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 trouble-shoot 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, explains Harold McKinney, Rain Bird product manager. 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, McKinney points out.

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.

continued on next page
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.

For more information on valve options and models available from Rain Bird, consult the Landscape Irrigation Products 1999-2000 Catalog.

My ESP-LX Plus Controller is locked up. What should I do?

When a solid state controller stops functioning, the cause is often a programming or power malfunction rather than a more serious problem. Before you worry, try these suggestions.

If the program does not come on automatically, make sure the dial is set to AUTO. If the station does not run, make sure the watering start time has been entered. Turn the dial to the station number and press the PGM key to check run times. Also, check to make sure the program’s watering budget is set above 0%.

Always check the display for error messages. The display will indicate if the Rain Delay feature is preventing irrigation or if this is not a programmed watering day. If the display shows the station is operating, but no watering is occurring, the sensor system may be stopping irrigation. You can check this by turning the sensor bypass OFF.

If the display indicates PWR off, verify the controller is connected to a working power supply.

If the display is partially or completely blank, or if the controller will not accept input from the keypad or dial, an electrical surge or lightning may have caused the microprocessor to lock up. The microprocessor is the “brain” of the controller and occasionally will freeze all of its functions.

To reset the controller functions on the ESP-LX Plus:

1. Turn off the primary power to the controller or disconnect the “ribbon” cable from the terminal board.
2. Battery backup – Remove the battery from the controller.
3. Wait – Maintain this power down condition for 3 minutes.
4. Reset the Microprocessor – Reconnect the primary power. Turn the dial to “OFF.” Press and hold the “ON” and “MANUAL START” keys simultaneously for 10 seconds until the display starts running a self-diagnostic test. Discontinue pressing the keys and wait 20 seconds for the diagnostic to finish. The microprocessor is now reset.
5. Reconnect the battery, reprogram the controller, and engage a manual start.

Editorial by Rod Waller

Welcome!
Welcome to Rain Bird’s new Authorized Service Center (ASC) Technical Newsletter! We’ve brought back one of our most popular informational tools and reshaped it to bring you more of the facts, tips, and training insights you need, whether you’re at the counter or in the field.

Each quarterly issue of this newsletter will feature an in-depth look at a specific system component and how it actually works. You’ll also find trouble-shooting tips for some of the situations you encounter most and the latest information on new product developments. We’ve even included highlights of new programs and opportunities designed to benefit you and your customers.

Of course, developing a newsletter tailored to your needs begins with your input. We’d like to hear from you! Tell us what you’d like to see in future issues. Anyone who submits an idea or comment will receive a Rain Bird hat as our special thanks. You can reach me any time by e-mail at rwaller@rainbird.com or by fax 520-434-6299 or phone 520-434-6259.

We look forward to partnering with you this spring and in the seasons to come!

Rod Waller,
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Authorized Service Center Manager
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Tucson, AZ 85706
Interested in more options and flexibility in the field? Here are a few of Rain Bird's latest products, designed to offer you and your customers numerous new advantages.

**NEW! 300-BPE/300-BPES Three-Inch Valves**
These three-inch valves provide the right solution for large commercial sites. Tough, hybrid construction combines a brass body with a glass-filled nylon bonnet for valves able to manage flow rates up to 300 gpm and pressures up to 200 psi. The 300-BPES is the only three-inch valve designed to handle effluent water, using a patented scrubber mechanism.

**NEW! Landscape Dripline**
This newest addition to Rain Bird's Xerigation® line truly is the next generation in pressure-compensating, inline emitter tubing. The patented, cylindrical design of the Advanced Drip Inline (ADI) emitter installed inside the tubing provides unmatched clog-resistance because it pressure compensates unlike any other inline emitter in the world – by lengthening the flow path instead of reducing its size. The larger the flow path, the more clog-resistant the emitter. Landscape Dripline pressure compensates between 8-60 psi and is available in 12, 18 or 24 inch spacing.

**NEW! MPR and VAN Nozzles**
New and improved 10-, 12- and 15-foot models are available from our versatile line of Variable Arc Nozzles (VAN). All of these nozzles are now easier to turn. They are adjustable from 0 to 360 degrees, making it simple to irrigate areas of almost any shape. You can easily regulate radius and flow with an adjustment screw. New short-range Matched Precipitation Rate (MPR) Nozzles provide a five-foot, full-, half-, third, or quarter-circle fixed arc pattern ideal for medians, planters or other small areas. In addition, all of the improved eight-foot MPR Series offer a lower flow rate and provide even water distribution throughout the zone.

