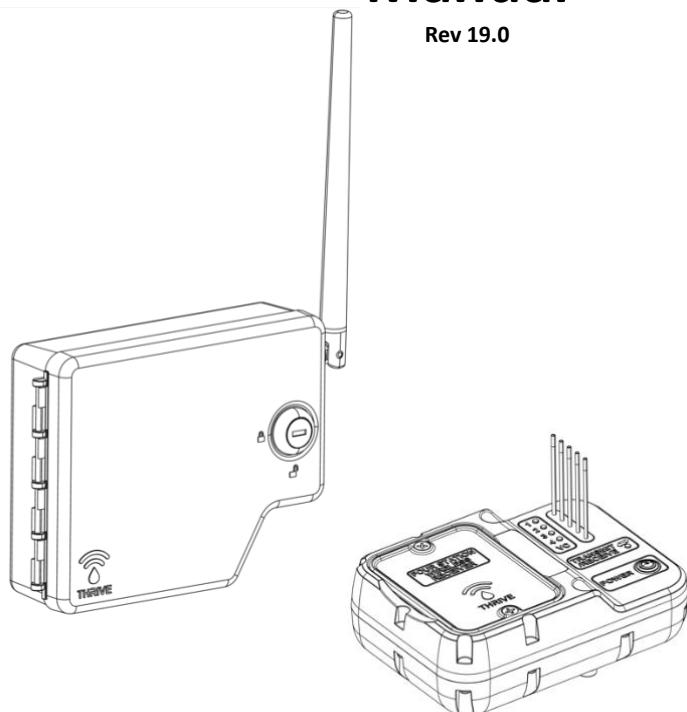




EVO™

Installation & User Manual

Rev 19.0



Thrive Smart Systems Inc.
(980) 202-2504
www.thrivesmartsystems.com

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Introduction

Welcome to the future of wireless irrigation communication: Thrive Smart System's EVO™, today's solution for overcoming broken or lost field wire and easily adding new valves. The EVO™ is comprised of two, fully pre-paired components, the Thrive Transmitter™ and Thrive Receiver™. They provide up to 200 yards range of consistent and reliable two-way wireless communication and are compatible with most multi-wire irrigation controllers.

We believe you'll find this product easy-to-use and easy-to-install, all while providing reliable and consistent operation for years to come.

Key Product Features

The Thrive Smart System EVO™:

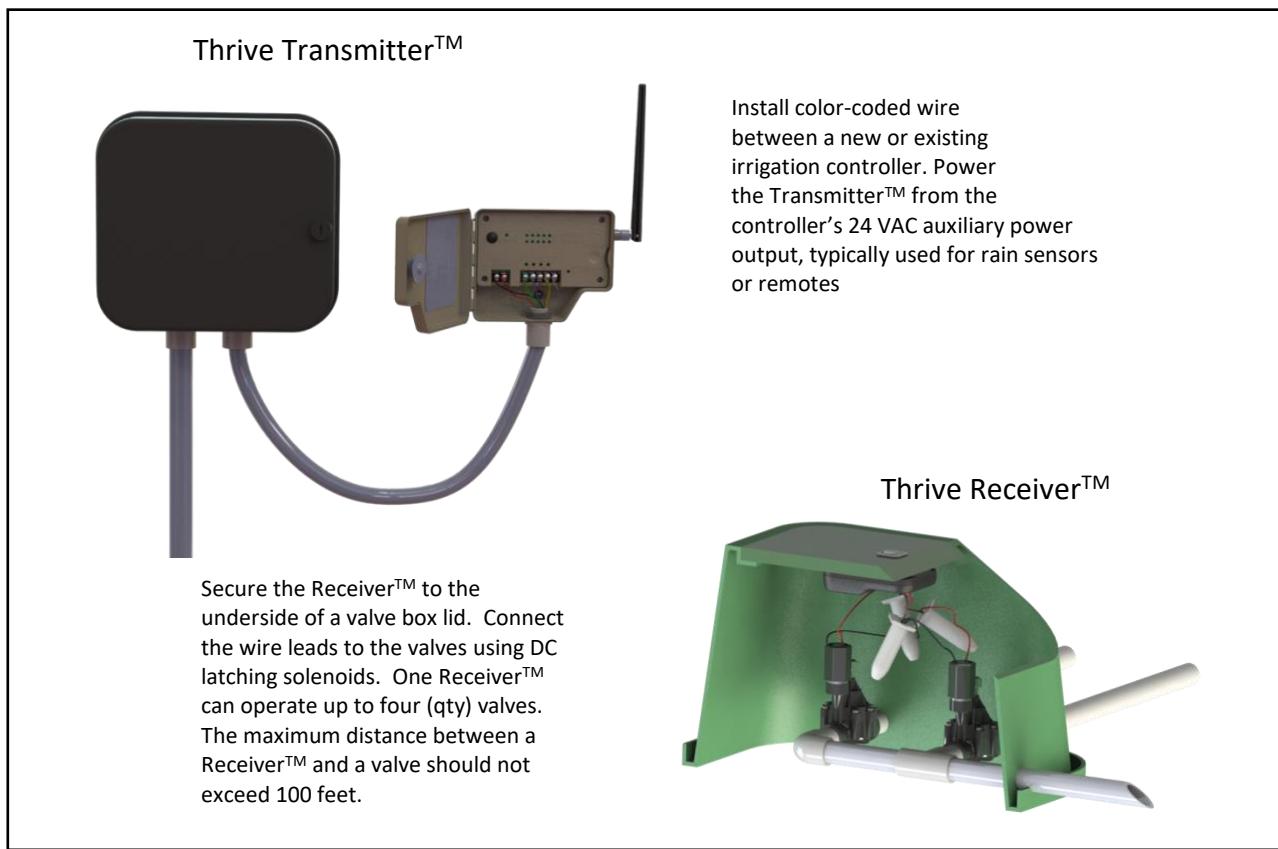
- Is comprised of a Thrive Transmitter™ and a Thrive Receiver™ that are pre-paired to the same radio frequency for ease of installation. The Thrive Transmitter™ receives power via a 24VAC, and is contained in a key-lock entry, weather-resistant enclosure.
- The Thrive Receiver™ has several gaskets to maintain a waterproof case up to a depth of 1.2 meters and is IP67 rated.
- The Receiver™ is powered by two, 9-volt lithium batteries located in a battery cassette making it easy to remove and replace batteries when needed. The Receiver will also operate on 2, 9-volt Alkali batteries, but with a much shorter service life.
- Provides reliable and consistent wireless communication up to 200 yards.
- Includes unique paired frequencies that eliminate interference when other Thrive EVO's™ are used on the same or adjacent sites.
- Manages up to four individual remote-control valves per Transmitter. If additional valves are needed, then another EVO™ is required.
- Manages up to four valves with DC Latching solenoids at one time if the control system has this capability.
- Displays real-time remaining battery life and signal strength on the Thrive Transmitter™.
- Has a built-in fail-safe to turn off any operating valves in the event that AC power is lost.
- This is an FCC compliant product that does not require licensure.
- Has patent pending.

