Irrigander® 4/8 Expander
8 Zone Irrigation Expander

Installation & User Guide
Model 8ZEXR V2.0

 PN1352-03

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Introduction

Congratulations on your purchase of the **Irrigander 4/8** irrigation expander! The **Irrigander 4/8** expander is an 8 zone expander that controls additional irrigation zones without adding new field wiring. It uses a state of the art microcontroller to control 8 valves using just 3 field wires, the system common, and only 4 outputs on the irrigation controller! This makes it simple to add an additional 4 zones to any irrigation system.

With the **Irrigander 4/8** expander connected to an irrigation controller, the lower bank zones (zones 1 to 4) will operate normally. While the irrigation controller is activating the lower bank zones the timings for each zone is recorded by the **Irrigander 4/8** expander. Once the lower bank zones have completed, the **Irrigander 4/8** expander will run the upper bank zones (zones 5 to 8) for the same time as the corresponding lower bank zone. The activation of the upper bank zones is based on a selectable trigger.

Each of the valves controlled by the **Irrigander 4/8** expander can be individually tested for easy system maintenance. The **Irrigander 4/8** expander puts a minimal load on each irrigation controller output to maximize the reliability of the controller. The **Irrigander 4/8** expander is designed to have all sensitive electronics in the Encoder, safe from water and weather. The Decoder is sealed and is built to rugged industrial standards to provide long life and high reliability in any environment.

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

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Overview

The **Irrigander 4/8** expander is comprised of two modules: an Encoder that is installed close to or inside the irrigation controller; a Decoder that is installed close to the irrigation valves to be controlled. The **Irrigander 4/8** expander can be configured to control 4 zones or 8 zones. In the 4 zone configuration the Encoder attaches to the irrigation controller using 5 wires: zone 1-2 inputs; trigger input; common; and 24 VAC. In the 8 zone configuration the Encoder attaches to the irrigation controller using 7 wires: zone 1-4 inputs; trigger input; common; and 24 VAC. The Encoder is attached to the Decoder using 2 field wires (4 zone configuration) or 3 field wires (8 zone configuration) and the system common wire. These wires are typically the existing field control wires. The decoder has 8 output wires and a common that are attached to up to 8 valves to be controlled. See Figure 1 for a typical installation.

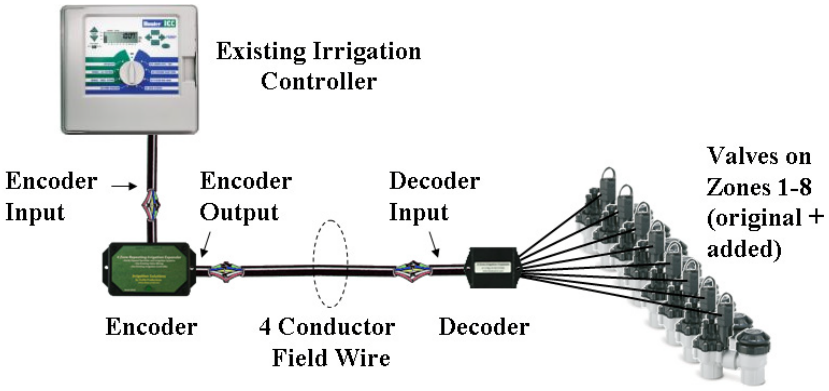

Figure 1 – Typical Installation

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Installation Instructions

The **Irrigander 4/8** expander can be installed to control 4 zones using 2 field wires and the system common or 8 zones using 3 field wires and the system common. In the 4 zone installation 2 inputs from the irrigation controller are used. In the 8 zone configuration 4 inputs from the irrigation controller are used. The instructions below describe the two different installation configurations.

Installing the Encoder

1. Mount the Encoder (the larger of the two modules) close to the irrigation controller. If the irrigation controller is mounted outdoors the Encoder must be mounted in a weatherproof enclosure. Mount the Encoder such that it can be accessed for service in case an overload causes the protection fuse to open.

