6.0"

Power Requirement: 9-13 VDC @ 200mA.

Connection: 8' cable, 4 conductor IDC connector



The Valve Actuator is a low voltage and high torque control device created for the express purpose of reliably shutting off the water line in response to the *shut off signal* generated by the Model-2500 Leak-Guardian System.

Offered in 3/4" and 1" diameters, this valve allows full flow of water in the open, or "ON" position, and is completely closed in the "OFF" position.

The Leak-Guardian motorized actuator has been designed to offer a controlled shutdown of a water supply unlike that of the common solenoid valve that "SNAPS" closed when the signal to shut off is given. The rapid "SNAP" action of the typical solenoid valve creates a dangerous side effect called "WATER HAMMERING". Water hammering is created when the flow of virtually any liquid is stopped very rapidly, and this is especially dangerous with water due to its weight of 62.5 pounds per cubic foot.

Water hammering can generate hundreds of pounds per square inch above the normal water line pressure of 65 to 90 PSI. Pressures of this level are known to break solder joints, rupture hoses, and even cause failures of pipes and water heaters.

The shut off valve of the Leak-Guardian System creates a slow, (2-3 seconds), shut off of water flow, eliminating the possibility of creating a water hammering shock in the line.

Suggested installation of the Leak-Guardian Valve Actuator is done with unions, so that the valve assembly can be inserted or removed from an application without the use of a torch. The use of a pipecutter may be the only tool you will need for this type of installation. Refer to the installation drawing for further details of this suggested method of placing the valve into an application.

Note: You must comply with your local plumbing code.

After installation of the ball valve Actuator in the water distribution pipeline, note that the attached 4-wire cable is inserted onto the 4-pin connector (J1) of the Model 2500 Receiver unit, located adjacent to the power connector (J2).

Once the ball valve connector (J1) is attached, and after being certain that the Receiver battery is in place, replace the cover of the Receiver Unit and reconnect the 9VDC power cord of the power supply.

Note: Do not remove the valve assembly cover.

The internal mechanism of the Leak-Guardian Motorized Ball Valve Actuator has no user serviceable parts. The internal cams of the unit have been precisely adjusted for the correct ON and OFF positions of the ball valve. Any alteration of the cam setting will render the Leak-Guardian System virtually useless.

Important notice:

Do not handle Leak-Guardian unit by the antenna.

Do not pick up the units by the antenna. When installing and transporting, hold only by the body of the units.

Do not operate this system without fresh batteries.

This device is equipped with a battery level indicator that will inform the user of a low battery. An audible alarm of about ½ second approximately every three minutes, will indicate the low battery.

There is no way to shut off the low battery level alarm beeping condition, except for the removal of the battery. This override is provided to the user as a shutoff for the beeper, and can only be accomplished with the intervention and knowledge of the user.

Do not disable the low battery alarm for an extended period of time.

The Leak-Guardian Receiver module will not beep indicating a low battery condition when the system is operated without a battery in place. Without a battery in place, the system will also lack the capacity to shut off the water system in the event of a flood, during a power failure.

Test your Leak-Guardian system once every month.

Externally available "OPEN" and "CLOSE" pushbuttons are provided for the user to test the system, as well as turning the water supply on and off for emergencies or repairs.

When the Leak-Guardian system is installed, the system should be tested (preferably once a month) by removing the 9VDC power plug from the side of the Leak-Guardian Receiver module, (figure 6). Press the "CLOSE" button, (figure 4), while watching for the "SHUTOFF" LED to illuminate. This should happen within 5 seconds. If it takes longer than 6 seconds, it is an indication of a low battery power, and the battery should be replaced. Pressing the "OPEN" button will turn the water supply back on and cause the LED to shut off.

After testing the system, be certain to replace the 9VDC power plug back into the Leak-Guardian Receiver module. Refer to figure 7 when replacing the battery.

The Leak-Guardian Receiver module battery will back up your 120V power for as much as 24 hours, in the event of a power failure. The backup battery should be replaced after power has been lost for any extended period of time. The low battery voltage alarm may not be the best indicator of the status of the battery. Always replace the battery when power failures have extended beyond a period of approximately 12 hours.

The Leak-Guardian Sensor/Transmitter

Size: 2.675" square, height: .925"

Frequency of operation: 418mhz.

