

IRRIGANDER[®] 4 SOAKER[™] SWITCH

4 Zone Irrigation Valve Switch

Installation & User Guide
Model 4ZEK V1.0



IRRIGANDER 4 SOAKER VALVE SWITCH

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IRRIGANDER 4 SOAKER VALVE SWITCH

Introduction

Typical irrigation controllers turn on an irrigation zone for the full period and then turn on the next zone. Depending on the terrain and the type of soil this can be wasteful. In the “cycle and soak” method of applying water each valve runs for several shorter periods instead of one longer period. Between each watering cycle there is a soak period. Water agencies recommend cycle and soak timing to improve water absorption into the soil and reduce water runoff and waste. A typical cycle and soak program has three watering cycles:

1. The first cycle breaks the surface tension of the soil and saturates the top layer of soil
2. The second cycle infiltrates the soil more efficiently and deeply after the first cycle
3. Additional cycles are beneficial if the area has a slope to minimize runoff

Setting up cycle and soak timings on an irrigation controller can be challenging even if the controller has a “cycle and soak” mode. Older controllers do not support automatic cycle and soak modes. The patent pending **IRRIGANDER 4 SOAKER** valve switch can control from 1 to 4 connected valves. The switch creates 3 run cycles for each connected valve based on the previous zone run time. Between each run cycle the watered areas soak. The **IRRIGANDER 4 SOAKER** valve switch makes it easy to implement the cycle and soak method of applying water on any set of valves.

Please read the following information and installation instructions before starting the installation.

IRRIGANDER 4 SOAKER VALVE SWITCH

Overview

The **IRRIGANDER 4 SOAKER** valve switch is installed close to the irrigation valves to be controlled. Connect the input to the switch to the field wire coming from the irrigation controller. Connect the common connection on the **IRRIGANDER 4 SOAKER** valve switch to the system common. These wires are typically the existing field wires in the irrigation system. The **IRRIGANDER 4 SOAKER** valve switch has four output wires that are attached to the valves to be controlled. Since the run times for all the valves will be the same it is best to have the valves irrigating the same type of area (garden or lawn) or sprinkler heads. See Figure 1 for a typical installation.

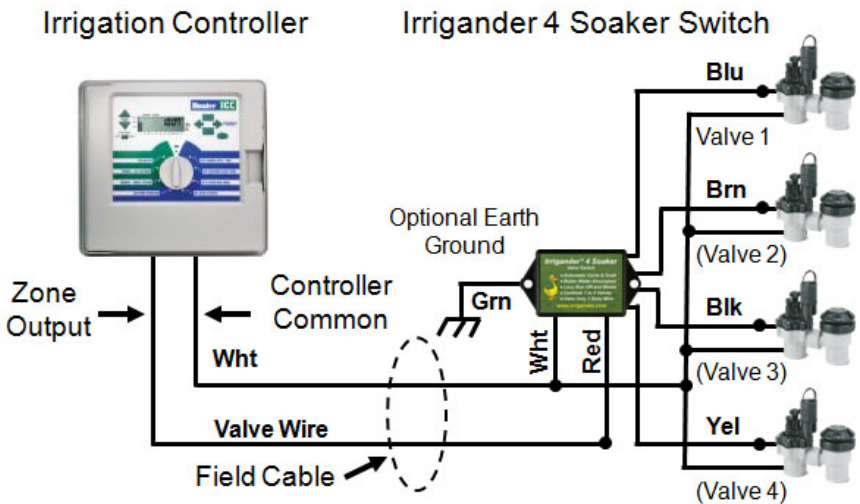


Figure 1 – Typical Installation

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Installation Instructions

1. Install the **IRRIGANDER 4 SOAKER** valve switch close to the valves to be controlled. The switch is very rugged and can be buried close to the valves or installed in a valve box. While the **IRRIGANDER 4 SOAKER** valve switch will operate under water it is best to install the switch where it will not be continuously under water.
2. The wire color coding on the **IRRIGANDER 4 SOAKER** valve switch is listed in Table 1.

Wire Color	Use
Red	Switch Input
Green	Earth Ground
White	Common
Blue	Valve 1 Output
Brown	Valve 2 Output
Black	Valve 3 Output
Yellow	Valve 4 Output

Table 1 - Cable Color Coding

3. Connect the Common on the **IRRIGANDER 4 SOAKER** valve switch (White), the field common wire (typically a white wire), and one solenoid wire from each of the valves to be controlled together using a waterproof wire connector (e.g. DryConn[®] Waterproof Connector).
4. Connect the input to the **IRRIGANDER 4 SOAKER** valve switch (Red) to the field wire coming from the irrigation controller using a waterproof wire connector.