How Does it Work?

The “EVO™” was developed to save time and money and making your efforts more efficient. This product is compatible with most multi-wire controllers including those with internet capability. To ensure the EVO™ is compatible with your controller please visit our website www.thrivesmartsystems.com in the “Products” tab under EVO™.

This product allows you to use the existing irrigation controller and its programming capabilities without having to add new or special programs. Attach wire from your irrigation controller’s existing or open station to the Thrive Transmitter™. When the controller signals a valve, the Transmitter™ sends this signal wirelessly to a Thrive Receiver™ up to 200 yards away. The Receiver™ has 18 inch-long, colored, wire leads for four valves with DC latching solenoids. The Receiver™ has a built-in safety feature that turns off any operating valves when power loss occurs to the Transmitter™, preventing property damage from over-watering.

Figure 2-1 shows how the Thrive Transmitter™ is mounted adjacent to any irrigation controller. The Thrive Receiver™ is secured to the underside of a valve box lid.



Verify Contents of Packaging

The Thrive EVO™ shipping carton includes the following items indicated in Figure 3-1 and the table below.



Contents of Shipping Carton
Figure 3-1

No.	Qty	Description
1	1	Thrive Transmitter™
2	1	Thrive Receiver™
3	2	Door lock keys for the transmitter (CH751)
4	2	#10x3/4" mounting fasteners for the Transmitter (a pair of plastic inserts are also included for drywall or masonry applications)
5	2	8-32x4" fasteners to secure the Receiver w/ washers
6	5	DBO/B Direct Burial Wire Splicing Kits
7	2	9-volt Lithium batteries
8	1	Quick Reference Guide (found on the inner door of the Transmitter)
9	1	Installation Guide and User Manual

Contact Thrive Smart Systems if any of the above listed parts are missing. (980) 202-2504
www.thrivesmartsystems.com

Recommended Tools

The table below identifies recommended tools needed to complete a successful installation:

Recommended Tools		
No.	Qty	Description
1	1	Corded or cordless drill motor w/ hammer-drill capability if securing the Wireless Transmitter to a masonry wall
2	1	1/8" wood drill bit or larger masonry bit depending on the installation
3	1	5/16" diameter drill bit for the Valve box thru-hole
4	1	7/64" diameter drill bit for the #8 fasteners
5	1	Level
6	1	#3 Philips-head screwdriver or driver tip
7	1	Marking pencil or permanent-ink type marker
8	1	Round-point shovel
9	1	Trenching shovel
10	1	Digging bar or electrically powered rotary hammer drill w/ different digging tips
11	1	A pair of diagonal wire cutters
12	1	A pair of wire strippers
13	1	A pair of PVC pipe cutters sized appropriately for the mainline pipe size to be cut.

Some additional components you may need to install the product are noted in the table below:

No.	Qty	Description
1	Varies	A length of 7-conductor, color-coded, (minimum size 18 AWG), stranded copper conductor irrigation field wire. This is to power and provide communication between the irrigation controller and Transmitter.
2	1	1/2" flexible PVC conduit to encase the field wire between the irrigation controller and Transmitter.
3	2	2 (qty) 1/2" PVC male adapters and locking nuts or wire restraints with locking nuts to secure the wire between the irrigation controller and the Transmitter
4	Varies	A quantity of DBRY waterproof connectors depending on the number of valves managed by the Receiver.
5	Varies	Compatible DC latching solenoids of the remote-control valves in place or new valves to be installed. The quantity purchased is to match the new of valves to be managed by the Receiver.

