N°2 02/03/06

We have no products news to report yet in this issue. We'll focus on valves training. This tool could help you in training end-users or "training the trainers".

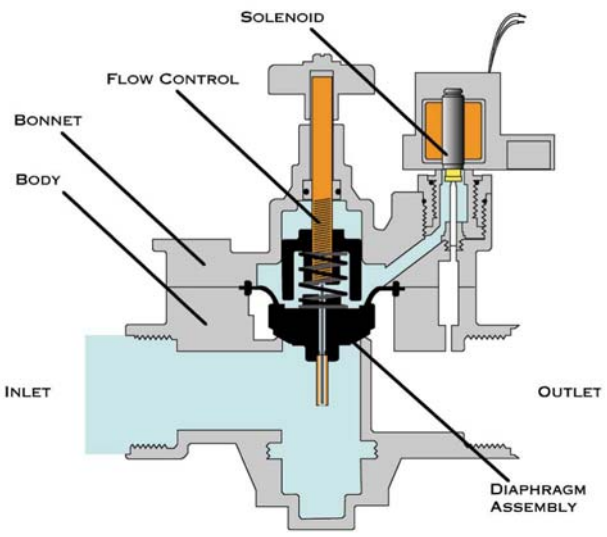
In this issue:
1. Talon Dual Spreader nozzles available
2. Technical Support Article on valves
3. Troubleshooting Irrigation valves

1. Talon Dual Spreader nozzles

The new Dual Spreader nozzles that we announced in our last issue are now available in stock. All Talon shipped from RBE are equipped with new nozzles.

2. The Value of Valves

An Inside Look: How a Valve Works



Whatever their size, shape or model, valves play a critical role in regulating the water flow for any irrigation system. To most effectively design or troubleshoot systems, it's helpful to take a close look at how the typical electric remote control valve actually works. Water enters a valve through the inlet side and travels to an upper chamber, located above the diaphragm. The diaphragm is a round, plastic component that opens or closes the valve by moving up or down inside the unit. Water funnels through the upper channels inside the bonnet (or top of the valve) and through the pilot flow port to the solenoid, which holds the water back. With no escape, water becomes pressurized. At this point, the inlet pressure and pressure on top of the diaphragm are the same. However, because the area on top of the diaphragm is larger, this creates a force that pushes the diaphragm down. It's not the water pressure, but this force (pressure X area), that keeps the diaphragm closed. The valve's solenoid is actually a small electromagnet with a spring that holds a plunger down to keep water from exiting. When the solenoid is manually operated or operated with a controller, it lifts the plunger, which allows water to drain through the external port chamber into the outlet part of the valve. As a result, force on top of the diaphragm is relieved. As the force underneath the diaphragm becomes stronger, the diaphragm is pushed up. Water flows from the inlet to outlet side of the valve, over a retainer wall, as long as the chamber or port under the solenoid is open. When the solenoid plunger drops, the exit channel closes and pressure builds back up in the upper bonnet chamber. When the force is greater on top of the diaphragm than below, the diaphragm closes, shutting

off the water flow. Of course, with the automatic system, all of this happens fairly quickly within the valve in response to the controller.

Rain Bird Extras
To ensure the most efficient operation, many Rain Bird valves offer extra features. An external manual bleed allows you to manually test the system by turning a screw at the top of the bonnet that vents water from above the diaphragm into the atmosphere, mainly the valve box. An internal bleed lets you turn the solenoid slightly, which draws the plunger up enough to test spray heads and system operation without turning on the controller and without getting the inside of the valve box wet. Flow control limits the distance the diaphragm can travel up which, in turn, controls the gallons of water that flow through the system. To avoid problems with clogs, especially in systems using effluent or dirty water, special Rain Bird valves force water through a fine filter that prevents debris from entering the upper chamber. A patented scraper removes the debris from the screen.

