

# IRRIGATION TROUBLESHOOTING GUIDE

Provided by Rain Bird and modified by Maddox Irrigation

(Most situations will work for all manufacturers (Hunter, Toro, K-Rain, etc.))

## TABLE OF CONCERNS

- WATER SEEPS SLOWLY FROM SOME OF MY SPRINKLERS
- SYSTEM STOPS AND THEN STARTS AGAIN
- ONE AREA OF MY SPRINKLER SYSTEM STAYS ON ALL THE TIME
- MY SPRINKLER TIMER COUNTS DOWN AND/OR APPEARS TO BE RUNNING NORMALLY, BUT NO WATER COMES OUT
- MY TIMER HAS A BLANK SCREEN OR SAYS AC/OFF, PR OFF, OR PO/OFF
- MY SPRINKLERS ARE NOT PROPERLY COVERING THE AREA THAT THEY NEED TO LEADING TO BROWN SPOTS IN SOME AREAS AND OVERWATERING IN OTHERS
- SOME SPRINKLERS WILL NOT POP UP OR WILL ONLY POP UP PART WAY

### **CONCERN: WATER SEEPS SLOWLY FROM SOME OF MY SPRINKLERS**

**First, monitor the system and determine whether water only seeps for a little while after irrigation and then stops or if it continues to seep throughout the day.**

#### **If the water continues to seep throughout the day:**

The issue with your sprinkler systems is most likely related to the valve in your system that operates the zone that continues to run.

#### **If the water only seeps for a while after irrigation then stops:**

Gravity plays a large factor in any irrigation system. If one of your sprinkler heads is positioned lower than the others (such as at the bottom of a hill or incline), standing water in your pipes will flow there when your system is turned off. If there is enough water, it can build enough pressure to push up through the head and cause the head to trickle or leak.

There are two possible solutions. The first is to replace the head with one using Rain Bird's patented Seal-A-Matic (SAM) technology. This will prevent water below a certain pressure (such as standing water not under the operating pressure of your system) from entering the sprinkler head, avoiding leaks.

If a SAM version of your head is not available, you can also install a check valve. This works similar to a SAM, but installs in your pipes, and also prevents the flow of water below a certain operating pressure.

### **CONCERN: SYSTEM STOPS AND THEN STARTS AGAIN**

You may have multiple start times programmed into your timer. Each start time will run all of your stations (zones) in order until the watering cycle is complete. You do not set a separate start time for each station.

If a start time falls within another watering cycle, the cycle will repeat when the first one is finished. For example, say you have two start times, one at 6:00 am and another at 6:10 am. You have four stations, each set to run 10 minutes. At 6:00 am, the cycle will run for 40 minutes (10 minutes each station). Because the first cycle is still running at 6:10 am, the second start time will be pushed at 6:40 am, after the first cycle is complete. For more information, please refer to your controller programming guide.

Most timers also have multiple programs. When checking for multiple start times, be sure to check all of your programs as well.

**CONCERN: ONE AREA OF MY SPRINKLER SYSTEM DOES NOT TURN OFF**  
**First, monitor the system and determine whether water comes out of the sprinklers for a period of time after the system turns off and then stops.**

**If water continues to come out of your sprinklers and then stops:**

Gravity plays a large factor in any irrigation system. If one of your sprinkler heads is positioned lower than the others (such as at the bottom of a hill or incline), standing water in your pipes will flow there when your system is turned off. If there is enough water, it can build enough pressure to push up through the head and cause the head to trickle or leak.

There are two possible solutions. The first is to replace the head with one using Rain Bird's patented Seal-A-Matic (SAM) technology. This will prevent water below a certain pressure (such as standing water not under the operating pressure of your system) from entering the sprinkler head, avoiding leaks.

If a SAM version of your head is not available, you can also install a check valve. This works similar to a SAM, but installs in your pipes, and also prevents the flow of water below a certain operating pressure.

**If watering continues look at your sprinkler timer and determine whether it is running or counting down. If it is:**

Your sprinkler timer is running as programmed. To change the program, the time at which it waters, please refer to your timer manual. If you do not have a timer manual, most manufacturers have one available on their website.

**If watering continues even when the controller is not running or counting down an irrigation schedule, try the following:**

Unplug the controller. If no program is running and unplugging the controller stops the system from running then most likely there is a problem with your irrigation controller. Try plugging the controller back in and see if watering resumes.

If unplugging the controller does not stop the system from running, the issue with your sprinkler system is most likely not related to the timer. It is most likely related the valve in your system that operates the zone that continues to run.