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5. Connect the valve 1 output on the switch to the second solenoid wire for a valve to be controlled using waterproof wire connectors.
6. If a 2nd, 3rd or 4th valve is used connect the valve 2, valve 3 and valve 4 outputs on the **IRRIGANDER 4 SOAKER** valve switch to the second solenoid wire on the remaining valves using waterproof wire connectors.
7. Connect the Earth Ground (Green) to a suitable earth ground. The Earth Ground connection is ***optional*** but an Earth ground will improve the **IRRIGANDER 4 SOAKER** valve switch's resistance to damage from lightning. See "*Lightning Protection*" for more details on properly grounding the **IRRIGANDER 4 SOAKER** valve switch.

Installation is complete! Test all zones by following the instructions in "*Operating the Irrigander 4 Soaker Valve Switch*".

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Lightning Protection

Lightning protection is vital to the reliable operation of the **IRRIGANDER 4 SOAKER** valve switch. The switch uses internal surge suppression technology to minimize the potential damage from lightning and other electrical surges. This protection is very reliable. However installation of an Earth ground on the **IRRIGANDER 4 SOAKER** valve switch will improve the system's surge and lightning protection:

1. Make sure the irrigation controller is properly grounded. See the irrigation controller's installation manual for instructions applicable to your controller. Irrigation controllers installed outside must be grounded per the requirements of the National Electrical Code and local ordinances.
2. If a metal pipe is available at the **IRRIGANDER 4 SOAKER** valve switch location, connect the Earth Ground connection (Green) to the metal pipe using a suitable grounding clamp. Do not put more than one wire under the clamp.
3. If a suitable ground is not present at the **IRRIGANDER 4 SOAKER** valve switch location, install an 8' copper clad ground rod (not included) close to the switch. Connect the Earth Ground (Green) from the **IRRIGANDER 4 SOAKER** valve switch to the ground rod using a copper clamp. Do not put more than one wire under the clamp.

While connecting the Earth ground as outlined above is **optional**, doing so will provide the best protection from lightning for your **IRRIGANDER 4 SOAKER** valve switch.

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Theory of Operation

Introduction

The **IRRIGANDER 4 SOAKER** valve switch's microcontroller records the total run time each time the zone is active. The next time the zone is active the switch divides the recorded run time based on the number of valves. The microprocessor further divides each valve run time into 3 run cycles separated by soak cycles. The switch will adjust its timing on the next cycle if the run time on the irrigation controller changes. This may add or reduce run times or cause a run cycle to be skipped.

Using 2, 3 or 4 Valves

The **IRRIGANDER 4 SOAKER** valve switch assumes that 2 valves are connected. It can detect if valves are connected to output 3 or output 4 and will adjust timings accordingly. Table 2 is an example of changing valve timings with 3 valves connected to the **IRRIGANDER 4 SOAKER** valve switch:

#	Zone Time	Valve 1 Run Cycle/Total	Valve 2 Run Cycle/Total	Valve 3 Run Cycle/Total
First	45 min	3.3 Min / 10 min ¹	3.3 min / 10 min ¹	3.3 min / 18.3 min ¹
2	45 min	5 min / 15 min	5 min / 15 min	5 min / 15 min
3	30 min	5 min / 10 min ²	5 min / 10 min ²	5 min / 10 min ²
4	30 min	3.3 Min / 10 min	3.3 Min / 10 min	3.3 Min / 10 min

Table 2 – Example Valve Timings

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Notes:

¹ – The initial total valve run time is set to 30 minutes at the factory. Since 3 valves are connected the run time is 3.3 minutes for each valve (30 minutes divided by 3 valves divided by 3 run and soak cycles), the remaining run time goes to the last run cycle of valve 3.

² – Since the recorded timing from the last watering cycle was 45 minutes each run cycle is 5 minutes (45 minutes divided by 3 valves divided by 3 run and soak cycles). After each valve has run 2 run cycles (30 minutes of total run time) the new zone run time has been consumed so none of the valves do a 3rd run cycle. This timing is corrected on the next cycle.

Using One valve

The **IRRIGANDER 4 SOAKER** valve switch can be used to create run and soak cycles for a single valve. Connect the valve to the valve 1 output on the switch. The **IRRIGANDER 4 SOAKER** valve switch will run the valve 1 output and then pause. The watering time on valve 1 will be 50% of the zone time from the irrigation controller. For example, to run the valve for 10 minute cycles set the irrigation controller to 60 minutes. The valve will get three 10 minute run cycles separated by 10 minute soak cycles. This is an effective way to control run off for a zone that has hills or high clay content soil.