3. Troubleshooting Irrigation valves

(By Laurie Berry, Rain Bird Sales, Inc)

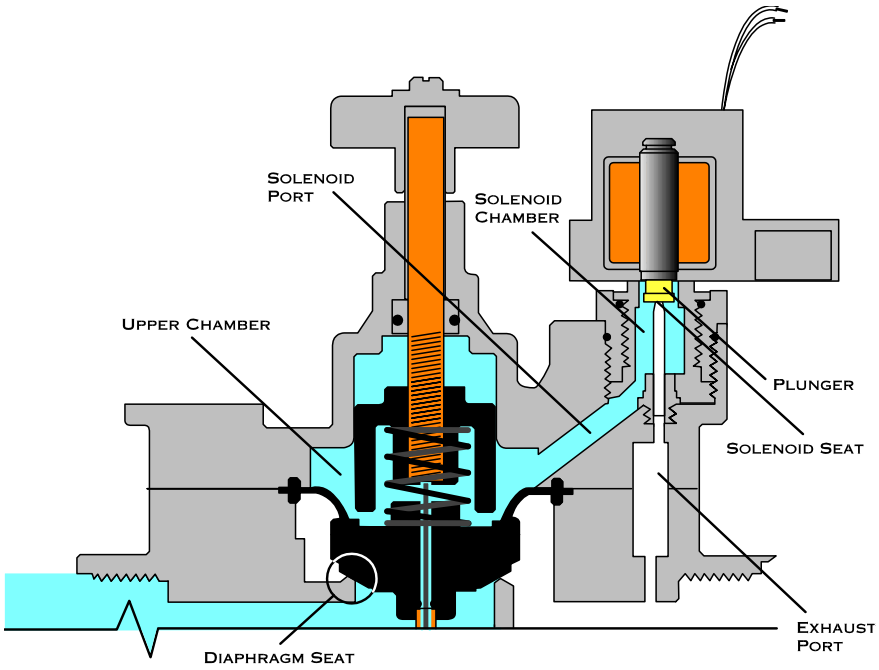
Trouble with irrigation valves can sometimes be the most difficult to troubleshoot. Irrigation valves are a combination of mechanical, hydraulic and electrical engineering. They are highly reliable and with some specific steps, you can avoid trouble all together.
In order to address the nonfunctioning valve it is important to understand how irrigation valves function. Most irrigation valves operate in the same manner. A valve is closed because the area above the diaphragm is approximately 2½ times larger than the outlet. This creates a force above the diaphragm that is larger than the water pressure below the diaphragm. When the water pressure above the diaphragm is reduced the diaphragm rises, allowing the valve to open. The water pressure above the diaphragm is relieved by manually venting the water to the air or by electrically bleeding the water to the downstream side of the valve.
In the automatic operation of a valve, the solenoid is the component of a valve that relieves the water pressure above the diaphragm and allows the valve to open. The solenoid is simply a coil of electrical wire that creates a magnetic force, which pulls up a small metal plunger. Similar to electric door locks on an automobile. When the solenoid receives an electrical current from the irrigation controller the solenoid plunger rises, the water pressure above the diaphragm is relieved, and the valve opens. The opposite occurs when the valve is closed. The irrigation controller stops sending an electrical current to the solenoid. The solenoid drops the plunger which stop the flow of water above the diaphragm and the pressure above the diaphragm builds to create a force greater than the pressure below the diaphragms – the valve closes.
This also occurs during the manual operation of the valve. When the manual bleed screw is opened, the water pressure above the diaphragm is relieved to either the air or to the downstream side of the valve.
A variety of conditions can occur which can cause an irrigation valve to malfunction. However, do not overlook the obvious. If the valve will not open, check to make sure there is water to the valve. This can be easily accomplished by manually operating the valve. Open the bleed

screw to check for manual operation. There are two types of manual bleed devices. The most common is a small knob on the top of the valve bonnet, which bleeds, or relieves, the water above the diaphragm to the air. The second type of manual bleed device is an internal manual bleed. This is usually a lever on the solenoid or a lever directly below the solenoid, which when turned will allow the water pressure above the diaphragm to bleed or be relieved to the downstream side of the valve. Some valves incorporate both types of manual bleed systems. Turn the manual bleed screw or operate the internal manual bleed and check for water. If water is not present, determine the cause.