Power: +8 dbm max. (6.4 mw)

Batteries: 2 ea. 20mm coin (CR2032)



The Leak-Guardian Sensor/Transmitter is equipped with a transistorized circuit that is specifically designed to extend the life of the internal batteries to their maximum capacity by not using any power until it senses a leak.

When a leak is detected by the sensing pads of the Leak-Guardian Sensor/Transmitter, (figure 2), power is sent through the unit which then transmits a radio signal to the Leak-Guardian Receiver module, closing the incoming water supply, thereby eliminating a potential flood.

Enabling the Sensor/Transmitter:

The Leak-Guardian is shipped from the factory with an insulator shim; (figure 3). The insulator shim *must be removed* from the battery holder of the Sensor/Transmitter to initialize the unit. Failure to remove this shim will render the leak Sensor/Transmitter unable to detect a leak, and be unable to transmit a signal to the Receiver.

How to remove the Insulator shim from the Sensor/Transmitter:

1. Remove the four screws from the bottom of the Sensor/Transmitter.
2. Gently remove the cover.
3. Pull out the shim from the battery holder, (see figure 2).
4. Carefully replace the cover and the four screws; (do not over-tighten).

Selecting an address:

The Leak-Guardian Sensor/Transmitter and the Leak-Guardian Receiver module communicate using a radio linked data protocol that requires the address selection switches on each respective unit to contain matching addresses. Addresses are the patterns of the on/off selections made for each of the switches numbered 1 through 8; (figure 9). The Leak-Guardian Receiver module is equipped with an equivalent 8-position switch that *must* be set with the same switch pattern as the Leak-Guardian Sensor/Transmitter.

Due to the many address selections available, your factory set Leak-Guardian system address may match the address of some other device; (ie: a remote garage door opener, or another Leak-Guardian system in a neighbors home).

In such cases a new address pattern will need to be set. The newly selected transmitter address must be duplicated into the Leak-Guardian Receiver module and all other Leak-Guardian Sensor/Transmitters. (See "Leak-Guardian Receiver module" specifications.)

Placement of the Leak-Guardian Sensor/Transmitter:

The Leak-Guardian Sensor/Transmitter should be placed in positions on the floor near any potential source of a water leak; (example: at the base of a water heater, a washing machine, dishwasher, ice maker, etc.). Be sure to place the Sensor/Transmitter in a dry place that is at the lowest level possible where any leaking water will tend to collect; (See below for examples of placement).



Testing the Leak-Guardian:

The battery operated Leak-Guardian Sensor/Transmitter, requires that it be tested on a monthly schedule in order to insure that it is always functioning properly.

Testing the Leak-Guardian is as simple as picking the unit up, wetting the tip of a finger, and placing the wet fingertip between the main sensing pad and the *two active screws*, (the two screws that are sectioned off from the main sensing pad), on the bottom of the unit; (figure 2). The red LED on the Leak-Guardian Sensor/Transmitter will illuminate and the Leak-Guardian Receiver module will respond by shutting off the water supply.

If the system fails to respond, change the Leak-Guardian batteries immediately.

How to replace the battery in the Sensor/Transmitter:

1. Remove the cover from the Sensor/Transmitter by removing the four screws from the bottom of the Sensor/Transmitter.
2. Gently remove the cover.
3. Remove the two coin batteries from holder; (see figure 2).
4. Replace with two new coin type batteries.
5. Replace the cover, and the four screws; (do not over-tighten).

Note: See P.14 for battery replacement instructions for Receiver Module.

Note: Do not handle the Leak-Guardian Sensor/Transmitter or Receiver Module by the antenna.

Electronic devices are sensitive to static electrical discharges. Walking on carpets, wearing certain clothing, and numerous other sources can generate very large static charges. Always pick up the Leak-Guardian Sensor/Transmitter by the plastic body and touch the bottom grounding surface first. This will reduce the risk of discharge damage. Avoid touching receiver Antenna.