2. Disconnect the field wires on the irrigation controller outputs that correspond to the valves to be expanded. The wires identified on the Encoder as "Cable A" connect to the irrigation controller. Connect the Zone Inputs on the Encoder to unused outputs on the irrigation controller. The zone inputs are different between the 8 zone configuration and the 4 zone configuration. See Table 1 for the color coding of the Encoder wires connected to the irrigation controller.

Note that the color coding on the Encoder and Decoder cables may vary depending on the particular cable used in the manufacture of the modules. However the color coding on the Encoder and the Decoder will be the same.

Encoder "Cable A" Color Coding

Wire Color	8 Zone Output	4 Zone Output
White	Common	Common
Red	Zone 1 input	Unused
Green	Zone 2 input	Zone 1 input
Black	Zone 3 input	Unused
Brown	Zone 4 input	Zone 2 input
Blue	Trigger input	Trigger input
Yellow	24 VAC	24 VAC

Table 1

3. Connect the Common on the Encoder to any of the common points on the irrigation controller.

4. Attach the Trigger Input on the Encoder to the irrigation controller output that corresponds to the zone that should trigger running the upper bank zones. This typically is the zone that is programmed to run last on the irrigation controller. Attach the Trigger input to the irrigation controller output in addition to the field wire that is already present on that output.

Note: if the output from the irrigation controller connected to the zone 4 input (zone 2 input for the 4 zone configuration) on the **Irrigander 4/8** expander is the desired trigger zone, do not connect the Trigger input. See "*Irrigander 4/8* expander *Setup*" to configure the **Irrigander 4/8** expander to use the zone 4 input as the trigger.

5. Remove power from the irrigation controller. Attach the 24 VAC input (Yellow wire) to the Encoder to one side of the 24 VAC transformer in the irrigation controller. Restore power to the irrigation controller. The LED on the front of the Encoder should light momentarily and then go off. If the LED does not light, remove power from the irrigation controller and connect the 24 VAC input to the

Encoder to the other side of the 24 VAC transformer in the irrigation controller. Restore power to the irrigation controller.

6. The wires identified on the Encoder as "Cable B" connect to the Decoder through the field wires. Attach the Encoder outputs on "Cable B" to the field wires disconnected from the irrigation controller in step 2 using twist-on wire connectors. Record the color of each wire used in Table 2 or 3 depending on the installation configuration.

8 Zone Encoder/Decoder Cable "B" Color Coding

Wire Color	Wire Use	Field Cable Wire Color
Red	Output/Input 1	
Green	Output/Input 2	
Black or Blue	Output/Input 3	

Table 2

4 Zone Encoder/Decoder Cable "B" Color Coding

Wire Color	Wire Use	Field Cable Wire Color
Red	Output/Input 1	Not Used
Green	Output/Input 2	
Black or Blue	Output/Input 3	

Table 3

Installing the Decoder

1. Install the Decoder close to the valves to be controlled. The Decoder is very rugged and can be buried close to the valves or installed in a valve box. While the Decoder will operate under water it is best to install the Decoder where it will not be continuously under water.

2. Disconnect the valve wires from the field cable connections used in step 6 of *"Installing the Encoder"* (Table 2 or 3). Disconnect these valves from the common connection.

3. The wires identified on the front of the Decoder as "Cable B" connect to the Encoder through the field wires. Match the Decoder input wire colors on the Decoder's "Cable B" to the field cable wire colors that were connected to the "Cable B" Encoder outputs in step 6 of *"Installing the Encoder"* (Table 2 or 3). The color coding on the Decoder "Cable B" inputs is the same as the color coding on the Encoder "Cable B" outputs. Connect the Decoder inputs to the field wires connected to the Encoder outputs using waterproof wire connectors (e.g. DryConn® Waterproof Connector). **The wires from the Decoder must be attached to the correct wires in the field cable that are attached to the Encoder for proper operation.**

4. Connect the "Cable B" White wire (depending on the cable used in manufacturing this wire may also be Brown or Yellow) to the system common connection from the irrigation controller (typically a white wire) using a waterproof wire connector.