Getting Started

The Thrive EVO™ has been developed and tested to provide consistent two-way communication up to 200 yards between a Thrive Transmitter™ and Thrive Receiver™.

Site conditions can vary greatly and may impact consistent two-way communication, so if in doubt, here is an easy way to determine if adequate communication can be obtained.

- 1) Connect a pair of wires from the existing irrigation controller's 24 VAC auxiliary output to the transmitter's 24 VAC Input. Press the "Power" button. The Power LED will illuminate to indicate it's been powered up correctly.
- 2) Install a pair of 9-volt batteries into the Receiver. Secure the battery "cassette" with the 2 fasteners to ensure the battery compartment is watertight. Press the "Power" button. The station output LED's will flash once to confirm the receiver has been powered up correctly.
- 3) The "Transmit / Receive" LED on the transmitter should start to flash green about every 3-4 seconds.
- 4) Place the receiver on top of the valve box where it is intended to be installed. Verify the "Transmit / Receive" LED on both devices are flashing green. If "yes", proceed with the final installation as this confirms two-way communication.
- 5) If the "Transmit / Receive" LED flashes red on either device, move one or both devices closer to one another so consistent two-way communication is obtained.

Summary of Installation

Installation of the Thrive EVO™ components reflects separate tasks noted in the following summary:

Thrive Transmitter™ – The enclosure is to be mounted adjacent to the existing irrigation controller. It should be installed where the outer door can be opened to access the terminal blocks.



The Transmitter can be installed up to 100 feet away from the irrigation controller if needed.

The Transmitter will need the following connections from a 7-conductor, color-coded, irrigation wire:

- Station Connections - Select the irrigation stations from your controller that you would like to make wireless. The Transmitter™ manages up to four (qty) new or existing stations assuming the existing irrigation controller has the capacity.
- Valve Common Connections - Connect one (qty) green or white colored wire to the "Valve Common" on both the irrigation controller and the Transmitter™.
- AC Power Connections – Two (qty) of the wires should be connected to the irrigation controller's 24 VAC auxiliary output. of the wires should be connected to the irrigation controller's 24-volt auxiliary output.

If the irrigation controller does not have this feature or is already wired to a rain switch and remote, then order and install an external step-down transformer p/n 1910101. Since this will require a separate set of wires, punch out the knock-out in the Transmitter™ case aligned with the 24-volt input terminal.

Thrive Receiver™ – Is to be secured to the underside of a valve box lid using the provided fasteners, washers, and nuts. The “stepped” design of the Receiver™ is intended to work around valve flow control stems that maybe protruding up into the open cavity of the valve box. Determine the best orientation of the Receiver before drilling holes in the valve box lid.

Do not place the Receiver in the valve box on its side as this will reduce two-way communication significantly.

The installer will need to:

- Install a pair of 9-volt batteries provided with the product. The battery “cassette” only fits one-way into the Receiver™ case for ease of installation.
- Remove and replace the AC solenoid and replace with a DC latching solenoid, for all valves that will be operated by the Receiver™. This may require the irrigation mainline to be shut-off temporarily to accomplish this task.
- Connect field wire between the DC latching solenoids and the Receiver™ including the valve common, (the black wire lead).

Once both products are installed, both can be powered by pressing the “Power” button on both products. No other programming of either device is needed.

Don’t forget to add existing or new stations into the appropriate irrigation programs as needed.



This is also a good time to document where the Receiver™ is located for future reference.



The Receiver™ can be located up to 100 feet away from a group or single remote-control valve to improve two-way communication if needed.

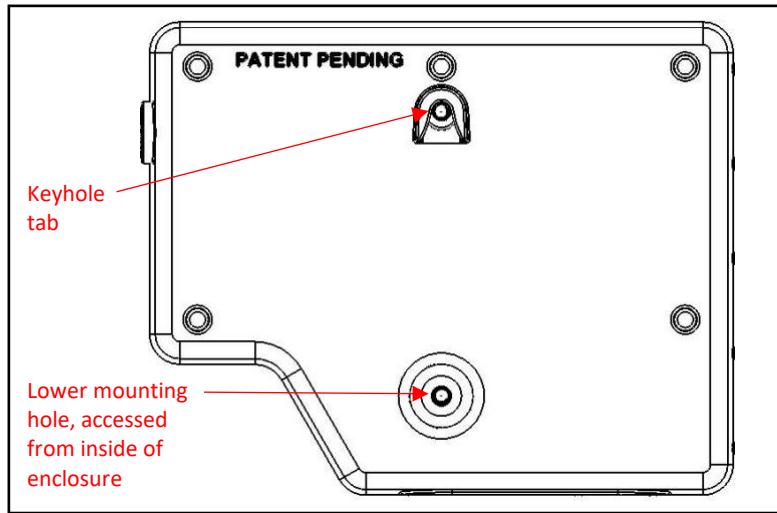
Installation

The following are step-by-step installation instructions for both the Thrive Transmitter™ and Thrive Receiver™.