LEAK-GUARDIAN SENSOR/TRANSMITTER MODULE

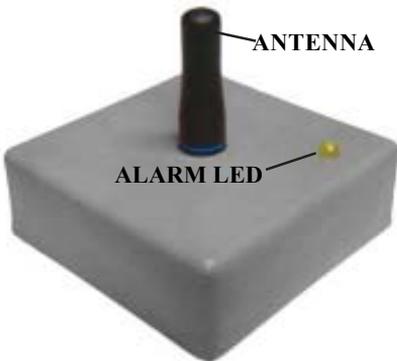


FIGURE 1 - TOP VIEW

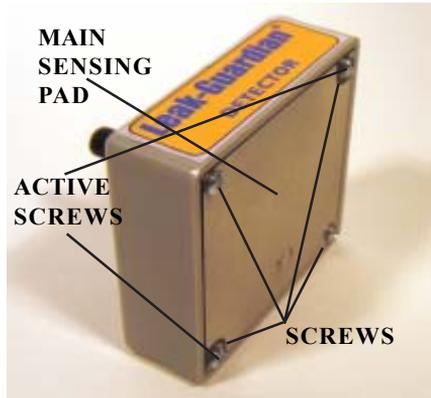


FIGURE 2 - BOTTOM VIEW

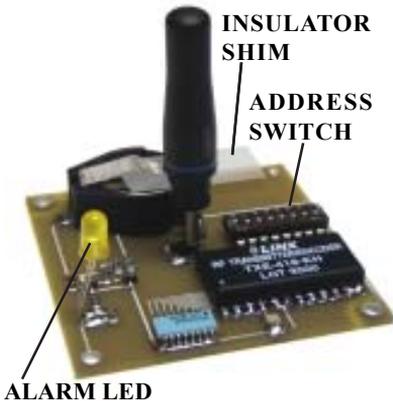


FIGURE 3 (COVER REMOVED)

Batteries: (2) CR2032 3 Volt Lithium

Note: Place both cells with the Plus (+) side *facing up*, when replacing the batteries.

ALWAYS REPLACE BOTH BATTERIES.

Always check that the antenna-to-antenna clip connection is tight. Use caution when tightening the connection, as it is possible to break the antenna clip off of the printed circuit board. Antenna breakage will result in the unit being unable to operate normally and require factory repair that is not covered under the warranty.

Never operate the unit without the antenna in place.

Picking up the Leak-Guardian by the antenna can cause an accumulated high voltage static discharge to be conducted directly into the Leak-Guardian electronics via the antenna lead, and cause permanent damage to the unit.

Damage to Leak-Guardian units caused by antenna-induced discharge failures are not covered under the warranty.

The Leak-Guardian Receiver module:

Size: Width: 4.6" depth: 3.0" height: 1.1"

Frequency of operation: 418MHz. / -97dBm

Power input: 9VDC @ 300mA

Internal battery: 9VDC 625mA



The Leak-Guardian Receiver module is a low voltage system that is tuned to the transmitting frequency of the matched Leak-Guardian Sensor/Transmitter.

When the Leak-Guardian Sensor/Transmitter senses a leak, power is sent to its internal transmitting unit which then transmits a radio signal to the Leak-Guardian Receiver module. The Leak-Guardian Receiver module decodes the properly addressed radio transmission and closes the incoming water supply by energizing its internal drive ball valve circuit. This controls the Leak-Guardian motorized ball valve, which is connected to J1 of the Leak-Guardian Receiver module.

The Leak-Guardian Receiver module incorporates an internal 9VDC battery for power loss backup for up to 24 hours. The battery must be replaced with a *high-energy* 9VDC/ 625mAh capacity, or better.

Do not use a 9VDC Ni-Cd or Ni-MH Rechargeable batteries.

Selecting an address (figure 9)

The Leak-Guardian Sensor/Transmitter and Receiver module communicate using a radio linked data protocol that requires the address selection switches on each respective unit to contain matching addresses. Addresses are the patterns of the on/off selections made for each of the switches numbered 1 through 8 as can be seen in figure 9. The Leak-Guardian Sensor/Transmitter is equipped with an equivalent 8-position switch that must be set with the exact pattern set in the Leak-Guardian Receiver module.

Due to the many address selections available, your factory set Leak-Guardian system address may match the address of some other device as the Leak-Guardian; (example: a remote garage door opener, or another Leak-Guardian system in a neighbors home).

In such cases, a new address pattern will need to be set on the address selectors. The newly selected Receiver address must be duplicated within the Leak-Guardian Sensor/Transmitter module and all other Leak-Guardian Sensor/Transmitters. (See "Leak-Guardian Sensor/Transmitter module" specifications.)

9 VDC battery backup; (figure 7):

The Leak-Guardian Receiver module uses an internal 9VDC-625mAh battery for *24 hours of backup protection*. The battery should be tested at least once every month to assure that the backup power is available; (See step 5 to 8, P.13). Circuitry inside the Leak-Guardian Receiver module will indicate a low voltage condition of the battery by sounding the alarm. When this alert is heard, replace the battery immediately, using the approved batteries only; unapproved batteries may cause the Leak-Guardian to malfunction and fail to protect against a flooding event.