5. Connect one side of all the valves to be controlled by the Decoder together and to the white "Output Common" wire on the Decoder using a waterproof wire connector. Connect each of the Decoder outputs to the other wire on

each of the valves to be controlled using a waterproof wire connector based on the installation configuration (see Table 4). Unused outputs on the Decoder should be insulated.

Decoder "Cable A" Color Coding

Wire Color	8 Zone Output	4 Zone Output
Red	Zone 1 output	Unused
Green	Zone 2 output	Zone 1 output
Black	Zone 3 output	Unused
Brown	Zone 4 output	Zone 2 output
Blue	Zone 5 output	Unused
Yellow	Zone 6 output	Zone 3 output
Orange	Zone 7 output	unused
Slate or Purple	Zone 8 output	Zone 4 output
White	Output Common	Output Common

Table 4

Note that the "Cable B" White (common) wire is connected to the "Cable A" White (common) wire inside the Decoder.

Installation is now complete! Test all zones by following the instructions in "*Operating the Irrigander 4/8 Expander*" later in this manual.

Irrigander 4/8 Expander Setup

The trigger condition to activate the upper bank zones on the **Irrigander 4/8** expander can be configured to accommodate various installation situations. See the information below to setup the trigger and trigger delay on the **Irrigander 4/8** expander's Encoder.

Trigger Input Setup
The **Irrigander 4/8** expander can trigger the upper bank zones based on one of two conditions: completion of the cycle for the zone to which the Trigger input is connected (the factory default configuration); or completion of the cycle for the irrigation controller zone connected to the zone 4 input on the **Irrigander 4/8** expander (zone 2 input for the 4 zone configuration). The Trigger input monitors the state of the irrigation controller output to which it is connected. Once this zone completes its run, the **Irrigander 4/8** expander will activate the upper bank zones after a 1 second delay. In a typical installation the Trigger input is connected to the last active zone on the irrigation controller.

If the output on the irrigation controller connected to any of the inputs to the **Irrigander 4/8** expander is the last active zone on the irrigation controller, then the **Irrigander 4/8** expander should be wired to have the zone 4 input (zone 2 input for the 4 zone configuration) be the last active zone and the Encoder should be configured to trigger the upper bank zones upon the completion of zone 4's cycle. In this situation do not connect the Trigger input and set SW1 on the **Irrigander 4/8** expander's Encoder to "ON" using the following procedure:

1. Remove power to the irrigation controller
2. Remove the 4 screws on the front cover of the Encoder and remove the cover. Be careful not to bend the LED as you remove the cover.

3. Carefully slide the handle on SW1 (SW1 is on top) to the right ("ON") position (see Figure 2).
4. Replace the cover on the front of the Encoder.
5. Restore power to the irrigation controller

Trigger Delay Setup

The **Irrigander 4/8** expander can delay running the upper bank zones after the trigger condition has been met. Switches SW2 and SW3 are used to set the delay according to the following table:

Trigger Delay Switch Settings

SW2	SW3	Delay Value
OFF	OFF	0 (Default)
ON	OFF	15 minutes
OFF	ON	30 minutes
ON	ON	60 minutes

Table 5

In order to change the delay settings use the following procedure:

1. Remove power to the irrigation controller
2. Remove the 4 screws on the front cover of the Encoder and remove the cover. Be careful not to bend the LED as you remove the cover.
3. Carefully slide the handle on SW2 and/or SW3 (see Table 5) to the right ("ON") position (see Figure 2).
4. Replace the cover on the front of the Encoder.
5. Restore power to the irrigation controller

