



# UNDERSTANDING AND TROUBLESHOOTING VALVES

STARNOTE 915  
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## *Mastering your Irrigation System*

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The major parts of your irrigation system are: Controller (or clock), Valve, Water lines, Emitters (or sprinklers) and Accessories (like Back Flow- Filter – Pressure Regulator). Valves have moving parts, unlike these other sections, and therefore are the most likely to wear out of fail. Understanding how valves work, and how to troubleshoot them is key to mastering your irrigation system.

### ◆ INTRODUCTION to VALVES

### ◆ TROUBLESHOOTING

#### ◆ SYMPTOM - VALVE STAYS ON

#### ◆ SYMPTOM – CURRENTLY INSTALLED VALVE WON'T ACTIVATE

#### ◆ SYMPTOM - NEW VALVE STAYS ON

#### ◆ SYMPTOM - NEW VALVE DOES NOT COME ON

**INTRODUCTION to VALVES:** Irrigation devices directly controlling water flow to sprinkler heads are known as valves. The principle behind the inner workings is very simple. A spring loaded diaphragm drives the gate attached to it against the seat which prevents water flow. There is normally water pressure on both the top and bottom of the diaphragm, and this allows the spring to keep the valve shut.

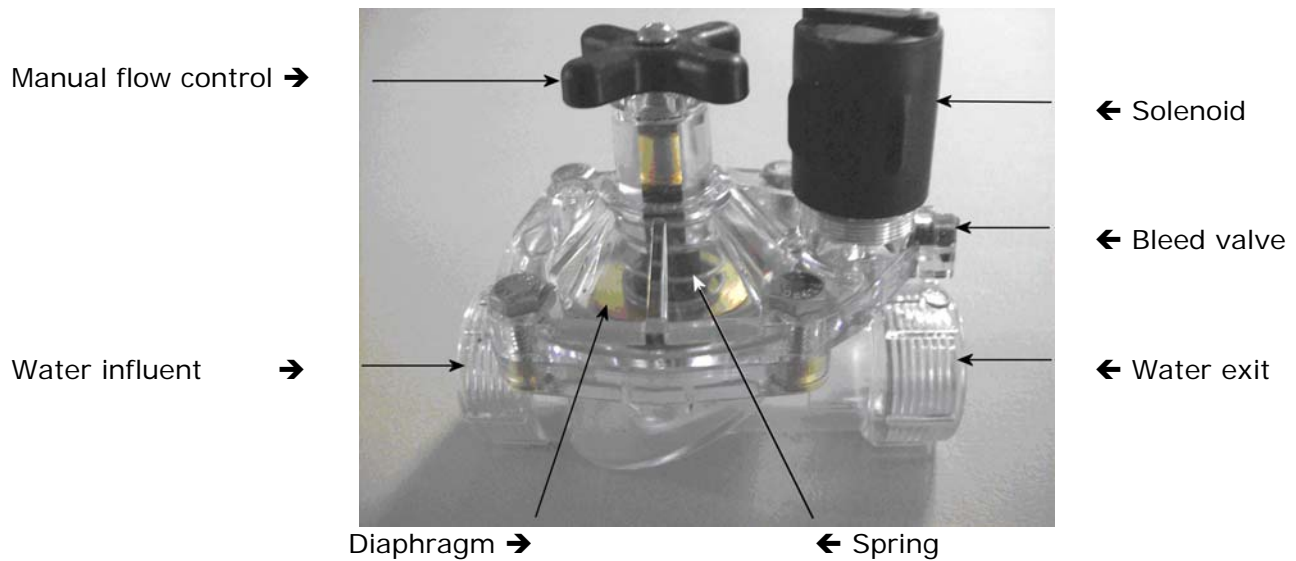
Mechanically an electronic solenoid actuates a “bleed” valve that relieves the pressure for the top of the rubber diaphragm, and then the pressure on the bottom of the diaphragm drives against the spring and opens the valve. There is also a mechanical bleed mechanism on most valves allowing a temporary testing of the valves operation. When either the bleeder screw/valve or the solenoid opens, pressure is released and water passes through the valve. [\(top\)](#)

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There are only two moving parts of a valve that can go bad, the solenoid and the diaphragm. The solenoid is electro-magnetic. A spring is wound around a metal core (the plunger) and is sucked in when power is applied. The plunger is positioned over the bleed port which allows / does not allow water to be removed from the top of the diaphragm. Diaphragms are the number one cause of most problems. Unfortunately many people try to replace the solenoid first because it is the easiest thing to replace. A small dent caused by a rock, or a tear in the diaphragm can cause it to not seal properly. [\(top\)](#)

### TROUBLESHOOTING

Next we will explore some common valve problems and their solutions:



### **SYMPTOM - VALVE STAYS ON: \***

- Examine diaphragm for tear or rock dent.
- Solenoid is rusted.
- Diaphragm is old. Rub it, if hands turn black, the rubber is going bad.
- Check for diaphragm bubbling in center; replace if found.
- Teflon screw on diaphragm is broken off.
- Hardie 205 Valves built prior to 1997 had a rusting pin. Bring in the **top** of the valve, and a Star Nursery irrigation associate will replace it with a new one.
- Rainbird DV-100 has a cream colored diaphragm with a separate o-ring. The replacement part is a black colored one-piece unit. Try replacing the diaphragm on this valve before the solenoid.
- Actuator valves (L1034 & L2034). Replace with a whole new assembly, it's not worth trying to find another solution..
- Check for rock or sand under the diaphragm.

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### **SYMPTOM – CURRENTLY INSTALLED VALVE WON'T ACTIVATE: \***

- Bad wire connection, either broken or corroded.
- Bad diaphragm.
- Rusted pin.
- Bad solenoid.
- Irrigation main has been shut off.
- Problem with the timer.

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### **SYMPTOM - NEW VALVE STAYS ON: \***

- Rock or sand under diaphragm.
- Air bubble trapped on top of diaphragm. Turn the back screws 5 times to purge air.
- Valve installed backwards or upside down.
- Missing plunger from solenoid.
- Spring placed under diaphragm, instead of on top.
- Timer sending out current, remove wires and see if the valve shuts down.

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**SYMPTOM - NEW VALVE DOES NOT COME ON: \***

- Air bubble trapped on top of diaphragm. Turn the back screws 5 times to purge air.
- There may be a crushed plastic port under bleed port on the valve cover assembly.
- No power. Check all connections. Wires leading from the timer may not be connected at some point. Check connection points outside house where wire from timer enters the ground, and at solenoid on valve in valve box.
- Could be a bad solenoid (very rare).
- Check to see if the water main *is* on.

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These are most of the reasons why a valve is not working properly. If you have the opportunity, take a valve apart and match the parts to the attached diagram. This diagram is for Hardie / Irritrol® 205T /TF, 204LG, and 204APR/PR valves.

\*Some new valves like Richdel, Hardie or Irritrol, and replacement solenoids for these valves, come with a white plastic ring around the plunger. If your solenoid has this ring, and your valve either won't shut off, won't turn on, or doesn't have full power, use a screwdriver or pliers to remove the ring, then reinstall the solenoid. This may solve your problem.

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