Another common problems encountered when troubleshooting valves is no power to the valve. To determine if the valve is receiving power you need to use a volt-ohm meter. Manually turn on the irrigation controller to the station you are troubleshooting. With the volt-ohm meter, check the current at the controller station terminal. Your reading should be 24 volts AC. If the voltage is not 24 volts AC, you need to determine the cause. It is usually a blown fuse in the controller or in the transformer of the controller.

This is also an excellent time to check the controller program. In many cases, the valve is not operating because the controller is not properly programmed. If you read 24 volts AC at the controller station wires, check the landscape in the field to see if the zone is operating. If the zone is operating, check to make sure the controller has a start time set, a run time set, and the days of the week are set. An improperly programmed controller is the largest source of customer complaints.

If the controller checks out, the next step is to check the electrical current running to the solenoid. With the controller turned off and at the irrigation valve, skin the insulation of the two wires running from the valve solenoid to the splice. These cuts should be made closely to the splice. After you have completed this test, you will have to cut out the original splice and reconnect the wires. It is important you leave enough wire to make the splice. Attach the volt-ohm meter to the two wires running from the splice. Manually operate the irrigation controller and check if you are receiving 24 volts AC. It normal to experience some voltage loss at the valve but if the volt-ohm meter reads less than 20 volts AC, there is a problem with the field wires. The source of this problem needs to be located with the proper equipment or replace the wires.



The previous tests isolated valve problems from the irrigation controller or the field wiring. The irrigation valve is most susceptible to contamination from dirt and debris. Most irrigation valves have a filter or screen to keep dirt out of the area above the diaphragm and the solenoid area. Turn the water off, remove the valve bonnet, and check the screens for contamination or algae growth. Some valves have filter screens directly below the solenoid, which can be, access by removing a small cap screw directly below the solenoid. Carefully wipe any debris off the screens.

This is also a good time to check the diaphragm and valve seat for wear or deterioration. The diaphragm and valve disc are rubber-like components. The diaphragm is a large flexible disc, which separates the bonnet or upper valve body from the lower valve body. The disc is a

smaller disc, which seals the valve closed. Sometimes these two components are molded in one piece. They are subject to wear and deterioration. Check both for cracks and wear. Replace them if they show signs of wear or deterioration. Reassemble the valve, turn on the water, and manually operate the irrigation controller.

Occasionally, the valve will still not operate. The only area left to create a problem is in the solenoid area. With the water turned off, remove the solenoid. This is usually accomplished by unscrewing the solenoid from the bonnet of the valve. Be careful not to lose the small spring, which force the solenoid plunger downward. Inspect the solenoid plunger. The plunger is the small metal piston with a rubber base inside the solenoid housing. The plunger should be clean and free of any debris. You can also check the operation of the solenoid. Manually operate the irrigation controller. The solenoid plunger will be pulled into the solenoid body. Some manufacturers have designed captive solenoid plungers. The solenoid plunger is held in the solenoid housing by a small plastic piece. If the valve has a captured solenoid, you will hear a sharp clicking sound when the solenoid is energized. If the solenoid is not working properly or if the solenoid plunger does not move freely in the solenoid housing, replace the solenoid. While the solenoid is removed, also check the small holes in the bonnet, which allows water to pass from above the diaphragm to the downstream side of the valve. These openings can be checked with a paper clip or small piece of wire. It is important not to enlarge these holes because they control the opening and closing speed of the valve.

At other times, an irrigation valve will fail open or the valve will weep, discharging water out of the sprinkler heads. Dirt and debris are usually the cause of this failure. Turn the water off, remove the bonnet of the valve, and inspect the valve seat, disc, and diaphragm for debris or wear. The valve seat is the lower sealing surface in the valve body. You can inspect this for nicks by running your finger over the lip of the valve seat. If the valve seat is damaged, replace the valve body. If the diaphragm or valve disc is damaged or worn, replace them. While you have the valve apart, also check the solenoid area, the solenoid plunger, and the openings in the bonnet for proper operation as previously described.

Irrigation valves are highly reliable and will last for years. Remember, when troubleshooting an irrigation valve, first check the basics:

Is the irrigation controller plugged in and properly programmed?
Is the master valve shut off?
Is water present to the valve?
Is the flow control handle in an open position?
Is there sufficient water pressure and flow?
Is your pump working?