Thrive Transmitter™

Step 1 – Installing the transmitter. Secure the Transmitter™ to a vertical surface in close proximity adjacent to a new or existing irrigation controller. It should be installed to allow the outer door to fully open providing access to the interior of this device.

Locate the keyhole tab centered on back of the Transmitter™ see Figure 7-1. Drill and thread a supplied fastener into the vertical surface leaving the screw-head out about 3/16”. Secure the Transmitter™ and then install the second mounting screw to complete the installation.



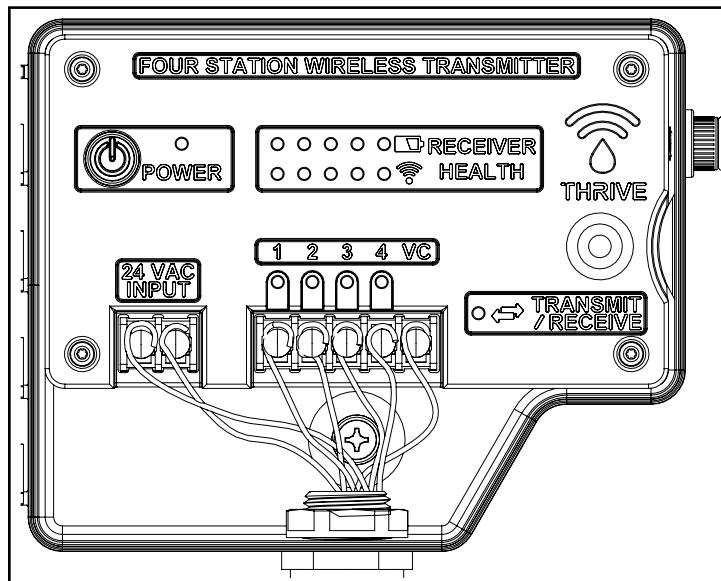
Transmitter™ Mounting Holes

Figure 7-1

Step 2 – Field Wire Connections. The Transmitter™ requires wiring between this device and the existing irrigation controller with one of two options:

Option #1 – Use Irrigation Controller’s 24-volt Auxiliary Power Output

- The Transmitter™ has an open conduit inlet for a 1/2" male adapter with locknut or wire restraint. This can be secured to a rigid or flexible PVC conduit to provide weather and vandal protection.
- Install a length of 7-conductor, 16 or 18 AWG, multi-color wire between the two devices. See Figure 7-2. Reserve the white or green conductor for the valve common.



Transmitter™ Wiring Diagram Using 7-Conductor Wire

Figure 7-2

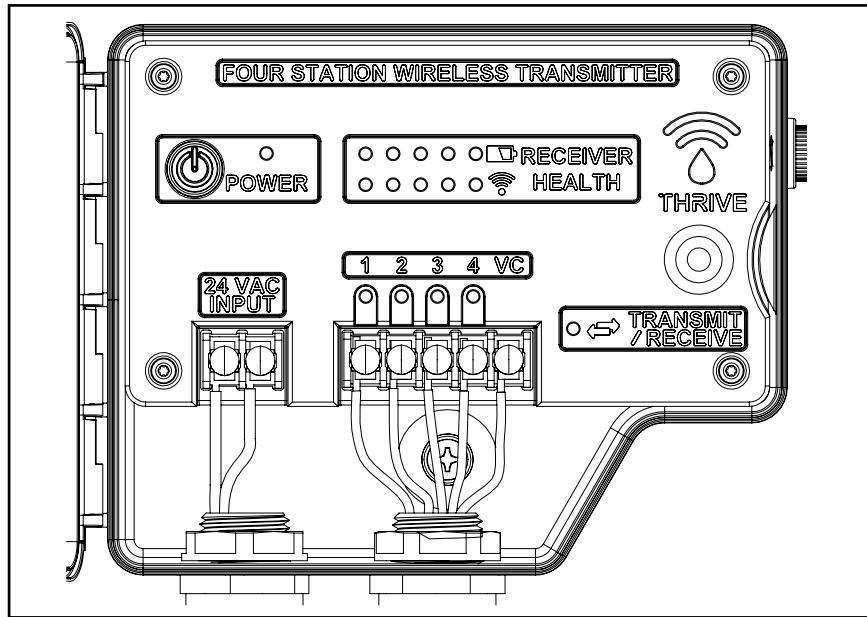
Option 2 – Install an External Transformer Exclusively for the Transmitter™

- If the irrigation controller does not have a 24-volt auxiliary output or its already used for other accessories, consider installing a separate step-down transformer as shown in Figure 8-1. This will require the plastic knockout directly aligned with the 24 Volt Input on the Transformer to be removed. See Figure 8-2. Install the wire inside of a conduit with rigid or flexible PCV and a male adapter or wire restraint.



