

Adding Irrigation Zones Without Adding Wires, Version 2.0

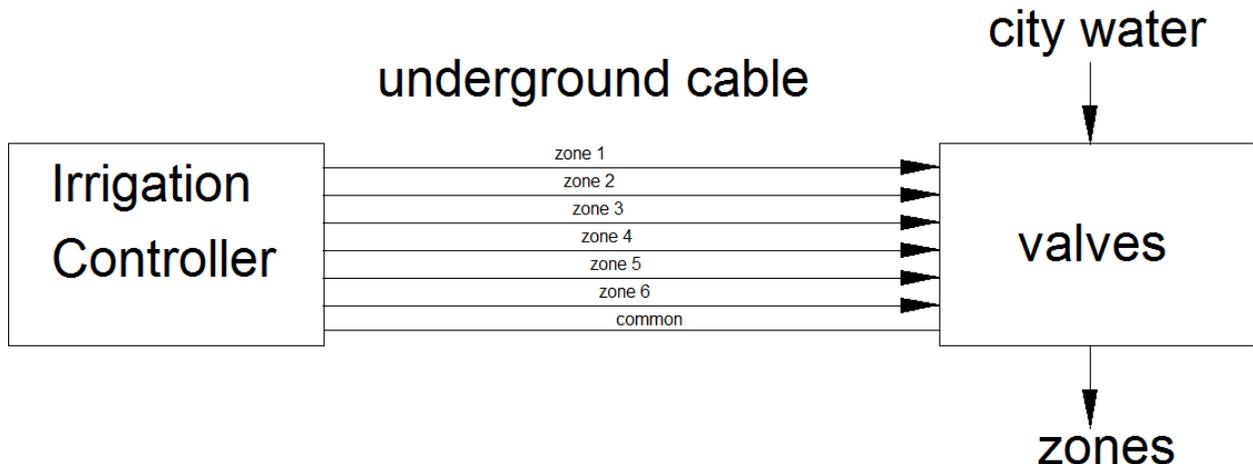
By R. G. Sparber

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Note: further analysis shows that the power dissipation in the valve's solenoid increases by a factor of 3 when you change from pure AC to the waveshape applied with this scheme. I do not know if this increase will harm the solenoid but plan to add a resistor in the common lead to reduce the power. Details to follow.



My irrigation controller operates 6 zones. This requires one wire per zone plus a common return wire. At the present time I have a 7 wire cable so there is no room for growth. This cable is under a slab of concrete so replacing it is not an attractive option. When the controller applies about 24 volts AC to a valve, it opens.



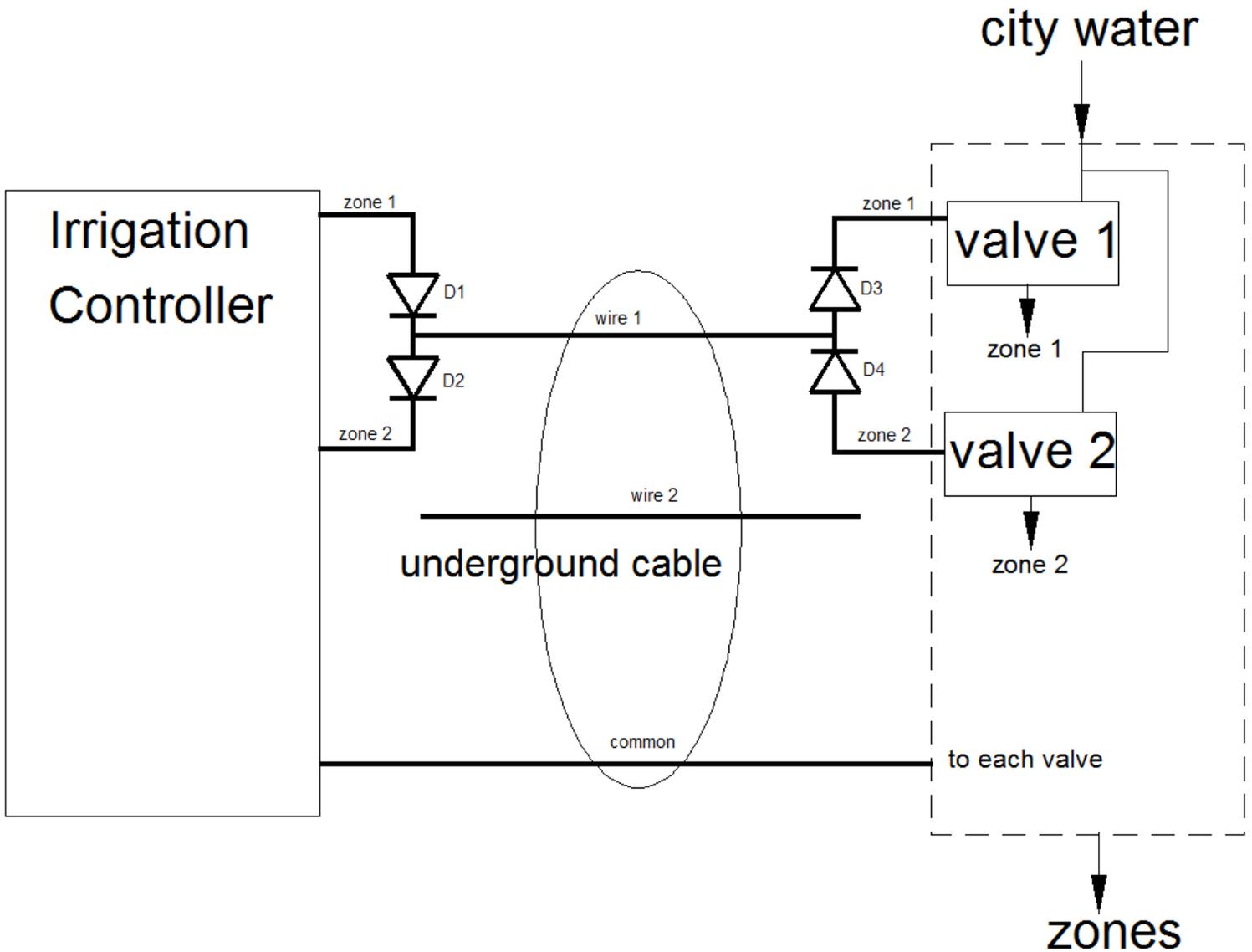
I wanted to add functionality that used 3 more wires but not replace the cable.

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My solution involves adding two diodes per valve. These diodes must be able to handle at least 50V and pass at least 2 amps. I see some 2 amp diodes on eBay: 100 for less than \$10 including shipping.

This scheme does reduce the power to each valve but given my cable is 15 feet long, this seems to work fine. The controller can drive up to 800 feet which would reduce the voltage applied to the valves. I'm not sure this trick will work on the end of such long cable runs.

Rather than run a dedicated wire for each zone from controller to valve, I have added 2 diodes for each zone. The diodes pass only half of the voltage from the controller: either the positive half or the negative half.



Here you see wire 1 serves zones 1 and 2 so wire 2 has been freed up. Wire 3 serves zones 3 and 4 freeing up wire 4. Wire 5 serves zones 5 and 6 freeing up wire 6.

My 6 zones will now occupy 3 wires and I will free up 3 wires for growth of the system.

I have chosen not to include the math that supports why this works. That will be left to a future article.

I welcome your comments and questions.

If you wish to be contacted each time I publish an article, email me with just "Article Alias" in the subject line.

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