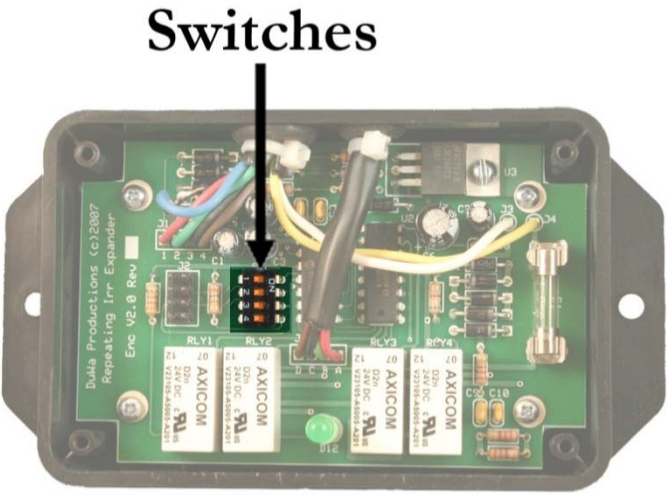

Figure 2 – Switch Location

Operating the Irrigander 4/8 Expander

The information below describes the various modes and features of the **Irrigander 4/8** expander.

Idle
While the **Irrigander 4/8** expander is waiting for input from the irrigation controller the LED on the front of the Encoder will blink briefly once every 10 seconds to indicate that the Encoder is functioning and a timing cycle has not yet started.

Running a Cycle on the Lower Bank Zones
When the irrigation controller activates any of the zone inputs on the **Irrigander 4/8** expander the LED on the Encoder will turn on and the corresponding lower bank zone will run. While the lower bank zone is running the timing for that zone will be recorded. The irrigation controller must run each zone for a minimum of 15 seconds. The **Irrigander 4/8** expander can record maximum timings of 9 hours per zone. Note that there is a 1 second delay between running each zone controlled by the **Irrigander 4/8** expander to minimize surge at the valves.

Waiting for Trigger Input
After one or more lower bank zones have run a cycle the **Irrigander 4/8** expander will be waiting for the trigger condition before running the upper bank zones. During this time the LED on the front of the **Irrigander 4/8** expander's Encoder will blink on and off every 2 seconds. If an input to the **Irrigander 4/8** expander repeats, the last run time for that zone will be the timing recorded by the **Irrigander 4/8** expander. Note that if the trigger condition is not met within 8 hours the **Irrigander 4/8** expander will reset all recorded timings and return to Idle.

Trigger Input Detected
When the Trigger input goes active the LED on the front of the **Irrigander 4/8** expander's Encoder will blink on and off twice per second. At the end of the trigger the Expander will wait for the Trigger Delay. If zone 4 is used as the trigger condition, the Trigger Input Delay will occur immediately after the completion of the run cycle on zone 4.

Trigger Input Delay
After the trigger condition has been met but while the trigger delay is active the LED on the front of the **Irrigander 4/8** expander's Encoder will blink on and off every 4 seconds. At the end of the trigger delay the upper bank zones will run. If the trigger delay is set to 0 (the factory default) then the upper bank zones will run immediately after the trigger condition is met. If any of the zone inputs becomes active during the delay time, the delay is canceled and the corresponding zone will run as long as the irrigation controller output remains active. At the end of the run cycle the **Irrigander 4/8** expander will again wait for the trigger condition to be met.

Running a Cycle on the Upper Bank Zones
Once the trigger condition is met, the **Irrigander 4/8** expander will run each of the upper bank zones in sequence. The run time for each upper bank zone will be the same as the corresponding lower bank zone (zone 5 will be the same as the timing recorded for zone 1, the run time for zone 6 will be the same as the timing recorded for zone 2, etc.). If the irrigation controller skipped any of the lower bank zones before the trigger condition was met then the **Irrigander 4/8** expander will skip the corresponding upper bank zone but the other zones will run based on the recorded run times. While running a cycle on the upper bank zones the LED on the front of the **Irrigander 4/8** expander's Encoder will blink based on the

zone being activated: 1 blink for zone 5; 2 blinks for zone 6; 3 blinks for zone 7; 4 blinks for zone 8.