There is no way to shut off the low-battery alarm sound *except* for the removal of the old battery and subsequent installation of a fresh battery. If the battery is removed, there will not be a power-failure backup, this will result in the possibility of an uncontrolled flooding event.

Do not operate the Leak-Guardian Receiver module without a good battery for an extended period of time.

Note: Although the internal circuitry of the Leak-Guardian Receiver module will generate an audio alert flag of a low-voltage condition of the battery, do not rely on this alert alone for prompting a change of batteries; the audio alert is **not** a substitute for monthly testing.

Alarm condition:

The Leak-Guardian Receiver module can be activated by 2 conditions:

1. Radio reception from any Leak-Guardian Sensor/Transmitter (Receiver LED will flash and Sonic Alarm will beep), when it senses a leak.
2. Leak-Guardian Receiver test procedure, P.13 (LED will be solid on).

Either alarm condition will cause the Leak-Guardian Receiver module to close the Leak-Guardian motorized ball valve. When the Leak-Guardian Receiver module closes the ball valve, it will indicate this condition by:

1. The front panel red LED will begin flashing.
2. The sonic alarm will sound in $\frac{3}{4}$ second beeps every 2 seconds.

Manual controls:

The manual control switches of the Leak-Guardian Receiver module are located underneath the mounting plate (figure 4).

Silencing the alarm warning:

When the Leak-Guardian Receiver module signals a leak alert, the alarm sound can be silenced *without* affecting the state of the shutoff valve.

Pressing the **“silence”** button will cause the alarm to stop. The red LED will *continue* to flash while the Leak-Guardian valve remains closed until the cause of the alarm condition can be remedied and the open button is pressed.

Opening the Leak-Guardian valve: The Leak-Guardian Receiver module “open” switch; (figure 4), will cause the Leak-Guardian Actuator module to rotate the Leak-Guardian valve into the open condition.

Note: If the Leak-Guardian ball valve is already in the open state, initiating the “open” switch will cause the valve to rotate 180° back to the “open” state.

Closing the Leak-Guardian valve: The Leak-Guardian Receiver modules “close” switch (figure 4) will cause the Leak-Guardian Receiver module system to rotate the Leak-Guardian valve into the closed condition.

When the Leak-Guardian is in a closed state:

1. If the Leak-Guardian valve is already in the closed state due to the initiation of a manual close request, pressing the “close” switch will cause the valve to rotate into its “open” state and then back to “closed”.
2. If the Leak-Guardian valve is in the closed state due to a leak initiated closure, the Leak-Guardian Receiver module *will not* respond to pressing the “close” switch.

Testing the Leak-Guardian Receiver module:

On a regular basis, the Leak-Guardian Receiver module should be tested. The proper way to test the system is as follows:

1. Press the "close" switch: the Leak-Guardian valve should close. Valve closure can be verified by the shutoff of the water supply. The red alarm LED *will* illuminate, the sonic alarm *will not* be heard.
2. Press the "open" switch, the Leak-Guardian valve should open. The valve open state can be verified by the return of the water supply flow. The red alarm LED will turn off.
3. Activate any of the Leak-Guardian Sensor/Transmitters used within the system and the Leak-Guardian Receiver module will shut off the water cutoff valve. Valve closure can once again be verified by the shutoff of the water supply. The red alarm LED will begin to flash and the sonic alarm will sound.
4. Press the "open" switch and the Leak-Guardian valve will open. The valve open state can be verified by the return of the water supply flow. The red alarm LED will turn off and the sonic alarm will stop.
5. Remove the 9VDC power pack cord from J2, (figure 5 & 8), to activate the internal battery back-up.
6. Activate the Leak-Guardian "Close" switch, or any of the Leak-Guardian Sensor/Transmitters used within the system and the Leak-Guardian Receiver module will shut off the Leak-Guardian water cutoff valve. Valve closure can once again be verified by the shutoff of the water supply. The red alarm LED will begin to flash and the sonic alarm will be heard in short beeps if the receiver is activated by a Leak Sensor/Transmitter.
7. Press the "open" switch and the Leak-Guardian valve will open. The valve open state can be verified by the return of the water supply flow. The red alarm LED will extinguish and the sonic alarm will stop.
8. **Note:** Plug the 9VDC power pack cord back into connector J2.