**CONCERN: MY ENTIRE SPRINKLER SYSTEM STAYS ON ALL THE TIME**  
First, answer the following question. Has your irrigation system been running normally for a while and only recently has begun to run all of the time?

**If your answer is: NO, my sprinkler system was recently started after being off for a long period of time and is constantly running then you will need to review the following steps:**

To prepare a system for a new irrigation season, reverse the steps for winterization. These include:

1. Close all manual drain valves
2. Make sure the solenoids and bleeder screws on all irrigation valves are “hand tight”
3. Reconnect wires to relays and valves, if they aren’t already connected
4. Check that the timer is plugged in and receiving power
5. Double check your controller programming
6. Set the timer to the ON or AUTO position

If your system has a back-flow preventor or pump, consult the manufacturer’s instructions for spring start-up procedures.

**If your answer is: YES, my system has only recently begun to operate continuously then you need to ask the following question. Does my sprinkler system stop and then start over and over again? If yes, please read the following. If no see the next set of bold type.**

You may have multiple start times programmed into your timer. Each start time will run all of your stations (zones) in order until the watering cycle is complete. You do not set a separate start time for each station. If a start time falls within another watering cycle, the cycle will repeat when the first one is finished. For example, say you have two start times, one at 6:00 am and another at 6:10 am. You have four stations, each set to run 10 minutes. At 6:00 am, the cycle will run for 40 minutes (10 minutes each station). Because the first cycle is still running at 6:10 am, the second start time will be pushed at 6:40 am, after the first cycle is complete. For more information, please refer to your controller programming guide.

Most timers also have multiple programs. When checking for multiple start times, be sure to check all of your programs as well.

**If you do not have multiple start times as described in the above section please follow the instructions and troubleshooting steps in the section “CONCERN: One area of my sprinkler system does not turn off.” This could be a controller or valve issue that is explained in that section.**

## **CONCERN: MY SPRINKLER TIMER COUNTS DOWN AND/OR APPEARS TO BE RUNNING NORMALLY, BUT NO WATER COMES OUT**

**If your sprinkler system has operated normally recently, please follow the steps below:**

### **Do you have a rain sensor?**

Determine whether a rain sensor is hooked up to your controller. Rain sensors are often hooked into the “sensor” terminal of your controllers wiring terminal area and will be located on an overhang or outside object. If you have a wireless rain sensor there will also be a receiver mounted next to your controller.

If you have a rain sensor and it has recently rained the rain sensor on your system has most likely suspended the operation of your sprinkler system due to the recent rain. It is normal for the timer to continue to appear to run with no water coming out in this situation. When the rain sensor dries out, it will allow the system to water normally.

If you have a rain sensor and it has not rained recently and the timer appears to count down and appears to be running normally without water coming out the rain sensor in your system may not be operating properly.

### **Is the primary water source turned on?**

Locate and turn on the primary water to the system. If this is the first time the system has been on for some time, the water supply may have been turned off. This would occur during winter in some areas or perhaps after work on the system was done. It may also occur if you have just moved in to a newly purchased house. In many new homes the primary water source can be found next to the valve manifold where the water pipes enter your house. Often times the landscape contractor will tee into your domestic supply here to provide water to the irrigation system. Locate the isolation valve just after the tee and make sure this is turned on.

### **Have there been recent repairs or digging in the yard?**

Digging in the yard without knowing the location of any buried valve wires could cause damage to your irrigation system. Also, in many cases, if this digging has been done by the homeowner or a landscape contractor other than the installing contractor this will void any warranties. The next step is to check the wiring between your timer and the solenoids on your zone valves to ensure no wires have accidentally been broken, become loose or disconnected. If you are uncomfortable working with electricity, you may want to contact Maddox Irrigation at 586-421-1900.

First, visually inspect the wires to ensure there are no obvious loose or broken wires that need to be repaired or replaced. If the wires go underground or out of sight, you can check continuity by using a device called a volt-ohm meter. Set the meter to test ohms resistance. Remove power to the timer. Place one probe on the timer’s common terminal (marked “C” or “COM”), and the other on one of the numbered station terminals. The reading should be between 20 and 60 ohms. If it is significantly higher or lower than this, the wiring to that zone may need to be repaired or replaced. Repeat this process for each zone. If all of the zones fail, the issue may be in the common wire, which runs between the timer and all valves.