External Step-down Transformer P/N 1910101

Figure 8-1

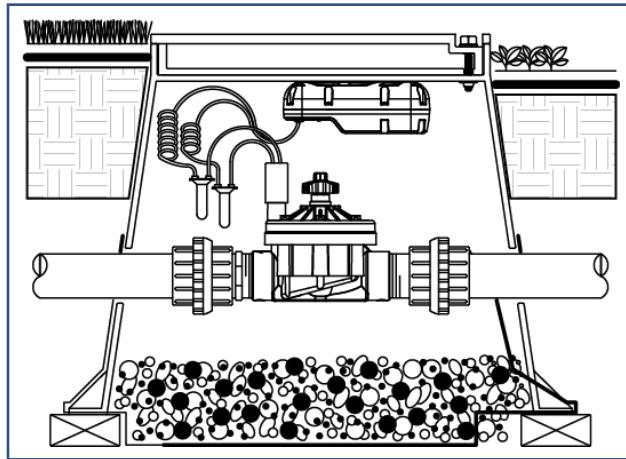


Separate Wire Path for External Transformer

Figure 8-2

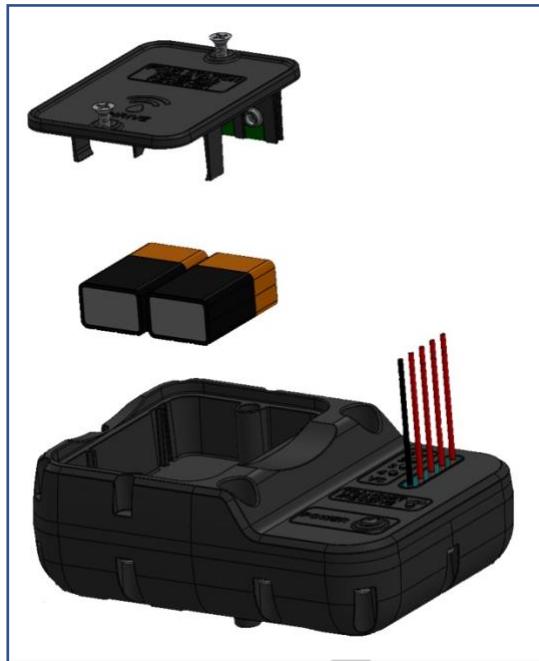
Thrive Receiver™

The Receiver™ is intended to be secured to the underside of a valve box lid, see Figure 9-1. It is recommended the supplied batteries and field wire connections are made prior to final mounting of the Receiver™.



Receiver™ Secured to Underside of a Valve Box Lid
Figure 9-1

Step 1 – Install the Pair of 9-volt Batteries – Using a Philips head screwdriver **partially** loosen the two screws of the Receiver's battery compartment and remove the battery cassette. Install the 2 (qty) 9-volt batteries and then re-install the cassette into the Receiver™ body, see Figure 9-2.



Install the 9-volt Receiver™ Batteries
Figure 9-2



Note: To avoid personal injury, de-pressurize the irrigation mainline prior to the next step.

Step 2 – Install DC Latching Solenoids – Once the mainline has been de-pressurized, when applicable, remove the existing AC solenoid(s) from the remote-control valves to be wired to the Receiver™ and replace them with the corresponding valve manufacturer’s DC latching solenoid. Figure 10-1.



Replace AC Solenoids w/ DC Latching Solenoids
Figure 10-1

Step 3 – Make Wire Connections to Valve(s) - Make all field wire connections with DBO/B waterproof connectors, see Figure 11-1.



Note: Provide a sufficient length of field wire between the receiver and the remote-control valve so the valve box lid can be flipped upside down for periodic battery replacement.



Note: Field wire connections should correspond to the same station input in the Transmitter™ as the receiver. For example, if station 14 on the controller is wired to input 1 of the Transmitter™ then field wire on the Receiver™ should also be connected to station 1.

Five (qty) DBO/B direct burial wires are included with this product. These should be used to make all field wire connections to the Receiver™.



Using “grease-caps” or other unapproved wire connectors may impact consistent performance of this product.



Field Wire Connections to Receiver™

Figure 11-1

Connect the black wire or “valve common” wire to the black wires of each DC latching solenoid. Connect one field wire to each red solenoid wire which represents the “pilot” or “power” wire.

! **Any unused valves should be capped off with a single DB0/B connector to avoid corrosion of the copper core.**

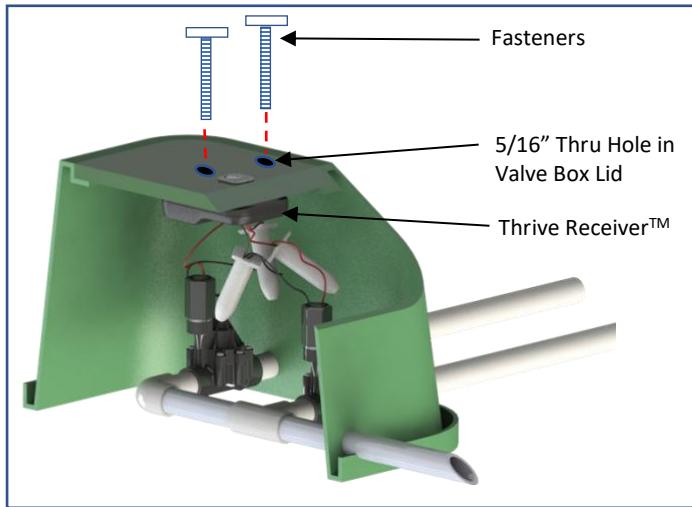
Step 4 – Press the Power Button to the receiver “On”. Once all field wire connections are made, press the “Power” button to initialize the Receiver™.