Changing the Receiver battery:

When the internal battery needs to be changed, the following procedure should be followed:

1. Remove the two case mounting screws; (figure 8).
2. Unplug the 9VDC power pack cord from connector J2.
4. *Carefully* pull the plastic cover off of the aluminum mounting plate in a vertical motion. The antenna support bushing holds the antenna tightly so that it remains perpendicular to the aluminum mounting plate. By jerking the case off of the mounting plate in any other than a vertical motion, the antenna may become separated from the internal antenna-mounting clip. If this should occur, use a small phillips screwdriver to tighten the connection before the case is replaced. Avoid over-tightening this connection, severe torque can break the antenna off the printed circuit board. This will result in a condition that will require factory repair that is not covered under warranty.
5. Remove the old battery and insert a new battery into the clips, *observing polarity*; (figures 7).
6. Replace the case onto the aluminum mounting plate in a vertical motion. Be careful not to bend the antenna.
7. Push the case down over the antenna base until the case is flush against the mounting plate. Make sure the ball valve actuator cable is in its original position.
8. Replace the two case mounting screws, until they are snug.
Note: avoid over-tightening the mounting screws.
9. Plug the 9VDC power pack cord back into the connector J2.
10. Plug the 9VDC power pack back into wall outlet, if removed.

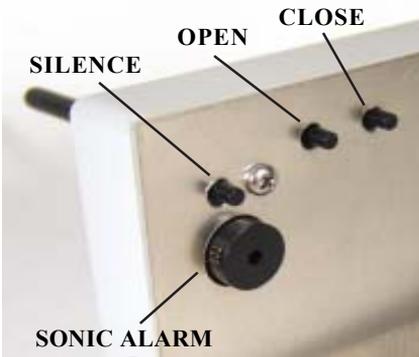


FIGURE 4. RECEIVER MOUNTING BASE

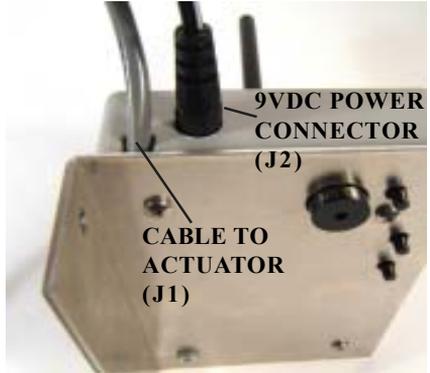


FIGURE 5

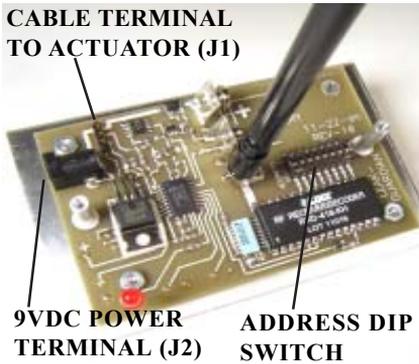


FIGURE 6 - INTERNAL VIEW



FIGURE 7 - BATTERY

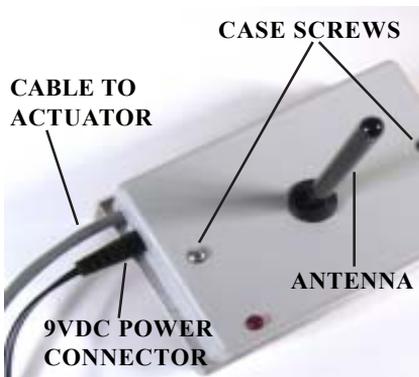


FIGURE 8

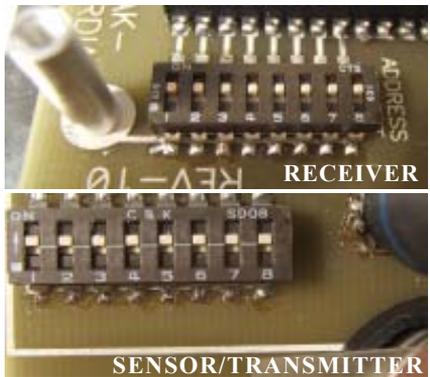


FIGURE 9 ADDRESS SWITCHES

LEAK-GUARDIAN LIMITED WARRANTY

Petro-Meter Corporation Warrants its Leak-Guardian systems to be free from manufacturing defects in materials and workmanship for a period of 180 days from the original date of purchase, and its water control cutoff valves for one year after the original installation.