Testing Lower Bank Zones

Follow these steps to test the valves connected to the lower bank zones of the **Irrigander 4/8** expander's Decoder:

1. Make sure the **Irrigander 4/8** expander is Idle. Manually turn on the output from the irrigation controller that corresponds to the zone to be tested. The valve connected to the Decoder output for that zone will turn on.
2. Once testing is completed, turn off the output being tested from the irrigation controller. The valve connected to the Decoder output for that zone will turn off.
3. After step 2 the LED on the front of the Encoder will be blinking indicating that the **Irrigander 4/8** expander is not idle. To return the **Irrigander 4/8** expander back to idle, manually turn on any irrigation controller output that is connected to an input on the **Irrigander 4/8** expander for less than 15 seconds and then turn that zone off again. The LED on the front of the **Irrigander 4/8** expander's Decoder will turn off indicating it is Idle. Note that the valve connected to the Decoder output for that zone will turn on during this step.

Testing Upper Bank Zones

Follow these steps in order to test the valves connected to the upper bank zones of the **Irrigander 4/8** expander's Decoder:

1. Make sure the **Irrigander 4/8** expander is Idle. Manually turn on any irrigation controller output that is connected to an input on the **Irrigander 4/8** expander.
2. Once the valve for that zone turns on, manually turn that zone off again at the irrigation controller. The zone must run for less than 15 seconds. The LED on the front of the **Irrigander 4/8** expander's Decoder will blink rapidly to indicate the **Irrigander 4/8** expander is in test mode.
3. Manually turn on the output from the irrigation controller that corresponds to the upper bank zone to be tested: zone 1 will turn on the valve connected to zone 5 of the **Irrigander 4/8** expander Decoder, zone 2 will turn on the valve connected to zone 6 of the **Irrigander 4/8** expander Decoder, etc.
4. Once testing is completed, manually turn off the output from the irrigation controller. The **Irrigander 4/8** expander will return to Idle.
5. In order to test a different zone connected to the **Irrigander 4/8** expander Decoder, repeat from step 1.

Terminating a Cycle Early

Any zone timing cycle, delay cycle or test cycle can be terminated by manually turning on any irrigation controller output that is connected to an input on the **Irrigander 4/8** expander for less than 15 seconds. Once the input is turned off, the **Irrigander 4/8** expander will return to idle.

Replacing the Encoder Fuse

The Encoder is equipped with a protection fuse that will open in case of overload in one of the valve circuits. To replace the fuse:

1. Remove power to the irrigation controller
2. Remove the 4 screws on the front cover of the Encoder and remove the cover. Be careful not to bend the LED as you remove the cover.
3. Remove the old fuse and replace with a fuse of identical rating (1 amp, 5mm x 20mm). See Figure 3 below for the fuse location.
4. Replace the cover on the front of the Encoder.
5. Restore power to the irrigation controller

The fuse is a standard size and is commonly available but if you have difficulty locating a source for a replacement fuse, email us at support@irrigander.com.