**NEW! Residential Quick Coupler Kit (RQC Series)**
Now homeowners can tap into a convenient water source without an unsightly hose bib. This new quick coupler kit is ideal for use near driveways or adjacent to garden plots. The rugged two-piece valve body design with leak-free triple swing joint, swivel elbow and stainless steel anchoring clamp can handle operating pressures up to 125 psi.

**NEW! UNI-Spray Series**
Save time and money without sacrificing quality. This pop-up Universal Spray Head (UNI-Spray) – now in worldwide release – provides a strong solution for sites where convenience and flexibility are primary considerations. UNI-Spray heads are available in 2-, 4- and 6-inch models, with or without pre-installed variable arc nozzles (VAN).

**NEW! E Class Controllers**
Deliver precise, flexible irrigation control with these new outdoor or indoor models. Three completely independent programs accommodate diverse irrigation applications for lawn, shrub or drip systems. Easy programming, virtual maintenance-free operation and an option of 3-12 stations make the E Class Controller perfect for today's homeowner.

**NEW! Maxicom 2 Central Control**
This latest version of Rain Bird's leading central control works with Windows 95 and offers mouse and graphics functions and an extensive Help feature to guide today's user. Expanded communication abilities can simultaneously handle phone and radio communication through 32 ports. Users can store more data and interface with several types of weather sources.

For more information about these and Rain Bird's other newest product releases, turn to the Landscape Irrigation Products 1999-2000 Catalog or our web site at www.rainbird.com.
Hats Off to You...
Test Your Knowledge and
Earn a Rain Bird Cap!

Try your hand at correctly answering each of the following questions about valves and controllers. If you are one of the first 100 to submit all the right answers, you will receive a FREE Rain Bird hat.

Choose one of the following answers for each. Circle your answers on the form below and submit it to Rain Bird by fax 520-434-6289 or by e-mail rwaller@rainbird.com. The correct answers will be published in the next issue. Allow 4-6 weeks for delivery of your hat.

1. Where is the size of a valve measured?
   a. top of the bonnet
   b. at the diameter of its inlet and outlet ports
   c. at the radius of the diaphragm
   d. both b & c

2. What determines the size of the common and station wires required to connect the valve to the controller?
   a. the number of valves per station
   b. distance of the valves from the controller
   c. water pressure in the submain
   d. all of the above

3. A PRS pressure regulating module on a valve allows you to regulate outlet water pressure between ...
   a. 5-10 psi
   b. 15-100 psi
   c. 100-150 psi
   d. 150-200 psi

4. Tightening the flow control handle on a valve too much can...
   a. decrease flow
   b. increase pressure loss
   c. clog the filter
   d. both a & b

Name: ___________________________
Company: _______________________
Address: _______________________
City: __________ State: _______ Zip: ________
Phone: _________________________
FAX: ___________________________
E-mail address: ____________________

New Controller Testing Program

Educate Customers at the Counter and Beyond

Rain Bird’s giving you the opportunity to better educate customers and earn extra money for your branch at the same time with our new controller testing program.

Every time a controller is returned, we’d like you to take a few minutes to test it right there at the counter with the customer. The entire process takes only a few minutes, but will better teach customers how to solve potential problems. As a token of our thanks, Rain Bird will pay the distributor $5 for each controller tested.

Rain Bird began the program after realizing that a number of controllers being returned were not actually damaged or malfunctioning. “We believe some customers do not fully understand how to operate them,” said Rod Waller, Technical Services Manager.

“Programming and installation errors often cause controller returns. Power surges and field wiring problems can mimic controller failure. Many of these problems can be corrected or prevented on site if the customer better understands the controller functions.”

All Authorized Service Centers will participate in the program, which applies to all Rain Bird Turf Division controllers, including Easy Rain and Unik.

Five Minutes, Five Dollars. It’s That Simple.

To test, you simply reset the chip on the solid state controller, fire a station or two and complete a brief form. It all takes five minutes or less.

Support literature is available to further educate the customer.

Of course, you can be sure Rain Bird stands behind all products with our Trade Warranty if the test indicates a replacement is needed. And you still receive our $5 thank-you, no matter what the test results.

“We believe the program will reduce unnecessary returns, saving money for us all,” said Waller. “The program should minimize customer downtime, increase customer satisfaction and strengthen customer trust in the distributor.”

Counter and Beyond

Testing Program

Controller Test Report
Rain Bird Turf Div

Customer name __________

Controller Model __________________

Date __________

Nature of Problem: __________________

Station numbers __________________

Replacement part(s) or “N/A”

Other comments __________________

Rain Bird Sales, Inc.

Documentation:

Order No. __________

Technical Support: 1-800-247-3782

For service in Canada, please fill out the controller test report and fax to: 1-888-455-4545