Petro-Meter Corporation Will, within said period, at its option, repair or replace any product failing to operate, and return such product, without charge, to the original purchaser or user, provided it is returned to Petro-Meter Corporation By the original user or purchaser, with all shipping costs prepaid and insured, in an appropriately protected shipping container if not the original protective packaging.

Petro-Meter will not assume any additional liability for products that sustain further damage caused by inappropriate packaging when shipping items back for factory repair or replacement.

This warranty shall not apply to any equipment or any part thereof, which has been repaired by other than Petro-Meter Corporation, improperly installed, improperly used or adjusted, abused, altered, physically or electrically damaged, subjected to acts of god, or on which serial numbers have been altered, defaced or removed. The seller will not be responsible for any dismantling or reinstallation charges or fees.

There are no warranties, express or implied, which extend beyond the description on the face hereof. There is no express or implied warranty of merchantability or a warrant of fitness for a particular purpose.

This warranty is the sole warranty in its entirety. Any prior agreements or representations, whether oral or written, are either merged in this warranty or are expressly cancelled. Petro-Meter Corporation Neither assumes, nor authorizes any other person purporting to act on its behalf to modify, to change, or to assume for it, any other warranty or liability concerning its products.

Additionally, this warranty is in lieu of all other obligations or liabilities on the part of Petro-Meter Corporation Seller's warranty, as hereinabove set forth, shall not be enlarged, diminished or affected by, and no obligation or liability shall arise or grow out of, seller's rendering of technical advice or service in connection with buyer's order of the goods furnished hereunder.

Petro-Meter Corporation Requires that all installed Leak-Guardian flood prevention systems be completely tested on a regularly scheduled basis and that no adjustments be made to any component of the system, except for those made by personnel qualified and or trained in such an adjustments or modifications, and that no such adjustments or modifications be made without express written permission by Petro-Meter Corporation Incorrect or inappropriate adjustments will cause the Leak-Guardian system to fail or to operate improperly.

Petro-Meter Corporation Limits its liability for any loss or damage, including incidental or consequential damages arising from the failure of its product to Leak-Guardian Inc.'s original selling price of the product regardless of the cause of such loss or damage.

Since Petro-Meter Corporation Hereby represents that it is not an insurer of either the property or safety of the user's family or employees, if the user wishes to protect itself to a greater extent, Petro-Meter Corporation Will, at the user's sole cost and expense, obtain an insurance policy to protect the user, supplemental to the user's own insurance policy, at a premium to be determined by Petro-Meter Corporation's insurer, upon written notice from the user, verified by certified mail, return receipt requested, to Petro-Meter Corporation's home address, and upon payment of the annual premium cost by the user.

Any action for breach of any expressed or implied warranty must be brought within 6 months following the end of warranty period. In no case shall Petro-Meter Corporation Be liable to anyone for any consequential or incidental damages for breach of this or any other warranty, express or implied, even if the loss or damage is caused by the seller's own negligence or fault.

Warning: Any electronic system is susceptible to unforeseeable random failure, and as such, it is possible for this system to fail to operate or perform as expected despite frequent testing. Malfunction can be due to electrical disturbances or disruptions, communications malfunctions or disruptions, criminal tampering, unauthorized adjustments, or other means beyond the seller's control. Petro-Meter Corporation Does not represent that the system/product may not be compromised or circumvented; or that the product or system will prevent any personal injury or property loss. A properly installed and maintained system may only reduce the risk of flood damage, or otherwise but it is not insurance or guaranty that these events will never occur.

Consequently, the seller shall have no liability for any personal injury, property damage, or other loss based on a claim that the product failed to stop a flooding event. To mitigate any such loss occurrence, system confidence testing on a weekly, or no longer that a monthly basis, is absolutely crucial.

The consumer is hereby advised to take any and all precautions for his or her safety and the protection of the premises in order to mitigate the possibilities of harm and/or damage should the Leak-Guardian system experience a random electronic failure beyond anyone's control or prediction.

This warranty shall be construed according to the laws of the state of New York. Some states do not allow limitations on how long an implied warranty lasts or do not allow the exclusion or limitation of incidental or consequential damages, or differentiate in their treatment of limitations of liability for ordinary or gross negligence, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other rights that vary from state to state.