**If none of the above situations apply to your problem then:**

The next step is to test the timer to insure it is putting out the proper voltage to operate the valves. If you are uncomfortable working with electricity, you may wish to contact Maddox Irrigation to do this for you.

You will need a device called a volt-ohm meter to perform this test. It must be performed while the timer is running; consult the manual for your timer for instructions on how to manually start it and advance through stations.

Set the meter to test for AC voltage. Place one probe on the common terminal of the timer (marked "C" or "COM"). Place the other on the numbered terminal of the station currently counting down on the timer's display. You should see a reading of between 22 and 28 volts AC. Repeat this test for each station. If one or more station terminals are putting out less than 22 volts AC, or are putting out no voltage at all, please contact Maddox Irrigation at 586-421-1900 for additional help.

**CONCERN: MY TIMER HAS A BLANK SCREEN OR SAYS AC/OFF, PR OFF, OR PO/OFF**

**Electric equipment and solid state components are vulnerable to voltage surges of various magnitudes. This is the most likely reason for the error message displayed on your timer or controller. First perform the following test:**

The first thing to do is check the outlet. Plug something else, like a lamp or portable hair dryer, into the outlet to see if it is working. If there is another outlet nearby, try plugging the timer into this outlet. If the outlet is not working, you may have experienced a power surge that tripped a household circuit breaker.

**If other products worked in the controller outlet and the controller does not, please follow these steps:**

Check the fuse. Put in a spare fuse or check the current one for continuity using a fuse tester or volt/ohm meter.

Use the following procedure to replace the fuse:

1. Turn the dial to the OFF position
2. Disconnect the common wire from the COM terminal
3. Reinstall the fuse. If the fuse blows at this point then you have a broken timer. If the fuse does not blow and the message does not go away, go to step 5
4. Reconnect the common wire to the COM terminal
5. Manually start station 1 and let it run for 1 minute. If the fuse blows then the problem is in the wiring or the solenoid for station 1
6. If the fuse does not blow repeat step 6 for all of the other stations. The station where the fuse blows is the station with the short in the wiring or the solenoid
7. If the "no power" message does not go away after reinstalling the fuse in step 4 but the fuse does not blow, verify that there is power (outlet or circuit is live) to the unit. If there is power to the unit, unplug the unit or turn the power off, remove the battery and fuse, and wait 5 minutes. Replace the battery and fuse, and restore power to the unit. You will need to reprogram the unit at this point, but the message should be gone.

If the fuse blows repeatedly, there may be a short in the wiring between your timer and your irrigation valves.

**If the fuse has not blown or does not blow repeatedly then the next step is to check the transformer:**

Most currently manufactured controllers has a two-wire configuration, meaning there are two wires leading out of the transformer in addition to the power cord that plugs into your wall outlet. These two wires connect to terminals on the controller marked 24VAC. Since we're dealing with alternating current, it does not matter which wire connects to which terminal.

There may also be a third wire (usually green) which is the ground wire. If your controller has a ground terminal it can be connected there, otherwise it can be grounded

If everything appears to be connected properly you should test the output of the transformer. To do this, take the following steps:

1. Disconnect the power
2. Using a volt-ohm meter, measure the ohms resistance on wires running from the transformer to the controller
3. If the reading is infinite, replace the transformer

If you do not need to replace the transformer, then there may be a problem with the timer itself. If, after inspection the transformer does not appear to be hooked up, please follow instructions available in your controller manual. If your controller is older or does not use a two-wire transformer, consult the product manual or contact Maddox Irrigation at 586-421-1900.

**CONCERN: MY SPRINKLERS ARE NOT PROPERLY COVERING THE AREA THAT THEY NEED TO LEADING TO BROWN SPOTS IN SOME AREAS AND OVERWATERING IN OTHERS**

**First you need to determine whether the pattern needs to be adjusted.**

**If the coverage looks good, but the pattern the sprinklers are covering appears to need adjustment please read below:**

Most manufacturers make both fixed-pattern and adjustable-pattern heads. If you are using a fixed-pattern head, you will need to replace the entire head or possibly just the nozzle in order to change the pattern. If you are using an adjustable-pattern head, consult the instructions on or inside the box your sprinkler head came in for specific details on how your model head can be adjusted, or you locate this information in most cases on the web.