Step 5 – Secure the Receiver™ to the Underside of a Valve Box Lid. Two fasteners, washers and nuts are provided to secure the Receiver™ to the underside of the valve box lid. Take a moment to confirm there is no interference with valve flow control stems, adjust the final location as needed.

Flip the valve box lid so that the top is facing downwards. Drill a 5/16” diameter hole between the “egg-crate” ribs making sure the Receiver™ clears the edges of the lid. Secure the Receiver™ with the supplied mounting hardware, see Figure 12.1.



Note: Avoid placing the Receiver™ on its side in a valve box. It can reduce two-way communication and product performance.



Thrive Receiver™ Secured to the Underside of a Valve Box Lid

Figure 12-1

Warning Labels

Both products have warning labels notifying the end-user not to open the clamshell case of the Receiver™ or remove the inner cover on the Transmitter™.



Note: Opening the cases will void the warranty.

Operating the EVO™ System

Once the “Power” button on the Thrive Transmitter™ is pressed, the installation is complete and valve operation can be tested. Current to the Transmitter is easily confirmed if “Power” LED is illuminated.

Manually operate one of the controller’s stations that is now connected to the Transmitter™. The corresponding station input LED on the Transmitter™ should flash green as well as the Transmit / Receive LED should continue to flash green. When the corresponding valve is turned “On” the station input LED will turn solid Green.

Thrive Transmitter™ States

The Transmitter™ can provide several different field conditions noted as:

- Power “On”
- Low Battery
- Poor Signal Strength
- Transmit / Receive
- Fail Safe Mode

Each of these conditions with expected colored LEDs are shown on the following page.



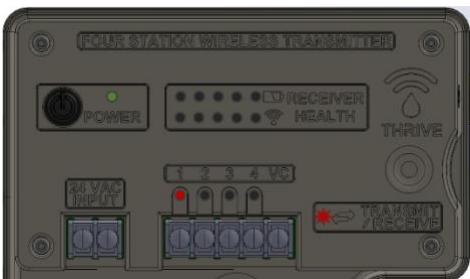
- Power is on
- Battery life is full
- Signal Strength is excellent
- Transmitter™ is communicating with the Receiver
- Station 1 is running



- Power is on
- Battery life is low
- Signal Strength is good
- Transmitter™ is communicating with the Receiver
- Station 1 is turning off/on



- Power is on
- Battery life is good
- Signal Strength is poor
- Transmitter™ is communicating with the Receiver
- Station 1 is not functioning properly – NEEDS ATTENTION
-



- Power is on
- Transmitter™ is NOT communicating with the Receiver
- Station 1 could be running – NEEDS ATTENTION
-

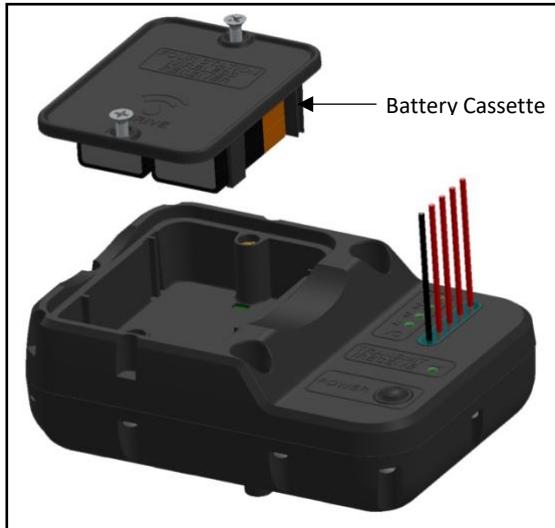


- Power is on
- Transmitter™ is NOT communicating with the Receiver
- Station 1 is trying to shut off – NEEDS ATTENTION

Replacing Thrive Receiver™ Batteries

The batteries in the Receiver™ are designed to operate at least one irrigation season before battery replacement is expected. Battery life may last longer depending on frequency of use and environmental conditions.

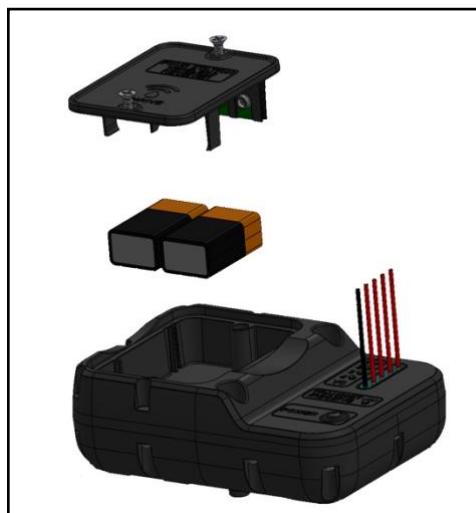
A pair of 9-volt lithium batteries are in a “holder or cassette” to make removal and replacement efficient as shown in Figure 14-1. Here are some recommended steps:



Battery Cassette
Figure 14-1

Step 1 – Open the valve box and turn the lid upside down exposing the underside of the receiver case.