Adding or Removing Valves

The **IRRIGANDER 4 SOAKER** valve switch checks to see if a valve is connected to output 3 and output 4 each cycle. If a valve is added or removed then the previous recorded zone run time will be divided between the new set of valves.

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Operating the Irrigander 4 Soaker Valve Switch

Normal Operation

The valve connected to the valve 1 output on the switch will run for the first run cycle when the irrigation controller activates the input to the **IRRIGANDER 4 SOAKER** valve switch. The first run cycle for the other valves follow in sequence. Once completed the second and third run cycles will run. There is a one second delay between running each valve to make sure the previous valve has completely closed before opening the next valve.

Testing Connected Valves

Running the zone connected to the **IRRIGANDER 4 SOAKER** valve switch for more than 1 second but less than 15 seconds will put the switch into test mode. Once in test mode, the next time the zone is activated the **IRRIGANDER 4 SOAKER** valve switch will run valve 1 for as long as the zone is active. When the zone is activated again the switch will run valve 2 for as long as the zone is active. This process continues until all connected valves have been tested. There is no minimum or maximum run time when testing a valve. Once the last valve has run the switch exits test mode. The **IRRIGANDER 4 SOAKER** valve switch does not record any zone run times during test mode. Be sure to exercise all valves when doing a test so that the **IRRIGANDER 4 SOAKER** valve switch is in normal mode when the next watering cycle starts.

Ignoring Short Zone Cycles

Some irrigation controllers will turn on a zone for less than a second to test if the valve is functioning correctly. The **IRRIGANDER 4 SOAKER** valve switch will activate valve 1 for this short period but will not record the run time.

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Specifications

Physical Dimensions

- Width: 2.9" (74 mm) including mounting flanges
- Height: 1.5" (38 mm)
- Depth: 1.0" (25 mm)
- Lead length: 12" (305 mm)

Power Requirements

- Nominal 24 VAC provided by irrigation controller
- Maximum irrigation controller voltage: 30 VAC
- Power consumption while operating: 0.5 watts max

Valves per Zone

Each output from the **IRRIGANDER 4 SOAKER** valve switch can drive 1 or 2 valves. Connecting more than 2 valves to any single output may cause improper operation.

Supported Irrigation Valves

Any 24 VAC solenoid activated irrigation valve can be used with the **IRRIGANDER 4 SOAKER** valve switch. DC low voltage valves will not work and should not be used.

Supported Irrigation Controllers

Irrigation controllers that use 24 VAC valves and a common connection on the output can be used with the **IRRIGANDER 4 SOAKER** valve switch.

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Operating Distance

Follow the recommendation of the manufacturer of the irrigation controller for the maximum distance from the irrigation controller to the valves. The valves to be controlled can be up to 100 feet from the **IRRIGANDER 4 SOAKER** valve switch using 18 gauge irrigation wire.

Environmental Specifications

Operating: -20°C to +50°C (-4°F to +122°F)

Non-Operating: -40°C to +70°C (-40°F to +158°F)

The **IRRIGANDER 4 SOAKER** valve switch is designed for harsh environments and is suitable for outdoor conditions including wet environments. For maximum life the switch should not be installed where it is continuously operated under water.

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Limited Warranty

DUWA PRODUCTS LLC, hereinafter referred to as the manufacturer, warrants the **IRRIGANDER 4 SOAKER** valve switch, hereinafter referred to as the product, to be free from defects in workmanship and materials for 1 (one) year from the date of purchase. In order for this warranty to apply the product must be installed and used according to the installation instructions herein and cannot be altered in any way. This warranty covers damage from electrical surge (including lightning) providing that the product is installed with a suitable earth ground as described herein. The use of the product for any purpose for which it was not intended voids this warranty. Purchaser's rights under this warranty shall consist solely of requiring manufacturer to repair, or in manufacturer's sole discretion replace, free of charge, F.O.B. factory, any defective items received at said factory and determined by manufacturer to be defective. To exercise your warranty, return the unit to your dealer with a copy of the sales receipt.

This warranty is in lieu of all other warranties, expressed, implied, or statutory as to merchantability, fitness for purpose sold, description, quality, or any other matter and limits the manufacturer's liability for damages to the cost of the product. In no event shall manufacturer be liable for special or consequential damages or for delay in performance of this warranty. This warranty gives the purchaser specific legal rights, and the purchaser may have other rights, which vary from state to state.

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