**If the pattern looks good, but it appears that the sprinklers are not throwing water the correct distance then determine whether they are not throwing far enough or are throwing too far. A good rule for determining proper distance is the principal of head to head coverage. A good design and installation will have heads that cover head to head meaning that the spray from one sprinkler should be slightly longer or shorter then the distance to the adjacent sprinkler. If the spray of an adjacent head**

**falls well short of its neighbor or greatly overlaps coverage then please refer to the following (remember that poorly covering sprinklers will result in having to use up to 50% more water to achieve the same result as properly functioning sprinklers):**

**If the coverage is not head to head and not throwing far enough:**

You may not have enough water pressure and water flow to properly operate all of your heads. In order to determine how many heads you can use per zone, we need to know your water pressure and flow rate. At different pressures, the sprinkler head and nozzle will consume different amounts of water. For example, at 35 pounds per square inch (PSI) a Rain Bird 5000 Series Rotor using the 3.0 nozzle will use 3.11 gallons per minute (GPM). If your home's water capacity was 10 GPM, you could place 3 heads per zone. Consult the Performance Charts on or inside the box your sprinkler head came in for your head's exact performance data.

**1. Check your water pressure:**

Screw the pressure gauge onto the nearest faucet to the water meter. Make sure no water is running anywhere inside or outside your house. Turn on the faucet with the gauge attached. The gauge shows your water pressure in pounds per square inch (PSI). You may also call your local water company to find out your water pressure.

**2. Measure your home's water capacity (flow):**

Get a measurable container, like a 5 gallon bucket, make sure no other water is running in or outside the house, turn the faucet on all the way and time how long it takes to fill the container.  $300 \div \text{number of seconds it takes to fill the container} = \text{GPM}$ . Note: For pump systems, check with your well and pump dealer or the owner's manual of your pump to determine its pressure and flow capacity.

**If the sprinklers are throwing water too far:**

Most sprinkler heads have a radius reduction screw which can reduce the distance the head throws water. You may need to adjust this if the head is throwing too far, or the head may have been improperly adjusted if it is not throwing far enough. Consult the instructions on or inside the box your sprinkler head came in or look on the manufacturer's web site.

**CONCERN: SOME SPRINKLERS WILL NOT POP UP OR WILL ONLY POP UP PART WAY**

**First, check to see if your valve has a flow control stem by following the instructions below:**

Many valves have a device that controls the volume of water that flows through the valve. This looks like a faucet handle on the top of the valve, and acts very much the same way. By turning the flow control clockwise, you can tighten it and restrict the flow of water passing through the valve. If you turn it all the way down, you can turn the valve off completely. By turning the flow control counter-clockwise, you can increase the flow and allow more water to pass through the valve.

If you need to adjust the flow control, it is recommended that you turn it all the way down first. Then, with that station running, slowly open the flow until your heads are releasing the desired amount of water.

**If adjusting the flow control does not work, or there is no flow control feature on your valves, perform the following diagnostic tests:**

In order to determine how many heads you can use per zone, we need to know your water pressure and flow rate. At different pressures, the sprinkler head and nozzle will consume different amounts of water. For example, at 35 pounds per square inch (PSI) the 5000 Series Rotor using the 3.0 nozzle will use 3.11 gallons per minute (GPM). If your home's water capacity was 10 GPM, you could place 3 heads per zone.

**1. Check your water pressure:**

Screw the pressure gauge onto the nearest faucet to the water meter. Make sure no water is running anywhere inside or outside your house. Turn on the faucet with the gauge attached. The gauge shows your water pressure in pounds per square inch (PSI). You may also call your local water company to find out your water pressure.

**2. Measure your home's water capacity (flow):**

Get a measurable container, like a 5 gallon bucket, make sure no other water is running in or outside the house, turn the faucet on all the way and time how long it takes to fill the container.  $300 \text{ divided by number of seconds it takes to fill the container} = \text{GPM}$ . Note: For pump systems, check with your well and pump dealer or the owner's manual of your pump to determine its pressure and flow capacity.

**If your calculations show that too much flow is being forced through your system, call Maddox Irrigation at 586-421-1900. Not only does excessive flow lead to undesirable results, excessive flow will wear down your system much faster and could be the cause of any hammering you may hear when your system turns on and off.**

**If your calculations show that you have enough pressure and flow available for the proper operation of your irrigation system then perform the following maintenance to your system.**

Over time, dirt, sand, algae, hard water deposits and other debris can cause a sprinkler head to become clogged. Most heads have removable nozzles and filters than can be removed and flushed out with clear water. Consult the manual for your head for specific instructions on cleaning and maintenance.

If you need additional assistance, please contact Maddox Irrigation at 586-421-1900.