Step 2 – Using a Philips head screwdriver, slightly loosen the two fasteners to the battery cover. These don't need to be completely removed from the cover, see Figure 14-2.



Replace 9-volt Batteries
Figure 14-2

Step 3 – Using one or more fingers lift the battery cassette up and out of the Receiver™ case.

Step 4 – Replace **both** 9-volt lithium batteries. These can be ordered from your Thrive distributor or from Amazon.com. In a pinch, 9-volt Alkali batteries can be used – expect a shorter service life with these types of batteries.



Note: When replacing batteries, it's important that both batteries be replaced at the same time. This is particularly important when using lithium batteries.

Step 5 – Re-insert the battery cassette back into the Receiver™ case. ***The battery cassette only fits in one direction.***

Step 6 – Tighten the two fasteners to secure to the Receiver™ case.



Note: It's important the seal into the battery compartment is watertight. If one of the fasteners is lost, replace with an 8/32x ¼" stainless steel flat head fastener.

Troubleshooting

The following represents observed site conditions, possible root causes and remedies that can be used to troubleshoot the Thrive EVO.

Notes:

1. Prior to starting any troubleshooting, it is recommended “Power cycling” the Receiver first. This places the power saving mode into “Start-up mode” for a period of 35 minutes.
2. When manually operating any station through the EVO, it is suggested setting a minimum runtime duration of 3 minutes.
3. Confirm the station number on the Transmitter corresponds to the station number of the Receiver – this will save time in the long run.
4. Replacing the AC solenoid with the manufacturer’s compatible DC Latching solenoid is expected to be a one-to-one operation. However, you may encounter some older Rain Bird valves where the new DC latching solenoid threads don’t fully seat that could lead to weeping around the threads. It may require full replacement of the remote-control valve.

Observed Site Condition	Possible Root Causes	Suggested Remedies
The Transmitter™ won’t turn on one or more valves	<ul style="list-style-type: none">▪ Low battery,▪ Inadequate signal strength▪ Stations inputs and outputs mis-wired▪ Solenoid hasn’t been changed to a DC latching solenoid	<ul style="list-style-type: none">▪ Install new batteries in the receiver▪ Verify adequate signal strength▪ Confirm that field wire terminated in the transmitter’s input corresponds to the same wire output of the receiver.

		<p>For example, if station 14 on the controller is wired to station 1 input on the transmitter, then it should also be station 1 output on the receiver.</p> <ul style="list-style-type: none"> Verify the corresponding valve solenoid is a DC latching type (verify it has red and black wire leads).
The Transmitter™ AC power LED is not illuminated	<ul style="list-style-type: none"> The Power button is in the “Off” position. The adjacent irrigation controller is also not powered. The Transmitter™ is damaged. 	<ul style="list-style-type: none"> Toggle the Power button to the “On” position Confirm the adjacent irrigation controller is powered using a multi-meter. Reset the circuit breaker to this location. If the irrigation controller is “On” and 24 AC power can be measured across the Transmitter’s 24 VAC terminals, then contact Thrive.
The Transmit/Receive LED is not flashing when a valve is operated through the transmitter	<ul style="list-style-type: none"> Insufficient remaining battery life in the receiver Inadequate signal strength between the Transmitter™ and Receiver™ 	<ul style="list-style-type: none"> Replace the 2 (qty) 9-volt batteries if needed. If inadequate signal strength, consider moving the Transmitter™ closer to the receiver.

Product Warranty

The Thrive Smart System warrants to its trade customers that its products will be free from original defects in material and workmanship, (commencing on the date of sale to the trade customer), for a period of (1), one-year.

If you have questions during installation or post-installation, please feel free to contact us either via phone (980) 202-2504, Monday-Friday MST from 8:00am to 5:00pm or through our website, www.thrivesmartsystems.com.

This warranty applies only to Thrive Smart Systems Inc. products, which are installed as specified and used as intended for commercial irrigation purposes. The warranty applies only to offered products, which have not been altered, converted, damaged, misused, or misapplied. This warranty does not cover products adversely affected by the system into which the products are incorporated, including improperly designed, installed, operated, or maintained systems or systems using water containing corrosive chemicals, electrolytes, sand, dirt, silt, rust, and scale. This warranty does not cover

component failure caused by lightning strikes, electrical power surges, or damage caused by freezing environments. Thrive Smart Systems Inc., liability is limited to the repair and/or replacement at Thrive Smart System's sole discretion, of products that are returned prepaid through the trade customer to the factory and found by Thrive Smart Systems to be defective, but in no event shall Thrive Smart System's liability exceed Thrive Smart System's selling price of the product. Thrive Smart Systems make no other warranties, expressed or implied. No representative, agent, or distributor or other persons have the authority to waive, alter, or add to the printed provisions of this warranty, or make representation of warranty not contained herein.