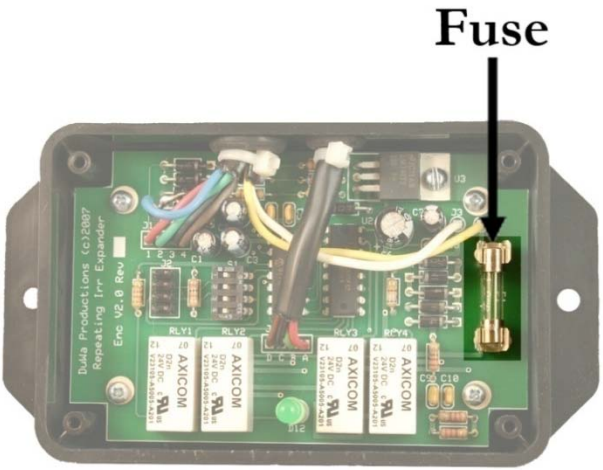

Figure 3 – Fuse Location

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Troubleshooting Guide

Problem	Cause	Solution
The Irrigation Controller will not turn on any valves connected to the Irrigander 4/8 expander, other zones work OK	Improper irrigation controller connections	Double check wiring of "Cable A" to the Encoder
	Short circuit or overload has opened the protection fuse in the Encoder	Diagnose the short circuit or overload and correct. Replace fuse according to directions in "*Replacing Encoder Fuse*".
The Irrigation Controller can control some valves attached to the Irrigander 4/8 expander but not all.	"Cable B" mis-wired at the Encoder or Decoder	Make sure that the field cable wires connected to "Cable B" on the Encoder and Decoder "Cable B" match.
Valve activation does not match zone programming on the irrigation controller	Multiple zones are operating at the same time	Reprogram the irrigation controller to only allow one zone connected to an Irrigander 4/8 expander to operate at a time.
LED on the Encoder blinks rapidly when zone input is activated	Irrigander 4/8 expander is in Test mode	Make sure that all zone timings are for more than 15 seconds
LED on front of Encoder does not blink when Idle	Short circuit or overload has opened the protection fuse in the Encoder.	Diagnose the short circuit or overload and correct. Replace fuse according to directions in "*Replacing Encoder Fuse*"
	Encoder does not have 24 VAC input	Double check wiring of 24 VAC. Move 24 VAC input to other side of 24 VAC transformer in irrigation controller

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Specifications

Expansion Capability
The **Irrigander 4/8** expander can control up to 8 zones. See Table 6 for expansion capability based on the number of field wires available:

Wires to Valves[1]	2	3	4	5	6
# Valves w/out Expander	1	2	3	4	5
# Valves w/Irrigander 4/8	NA	4	8	9[2]	10[3]

Table 6

Notes:

NA - Not Applicable

[1] One wire is the system wide common

[2] 3 field wires connected to **Irrigander 4/8** expander**,** 1 field wire connected directly to 1 valve, all valves connected to shared common

[3] 3 field wires connected to **Irrigander 8** expander**,** 2 field wires connected directly to 2 valves, all valves connected to shared common

Physical Dimensions

	Width	Depth	Height
Encoder	5.1”	2.9”	1.1”
Decoder	4.0”	2.0”	0.9”

Note that the width dimensions include mounting flanges.

Power Requirements

- 24-30 VAC provided by the irrigation controller
- Power consumption: idling 0.3 watts**;** operating: 1.5 watt max

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Maximum Zone Timing
The maximum run time the **Irrigander 4/8** expander will record for each zone is approximately 9 hours.

Supported Irrigation Controllers
Virtually any irrigation controller that uses 24 VAC valves can be used with the **Irrigander 4/8** expander.

Supported Irrigation Valves
Virtually any 24 VAC irrigation valve can be used with the **Irrigander 4/8** expander.

Valves per Zone
Each output from the **Irrigander 4/8** expander Decoder is designed to drive a maximum of one valve.

Simultaneous Active Zones
The **Irrigander 4/8** expander can only have one output active at a time. If more than one input is active, the **Irrigander 4/8** expander will only activate one output zone.

Encoder Environmental
Operating: 0°C to +50°C (+32°F to +122°F)
Non-Operating: -40°C to +70°C (-40°F to +158°F)
The Encoder is not waterproof; enclose the Encoder unit in a suitable weather proof enclosure if installed outdoors.

Decoder Environmental
Operating: -20°C to +50°C (-4°F to +122°F)
Non-Operating: -40°C to +70°C (-40°F to +158°F)
The Decoder is designed for harsh environments and is suitable for most outdoor conditions including wet environments. However the decoder should not be placed where it is operated continuously under water.

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Limited Warranty

DUWA PRODUCTS LLC, hereinafter referred to as the manufacturer, warrants the **Irrigander 4/8 Expander** to be free from defects in workmanship and materials for 1 (one) year from the date of sale. In order for this warranty to apply the **Irrigander 4/8 Expander** 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 **Irrigander 4/8 Expander** is installed with a suitable earth ground as described herein. The use of the **Irrigander 4/8 Expander** 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 within 1 (one) year 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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