Product Limitations

This product incorporates wireless technology as its communication path between devices. Thrive Smart Systems recognizes that its product may not provide sufficient communication to satisfy all applications. Limitations of signal strength can be:

- Site conditions and the location of an existing irrigation controller located in a basement or parking garage where signal strength is attenuated.
- Applications with severe topographic or elevation changes.
- Heavily reinforced structures or objects that can deflect or attenuate signal strength.

FCC Compliance Notice

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient the receiving antenna
- Increase the separation between the Transmitter and Receiver
- Plug the controller into a different outlet so that controller and Transmitter are on different branch circuits
- Consult the dealer or an experienced radio/TV technician for help

Changes or modifications to this product not authorized by Thrive Smart Systems could void and negate your authority to operate the product.

Exposure to radio frequency energy: The radiated output power of this device meets the limits of FCC/IC radio frequency exposure limits. This device should be operated with a minimum separation distance of 20 cm (8 inches) between the equipment and a person's body.

Electrical Specifications

Thrive Transmitter™

Maximum AC input voltage	30 VAC
Minimum AC input voltage	19 VAC
Maximum stations (zones) active together	4
Temperature Range	-10° F - 140° F (-23.3° C - 60° C)
Wireless Transmitter Terminal Blocks	
Input voltage to register a station (zone) active	12V-30V
Current Demand	150 mA or 0.15amps RMS @ 24 VAC

Thrive Receiver™

Maximum AC input voltage	9 volts DC
Minimum AC input voltage	5.5 volts DC
Temperature Range	-10° F - 140° F (-23.3° C - 60° C)

Mechanical Specifications

Thrive Transmitter™

Mechanical Dimensions	6.6" long x 5" wide x 2" thick (165mm l x 127mm w x 51mm t)
Weight	1.5 lbs. (3.3kg)

Thrive Receiver™

Mechanical Dimensions	6" long x 4" wide x 2" thick (162mm l x 102mm w x 51mm t)
Weight	1.5 lbs. (3.3kg)

Enclosure Specifications

Transmitter™:	NEMA 3R rated w/ 751CH Key Lock Entry
Receiver™:	IP67 Enclosure

Antenna Specifications

Transmitter™:	External Antenna, peak gain 1.21 dBi (when straight) Peak gain 2.1 dBi (bent position)
Receiver™:	Internal antenna peak gain 1.5 dBi

Radio Information

Frequencies / Bandwidth

The following 5 channels have separate frequencies which are configured upon manufacturing and cannot be changed by the customer.

- 903.5 MHz
- 906.5 MHz
- 910.5 MHz
- 914.3 MHz
- 925.3 MHz

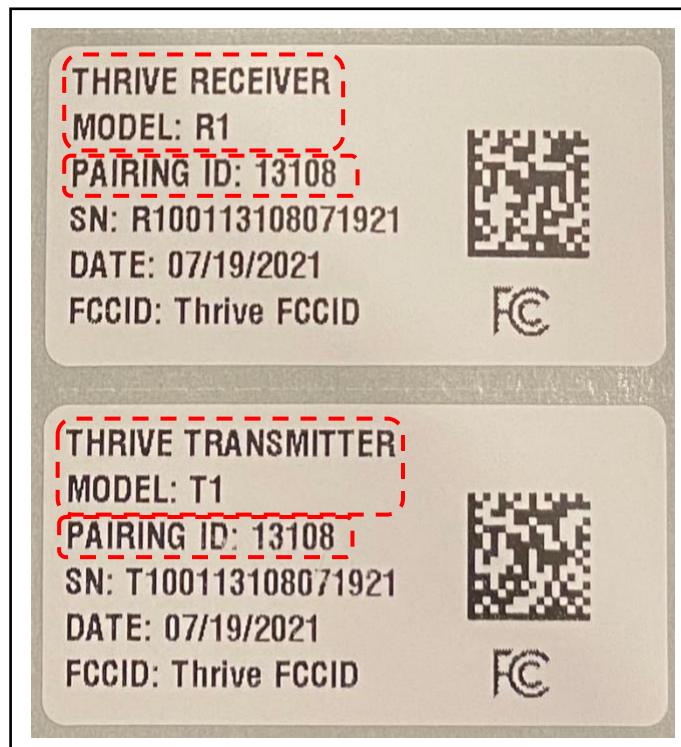
w/ a fixed bandwidth of 500 MHz

Replacement Parts

Parts breakout diagrams for both devices along with List Pricing can be found on the Thrive Smart System website: www.thrivesmartsystems.com. Contact Thrive Smart Systems (980) 202-2504 or your local distributor as needed.

If a replacement whole finished good is needed whether under or out-of-warranty, locate the product label as shown in Figure 19-1 below. Provide Thrive Smart Systems with the following information:

- 1) Model: R1=Thrive Receiver™
T1=Thrive Transmitter™
- 2) Paring ID: This is the radio frequency shared by both devices.



Product Label

Figure 19-1

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2	
200 yards	<i>See range, See range</i>
9	
9-volt batteries	<i>See Receiver</i>
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